DOE/NASA/0153-4
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84AEPD004

Mod-5A Wind Turbine Generator Program Design Report

Volume IV—Drawings and Specifications Book 4

General Electric Company
(Advanced Energy Programs Department)

August 1984

Prepared for
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
Lewis Research Center
Under Contract DEN 3-153

for
U.S. DEPARTMENT OF ENERGY
Conservation and Renewable Energy
Division of Wind Energy Technology

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Volume I, Executive Summary

Volume I contains an overview of the MOD-5A Program. These topics are covered:

Objectives of the MOD-5A Program
Description of the Final Design (Model 304.2)
Cost of Energy
Power Output
Trade-Off Studies
Development Tests
Analyses of Loads and Dynamics
Manufacturing and Quality Assurance and Safety Plans

Volume II, Conceptual and Preliminary Design

These sections comprise Volume II, which is divided into two books, as follows:

Book 1
1.0 Summary
2.0 Introduction
3.0 Design Requirements
4.0 Conceptual Design Studies
5.0 Design, Development, and Optimization
6.0 System Dynamics Analysis
7.0 System Loads Analysis

Book 2
8.0 Development Tests
9.0 Design Criteria
Appendix A System Specification
Appendix B Design Load Tables

Volume III, Final Design and System Description

These sections comprise Volume III, which is divided into two books, as follows:

Book 1
1.0 Summary
2.0 Introduction
3.0 System Description - Model 304.2
4.0 Rotor Subsystem
5.0 Drivetrain Subsystem
6.0 Nacelle Subsystem
7.0 Tower and Foundation Subsystems

Book 2

8.0 Power Generation Subsystem
9.0 Control and Instrumentation Subsystems
10.0 Manufacturing
11.0 Site and Erection
12.0 Quality Assurance and Safety
13.0 FMEA, RAM and Maintenance

Appendix A C.F. Braun & Company - Foundation Design Criteria
Appendix B GE - Product Assurance Program Plan for the MOD-5A WTG Program
Appendix C GE - System Safety Plan for the MOD-5A Program
Appendix D GE - MOD-5A Configuration Management Plan
Appendix E GE - MOD-5A Defect Reports for Development Hardware
Appendix F GE - MOD-5A Program Quality Assurance Requirements for the Control of Raw Materials and the Blade Fabrication Process
Appendix G GE - Statement of Work for the Erection of the MOD-5A WTG Yaw, Nacelle and Blade Subsystems

Volume IV, Drawings and Specifications

This volume contains the numbered drawings and specifications for the final design of the MOD-5A wind turbine. The volume is divided into five books, as follows:

Book 1 47A380002 through 47A380030
Book 2 47A380031 through 47A380068
Book 3 47A380074 through 47A380126
Book 4 47A380128 through 47A387125
Book 5 47D381002 through 47D387130

Volume IV of the MOD-5A Wind Turbine Generator Program Design Report contains the drawings and specifications for the baseline configuration in ascending drawing number order. Due to binding limitations, this volume is presented in multiple books.

Each book contains a full breakdown parts listing, as well as "where-used" list. The first and last drawing number in each part is noted below to indicate in which part of Volume IV to locate a particular drawing.

Volume IV	First Drawing
Part 1	47A380002 through 47A380030
Part 2	47A380031 through 47A380068
Part 3	47A380074 through 47A380126
Part 4	47A380128 through 47A387125
Part 5	47D381002 through 47D387130

NOTES: Part numbers preceded by "**" or not starting with "47-" are either standard hardware, vendor numbers, or unissued drawings. These numbers appear on the parts lists, but are not included in the volume.

DRAWINGS AND SPECIFICATIONS

WTG - MOD 5A

DRAWING LIST

(NUMERICAL SEQUENCE)

IDENTIFICATION NO.	NOMENCLATURE	ECN DWG INC	ECN DWG OUT	ECN PL-LATE APPLY	P C	T Y	CYCLE TIME	FSCM	U/M	NEXT HIGHER ASSEMBLY	QTY	EXT/TOT-QTY	CROSS REF
47A380024	INSTL CABLING REQT				X		0000		EA	47E382304G1		X	001867
47A380030	SPEC,SYST DISP PNL				X		0000		EA	47E387112G1		X	001849
47A380046	CONT ELEK CAB SPEC				X		0000		EA	47E387062G1		X	000564
47A380052	ELECTRICAL FAB. STD				X	5	0000		EA	47D387083G1		X	000663
47A380052	ELECTRICAL FAB. STD				X	5	0000		EA	47D387089G1		X	001561
47A380052	ELECTRICAL FAB. STD				X	5	0000		EA	47D387113G1		X	001774
47A380052	ELECTRICAL FAB. STD				X	5	0000		EA	47D387121G1		X	000877
47A380052	ELECTRICAL FAB. STD				X	5	0000		EA	47D387130G1		X	000914
47A380052	ELECTRICAL FAB. STD				X	5	0000		EA	47E387027G1		X	001370
47A380052	ELECTRICAL FAB. STD				X	5	0000		EA	47E387037G1		X	000701
47A380052	ELECTRICAL FAB. STD				X	5	0000		EA	47E387062G1		X	000561
47A380052	ELECTRICAL FAB. STD				X	5	0000		EA	47E387072G1		X	000777
47A380052	ELECTRICAL FAB. STD				X	5	0000		EA	47E387084G1		X	001811
47A380052	ELECTRICAL FAB. STD				X	5	0000		EA	47E387085G1		X	001636
47A380052	ELECTRICAL FAB. STD				X	5	0000		EA	47E387091G1		X	001513
47A380052	ELECTRICAL FAB. STD				X	5	0000		EA	47E387095G1		X	000638
												00.000	
47A380067	CONT SYST U.P.S.SPEC				M		0000		EA	47E387081G1	01.000	01.000	001318
47A380068	30-KVA XFMR SPEC				M		0000		EA	47E387081G1	01.000	01.000	001316
47A380069P31	NAMEPLATE,IDENT (J1)				*		0000		EA	47E387027G1	01.000	01.000	001345
47A380069P31	NAMEPLATE,IDENT (J1)				*		0000		EA	47E387084G1	01.000	01.000	001822
47A380069P31	NAMEPLATE,IDENT (J1)				*		0000		EA	47E387085G1	01.000	01.000	001646
47A380069P31	NAMEPLATE,IDENT (J1)				*		0000		EA	47E387091G1	01.000	01.000	001524
												04.000	
47A380069P32	NAMEPLATE,IDENT (J2)				*		0000		EA	47E387084G1	01.000	01.000	001823
47A380069P32	NAMEPLATE,IDENT (J2)				*		0000		EA	47E387085G1	01.000	01.000	001647
47A380069P32	NAMEPLATE,IDENT (J2)				*		0000		EA	47E387091G1	01.000	01.000	001525
												03.000	
47A380069P33	NAMEPLATE,IDENT (J3)				B		0000		EA	47E387084G1	01.000	01.000	001824
47A380069P33	NAMEPLATE,IDENT (J3)				B		0000		EA	47E387091G1	01.000	01.000	001526
												02.000	
47A380069P52	NAMEPLATE, IDENT (TB*				*		0000		EA	47E387072G1	01.000	01.000	000782
47A380069P71	NAMEPLATE,IDENT(GND)				*		0000		EA	47E387027G1	01.000	01.000	001346
47A380070P3	NPL, AN/REV STATUS				*		0000		EA	47E387027G1	01.000	01.000	001348
47A380070P3	NPL, AN/REV STATUS				*		0000		EA	47E387062G1	01.000	01.000	000560
47A380070P3	NPL, AN/REV STATUS				*		0000		EA	47E387072G1	01.000	01.000	000677
47A380070P3	NPL, AN/REV STATUS				*		0000		EA	47E387084G1	01.000	01.000	001825
47A380070P3	NPL, AN/REV STATUS				*		0000		EA	47E387085G1	01.000	01.000	001648

IDENTIFICATION NO.	NOMENCLATURE	ECN DWG INC	ECN DWG OUT	PL-LATE APPLY	P C	T Y	CYCLE TIME	FSCM	U/M	NEXT HIGHER ASSEMBLY	QTY	EXT/TOT-QTY	CROSS REF
47A380070P3	NPL, AN/REV STATUS				*		0000		EA	47E387091G1	01.000	01.000	001527
47A380070P3	NPL, AN/REV STATUS				*		0000		EA	47E387095G1	01.000	01.000	000640
												07.000	
47A380071PAR	SLEEVING, SHRINK				*		0000		FT	47D387121G1		AR	000881
47A380071PAR	SLEEVING, SHRINK				*		0000		FT	47D387130G1		AR	000920
47A380071PAR	SLEEVING, SHRINK				*		0000		FT	47E387027G1		AR	001366
47A380071PAR	SLEEVING, SHRINK				*		0000		FT	47E387062G1		AR	000954
47A380071PAR	SLEEVING, SHRINK				*		0000		FT	47E387072G1		AR	000784
47A380071PAR	SLEEVING, SHRINK				*		0000		FT	47E387084G1		AR	001818
47A380071PAR	SLEEVING, SHRINK				*		0000		FT	47E387085G1		AR	001642
47A380071PAR	SLEEVING, SHRINK				*		0000		FT	47E387091G1		AR	001520
47A380071PAR	SLEEVING, SHRINK				*		0000		FT	47E387095G1		AR	000643
												00.000	
47A380094	7500KVA VAR SP GEN				X		0000		EA	47E387081G1		X	001864
47A380102	FINISH				X		0000		PT	47C387096G1		X	000827
47A380102	FINISH				X		0000		PT	47E387084G1		X	001847
												00.000	
47A380102P1	FINISH				M		0000		QT	47D387121G1		AR	000878
47A380102P1	FINISH				M		0000		QT	47D387130G1		AR	000917
												00.000	
47D381002P1	BEARING, YAW				M		0000		EA	47E382133G1	01.000	01.000	000025
47D381003P1	ACTUATOR,HYDRAULIC				M		0000		EA	47E382165G1	04.000	04.000	000032
47D381010P1	BRAKE ASSY				M		0000		EA	47E382165G1	08.000	08.000	000031
47D381010P2	BRAKE ASSY				M		0000		EA	47E382603G1	02.000	04.000	000218
47D381010P2	BRAKE ASSY				M		0000		EA	47E382603G2	02.000	04.000	000246
												08.000	
47E381017	YAW SR ELECT INTFC				X		0000		EA	47E382594G1		X	000109
47D381018	ELEC INTERFACE				X		0000		EA	47E382599G1		X	001236
47D381019P1	SLIP RNG UN YAW AXIS				M		0000		EA	47E382594G1	01.000	01.000	000108
47D381020P1	ROTOR SLIPRING UNIT				M		0000		EA	47E382599G1	01.000	01.000	001237
47D381024P1	ROTARY POSITION SR				M		0000		EA	47E382599G1	01.000	01.000	001252
47C381030P1	HINGE, TRAP DOOR				*		0000		EA	47D382430G1	01.000	02.000	000397
47C381030P1	HINGE, TRAP DOOR				*		0000		EA	47D382430G2	01.000	02.000	000405
47C381030P1	HINGE, TRAP DOOR				*		0000		EA	47D382474G1	01.000	01.000	000414
47C381030P1	HINGE, TRAP DOOR				*		0000		EA	47D382474G2	01.000	01.000	000422
												06.000	

IDENTIFICATION NO.	NOMENCLATURE	ECN DWG INC	ECN DWG OUT	ECN PL-LATE APPLY	P C	T Y	CYCLE TIME	FSCM	U/M	NEXT HIGHER ASSEMBLY	QTY	EXT/TOT-QTY	CROSS REF
47C381036P1	BOLT,FATIGUE RATED				B		0000		EA	47E382363G1	14.000	14.000	000350
47C381036P10	BOLT,FATIGUE RATED				B		0000		EA	47E382363G1	12.000	12.000	000327
47C381036P10	BOLT,FATIGUE RATED				B		0000		EA	47E382496G1	08.000	08.000	001270
47C381036P10	BOLT,FATIGUE RATED				B		0000		EA	47E382608G1	60.000	60.000	001291
												80.000	
47C381036P14	BOLT,FATIGUE RATED				B		0000		EA	47E382602G1	16.000	16.000	000167
47C381036P14	BOLT,FATIGUE RATED				B		0000		EA	47E382603G1	12.000	24.000	000238
47C381036P14	BOLT,FATIGUE RATED				B		0000		EA	47E382603G2	12.000	24.000	000265
												64.000	
47C381036P15	BOLT,FATIGUE RATED				B		0000		EA	47E382165G1	36.000	36.000	000045
47C381036P16	BOLT,FATIGUE RATED				B		0000		EA	47E382165G1	12.000	12.000	000046
47C381036P2	BOLT,FATIGUE RATED				B		0000		EA	47E382363G1	32.000	32.000	000324
47C381036P2	BOLT,FATIGUE RATED				B		0000		EA	47E382602G1	20.000	20.000	000174
												52.000	
47C381036P20	BOLT, FATIGUE RATED				B		0000		EA	47D382598G1	08.000	08.000	000548
47C381036P20	BOLT, FATIGUE RATED				B		0000		EA	47E382363G1	88.000	88.000	000326
47C381036P20	BOLT, FATIGUE RATED				B		0000		EA	47E382597G1	120.000	120.000	000537
												216.000	
47C381036P21	BOLT				B		0000		EA	47E382608G1	08.000	08.000	001295
47C381036P22	BOLT,FATIGUE RATED				B		0000		EA	47D382598G1	08.000	08.000	000549
47C381036P24	BOLT,FATIGUE RATED				B		0000		EA	47D382598G1	08.000	08.000	000547
47C381036P24	BOLT,FATIGUE RATED				B		0000		EA	47E382441G1	36.000	36.000	000196
												44.000	
47C381036P25	BOLT,FATIGUE RATED				B		0000		EA	47E382363G1	36.000	36.000	000328
47C381036P26	BOLT,FATIGUE RATED				B		0000		EA	47E382363G1	12.000	12.000	000348
47C381036P26	BOLT,FATIGUE RATED				B		0000		EA	47E382607G1	96.000	96.000	001279
												108.000	
47C381036P3	BOLT,FATIGUE RATED				B		0000		EA	47E382496G1	84.000	84.000	001268
47C381036P32	BOLT				M		0000		EA	47E382133G1	144.000	144.000	000026
47C381036P4	BOLT,FATIGUE RATED				M		0000		EA	47E382306G1	20.000	20.000	000310
47C381036P40	BOLT, STRUCT. 2-12				M		0000		EA	47E382306G1	24.000	24.000	000307
47C381036P5	BOLT,FATIGUE RATED				B		0000		EA	47E382495G1	24.000	48.000	001267

IDENTIFICATION NO.	NOMENCLATURE	ECN DWG INC	ECN DWG OUT	PL-LATE APPLY	P C	T Y	CYCLE TIME	FSCM	U/M	NEXT HIGHER ASSEMBLY	QTY	EXT/TOT-QTY	CROSS REF
47C381036P50	BOLT				B		0000		EA	47E382553G1	36.000	36.000	000366
47C381036P6	BOLT,FATIGUE RATED				B		0000		EA	47E382363G1	60.000	60.000	000325
47C381036P6	BOLT,FATIGUE RATED				B		0000		EA	47E382602G1	20.000	20.000	000170
												80.000	
47A381037P1	LACING TAPE				*		0000		FT	47D387121G1		AR	000880
47A381037P1	LACING TAPE				*		0000		FT	47D387130G1		AR	000919
47A381037P1	LACING TAPE				*		0000		FT	47E387062G1		AR	000853
47A381037P1	LACING TAPE				*		0000		FT	47E387072G1		AR	000773
47A381037P1	LACING TAPE				*		0000		FT	47E387084G1		AR	001820
47A381037P1	LACING TAPE				*		0000		FT	47E387085G1		AR	001644
47A381037P1	LACING TAPE				*		0000		FT	47E387091G1		AR	001522
47A381037P1	LACING TAPE				*		0000		FT	47E387095G1		AR	000642
												00.000	
47A381038P3	TAPE,LACING				*		0000		FT	47E387027G1		AR	001367
47C381039P1	EXPANSION JOINT				M		0000		EA	47E382570G1	02.000	02.000	000519
47C381039P2	EXPANSION JOINT				M		0000		EA	47E382570G1	01.000	01.000	000520
47D381040P1	HEAT EXCHANGER				M		0000		EA	47E387062G1	02.000	02.000	000555
47A381043PAR	SLEEVING, VINYL				*		0000		FT	47E387062G1		AR	000955
47A381043PAR	SLEEVING, VINYL				*		0000		FT	47E387072G1		AR	000774
47A381043PAR	SLEEVING, VINYL				*		0000		FT	47E387095G1		AR	000629
												00.000	
47A381044PAR	SLEEVING,TEFLON				*		0000		FT	47D387089G1		AR	001383
47A381044PAR	SLEEVING,TEFLON				*		0000		FT	47D387121G1		AR	000868
47A381044PAR	SLEEVING,TEFLON				*		0000		FT	47D387130G1		AR	000921
47A381044PAR	SLEEVING,TEFLON				*		0000		FT	47E387084G1		AR	001819
47A381044PAR	SLEEVING,TEFLON				*		0000		FT	47E387085G1		AR	001643
47A381044PAR	SLEEVING,TEFLON				*		0000		FT	47E387091G1		AR	001521
												00.000	
47A381044P5	SLEEVING				B		0000		FT	47D387113G1		AR	001469
47A381045PAR	CLAMP,LOOP-CUSHIONED				M		0000		EA	47E387062G1		AR	000579
47A381045P3	CLAMP,CABLE (.187 DI*				*		0000		EA	47E387072G1	02.000	02.000	000743
47A381045P5	CABLE CLAMP				B		0000		EA	47E387084G1	03.000	03.000	001817
47A381045P5	CABLE CLAMP				B		0000		EA	47E387085G1	03.000	03.000	001641
47A381045P5	CABLE CLAMP				B		0000		EA	47E387091G1	03.000	03.000	001519
												09.000	
47A381045P6	CLAMP,CABLE (.375 DI*				*		0000		EA	47E387072G1	04.000	04.000	000744

IDENTIFICATION NO.	NOMENCLATURE	--- ECN ---- DWG INC	OUT	PL-LATE APPLY	P C	T Y	CYCLE TIME	FSCM	U/M	NEXT HIGHER ASSEMBLY	QTY	EXT/TOT-QTY	CROSS REF
47E381046P1	GEARBOX ENVELOPE				B		0000		EA	47E382553G1	01.000	01.000	000364
47B381059P4	CONNECTOR CUTOUT COV*				*		0000		EA	47E387072G1	03.000	03.000	000680
47D381060P1	VIDEO MONITOR				M		0000		EA	47E387112G1	01.000	01.000	001327
47C381066P1	HOSE ASSY				M		0000		EA	47J382330G1	04.000	04.000	001126
47C381066P2	HOSE ASSY				M		0000		EA	47J382330G1	06.000	06.000	001125
47A381067P1	CTL PROCESSING UNIT				M		0000		EA	47E387095G1	01.000	01.000	000594
47A381067P10	120 VAC TRK OUT MDL				M		0000		EA	47E387062G1	47.000	47.000	000570
47A381067P11	12-BIT A/D CONVERTER				M		0000		EA	47E387095G1	02.000	02.000	000603
47A381067P12	12-BIT SS ANLG INPUT				M		0000		EA	47E387095G1	03.000	03.000	000604
47A381067P13	12-BIT ANALOG OUTPUT				M		0000		EA	47E387095G1	02.000	02.000	000605
47A381067P14	WATCHDOG TIMER				M		0000		EA	47E387095G1	01.000	01.000	000601
47A381067P15	ERROR DETECTOR				M		0000		EA	47E387095G1	01.000	01.000	000600
47A381067P16	POWER SUPPLY				M		0000		EA	47E387095G1	01.000	01.000	000591
47A381067P17	CHASSIS INTERFACE				M		0000		EA	47E387095G1	01.000	01.000	000595
47A381067P18	CHASSIS				M		0000		EA	47E387095G1	02.000	02.000	000592
47A381067P2	ARITH. PROCESSING				M		0000		EA	47E387095G1	01.000	01.000	000599
47A381067P20	FILLER BLANK				M		0000		EA	47E387095G1	15.000	15.000	000602
47A381067P23	CABLE, I/O TRACK				M		0000		EA	47E387062G1	01.000	01.000	000575
47A381067P3	16K EXECUTIVE MEMORY				M		0000		EA	47E387095G1	01.000	01.000	000596
47A381067P31	TERMINATOR PLUG				M		0000		EA	47E387062G1	01.000	01.000	000571
47A381067P4	12K PROM, 4K RAM MEM				M		0000		EA	47E387095G1	01.000	01.000	000598
47A381067P5	16K RAM MEMORY				M		0000		EA	47E387095G1	01.000	01.000	000597
47A381067P6	TTY & EIA INTFC MDL				M		0000		EA	47E387095G1	03.000	03.000	000606
47A381067P7	I/O SYS DRIVER MDL				M		0000		EA	47E387095G1	01.000	01.000	000607
47A381067P8	I/O TRACK				M		0000		EA	47E387062G1	08.000	08.000	000568

IDENTIFICATION NO.	NOMENCLATURE	ECN DWG INC	ECN DWG OUT	PL-LATE APPLY	P C	T Y	CYCLE TIME	FSCM	U/M	NEXT HIGHER ASSEMBLY	QTY	EXT/TOT-QTY	CROSS REF
47A381067P9	120 VAC TRK INP MDL				M		.0000		EA	47E387062G1	81.000	81.000	000569
47C381072P1	CLAMP UNIT				M		0000		EA	47J382330G1	04.000	04.000	001138
47C381072P2	CLAMP UNIT				M		0000		EA	47J382330G1	52.000	52.000	001137
47C381072P3	CLAMP UNIT				M		0000		EA	47C382336G1	01.000	38.000	001133
47C381072P3	CLAMP UNIT				M		0000		EA	47C382336G2	01.000	08.000	001136
47C381072P3	CLAMP UNIT				M		0000		EA	47C382336G3	01.000	06.000	001186
												52.000	
47B381074P1	HOSE ASSY				M		0000		EA	47J382313G1	02.000	02.000	000086
47C381075P1	HOSE ASSY				M		0000		EA	47J382313G1	04.000	04.000	000084
47C381075P2	HOSE ASSY				M		0000		EA	47J382313G1	04.000	04.000	000085
47D381078P1	HIGH SPEED SFT ASSY				B		0000		EA	47D382589G1	01.000	01.000	000372
47D381080P1	TPR RLR BRG,SPDL/AFT				M		0000	80657	EA	47E382441G1	01.000	01.000	000178
47D381081P1	TPR RLR BRG,SPDL/FWD				M		0000	80657	EA	47E382441G1	01.000	01.000	000179
47D381082P1	COUPLING HUB, FWD				*		0000		EA	47D382435G1	01.000	01.000	000210
47D381082P2	TORQUE PLATE				M		0000		EA	47E382441G1	01.000	01.000	000195
47C381083P1	COUPLING HUB, AFT				*		0000		EA	47D382435G1	01.000	01.000	000211
47C381084P1	VALVE,THERMO,AMOT				M		0000		EA	47E382579G1	01.000	01.000	000477
47C381086P1	VALVE,RELIEF,4-IN				M		.0000		EA	47E382579G1	01.000	01.000	000478
47C381087P1	NUT				M		0000		EA	47E382306G1	20.000	20.000	000311
47C381087P1	NUT				M		0000		EA	47E382610G1	28.000	56.000	001028
												76.000	
47C381087P10	LOCKNUT				B		0000		EA	47E382363G1	124.000	124.000	000331
47C381087P10	LOCKNUT				B		0000		EA	47E382608G1	08.000	08.000	001296
												132.000	
47C381087P13	NUT, FATIGUE RATED				B		0000		EA	47E382133G1	144.000	144.000	000027
47C381087P13	NUT, FATIGUE RATED				B		0000		EA	47E382597G1	120.000	120.000	000538
												264.000	
47C381087P18	NUT 2-12				M		0000		EA	47E382306G1	24.000	24.000	000308
47C381087P2	LOCKNUT				B		0000		EA	47E382363G1	92.000	92.000	000329
47C381087P2	LOCKNUT				B		0000		EA	47E382602G1	40.000	40.000	000173
												132.000	

IDENTIFICATION NO.	NOMENCLATURE	ECN DWG INC	ECN DWG OUT	PL-LATE APPLY	P C	T Y	CYCLE TIME	FSCM	U/M	NEXT HIGHER ASSEMBLY	QTY	EXT/TOT-QTY	CROSS REF
47C381087P22	LOCKNUT				B		0000		EA	47E382553G1	36.000	36.000	000368
47C381087P5	NUT				B		0000		EA	47E382441G1	360.000	360.000	000200
47C381087P5	NUT				B		0000		EA	47E382603G1	12.000	24.000	000239
47C381087P5	NUT				B		0000		EA	47E382603G2	12.000	24.000	000266
												408.000	
47C381087P6	LOCKNUT				B		0000		EA	47E382363G1	12.000	12.000	000330
47C381087P6	LOCKNUT				B		0000		EA	47E382608G1	60.000	60.000	001292
												72.000	
47C381087P9	NUT				B		0000		EA	47D382598G1	24.000	24.000	000546
47C381087P9	NUT				B		0000		EA	47E382363G1	12.000	12.000	000349
47C381087P9	NUT				B		0000		EA	47E382441G1	36.000	36.000	000198
47C381087P9	NUT				B		0000		EA	47E382607G1	96.000	96.000	001280
												168.000	
47C381088P1	WASHER, 1.00 DIA				M		0000		EA	47E382306G1	20.000	20.000	000319
47C381088P1	WASHER, 1.00 DIA				M		0000		EA	47E382363G1	92.000	92.000	000332
47C381088P1	WASHER, 1.00 DIA				M		0000		EA	47E382496G1	84.000	84.000	001269
47C381088P1	WASHER, 1.00 DIA				M		0000		EA	47E382602G1	40.000	40.000	000171
47C381088P1	WASHER, 1.00 DIA				M		0000		EA	47E382610G1	28.000	56.000	001029
												292.000	
47C381088P10	WASHER, 1.50 DIA				B		0000		EA	47D382598G1	24.000	24.000	000552
47C381088P10	WASHER, 1.50 DIA				B		0000		EA	47E382363G1	136.000	136.000	000346
47C381088P10	WASHER, 1.50 DIA				B		0000		EA	47E382607G1	96.000	96.000	001282
47C381088P10	WASHER, 1.50 DIA				B		0000		EA	47E382608G1	68.000	68.000	001298
												324.000	
47C381088P13	WASHER, HARDENED STL				B		0000		EA	47E382133G1	144.000	144.000	000028
47C381088P13	WASHER, HARDENED STL				B		0000		EA	47E382597G1	120.000	120.000	000540
												264.000	
47C381088P14	WASHER, HARDENED STL				B		0000		EA	47E382133G1	144.000	144.000	000029
47C381088P14	WASHER, HARDENED STL				B		0000		EA	47E382597G1	120.000	120.000	000539
												264.000	
47C381088P17	WASHER 2.00				M		0000		EA	47E382306G1	24.000	24.000	000318
47C381088P18	WASHER 2.00				B		0000		EA	47E382306G1	24.000	24.000	000309
47C381088P2	WASHER, 1.00 DIA				M		0000		EA	47E382306G1	20.000	20.000	000312
47C381088P2	WASHER, 1.00 DIA				M		0000		EA	47E382363G1	105.000	105.000	000345
47C381088P2	WASHER, 1.00 DIA				M		0000		EA	47E382602G1	40.000	40.000	000172
												165.000	
47C381088P21	WASHER				B		0000		EA	47E382553G1	36.000	36.000	000367

IDENTIFICATION NO.	NOMENCLATURE	ECN INC	ECN OUT	DWG PL-LATE APPLY	P C	T Y	CYCLE TIME	FSCM	U/M	NEXT HIGHER ASSEMBLY	QTY	EXT/TOT-QTY	CROSS REF
47C381088P22	WASHER				B		0000		EA	47E382553G1	36.000	36.000	000369
47C381088P5	WASHER,1.25 DIA				B		0000		EA	47E382363G1	12.000	12.000	000333
47C381088P5	WASHER,1.25 DIA				B		0000		EA	47E382441G1	240.000	240.000	000201
47C381088P5	WASHER,1.25 DIA				B		0000		EA	47E382496G1	08.000	08.000	001271
47C381088P5	WASHER,1.25 DIA				B		0000		EA	47E382602G1	16.000	16.000	000168
												276.000	
47C381088P6	WASHER,1.25 DIA				B		0000		EA	47E382363G1	12.000	12.000	000347
47C381088P6	WASHER,1.25 DIA				B		0000		EA	47E382603G1	24.000	48.000	000242
47C381088P6	WASHER,1.25 DIA				B		0000		EA	47E382603G2	24.000	48.000	000270
												108.000	
47C381088P9	WASHER,1.50 DIA				M		0000		EA	47D382598G1	24.000	24.000	000545
47C381088P9	WASHER,1.50 DIA				M		0000		EA	47E382363G1	136.000	136.000	000334
47C381088P9	WASHER,1.50 DIA				M		0000		EA	47E382441G1	72.000	72.000	000197
47C381088P9	WASHER,1.50 DIA				M		0000		EA	47E382607G1	96.000	96.000	001281
47C381088P9	WASHER,1.50 DIA				M		0000		EA	47E382608G1	68.000	68.000	001293
												396.000	
47E381089P1	TRAILING EDGE INSTL				M		0000		EA	47E382590G1	02.000	02.000	001008
47E381089P2	TRAILING EDGE INSTL				M		0000		EA	47E382590G1	02.000	02.000	001009
47E381089P3	TRAILING EDGE INSTL				M		0000		EA	47E382590G1	02.000	02.000	001010
47J381090P1	INNER BLADE SECTION				M		0000		EA	47E382590G1	02.000	02.000	001006
47D381091P1	ICE DETECTOR				M		0000		EA	47E382469G1	02.000	04.000	001071
47E381093P1	BGR THRUST TEETER				M		0000		EA	47E382605G1	02.000	02.000	001198
47J381097P1	OUTER BLADE SECTION				M		0000		EA	47E382590G1	02.000	02.000	001007
47B381099PAR	WIRE,AWG 30,SLDRLESS				B		0000		FT	47D387113G1	AR		001776
47B381099PAR	WIRE,AWG 30,SLDRLESS				B		0000		FT	47E387037G1	AR		000698
												00.000	
47E381100P1	CABINET				M		0000		EA	47E387062G1	01.000	01.000	000554
47D381101P1	SHRINK DISC				M		0000		EA	47E382605G1	02.000	02.000	001200
47C381102P1	ROTOR SEAL FWD				M		0000	03668	EA	47E382441G1	02.000	02.000	000189
47C381103P1	ROTOR SEAL AFT				M		0000	03668	EA	47E382441G1	02.000	02.000	000190
47C381104P1	STUD				M		0000		EA	47E382441G1	120.000	120.000	000192
47C381104P2	STUD				M		0000		EA	47E382441G1	120.000	120.000	000193

IDENTIFICATION NO.	NOMENCLATURE	ECN DWG INC	ECN DWG OUT	ECN PL-LATE APPLY	P C	T Y	CYCLE TIME	FSCM	U/M	NEXT HIGHER ASSEMBLY	QTY	EXT/TOT-QTY	CROSS REF
47E381105G1	BOLSTER ASSY				M		0000		EA	47E382590G1	01.000	01.000	000985
47B381106P1	"O" RING SEAL, AFT				M		0000		EA	47E382441G1	01.000	01.000	000181
47E381107P1	TROLLEY ASSY				M		0000		EA	47E382165G1	02.000	02.000	000034
47B381108P1	SENSOR, ROTOR SPEED				M		0000	81692	EA	47E382498G1	02.000	02.000	001276
47B381109P1	WSHR, BELLEVILLE SPR				B		0000	92830	EA	47E382441G1	120.000	120.000	000199
47C381110P1	SEAL, FWD, COUPLING				M		0000		EA	47E382601G1	04.000	04.000	000214
47C381111P1	BELLOWS JOINT				M		0000		EA	47E382599G1	01.000	01.000	001238
47E381112G1	FOUNDATION REQT				M		0000		EA	47E382297G1	01.000	01.000	000006
47E381112P1	FOUNDATION ASSEMBLY				M		0000		EA	47E381112G1	01.000	01.000	000007
47E381112P10	#11 REINFORCING ROD				M		0000		FT	47E381112G1	AR		000016
47E381112P3	NUT				B		0000		EA	47E381112G1	192.000	192.000	000009
47E381112P5	RECT. WIREWAY				M		0000		EA	47E381112G1	03.000	03.000	000011
47E381112P6	CONDUIT SECTION				M		0000		EA	47E381112G1	01.000	01.000	000012
47E381112P7	CONDUIT SECTION				M		0000		EA	47E381112G1	02.000	02.000	000013
47E381112P8	CONDUIT SECTION				M		0000		EA	47E381112G1	01.000	01.000	000014
47E381112P9	#09 REINFORCING ROD				M		0000		FT	47E381112G1	AR		000015
47E381113P1	FAIRING ENVELOPE				B		0000		EA	47D382606G1	01.000	01.000	000378
47D381114P1	BRG,RADIAL-TEETER				M		0000		EA	47E382583G1	01.000	02.000	001195
47C381115P1	ACTUATOR				B		0000		EA	47E382610G1	06.000	12.000	001025
47D382000	TOWER GEOMETRY/DIAG				X		0000		EA	47E382304G1	X		001873
47C382020	LUBRICATION SCHEM				X		0000		EA	47E382570G1	X		000535
47E382045	GEOMETRY ENVELOPE				X		0000		EA	47E382304G1	X		001307
47E382050P1	YAW HSG STRUCT,UPPER				M		0000		EA	47E382133G1	01.000	01.000	000023
47B382131P1	ENCLOSURE, DOOR				*		0000		EA	47D382430G1	01.000	02.000	000396
47B382131P1	ENCLOSURE, DOOR				*		0000		EA	47D382430G2	01.000	02.000	000404
47B382131P1	ENCLOSURE, DOOR				*		0000		EA	47D382474G1	01.000	01.000	000413

IDENTIFICATION NO.	NOMENCLATURE	--- ECN ---- DWG INC	DWG OUT	PL-LATE APPLY	P C	T Y	CYCLE TIME	FSCM	U/M	NEXT HIGHER ASSEMBLY	QTY	EXT/TOT-QTY	CROSS REF
47B382131P1	ENCLOSURE, DOOR				*		0000		EA	47D382474G2	01.000	01.000 06.000	000421
47E382133G1	YAW STRUCTURE ASSY				M		0000		EA	47D382593G1	01.000	01.000	000022
47E382165G1	YAW DRIVE INSTL				M		0000		EA	47D382593G1	01.000	01.000	000030
47C382181P1	TRACK MTG BRACKET				M		0000		EA	47E382165G1	04.000	04.000	000033
47C382181P2	TRACK, MTG BRACKET				M		0000		EA	47E382165G1	02.000	02.000	000063
47D382192P1	BRAKE MTG PLATE				M		0000		EA	47E382165G1	02.000	02.000	000041
47B382193P1	PIN, CLEVIS - BRAKE				M		0000		EA	47E382165G1	04.000	04.000	000044
47B382196P1	SPACER, CLEVIS BLOCK				M		0000		EA	47E382165G1	04.000	04.000	000061
47B382196P2	SPCR,ACTUATOR CLEVIS				M		0000		EA	47E382165G1	08.000	08.000	000062
47D382198P1	CLEVIS BLOCK				M		0000		EA	47E382165G1	02.000	02.000	000042
47D382198P2	CLEVIS BLOCK				M		0000		EA	47E382165G1	02.000	02.000	000064
47B382200P1	RETAINER, PIN				M		0000		EA	47E382165G1	04.000	04.000	000043
47E382219P1	YAW HSG STRUCT,LOWER				M		0000		EA	47E382133G1	01.000	01.000	000024
47C382234P1	GASKET				M		0000		EA	47E387062G1	02.000	02.000	000565
47B382248P1	AIR BAF, RIGHT SIDE				M		0000		EA	47E387062G1	01.000	01.000	000573
47B382248P2	AIR BAF, LEFT SIDE				M		0000		EA	47E387062G1	01.000	01.000	000574
47E382264P1	SIDE SUPPORT,WLDMT				M		0000		EA	47E382363G1	01.000	01.000	000361
47E382265P1	SIDE SUPPORT				M		0000		EA	47E382363G1	01.000	01.000	000320
47E382265P2	SIDE SUPPORT				M		0000		EA	47E382363G1	01.000	01.000	000321
47E382271P1	ROTOR ADAPTER,WLDMT				M		0000		EA	47E382363G1	01.000	01.000	000362
47E382272P1	ROTOR ADAPTER STRL				M		0000		EA	47E382363G1	01.000	01.000	000323
47D382274	NACELLE GEOMETRY				X		0000		EA	47E382304G1	X		001874
47B382277P1	DRIP TROUGH				M		0000		EA	47E382165G1	02.000	02.000	000069
47B382277P2	DRIP TROUGH				M		0000		EA	47E382165G1	02.000	02.000	000070

IDENTIFICATION NO.	NOMENCLATURE	--- ECN ---- DWG INC	OUT	PL-LATE APPLY	P C	T Y	CYCLE TIME	FSCM	U/M	NEXT HIGHER ASSEMBLY	QTY	EXT/TOT-QTY	CROSS REF
47C382278P1	MANIFOLD FITTING				M		0000		EA	47E382165G1	02.000	02.000	000065
47A382285	PROFILE COORDINATES				X		0000		EA	47E382590G1	X		001228
47J382287P1	CENTER BLADE SECT				M		0000		EA	47E382590G1	01.000	01.000	000984
47D382288	GENERAL SITE LCTN				X		0000		EA	47E382304G1	X		001870
47D382296P1	LOW SPEED SHAFT				*		0000		EA	47D382435G1	01.000	01.000	000209
47E382297G1	TWR/FOUNDATION INSTL				M		0000		EA	47D382356G1	01.000	01.000	000003
47E382297P7	GROUT				M		0000		LB	47E382297G1	AR		000020
47D382298	SITE PLAN-1ST UNIT				X		0000		EA	47E382304G1	X		001871
47E382301P1	BOLSTER				M		0000		EA	47E381105G1	02.000	02.000	000986
47E382303P1	TWR/ FDN PLATF REQT				M		0000		EA	47E382297G1	01.000	01.000	000017
47E382304G1	WTG ASSY, MOD-5A	1			M		0000		EA			01.000	000001
47E382306G1	BED PL.,MACH.&DRILL.	01			M		0000		EA	47E382363G1	01.000	01.000	000304
47J382313G1	HYDR PIPING, YAW DR				M		0000		EA	47D382593G1	01.000	01.000	000075
47E382314	HYDRAULIC SYS SCHEM				X		0000		EA	47J382313G1	X		000105
47J382330G1	BLADE HYDRAULIC INST				M		0000		EA	47E382590G1	01.000	01.000	001122
47J382330P1	TUBING HYDRAULIC				M		0000		FT	47J382330G1	720.000	720.000	001123
47J382330P2	TUBING HYDRAULIC				M		0000		FT	47J382330G1	480.000	480.000	001124
47E382333P1	SPINDLE SHAFT				M		0000		EA	47E382441G1	01.000	01.000	000177
47E382334P1	TIP,BLADE				M		0000		EA	47E382582G1	02.000	04.000	001053
47C382335P1	TUBE ADAPTER				M		0000		EA	47J382330G1	04.000	04.000	001140
47C382335P2	TUBE ADAPTER				M		0000		EA	47J382330G1	06.000	06.000	001139
47C382336G1	BRKT,CLAMP MODIFIED				M		0000		EA	47J382330G1	38.000	38.000	001131
47C382336G2	BRKT,CLAMP MODIFIED				M		0000		EA	47J382330G1	08.000	08.000	001134
47C382336G3	BRKT,CLAMP				M		0000		EA	47J382330G1	06.000	06.000	001184
47C382336P1	BRACKET,ANGLE				M		0000		EA	47C382336G1	02.000	76.000	001132

IDENTIFICATION NO.	NOMENCLATURE	ECN DWG INC	ECN DWG OUT	PL-LATE APPLY	P C	T Y	CYCLE TIME	FSCM	U/M	NEXT HIGHER ASSEMBLY	QTY	EXT/TOT-QTY	CROSS REF
47C382336P1	BRACKET,ANGLE				M		0000		EA	47C382336G2	02.000	16.000	001135
47C382336P1	BRACKET,ANGLE				M		0000		EA	47C382336G3	02.000	12.000	001185
												104.000	
47C382337P1	ADAPTER,TUBE				M		0000		EA	47J382330G1	12.000	12.000	001145
47B382338P1	STUD,MOUNTING				M		0000		EA	47J382330G1	10.000	10.000	001142
47C382349P1	SLEEVE,SPLIT				M		0000		EA	47J382330G1	150.000	150.000	001149
47C382349P2	SLEEVE,SPLIT				M		0000		EA	47J382330G1	100.000	100.000	001150
47C382350P1	TEETER SPRT OUTER				M		0000		EA	47C382551G2	01.000	04.000	001000
47C382351P1	TEETER SPRT INNER				M		0000		EA	47C382551G1	01.000	04.000	000996
47D382352G1	TEETER ARM ASSY				M		0000		EA	47E382605G1	04.000	04.000	001204
47D382352P1	TEETER ARM				M		0000		EA	47D382352G1	01.000	04.000	001205
47D382352P2	RETAINING RING				M		0000		EA	47D382352G1	01.000	04.000	001206
47C382353P1	TEETER SUPPORT PIN				M		0000		EA	47E382605G1	04.000	04.000	001210
47E382355P1	TWR STRUCTURE ASSY				M		0000		EA	47E382297G1	01.000	01.000	000004
47D382356G1	TOWER ASSY, WTG				M		0000		EA	47E382304G1	01.000	01.000	000002
47E382357G1	BRACKET,INBOARD				M		0000		EA	47J382330G1	02.000	02.000	001127
47E382357P1	BRACKET				M		0000		EA	47E382357G1	01.000	02.000	001128
47D382358P1	BRKT,OUTBOARD				M		0000		EA	47J382330G1	02.000	02.000	001130
47C382359P1	PLATE				M	M	0000		EA	47J382330G1	04.000	04.000	001165
47C382360G1	SUPPORT,HOSE				M		0000		EA	47J382330G1	02.000	02.000	001160
47C382360P1	PLATE				M		0000		EA	47C382360G1	01.000	02.000	001161
47C382360P2	PAD				M		0000		EA	47C382360G1	01.000	02.000	001162
47D382361G1	BASE,HOSE SUPPORT				M		0000		EA	47J382330G1	02.000	02.000	001155
47D382361P1	PLATE				M		0000		EA	47D382361G1	01.000	02.000	001156
47D382361P2	PAD				M		0000		EA	47D382361G1	01.000	02.000	001157
47E382363G1	NACELLE STRUCT ASSY	1			M		0000		EA	47E382597G1	01.000	01.000	000303

IDENTIFICATION NO.	NOMENCLATURE	--- ECN --- DWG INC	DWG OUT	PL-LATE APPLY	P C	T Y	CYCLE TIME	FSCM	U/M	NEXT HIGHER ASSEMBLY	QTY	EXT/TOT-QTY	CROSS REF
47D382372P1	RTR BRG RETAINER,FWD				M		0000		EA	47E382441G1	01.000	01.000	000184
47B382373P1	SPACER				M		0000		EA	47J382330G1	08.000	08.000	001166
47B382373P2	SPACER				M		0000		EA	47J382330G1	08.000	08.000	001167
47B382373P3	SPACER				M		0000		EA	47J382330G1	08.000	08.000	001168
47C382390P1	PLUG, SHAFT TEETER				M		0000		EA	47D382397G1	02.000	02.000	000992
47B382396P1	SHIM,BRG				M		0000		EA	47E382605G1	02.000	02.000	001199
47B382396P1	SHIM,BRG				X		0000		EA	47E382608G1	X	02.000	001290
47D382397G1	TEETER PVT SFT ASSY				M		0000		EA	47D382550G1	01.000	01.000	000990
47D382397P1	TEETER PIVOT SHAFT				M		0000		EA	47D382397G1	01.000	01.000	000991
47B382398P1	SPACER				M		0000		EA	47E382413G1	AR		001082
47C382399P1	BLOCK,BALLAST				M		0000		EA	47E382413G1	96.000	96.000	001080
47E382400G1	LIGHTING PROT INSTL				M		0000		EA	47E382590G1	02.000	02.000	001106
47E382400P3	LIGHTING STRIP				M		0000		FT	47E382400G1	AR		001109
47E382400P4	SPLICE PLATE				M		0000		EA	47E382400G1	16.000	32.000	001110
47E382400P6	SHIM				M		0000		EA	47E382400G1	02.000	04.000	001112
47B382401P1	STUD				M		0000		EA	47E382413G1	32.000	32.000	001081
47E382403P1	INSERT,BOLSTER				M		0000		EA	47C382552G1	01.000	02.000	001004
47D382406	GEOMETRY DWG				X		0000		EA	47E382590G1	X		001225
47E382407P1	LOW SP BK SPRT BRKT				M		0000		EA	47E382495G1	01.000	02.000	001255
47E382413G1	BALLAST INSTL				M		0000		EA	47E382590G1	01.000	01.000	001079
47B382419P1	WASHER				B		0000		EA	47E382165G1	96.000	96.000	000050
47B382420P1	JAM NUT				B		0000		EA	47E382165G1	04.000	04.000	000056
47E382429P1	BED PL. STRUCT. WELD				M		0000		EA	47E382306G1	01.000	01.000	000305
47D382430G1	TRAP DR, BEDPL / TWR				M		0000		EA	47E382472G1	02.000	02.000	000389
47D382430G2	TRAP DR, BEDPL / TWR				M		0000		EA	47E382472G1	02.000	02.000	000398

IDENTIFICATION NO.	NOMENCLATURE	--- ECN ---- DWG INC	DWG OUT	PL-LATE APPLY	P C	T Y	CYCLE TIME	FSCM	U/M	NEXT HIGHER ASSEMBLY	QTY	EXT/TOT-QTY	CROSS REF
47D382430P1	COVER				M		0000		EA	47D382430G1	01.000	02.000	000390
47D382430P1	COVER				M		0000		EA	47D382430G2	01.000	02.000	000399
												04.000	
47D382430P2	ANGLE				M		0000		EA	47D382430G1	02.000	04.000	000391
47D382430P2	ANGLE				M		0000		EA	47D382430G2	02.000	04.000	000400
												08.000	
47D382430P3	ANGLE				M		0000		EA	47D382430G1	02.000	04.000	000392
47D382430P3	ANGLE				M		0000		EA	47D382430G2	02.000	04.000	000401
												08.000	
47D382430P4	RIB				M		0000		EA	47D382430G1	02.000	04.000	000393
47D382430P4	RIB				M		0000		EA	47D382430G2	02.000	04.000	000402
												08.000	
47D382430P5	PLATE				M		0000		EA	47D382430G1	01.000	02.000	000394
47D382430P6	BAR				M		0000		EA	47D382430G1	01.000	02.000	000395
47D382430P6	BAR				M		0000		EA	47D382430G2	01.000	02.000	000403
												04.000	
47D382435G1	LOW SPEED SHAFT ASSY				*		0000		EA	47E382601G1	01.000	01.000	000208
47C382436P1	SEAL RTNR, COUPLING				M		0000		EA	47E382601G1	02.000	02.000	000212
47C382437P1	SEAL PL, FWD CPLG				M		0000		EA	47E382601G1	06.000	06.000	000213
47E382440	SCHEM ROTOR HYDR SYS				X		0000		EA	47E382590G1	X		001227
47E382441G1	YOKE / SPINDLE ASSY				M		0000		EA	47E382601G1	01.000	01.000	000159
47E382450P1	GEARBOX MTG. STRUCT.				M		0000		EA	47E382306G1	01.000	01.000	000306
47B382454P1	ANTI-ROTATION PIN				M		0000		EA	47E382441G1	02.000	02.000	000183
47D382455P1	DISC, RTR SPEED SNSR				M		0000		EA	47E382441G1	01.000	01.000	000191
47D382456P1	RTR SEAL RTNR, AFT				M		0000		EA	47E382441G1	01.000	01.000	000182
47D382457P1	LOW SPEED BRAKE DISC				M		0000		EA	47E382441G1	01.000	01.000	000185
47C382458P1	RETAINER, AFT				M		0000		EA	47E382441G1	06.000	06.000	000180
47E382460	BLADE TOLERANCE DWG				X		0000		EA	47E382590G1	X		001226
47D382461P1	LOW SPEED BRAKE				M		0000		EA	47E382495G1	04.000	08.000	001256
47C382463G1	RING, MOUNTING				M		0000		EA	47C382464G1	02.000	08.000	001067

IDENTIFICATION NO.	NOMENCLATURE	ECN DWG INC	ECN DWG OUT	ECN PL-LATE APPLY	P C	T Y	CYCLE TIME	FSCM	U/M	NEXT HIGHER ASSEMBLY	QTY	EXT/TOT-QTY	CROSS REF
47C382463P1	RING, MOUNTING				M		0000		EA	47C382463G1	02.000	08.000	001068
47C382464G1	RING & HOUSING ASSY				M		0000		EA	47E382469G1	02.000	04.000	001066
47C382464G1	RING & HOUSING ASSY				M		0000		EA	47E382469G2	02.000	04.000	001097
												08.000	
47D382465P1	FRAME,TRAP DOOR				M		0000		EA	47E382472G1	02.000	02.000	000423
47B382467P1	RETAINER				M		0000		EA	47E382469G1	02.000	04.000	001072
47B382467P2	RETAINER / COVER				M		0000		EA	47E382469G1	02.000	04.000	001075
47B382467P2	RETAINER / COVER				M		0000		EA	47E382469G2	02.000	04.000	001103
												08.000	
47B382468P1	GASKET				M		0000		EA	47E382469G1	02.000	04.000	001073
47E382469G1	ICE DETECTOR INSTL				M		0000		EA	47E382590G1	02.000	02.000	001065
47E382469G2	ICE DETECTOR INSTL				M		0000		EA	47E382590G1	02.000	02.000	001096
47B382470P1	GASKET, COVER				M		0000		EA	47E382469G1	02.000	04.000	001078
47B382470P1	GASKET, COVER				M		0000		EA	47E382469G2	02.000	04.000	001105
												08.000	
47E382472G1	LAD & FALSE FL INSTL				M		0000		EA	47E382597G1	01.000	01.000	000388
47E382472P11	SEALING STRIP				M		0000		EA	47E382472G1	AR		000429
47E382472P8	ROOF SCUTTLE				B		0000		EA	47E382472G1	01.000	01.000	000426
47D382474G1	TRAP DR,BEDPL / LUBE				M		0000		EA	47E382472G1	01.000	01.000	000406
47D382474G2	TRAP DR,BEDPL / LUBE				M		0000		EA	47E382472G1	01.000	01.000	000415
47D382474P1	COVER				M		0000		EA	47D382474G1	01.000	01.000	000407
47D382474P1	COVER				M		0000		EA	47D382474G2	01.000	01.000	000416
												02.000	
47D382474P2	ANGLE				M		0000		EA	47D382474G1	02.000	02.000	000408
47D382474P2	ANGLE				M		0000		EA	47D382474G2	02.000	02.000	000417
												04.000	
47D382474P3	ANGLE				M		0000		EA	47D382474G1	02.000	02.000	000409
47D382474P3	ANGLE				M		0000		EA	47D382474G2	02.000	02.000	000418
												04.000	
47D382474P4	RIB				M		0000		EA	47D382474G1	02.000	02.000	000410
47D382474P4	RIB				M		0000		EA	47D382474G2	02.000	02.000	000419
												04.000	

IDENTIFICATION NO.	NOMENCLATURE	ECN DWG INC	ECN DWG OUT	PL-LATE APPLY	P C	T Y	CYCLE TIME	FSCM	U/M	NEXT HIGHER ASSEMBLY	QTY	EXT/TOT-QTY	CROSS REF
47D382474P5	PLATE				M		0000		EA	47D382474G1	01.000	01.000	000411
47D382474P6	BAR				M		0000		EA	47D382474G1	01.000	01.000	000412
47D382474P6	BAR				M		0000		EA	47D382474G2	01.000	01.000 02.000	000420
47C382475P1	MOUNTING BLOCK				M		0000		EA	47E382472G1	02.000	02.000	000424
47B382480P1	BRACKET, SENSOR				M		0000		EA	47E382498G1	02.000	02.000	001275
47C382485P1	LIFTING,BRKT				M		0000		EA	47D382598G1	02.000	02.000	000543
47E382486P1	SIDE SUPPORT				M		0000		EA	47E382599G1	01.000	01.000	001235
47E382488P1	PRE-LOAD FIXTURE				M		0000		EA	47E382605G1	02.000	02.000	001213
47E382491G1	AIR DUCT UNIT				M		0000		EA	47E387062G1	02.000	02.000	000556
47D382492P1	NUT PLATE				M		0000		EA	47E382495G1	01.000	02.000	001259
47D382492P2	NUT PLATE				M		0000		EA	47E382495G1	02.000	04.000	001258
47D382492P3	NUT PLATE				M		0000		EA	47E382495G1	01.000	02.000	001260
47D382492P4	NUT PLATE				M		0000		EA	47E382495G1	02.000	04.000	001257
47D382493P1	NUT PLATE				M		0000		EA	47E382495G1	02.000	04.000	001262
47D382493P2	NUT PLATE				M		0000		EA	47E382495G1	01.000	02.000	001263
47D382493P3	NUT PLATE				M		0000		EA	47E382495G1	02.000	04.000	001261
47B382494P1	NUT PLATE				M		0000		EA	47E382495G1	08.000	16.000	001264
47E382495G1	LOW SP BK SPRT ASSY				M		0000		EA	47E382496G1	02.000	02.000	001254
47E382496G1	LOW SPEED BRAKE INST				M		0000		EA	47E382607G1	01.000	01.000	001253
47F382498G1	RTR SPEED SNSR INSTL				M		0000		EA	47E382607G1	01.000	01.000	001274
47C382499P1	TOWER ACCESS DOOR				M		0000		EA	47E382297G1	01.000	01.000	000005
47D382550G1	SFT,TEETER BRG ASSY				M		0000		EA	47E381105G1	01.000	01.000	000987
47D382550P1	CLOTH,FIBERGLASS				M		0000		FT	47D382550G1	AR		000988
47D382550P2	ADHESIVE				M		0000		OZ	47D382550G1	AR		000989
47C382551G1	TEETER RESTR ASSY				M		0000		EA	47E381105G1	04.000	04.000	000993

IDENTIFICATION NO.	NOMENCLATURE	ECN DWG INC	ECN DWG OUT	ECN PL-LATE APPLY	P C	T Y	CYCLE TIME	FSCM	U/M	NEXT HIGHER ASSEMBLY	QTY	EXT/TOT-QTY	CROSS REF
47C382551G2	TEETEER RESTR ASSY				M		0000		EA	47E381105G1	04.000	04.000	000997
47C382551P1	CLOTH, FIBERGLASS				M		0000		FT	47C382551G1	AR		000994
47C382551P1	CLOTH, FIBERGLASS				M		0000		FT	47C382551G2	AR	00.000	000998
47C382551P2	ADHESIVE, EPOXY				M		0000		OZ	47C382551G1	AR		000995
47C382551P2	ADHESIVE, EPOXY				M		0000		OZ	47C382551G2	AR	00.000	000999
47C382552G1	BOLSTER INSR ASSY				M		0000		EA	47E381105G1	02.000	02.000	001001
47C382552P1	CLOTH,FIBERGLASS				M		0000		FT	47C382552G1	AR		001002
47C382552P2	ADHESIVE				M		0000		OZ	47C382552G1	AR		001003
47E382553G1	GEARBOX INSTALLATION				M		0000		EA	47E382597G1	01.000	01.000	000363
47D382554P1	FLOORING, BEDPLATE				M		0000		EA	47E382306G1	01.000	01.000	000313
47D382555P1	LIFTING BRKT				M		0000		EA	47D382598G1	02.000	02.000	000544
47E382556G1	GEARBOX/CLG PLATFORM				M		0000		EA	47E382579G1	01.000	01.000	000444
47E382556P1	ANGLE,4 X 4 X 3/8				M		0000		EA	47E382556G1	04.000	04.000	000445
47E382556P10	SIDE PLATE 4.0 HT				M		0000		EA	47E382556G1	02.000	02.000	000454
47E382556P11	ANGLE,3 X 3 X 3/8				M		0000		EA	47E382556G1	04.000	04.000	000455
47E382556P12	ANGLE,3 X 3 X 3/8				M		0000		EA	47E382556G1	04.000	04.000	000456
47E382556P13	ANGLE,3 X 3 X 3/8				M		0000		EA	47E382556G1	02.000	02.000	000457
47E382556P14	ANGLE,3 X 3 X 3/8				M		0000		EA	47E382556G1	02.000	02.000	000458
47E382556P2	CHANNEL,8-20 LB				M		0000		EA	47E382556G1	02.000	02.000	000446
47E382556P3	CHANNEL,6-16.3 LB				M		0000		EA	47E382556G1	04.000	04.000	000447
47E382556P4	ANGLE,3X3-7.2 LB				M		0000		EA	47E382556G1	04.000	04.000	000448
47E382556P5	CHANNEL,8-20 LB				M		0000		EA	47E382556G1	04.000	04.000	000449
47E382556P6	9-IN X 2 1/2 DP DECK				M		0000		EA	47E382556G1	14.000	14.000	000450
47E382556P7	6-IN X 2 1/2 DP DECK				M		0000		EA	47E382556G1	01.000	01.000	000451
47E382556P8	9-IN X 2 1/2 DP DECK				M		0000		EA	47E382556G1	01.000	01.000	000452

IDENTIFICATION NO.	NOMENCLATURE	ECN DWG INC	ECN DWG OUT	ECN PL-LATE APPLY	P C	T Y	CYCLE TIME	FSCM	U/M	NEXT HIGHER ASSEMBLY	QTY	EXT/TOT-QTY	CROSS REF
47E382556P9	END PLATE 4.0 HT				M		0000		EA	47E382556G1	02.000	02.000	000453
47C382557P1	ROTOR BRG SHIM				M		0000		EA	47E382441G1	04.000	04.000	000186
47B382558P1	INSERT, BRAKE DISC				M		0000		EA	47E382441G1	120.000	120.000	000187
47C382559P1	RTR SEAL RTNR, FWD				M		0000		EA	47E382441G1	01.000	01.000	000188
47C382560P1	PLUG, TORQUE PLATE				M		0000		EA	47E382441G1	02.000	02.000	000194
47D382563G1	TORQUE PLATE ASSY				M		0000		EA	47E382165G1	04.000	04.000	000035
47D382563P1	TORQUE PLATE				M		0000		EA	47D382563G1	01.000	04.000	000036
47B382564P1	BEARING ANGLE				M		0000		EA	47D382563G1	02.000	08.000	000037
47E382570G1	LUBE PLATFORM INSTL				M		0000		EA	47E382597G1	01.000	01.000	000442
47E382570P10	PIPE ASSY				M		0000		EA	47E382570G1	01.000	01.000	000513
47E382570P11	PIPE ASSY				M		0000		EA	47E382570G1	01.000	01.000	000514
47E382570P12	PIPE ASSY				M		0000		EA	47E382570G1	01.000	01.000	000515
47E382570P13	PIPE ASSY				M		0000		EA	47E382570G1	01.000	01.000	000516
47E382570P4	PIPE ASSY				M		0000		EA	47E382570G1	01.000	01.000	000507
47E382570P5	PIPE ASSY				M		0000		EA	47E382570G1	01.000	01.000	000508
47E382570P6	PIPE ASSY				M		0000		EA	47E382570G1	01.000	01.000	000509
47E382570P7	PIPE ASSY				M		0000		EA	47E382570G1	01.000	01.000	000510
47E382570P8	PIPE ASSY				M		0000		EA	47E382570G1	01.000	01.000	000511
47E382570P9	PIPE ASSY				M		0000		EA	47E382570G1	01.000	01.000	000512
47E382571	LIFT REQT, TWR CMPNT				X		0000		EA	47D382356G1	X		000157
47D382572P1	SPACER,ADAPTER				M		0000		EA	47E382363G1	01.000	01.000	000338
47D382572P2	SPACER,ADAPTER				M		0000		EA	47E382363G1	01.000	01.000	000339
47D382572P3	SPACER,ADAPTER				M		0000		EA	47E382363G1	01.000	01.000	000340
47D382572P4	SPACER,ADAPTER				M		0000		EA	47E382363G1	01.000	01.000	000341
47D382572P5	SPACER,SIDE SUPPORT				M		0000		EA	47E382363G1	04.000	04.000	000342

IDENTIFICATION NO.	NOMENCLATURE	--- ECN ---- DWG INC	OUT	PL-LATE APPLY	P C	T Y	CYCLE TIME	FSCM	U/M	NEXT HIGHER ASSEMBLY	QTY	EXT/TOT-QTY	CROSS REF
47D382572P6	SPACER,SIDE SUPPORT				M		0000		EA	47E382363G1	02.000	02.000	000343
47D382572P7	SPACER,SIDE SUPPORT				M		0000		EA	47E382363G1	02.000	02.000	000344
47D382574P1	TOP,STRL,FWD,WLDMT				M		0000		EA	47E382363G1	01.000	01.000	000360
47D382575P1	TOP STRUCTURE FWD				M		0000		EA	47E382363G1	01.000	01.000	000336
47D382576P1	TOP,STRL,AFT,WLDMT				M		0000		EA	47E382363G1	01.000	01.000	000359
47D382577P1	TOP STRUCTURE,AFT				M		0000		EA	47E382363G1	01.000	01.000	000322
47E382578P1	CRANE,MOUNTING STRL				M		0000		EA	47E382363G1	01.000	01.000	000337
47E382579G1	COOLING PLATFORM ASM				M		0000		EA	47E382570G1	01.000	01.000	000443
47E382579P16	PIPE,SCHED 40,5-IN				M		0000		FT	47E382579G1	07.000	07.000	000483
47E382579P18	PIPE,SCHED 40				M		0000		FT	47E382579G1	90.000	90.000	000485
47E382579P24	PIPE,SCHED 40,3IN				M		0000		FT	47E382579G1	05.000	05.000	000491
47B382580P1	SEAL,TOP STRUCTURE				M		0000		EA	47E382363G1	01.000	01.000	000351
47B382580P2	SEAL,TOP STRUCTURE				M		0000		EA	47E382363G1	01.000	01.000	000353
47B382580P3	SEAL,TOP STRUCTURE				M		0000		EA	47E382363G1	02.000	02.000	000354
47E382581P1	HUB, BRG - TEETER				M		0000		EA	47E382583G1	01.000	02.000	001196
47E382582G1	BLADE TIP ATCH ASSY				M		0000		EA	47E382590G1	02.000	02.000	001051
47E382582P10	ADHESIVE,EPOXY				B		0000		PT	47E382582G1	AR		001061
47E382582P11	GLASSFIBER CLOTH				B		0000		FT	47E382582G1	AR		001062
47E382583G1	TEETER HUB/BRG ASSY				M		0000		EA	47E382605G1	02.000	02.000	001194
47E382583P3	DOWEL PIN				M		0000		EA	47E382583G1	03.000	06.000	001197
47C382584G1	MOT/PUMP/CLR PLATF				M		0000		EA	47E382579G1	01.000	01.000	000464
47C382584P1	PLATE,BASE				M		0000		EA	47C382584G1	01.000	01.000	000465
47C382584P2	BEAM,4 W 13#				M		0000		EA	47C382584G1	02.000	02.000	000466
47C382584P3	BEAM,6 W 9#				M		0000		EA	47C382584G1	02.000	02.000	000467
47B382585P1	ANCHOR STUD				M		0000		EA	47E381112G1	96.000	96.000	000008

IDENTIFICATION NO.	NOMENCLATURE	ECN DWG INC	ECN DWG OUT	PL-LATE APPLY	P C	T Y	CYCLE TIME	FSCM	U/M	NEXT HIGHER ASSEMBLY	QTY	EXT/TOT-QTY	CROSS REF
47B382586P1	ANCHOR PLATE				M		0000		EA	47E381112G1	48.000	48.000	000010
47D382587P1	FLOATING MT BRACKET				M		0000		EA	47E382592G1	04.000	04.000	000152
47D382588P1	CROSS SPRT TOP STRL				M		0000		EA	47E382363G1	01.000	01.000	000352
47D382589G1	GEN & HS SFT INSTL				M		0000		EA	47E382597G1	01.000	01.000	000370
47E382590G1	ROTOR BLADE ASSY				M		0000		EA	47E382304G1	01.000	01.000	000983
47E382590P12	FIBERGLASS,CLOTH				B		0000		EA	47E382590G1	AR		001095
47E382590P23	ADHESIVE,EPOXY				B		0000		PT	47E382590G1	AR		001191
47D382591P1	STRUCTURE FRAME UNIT				M		0000		EA	47E382592G1	04.000	04.000	000149
47E382592G1	PERS ELEV/SUPT INSTL				M		0000		EA	47D382356G1	01.000	01.000	000146
47E382592P5	ANGLE SECTION				M		0000		EA	47E382592G1	20.000	20.000	000151
47D382593G1	YAW S/S ASSY				M		0000		EA	47D382356G1	01.000	01.000	000021
47E382594G1	YAW SLIP RING INSTL				M		0000		EA	47D382593G1	01.000	01.000	000107
47E382595G1	TWR PLATFORM INSTL				M		0000		EA	47D382356G1	01.000	01.000	000127
47D382596G1	AUX CRANE INSTL				M		0000		EA	47E382597G1	01.000	01.000	000373
47E382597G1	NACELLE OVERALL ASSY	1			M		0000		EA	47E382304G1	01.000	01.000	000302
47E382597G1	NACELLE OVERALL ASSY	1			X		0000		EA	47E382607G1	X		001230
												01.000	
47D382598G1	LFT BRACKETS INSTL				M		0000		EA	47E382597G1	01.000	01.000	000542
47D382598P8	SPACER,STA 227.5				M		0000		EA	47D382598G1	04.000	04.000	000550
47D382598P9	SPACER,STA 227.5				M		0000		EA	47D382598G1	02.000	02.000	000551
47E382599G1	SLIP RING INST				M		0000		EA	47E382607G1	01.000	01.000	001232
47E382599P10	CONDUIT 1.50 DIA				M		0000		EA	47E382599G1	06.000	06.000	001242
47E382599P19	ANGLES				M		0000		EA	47E382599G1	02.000	02.000	001251
47E382599P9	CONDUIT 2.00 DIA				M		0000		EA	47E382599G1	03.000	03.000	001241
47E382600P1	YOKE STRL,WELDMENT				M		0000		EA	47E382602G1	01.000	01.000	000161
47E382601G1	YOKE ASSY				M		0000		EA	47E382304G1	01.000	01.000	000158

IDENTIFICATION NO.	NOMENCLATURE	ECN DWG INC	ECN DWG OUT	PL-LATE APPLY	P C	T Y	CYCLE TIME	FSCM	U/M	NEXT HIGHER ASSEMBLY	QTY	EXT/TOT-QTY	CROSS REF
47E382601G1	YOKE ASSY				X		0000		EA	47E382607G1	X	01.000	001231
47E382601P27	GREASE				B		0000		LB	47E382601G1	AR		000300
47E382602G1	MACHINING ASSY, YOKE				M		0000		EA	47E382441G1	01.000	01.000	000160
47E382602P16	YOKE BRG CAP MACH				X		0000		EA	47E382602G1	X		000176
47E382602P2	YOKE BRG CAP				M		0000		EA	47E382605G1	02.000	02.000	001193
47E382602P3	BRACKET				M		0000		EA	47E382602G1	06.000	06.000	000163
47E382602P4	BRACKET				M		0000		EA	47E382602G1	01.000	01.000	000164
47E382602P5	BRACKET				M		0000		EA	47E382602G1	01.000	01.000	000165
47E382603G1	TEETER RSTR BK ASSY				M		0000		EA	47E382601G1	02.000	02.000	000215
47E382603G2	TEETER RSTR BK ASSY				M		0000		EA	47E382601G1	02.000	02.000	000243
47D382604G1	SHAFT ALIGNMENT FTG				M		0000		EA	47E382601G1	04.000	04.000	000288
47D382604P1	SHOE				M		0000		EA	47D382604G1	01.000	04.000	000289
47D382604P2	ADJUSTING SCREW				M		0000		EA	47D382604G1	01.000	04.000	000290
47D382604P3	BRACKET				M		0000		EA	47D382604G1	01.000	04.000	000291
47D382604P4	PIN,6.00-LG X.50 DIA				M		0000		EA	47D382604G1	02.000	08.000	000292
47D382604P9	PAD,NYLON				M		0000		EA	47D382604G1	02.000	08.000	000297
47E382605G1	TEETER BRG/RSTR INST				M		0000		EA	47E382590G1	01.000	01.000	001192
47E382605P19	PIN				M		0000		EA	47E382605G1	04.000	04.000	001219
47D382606G1	FAIRING INSTALLATION				M		0000		EA	47E382597G1	01.000	01.000	000377
47D382606P2	SEALING STRIP				M		0000		EA	47D382606G1	AR		000379
47D382606P3	ADHESIVE(SEE NOTE 4)				B		0000		EA	47D382606G1	AR		000380
47E382607G1	YOKE / NACELLE INSTL				M		0000		EA	47E382304G1	01.000	01.000	001229
47E382608G1	ROTOR BLADE INSTL				M		0000		EA	47E382304G1	01.000	01.000	001289
47D382609P1	YOKE BRG CAP,WLDMT				M		0000		EA	47E382602G1	02.000	02.000	000162

7241-3 TOTAL SUMMARY REPORT FOR COMPONENTS IN ASSEMBLY 47E382304G1 WTG ASSY, MOD-5A 06/15/84 PAGE 56

MODEL EA UNIT 000001

IDENTIFICATION NO.	NOMENCLATURE	ECN DWG INC	ECN DWG OUT	PL-LATE APPLY	P C	T Y	CYCLE TIME	FSCM	U/M	NEXT HIGHER ASSEMBLY	QTY	EXT/TOT-QTY	CROSS REF
47E382610G1	AILERON INSTALLATION				M		0000		EA	47E382590G1	02.000	02.000	001011
47A387005	I&C SIGNAL LIST				X		0000		EA	47E382304G1	X		001869
47D387009P1	GROUNDING XFMR				M		0000		EA	47E387060G1	01.000	01.000	000964
47D387010P1	CURRENT XFMR				M		0000		EA	47E387060G1	06.000	06.000	000966
47D387011P1	POTENTIAL XFMR				M		0000		EA	47E387060G1	03.000	03.000	000967
47C387013P1	GROUNDING RESISTOR				M		0000		EA	47E387060G1	02.000	02.000	000965
47E387014	SCHEM,NACELLE,GEN				X		0000		EA	47E382304G1	X		001872
47E387018	POWER DISTBR SCHEM				X		0000		EA	47E387081G1	X		001859
47D387022	SCHEMATIC				X		0000		EA	47D387121G1	X		000876
47E387027G1	ASSY,WTG CONTROL PAN*				*		0000		EA	47E387112G1	01.000	01.000	001328
47D387028P1	PANEL,FRONT,WTG CONT*				*		0000		EA	47E387027G1	01.000	01.000	001329
47D387029P1	CONNECTOR PANEL, WTG*				*		0000		EA	47E387027G1	01.000	01.000	001330
47D387030	SCHEMATIC DIAGRAM EL*				X	5	0000		EA	47E387027G1	X		001369
47D387032G1	GEAR BOX SIGNAL COND*				*		0000		EA	47E387072G1	01.000	01.000	000683
47D387034G1	WIND SIGNAL CONDITIO*				*		0000		EA	47E387072G1	01.000	01.000	000684
47E387037G1	ASSY,SYN SIG COND BD				*		0000		EA	47E387072G1	02.000	02.000	000685
47D387038	SCHEMATIC				X		0000		EA	47E387037G1	X		000702
47A387039	WIRE LIST				X		0000		EA	47E387037G1	X		000687
47D387040G1	POWER SIGNAL CONDITI*				*		0000		EA	47E387072G1	01.000	01.000	000681
47D387043G1	SYNCRO TO CURRENT CO*				*		0000		EA	47E387072G1	02.000	02.000	000682
47E387060G1	HIGH VOLTAGE CG ASSY				M		0000		EA	47E382597G1	01.000	01.000	000962
47E387061	SCHEMATIC				X		0000		EA	47E387072G1	X		000778
47E387062G1	CONT ELEK CAB, (CEC)				M		0000		EA	47E382597G1	01.000	01.000	000553
47D387063P1	PANEL				M		0000		EA	47D387121G1	01.000	01.000	000857
47D387063P2	MOUNTING CHASIS				M		0000		EA	47D387121G1	01.000	01.000	000858

IDENTIFICATION NO.	NOMENCLATURE	ECN DWG INC	ECN DWG OUT	PL-LATE APPLY	P C	T Y	CYCLE TIME	FSCM	U/M	NEXT HIGHER ASSEMBLY	QTY	EXT/TOT-QTY	CROSS REF
47E387064	SCHEMATIC				X		0000		EA	47E387062G1	X		000562
47E387064	SCHEMATIC				X		0000		EA	47E387095G1	X		000637
												00.000	
47E387065G1	PANEL, RIGHT SIDE				*		0000		EA	47E387062G1	01.000	01.000	000816
47E387065P1	PANEL,RIGHT SIDE				*		0000		EA	47E387065G1	01.000	01.000	000817
47E387069G1	HIGH V CG DRILL ASSY				M		0000		EA	47E387060G1	01.000	01.000	000963
47D387070G1	CENTER PANEL				*		0000		EA	47E387062G1	01.000	01.000	000582
47D387070P1	PANEL				*		0000		EA	47D387070G1	01.000	01.000	000583
47D387070P2	SPACER STRIP				*		0000		EA	47D387070G1	02.000	02.000	000584
47E387072G1	I&C SIG CONDITIONER				*		0000		EA	47E387062G1	01.000	01.000	000645
47D387073P1	PANEL,FRONT				*		0000		EA	47E387072G1	01.000	01.000	000646
47D387074P1	PANEL,RIGHT SIDE				*		0000		EA	47E387072G1	01.000	01.000	000647
47D387074P2	PANEL,LEFT SIDE				*		0000		EA	47E387072G1	01.000	01.000	000648
47C387075P1	PANEL,REAR				*		0000		EA	47E387072G1	01.000	01.000	000649
47B387076G1	MTG. BRACKET,CIRCUIT*				*		0000		EA	47E387072G1	02.000	02.000	000664
47B387076G2	MTG. BRACKET,CIRCUIT*				*		0000		EA	47E387072G1	02.000	02.000	000668
47B387076P1	BRACKET				*		0000		EA	47B387076G1	01.000	02.000	000665
47B387076P2	BRACKET				*		0000		EA	47B387076G2	01.000	02.000	000669
47B387078P1	SUPPORT ANGLE,CABLE				*		0000		EA	47E387072G1	01.000	01.000	000678
47B387079P1	MTG. BRACKET				*		0000		EA	47E387072G1	02.000	02.000	000679
47E387081G1	ELEC EQUIP BUILDING				M		0000		EA	47E382304G1	01.000	01.000	001308
47B387082P1	SHIELD				*		0000		EA	47E387072G1	01.000	01.000	000748
47B387082P1	SHIELD				*		0000		EA	47E387095G1	01.000	01.000	000611
												02.000	
47D387083G1	ASSY, MOTHER BD-SIGN*				*		0000		EA	47E387072G1	01.000	01.000	000651
47D387083P4	TERMINAL BLOCK				*		0000		EA	47D387083G1	01.000	01.000	000655
47D387083P5	TERMINAL BLOCK				*		0000		EA	47D387083G1	01.000	01.000	000656

IDENTIFICATION NO.	NOMENCLATURE	--- ECN ---- DWG INC	OUT	PL-LATE APPLY	P C	T Y	CYCLE TIME	FSCM	U/M	NEXT HIGHER ASSEMBLY	QTY	EXT/TOT-QTY	CROSS REF
47E387084G1	ASSY, STATUS PANEL				M		0000		EA	47E387112G1	01.000	01.000	001666
47E387084P2	PANEL, SIDE				B		0000		EA	47E387084G1	02.000	02.000	001668
47E387085G1	ASSY, UTILITY PANEL				M		0000		EA	47E387112G1	01.000	01.000	001544
47E387085P2	PANEL, SIDE				M		0000		EA	47E387085G1	02.000	02.000	001546
47B387086P1	ANGLE				*		0000		EA	47D387083G1	02.000	02.000	000653
47D387087G1	ASSY, COLOR CODED FL*				*		0000		EA	47E387072G1	07.000	07.000	000738
47A387088	WIRE LIST				X		0000		EA	47E387072G1	X		000770
47D387089G1	ASSY,MTR SIG CONDTNR				M		0000		EA	47E387084G1	05.000	05.000	001675
47D387089G1	ASSY,MTR SIG CONDTNR				M		0000		EA	47E387085G1	03.000	03.000	001553
47D387089G1	ASSY,MTR SIG CONDTNR				M		0000		EA	47E387091G1	03.000	03.000	001380
												11.000	
47E387090P1	DRILL & TRIM				*		0000		EA	47D387083G1	01.000	01.000	000652
47E387091G1	ASSY,GENERATOR PANEL				M		0000		EA	47E387112G1	01.000	01.000	001371
47E387091P2	PANEL, SIDE				B		0000		EA	47E387091G1	01.000	01.000	001373
47D387092	SCHEMATIC				X		0000		EA	47D387089G1	X		001682
47E387093G1	WIND TRANSLATOR				M		0000		EA	47E387062G1	01.000	01.000	000800
47E387095G1	CONTROLLER ASSY				M		0000		EA	47E387062G1	01.000	01.000	000589
47E387095P42	BUSHING, STRAIN RLF				M		0000		EA	47E387095G1	01.000	01.000	000631
47E387095P43	BUSHING, STRAIN RLF				M		0000		EA	47E387095G1	08.000	08.000	000632
47E387095P47	PLUG, SNAP OUT				M		0000		EA	47E387095G1	03.000	03.000	000636
47C387096G1	MTG BRACKET ASSY				M		0000		EA	47E387062G1	02.000	02.000	000824
47C387096P1	MTG BRACKET				M		0000		EA	47C387096G1	01.000	02.000	000825
47E387097	SCHEMATIC				X		0000		EA	47E387085G1	X		001637
47E387098P1	PANEL, FRONT				M		0000		EA	47E387085G1	01.000	01.000	001545
47C387099P1	PANEL, REAR				M		0000		EA	47E387085G1	01.000	01.000	001547
47D387100	SCHEMATIC				X		0000		EA	47D387113G1	X		001772

IDENTIFICATION NO.	NOMENCLATURE	ECN DWG INC	ECN DWG OUT	ECN PL-LATE APPLY	P C	T Y	CYCLE TIME	FSCM	U/M	NEXT HIGHER ASSEMBLY	QTY	EXT/TOT-QTY	CROSS REF
47E387101	SCHEMATIC				X		0000		EA	47E387084G1	X		001812
47E387103	SCHEMATIC				X		0000		EA	47E387091G1	X		001514
47E387104P1	PANEL, FRONT				B		0000		EA	47E387084G1	01.000	01.000	001667
47E387105P1	PANEL, FRONT				B		0000		EA	47E387091G1	01.000	01.000	001372
47D387106P1	PANEL, REAR				B		0000		EA	47E387084G1	01.000	01.000	001669
47D387106P1	PANEL, REAR				B		0000		EA	47E387091G1	01.000	01.000	001374
												02.000	
47D387107P1	SGL CD FR.,MODIFIED				B		0000		EA	47E387084G1	01.000	01.000	001671
47D387107P1	SGL CD FR.,MODIFIED				B		0000		EA	47E387091G1	01.000	01.000	001376
												02.000	
47D387108P1	BRACKET, CARD FRAME				B		0000		EA	47E387084G1	01.000	01.000	001672
47D387108P1	BRACKET, CARD FRAME				B		0000		EA	47E387091G1	01.000	01.000	001377
												02.000	
47D387109G1	FRONT PANEL				M		0000		EA	47E387060G1	01.000	01.000	000971
47D387110P1	BUS BAR				M		0000		EA	47E387060G1	01.000	01.000	000969
47E387112G1	SYS DISPLAY PNL ASSY				M		0000		EA	47E387081G1	01.000	01.000	001326
47D387113G1	SECURITY ALARM BOARD				M		0000		EA	47E387084G1	01.000	01.000	001763
47D387113G1	SECURITY ALARM BOARD				M		0000		EA	47E387091G1	01.000	01.000	001464
												02.000	
47E387114	CONTROL SYSTEM SCHEM				X		0000		EA	47E382304G1	X		001865
47E387115P1	MOUNTING FRAME				M		0000		EA	47E387095G1	01.000	01.000	000590
47E387116P1	DRILL & TRIM				M		0000		EA	47D387089G1	03.000	11.000	001381
47D387121G1	ESD ELECT ASSY				M		0000		EA	47E387062G1	01.000	01.000	000856
47D387122	SCHEMATIC				X		0000		EA	47D387130G1	X		000903
47A387124	WIRE LIST				X		0000		EA	47E387095G1	X		000630
47A387125	WIRE LIST				X		0000		EA	47D387121G1	X		000869
47A387128	WIRE LIST				X		0000		EA	47D387130G1	X		000902
47D387129P1	PANEL				M		0000		EA	47D387130G1	01.000	01.000	000883
47D387129P2	MOUNTING CHASSIS				M		0000		EA	47D387130G1	01.000	01.000	000884

IDENTIFICATION NO.	NOMENCLATURE	ECN DWG INC	ECN DWG OUT	ECN PL-LATE APPLY	P C	T Y	CYCLE TIME	FSCM	U/M	NEXT HIGHER ASSEMBLY	QTY	EXT/TOT-QTY	CROSS REF
47D387130G1	"G" SWITCH TEST ELEK				M		0000		EA	47E387062G1	01.000	01.000	000882
47D387132G1	ICE DETECTOR ELEK				M		0000		EA	47E387062G1	01.000	01.000	000922
4HP	PLUG				B		0000	97576	EA	47J382313G1	03.000	03.000	000099
4PN-SS	NIPPLE, PIPE				B		0000	97576	EA	47J382313G1	03.000	03.000	000079
4PT-SS	TEE, PIPE				B		0000	97576	EA	47J382313G1	03.000	03.000	000081
41F2R0	RESISTOR, 2 OHM				M		0000	03615	EA	47D387130G1	01.000	01.000	000897
4156-14-1	TERMINAL				M		0000	17117	EA	47D387130G1	08.000	08.000	000886
427D-SIZE-4	ELBOW,LONG				B		0000	14959	EA	47E382570G1	06.000	06.000	000505
427D-SIZE-5	ELBOW,LONG				B		0000	14959	EA	47E382570G1	03.000	03.000	000506
44A0111-16-9	WIRE, AWG #16				B	5	0000	06090	FT	47E387027G1	AR		001364
44A0111-16-9	WIRE, AWG #16				B	5	0000	06090	FT	47E387062G1	AR		000957
44A0111-16-9	WIRE, AWG #16				B	5	0000	06090	FT	47E387072G1	AR		000775
												00.000	
44A0111-20-9	WIRE, AWG #20				B	5	0000	06090	FT	47D387121G1	AR		000874
44A0111-20-9	WIRE, AWG #20				B	5	0000	06090	FT	47D387130G1	AR		000915
44A0111-20-9	WIRE, AWG #20				B	5	0000	06090	FT	47E387062G1	AR		000958
												00.000	
44A0111-22-9	WIRE, #22 AWG				B	5	0000	06090	FT	47E387072G1	AR		000783
44A0111-24-9	WIRE, AWG 24				B	5	0000	06090	FT	47E387084G1	AR		001816
44A0111-24-9	WIRE, AWG 24				B	5	0000	06090	FT	47E387085G1	AR		001640
44A0111-24-9	WIRE, AWG 24				B	5	0000	06090	FT	47E387091G1	AR		001518
												00.000	
44A0811-12-9	WIRE, AWG #12				B	5	0000	06090	FT	47E387062G1	AR		000956
4538K1	TFE SEALER, TEFLON				B		0000	39428	EA	47J382313G1	01.000	01.000	000076
4697-1032-SS-20	HEX M & F STANDOFF				M		0000	55566	EA	47E387062G1	12.000	12.000	000934
47-61-201-10	CAPTIVE SCREW				M		0000	94222	EA	47D387121G1	04.000	04.000	000861
47-61-201-10	CAPTIVE SCREW				M		0000	94222	EA	47D387130G1	04.000	04.000	000885
												08.000	
53451-1	RELAY				B	7	0000	18342	EA	47D387089G1	09.000	33.000	001595
5596A-8	TERMINAL BOARD				*		0000	75382	EA	47E387072G1	01.000	01.000	000750

WTG - MOD 5A

TOP DOWN

BREAK DOWN

7241-1 TOPDOWN BREAKDOWN FOR ASSEMBLY 47E382304G1 WTG ASSY, MOD-5A 06/15/84 PAGE 01
MODEL EA UNIT 000001

LVL	IDENTIFICATION NO.	NOMENCLATURE	ECN DWG INC	ECN DWG OUT	PL-LATE APPLY	P C	T Y	CYCLE TIME	U/M	PL-QTY	EXT/TOT QTY	ITEM/ REF DESG	FSCM CROSS REF
00	47E382304G1	WTG ASSY, MOD-5A	1			M		0000	EA		1.00	-	000001
01	47D382356G1	TOWER ASSY, WTG				M		0000	EA	1.00	1.00	1-00	000002
02	47E382297G1	TWR/FOUNDATION INSTL				M		0000	EA	1.00	1.00	1-00	000003
03	47E382355P1	TWR STRUCTURE ASSY				M		0000	EA	1.00	1.00	1-00	000004
03	47C382499P1	TOWER ACCESS DOOR				M		0000	EA	1.00	1.00	2-00	000005
03	47E381112G1	FOUNDATION REQT				M		0000	EA	1.00	1.00	3-00	000006
04	47E381112P1	FOUNDATION ASSEMBLY				M		0000	EA	1.00	1.00	1-00	000007
04	47B382585P1	ANCHOR STUD				M		0000	EA	96.00	96.00	2-00	000008
04	47E381112P3	NUT				B		0000	EA	192.00	192.00	3-00	000009
04	47B382586P1	ANCHOR PLATE				M		0000	EA	48.00	48.00	4-00	000010
04	47E381112P5	RECT. WIREWAY				M		0000	EA	3.00	3.00	5-00	000011
04	47E381112P6	CONDUIT SECTION				M		0000	EA	1.00	1.00	6-00	000012
04	47E381112P7	CONDUIT SECTION				M		0000	EA	2.00	2.00	7-00	000013
04	47E381112P8	CONDUIT SECTION				M		0000	EA	1.00	1.00	8-00	000014
04	47E381112P9	#09 REINFORCING ROD				M		0000	FT	AR		9-00	000015
04	47E381112P10	#11 REINFORCING ROD				M		0000	FT	AR		10-00	000016
03	47E382303P1	TWR/ FDN PLATF REQT				M		0000	EA	1.00	1.00	4-00	000017
03	N214P58B	NUT 2 1/2 DIA.				B		0000	EA	96.00	96.00	5-00	000018
03	N402P58B	WASHER				B		0000	EA	96.00	96.00	6-00	000019
03	47E382297P7	GROUT				M		0000	LB	AR		7-00	000020
02	47D382593G1	YAW S/S ASSY				M		0000	EA	1.00	1.00	2-00	000021
03	47E382133G1	YAW STRUCTURE ASSY				M		0000	EA	1.00	1.00	1-00	000022
04	47E382050P1	YAW HSG STRUCT,UPPER				M		0000	EA	1.00	1.00	1-00	000023
04	47E382219P1	YAW HSG STRUCT,LOWER				M		0000	EA	1.00	1.00	2-00	000024
04	47D381002P1	BEARING, YAW				M		0000	EA	1.00	1.00	3-00	000025
04	47C381036P32	BOLT				M		0000	EA	144.00	144.00	4-00	000026
04	47C381087P13	NUT, FATIGUE RATED				B		0000	EA	144.00	144.00	5-00	000027
04	47C381088P13	WASHER, HARDENED STL				B		0000	EA	144.00	144.00	6-00	000028
04	47C381088P14	WASHER, HARDENED STL				B		0000	EA	144.00	144.00	7-00	000029
03	47E382165G1	YAW DRIVE INSTL				M		0000	EA	1.00	1.00	2-00	000030
04	47D381010P1	BRAKE ASSY				M		0000	EA	8.00	8.00	1-00	000031
04	47D381003P1	ACTUATOR,HYDRAULIC				M		0000	EA	4.00	4.00	2-00	000032
04	47C382181P1	TRACK MTG BRACKET				M		0000	EA	4.00	4.00	3-00	000033
04	47E381107P1	TROLLEY ASSY				M		0000	EA	2.00	2.00	4-00	000034
04	47D382563G1	TORQUE PLATE ASSY				M		0000	EA	4.00	4.00	5-00	000035
05	47D382563P1	TORQUE PLATE				M		0000	EA	1.00	4.00	1-00	000036
05	47B382564P1	BEARING ANGLE				M		0000	EA	2.00	8.00	2-00	000037
05	N23P25012B	SCREW,CAP				B		0000	EA	6.00	24.00	3-00	000038

LVL	IDENTIFICATION NO.	NOMENCLATURE	ECN DWG INC	ECN DWG OUT	PL-LATE APPLY	P C	T Y	CYCLE TIME	U/M	PL-QTY	EXT/TOT QTY	ITEM/ REF DESG		FSCM CROSS REF
05	N400P13B	WASHER,PLAIN				B		0000	EA	6.00	24.00	4-00		000039
05	N406P43B	LOCKWASHER				B		0000	EA	6.00	24.00	5-06		000040
04	47D382192P1	BRAKE MTG PLATE				M		0000	EA	2.00	2.00	6-00		000041
04	47D382198P1	CLEVIS BLOCK				M		0000	EA	2.00	2.00	7-00		000042
04	47B382200P1	RETAINER, PIN				M		0000	EA	4.00	4.00	8-00		000043
04	47B382193P1	PIN, CLEVIS - BRAKE				M		0000	EA	4.00	4.00	9-00		000044
04	47C381036P15	BOLT,FATIGUE RATED				B		0000	EA	36.00	36.00	10-00		000045
04	47C381036P16	BOLT,FATIGUE RATED				B		0000	EA	12.00	12.00	11-00		000046
04	N733P33112B	SCREW,12 POINT				B		0000	EA	12.00	12.00	12-00		000047
04	BLFR-22	SPHERICAL BEARING				B		0000	EA	4.00	4.00	13-00	81376	000048
04	DREM-20-080	ROD END BEARING				B		0000	EA	4.00	4.00	14-00	81376	000049
04	47B382419P1	WASHER				B		0000	EA	96.00	96.00	15-00		000050
04	N727P33040B	CAPSCREW				B		0000	EA	24.00	24.00	16-00		000051
04	N265P33B	LOCKNUT				B		0000	EA	32.00	32.00	17-00		000052
04	N265P34B	LOCKNUT				B		0000	EA	12.00	12.00	18-00		000053
04	N214P34B	HEX NUT				B		0000	EA	12.00	12.00	19-00		000054
04	N266P43B	LOCKNUT				B		0000	EA	48.00	48.00	20-00		000055
04	47B382420P1	JAM NUT				B		0000	EA	4.00	4.00	21-00		000056
04	N402AP17B	PLAIN WASHER, NARROW				B		0000	EA	64.00	64.00	22-00		000057
04	N402AP48B	PLAIN WASHER, REG.				B		0000	EA	24.00	24.00	23-00		000058
04	**47E382165-24	BOLT				B		0000	EA	24.00	24.00	24-00		000059
04	N22BP21016B	CAPSCREW				B		0000	EA	16.00	16.00	26-00		000060
04	47B382196P1	SPACER, CLEVIS BLOCK				M		0000	EA	4.00	4.00	27-00		000061
04	47B382196P2	SPCR,ACTUATOR CLEVIS.				M		0000	EA	8.00	8.00	28-00		000062
04	47C382181P2	TRACK, MTG BRACKET				M		0000	EA	2.00	2.00	29-00		000063
04	47D382198P2	CLEVIS BLOCK				M		0000	EA	2.00	2.00	30-00		000064
04	47C382278P1	MANIFOLD FITTING				M		0000	EA	2.00	2.00	31-00		000065
04	N22P25036B	CAPSCREW				B		0000	EA	8.00	8.00	32-00		000066
04	N402AP13B	PLAIN WASHER, NARROW				B		0000	EA	8.00	8.00	33-00		000067
04	N405P43B	LOCKWASHER - MEDIUM				B	5	0000	EA	8.00	8.00	34-00		000068
04	47B382277P1	DRIP TROUGH				M		0000	EA	2.00	2.00	35-00		000069
04	47B382277P2	DRIP TROUGH				M		0000	EA	2.00	2.00	36-00		000070
04	A100-4	TUBE FTG, MALE CONN.				B		0000	EA	4.00	4.00	37-00	97576	000071
04	A400-4	TUBE FTG, MALE ELBOW				B		0000	EA	16.00	16.00	38-00	97576	000072
04	700-4	TUBE FTG, TEE UNION				B		0000	EA	8.00	8.00	39-00	97576	000073
04	B7A17B	.250 O.D X .035 WALL				M		0000	FT	20.00	20.00	40-00		000074
03	47J382313G1	HYDR PIPING, YAW DR				M		0000	EA	1.00	1.00	3-00		000075
04	4538K1	TFE SEALER, TEFLON				B		0000	EA	1.00	1.00	1-00	39428	000076
04	**47J382313-2	ACCUMULATOR & V PKG				M		0000	EA	1.00	1.00	2-00		000077
04	**47J382313-3	YAW POWER UNIT				M		0000	EA	1.00	1.00	3-00		000078
04	4PN-SS	NIPPLE, PIPE				B		0000	EA	3.00	3.00	4-00	97576	000079
04	3043T18	"U" BOLT & NUTS				B	5	0000	EA	6.00	6.00	5-00	39428	000080
04	4PT-SS	TEE, PIPE				B		0000	EA	3.00	3.00	6-00	97576	000081
04	B7A17B-.035	TUBING, .250 OD				B		0000	FT	4.00	4.00	7-00		000082
04	B7A17B-.065	TUBING, .500 OD				B		0000	FT	200.00	200.00	8-00		000083
04	47C381075P1	HOSE ASSY				M		0000	EA	4.00	4.00	9-00		000084

LVL	IDENTIFICATION NO.	NOMENCLATURE	ECN DWG INC	ECN DWG OUT	ECN PL-LATE APPLY	P C	T Y	CYCLE TIME	U/M	PL-QTY	EXT/TOT QTY	ITEM/ REF DESG	FSCM	CROSS REF
04	47C381075P2	HOSE ASSY				M		0000	EA	4.00	4.00	10-00		000085
04	47B381074P1	HOSE ASSY				M		0000	EA	2.00	2.00	11-00		000086
04	C9612-3	PRESSURE, SWITCH				B		0000	EA	3.00	3.00	12-00	89326	000087
04	HP36GT	VALVE, .50 NPT				B		0000	EA	3.00	3.00	13-00	01029	000088
04	22617-8	O-RING				B		0000	EA	10.00	10.00	14-00	01276	000089
04	980-8-8SS	CONNECTOR, BULKHEAD				B		0000	EA	2.00	2.00	15-00	97576	000090
04	100-8-4SS	CONNECTOR, MALE				B		0000	EA	3.00	3.00	16-00	97576	000091
04	100-8-8SS	CONNECTOR, MALE				B		0000	EA	3.00	3.00	17-00	97576	000092
04	8TFNSS	NIPPLE				B		0000	EA	8.00	8.00	18-00	97576	000093
04	A400-8SS	ELBOW, MALE				B		0000	EA	8.00	8.00	19-00	97576	000094
04	A600-8SS	TEE BRANCH, MALE				B		0000	EA	3.00	3.00	20-00	97576	000095
04	140-8-4SS	ADAPTER, REDUCER				B		0000	EA	4.00	4.00	21-00	97576	000096
04	700-8SS	TEE, UNION				B		0000	EA	16.00	16.00	22-00	97576	000097
04	100C-8SS	TUBE CAP				B		0000	EA	4.00	4.00	23-00	97576	000098
04	4HP	PLUG				B		0000	EA	3.00	3.00	24-00	97576	000099
04	100025	CLAMP ASSY				B		0000	EA	5.00	5.00	25-00	55017	000100
04	100050	CLAMP ASSY				B		0000	EA	103.00	103.00	26-00	55017	000101
04	8PRC-SS	CONNECTOR, REDUCING				B		0000	EA	3.00	3.00	27-00	97576	000102
04	300H1-15CG-04-K	PRESSURE TRANSDUCER				B		0000	EA	3.00	3.00	28-00	89326	000103
04	N405P41B	LOCK WASHER				B	5	0000	EA	12.00	12.00	29-00		000104
04	47E382314	HYDRAULIC SYS SCHEM				X		0000	EA	X		30-00		000105
03	**47D382593-4	GREASE SHIELD INSTL				M		0000	EA	1.00	1.00	4-00		000106
03	47E382594G1	YAW SLIP RING INSTL				M		0000	EA	1.00	1.00	5-00		000107
04	47D381019P1	SLIP RNG UN YAW AXIS				M		0000	EA	1.00	1.00	1-00		000108
04	47E381017	YAW SR ELECT INTFC				X		0000	EA	X		2-00		000109
04	**47E382594-3	CROSS BEAM				M		0000	EA	2.00	2.00	3-00		000110
04	**47E382594-4	MOUNTING BRACKET				M		0000	EA	1.00	1.00	4-00		000111
04	**47E382594-5	SUPPORT ANGLE				M		0000	EA	4.00	4.00	5-00		000112
04	**47E382594-6	YAW ELEC&INSTR INSTL				M		0000	EA	1.00	1.00	6-00		000113
04	N22P35052B	HEX HD BOLT				B		0000	EA	24.00	24.00	7-00		000114
04	N22AP35040B	HEX HD BOLT				B		0000	EA	12.00	12.00	8-00		000115
04	N265P35B	LOCK NUT, 3/4 DIA.				*		0000	EA	24.00	24.00	9-00		000116
04	N402P18B	WASHER, 3/4 DIA.				B		0000	EA	36.00	36.00	10-00		000117
04	N22P39068B	HEX HD BOLT				B		0000	EA	8.00	8.00	11-00		000118
04	N265P39B	LOCK NUT - 1 DIA.				B	5	0000	EA	8.00	8.00	12-00		000119
04	N402P20B	WASHER				B		0000	EA	8.00	8.00	13-00		000120
04	MS20995C20	LOCK WIRE				B	5	0000	FT	AR		14-00		000121
04	650LR-HAB350	POWER DISTR CONN				B		0000	EA	14.00	14.00	15-00	11117	000122
04	600BE	EXTENDER				B		0000	EA	6.00	6.00	16-00	11117	000123
04	**47E382594-17	DRAG LINK				M		0000	EA	2.00	2.00	17-00		000124
03	**47D382593-6	BRG, AUTO LUBE INSTL				M		0000	EA	1.00	1.00	6-00		000125
02	**47D382356-3	ELEC WIRE WAY INSTL				M		0000	EA	1.00	1.00	3-00		000126
02	47E382595G1	TWR PLATFORM INSTL				M		0000	EA	1.00	1.00	4-00		000127
03	**47E382595-1	LOWER PLATFORM ASSY				M		0000	EA	1.00	1.00	1-00		000128

LVL	IDENTIFICATION NO.	NOMENCLATURE	ECN DWG INC	ECN DWG OUT	PL-LATE APPLY	P C	T Y	CYCLE TIME	U/M	PL-QTY	EXT/TOT QTY	ITEM/ REF DESG	FSCM	CROSS REF
03	**47E382595-2	MID PLATFORM ASSY				M		0000	EA	1.00	1.00	2-00		000129
03	**47E382595-3	UPR (YAW) PLATF ASSY				M		0000	EA	1.00	1.00	3-00		000130
03	**47E382595-4	STAIRWAY ASSY				M		0000	EA	1.00	1.00	4-00		000131
03	**47E382595-5	PRIMARY LADDER ASSY				M		0000	EA	1.00	1.00	5-00		000132
03	**47E382595-6	ALTN LADDER ASSY				M		0000	EA	1.00	1.00	6-00		000133
03	**47E382595-7	GUARDRAIL ASSY				M		0000	EA	1.00	1.00	7-00		000134
03	**47E382595-8	HGR CABLE ASSY - UPR				M		0000	EA	12.00	12.00	8-00		000135
03	**47E382595-9	HGR CABLE ASSY - LWR				M		0000	EA	6.00	6.00	9-00		000136
03	**47E382595-10	ACCESS COVER HATCH				M		0000	EA	1.00	1.00	10-00		000137
03	**47E382595-11	HGR CLEVIS FITTING				M		0000	EA	12.00	12.00	11-00		000138
03	**47E382595-12	BEARING PADS				M		0000	EA	12.00	12.00	12-00		000139
03	N22P35036B	BLT,HEX HD, 3/4 DIA.				B		0000	EA	36.00	36.00	13-00		000140
03	N264P35B	LOCKNUT, 3/4 DIA.				B		0000	EA	36.00	36.00	14-00		000141
03	N402P18B	WASHER, 3/4 DIA.				B		0000	EA	36.00	36.00	15-00		000142
02	**47D382356-5	TWR INSTM INSTL				M		0000	EA	1.00	1.00	5-00		000143
02	**47D382356-6	TOWER MARKINGS				M		0000	EA	1.00	1.00	6-00		000144
02	**47D382356-7	GND WIRE WAY INSTL				M		0000	EA	1.00	1.00	7-00		000145
02	47E382592G1	PERS ELEV/SUPT INSTL				M		0000	EA	1.00	1.00	8-00		000146
03	**47E382592-1	LWR G TWR SECT ASSY				M		0000	EA	1.00	1.00	1-00		000147
03	**47E382592-2	UPR G TWR SECT ASSY				M		0000	EA	1.00	1.00	2-00		000148
03	47D382591P1	STRUCTURE FRAME UNIT				M		0000	EA	4.00	4.00	3-00		000149
03	15AS650	PERS ELEVATOR UNIT				M		0000	EA	1.00	1.00	4-00		000150
03	47E382592P5	ANGLE SECTION				M		0000	EA	20.00	20.00	5-00		000151
03	47D382587P1	FLOATING MT BRACKET				M		0000	EA	4.00	4.00	6-00		000152
03	N14P35060B	HEX HD BOLT,3/4 DIA.				B		0000	EA	16.00	16.00	7-00		000153
03	N265P35B	LOCK NUT, 3/4 DIA.				*		0000	EA	16.00	16.00	8-00		000154
03	N402P18B	WASHER, 3/4 DIA.				B		0000	EA	16.00	16.00	9-00		000155
03	PB34-414	PARA BLT,CONC ANCHOR				B		0000	EA	16.00	16.00	10-00		000156
02	47E382571	LIFT REQT, TWR CMPNT				X		0000	EA	X		9-00		000157
01	47E382601G1	YOKE ASSY				M		0000	EA	1.00	1.00	2-00		000158
02	47E382441G1	YOKE / SPINDLE ASSY				M		0000	EA	1.00	1.00	1-00		000159
03	47E382602G1	MACHINING ASSY, YOKE				M		0000	EA	1.00	1.00	1-00		000160
04	47E382600P1	YOKE STRL,WELDMENT				M		0000	EA	1.00	1.00	1-00		000161
04	47D382609P1	YOKE BRG CAP,WLDMT				M		0000	EA	2.00	2.00	2-00		000162
04	47E382602P3	BRACKET				M		0000	EA	6.00	6.00	3-00		000163
04	47E382602P4	BRACKET				M		0000	EA	1.00	1.00	4-00		000164
04	47E382602P5	BRACKET				M		0000	EA	1.00	1.00	5-00		000165
04	N500P12464C	PIN,TAPERED DOWEL#13				M		0000	EA	8.00	8.00	6-00		000166
04	47C381036P14	BOLT,FATIGUE RATED				B		0000	EA	16.00	16.00	7-00		000167
04	47C381088P5	WASHER,1.25 DIA				B		0000	EA	16.00	16.00	8-00		000168
04	N405P52B	LOCK WASHER				M		0000	EA	16.00	16.00	9-00		000169
04	47C381036P6	BOLT,FATIGUE RATED				B		0000	EA	20.00	20.00	10-00		000170

LVL	IDENTIFICATION NO.	NOMENCLATURE	ECN DWG INC	ECN DWG OUT	PL-LATE APPLY	P C	T Y	CYCLE TIME	U/M	PL-QTY	EXT/TOT QTY	ITEM/ REF DESG	FSCM	CROSS REF
04	47C381088P1	WASHER,1.00 DIA				M		0000	EA	40.00	40.00	11-00		000171
04	47C381088P2	WASHER,1.00 DIA				M		0000	EA	40.00	40.00	12-00		000172
04	47C381087P2	LOCKNUT				B		0000	EA	40.00	40.00	13-00		000173
04	47C381036P2	BOLT,FATIGUE RATED				B		0000	EA	20.00	20.00	14-00		000174
04	CHOCKFAST-ORANGE	GROUTING				B		0000	EA	AR		15-00	20420	000175
04	47E382602P16	YOKE BRG CAP MACH				X		0000	EA	X		16-00		000176
03	47E382333P1	SPINDLE SHAFT				M		0000	EA	1.00	1.00	2-00		000177
03	47D381080P1	TPR RLR BRG,SPDL/AFT				M		0000	EA	1.00	1.00	3-00	80657	000178
03	47D381081P1	TPR RLR BRG,SPDL/FWD				M		0000	EA	1.00	1.00	4-00	80657	000179
03	47C382458P1	RETAINER, AFT				M		0000	EA	6.00	6.00	5-00		000180
03	47B381106P1	"O" RING SEAL, AFT				M		0000	EA	1.00	1.00	6-00		000181
03	47D382456P1	RTR SEAL RTNR, AFT				M		0000	EA	1.00	1.00	7-00		000182
03	47B382454P1	ANTI-ROTATION PIN				M		0000	EA	2.00	2.00	8-00		000183
03	47D382372P1	RTR BRG RETAINER,FWD				M		0000	EA	1.00	1.00	9-00		000184
03	47D382457P1	LOW SPEED BRAKE DISC				M		0000	EA	1.00	1.00	10-00		000185
03	47C382557P1	ROTOR BRG SHIM				M		0000	EA	4.00	4.00	11-00		000186
03	47B382558P1	INSERT, BRAKE DISC				M		0000	EA	120.00	120.00	12-00		000187
03	47C382559P1	RTR SEAL RTNR, FWD				M		0000	EA	1.00	1.00	13-00		000188
03	47C381102P1	ROTOR SEAL FWD				M		0000	EA	2.00	2.00	14-00	03668	000189
03	47C381103P1	ROTOR SEAL AFT				M		0000	EA	2.00	2.00	15-00	03668	000190
03	47D382455P1	DISC, RTR SPEED SNSR				M		0000	EA	1.00	1.00	16-00		000191
03	47C381104P1	STUD				M		0000	EA	120.00	120.00	17-00		000192
03	47C381104P2	STUD				M		0000	EA	120.00	120.00	18-00		000193
03	47C382560P1	PLUG, TORQUE PLATE				M		0000	EA	2.00	2.00	19-00		000194
03	47D381082P2	TORQUE PLATE				M		0000	EA	1.00	1.00	20-00		000195
03	47C381036P24	BOLT,FATIGUE RATED				B		0000	EA	36.00	36.00	21-00		000196
03	47C381088P9	WASHER,1.50 DIA				M		0000	EA	72.00	72.00	22-00		000197
03	47C381087P9	NUT				B		0000	EA	36.00	36.00	23-00		000198
03	47B381109P1	WSHR, BELLEVILLE SPR				B		0000	EA	120.00	120.00	24-00	92830	000199
03	47C381087P5	NUT				B		0000	EA	360.00	360.00	25-00		000200
03	47C381088P5	WASHER,1.25 DIA				B		0000	EA	240.00	240.00	26-00		000201
03	N2800P2	FITTING, LUBE				B		0000	EA	4.00	4.00	27-00		000202
03	N733P25016B	SCREW, TWELVE-POINT				B		0000	EA	78.00	78.00	28-00		000203
03	N405P43B	LOCKWASHER - MEDIUM				B	5	0000	EA	78.00	78.00	29-00		000204
03	N5700P6053B	PLUG, PIPE				B		0000	EA	4.00	4.00	30-00		000205
03	N733P29024B	SCREW, TWELVE-POINT				B		0000	EA	36.00	36.00	31-00		000206
03	N405P45B	WASHER, LOCK				B	5	0000	EA	36.00	36.00	32-00		000207
02	47D382435G1	LOW SPEED SHAFT ASSY				*		0000	EA	1.00	1.00	2-00		000208
03	47D382296P1	LOW SPEED SHAFT				*		0000	EA	1.00	1.00	1-00		000209
03	47D381082P1	COUPLING HUB, FWD				*		0000	EA	1.00	1.00	2-00		000210
03	47C381083P1	COUPLING HUB, AFT				*		0000	EA	1.00	1.00	3-00		000211
02	47C382436P1	SEAL RTNR, COUPLING				M		0000	EA	2.00	2.00	3-00		000212
02	47C382437P1	SEAL PL, FWD CPLG				M		0000	EA	6.00	6.00	4-00		000213
02	47C381110P1	SEAL, FWD, COUPLING				M		0000	EA	4.00	4.00	5-00		000214
02	47E382603G1	TEETER RSTR BK ASSY				M		0000	EA	2.00	2.00	6-00		000215

LVL	IDENTIFICATION NO.	NOMENCLATURE	ECN DWG INC	ECN DWG OUT	PL-LATE APPLY	P C	T Y	CYCLE TIME	U/M	PL-QTY	EXT/TOT QTY	ITEM/ REF DESG	FSCM	CROSS REF
03	**47E382603-1	HOUSING WALL,LH				M		0000	EA	1.00	2.00	1-00		000216
03	**47E382603-2	HOUSING WALL,RH				M		0000	EA	1.00	2.00	2-00		000217
03	47D381010P2	BRAKE ASSY				M		0000	EA	2.00	4.00	3-00		000218
03	**47E382603-4	HOUSING COVER				M		0000	EA	1.00	2.00	4-00		000219
03	**47E382603-5	TEETER ARM				M		0000	EA	1.00	2.00	5-00		000220
03	**47E382603-6	HOUSING COVER				M		0000	EA	2.00	4.00	6-00		000221
03	**47E382603-7	OUTBD BELLOWS COVER				M		0000	EA	1.00	2.00	7-00		000222
03	**47E382603-8	INBD BELLOWS COVER				M		0000	EA	1.00	2.00	8-00		000223
03	**47E382603-9	ROLLER GUIDE ASSY				M		0000	EA	1.00	2.00	9-00		000224
03	**47E382603-10	BRKT ASSY,LIMIT SW				M		0000	EA	1.00	2.00	10-00		000225
03	**47E382603-11	BRKT,MTG,LIMIT SW				M		0000	EA	1.00	2.00	11-00		000226
03	CR115GM101	SWITCH,LIMIT				B		0000	EA	1.00	2.00	12-00	02295	000227
03	N14P21012B	SCREW,CAP,HEX HD				B		0000	EA	4.00	8.00	13-00		000228
03	N405P111B	LOCKWASHER				B		0000	EA	4.00	8.00	14-00		000229
03	N14P25016B	SCREW,HEX HD				B		0000	EA	34.00	68.00	15-00		000230
03	N405P113B	LOCKWASHER				B		0000	EA	34.00	68.00	16-00		000231
03	N14P29016B	SCREW HEX HD				B		0000	EA	2.00	4.00	17-00		000232
03	N405P115B	LOCKWASHER				B		0000	EA	2.00	4.00	18-00		000233
03	N14P35032B	SCREW,HEX HD				B		0000	EA	4.00	8.00	19-00		000234
03	N405P118B	LOCKWASHER				B		0000	EA	4.00	8.00	20-00		000235
03	N14P39048B	SCREW,HEX HD				B		0000	EA	10.00	20.00	21-00		000236
03	N266P39B	LOCKNUT				B		0000	EA	10.00	20.00	22-00		000237
03	47C381036P14	BOLT,FATIGUE RATED				B		0000	EA	12.00	24.00	23-00		000238
03	47C381087P5	NUT				B		0000	EA	12.00	24.00	24-00		000239
03	**47E382603-25	HYDR FLUID LINE ASSY				M		0000	EA	1.00	2.00	25-00		000240
03	271	LOCKTITE				B		0000	EA	AR		26-00	05972	000241
03	47C381088P6	WASHER,1.25 DIA				B		0000	EA	24.00	48.00	28-00		000242
02	47E382603G2	TEETER RSTR BK ASSY				M		0000	EA	2.00	2.00	7-00		000243
03	**47E382603-1	HOUSING WALL,LH				M		0000	EA	1.00	2.00	1-00		000244
03	**47E382603-2	HOUSING WALL,RH				M		0000	EA	1.00	2.00	2-00		000245
03	47D381010P2	BRAKE ASSY				M		0000	EA	2.00	4.00	3-00		000246
03	**47E382603-4	HOUSING COVER				M		0000	EA	1.00	2.00	4-00		000247
03	**47E382603-5	TEETER ARM				M		0000	EA	1.00	2.00	5-00		000248
03	**47E382603-6	HOUSING COVER				M		0000	EA	2.00	4.00	6-00		000249
03	**47E382603-7	OUTBD BELLOWS COVER				M		0000	EA	1.00	2.00	7-00		000250
03	**47E382603-8	INBD BELLOWS COVER				M		0000	EA	1.00	2.00	8-00		000251
03	**47E382603-9	ROLLER GUIDE ASSY				M		0000	EA	1.00	2.00	9-00		000252
03	**47E382603-11	BRKT,MTG,LIMIT SW				M		0000	EA	1.00	2.00	11-00		000253
03	CR115GM101	SWITCH,LIMIT				B		0000	EA	1.00	2.00	12-00	02295	000254
03	N14P21012B	SCREW,CAP,HEX HD				B		0000	EA	4.00	8.00	13-00		000255
03	N405P111B	LOCKWASHER				B		0000	EA	4.00	8.00	14-00		000256
03	N14P25016B	SCREW,HEX HD				B		0000	EA	34.00	68.00	15-00		000257
03	N405P113B	LOCKWASHER				B		0000	EA	34.00	68.00	16-00		000258
03	N14P29016B	SCREW HEX HD				B		0000	EA	2.00	4.00	17-00		000259
03	N405P115B	LOCKWASHER				B		0000	EA	2.00	4.00	18-00		000260
03	N14P35032B	SCREW,HEX HD				B		0000	EA	4.00	8.00	19-00		000261

LVL	IDENTIFICATION NO.	NOMENCLATURE	ECN DWG INC	ECN DWG OUT	PL-LATE APPLY	P C	T Y	CYCLE TIME	U/M	PL-QTY	EXT/TOT QTY	ITEM/ REF DESG	FSCM	CROSS REF
03	N405P118B	LOCKWASHER				B		0000	EA	4.00	8.00	20-00		000262
03	N14P39048B	SCREW,HEX HD				B		0000	EA	10.00	20.00	21-00		000263
03	N266P39B	LOCKNUT				B		0000	EA	10.00	20.00	22-00		000264
03	47C381036P14	BOLT,FATIGUE RATED				B		0000	EA	12.00	24.00	23-00		000265
03	47C381087P5	NUT				B		0000	EA	12.00	24.00	24-00		000266
03	**47E382603-25	HYDR FLUID LINE ASSY				M		0000	EA	1.00	2.00	25-00		000267
03	271	LOCKTITE				B		0000	EA	AR		26-00	05972	000268
03	**47E382603-27	BRKT ASSY,LIMIT SW				M		0000	EA	1.00	2.00	27-00		000269
03	47C381088P6	WASHER,1.25 DIA				B		0000	EA	24.00	48.00	28-00		000270
02	**47E382601-8	DRAG LINK				M		0000	EA	4.00	4.00	8-00		000271
02	**47E382601-9	CLAMP RING				M		0000	EA	1.00	1.00	9-00		000272
02	**47E382601-10	RTR BLADE HYD ASSY				M		0000	EA	1.00	1.00	10-00		000273
02	**47E382601-11	RTR BLADE ELECT ASSY				M		0000	EA	1.00	1.00	11-00		000274
02	N22BP29020B	BOLT, SLFLKG				B		0000	EA	48.00	48.00	12-00		000275
02	N22BP25016B	BOLT, SLFLKG				B		0000	EA	72.00	72.00	13-00		000276
02	N402P15B	WASHER				B		0000	EA	48.00	48.00	14-00		000277
02	N402P13B	WASHER				B		0000	EA	72.00	72.00	15-00		000278
02	N22P39048B	BOLT, HEX HD				B		0000	EA	12.00	12.00	16-00		000279
02	N402P20B	WASHER				B		0000	EA	20.00	20.00	17-00		000280
02	N22P39052B	BOLT, HEX HD				B		0000	EA	8.00	8.00	18-00		000281
02	N214P39B	NUT				B		0000	EA	8.00	8.00	19-00		000282
02	N22P45112B	BOLT, HEX HD				B		0000	EA	32.00	32.00	20-00		000283
02	N402P22B	WASHER				B		0000	EA	32.00	32.00	21-00		000284
02	N264P45B	LOCKNUT				B		0000	EA	32.00	32.00	22-00		000285
02	TA-30	PHILLYBOND ADHESIVE				B		0000	GA	AR		23-00	20420	000286
02	**47E382601-24	MTG BRACKET				B		0000	EA	4.00	4.00	24-00		000287
02	47D382604G1	SHAFT ALIGNMENT FTG				M		0000	EA	4.00	4.00	25-00		000288
03	47D382604P1	SHOE				M		0000	EA	1.00	4.00	1-00		000289
03	47D382604P2	ADJUSTING SCREW				M		0000	EA	1.00	4.00	2-00		000290
03	47D382604P3	BRACKET				M		0000	EA	1.00	4.00	3-00		000291
03	47D382604P4	PIN,6.00-LG X.50 DIA				M		0000	EA	2.00	8.00	4-00		000292
03	N504P2264	COTTER PIN				B		0000	EA	1.00	4.00	5-00		000293
03	N504P2224	COTTER PIN				B		0000	EA	1.00	4.00	6-00		000294
03	N402P20B	WASHER				B		0000	EA	1.00	4.00	7-00		000295
03	N402P81B	WASHER,FLAT				B		0000	EA	1.00	4.00	8-00		000296
03	47D382604P9	PAD,NYLON				M		0000	EA	2.00	8.00	9-00		000297
03	A15B60B1	ADH,ECCOBOND 281				B		0000	EA	AR		10-00		000298
02	**47E382601-26	HYD PIPING INSTL				M		0000	EA	1.00	1.00	26-00		000299
02	47E382601P27	GREASE				B		0000	LB	AR		27-00		000300
02	**47E382601-28	BLADE BUMPER ASSY				M		0000	EA	2.00	2.00	28-00		000301
01	47E382597G1	NACELLE OVERALL ASSY	1			M		0000	EA	1.00	1.00	3-00		000302
02	47E382363G1	NACELLE STRUCT ASSY	1			M		0000	EA	1.00	1.00	1-00		000303
03	47E382306G1	BED PL.,MACH.&DRILL.	01			M		0000	EA	1.00	1.00	1-00		000304

LVL	IDENTIFICATION NO.	NOMENCLATURE	ECN DWG INC	ECN DWG OUT	PL-LATE APPLY	P C	T Y	CYCLE TIME	U/M	PL-QTY	EXT/TOT QTY	ITEM/ REF DESG	FSCM	CROSS REF
04	47E382429P1	BED PL. STRUCT. WELD				M		0000	EA	1.00	1.00	1-00		000305
04	47E382450P1	GEARBOX MTG. STRUCT.				M		0000	EA	1.00	1.00	2-00		000306
04	47C381036P40	BOLT, STRUCT. 2-12				M		0000	EA	24.00	24.00	3-00		000307
04	47C381087P18	NUT 2-12				M		0000	EA	24.00	24.00	4-00		000308
04	47C381088P18	WASHER 2.00				B		0000	EA	24.00	24.00	5-00		000309
04	47C381036P4	BOLT,FATIGUE RATED				M		0000	EA	20.00	20.00	6-00		000310
04	47C381087P1	NUT				M		0000	EA	20.00	20.00	7-00		000311
04	47C381088P2	WASHER,1.00 DIA				M		0000	EA	20.00	20.00	8-00		000312
04	47D382554P1	FLOORING, BEDPLATE				M		0000	EA	1.00	1.00	9-00		000313
04	N733P35040B	BOLT, STRUCT. .75-10				M		0000	EA	36.00	36.00	10-00		000314
04	N272P35	LOCKNUT .75-10				M		0000	EA	36.00	36.00	11-00		000315
04	N402P48B	WASHER .75				*		0000	EA	36.00	36.00	12-00		000316
04	A15F6C18	RTV SILICONE SEALANT				M		0000	OZ	AR		13-00		000317
04	47C381088P17	WASHER 2.00				M		0000	EA	24.00	24.00	14-00		000318
04	47C381088P1	WASHER,1.00 DIA				M		0000	EA	20.00	20.00	15-00		000319
03	47E382265P1	SIDE SUPPORT				M		0000	EA	1.00	1.00	2-00		000320
03	47E382265P2	SIDE SUPPORT				M		0000	EA	1.00	1.00	3-00		000321
03	47D382577P1	TOP STRUCTURE,AFT				M		0000	EA	1.00	1.00	4-00		000322
03	47E382272P1	ROTOR ADAPTER STRL				M		0000	EA	1.00	1.00	5-00		000323
03	47C381036P2	BOLT,FATIGUE RATED				B		0000	EA	32.00	32.00	6-00		000324
03	47C381036P6	BOLT,FATIGUE RATED				B		0000	EA	60.00	60.00	7-00		000325
03	47C381036P20	BOLT, FATIGUE RATED				B		0000	EA	88.00	88.00	8-00		000326
03	47C381036P10	BOLT,FATIGUE RATED				B		0000	EA	12.00	12.00	9-00		000327
03	47C381036P25	BOLT,FATIGUE RATED				B		0000	EA	36.00	36.00	10-00		000328
03	47C381087P2	LOCKNUT				B		0000	EA	92.00	92.00	11-00		000329
03	47C381087P6	LOCKNUT				B		0000	EA	12.00	12.00	12-00		000330
03	47C381087P10	LOCKNUT				B		0000	EA	124.00	124.00	13-00		000331
03	47C381088P1	WASHER,1.00 DIA				M		0000	EA	92.00	92.00	14-00		000332
03	47C381088P5	WASHER,1.25 DIA				B		0000	EA	12.00	12.00	15-00		000333
03	47C381088P9	WASHER,1.50 DIA				M		0000	EA	136.00	136.00	16-00		000334
03	90681A487	PIN,TAPER				B		0000	EA	6.00	6.00	17-00	39428	000335
03	47D382575P1	TOP STRUCTURE FWD				M		0000	EA	1.00	1.00	18-00		000336
03	47E382578P1	CRANE,MOUNTING STRL				M		0000	EA	1.00	1.00	19-00		000337
03	47D382572P1	SPACER,ADAPTER				M		0000	EA	1.00	1.00	20-00		000338
03	47D382572P2	SPACER,ADAPTER				M		0000	EA	1.00	1.00	21-00		000339
03	47D382572P3	SPACER,ADAPTER				M		0000	EA	1.00	1.00	22-00		000340
03	47D382572P4	SPACER,ADAPTER				M		0000	EA	1.00	1.00	23-00		000341
03	47D382572P5	SPACER,SIDE SUPPORT				M		0000	EA	4.00	4.00	24-00		000342
03	47D382572P6	SPACER,SIDE SUPPORT				M		0000	EA	2.00	2.00	25-00		000343
03	47D382572P7	SPACER,SIDE SUPPORT				M		0000	EA	2.00	2.00	26-00		000344
03	47C381088P2	WASHER,1.00 DIA				M		0000	EA	105.00	105.00	27-00		000345
03	47C381088P10	WASHER,1.50 DIA				B		0000	EA	136.00	136.00	28-00		000346
03	47C381088P6	WASHER,1.25 DIA				B		0000	EA	12.00	12.00	29-00		000347
03	47C381036P26	BOLT,FATIGUE RATED				B		0000	EA	12.00	12.00	30-00		000348
03	47C381087P9	NUT				B		0000	EA	12.00	12.00	31-00		000349
03	47C381036P1	BOLT,FATIGUE RATED				B		0000	EA	14.00	14.00	32-00		000350
03	47B382580P1	SEAL,TOP STRUCTURE				M		0000	EA	1.00	1.00	33-00		000351

LVL	IDENTIFICATION NO.	NOMENCLATURE	ECN DWG INC	ECN DWG OUT	ECN PL-LATE APPLY	P C	T Y	CYCLE TIME	U/M	PL-QTY	EXT/TOT QTY	ITEM/ REF DESG	FSCM	CROSS REF
03	47D382588P1	CROSS SPRT TOP STRL				M		0000	EA	1.00	1.00	34-00		000352
03	47B382580P2	SEAL,TOP STRUCTURE				M		0000	EA	1.00	1.00	35-00		000353
03	47B382580P3	SEAL,TOP STRUCTURE				M		0000	EA	2.00	2.00	36-00		000354
03	N733P35040B	BOLT, STRUCT. .75-10				M		0000	EA	20.00	20.00	37-00		000355
03	N733P35064B	BOLT,STRL				B		0000	EA	8.00	8.00	38-00		000356
03	N402P18B	WASHER, 3/4 DIA.				B		0000	EA	56.00	56.00	39-00		000357
03	N272P35	LOCKNUT .75-10				M		0000	EA	28.00	28.00	40-00		000358
03	47D382576P1	TOP,STRL,AFT,WLDMT				M		0000	EA	1.00	1.00	41-00		000359
03	47D382574P1	TOP,STRL,FWD,WLDMT				M		0000	EA	1.00	1.00	42-00		000360
03	47E382264P1	SIDE SUPPORT,WLDMT				M		0000	EA	1.00	1.00	43-00		000361
03	47E382271P1	ROTOR ADAPTER,WLDMT				M		0000	EA	1.00	1.00	44-00		000362
02	47E382553G1	GEARBOX INSTALLATION				M		0000	EA	1.00	1.00	2-00		000363
03	47E381046P1	GEARBOX ENVELOPE				B		0000	EA	1.00	1.00	1-00		000364
03	NUMBER-14	TAPER PIN 6.00 LG				B		0000	EA	4.00	4.00	2-00	76054	000365
03	47C381036P50	BOLT				B		0000	EA	36.00	36.00	3-00		000366
03	47C381088P21	WASHER				B		0000	EA	36.00	36.00	4-00		000367
03	47C381087P22	LOCKNUT				B		0000	EA	36.00	36.00	5-00		000368
03	47C381088P22	WASHER				B		0000	EA	36.00	36.00	6-00		000369
02	47D382589G1	GEN & HS SFT INSTL				M		0000	EA	1.00	1.00	3-00		000370
03	**47D382589-1	GENERATOR				B		0000	EA	1.00	1.00	1-00		000371
03	47D381078P1	HIGH SPEED SFT ASSY				B		0000	EA	1.00	1.00	2-00		000372
02	47D382596G1	AUX CRANE INSTL				M		0000	EA	1.00	1.00	4-00		000373
03	P20-10-30-20	CRANE				B		0000	EA	1.00	1.00	1-00	58811	000374
03	N405P49B	LOCKWASHER				B		0000	EA	36.00	36.00	2-00		000375
03	N22P36064B	BOLT				B		0000	EA	36.00	36.00	3-00		000376
02	47D382606G1	FAIRING INSTALLATION				M		0000	EA	1.00	1.00	5-00		000377
03	47E381113P1	FAIRING ENVELOPE				B		0000	EA	1.00	1.00	1-00		000378
03	47D382606P2	SEALING STRIP				M		0000	EA	AR		2-00		000379
03	47D382606P3	ADHESIVE(SEE NOTE 4)				B		0000	EA	AR		3-00		000380
03	BN360-813-3	BLIND NUT ASSY				B	5	0000	EA	56.00	56.00	4-00	73197	000381
03	N24P29048C	SCREW,HEX HD				B		0000	EA	48.00	48.00	5-00		000382
03	N405P15C	WASHER,LOCK				B	5	0000	EA	56.00	56.00	6-00		000383
03	N402P15C	WASHER 1/2 DIA				B	5	0000	EA	56.00	56.00	7-00		000384
03	N24P29024C	SCREW,HEX HD				B		0000	EA	8.00	8.00	8-00		000385
03	**47D382606-9	WIND SENSOR MAST				M		0000	EA	2.00	2.00	9-00		000386
02	**47E382597-6	ELECT EQUIP INSTL				M		0000	EA	1.00	1.00	6-00		000387
02	47E382472G1	LAD & FALSE FL INSTL				M		0000	EA	1.00	1.00	7-00		000388
03	47D382430G1	TRAP DR, BEDPL / TWR				M		0000	EA	2.00	2.00	1-00		000389
04	47D382430P1	COVER				M		0000	EA	1.00	2.00	1-00		000390

LVL	IDENTIFICATION NO.	NOMENCLATURE	ECN DWG INC	ECN DWG OUT	PL-LATE APPLY	P C	T Y	CYCLE TIME	U/M	PL-QTY	EXT/TOT QTY	ITEM/ REF DESG	FSCM CROSS REF
04	47D382430P2	ANGLE				M		0000	EA	2.00	4.00	2-00	000391
04	47D382430P3	ANGLE				M		0000	EA	2.00	4.00	3-00	000392
04	47D382430P4	RIB				M		0000	EA	2.00	4.00	4-00	000393
04	47D382430P5	PLATE				M		0000	EA	1.00	2.00	5-00	000394
04	47D382430P6	BAR				M		0000	EA	1.00	2.00	6-00	000395
04	47B382131P1	ENCLOSURE, DOOR				*		0000	EA	1.00	2.00	7-00	000396
04	47C381030P1	HINGE, TRAP DOOR				*		0000	EA	1.00	2.00	8-00	000397
03	47D382430G2	TRAP DR, BEDPL / TWR				M		0000	EA	2.00	2.00	2-00	000398
04	47D382430P1	COVER				M		0000	EA	1.00	2.00	1-00	000399
04	47D382430P2	ANGLE				M		0000	EA	2.00	4.00	2-00	000400
04	47D382430P3	ANGLE				M		0000	EA	2.00	4.00	3-00	000401
04	47D382430P4	RIB				M		0000	EA	2.00	4.00	4-00	000402
04	47D382430P6	BAR				M		0000	EA	1.00	2.00	6-00	000403
04	47B382131P1	ENCLOSURE, DOOR				*		0000	EA	1.00	2.00	7-00	000404
04	47C381030P1	HINGE, TRAP DOOR				*		0000	EA	1.00	2.00	8-00	000405
03	47D382474G1	TRAP DR,BEDPL / LUBE				M		0000	EA	1.00	1.00	3-00	000406
04	47D382474P1	COVER				M		0000	EA	1.00	1.00	1-00	000407
04	47D382474P2	ANGLE				M		0000	EA	2.00	2.00	2-00	000408
04	47D382474P3	ANGLE				M		0000	EA	2.00	2.00	3-00	000409
04	47D382474P4	RIB				M		0000	EA	2.00	2.00	4-00	000410
04	47D382474P5	PLATE				M		0000	EA	1.00	1.00	5-00	000411
04	47D382474P6	BAR				M		0000	EA	1.00	1.00	6-00	000412
04	47B382131P1	ENCLOSURE, DOOR				*		0000	EA	1.00	1.00	7-00	000413
04	47C381030P1	HINGE, TRAP DOOR				*		0000	EA	1.00	1.00	8-00	000414
03	47D382474G2	TRAP DR,BEDPL / LUBE				M		0000	EA	1.00	1.00	4-00	000415
04	47D382474P1	COVER				M		0000	EA	1.00	1.00	1-00	000416
04	47D382474P2	ANGLE				M		0000	EA	2.00	2.00	2-00	000417
04	47D382474P3	ANGLE				M		0000	EA	2.00	2.00	3-00	000418
04	47D382474P4	RIB				M		0000	EA	2.00	2.00	4-00	000419
04	47D382474P6	BAR				M		0000	EA	1.00	1.00	6-00	000420
04	47B382131P1	ENCLOSURE, DOOR				*		0000	EA	1.00	1.00	7-00	000421
04	47C381030P1	HINGE, TRAP DOOR				*		0000	EA	1.00	1.00	8-00	000422
03	47D382465P1	FRAME,TRAP DOOR				M		0000	EA	2.00	2.00	5-00	000423
03	47C382475P1	MOUNTING BLOCK				M		0000	EA	2.00	2.00	6-00	000424
03	**47E382472-7	FALSE FLOOR				M		0000	EA	1.00	1.00	7-00	000425
03	47E382472P8	ROOF SCUTTLE				B		0000	EA	1.00	1.00	8-00	000426
03	**47E382472-9	LADDER,ROOF				M		0000	EA	1.00	1.00	9-00	000427
03	**47E382472-10	LADDER,TOWER				M		0000	EA	2.00	2.00	10-00	000428
03	47E382472P11	SEALING STRIP				M		0000	EA	AR		11-00	000429
03	N727P29016B	BOLT,STRUCTURAL				B		0000	EA	32.00	32.00	12-00	000430
03	N402P45B	WASHER				B		0000	EA	72.00	72.00	13-00	000431
03	N265P29B	NUT,SELF-LOCKING .50*				*		0000	EA	112.00	112.00	14-00	000432

LVL	IDENTIFICATION NO.	NOMENCLATURE	ECN DWG INC	ECN DWG OUT	PL-LATE APPLY	P C	T Y	CYCLE TIME	U/M	PL-QTY	EXT/TOT QTY	ITEM/ REF DESG	FSCM	CROSS REF
03	N727P29036B	BOLT,STRUCTURAL				B		0000	EA	48.00	48.00	15-00		000433
03	91151A033	WASHER,BEVEL				B		0000	EA	40.00	40.00	16-00	39428	000434
03	N727P29052B	BOLT,STRUCTURAL				B		0000	EA	28.00	28.00	17-00		000435
03	**47E382472-18	BRACKET,LADDER				M		0000	EA	8.00	8.00	18-00		000436
03	**47E382472-19	BRACKET,LADDER				M		0000	EA	1.00	1.00	19-00		000437
03	**47E382472-20	BRACKET,LADDER				M		0000	EA	1.00	1.00	20-00		000438
03	**47E382472-21	BRACKET,LADDER				M		0000	EA	2.00	2.00	21-00		000439
03	N727P29028B	BOLT,STRUCTURAL				B		0000	EA	24.00	24.00	22-00		000440
03	A15F6C18	RTV SILICONE SEALANT				M		0000	OZ	AR		23-00		000441
02	47E382570G1	LUBE PLATFORM INSTL				M		0000	EA	1.00	1.00	8-00		000442
03	47E382579G1	COOLING PLATFORM ASM				M		0000	EA	1.00	1.00	1-00		000443
04	47E382556G1	GEARBOX/CLG PLATFORM				M		0000	EA	1.00	1.00	1-00		000444
05	47E382556P1	ANGLE,4 X 4 X 3/8				M		0000	EA	4.00	4.00	1-00		000445
05	47E382556P2	CHANNEL,8-20 LB				M		0000	EA	2.00	2.00	2-00		000446
05	47E382556P3	CHANNEL,6-16.3 LB				M		0000	EA	4.00	4.00	3-00		000447
05	47E382556P4	ANGLE,3X3-7.2 LB				M		0000	EA	4.00	4.00	4-00		000448
05	47E382556P5	CHANNEL,8-20 LB				M		0000	EA	4.00	4.00	5-00		000449
05	47E382556P6	9-IN X 2 1/2 DP DECK				M		0000	EA	14.00	14.00	6-00		000450
05	47E382556P7	6-IN X 2 1/2 DP DECK				M		0000	EA	1.00	1.00	7-00		000451
05	47E382556P8	9-IN X 2 1/2 DP DECK				M		0000	EA	1.00	1.00	8-00		000452
05	47E382556P9	END PLATE 4.0 HT				M		0000	EA	2.00	2.00	9-00		000453
05	47E382556P10	SIDE PLATE 4.0 HT				M		0000	EA	2.00	2.00	10-00		000454
05	47E382556P11	ANGLE,3 X 3 X 3/8				M		0000	EA	4.00	4.00	11-00		000455
05	47E382556P12	ANGLE,3 X 3 X 3/8				M		0000	EA	4.00	4.00	12-00		000456
05	47E382556P13	ANGLE,3 X 3 X 3/8				M		0000	EA	2.00	2.00	13-00		000457
05	47E382556P14	ANGLE,3 X 3 X 3/8				M		0000	EA	2.00	2.00	14-00		000458
05	N22P28024B	SCREW,HEX HD,1/2-13				B		0000	EA	130.00	130.00	15-00		000459
05	N405P15B	LOCKWASHER				B		0000	EA	130.00	130.00	16-00		000460
05	N214FP29B	NUT,HEX,1/2-13				B		0000	EA	130.00	130.00	17-00		000461
05	1-700	CRIMPING TOOL				B		0000	EA	1.00	1.00	18-00	09098	000462
05	1-600	J-BOLT/NUT/WASHER				B		0000	EA	12.00	12.00	19-00	09098	000463
04	47C382584G1	MOT/PUMP/CLR PLATF				M		0000	EA	1.00	1.00	2-00		000464
05	47C382584P1	PLATE,BASE				M		0000	EA	1.00	1.00	1-00		000465
05	47C382584P2	BEAM,4 W 13#				M		0000	EA	2.00	2.00	2-00		000466
05	47C382584P3	BEAM,6 W 9#				M		0000	EA	2.00	2.00	3-00		000467
05	N22P33020B	SCREW,HEX HD				B		0000	EA	16.00	16.00	4-00		000468
05	N405P77B	LOCKWASHER				B		0000	EA	16.00	16.00	5-00		000469
04	350-SERIES-3DC	PUMP				B		0000	EA	1.00	1.00	3-00	59180	000470
04	326T-FRAME	MOTOR,TEFC				B		0000	EA	1.00	1.00	4-00		000471
04	N620B-SERIES-N600	COUPLING				B		0000	EA	1.00	1.00	5-00	89040	000472
04	OCS-2000D	OIL COOLER				B		0000	EA	3.00	3.00	6-00	67049	000473
04	89281/2F	CHECKVALVE,SWG,125LB				B		0000	EA	1.00	1.00	7-00	63686	000474

LVL	IDENTIFICATION NO.	NOMENCLATURE	ECN DWG INC	ECN DWG OUT	ECN PL-LATE APPLY	P C	T Y	CYCLE TIME	U/M	PL-QTY	EXT/TOT QTY	ITEM/ REF DESG	FSCM	CROSS REF
04	MODEL-400-D	FILTER,DUPLEX,4-IN				B		0000	EA	1.00	1.00	8-00	61424	000475
04	**47E382579-9	BASE,FILTER SUPPORT				M		0000	EA	1.00	1.00	9-00		000476
04	47C381084P1	VALVE,THERMO,AMOT				M		0000	EA	1.00	1.00	10-00		000477
04	47C381086P1	VALVE,RELIEF,4-IN				M		0000	EA	1.00	1.00	11-00		000478
04	FIG-258-32IN-LONG	SADDLE SUPPORT,4 IN				B		0000	EA	2.00	2.00	12-00	92959	000479
04	FIG-258-12.5IN-LONG	SADDLE SUPPORT,4 IN				B		0000	EA	1.00	1.00	13-00	92959	000480
04	FIG-277	PIPE ROLL & PLATE				B		0000	EA	1.00	1.00	14-00	92959	000481
04	105E-SIZE-4	TEE,FLANGED,250 LB				B		0000	EA	1.00	1.00	15-00	40475	000482
04	47E382579P16	PIPE,SCHED 40,5-IN				M		0000	FT	7.00	7.00	16-00		000483
04	290E-SIZE-5	FLANGE,SLIP-ON 300LB				B		0000	EA	2.00	2.00	17-00	40475	000484
04	47E382579P18	PIPE,SCHED 40				M		0000	FT	90.00	90.00	18-00		000485
04	290E-SIZE-4	FLANGE,SLIP-ON,300LB				B		0000	EA	12.00	12.00	19-00	40475	000486
04	264E-SIZE-4	TEE,STRAIGHT,300LB				B		0000	EA	4.00	4.00	20-00	40475	000487
04	264E-SIZE-4-X-3	TEE,REDUCING,300LB				B		0000	EA	3.00	3.00	21-00	40475	000488
04	260E-SIZE-4	ELBOW,STRAIGHT,300LB				B		0000	EA	10.00	10.00	22-00	40475	000489
04	1981/2E	UNION-3IN,300LB				B		0000	EA	6.00	6.00	23-00	40475	000490
04	47E382579P24	PIPE,SCHED 40,3IN				M		0000	FT	5.00	5.00	24-00		000491
04	FIG-268E-SIZE-3	ELBOW,STREET,300LB				B		0000	EA	6.00	6.00	25-00	40475	000492
04	260E-SIZE-4-X-3	ELBOW,REDUCING,300LB				B		0000	EA	3.00	3.00	26-00	40475	000493
04	N22P35056B	SCREW,HEX HD				B		0000	EA	120.00	120.00	27-00		000494
04	N405P48B	LOCKWASHER				B		0000	EA	120.00	120.00	28-00		000495
04	N214P35B	NUT				B		0000	EA	120.00	120.00	29-00		000496
04	N22P33036B	SCREW,HEX HD				B		0000	EA	8.00	8.00	30-00		000497
04	N405P47B	LOCKWASHER				B		0000	EA	50.00	50.00	31-00		000498
04	N214P33B	NUT				B		0000	EA	50.00	50.00	32-00		000499
04	N22P33032B	SCREW,HEX HD				B		0000	EA	10.00	10.00	33-00		000500
04	N402AP17B	PLAIN WASHER, NARROW				B		0000	EA	50.00	50.00	34-00		000501
04	N22P33020B	SCREW,HEX HD				B		0000	EA	40.00	40.00	35-00		000502
04	N22P29018B	SCREW,HEX HD				B		0000	EA	8.00	8.00	36-00		000503
04	N405P45B	WASHER, LOCK				B	5	0000	EA	8.00	8.00	37-00		000504
03	427D-SIZE-4	ELBOW,LONG				B		0000	EA	6.00	6.00	2-00	14959	000505
03	427D-SIZE-5	ELBOW,LONG				B		0000	EA	3.00	3.00	3-00	14959	000506
03	47E382570P4	PIPE ASSY				M		0000	EA	1.00	1.00	4-00		000507
03	47E382570P5	PIPE ASSY				M		0000	EA	1.00	1.00	5-00		000508
03	47E382570P6	PIPE ASSY				M		0000	EA	1.00	1.00	6-00		000509
03	47E382570P7	PIPE ASSY				M		0000	EA	1.00	1.00	7-00		000510
03	47E382570P8	PIPE ASSY				M		0000	EA	1.00	1.00	8-00		000511
03	47E382570P9	PIPE ASSY				M		0000	EA	1.00	1.00	9-00		000512
03	47E382570P10	PIPE ASSY				M		0000	EA	1.00	1.00	10-00		000513
03	47E382570P11	PIPE ASSY				M		0000	EA	1.00	1.00	11-00		000514
03	47E382570P12	PIPE ASSY				M		0000	EA	1.00	1.00	12-00		000515
03	47E382570P13	PIPE ASSY				M		0000	EA	1.00	1.00	13-00		000516
03	294E-SIZE-4	FLANGE,SLIP ON				B		0000	EA	14.00	14.00	14-00	14959	000517
03	294E-SIZE-5	FLANGE,SLIP ON				B		0000	EA	6.00	6.00	15-00	14959	000518
03	47C381039P1	EXPANSION JOINT				M		0000	EA	2.00	2.00	16-00		000519
03	47C381039P2	EXPANSION JOINT				M		0000	EA	1.00	1.00	17-00		000520
03	FIG-88-SIZE-4	U-BOLT				B		0000	EA	2.00	2.00	18-00	96723	000521
03	FIG-88-SIZE-5	U-BOLT				B		0000	EA	1.00	1.00	19-00	96723	000522

LVL	IDENTIFICATION NO.	NOMENCLATURE	ECN DWG INC	ECN DWG OUT	ECN PL-LATE APPLY	P C	T Y	CYCLE TIME	U/M	PL-QTY	EXT/TOT QTY	ITEM/ REF DESG	FSCM	CROSS REF
03	91151A031	WASHER,BEVEL				B		0000	EA	4.00	4.00	20-00	39428	000523
03	91151A33	WASHER,BEVEL				B		0000	EA	2.00	2.00	21-00	39428	000524
03	FIG-9-SIZE-5	HANGER,PEAR				B		0000	EA	1.00	1.00	22-00	96723	000525
03	FIG-500-5/8-DIA	ROD,THREADED				B		0000	EA	1.00	1.00	23-00	96723	000526
03	N214P33B	NUT				B		0000	EA	2.00	2.00	24-00		000527
03	N727P35056B	BOLT,STRUCTURAL				B		0000	EA	200.00	200.00	25-00		000528
03	N405P48B	LOCKWASHER				B		0000	EA	200.00	200.00	26-00		000529
03	N214P35B	NUT				B		0000	EA	200.00	200.00	27-00		000530
03	N727P35048B	BOLT,STRUCTURAL				B		0000	EA	32.00	32.00	28-00		000531
03	N402P48B	WASHER .75				*		0000	EA	32.00	32.00	29-00		000532
03	N265P35B	LOCK NUT, 3/4 DIA.				*		0000	EA	32.00	32.00	30-00		000533
03	91151A036	WASHER,BEVEL				B		0000	EA	32.00	32.00	31-00	39428	000534
03	47C382020	LUBRICATION SCHEM				X		0000	EA	X		32-00		000535
02	**47E382597-9	ELECT WW & CND INSTL				M		0000	EA	1.00	1.00	9-00		000536
02	47C381036P20	BOLT, FATIGUE RATED				B		0000	EA	120.00	120.00	10-00		000537
02	47C381087P13	NUT, FATIGUE RATED				B		0000	EA	120.00	120.00	11-00		000538
02	47C381088P14	WASHER, HARDENED STL				B		0000	EA	120.00	120.00	12-00		000539
02	47C381088P13	WASHER, HARDENED STL				B		0000	EA	120.00	120.00	13-00		000540
02	A15F6C18	RTV SILICONE SEALANT				M		0000	OZ	AR		14-00		000541
02	47D382598G1	LFT BRACKETS INSTL				M		0000	EA	1.00	1.00	15-00		000542
03	47C382485P1	LIFTING,BRKT				M		0000	EA	2.00	2.00	1-00		000543
03	47D382555P1	LIFTING BRKT				M		0000	EA	2.00	2.00	2-00		000544
03	47C381088P9	WASHER,1.50 DIA				M		0000	EA	24.00	24.00	3-00		000545
03	47C381087P9	NUT				B		0000	EA	24.00	24.00	4-00		000546
03	47C381036P24	BOLT,FATIGUE RATED				B		0000	EA	8.00	8.00	5-00		000547
03	47C381036P20	BOLT, FATIGUE RATED				B		0000	EA	8.00	8.00	6-00		000548
03	47C381036P22	BOLT,FATIGUE RATED				B		0000	EA	8.00	8.00	7-00		000549
03	47D382598P8	SPACER,STA 227.5				M		0000	EA	4.00	4.00	8-00		000550
03	47D382598P9	SPACER,STA 227.5				M		0000	EA	2.00	2.00	9-00		000551
03	47C381088P10	WASHER,1.50 DIA				B		0000	EA	24.00	24.00	10-00		000552
02	47E387062G1	CONT ELEK CAB, (CEC)				M		0000	EA	1.00	1.00	16-00		000553
03	47E381100P1	CABINET				M		0000	EA	1.00	1.00	1-00		000554
03	47D381040P1	HEAT EXCHANGER				M		0000	EA	2.00	2.00	2-00		000555
03	47E382491G1	AIR DUCT UNIT				M		0000	EA	2.00	2.00	3-00		000556
03	NP136931-A1	SIGNATURE STRIP				B	5	0000	EA	1.00	1.00	4-00		000557
03	N530P405G	SCR,DR RD HD,#4 X.31				B		0000	EA	4.00	4.00	5-00		000558
03	NP-206417	NAMEPLATE				B	5	0000	EA	1.00	1.00	6-00		000559
03	47A380070P3	NPL, AN/REV STATUS				*		0000	EA	1.00	1.00	7-00		000560
03	47A380052	ELECTRICAL FAB. STD				X	5	0000	EA	X		8-00		000561
03	47E387064	SCHEMATIC				X		0000	EA	X		9-00		000562
03	**47E387062-10	WIRE LIST				X		0000	EA	X		10-00		000563
03	47A380046	CONT ELEK CAB SPEC				X		0000	EA	X		11-00		000564
03	47C382234P1	GASKET				M		0000	EA	2.00	2.00	12-00		000565
03	**47E387062-13	PANEL, REAR RIGHT				M		0000	EA	1.00	1.00	13-00		000566
03	**47E387062-14	PANEL, REAR LEFT				M		0000	EA	1.00	1.00	14-00		000567

LVL	IDENTIFICATION NO.	NOMENCLATURE	ECN DWG INC	ECN DWG OUT	PL-LATE APPLY	P C	T Y	CYCLE TIME	U/M	PL-QTY	EXT/TOT QTY	ITEM/ REF DESG	FSCM	CROSS REF
03	47A381067P8	I/O TRACK				M		0000	EA	8.00	8.00	15-00		000568
03	47A381067P9	120 VAC TRK INP MDL				M		0000	EA	81.00	81.00	16-00		000569
03	47A381067P10	120 VAC TRK OUT MDL				M		0000	EA	47.00	47.00	17-00		000570
03	47A381067P31	TERMINATOR PLUG				M		0000	EA	1.00	1.00	18-00		000571
03	**47E387062-19	CABLE ASSY				M		0000	EA	3.00	3.00	19-00		000572
03	47B382248P1	AIR BAF, RIGHT SIDE				M		0000	EA	1.00	1.00	20-00		000573
03	47B382248P2	AIR BAF, LEFT SIDE				M		0000	EA	1.00	1.00	21-00		000574
03	47A381067P23	CABLE, I/O TRACK				M		0000	EA	1.00	1.00	22-00		000575
03	**47E387062-23	CABLE CLAMP SUPPORT				M		0000	EA	1.00	1.00	23-00		000576
03	**47E387062-24	CABLE CLAMP SUPPORT				M		0000	EA	1.00	1.00	24-00		000577
03	**47E387062-25	CABLE CLAMP SUPPORT				M		0000	EA	1.00	1.00	25-00		000578
03	47A381045PAR	CLAMP,LOOP-CUSHIONED				M		0000	EA	AR		26-00		000579
03	A-72FSCPS	CENTER PANEL SUPPORT				M		0000	EA	2.00	2.00	27-00	00843	000580
03	A-72RP24F5	RELAY RACK ANGLE				M		0000	EA	1.00	1.00	28-00	00843	000581
03	47D387070G1	CENTER PANEL				*		0000	EA	1.00	1.00	29-00		000582
04	47D387070P1	PANEL				*		0000	EA	1.00	1.00	1-00		000583
04	47D387070P2	SPACER STRIP				*		0000	EA	2.00	2.00	2-00		000584
04	SS-024-3-ZI	SELF CLINCHING FASTE*				*		0000	EA	29.00	29.00	3-00	46384	000585
04	S-832-3-ZI	SELF CLINCHING FASTE*				*		0000	EA	6.00	6.00	4-00	46384	000586
04	S-632-3-ZI	SELF CLINCHING FASTE*				B	5	0000	EA	28.00	28.00	5-00	46384	000587
03	**47E387062-30	CABLE RETAINER				M		0000	EA	1.00	1.00	30-00		000588
03	47E387095G1	CONTROLLER ASSY				M		0000	EA	1.00	1.00	31-00		000589
04	47E387115P1	MOUNTING FRAME				M		0000	EA	1.00	1.00	1-00		000590
04	47A381067P16	POWER SUPPLY				M		0000	EA	1.00	1.00	2-00		000591
04	47A381067P18	CHASSIS				M		0000	EA	2.00	2.00	3-00		000592
04	SS00-30	HDL,RND 30 SET-OFF				B		0000	EA	2.00	2.00	4-00	08730	000593
04	47A381067P1	CTL PROCESSING UNIT				M		0000	EA	1.00	1.00	5-00		000594
04	47A381067P17	CHASSIS INTERFACE				M		0000	EA	1.00	1.00	6-00		000595
04	47A381067P3	16K EXECUTIVE MEMORY				M		0000	EA	1.00	1.00	7-00		000596
04	47A381067P5	16K RAM MEMORY				M		0000	EA	1.00	1.00	8-00		000597
04	47A381067P4	12K PROM, 4K RAM MEM				M		0000	EA	1.00	1.00	9-00		000598
04	47A381067P2	ARITH. PROCESSING				M		0000	EA	1.00	1.00	10-00		000599
04	47A381067P15	ERROR DETECTOR				M		0000	EA	1.00	1.00	11-00		000600
04	47A381067P14	WATCHDOG TIMER				M		0000	EA	1.00	1.00	12-00		000601
04	47A381067P20	FILLER BLANK				M		0000	EA	15.00	15.00	13-00		000602
04	47A381067P11	12-BIT A/D CONVERTER				M		0000	EA	2.00	2.00	14-00		000603
04	47A381067P12	12-BIT SS ANLG INPUT				M		0000	EA	3.00	3.00	15-00		000604
04	47A381067P13	12-BIT ANALOG OUTPUT				M		0000	EA	2.00	2.00	16-00		000605
04	47A381067P6	TTY & EIA INTFC MDL				M		0000	EA	3.00	3.00	17-00		000606
04	47A381067P7	I/O SYS DRIVER MDL				M		0000	EA	1.00	1.00	18-00		000607
04	3596A-3	TERMINAL BOARD				*		0000	EA	1.00	1.00	19-00	75382	000608
04	MS3596A-XP-3-38C	MARKER STRIP				*		0000	EA	1.00	1.00	20-00	75382	000609
04	9083	SPACER, THREADED				*		0000	EA	2.00	2.00	21-00	83330	000610
04	47B387082P1	SHIELD				*		0000	EA	1.00	1.00	22-00		000611
04	24205	COMPOUND, (LOCKTITE)				*		0000	OZ	AR		23-00	05972	000612
04	74755	PRIMER				*		0000	OZ	AR		24-00	05972	000613

LVL	IDENTIFICATION NO.	NOMENCLATURE	ECN DWG INC	ECN DWG OUT	PL-LATE APPLY	P C	T Y	CYCLE TIME	U/M	PL-QTY	EXT/TOT QTY	ITEM/ REF DESG	FSCM	CROSS REF
04	N153P13024	SCREW, PAN HD, #6-32			*			0000	EA	2.00	2.00	25-00		000614
04	N415P13	WASHER, LOCK, #6			*			0000	EA	4.00	4.00	26-00		000615
04	N400P37	WASHER, FL. #6			*			0000	EA	2.00	2.00	27-00		000616
04	N226P13	NUT,PLAIN HEX, #6-32			*			0000	EA	2.00	2.00	28-00		000617
04	N416P13	WSHR,LOCK, INTL T #6			*			0000	EA	2.00	2.00	29-00		000618
04	SFSW-10F-CP-G02NA	PAN-L-SCREW, #10-32			B			0000	EA	12.00	12.00	30-00		000619
04	N153P16006	SCR, PH, #10-32			*			0000	EA	4.00	4.00	31-00		000620
04	N415P19	WASHER, LOCK, #10			*			0000	EA	4.00	4.00	32-00		000621
04	DC-37P	CONNECTOR			B			0000	EA	4.00	4.00	33-00	71468	000622
04	3341-1L	JACK SOCKET KIT			*			0000	EA	4.00	4.00	34-00	52760	000623
04	CP700-51	CONN HOUSING KIT			B			0000	EA	9.00	9.00	35-00	19006	000624
04	9158	CABLE, 5TP			B			0000	FT	AR		36-00	07903	000625
04	9160	CABLE, 8TP			B			0000	FT	AR		37-00	07903	000626
04	8741	CABLE, 2TP			B			0000	FT	AR		38-00	07907	000627
04	8740	CABLE, 1TP			B			0000	FT	AR		39-00	07907	000628
04	47A381043PAR	SLEEVING, VINYL			*			0000	FT	AR		40-00		000629
04	47A387124	WIRE LIST			X			0000	EA	X		41-00		000630
04	47E387095P42	BUSHING, STRAIN RLF			M			0000	EA	1.00	1.00	42-00		000631
04	47E387095P43	BUSHING, STRAIN RLF			M			0000	EA	8.00	8.00	43-00		000632
04	AML31EBA4AC	SWITCH, PUSH BUTTON			B			0000	EA	1.00	1.00	44-00	91929	000633
04	AML76F10T01P	SWITCH GUARD			B	5		0000	EA	1.00	1.00	45-00	91929	000634
04	**47E387095-46	LENS (RESET)			M			0000	EA	1.00	1.00	46-00		000635
04	47E387095P47	PLUG, SNAP OUT			M			0000	EA	3.00	3.00	47-00		000636
04	47E387064	SCHEMATIC			X			0000	EA	X		48-00		000637
04	47A380052	ELECTRICAL FAB. STD			X	5		0000	EA	X		49-00		000638
04	NP-206417	NAMEPLATE			B	5		0000	EA	1.00	1.00	50-00		000639
04	47A380070P3	NPL, AN/REV STATUS			*			0000	EA	1.00	1.00	51-00		000640
04	SN60WRMAP2	SOLDER / QQ-S-571			B	5		0000	LB	AR		52-00		000641
04	47A381037P1	LACING TAPE			*			0000	FT	AR		53-00		000642
04	47A380071PAR	SLEEVING, SHRINK			*			0000	FT	AR		54-00		000643
03	**47E387062-32	TACHOMETER PANEL			M			0000	EA	1.00	1.00	32-00		000644
03	47E387072G1	I&C SIG CONDITIONER			*			0000	EA	1.00	1.00	33-00		000645
04	47D387073P1	PANEL,FRONT			*			0000	EA	1.00	1.00	1-00		000646
04	47D387074P1	PANEL,RIGHT SIDE			*			0000	EA	1.00	1.00	2-00		000647
04	47D387074P2	PANEL,LEFT SIDE			*			0000	EA	1.00	1.00	3-00		000648
04	47C387075P1	PANEL,REAR			*			0000	EA	1.00	1.00	4-00		000649
04	FCA4	HANDLE			B	5		0000	EA	2.00	2.00	5-00	08730	000650
04	47D387083G1	ASSY, MOTHER BD-SIGN*			*			0000	EA	1.00	1.00	6-00		000651
05	47E387090P1	DRILL & TRIM			*			0000	EA	1.00	1.00	1-00		000652
05	47B387086P1	ANGLE			*			0000	EA	2.00	2.00	2-00		000653
05	SN60WRMAP2	SOLDER / QQ-S-571			B	5		0000	LB	AR		3-00		000654
05	47D387083P4	TERMINAL BLOCK			*			0000	EA	1.00	1.00	4-00		000655
05	47D387083P5	TERMINAL BLOCK			*			0000	EA	1.00	1.00	5-00		000656
05	RC36-8542-5	RECEPTACLE			*			0000	EA	10.00	10.00	6-00	57856	000657
05	3432-4205	HEADER			*			0000	EA	10.00	10.00	7-00	52760	000658
05	N153P9010	SCREW,PAN HD #4-40X5*			*			0000	EA	20.00	20.00	8-00		000659

LVL	IDENTIFICATION NO.	NOMENCLATURE	ECN DWG INC	ECN DWG OUT	PL-LATE APPLY	P C	T Y	CYCLE TIME	U/M	PL-QTY	EXT/TOT QTY	ITEM/ REF DESG	FSCM	CROSS REF
05	N415P11	WASHER, LOCK, #4				*		0000	EA	20.00	20.00	9-00		000660
05	N226P9	NUT, HEX, #4-40				*		0000	EA	20.00	20.00	10-00		000661
05	AD34BS	RIVET				*		0000	EA	9.00	9.00	11-00	7707	000662
05	47A380052	ELECTRICAL FAB. STD				X	5	0000	EA	X		12-00		000663
04	47B387076G1	MTG. BRACKET,CIRCUIT*				*		0000	EA	2.00	2.00	7-00		000664
05	47B387076P1	BRACKET				*		0000	EA	1.00	2.00	1-00		000665
05	CLSS-032-3ZI	SELF CLINCHING FASTE*				*		0000	EA	1.00	2.00	3-00	46384	000666
05	CLS-832-3ZI	SELF CLINCHING FASTE*				*		0000	EA	2.00	4.00	4-00	46384	000667
04	47B387076G2	MTG. BRACKET,CIRCUIT*				*		0000	EA	2.00	2.00	8-00		000668
05	47B387076P2	BRACKET				*		0000	EA	1.00	2.00	2-00		000669
05	CLSS-032-3ZI	SELF CLINCHING FASTE*				*		0000	EA	1.00	2.00	3-00	46384	000670
05	CLS-832-3ZI	SELF CLINCHING FASTE*				*		0000	EA	2.00	4.00	4-00	46384	000671
04	HE215	POWER SUPPLY				B	5	0000	EA	1.00	1.00	9-00	18655	000672
04	PM345	POWER SUPPLY				*		0000	EA	1.00	1.00	10-00	18655	000673
04	RGR17-.250	GUIDE RAIL,CARD				*		0000	EA	4.00	4.00	11-00	57856	000674
04	051-64-002-41	GUIDE				B	5	0000	EA	20.00	20.00	12-00	57856	000675
04	NP-206417	NAMEPLATE				B	5	0000	EA	1.00	1.00	13-00		000676
04	47A380070P3	NPL, AN/REV STATUS				*		0000	EA	1.00	1.00	14-00		000677
04	47B387078P1	SUPPORT ANGLE,CABLE				*		0000	EA	1.00	1.00	15-00		000678
04	47B387079P1	MTG. BRACKET				*		0000	EA	2.00	2.00	16-00		000679
04	47B381059P4	CONNECTOR CUTOUT COV*				*		0000	EA	3.00	3.00	17-00		000680
04	47D387040G1	POWER SIGNAL CONDITI*				*		0000	EA	1.00	1.00	18-00		000681
04	47D387043G1	SYNCRO TO CURRENT CO*				*		0000	EA	2.00	2.00	19-00		000682
04	47D387032G1	GEAR BOX SIGNAL COND*				*		0000	EA	1.00	1.00	20-00		000683
04	47D387034G1	WIND SIGNAL CONDITIO*				*		0000	EA	1.00	1.00	21-00		000684
04	47E387037G1	ASSY,SYN SIG COND BD				*		0000	EA	2.00	2.00	22-00		000685
05	BB03-0501	BOARD				B		0000	EA	1.00	2.00	1-00	57856	000686
05	47A387039	WIRE LIST				X		0000	EA	X		2-00		000687
05	IC-308-WGG	SOCKET, 8-PIN				B		0000	EA	6.00	12.00	3-00	55322	000688
05	SC-1W3-GG	SOCKET				B		0000	EA	16.00	32.00	4-00	55322	000689
05	SC-1W1-GG-1	TERMINAL				B		0000	EA	15.00	30.00	5-00	55322	000690
05	DSS-C4	SWITCH COVER				M		0000	EA	1.00	2.00	6-00	95146	000691
05	AP-616-G-E	ADAPTER PLUG				M		0000	EA	2.00	4.00	7-00	55322	000692
05	BB248	TERMINAL				B		0000	EA	21.00	42.00	8-00	57856	000693
05	T-1S5-G	TERMINAL				B		0000	EA	6.00	12.00	9-00	55322	000694
05	N153P9006	SCR,PNH 4-40 X.375LG				B		0000	EA	2.00	4.00	10-00		000695
05	N400P35	WASHER,FLAT, NO. 4				*		0000	EA	2.00	4.00	11-00		000696
05	N415P11	WASHER, LOCK, #4				*		0000	EA	2.00	4.00	12-00		000697
05	47B381099PAR	WIRE,AWG 30,SLDRLESS				B		0000	FT	AR		13-00		000698
05	T-1S1-G	TERMINAL				B		0000	EA	21.00	42.00	14-00	55322	000699
05	SN60WRMAP2	SOLDER / QQ-S-571				B	5	0000	LB	AR		15-00		000700
05	47A380052	ELECTRICAL FAB. STD				X	5	0000	EA	X		16-00		000701
05	47D387038	SCHEMATIC				X		0000	EA	X		17-00		000702

IVL	IDENTIFICATION NO.	NOMENCLATURE	ECN DWG INC	ECN DWG OUT	PL-LATE APPLY	P C	T Y	CYCLE TIME	U/M	PL-QTY	EXT/TOT QTY	ITEM/ REF DESG	FSCM	CROSS REF
05	AWG-26-TYPE-S	BUS WIRE / QQ-W-343				B		0000	FT	AR		18-00		000703
05	CK06BX104K	CAPACITOR, .1 MFD				B	5	0000	EA	1.00	2.00 C1	-00	95275	000704
05	CK06BX104K	CAPACITOR, .1 MFD				B	5	0000	EA	1.00	2.00 C2	-00	95275	000705
05	150D106X9035R2	CAPACITOR, 10 MFD				B	5	0000	EA	1.00	2.00 C3	-00	56289	000706
05	CK06BX104K	CAPACITOR, .1 MFD				B	5	0000	EA	1.00	2.00 C4	-00	95275	000707
05	CK06BX104K	CAPACITOR, .1 MFD				B	5	0000	EA	1.00	2.00 C5	-00	95275	000708
05	RNC55H4530FS	RESISTOR, 453 OHMS				B		0000	EA	1.00	2.00 R1	-00		000709
05	RNC55H1102FS	RESISTOR, 11 K				B	5	0000	EA	1.00	2.00 R10	-00		000710
05	RNC55H1102FS	RESISTOR, 11 K				B	5	0000	EA	1.00	2.00 R11	-00		000711
05	3009P-1-202	POTENTIOMETER, 2 K				B		0000	EA	1.00	2.00 R12	-00	32997	000712
05	RNC55H9091FS	RESISTOR, 9.09 K				B	5	0000	EA	1.00	2.00 R13	-00		000713
05	RNC55H1001FS	RESISTOR				B	5	0000	EA	1.00	2.00 R14	-00		000714
05	3009P-1-202	POTENTIOMETER, 2 K				B		0000	EA	1.00	2.00 R15	-00	32997	000715
05	RNC55H1912FS	RESISTOR, 19.1 K				B	5	0000	EA	1.00	2.00 R16	-00		000716
05	3009P-1-501	POTENTIOMTR 500 OHMS				B		0000	EA	1.00	2.00 R17	-00	32997	000717
05	3009P-1-501	POTENTIOMTR 500 OHMS				B		0000	EA	1.00	2.00 R18	-00	32997	000718
05	3009P-1-501	POTENTIOMTR 500 OHMS				B		0000	EA	1.00	2.00 R19	-00	32997	000719
05	3009P-1-102	POTENTIOMETER, 1 K				B	7	0000	EA	1.00	2.00 R2	-00	32997	000720
05	3009P-1-501	POTENTIOMTR 500 OHMS				B		0000	EA	1.00	2.00 R20	-00	32997	000721
05	RNC55H1003FS	RESISTOR, 100 K				B	5	0000	EA	1.00	2.00 R3	-00		000722
05	RNC55H1271FS	RESISTOR, 1.27 K				B		0000	EA	1.00	2.00 R4	-00		000723
05	RNC55H1003FS	RESISTOR, 100 K				B	5	0000	EA	1.00	2.00 R5	-00		000724
05	RNC55H1003FS	RESISTOR, 100 K				B	5	0000	EA	1.00	2.00 R6	-00		000725
05	RNC55H1002FS	RESISTOR				B	5	0000	EA	1.00	2.00 R7	-00		000726
05	RNC55H1333FS	RESISTOR, 133 K				B		0000	EA	1.00	2.00 R8	-00		000727
05	RNC55H3922FS	RESISTOR, 39.2 K				B	5	0000	EA	1.00	2.00 R9	-00		000728
05	DSS-4	SWITCH				B		0000	EA	1.00	2.00 S1	-00	95146	000729
05	SA810-C-96-0	SYN TO DC CONVERTER				M		0000	EA	1.00	2.00 U1	-00	14352	000730
05	TL087CP	OPERATIONAL AMPL				M		0000	EA	1.00	2.00 U2	-00	01295	000731
05	TL087CP	OPERATIONAL AMPL				M		0000	EA	1.00	2.00 U3	-00	01295	000732
05	TL087CP	OPERATIONAL AMPL				M		0000	EA	1.00	2.00 U4	-00	01295	000733
05	TL087CP	OPERATIONAL AMPL				M		0000	EA	1.00	2.00 U5	-00	01295	000734
05	2B20B	VOLT TO CUR CONV				M		0000	EA	1.00	2.00 U6	-00	24355	000735
05	2B20B	VOLT TO CUR CONV				M		0000	EA	1.00	2.00 U7	-00	24355	000736
05	TL087CP	OPERATIONAL AMPL				M		0000	EA	1.00	2.00 U8	-00	01295	000737
04	47D387087G1	ASSY, COLOR CODED FL*				*		0000	EA	7.00	7.00	23-00		000738
05	3502-1000	CONNECTOR				*		0000	EA	1.00	7.00	1-00	75037	000739
05	3417-7040	CONNECTOR				B	5	0000	EA	1.00	7.00	2-00	75037	000740
05	3302-37	CABLE 12" LG				*		0000	EA	1.00	7.00	3-00	75037	000741
04	3341-1L	JACK SOCKET KIT				*		0000	EA	7.00	7.00	24-00	52760	000742
04	47A381045P3	CLAMP,CABLE (.187 DI*				*		0000	EA	2.00	2.00	25-00		000743
04	47A381045P6	CLAMP,CABLE (.375 DI*				*		0000	EA	4.00	4.00	26-00		000744
04	3596A-3	TERMINAL BOARD				*		0000	EA	1.00	1.00	27-00	75382	000745
04	MS3596A-XP-3-38C	MARKER STRIP				*		0000	EA	1.00	1.00	28-00	75382	000746
04	9083	SPACER, THREADED				*		0000	EA	2.00	2.00	29-00	83330	000747
04	47B387082P1	SHIELD				*		0000	EA	1.00	1.00	30-00		000748

LVL	IDENTIFICATION NO.	NOMENCLATURE	ECN DWG INC	ECN DWG OUT	PL-LATE APPLY	P C	T Y	CYCLE TIME	U/M	PL-QTY	EXT/TOT QTY	ITEM/ REF DESG	FSCM	CROSS REF
04	24205	COMPOUND, (LOCKTITE)				*		0000	OZ	AR		31-00	05972	000749
04	5596A-8	TERMINAL BOARD				*		0000	EA	1.00	1.00	32-00	75382	000750
04	N153P15010	SCR, PH, #8-32				*		0000	EA	4.00	4.00	33-00		000751
04	N415P16	WASHER, LOCK, #8				*		0000	EA	30.00	30.00	34-00		000752
04	N678P15008	SCREW, FLAT HD				B	5	0000	EA	2.00	2.00	35-00		000753
04	N226P15	NUT, HEX, #8-32				B	5	0000	EA	6.00	6.00	36-00		000754
04	N153P16010	SCREW,PAN HD #10-32X*				*		0000	EA	4.00	4.00	37-00		000755
04	N415P19	WASHER, LOCK, #10				*		0000	EA	20.00	20.00	38-00		000756
04	N226P16	NUT, HEX, #10-32				*		0000	EA	16.00	16.00	39-00		000757
04	N153P15005	SCREW,PAN HD #8-32X5*				*		0000	EA	12.00	12.00	40-00		000758
04	N153P9003	SCREW,PAN HD #4-40X3*				*		0000	EA	4.00	4.00	41-00		000759
04	N415P11	WASHER, LOCK, #4				*		0000	EA	6.00	6.00	42-00		000760
04	N153P16007	SCREW, PAN HD				*		0000	EA	8.00	8.00	43-00		000761
04	N153P15005	SCREW,PAN HD #8-32X5*				*		0000	EA	4.00	4.00	44-00		000762
04	N153P13024	SCREW, PAN HD, #6-32				*		0000	EA	2.00	2.00	45-00		000763
04	N415P13	WASHER, LOCK, #6				*		0000	EA	6.00	6.00	46-00		000764
04	N400P37	WASHER, FL. #6				*		0000	EA	2.00	2.00	47-00		000765
04	N226P13	NUT,PLAIN HEX, #6-32				*		0000	EA	2.00	2.00	48-00		000766
04	N153P16005	SCREW,PAN HD #10-32X*				*		0000	EA	6.00	6.00	49-00		000767
04	N153P9012	SCREW,PAN HD #4-40X3*				*		0000	EA	2.00	2.00	50-00		000768
04	N226P9	NUT, HEX, #4-40				*		0000	EA	2.00	2.00	51-00		000769
04	47A387088	WIRE LIST				X		0000	EA	X		52-00		000770
04	L10BP12012	SCREW,PAN HD.M4X12				*		0000	EA	8.00	8.00	53-00		000771
04	SN60WRMAP2	SOLDER / QQ-S-571				B	5	0000	LB	AR		54-00		000772
04	47A381037P1	LACING TAPE				*		0000	FT	AR		55-00		000773
04	47A381043PAR	SLEEVING, VINYL				*		0000	FT	AR		56-00		000774
04	44A0111-16-9	WIRE, AWG #16				B	5	0000	FT	AR		57-00	06090	000775
04	N400P39	WASHER, FLAT, #10				*		0000	EA	2.00	2.00	58-00		000776
04	47A380052	ELECTRICAL FAB. STD				X	5	0000	EA	X		59-00		000777
04	47E387061	SCHEMATIC				X		0000	EA	X		60-00		000778
04	N416P13	WSHR,LOCK, INTL T #6				*		0000	EA	1.00	1.00	61-00		000779
04	74755	PRIMER				*		0000	OZ	AR		62-00	05972	000780
04	MS5596-XP-8-8C	MARKER STRIP				*		0000	EA	1.00	1.00	63-00	75382	000781
04	47A380069P52	NAMEPLATE, IDENT (TB*				*		0000	EA	1.00	1.00	64-00		000782
04	44A0111-22-9	WIRE, #22 AWG				B	5	0000	FT	AR		65-00	06090	000783
04	47A380071PAR	SLEEVING, SHRINK				*		0000	FT	AR		66-00		000784
04	1488-6	SOLDER LUG				*		0000	EA	2.00	2.00	67-00	83330	000785
04	18RA-6	TERMINAL, LUG				*		0000	EA	8.00	8.00	68-00	59730	000786
04	18RA-6FLX	TERMINAL LUG, CRIMP				B	5	0000	EA	8.00	8.00	69-00	56501	000787
04	18RA-10	TERMINAL LUG, RING (*				*		0000	EA	4.00	4.00	70-00	56501	000788
04	30B-010	WIRE WRAP WIRE (1")				*		0000	FT	AR		71-00	8666	000789
04	30W-020	WIRE WRAP WIRE (2")				*		0000	FT	AR		72-00	8666	000790
04	30Y-030	WIRE WRAP WIRE (3")				*		0000	FT	AR		73-00	8666	000791
04	30R-040	WIRE WRAP WIRE (4")				*		0000	FT	AR		74-00	8666	000792
04	30BLK-050	WIRE WRAP WIRE (5")				*		0000	FT	AR		75-00	8666	000793
04	30B-060	WIRE WRAP WIRE (6")				*		0000	FT	AR		76-00	8666	000794
04	30W-070	WIRE WRAP WIRE (7")				*		0000	FT	AR		77-00	8666	000795
04	30Y-080	WIRE WRAP WIRE (8")				*		0000	FT	AR		78-00	8666	000796
04	30R-090	WIRE WRAP WIRE (9")				*		0000	FT	AR		79-00	8666	000797

LVL	IDENTIFICATION NO.	NOMENCLATURE	ECN DWG INC	ECN DWG OUT	PL-LATE APPLY	P C	T Y	CYCLE TIME	U/M	PL-QTY	EXT/TOT QTY	ITEM/ REF DESG	FSCM	CROSS REF
04	30BLK-100	WIRE WRAP WIRE,(10")				*		0000	FT	AR		80-00	8666	000798
04	WB-16	WIRE WRAP WIRE, ROLL				*		0000	FT	AR		81-00	8666	000799
03	47E387093G1	WIND TRANSLATOR				M		0000	EA	1.00	1.00	34-00		000800
03	**47E387062-35	SPCR, CABLE RETAINER				M		0000	EA	1.00	1.00	35-00		000801
03	**47E387062-36	WIRE DUCT				M		0000	EA	2.00	2.00	36-00		000802
03	**47E387062-37	WIRE DUCT COVER				M		0000	EA	2.00	2.00	37-00		000803
03	722140	TERMINAL STRIP				M		0000	EA	8.00	8.00	38-00	52458	000804
03	**47E387062-39	MARKER STRIP				M		0000	EA	8.00	8.00	39-00		000805
03	**47E387062-40	CABLE ASSY, W1				M		0000	EA	1.00	1.00	40-00		000806
03	**47E387062-41	CABLE ASSY, W2				M		0000	EA	1.00	1.00	41-00		000807
03	**47E387062-42	CABLE ASSY, W3				M		0000	EA	1.00	1.00	42-00		000808
03	**47E387062-43	CABLE ASSY, W4				M		0000	EA	1.00	1.00	43-00		000809
03	**47E387062-44	CABLE ASSY, W5				M		0000	EA	1.00	1.00	44-00		000810
03	**47E387062-45	CABLE ASSY, W6				M		0000	EA	1.00	1.00	45-00		000811
03	**47E387062-46	CABLE ASSY, W7				M		0000	EA	1.00	1.00	46-00		000812
03	**47E387062-47	CABLE ASSY, W8				M		0000	EA	1.00	1.00	47-00		000813
03	**47E387062-48	CABLE ASSY, W9				M		0000	EA	1.00	1.00	48-00		000814
03	**47E387062-49	CABLE ASSY, W10				M		0000	EA	1.00	1.00	49-00		000815
03	47E387065G1	PANEL, RIGHT SIDE				*		0000	EA	1.00	1.00	50-00		000816
04	47E387065P1	PANEL,RIGHT SIDE				*		0000	EA	1.00	1.00	1-00		000817
04	S-0420-2-ZI	SELF CLINCHING FASTE*				*		0000	EA	12.00	12.00	2-00	46384	000818
04	SS-024-3-ZI	SELF CLINCHING FASTE*				*		0000	EA	45.00	45.00	3-00	46384	000819
04	S-832-3-ZI	SELF CLINCHING FASTE*				*		0000	EA	2.00	2.00	4-00	46384	000820
04	S-632-3-ZI	SELF CLINCHING FASTE*				B	5	0000	EA	6.00	6.00	5-00	46384	000821
03	**47E387062-51	WIRE DUCT				M		0000	EA	1.00	1.00	51-00		000822
03	**47E387062-52	WIRE DUCT COVER				M		0000	EA	1.00	1.00	52-00		000823
03	47C387096G1	MTG BRACKET ASSY				M		0000	EA	2.00	2.00	53-00		000824
04	47C387096P1	MTG BRACKET				M		0000	EA	1.00	2.00	1-00		000825
04	CLS-632-3	SELF CLINCHING FSTNR				B		0000	EA	8.00	16.00	2-00	46384	000826
04	47A380102	FINISH				X		0000	PT	X		3-00		000827
03	**47E387062-54	BLANK PANEL				M		0000	EA	1.00	1.00	54-00		000828
03	N30AP16010	SCR, HEX HD, #10-32				B		0000	EA	151.00	151.00	55-00		000829
03	N415P19	WASHER, LOCK, #10				*		0000	EA	187.00	187.00	56-00		000830
03	N226P16	NUT, HEX, #10-32				*		0000	EA	103.00	103.00	57-00		000831
03	N30AP21010	SCR, HEX HD, #1/4-20				B		0000	EA	37.00	37.00	58-00		000832
03	N415P25	WASHER, LOCK, (1/4)				B		0000	EA	37.00	37.00	59-00		000833
03	N400P39	WASHER, FLAT, #10				*		0000	EA	60.00	60.00	60-00		000834
03	SFSW10F16CP-G02NA	SCR, PANEL, #10-32				B		0000	EA	12.00	12.00	61-00	12324	000835
03	SFSW10F8CP-G02NA	SCR, PANEL, #10-32				B	5	0000	EA	12.00	12.00	62-00	12324	000836
03	N678P15016	SCR, FLAT HD, #8-32				B		0000	EA	9.00	9.00	63-00		000837
03	N415P16	WASHER, LOCK, #8				*		0000	EA	19.00	19.00	64-00		000838
03	N226P15	NUT, HEX, #8-32				B	5	0000	EA	9.00	9.00	65-00		000839
03	N153P9014	SCR, PH, #4-40				B		0000	EA	32.00	32.00	66-00		000840
03	N415P11	WASHER, LOCK, #4				*		0000	EA	32.00	32.00	67-00		000841

LVL	IDENTIFICATION NO.	NOMENCLATURE	ECN DWG INC	ECN DWG OUT	ECN PL-LATE APPLY	P C	T Y	CYCLE TIME	U/M	PL-QTY	EXT/TOT QTY	ITEM/ REF DESG	FSCM	CROSS REF
03	N226P9	NUT, HEX, #4-40				*		0000	EA	32.00	32.00	68-00		000842
03	N334P1502	RIVET,DOMED HD,BLIND				B		0000	EA	50.00	50.00	69-00		000843
03	N30AP16007	SCR, HEX HD, #10-32				B		0000	EA	30.00	30.00	70-00		000844
03	A-PS1420CM	CLAMPING NUT				B		0000	EA	9.00	9.00	71-00	00843	000845
03	N153P16006	SCR, PH, #10-32				*		0000	EA	18.00	18.00	72-00		000846
03	N153P15010	SCR, PH, #8-32				*		0000	EA	6.00	6.00	73-00		000847
03	N153P13016	SCR, PH, #6-32				B		0000	EA	13.00	13.00	74-00		000848
03	N415P13	WASHER, LOCK, #6				*		0000	EA	29.00	29.00	75-00		000849
03	N153P15006	SCR, PH, #8-32				*		0000	EA	4.00	4.00	76-00		000850
03	N153P13004	SCR, PH, #6-32				*		0000	EA	16.00	16.00	77-00		000851
03	SN60WRMAP2	SOLDER / QQ-S-571				B	5	0000	LB	AR		78-00		000852
03	47A381037P1	LACING TAPE				*		0000	FT	AR		79-00		000853
03	**47E387062-80	BRKT,PWR SUPPLY SPRT				M		0000	EA	8.00	8.00	80-00		000854
03	7022AD	RELAY				B		0000	EA	1.00	1.00	81-00	72962	000855
03	47D387121G1	ESD ELECT ASSY				M		0000	EA	1.00	1.00	82-00		000856
04	47D387063P1	PANEL				M		0000	EA	1.00	1.00	1-00		000857
04	47D387063P2	MOUNTING CHASIS				M		0000	EA	1.00	1.00	2-00		000858
04	KHU17A11-120	RELAY				B	5	0000	EA	6.00	6.00	3-00	77342	000859
04	KHU17D11-28	RELAY				B		0000	EA	1.00	1.00	4-00	77342	000860
04	47-61-201-10	CAPTIVE SCREW				M		0000	EA	4.00	4.00	5-00	94222	000861
04	N678P13007	SCR,FLH 6-32 X .44LG				M		0000	EA	4.00	4.00	6-00		000862
04	N415P13	WASHER, LOCK, #6				*		0000	EA	6.00	6.00	7-00		000863
04	N226P13	NUT,PLAIN HEX, #6-32				*		0000	EA	4.00	4.00	8-00		000864
04	N226P7	NUT, HEX 3-48				M		0000	EA	7.00	7.00	9-00		000865
04	N415P9	WASHER,LOCK, EXT T #3				M		0000	EA	7.00	7.00	10-00		000866
04	IN4005	DIODE				B		0000	EA	1.00	1.00	11-00		000867
04	47A381044PAR	SLEEVING,TEFLON				*		0000	FT	AR		12-00		000868
04	47A387125	WIRE LIST				X		0000	EA	X		13-00		000869
04	MRA20PJ	CONNECTOR				M		0000	EA	1.00	1.00	14-00	79376	000870
04	6STV-15	TERMINAL STRIP				M		0000	EA	1.00	1.00	15-00	53337	000871
04	TC6-15	COVER, TERM STRIP				M		0000	EA	1.00	1.00	16-00	53337	000872
04	N195P1306	SCR,PNH 6-20 X .375LG				M		0000	EA	2.00	2.00	17-00		000873
04	44A0111-20-9	WIRE, AWG #20				B	5	0000	FT	AR		18-00	06090	000874
04	AWG-20-TYPE-S	WIRE, BUS/QQ-W-343				B		0000	FT	AR		19-00		000875
04	47D387022	SCHEMATIC				X		0000	EA	X		20-00		000876
04	47A380052	ELECTRICAL FAB. STD				X	5	0000	EA	X		21-00		000877
04	47A380102P1	FINISH				M		0000	QT	AR		22-00		000878
04	SN60WRMAP2	SOLDER / QQ-S-571				B	5	0000	LB	AR		23-00		000879
04	47A381037P1	LACING TAPE				*		0000	FT	AR		24-00		000880
04	47A380071PAR	SLEEVING, SHRINK				*		0000	FT	AR		25-00		000881
03	47D387130G1	"G" SWITCH TEST ELEK				M		0000	EA	1.00	1.00	83-00		000882
04	47D387129P1	PANEL				M		0000	EA	1.00	1.00	1-00		000883
04	47D387129P2	MOUNTING CHASSIS				M		0000	EA	1.00	1.00	2-00		000884
04	47-61-201-10	CAPTIVE SCREW				M		0000	EA	4.00	4.00	3-00	94222	000885
04	4156-14-1	TERMINAL				M		0000	EA	8.00	8.00	4-00	17117	000886
04	KHU17A17-120	RELAY				M		0000	EA	6.00	6.00	5-00	77342	000887

LVL	IDENTIFICATION NO.	NOMENCLATURE	ECN DWG INC	ECN DWG OUT	PL-LATE APPLY	P C	T Y	CYCLE TIME	U/M	PL-QTY	EXT/TOT QTY	ITEM/ REF DESG	FSCM	CROSS REF
04	MJ1000	TRANSISTOR				B	5	0000	EA	1.00	1.00	6-00	04713	000888
04	177-3-62	INSULATOR				B	5	0000	EA	1.00	1.00	7-00	05820	000889
04	MD-3452-G	SOCKET,TO-3				B	5	0000	EA	1.00	1.00	8-00	06770	000890
04	120-2	GREASE,THERMAL				B	5	0000	OZ	AR		9-00	05820	000891
04	LM10CH	OPERATIONAL AMPLIFIER				B	7	0000	EA	1.00	1.00	10-00	27014	000892
04	6140-188-1	SOCKET, 8 PIN				M		0000	EA	1.00	1.00	11-00	17117	000893
04	3059J-1-102M	POTENTIOMETER				M		0000	EA	2.00	2.00	12-00	32997	000894
04	WBR1000-50	CAPACITOR				B	5	0000	EA	1.00	1.00	13-00	14655	000895
04	150D105X9035A2	CAPACITOR				B	5	0000	EA	1.00	1.00	14-00	56289	000896
04	41F2RO	RESISTOR, 2 OHM				M		0000	EA	1.00	1.00	15-00	03615	000897
04	RN65C1004F	RESISTOR, 1M OHM				B	5	0000	EA	1.00	1.00	16-00		000898
04	MRA20PJ	CONNECTOR				M		0000	EA	1.00	1.00	17-00	79376	000899
04	6STV-10	TERMINAL STRIP				M		0000	EA	1.00	1.00	18-00	53337	000900
04	TC6-10	COVER, TERM. STRIP				M		0000	EA	1.00	1.00	19-00	53337	000901
04	47A387128	WIRE LIST				X		0000	EA	X		20-00		000902
04	47D387122	SCHEMATIC				X		0000	EA	X		21-00		000903
04	N678P13007	SCR,FLH 6-32 X .44LG				M		0000	EA	4.00	4.00	22-00		000904
04	N415P13	WASHER, LOCK, #6				*		0000	EA	8.00	8.00	23-00		000905
04	N226P13	NUT,PLAIN HEX, #6-32				*		0000	EA	4.00	4.00	24-00		000906
04	N226P7	NUT, HEX 3-48				M		0000	EA	6.00	6.00	25-00		000907
04	N415P9	WASHER,LOCK, EXT T #3				M		0000	EA	6.00	6.00	26-00		000908
04	N195P1306	SCR,PNH 6-20 X .375LG				M		0000	EA	2.00	2.00	27-00		000909
04	N153P13010	SCREW,PAN HD. #6-32				M		0000	EA	2.00	2.00	28-00		000910
04	N678P9008	SCREW,FLAT HD. #4-40				M		0000	EA	1.00	1.00	29-00		000911
04	N415P11	WASHER, LOCK, #4				*		0000	EA	1.00	1.00	30-00		000912
04	N226P9	NUT, HEX, #4-40				*		0000	EA	1.00	1.00	31-00		000913
04	47A380052	ELECTRICAL FAB. STD				X	5	0000	EA	X		32-00		000914
04	44A0111-20-9	WIRE, AWG #20				B	5	0000	FT	AR		33-00	06090	000915
04	AWG-20-TYPE-S	WIRE, BUS/QQ-W-343				B		0000	FT	AR		34-00		000916
04	47A380102P1	FINISH				M		0000	QT	AR		35-00		000917
04	SN60WRMAP2	SOLDER / QQ-S-571				B	5	0000	LB	AR		36-00		000918
04	47A381037P1	LACING TAPE				*		0000	FT	AR		37-00		000919
04	47A380071PAR	SLEEVING, SHRINK				*		0000	FT	AR		38-00		000920
04	47A381044PAR	SLEEVING,TEFLON				*		0000	FT	AR		39-00		000921
03	47D387132G1	ICE DETECTOR ELEK				M		0000	EA	1.00	1.00	84-00		000922
03	MRA20SJH1	CONNECTOR				B		0000	EA	3.00	3.00	85-00	79376	000923
03	**47E387062-86	WIRE DUCT				M		0000	EA	4.00	4.00	86-00		000924
03	**47E387062-87	WIRE DUCT COVER				M		0000	EA	4.00	4.00	87-00		000925
03	**47E387062-88	CIRCUIT BKR PANEL				M		0000	EA	1.00	1.00	88-00		000926
03	112-220-101	CIRCUIT BKR (20A)				B		0000	EA	2.00	2.00	89-00	77342	000927
03	112-215-101	CIRCUIT BKR (15A)				B		0000	EA	7.00	7.00	90-00	77342	000928
03	112-210-101	CIRCUIT BKR (10A)				*		0000	EA	7.00	7.00	91-00	77342	000929
03	112-205-101	CIRCUIT BKR (5A)				B		0000	EA	2.00	2.00	92-00	77342	000930
03	1422552	POWER BLOCK (2 CKT)				M		0000	EA	1.00	1.00	93-00	26405	000931
03	1423552	POWER BLOCK (3 CKT)				M		0000	EA	1.00	1.00	94-00	26405	000932
03	**47E387062-95	SAFETY SHIELD				M		0000	EA	1.00	1.00	95-00		000933
03	4697-1032-SS-20	HEX M & F STANDOFF				M		0000	EA	12.00	12.00	96-00	55566	000934
03	24205	COMPOUND, (LOCKTITE)				*		0000	OZ	AR		97-00	05972	000935

LVL	IDENTIFICATION NO.	NOMENCLATURE	ECN DWG INC	ECN DWG OUT	PL-LATE APPLY	P C	T Y	CYCLE TIME	U/M	PL-QTY	EXT/TOT QTY	ITEM/ REF DESG	FSCM	CROSS REF
03	74755	PRIMER				*		0000	OZ	AR		98-00	05972	000936
03	**47E387062-99	SPACER				M		0000	EA	13.00	13.00	99-00		000937
03	**47E387062-100	SUPPORT,(04-04-42-8)				M		0000	EA	13.00	13.00	100-00		000938
03	**47E387062-101	BUS BAR				M		0000	EA	1.00	1.00	101-00		000939
03	**47E387062-102	BUS BAR				M		0000	EA	1.00	1.00	102-00		000940
03	**47E387062-103	BUS BAR				M		0000	EA	1.00	1.00	103-00		000941
03	**47E387062-104	BUS BAR				M		0000	EA	1.00	1.00	104-00		000942
03	**47E387062-105	CONNECTION				M		0000	EA	130.00	130.00	105-00		000943
03	**47E387062-106	CONNECTION				M		0000	EA	62.00	62.00	106-00		000944
03	**47E387062-107	CONNECTION				M		0000	EA	4.00	4.00	107-00		000945
03	**47E387062-108	CONNECTION				M		0000	EA	1.00	1.00	108-00		000946
03	**47E387062-109	MARKERS (1 THRU 120)				M		0000	EA	1.00	1.00	109-00		000947
03	**47E387062-110	MARKERS (1 THRU 14)				M		0000	EA	1.00	1.00	110-00		000948
03	**47E387062-111	MARKERS (1 THRU 63)				M		0000	EA	1.00	1.00	111-00		000949
03	FD15-50	PWR SUPPLY,+/- 15VDC				M		0000	EA	1.00	1.00	112-00	14749	000950
03	B24N75	PWR SUPPLY, (24 VDC)				M		0000	EA	1.00	1.00	113-00	14749	000951
03	B28N70	PWR SUPPLY, (28 VDC)				M		0000	EA	1.00	1.00	114-00	14749	000952
03	B35FT40	PWR SUPPLY, (35 VDC)				M		0000	EA	1.00	1.00	115-00	14749	000953
03	47A380071PAR	SLEEVING, SHRINK				*		0000	FT	AR		116-00		000954
03	47A381043PAR	SLEEVING, VINYL				*		0000	FT	AR		117-00		000955
03	44A0811-12-9	WIRE, AWG #12				B	5	0000	FT	AR		118-00	06090	000956
03	44A0111-16-9	WIRE, AWG #16				B	5	0000	FT	AR		119-00	06090	000957
03	44A0111-20-9	WIRE, AWG #20				B	5	0000	FT	AR		120-00	06090	000958
03	18RA-6FLX	TERMINAL LUG, CRIMP				B	5	0000	EA	AR		121-00	56501	000959
03	10RC-10FLX	TERMINAL LUG, CRIMP				B		0000	EA	AR		122-00	56501	000960
03	**47E387062-123	BRKT, WIRING SUPPORT				M		0000	EA	1.00	1.00	123-00		000961
02	47E387060G1	HIGH VOLTAGE CG ASSY				M		0000	EA	1.00	1.00	17-00		000962
03	47E387069G1	HIGH V CG DRILL ASSY				M		0000	EA	1.00	1.00	1-00		000963
03	47D387009P1	GROUNDING XFMR				M		0000	EA	1.00	1.00	2-00		000964
03	47C387013P1	GROUNDING RESISTOR				M		0000	EA	2.00	2.00	3-00		000965
03	47D387010P1	CURRENT XFMR				M		0000	EA	6.00	6.00	4-00		000966
03	47D387011P1	POTENTIAL XFMR				M		0000	EA	3.00	3.00	5-00		000967
03	N24P25016	BOLT, HEX HEAD				B		0000	EA	12.00	12.00	6-00		000968
03	47D387110P1	BUS BAR				M		0000	EA	1.00	1.00	7-00		000969
03	N673P35	EYE BOLT				B		0000	EA	2.00	2.00	8-00		000970
03	47D387109G1	FRONT PANEL				M		0000	EA	1.00	1.00	9-00		000971
03	N227P25	NUT, HEX				B		0000	EA	12.00	12.00	10-00		000972
03	N415P75	WASHER, LOCK				B		0000	EA	2.00	2.00	11-00		000973
03	N227P35	NUT, HEX				B		0000	EA	2.00	2.00	12-00		000974
03	N415P37	WASHER, LOCK				B		0000	EA	36.00	36.00	13-00		000975
03	N24P25008	BOLT, HEX HD				B		0000	EA	24.00	24.00	14-00		000976
03	N24P29020	BOLT, HEX HD				B		0000	EA	36.00	36.00	15-00		000977
03	N415P50	WASHER, LOCK				B		0000	EA	36.00	36.00	16-00		000978
03	N227P29	NUT, HEX				B		0000	EA	36.00	36.00	17-00		000979
03	N27P21022	BOLT, HEX HD, SLOTTED				B		0000	EA	10.00	10.00	18-00		000980
03	N415P25	WASHER, LOCK, (1/4)				B		0000	EA	10.00	10.00	19-00		000981
03	N400P41	WASHER, FLAT				B	5	0000	EA	10.00	10.00	20-00		000982

LVL	IDENTIFICATION NO.	NOMENCLATURE	ECN DWG INC	ECN DWG OUT	PL-LATE APPLY	P C	T Y	CYCLE TIME	U/M	PL-QTY	EXT/TOT QTY	ITEM/ REF DESG	FSCM CROSS REF
01	47E382590G1	ROTOR BLADE ASSY				M		0000	EA	1.00	1.00	4-00	000983
02	47J382287P1	CENTER BLADE SECT				M		0000	EA	1.00	1.00	1-00	000984
02	47E381105G1	BOLSTER ASSY				M		0000	EA	1.00	1.00	2-00	000985
03	47E382301P1	BOLSTER				M		0000	EA	2.00	2.00	1-00	000986
03	47D382550G1	SFT,TEETER BRG ASSY				M		0000	EA	1.00	1.00	2-00	000987
04	47D382550P1	CLOTH,FIBERGLASS				M		0000	FT	AR		1-00	000988
04	47D382550P2	ADHESIVE				M		0000	OZ	AR		2-00	000989
04	47D382397G1	TEETER PVT SFT ASSY				M		0000	EA	1.00	1.00	3-00	000990
05	47D382397P1	TEETER PIVOT SHAFT				M		0000	EA	1.00	1.00	1-00	000991
05	47C382390P1	PLUG, SHAFT TEETER				M		0000	EA	2.00	2.00	2-00	000992
03	47C382551G1	TEETER RESTR ASSY				M		0000	EA	4.00	4.00	3-00	000993
04	47C382551P1	CLOTH, FIBERGLASS				M		0000	FT	AR		1-00	000994
04	47C382551P2	ADHESIVE, EPOXY				M		0000	OZ	AR		2-00	000995
04	47C382351P1	TEETER SPRT INNER				M		0000	EA	1.00	4.00	3-00	000996
03	47C382551G2	TEETEER RESTR ASSY				M		0000	EA	4.00	4.00	4-00	000997
04	47C382551P1	CLOTH, FIBERGLASS				M		0000	FT	AR		1-00	000998
04	47C382551P2	ADHESIVE, EPOXY				M		0000	OZ	AR		2-00	000999
04	47C382350P1	TEETER SPRT OUTER				M		0000	EA	1.00	4.00	4-00	001000
03	47C382552G1	BOLSTER INSR ASSY				M		0000	EA	2.00	2.00	5-00	001001
04	47C382552P1	CLOTH,FIBERGLASS				M		0000	FT	AR		1-00	001002
04	47C382552P2	ADHESIVE				M		0000	OZ	AR		2-00	001003
04	47E382403P1	INSERT,BOLSTER				M		0000	EA	1.00	2.00	3-00	001004
03	**47E381105-6	EPOXY,THICKENED				B		0000	EA	AR		6-00	001005
02	47J381090P1	INNER BLADE SECTION				M		0000	EA	2.00	2.00	3-00	001006
02	47J381097P1	OUTER BLADE SECTION				M		0000	EA	2.00	2.00	4-00	001007
02	47E381089P1	TRAILING EDGE INSTL				M		0000	EA	2.00	2.00	5-00	001008
02	47E381089P2	TRAILING EDGE INSTL				M		0000	EA	2.00	2.00	6-00	001009
02	47E381089P3	TRAILING EDGE INSTL				M		0000	EA	2.00	2.00	7-00	001010
02	47E382610G1	AILERON INSTALLATION				M		0000	EA	2.00	2.00	8-00	001011
03	**47E382610-1	AIL SECT,INDB DRIVE				M		0000	EA	2.00	4.00	1-00	001012
03	**47E382610-2	AIL SECT,INBD TRAIL				M		0000	EA	2.00	4.00	2-00	001013
03	**47E382610-3	AIL SECT,CENTER DR				M		0000	EA	2.00	4.00	3-00	001014
03	**47E382610-4	AIL SECT,CENTER TR				M		0000	EA	2.00	4.00	4-00	001015
03	**47E382610-5	AIL SECT,OUTBD DRIVE				M		0000	EA	2.00	4.00	5-00	001016
03	**47E382610-6	AIL SECT,OUTBD TRAIL				M		0000	EA	2.00	4.00	6-00	001017

LVL	IDENTIFICATION NO.	NOMENCLATURE	ECN DWG INC	ECN DWG OUT	ECN PL-LATE APPLY	P C	T Y	CYCLE TIME	U/M	PL-QTY	EXT/TOT QTY	ITEM/ REF DESG	FSCM	CROSS REF
03	**47E382610-7	HINGE FITTING,INBD				M		0000	EA	2.00	4.00	7-00		001018
03	**47E382610-8	HINGE FITTING,INBD				M		0000	EA	2.00	4.00	8-00		001019
03	**47E382610-9	HINGE FITTING,CENTER				M		0000	EA	2.00	4.00	9-00		001020
03	**47E382610-10	HINGE FITTING,CENTER				M		0000	EA	2.00	4.00	10-00		001021
03	**47E382610-11	HINGE FITTING,OUTBD				M		0000	EA	2.00	4.00	11-00		001022
03	**47E382610-12	HINGE FITTING,OUTBD				M		0000	EA	2.00	4.00	12-00		001023
03	**47E382610-13	HINGE FITTING,TIP				M		0000	EA	2.00	4.00	13-00		001024
03	47C381115P1	ACTUATOR				B		0000	EA	6.00	12.00	14-00		001025
03	MXJRR-10AS	ROD END,MALE				B		0000	EA	6.00	12.00	15-00	73143	001026
03	FXJRR-10AS	ROD END,FEMALE				M		0000	EA	6.00	12.00	16-00	73143	001027
03	47C381087P1	NUT				M		0000	EA	28.00	56.00	17-00		001028
03	47C381088P1	WASHER,1.00 DIA				M		0000	EA	28.00	56.00	18-00		001029
03	**47E382610-19	PIN,SPECIAL				M		0000	EA	6.00	12.00	19-00		001030
03	N900P62C	RING,RETAINING				B		0000	EA	12.00	24.00	20-00		001031
03	N402P17C	WASHER,SHIM				B		0000	EA	6.00	12.00	21-00		001032
03	**47E382610-22	STUD,SPECIAL				M		0000	EA	6.00	12.00	22-00		001033
03	**47E382610-23	PIN,HOLLOW SPECIAL				M		0000	EA	6.00	12.00	23-00		001034
03	**47E382610-24	SPACER SLEEVE				M		0000	EA	12.00	24.00	24-00		001035
03	**47E382610-25	SPACER SLEEVE				M		0000	EA	6.00	12.00	25-00		001036
03	**47E382610-26	WASHER,SHIM				M		0000	EA	18.00	36.00	26-00		001037
03	**47E382610-27	WASHER,SPECIAL				M		0000	EA	24.00	48.00	27-00		001038
03	N271P35	NUT				B		0000	EA	24.00	48.00	28-00		001039
03	**47E382610-29	SHOULDER PIN				M		0000	EA	12.00	24.00	29-00		001040
03	**47E382610-30	SPACER SLEEVE				M		0000	EA	24.00	48.00	30-00		001041
03	**47E382610-31	PIN				M		0000	EA	6.00	12.00	31-00		001042
03	N900P75C	RING,RETAINING				B		0000	EA	12.00	24.00	32-00		001043
03	N402P18C	WASHER 3/4"DIA				B	5	0000	EA	12.00	24.00	33-00		001044
03	MODEL-RC	SHOCK ABSORBER				B		0000	EA	8.00	16.00	34-00	94389	001045
03	**47E382610-35	ACTUATOR ARM,ADJ				M		0000	EA	8.00	16.00	35-00		001046
03	N94P75024	SCREW,SHOULDER				B		0000	EA	8.00	16.00	36-00		001047
03	N264P33B	LOCKNUT				B		0000	EA	40.00	80.00	37-00		001048
03	N402P17B	WASHER				B		0000	EA	40.00	80.00	38-00		001049
03	N22P33036B	SCREW,HEX HD				B		0000	EA	32.00	64.00	39-00		001050
02	47E382582G1	BLADE TIP ATCH ASSY				M		0000	EA	2.00	2.00	9-00		001051
03	**47E382582-1	ATCH STRIP-NOSE SECT				M		0000	EA	2.00	4.00	1-00		001052
03	47E382334P1	TIP,BLADE				M		0000	EA	2.00	4.00	2-00		001053
03	D170-RF-6-6-5	INSERT,DELRIN				B		0000	EA	10.00	20.00	3-00		001054
03	N50P24020C	SCREW,HEX HD				B		0000	EA	10.00	20.00	4-00		001055
03	N400P43	WASHER,FLAT				B		0000	EA	10.00	20.00	5-00		001056
03	**47E382582-6	ATCH STRIP-UPPER FWD				M		0000	EA	2.00	4.00	6-00		001057
03	**47E382582-7	ATCH STRIP-UPPER AFT				M		0000	EA	2.00	4.00	7-00		001058
03	**47E382582-8	ATCH STRIP-LOWER FWD				M		0000	EA	2.00	4.00	8-00		001059
03	**47E382582-9	ATCH STRIP-LOWER AFT				M		0000	EA	2.00	4.00	9-00		001060
03	47E382582P10	ADHESIVE,EPOXY				B		0000	PT	AR		10-00		001061
03	47E382582P11	GLASSFIBER CLOTH				B		0000	FT	AR		11-00		001062
03	A15F7A1	SILICONE POTTING RTV				B		0000	PT	AR		12-00		001063
03	N197P2440	SCERW,WOOD,FLAT HD				B		0000	EA	AR		13-00		001064

LVL	IDENTIFICATION NO.	NOMENCLATURE	ECN DWG INC	ECN DWG OUT	PL-LATE APPLY	P C	T Y	CYCLE TIME	U/M	PL-QTY	EXT/TOT QTY	ITEM/ REF DESG	FSCM	CROSS REF
02	47E382469G1	ICE DETECTOR INSTL				M		0000	EA	2.00	2.00	10-00		001065
03	47C382464G1	RING & HOUSING ASSY				M		0000	EA	2.00	4.00	1-00		001066
04	47C382463G1	RING, MOUNTING				M		0000	EA	1.00	4.00	1-00		001067
05	47C382463P1	RING, MOUNTING				M		0000	EA	1.00	4.00	1-00		001068
05	TLC-4C-0500W	INSERT, COIL THREAD				B		0000	EA	5.00	20.00	2-00	26390	001069
04	ZTR-64D	CAN, HOUSING				M		0000	EA	1.00	4.00	2-00	19178	001070
03	47D381091P1	ICE DETECTOR				M		0000	EA	2.00	4.00	2-00		001071
03	47B382467P1	RETAINER				M		0000	EA	2.00	4.00	3-00		001072
03	47B382468P1	GASKET				M		0000	EA	2.00	4.00	4-00		001073
03	**47E382469-5	EPOXY, ASBESTOS				B		0000	QT	AR		5-00		001074
03	47B382467P2	RETAINER / COVER				M		0000	EA	2.00	4.00	6-00		001075
03	N678P21010	SCREW, 100 DEG CSK				B		0000	EA	10.00	20.00	7-00		001076
03	N678P9006	SCREW, 100 DEG CSK				B		0000	EA	10.00	20.00	8-00		001077
03	47B382470P1	GASKET, COVER				M		0000	EA	2.00	4.00	9-00		001078
02	47E382413G1	BALLAST INSTL				M		0000	EA	1.00	1.00	11-00		001079
03	47C382399P1	BLOCK,BALLAST				M		0000	EA	96.00	96.00	1-00		001080
03	47B382401P1	STUD				M		0000	EA	32.00	32.00	2-00		001081
03	47B382398P1	SPACER				M		0000	EA	AR		3-00		001082
03	N214DP44B	NUT				B		0000	EA	64.00	64.00	4-00		001083
03	**47E382413-5	WASHER				M		0000	EA	64.00	64.00	5-00		001084
03	**47E382413-6	HOUSING,BALLAST				M		0000	EA	2.00	2.00	6-00		001085
03	**47E382413-7	PLATE,RETAINER				M		0000	EA	2.00	2.00	7-00		001086
03	**47E382413-8	STEM,THREADED				M		0000	EA	2.00	2.00	8-00		001087
03	**47E382413-9	NUT				M		0000	EA	2.00	2.00	9-00		001088
03	**47E382413-10	WASHER				M		0000	EA	2.00	2.00	10-00		001089
03	**47E382413-11	SCREW,HEX HD				M		0000	EA	24.00	24.00	11-00		001090
03	**47E382413-12	PLATE,KEEPER				M		0000	EA	2.00	2.00	12-00		001091
03	**47E382413-13	SCREW,HEX HD				M		0000	EA	8.00	8.00	13-00		001092
03	**47E382413-14	INSERT				M		0000	EA	8.00	8.00	14-00		001093
03	**47E382413-15	INSERT				M		0000	EA	16.00	16.00	15-00		001094
02	47E382590P12	FIBERGLASS,CLOTH				B		0000	EA	AR		12-00		001095
02	47E382469G2	ICE DETECTOR INSTL				M		0000	EA	2.00	2.00	13-00		001096
03	47C382464G1	RING & HOUSING ASSY				M		0000	EA	2.00	4.00	1-00		001097
04	47C382463G1	RING, MOUNTING				M		0000	EA	1.00	4.00	1-00		001098
05	47C382463P1	RING, MOUNTING				M		0000	EA	1.00	4.00	1-00		001099
05	TLC-4C-0500W	INSERT, COIL THREAD				B		0000	EA	5.00	20.00	2-00	26390	001100
04	ZTR-64D	CAN, HOUSING				M		0000	EA	1.00	4.00	2-00	19178	001101

LVL	IDENTIFICATION NO.	NOMENCLATURE	ECN DWG INC	ECN DWG OUT	PL-LATE APPLY	P C	T Y	CYCLE TIME	U/M	PL-QTY	EXT/TOT QTY	ITEM/ REF DESG	FSCM	CROSS REF
03	**47E382469-5	EPOXY, ASBESTOS				B		0000	QT	AR		5-00		001102
03	47B382467P2	RETAINER / COVER				M		0000	EA	2.00	4.00	6-00		001103
03	N678P21010	SCREW, 100 DEG CSK				B		0000	EA	10.00	20.00	7-00		001104
03	47B382470P1	GASKET, COVER				M		0000	EA	2.00	4.00	9-00		001105
02	47E382400G1	LIGHTING PROT INSTL				M		0000	EA	2.00	2.00	14-00		001106
03	**47E382400-1	GROUND STRAP,BRAIDED				M		0000	EA	6.00	12.00	1-00		001107
03	N46P20B	SCREW,STEEL CAP				B		0000	EA	6.00	12.00	2-00		001108
03	47E382400P3	LIGHTING STRIP				M		0000	FT	AR		3-00		001109
03	47E382400P4	SPLICE PLATE				M		0000	EA	16.00	32.00	4-00		001110
03	**47E382400-5	EPOXT,WEST SYSTEM				B		0000	PT	AR		5-00		001111
03	47E382400P6	SHIM				M		0000	EA	2.00	4.00	6-00		001112
03	N197P816	SCREW,WOOD				B		0000	EA	32.00	64.00	7-00		001113
03	72-08116	EPOXY,CONDUCTIVE				B		0000	PT	AR		8-00	07700	001114
03	72-00005	CAULKING,CONDUCTIVE				B		0000	PT	AR		9-00	07700	001115
03	**47E382400-10	R.T.V,TEFLON				B		0000	PT	AR		10-00		001116
03	**47E382400-11	JOINT COMPOUND,ELEC				B		0000	PT	AR		11-00	09922	001117
03	47A380009	DES. REQMTS,ROTOR BL				X		0000	EA	X		12-00		001118
02	**47E382590-15	BUMPER INSTL				M		0000	EA	1.00	1.00	15-00		001119
02	**47E382590-16	TETHER RETENN INSTL				M		0000	EA	2.00	2.00	16-00		001120
02	**47E382590-17	ELEC INSTM INSTL				M		0000	EA	1.00	1.00	17-00		001121
02	47J382330G1	BLADE HYDRAULIC INST				M		0000	EA	1.00	1.00	18-00		001122
03	47J382330P1	TUBING HYDRAULIC				M		0000	FT	720.00	720.00	1-00		001123
03	47J382330P2	TUBING HYDRAULIC				M		0000	FT	480.00	480.00	2-00		001124
03	47C381066P2	HOSE ASSY				M		0000	EA	6.00	6.00	3-00		001125
03	47C381066P1	HOSE ASSY				M		0000	EA	4.00	4.00	4-00		001126
03	47E382357G1	BRACKET,INBOARD				M		0000	EA	2.00	2.00	5-00		001127
04	47E382357P1	BRACKET				M		0000	EA	1.00	2.00	1-00		001128
04	N926P225	INSERT,COIL THD				B		0000	EA	5.00	10.00	2-00		001129
03	47D382358P1	BRKT,OUTBOARD				M		0000	EA	2.00	2.00	6-00		001130
03	47C382336G1	BRKT,CLAMP MODIFIED				M		0000	EA	38.00	38.00	7-00		001131
04	47C382336P1	BRACKET,ANGLE				M		0000	EA	2.00	76.00	1-00		001132
04	47C381072P3	CLAMP UNIT				M		0000	EA	1.00	38.00	2-00		001133
03	47C382336G2	BRKT,CLAMP MODIFIED				M		0000	EA	8.00	8.00	8-00		001134
04	47C382336P1	BRACKET,ANGLE				M		0000	EA	2.00	16.00	1-00		001135
04	47C381072P3	CLAMP UNIT				M		0000	EA	1.00	8.00	2-00		001136
03	47C381072P2	CLAMP UNIT				M		0000	EA	52.00	52.00	9-00		001137
03	47C381072P1	CLAMP UNIT				M		0000	EA	4.00	4.00	10-00		001138
03	47C382335P2	TUBE ADAPTER				M		0000	EA	6.00	6.00	11-00		001139

LVL	IDENTIFICATION NO.	NOMENCLATURE	ECN DWG INC	ECN DWG OUT	PL-LATE APPLY	P C	T Y	CYCLE TIME	U/M	PL-QTY	EXT/TOT QTY	ITEM/ REF DESG	FSCM	CROSS REF
03	47C382335P1	TUBE ADAPTER				M		0000	EA	4.00	4.00	12-00		001140
03	C-MA-32	ADAPTER,MOUNTING				B		0000	EA	8.00	8.00	13-00	30780	001141
03	47B382338P1	STUD,MOUNTING				M		0000	EA	10.00	10.00	14-00		001142
03	C-SN-32	NUT,STACKING				B	5	0000	EA	332.00	332.00	15-00	30780	001143
03	C-TA-32	ADAPTER,THREADED				B	5	0000	EA	166.00	166.00	16-00	30780	001144
03	47C382337P1	ADAPTER,TUBE				M		0000	EA	12.00	12.00	17-00		001145
03	100-8-F8SS	ADAPTER,TUBE				B		0000	EA	8.00	8.00	18-00	97576	001146
03	900-14SS	UNION,BULKHEAD				B		0000	EA	6.00	6.00	19-00	97576	001147
03	900-8SS	UNION,BULKHEAD				B		0000	EA	4.00	4.00	20-00	97576	001148
03	47C382349P1	SLEEVE,SPLIT				M		0000	EA	150.00	150.00	21-00		001149
03	47C382349P2	SLEEVE,SPLIT				M		0000	EA	100.00	100.00	22-00		001150
03	C-SB-32-16	BUSHING,SPLIT				B	5	0000	EA	150.00	150.00	23-00	30780	001151
03	C-SB-32-14	BUSHING,SPLIT				B		0000	EA	6.00	6.00	24-00	30780	001152
03	C-SB-32-10	BUSHING,SPLIT				B		0000	EA	100.00	100.00	25-00	30780	001153
03	C-SB-32-8	BUSHING,SPLIT				B	5	0000	EA	4.00	4.00	26-00	30780	001154
03	47D382361G1	BASE,HOSE SUPPORT				M		0000	EA	2.00	2.00	27-00		001155
04	47D382361P1	PLATE				M		0000	EA	1.00	2.00	1-00		001156
04	47D382361P2	PAD				M		0000	EA	1.00	2.00	2-00		001157
04	N926P225	INSERT,COIL THD				B		0000	EA	4.00	8.00	3-00		001158
04	**47D382361-4	ADHESIVE				B		0000	PT	AR		4-00		001159
03	47C382360G1	SUPPORT,HOSE				M		0000	EA	2.00	2.00	28-00		001160
04	47C382360P1	PLATE				M		0000	EA	1.00	2.00	1-00		001161
04	47C382360P2	PAD				M		0000	EA	1.00	2.00	2-00		001162
04	N926P225	INSERT,COIL THD				B		0000	EA	2.00	4.00	3-00		001163
04	**47C382360-4	ADHESIVE				B		0000	PT	AR		4-00		001164
03	47C382359P1	PLATE				M	M	0000	EA	4.00	4.00	29-00		001165
03	47B382373P1	SPACER				M		0000	EA	8.00	8.00	30-00		001166
03	47B382373P2	SPACER				M		0000	EA	8.00	8.00	31-00		001167
03	47B382373P3	SPACER				M		0000	EA	8.00	8.00	32-00		001168
03	C-B-32	BOLT,.375-16 1.00 LG				B	5	0000	EA	322.00	322.00	33-00	30780	001169
03	C-N-32	NUT,.375-16				B	5	0000	EA	8.00	8.00	34-00	30780	001170
03	C-LW-32	LOCKWASHER				B	5	0000	EA	330.00	330.00	35-00	30780	001171
03	N727P29024B	BOLT,.500-13 1.50 LG				B		0000	EA	16.00	16.00	36-00		001172
03	N405P45B	WASHER, LOCK				B	5	0000	EA	16.00	16.00	37-00		001173
03	N405P43B	LOCKWASHER - MEDIUM				B	5	0000	EA	248.00	248.00	38-00		001174
03	N22P25012B	BOLT,.375-16 .75 LG				B		0000	EA	104.00	104.00	39-00		001175
03	N22P25020B	BOLT 3/8-16 X 1-1/4"*				B	5	0000	EA	28.00	28.00	40-00		001176
03	N22P25038B	BOLT,.375-16 2.38 LG				B		0000	EA	4.00	4.00	41-00		001177
03	N22P25042B	BOLT,.375-16 2.88 LG				B		0000	EA	4.00	4.00	42-00		001178
03	N22P25074B	BOLT,.375-16 4.62 LG				B		0000	EA	4.00	4.00	43-00		001179
03	**47J382330-44	SLEEVING				M		0000	EA	4.00	4.00	44-00		001180
03	**47J382330-45	SLEEVING,SHRINK				M		0000	EA	8.00	8.00	45-00		001181
03	N22P25034B	BOLT,.375-16 2.12 LG				B		0000	EA	8.00	8.00	46-00		001182
03	**47J382330-47	BRAZING ALLOY				B		0000	EA	AR		47-00		001183
03	47C382336G3	BRKT,CLAMP				M		0000	EA	6.00	6.00	48-00		001184

LVL	IDENTIFICATION NO.	NOMENCLATURE	ECN DWG INC	ECN DWG OUT	ECN PL-LATE APPLY	P C	T Y	CYCLE TIME	U/M	PL-QTY	EXT/TOT QTY	ITEM/ REF DESG	FSCM	CROSS REF
04	47C382336P1	BRACKET,ANGLE				M		0000	EA	2.00	12.00	1-00		001185
04	47C381072P3	CLAMP UNIT				M		0000	EA	1.00	6.00	2-00		001186
02	47D382406	GEOMETRY DWG				X		0000	EA	X		19-00		001187
02	47E382460	BLADE TOLERANCE DWG				X		0000	EA	X		20-00		001188
02	**47E382590-21	CONNECTING PLATE				M		0000	EA	2.00	2.00	21-00		001189
02	**47E382590-22	CONNECTING PLATE				M		0000	EA	2.00	2.00	22-00		001190
02	47E382590P23	ADHESIVE,EPOXY				B		0000	PT	AR		23-00		001191
02	47E382605G1	TEETER BRG/RSTR INST				M		0000	EA	1.00	1.00	24-00		001192
03	47E382602P2	YOKE BRG CAP				M		0000	EA	2.00	2.00	1-00		001193
03	47E382583G1	TEETER HUB/BRG ASSY				M		0000	EA	2.00	2.00	2-00		001194
04	47D381114P1	BRG,RADIAL-TEETER				M		0000	EA	1.00	2.00	1-00		001195
04	47E382581P1	HUB, BRG - TEETER				M		0000	EA	1.00	2.00	2-00		001196
04	47E382583P3	DOWEL PIN				M		0000	EA	3.00	6.00	3-00		001197
03	47E381093P1	BGR THRUST TEETER				M		0000	EA	2.00	2.00	3-00		001198
03	47B382396P1	SHIM,BRG				M		0000	EA	2.00	2.00	4-00		001199
03	47D381101P1	SHRINK DISC				M		0000	EA	2.00	2.00	5-00		001200
03	N060	LOCKNUT,TYPE SD				B		0000	EA	2.00	2.00	6-00	80648	001201
03	P60	LOCK PLATE				B		0000	EA	2.00	2.00	7-00	80648	001202
03	V1120E	SEAL-VEE RING				B		0000	EA	2.00	2.00	8-00		001203
03	47D382352G1	TEETER ARM ASSY				M		0000	EA	4.00	4.00	9-00		001204
04	47D382352P1	TEETER ARM				M		0000	EA	1.00	4.00	1-00		001205
04	47D382352P2	RETAINING RING				M		0000	EA	1.00	4.00	2-00		001206
04	GE160TG3AS-2RS	MONO BEARING				B		0000	EA	1.00	4.00	3-00	52676	001207
04	N22BP21014B	BOLT,LOCK				B		0000	EA	8.00	32.00	4-00		001208
04	N402P11B	WASHER, NARROW				B	5	0000	EA	8.00	32.00	5-00		001209
03	47C382353P1	TEETER SUPPORT PIN				M		0000	EA	4.00	4.00	10-00		001210
03	N22BP82080B	BOLT,LOCK				B		0000	EA	36.00	36.00	11-00		001211
03	N402P20B	WASHER				B		0000	EA	36.00	36.00	12-00		001212
03	47E382488P1	PRE-LOAD FIXTURE				M		0000	EA	2.00	2.00	13-00		001213
03	**47E382605-14	PRE-LOAD COLLAR				M		0000	EA	2.00	2.00	14-00		001214
03	**47E382605-15	LOADING STUD				M		0000	EA	6.00	6.00	15-00		001215
03	**47E382605-16	HYDR EXTENDER				M		0000	EA	2.00	2.00	16-00		001216
03	N22BP29020B	BOLT, SLFLKG				B		0000	EA	24.00	24.00	17-00		001217
03	N402P15B	WASHER				B		0000	EA	24.00	24.00	18-00		001218
03	47E382605P19	PIN				M		0000	EA	4.00	4.00	19-00		001219
02	N197P2048	SCREW,WOOD				B		0000	EA	AR		25-00		001220
02	**47E382590-26	BUTT WEDGE-REAR SPAR				M		0000	EA	2.00	2.00	26-00		001221
02	**47E382590-27	JOINT WEDGE-UPPER				M		0000	EA	2.00	2.00	27-00		001222
02	**47E382590-28	JOINT WEDGE-LOWER				M		0000	EA	2.00	2.00	28-00		001223
02	47A380009	DES. REQMTS,ROTOR BL				X		0000	EA	X		29-00		001224
02	47D382406	GEOMETRY DWG				X		0000	EA	X		30-00		001225

LVL	IDENTIFICATION NO.	NOMENCLATURE	ECN DWG INC	ECN DWG OUT	PL-LATE APPLY	P C	T Y	CYCLE TIME	U/M	PL-QTY	EXT/TOT QTY	ITEM/ REF DESG	FSCM CROSS REF
02	47E382460	BLADE TOLERANCE DWG				X		0000	EA	X		31-00	001226
02	47E382440	SCHEM ROTOR HYDR SYS				X		0000	EA	X		32-00	001227
02	47A382285	PROFILE COORDINATES				X		0000	EA	X		33-00	001228
01	47E382607G1	YOKE / NACELLE INSTL				M		0000	EA	1.00	1.00	5-00	001229
02	47E382597G1	NACELLE OVERALL ASSY	1			X		0000	EA	X		1-00	001230
02	47E382601G1	YOKE ASSY				X		0000	EA	X		2-00	001231
02	47E382599G1	SLIP RING INST				M		0000	EA	1.00	1.00	3-00	001232
03	**47E382599-1	SUPPORT TUBE				M		0000	EA	1.00	1.00	1-00	001233
03	**47E382599-2	SUPPORT PADS				M		0000	EA	2.00	2.00	2-00	001234
03	47E382486P1	SIDE SUPPORT				M		0000	EA	1.00	1.00	3-00	001235
03	47D381018	ELEC INTERFACE				X		0000	EA	X		4-00	001236
03	47D381020P1	ROTOR SLIPRING UNIT				M		0000	EA	1.00	1.00	5-00	001237
03	47C381111P1	BELLOWS JOINT				M		0000	EA	1.00	1.00	6-00	001238
03	**47E382599-7	CONDUIT TIE BLOCK				M		0000	EA	3.00	3.00	7-00	001239
03	**47E382599-8	CONDUIT SPACER PAD				M		0000	EA	6.00	6.00	8-00	001240
03	47E382599P9	CONDUIT 2.00 DIA				M		0000	EA	3.00	3.00	9-00	001241
03	47E382599P10	CONDUIT 1.50 DIA				M		0000	EA	6.00	6.00	10-00	001242
03	**47E382599-11	JUNCTION BOX				M		0000	EA	1.00	1.00	11-00	001243
03	**47E382599-12	SEALING COLLAR				M		0000	EA	1.00	1.00	12-00	001244
03	A15B36	ADHESIVE,EPOXY				B		0000	OZ	AR		13-00	001245
03	B12B33	ADHESIVE,AL TAPE				B		0000	FT	AR		14-00	001246
03	N22BP29016B	BOLT,LOCK				B		0000	EA	12.00	12.00	15-00	001247
03	N402P15B	WASHER				B		0000	EA	16.00	16.00	16-00	001248
03	N22P29032B	BOLT				B		0000	EA	4.00	4.00	17-00	001249
03	N264P29B	NUT 1/2				B	5	0000	EA	4.00	4.00	18-00	001250
03	47E382599P19	ANGLES				M		0000	EA	2.00	2.00	19-00	001251
03	47D381024P1	ROTARY POSITION SR				M		0000	EA	1.00	1.00	20-00	001252
02	47E382496G1	LOW SPEED BRAKE INST				M		0000	EA	1.00	1.00	4-00	001253
03	47E382495G1	LOW SP BK SPRT ASSY				M		0000	EA	2.00	2.00	1-00	001254
04	47E382407P1	LOW SP BK SPRT BRKT				M		0000	EA	1.00	2.00	1-00	001255
04	47D382461P1	LOW SPEED BRAKE				M		0000	EA	4.00	8.00	2-00	001256
04	47D382492P4	NUT PLATE				M		0000	EA	2.00	4.00	3-00	001257
04	47D382492P2	NUT PLATE				M		0000	EA	2.00	4.00	4-00	001258
04	47D382492P1	NUT PLATE				M		0000	EA	1.00	2.00	5-00	001259
04	47D382492P3	NUT PLATE				M		0000	EA	1.00	2.00	6-00	001260
04	47D382493P3	NUT PLATE				M		0000	EA	2.00	4.00	7-00	001261
04	47D382493P1	NUT PLATE				M		0000	EA	2.00	4.00	8-00	001262
04	47D382493P2	NUT PLATE				M		0000	EA	1.00	2.00	9-00	001263
04	47B382494P1	NUT PLATE				M		0000	EA	8.00	16.00	10-00	001264
04	N46P22032B	SCREW, FLAT HD				B		0000	EA	38.00	76.00	11-00	001265
04	N402AP20B	WASHER				B		0000	EA	24.00	48.00	12-00	001266
04	47C381036P5	BOLT,FATIGUE RATED				B		0000	EA	24.00	48.00	13-00	001267
03	47C381036P3	BOLT,FATIGUE RATED				B		0000	EA	84.00	84.00	2-00	001268

LVL	IDENTIFICATION NO.	NOMENCLATURE	ECN DWG INC	ECN DWG OUT	PL-LATE APPLY	P C	T Y	CYCLE TIME	U/M	PL-QTY	EXT/TOT QTY	ITEM/ REF DESG	FSCM	CROSS REF
03	47C381088P1	WASHER, 1.00 DIA				M		0000	EA	84.00	84.00	3-00		001269
03	47C381036P10	BOLT, FATIGUE RATED				B		0000	EA	8.00	8.00	4-00		001270
03	47C381088P5	WASHER, 1.25 DIA				B		0000	EA	8.00	8.00	5-00		001271
03	81341EB-30	EYE BOLT				B		0000	EA	2.00	2.00	6-00		001272
03	A15F6C18	RTV SILICONE SEALANT				M		0000	OZ	AR		7-00		001273
02	47E382498G1	RTR SPEED SNSR INSTL				M		0000	EA	1.00	1.00	5-00		001274
03	47B382480P1	BRACKET, SENSOR				M		0000	EA	2.00	2.00	1-00		001275
03	47B381108P1	SENSOR, ROTOR SPEED				M		0000	EA	2.00	2.00	2-00	81692	001276
03	N733P25016B	SCREW, TWELVE-POINT				B		0000	EA	4.00	4.00	3-00		001277
03	N405P43B	LOCKWASHER - MEDIUM				B	5	0000	EA	4.00	4.00	4-00		001278
02	47C381036P26	BOLT, FATIGUE RATED				B		0000	EA	96.00	96.00	6-00		001279
02	47C381087P9	NUT				B		0000	EA	96.00	96.00	7-00		001280
02	47C381088P9	WASHER, 1.50 DIA				M		0000	EA	96.00	96.00	8-00		001281
02	47C381088P10	WASHER, 1.50 DIA				B		0000	EA	96.00	96.00	9-00		001282
02	**47E382607-10	SEAL, STATOR HALVES				M		0000	EA	2.00	2.00	10-00		001283
02	**47E382607-11	SEAL PLATE				M		0000	EA	6.00	6.00	11-00		001284
02	**47E382607-12	SEAL				M		0000	EA	1.00	1.00	12-00		001285
02	**47E382607-13	LOCKBOLT				M		0000	EA	AR		13-00		001286
02	**47E382607-14	WASHER				M		0000	EA	AR		14-00		001287
02	A15F6C18	RTV SILICONE SEALANT				M		0000	OZ	AR		15-00		001288
01	47E382608G1	ROTOR BLADE INSTL				M		0000	EA	1.00	1.00	6-00		001289
02	47B382396P1	SHIM, BRG				X		0000	EA	X		1-00		001290
02	47C381036P10	BOLT, FATIGUE RATED				B		0000	EA	60.00	60.00	2-00		001291
02	47C381087P6	LOCKNUT				B		0000	EA	60.00	60.00	3-00		001292
02	47C381088P9	WASHER, 1.50 DIA				M		0000	EA	60.00	60.00	4-00		001293
02	47C381088P10	WASHER, 1.50 DIA				B		0000	EA	60.00	60.00	5-00		001294
02	47C381036P21	BOLT				B		0000	EA	8.00	8.00	6-00		001295
02	47C381087P10	LOCKNUT				B		0000	EA	8.00	8.00	7-00		001296
02	47C381088P9	WASHER, 1.50 DIA				M		0000	EA	8.00	8.00	8-00		001297
02	47C381088P10	WASHER, 1.50 DIA				B		0000	EA	8.00	8.00	9-00		001298
02	N22BP82080B	BOLT, LOCK				B		0000	EA	36.00	36.00	10-00		001299
02	N402P20B	WASHER				B		0000	EA	36.00	36.00	11-00		001300
02	**47E382608-12	TEETER POSN IND				M		0000	EA	1.00	1.00	12-00		001301
02	**47E382608-13	TEETER MOTION INSTL				M		0000	EA	1.00	1.00	13-00		001302
02	**47E382608-14	FLEX HOSE				M		0000	EA	2.00	2.00	14-00		001303
02	**47E382608-15	FLEX HOSE				M		0000	EA	2.00	2.00	15-00		001304
02	**47E382608-16	FLEX HOSE				M		0000	EA	2.00	2.00	16-00		001305
01	**47E382304-7	GND SPRT EQUIP INSTL				M		0000	EA	1.00	1.00	7-00		001306
01	47E382045	GEOMETRY ENVELOPE				X		0000	EA	X		8-00		001307
01	47E387081G1	ELEC EQUIP BUILDING				M		0000	EA	1.00	1.00	9-00		001308
02	**47E387081-1	GRND ENCLOSURE BLDG				M		0000	EA	1.00	1.00	1-00		001309
02	**47E387081-2	TRANSFORMER				M		0000	EA	1.00	1.00	2-00		001310

LVL	IDENTIFICATION NO.	NOMENCLATURE	ECN DWG INC	ECN DWG OUT	ECN PL-LATE APPLY	P C	T Y	CYCLE TIME	U/M	PL-QTY	EXT/TOT QTY	ITEM/ REF DESG	FSCM	CROSS REF
02	**47E387081-3	P.F. CAPACITOR				M		0000	EA	1.00	1.00	3-00		001311
02	**47E387081-4	CYCLOCONVERTER				M		0000	EA	1.00	1.00	4-00		001312
02	**47E387081-5	SWITCHGEAR LINE-UP				M		0000	EA	1.00	1.00	5-00		001313
02	**47E387081-6	INTERFACE CABINET				M		0000	EA	1.00	1.00	6-00		001314
02	**47E387081-7	ELECTRONICS CABINET				M		0000	EA	1.00	1.00	7-00		001315
02	47A380068	30-KVA XFMR SPEC				M		0000	EA	1.00	1.00	8-00		001316
02	47A380014	STATION BATTERY SPEC				M		0000	EA	1.00	1.00	9-00		001317
02	47A380067	CONT SYST U.P.S.SPEC				M		0000	EA	1.00	1.00	10-00		001318
02	**47E387081-11	ENG INSTR SUBSYSTEM				M		0000	EA	1.00	1.00	11-00		001319
02	**47E387081-12	OFFICE EQPT INSTL				M		0000	EA	1.00	1.00	12-00		001320
02	**47E387081-13	HECO ELEC INTERFACE				M		0000	EA	1.00	1.00	13-00		001321
02	**47E387081-14	SITE OPERATOR TERM				M		0000	EA	1.00	1.00	14-00		001322
02	**47E387081-15	FUSE PANELS				M		0000	EA	2.00	2.00	15-00		001323
02	**47E387081-16	AIR COND & HEATER				M		0000	EA	1.00	1.00	16-00		001324
02	**47E387081-17	COM DATA SYSTEM				M		0000	EA	1.00	1.00	17-00		001325
02	47E387112G1	SYS DISPLAY PNL ASSY				M		0000	EA	1.00	1.00	18-00		001326
03	47D381060P1	VIDEO MONITOR				M		0000	EA	1.00	1.00	1-00		001327
03	47E387027G1	ASSY,WTG CONTROL PAN*				*		0000	EA	1.00	1.00	2-00		001328
04	47D387028P1	PANEL,FRONT,WTG CONT*				*		0000	EA	1.00	1.00	1-00		001329
04	47D387029P1	CONNECTOR PANEL, WTG*				*		0000	EA	1.00	1.00	2-00		001330
04	CS-A-3-17	CHASSIS, SIDE				B	5	0000	EA	1.00	1.00	3-00	6666	001331
04	BC-A-17	BOTTOM COVER				B	5	0000	EA	1.00	1.00	4-00	6666	001332
04	TC-A-17	TOP COVER				B	5	0000	EA	1.00	1.00	5-00	6666	001333
04	FCA8	HANDLE				B	5	0000	EA	2.00	2.00	6-00	08730	001334
04	CR104PBM92R6C	PUSHBUTTON,MUSHROOM *				*		0000	EA	1.00	1.00	7-00	2295	001335
04	CR104PSK47A92Z	SWITCH,4 POSITION NO*				*		0000	EA	1.00	1.00	8-00	2295	001336
04	20001	METER,120V,60HZ				B	5	0000	EA	1.00	1.00	9-00	74400	001337
04	CR103HC2001G	INDICATOR LIGHT, GRE*				*		0000	EA	1.00	1.00	10-00	2295	001338
04	CR103HC2001R	INDICATOR LIGHT, RED				*		0000	EA	1.00	1.00	11-00	2295	001339
04	GE327	LAMP				*		0000	EA	2.00	2.00	12-00	8806	001340
04	N7003P14250	RESISTOR, WIRE WOUND*				*		0000	EA	1.00	1.00	13-00		001341
04	PT07SE-18-11P	CONNECTOR ELEC 11 PIN				*		0000	EA	1.00	1.00	14-00	77820	001342
04	17236	POWER CORD				B	5	0000	EA	1.00	1.00	15-00	16428	001343
04	939	STRAIN RELIEF,SMITH				B	5	0000	EA	1.00	1.00	16-00	83330	001344
04	47A380069P31	NAMEPLATE,IDENT (J1)				*		0000	EA	1.00	1.00	17-00		001345
04	47A380069P71	NAMEPLATE,IDENT(GND)				*		0000	EA	1.00	1.00	18-00		001346
04	NP-206417	NAMEPLATE				B	5	0000	EA	1.00	1.00	19-00		001347
04	47A380070P3	NPL, AN/REV STATUS				*		0000	EA	1.00	1.00	20-00		001348
04	N153P13005	SCREW, PAN HD				*		0000	EA	2.00	2.00	21-00		001349
04	N153P15006	SCR, PH, #8-32				*		0000	EA	12.00	12.00	22-00		001350
04	N153P16006	SCR, PH, #10-32				*		0000	EA	4.00	4.00	23-00		001351
04	N153P16012	SCREW,PAN HD #10-32X*				*		0000	EA	1.00	1.00	24-00		001352
04	N678P15008	SCREW, FLAT HD				B	5	0000	EA	8.00	8.00	25-00		001353
04	N415P13	WASHER, LOCK, #6				*		0000	EA	2.00	2.00	26-00		001354
04	N415P16	WASHER, LOCK, #8				*		0000	EA	16.00	16.00	27-00		001355
04	N400P39	WASHER, FLAT, #10				*		0000	EA	2.00	2.00	28-00		001356
04	N415P19	WASHER, LOCK, #10				*		0000	EA	7.00	7.00	29-00		001357

LVL	IDENTIFICATION NO.	NOMENCLATURE	ECN DWG INC	ECN DWG OUT	ECN PL-LATE APPLY	P C	T Y	CYCLE TIME	U/M	PL-QTY	EXT/TOT QTY	ITEM/ REF DESG	FSCM	CROSS REF
04	N226P13	NUT,PLAIN HEX, #6-32				*		0000	EA	2.00	2.00	30-00		001358
04	N226P15	NUT, HEX, #8-32				B	5	0000	EA	4.00	4.00	31-00		001359
04	N226P16	NUT, HEX, #10-32				*		0000	EA	6.00	6.00	32-00		001360
04	18RA-8FLX	TERMINAL LUG,CRIMP(2*				B	5	0000	EA	3.00	3.00	33-00	56501	001361
04	18RA-10FLX	TERMINAL LUG,CRIMP(2*				B	5	0000	EA	1.00	1.00	34-00	56501	001362
04	RB4	WIRE JOINT				*		0000	EA	1.00	1.00	35-00	56501	001363
04	44A0111-16-9	WIRE, AWG #16				B	5	0000	FT	AR		36-00	06090	001364
04	RC6	WIRE JOINT				*		0000	EA	1.00	1.00	37-00	56501	001365
04	47A380071PAR	SLEEVING, SHRINK				*		0000	FT	AR		38-00		001366
04	47A381038P3	TAPE,LACING				*		0000	FT	AR		39-00		001367
04	SN60WRMAP2	SOLDER / QQ-S-571				B	5	0000	LB	AR		40-00		001368
04	47D387030	SCHEMATIC DIAGRAM EL*				X	5	0000	EA	X		41-00		001369
04	47A380052	ELECTRICAL FAB. STD				X	5	0000	EA	X		42-00		001370
03	47E387091G1	ASSY,GENERATOR PANEL				M		0000	EA	1.00	1.00	3-00		001371
04	47E387105P1	PANEL, FRONT				B		0000	EA	1.00	1.00	1-00		001372
04	47E387091P2	PANEL, SIDE				B		0000	EA	1.00	1.00	2-00		001373
04	47D387106P1	PANEL, REAR				B		0000	EA	1.00	1.00	3-00		001374
04	FCA4	HANDLE				B	5	0000	EA	2.00	2.00	4-00	08730	001375
04	47D387107P1	SGL CD FR.,MODIFIED				B		0000	EA	1.00	1.00	5-00		001376
04	47D387108P1	BRACKET, CARD FRAME				B		0000	EA	1.00	1.00	6-00		001377
04	DM-3100N	DIGITAL, METER				B	5	0000	EA	6.00	6.00	7-00	50521	001378
04	58-2073082	EDGE CONNECTOR				B	5	0000	EA	6.00	6.00	8-00	50521	001379
04	47D387089G1	ASSY,MTR SIG CONDTNR				M		0000	EA	3.00	3.00	9-00		001380
05	47E387116P1	DRILL & TRIM				M		0000	EA	1.00	3.00	1-00		001381
05	AWG-22-TYPE-S	BUS WIRE/QQ-W-343				B	5	0000	FT	AR		2-00		001382
05	47A381044PAR	SLEEVING,TEFLON				*		0000	FT	AR		3-00		001383
05	IC-314-SGT	SOCKET, 14 PIN				B		0000	EA	2.00	6.00	4-00	55322	001384
05	IC-316-SGT	SOCKET, 16 PIN				B		0000	EA	4.00	12.00	5-00	55322	001385
05	SN60WRMAP2	SOLDER / QQ-S-571				B	5	0000	LB.	AR		6-00		001386
05	47D387092	SCHEMATIC				X		0000	EA	X		7-00		001387
05	47A380052	ELECTRICAL FAB. STD				X	5	0000	EA	X		8-00		001388
05	1N4148	DIODE				B	7	0000	EA	1.00	3.00	CR1 -00	01295	001389
05	1N4148	DIODE				B	7	0000	EA	1.00	3.00	CR2 -00	01295	001390
05	1N4148	DIODE				B	7	0000	EA	1.00	3.00	CR3 -00	01295	001391
05	1N4148	DIODE				B	7	0000	EA	1.00	3.00	CR4 -00	01295	001392
05	1N4148	DIODE				B	7	0000	EA	1.00	3.00	CR5 -00	01295	001393
05	1N4148	DIODE				B	7	0000	EA	1.00	3.00	CR6 -00	01295	001394
05	1N4148	DIODE				B	7	0000	EA	1.00	3.00	CR7 -00	01295	001395
05	1N4148	DIODE				B	7	0000	EA	1.00	3.00	CR8 -00	01295	001396
05	1N4148	DIODE				B	7	0000	EA	1.00	3.00	CR9 -00	01295	001397
05	CKR05BX221KR	CAPACITOR, 200 PF				B		0000	EA	1.00	3.00	C1 -00		001398
05	199D106X0010BB1	CAPACITOR, 10 MFD				B		0000	EA	1.00	3.00	C2 -00	56289	001399
05	CKR06BX103KR	CAPACITOR, .01 MFD				B		0000	EA	1.00	3.00	C3 -00		001400
05	CKR06BX104KR	CAPACITOR, .1 MFD				B		0000	EA	1.00	3.00	C4 -00		001401
05	CKR06BX104KR	CAPACITOR, .1 MFD				B		0000	EA	1.00	3.00	C5 -00		001402
05	T-1R2-T	TERMINAL				B		0000	EA	1.00	3.00	E1 -00	55322	001403

LVL	IDENTIFICATION NO.	NOMENCLATURE	ECN DWG INC	ECN DWG OUT	PL-LATE APPLY	P C	T Y	CYCLE TIME	U/M	PL-QTY	EXT/TOT QTY	ITEM/ REF DESG	FSCM	CROSS REF
05	T-1R2-T	TERMINAL				B		0000	EA	1.00	3.00	E10	-00 55322	001404
05	T-1R2-T	TERMINAL				B		0000	EA	1.00	3.00	E11	-00 55322	001405
05	T-1R2-T	TERMINAL				B		0000	EA	1.00	3.00	E12	-00 55322	001406
05	T-1R2-T	TERMINAL				B		0000	EA	1.00	3.00	E13	-00 55322	001407
05	T-1R2-T	TERMINAL				B		0000	EA	1.00	3.00	E14	-00 55322	001408
05	T-1R2-T	TERMINAL				B		0000	EA	1.00	3.00	E15	-00 55322	001409
05	T-1R2-T	TERMINAL				B		0000	EA	1.00	3.00	E16	-00 55322	001410
05	T-1R2-T	TERMINAL				B		0000	EA	1.00	3.00	E17	-00 55322	001411
05	T-1R2-T	TERMINAL				B		0000	EA	1.00	3.00	E18	-00 55322	001412
05	T-1R2-T	TERMINAL				B		0000	EA	1.00	3.00	E19	-00 55322	001413
05	T-1R2-T	TERMINAL				B		0000	EA	1.00	3.00	E2	-00 55322	001414
05	T-1R2-T	TERMINAL				B		0000	EA	1.00	3.00	E3	-00 55322	001415
05	T-1R2-T	TERMINAL				B		0000	EA	1.00	3.00	E4	-00 55322	001416
05	T-1R2-T	TERMINAL				B		0000	EA	1.00	3.00	E5	-00 55322	001417
05	T-1R2-T	TERMINAL				B		0000	EA	1.00	3.00	E6	-00 55322	001418
05	T-1R2-T	TERMINAL				B		0000	EA	1.00	3.00	E7	-00 55322	001419
05	T-1R2-T	TERMINAL				B		0000	EA	1.00	3.00	E8	-00 55322	001420
05	T-1R2-T	TERMINAL				B		0000	EA	1.00	3.00	E9	-00 55322	001421
05	53451-1	RELAY				B	7	0000	EA	1.00	3.00	K1	-00 18342	001422
05	53451-1	RELAY				B	7	0000	EA	1.00	3.00	K2	-00 18342	001423
05	53451-1	RELAY				B	7	0000	EA	1.00	3.00	K3	-00 18342	001424
05	RCR05G102JS	RESISTOR, 1K				B	7	0000	EA	1.00	3.00	R1	-00	001425
05	RNC55H1002FS	RESISTOR				B	5	0000	EA	1.00	3.00	R10	-00	001426
05	RNC55H1002FS	RESISTOR				B	5	0000	EA	1.00	3.00	R11	-00	001427
05	RNC55H1002FS	RESISTOR				B	5	0000	EA	1.00	3.00	R12	-00	001428
05	RNC55H1101FS	RESISTOR, 1.1K				B	5	0000	EA	1.00	3.00	R13	-00	001429
05	RNC55H1002FS	RESISTOR				B	5	0000	EA	1.00	3.00	R14	-00	001430
05	RNC55H1002FS	RESISTOR				B	5	0000	EA	1.00	3.00	R15	-00	001431
05	RNC55H1002FS	RESISTOR				B	5	0000	EA	1.00	3.00	R16	-00	001432
05	RNC55H1002FS	RESISTOR				B	5	0000	EA	1.00	3.00	R17	-00	001433
05	RNC55H1002FS	RESISTOR				B	5	0000	EA	1.00	3.00	R18	-00	001434
05	RNC55H1002FS	RESISTOR				B	5	0000	EA	1.00	3.00	R19	-00	001435
05	RCR05G102JS	RESISTOR, 1K				B	7	0000	EA	1.00	3.00	R2	-00	001436
05	64Y103	POTENTIOMETER, 10K				B		0000	EA	1.00	3.00	R20	-00 02111	001437
05	64Y102	POTENTIOMETER, 1K				B		0000	EA	1.00	3.00	R21	-00 02111	001438
05	64Y103	POTENTIOMETER, 10K				B		0000	EA	1.00	3.00	R22	-00 02111	001439
05	64Y102	POTENTIOMETER, 1K				B		0000	EA	1.00	3.00	R23	-00 02111	001440
05	64Y103	POTENTIOMETER, 10K				B		0000	EA	1.00	3.00	R24	-00 02111	001441
05	64Y102	POTENTIOMETER, 1K				B		0000	EA	1.00	3.00	R25	-00 02111	001442
05	RCR05G102JS	RESISTOR, 1K				B	7	0000	EA	1.00	3.00	R3	-00	001443
05	RCR05G102JS	RESISTOR, 1K				B	7	0000	EA	1.00	3.00	R4	-00	001444
05	RCR05G471JS	RESISTOR, 470				B	7	0000	EA	1.00	3.00	R5	-00	001445
05	RNC55H2490FS	RESISTOR, 249				B		0000	EA	1.00	3.00	R6	-00	001446
05	RNC55H2490FS	RESISTOR, 249				B		0000	EA	1.00	3.00	R7	-00	001447
05	RNC55H2490FS	RESISTOR, 249				B		0000	EA	1.00	3.00	R8	-00	001448
05	RNC55H1002FS	RESISTOR				B	5	0000	EA	1.00	3.00	R9	-00	001449
05	SN7475N	4-BIT BISTABLE LCH				B	5	0000	EA	1.00	3.00	U1	-00 01295	001450
05	UHP-407	DRIVER				B	7	0000	EA	1.00	3.00	U2	-00 56289	001451
05	TL084CN	QUAD JFET OPNL AMPL				B	7	0000	EA	1.00	3.00	U3	-00 01295	001452

LVL	IDENTIFICATION NO.	NOMENCLATURE	ECN DWG INC	ECN DWG OUT	PL-LATE APPLY	P C	T Y	CYCLE TIME	U/M	PL-QTY	EXT/TOT QTY	ITEM/ REF DESG	FSCM	CROSS REF
04	AML12CBC3AA	SWITCH,(MOM)				B		0000	EA	9.00	9.00	10-00	91929	001453
04	**47E387091-11	LENS, ENGRAVED				M		0000	EA	1.00	1.00	11-00		001454
04	**47E387091-12	LENS, ENGRAVED				B		0000	EA	1.00	1.00	12-00		001455
04	**47E387091-13	LENS, ENGRAVED				B		0000	EA	1.00	1.00	13-00		001456
04	**47E387091-14	LENS, ENGRAVED				B		0000	EA	2.00	2.00	14-00		001457
04	**47E387091-15	LENS, ENGRAVED				B		0000	EA	2.00	2.00	15-00		001458
04	**47E387091-16	LENS, ENGRAVED				B		0000	EA	2.00	2.00	16-00		001459
04	**47E387091-17	LENS, ENGRAVED				B		0000	EA	3.00	3.00	17-00		001460
04	**47E387091-18	LENS, ENGRAVED				B		0000	EA	3.00	3.00	18-00		001461
04	AML21GBA2AC	SWITCH,(MOM)				B	5	0000	EA	6.00	6.00	19-00	91929	001462
04	86	LAMP,INCANDESCENT				B	5	0000	EA	12.00	12.00	20-00	91929	001463
04	47D387113G1	SECURITY ALARM BOARD				M		0000	EA	1.00	1.00	21-00		001464
05	11-DE-6P	COMPONENT CARD				M		0000	EA	1.00	1.00	1-00	50125	001465
05	E-1	CARD EJECTOR				M		0000	EA	1.00	1.00	2-00	50125	001466
05	T-1SF2-T	WIRE WRAP PIN				B	5	0000	EA	6.00	6.00	3-00	55322	001467
05	AWG-22-TYPE-S	BUS WIRE/QQ-W-343				B	5	0000	FT	AR		4-00		001468
05	47A381044P5	SLEEVING				B		0000	FT	AR		5-00		001469
05	IC-314-WWG	SOCKET, 14 PIN				B		0000	EA	7.00	7.00	6-00	55322	001470
05	IC-316-WWG	SOCKET, 16 PIN				B		0000	EA	3.00	3.00	7-00	55322	001471
05	AP-616-G-E	ADAPTER PLUG				M		0000	EA	2.00	2.00	8-00	55322	001472
05	47D387100	SCHEMATIC				X		0000	EA	X		9-00		001473
05	**47D387113-10	WIRE LIST				X		0000	EA	X		10-00		001474
05	47A380052	ELECTRICAL FAB. STD				X	5	0000	EA	X		11-00		001475
05	SN60WRMAP2	SOLDER / QQ-S-571				B	5	0000	LB	AR		12-00		001476
05	47B381099PAR	WIRE,AWG 30,SLDRLESS				B		0000	FT	AR		13-00		001477
05	1N4148	DIODE				B	7	0000	EA	1.00	1.00 CR1	-00	01295	001478
05	CK06BX103K	CAPACITOR, .01 MFD				B	5	0000	EA	1.00	1.00 C1	-00	95275	001479
05	CK06BX104K	CAPACITOR, .1 MFD				B	5	0000	EA	1.00	1.00 C2	-00	95275	001480
05	CK06BX103K	CAPACITOR, .01 MFD				B	5	0000	EA	1.00	1.00 C3	-00	95275	001481
05	CK06BX473K	CAPACITOR, .47 MFD				B	7	0000	EA	1.00	1.00 C4	-00		001482
05	CK06BX104K	CAPACITOR, .1 MFD				B	5	0000	EA	1.00	1.00 C5	-00	95275	001483
05	RZ-12	RELAY				B		0000	EA	1.00	1.00 K1	-00	05292	001484
05	RCR05G203JS	RESISTOR, 20K				B		0000	EA	1.00	1.00 R1	-00		001485
05	RCR20G681JS	RES, 680 OHMS, 1/2 W				B	5	0000	EA	1.00	1.00 R10	-00		001486
05	RCR05G202JS	RESISTOR, 2K				B	7	0000	EA	1.00	1.00 R11	-00		001487
05	**47D387113-R12	VARISTOR				B		0000	EA	1.00	1.00 R12	-00		001488
05	3009-P-503	POTENTIOMETER, 50K				B		0000	EA	1.00	1.00 R2	-00	32997	001489
05	RCR05G563JS	RESISTOR, 56K				B		0000	EA	1.00	1.00 R3	-00		001490
05	RCR05G203JS	RESISTOR, 20K				B		0000	EA	1.00	1.00 R4	-00		001491
05	3009-P-104	POTENTIOMETER, 100 K				B		0000	EA	1.00	1.00 R5	-00	32997	001492
05	RCR05G753JS	RESISTOR, 75K				B		0000	EA	1.00	1.00 R6	-00		001493
05	RCR07G680JS	RES, 68 OHMS, 1/4 W				B		0000	EA	1.00	1.00 R7	-00		001494
05	RCR05G103JS	RESISTOR, 10K				B	7	0000	EA	1.00	1.00 R8	-00		001495
05	RCR05G103JS	RESISTOR, 10K				B	7	0000	EA	1.00	1.00 R9	-00		001496
05	MC14013BCP	DUAL D FLIP-FLOP				B		0000	EA	1.00	1.00 U1	-00	04713	001497
05	MC14081BCP	QUAD 2-INPUT AND G				M		0000	EA	1.00	1.00 U10	-00	04713	001498
05	MC14541BCP	PROGRAMMABLE OSC-TMR				M		0000	EA	1.00	1.00 U11	-00	04713	001499

LVL	IDENTIFICATION NO.	NOMENCLATURE	ECN DWG INC	ECN DWG OUT	PL-LATE APPLY	P C	T Y	CYCLE TIME	U/M	PL-QTY	EXT/TOT QTY	ITEM/ REF DESG	FSCM	CROSS REF
05	MC14071BCP	QUAD 2-INPUT OR GATE				M		0000	EA	1.00	1.00	U12 -00	04713	001500
05	MC14490FP	CONTACT DEBOUNCER				B	5	0000	EA	1.00	1.00	U2 -00	04713	001501
05	UNC-4401A	LATCH/DRIVER				B		0000	EA	1.00	1.00	U4 -00	80183	001502
05	MC14528BCP	DUAL MONOSTABLE MV				B		0000	EA	1.00	1.00	U5 -00	04713	001503
05	MC14011BCP	QUAD 2-INPUT NAND G				B		0000	EA	1.00	1.00	U8 -00	04713	001504
05	MC14541BCP	PROGRAMMABLE OSC-TMR				M		0000	EA	1.00	1.00	U9 -00	04713	001505
04	2T1B215	RELAY				B		0000	EA	3.00	3.00	22-00	02289	001506
04	**47E387091-23	PANEL, SIDE				B		0000	EA	1.00	1.00	23-00		001507
04	108-0902-001	BANANA JACK (RED)				B	5	0000	EA	12.00	12.00	26-00	74970	001508
04	108-0903-001	BANANA JACK (BLK)				B	5	0000	EA	12.00	12.00	27-00	74970	001509
04	PTO7A-14-5P	RECEPTACLE, JAM NUT				B		0000	EA	1.00	1.00	29-00	77820	001510
04	DBM-25P	CONNECTOR				B	5	0000	EA	2.00	2.00	30-00	71785	001511
04	3341-1L	JACK SOCKET KIT				*		0000	EA	2.00	2.00	31-00	52760	001512
04	47A380052	ELECTRICAL FAB. STD				X	5	0000	EA	X		32-00		001513
04	47E387103	SCHEMATIC				X		0000	EA	X		33-00		001514
04	**47E387091-34	WIRE LIST				X		0000	EA	X		34-00		001515
04	SN60WRMAP2	SOLDER / QQ-S-571				B	5	0000	LB	AR		35-00		001516
04	AWG-22-TYPE-S	BUS WIRE/QQ-W-343				B	5	0000	FT	AR		36-00		001517
04	44A0111-24-9	WIRE, AWG 24				B	5	0000	FT	AR		37-00	06090	001518
04	47A381045P5	CABLE CLAMP				B		0000	EA	3.00	3.00	38-00		001519
04	47A380071PAR	SLEEVING, SHRINK				*		0000	FT	AR		39-00		001520
04	47A381044PAR	SLEEVING,TEFLON				*		0000	FT	AR		40-00		001521
04	47A381037P1	LACING TAPE				*		0000	FT	AR		41-00		001522
04	NP-206417	NAMEPLATE				B	5	0000	EA	1.00	1.00	42-00		001523
04	47A380069P31	NAMEPLATE,IDENT (J1)				*		0000	EA	1.00	1.00	43-00		001524
04	47A380069P32	NAMEPLATE,IDENT (J2)				*		0000	EA	1.00	1.00	44-00		001525
04	47A380069P33	NAMEPLATE,IDENT (J3)				B		0000	EA	1.00	1.00	45-00		001526
04	47A380070P3	NPL, AN/REV STATUS				*		0000	EA	1.00	1.00	46-00		001527
04	AWG-20-TYPE-S	WIRE, BUS/QQ-W-343				B		0000	FT	AR		47-00		001528
04	AWG-16-TYPE-S	WIRE, BUS/QQ-W-343				B	5	0000	FT	AR		48-00		001529
04	570-3650-02-01-00	TERMINAL, INSULATED				B	5	0000	EA	8.00	8.00	49-00	71279	001530
04	N153P16007	SCREW, PAN HD				*		0000	EA	4.00	4.00	53-00		001531
04	N153P13005	SCREW, PAN HD				*		0000	EA	15.00	15.00	54-00		001532
04	N415P19	WASHER, LOCK, #10				*		0000	EA	4.00	4.00	55-00		001533
04	N226P16	NUT, HEX, #10-32				*		0000	EA	4.00	4.00	56-00		001534
04	N678P15008	SCREW, FLAT HD				B	5	0000	EA	2.00	2.00	57-00		001535
04	N153P15008	SCREW, PAN HD				B		0000	EA	4.00	4.00	58-00		001536
04	N415P16	WASHER, LOCK, #8				*		0000	EA	6.00	6.00	59-00		001537
04	N226P15	NUT, HEX, #8-32				B	5	0000	EA	2.00	2.00	60-00		001538
04	N153P13004	SCR, PH, #6-32				*		0000	EA	8.00	8.00	61-00		001539
04	N153P13006	SCREW, PAN HD				B		0000	EA	6.00	6.00	62-00		001540
04	N400P37	WASHER, FL. #6				*		0000	EA	8.00	8.00	63-00		001541
04	N415P13	WASHER, LOCK, #6				*		0000	EA	29.00	29.00	64-00		001542
04	N226P13	NUT,PLAIN HEX, #6-32				*		0000	EA	21.00	21.00	65-00		001543
03	47E387085G1	ASSY, UTILITY PANEL				M		0000	EA	1.00	1.00	4-00		001544
04	47E387098P1	PANEL, FRONT				M		0000	EA	1.00	1.00	1-00		001545

LVL	IDENTIFICATION NO.	NOMENCLATURE	ECN DWG INC	ECN DWG OUT	PL-LATE APPLY	P C	T Y	CYCLE TIME	U/M	PL-QTY	EXT/TOT QTY	ITEM/ REF DESG	FSCM	CROSS REF
04	47E387085P2	PANEL, SIDE				M		0000	EA	2.00	2.00	2-00		001546
04	47C387099P1	PANEL, REAR				M		0000	EA	1.00	1.00	3-00		001547
04	FCA8	HANDLE				B	5	0000	EA	2.00	2.00	4-00	08730	001548
04	108-0902-001	BANANA JACK (RED)				B	5	0000	EA	8.00	8.00	5-00	74970	001549
04	108-0903-001	BANANA JACK (BLK)				B	5	0000	EA	8.00	8.00	6-00	74970	001550
04	DM-3100N	DIGITAL, METER				B	5	0000	EA	3.00	3.00	7-00	50521	001551
04	58-2073082	EDGE CONNECTOR				B	5	0000	EA	3.00	3.00	8-00	50521	001552
04	47D387089G1	ASSY,MTR SIG CONDTNR				M		0000	EA	3.00	3.00	9-00		001553
05	47E387116P1	DRILL & TRIM				M		0000	EA	1.00	3.00	1-00		001554
05	AWG-22-TYPE-S	BUS WIRE/QQ-W-343				B	5	0000	FT	AR		2-00		001555
05	47A381044PAR	SLEEVING,TEFLON				*		0000	FT	AR		3-00		001556
05	IC-314-SGT	SOCKET, 14 PIN				B		0000	EA	2.00	6.00	4-00	55322	001557
05	IC-316-SGT	SOCKET, 16 PIN				B		0000	EA	4.00	12.00	5-00	55322	001558
05	SN60WRMAP2	SOLDER / QQ-S-571				B	5	0000	LB	AR		6-00		001559
05	47D387092	SCHEMATIC				X		0000	EA	X		7-00		001560
05	47A380052	ELECTRICAL FAB. STD				X	5	0000	EA	X		8-00		001561
05	1N4148	DIODE				B	7	0000	EA	1.00	3.00	CR1 -00	01295	001562
05	1N4148	DIODE				B	7	0000	EA	1.00	3.00	CR2 -00	01295	001563
05	1N4148	DIODE				B	7	0000	EA	1.00	3.00	CR3 -00	01295	001564
05	1N4148	DIODE				B	7	0000	EA	1.00	3.00	CR4 -00	01295	001565
05	1N4148	DIODE				B	7	0000	EA	1.00	3.00	CR5 -00	01295	001566
05	1N4148	DIODE				B	7	0000	EA	1.00	3.00	CR6 -00	01295	001567
05	1N4148	DIODE				B	7	0000	EA	1.00	3.00	CR7 -00	01295	001568
05	1N4148	DIODE				B	7	0000	EA	1.00	3.00	CR8 -00	01295	001569
05	1N4148	DIODE				B	7	0000	EA	1.00	3.00	CR9 -00	01295	001570
05	CKR05BX221KR	CAPACITOR, 200 PF				B		0000	EA	1.00	3.00	C1 -00		001571
05	199D106X0010BB1	CAPACITOR, 10 MFD				B		0000	EA	1.00	3.00	C2 -00	56289	001572
05	CKR06BX103KR	CAPACITOR, .01 MFD				B		0000	EA	1.00	3.00	C3 -00		001573
05	CKR06BX104KR	CAPACITOR, .1 MFD				B		0000	EA	1.00	3.00	C4 -00		001574
05	CKR06BX104KR	CAPACITOR, .1 MFD				B		0000	EA	1.00	3.00	C5 -00		001575
05	T-1R2-T	TERMINAL				B		0000	EA	1.00	3.00	E1 -00	55322	001576
05	T-1R2-T	TERMINAL				B		0000	EA	1.00	3.00	E10 -00	55322	001577
05	T-1R2-T	TERMINAL				B		0000	EA	1.00	3.00	E11 -00	55322	001578
05	T-1R2-T	TERMINAL				B		0000	EA	1.00	3.00	E12 -00	55322	001579
05	T-1R2-T	TERMINAL				B		0000	EA	1.00	3.00	E13 -00	55322	001580
05	T-1R2-T	TERMINAL				B		0000	EA	1.00	3.00	E14 -00	55322	001581
05	T-1R2-T	TERMINAL				B		0000	EA	1.00	3.00	E15 -00	55322	001582
05	T-1R2-T	TERMINAL				B		0000	EA	1.00	3.00	E16 -00	55322	001583
05	T-1R2-T	TERMINAL				B		0000	EA	1.00	3.00	E17 -00	55322	001584
05	T-1R2-T	TERMINAL				B		0000	EA	1.00	3.00	E18 -00	55322	001585
05	T-1R2-T	TERMINAL				B		0000	EA	1.00	3.00	E19 -00	55322	001586
05	T-1R2-T	TERMINAL				B		0000	EA	1.00	3.00	E2 -00	55322	001587
05	T-1R2-T	TERMINAL				B		0000	EA	1.00	3.00	E3 -00	55322	001588
05	T-1R2-T	TERMINAL				B		0000	EA	1.00	3.00	E4 -00	55322	001589
05	T-1R2-T	TERMINAL				B		0000	EA	1.00	3.00	E5 -00	55322	001590
05	T-1R2-T	TERMINAL				B		0000	EA	1.00	3.00	E6 -00	55322	001591
05	T-1R2-T	TERMINAL				B		0000	EA	1.00	3.00	E7 -00	55322	001592
05	T-1R2-T	TERMINAL				B		0000	EA	1.00	3.00	E8 -00	55322	001593

LVL	IDENTIFICATION NO.	NOMENCLATURE	ECN DWG INC	ECN DWG OUT	PL-LATE APPLY	P C	T Y	CYCLE TIME	U/M	PL-QTY	EXT/TOT QTY	ITEM/ REF DESG	FSCM	CROSS REF
05	T-1R2-T	TERMINAL				B		0000	EA	1.00	3.00	E9 -00	55322	001594
05	53451-1	RELAY				B	7	0000	EA	1.00	3.00	K1 -00	18342	001595
05	53451-1	RELAY				B	7	0000	EA	1.00	3.00	K2 -00	18342	001596
05	53451-1	RELAY				B	7	0000	EA	1.00	3.00	K3 -00	18342	001597
05	RCR05G102JS	RESISTOR, 1K				B	7	0000	EA	1.00	3.00	R1 -00		001598
05	RNC55H1002FS	RESISTOR				B	5	0000	EA	1.00	3.00	R10 -00		001599
05	RNC55H1002FS	RESISTOR				B	5	0000	EA	1.00	3.00	R11 -00		001600
05	RNC55H1002FS	RESISTOR				B	5	0000	EA	1.00	3.00	R12 -00		001601
05	RNC55H1101FS	RESISTOR, 1.1K				B	5	0000	EA	1.00	3.00	R13 -00		001602
05	RNC55H1002FS	RESISTOR				B	5	0000	EA	1.00	3.00	R14 -00		001603
05	RNC55H1002FS	RESISTOR				B	5	0000	EA	1.00	3.00	R15 -00		001604
05	RNC55H1002FS	RESISTOR				B	5	0000	EA	1.00	3.00	R16 -00		001605
05	RNC55H1002FS	RESISTOR				B	5	0000	EA	1.00	3.00	R17 -00		001606
05	RNC55H1002FS	RESISTOR				B	5	0000	EA	1.00	3.00	R18 -00		001607
05	RNC55H1002FS	RESISTOR				B	5	0000	EA	1.00	3.00	R19 -00		001608
05	RCR05G102JS	RESISTOR, 1K				B	7	0000	EA	1.00	3.00	R2 -00		001609
05	64Y103	POTENTIOMETER, 10K				B		0000	EA	1.00	3.00	R20 -00	02111	001610
05	64Y102	POTENTIOMETER, 1K				B		0000	EA	1.00	3.00	R21 -00	02111	001611
05	64Y103	POTENTIOMETER, 10K				B		0000	EA	1.00	3.00	R22 -00	02111	001612
05	64Y102	POTENTIOMETER, 1K				B		0000	EA	1.00	3.00	R23 -00	02111	001613
05	64Y103	POTENTIOMETER, 10K				B		0000	EA	1.00	3.00	R24 -00	02111	001614
05	64Y102	POTENTIOMETER, 1K				B		0000	EA	1.00	3.00	R25 -00	02111	001615
05	RCR05G102JS	RESISTOR, 1K				B	7	0000	EA	1.00	3.00	R3 -00		001616
05	RCR05G102JS	RESISTOR, 1K				B	7	0000	EA	1.00	3.00	R4 -00		001617
05	RCR05G471JS	RESISTOR, 470				B	7	0000	EA	1.00	3.00	R5 -00		001618
05	RNC55H2490FS	RESISTOR, 249				B		0000	EA	1.00	3.00	R6 -00		001619
05	RNC55H2490FS	RESISTOR, 249				B		0000	EA	1.00	3.00	R7 -00		001620
05	RNC55H2490FS	RESISTOR, 249				B		0000	EA	1.00	3.00	R8 -00		001621
05	RNC55H1002FS	RESISTOR				B	5	0000	EA	1.00	3.00	R9 -00		001622
05	SN7475N	4-BIT BISTABLE LCH				B	5	0000	EA	1.00	3.00	U1 -00	01295	001623
05	UHP-407	DRIVER				B	7	0000	EA	1.00	3.00	U2 -00	56289	001624
05	TL084CN	QUAD JFET OPNL AMPL				B	7	0000	EA	1.00	3.00	U3 -00	01295	001625
04	AML12CBC3AA	SWITCH,(MOM)				B		0000	EA	8.00	8.00	10-00	91929	001626
04	**47E387085-11	LENS, ENGRAVED				M		0000	EA	1.00	1.00	11-00		001627
04	**47E387085-12	LENS, ENGRAVED				M		0000	EA	1.00	1.00	12-00		001628
04	**47E387085-13	LENS, ENGRAVED				M		0000	EA	1.00	1.00	13-00		001629
04	**47E387085-14	LENS, ENGRAVED				M		0000	EA	1.00	1.00	14-00		001630
04	**47E387085-15	LENS, ENGRAVED				M		0000	EA	1.00	1.00	15-00		001631
04	**47E387085-16	LENS, ENGRAVED				M		0000	EA	1.00	1.00	16-00		001632
04	**47E387085-17	LENS, ENGRAVED				M		0000	EA	1.00	1.00	17-00		001633
04	**47E387085-18	LENS, ENGRAVED				M		0000	EA	1.00	1.00	18-00		001634
04	DB-25P	CONNECTOR, 25 PIN				B	5	0000	EA	1.00	1.00	19-00	71785	001635
04	47A380052	ELECTRICAL FAB. STD				X	5	0000	EA	X		20-00		001636
04	47E387097	SCHEMATIC				X		0000	EA	X		21-00		001637
04	**47E387085-22	WIRE LIST				X		0000	EA	X		22-00		001638
04	AWG-22-TYPE-S	BUS WIRE/QQ-W-343				B	5	0000	FT	AR		23-00		001639
04	44A0111-24-9	WIRE, AWG 24				B	5	0000	FT	AR		24-00	06090	001640
04	47A381045P5	CABLE CLAMP				B		0000	EA	3.00	3.00	25-00		001641

LVL	IDENTIFICATION NO.	NOMENCLATURE	ECN DWG INC	ECN DWG OUT	PL-LATE APPLY	P C	T Y	CYCLE TIME	U/M	PL-QTY	EXT/TOT QTY		ITEM/ REF DESG	FSCM	CROSS REF
04	47A380071PAR	SLEEVING, SHRINK				*		0000	FT	AR			26-00		001642
04	47A381044PAR	SLEEVING,TEFLON				*		0000	FT	AR			27-00		001643
04	47A381037P1	LACING TAPE				*		0000	FT	AR			28-00		001644
04	NP-206417	NAMEPLATE				B	5	0000	EA	1.00	1.00		29-00		001645
04	47A380069P31	NAMEPLATE,IDENT (J1)				*		0000	EA	1.00	1.00		30-00		001646
04	47A380069P32	NAMEPLATE,IDENT (J2)				*		0000	EA	1.00	1.00		31-00		001647
04	47A380070P3	NPL, AN/REV STATUS				*		0000	EA	1.00	1.00		32-00		001648
04	AWG-20-TYPE-S	WIRE, BUS/QQ-W-343				B		0000	FT	AR			33-00		001649
04	PT07A-14-5P	RECEPTACLE, JAM NUT				B		0000	EA	1.00	1.00		34-00	77820	001650
04	570-3650-02-01-00	TERMINAL, INSULATED				B	5	0000	EA	8.00	8.00		35-00	71279	001651
04	3341-1L	JACK SOCKET KIT				*		0000	EA	1.00	1.00		36-00	52760	001652
04	AWG-16-TYPE-S	WIRE, BUS/QQ-W-343				B	5	0000	FT	AR			37-00		001653
04	N153P13005	SCREW, PAN HD				*		0000	EA	3.00	3.00		38-00		001654
04	N415P19	WASHER, LOCK, #10				*		0000	EA	4.00	4.00		39-00		001655
04	N226P16	NUT, HEX, #10-32				*		0000	EA	4.00	4.00		40-00		001656
04	N153P16007	SCREW, PAN HD				*		0000	EA	4.00	4.00		41-00		001657
04	N153P15008	SCREW, PAN HD				B		0000	EA	4.00	4.00		42-00		001658
04	N415P16	WASHER, LOCK, #8				*		0000	EA	6.00	6.00		43-00		001659
04	N678P15008	SCREW, FLAT HD				B	5	0000	EA	2.00	2.00		44-00		001660
04	N226P15	NUT, HEX, #8-32				B	5	0000	EA	2.00	2.00		45-00		001661
04	N415P13	WASHER, LOCK, #6				*		0000	EA	11.00	11.00		46-00		001662
04	N153P13004	SCR, PH, #6-32				*		0000	EA	8.00	8.00		47-00		001663
04	N400P37	WASHER, FL. #6				*		0000	EA	8.00	8.00		48-00		001664
04	N226P13	NUT,PLAIN HEX, #6-32				*		0000	EA	3.00	3.00		49-00		001665
03	47E387084G1	ASSY, STATUS PANEL				M		0000	EA	1.00	1.00		5-00		001666
04	47E387104P1	PANEL, FRONT				B		0000	EA	1.00	1.00		1-00		001667
04	47E387084P2	PANEL, SIDE				B		0000	EA	2.00	2.00		2-00		001668
04	47D387106P1	PANEL, REAR				B		0000	EA	1.00	1.00		3-00		001669
04	FCA4	HANDLE				B	5	0000	EA	2.00	2.00		4-00	08730	001670
04	47D387107P1	SGL CD FR.,MODIFIED				B		0000	EA	1.00	1.00		5-00		001671
04	47D387108P1	BRACKET, CARD FRAME				B		0000	EA	1.00	1.00		6-00		001672
04	DM-3100N	DIGITAL, METER				B	5	0000	EA	5.00	5.00		7-00	50521	001673
04	58-2073082	EDGE CONNECTOR				B	5	0000	EA	5.00	5.00		8-00	50521	001674
04	47D387089G1	ASSY,MTR SIG CONDTNR				M		0000	EA	5.00	5.00		9-00		001675
05	47E387116P1	DRILL & TRIM				M		0000	EA	1.00	5.00		1-00		001676
05	AWG-22-TYPE-S	BUS WIRE/QQ-W-343				B	5	0000	FT	AR			2-00		001677
05	47A381044PAR	SLEEVING,TEFLON				*		0000	FT	AR			3-00		001678
05	IC-314-SGT	SOCKET, 14 PIN				B		0000	EA	2.00	10.00		4-00	55322	001679
05	IC-316-SGT	SOCKET, 16 PIN				B		0000	EA	4.00	20.00		5-00	55322	001680
05	SN60WRMAP2	SOLDER / QQ-S-571				B	5	0000	LB	AR			6-00		001681
05	47D387092	SCHEMATIC				X		0000	EA	X			7-00		001682
05	47A380052	ELECTRICAL FAB. STD				X	5	0000	EA	X			8-00		001683
05	1N4148	DIODE				B	7	0000	EA	1.00	5.00	CR1	-00	01295	001684
05	1N4148	DIODE				B	7	0000	EA	1.00	5.00	CR2	-00	01295	001685
05	1N4148	DIODE				B	7	0000	EA	1.00	5.00	CR3	-00	01295	001686
05	1N4148	DIODE				B	7	0000	EA	1.00	5.00	CR4	-00	01295	001687

LVL	IDENTIFICATION NO.	NOMENCLATURE	ECN DWG INC	ECN DWG OUT	ECN PL-LATE APPLY	P C	T Y	CYCLE TIME	U/M	PL-QTY	EXT/TOT QTY	ITEM/ REF DESG	FSCM	CROSS REF
05	1N4148	DIODE				B	7	0000	EA	1.00	5.00	CR5	-00 01295	001688
05	1N4148	DIODE				B	7	0000	EA	1.00	5.00	CR6	-00 01295	001689
05	1N4148	DIODE				B	7	0000	EA	1.00	5.00	CR7	-00 01295	001690
05	1N4148	DIODE				B	7	0000	EA	1.00	5.00	CR8	-00 01295	001691
05	1N4148	DIODE				B	7	0000	EA	1.00	5.00	CR9	-00 01295	001692
05	CKR05BX221KR	CAPACITOR, 200 PF				B		0000	EA	1.00	5.00	C1	-00	001693
05	199D106X0010BB1	CAPACITOR, 10 MFD				B		0000	EA	1.00	5.00	C2	-00 56289	001694
05	CKR06BX103KR	CAPACITOR, .01 MFD				B		0000	EA	1.00	5.00	C3	-00	001695
05	CKR06BX104KR	CAPACITOR, .1 MFD				B		0000	EA	1.00	5.00	C4	-00	001696
05	CKR06BX104KR	CAPACITOR, .1 MFD				B		0000	EA	1.00	5.00	C5	-00	001697
05	T-1R2-T	TERMINAL				B		0000	EA	1.00	5.00	E1	-00 55322	001698
05	T-1R2-T	TERMINAL				B		0000	EA	1.00	5.00	E10	-00 55322	001699
05	T-1R2-T	TERMINAL				B		0000	EA	1.00	5.00	E11	-00 55322	001700
05	T-1R2-T	TERMINAL				B		0000	EA	1.00	5.00	E12	-00 55322	001701
05	T-1R2-T	TERMINAL				B		0000	EA	1.00	5.00	E13	-00 55322	001702
05	T-1R2-T	TERMINAL				B		0000	EA	1.00	5.00	E14	-00 55322	001703
05	T-1R2-T	TERMINAL				B		0000	EA	1.00	5.00	E15	-00 55322	001704
05	T-1R2-T	TERMINAL				B		0000	EA	1.00	5.00	E16	-00 55322	001705
05	T-1R2-T	TERMINAL				B		0000	EA	1.00	5.00	E17	-00 55322	001706
05	T-1R2-T	TERMINAL				B		0000	EA	1.00	5.00	E18	-00 55322	001707
05	T-1R2-T	TERMINAL				B		0000	EA	1.00	5.00	E19	-00 55322	001708
05	T-1R2-T	TERMINAL				B		0000	EA	1.00	5.00	E2	-00 55322	001709
05	T-1R2-T	TERMINAL				B		0000	EA	1.00	5.00	E3	-00 55322	001710
05	T-1R2-T	TERMINAL				B		0000	EA	1.00	5.00	E4	-00 55322	001711
05	T-1R2-T	TERMINAL				B		0000	EA	1.00	5.00	E5	-00 55322	001712
05	T-1R2-T	TERMINAL				B		0000	EA	1.00	5.00	E6	-00 55322	001713
05	T-1R2-T	TERMINAL				B		0000	EA	1.00	5.00	E7	-00 55322	001714
05	T-1R2-T	TERMINAL				B		0000	EA	1.00	5.00	E8	-00 55322	001715
05	T-1R2-T	TERMINAL				B		0000	EA	1.00	5.00	E9	-00 55322	001716
05	53451-1	RELAY				B	7	0000	EA	1.00	5.00	K1	-00 18342	001717
05	53451-1	RELAY				B	7	0000	EA	1.00	5.00	K2	-00 18342	001718
05	53451-1	RELAY				B	7	0000	EA	1.00	5.00	K3	-00 18342	001719
05	RCR05G102JS	RESISTOR, 1K				B	7	0000	EA	1.00	5.00	R1	-00	001720
05	RNC55H1002FS	RESISTOR				B	5	0000	EA	1.00	5.00	R10	-00	001721
05	RNC55H1002FS	RESISTOR				B	5	0000	EA	1.00	5.00	R11	-00	001722
05	RNC55H1002FS	RESISTOR				B	5	0000	EA	1.00	5.00	R12	-00	001723
05	RNC55H1101FS	RESISTOR, 1.1K				B	5	0000	EA	1.00	5.00	R13	-00	001724
05	RNC55H1002FS	RESISTOR				B	5	0000	EA	1.00	5.00	R14	-00	001725
05	RNC55H1002FS	RESISTOR				B	5	0000	EA	1.00	5.00	R15	-00	001726
05	RNC55H1002FS	RESISTOR				B	5	0000	EA	1.00	5.00	R16	-00	001727
05	RNC55H1002FS	RESISTOR				B	5	0000	EA	1.00	5.00	R17	-00	001728
05	RNC55H1002FS	RESISTOR				B	5	0000	EA	1.00	5.00	R18	-00	001729
05	RNC55H1002FS	RESISTOR				B	5	0000	EA	1.00	5.00	R19	-00	001730
05	RCR05G102JS	RESISTOR, 1K				B	7	0000	EA	1.00	5.00	R2	-00	001731
05	64Y103	POTENTIOMETER, 10K				B		0000	EA	1.00	5.00	R20	-00 02111	001732
05	64Y102	POTENTIOMETER, 1K				B		0000	EA	1.00	5.00	R21	-00 02111	001733
05	64Y103	POTENTIOMETER, 10K				B		0000	EA	1.00	5.00	R22	-00 02111	001734
05	64Y102	POTENTIOMETER, 1K				B		0000	EA	1.00	5.00	R23	-00 02111	001735
05	64Y103	POTENTIOMETER, 10K				B		0000	EA	1.00	5.00	R24	-00 02111	001736

LVL	IDENTIFICATION NO.	NOMENCLATURE	ECN DWG INC	ECN DWG OUT	PL-LATE APPLY	P C	T Y	CYCLE TIME	U/M	PL-QTY	EXT/TOT QTY	ITEM/ REF DESG	FSCM	CROSS REF
05	64Y102	POTENTIOMETER, 1K				B		0000	EA	1.00	5.00	R25 -00	02111	001737
05	RCR05G102JS	RESISTOR, 1K				B	7	0000	EA	1.00	5.00	R3 -00		001738
05	RCR05G102JS	RESISTOR, 1K				B	7	0000	EA	1.00	5.00	R4 -00		001739
05	RCR05G471JS	RESISTOR, 470				B	7	0000	EA	1.00	5.00	R5 -00		001740
05	RNC55H2490FS	RESISTOR, 249				B		0000	EA	1.00	5.00	R6 -00		001741
05	RNC55H2490FS	RESISTOR, 249				B		0000	EA	1.00	5.00	R7 -00		001742
05	RNC55H2490FS	RESISTOR, 249				B		0000	EA	1.00	5.00	R8 -00		001743
05	RNC55H1002FS	RESISTOR				B	5	0000	EA	1.00	5.00	R9 -00		001744
05	SN7475N	4-BIT BISTABLE LCH				B	5	0000	EA	1.00	5.00	U1 -00	01295	001745
05	UHP-407	DRIVER				B	7	0000	EA	1.00	5.00	U2 -00	56289	001746
05	TL084CN	QUAD JFET OPNL AMPL				B	7	0000	EA	1.00	5.00	U3 -00	01295	001747
04	AML12CBC3AA	SWITCH,(MOM)				B		0000	EA	15.00	15.00	10-00	91929	001748
04	**47E387084-11	LENS, ENGRAVED				M		0000	EA	2.00	2.00	11-00		001749
04	**47E387084-12	LENS, ENGRAVED				B		0000	EA	2.00	2.00	12-00		001750
04	**47E387084-13	LENS, ENGRAVED				B		0000	EA	2.00	2.00	13-00		001751
04	**47E387084-14	LENS, ENGRAVED				B		0000	EA	1.00	1.00	14-00		001752
04	**47E387084-15	LENS, ENGRAVED				B		0000	EA	1.00	1.00	15-00		001753
04	**47E387084-16	LENS, ENGRAVED				B		0000	EA	1.00	1.00	16-00		001754
04	**47E387084-17	LENS, ENGRAVED				B		0000	EA	1.00	1.00	17-00		001755
04	AML21GBA2AC	SWITCH,(MOM)				B	5	0000	EA	1.00	1.00	18-00	91929	001756
04	AML27ABK2AC02AA	SWITCH, KEY				B		0000	EA	1.00	1.00	19-00	91929	001757
04	86	LAMP,INCANDESCENT				B	5	0000	EA	2.00	2.00	20-00	91929	001758
04	**47E387084-21	LENS, ENGRAVED				B		0000	EA	1.00	1.00	21-00		001759
04	**47E387084-22	LENS, ENGRAVED				B		0000	EA	1.00	1.00	22-00		001760
04	SNP-428	ALARM				B	5	0000	EA	1.00	1.00	23-00	90201	001761
04	PW1	WASHER, COMPRESSION				B	5	0000	EA	1.00	1.00	24-00	90201	001762
04	47D387113G1	SECURITY ALARM BOARD				M		0000	EA	1.00	1.00	25-00		001763
05	11-DE-6P	COMPONENT CARD				M		0000	EA	1.00	1.00	1-00	50125	001764
05	E-1	CARD EJECTOR				M		0000	EA	1.00	1.00	2-00	50125	001765
05	T-1SF2-T	WIRE WRAP PIN				B	5	0000	EA	6.00	6.00	3-00	55322	001766
05	AWG-22-TYPE-S	BUS WIRE/QQ-W-343				B	5	0000	FT	AR		4-00		001767
05	47A381044P5	SLEEVING				B		0000	FT	AR		5-00		001768
05	IC-314-WWG	SOCKET, 14 PIN				B		0000	EA	7.00	7.00	6-00	55322	001769
05	IC-316-WWG	SOCKET, 16 PIN				B		0000	EA	3.00	3.00	7-00	55322	001770
05	AP-616-G-E	ADAPTER PLUG				M		0000	EA	2.00	2.00	8-00	55322	001771
05	47D387100	SCHEMATIC				X		0000	EA	X		9-00		001772
05	**47D387113-10	WIRE LIST				X		0000	EA	X		10-00		001773
05	47A380052	ELECTRICAL FAB. STD				X	5	0000	EA	X		11-00		001774
05	SN60WRMAP2	SOLDER / QQ-S-571				B	5	0000	LB	AR		12-00		001775
05	47B381099PAR	WIRE,AWG 30,SLDRLESS				B		0000	FT	AR		13-00		001776
05	1N4148	DIODE				B	7	0000	EA	1.00	1.00	CR1 -00	01295	001777
05	CK06BX103K	CAPACITOR, .01 MFD				B	5	0000	EA	1.00	1.00	C1 -00	95275	001778
05	CK06BX104K	CAPACITOR, .1 MFD				B	5	0000	EA	1.00	1.00	C2 -00	95275	001779
05	CK06BX103K	CAPACITOR, .01 MFD				B	5	0000	EA	1.00	1.00	C3 -00	95275	001780
05	CK06BX473K	CAPACITOR, .47 MFD				B	7	0000	EA	1.00	1.00	C4 -00		001781
05	CK06BX104K	CAPACITOR, .1 MFD				B	5	0000	EA	1.00	1.00	C5 -00	95275	001782
05	RZ-12	RELAY				B		0000	EA	1.00	1.00	K1 -00	05292	001783

LVL	IDENTIFICATION NO.	NOMENCLATURE	ECN DWG INC	ECN DWG OUT	PL-LATE APPLY	P C	T Y	CYCLE TIME	U/M	PL-QTY	EXT/TOT QTY	ITEM/ REF DESG		FSCM CROSS REF
05	RCR05G203JS	RESISTOR, 20K				B		0000	EA	1.00	1.00	R1 -00		001784
05	RCR20G681JS	RES, 680 OHMS, 1/2 W				B	5	0000	EA	1.00	1.00	R10 -00		001785
05	RCR05G202JS	RESISTOR, 2K				B	7	0000	EA	1.00	1.00	R11 -00		001786
05	**47D387113-R12	VARISTOR				B		0000	EA	1.00	1.00	R12 -00		001787
05	3009-P-503	POTENTIOMETER, 50K				B		0000	EA	1.00	1.00	R2 -00	32997	001788
05	RCR05G563JS	RESISTOR, 56K				B		0000	EA	1.00	1.00	R3 -00		001789
05	RCR05G203JS	RESISTOR, 20K				B		0000	EA	1.00	1.00	R4 -00		001790
05	3009-P-104	POTENTIOMETER, 100 K				B		0000	EA	1.00	1.00	R5 -00	32997	001791
05	RCR05G753JS	RESISTOR, 75K				B		0000	EA	1.00	1.00	R6 -00		001792
05	RCR07G680JS	RES, 68 OHMS, 1/4 W				B		0000	EA	1.00	1.00	R7 -00		001793
05	RCR05G103JS	RESISTOR, 10K				B	7	0000	EA	1.00	1.00	R8 -00		001794
05	RCR05G103JS	RESISTOR, 10K				B	7	0000	EA	1.00	1.00	R9 -00		001795
05	MC14013BCP	DUAL D FLIP-FLOP				B		0000	EA	1.00	1.00	U1 -00	04713	001796
05	MC14081BCP	QUAD 2-INPUT AND G				M		0000	EA	1.00	1.00	U10 -00	04713	001797
05	MC14541BCP	PROGRAMMABLE OSC-TMR				M		0000	EA	1.00	1.00	U11 -00	04713	001798
05	MC14071BCP	QUAD 2-INPUT OR GATE				M		0000	EA	1.00	1.00	U12 -00	04713	001799
05	MC14490FP	CONTACT DEBOUNCER				B	5	0000	EA	1.00	1.00	U2 -00	04713	001800
05	UNC-4401A	LATCH/DRIVER				B		0000	EA	1.00	1.00	U4 -00	80183	001801
05	MC14528BCP	DUAL MONOSTABLE MV				B		0000	EA	1.00	1.00	U5 -00	04713	001802
05	MC14011BCP	QUAD 2-INPUT NAND G				B		0000	EA	1.00	1.00	U8 -00	04713	001803
05	MC14541BCP	PROGRAMMABLE OSC-TMR				M		0000	EA	1.00	1.00	U9 -00	04713	001804
04	108-0902-001	BANANA JACK (RED)				B	5	0000	EA	15.00	15.00	26-00	74970	001805
04	108-0903-001	BANANA JACK (BLK)				B	5	0000	EA	15.00	15.00	27-00	74970	001806
04	**47E387084-28	LENS, ENGRAVED				B		0000	EA	1.00	1.00	28-00		001807
04	PT07A-14-5P	RECEPTACLE, JAM NUT				B		0000	EA	1.00	1.00	29-00	77820	001808
04	DBM-25P	CONNECTOR				B	5	0000	EA	2.00	2.00	30-00	71785	001809
04	3341-1L	JACK SOCKET KIT				*		0000	EA	2.00	2.00	31-00	52760	001810
04	47A380052	ELECTRICAL FAB. STD				X	5	0000	EA	X		32-00		001811
04	47E387101	SCHEMATIC				X		0000	EA	X		33-00		001812
04	**47E387084-34	WIRE LIST				X		0000	EA	X		34-00		001813
04	SNGOWRMAP2	SOLDER / QQ-S-571				B	5	0000	LB	AR		35-00		001814
04	AWG-22-TYPE-S	BUS WIRE/QQ-W-343				B	5	0000	FT	AR		36-00		001815
04	44A0111-24-9	WIRE, AWG 24				B	5	0000	FT	AR		37-00	06090	001816
04	47A381045P5	CABLE CLAMP				B		0000	EA	3.00	3.00	38-00		001817
04	47A380071PAR	SLEEVING, SHRINK				*		0000	FT	AR		39-00		001818
04	47A381044PAR	SLEEVING,TEFLON				*		0000	FT	AR		40-00		001819
04	47A381037P1	LACING TAPE				*		0000	FT	AR		41-00		001820
04	NP-206417	NAMEPLATE				B	5	0000	EA	1.00	1.00	42-00		001821
04	47A380069P31	NAMEPLATE,IDENT (J1)				*		0000	EA	1.00	1.00	43-00		001822
04	47A380069P32	NAMEPLATE,IDENT (J2)				*		0000	EA	1.00	1.00	44-00		001823
04	47A380069P33	NAMEPLATE,IDENT (J3)				B		0000	EA	1.00	1.00	45-00		001824
04	47A380070P3	NPL, AN/REV STATUS				*		0000	EA	1.00	1.00	46-00		001825
04	AWG-20-TYPE-S	WIRE, BUS/QQ-W-343				B		0000	FT	AR		47-00		001826
04	AWG-16-TYPE-S	WIRE, BUS/QQ-W-343				B	5	0000	FT	AR		48-00		001827
04	570-3650-02-01-00	TERMINAL, INSULATED				B	5	0000	EA	8.00	8.00	49-00	71279	001828
04	**47E387084-50	LENS, ENGRAVED				B		0000	EA	1.00	1.00	50-00		001829
04	**47E387084-51	LENS, ENGRAVED				B		0000	EA	1.00	1.00	51-00		001830
04	**47E387084-52	LENS, ENGRAVED				B		0000	EA	2.00	2.00	52-00		001831

LVL	IDENTIFICATION NO.	NOMENCLATURE	ECN DWG INC	ECN OUT	PL-LATE APPLY	P C	T Y	CYCLE TIME	U/M	PL-QTY	EXT/TOT QTY	ITEM/ REF DESG	FSCM	CROSS REF
04	N153P16007	SCREW, PAN HD				*		0000	EA	4.00	4.00	53-00		001832
04	N153P13005	SCREW, PAN HD				*		0000	EA	3.00	3.00	54-00		001833
04	N415P19	WASHER, LOCK, #10				*		0000	EA	4.00	4.00	55-00		001834
04	N226P16	NUT, HEX, #10-32				*		0000	EA	4.00	4.00	56-00		001835
04	N678P15008	SCREW, FLAT HD				B	5	0000	EA	2.00	2.00	57-00		001836
04	N153P15008	SCREW, PAN HD				B		0000	EA	4.00	4.00	58-00		001837
04	N415P16	WASHER, LOCK, #8				*		0000	EA	4.00	4.00	59-00		001838
04	N226P15	NUT, HEX, #8-32				B	5	0000	EA	2.00	2.00	60-00		001839
04	N153P13004	SCR, PH, #6-32				*		0000	EA	8.00	8.00	61-00		001840
04	N153P13006	SCREW, PAN HD				B		0000	EA	6.00	6.00	62-00		001841
04	N400P37	WASHER, FL. #6				*		0000	EA	8.00	8.00	63-00		001842
04	N415P13	WASHER, LOCK, #6				*		0000	EA	17.00	17.00	64-00		001843
04	N226P13	NUT,PLAIN HEX, #6-32				*		0000	EA	9.00	9.00	65-00		001844
04	**47E387084-66	LENS, ENGRAVED				B		0000	EA	1.00	1.00	66-00		001845
04	AML52-N10W	LENS				B		0000	EA	1.00	1.00	67-00	91929	001846
04	47A380102	FINISH				X		0000	PT	X		68-00		001847
03	**47E387112-6	COMM PANEL				M		0000	EA	1.00	1.00	6-00		001848
03	47A380030	SPEC,SYST DISP PNL				X		0000	EA	X		7-00		001849
03	**47E387112-8	BLOWER,130 CFM				B		0000	EA	1.00	1.00	8-00		001850
03	**47E387112-9	BLOWER				B		0000	EA	1.00	1.00	9-00		001851
03	**47E387112-10	ENCLOSURE,FRAME				M		0000	EA	1.00	1.00	10-00		001852
03	**47E387112-11	AIR EXHAUST UNIT L.H				B		0000	EA	1.00	1.00	11-00		001853
03	**47E387112-12	AIR EXHAUST UNIT R.H				B		0000	EA	1.00	1.00	12-00		001854
03	**47E387112-13	SCHEMATIC				X		0000	EA	X		13-00		001855
03	**47E387112-14	CABLE ASSY				X		0000	EA	X		14-00		001856
03	**47E387112-15	WIRE LIST				X		0000	EA	X		15-00		001857
02	**47E387081-19	C.D.S. OPR TERMINAL				M		0000	EA	1.00	1.00	19-00		001858
02	47E387018	POWER DISTBR SCHEM				X		0000	EA	X		20-00		001859
02	**47E387081-21	EYE WASH STATION				M		0000	EA	1.00	1.00	21-00		001860
02	**47E387081-22	EMER LIGHT UNIT				M		0000	EA	3.00	3.00	22-00		001861
02	**47E387081-23	FIRE EXT UNIT				M		0000	EA	5.00	5.00	23-00		001862
02	**47E387081-24	TEL & SITE INTERCOM				M		0000	EA	1.00	1.00	24-00		001863
02	47A380094	7500KVA VAR SP GEN				X		0000	EA	X		25-00		001864
01	47E387114	CONTROL SYSTEM SCHEM				X		0000	EA	X		10-00		001865
01	47A380023	POWER CABLING REQT				X		0000	EA	X		11-00		001866
01	47A380024	INSTL CABLING REQT				X		0000	EA	X		12-00		001867
01	47A380008	STEP-UP XFMR SPEC				X		0000	EA	X		13-00		001868
01	47A387005	I&C SIGNAL LIST				X		0000	EA	X		14-00		001869
01	47D382288	GENERAL SITE LCTN				X		0000	EA	X		15-00		001870
01	47D382298	SITE PLAN-1ST UNIT				X		0000	EA	X		16-00		001871
01	47E387014	SCHEM,NACELLE,GEN				X		0000	EA	X		17-00		001872
01	47D382000	TOWER GEOMETRY/DIAG				X		0000	EA	X		18-00		001873
01	47D382274	NACELLE GEOMETRY				X		0000	EA	X		19-00		001874

IDENTIFICATION NO.	NOMENCLATURE	ECN DWG INC	ECN DWG OUT	PL-LATE APPLY	P C	T Y	CYCLE TIME	FSCM	U/M	NEXT HIGHER ASSEMBLY	QTY	EXT/TOT-QTY	CROSS REF
300H1-15CG-04-K	PRESSURE TRANSDUCER				B		0000	89326	EA	47J382313G1	03.000	03.000	000103
3009-P-104	POTENTIOMETER, 100 K				B		0000	32997	EA	47D387113G1	02.000	02.000	001492
3009-P-503	POTENTIOMETER, 50K				B		0000	32997	EA	47D387113G1	02.000	02.000	001788
3009P-1-102	POTENTIOMETER, 1 K				B	7	0000	32997	EA	47E387037G1	01.000	02.000	000720
3009P-1-202	POTENTIOMETER, 2 K				B		0000	32997	EA	47E387037G1	02.000	04.000	000715
3009P-1-501	POTENTIOMTR 500 OHMS				B		0000	32997	EA	47E387037G1	04.000	08.000	000718
3043T18	"U" BOLT & NUTS				B	5	0000	39428	EA	47J382313G1	06.000	06.000	000080
3059J-1-102M	POTENTIOMETER				M		0000	32997	EA	47D387130G1	02.000	02.000	000894
326T-FRAME	MOTOR,TEFC				B		0000		EA	47E382579G1	01.000	01.000	000471
3302-37	CABLE 12" LG				*		0000	75037	EA	47D387087G1	01.000	07.000	000741
3341-1L	JACK SOCKET KIT				*		0000	52760	EA	47E387072G1	07.000	07.000	000742
3341-1L	JACK SOCKET KIT				*		0000	52760	EA	47E387084G1	02.000	02.000	001810
3341-1L	JACK SOCKET KIT				*		0000	52760	EA	47E387085G1	01.000	01.000	001652
3341-1L	JACK SOCKET KIT				*		0000	52760	EA	47E387091G1	02.000	02.000	001512
3341-1L	JACK SOCKET KIT				*		0000	52760	EA	47E387095G1	04.000	04.000	000623
												16.000	
3417-7040	CONNECTOR				B	5	0000	75037	EA	47D387087G1	01.000	07.000	000740
3432-4205	HEADER				*		0000	52760	EA	47D387083G1	10.000	10.000	000658
350-SERIES-3DC	PUMP				B		0000	59180	EA	47E382579G1	01.000	01.000	000470
3502-1000	CONNECTOR				*		0000	75037	EA	47D387087G1	01.000	07.000	000739
3596A-3	TERMINAL BOARD				*		0000	75382	EA	47E387072G1	01.000	01.000	000745
3596A-3	TERMINAL BOARD				*		0000	75382	EA	47E387095G1	01.000	01.000	000608
												02.000	
47A380008	STEP-UP XFMR SPEC				X		0000		EA	47E382304G1	X		001868
47A380009	DES. REQMTS,ROTOR BL				X		0000		EA	47E382400G1	X		001118
47A380009	DES. REQMTS,ROTOR BL				X		0000		EA	47E382590G1	X		001224
												00.000	
47A380014	STATION BATTERY SPEC				M		0000		EA	47E387081G1	01.000	01.000	001317
47A380023	POWER CABLING REQT				X		0000		EA	47E382304G1	X		001866

GENERAL ELECTRIC

47A380128

CONT ON SHEET ii SH NO. i

REV NO.

47A380128

CONT ON SHEET ii SH NO. i

TITLE

FIRST MADE FOR

REVISION

LOGIC DESIGN OF THE CONTROLLER SOFTWARE - MAIN PROGRAM

FOR THE

MOD-5A WIND TURBINE GENERATOR

MAY 1984

Responsible Engineer DATE: 11 MAY 84

Systems Engineering DATE: 11 MAY 1984

N/A Engineering Manager DATE: ______

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REVISION LOG

This log identifies those portions of this document which have been revised since original issue. revised portions of each page, for the current revision only, are identified by marginal striping or text notes.

Revision	Page No.	Paragraph Number(s) Affected	Rev. Date	Approval

SECTION 1.0
SCOPE

This document describes the logic design of the MOD-5A controller software main program.

1.1 GENERAL DESCRIPTION

The software function of the controller is divided into the following software modules:

- Executive
- Input Signal Manager (ISM)
- Data Processing
- Mode Logic
- Data Archive
- Power Generation
- Manual
- Communication
  - Remote Terminal
  - Site Terminal
  - Control Data System (CDS)
- Startup
- Ramp
- Yaw
- Alarm
- Normal/Emergency Shutdown
- Rotor Hydraulics Pump
- Output Signal Management

Each main program module has several sub-modules called segments. A RAM location is used as an activation flag for each module and another RAM location is used as a segment counter. The activation flag is used by executive to execute the corresponding module. If the module is activated, then the segment counter is used to decide which segment or part of the module to call.

SECTION 2.0
APPLICABLE DOCUMENTS

The following documents of the date of issue noted form a part of this specification to the extent specified herein. In the event of conflict between this specification and the documents referenced herein, the contents of this specification shall supersede.

2.1 GOVERNMENT DOCUMENTS

NASA/LERC - Statement of Work, DEN 3-153, April 2, 1982

2.2 GENERAL ELECTRIC DOCUMENTS

47A380011	System Specification for the MOD-5A WTG
47A387005	Signal and Command List
47A380013	Control System Requirements
47A380044	Software Management Plan
47A380029	Controller Software Requirements
47A380028	Functional Requirements for the Controller Hardware

SECTION 3.0
LOGIC DESIGN DESCRIPTION

3.1 EXECUTIVE

The executive is initiated at 100 msec intervals and addresses the modules in sequence. The ISM, OSM, data processing, mode and data communications modules are continuously called by the executive. The yaw and data archive modules are called continuously by the executive if the controller is in the automatic run mode sequence. Startup, Ramp, Power Generation, Shutdown, and Standby/Enable are automatic run sequence modules and are called as determined by the mode module. Standby/Inhibit, Lockout, and Manual modes are determined by operator command. Standby/Inhibit and Lockout modes are also generated at the conclusion of a safety shutdown.

3.2 INPUT SIGNAL MANAGEMENT (ISM)

The ECL executive controls the signal input/output to the EPTAK system and is transparent to the user application software. The input signal manager transfers the signals read in by the ECL executive into user RAM throughout the user executive cycle.

3.3 DATA PROCESSING

The data processing module calculates signal averages, computer data output, and discrete signal packing.

The calculation of signal average includes wind velocity, wind direction and electrical power produced.

Data output calculations are energy produced for summary printout by the operators terminals.

Discrete signals are read in as one byte for each signal. The data processing module packs each discrete signal as a single bit in an 8 bit word. Thus 8 signals are packed into a single 8 bit word for data output and data archiving.

Analog signals used for computation are 12 bit resolution. For data output and data archive, the data processor truncates the 12 bit analog value to an 8 bit value.

3.4 MODE

Mode determines which of the automatic sequence modules are to be called by the executive. Signal inputs, processed data, and operator input commands are processed by the mode logic to activate/deactivate the operating modes.

The mode sequence as a function of output power and hub wind velocity is shown in Figure 1. A logic diagram of the mode sequence is shown in Figure 2.

3.5 DATA ARCHIVE

The purpose of data archive is to preserve the operating data prior to and immediately after a 2nd level fault that results in a shutdown to lockout. The ongoing operational data is recorded and overwritten such that only the most recent data preserved. On event, the ongoing data set is preserved and a second data set of post event data is generated. The data archive is maintained in RAM for subsequent read-out through the operators terminal.

3.6 POWER GENERATION

Power generation calculates the control signals to position the ailerons and the reference signal for the converter (torque) control. The aileron control signal is based on proportional plus integral computation of rotor speed error. The converter reference signal is a steady state value. There are two nominal operating speeds defined. The power generation module computes the reference signal for the two control loops and processes the aileron control.

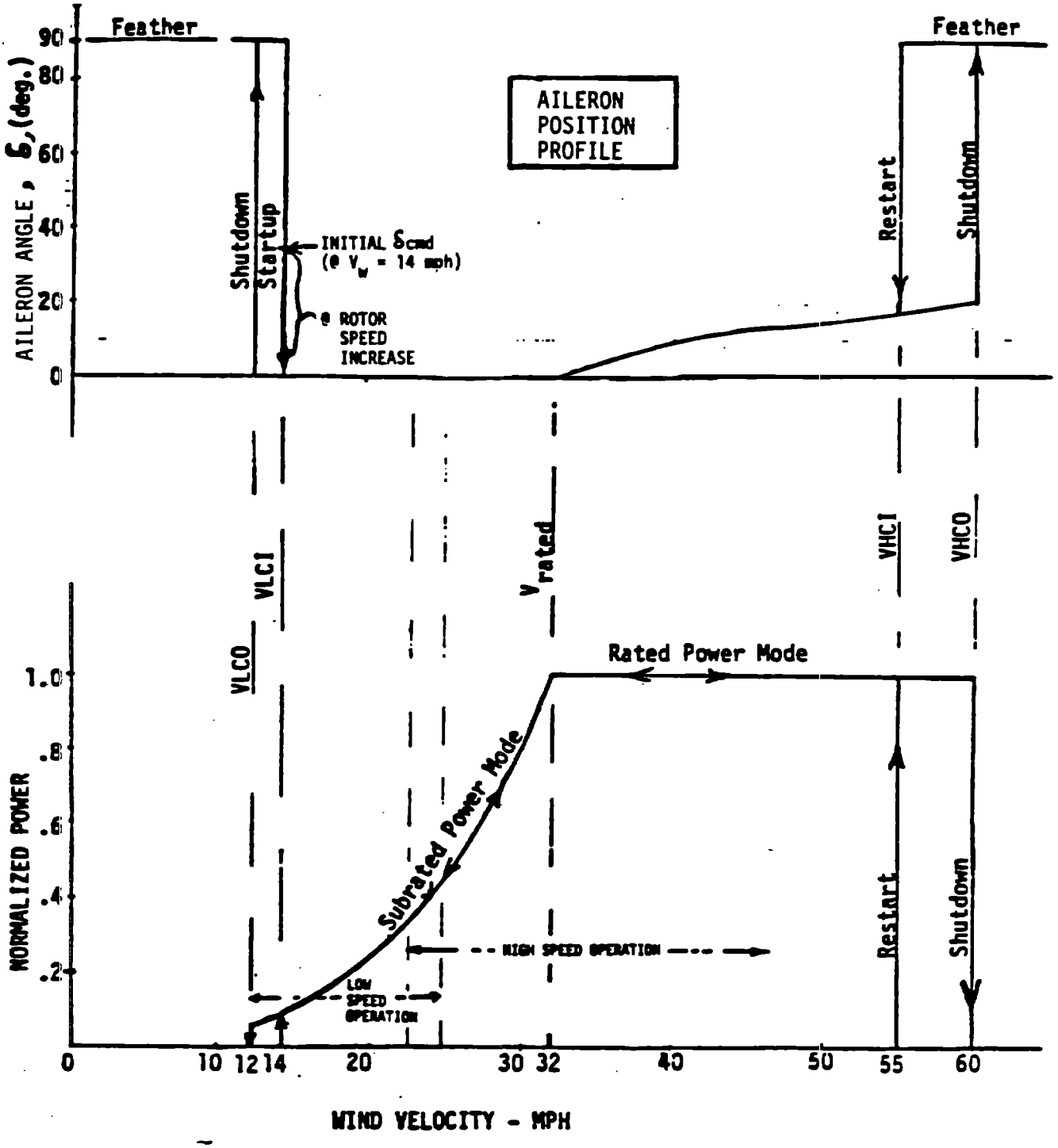


FIGURE 1. AILERON PROFILE AND OPERATING MODES AS A FUNCTION OF WIND SPEED

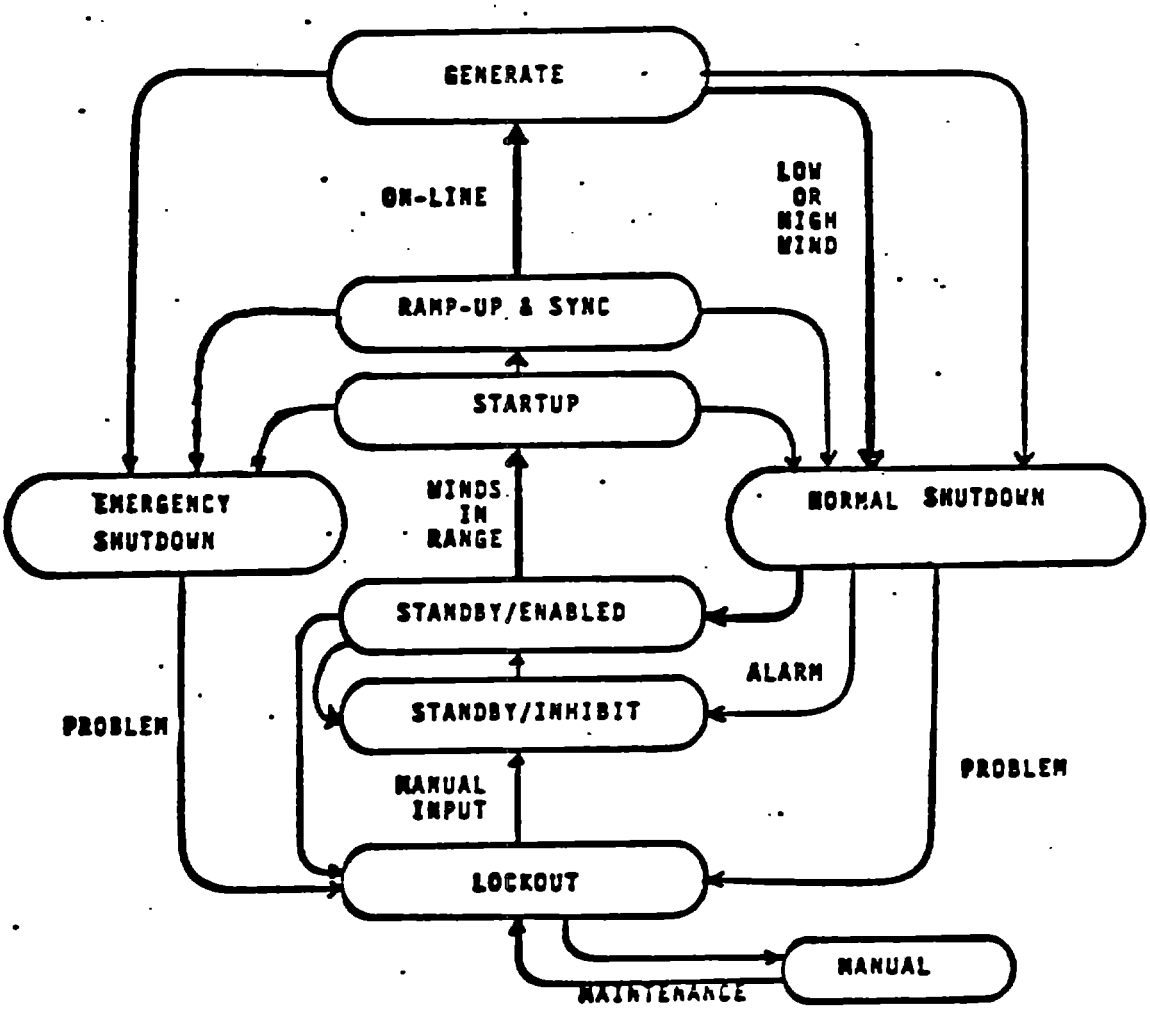


FIGURE 2. CONTROL SYSTEM MODE LOGIC

3.7 MANUAL

Manual is a mode outside the automatic sequence where the operator can exercise control of individual control functions. The basic purpose of the manual mode is to support maintenance operations where it is desired to operate and checkout functions individually. Operator command inputs are via the site operator terminal. Minimum inhibit logic prevents the execution of undesirable commands.

3.8 COMMUNICATION

a) Control Data System - The CDS communication is two-way between the controller and the CDS. The controller outputs data at a rate of one data set per second. The operator can request for read-out of a specified RAM location and on operator command the value of operating parameters can be changed.

b) Site Terminal - Communication with the site terminal is two-way. The controller prints at 15 min. interval or on event summary data such as: average power, energy, wind speed, mode, and any alarms present. Site to controller communications sends commands such as speed set point, power set point, and standby enable. Manual control inputs are entered via the site terminal.

c) Remote Terminal - Remote terminal to controller communication is the same as communication with the site terminal except the manual control function is deleted.

3.9 STARTUP

Startup is the first module executed in the automatic sequencing operation when the wind turbine is in Standby/Enable and ready to generate power. Startup is designed to do a function checkout of critical items such as failsafe electronics, tip command and sensors, "G" switches, and teeter brakes prior to rotation.

3.10 RAMP

Ramp is designed to accelerate the turbine rotor to operating speed by control of the aileron angle and the generator/motor torque.

3.11 YAW

The yaw module controls the yaw position to turn the nacelle so the wind turbine is facing into the wind. Yaw is active in the Standby/Enable, Startup, Ramp, and Power Generation modes.

3.12 ALARM

This module senses an alarm condition and sets up the alarm code for output by Data Communication to site and remote terminals, and CDS.

3.13 SHUTDOWN

Normal Shutdown is achieved by changing the blade control angle and simultaneously adjusting air gap torque reference to apply deceleration torque and a speed ramp to stop. This module also controls outputs to engage teeter brakes, latch tips and turn pumps off.

3.14 ROTOR HYDRAULICS PUMP

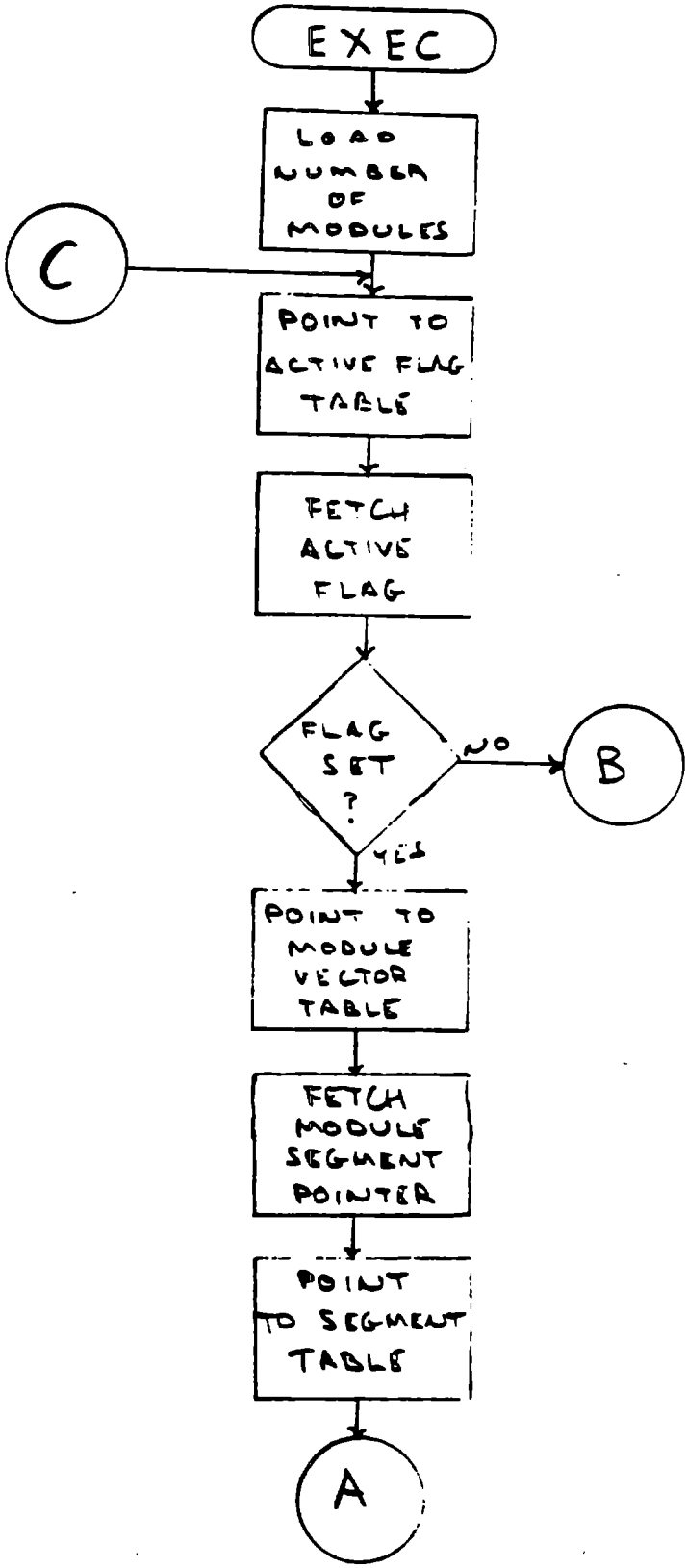
During non-rotating modes the teeter brake hydraulic pressure is maintained. When low pressure is sensored the rotor hydraulic pump is turned ON for a period of two minutes.

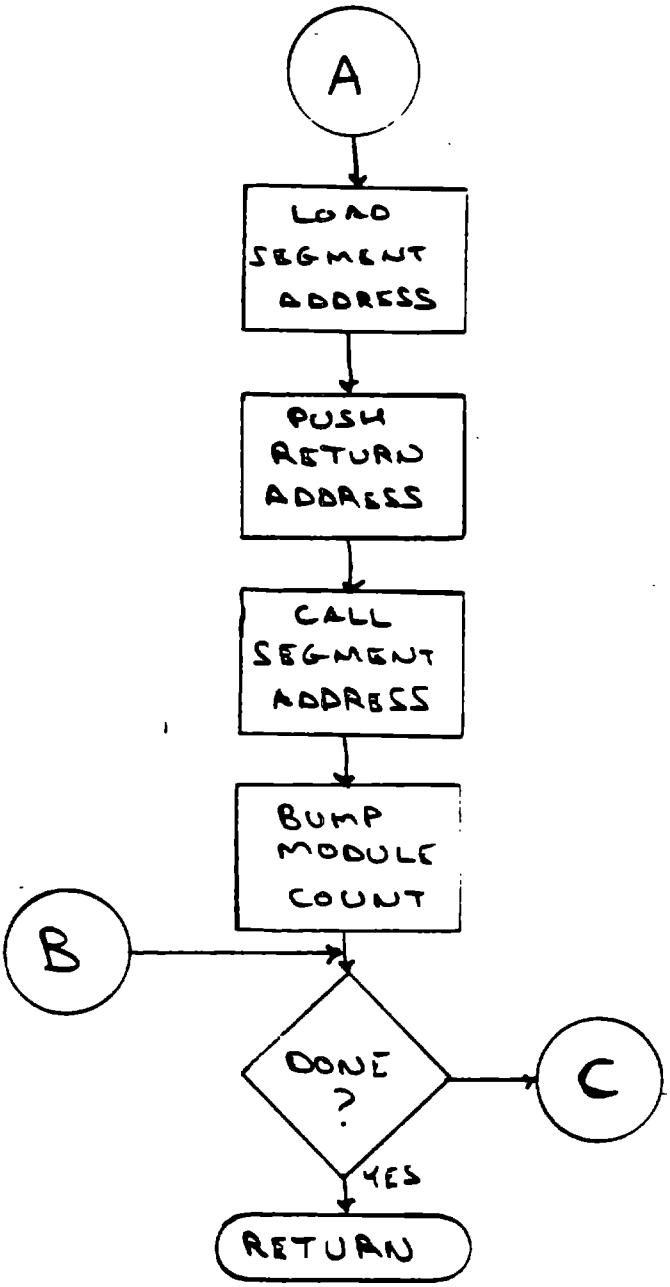
3.15 OUTPUT SIGNAL MANAGEMENT (OSM)

The output command signals generated during the executive cycle are read-out by the OSM at the completion of the active portion of the executive cycle.

SECTION 4.0
LOGIC DIAGRAMS

The logic diagrams are given as follows:



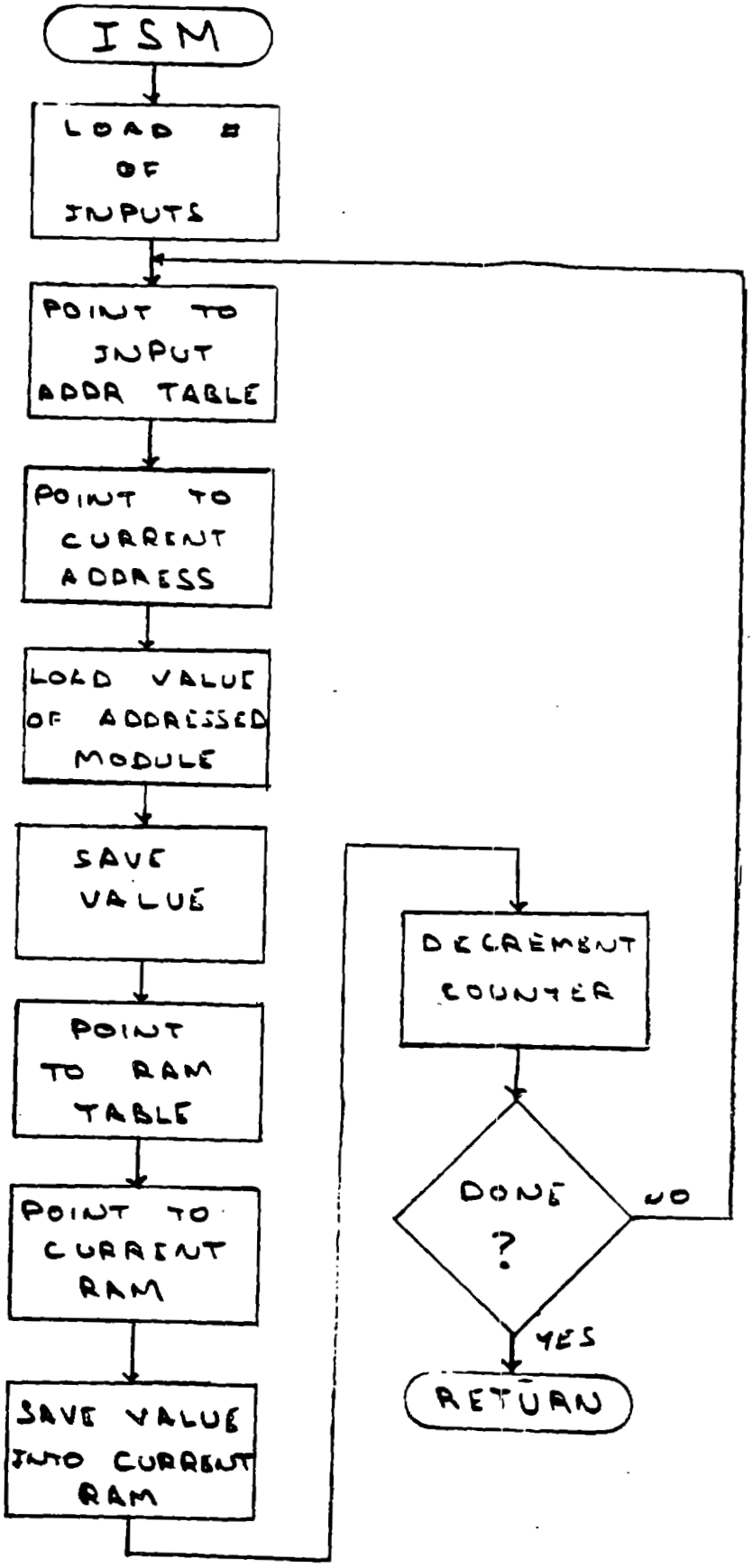

A
LOAD SEGMENT ADDRESS
PUSH RETURN ADDRESS
CALL SEGMENT ADDRESS
BUMP MODULE COUNT
B
DONE ?
C
YES
RETURN

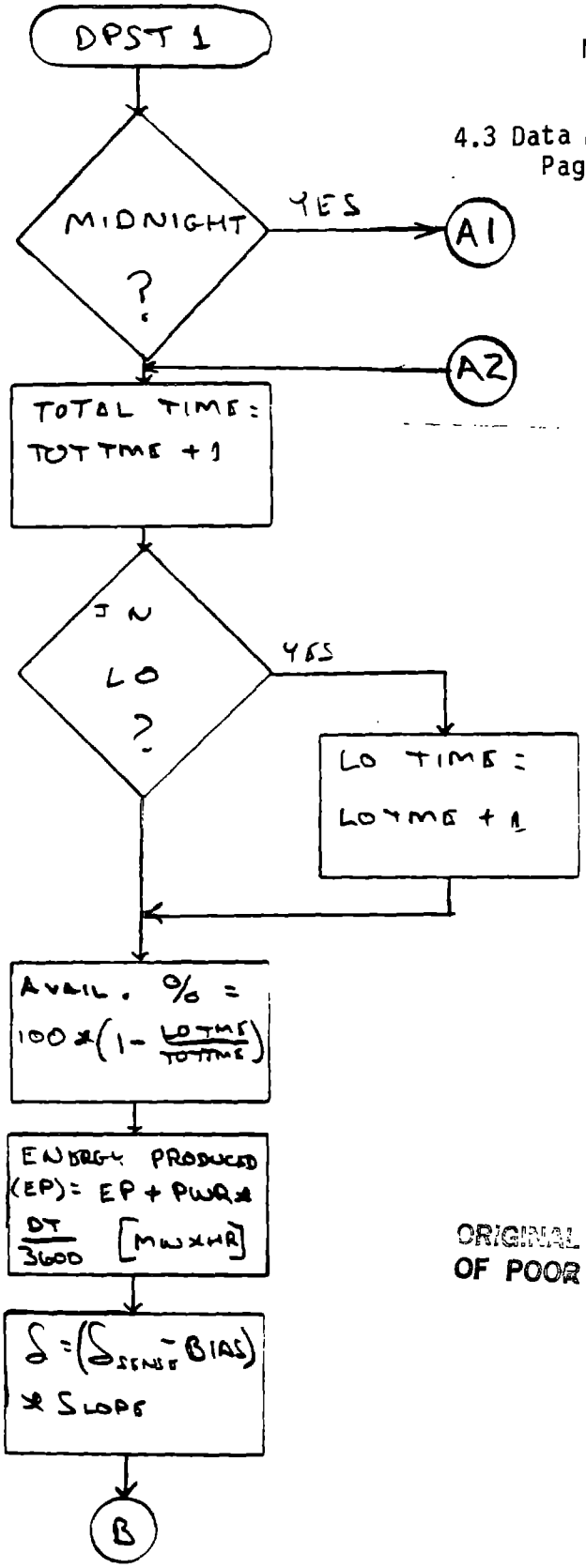
Sample Executive Tables

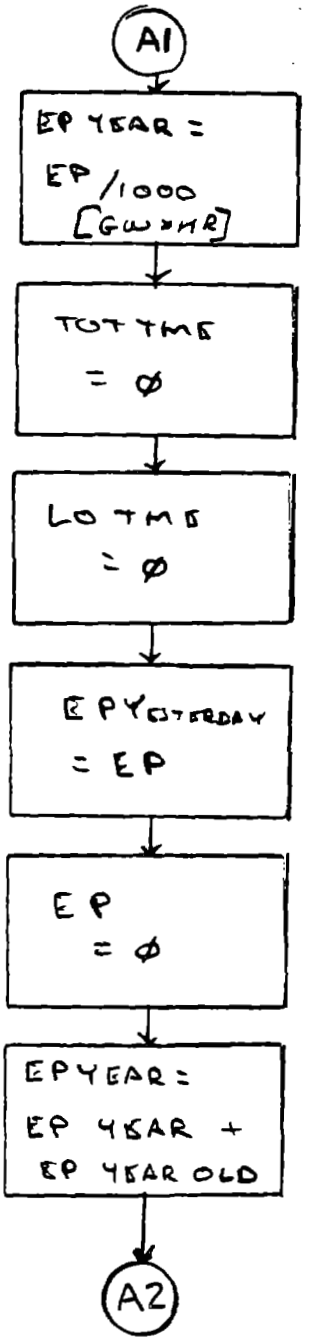
```
MODVTB    DC    PWRST
          DC    NSDST
          DC    YAWST

PWRST     DC    PWRS1

NSDST     DC    NSDS1
          DC    NSDS2
          DC    NSDS3
          DC    NSDS4

YAWST     DC    YAWS1
          DC    YAWS2
```

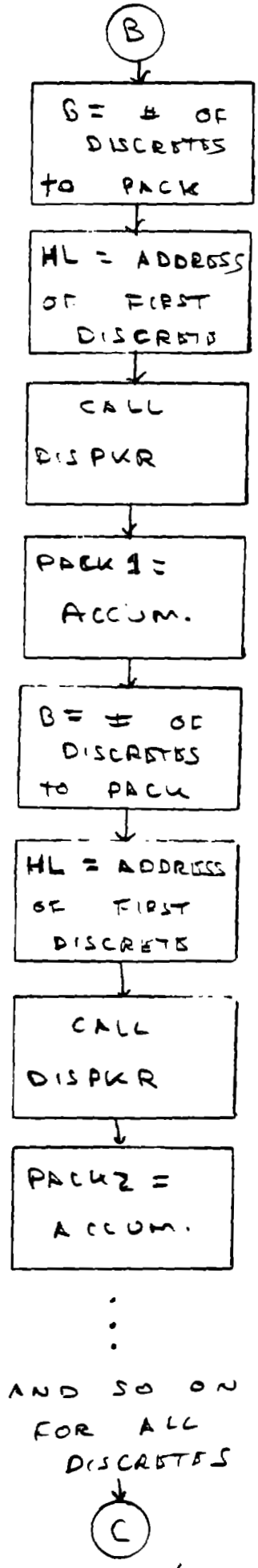
Where :

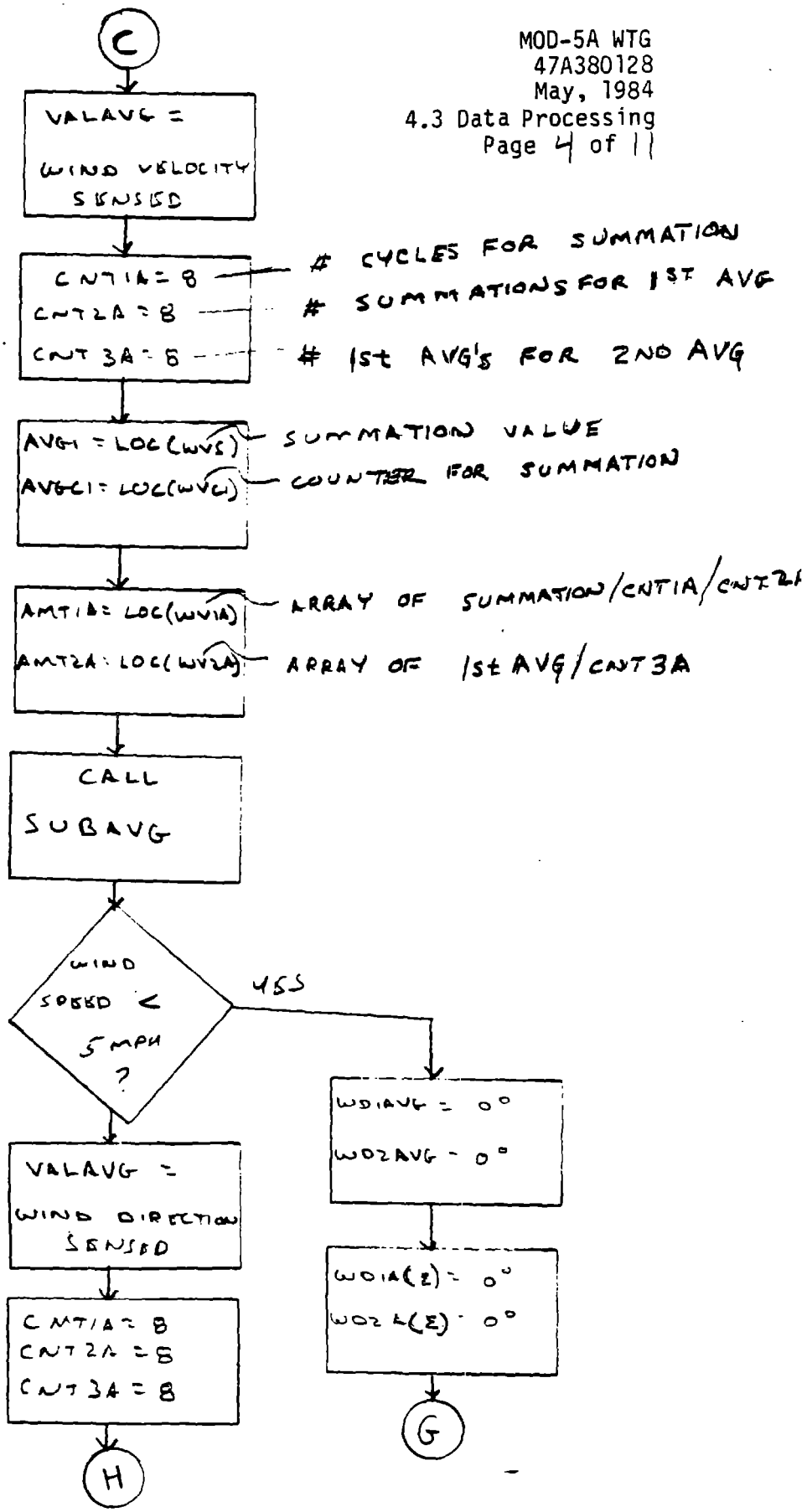
MODVTB	is the vector table
PWRST	is a segment table
NSDS1	is a segment

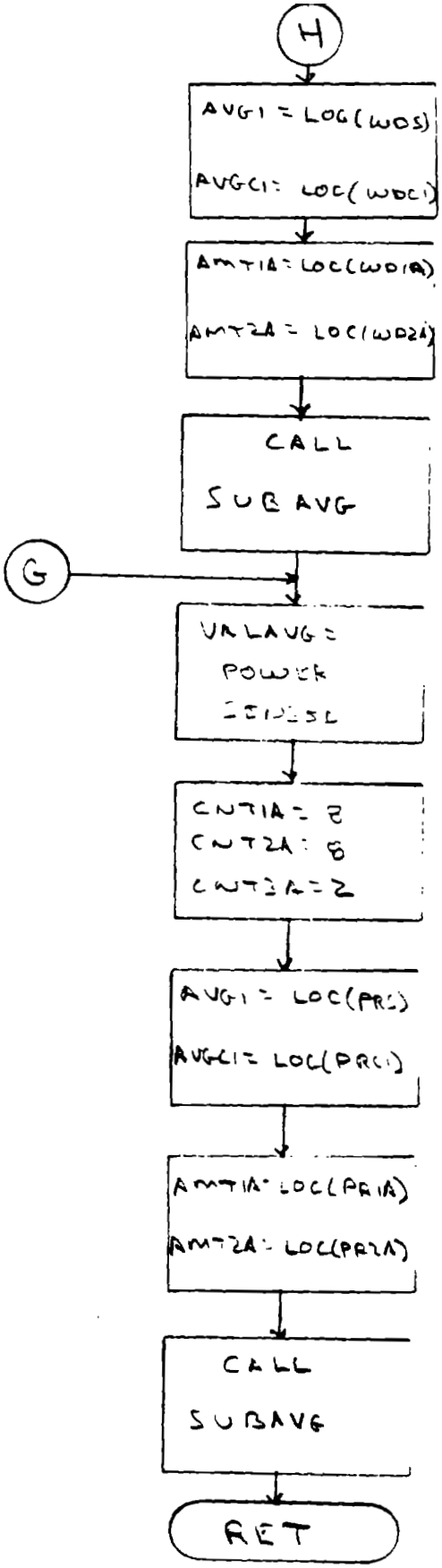


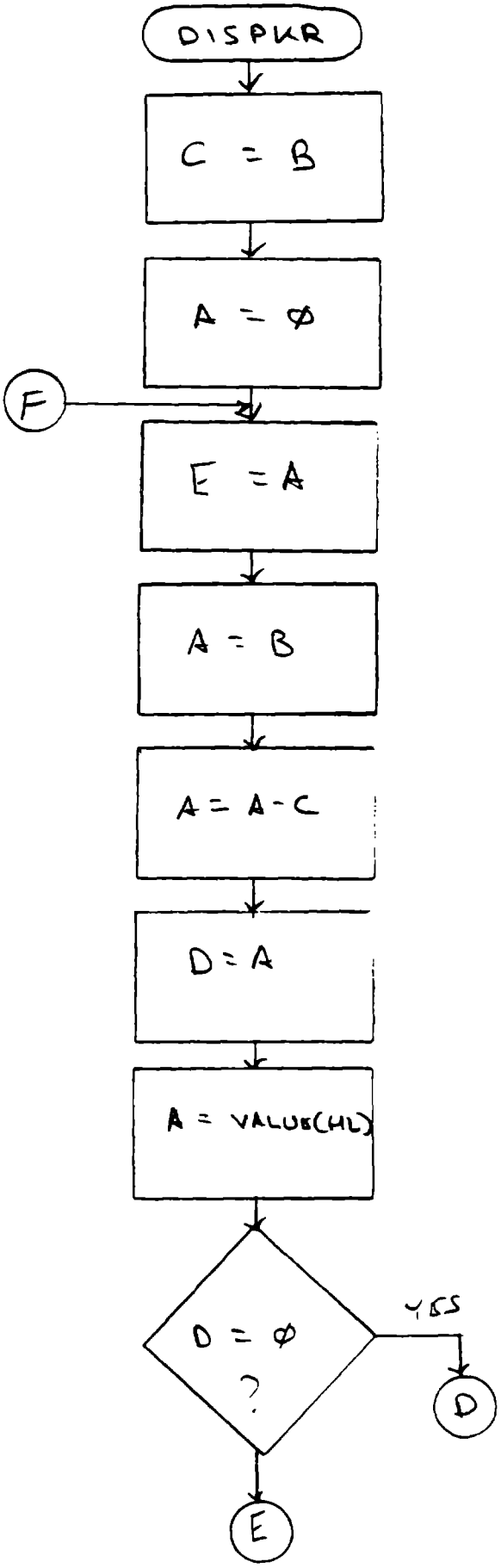


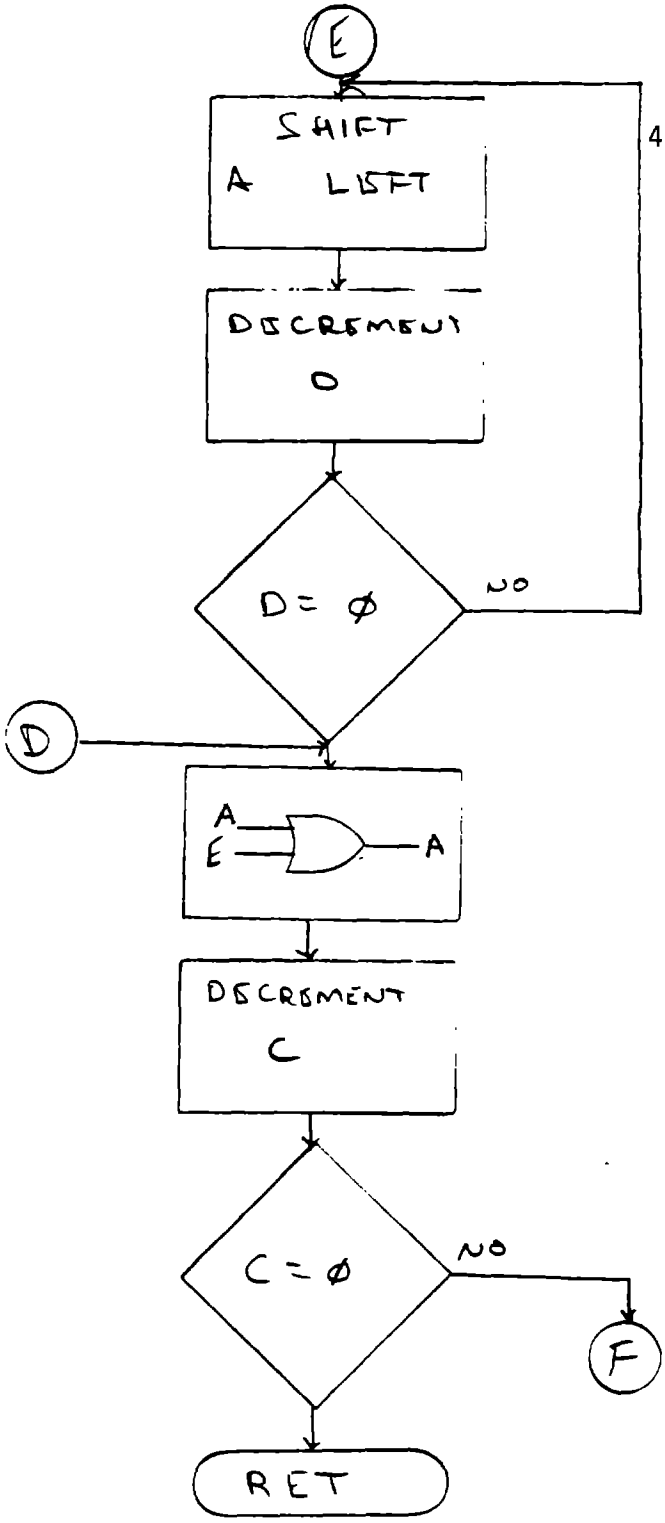

A1
EP YEAR =
EP/1000
[GW*HR]
TOT TMS
= ∅
LO TMS
= ∅
EPYESTERDAY
= EP
EP
= ∅
EPYEAR =
EP YEAR +
EP YEAR OLD
A2

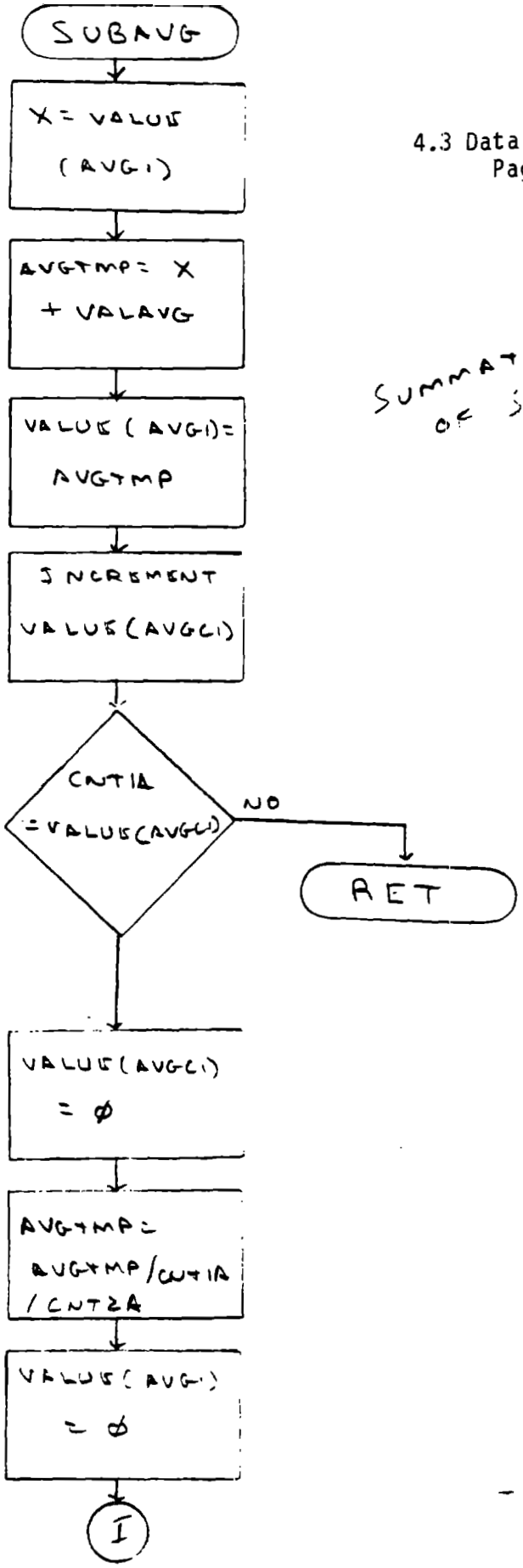

B
B = # OF DISCRETES TO PACK
HL = ADDRESS OF FIRST DISCRETE
CALL DISPKR
PACK 1 = ACCUM.
B = # OF DISCRETES TO PACK
HL = ADDRESS OF FIRST DISCRETE
CALL DISPKR
PACK2 = ACCUM.
AND SO ON FOR ALL DISCRETES
C



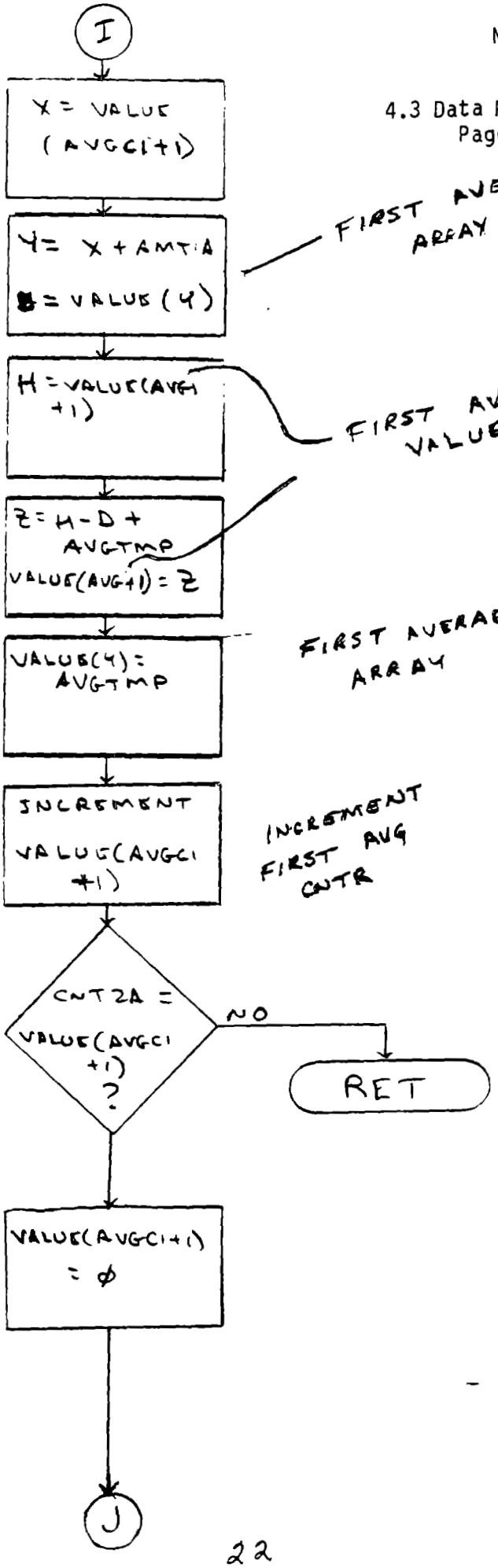


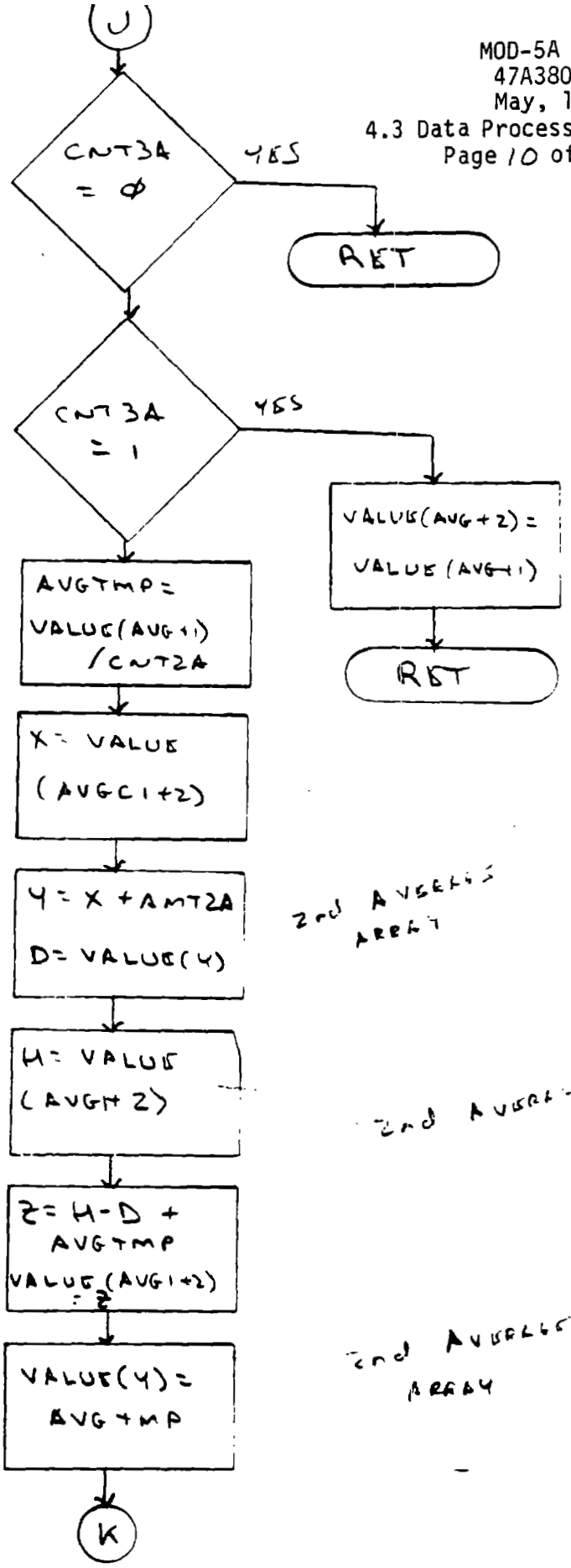

DISPKR
C = B
A = ∅
F
E = A
A = B
A = A - C
D = A
A = VALUE(HL)
D = ∅ ?
YES
D
E

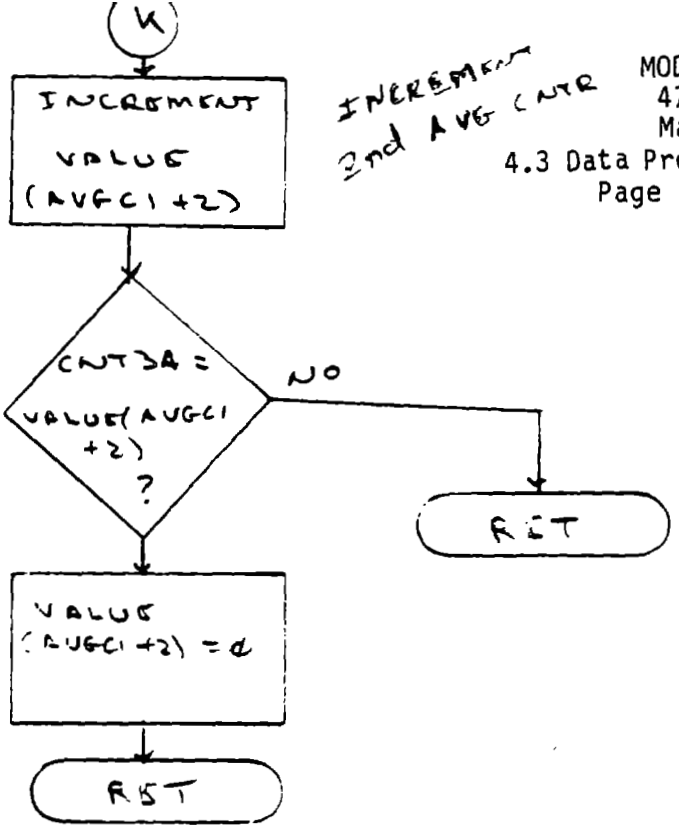

E
SHIFT
A LEFT
DECREMENT
D
D = Ø
NO
D
A
E
A
DECREMENT
C
C = Ø
NO
F
RET



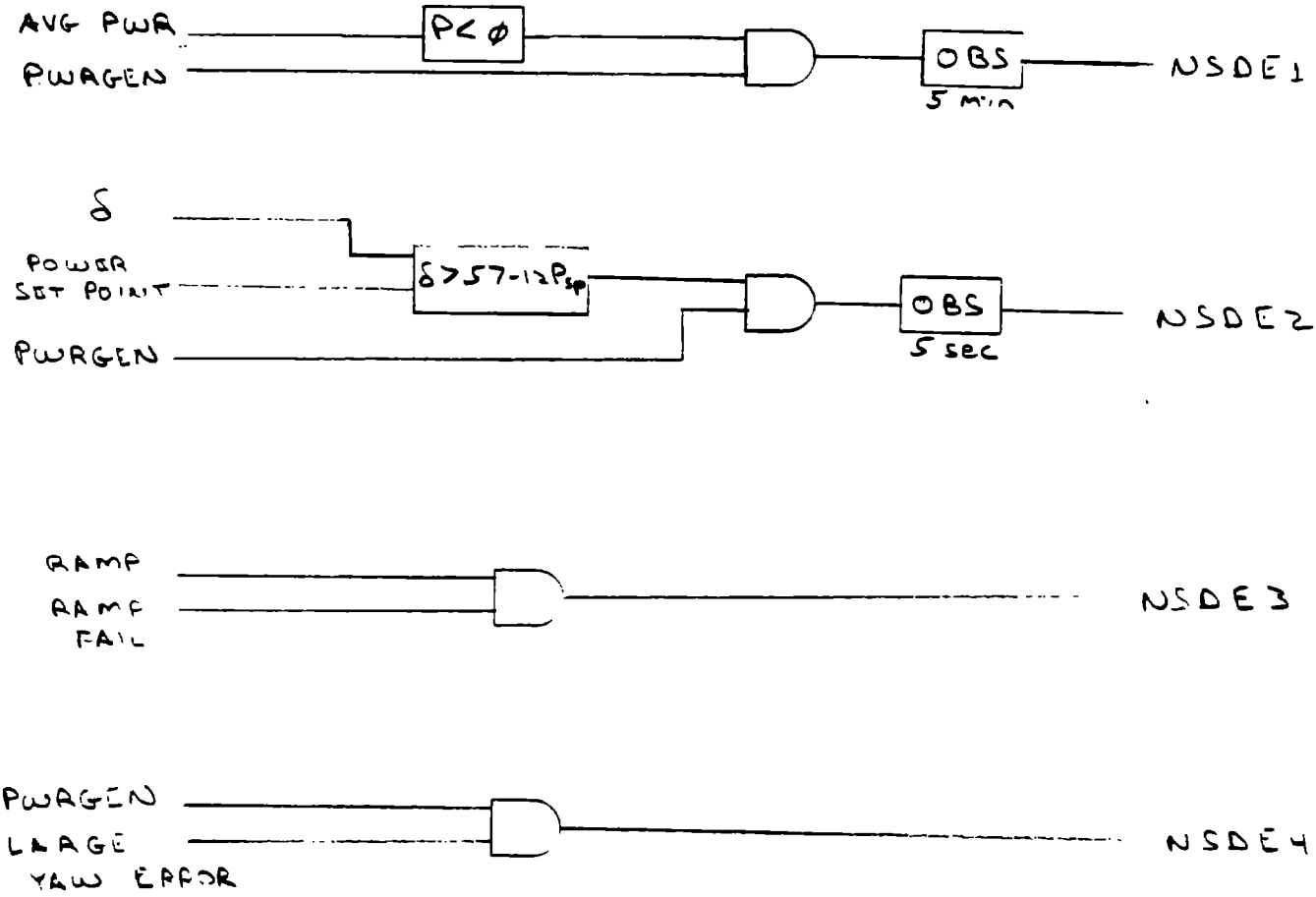
SUMMATION OF SQUARED


I
X = VALUE (AVGCI+1)
Y = X + AMTIA
= VALUE (Y)
FIRST AVERAGE ARRAY
H = VALUE(AVG +1)
FIRST AVERAGE VALUE
Z = H - D + AVGTMP
VALUE(AVG+1) = Z
VALUE(Y) = AVGTMP
FIRST AVERAGE ARRAY
INCREMENT VALUE(AVGCI +1)
INCREMENT FIRST AVG CNTR
CNT2A = VALUE(AVGCI +1) ?
NO
RET
VALUE(AVGCI+1) = ϕ
J




K
INCREMENT
VALUE
(AVGC1+2)
INCREMENT 2nd AVG CNTR
CNT3A =
VALUE(AVGC1
+2)
?
NO
RET
VALUE
(AVGC1+2) = 0
RET

Mode Logic

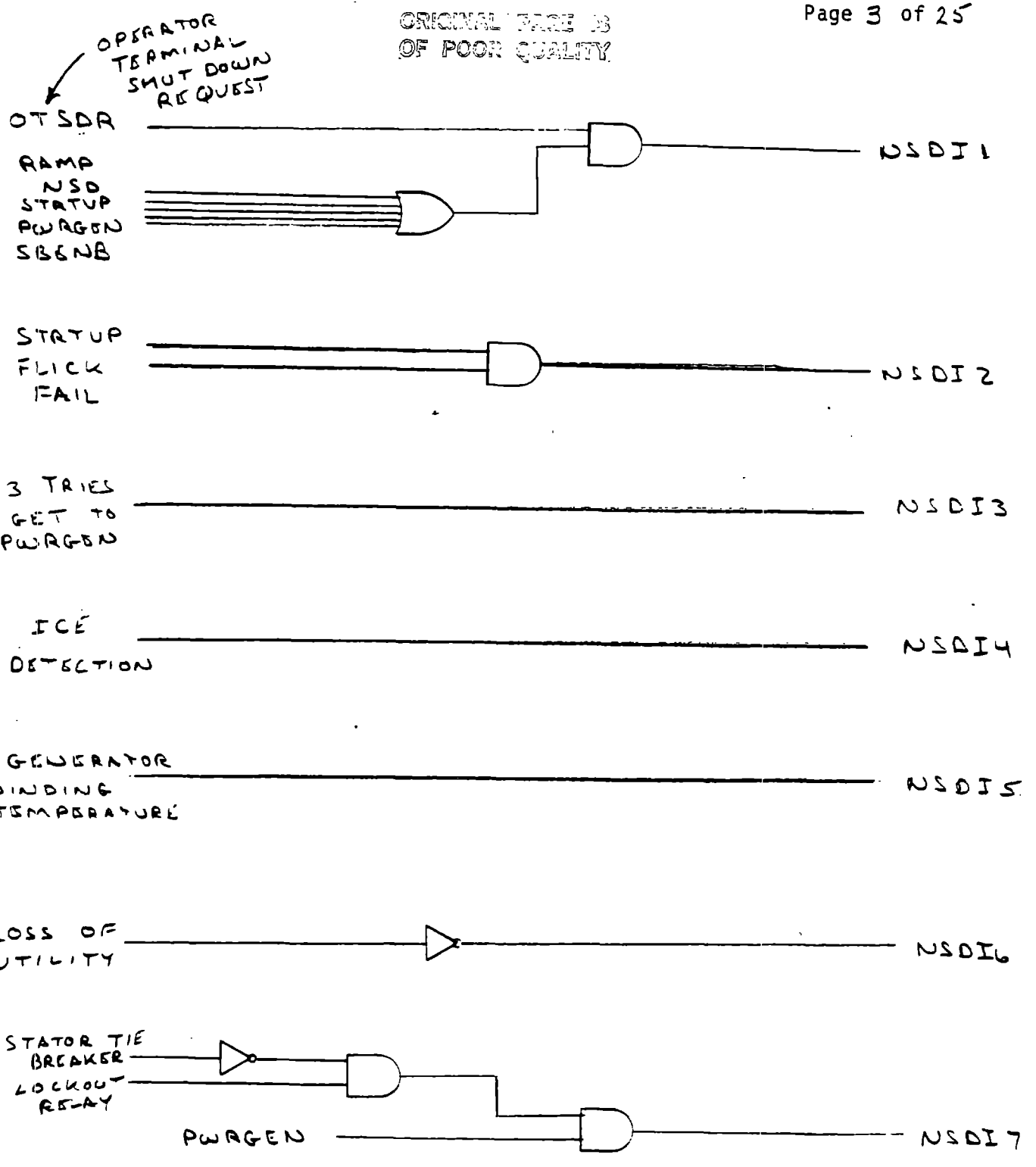


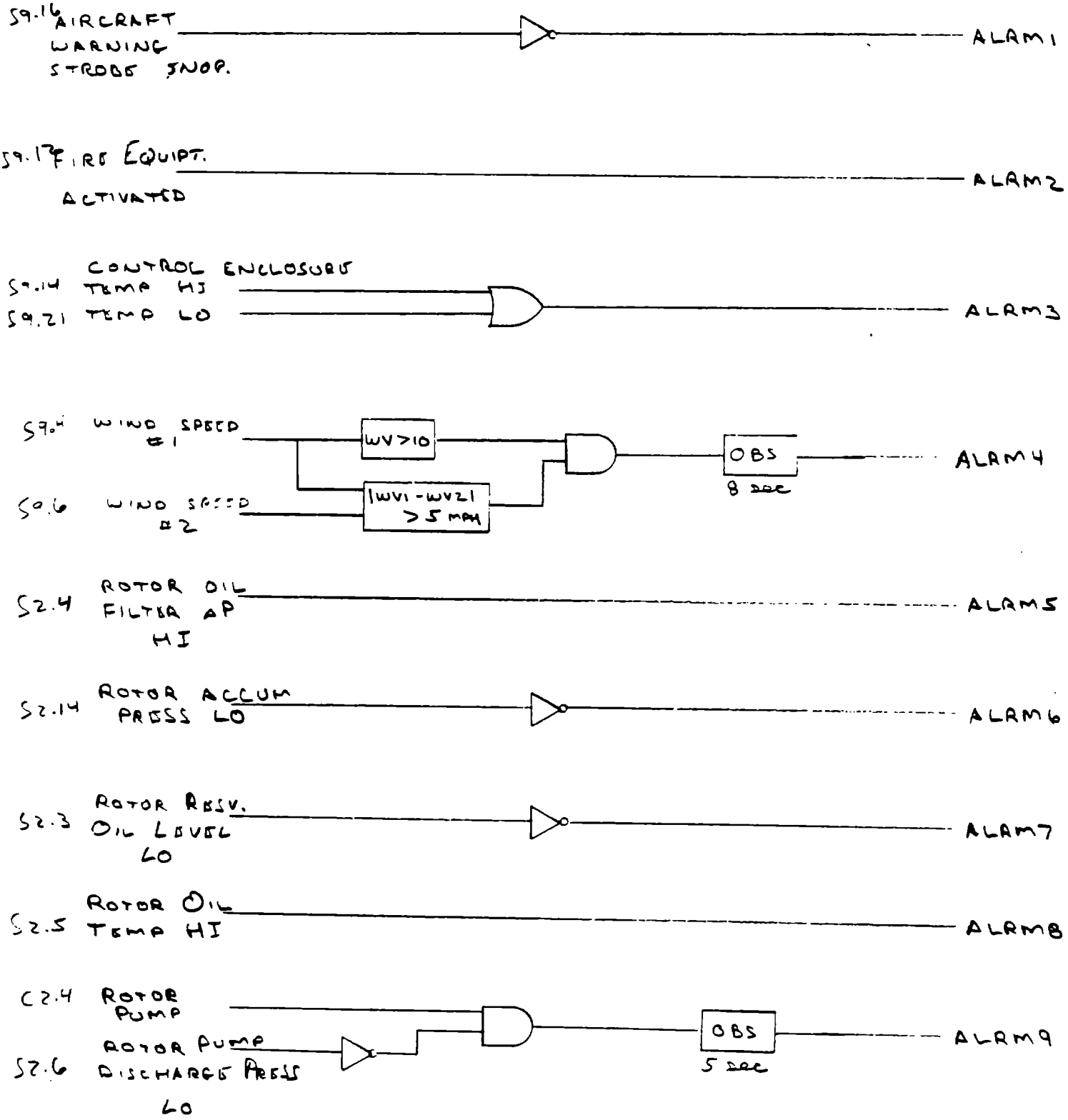
LARGE YAW ERROR

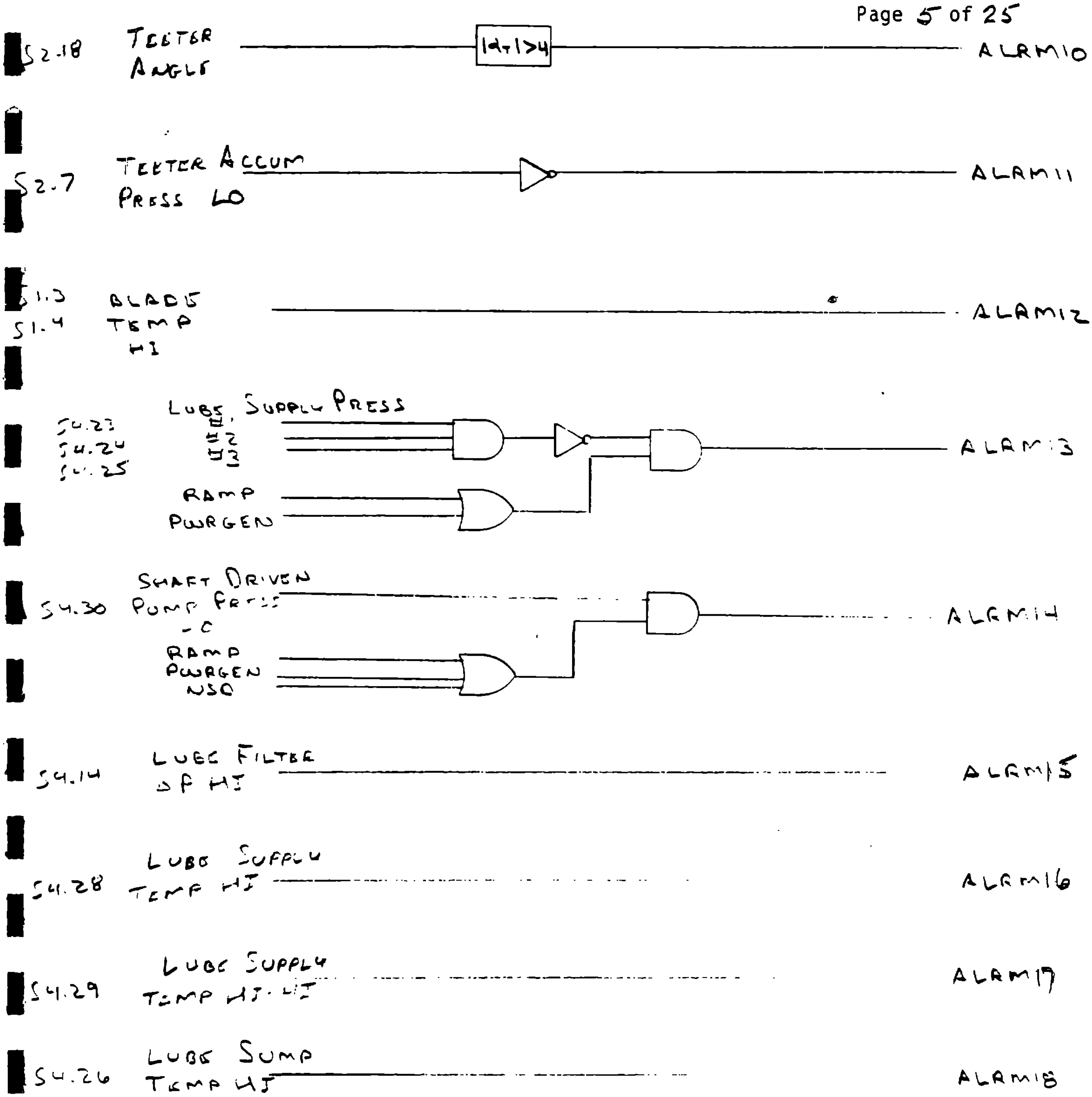
$|WDAVG| > 45°$ when $WVAUG < 45$ MPH

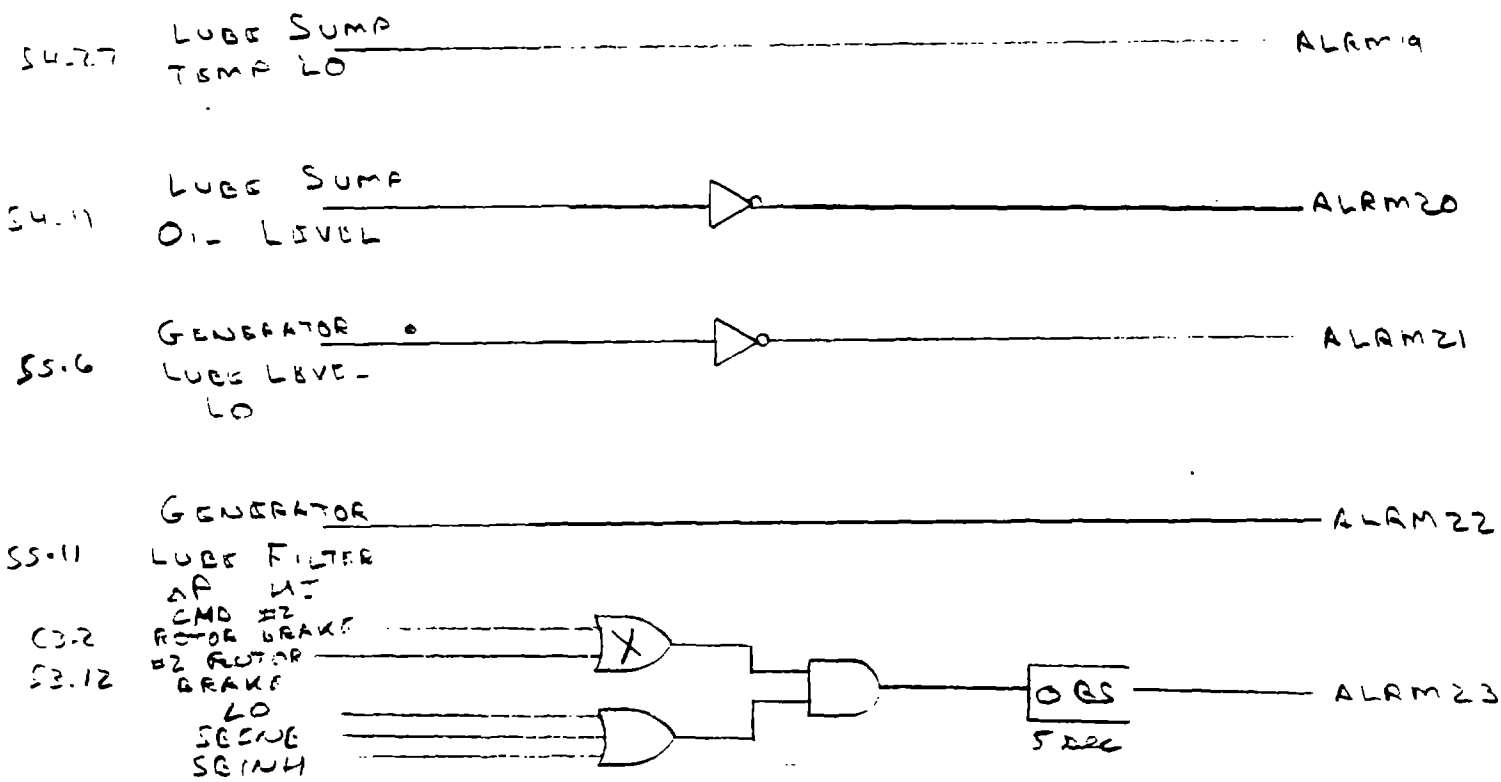
$|WDAVG| > |145° - 7.7 \times \delta_{cmd}|$ when $WVAUG \geq 45$

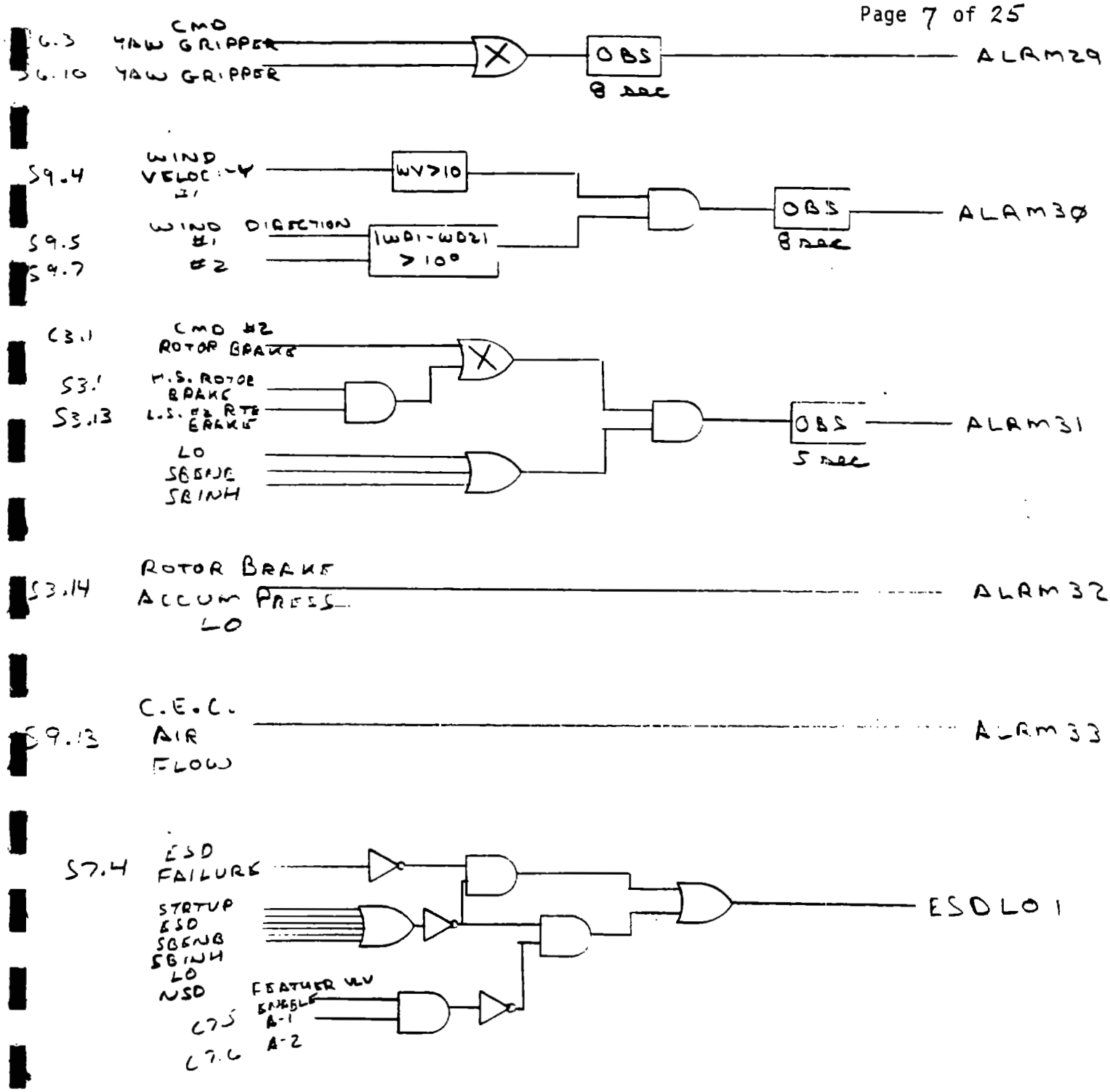
↑ LIMITED TO 100°

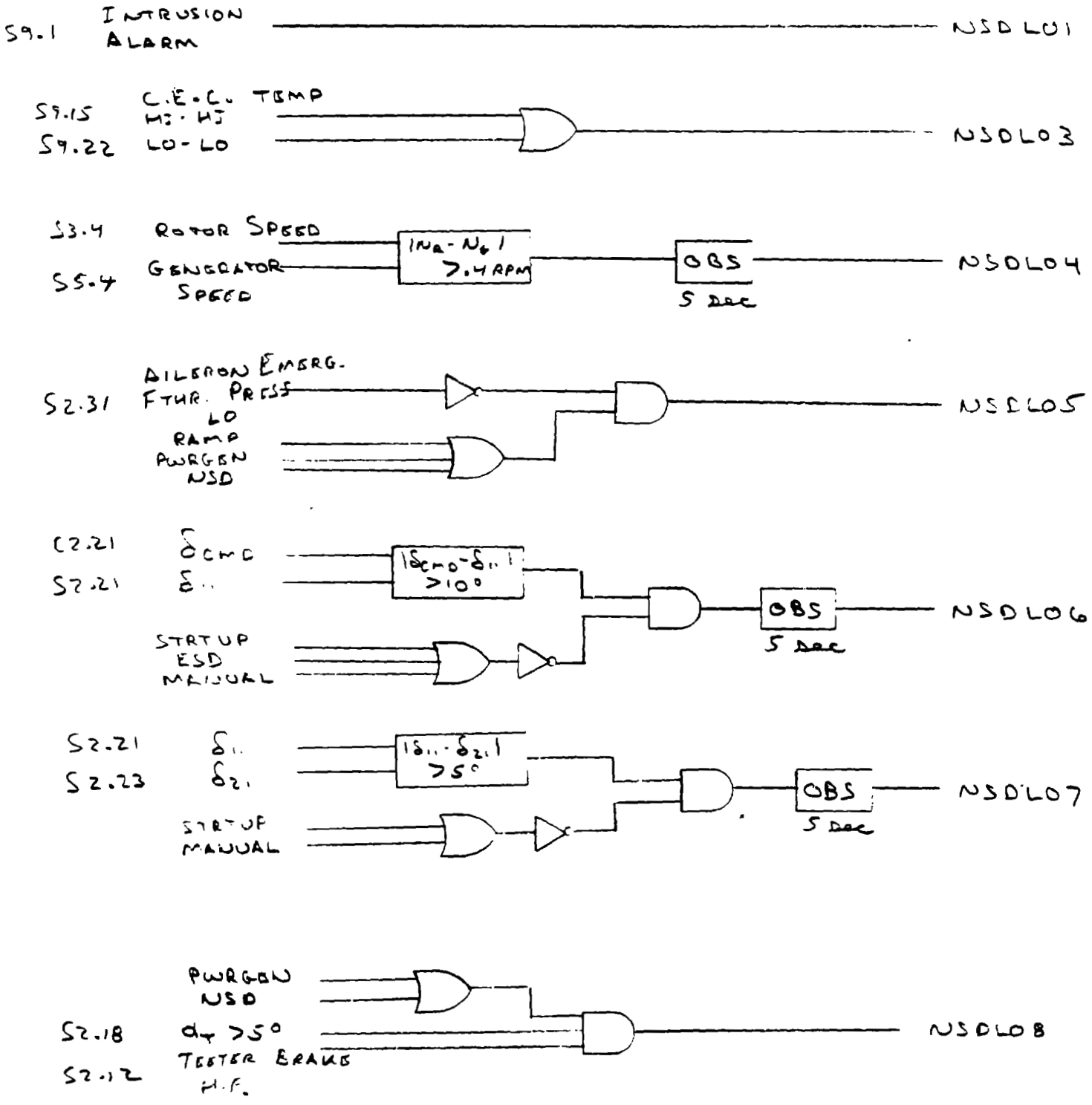


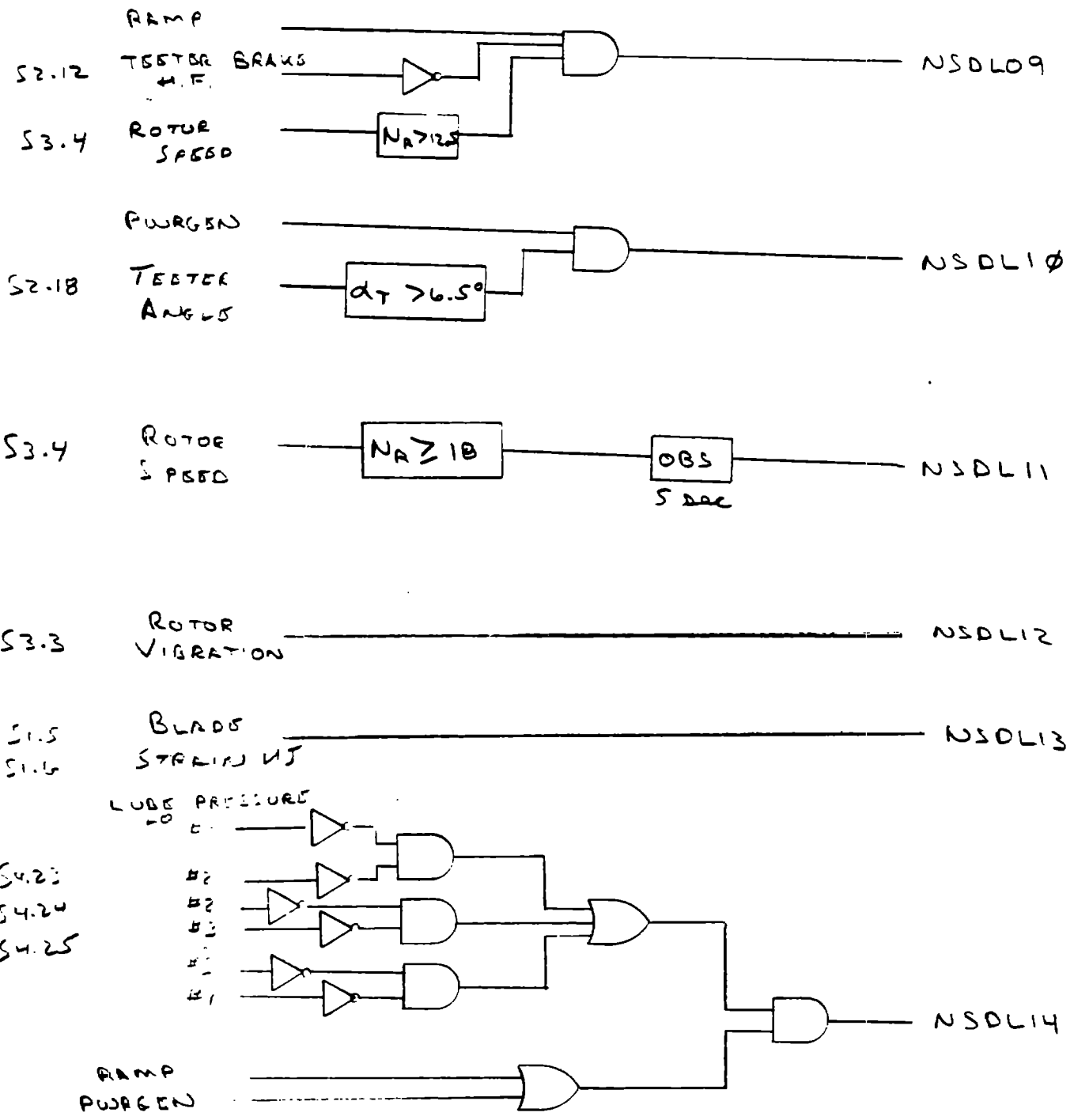

S9.16 AIRCRAFT WARNING STROBE INOP.
ALARM 1
S9.17 FIRE EQUIPT. ACTIVATED
ALARM 2
CONTROL ENCLOSURE
S9.14 TEMP HI
S9.21 TEMP LO
ALARM 3
S9.4 WIND SPEED #1
S9.6 WIND SPEED #2
WV>10
|WV1 - WV2| > 5 MPH
OBS
8 sec
ALARM 4
S2.4 ROTOR OIL FILTER ΔP HI
ALARM 5
S2.14 ROTOR ACCUM PRESS LO
ALARM 6
S2.3 ROTOR RESV. OIL LEVEL LO
ALARM 7
S2.5 ROTOR OIL TEMP HI
ALARM 8
C2.4 ROTOR PUMP
S2.6 ROTOR PUMP DISCHARGE PRESS LO
OBS
5 sec
ALARM 9

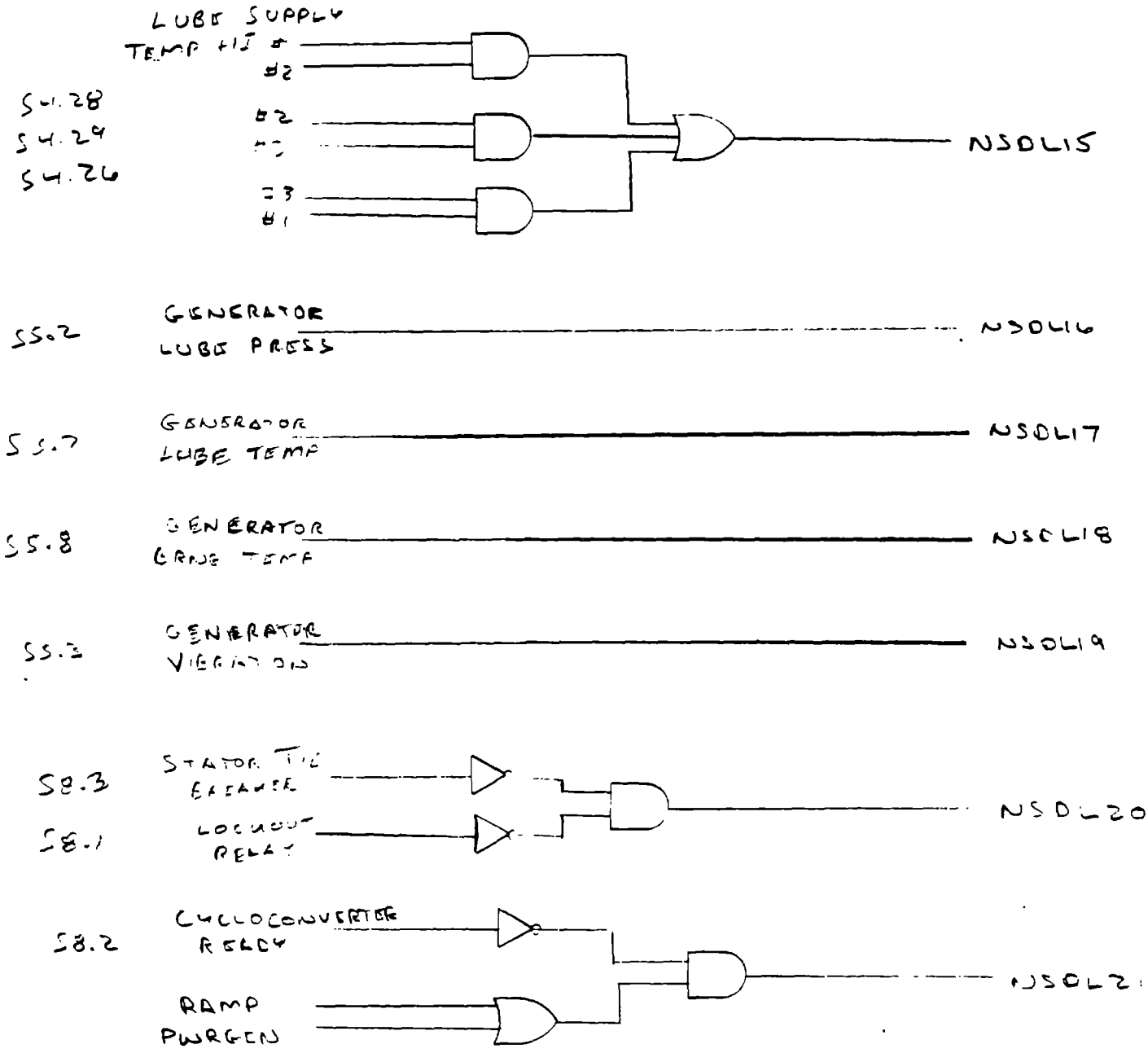

S2.18 TEETER ANGLE
|4+|>4
ALRM10
S2.7 TEETER ACCUM PRESS LO
ALRM11
S1.3 S1.4 BLADE TEMP HI
ALRM12
LUBE SUPPLY PRESS
S4.23 S4.24 S4.25
#1 #2 #3
RAMP
PWRGEN
ALRM13
SHAFT DRIVEN PUMP PRESS LO
S4.30
RAMP
PWRGEN
NSO
ALRM14
S4.14 LUBE FILTER ΔP HI
ALRM15
S4.28 LUBE SUPPLY TEMP HI
ALRM16
S4.29 LUBE SUPPLY TEMP HI-HI
ALRM17
S4.26 LUBE SUMP TEMP HI
ALRM18

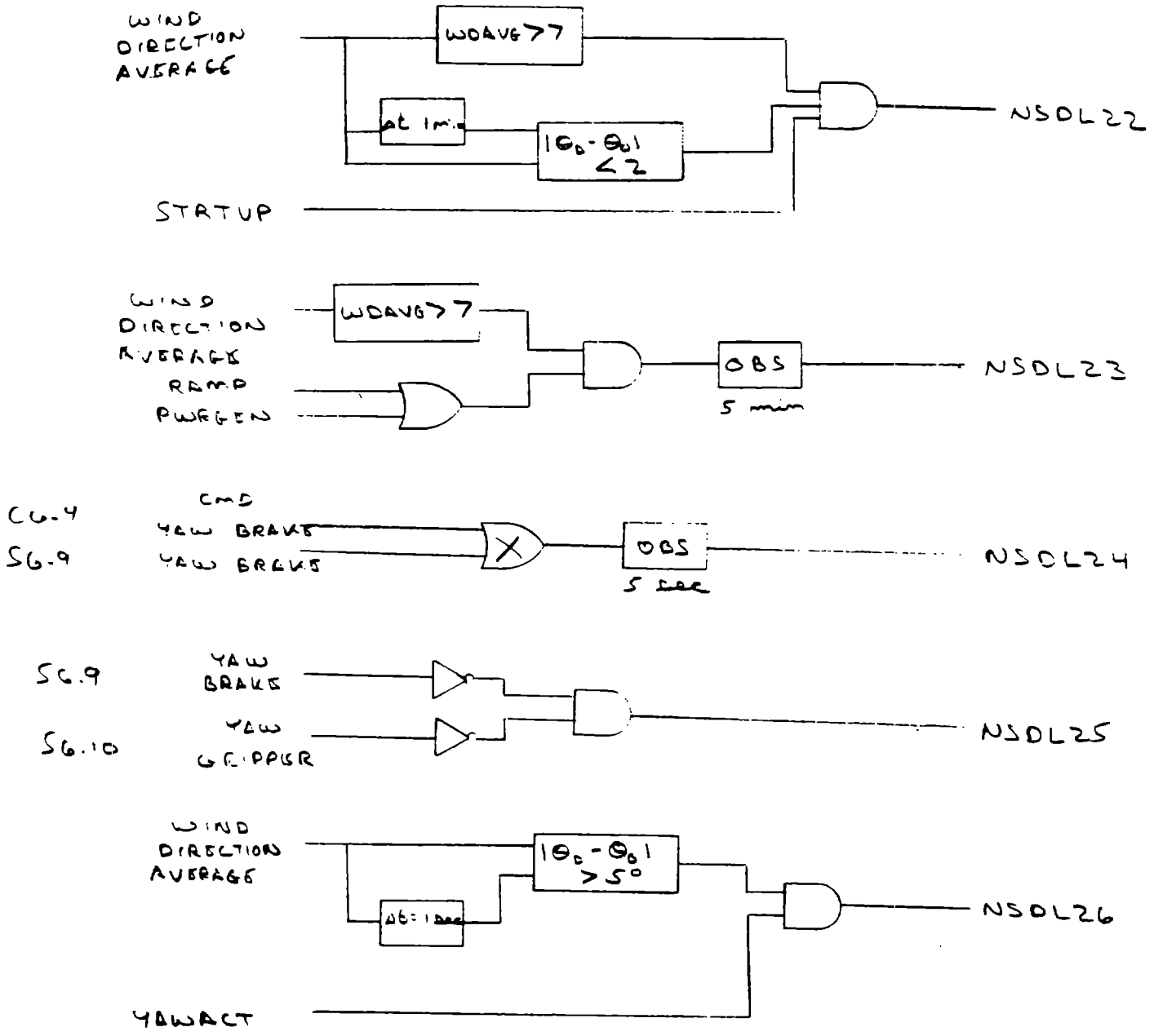


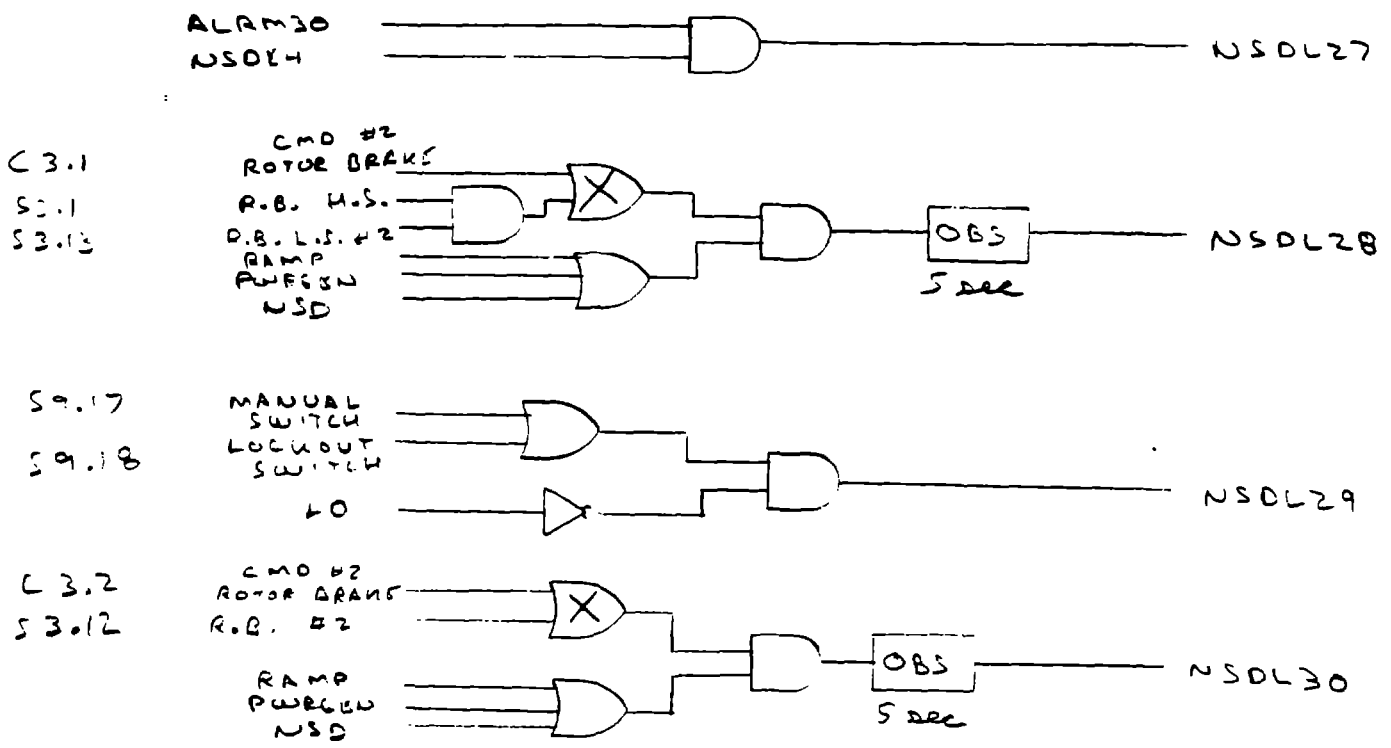


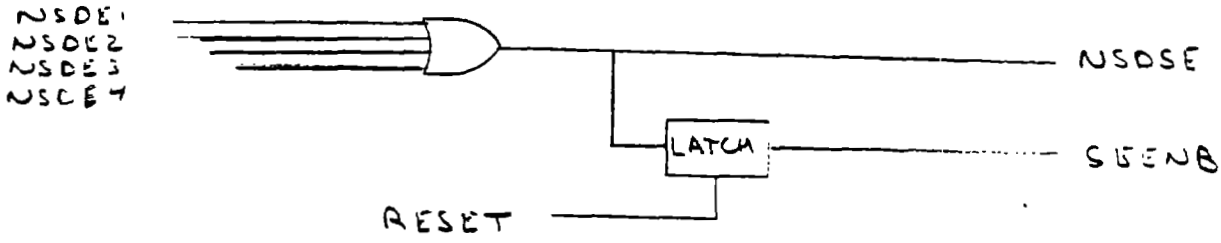

S9.1
INTRUSION ALARM
NSDLO1
S9.15
S9.22
C.E.C. TEMP HI-HI
LO-LO
NSDLO3
S3.4
S5.4
ROTOR SPEED
GENERATOR SPEED
|NR - NG|
>7.4 RPM
OBS
5 sec
NSDLO4
S2.31
AILERON EMERG. FTHR. PRESS LO
RAMP PWRGEN NSD
NSDLO5
C2.21
S2.21
δCMD
δ11
STRTUP ESD MANUAL
|δCMD - δ11|
>10°
OBS
5 sec
NSDLO6
S2.21
S2.23
δ11
δ21
STRTUP MANUAL
|δ11 - δ21|
>5°
OBS
5 sec
NSDLO7
S2.18
S2.12
PWRGEN NSD
dT >5°
TESTER BRAKE H.F.
NSDLO8

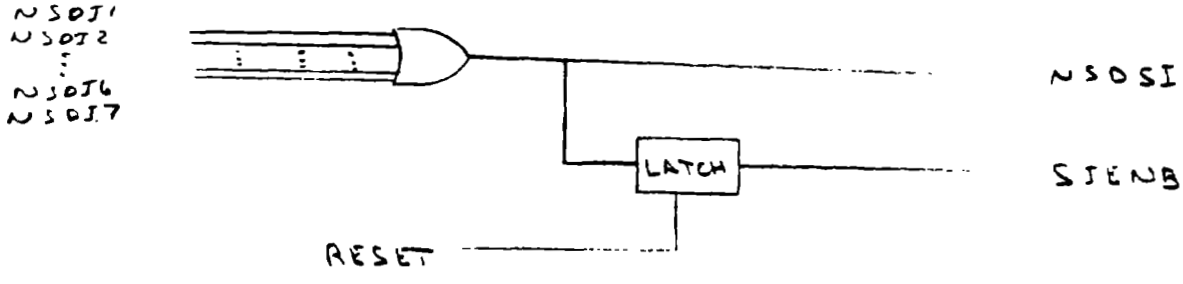


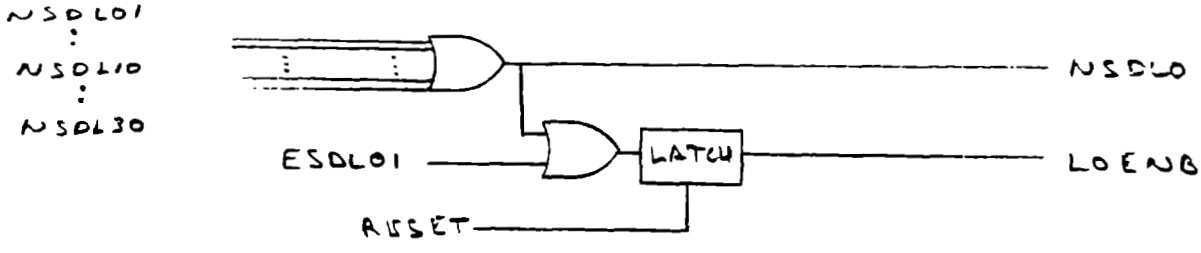

LUBE SUPPLY
TEMP HI
S4.28
S4.29
S4.26
NSOL15
S5.2
GENERATOR
LUBE PRESS
NSOL16
S5.7
GENERATOR
LUBE TEMP
NSOL17
S5.8
GENERATOR
NSOL18
S5.3
NSOL19
S8.3
STATOR TIC
EXCITER
S8.1
LOCKOUT
RELAY
NSOL20
S8.2
CYCLOCONVERTOR
RELAY
RAMP
PWRGEN

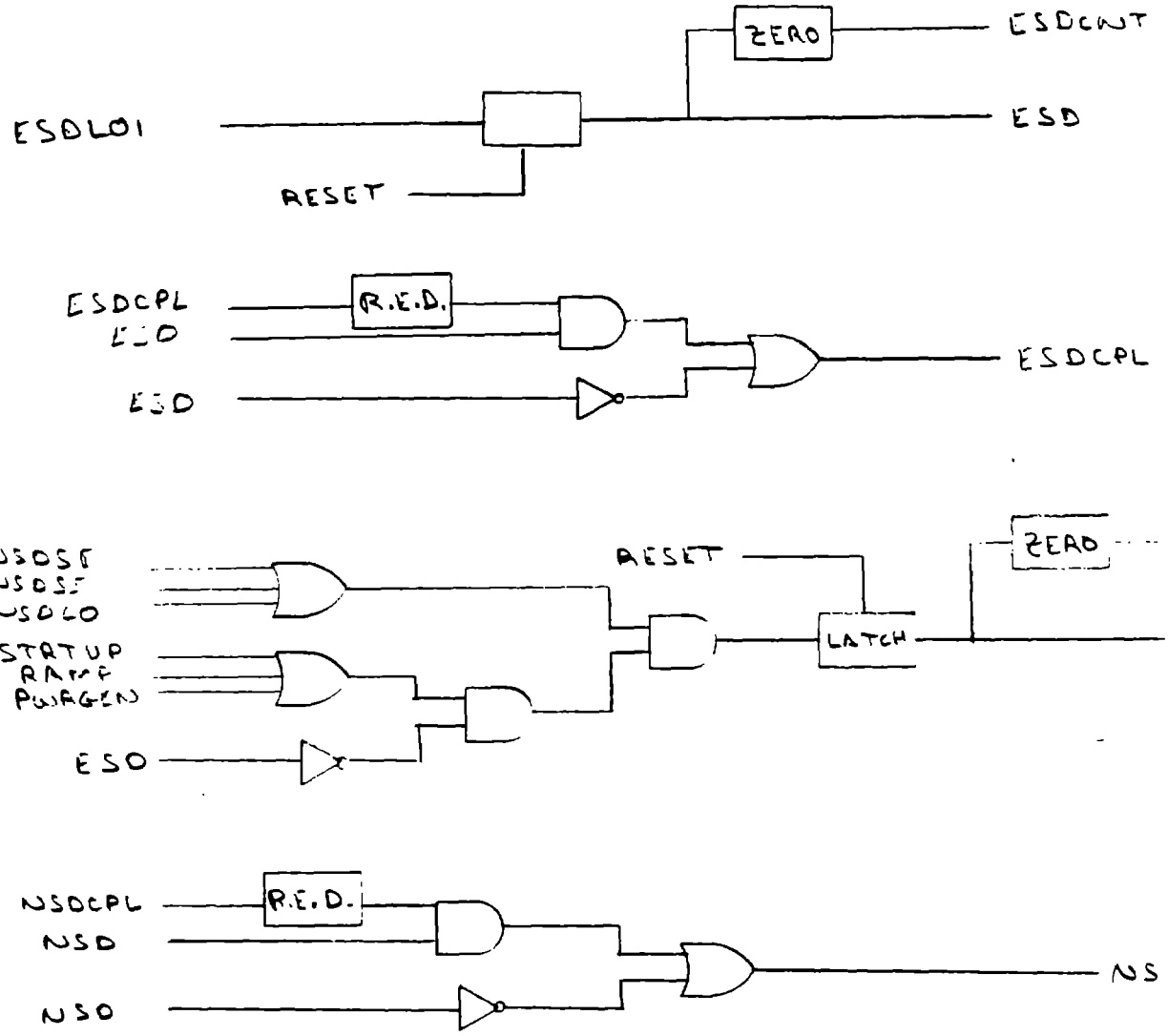


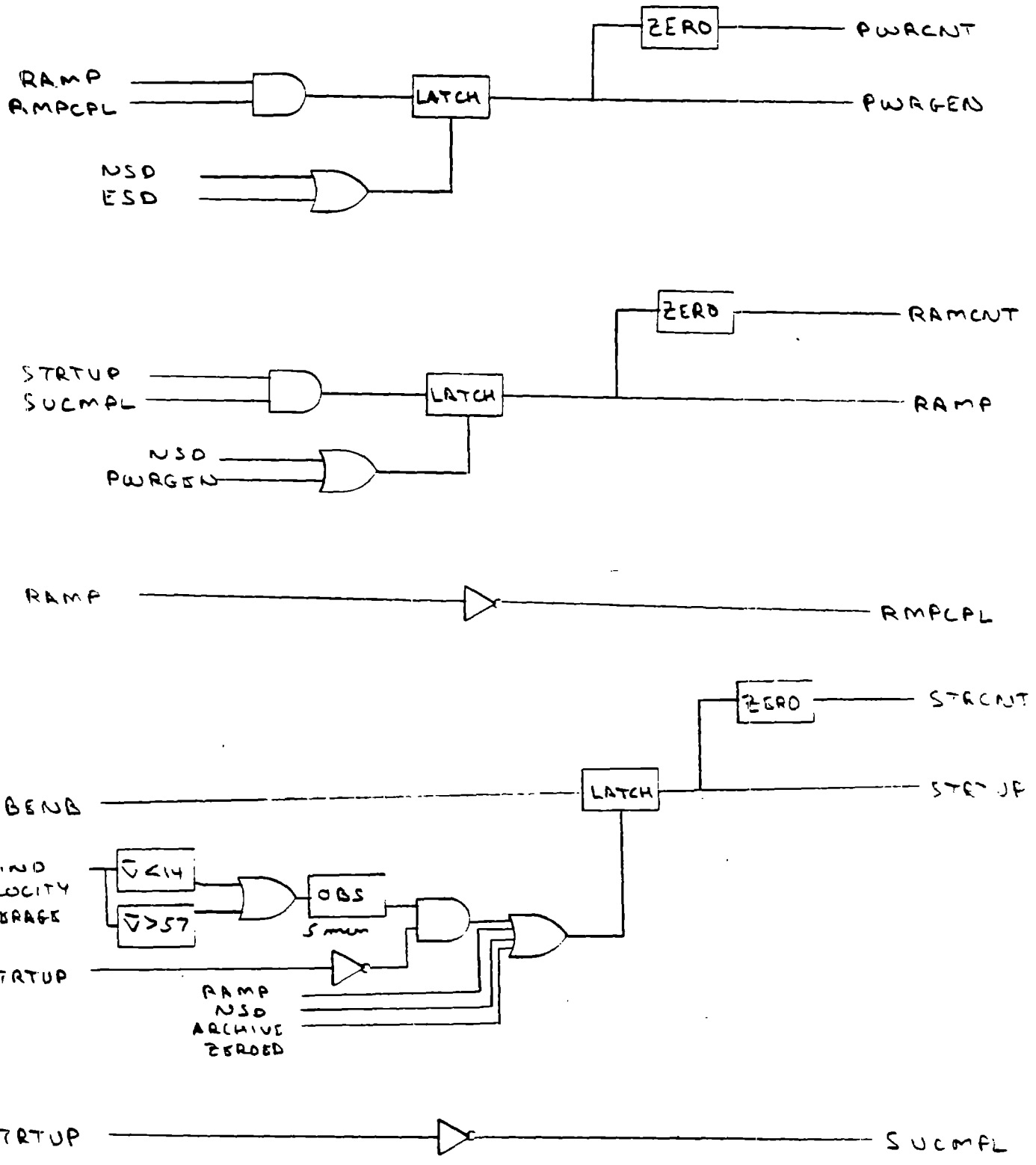

ALRM30
NSOL4
NSOL27
C3.1
S3.1
S3.13
CMD #2
ROTOR BRAKE
R.B. H.S.
D.B. L.S. #2
RAMP
PWRGEN
NSD
OBS
5 sec
NSOL28
S9.17
S9.18
MANUAL
SWITCH
LOCKOUT
SWITCH
LO
NSOL29
C3.2
S3.12
CMD #2
ROTOR BRAKE
R.B. #2
RAMP
PWRGEN
NSD
OBS
5 sec
NSOL30

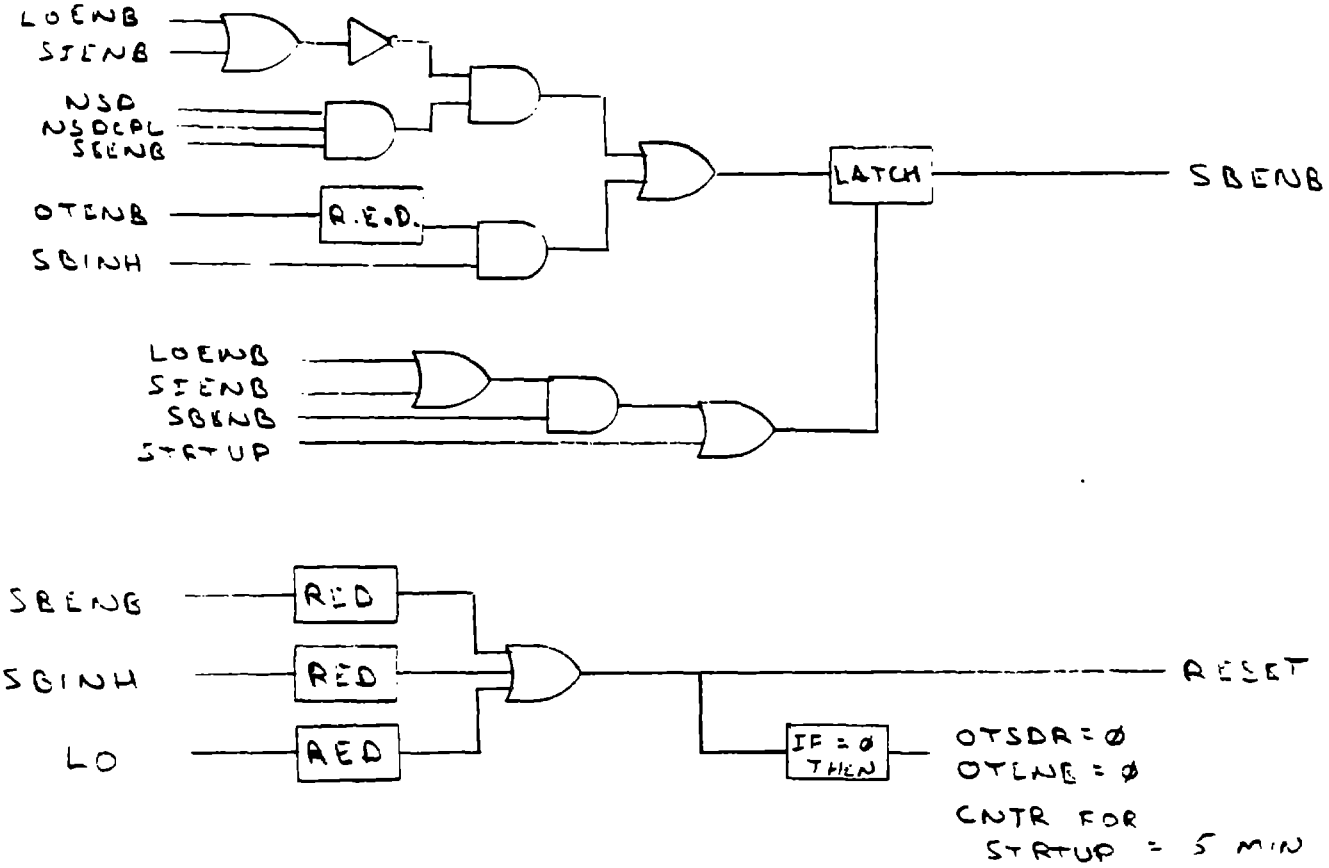

NSDE1
NSDE2
NSDE3
NSDE4
NSDSE
LATCH
SEENB
RESET

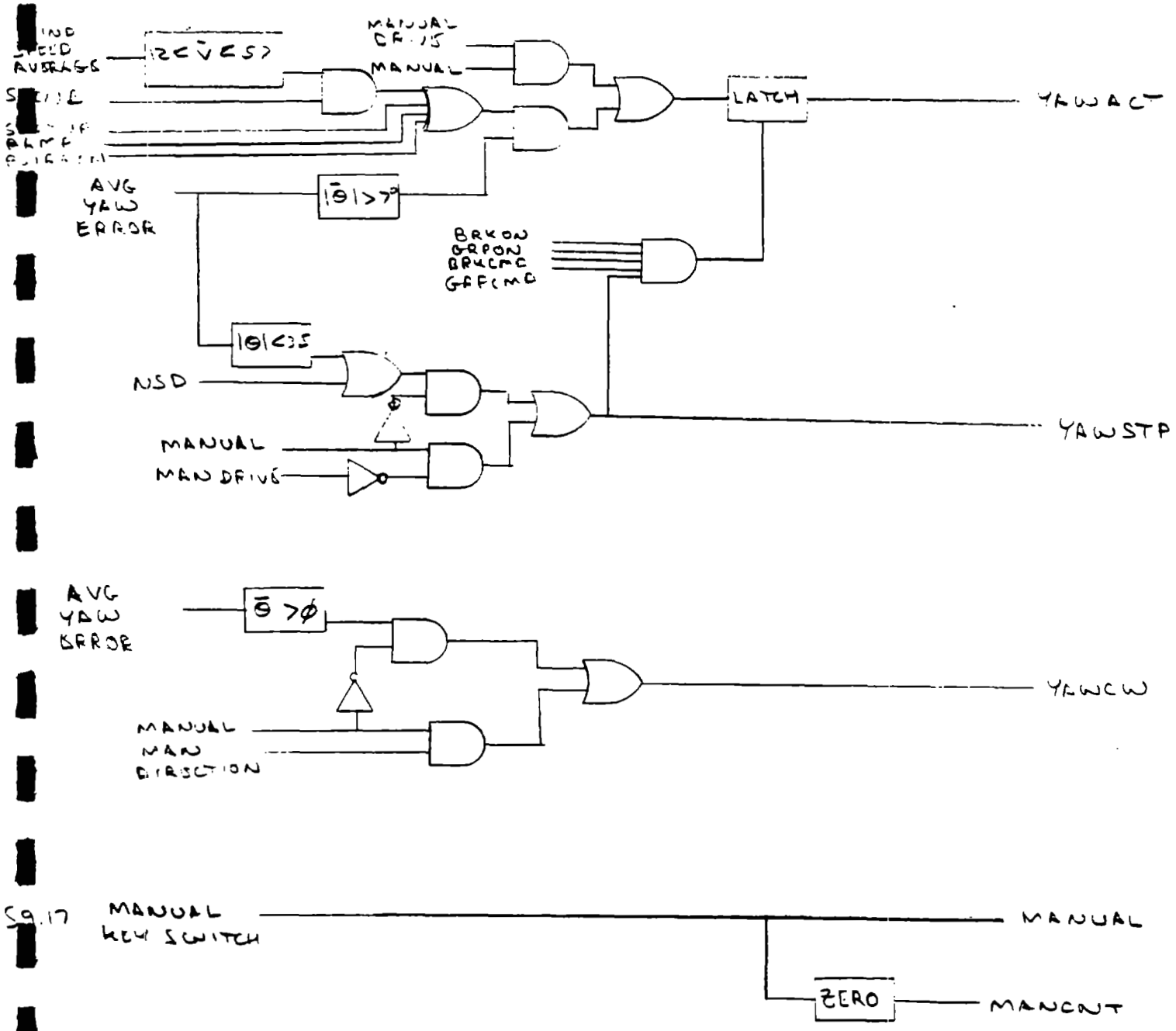

NSDI1
NSDI2
NSDI6
NSDI7
NSDSI
LATCH
SIENB
RESET

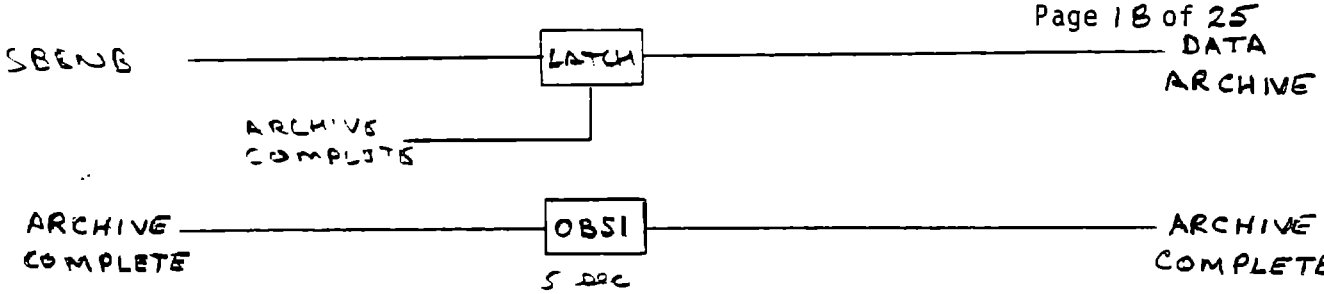

NSDL01
NSDL10
NSDL30
NSDLO
ESDL01
LATCH
LOENB
RESET

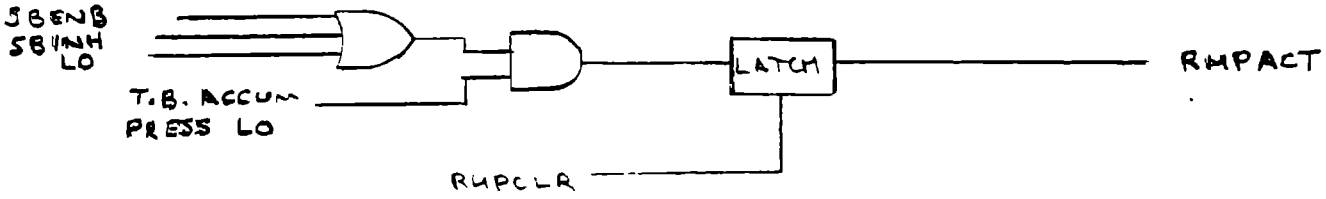


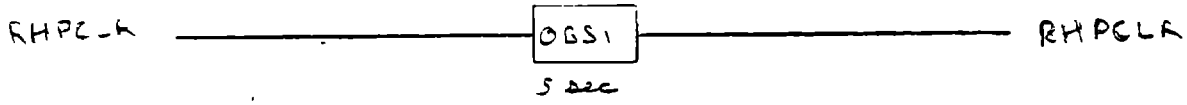

ZERO
PWRCNT
RAMP
RMPCPL
LATCH
PWRGEN
NSD
ESD
ZERO
RAMCNT
STRTUP
SUCMPL
LATCH
RAMP
NSD
PWRGEN
RAMP
RMPCPL
ZERO
STRCNT
SBENB
LATCH
STRTUP
WIND
VELOCITY
AVERAGE
V<14
V>57
OBS
5 min
STRTUP
RAMP
NSD
ARCHIVE
ZEROED
STRTUP
SUCMPL


LOENB
SIENB
NSD
NSDCPL
SBENB
OTENB
SBINH
R.E.D.
LATCH
SBENB
LOENB
SIENB
SBENB
STRTUP
SBENB
SBINH
LO
RED
RED
RED
RESET
IF = Ø
THEN
OTSDR = Ø
OTLNE = Ø
CNTR FOR
STRTUP = 5 MIN

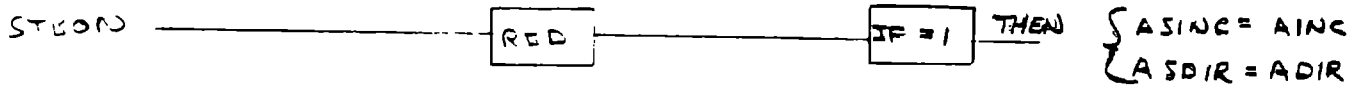



SBENB
LATCH
DATA ARCHIVE
ARCHIVE COMPLETE
ARCHIVE COMPLETE
OBS1
5 sec
ARCHIVE COMPLETE


SBENB
SBINH LO
T.B. ACCUM PRESS LO
LATCH
RHPACT
RHPCLR


RHPCLR
OBS1
5 sec
RHPCLR

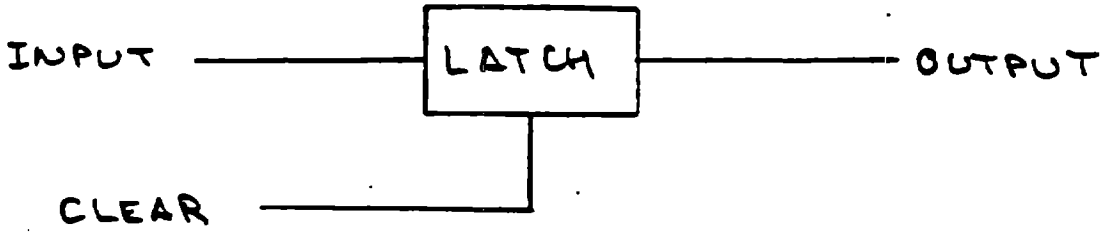

RSMON
RED
IF =1
THEN
ARINC = AINC
ARDIR = ADIR


STSON
RED
IF =1
THEN
ASINC = AINC
ASDIR = ADIR

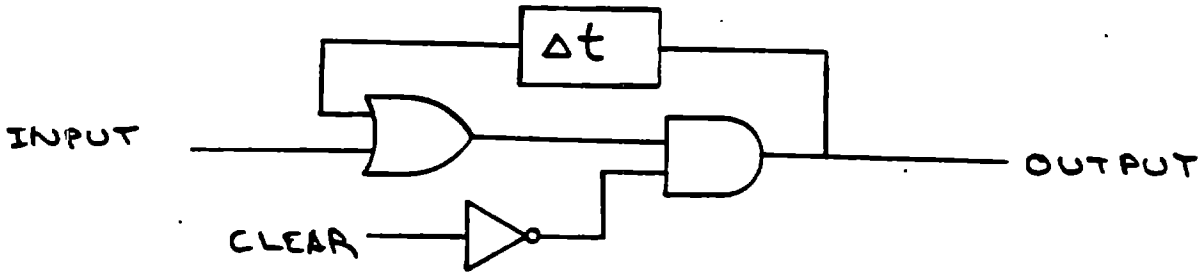

CDSON
RED
IF =1
THEN
ACINC = AINC
ACDIR = ADIR

LATCH

SYMBOL



LOGIC

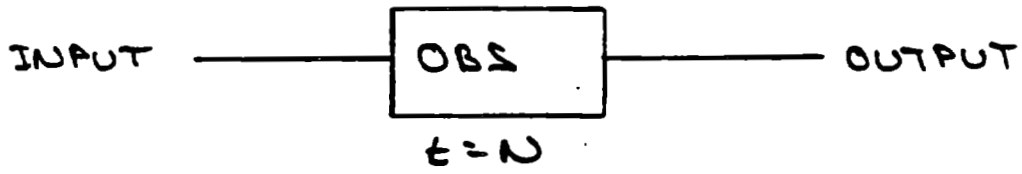


CODE

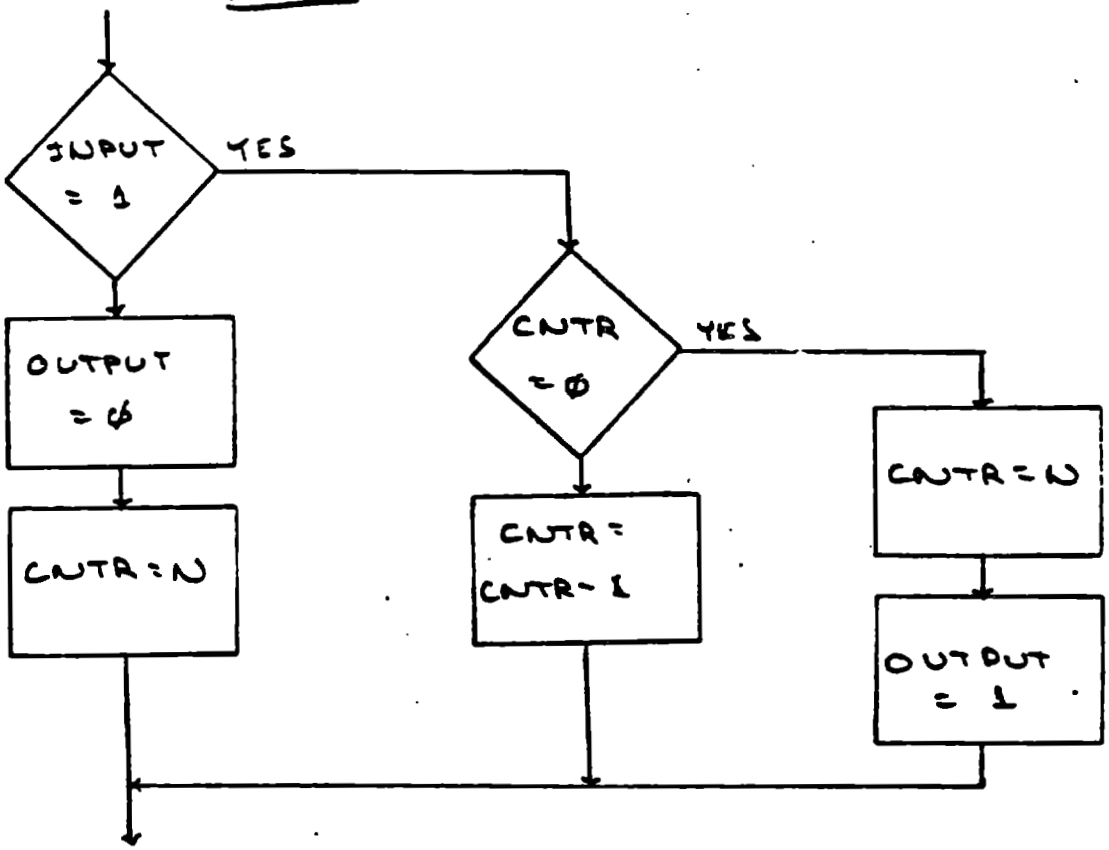
```
LOAD    INPUT
IOR     OUTPUT
CAND    CLR
STO     OUTPUT
```

OBSERVER

SYMBOL



FLOW



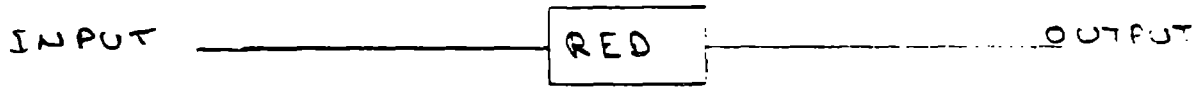
OBSERVER

CODE

```
     LOAD    INPUT
     ORA
     UFZ     X
     LOAD    2
     STOD    CNTR
     LA      0
     JMP     Y
X    LOAD    CNTR
     DCX     1
     STOD    CNTR
     JTZ     Z
     LA      1
     LOAD    2
     STOD    CNTR
Y    STO     OUTPUT

Z    NOP
```

RISING EDGE DETECTOR

SYMBOL

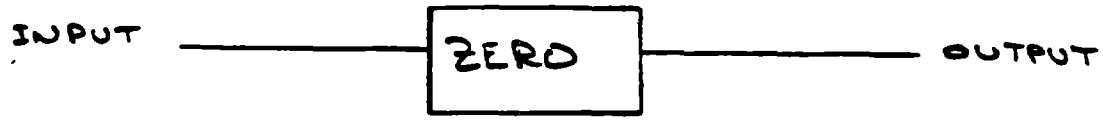


CODE

```
LOAD   INPUT
XOR    OLD INPUT
AND    INPUT
CAND   OUTPUT
STO    OUTPUT

LOAD   INPUT
STO    OLD INPUT
```

ZERO

SYMBOL

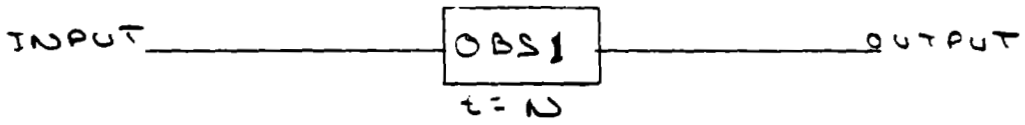


CODE

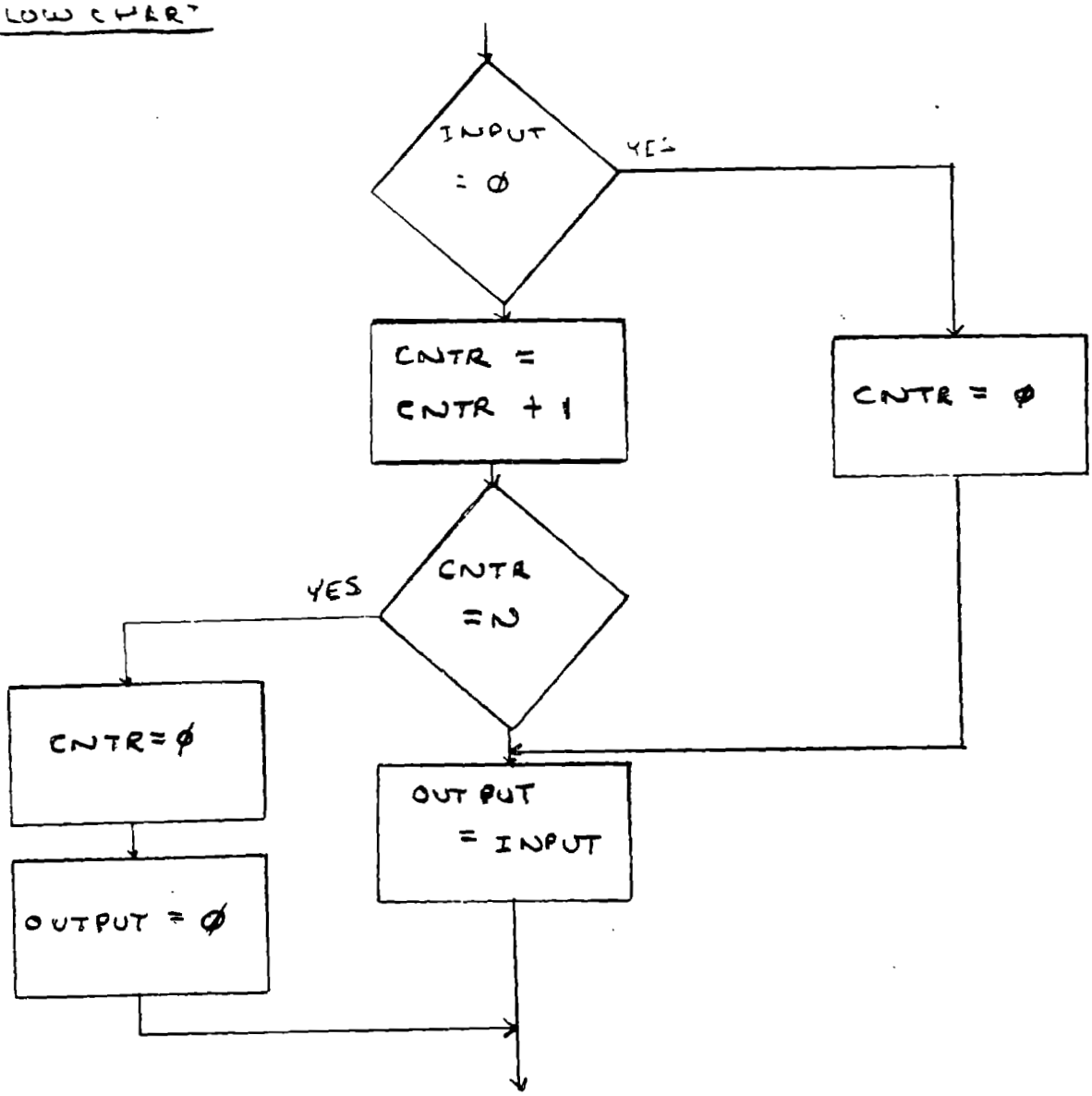
```
      LOAD   INPUT
      ORA
      JFZ    X
      LOAD   Ø
      STO    OUTPUT
X
```

OBSERVER #1

SYMBOL



FLOW CHART



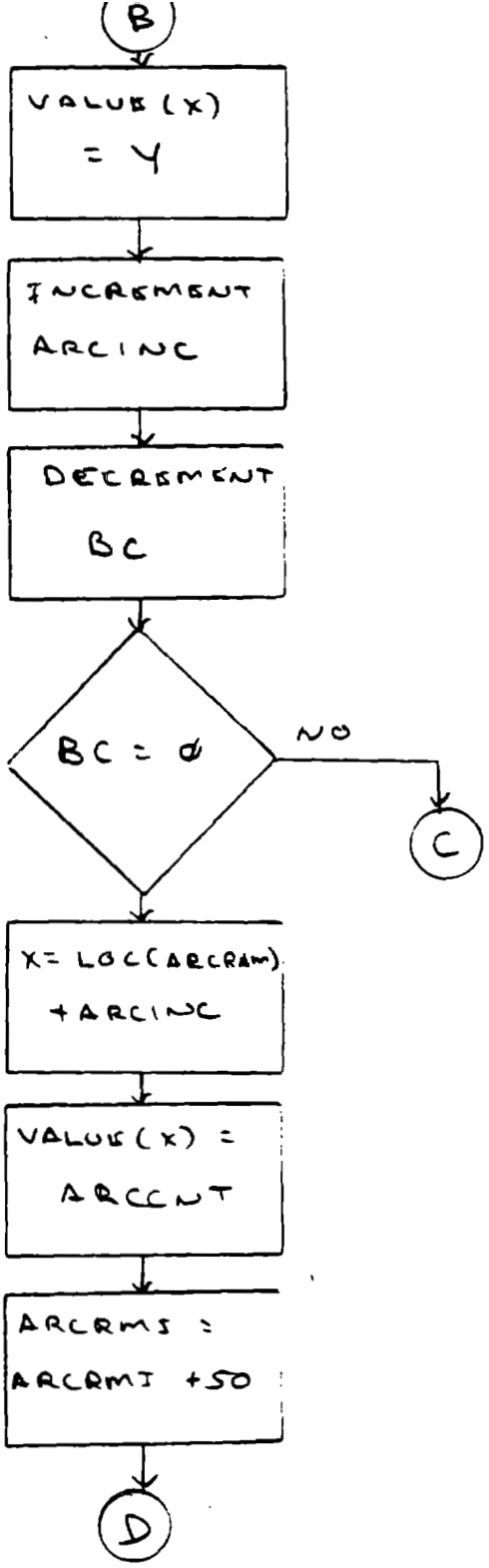
OBSERVER #1

CODE

```
        LOAD    INPUT
        ORA
        JFZ     X
        LOAD    ϕ
        STO     CNTR
        LOAD    INPUT
        STO     OUTPUT
        JMP     Y
X       LOAD    CNTR
        INA
        STO     CNTR
        COMP    2
        JFZ     Y
        LOAD    ϕ
        STO     OUTPUT
        STO     CNTR
Y       NOP
```

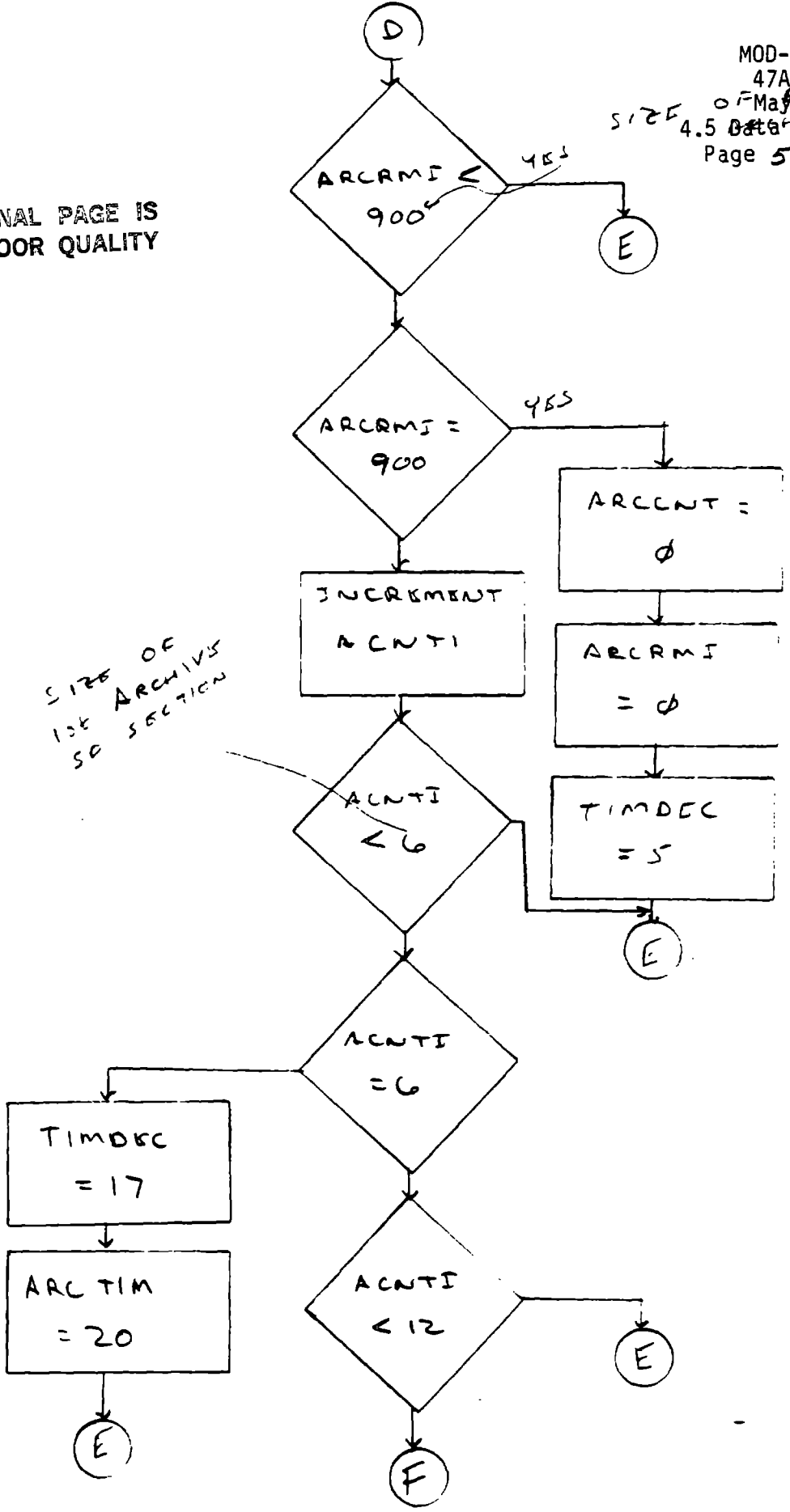
Data Archiving Segment Table

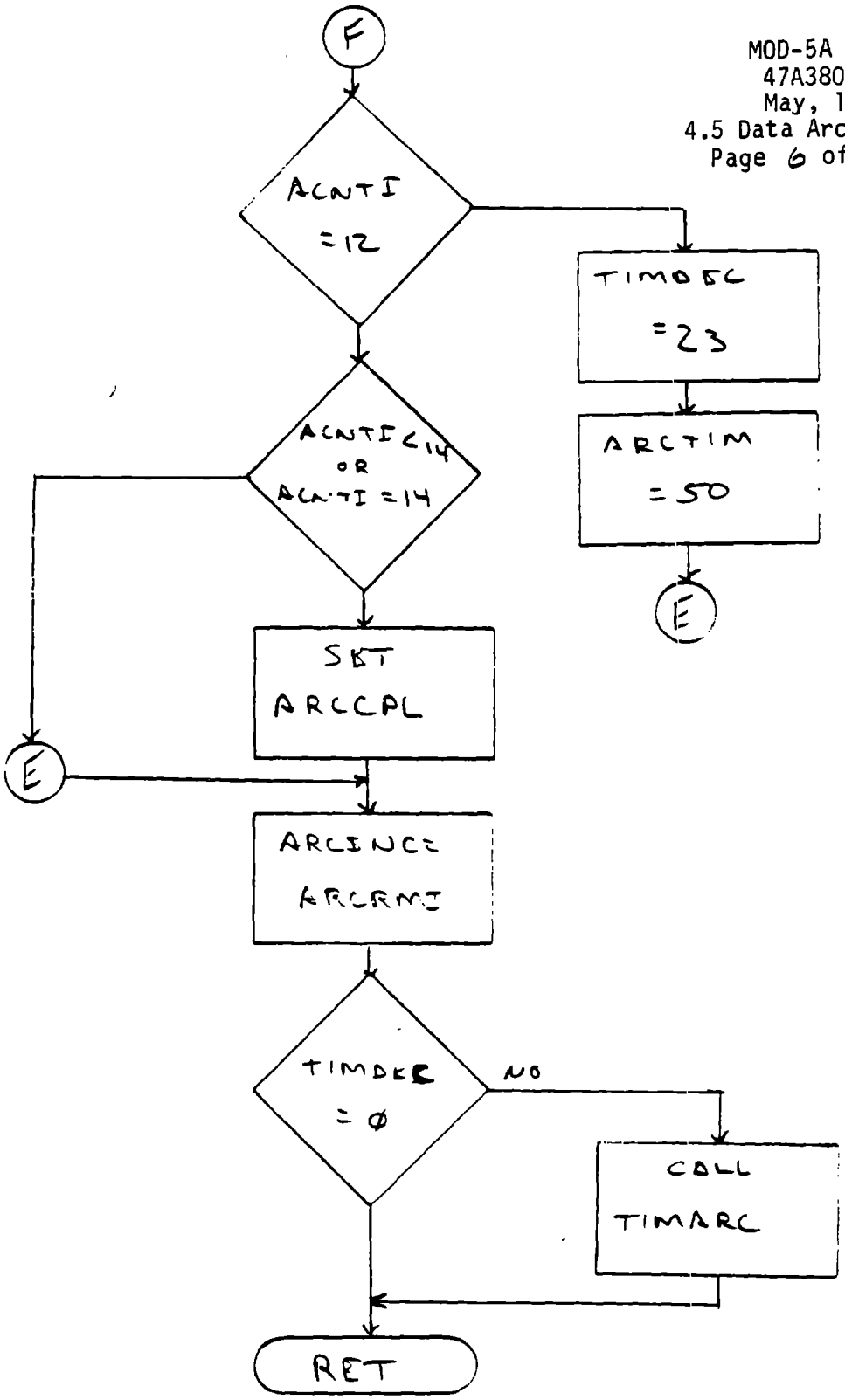
```
DAST    DC    ARCH1          DATA ARCHIVE
        DC    ARCH2          DATA ARCHIVE RAM SET TO ZERO
        DC    ARCH3          RESET INITIAL CONDITIONS
```



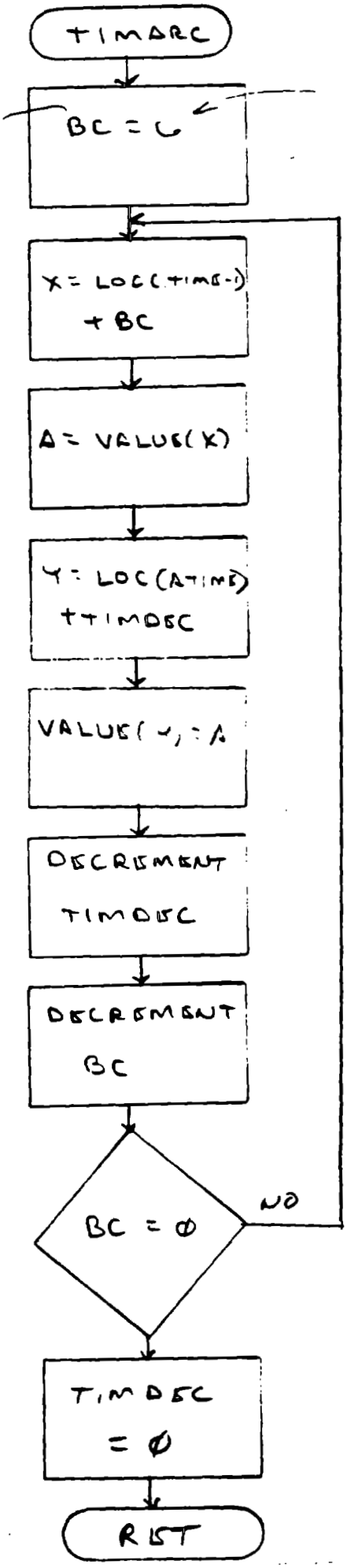
PRECEDING PAGE BLANK NOT FILMED

51, 52

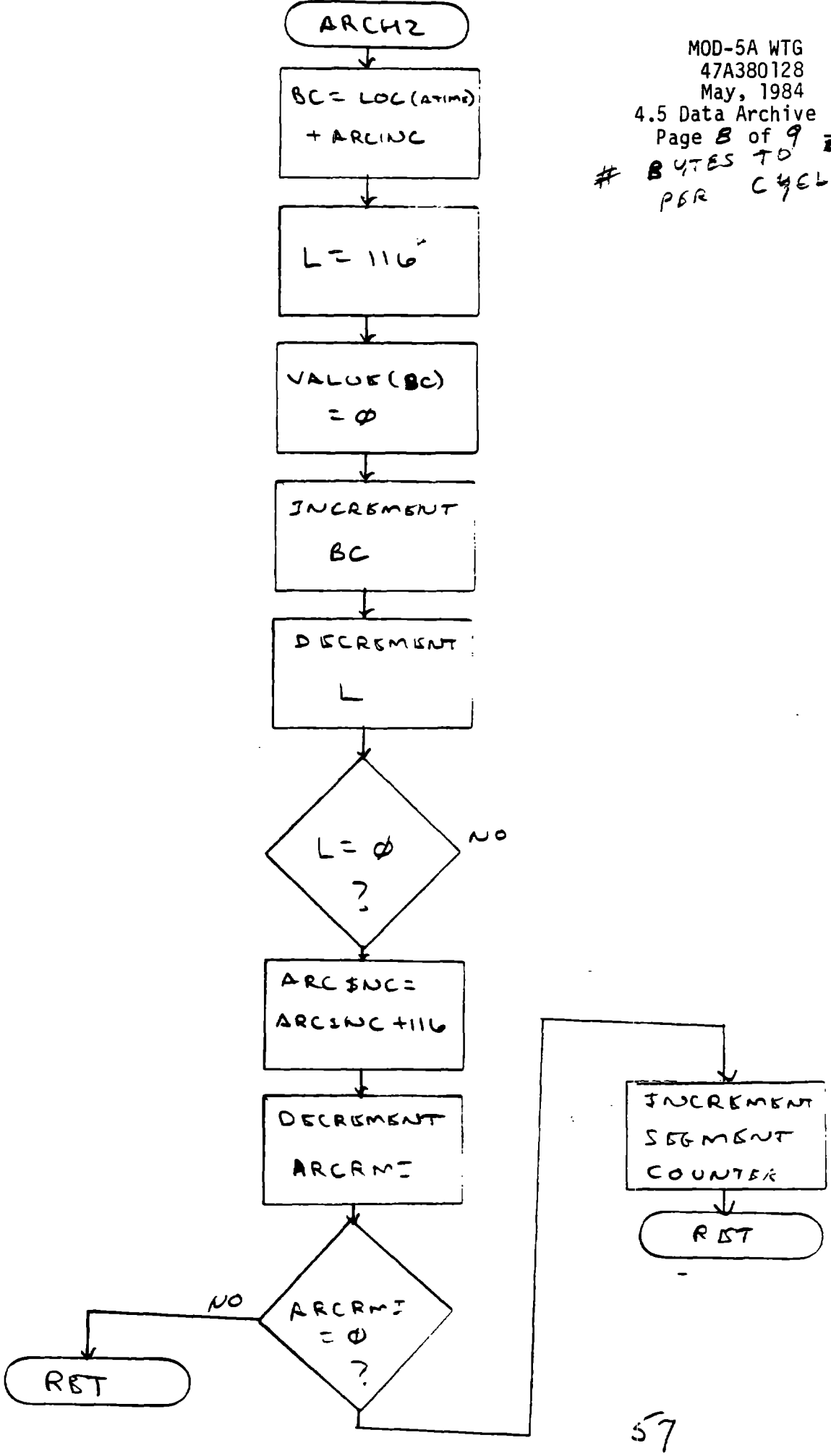


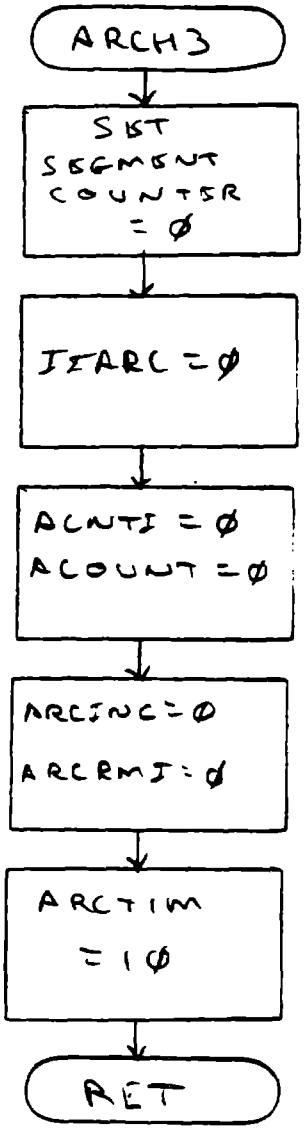

F
ACNTI =12
TIMOBC =23
ARCTIM =50
E
ACNTI<14 OR ACNTI =14
SET ARCCPL
E
ARCINCR ARCRMI
TIMDER =0
NO
CALL TIMARC
RET

TIMS IN
(HR-MIN-1/10SEC.
1/6 SEC)



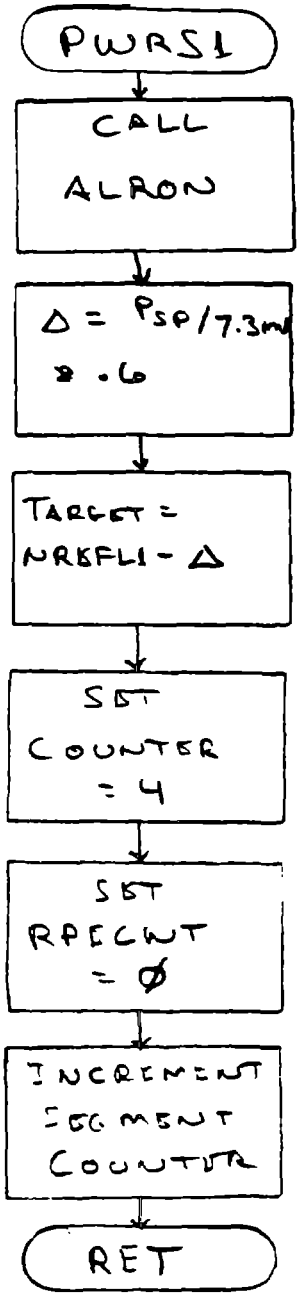
BYTES TO REC PER CYCLE

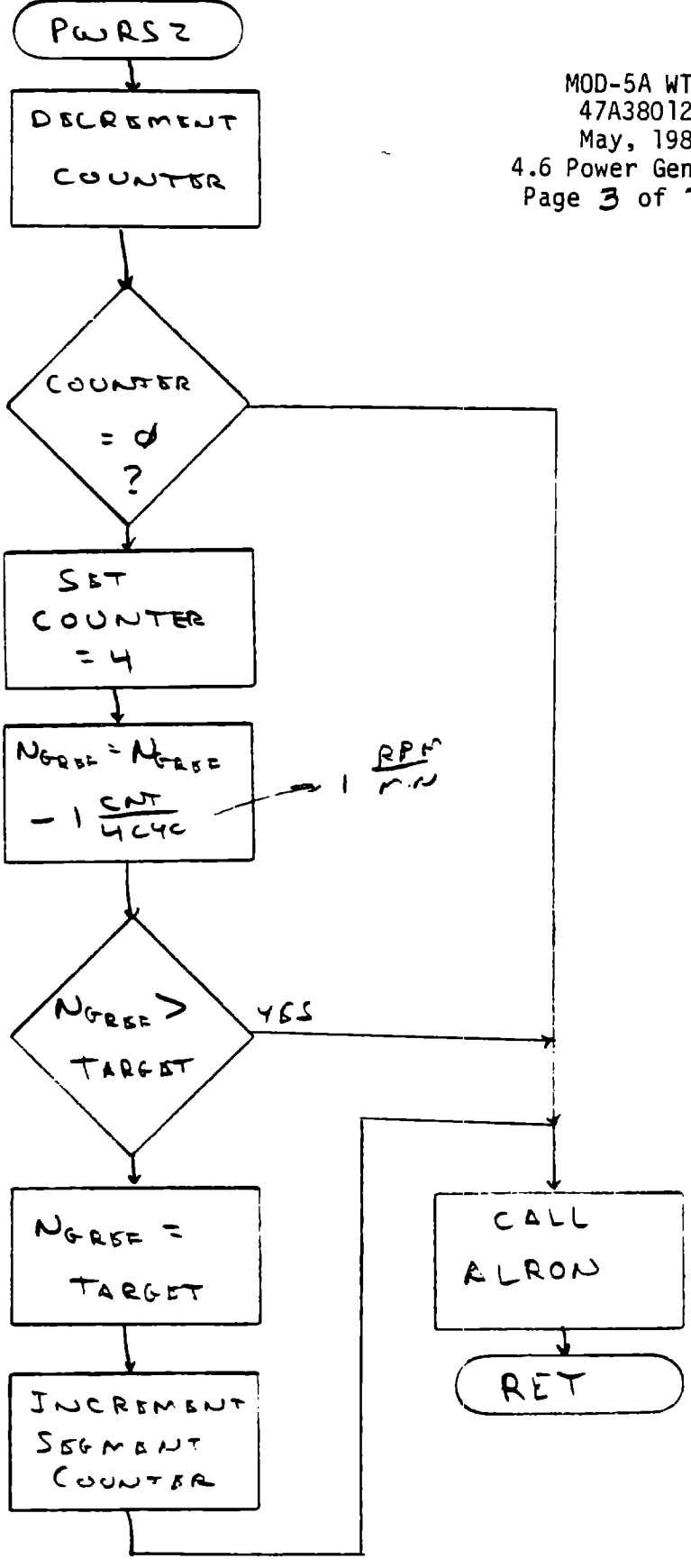


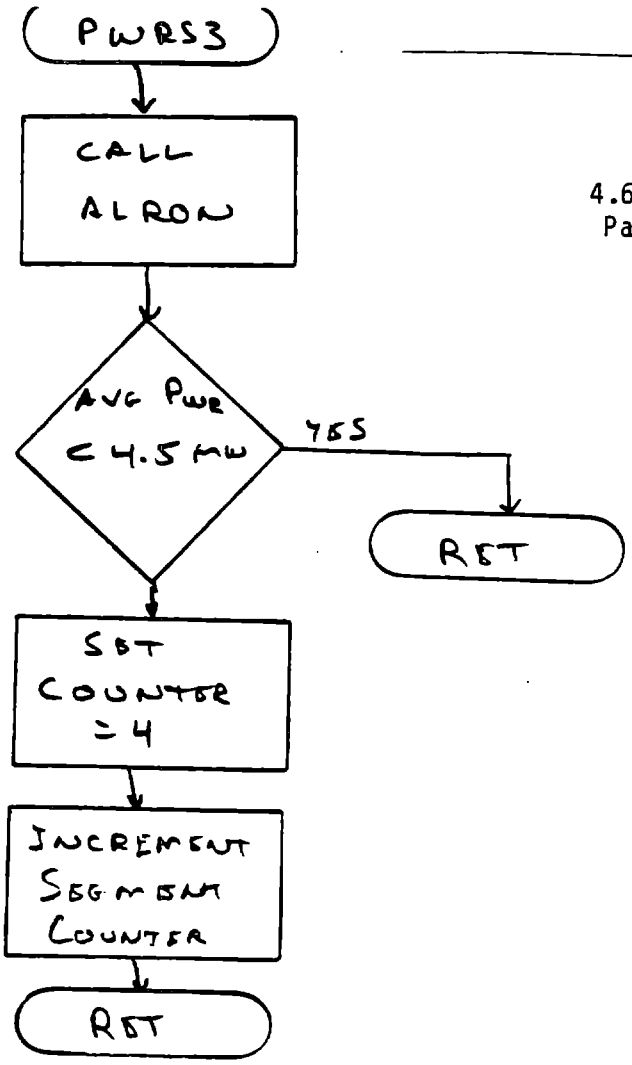

ARCH3
SET SEGMENT COUNTER = 0
IIARC = 0
ACNTI = 0
ACOUNT = 0
ARCINC = 0
ARCRMI = 0
ARCTIM = 10
RET

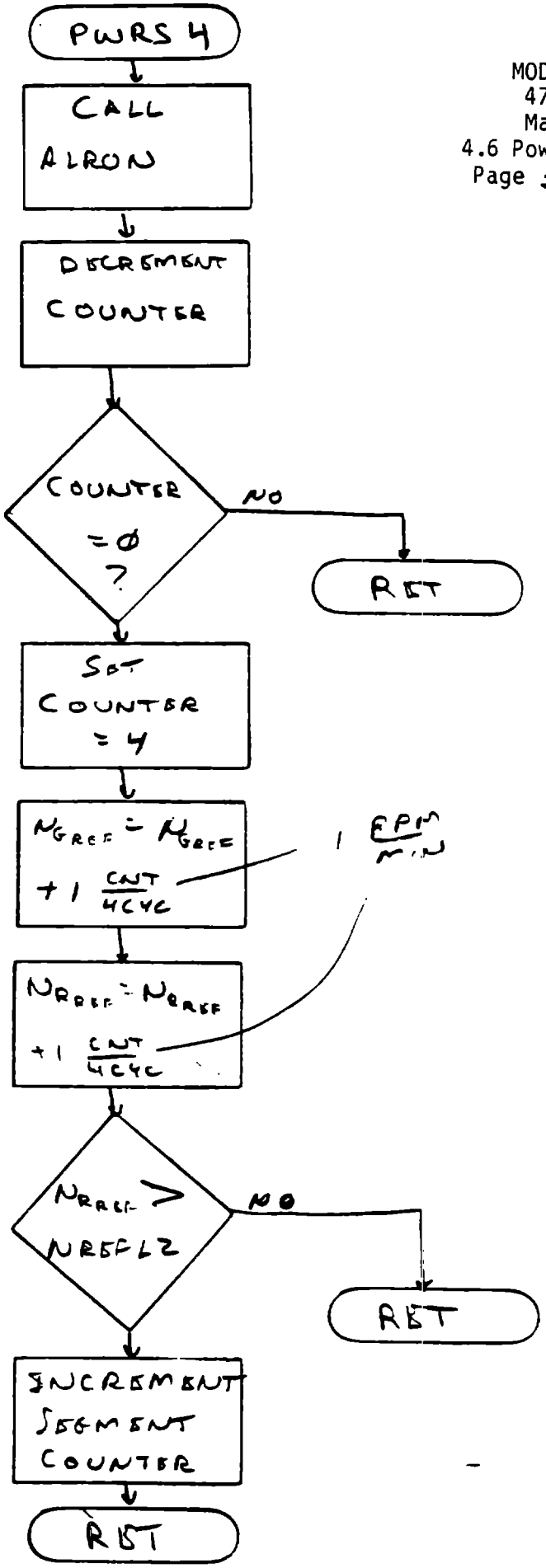
Power Generation Segment Table

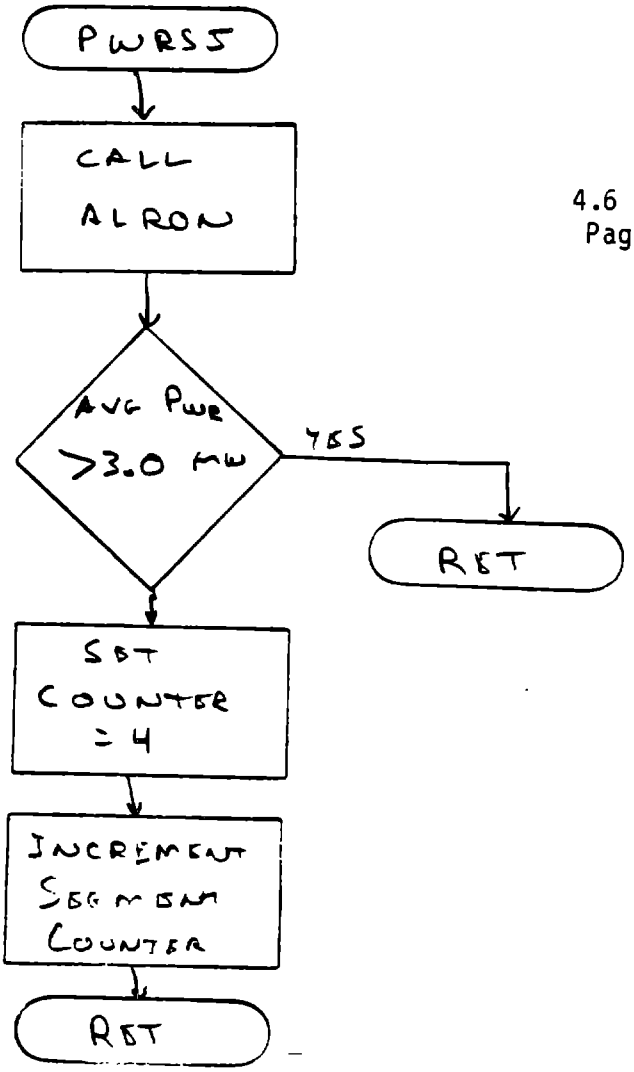
```
PWRST   DC    PWRS1      SET NG REF TARGET AND ZERO RPECNT
        DC    PWRS2      DECREASE NG REF TO TARGET
        DC    PWRS3      LOW SPEED OPERATION
        DC    PWRS4      RAMP UP TO HIGH SPEED OPERATION
        DC    PWRS5      HIGH SPEED OPERATION
        DC    PWRS6      RAMP DOWN TO LOW SPEED OPERATION
```

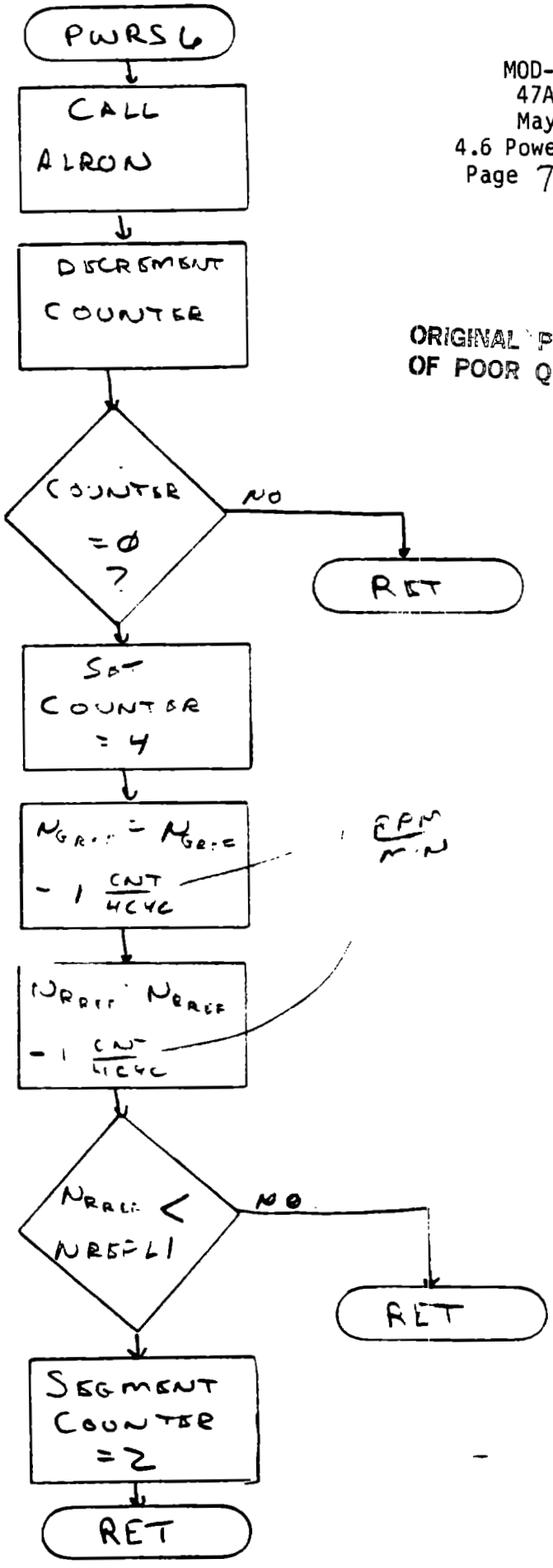

PWRS1
CALL ALRON
Δ = PSP/7.3MW
* .6
TARGET = NREFLI - Δ
SET COUNTER = 4
SET RPECNT = Ø
INCREMENT SEGMENT COUNTER
RET


PWRSZ
DECREMENT COUNTER
COUNTER = 0 ?
SET COUNTER = 4
NGREF = NGREF - 1 CNT/4C4C
1 RPM/MIN
NGREF > TARGET
YES
NGREF = TARGET
INCREMENT SEGMENT COUNTER
CALL ALRON
RET


PWRS3
CALL
ALRON
AVG PWR
< 4.5 MW
YES
RET
SET
COUNTER
= 4
INCREMENT
SEGMENT
COUNTER
RET


PWRS 4
CALL ALRON
DECREMENT COUNTER
COUNTER = Ø ?
NO
RET
SET COUNTER = 4
$N_{GREF} = N_{GREF} + 1 \frac{CNT}{4CYC}$
1 EPM / MIN
$N_{REF} = N_{REF} + 1 \frac{CNT}{4CYC}$
$N_{REF} >$ NREFL2
NO
RET
INCREMENT SEGMENT COUNTER
RET


PWRSS
CALL
ALRON
AVG PWR
>3.0 MW
YES
RET
SET
COUNTER
= 4
INCREMENT
SEGMENT
COUNTER
RET



Manual Control Segment Table

```
MANST   DC      MANC1           CHECK MANUAL SWITCH
        DC      MANC2           CODE FROM COMMUNICATIONS
        DC      MANC3           ROTOR HYDRAULIC PUMP
        DC      MANC4           YAW PUMP
        DC      MANC5           LUBE PUMP
        DC      MANC6           SHAFT BRAKE
        DC      MANC8           HIGH PRESSURE TEETER BRAKE
        DC      MANC9           YAW BRAKES
        DC      MANC10          LATCH TIP #1
        DC      MANC11          LATCH TIP #2
        DC      MANC12          TIP #1 BETA CMD
        DC      MANC13          TIP #2 BETA CMD
        DC      MANC14          TURNING GEAR
        DC      MANC17          ENABLE FSE RESET
        DC      MANC18          SET TIMF FOR YAW TO BE ENABLED
        DC      MCSS8           DATA DUMP
        DC      MANC15          CMD INVALID PRINT
        DC      MANC19          TIP #1 ANGLE CHANGE SEGMENT
        DC      MANC20          TIP #2 ANGLE CHANGE SEGMENT
        DC      MANC21          FSE RESET OFF
        DC      MCSS16          DUMP ARCHIVE ONGOING HEADING
        DC      MCSS18          DUMP ARCHIVE ONGOING NUMBERS
        DC      MCSS19          DUMP ARCHIVE 1/1 SEC HEADING
        DC      MCSS20          DUMP ARCHIVE 1/1 SEC NUMBERS
        DC      MCSS21          DUMP ARCHIVE 1/2 SEC HEADING
        DC      MCSS22          DUMP ARCHIVE 1/2 SEC NUMBERS
        DC      MCSS23          DUMP ARCHIVE 1/5 SEC HEADING
        DC      MCSS24          DUMP ARCHIVE 1/5 SEC NUMBERS
```

MANUAL CONTROL

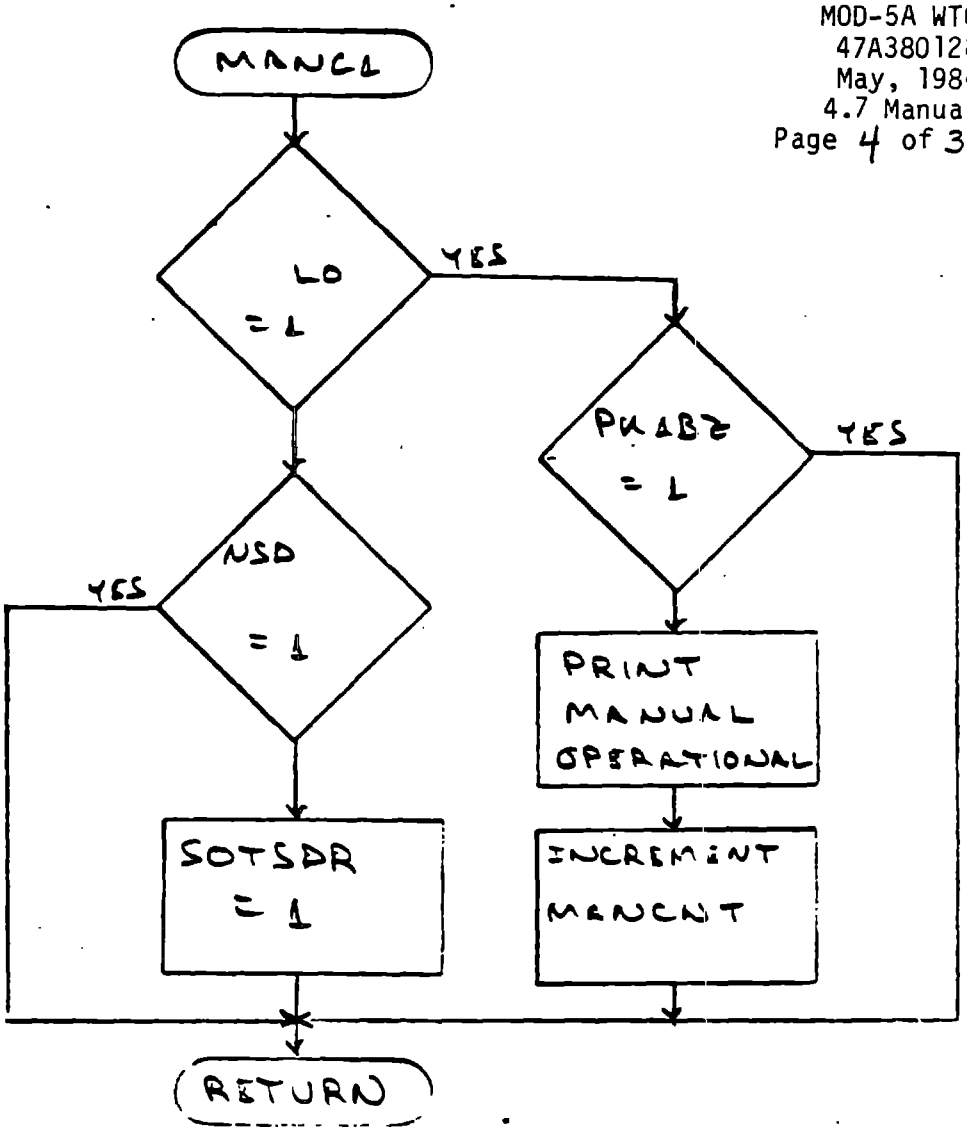
DESCRIPTION		MESSAGE			
① ROTOR HYDRAULIC PUMP	OFF	A	Ø	CR
	ON	A	1	CR
② YAW PUMP	OFF	B	Ø	CR
	ON	B	1	CR
③ LUBE PUMP	OFF	C	Ø	CR
	ON	C	1	CR
④ SHAFT BRAKE	OFF	D	1	CR
	ON	D	2	CR
⑤ TEMP BRAKE HIGH FORCE	OFF	E	Ø	CR
	ON	E	1	CR
⑥ YAW BRAKES	OFF	F	Ø	CR
	ON	F	1	CR
⑦ DE-ENERGIZE FEATHER VALVE A-1		G	Ø	CR
ENERGIZE		G	1	CR
⑧ DE-ENERGIZE FEATHER VALVE A-2		H	Ø	CR
ENERGIZE		H	1	CR
⑨ CMD CONTROL ANGLE #1	[70°]	I	7	Ø	CR
(MOVE TO DEG)	[55°]	I	5	5	CR
⑩ CMD CONTROL ANGLE #2	[70°]	J	7	Ø	CR
(MOVE TO DEG)	[55°]	J	5	5	CR
⑪ TURNING GEAR	OFF	K	Ø	CR
	ON	K	1	CR

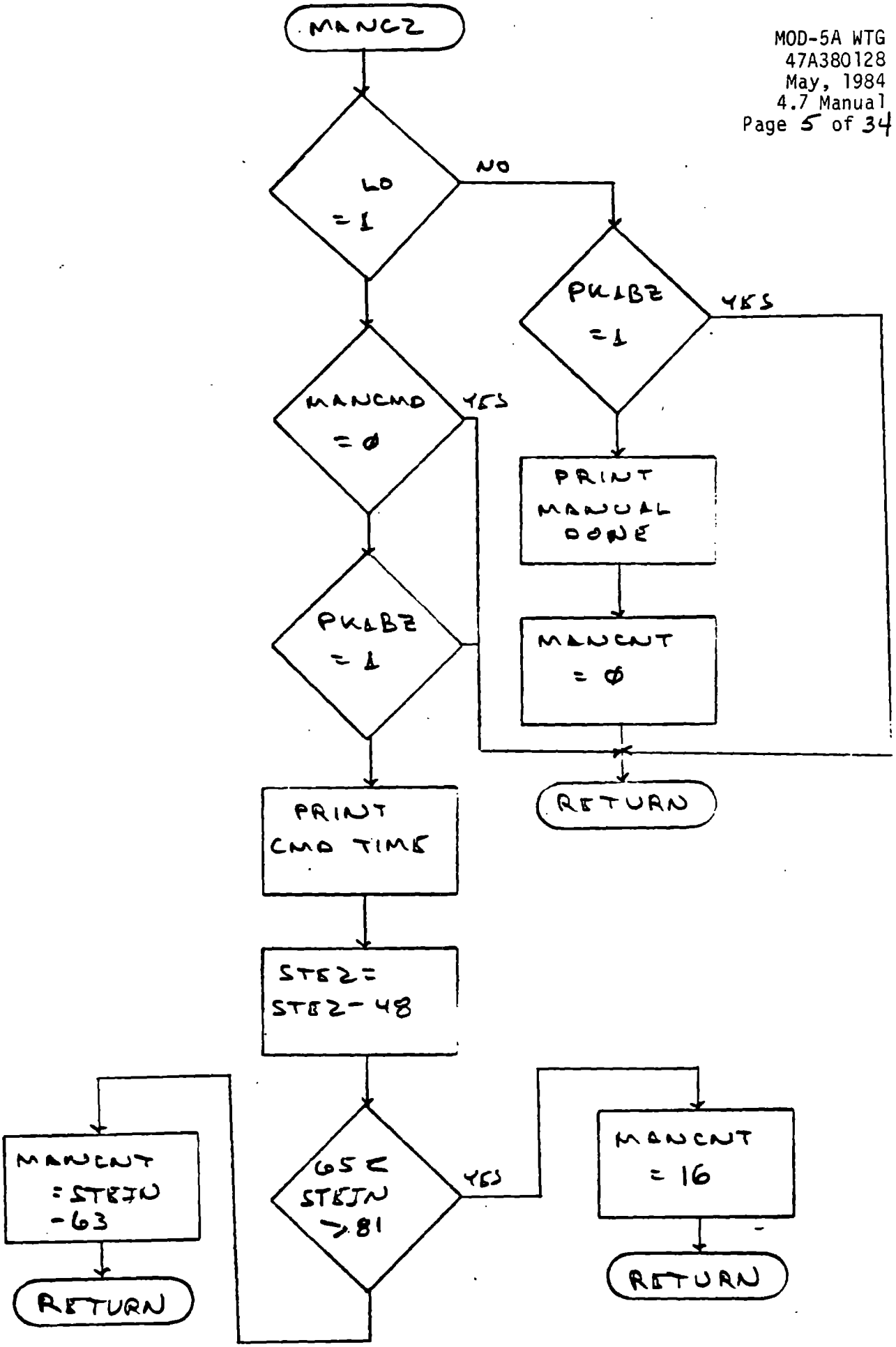
(12) ENERGIZE FAILSAFE ELECTRONICS L 1 (CR)

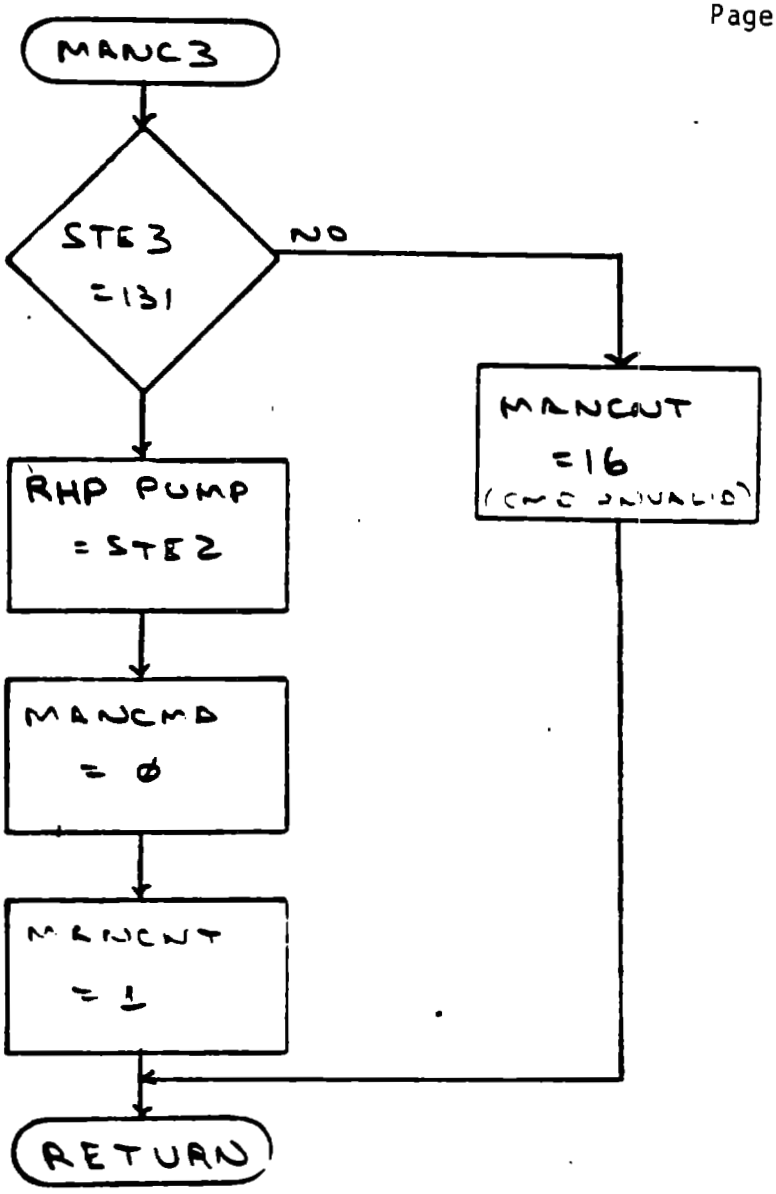
(13) ENERGIZE TAW FOR __ SECONDS (CW 25S) M + 2 5 (CR)
(CCW 80S) M - 8 0 (CR)
80 sec ≈ 10°

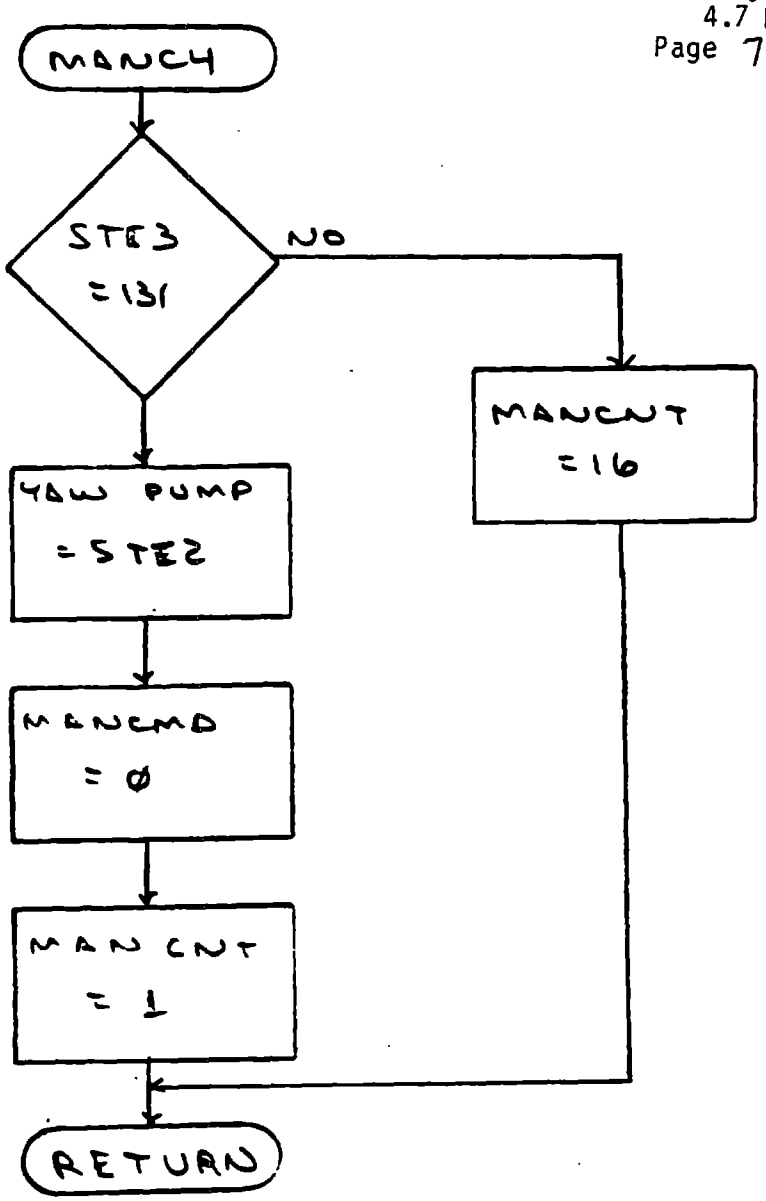
(14) DUMP DATA ARCHIVE
VARIABLE LINE PRINT [every 3rd line] N 0 3 (CR)

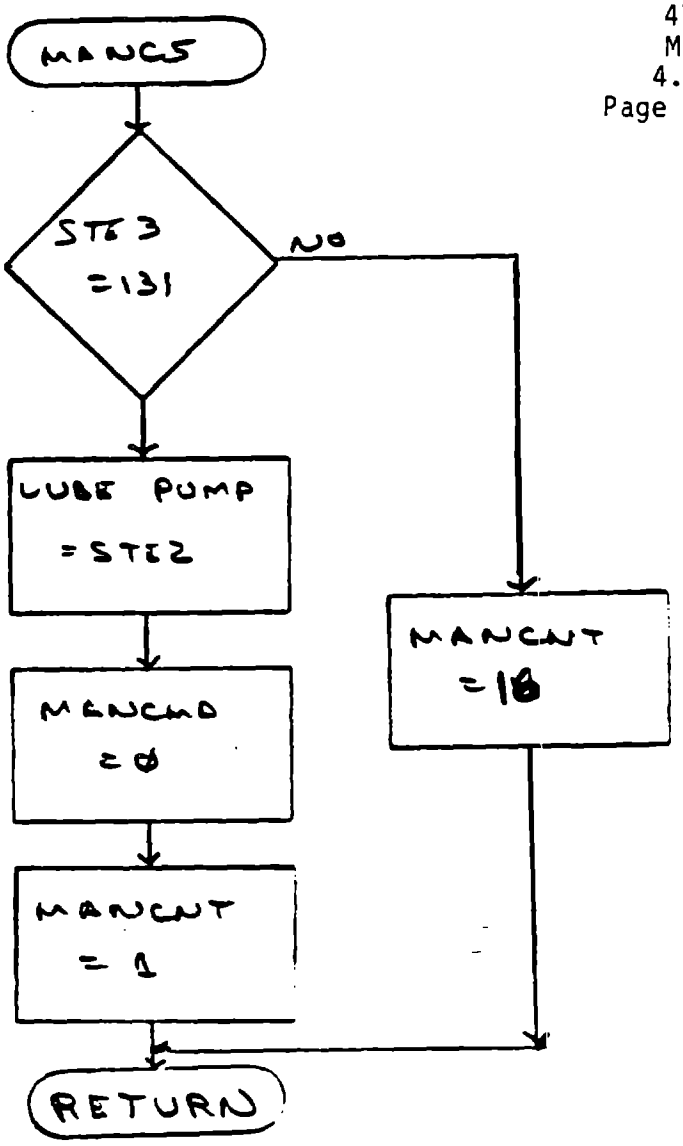
STARTING AT LINE _ [Start at line 12 For 5 lines] 0 0 1 2 5 (E)
FOR _ LINES

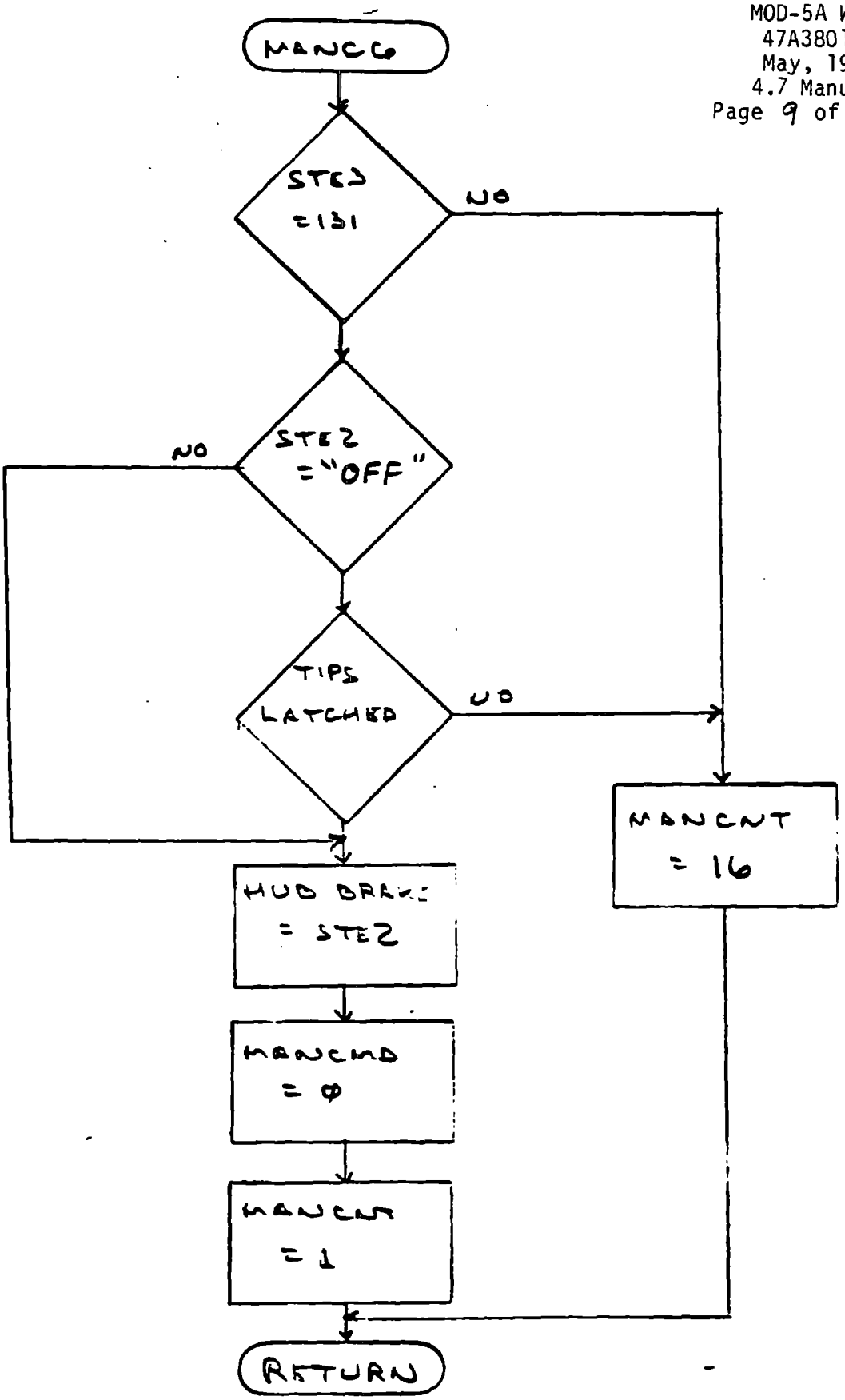

MANCL
LO = L
YES
PHASE = L
YES
NSD = 1
YES
PRINT MANUAL OPERATIONAL
SOTSDR = 1
INCREMENT MANCNT
RETURN

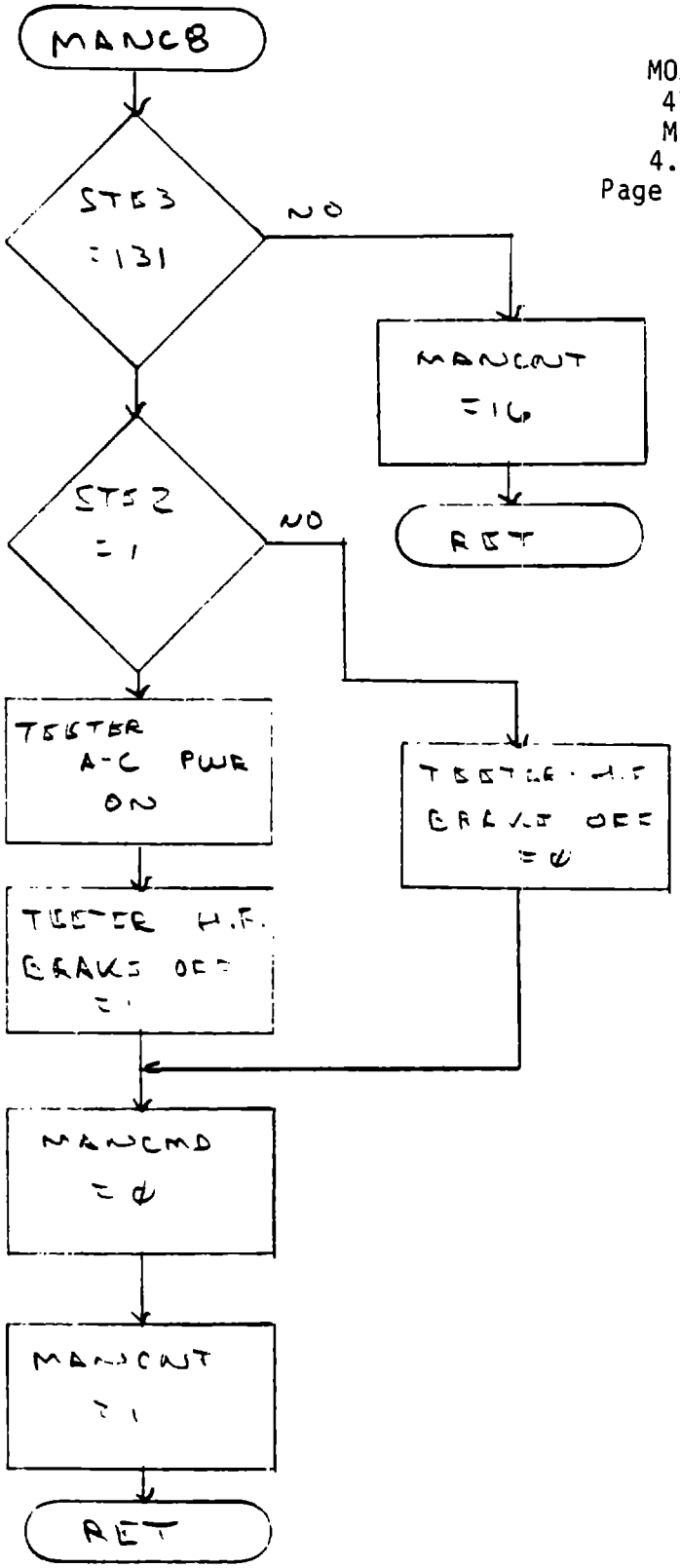

MANC2
LO = 1
NO
PKLBZ = 1
YES
MANCMD = 0
YES
PRINT MANUAL DONE
PKLBZ = 1
MANCNT = 0
RETURN
PRINT CMD TIME
STEZ = STEZ - 48
65 < STEJN > 81
YES
MANCNT = 16
RETURN
MANCNT = STEJN - 63
RETURN

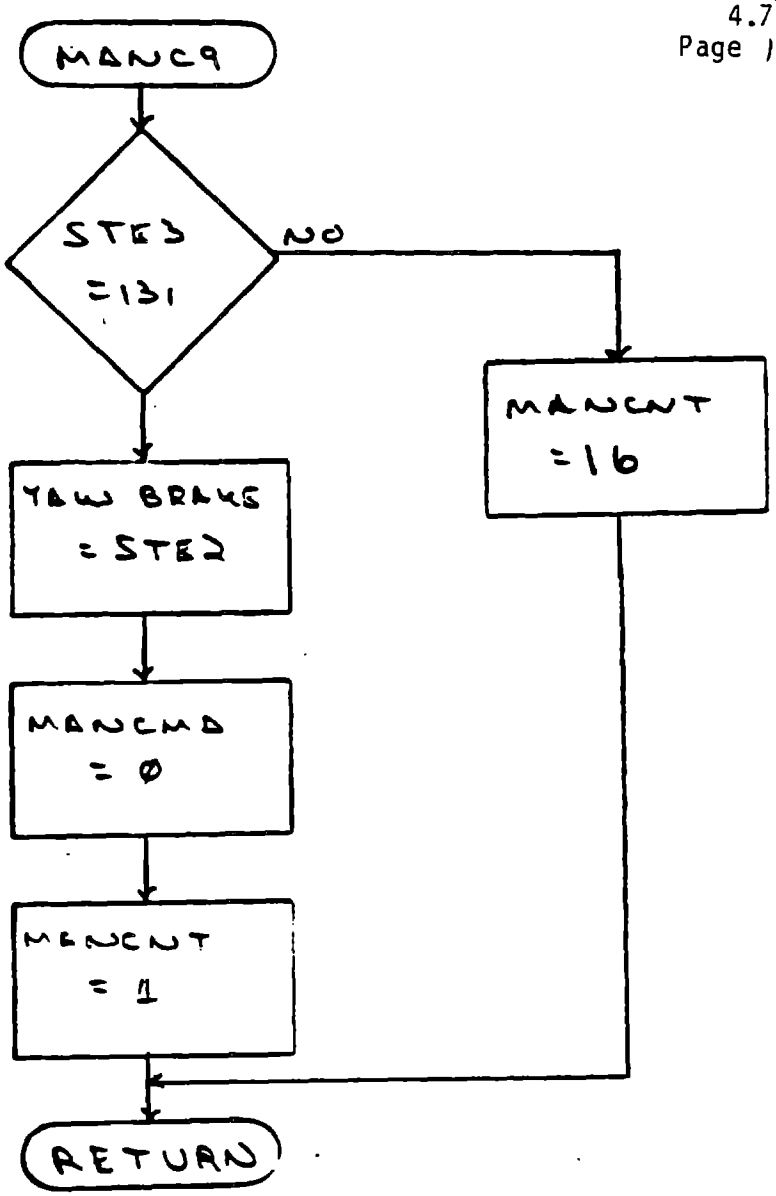

MANC3
STE3
=131
NO
MANCNT
=16
(CMD INVALID)
RHP PUMP
= STE2
MANCMD
= 0
MANCNT
= 1
RETURN

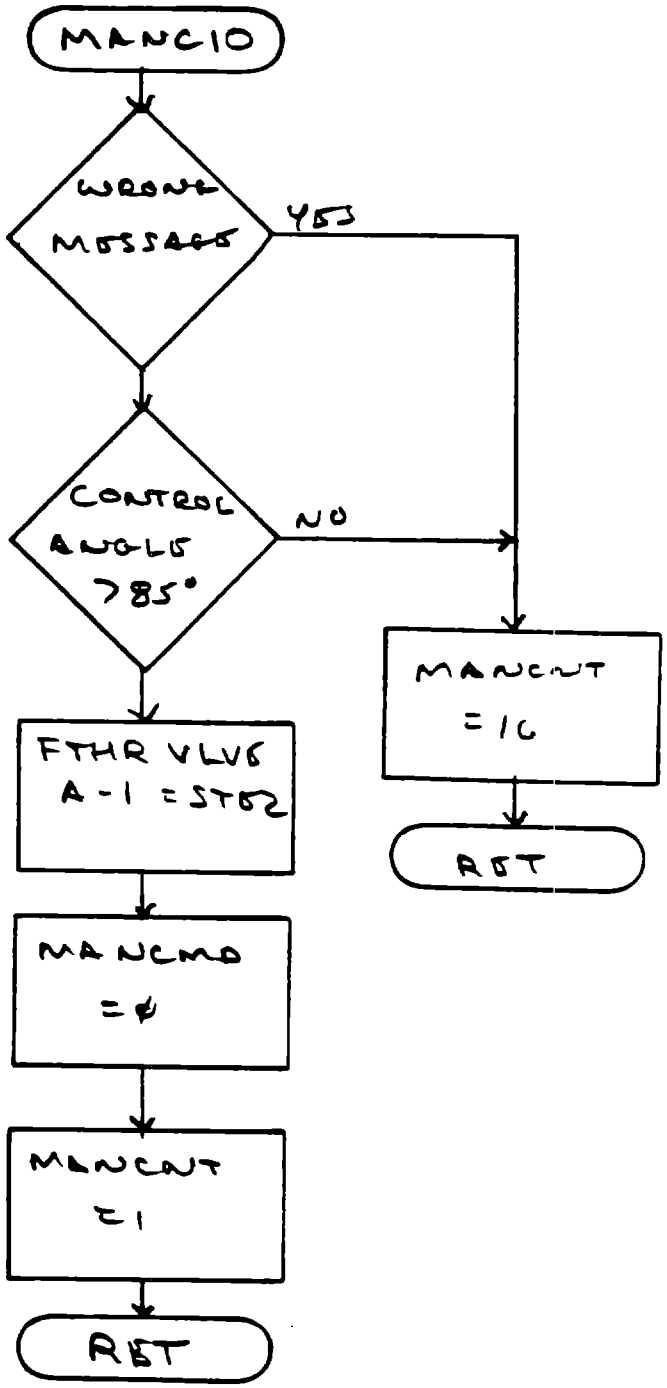

MANCH
STE3
=131
NO
MANCNT
=16
YAW PUMP
=STE2
MANCMD
=0
MAN CNT
=1
RETURN

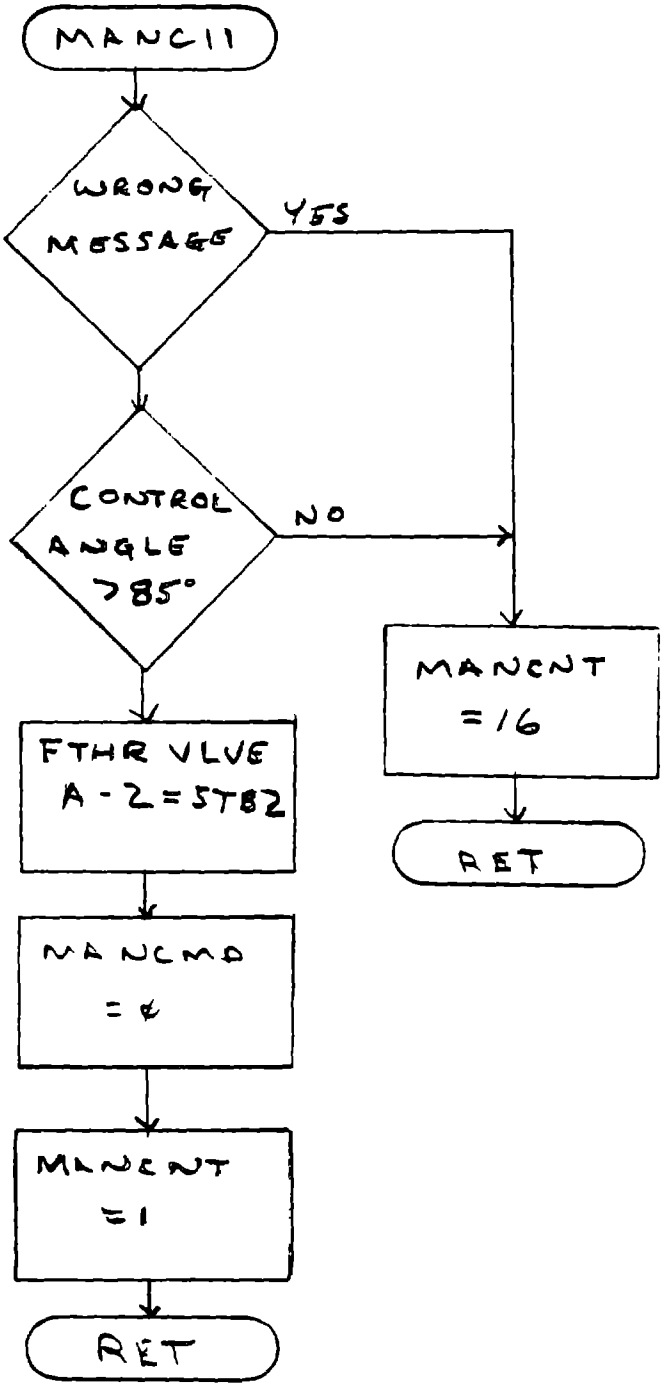

MANCS
STE 3
=131
NO
LUBE PUMP
=STE2
MANCMD
=0
MANCNT
=1
MANCNT
=18
RETURN

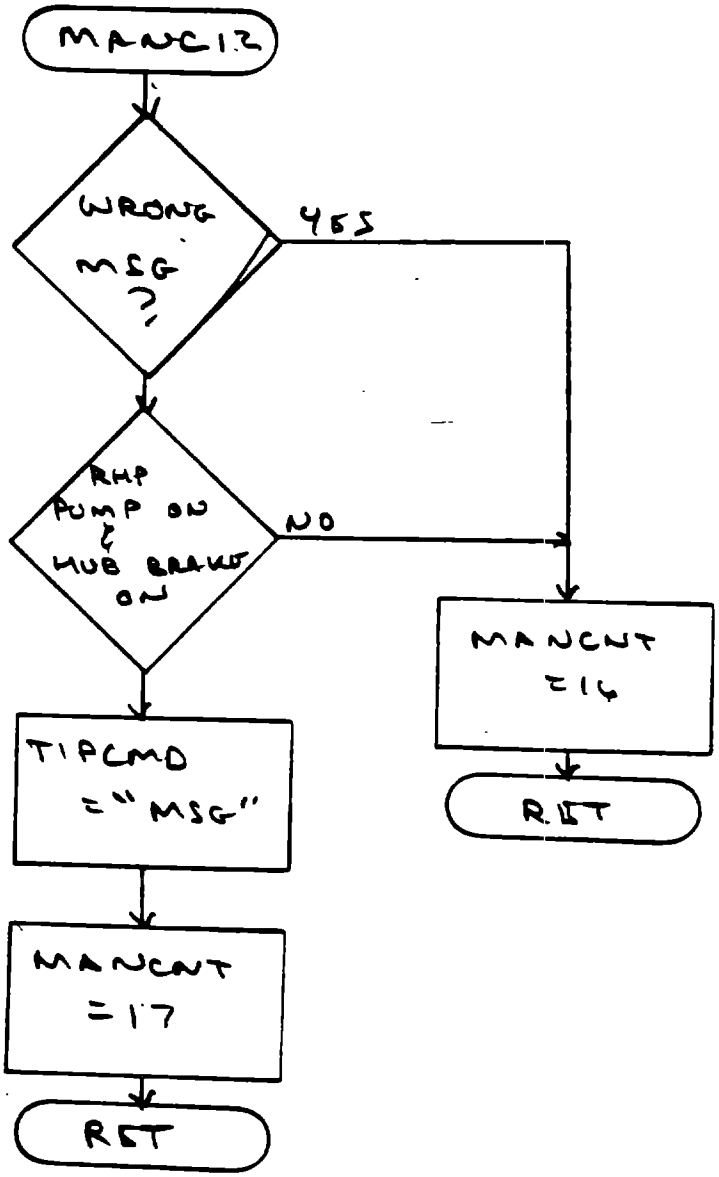

MANCG
STE3 =131
NO
STE2 ="OFF"
NO
TIPS LATCHED
NO
MANCNT = 16
HUD BRKS = STE2
MANCMD = 0
MANCNT = 1
RETURN

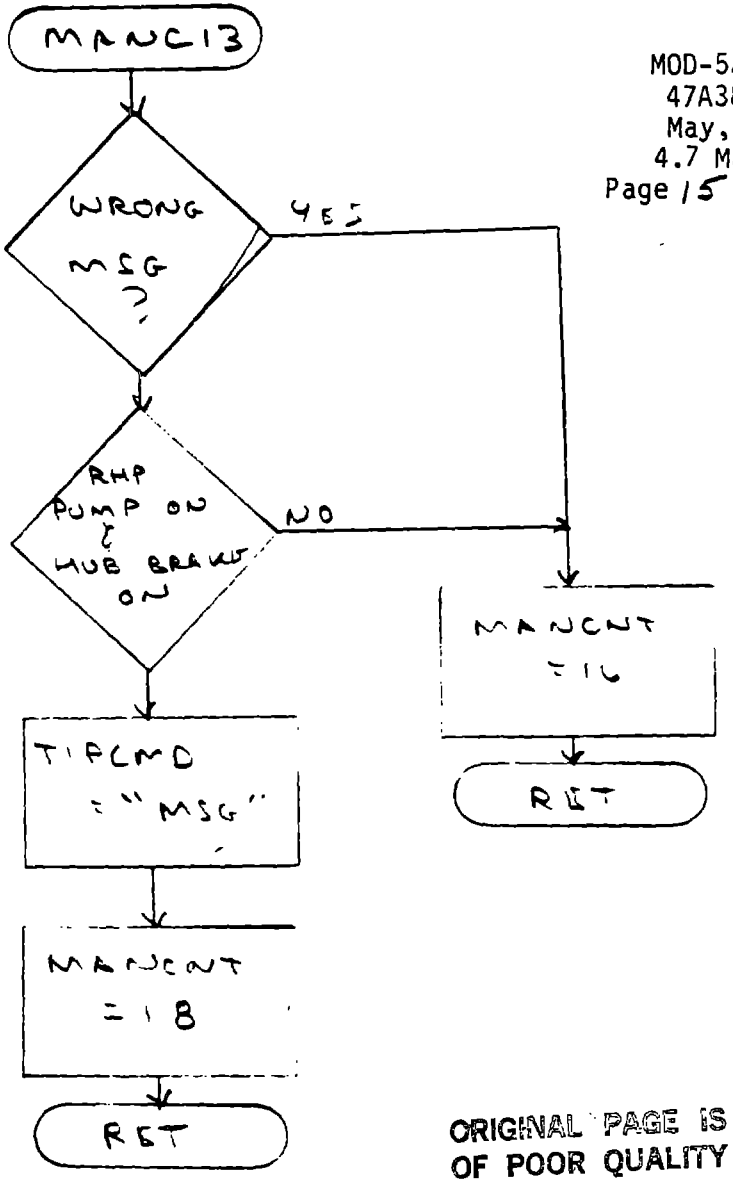


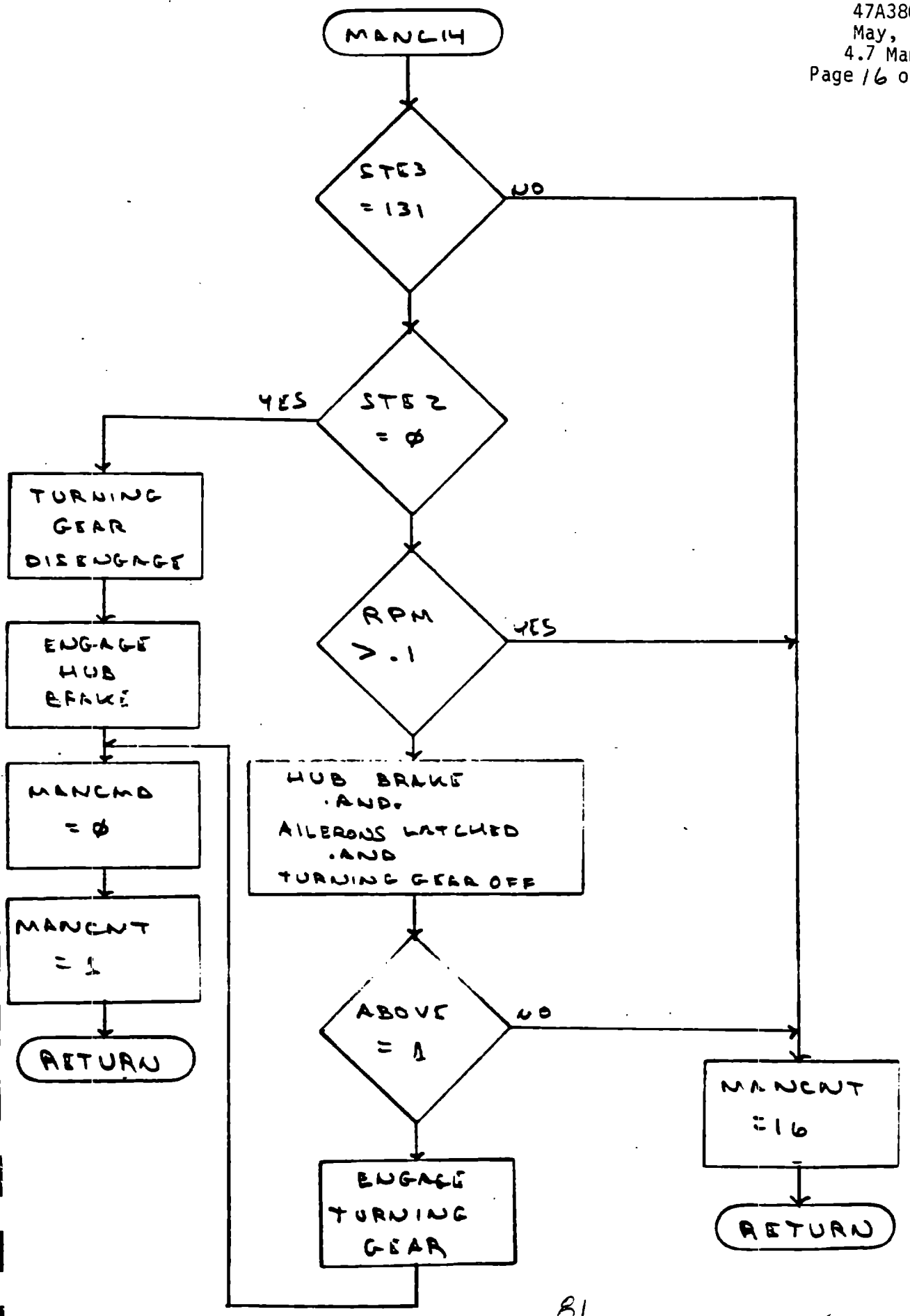

MANC9
STE3
=131
NO
MANCNT
=16
YAW BRAKE
= STE2
MANCMD
= 0
MANCNT
= 1
RETURN

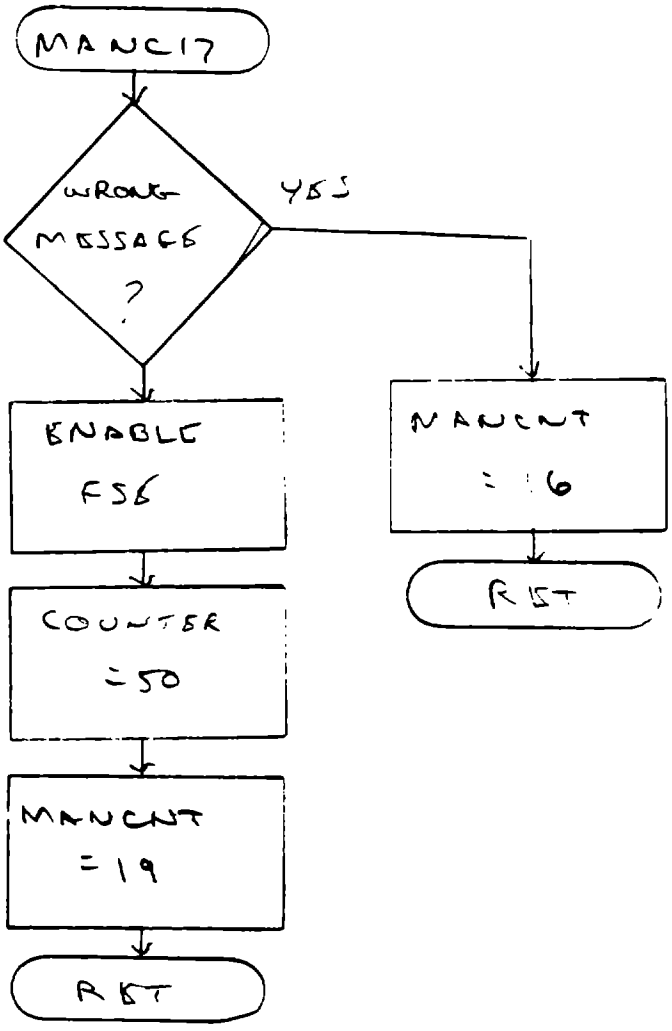

MANC10
WRONG MESSAGE
YES
CONTROL ANGLE >85°
NO
FTHR VLVS A-1 = STBZ
MANCMD = 0
MANCNT = 1
RET
MANCNT = 16
RET

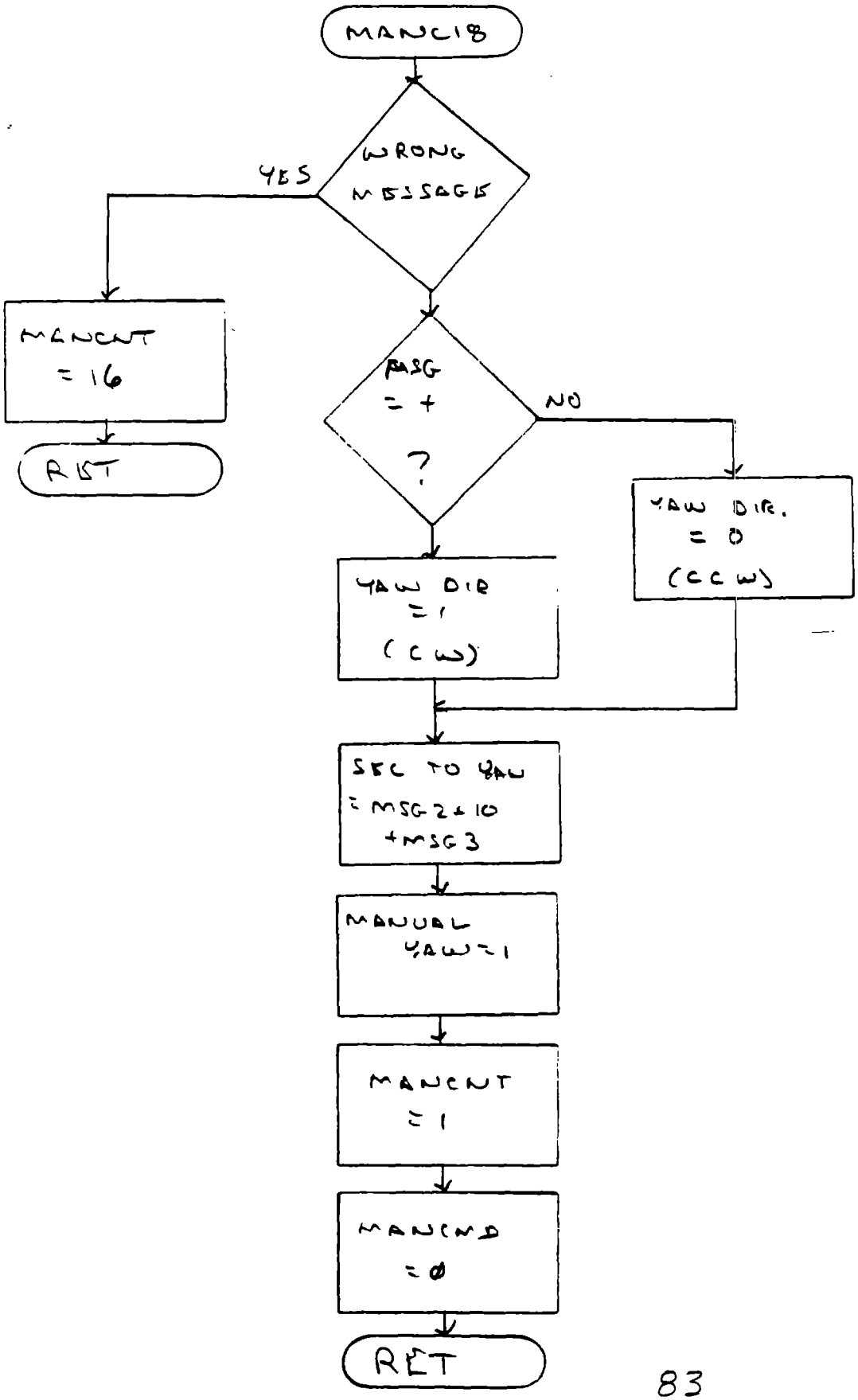

MANC11
WRONG MESSAGE
YES
CONTROL ANGLE >85°
NO
MANCNT =16
RET
FTHR VLVE A-2=STB2
MANCMD =4
MANCNT =1
RET

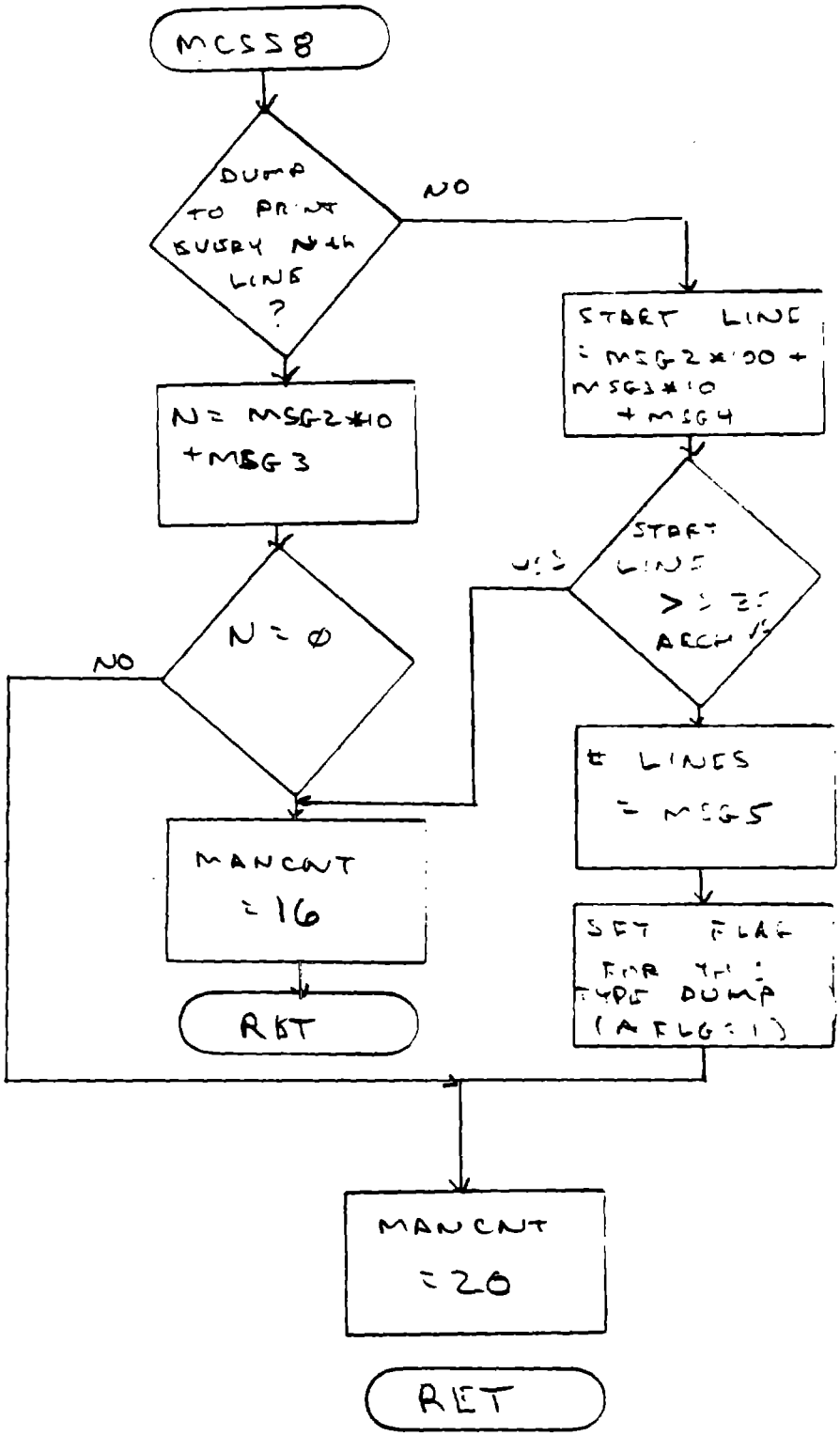

MANC13
WRONG MSG ?
YES
RHP PUMP ON & HUB BRAKE ON
NO
MANCNT = 16
RET
TIPCMD = "MSG"
MANCNT = 17
RET

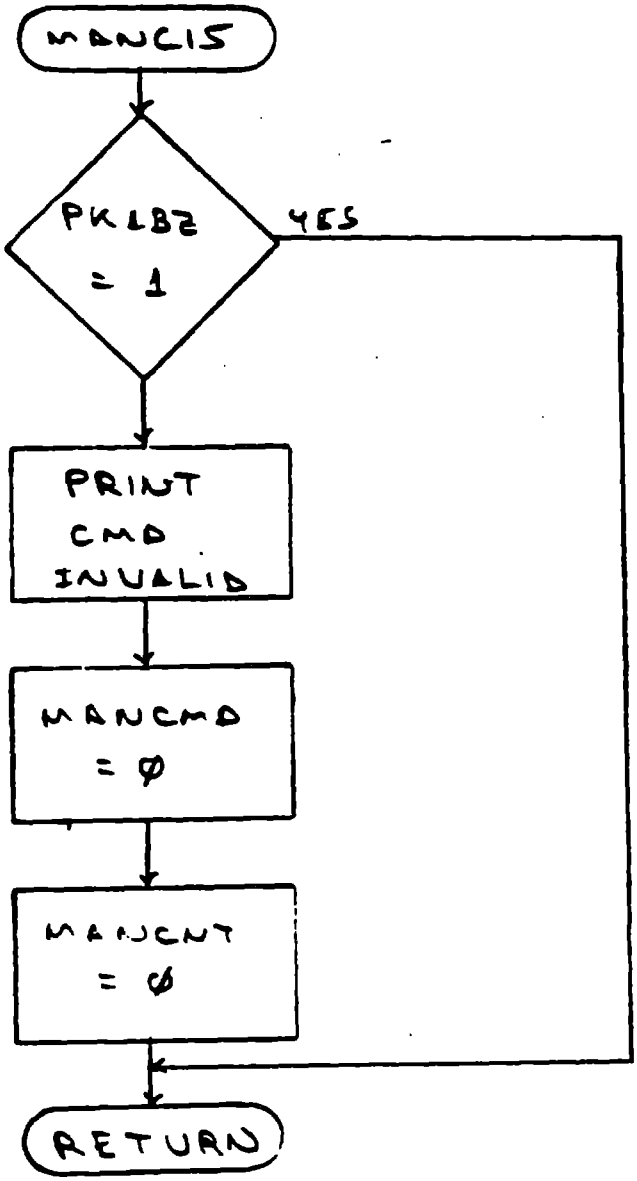


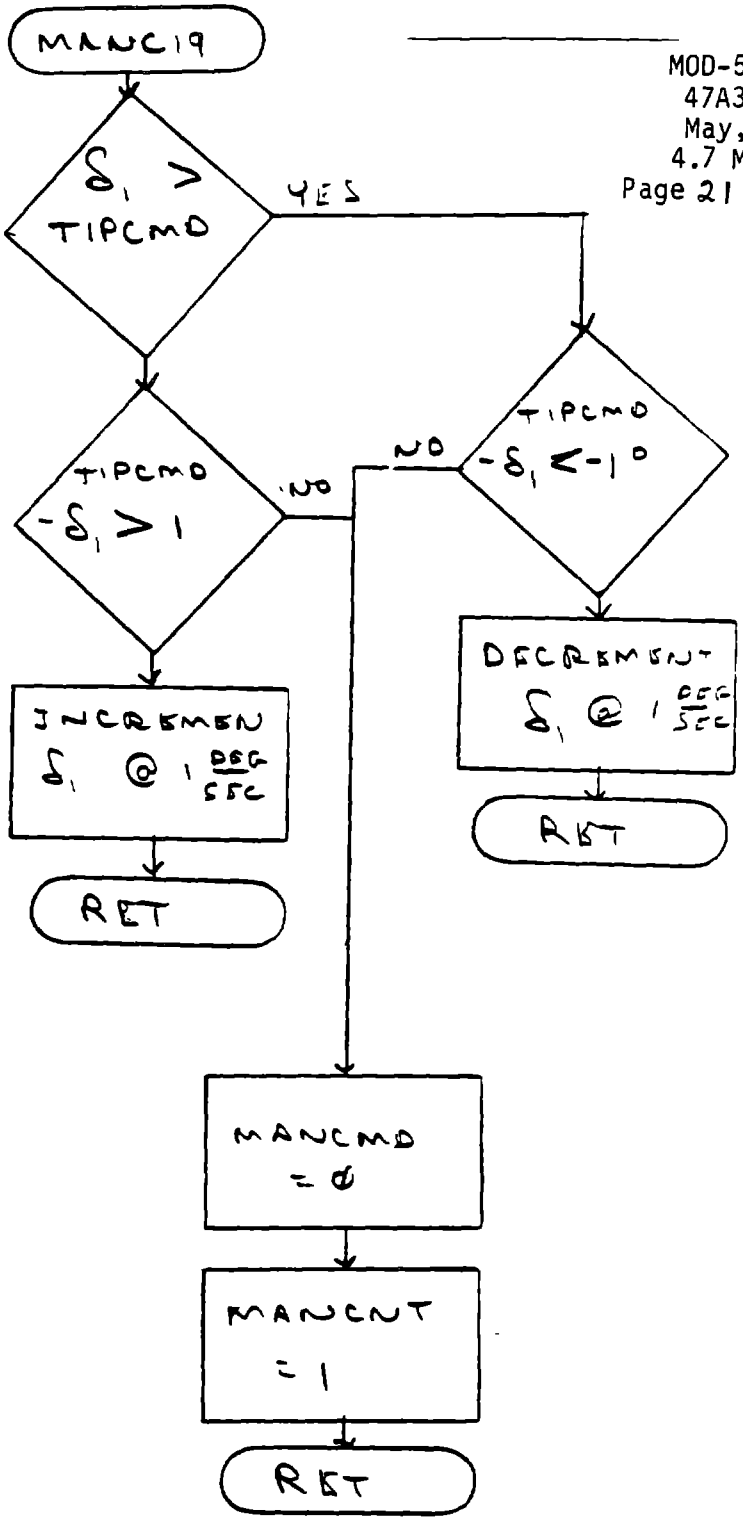

MANC14
STE3 = 131
NO
STE2 = Ø
YES
TURNING GEAR DISENGAGE
ENGAGE HUB BRAKE
MANCMD = Ø
MANCNT = 1
RETURN
RPM > .1
YES
HUB BRAKE .AND. AILERONS LATCHED .AND. TURNING GEAR OFF
ABOVE = 1
NO
ENGAGE TURNING GEAR
MANCNT = 16
RETURN

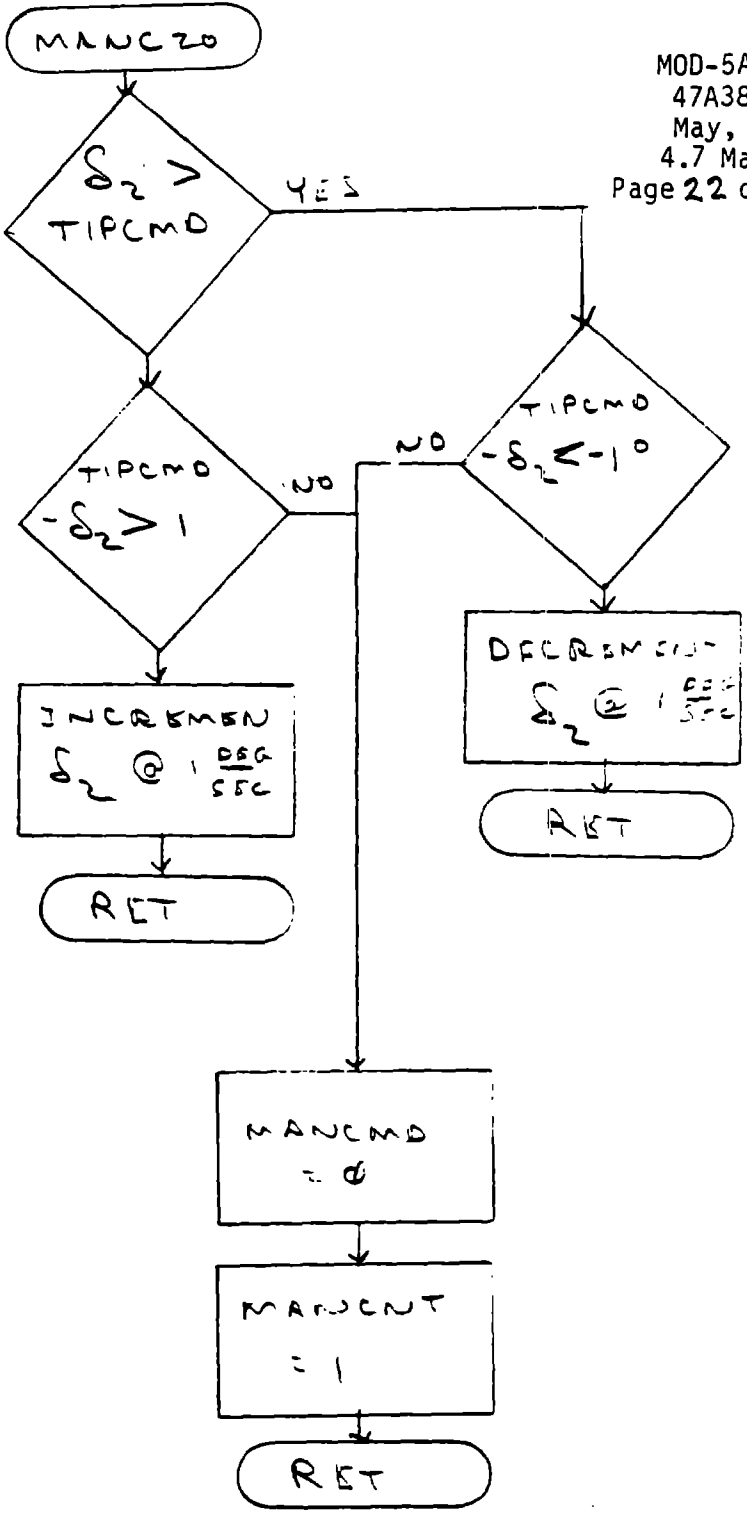

MANC17
WRONG MESSAGE ?
YES
ENABLE FS6
COUNTER =50
MANCNT =19
RET
MANCNT =16
RET

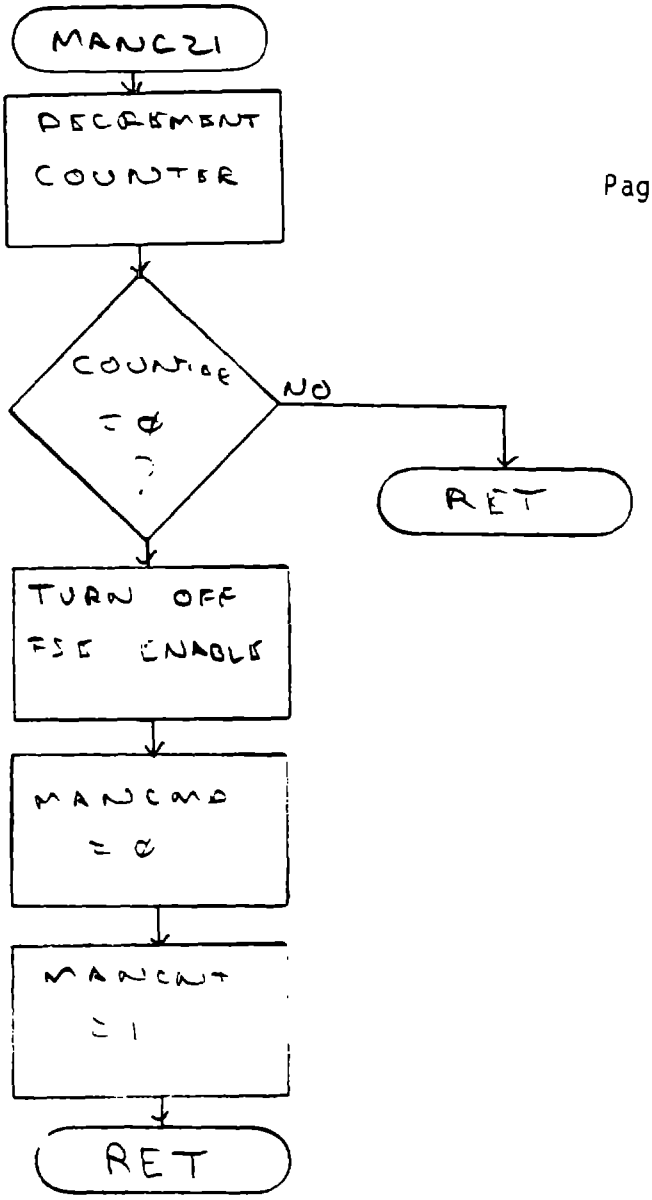


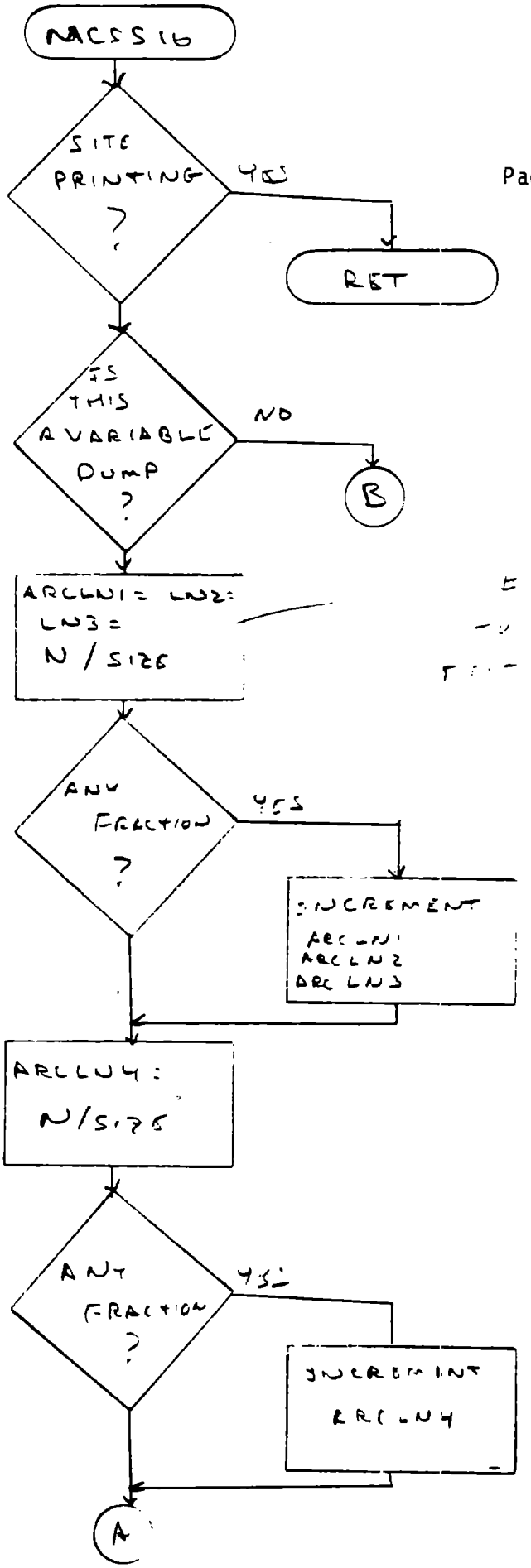


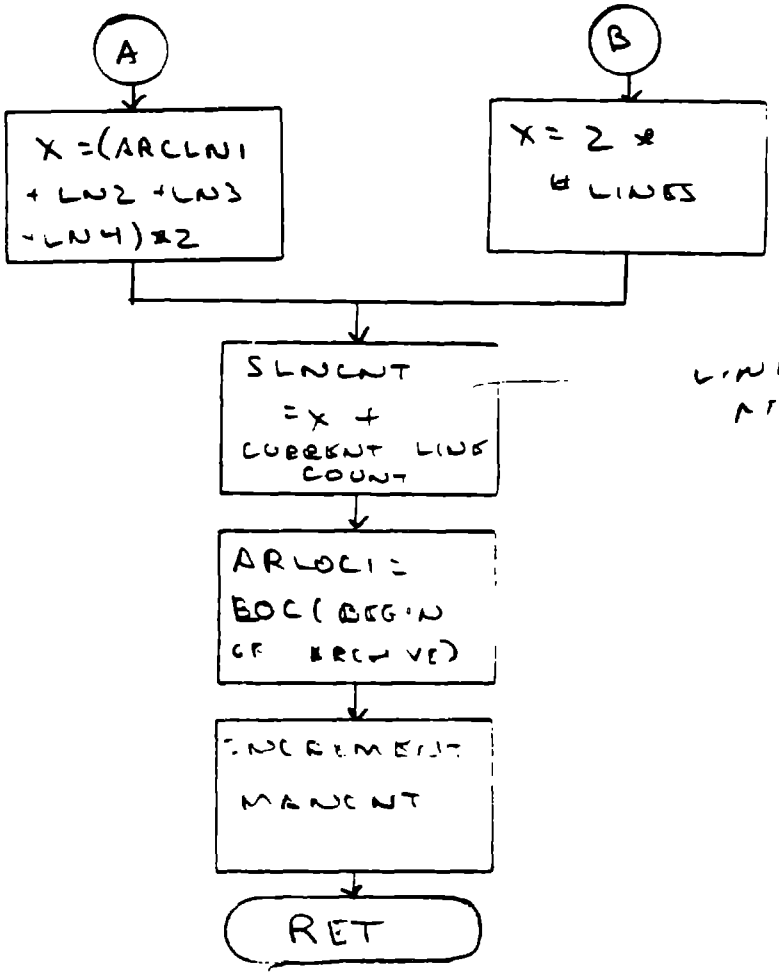

MANCIS
PKLBZ
= 1
YES
PRINT
CMD
INVALID
MANCMD
= Ø
MANCNT
= Ø
RETURN

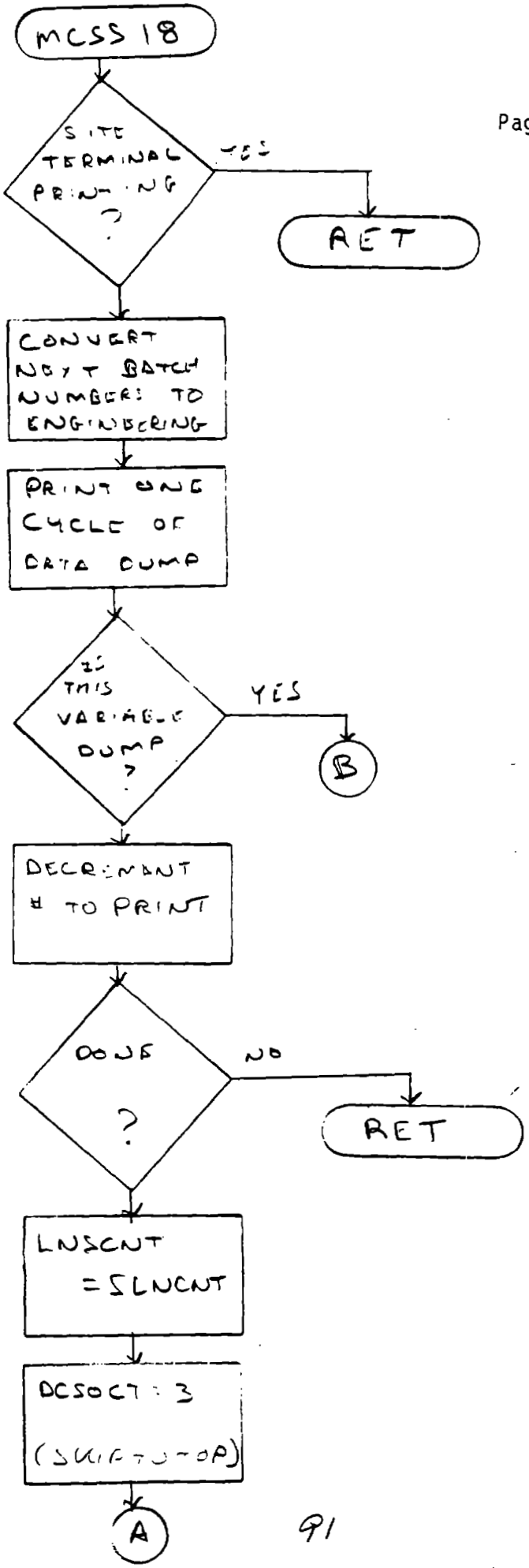

MANC19
δ1 > TIPCMD
YES
TIPCMD -δ1 > 1
NO
TIPCMD -δ1 < -1°
NO
INCREMENT δ1 @ 1 DEG/SEC
RET
DECREMENT δ1 @ 1 DEG/SEC
RET
MANCMD = 0
MANCNT = 1
RET

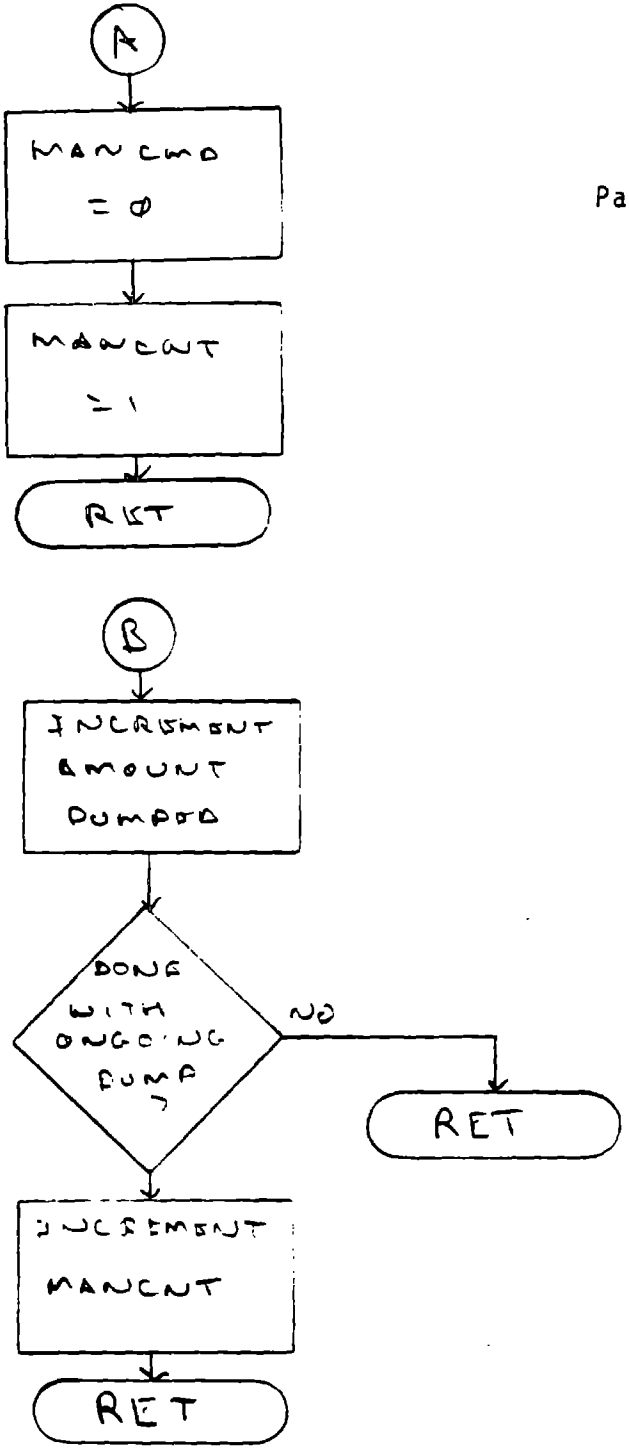


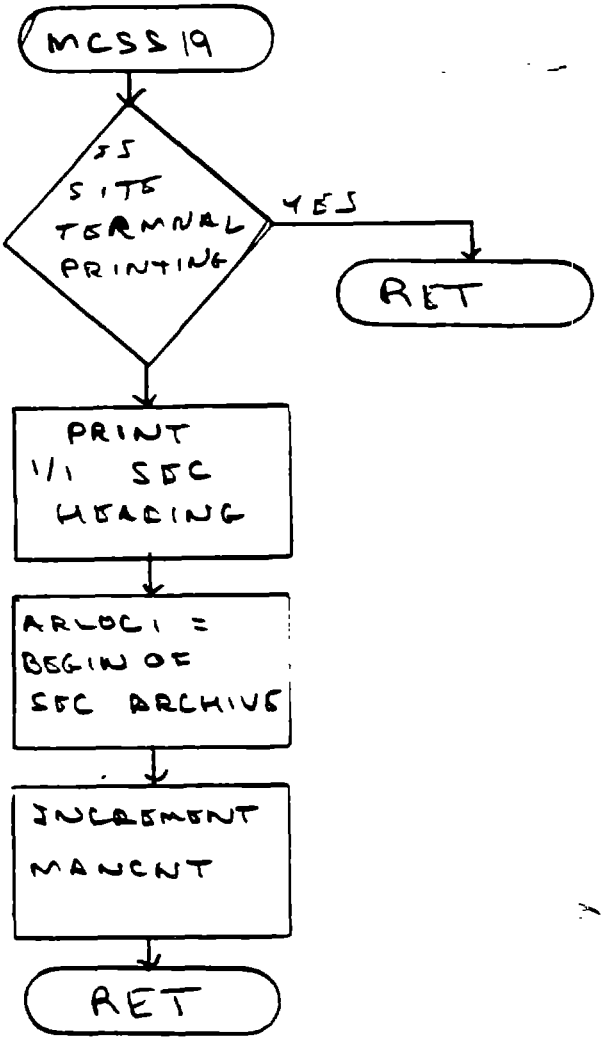

MANC21
DECREMENT COUNTER
COUNTER = 0 ?
NO
RET
TURN OFF FSE ENABLE
MANCMD = 0
MANCNT = 1
RET

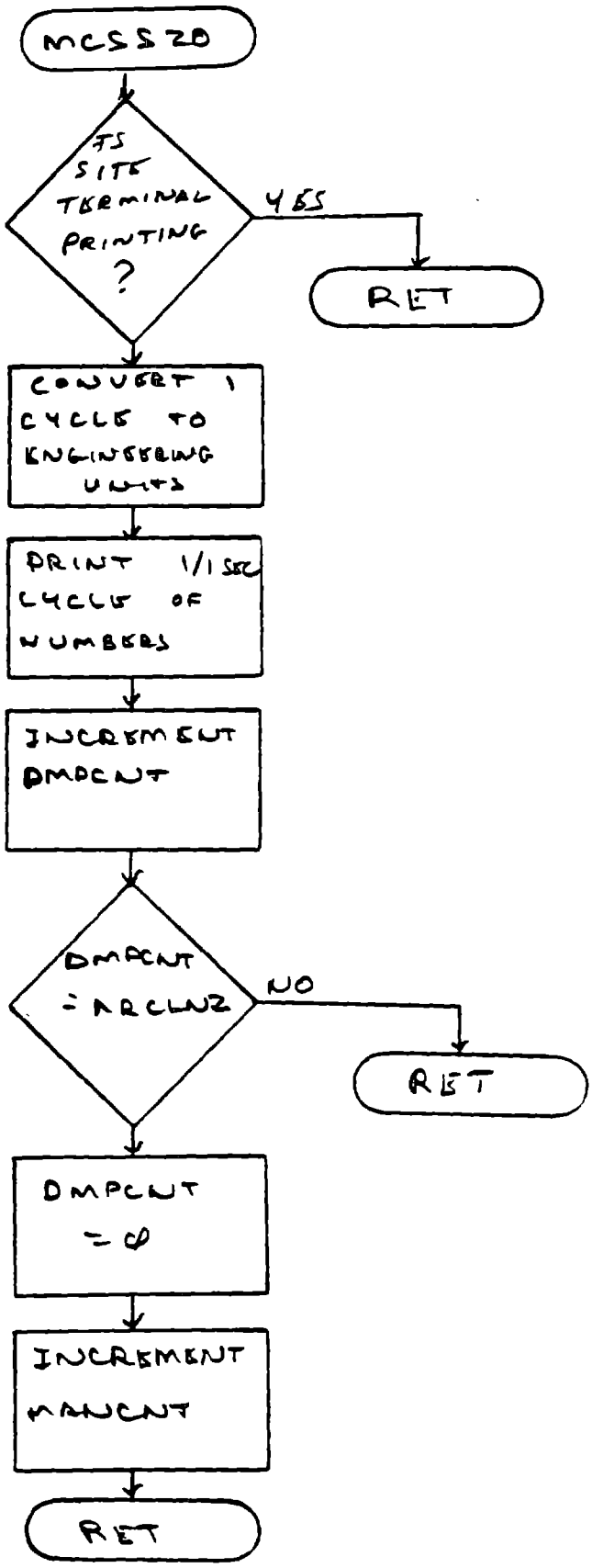


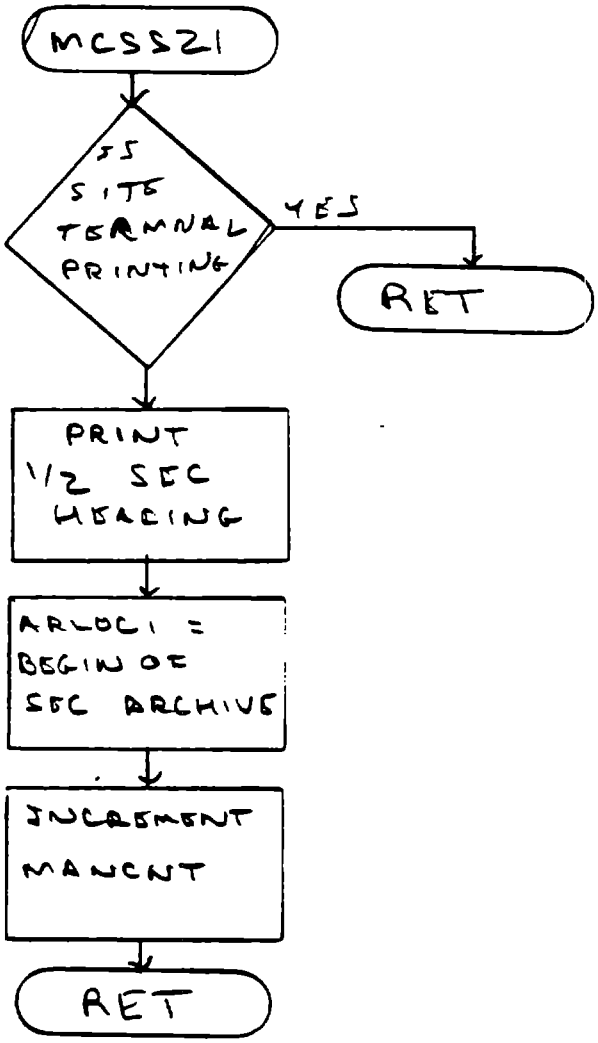


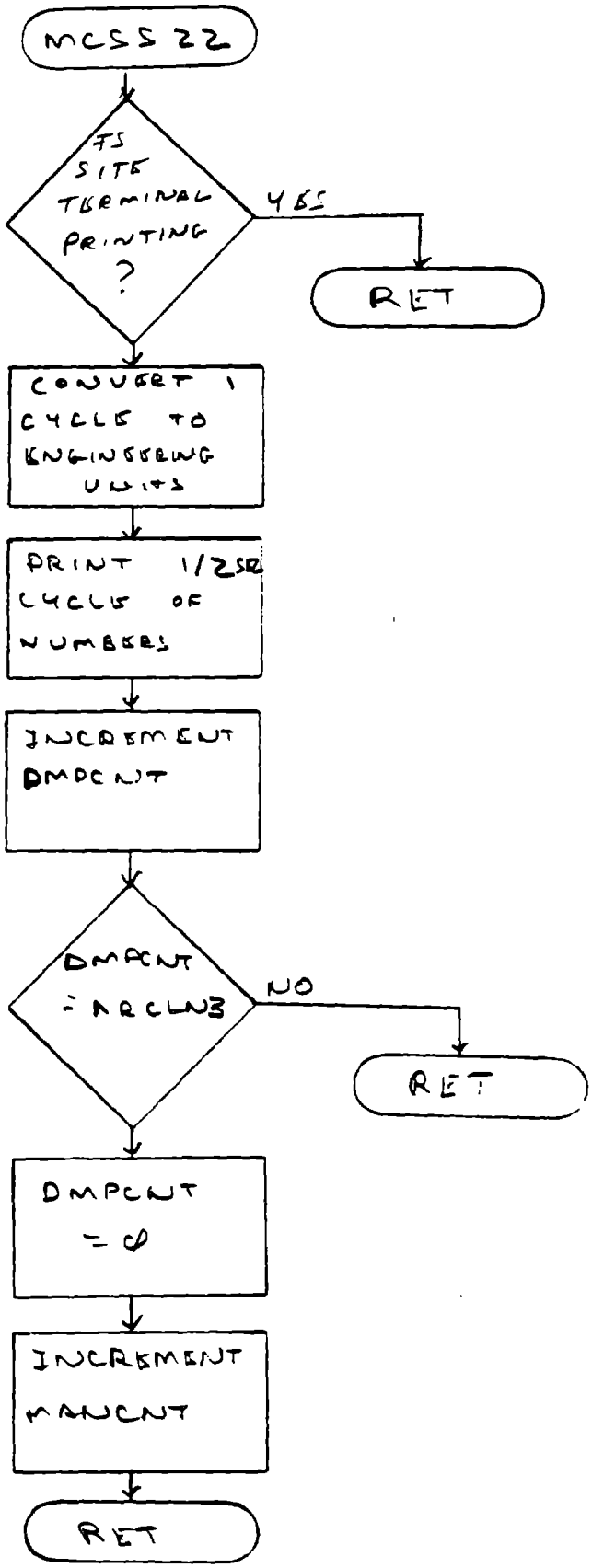


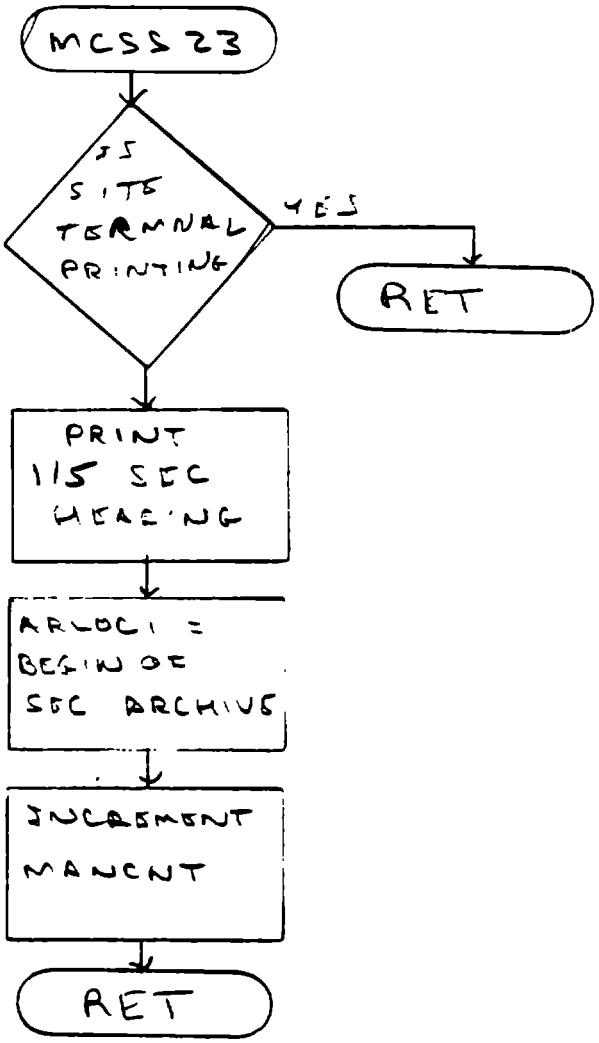

A
MANCMD
= 0
MANCNT
= 1
RET
B
INCREMENT
AMOUNT
DUMPDD
DONE
WITH
ONGOING
DUMP
?
NO
RET
INCREMENT
MANCNT
RET

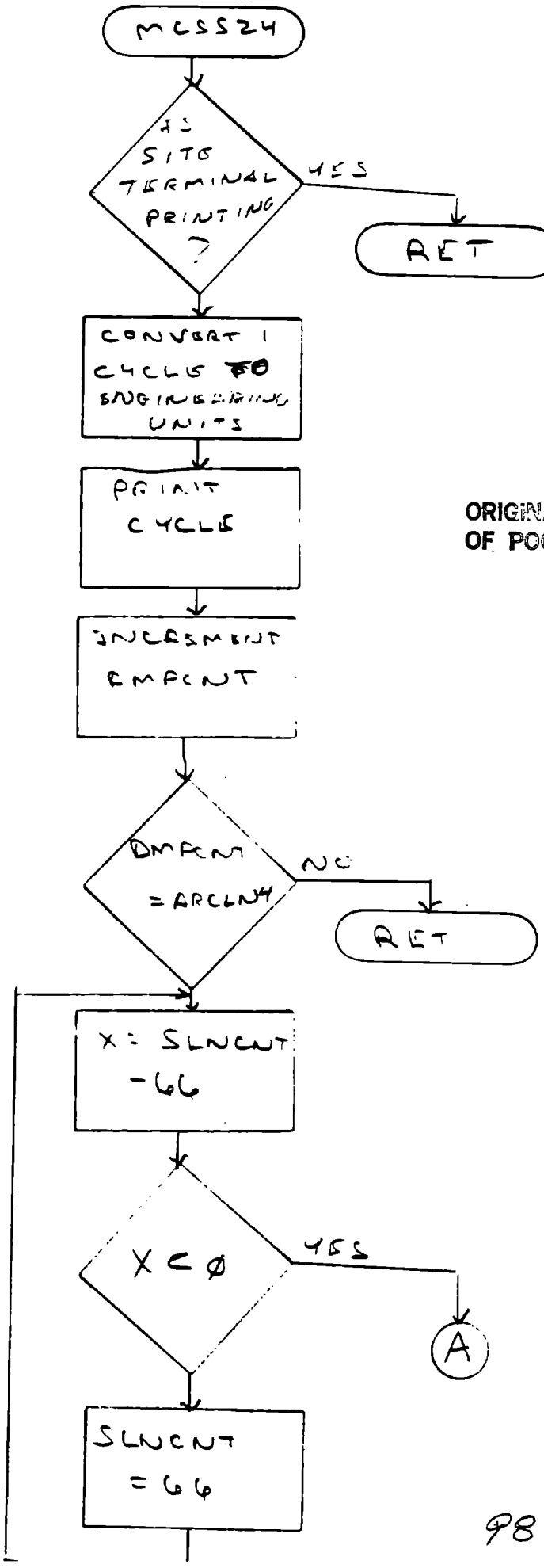

MCSS19
SS SITE TERMNAL PRINTING
YES
RET
PRINT 1/1 SEC HEADING
ARLOC1 = BEGIN OF SEC ARCHIVE
INCREMENT MANCNT
RET

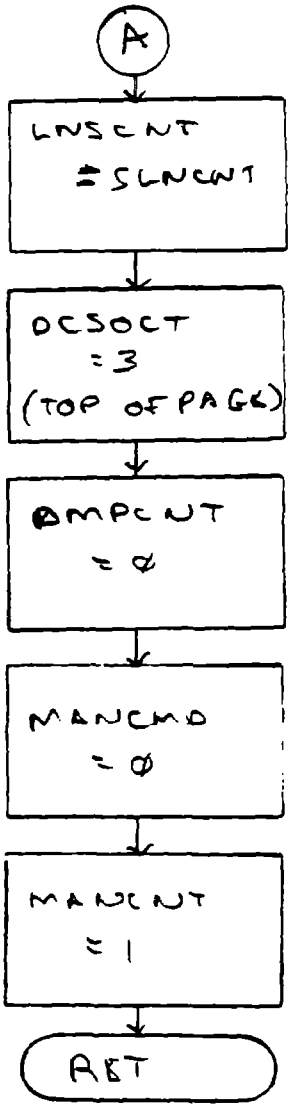

MCS520
IS SITE TERMINAL PRINTING ?
YES
RET
CONVERT 1 CYCLE TO ENGINEERING UNITS
PRINT 1/1 SEC CYCLE OF NUMBERS
INCREMENT DMPCNT
DMPCNT = ARCLN2
NO
RET
DMPCNT = 0
INCREMENT MANCNT
RET




MCSS 22
IS SITE TERMINAL PRINTING ?
YES
RET
CONVERT 1 CYCLE TO ENGINEERING UNITS
PRINT 1/2 SEC CYCLE OF NUMBERS
INCREMENT DMPCNT
DMPCNT = NRCLNS
NO
RET
DMPCNT = 0
INCREMENT MANCNT
RET

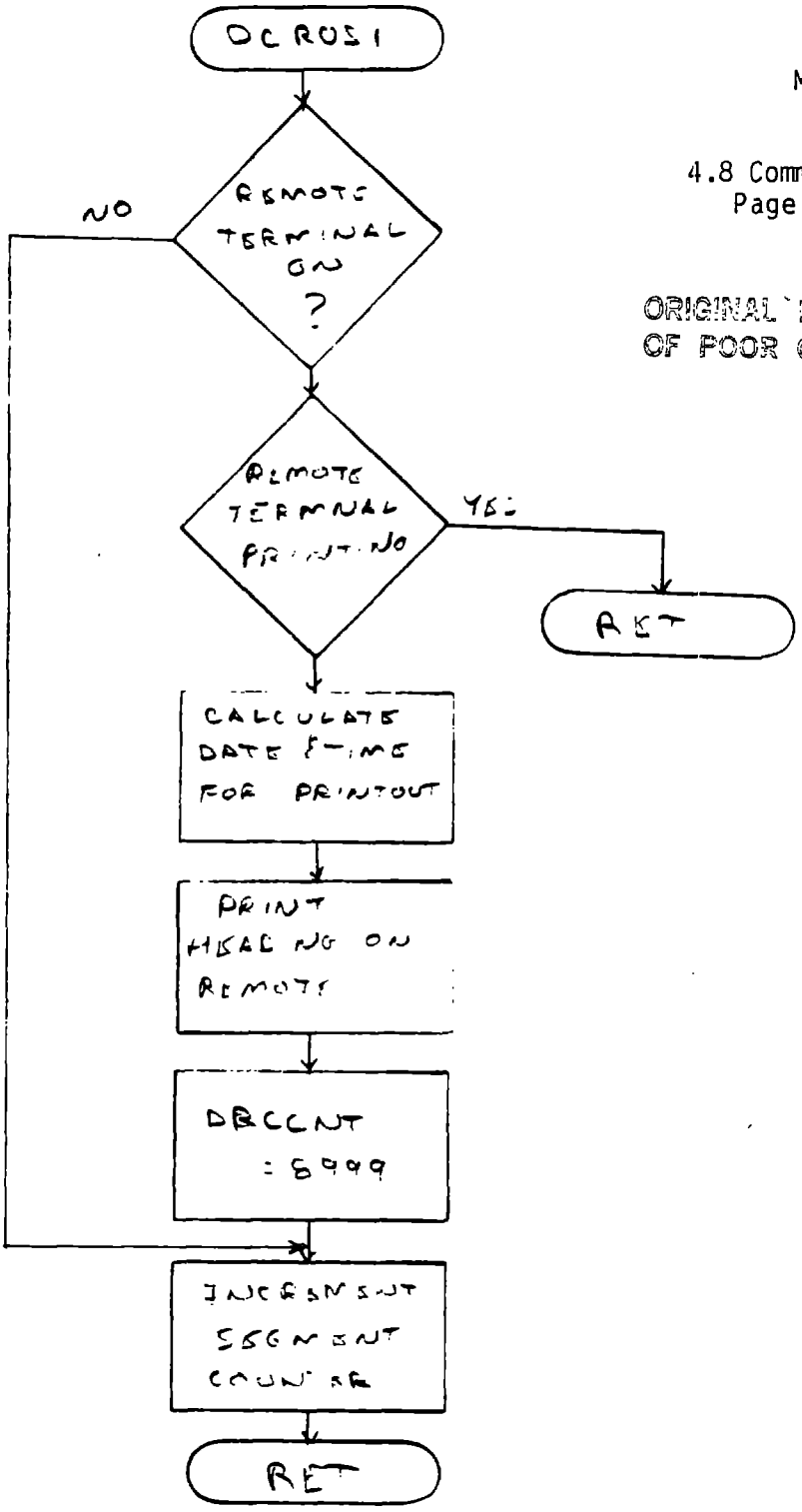


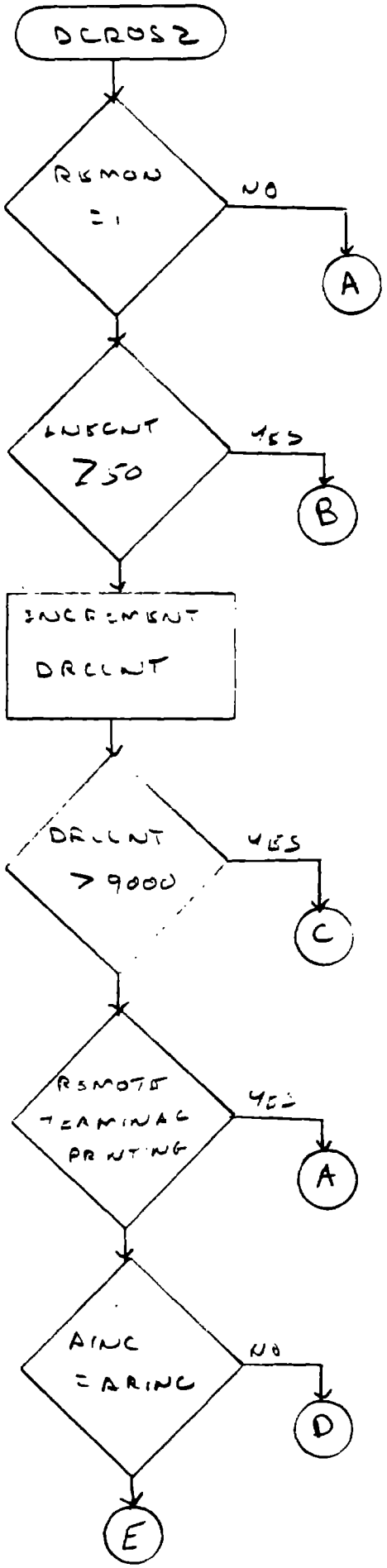


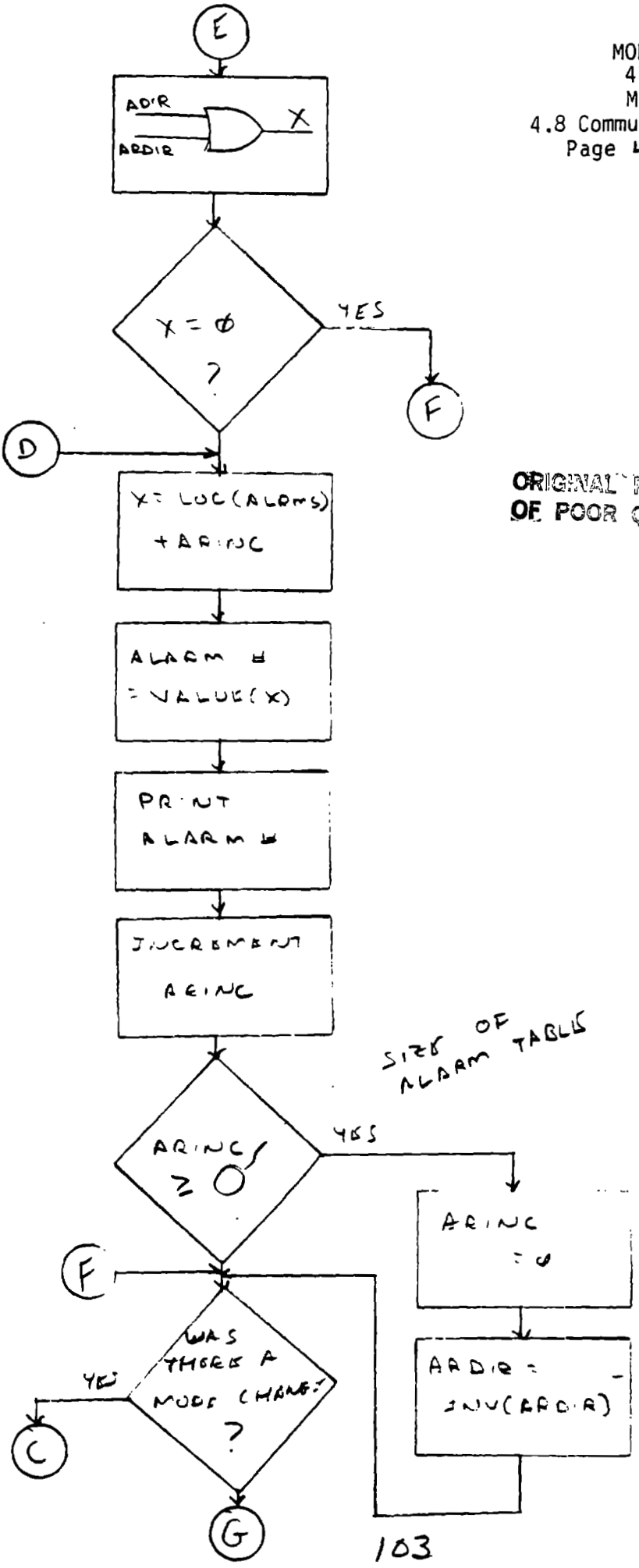

A
LNSCNT
=SLNCNT
DCSOCT
=3
(TOP OF PAGE)
OMPCNT
=0
MANCMD
=0
MANCNT
=1
RET

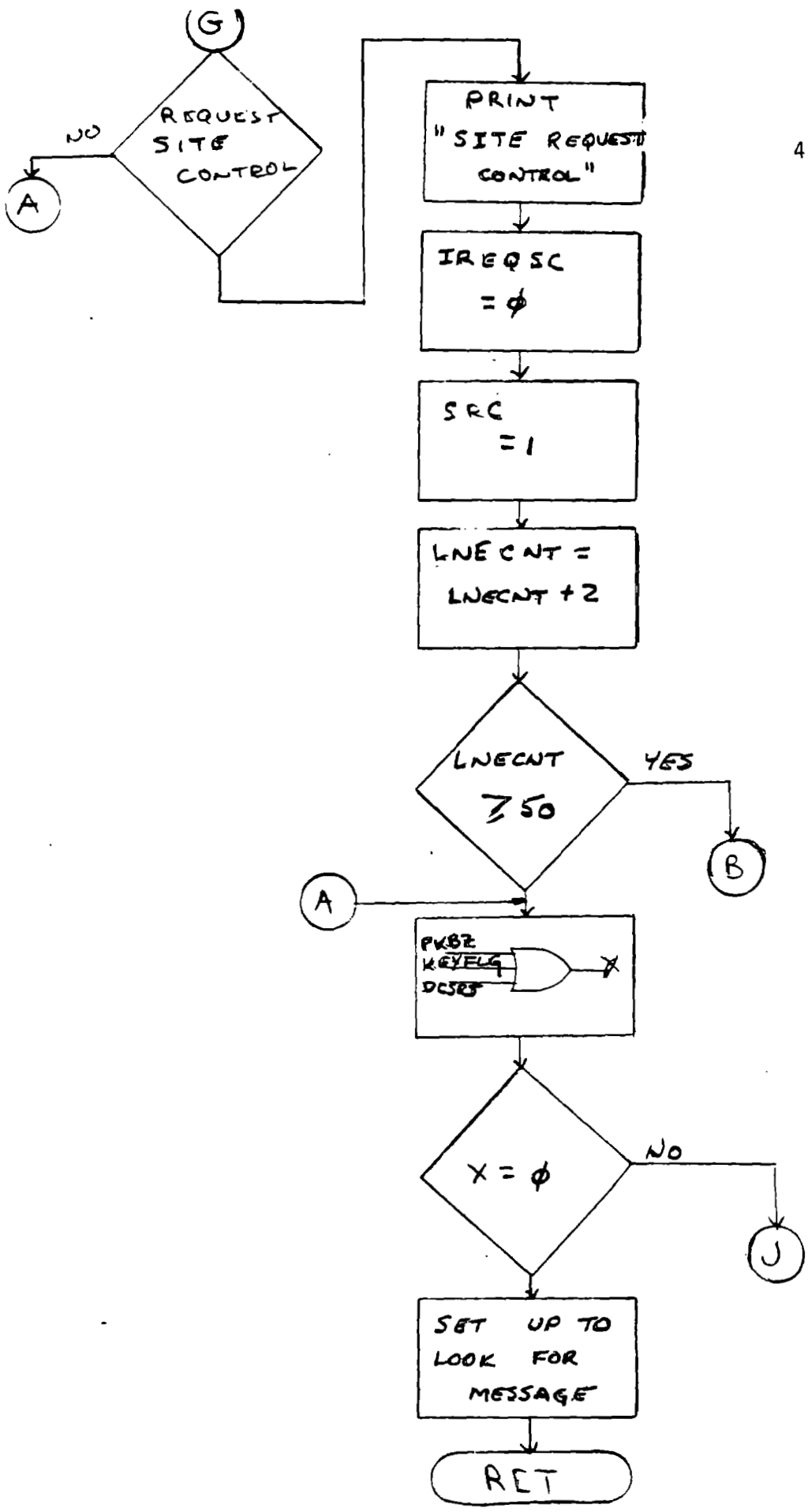
Remote Terminal Output Segment Table

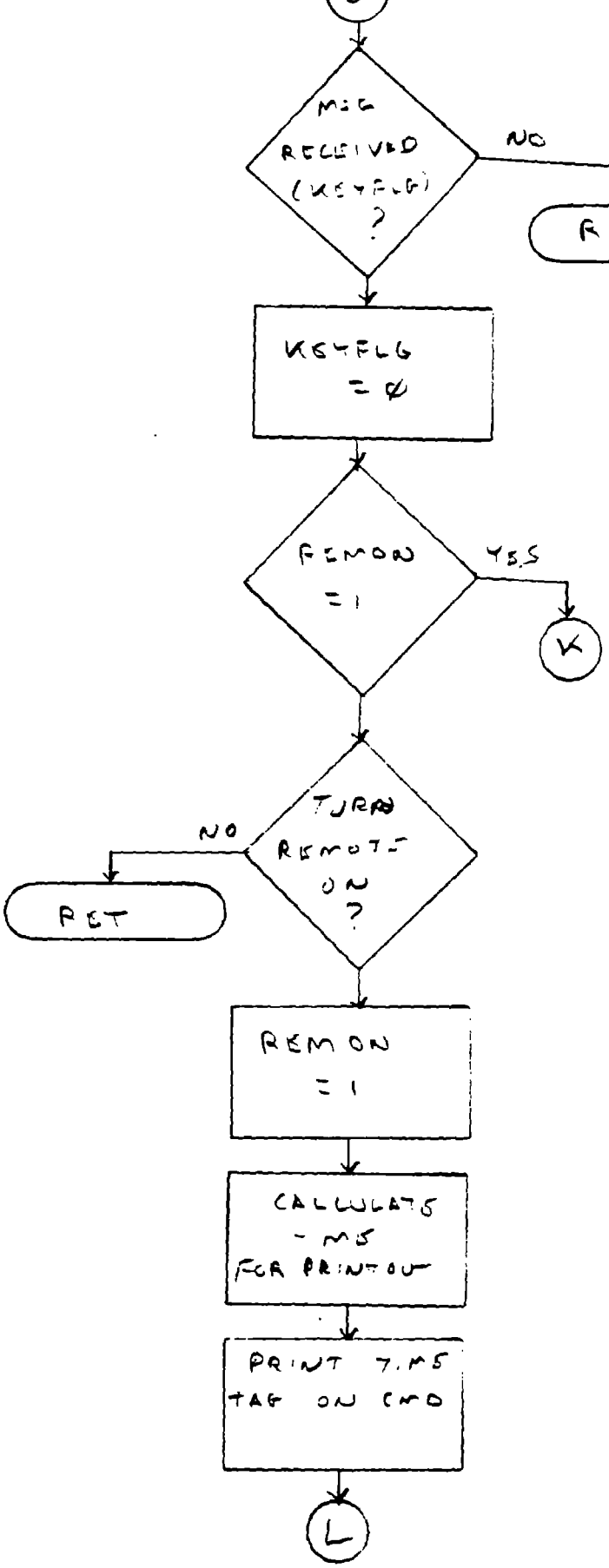
```
DCROST   DC     DCROS1          PUT TOP OF PAGE FORMAT ON REMOTE TERMINAL
         DC     DCROS2          PRINT ALARMS
         DC     DCROS3          PRINT DATA
         DC     DCROS4          SKIP TO TOP OF NEXT PAGE IF 50 LINES PRINTED
```

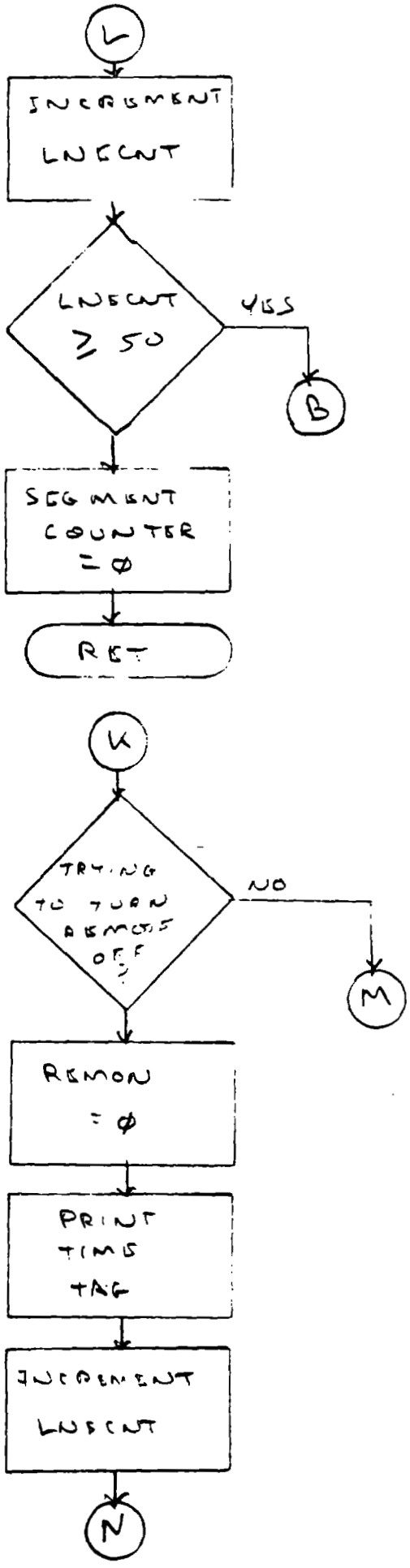


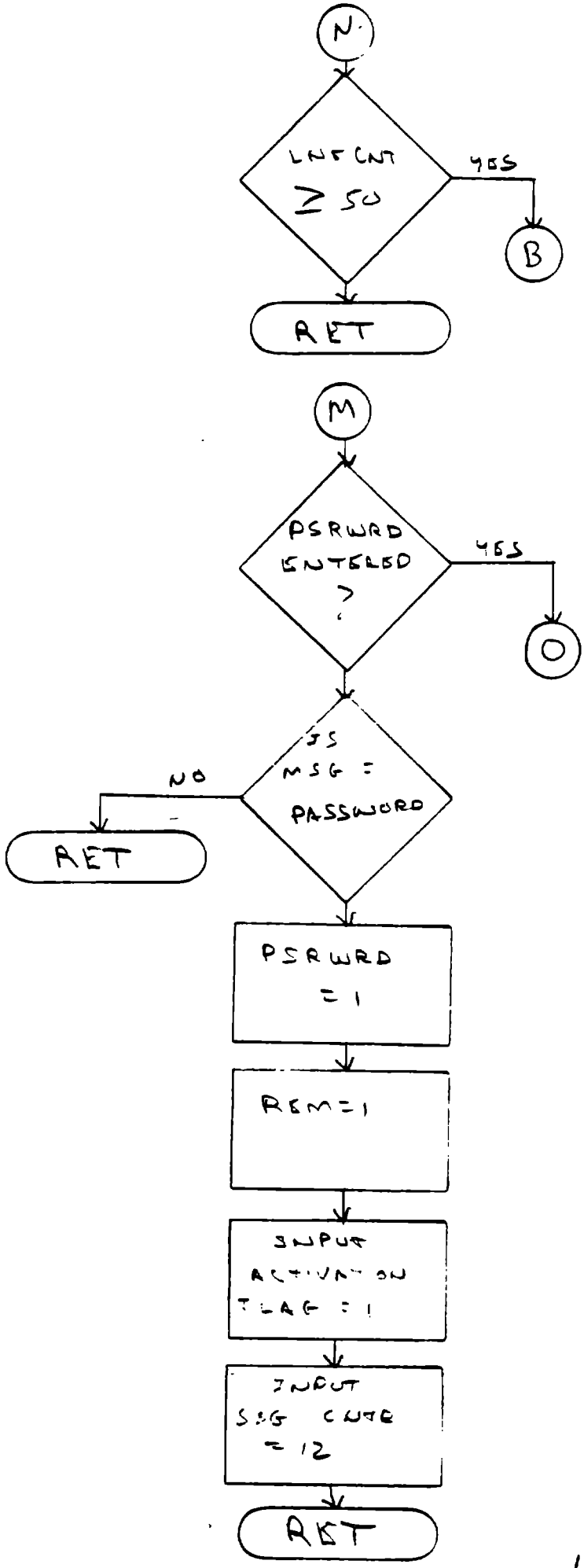

DCROSZ
RSMON
=1
NO
A
LNECNT
750
YES
B
INCREMENT
DRCLNT
DRCLNT
>9000
YES
C
RSMOTE
TERMINAL
PRINTING
YES
A
AINC
=ARINC
NO
D
E

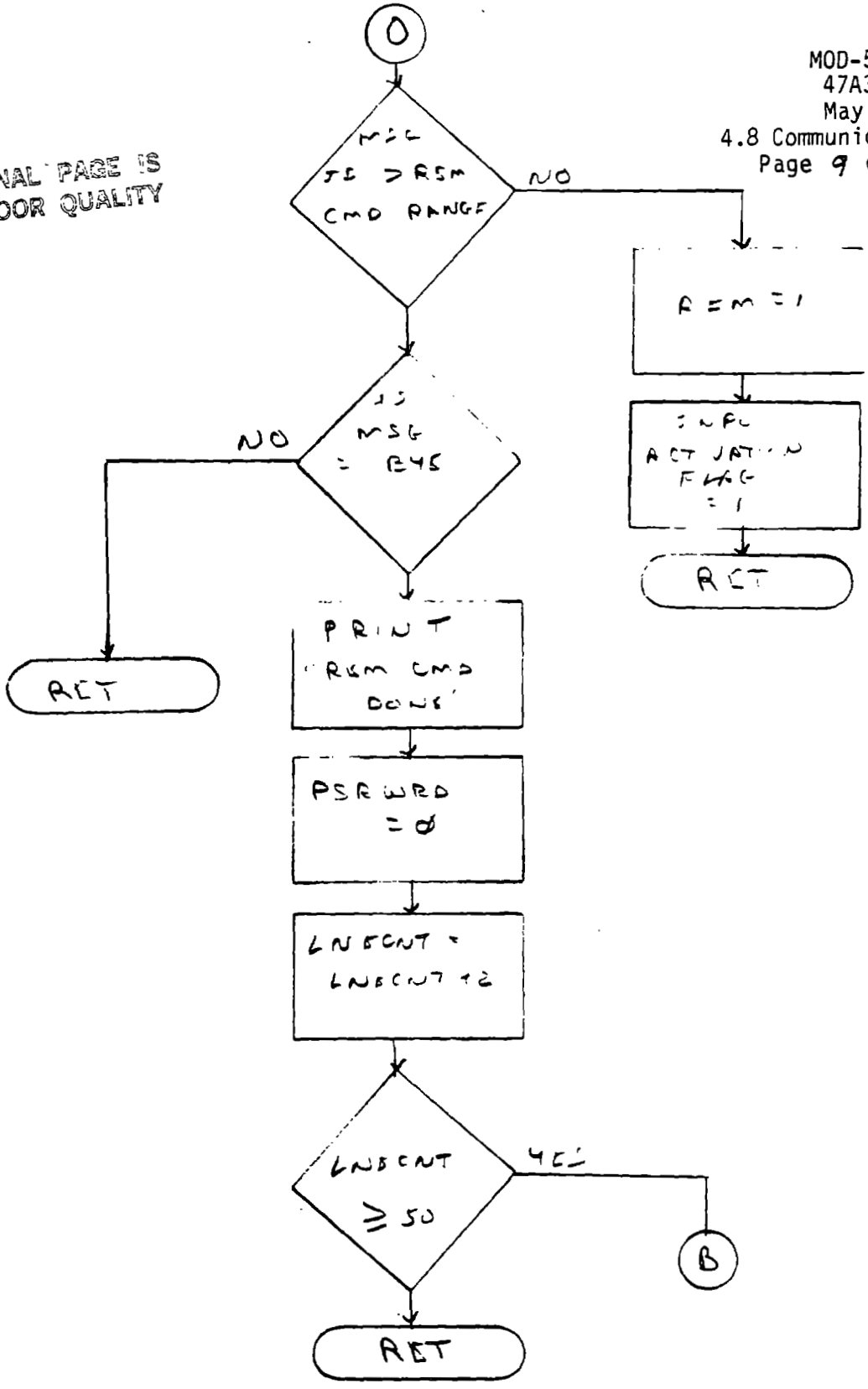


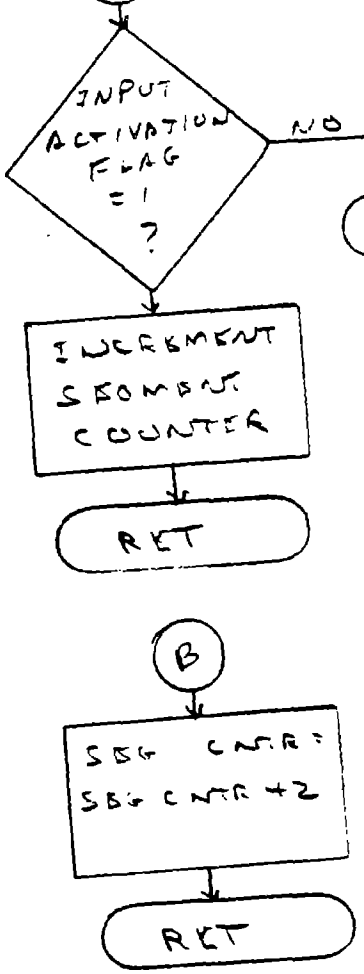

G
REQUEST SITE CONTROL
NO
A
PRINT "SITE REQUEST CONTROL"
IREQSC = ϕ
SRC = 1
LNECNT = LNECNT + 2
LNECNT ≥ 50
YES
B
A
PKBZ
KEYFLG
DCSRF
X = ϕ
NO
J
SET UP TO LOOK FOR MESSAGE
RET

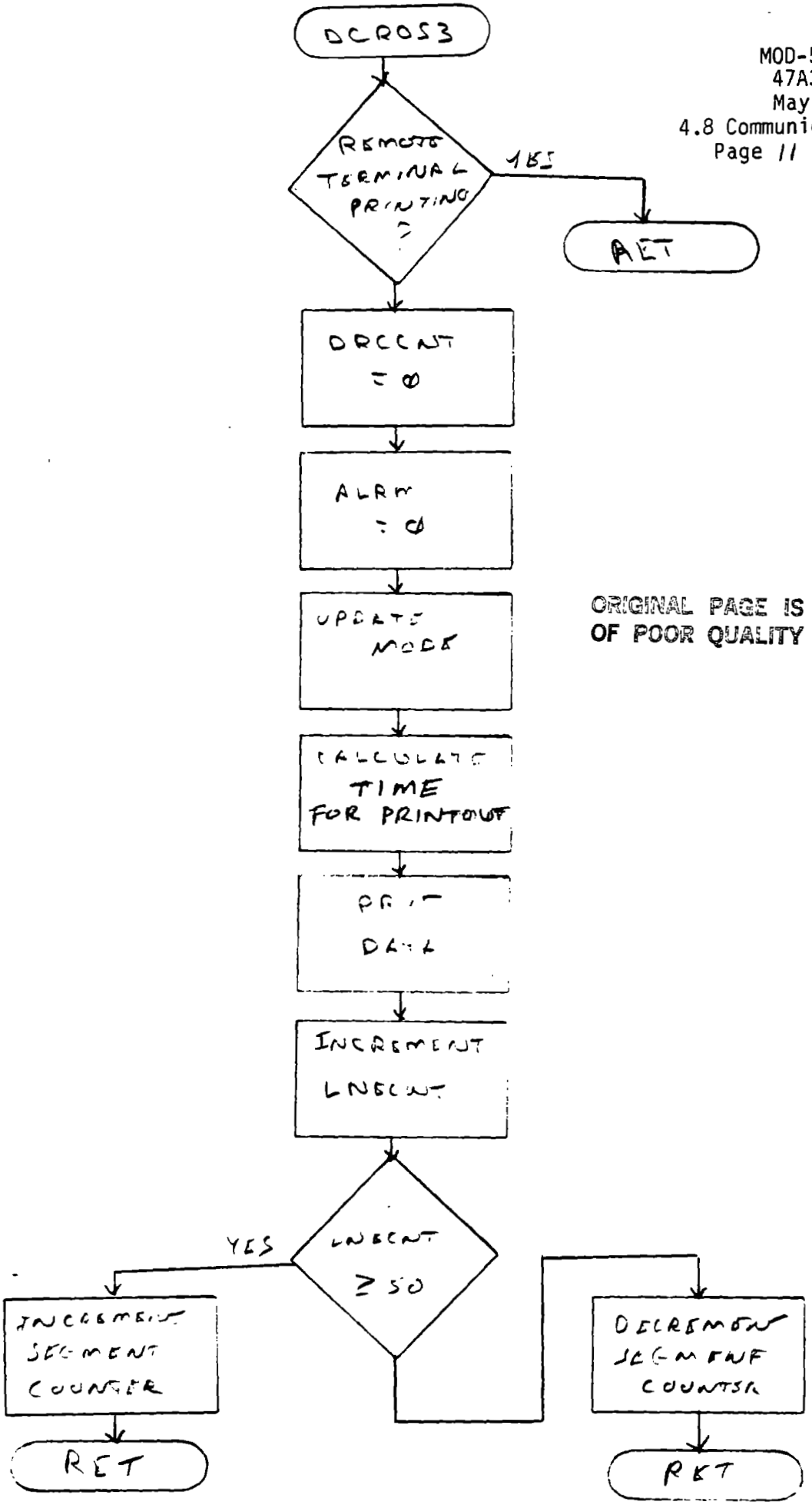


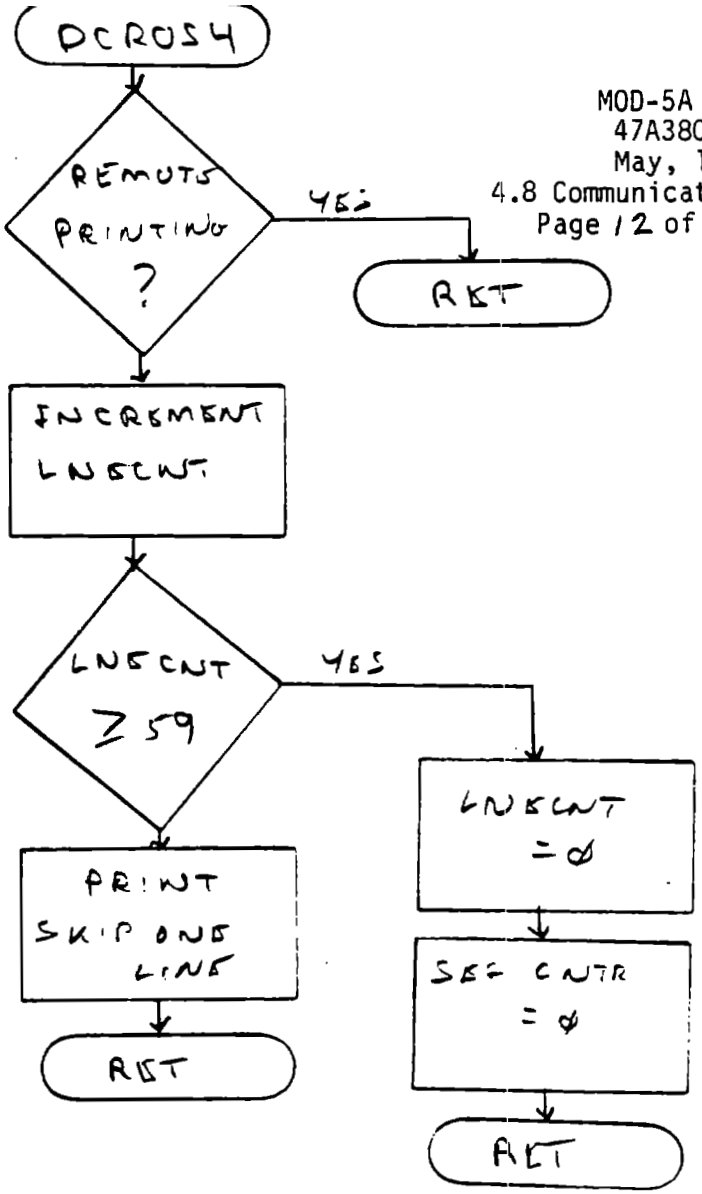

L
INCREMENT
LNECNT
LNECNT
≥ 50
YES
B
SEGMENT
COUNTER
= Ø
RET
K
TRYING
TO TURN
REMOTES
OFF
NO
M
REMON
= Ø
PRINT
TIME
TAG
INCREMENT
LNECNT
N


N
LNT CNT
≥ 50
YES
B
RET
M
PSRWD
ENTERED
?
YES
O
IS
MSG =
PASSWORD
NO
RET
PSRWD
= 1
REM=1
INPUT
ACTIVATION
FLAG = 1
INPUT
SIG CODE
= 12
RET



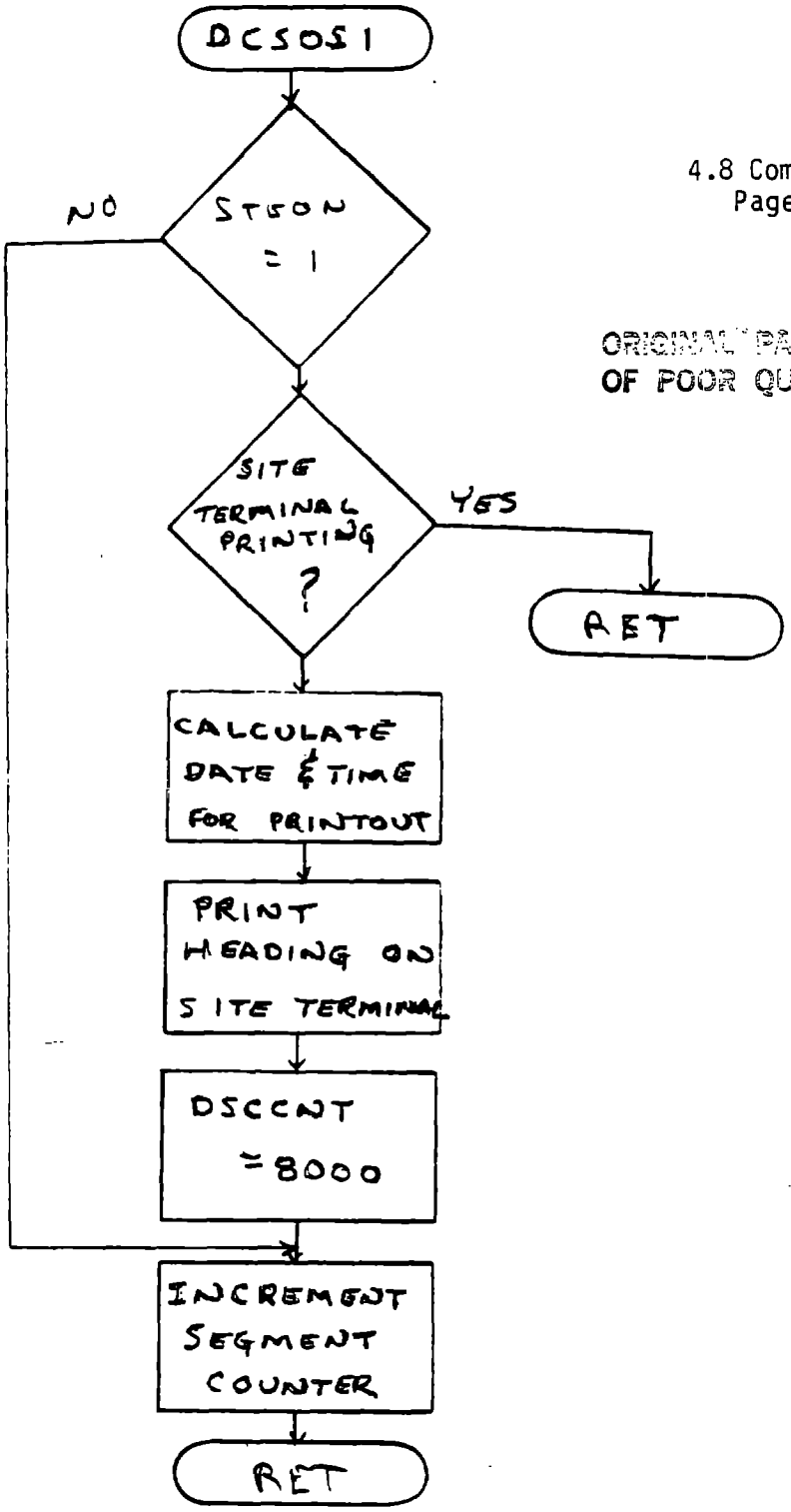


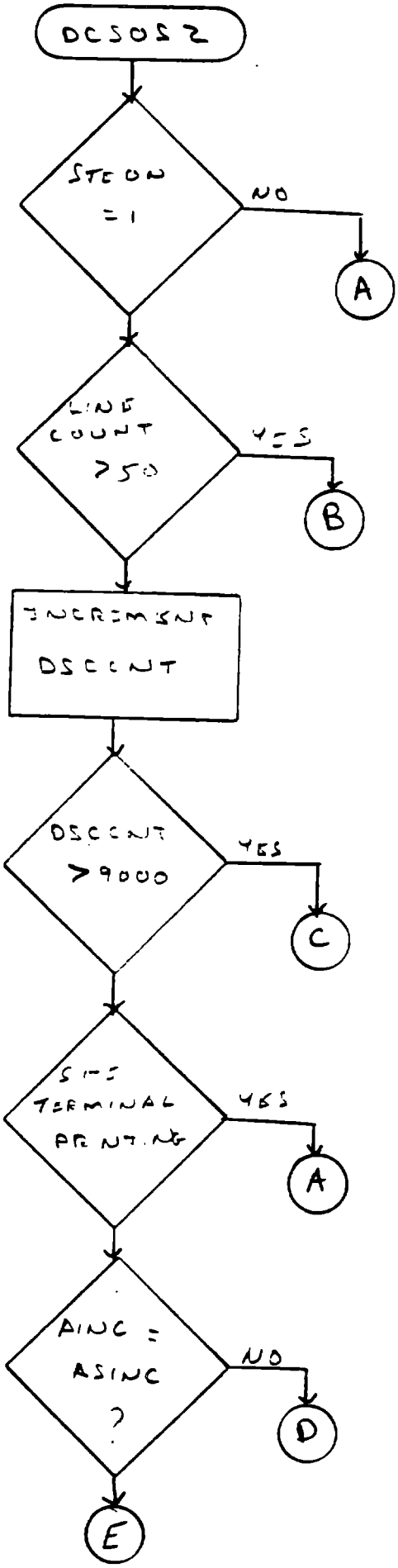



DCROS4
REMOTE PRINTING ?
YES
RET
INCREMENT LNSCNT
LNSCNT ≥ 59
YES
PRINT SKIP ONE LINE
RET
LNSCNT = 0
SEC CNTR = 0
RET

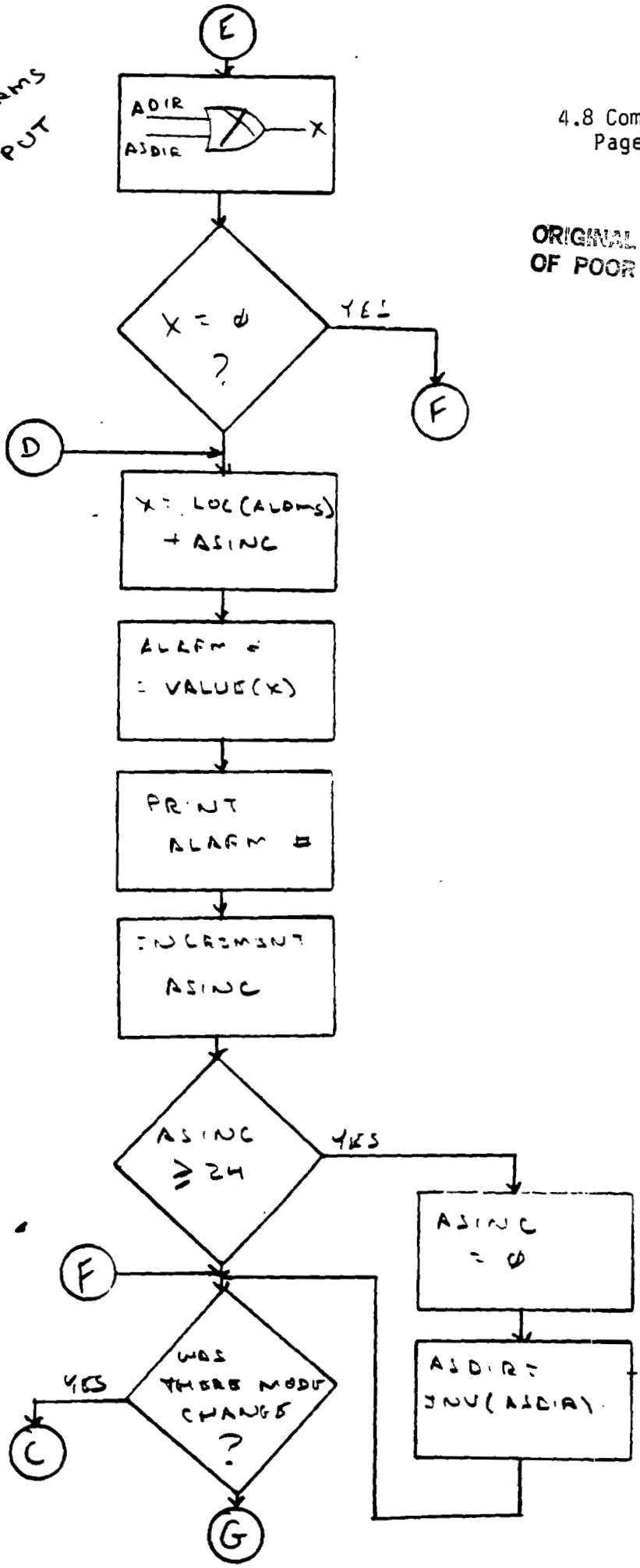
Site Terminal Output Segment Table

```
DCSOST   DC     DCSOS1          PUT TOP OF PAGE FORMAT ON SITE TERMINAL
         DC     DCSOS2          PRINT ALARMS
         DC     DCSOS3          PRINT DATA
         DC     DCSOS4          SKIP TO TOP OF NEXT PAGE IF 50 LINES ARE PRINTED
```

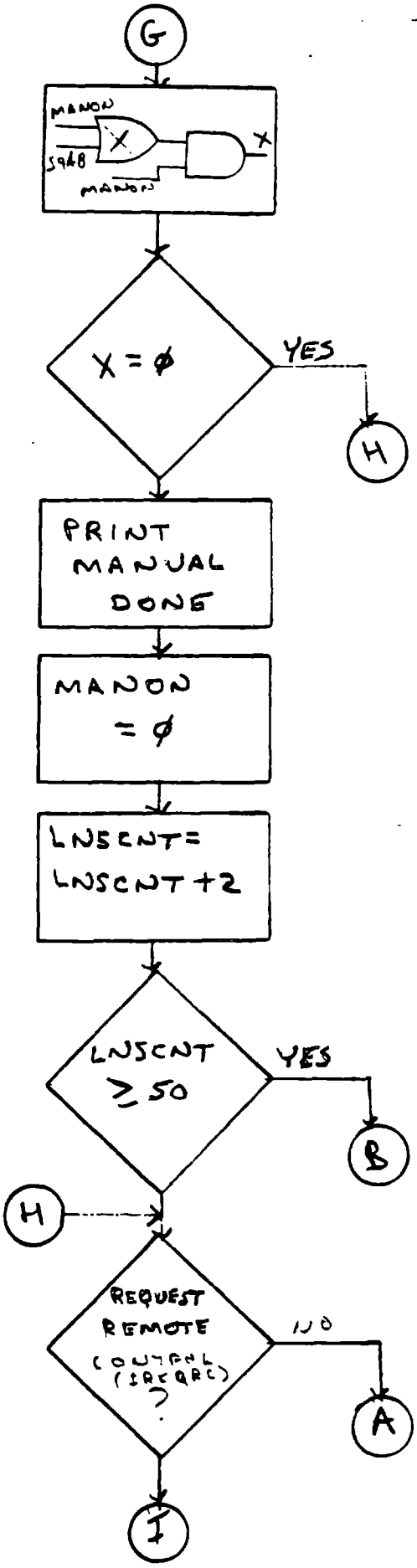


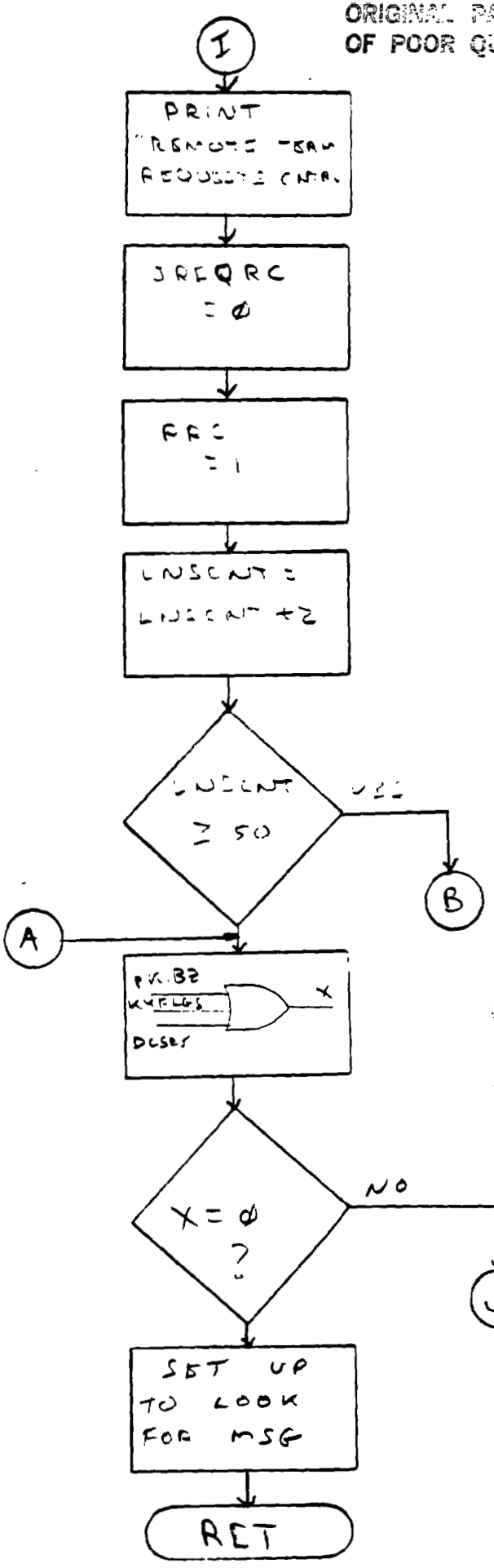

DCSOS2
STEON = 1
NO
A
LINE COUNT > 50
YES
B
INCREMENT DSCCNT
DSCCNT > 9000
YES
C
SIO TERMINAL PRINTING
YES
A
AINC = ASINC ?
NO
D
E

ANY ALARMS TO OUTPUT

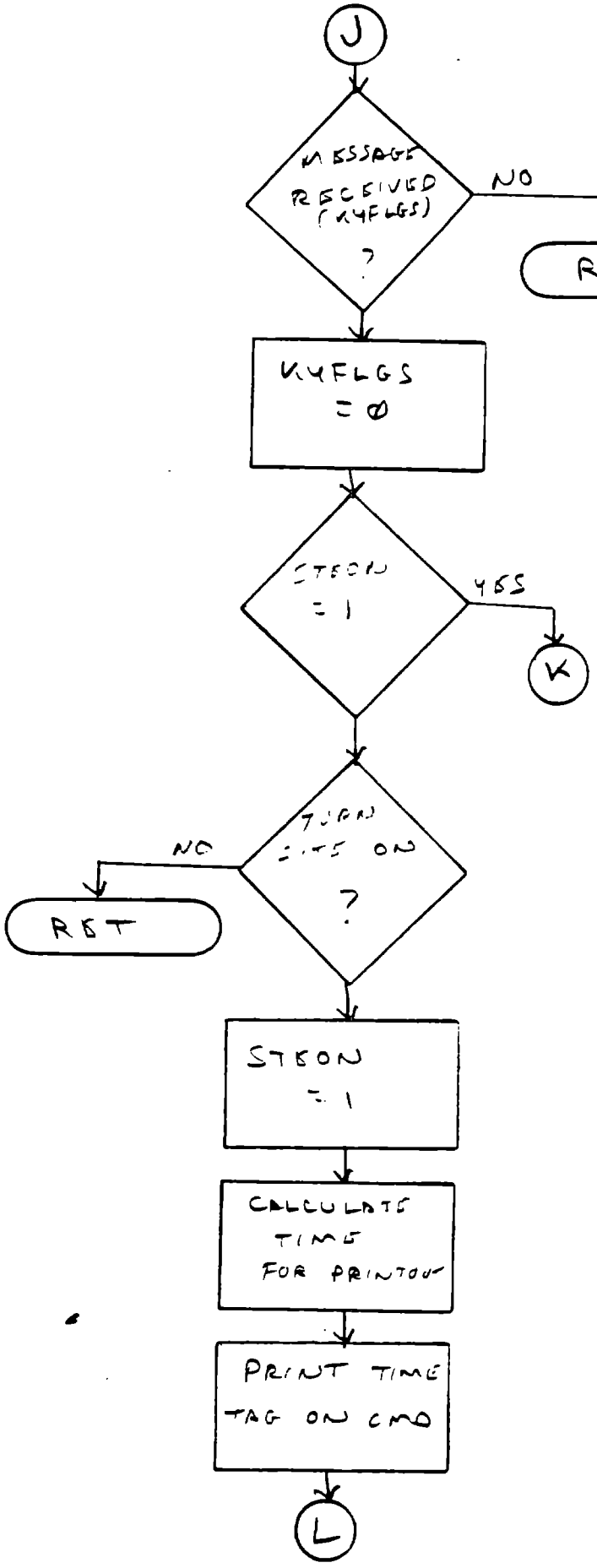


MANUAL DISABLED

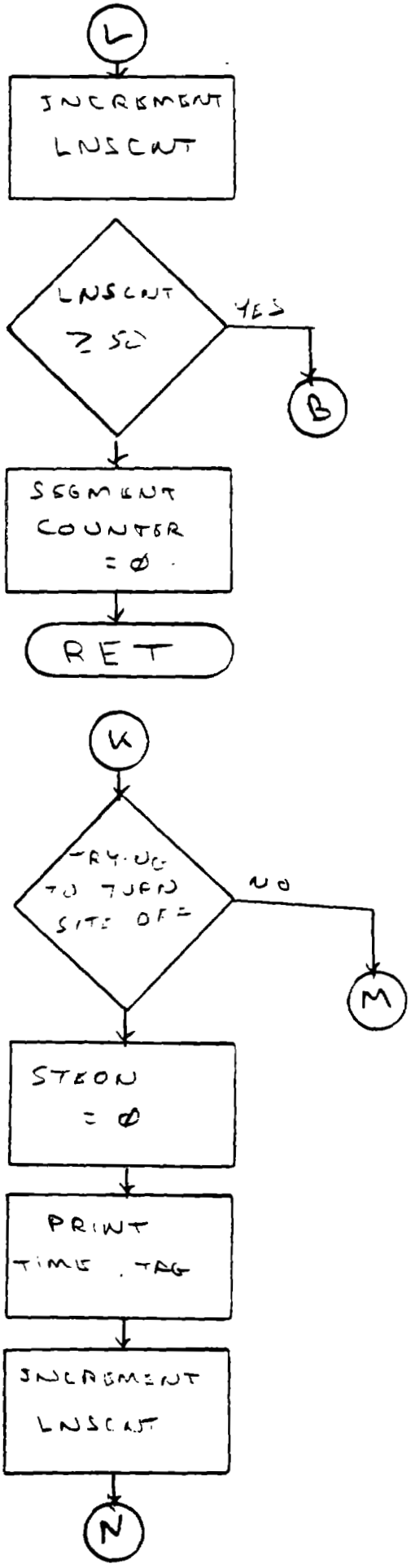


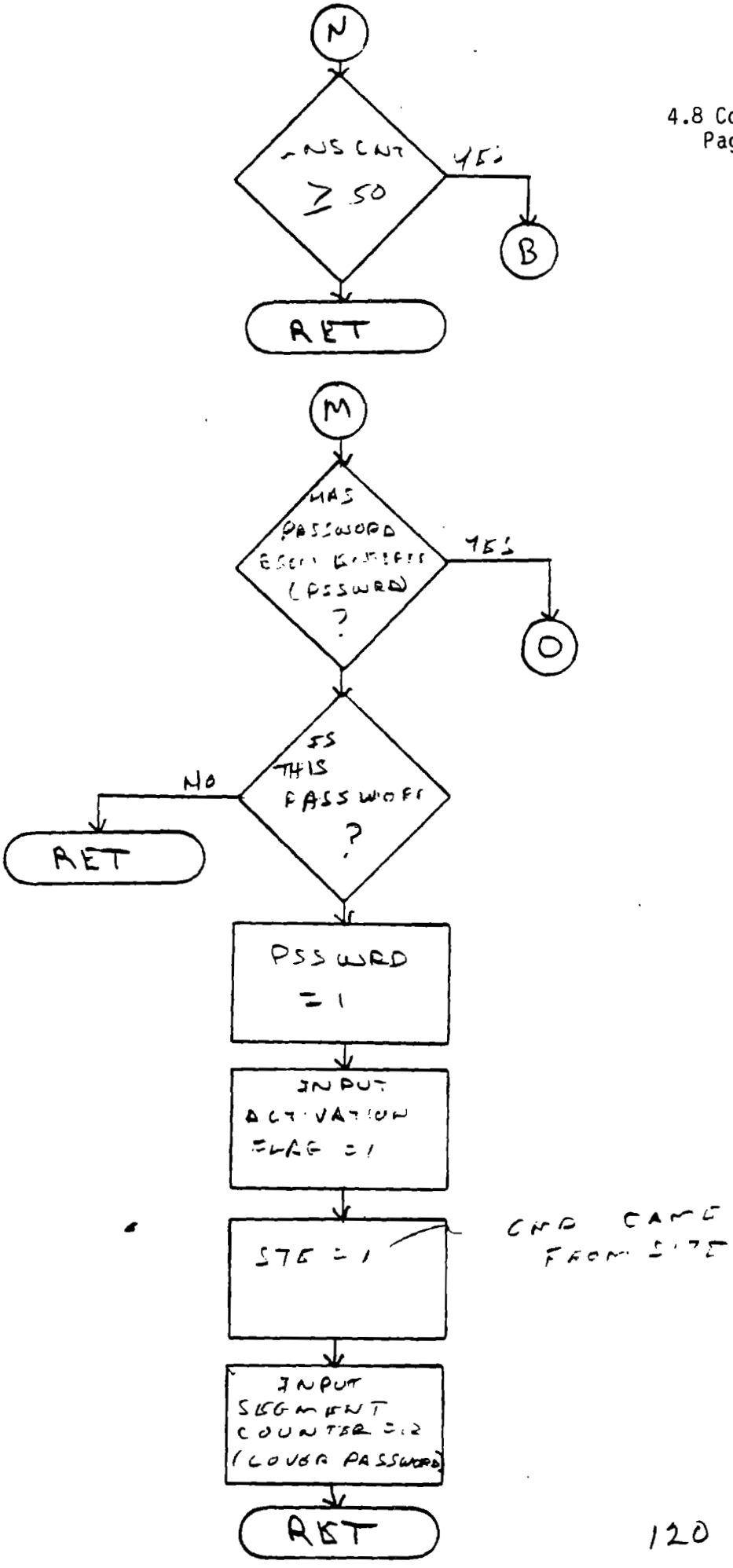


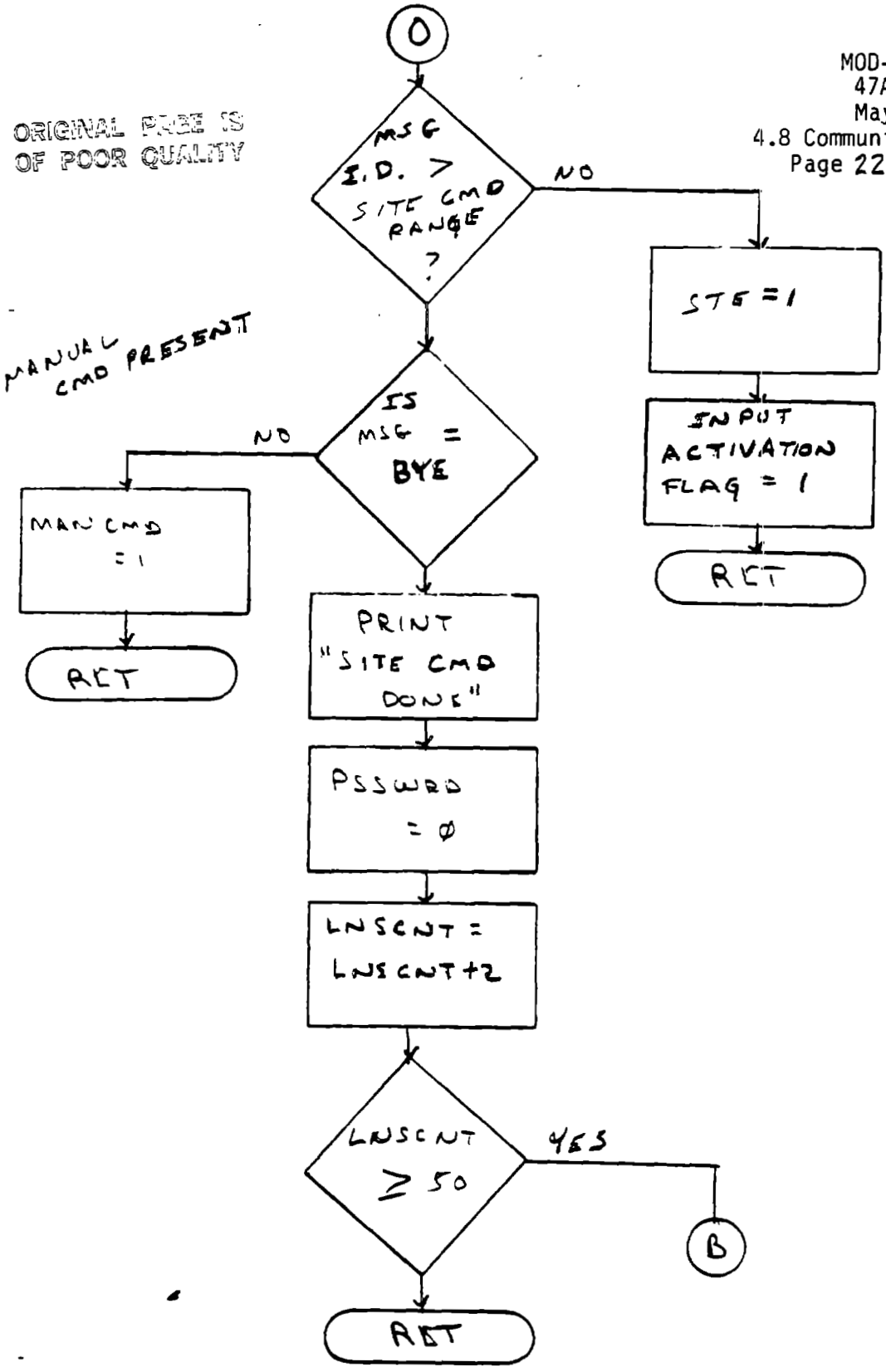
C-3

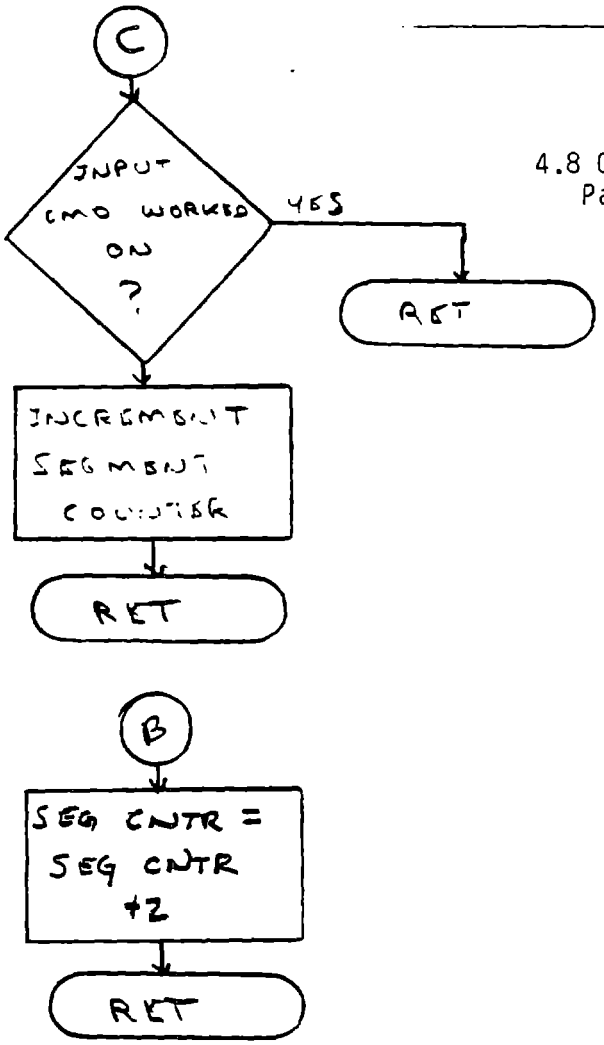


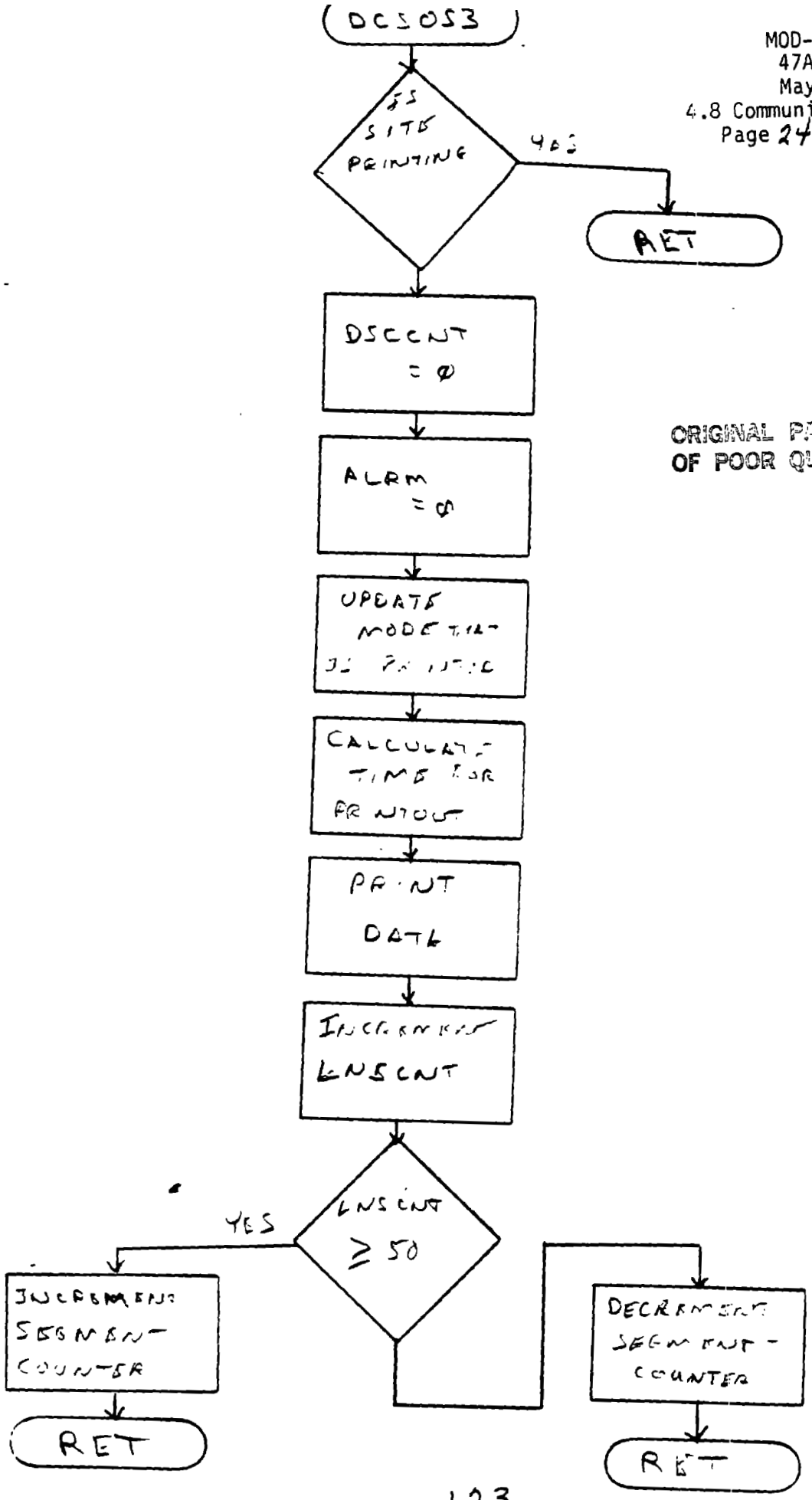
CMS FROM SITE TURN ACTION ON

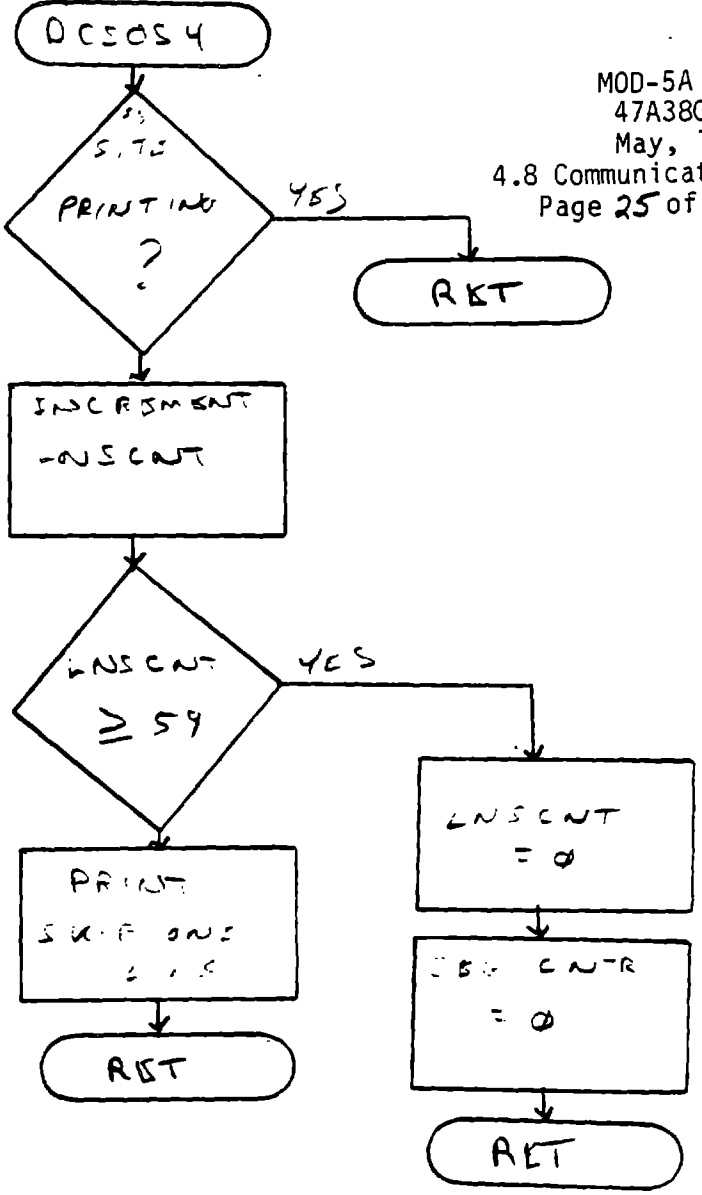



N
-NS CNT
≥ 50
YES
B
RET
M
HAS PASSWORD BEEN ENTERED (PSSWRD) ?
YES
O
IS THIS PASSWORD ?
NO
RET
PSSWRD = 1
INPUT ACTIVATION FLAG = 1
STE = 1
CMD CAME FROM SITE
INPUT SEGMENT COUNTER = 2 (COVER PASSWORD)
RET




C
INPUT CMD WORKED ON ?
YES
RET
INCREMENT SEGMENT COUNTER
RET
B
SEG CNTR = SEG CNTR +2
RET



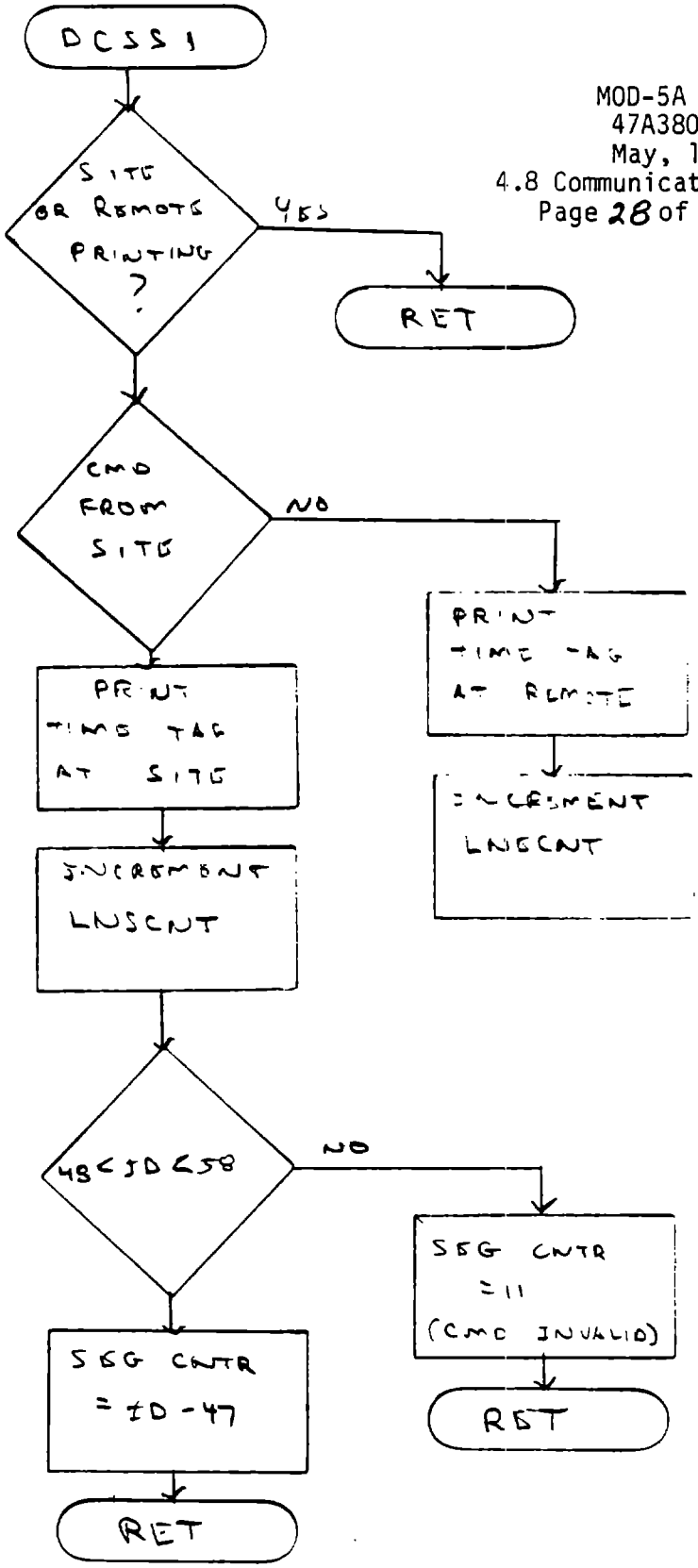

DCSOS4
PRINTING
?
YES
RET
INCREMENT
-NSCNT
LNSCNT
≥ 59
YES
PRINT
RET
LNSCNT
= 0
RET

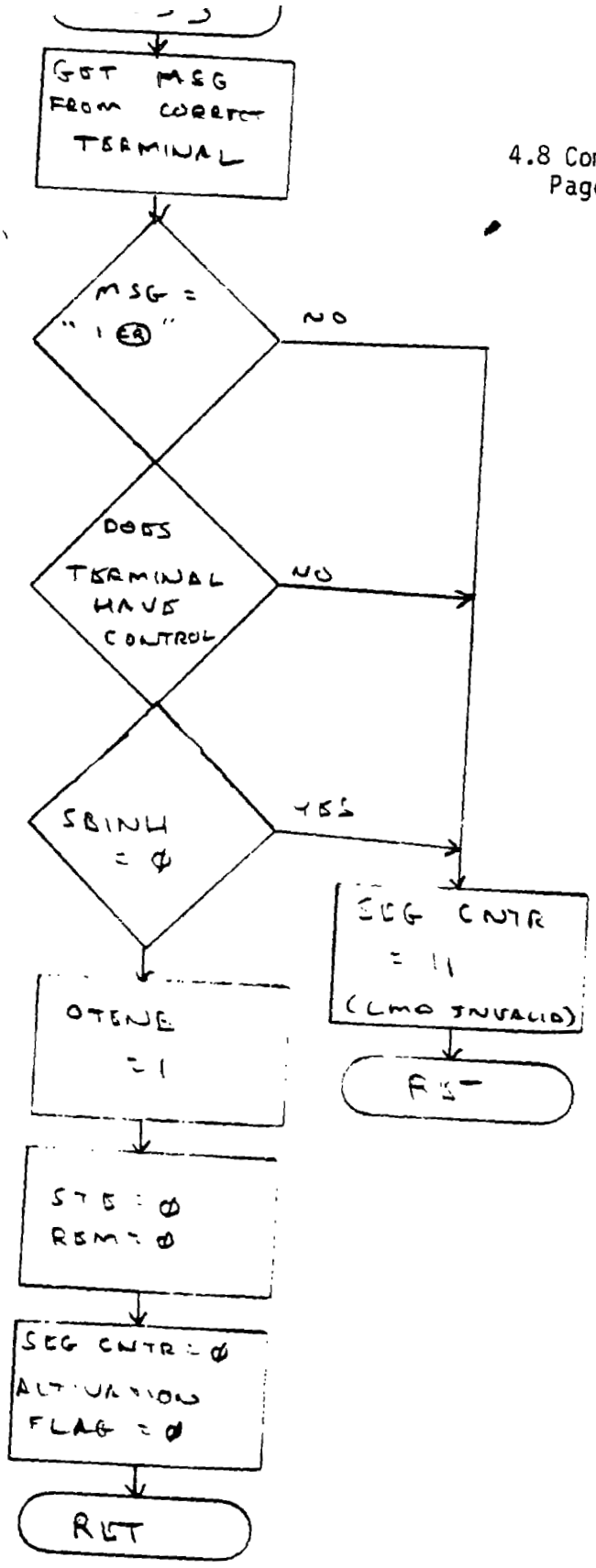
Site/Remote Terminal Input Segment Table

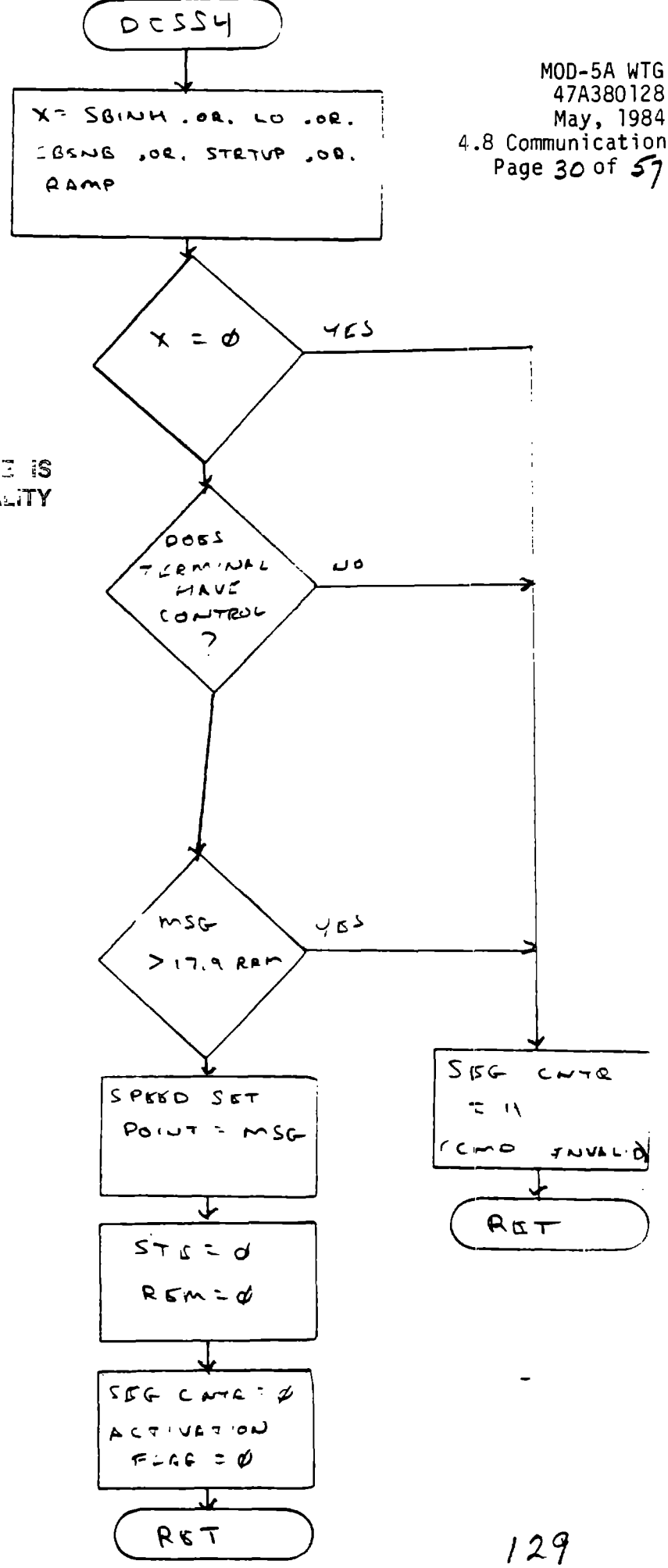
```
DCSRST   DC     DCSS1          PRINT TIME AND DECIDE
         DC     DCSS3          SBENR
         DC     DCSS4          SPEED SET POINT
         DC     DCSS5          POWER SET POINT
         DC     DCSS6          NSD
         DC     DCSS7          ESD
         DC     DCSS9          REQUEST SITE/REMOTE TERMINAL CONTROL
         DC     DCSS10         ENABLE REMOTE/SITE TERMINAL CONTROL
         DC     DCSSZ          ZERO OUT CUMM. ENERGY
         DC     DCSST          SET TIME
         DC     DCSSM          SET MONTH AND DAY
         DC     DCSS11         CMD NOT VALID
         DC     DCSS17         COVER PASSWORD
```

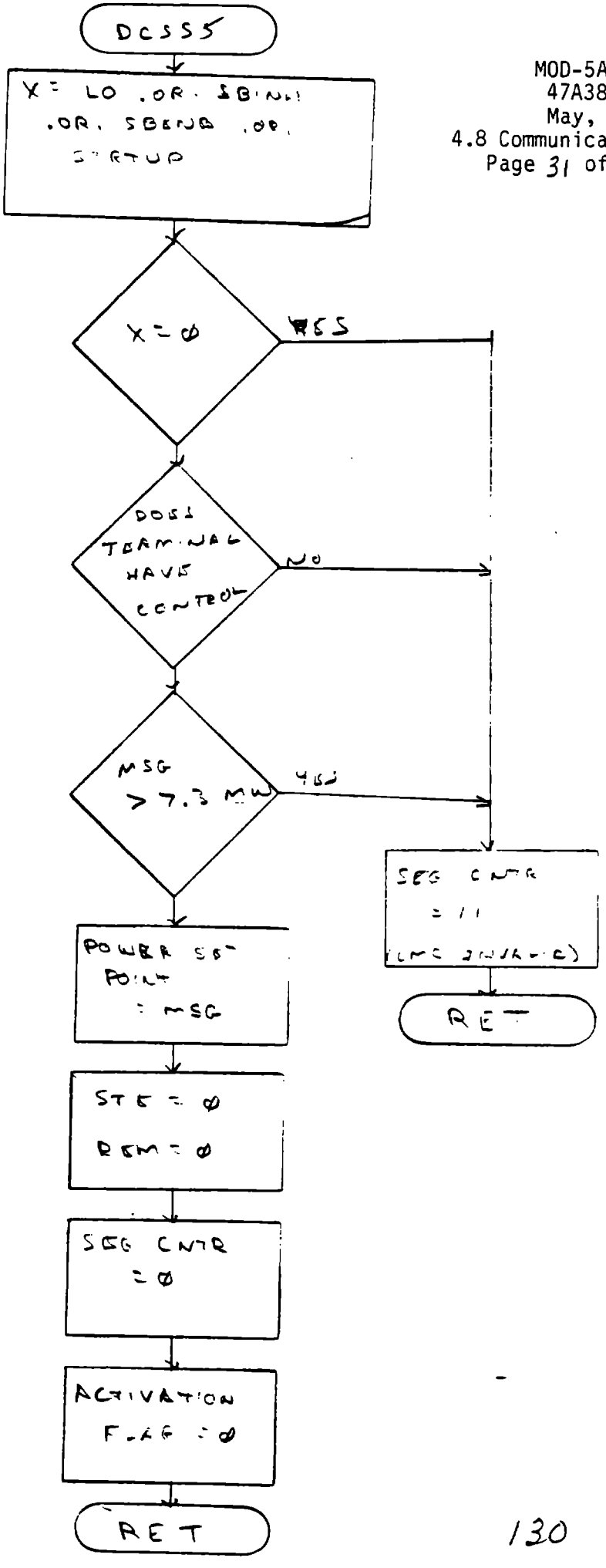
Site / Remote Terminal Commands

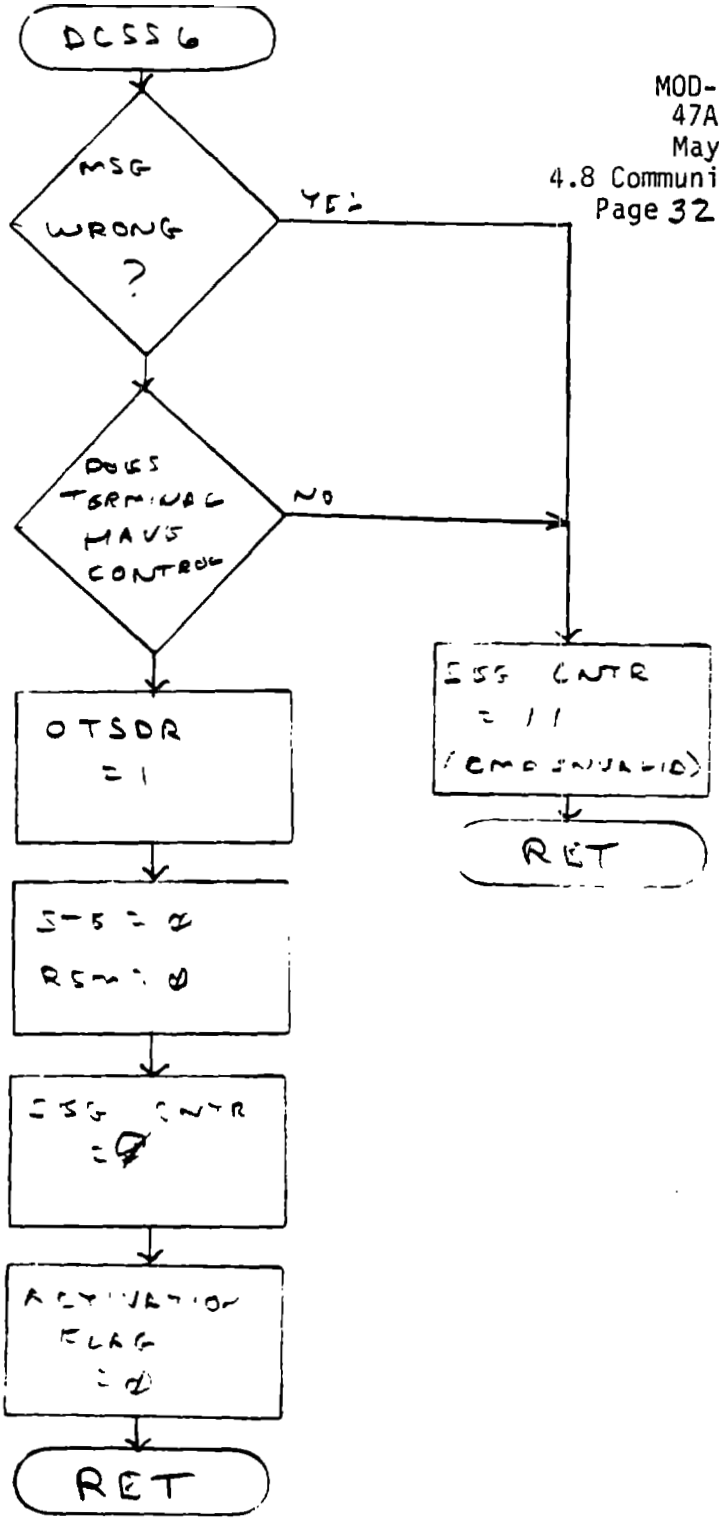
	DESCRIPTION		MESSAGE
0	Operator Terminal Enable (Standby Inhibit → Enable)		0 1 CR
2	RPM Speed Set Point (Init Ramp / Sync)	[5.0 RPM]	1 0 5 0 CR
		[5.0 RPM]	1 1 5 0 CR
		[16.7 RPM]	1 1 6 7 CR
3	Power Set Point	[3.0 MW]	2 1 3 2 CR
		[5.4 MW]	2 0 5 4 CR
4	Normal Shutdown To Standby Inhibit		3 1 CR
5	Emergency Shutdown To Lockout		4 1 CR
6	Request Terminal Control		5 1 CR
7	Enable Terminal Control		6 1 CR
8	Zero Cummulative Energy To Date		7 1 CR
9	Set Time (Master Time)	[10:33 AM]	8 1 0 3 3 CR
10	Set Month / Date	[March 25]	9 0 3 2 5 CR
11	Print Another Line		: 1 CR
12	Disconnect / Connect Terminal	[Conn.]	; 1 CR
		[Disconn.]	; 0 CR

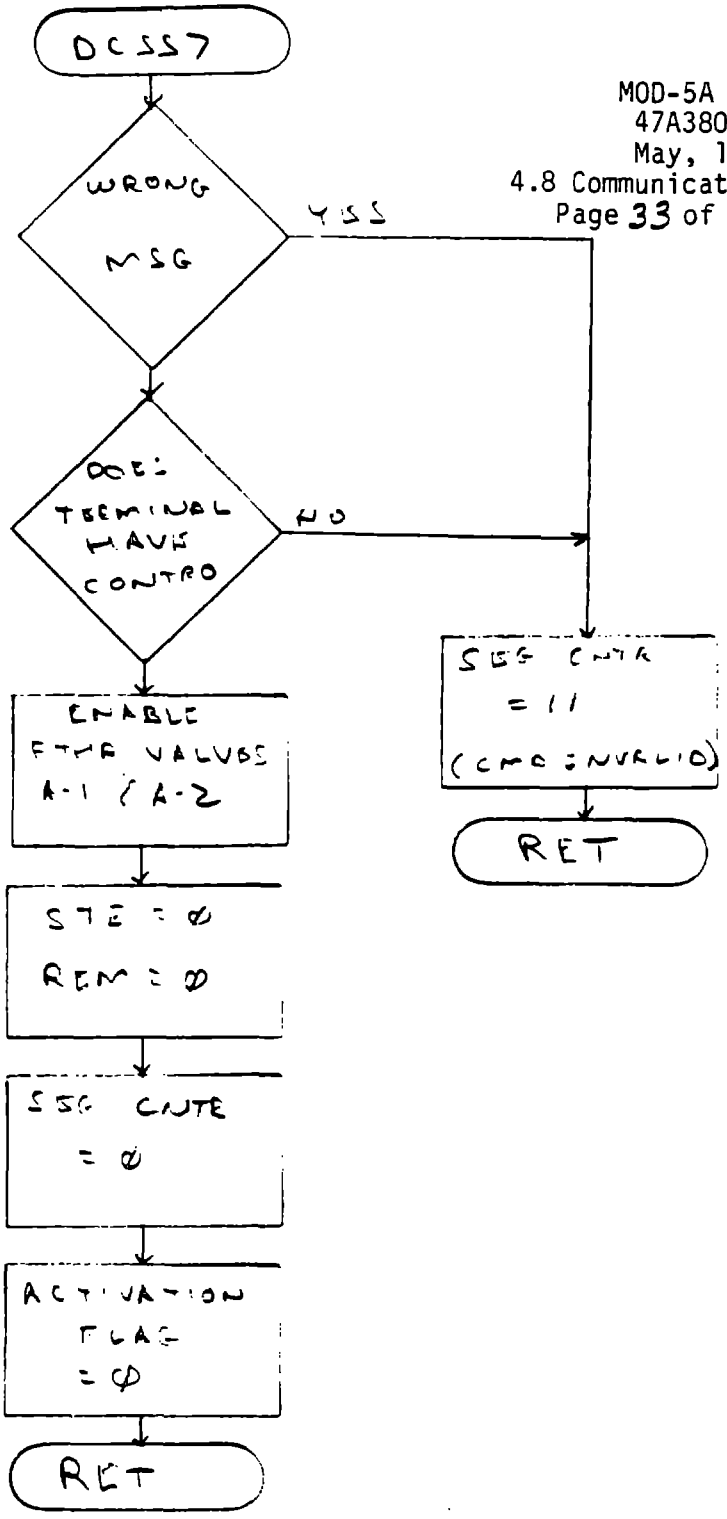


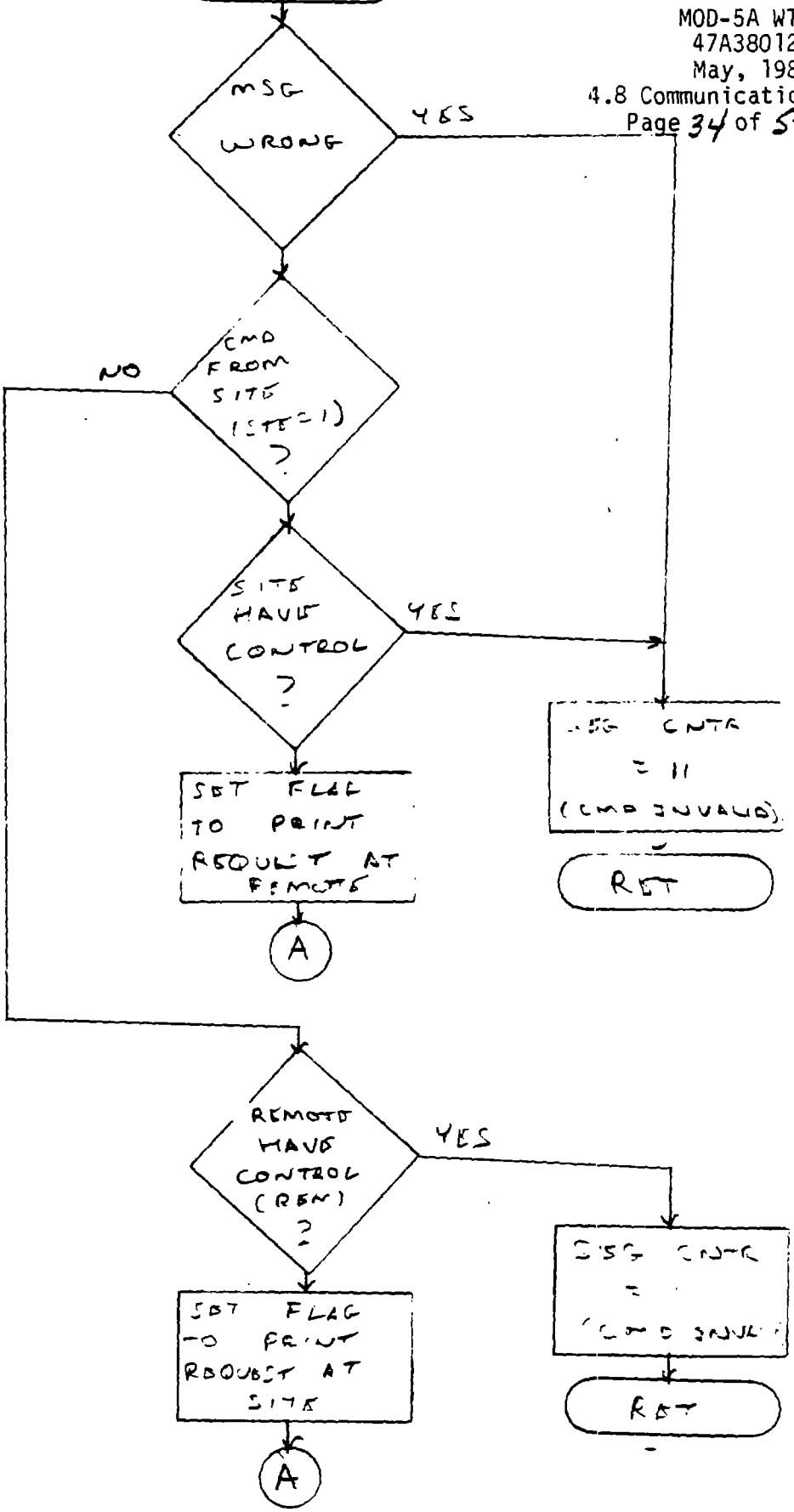


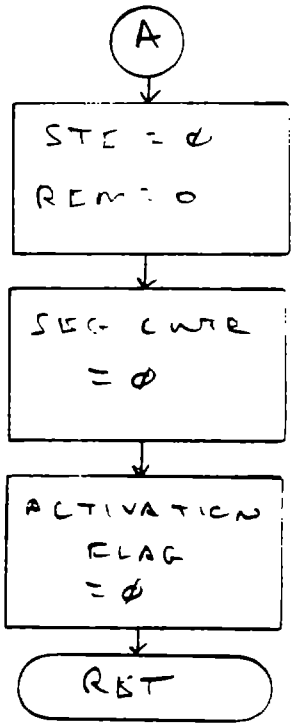


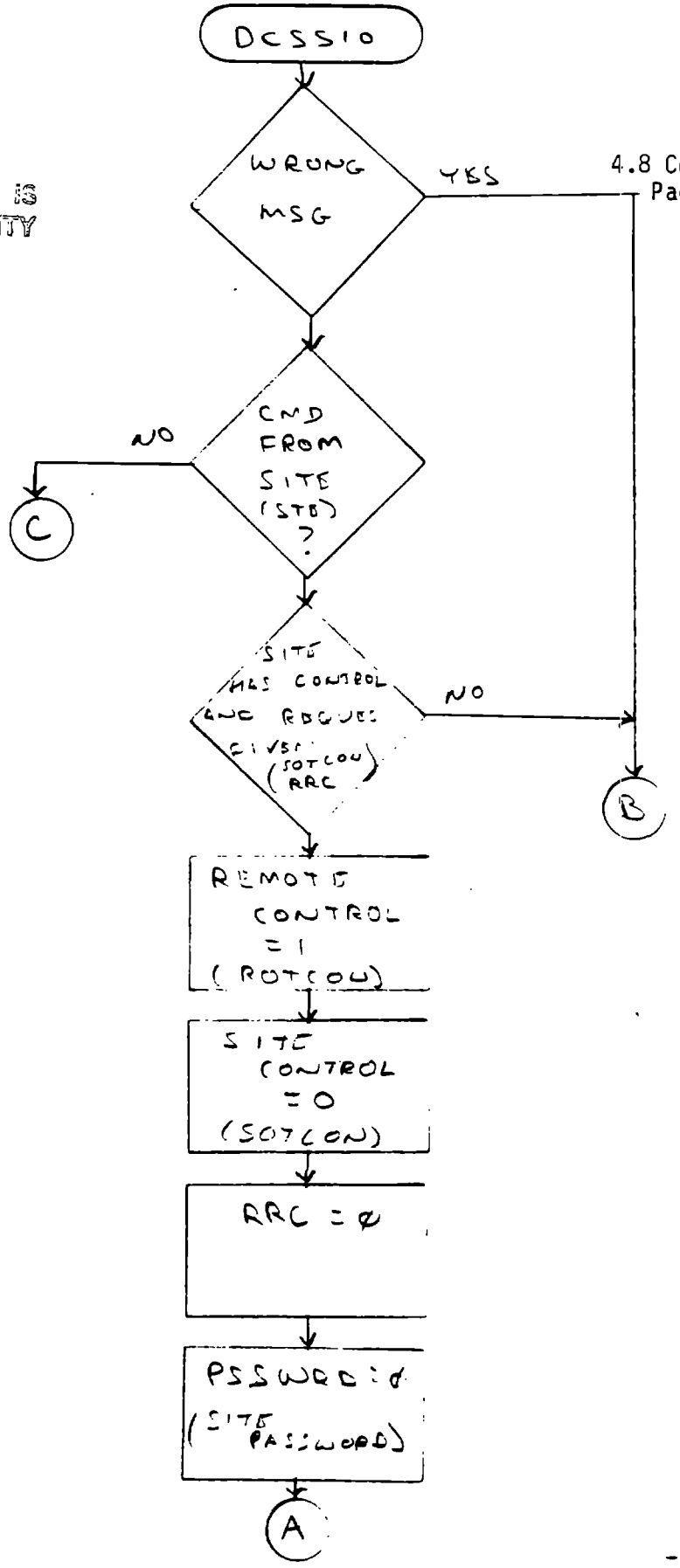


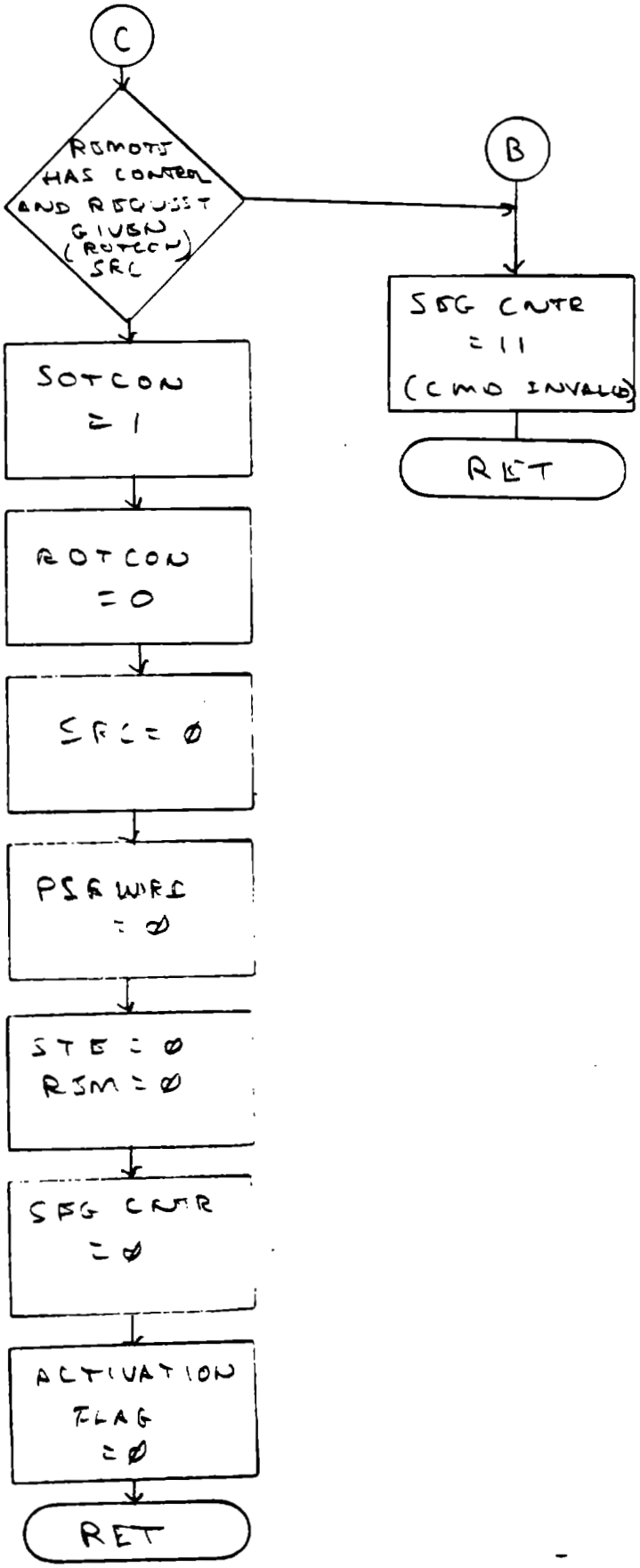

DCSS 6
MSG WRONG ?
YES
DOES TERMINAL HAVE CONTROL
NO
ESS CNTR = 11 (CMD INVALID)
RET
OTSDR = 1
S-S = 0
RSM = 0
ESS CNTR = 0
ACTIVATION FLAG = 0
RET

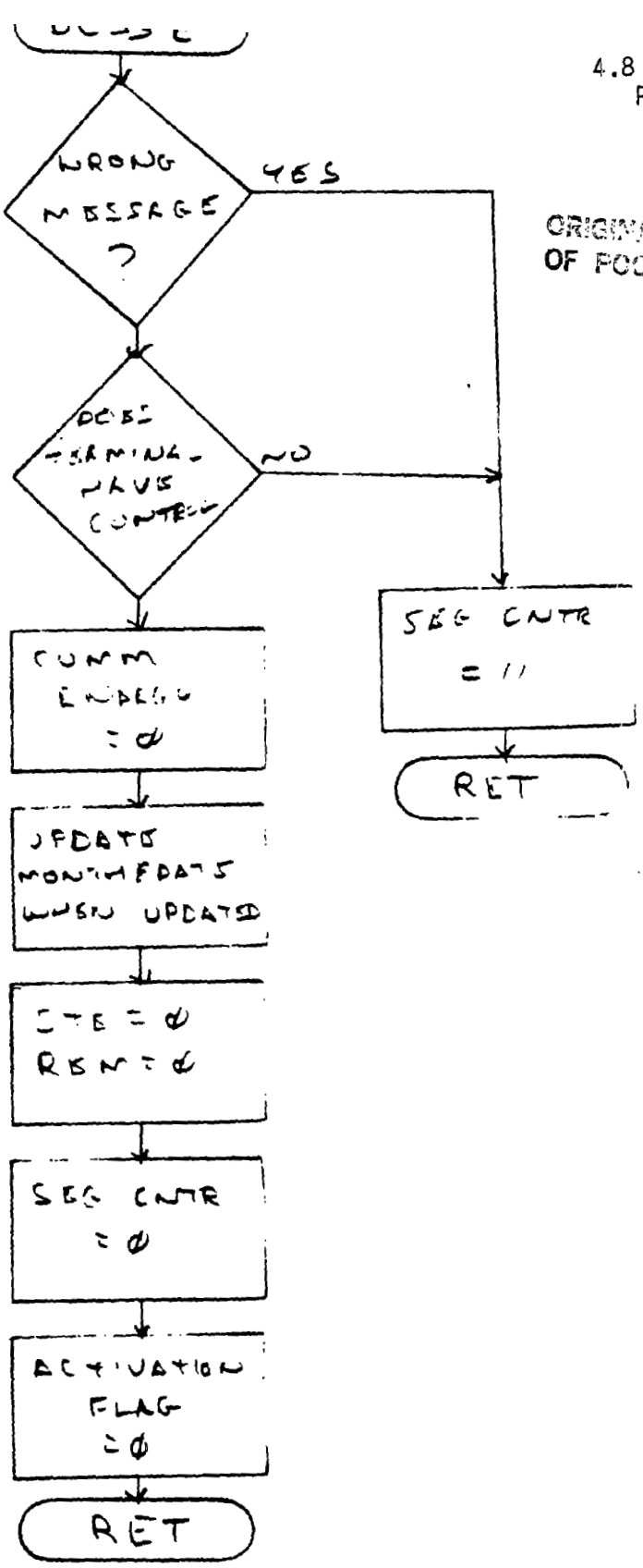

DCSS7
WRONG MSG
YES
DCE: TERMINAL HAVE CONTRO
NO
SEG CNTR = 11
(CMD: NVRLIO)
RET
ENABLE ETHR VALVES A-1 & A-2
STE = 0
REM = 0
SEG CNTR = 0
ACTIVATION FLAG = 0
RET

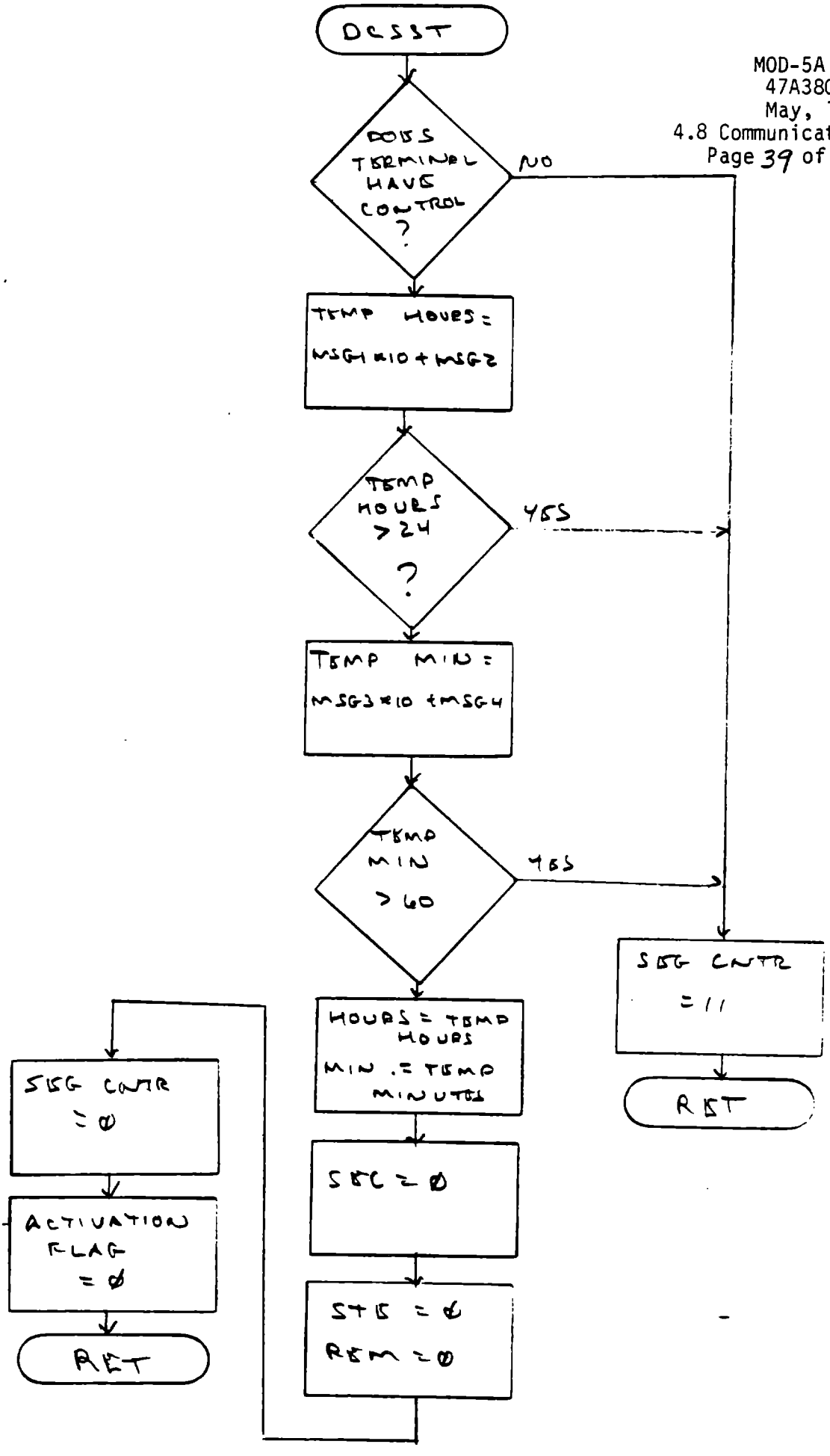

MSG WRONG
YES
CMD FROM SITE (SITE=1) ?
NO
SITE HAVE CONTROL ?
YES
SET FLAG TO PRINT REQUEST AT REMOTE
A
MSG CNTR = 11 (CMD INVALID)
RET
REMOTE HAVE CONTROL (REM) ?
YES
SET FLAG TO PRINT REQUEST AT SITE
A
MSG CNTR = (CMD INVL)
RET

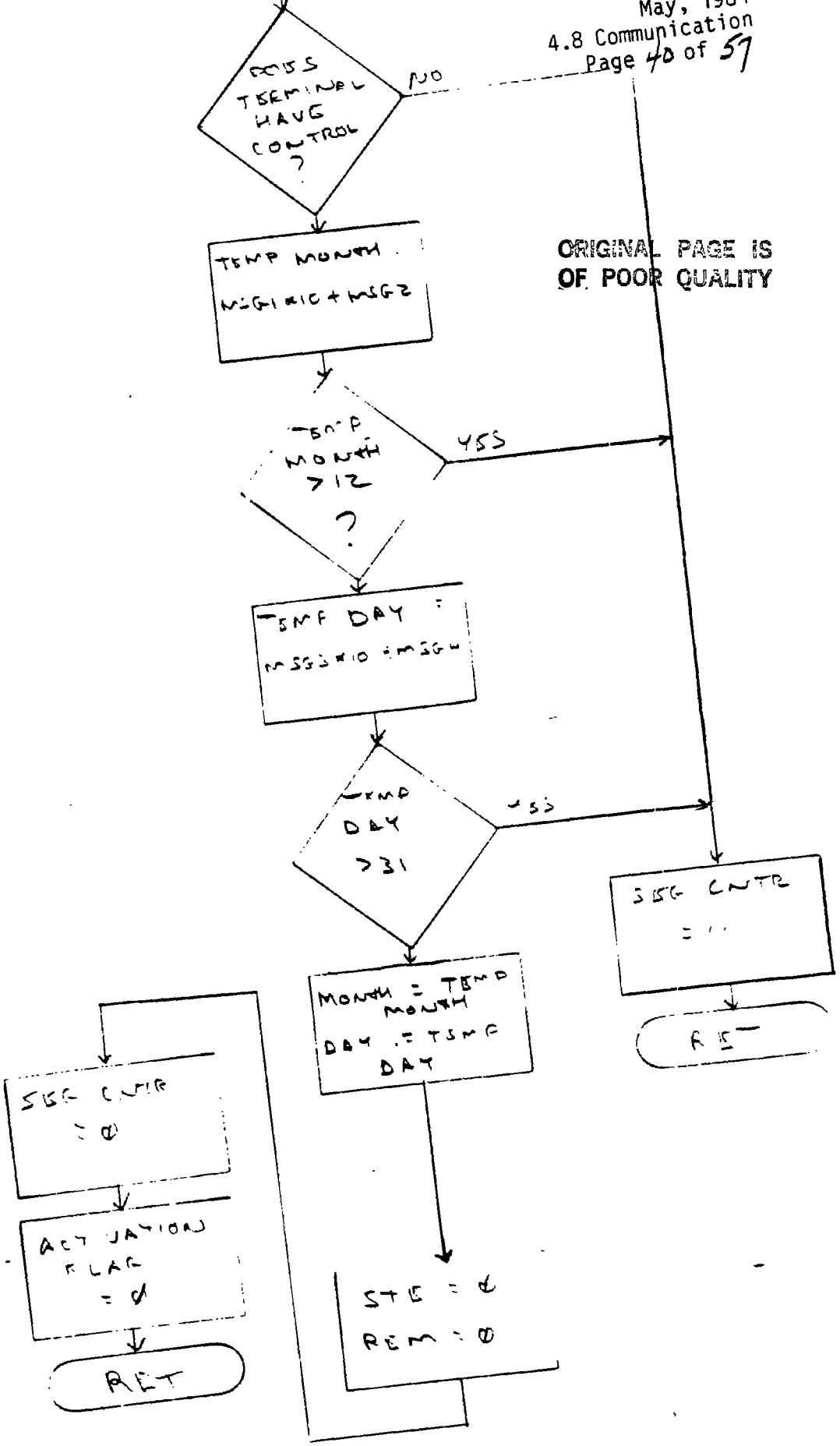

A
STE = 0
REM = 0
SEG CNTR
= 0
ACTIVATION
FLAG
= 0
RET



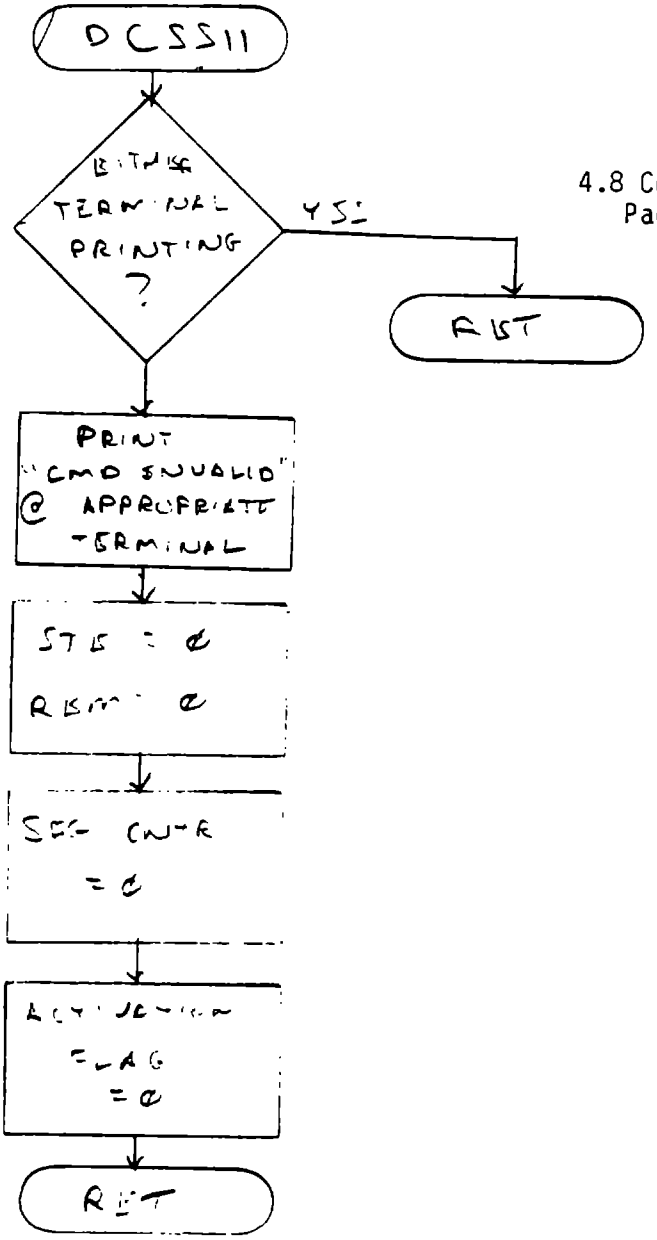

C
REMOTE HAS CONTROL AND REQUEST GIVEN (ROTCON) SRC
B
SOTCON = 1
ROTCON = 0
SRC = 0
PSA WRD = 0
STE = 0
RSM = 0
SEG CNTR = 0
ACTIVATION FLAG = 0
RET
SEG CNTR = 11 (CMD INVALID)
RET

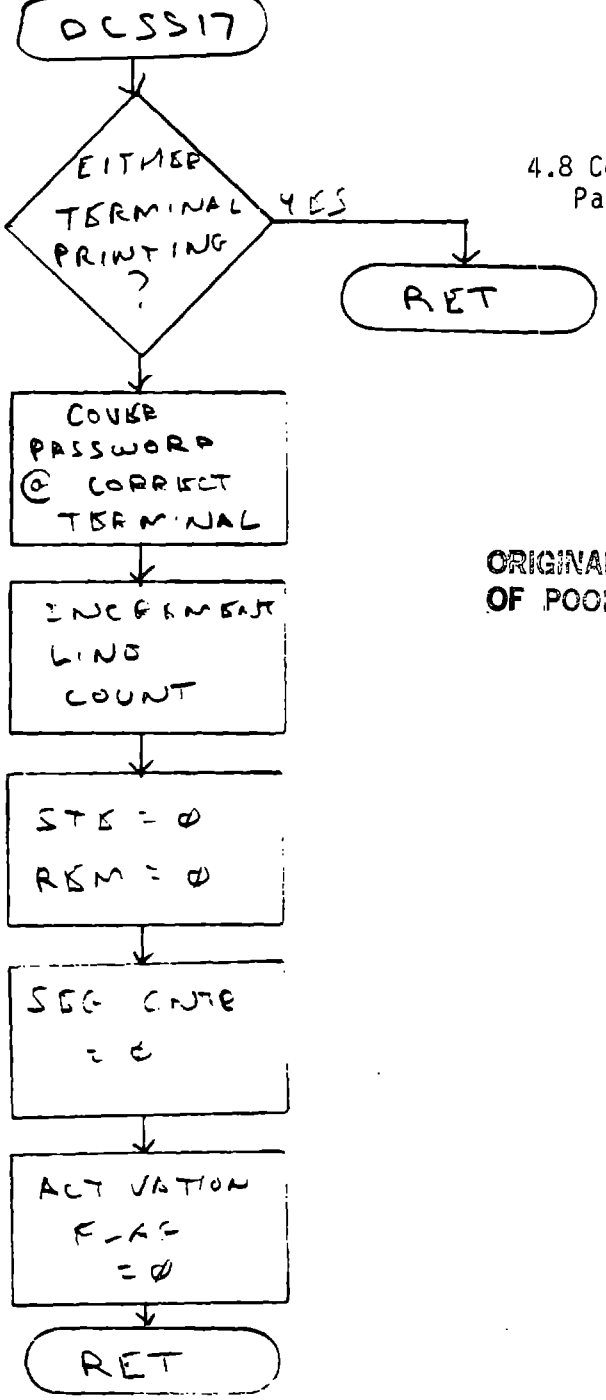



DCSST
DOES TERMINAL HAVE CONTROL ?
NO
TEMP HOURS = MSG1 *10 + MSG2
TEMP HOURS > 24 ?
YES
TEMP MIN = MSG3 *10 + MSG4
TEMP MIN > 60
YES
SEG CNTR = 11
RET
HOURS = TEMP HOURS
MIN = TEMP MINUTES
SEC = 0
STS = 0
REM = 0
SEG CNTR = 0
ACTIVATION FLAG = 0
RET



ORIGINAL PAGE IS
OF POOR QUALITY


DCSS11
IS THIS TERMINAL PRINTING ?
YES
RET
PRINT "CMD INVALID" @ APPROPRIATE TERMINAL
STS = 0
RSM = 0
SEC CNTR = 0
ACTIVATION FLAG = 0
RET



Control Data System Output Segment Table

```
CDSOST   DC     CDSOS1          SEND DATA TO CDS EVERY SECOND
```

Control Data System Input Segment Table

```
CDSIST   DC     CDSIS1          CHECK SINGLE RAM
         DC     CDSIS2          CHECK DOUBLE RAM
         DC     CDSIS3          CHECK APU RAM
         DC     CDSIS4          CHANGE SINGLE RAM
         DC     CDSIS5          CHANGE DOUBLE RAM
         DC     CDSIS6          CHANGE APU RAM
         DC     CDSIS7          CONNECT/DISCONNECT CDS TERMINAL
```

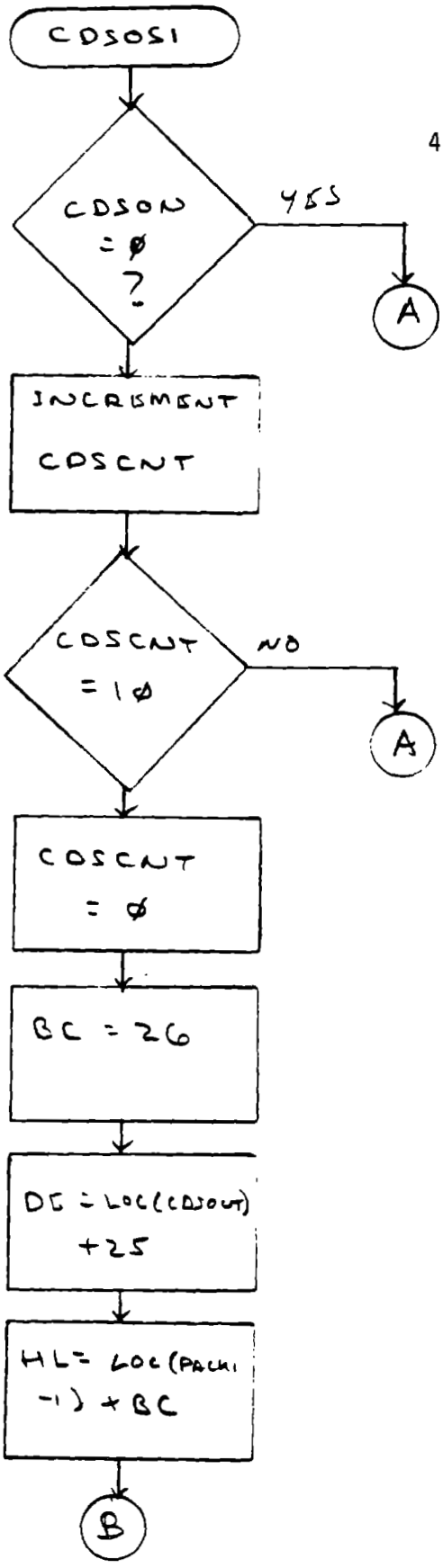
CONTROL DATA SYSTEM TO CONTROLLER

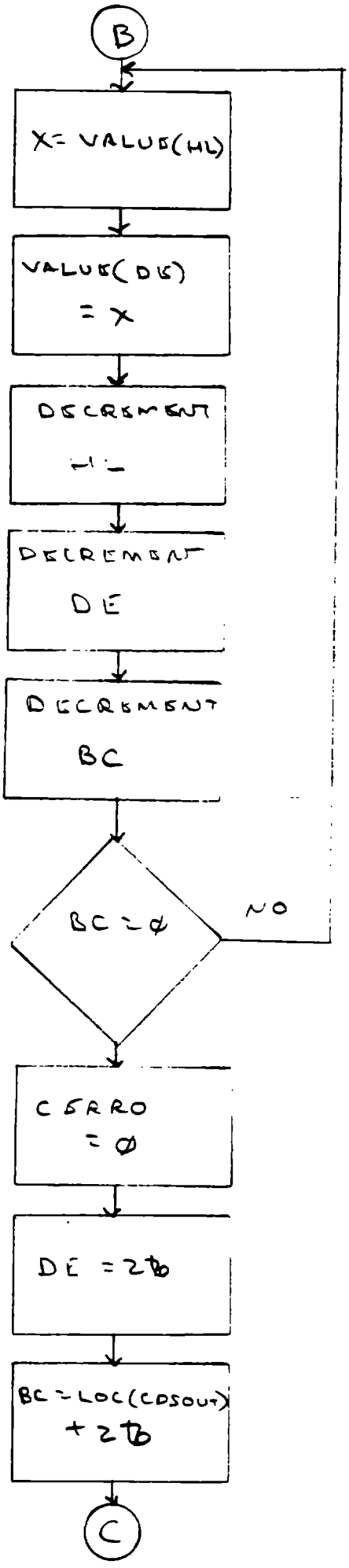
DESCRIPTION	ID #
CHECK SINGLE RAM	4
CHECK DOUBLE RAM	8
CHECK APU RAM	16
CHANGE SINGLE RAM	5
CHANGE DOUBLE RAM	9
CHANGE APU RAM	17
CDS CONNECTED / DISCONNECTED	25

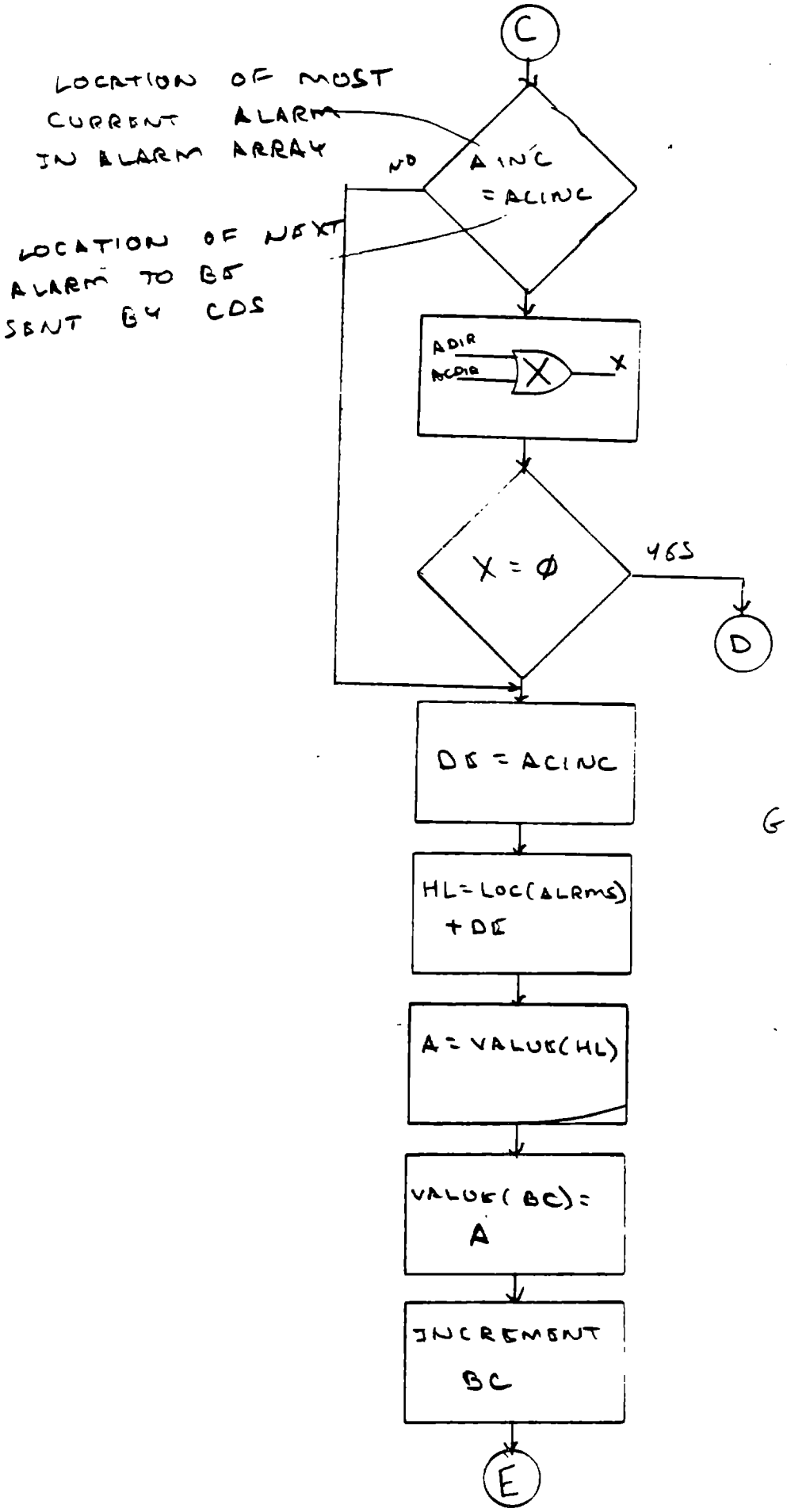
CONTROLLER TO CDS

—Data stream is sent at a rate of 1 stream per second. This stream contains the packed I/O discretes, all input and output analog values, alarms when present and command values when requested. The ID of the stream will depend on the content of the stream as shown below.

ID	Code
0	Normal (discretes & analog = 0)
1	Normal with 1 alarm
2	" " 2 alarms
4	Normal with single RAM
5	" " " " & 1 alarm
6	" " " " & 2 alarms
8	" " double RAM
9	" " " " & 1 alarm
10	" " " " & 2 alarms
16	Normal with APU RAM
17	" " " " & 1 alarm
18	" " & 2 alarms

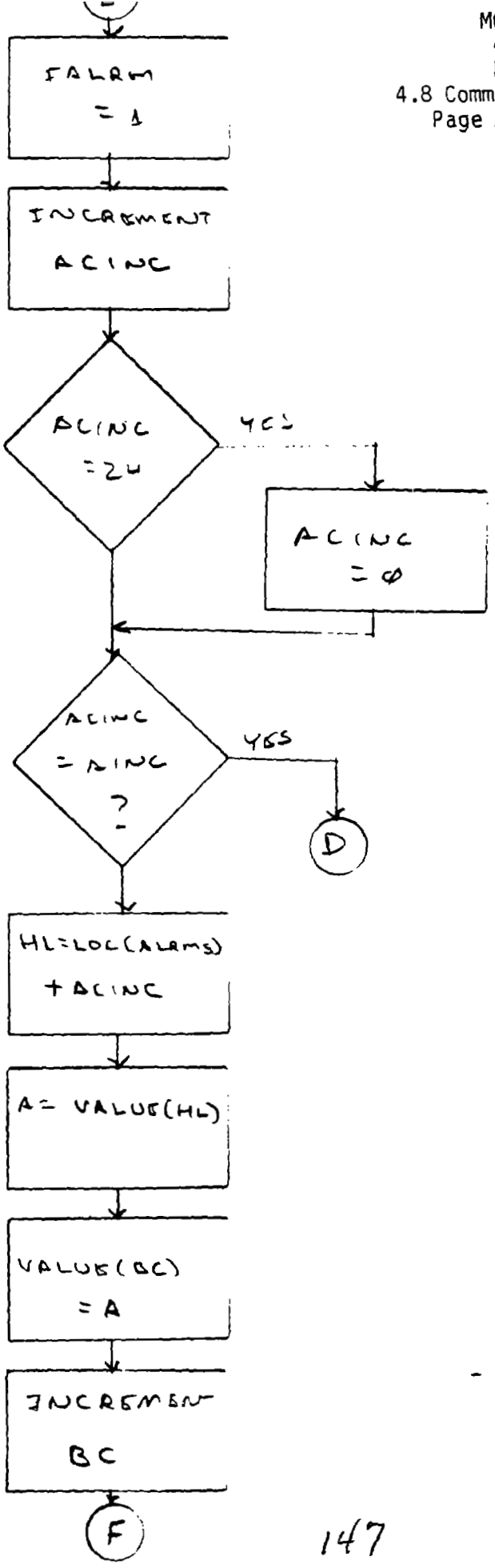

CDSOS1
CDSON = Ø ?
YES
A
INCREMENT CDSCNT
CDSCNT = 10
NO
A
CDSCNT = Ø
BC = 26
DE = LOC(CDJOUT) +25
HL = LOC(PACH1 -1) + BC
B

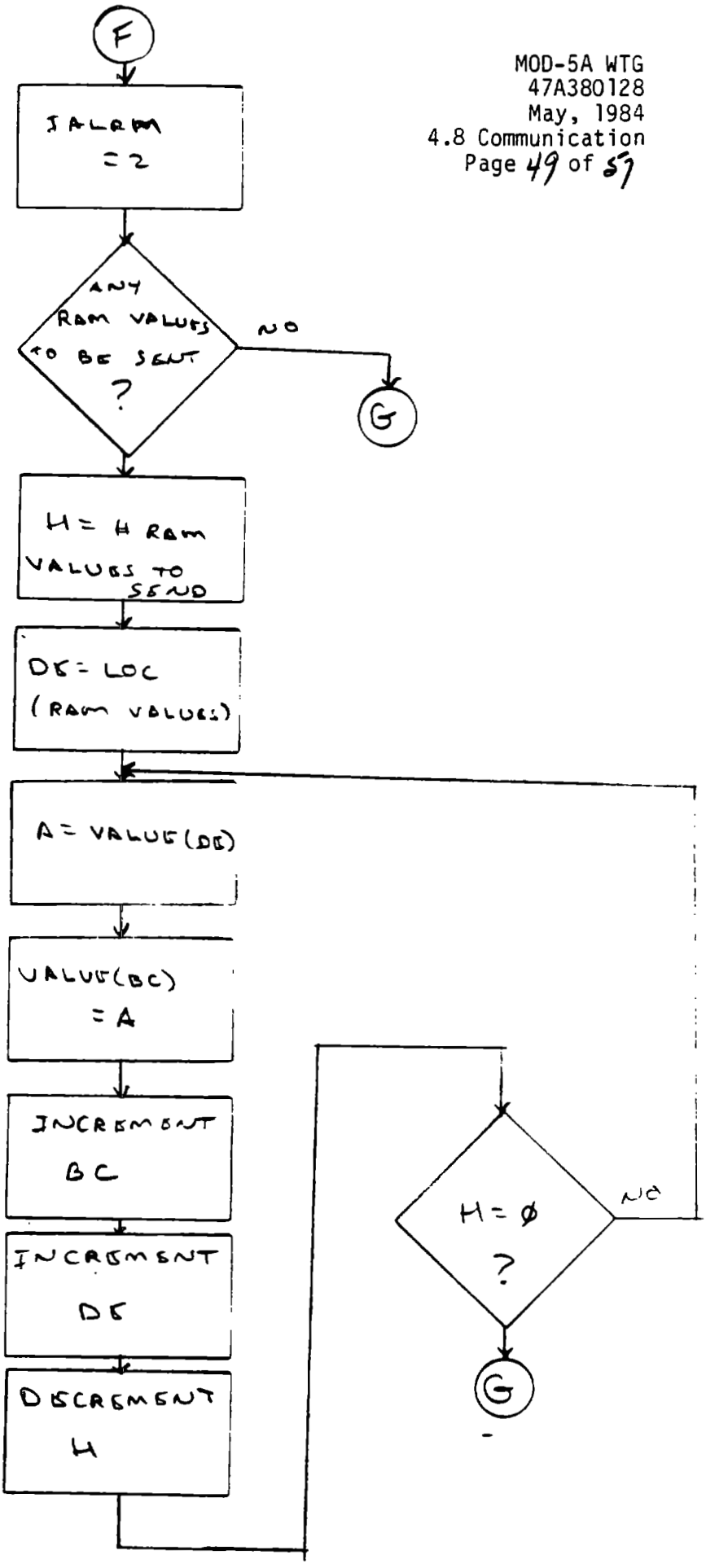

B
X= VALUE(HL)
VALUE(DE)
= X
DECREMENT
HL
DECREMENT
DE
DECREMENT
BC
BC = 0
NO
CARRY
= 0
DE = 2B
BC = LOC(CDSOUT)
+ 2B
C

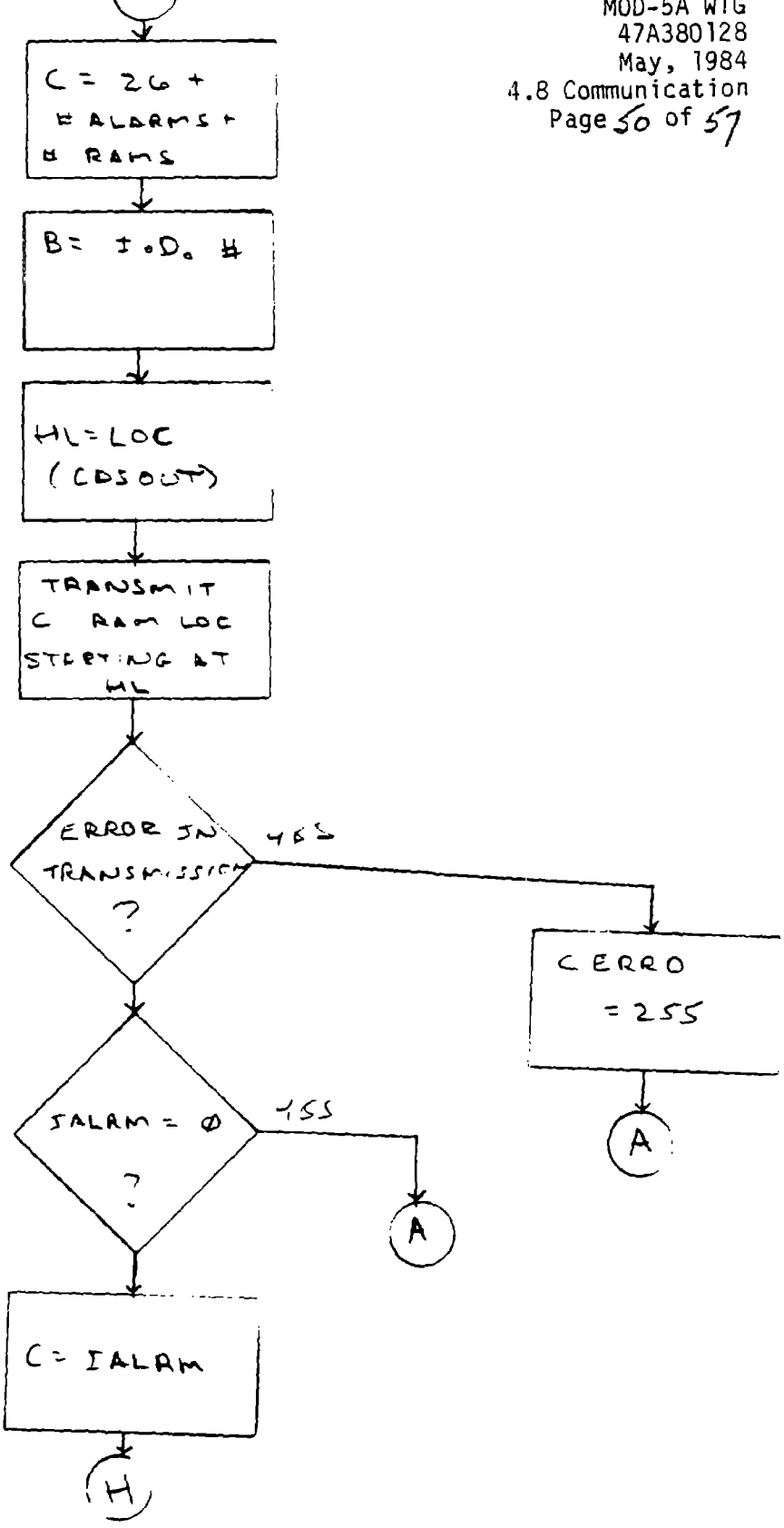


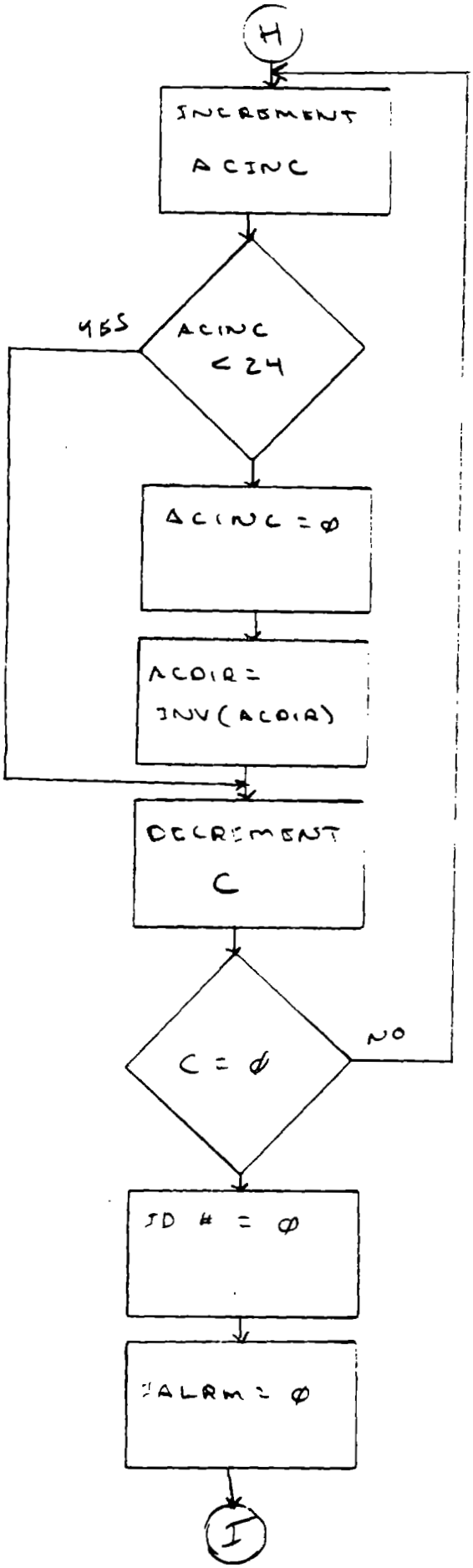
ANY ALARMS?

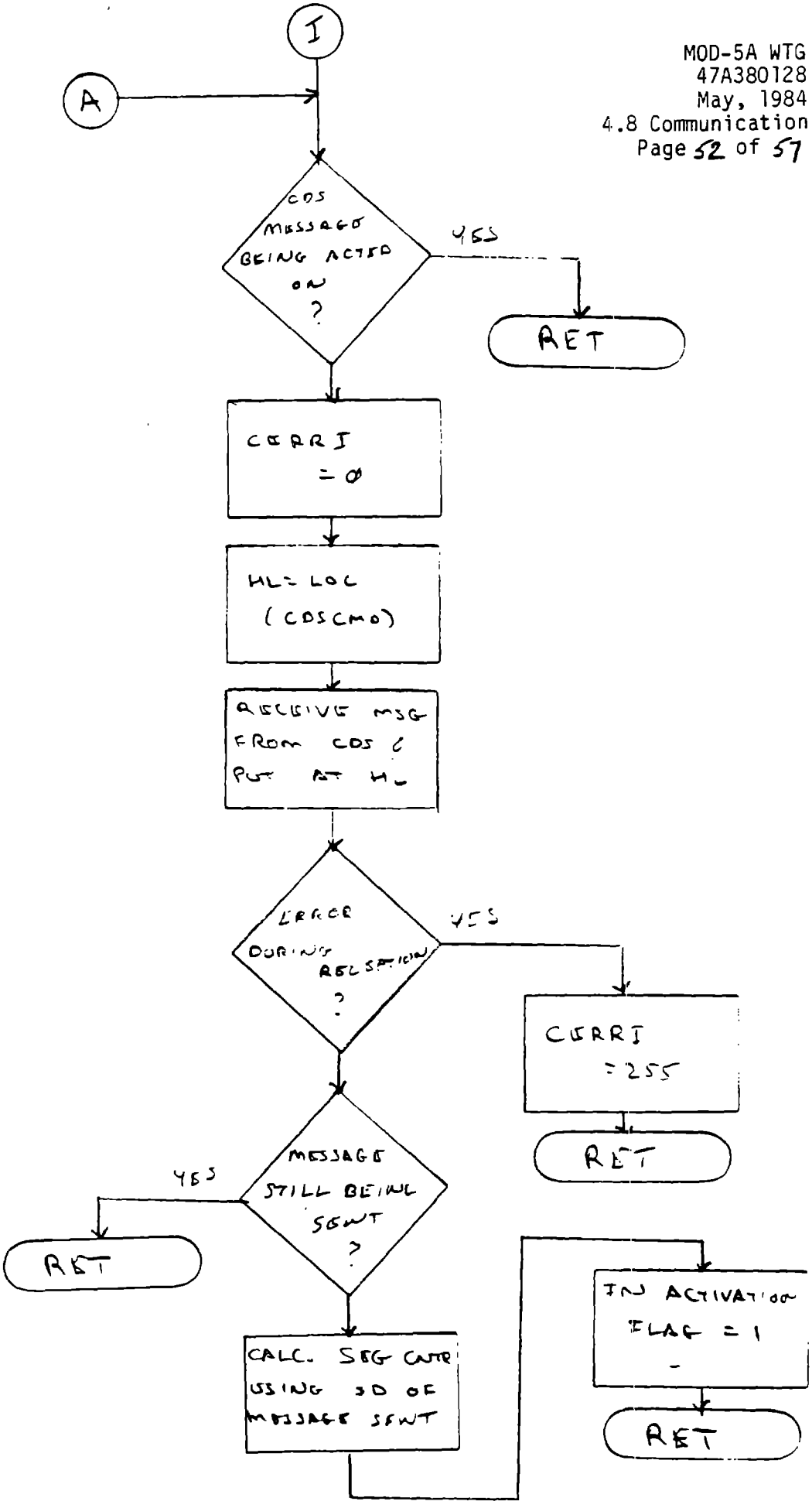
GET ALARM = S

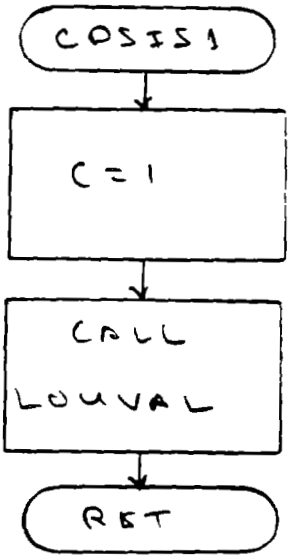


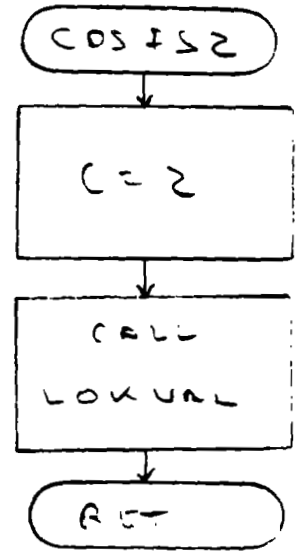

F
IALRM
=2
ANY
RAM VALUES
TO BE SENT
?
NO
G
H = H RAM
VALUES TO
SEND
DE = LOC
(RAM VALUES)
A = VALUE(DE)
VALUE(BC)
= A
INCREMENT
BC
INCREMENT
DE
DECREMENT
H
H = Ø
?
NO
G

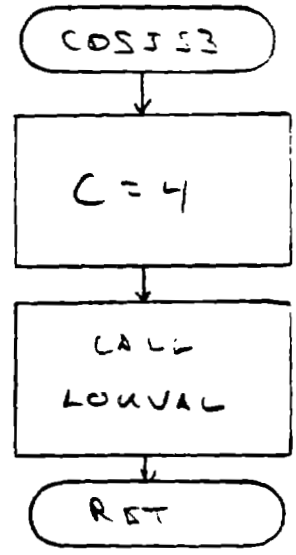

C = 26 + # ALARMS + # RAMS
B = I.D. #
HL = LOC (CDSOUT)
TRANSMIT C RAM LOC STARTING AT HL
ERROR IN TRANSMISSION ?
YES
C ERRO = 255
A
IALARM = Ø ?
YES
A
C = IALARM
H

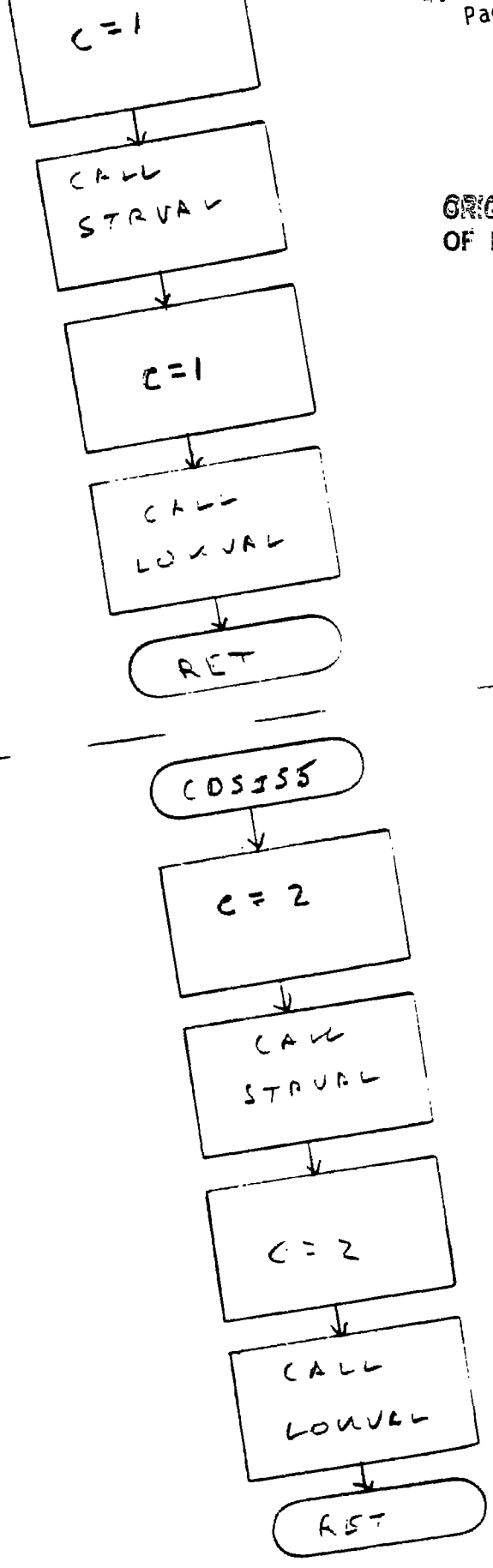

H
INCREMENT
ACINC
ACINC
< 24
YES
ACINC = 0
ACOIR =
INV(ACOIA)
DECREMENT
C
C = 0
NO
JD # = 0
ALRM = 0
I

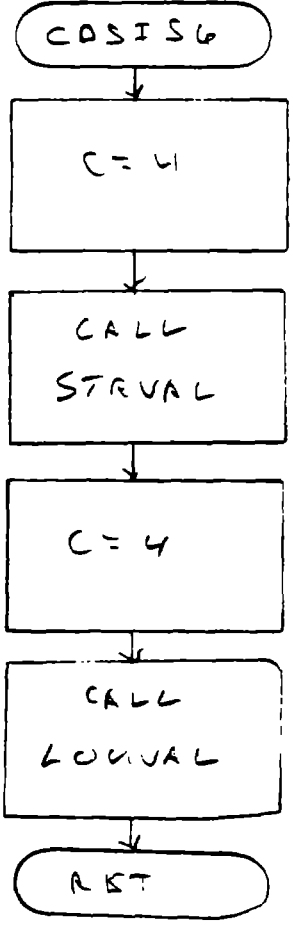

I
A
COS MESSAGE BEING ACTED ON ?
YES
RET
CERRI = 0
HL = LOC (COSCMD)
RECEIVE MSG FROM COS & PUT AT HL
ERROR DURING RECEPTION ?
YES
CERRI = 255
RET
MESSAGE STILL BEING SENT ?
YES
RET
CALC. SEG CNTR USING ID OF MESSAGE SENT
IN ACTIVATION FLAG = 1
RET

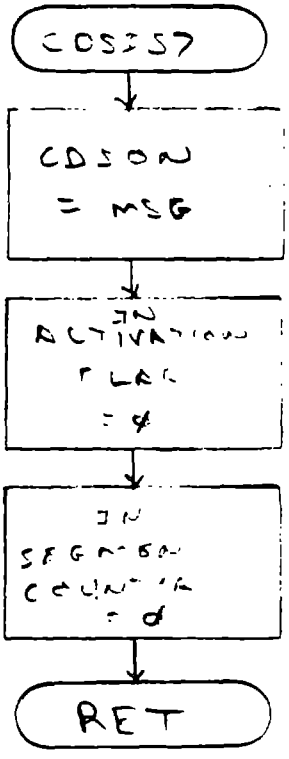

COSIS1
C=1
CALL
LOUVAL
RET

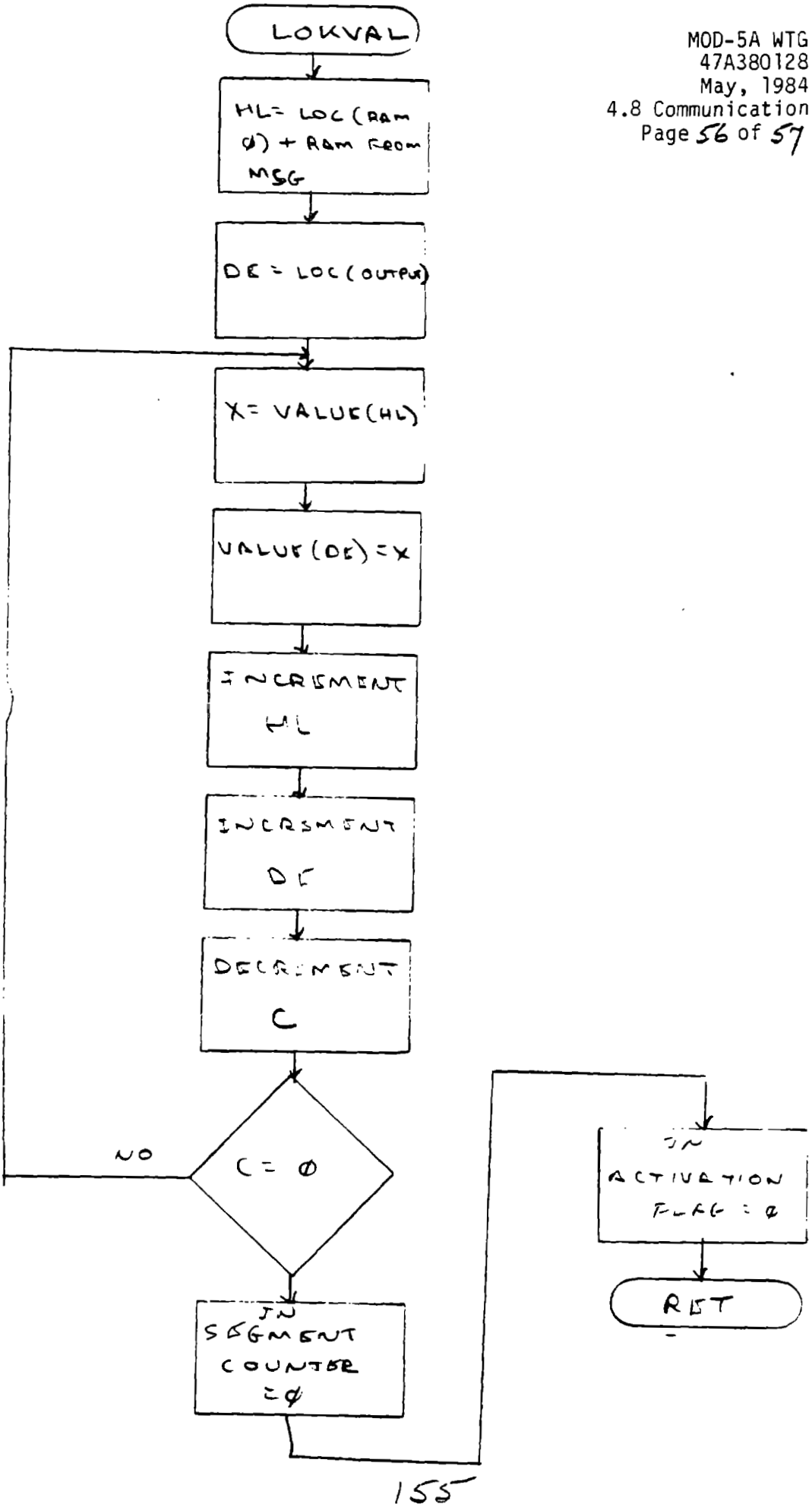

COSIS2
C=2
CALL
LOUVAL
RET

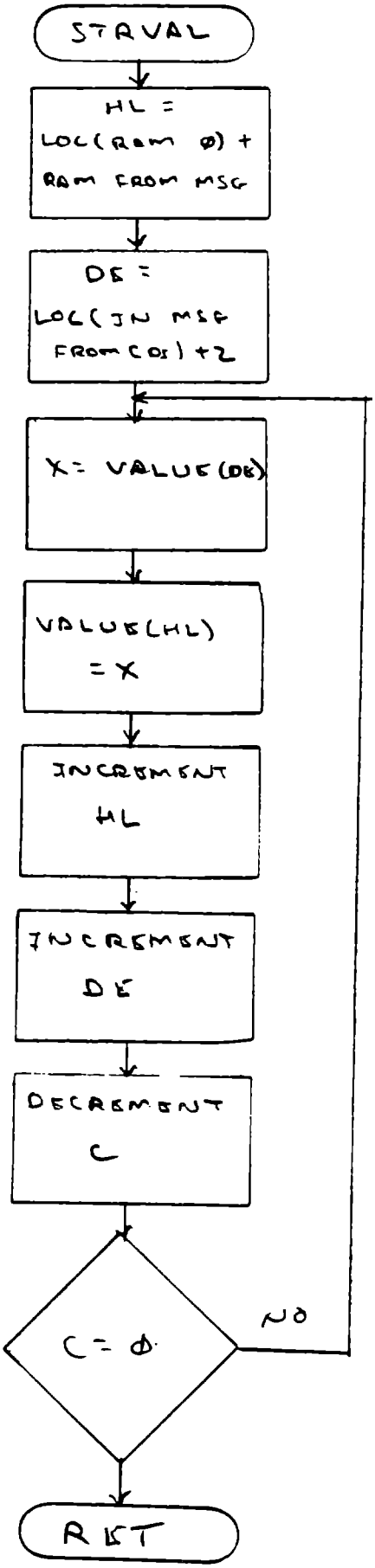

COSIS3
C=4
CALL
LOUVAL
RET




COSIS6
C = 4
CALL
STRVAL
C = 4
CALL
LOCVAL
RET

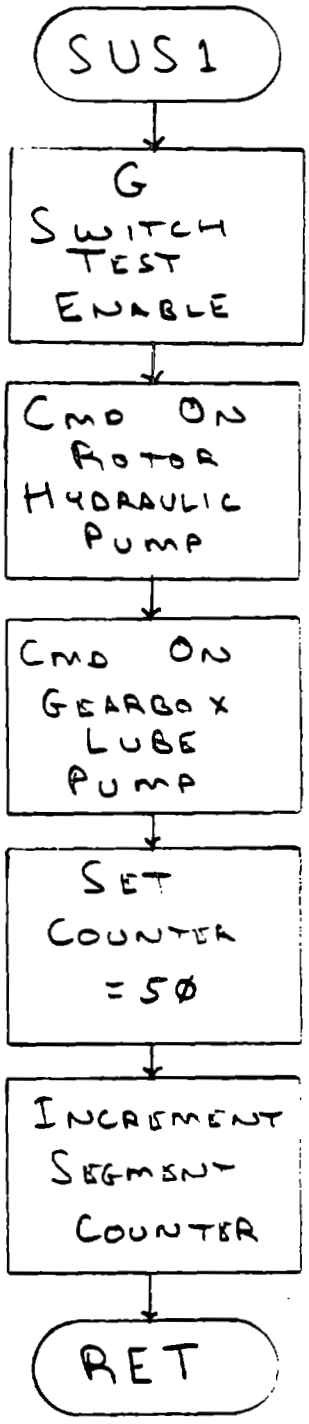

COSIS7
CDSON
= MSG
IN
ACTIVATION
FLAG
= 0
IN
SEGMENT
COUNTER
= 0
RET

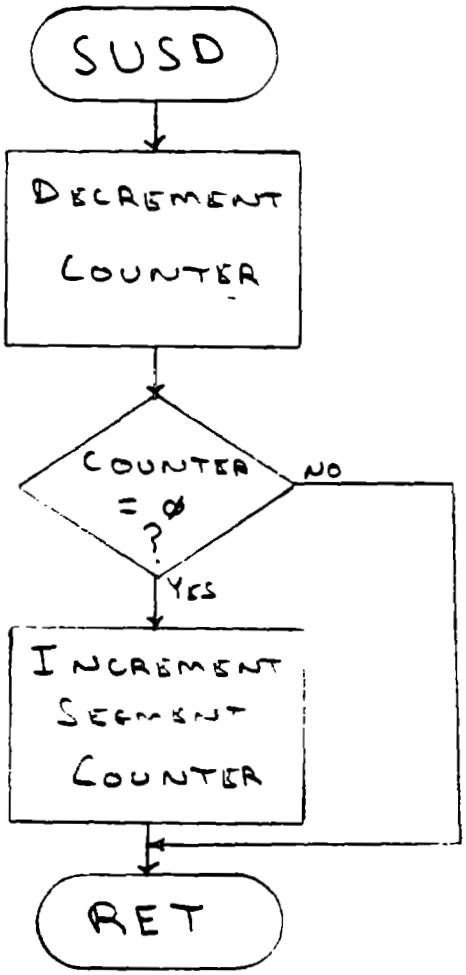

LOKVAL
HL= LOC (RAM Ø) + RAM FROM MSG
DE = LOC (OUTPUT)
X= VALUE(HL)
VALUE(DE) = X
INCREMENT HL
INCRSMENT DE
DECREMENT C
C = Ø
NO
IN SEGMENT COUNTER = Ø
IN ACTIVATION FLAG = Ø
RET

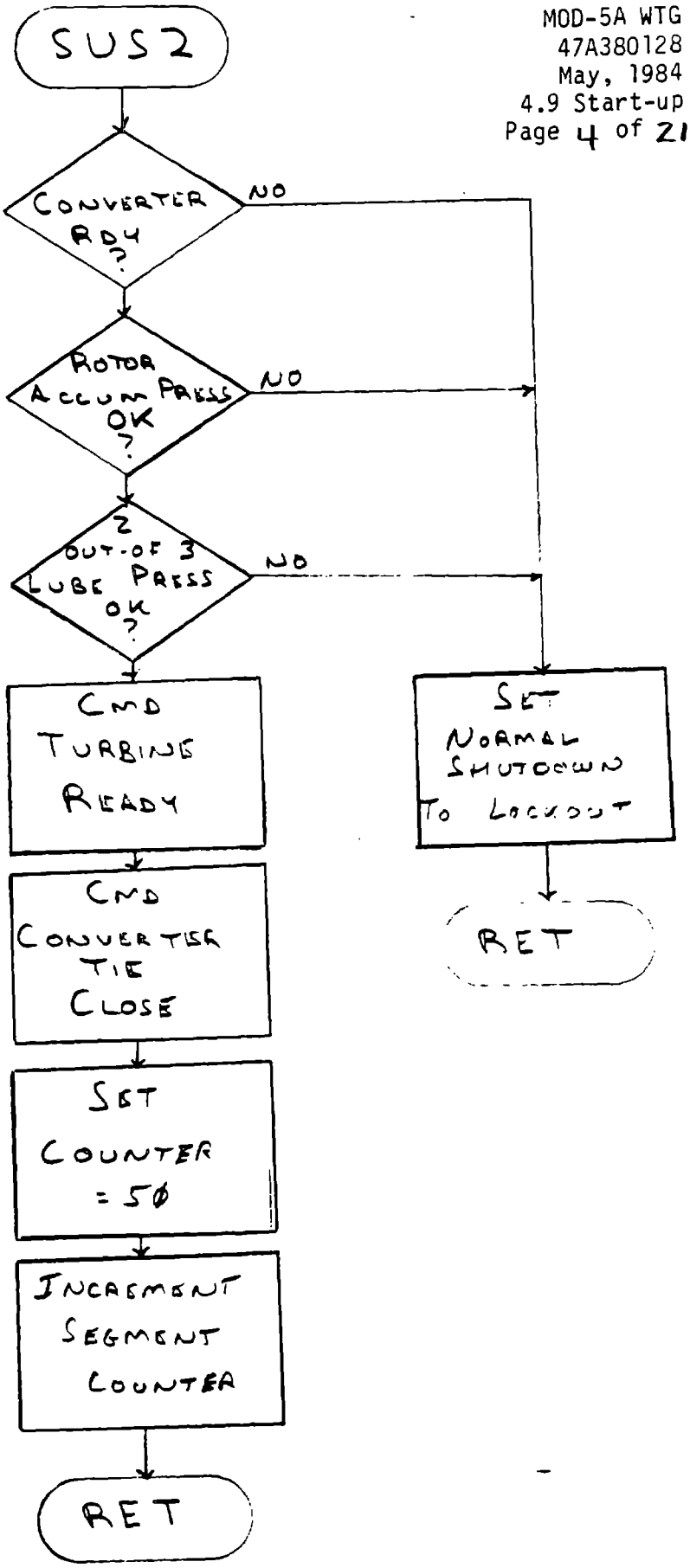

STRVAL
HL = LOC(RAM Ø) + RAM FROM MSG
DE = LOC(IN MSG FROM COS) +2
X = VALUE(DE)
VALUE(HL) = X
INCREMENT HL
INCREMENT DE
DECREMENT C
C = Ø
NO
RET

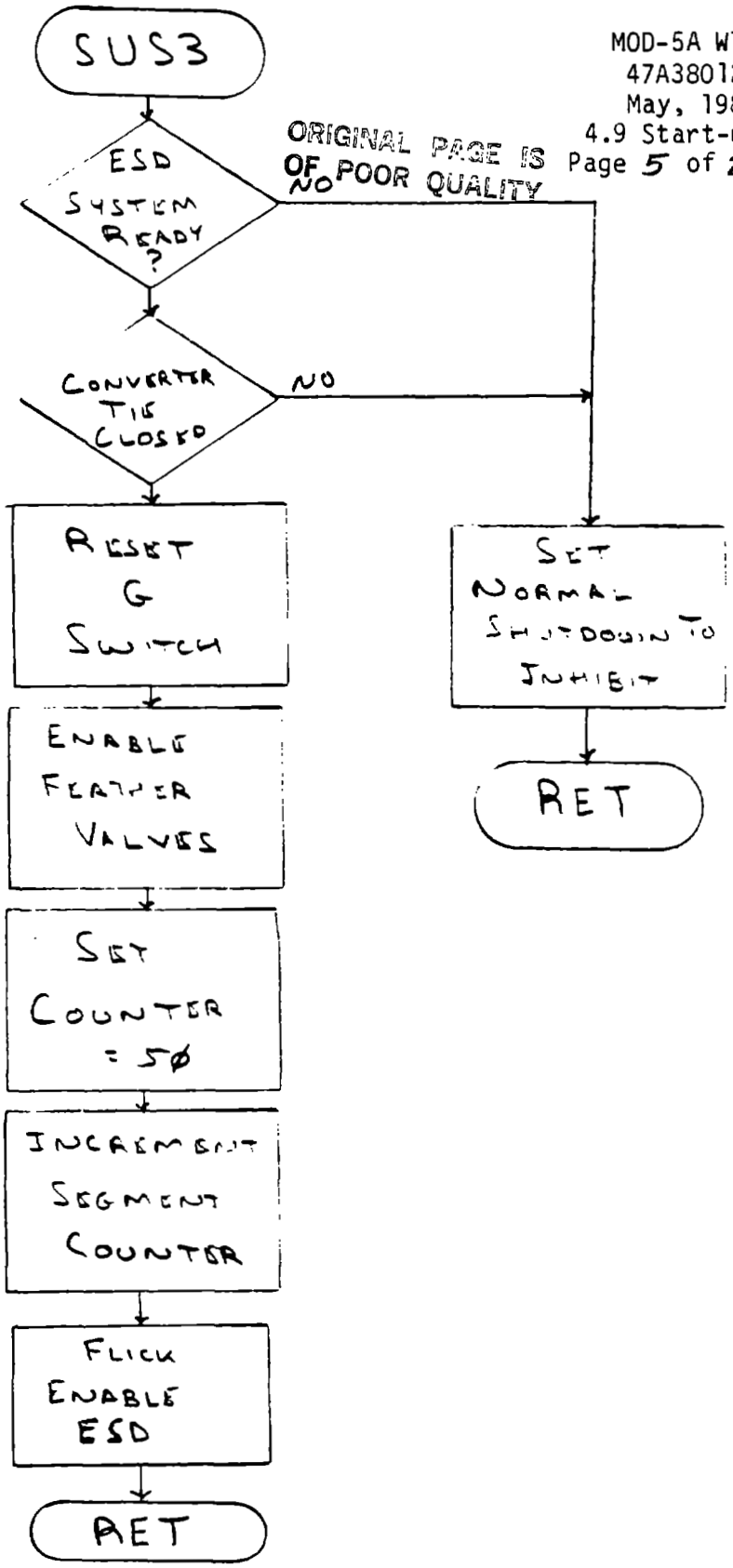
Startup Segment Table

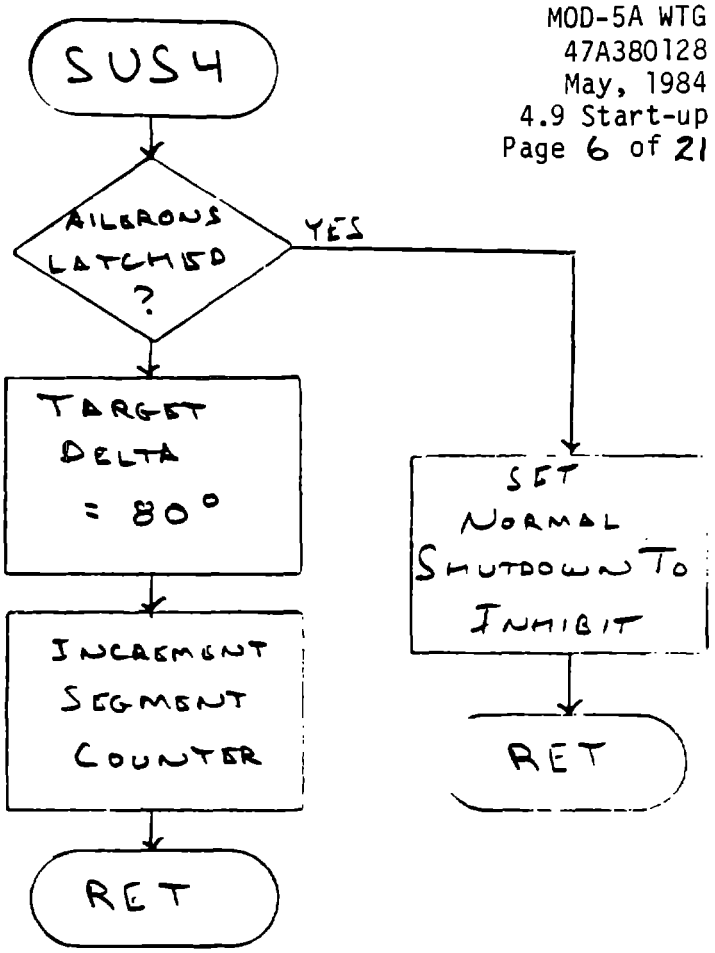
```
STUPST  DC    SUS1      PUMPS ON
        DC    SUSD      WAIT 5 SECONDS
        DC    SUS2      VERIFY PUMPS ON & CONVERTER READY, ISSUE CMDS
        DC    SUSD      WAIT 5 SECONDS
        DC    SUS3      VERIFY CONVERTER TIE CLOSED & ESD OK, RESET G SW
        DC    SUSD      WAIT 5 SECONDS
        DC    SUS4      VERIFY LATCHES RELEASED, SET DELCMD TO 80 DEGREES
        DC    SUST      CONTROL ANGLE TRAVEL TO DELCMD
        DC    SUSD      WAIT 5 SECONDS
        DC    SUSV      VERIFY ABS(DELCMD-DEL SENSED) < 5 DEGREES
        DC    SUS5      G SWITCH #1 TEST #1
        DC    SUSD      WAIT 5 SECONDS
        DC    SUSV      VERIFY 80 DEGREES
        DC    SUS6      G SWITCH #1 TEST #2
        DC    SUSD      WAIT 5 SECONDS
        DC    SUSV      VERIFY 95 DEGREES
        DC    SUS7      RESET G SWITCH
        DC    SUSD      WAIT 5 SECONDS
        DC    SUS4      VERIFY LATCHES RELEASED, SET DELCMD TO 80 DEGREES
        DC    SUST      CONTROL ANGLE TRAVEL TO DELCMD
        DC    SUSD      WAIT 5 SECONDS
        DC    SUSV      VERIFY ABS(DELCMD-DEL SENSED) < 5 DEGREES
        DC    SUS8      G SWITCH #2 TEST #1
        DC    SUSD      WAIT 5 SECONDS
        DC    SUSV      VERIFY 80 DEGREES
        DC    SUS9      G SWITCH #2 TEST #2
        DC    SUSD      WAIT 5 SECONDS
        DC    SUSV      VERIFY 95 DEGREES
        DC    SUS10     RESET G SWITCH
        DC    SUSD      WAIT 5 SECONDS
        DC    SUS11     VERIFY FTHR VALVES RELEASED, DELCMD = 70 DEG
        DC    SUS12     CONTROL ANGLE TRAVEL TO 70 @ 5 DEG/SEC, VERIFY RHP
        DC    SUSD      WAIT 5 SECONDS
        DC    SUSV      VERIFY 70 DEGREES
        DC    SUS13     REMOVE FTHR VALVE A-1 & A-2 ENABLE
        DC    SUSD      WAIT 5 SECONDS
        DC    SUSV      VERIFY 95 DEGREES
        DC    SUS14     ENABLE ESD PANEL
        DC    SUST      TRAVEL TO 90 DEGREES
        DC    SUS15     VERIFY ESD OK, TEETER ACCUM PRESS, & TEETER PWR
        DC    SUSD      WAIT 5 SECONDS
        DC    SUS16     VERIFY H.F. TEETER BREAKES ON
        DC    SUS17     CHECK  14< VWIND <55, SET SUCMPL
```

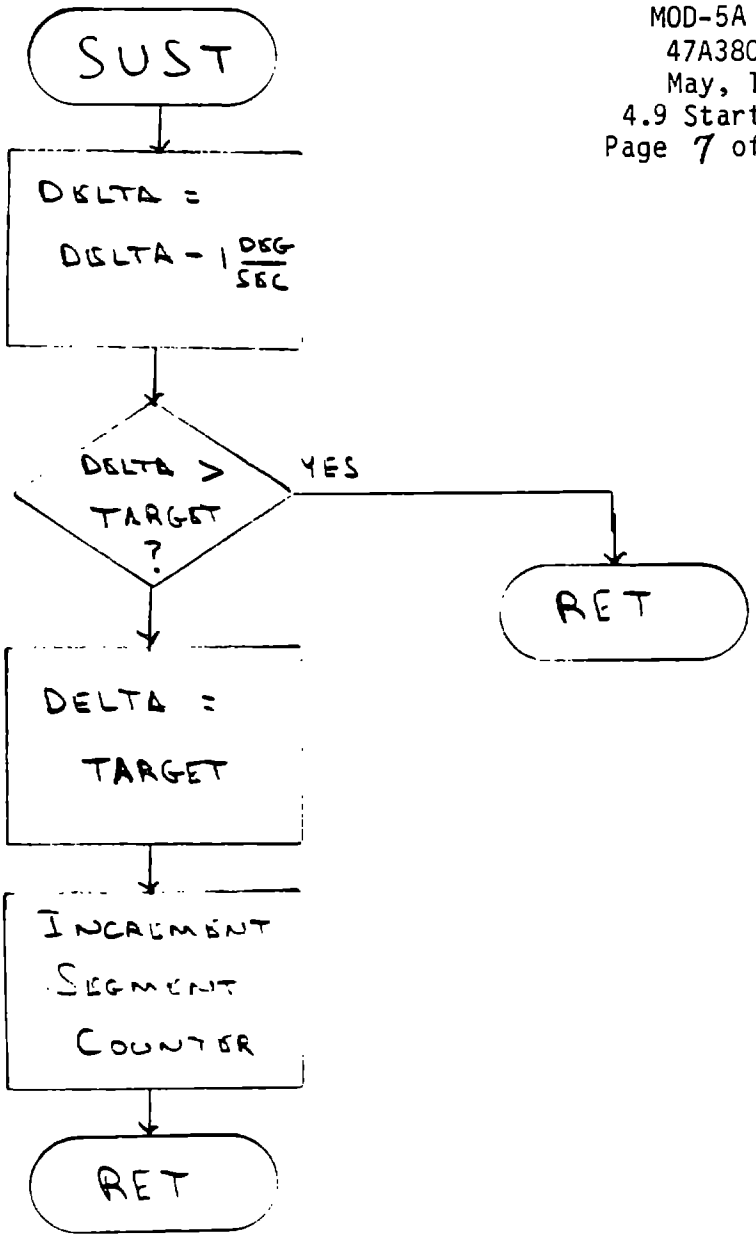

SUS1
G
SWITCH
TEST
ENABLE
CMD ON
ROTOR
HYDRAULIC
PUMP
CMD ON
GEARBOX
LUBE
PUMP
SET
COUNTER
=50
INCREMENT
SEGMENT
COUNTER
RET

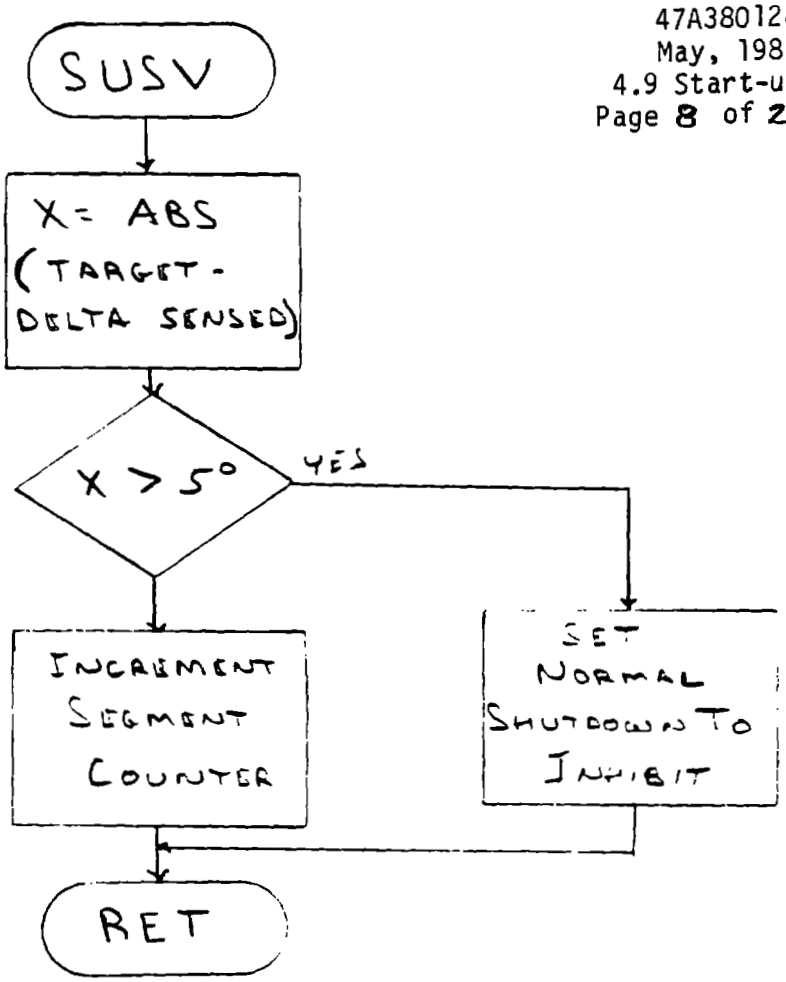

SUSD
DECREMENT COUNTER
COUNTER = 0 ?
NO
YES
INCREMENT SEGMENT COUNTER
RET

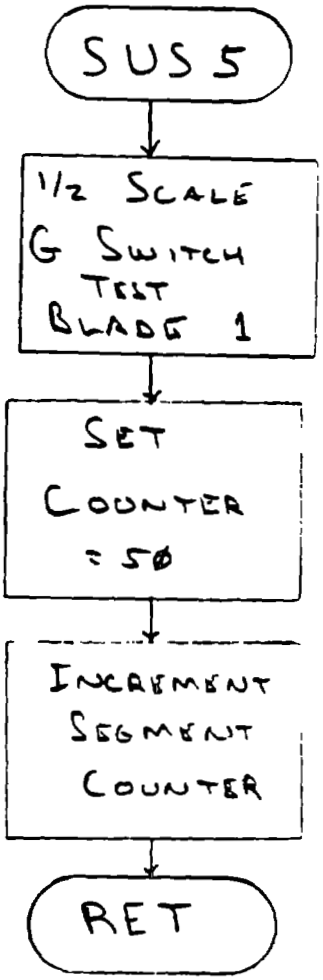

SUS2
CONVERTER RDY ?
NO
ROTOR ACCUM PRESS OK ?
NO
2 OUT-OF 3 LUBE PRESS OK ?
NO
CMD TURBINE READY
CMD CONVERTER TIE CLOSE
SET COUNTER = 50
INCREMENT SEGMENT COUNTER
RET
SET NORMAL SHUTDOWN TO LOCKOUT
RET

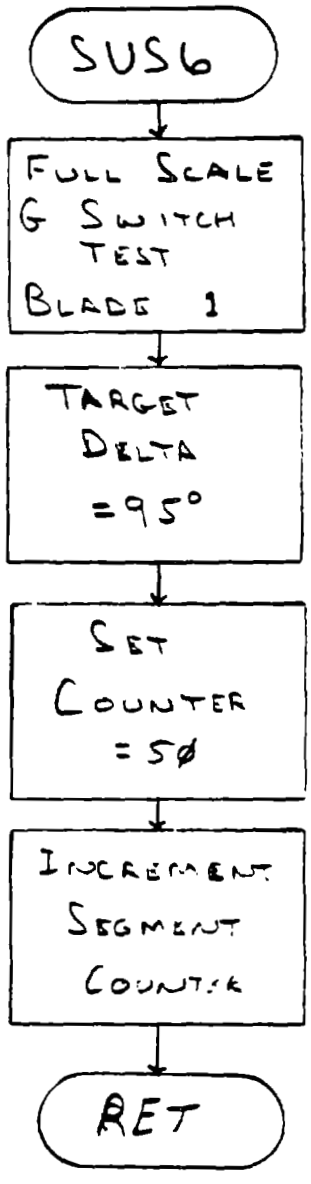


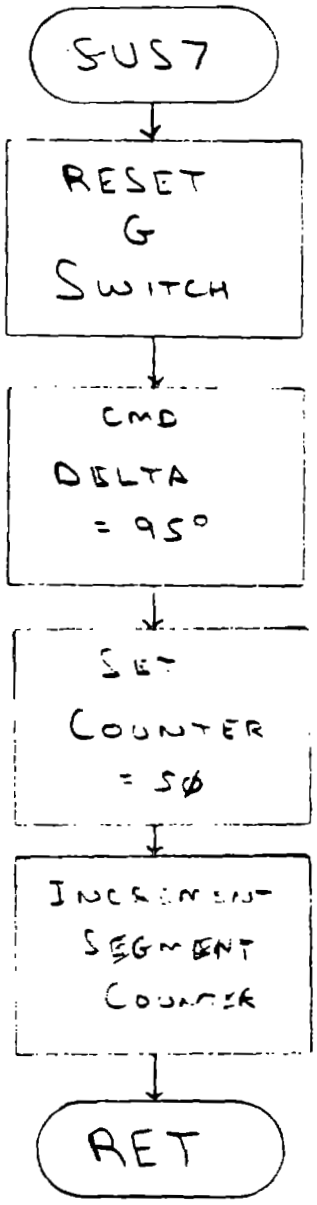

SUS4
AILERONS LATCHED ?
YES
TARGET DELTA = 80°
INCREMENT SEGMENT COUNTER
RET
SET NORMAL SHUTDOWN TO INHIBIT
RET

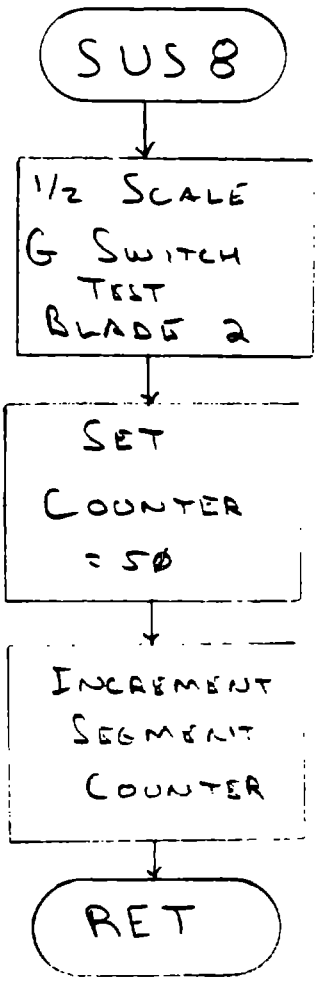


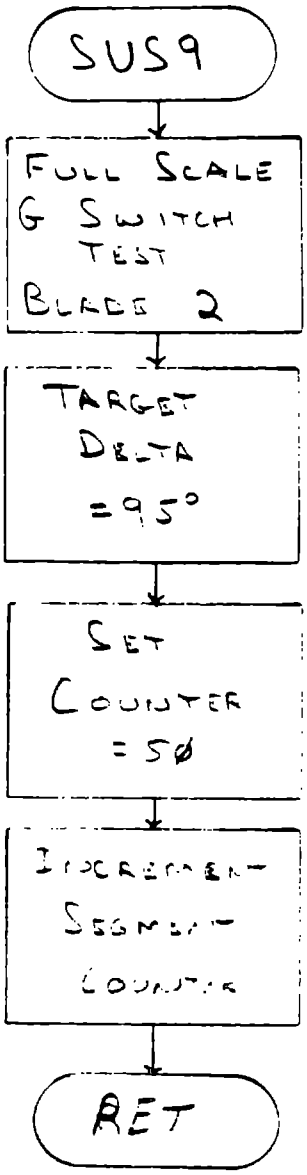

SUSV
X= ABS (TARGET - DELTA SENSED)
X > 5°
YES
INCREMENT SEGMENT COUNTER
SET NORMAL SHUTDOWN TO INHIBIT
RET

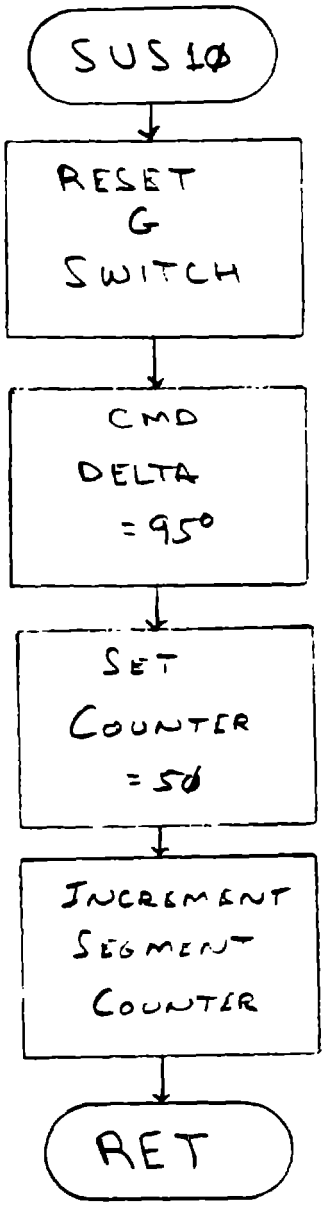

SUS 5
1/2 SCALE G SWITCH TEST BLADE 1
SET COUNTER = 50
INCREMENT SEGMENT COUNTER
RET

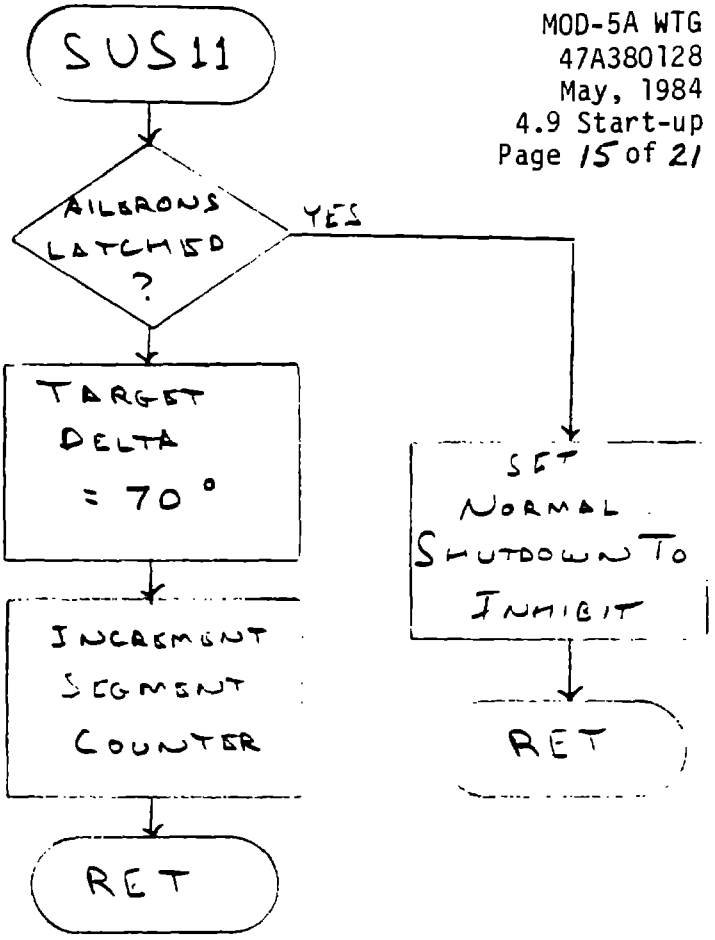

SUS6
FULL SCALE G SWITCH TEST BLADE 1
TARGET DELTA =95°
SET COUNTER =50
INCREMENT SEGMENT COUNTER
RET

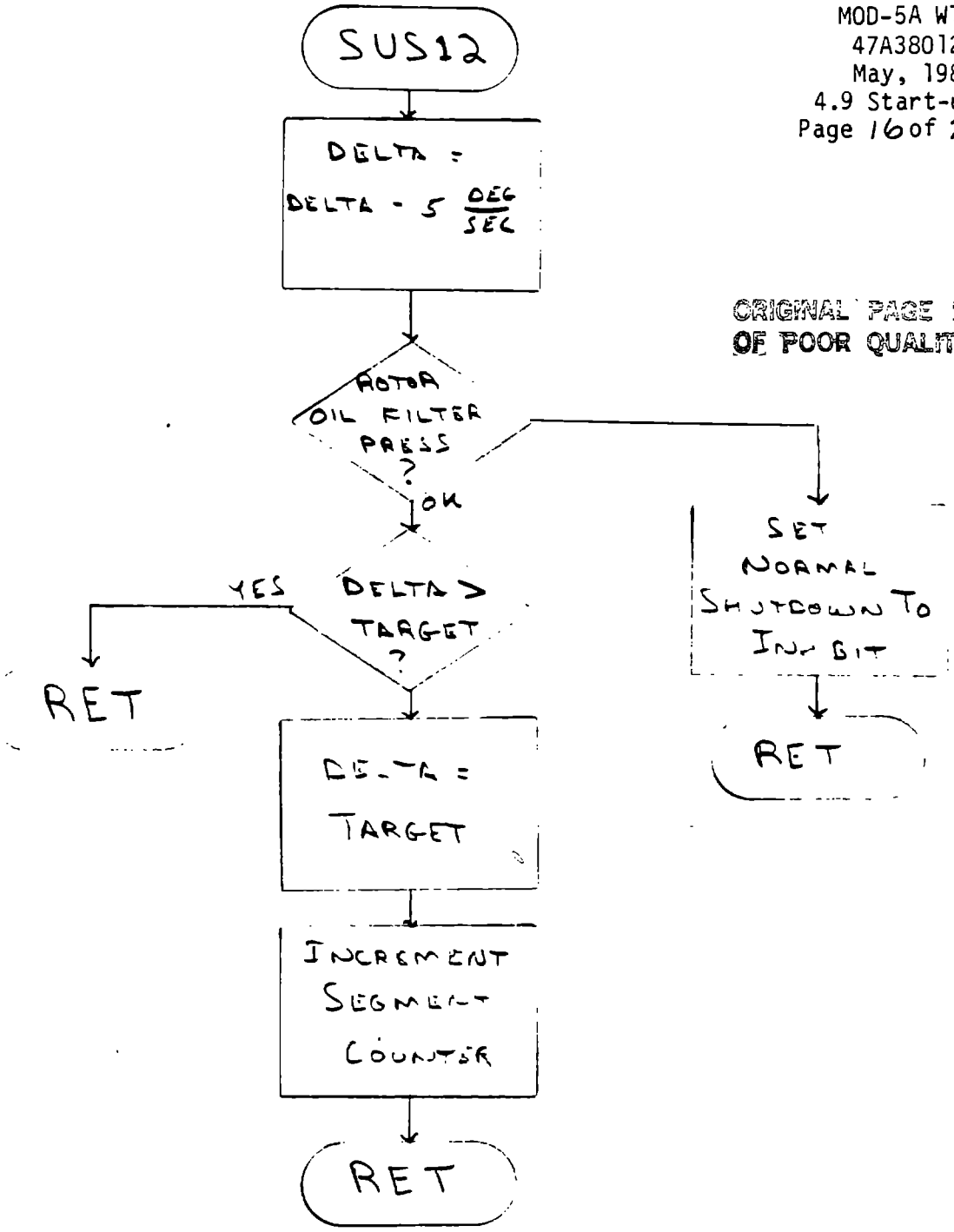


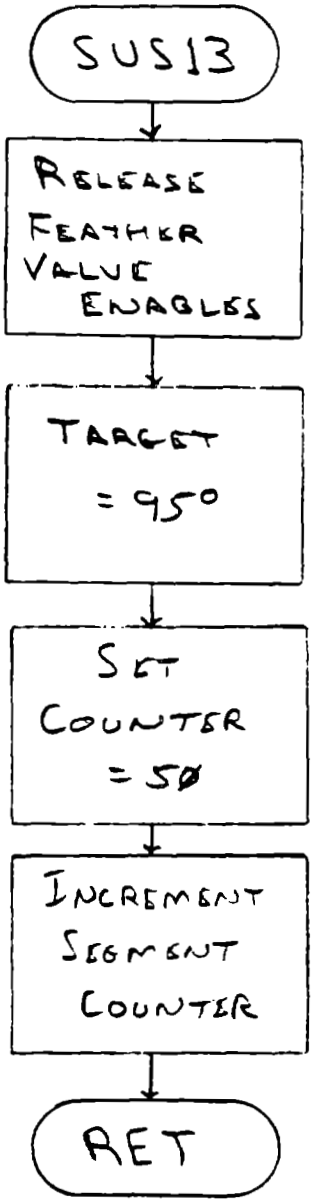

SUS 8
1/2 SCALE G SWITCH TEST BLADE 2
SET COUNTER = 50
INCREMENT SEGMENT COUNTER
RET

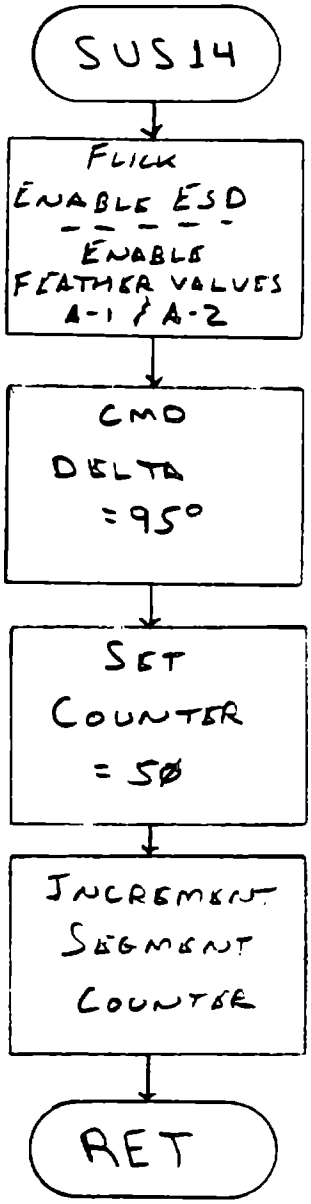


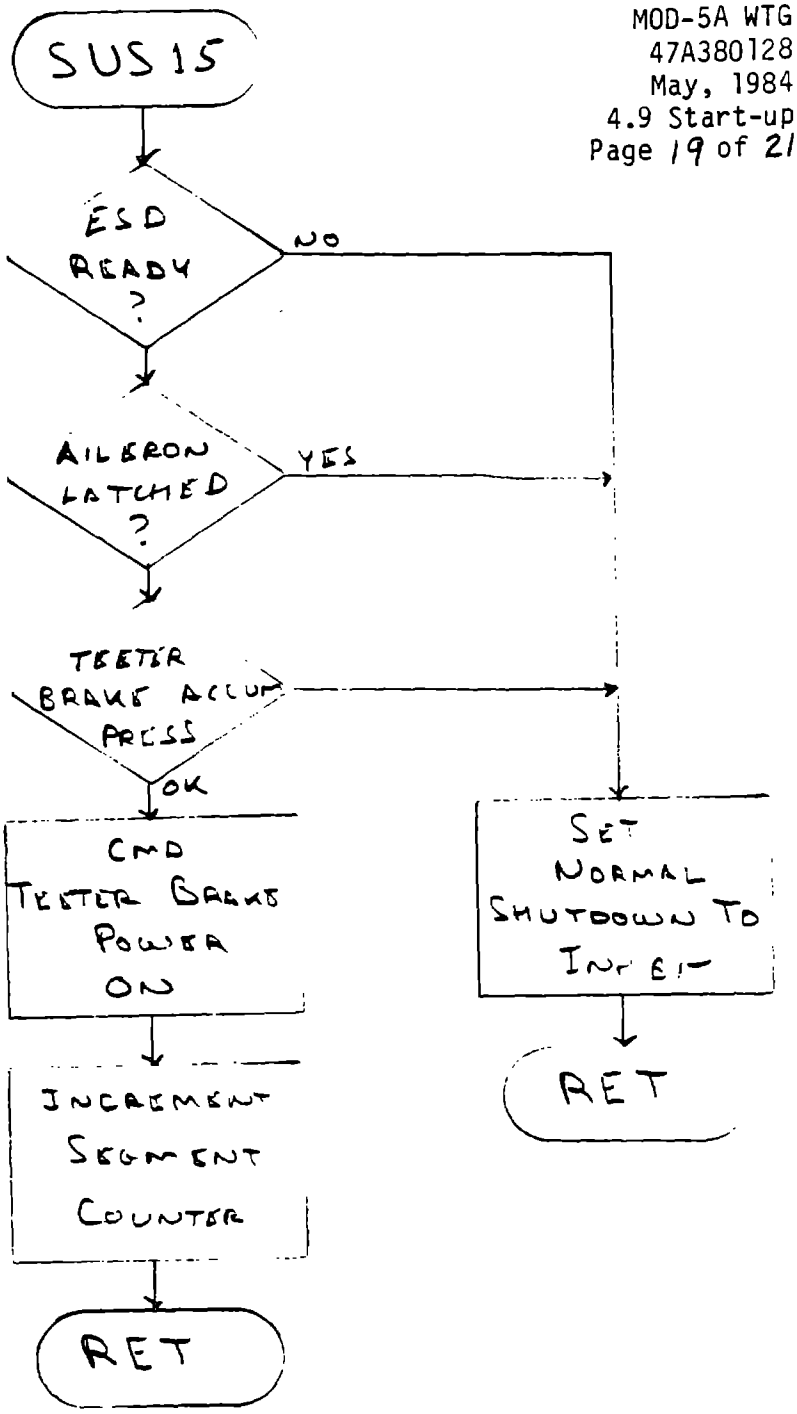

SUS10
RESET G SWITCH
CMD DELTA = 95°
SET COUNTER = 50
INCREMENT SEGMENT COUNTER
RET

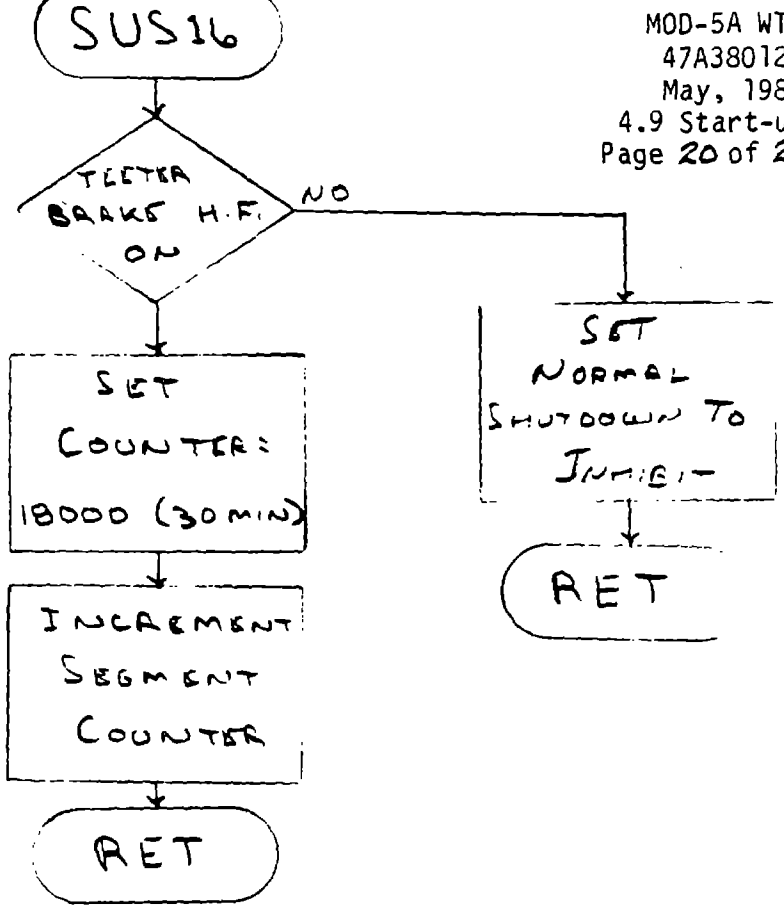


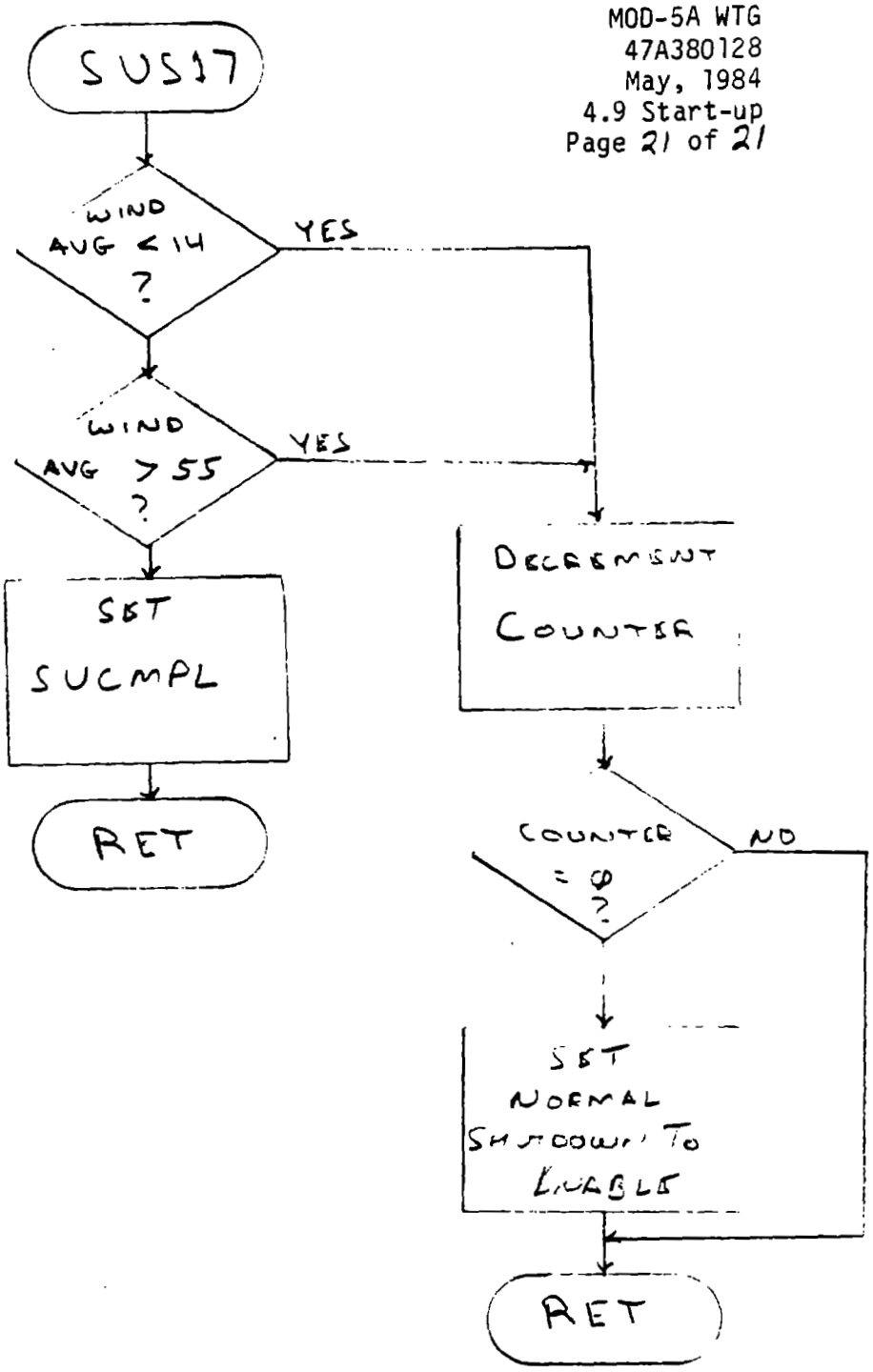



SUS13
RELEASE FEATHER VALVE ENABLES
TARGET = 95°
SET COUNTER = 50
INCREMENT SEGMENT COUNTER
RET


SUS14
FLICK
ENABLE ESD
ENABLE
FEATHER VALVES
A-1 & A-2
CMD
DELTA
=95°
SET
COUNTER
=50
INCREMENT
SEGMENT
COUNTER
RET

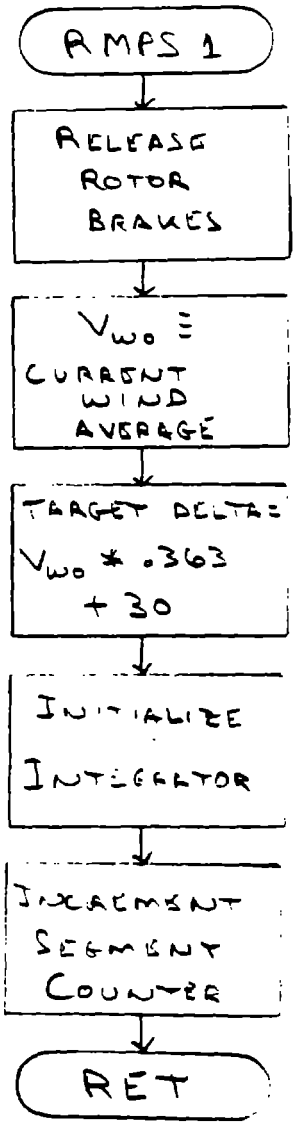


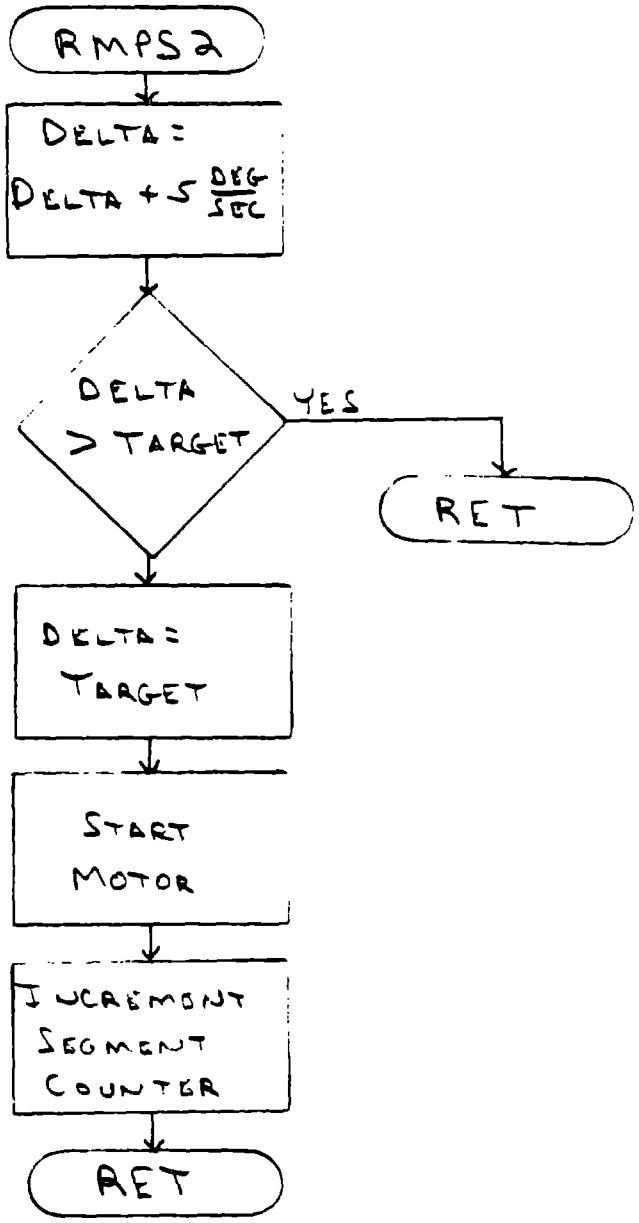

SUS16
TESTER BRAKE H.F. ON
NO
SET COUNTER: 18000 (30 MIN)
INCREMENT SEGMENT COUNTER
RET
SET NORMAL SHUTDOWN TO INHIBIT
RET

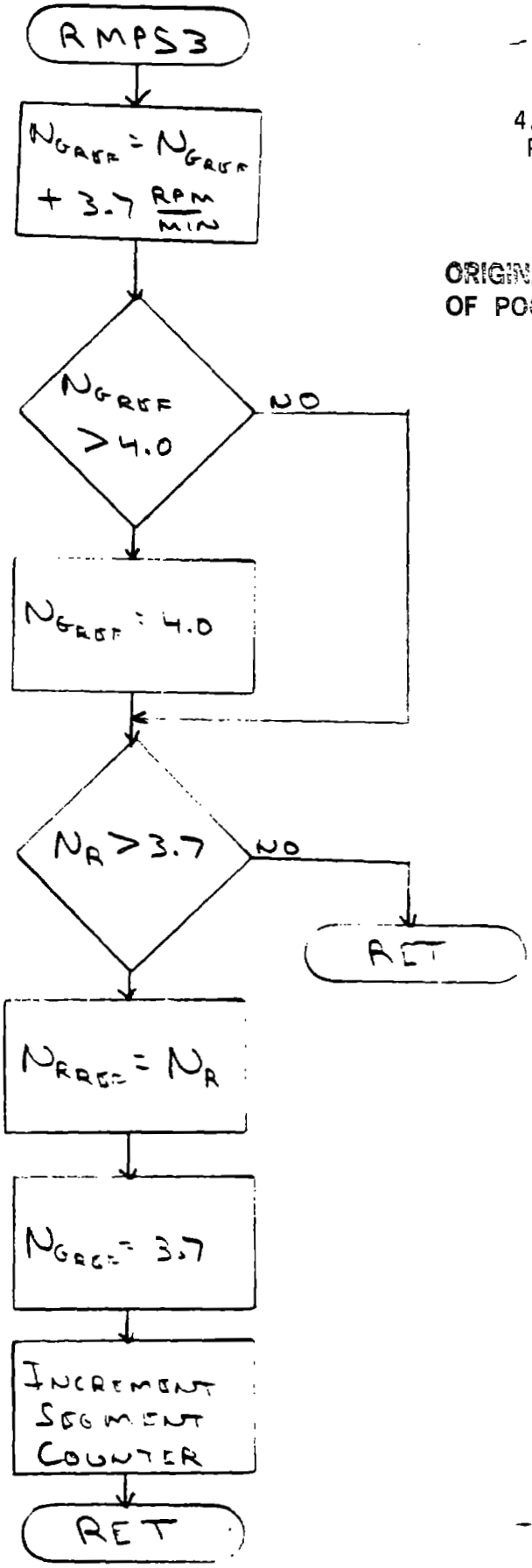


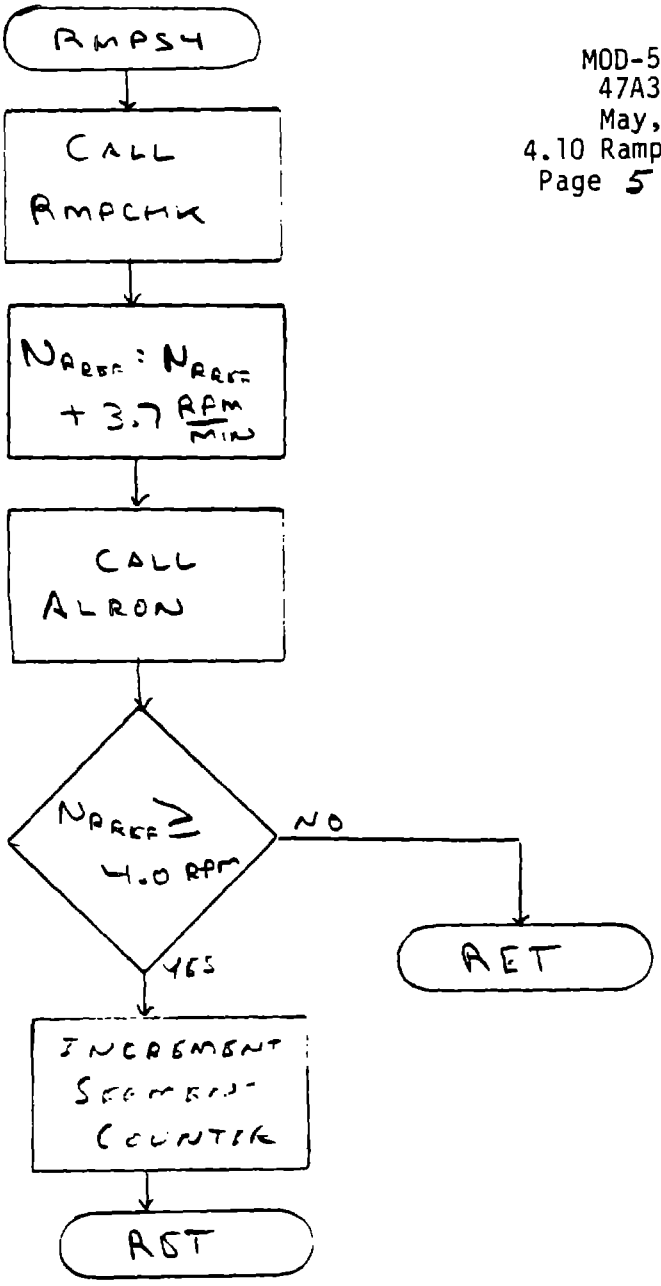
Ramp Segment Table

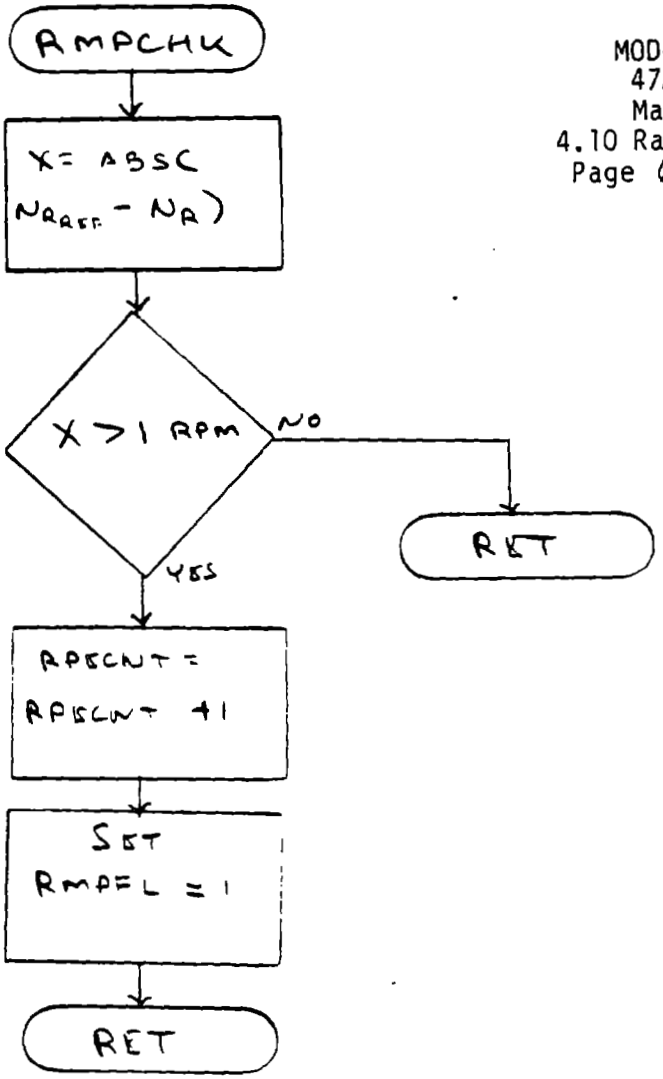
```
RMPST   DC      RMPS1       RELEASE ROTOR BRAKES, SET VWO, DELCMD, INIT DELCMI
        DC      RMPS2       CNTRL ANGLES TO DELCMD AT 5 DEG/SEC & START MOTOR
        DC      RMPS3       NG REF TO 4 AT 3.7 RPM/MIN UNTIL NR > 3.7
        DC      RMPS4       ROTOR SPEED CONTROL TO 4 AT 3.7 RPM/MIN
        DC      RMPS5       HOLD NR REF ON 4 UNTIL POWER = 0 THEN REMOVE MOTOR
        DC      RMPSD       DELAY 2 SEC WITH NR REF = 4
        DC      RMPS6       NR REF = 4, VERIFY STATOR SHORT IS OPEN
        DC      RMPS7       NR REF = 4, VERIFY BLADE TEMP OK
        DC      RMPS8       RAMP NR REF & NG REF TO NR = 6 AT .145*VWO
        DC      RMPS9       CONT RAMP, TEETER ANGLE<2.4 INCR. SEG. & SHAFT
        DC      RMPS10      CONT RAMP, CLOSE H.F. OFF RELAY & SHAFT PRESS
        DC      RMPS11      CONT RAMP, VERIFY TEETER BRAKE ON & SHAFT PRESS
        DC      RMPS12      CONT RAMP, DELAY, VERIFY TEETER BRAKE ON & SHAFT
        DC      RMPS13      CONT RAMP TO NREFL1 - .6 & SHAFT PRESSURE
        DC      RMPS14      CHANGE RAMP RATE TO 1 RPM/MIN UNTIL NR REF = NREFL
        DC      RMPS15      HOLD AT NREFL1 FOR 10 SEC AND SYNC/GENERATE
        DC      RMPS16      HOLD VERIFY STATOR TIE CLOSE & DONE
```

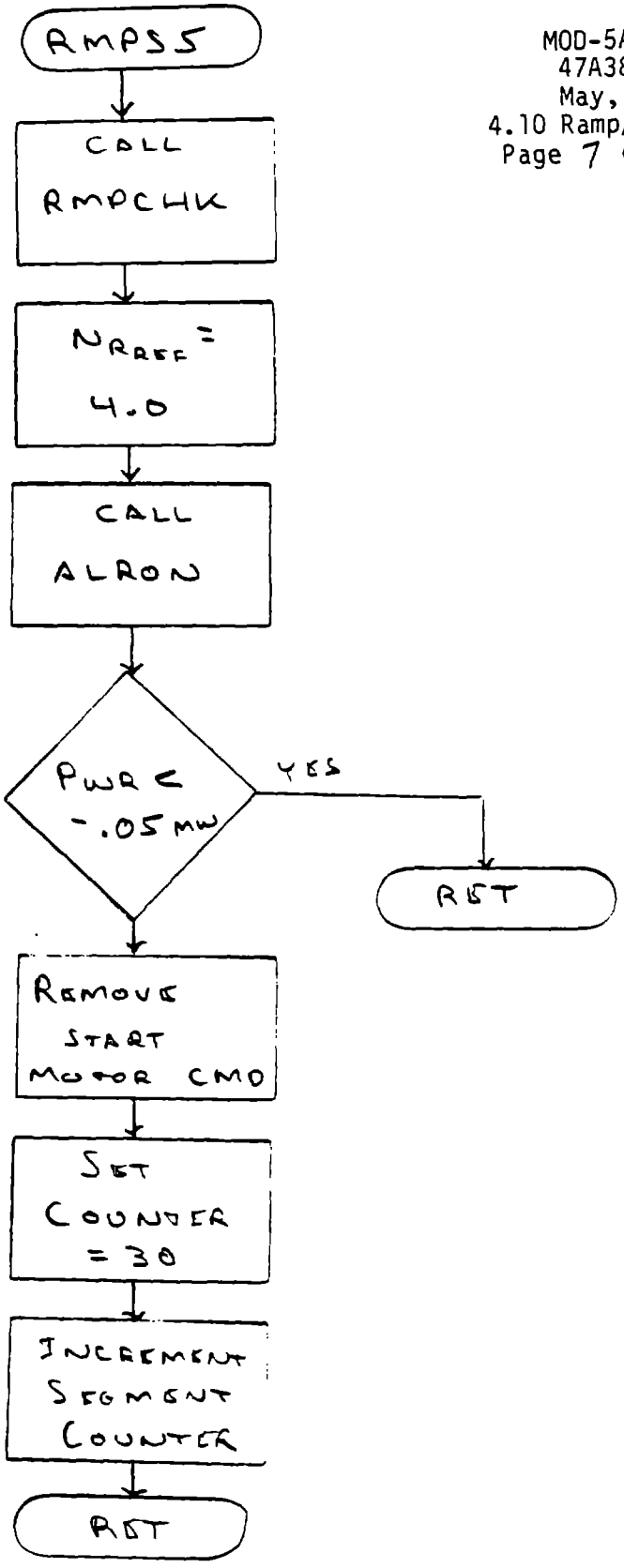

RMPS 1
RELEASE ROTOR BRAKES
V_{WO} = CURRENT WIND AVERAGE
TARGET DELTA = V_{WO} * .363 + 30
INITIALIZE INTEGRATOR
INCREMENT SEGMENT COUNTER
RET

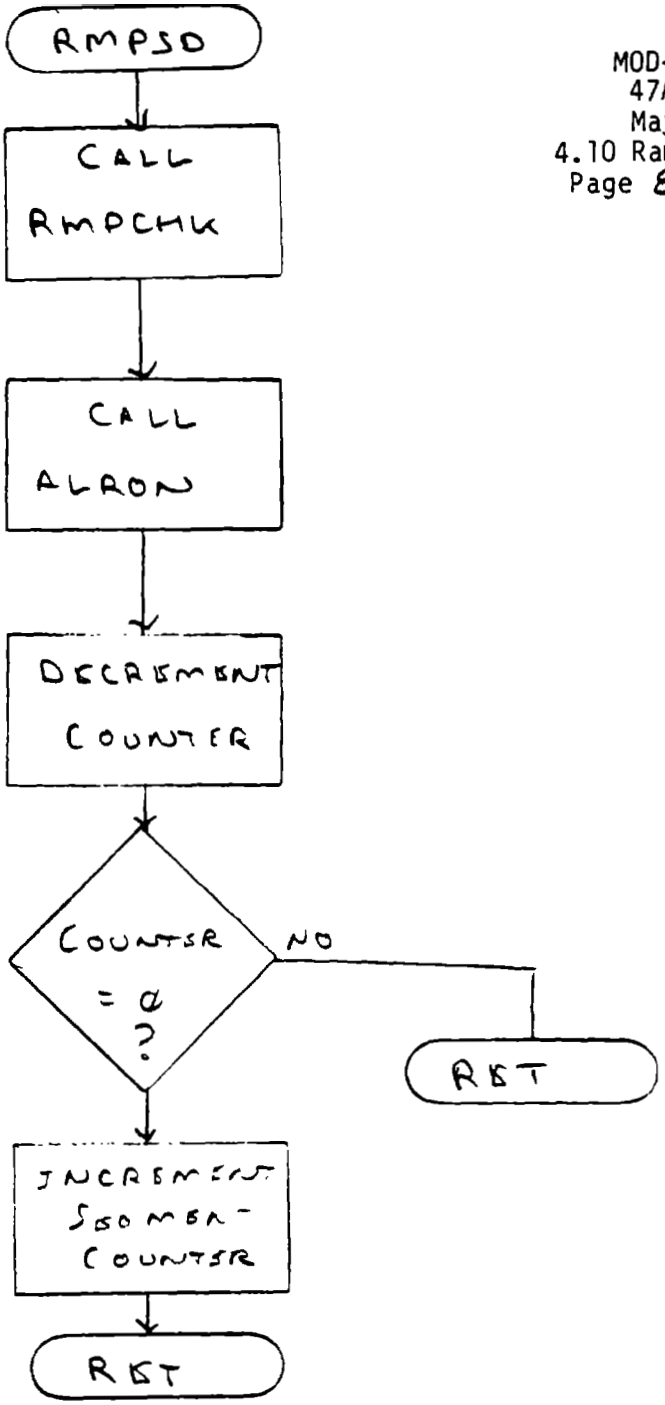

RMPS2
DELTA = DELTA + 5 DEG/SEC
DELTA > TARGET
YES
RET
DELTA = TARGET
START MOTOR
INCREMONT SEGMENT COUNTER
RET

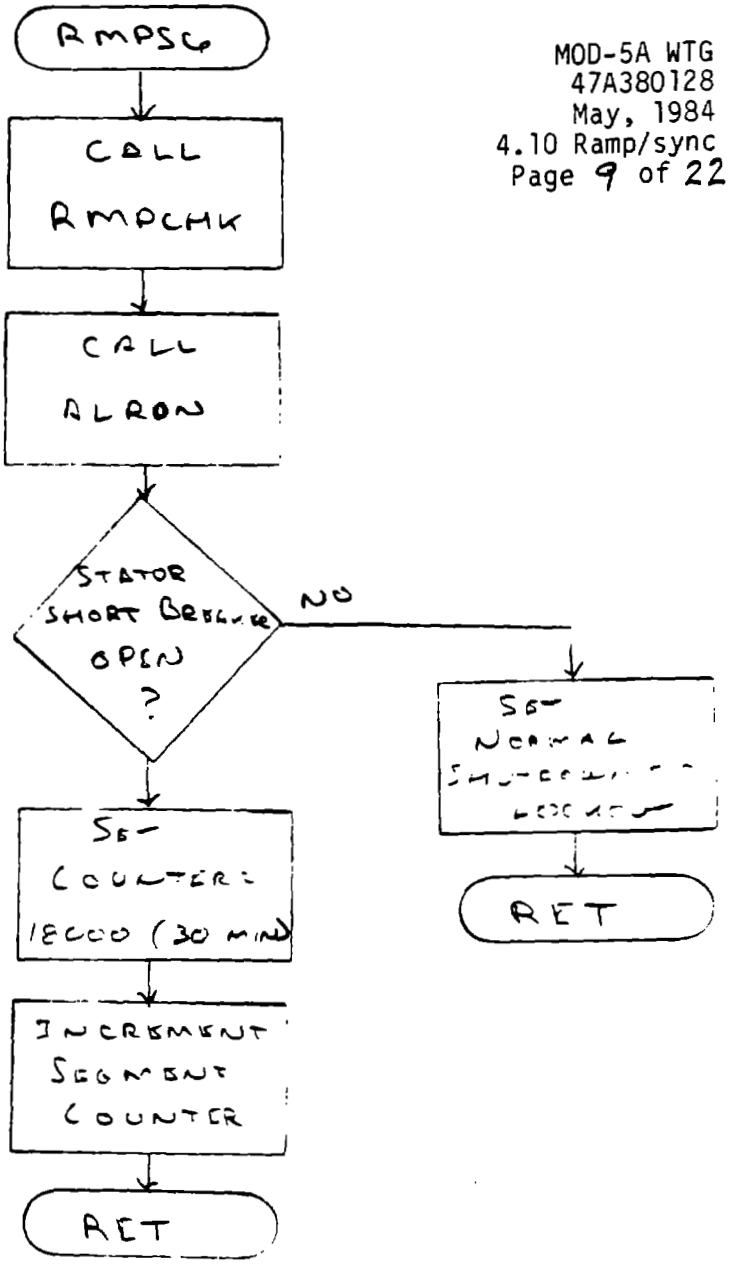


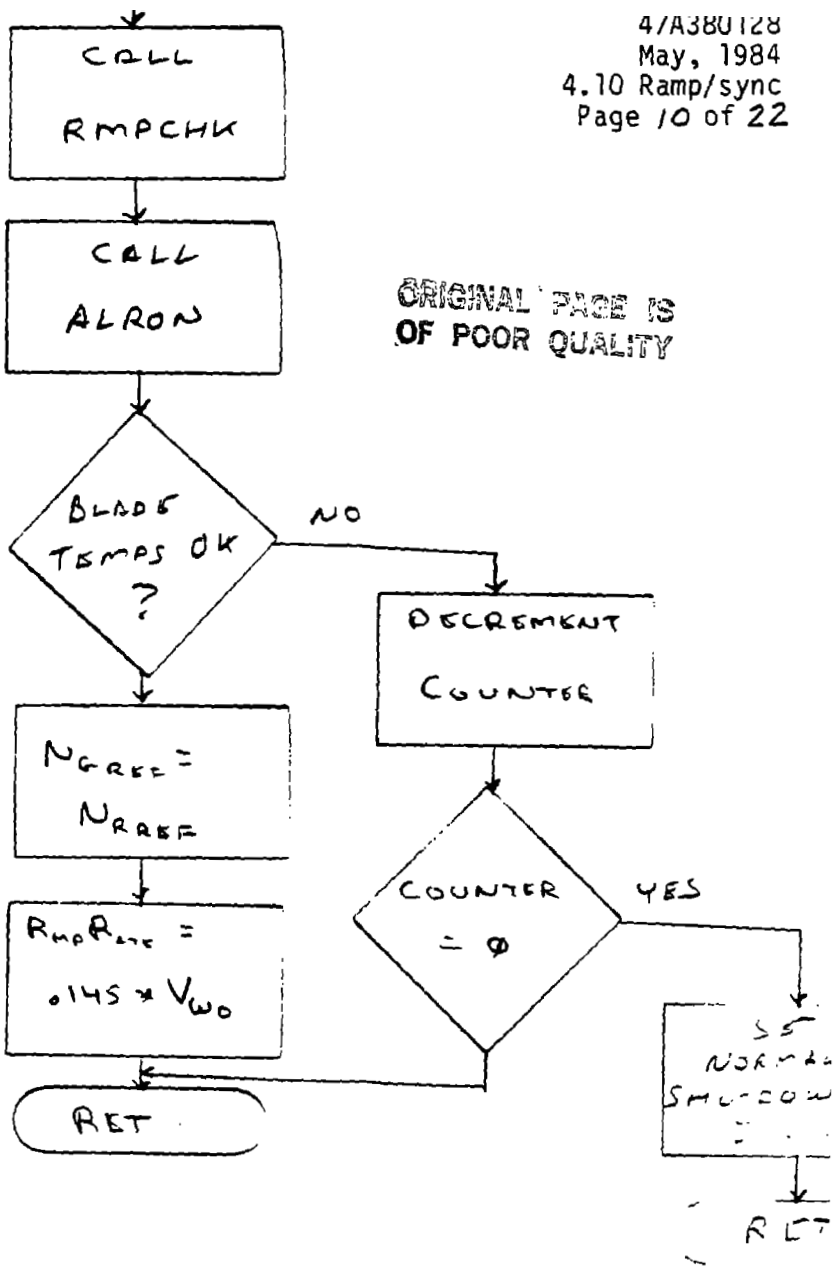

RMPSY
CALL RMPCHK
$N_{REF} = N_{REF} + 3.7 \frac{RPM}{MIN}$
CALL ALRON
$N_{REF} \geq 4.0$ RPM
NO
YES
RET
INCREMENT SEGMENT COUNTER
RET

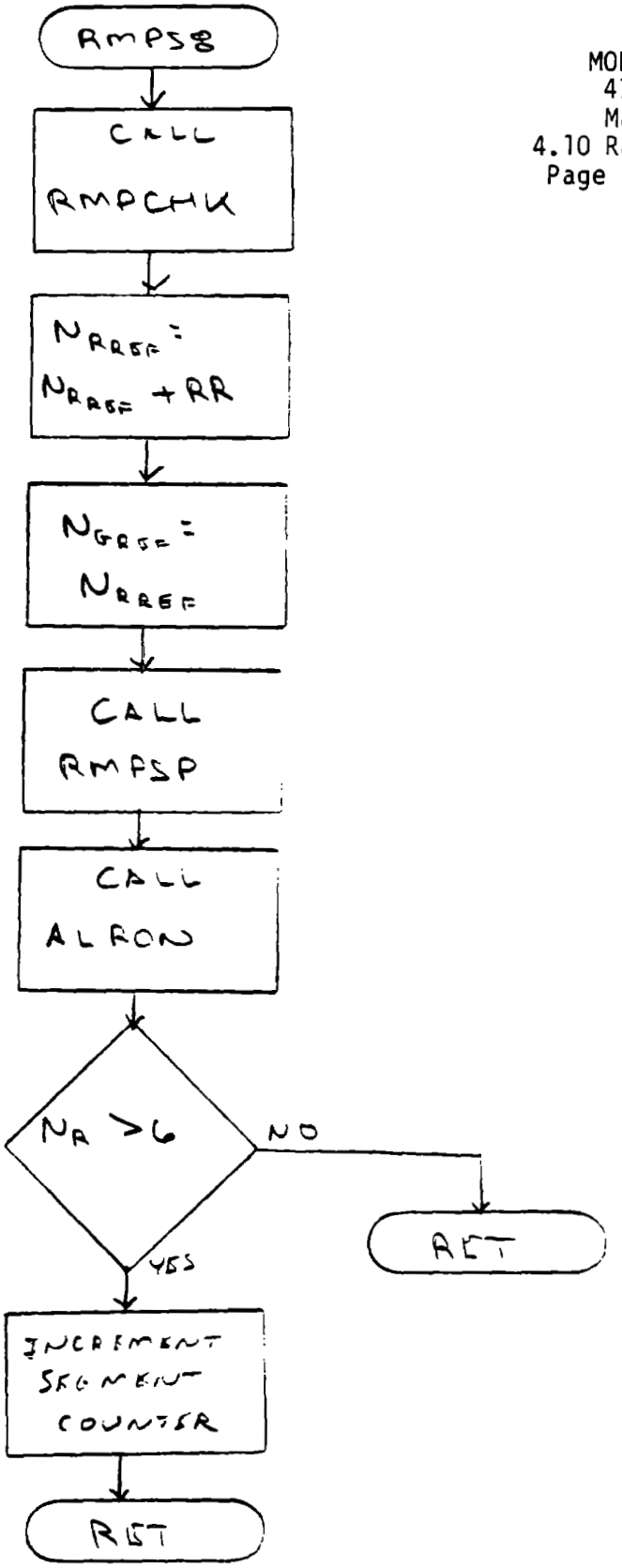

RMPCHK
X= ABSC
NREF - NR)
X > 1 RPM
NO
YES
RET
RPSCNT =
RPSCNT +1
SET
RMPFL = 1
RET

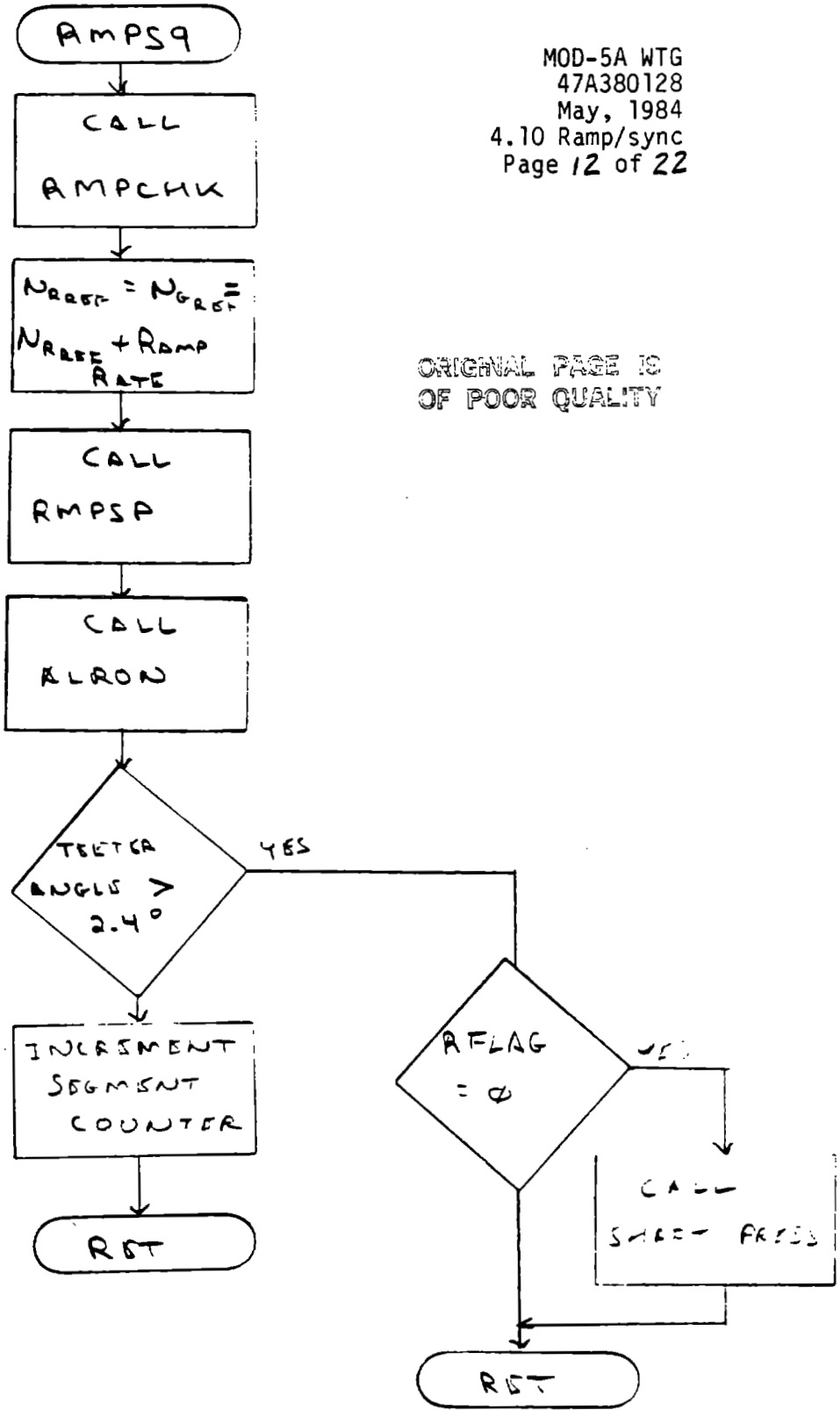

RMPSS
CALL RMPCHK
N_{REF} = 4.0
CALL ALRON
PWR < -.05 MW
YES
RET
REMOVE START MOTOR CMD
SET COUNTER = 30
INCREMENT SEGMENT COUNTER
RET

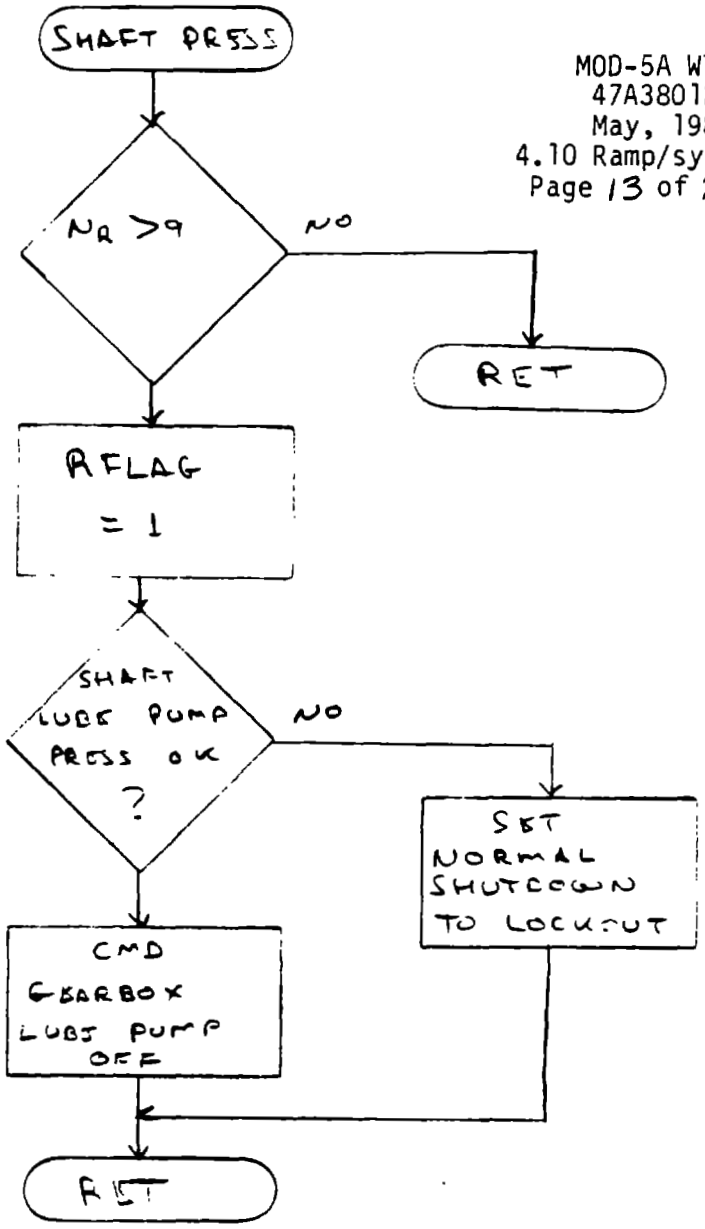

RMPSD
CALL RMPCHK
CALL ALRON
DECREMENT COUNTER
COUNTER = 0 ?
NO
RET
INCREMENT SECOND-COUNTER
RET

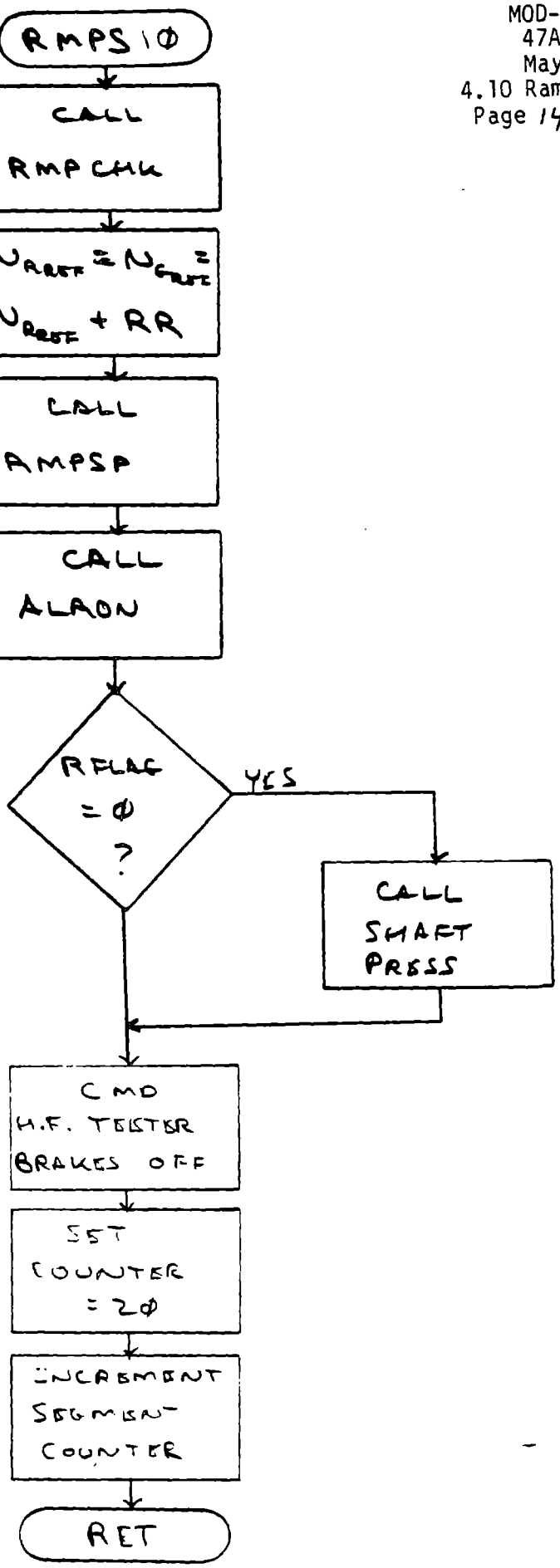

RMPSG
CALL RMPCHK
CALL ALRON
STATOR SHORT BRKR OPEN ?
NO
SG- NORMAL
SG- COUNTER = 18000 (30 MIN)
INCREMENT SEGMENT COUNTER
RET
RET

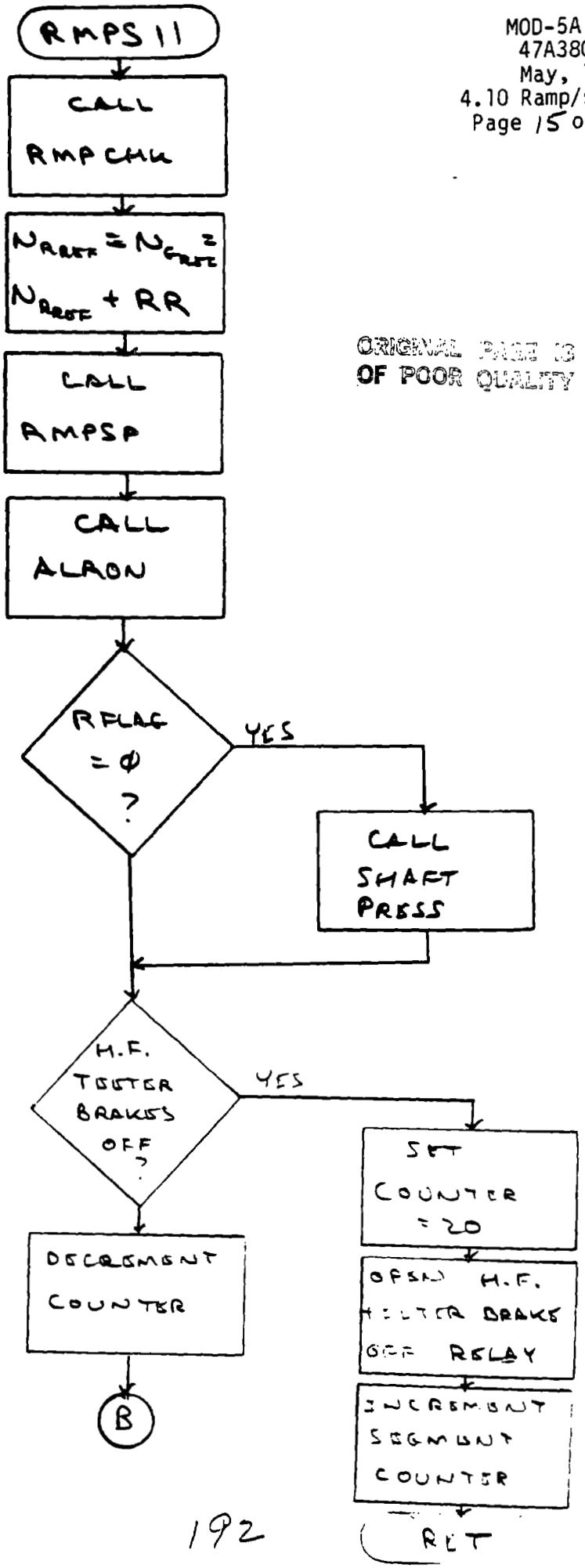


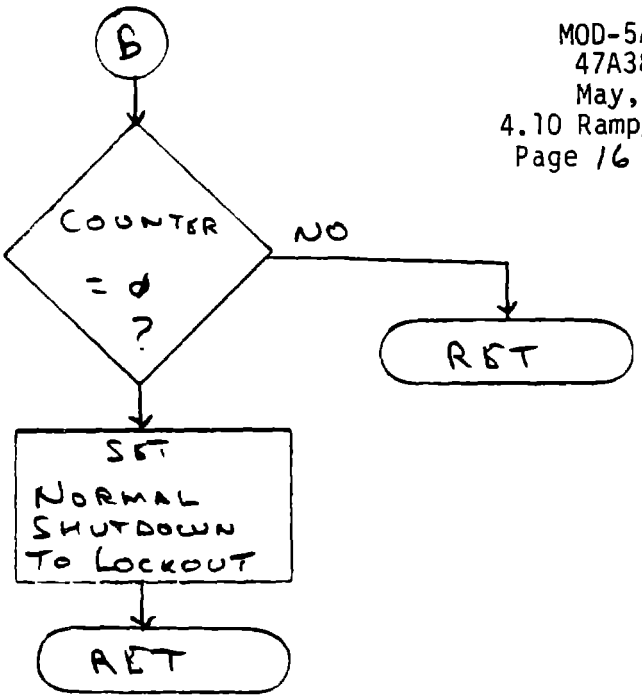

RMPSB
CALL RMPCHK
$N_{RREF} = N_{RREF} + RR$
$N_{GREF} = N_{RREF}$
CALL RMPSP
CALL ALRON
$N_A > 6$
NO
RET
YES
INCREMENT SEGMENT COUNTER
RET

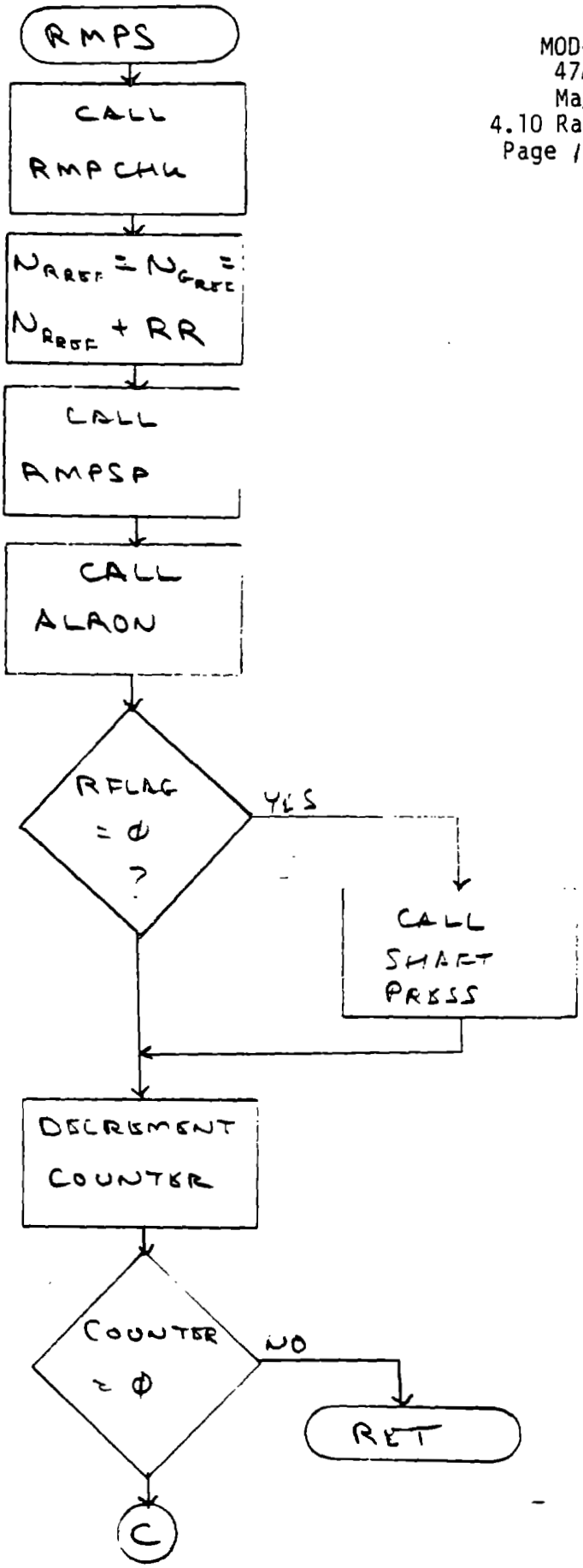


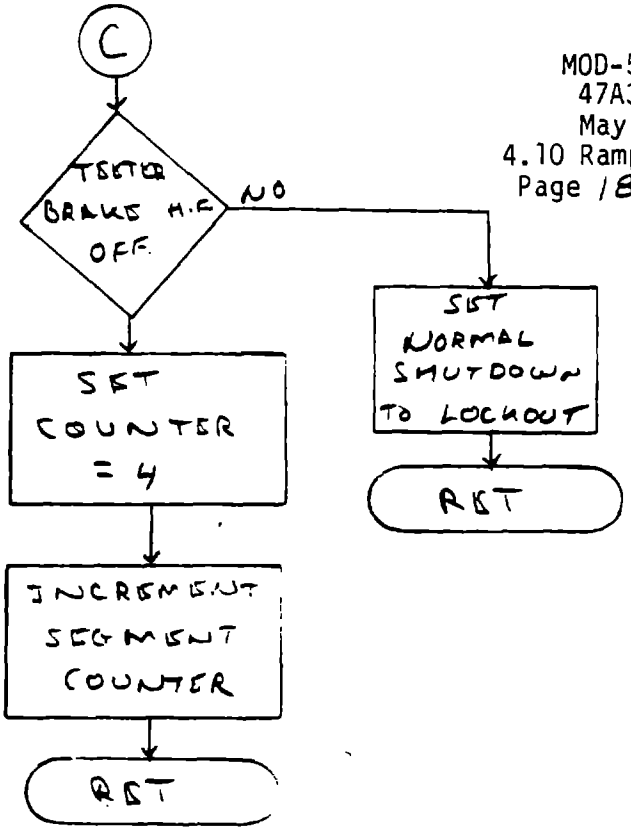

SHAFT PRESS
NR >9
NO
RET
RFLAG
= 1
SHAFT
LUBE PUMP
PRESS OK
?
NO
SET
NORMAL
SHUTDOWN
TO LOCKOUT
CMD
GEARBOX
LUBE PUMP
OFF
RET

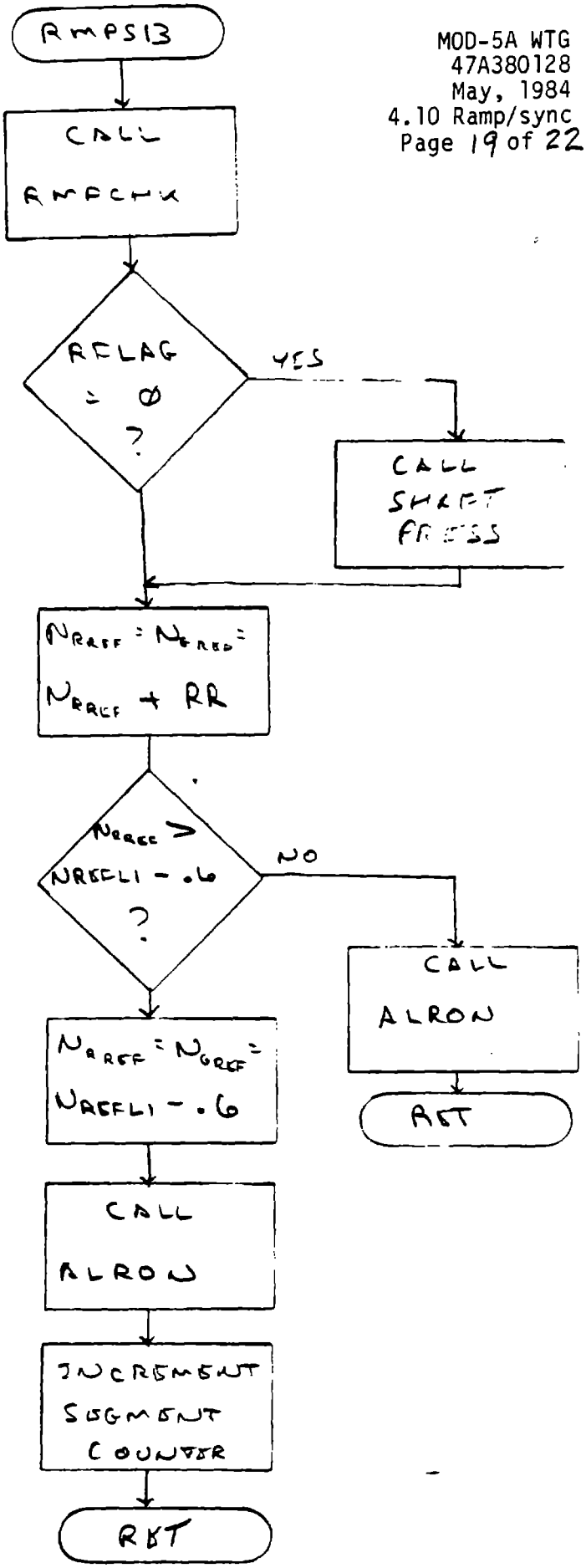

RMPS10
CALL RMPCHK
$N_{REF} = N_{CNT} = N_{REF} + RR$
CALL AMPSP
CALL ALAON
RFLAG = 0 ?
YES
CALL SHAFT PRESS
CMD H.F. TESTER BRAKES OFF
SST COUNTER = 20
INCREMENT SEGMENT COUNTER
RET

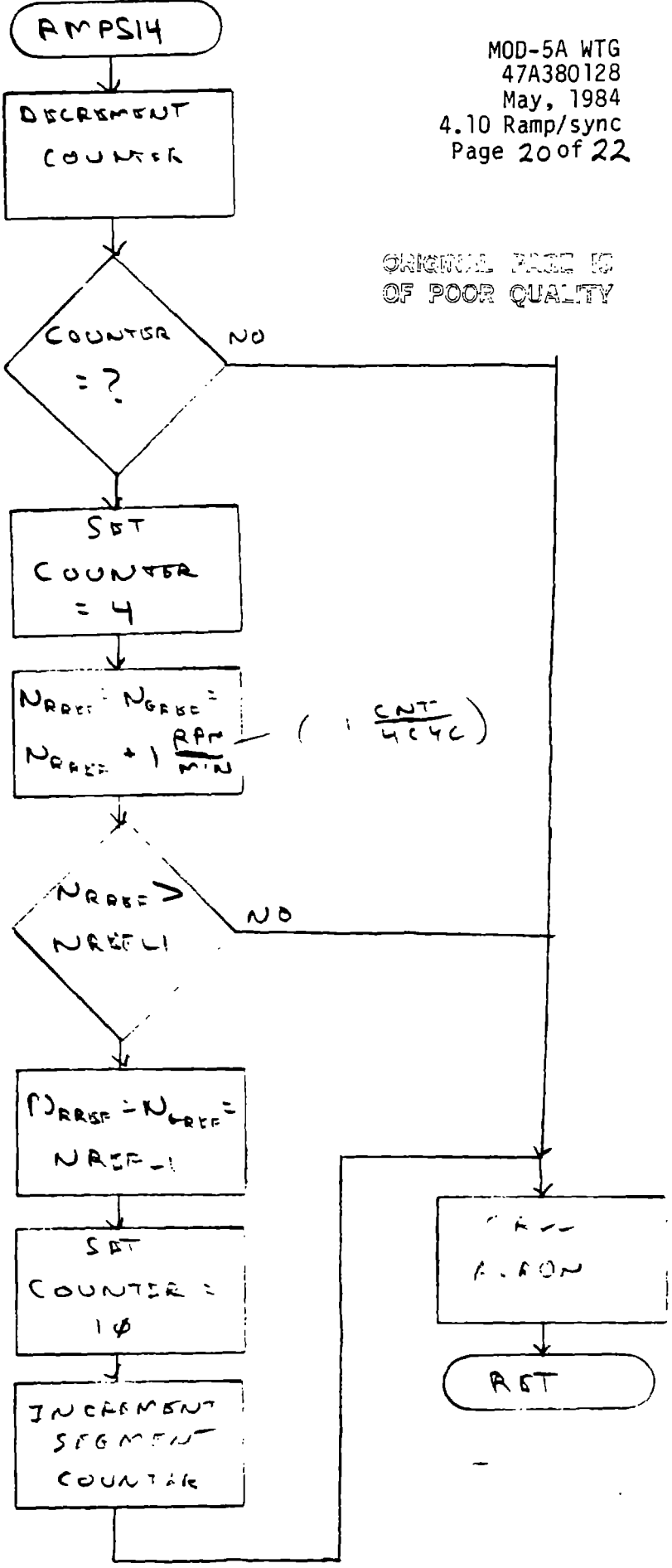


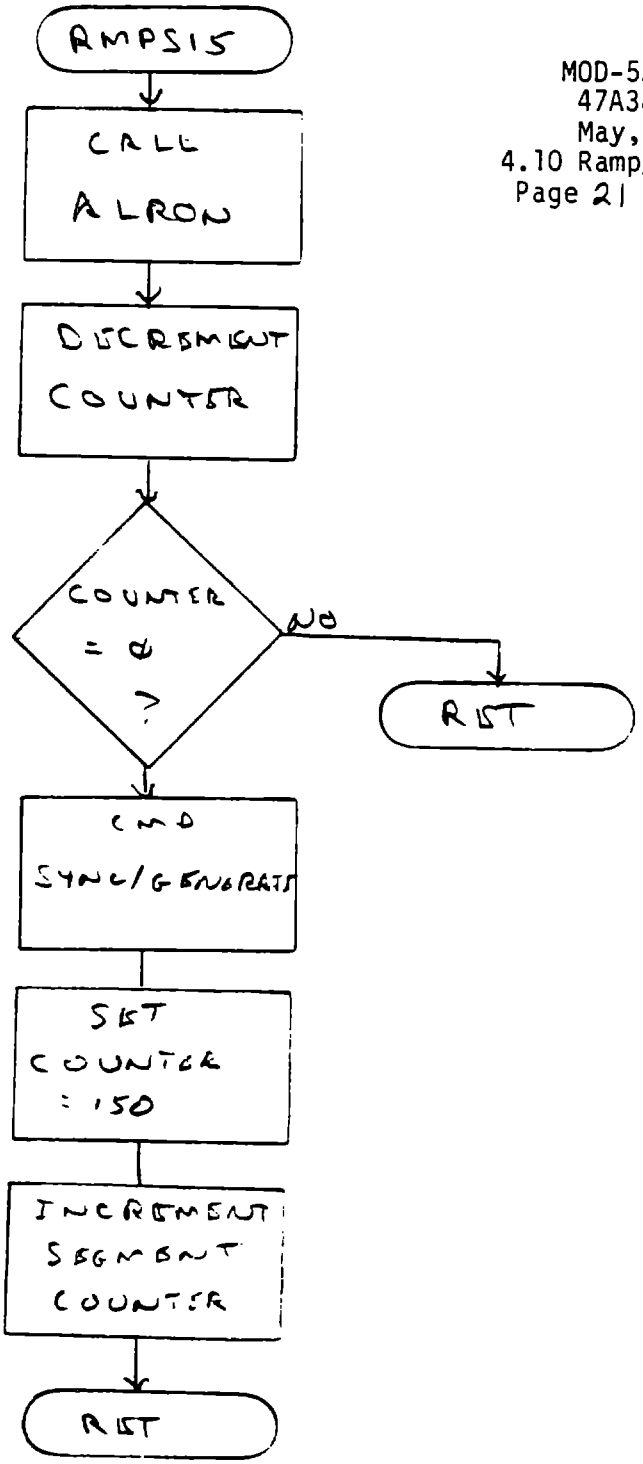

B
COUNTER
= 0
?
NO
RET
SET
NORMAL
SHUTDOWN
TO LOCKOUT
RET

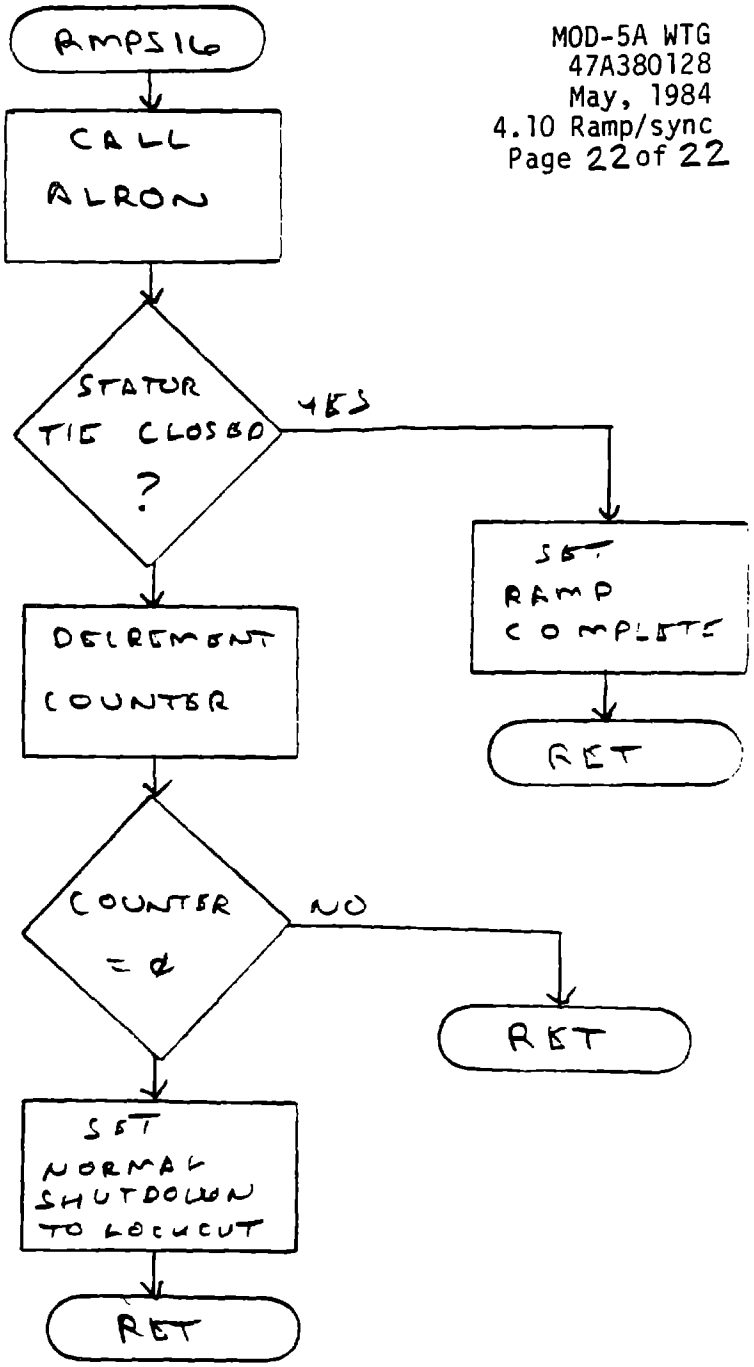

RMPS
CALL
RMPCHK
$N_{RREF} = N_{GREF} =$
$N_{RREF} + RR$
CALL
RMPSP
CALL
ALRON
RFLAG
= Ø
?
YES
CALL
SHAFT
PRESS
DECREMENT
COUNTER
COUNTER
= Ø
NO
RET
C


C
TEST
BRAKE M.F.
OFF
NO
SET
NORMAL
SHUTDOWN
TO LOCKOUT
RET
SET
COUNTER
= 4
INCREMENT
SEGMENT
COUNTER
RET

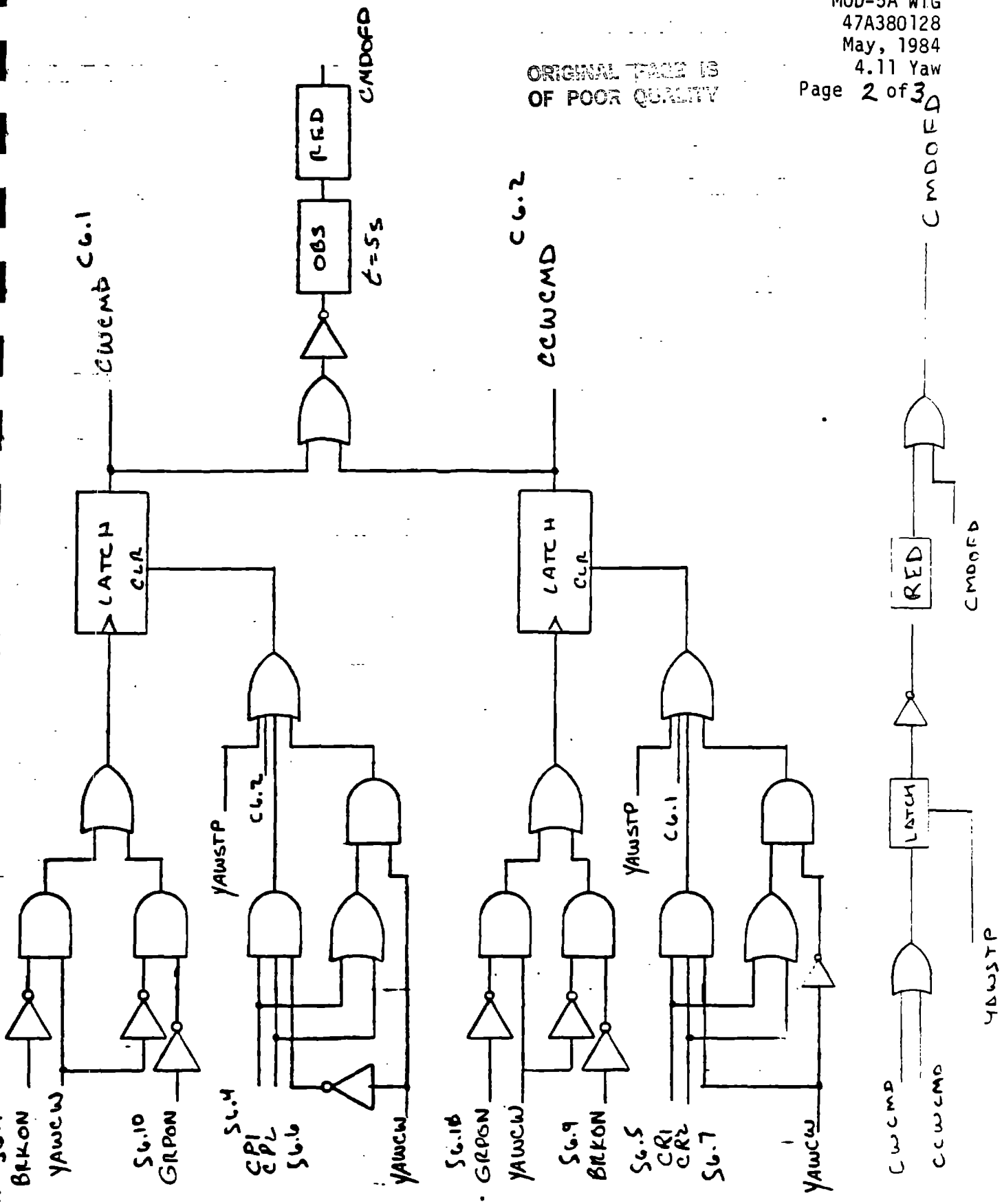

RMPS13
CALL
RMPCHK
RFLAG
= 0
?
YES
CALL
SHAFT
PROCESS
NRREF = NGREF =
NRREF + RR
NRREF >
NREFLI - .6
?
NO
CALL
ALRON
RET
NRREF = NGREF =
NREFLI - .6
CALL
ALRON
INCREMENT
SEGMENT
COUNTER
RET

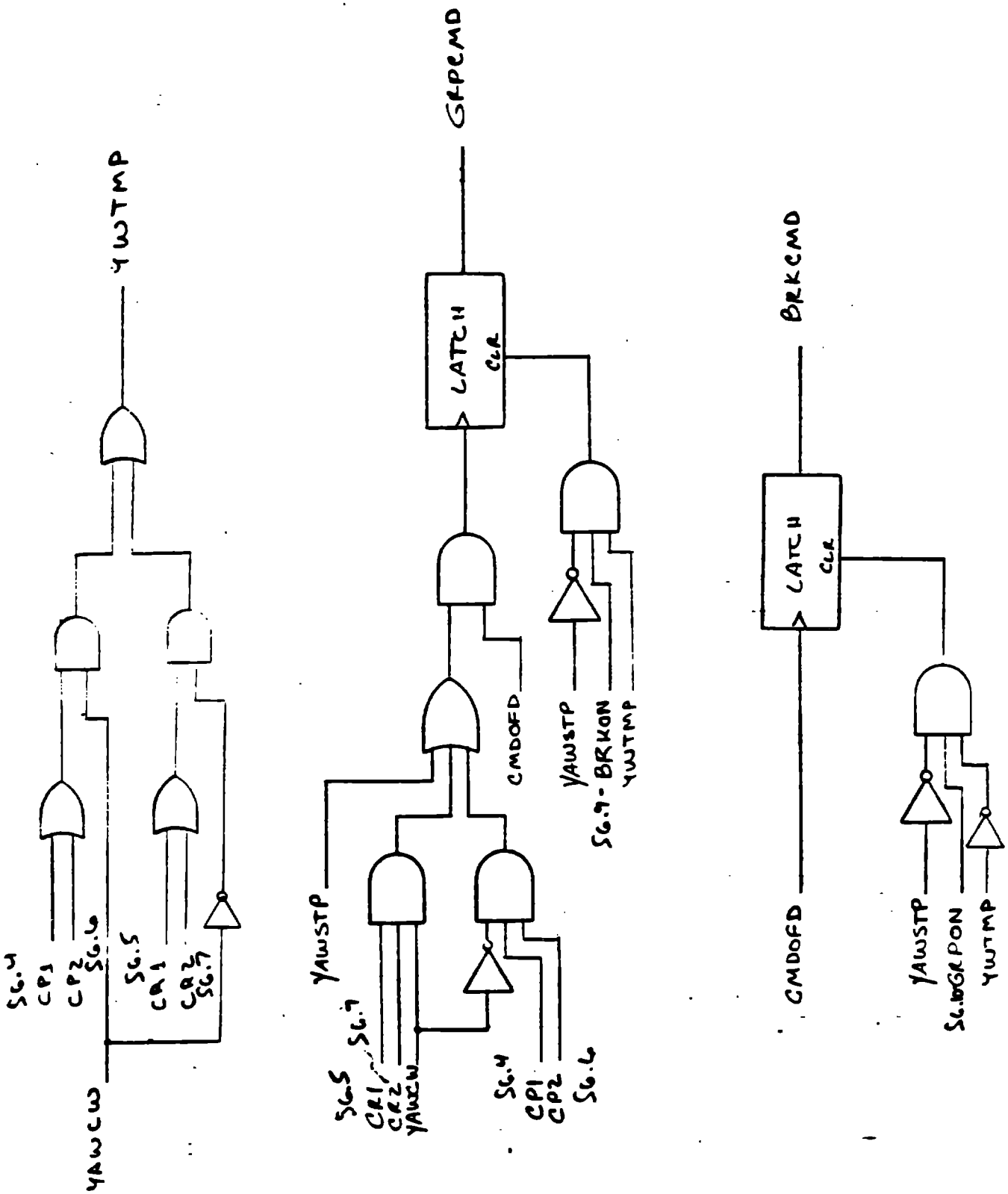


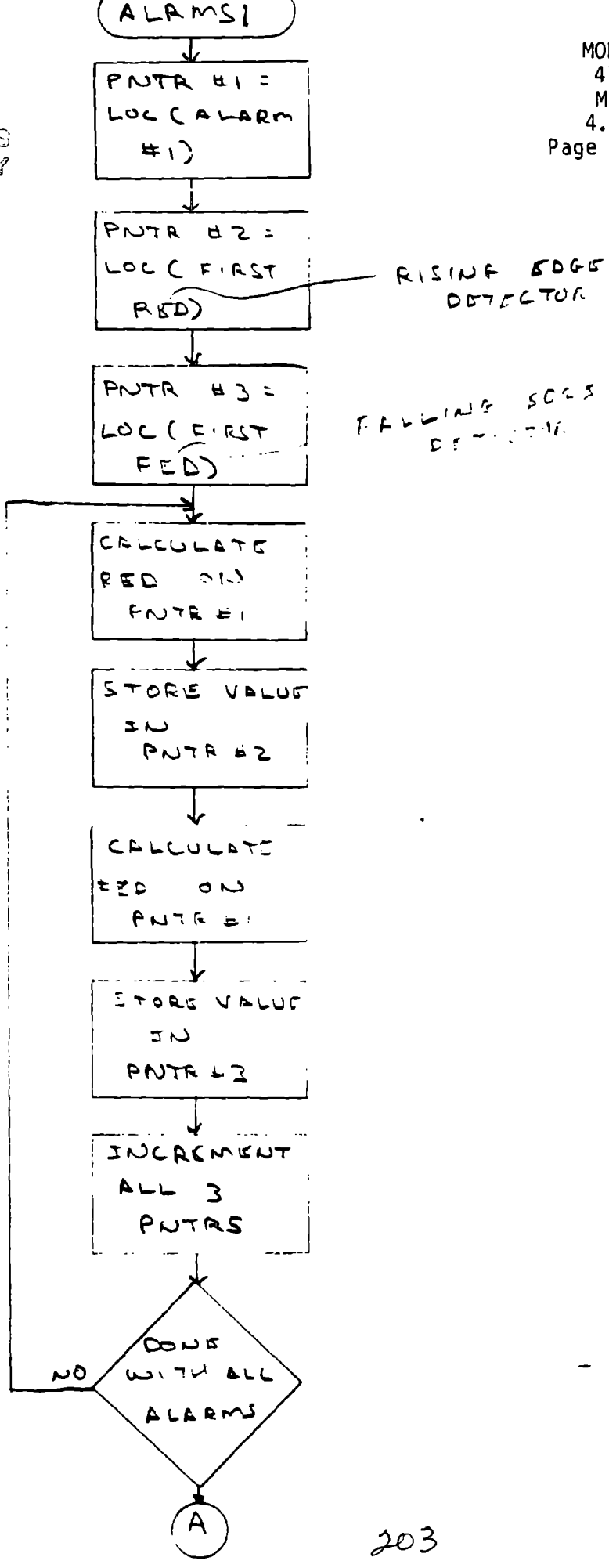

RMPSIS
CALL
ALRON
DECREMENT
COUNTER
COUNTER
= 0
?
NO
RET
CMD
SYNC/GENERATE
SET
COUNTER
= 150
INCREMENT
SEGMENT
COUNTER
RET

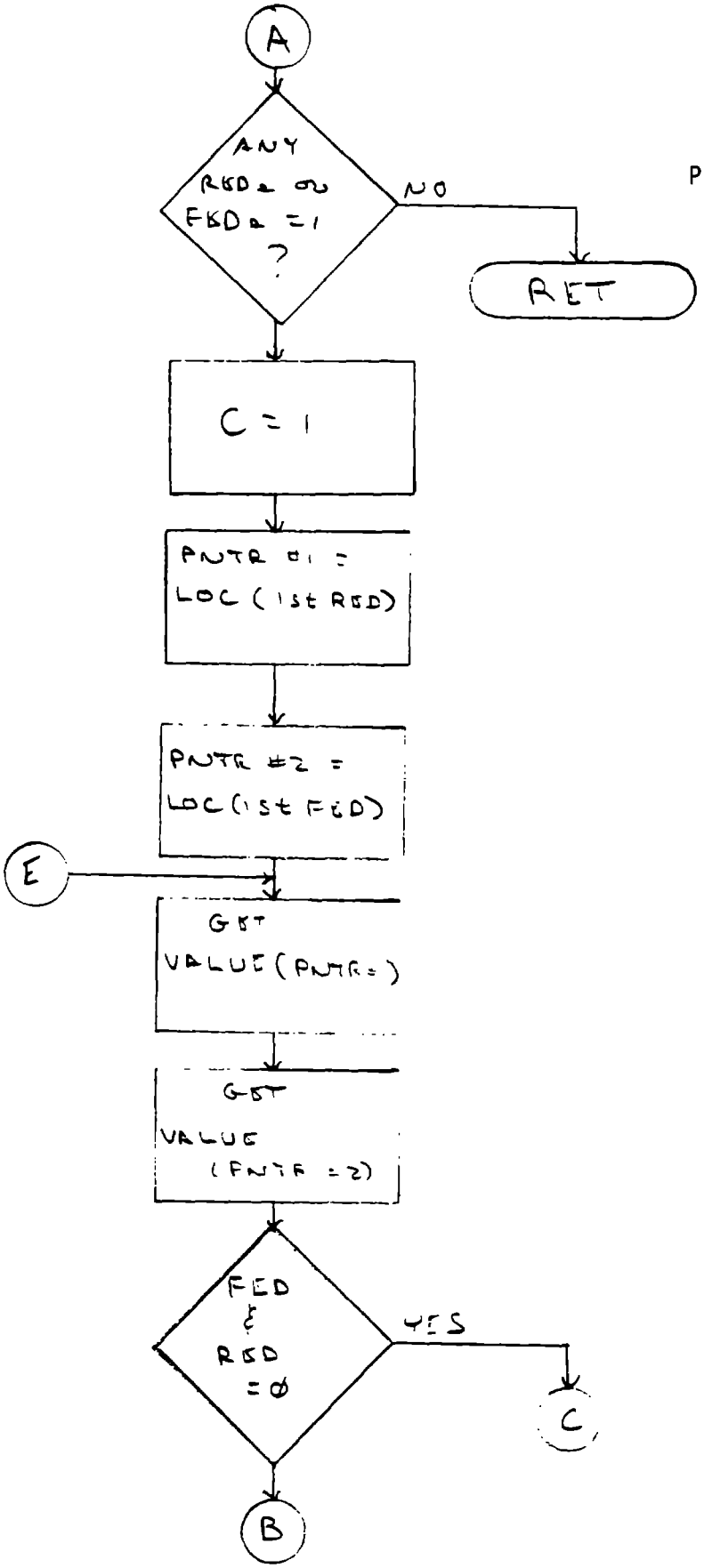

RMPS16
CALL ALRON
STATOR TIE CLOSED ?
YES
SET RAMP COMPLETE
RET
DELREMENT COUNTER
COUNTER = 0
NO
RET
SET NORMAL SHUTDOWN TO LOCKOUT
RET

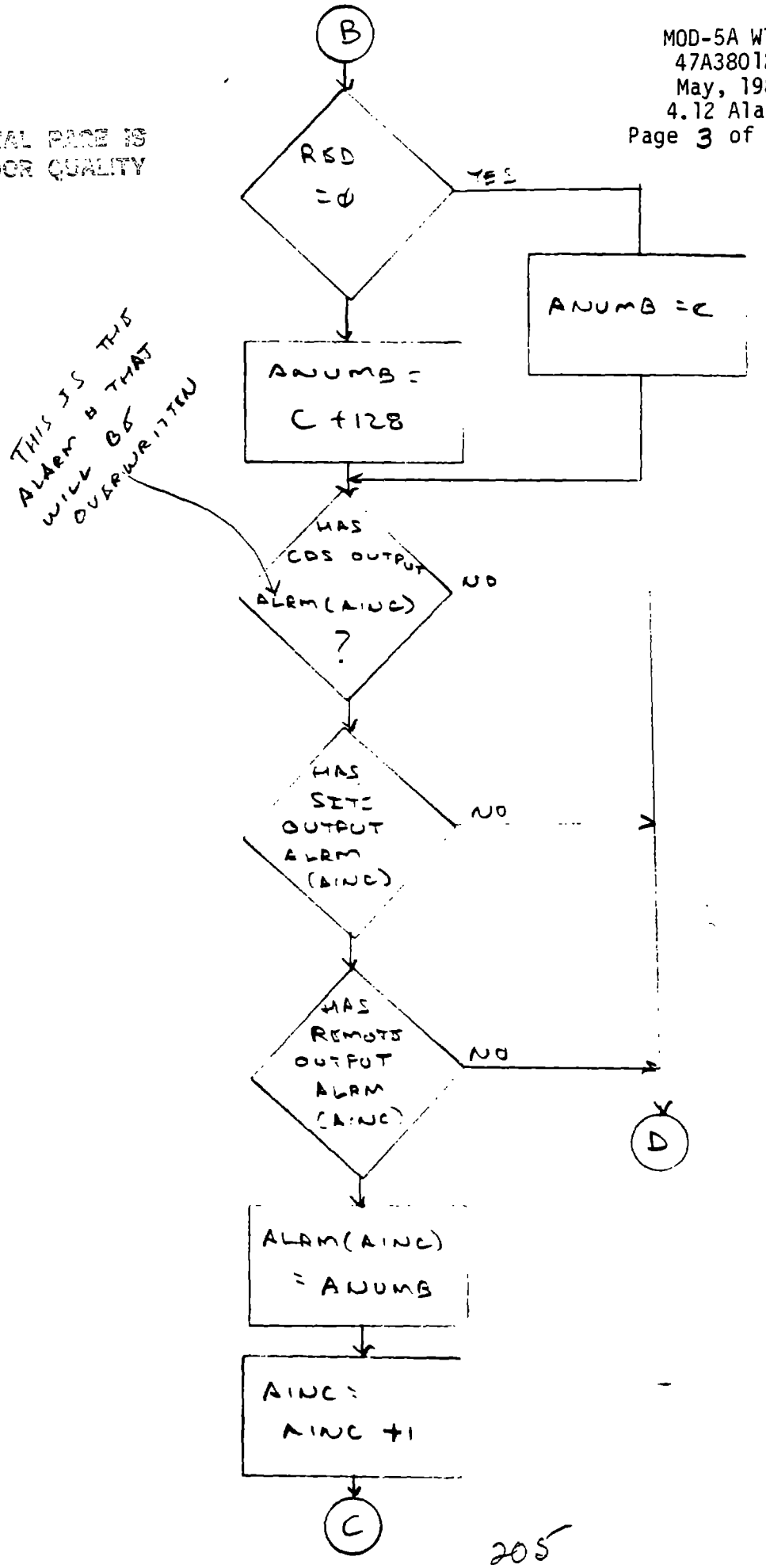
Yaw Module

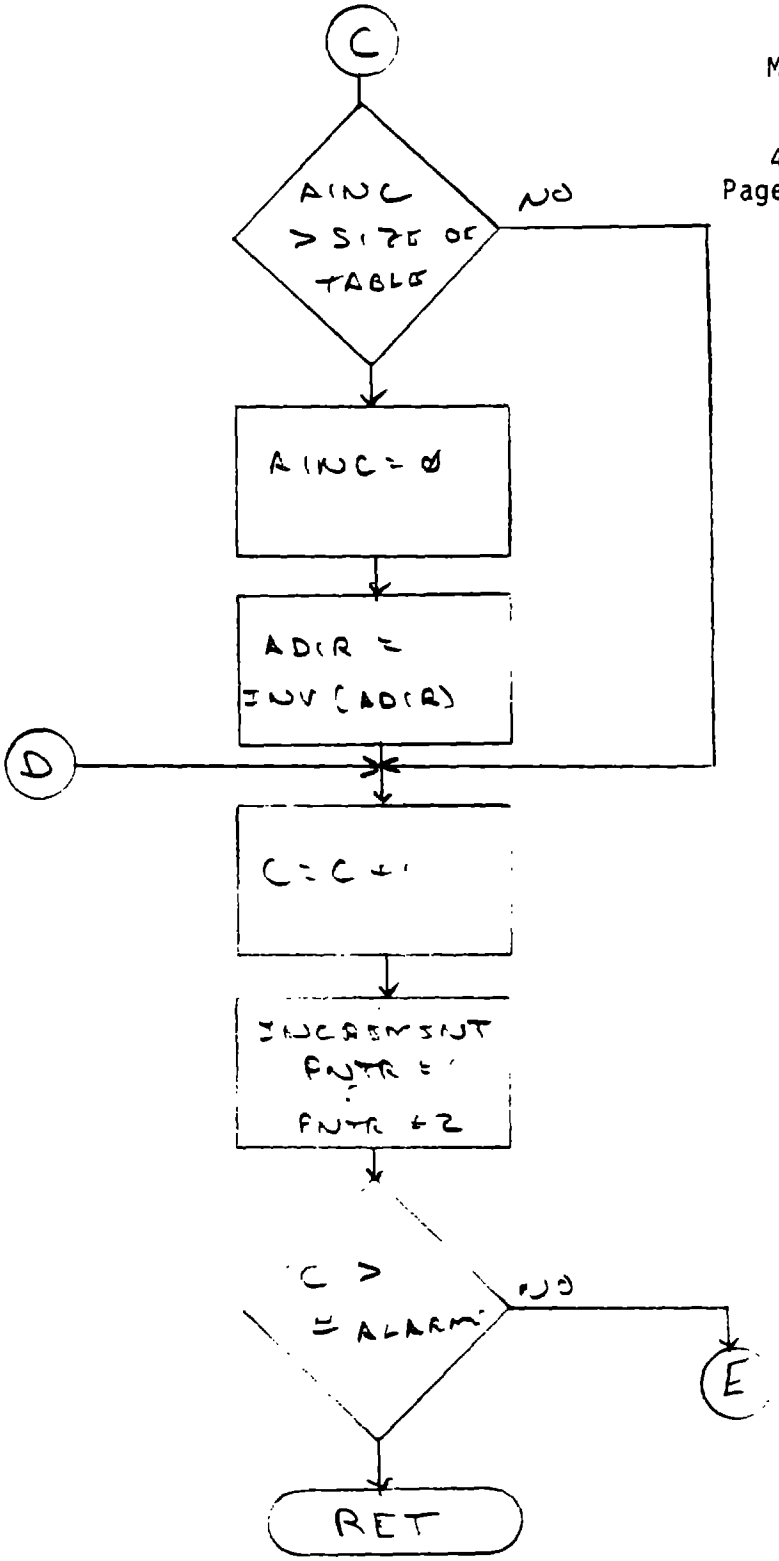



YAWTMP
SG.4
CP1
CP2
SG.6
SG.5
CR1
CR2
SG.7
YAWCW
GRPCMD
LATCH
CLR
CMDOFD
YAWSTP
SG.7
SG.5
CR1
CR2
YAWCW
SG.4
CP1
CP2
SG.6
YAWSTP
SG.9 - BRKON
YAWTMP
BRKCMD
LATCH
CLR
CMDOFD
YAWSTP
SG.8 GRPON
YAWTMP




A
ANY RED or FED = 1 ?
NO
RET
C = 1
PNTR #1 = LOC (1st RED)
PNTR #2 = LOC (1st FED)
E
GET VALUE (PNTR=)
GET VALUE (PNTR = 2)
FED & RED = 0
YES
C
B



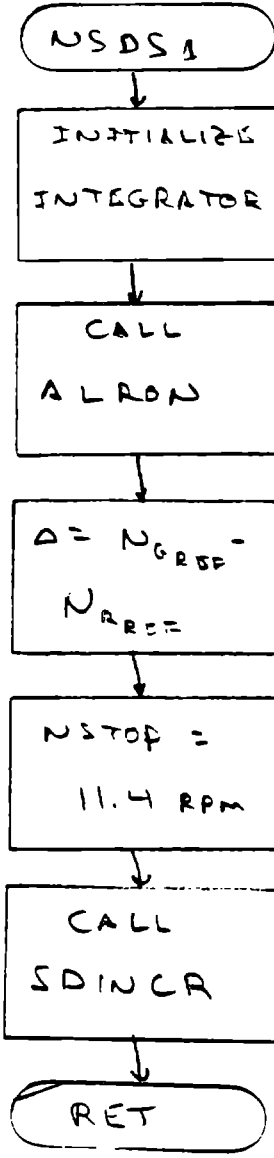

C
AINC > SIZE OF TABLE
NO
AINC = 0
ADDR = INV (ADDR)
D
C = C + 1
INCREMENT PNTR = PNTR + 2
C > = ALARM
NO
E
RET

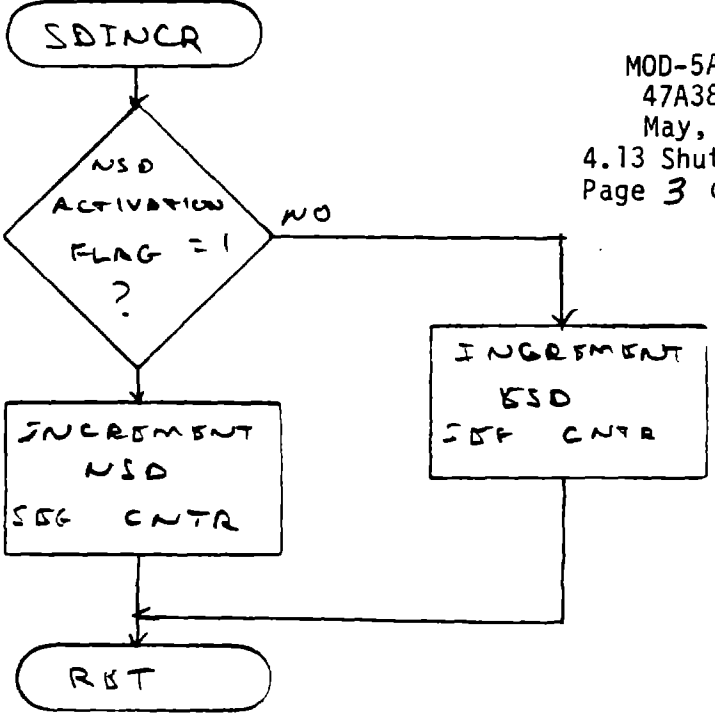
Normal Shutdown Segment Table

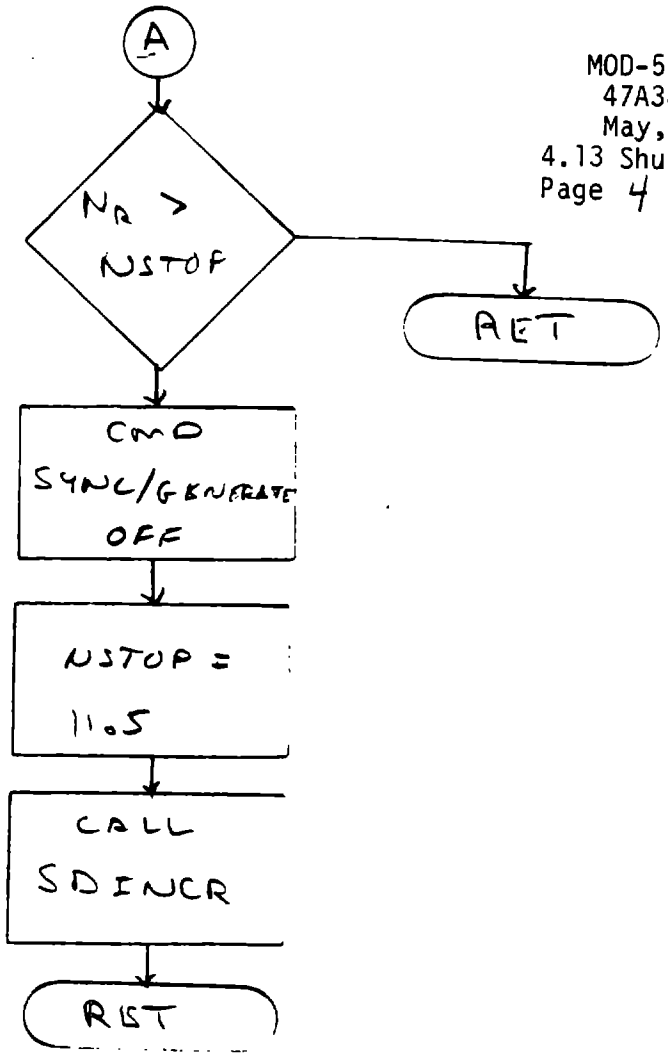
```
NSDST   DC    NSDS1      INITIALIZE DELI FOR SPEED CONTROL
        DC    NSDS2      RAMP SPEED REFS DOWN @ 10 RPM/MIN TO 11.4, NO SYNC
        DC    NSDS3      CONTINUE RAMP, DELAY, AND VERIFY TIE TRIPPED
        DC    NSDS4      CONTINUE RAMP UNTIL 9 RPM, TURN AC LUBE PUMP ON
        DC    NSDS5      CONTINUE RAMP UNTIL .2 RPM, ZERO OUT CMDS
        DC    NSDS6      DELAY 5 SEC AND VERIFY TEETER BRAKES
        DC    NSDS7      SET NSDCPL AND TURN OFF ALARMS
```

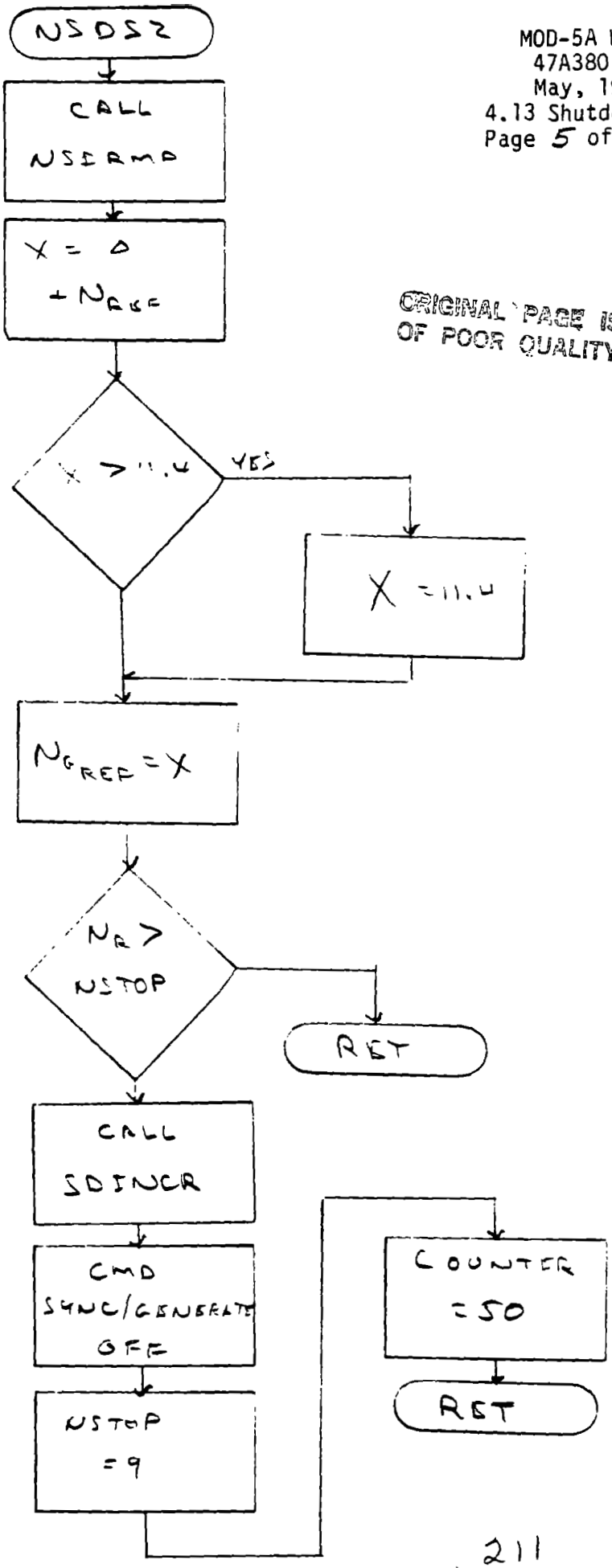
Emergency Shutdown Segment Table

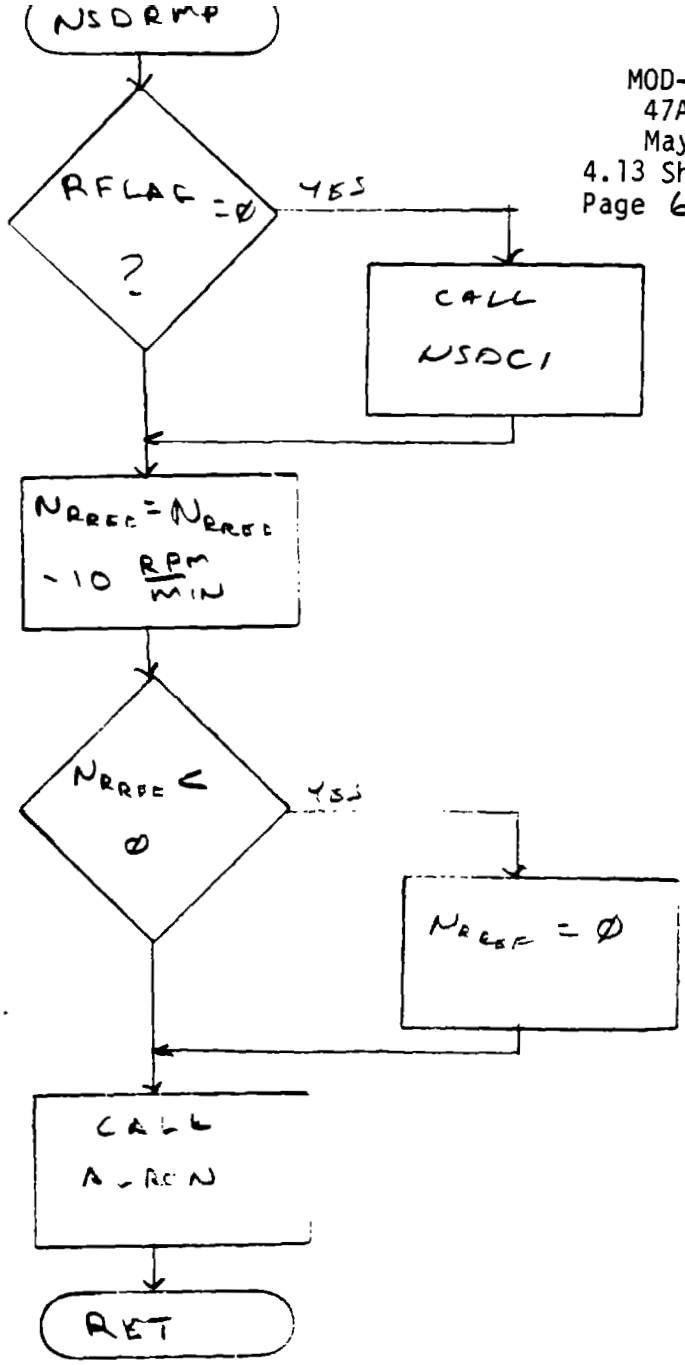
```
ESDST   DC    NSDS1      INITIALIZE DELI FOR SPEED CONTROL
        DC    NSDS2      RAMP SPEED REFS DOWN @ 10 RPM/MIN TO 11.4, NO SYNC
        DC    NSDS3      CONTINUE RAMP, DELAY, AND VERIFY TIE TRIPPED
        DC    NSDS4      CONTINUE RAMP UNTIL 9 RPM, TURN AC LUBE PUMP ON
        DC    NSDS5      CONTINUE RAMP UNTIL .2 RPM, ZERO OUT CMDS
        DC    NSDS6      DELAY 5 SEC AND VERIFY TEETER BRAKES
        DC    NSDS7      SET NSDCPL AND TURN OFF ALARMS
```

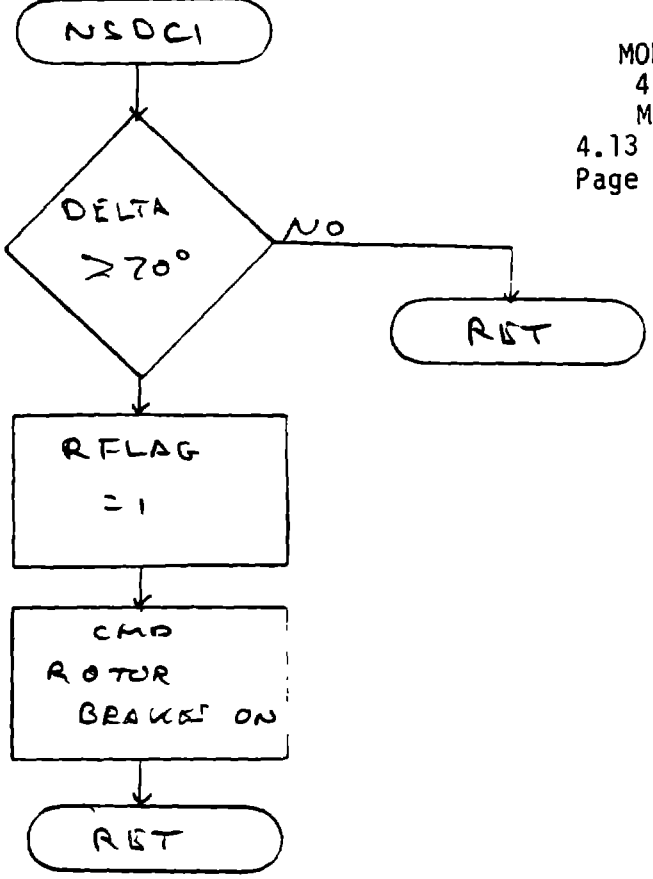

NSDS1
INITIALIZE INTEGRATOR
CALL ALRON
Δ = N_{GREF} - N_{REF}
NSTOP = 11.4 RPM
CALL SDINCR
RET

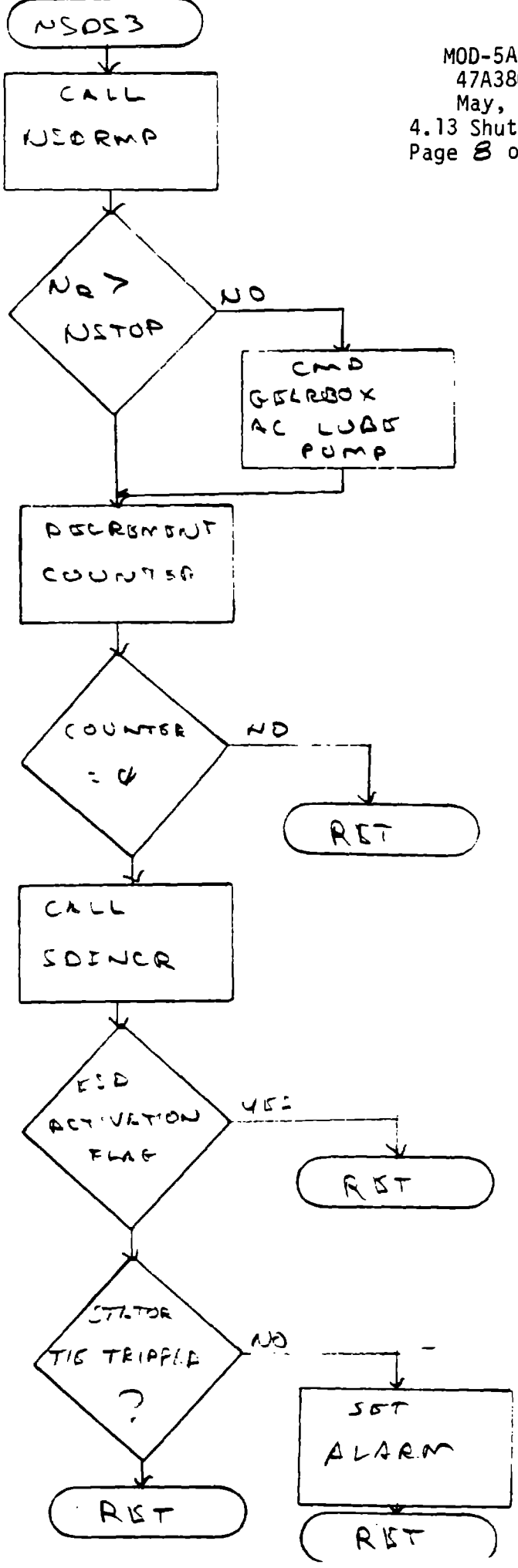

SDINCR
NSD ACTIVATION FLAG = 1 ?
NO
INCREMENT NSD SDG CNTR
INCREMENT BSD SDF CNTR
RET

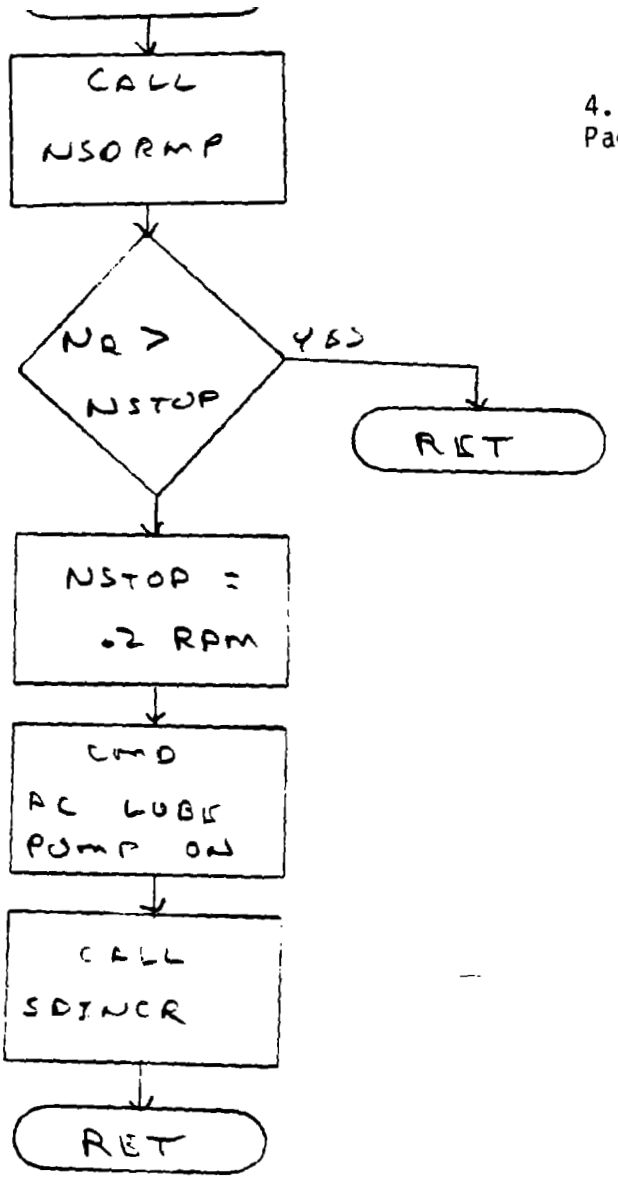

A
NR > NSTOP
RET
CMD SYNC/GENERATE OFF
NSTOP = 11.5
CALL SDINCR
RET

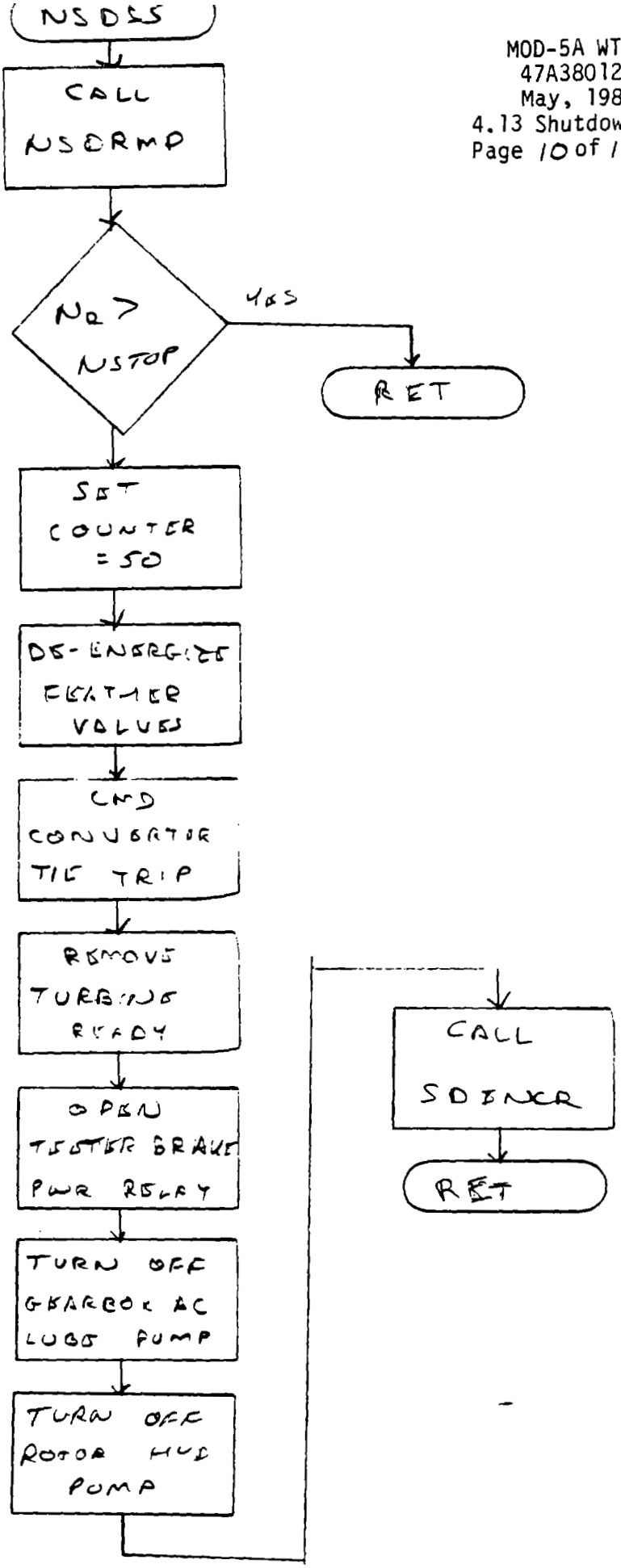


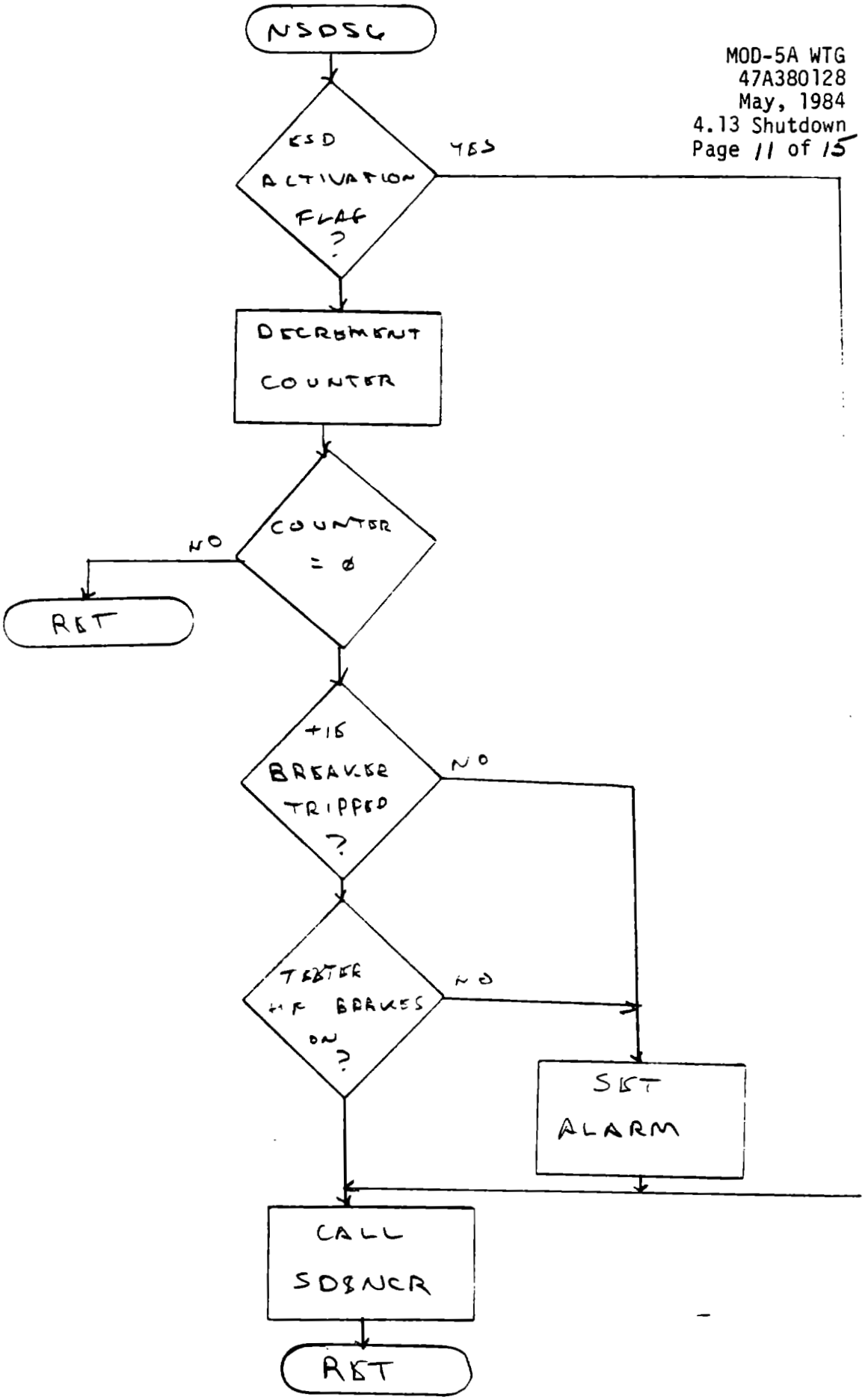

NSDRMP
RFLAG = Ø ?
YES
CALL NSDC1
NRREF = NRREF - 10 RPM/MIN
NRREF < Ø
YES
NRREF = Ø
CALL A_RCN
RET

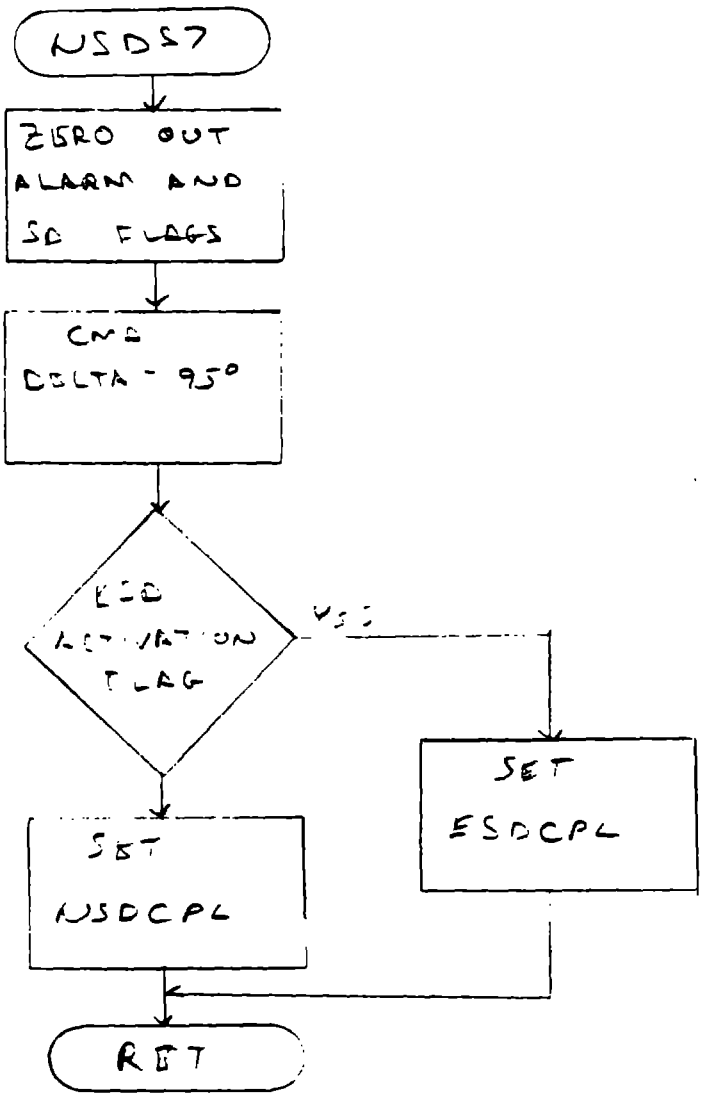

NSDC1
DELTA
≥70°
NO
RET
RFLAG
=1
CMD
ROTOR
BRAKE ON
RET

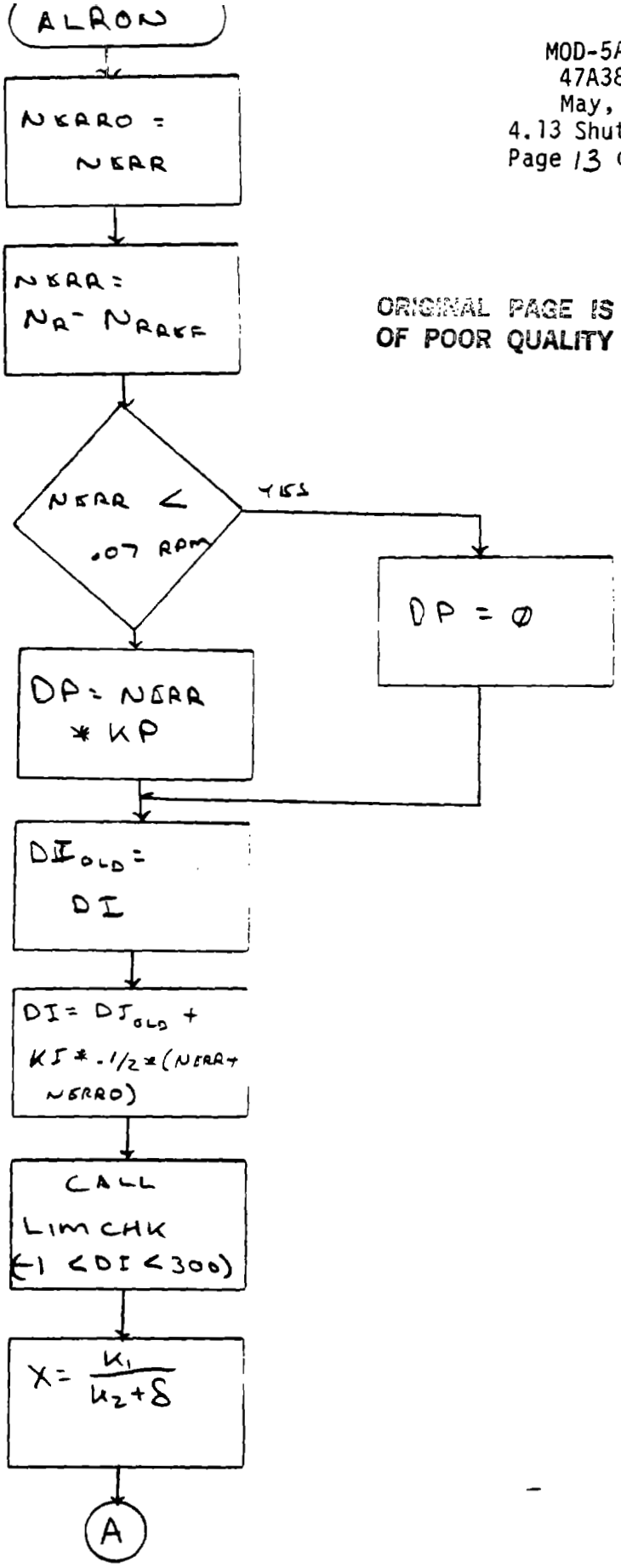

NSDS3
CALL
NSDRMP
NR > NSTOP
NO
CMD
GBLRBOX
AC LUBE
PUMP
DECREMENT
COUNTER
COUNTER = 0
NO
RET
CALL
SDINCR
EID
ACTIVATION
FLAG
YES
RET
STATOR
TIP TRIPPED
?
NO
SET
ALARM
RET
RET

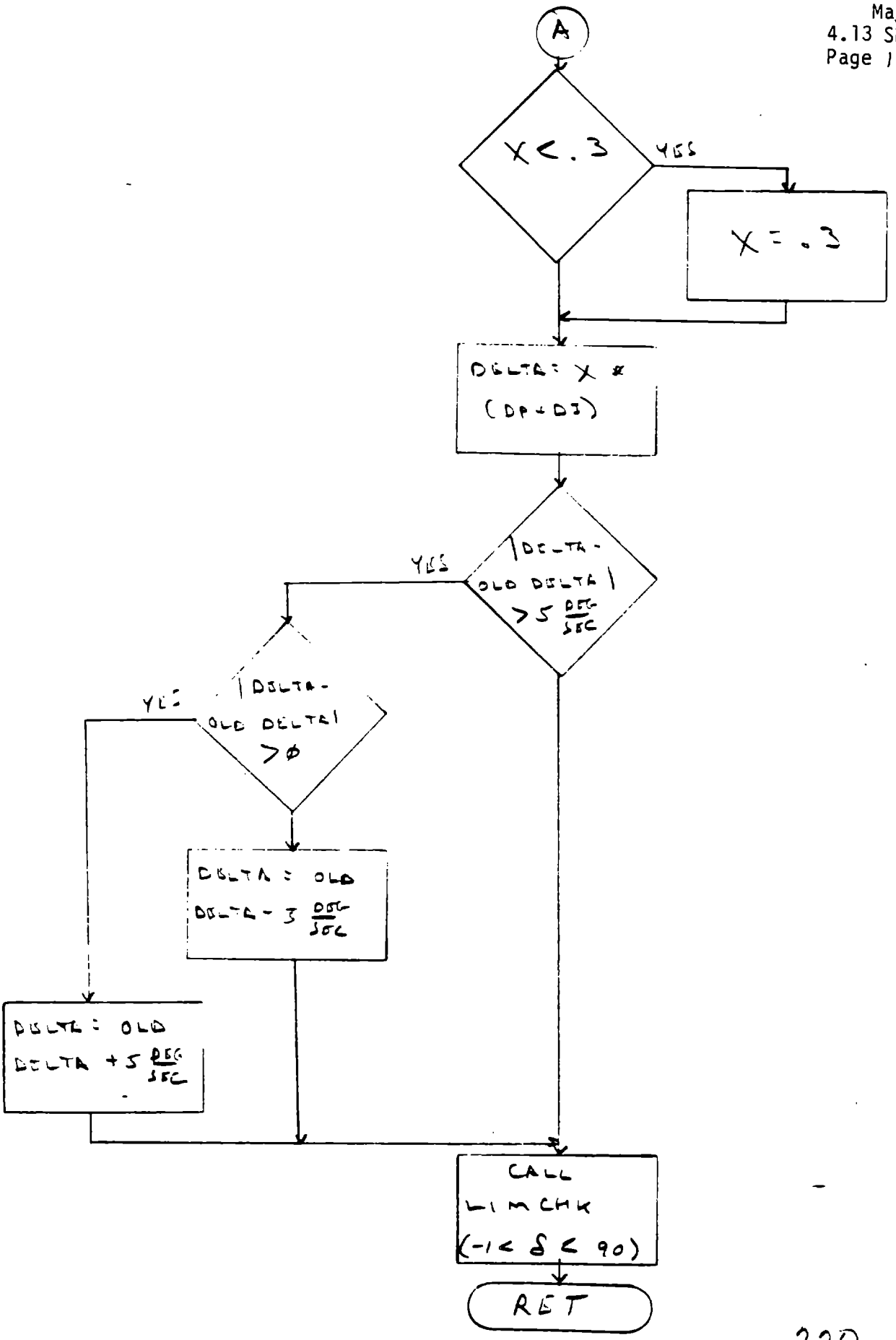

CALL
NSORMP
NQ >
NSTOP
YES
RET
NSTOP =
.2 RPM
CMD
AC LUBE
PUMP ON
CALL
SDINCR
RET

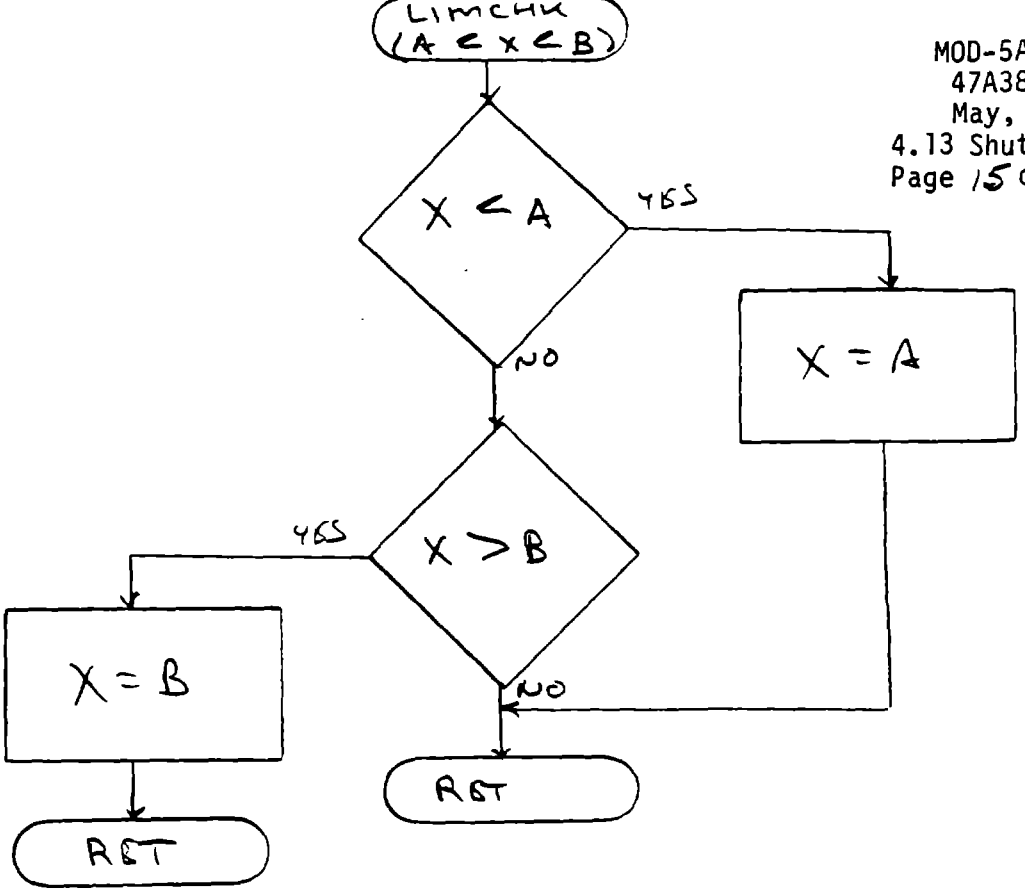

NSDSS
CALL NSERMD
NR > NSTOP
YES
RET
SET COUNTER = 50
DE-ENERGIZE FEATHER VALVES
CMD CONVERTER TIE TRIP
REMOVE TURBINE READY
OPEN TESTER BRAKE PWR RELAY
TURN OFF GEARBOX AC LUBE PUMP
TURN OFF ROTOR HYD PUMP
CALL SDSNCR
RET


NSDSC
ESD ACTIVATION FLAG ?
YES
DECREMENT COUNTER
COUNTER = 0
NO
RET
+15 BREAKER TRIPPED ?
NO
TESTER HP BRAKES ON ?
NO
SET ALARM
CALL SDSNCR
RET


NSDS7
ZERO OUT
ALARM AND
SD FLAGS
CMD
DELTA - 95°
ESD
ACTIVATION
FLAG
YES
SET
NSDCPL
SET
ESDCPL
RET

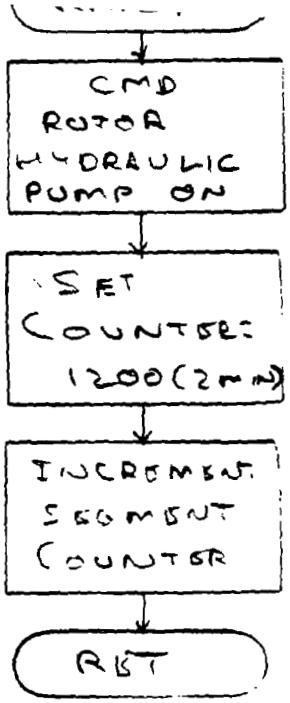


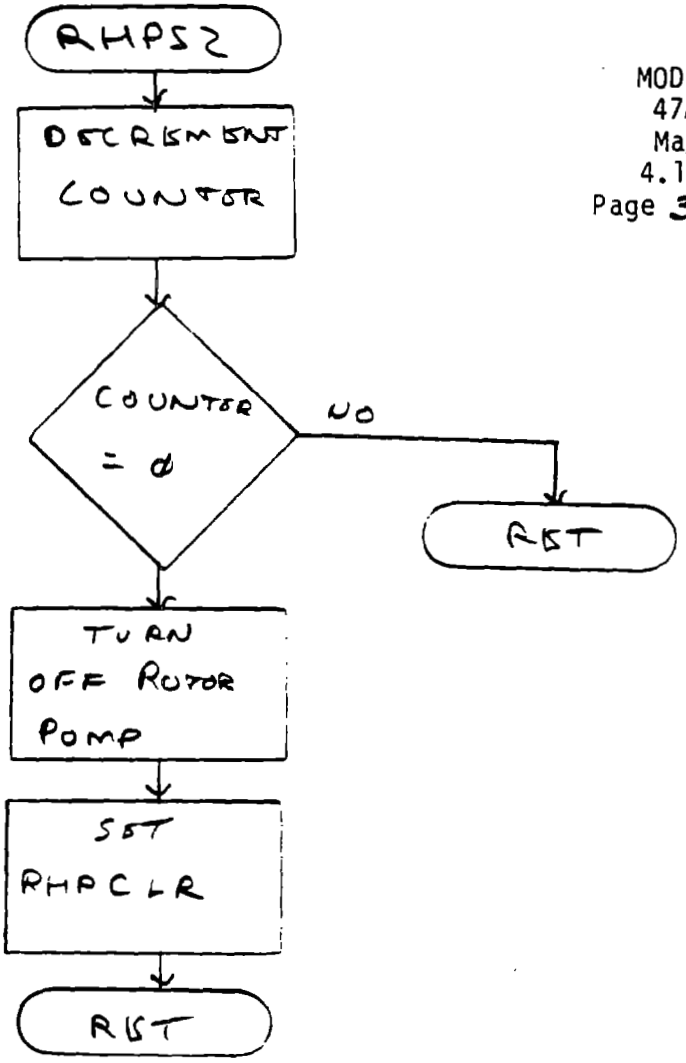

A
X < .3
YES
X = .3
DELTA = X * (DP + DJ)
|DELTA - OLD DELTA| > 5 DEG/SEC
YES
|DELTA - OLD DELTA| > 0
YES
DELTA = OLD DELTA - 3 DEG/SEC
DELTA = OLD DELTA + 5 DEG/SEC
CALL LIMCHK (-1 < δ < 90)
RET

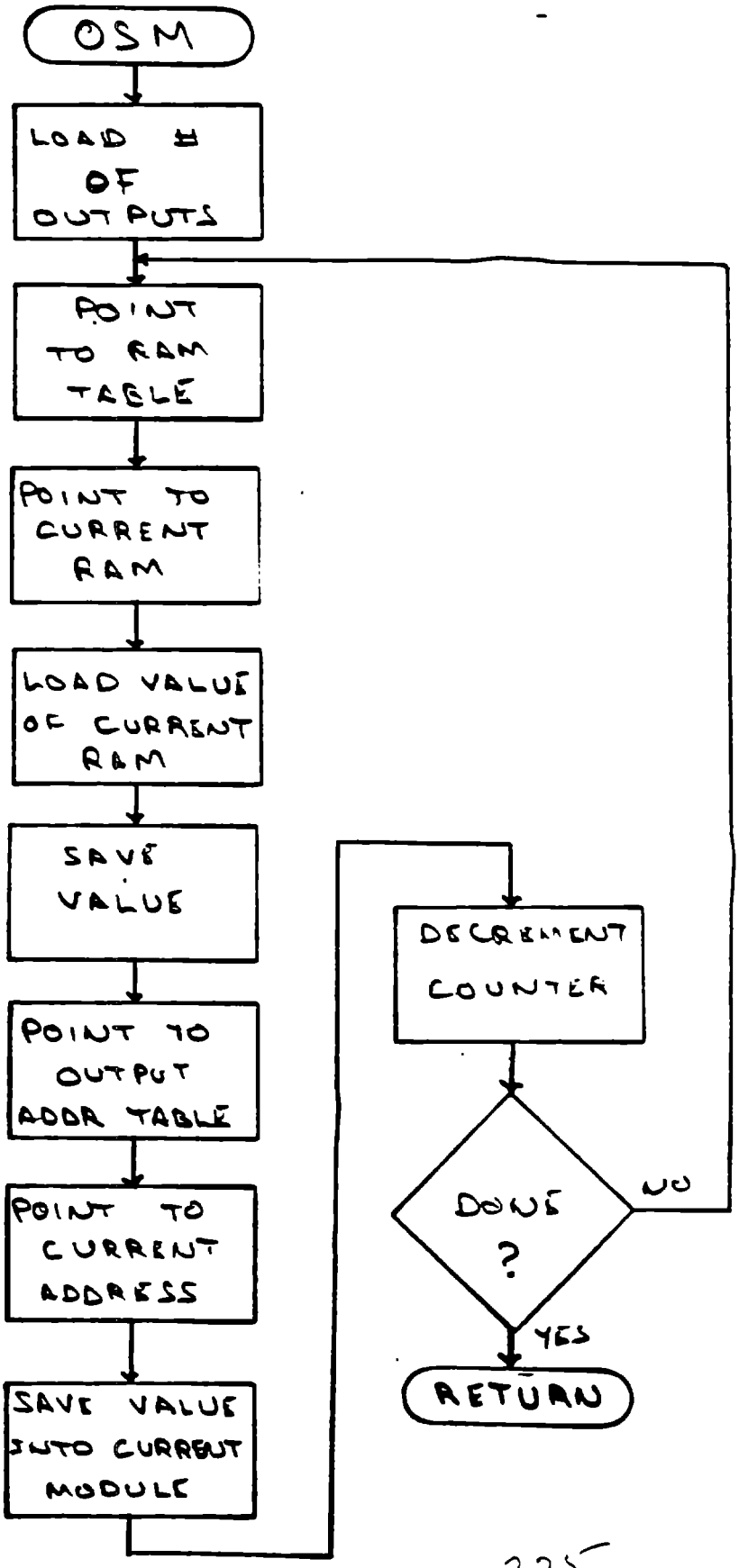

LIMCHK
(A < X < B)
X < A
YES
X = A
NO
X > B
YES
X = B
NO
RET
RET

Rotor Hydraulics Pump Segment Table

RHPST	DC	RHPS1	SET DELAY TIMER TO 2 MIN AND TURN ON ROTOR PUMP
	DC	RHPS2	DELAY AND SHUT OFF PUMP




RHPS2
DECREMENT COUNTER
COUNTER = 0
NO
RET
TURN OFF ROTOR PUMP
SET RHPCLR
RET


OSM
LOAD # OF OUTPUTS
POINT TO RAM TABLE
POINT TO CURRENT RAM
LOAD VALUE OF CURRENT RAM
SAVE VALUE
POINT TO OUTPUT ADDR TABLE
POINT TO CURRENT ADDRESS
SAVE VALUE INTO CURRENT MODULE
DECREMENT COUNTER
DONE ?
NO
YES
RETURN

CODE LISTING OF THE CONTROLLER SOFTWARE - MAIN PROGRAM

FOR THE

MOD-5A WIND TURBINE GENERATOR

MAY 1984

GP Schoenbach — DATE: 5-14-84
Responsible Engineer

N/A — DATE: —
Systems Engineering

NA — DATE: —
Engineering Manager

[signature] — DATE: 5/14/84
Chief Engineer

NA — DATE: —
Quality Assurance

NA — DATE: —
WTG Integration

TOTAL NUMBER OF PAGES 189

WTG 516
PRINTS

REVISION LOG

This log identifies those portions of this document which have been revised since original issue. revised portions of each page, for the current revision only, are identified by marginal striping or text notes.

Revision	Page No.	Paragraph Number(s) Affected	Rev. Date	Approval

SECTION 1.0
SCOPE

This document contains the code listing of the MOD-5A Controller Software main program.

SECTION 2.0
APPLICABLE DOCUMENTS

The following documents of the date of issue noted form a part of this specification to the extent specified herein. In the event of conflict between this specification and the documents referenced herein, the contents of this specification shall supersede.

2.1 GOVERNMENT DOCUMENTS

NASA/LERC - Statement of Work, DEN 3-153, April 2, 1982

2.2 GENERAL ELECTRIC DOCUMENTS

47A380011	System Specification for the MOD-5A WTG
47A387005	Signal and Command List
47A380013	Control System Requirements
47A380044	Software Management Plan
47A380029	Controller Software Requirements
47A380028	Functional Requirements for the Controller Hardware
47A380128	Logic Design for Controller Software Main Program

SECTION 3.0
DESCRIPTION OF SOFTWARE PROGRAM

The control software provided with the EPTAK system is the ECL 3/Executive D. The executive D software processes system interrupts, power-up and -down operation, error detection, arithmetic functions, data conversions, and ECL3 control functions. The standard ECL3 instructions are:

- logic
- print/keyin
- transfer of control
- arithmetic

The logic instructions are:

- load
- compliment
- store
- AND
- compliment AND
- OR
- compliment OR
- exclusive OR
- compliment exclusive OR
- compare
- binary invert
- invert
- no operation
- load double accumulator with address
- load SP1 and SP2 with address.

The print instruction commands transmission of character-string information to a peripheral device. The keyin instruction allows the input of characters from a keyboard.

Transfer of control functions are:

- o unconditional jump
- o jump on equal
- o jump if less than
- o subroutine call
- o return from subroutine

Arithmetic functions are:

- o load double accumulator
- o store double accumulator
- o add double accumulator
- o multiply double accumulator
- o divide double accumulator

The EPTAK system can be programmed using 8080 assembly language instructions.

The user application software generated by GE consists of the following:

- o structure declaration
- o cold start
- o executive
- o main program
- o vendor software

3.1 STRUCTURE DECLARATION

The structure declaration defines and labels required to use the executive D program functions. The declare statements are located at the beginning of the user program and consist of the following:

- o equate memory and input/output (EQU)
- o real time lock (ARTX)
- o analog input (AIS)
- o user RAM (EQUR)
- o text statement (TXT)
- o user print/(KEYIN) (PK)
- o user keyin (KEYIN)

3.2 COLD START

Cold start is executed once at power up to initialize the system. The functions of cold start are:

- o set the activation flags for full time modules
  - alarm
  - CDS data output
  - operators terminal data output
- o initialize output commands
  - aileron at feather (90°)
  - yaw gripper & brake ON
  - lockout relay
- o initialize variable parameters
  - zero counters
  - archive sample rate
  - proportional gains and integration constants
  - aileron output command rate limit
  - data conversion constants
- o set default configuration
  - site terminal control
  - operators terminals connected
  - lockout mode
  - ramp speed limit
  - HI & LO speed reference
  - power set point

3.3 EXECUTIVE

The executive module controls execution of the main program modules. Each main program module has several sub-modules called segments. A RAM location is used as an activation flag for each module and another RAM location is used as a segment counter. The activation flag is used by executive to execute the corresponding module. If the module is activated, then the segment counter is used to decide which segment or part of the module to call.

The executive is initiated by a timer at intervals of 100 msec and addresses the main program modules in sequence. The ISM, OSM, data processing, mode and data communications modules are called continuously by the executive. The yaw

and data archive modules are called continuously by the executive if the controller is in the automatic run mode sequence. Startup, ramp, power generation, shutdown, and standby/enable are automatic run sequence modules and are called as determined by the mode module. The standby/inhibit, lockout, and manual modes are determined by operator command. The standby/inhibit and lockout modes are also generated after a safety shutdown.

3.4 MAIN PROGRAM

The main program of the controller is divided into the following software modules:

- Input Signal Manager (ISM)
- Data Processing
- Mode Logic
- Data Archive
- Power Generation
- Manual
- Communication
- - Remote Terminal
  - Site Terminal
  - Control Data System (CDS)
- Startup
- Ramp
- Yaw
- Alarm
- Normal/Emergency Shutdown
- Rotor Hydraulic Pump Module
- Output Signal Management (OSM)
- Memory Test (background)

A more detailed description of the main program is given in 47A380128. Logic Design for MOD-5A Controller Software Main Program.

3.5 VENDOR SOFTWARE

Three vendor supplied software packages are used. They are:

- Real time clock and calendar
  SL709-6015-M RTCCND, RTG clock/calendar.

- Print and key in communication
  SL709-6034-M PRTKYND, Type D Print/Keyin

- General data communication
  SL709-6037-01 CP7COMD, CP717 Comm Pkg

A brief description of each software package is given in the following paragraphs.

3.5.1 Real Time Clock and Calendar

The real time clock and calendar program counts 0.1 second pulses to develop month, day, hour, minute, and second.

The data is updated at midnight, the months is updated at 28, 30, or 31 days as appropriate. There are no provision for updating the year. Thus, in leap year, February 29 would have to be extended manually, i.e., reset Mar 2 to Mar 1.

3.5.2 Print and Key in Communication

The EPTAIK executive (ECL) software includes capability to control communications between the controller and one print/keyin (P/K) device. The supplementary P/K subroutine extends the capability to communicate with additional (up to 15) P/K devices. The P/K devices are the site and remote operator terminals and provisions to communication with two P/K devices is needed.

The P/K interface is TTY/EIA RS232C with 20ma current loop.

Standard ASCII Code is used at BAUD rates between 110 and 9600. Parity can be odd, even, or none. Stops bits can be 1, 1 1/2, or 2. Bits per character can be 5, 6, 7 or 8. MOD-5 is set to operate at 300 BAUD, 8 bits/character, 1 stop bit, and no parity.

The P/K communications is used with the site and remote operator terminals. The information transmitted is alpha-numeric and does not require processing.

3.5.3 General-Data Communications

The general data communications software package provides the capability to the controller for data communications through an RS 232C interface to the Controls Data System (CDS).

The format of the 8 bit data message word used with this software is 0011XXXX where XXXX is 4 bits of data. An 8 bit data word is transmitted in 2 message words with the 4 most significant data bits in the first message word and the 4 least significant data bits in the second message word. The data word $A_7A_6A_5A_4A_3A_2A_1A_0$ is thus transmitted by the data message words $0011A_7A_6A_5A_4$ and $0011A_3A_2A_1A_0$.

The 50 word data set, comprised of operating data and alarms is transmitted to the Controls Data System by a 100 word message. The data set is transmitted once per second at 1200 BAUD.

SECTION 4.0
CODE LISTING

```
PAGE    1 ECL3 COMPILER SL768-2013-02 FULL MOD-5A CONTROLLER COMPILATION  4/25/84

 PROGRAM: 3K     3 DATA: 7K
SOURCE FILE: EX42584 /1        OBJECT FILE: EX       /AB1:DR1

3B54:A W                                                BC     ZERO-PNIEFW-1  EXPECT A WARNING HERE
 WARNINGS
3718 LABELS LEFT
DICTIONARY:
        057345        AAA
        032771        ABSWDA
        101644        ACBIR
        101625        ACINC
        107165        ACNT1
        000006   R    ACOS
        107160        ACOUNT
        034763        AB11
        033761        AB1DRL
        101643        ADIR
        105415        AFLG
        105423        AFLG1
        105412        AI1
        105414        AI2
        042413        AIL1
        042436        AIL2
        042463        AIL3
        042471        AIL4
        042553        AIL5
        042560        AIL6
        042731        AIL7
        042771        AIL8
        042761        AIL9
        101623        AINC
        044231        AL1
        044444        AL10
        044245        AL2
        044074        AL3
        044522        AL4
        044265        AL5
        044513        AL6
        044320        AL7
        044356        AL8
        044411        AL9
        043053        ALC1
        043060        ALC2
        043003        ALCALC
        000534        ALG2EU
        105417        ALINE
        043130        ALINIT
        100470        ALMACT
        100410   R    ALMCM
        043042        ALMS1
        023611        ALMST
        100657        ALRM
        101166        ALRM1
        101177        ALRM10
```

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OF POOR QUALITY

```
101200      ALRM11
101201      ALRM12
101202      ALRM13
101203      ALRM14
101204      ALRM15
101205      ALRM16
101206      ALRM17
101207      ALRM18
101210      ALRM19
101167      ALRM2
101211      ALRM20
101212      ALRM21
101213      ALRM22
101214      ALRM23
101215      ALRM24
101216      ALRM25
101217      ALRM26
101220      ALRM27
101221      ALRM28
101222      ALRM29
101170      ALRM3
101223      ALRM30
101224      ALRM31
101225      ALRM32
101226      ALRM33
101227      ALRM34
101171      ALRM4
101172      ALRM5
101173      ALRM6
101174      ALRM7
101175      ALRM8
101176      ALRM9
102362      ALRMS
042357      ALRON
105063      AMT1A
105065      AMT2A
035516      AN12TB
105421      ANUL
101647      ANUMB
105424      AOFLG
144000    R AP1ADA
144001    R AP1ADB
105041      APER
000537      APUSTR
057053      ARC1
056750      ARC1A
057066      ARC3
057206      ARC5
057256      ARC6
057275      ARC7
057311      ARC8
107157      ARCCNT
107152      ARCCPL
056716      ARCH1
```

```
057327      ARCH2
057411      ARCH3
107153      ARCINC
105406      ARCLN1
105407      ARCLN2
105410      ARCLN3
105411      ARCLN4
105370      ARCLOC
105302      ARCOUT
111024      ARCR1
111500      ARCR2
112154      ARCR3
107220      ARCRAM
107155      ARCRMI
077516      ARCTEM
107162      ARCTIM
101646      ARDIR
101631      ARINC
105300      ARLOC1
105402      ARLOC2
101645      ASDIR
000005  R   ASIN
101627      ASINC
000007  R   ATAN
107170      ATIME
060523      ATTNAD
105071      AVG1
105067      AVGC1
105075      AVGINF
137700      BA5717
100665      BC
105031      BIAS1
105041      BIAS2
000443      BIN2AS
000626      BLKTFR
000207      BR
000211  R   BRC
000213  R   BRE
000212      BRS
000210  R   BRZ
077065      C1A1
077066  R   C1A2
077076      C2A11
077077      C2A12
077465      C2A21
077473      C2A22
077475      C2A23
077467      C2A24
077070      C2A25
077071      C2A26
077072      C2A27
077073      C2A28
077074      C2A29
077075      C2A30
```

```
077067       C2A4
077100       C3A1
077101       C3A2
077133  R    C3A3
077134  R    C3A4
077102       C4A1
077103       C4A6
077104       C5A2
077105       C5A3
077106       C5A4
077471       C5A5
077477  R    C5A6
077107       C5A7
077110       C5A8
077111       C5A9
077112       C6A1
077113       C6A2
077114       C6A3
077115       C6A4
077116       C6A5
077135  R    C7A3
077136  R    C7A4
077117       C7A5
077120       C7A6
077137  R    C7A7
077140  R    C7A8
077121       C9A1
032732       CDIFF5
052065       CDS12
051623       CDS13
051656       CDS14
052041       CDS15
052007       CDS16
052117       CDS2
051546       CDS3
051704       CDS4
052060       CDS5
051732       CDS6
051722       CDS7
052136       CDS8
052151       CDS9
100474       CDSACT
105515  R    CDSC2
105516       CDSC3
105517  R    CDSC4
105520  R    CDSC5
105521  R    CDSC6
105514       CDSCMD
105503       CDSCNT
100515       CDSLCT
105507       CDSLD
100475       CDSLN
052165       CDSLS1
052173       CDSLS2
```

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052201       CDSIS3
052207       CDSIS4
052222       CDSIS5
052235       CDSIS6
052250       CDSIS7
024007       CDSIST
100514 R     CDSOCT
105502       CDSDN
051503       CDSOS1
024005       CDSOST
105522       CDSOUT
105510       CDSVAL
105505       CERRI
105504       CERRO
000064 R     CHSD
000025       CHSF
000164 R     CHSS
022612 R     CLDST
021350       CMDNU
104575       CMDOFD
021213       CMDTME
032672       CNCALC
060005       CNDTBL
020526       CNKEM
020536       CNSTE
105060       CNT1A
105061       CNT2A
105062       CNT3A
101110       CNTR1
101123       CNTR10
101125       CNTR11
101126       CNTR12
101127       CNTR13
101130       CNTR14
101131       CNTR15
101132       CNTR16
101133       CNTR17
101134       CNTR18
101135       CNTR19
101112       CNTR2
101136       CNTR20
101113       CNTR3
101114       CNTR4
101115       CNTR5
101116       CNTR6
101117       CNTR7
101120       CNTR8
101121       CNTR9
045671       CNTRL
056167       CNV1
056313       CNV10
056344       CNV13
056252       CNV2
056250       CNV3
```

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056270       CNV4
056305       CNV5
056321       CNV7
056333       CNV8
056341       CNV9
056102       CNVRT
105631       COMID
060507       COMINT
060241       COMRCV
060022       COMXMT
020546       CONT
046006       CONVRT
000003   R   COS
022375       COVER
144365       CP731R
060410       CR3
060445       CR4
060460       CR5
060550       CRC
060545       CRC16
105626       CRCNT
105630   R   CRCTR
060401       CRERR
051371       CSCMP1
051414       CSCMP2
060104       CX1
060144   R   CX2
105625       CXCNT
105627   R   CXCTR
060235       CXERR
100523       DACNT
000054   R   DAID
024205       DAST
100503       DATAA
100477       DATCRD
100476       DATCSD
100113       DATE
106611       DATED
106623       DATED2
106635       DATED3
106647       DATED4
106573       DATEDO
106613       DATEM
106625       DATEM2
106637       DATEM3
106651       DATEM4
106571       DATEMO
055513       DC1
055541       DC2
045451       DCK1
045557       DCK4
045615       DCK5A
045626       DCKT
106517       DCRDCT
```

044523	DCKOS1
044604	DCKOS2
045472	DCKOS3
045564	DCKOS4
024035	DCKOST
047112	DCS1
047461	DCS14
047664	DCS16
050071	DCS18
047372	DCS2
050140	DCS22
050216	DCS24
054254	DCS26
054130	DCS26A
054246	DCS26B
050314	DCS28
051203	DCS3
050444	DCS30
047343	DCS32
047360	DCS33
050262	DCS34
050275	DCS35
050376	DCS36
050427	DCS37
047220	DCS4
051250	DCS40
051263	DCS41
051340	DCS42
051352	DCS43
051161	DCS5
047256	DCS5A
051164	DCS6
050720	DCS70
051123	DCS71
050540	DCS80
047400	DCS93
055213	DCSD2A
047271	DCSI
100516	DCSDCT
046057	DCSDS1
046140	DCSDS2
047133	DCSDS3
047225	DCSDS4
024025	DCSDST
100520	DCSRCT
100500	DCSRI
024045	DCSRST
047277	DCSS1
050342	DCSS10
051211	DCSS11
051131	DCSS12
051302	DCSS17
047406	DCSS3
047467	DCSS4

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047672       DCSS5
050077       DCSS6
050146       DCSS7
050224       DCSS9
050726       DCSSM
050546       DCSST
050452       DCSSZ
054730       DD1
054754       DD2
055003       DD3
055031       DD4
055043       DD5
055633       DD6
000057   R   DDIV
104656       DELCMD
101511       DELI
101513       DELIO
101505       DELP
033720       DISFKR
022305       DMF1
022331       DMF2
022335       DMF3
056502       DMF97
056470       DMF98
056144       DMF99
022276       DMFANA
105400       DMFCNT
021503       DMFHD1
021716       DMFHD2
022031       DMFHD3
022145       DMFHD4
105364       DMFI10
105374       DMFI2
105372       DMFINC
055640       DMFS1
056512       DMFS2
056543       DMFS3
056570       DMFS4
056617       DMFS5
056642       DMFS6
056673       DMFS7
105276       DMFTMP
000056   R   DMUL
000066   R   DMUU
033157       DP1
033545       DP10
033565       DP11
033641       DP12
033131       DP2
033205       DP3
033106       DP7
033015       DPST1
034411       DPST2
034554       DPST3
```

```
101525       DRATE
106543       DRCCNT
106413       DSCCNT
000055  R    DSUB
100120       DT
100114       DT2
105051  R    DTEOLD
033737       ENDSHF
105027       EP
105023       EPR
105052       EPY
105054       EPYR
105056       EPYRO
100467       ESD
100507       ESDCNT
101574       ESDCFL
101332       ESDLD1
021156       ESDPT
023571       ESDST
023367       EXEC
023416       EXEC1
023465       EXEC2
023466       EXEC3
000200       EXIT
000012  R    EXP
000020       FADD
101637       FADDR
035264       FDG1
000023       FDIV
061586       FDXDRZ
061741       FDXDCH
000020       FDXDRF
061303       FDXDSP
105477       FDXDZ
137707       FDXC3
061616       FDXCHL
061637       FDXCHM
061415       FDXCLD
060772       FDXCNB
061202       FDXCNC
137705       FDXCS1
137706       FDXCS2
137704       FDXDAT
000001       FDXDIV
000004       FDXDV4
000002       FDXEFW
061174       FDXEND
061350       FDXENO
061756       FDXEOS
061001       FDXERR
061211       FDXESK
105611       FDXESP
105621       FDXEST
105610       FDXEST
```

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060712       FDXGCP
061706       FDXICK
061267       FDXIER
061423       FDXINI
060632       FDXINR
060630       FDXINT
061461       FDXIP2
061517       FDXIP3
061732       FDXIXB
105605       FDXKAA
105601       FDXKBA
105604       FDXKBC
105633       FDXKBF
105603       FDXKBL
061257       FDXKCC
061325       FDXKND
061112       FDXKYI
061366       FDXKYN
000116       FDXMOD
061544       FDXNOP
105661       FDXPDF
061020       FDXPND
060564       FDXPRI
061041       FDXPRT
061546       FDXRNC
061552       FDXRNI
000244       FDXSPD
061061       FDXSTR
061105       FDXSTX
105563       FDXTBL
105607       FDXTMR
061614       FDXVAL
060737       FDXXIT
060766       FDXXTA
000036   R   FIXD
000037       FIXS
000034       FLTD
000035       FLTS
000022       FMUL
102204       FNSQL1
021165       FNSH
021012       FNSH1
000021       FSUB
034706       GV
020251       HDGT
035016       IADDR
035240       IADDR1
105506       IALRM
023104       IDATA1
107164       IIARC
045705       IMODE
101076       IMODER
034577       IN1
044635       IN2
```

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105632       INHFG
105376       IPT
106547       IREQRC
106417       IRLOSC
034573       ISM
101515       K1
101521       K2
000026       KBFSIZ
106534       KBUF
106535       KBUF2
106536       KBUF3
106537       KBUF4
106540       KBUF5
106545       KEYFLG
101507       KI
101503       KP
106410       KYFLGS
045057       L1
045464       L10
047125       L10S
044703       L11
046233       L11S
044766       L12
046316       L12S
045201       L13
046624       L13S
045255       L14
046700       L14S
046475       L1S
045111       L2
046527       L2S
047104       L3S
045002       L5
046332       L5S
045344       L6
046767       L6S
046431       L7S
045365       L8
047010       L8S
044577       L9
046133       L9S
000204       LDD
000202   R   LDDI
000204       LDF
000202       LDFI
000203       LDS
000201   R   LDSI
043107       LIM1
043126       LIM2
043072       LIMCHK
052302       LK1
000011   R   LN
106542       LNECNT
106415       LNSCNT
```

```
101053       LO
101074       LOENB
000010   R   LOG
052367       LOKVAL
021075       LOPT
105015       LOTME
052347       MANC1
053123       MANC10
053201       MANC11
053257       MANC12
053412       MANC13
053545       MANC14
054262       MANC15
053672       MANC17
053737       MANC18
054315       MANC19
052427       MANC2
054424       MANC20
054533       MANC21
052600       MANC3
052636       MANC4
052674       MANC5
052732       MANC6
053006       MANC8
053065       MANC9
105275       MANCMD
100521       MANCNT
105367       MANDIR
105366       MANDR
105365       MANON
021170       MANOP
021260       MANOUT
024101       MANST
055571       MANTIP
100501       MANUAL
054557       MCSS16
055071       MCSS18
055241       MCSS19
055270       MCSS20
055335       MCSS21
055364       MCSS22
055431       MCSS23
055460       MCSS24
054060       MCSS8
024227       MD1
025051       MD10
025207       MD100
026515       MD101
026636       MD102
030217       MD103
030112       MD104
026734       MD105
026757       MD106
026333       MD107
```

026357	MD108
026321	MD109
025013	MD11
026451	MD110
026377	MD111
026454	MD112
027575	MD114
027537	MD115
025061	MD12
025154	MD13
025227	MD14
025563	MD15
025676	MD16
025640	MD17
025706	MD18
025760	MD19
024275	MD2
026132	MD20
030676	MD200
030640	MD201
026256	MD21
026354	MD22
026161	MD220
026202	MD221
026205	MD222
024641	MD23
024646	MD24
025461	MD25
025573	MD26
032760	MD27
026411	MD28
026565	MD29
024254	MD3
026601	MD30
026656	MD31
026725	MD32
027367	MD33
027312	MD34
027301	MD35
025757	MD36
033013	MD37
027402	MD38
024322	MD4
027432	MD41
027443	MD42
027433	MD43
024306	MD44
025050	MD45
026153	MD46
026164	MD47
025562	MD48
025675	MD49
024374	MD5
025471	MD50

```
027371  MD52
025770  MD53
027261  MD54
027603  MD55
027552  MD57
027572  MD58
027677  MD59
024355  MD6
027767  MD61
027666  MD63
027777  MD64
030133  MD65
030357  MD66
030476  MD67
030542  MD68
030651  MD69
024404  MD7
030727  MD70
031471  MD71
031743  MD72
027766  MD73
031557  MD74
031571  MD75
031573  MD76
031675  MD77
027667  MD78
032002  MD79
024552  MD8
032000  MD80
032164  MD81
032203  MD82
032222  MD83
032241  MD84
032260  MD85
032277  MD86
032316  MD87
032332  MD88
032347  MD89
024500  MD9
032377  MD90
032416  MD91
032442  MD92
032507  MD93
032562  MD94
032635  MD95
032145  MD96
024373  MD97
025460  MD98
025614  MLT2
024213  MODE
025507  MODVTB
101611  NADDR
021005  NALRM
034005  NB1
```

```
033776       NBSHF
100101       NC
057562       NEGNUM
101475       NERR
101477       NERRO
000000   R   NOP
101501       NREF
101547       NREFL1
101551       NREFL2
100466       NSD
042352       NSD1
041554       NSD2
041560       NSD3
042262       NSD4
042113       NSD5
042222       NSD6
041635       NSD7
042042       NSD8
042303       NSDC1
100506       NSDCNT
101571       NSDCPL
101236       NSDE1
101237       NSDE2
101240       NSDE3
101241       NSDE4
101242       NSDE5
101250       NSDI1
101251       NSDI2
101252       NSDI3
101253       NSDI4
101254       NSDI5
101255       NSDI6
101256       NSDI7
101257       NSDI8
101273       NSDL10
101274       NSDL11
101275       NSDL12
101276       NSDL13
101277       NSDL14
101300       NSDL15
101301       NSDL16
101302       NSDL17
101303       NSDL18
101304       NSDL19
101305       NSDL20
101306       NSDL21
101307       NSDL22
101310       NSDL23
101311       NSDL24
101312       NSDL25
101313       NSDL26
101314       NSDL27
101315       NSDL28
101316       NSDL29
```

```
101317      NSDL30
101320      NSDL31
101321      NSDL32
101322      NSDL33
101071      NSDLO
101262      NSDLO1
101263      NSDLO2
101264      NSDLO3
101265      NSDLO4
101266      NSDLO5
101267      NSDLO6
101270      NSDLO7
101271      NSDLO8
101272      NSDLO9
021147      NSDPT
042227      NSDRMP
041437      NSDS1
041513      NSDS2
041614      NSDS3
041666      NSDS4
041717      NSDS5
042057      NSDS6
042125      NSDS7
041735      NSDSD
101067      NSDSE
101070      NSDSI
023551      NSDST
104451      NSET
101572      NSTOP
023351  R   NTRP5
035424      OADDR
101107      OCDSON
101045      OESDCP
104577      OFLAG1
104600      OFLAG2
104601      OFLAG3
101104      OLO
106554      OMODER
106422      OMODES
101433      ONADDR
000001      ONE
101044      ONSDCP
101650      ONSTL1
101101      OOTENB
101105      OREMON
101103      OSBENB
101102      OSBINH
035203      OSM
101106      OSTEON
101062      OTCDS
106556      OTENB
101047      OTESDC
101057      OTLO
101046      OTNSDC
```

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101060      OTREM
101056      OTSBE
101055      OTSBI
100545      OTSBR
101061      OTSIE
101054      OTTENB
035307      OUT1
033732      PACK
077501      PACK1
077512      PACK10
077513      PACK11
077514      PACK12
077515      PACK13
077502      PACK2
077503      PACK3
077504      PACK4
077505      PACK5
077506      PACK6
077507      PACK7
077510      PACK8
077511      PACK9
021000      PALRM
000144  R   PBFSIZ
100071      PEC
062327      PK1200
062464      PK1214
062503      PK1215
062522      PK1216
106476      PK1A1
063510      PK1BBZ
063553      PK1BCH
000020      PK1BRF
063260      PK1BSP
106454      PK1BUF
106412      PK1BZ
137717      PK1C3
062711      PK1CAL
063535      PK1CHL
063556      PK1CHM
063376      PK1CLD
062134      PK1CNB
064157      PK1CNC
137715      PK1CS1
137716      PK1CS2
137714      PK1DAT
000451      PK1DE2
062440      PK1DE3
062600      PK1DE5
000456      PK1DEC
000003      PK1DIV
000014      PK1DV4
063114      PK1EC1
062375      PK1EC0
000010      PK1EFW
```

063141	PK1EKO
062631	PK1ELP
063334	PK1END
063670	PK1ENO
062235	PK1EOS
063166	PK1ERR
106452	PK1ESK
106462	PK1ESP
106451	PK1EST
062061	PK1GCP
063302	PK1GNE
106477	PK1HL1
106501	PK1HL2
063625	PK1ICK
063246	PK1IER
062671	PK1INC
062313	PK1IND
063404	PK1INI
062613	PK1INM
062010	PK1INR
062006	PK1INT
063436	PK1IP2
063644	PK1IXB
106446	PK1KAA
106442	PK1KBA
106445	PK1KBC
106444	PK1KBL
063234	PK1KCC
063241	PK1KER
063313	PK1KND
063037	PK1KYI
063346	PK1KYN
062730	PK1MDB
062735	PK1MDC
062747	PK1MDF
000116	PK1MOD
062130	PK1NLL
063466	PK1NOP
063453	PK1NSC
062125	PK1NUL
062321	PK1NUS
062143	PK1PCC
062765	PK1PCH
062262	PK1PDN
062460	PK1PKS
062367	PK1PND
062034	PK1PRI
062766	PK1PRT
063346	PK1PSL
063470	PK1RNC
063474	PK1RNI
062407	PK1SBS
062064	PK1SKP

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063006       PK1STR
063032       PK1STX
062171       PK1TAB
106424       PK1TBL
106450       PK1TMR
063533       PK1VAL
062100       PK1XIT
062406   *   PK1XNP
062121       PK1XTA
106533       PKBZ
000620       PKRSER
000615       PKSTER
045766       PMALRM
101545       PMANU
021021       PNUMB
100130       POLFST
000070   R   POPD
000030       POPF
000170   R   POPS
057552       POSNUM
105221       PR1A
105247       PR1AVG
105241       PR2A
105251       PR2AVG
105253       PRC1
105254   R   PRC2
105255   R   PRC3
100126       PROUT
105245       PRS
021346       PSKIP
106550       PSRWRD
106411       PSWRD
020754       PTALRM
000067   R   PTOD
000027       PTOF
000167   R   PTOS
000032   R   PUPI
000013   R   PWR
041152       PWR1
041376       PWR3
041412       PWRC1
105532       PWRCNT
100502       PWRGEN
021140       PWRPT
041026       PWRS1
041075       PWRS2
041156       PWRS3
041211       PWRS4
041267       PWRS5
041322       PWRS6
104575       PWRSLT
021171       PWRST
054053       Q10
052371       Q12
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ORIGINAL PAGE IS
OF POOR QUALITY

052507	022
052616	023
052654	025
052760	029
052766	032
053103	038
053133	040A
053141	040C
053040	041
053046	042
053211	044A
053217	044C
054615	048
052564	050
054365	051
053404	052
054412	053
052572	055
054474	061
053537	062
054521	063
054613	064
053600	071
053652	072
053660	073
053731	084
053774	086
053776	087
053766	088
052712	091
101635	RADDR
100512	RAMCNT
105624	RAMKBC
105623	RAMKBL
100472	RAMP
101615	RCNTR
104650	RDELAY
104553	RLM
104552	REMON
021375	REO
021437	REOC
104652	RFLAG
100465	RHPACT
101050	RHPCLR
100505	RHPCNT
043773	RHPS1
044013	RHPS2
023515	RHPST
[illegible]	RMP1
	RMP10

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037557      RMP4
037762      RMP5
040026      RMP6
040050      RMP7
040273      RMP8
040220      RMP9
040625      RMPC1
040614      RMPC2
040733      RMPC3
040663      RMPCHK
104645      RMPCPL
104646      RMPFL
104653      RMPPMP
021131      RMPPT
037141      RMPS1
040060      RMPS10
040135      RMPS11
040257      RMPS12
040331      RMPS13
040430      RMPS14
040524      RMPS15
040563      RMPS16
037221      RMPS2
037317      RMPS3
037406      RMPS4
037443      RMPS5
037514      RMPS6
037572      RMPS7
037702      RMPS8
037754      RMPS9
037511      RMPSD
041000      RMPSP
023615      RMPST
102026      RNSDL1
104546      ROTCON
104647      RPFCNT
106551      RRC
101075      RST
057705      RTCC1
057576      RTCCND
007416      RTCFLG
021332      RTEDNE
076065      S1A1
076066      S1A2
076067      S1A3
076070      S1A4
076071      S1A5
076072      S1A6
076103      S2A12
076107  R   S2A13
076076      S2A14
076471      S2A18
076205  R   S2A19
076206  R   S2A20
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ORIGINAL PAGE IS
OF POOR QUALITY

PAGE 22 ECL3 COMPILER SL768-2013-02 FULL MOD-5A CONTROLLER COMPILATION 4/25/84

```
076465      S2A21
076515  R   S2A22
076467      S2A23
076517  R   S2A24
076521  R   S2A25
076523  R   S2A26
076525  R   S2A27
076527  R   S2A28
076210  R   S2A29
076073      S2A3
076100      S2A30
076101      S2A31
076074      S2A4
076075      S2A5
076077      S2A6
076102      S2A7
076106      S3A1
076531  R   S3A10
076105      S3A11
076107      S3A12
076110      S3A13
076111      S3A14
076533  R   S3A15
076104      S3A3
076473      S3A4
076112      S4A11
076122      S4A14
076117      S4A23
076120      S4A24
076121      S4A25
076113      S4A26
076114      S4A27
076115      S4A28
076116      S4A29
076123      S4A30
076130      S5A1
076537  R   S5A10
076211      S5A11
076126      S5A2
076131      S5A3
076535  R   S5A4
076477      S5A5
076124      S5A6
076125      S5A7
076127      S5A8
076475      S5A9
076134      S6A10
076140      S6A12
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076137      S6A3
076141      S6A4
076142      S6A5
076143      S6A6
076144      S6A7
076132      S6A8
076133      S6A9
076217  R   S7A10
076146  R   S7A13
076147  R   S7A14
076220  R   S7A2
076145      S7A4
076215  R   S7A8
076216  R   S7A9
076150      S8A1
076154      S8A2
076151      S8A3
076152      S8A4
076153      S8A5
076155      S8A6
076156      S9A1
076161  R   S9A10
076162  R   S9A11
076167      S9A12
076170      S9A13
076171      S9A14
076172      S9A15
076175      S9A16
076163      S9A17
076164      S9A18
076165      S9A19
076157  R   S9A2
076166      S9A20
076173      S9A21
076174      S9A22
076160  R   S9A3
076501      S9A4
076503      S9A5
076505      S9A6
076507      S9A7
000154  R   SADD
034264      SBA1
101051      SBENB
021113      SBEPT
101052      SBINH
021104      SBIPT
042336      SDINCR
000157  R   SDIV
101072      SEENB
000567      SETERI
106603      SETIN
057541      SFT1
057522      SFT2
033732      SHIFT
```

```
057517       SHIFTR
101073       SIENB
000002   R   SIN
105425       SLNCNT
105035       SLOPE1
105045       SLOPE2
000156   R   SMUL
000166   R   SMUU
106407       SOTCON
106577       SPDSET
106601       SPTMP
106602       SPTMP2
000001   R   SQRT
051456       SR1
106416       SRC
051462       SRCHK
000155   R   SSUB
052336       ST1
023331   R   START
000206   R   STD
106421       STE
106402       STE2
106403       STE3
106404       STE4
106405       STE5
106406       STE6
021300       STEDNE
106401       STEIN
106420       STEON
051443       STEREM
000206       STF
100513       STRCNT
023334       STRT1
100473       STRTUP
052323       STRVAL
000205       STS
023657       STUPST
035740       SU1
036033       SU10
036622       SU11
037012       SU12
037041       SU13
037121       SU14
037102       SU1B
036005       SU2
036044       SU3
036113       SU4
036170       SU5
036243       SU6
036221       SU7
036540       SU9
036617       SUBAVG
104621       SUCMPL
104622       SUFAIL
```

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031122     SUFT
035543     SUS1
036441     SUS10
036511     SUS11
036545     SUS12
036663     SUS13
036713     SUS14
036760     SUS15
037017     SUS16
037045     SUS17
035647     SUS2
035745     SUS3
036012     SUS4
036251     SUS5
036273     SUS6
036324     SUS7
036366     SUS8
036410     SUS9
036632     SUSD
036051     SUST
036144     SUSV
100115     T1
100116     T2
000004  R  TAN
100134     TC
045634     TCALC
101077     TEMP
057447     TIMARC
107166     TIMDEC
100111     TIME
106607     TIMEH
106621     TIMEH2
106633     TIMEH3
106645     TIMEH4
106605     TIMEM
106617     TIMEM2
106631     TIMEM3
106643     TIMEM4
105427     TIPCMD
100112     TM2
057453     TMA1
105011     TOTTME
106615     TSEC
106627     TSEC2
106641     TSEC3
106653     TSEC4
034707     UV
105073     VALAVG
105424     VAR1
100105     VIC
100075     VWC
104654     VWD
105150     WD1A
105212     WD1AVG
```

105170		WD2A
105214		WD2AVG
101063		WDAVD1
101065		WDAVD2
105216		WDC1
105217	R	WDC2
105220	R	WDC3
105210		WDS
023360	R'	WRMST
105077		WV1A
105141		WV1AVG
105117		WV2A
105143		WV2AVG
105145		WVC1
105146	R	WVC2
105147	R	WVC3
100124		WVOUT
105137		WVS
000071	R	XCHD
000031		XCHF
000171	R	XCHS
043451		YAW1
043466		YAW2
043502		YAW3
100471		YAWACT
100511	R	YAWCNT
104602		YAWCW
043177		YAWS1
023613		YAWST
104603		YAWSTP
104576		YCNTR1
032644		YECALC
104604		YWCNTR
033752		ZA1
033746		ZAFU
000000		ZERO

```
 1:A  020220                    .
 2:A                            .       APU OPCODE EQUATES   NECESSARY TO USE THE APU
 3:A                            .
 4:A                            .OPCODE       OCTAL          DESCRIPTION                    MAXIMUM
 5:A                            .             CODE            TOS MEANS TOP OF STACK      EXECUTION TIME
 6:A                            .                               NOS MEANS NEXT ON STACK    (MICRO SEC.)
 7:A                            .
 8:A                            .                           *** 16 BIT FIXED POINT ***************
 9:A  000154                    SADD    EQU   0154          TOS=TOS+NOS                          9
10:A  000155                    SSUB    EQU   0155          TOS=NOS-TOS                         16
11:A  000156                    SMUL    EQU   0156          TOS=TOS X NOS LOWER 16 BITS         47
12:A  000166                    SMUU    EQU   0166          TOS=TOS X NOS UPPER 16 BITS         49
13:A  000157                    SDIV    EQU   0157          TOS=NOS / TOS                       47
14:A                            .
15:A                            .                           *** 32 BIT FIXED POINT ***************
16:A  000054                    DADD    EQU   054           TOS=TOS+NOS                         11
17:A  000055                    DSUB    EQU   055           TOS=NOS-TOS                         20
18:A  000056                    DMUL    EQU   056           TOS=TOS X NOS LOWER 32 BITS        105
19:A  000066                    DMUU    EQU   066           TOS=NOS X TOS LOWER 32 BITS        109
20:A  000057                    DDIV    EQU   057           TOS=NOS / TOS                      105
21:A                            .
22:A                            .                           *** 32 BITS FLOATING POINT ***********
23:A  000020                    FADD    EQU   020           TOS=TOS+NOS                        184
24:A  000021                    FSUB    EQU   021           TOS=NOS-TOS                        185
25:A  000022                    FMUL    EQU   022           TOS=TOS X NOS                       84
26:A  000023                    FDIV    EQU   023           TOS=NOS / TOS                       92
27:A                            .
28:A                            .                           *** FLOATING POINT OPERATIONS *********
29:A                            .                           ***  WHICH DESTROY THE STACK  *********
30:A  000001                    SQRT    EQU   01            TOS=SQUARE ROOT OF TOS             435
31:A  000002                    SIN     EQU   02            TOS=SINE OF TOS                   2404
32:A  000003                    COS     EQU   03            TOS=COSINE OF TOS                 2439
33:A  000004                    TAN     EQU   04            TOS=TANGENT OT TOS                2943
34:A  000005                    ASIN    EQU   05            TOS=INVERSE SINE OF TOS           3969
35:A  000006                    ACOS    EQU   06            TOS=INVERSE COSINE OF TOS         4143
36:A  000007                    ATAN    EQU   07            TOS=INVERSE TANGENT OF TOS        3268
37:A  000010                    LOG     EQU   010           TOS=BASE 10 LOG OF TOS            3566
38:A  000011                    LN      EQU   011           TOS=NATURAL LOG OF TOS            3478
39:A  000012                    EXP     EQU   012           TOS=E TO THE POWER OF TOS         2439
40:A  000013                    PWR     EQU   013           TOS=NOS TO THE POWER OF TOS       6016
41:A                            .
42:A                            .                           *** DATA AND STACK MANIPULATION ******
43:A  000037                    FIXS    EQU   037           TOS TO FIXED POINT FORMAT          107
44:A  000036                    FIXD    EQU   036           TOS TO FIXED POINT FORMAT          118
45:A  000035                    FLTS    EQU   035           TOS TO FLOATING POINT FORMAT        78
46:A  000034                    FLTD    EQU   034           TOS TO FLT. PNT. FORMAT  DOUBLE    171
47:A  000164                    CHSS    EQU   0164          CHANGE SIGN FIXED POINT  SINGLE     12
48:A  000064                    CHSD    EQU   064             .      .    .    .     DOUBLE     14
49:A  000025                    CHSF    EQU   025             .      .    .    .     FLOATING   10
50:A  000167                    PTOS    EQU   0167          DUPLICATE TOS AT NOS  SINGLE       8
51:A  000067                    PTOD    EQU   067               .      .    .    .  DOUBLE      10
52:A  000027                    PTOF    EQU   027               .      .    .    .  FLOATING    10
53:A  000170                    POPS    EQU   0170          POP SINGLE NOS TO TOS               5
54:A  000070                    POPD    EQU   070           POP DOUBLE NOS TO TOS               6
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 55:A  000030                    POPF    EQU   030          POP FLOATING NOS TO TOS              6
 56:A                            .                       (TOS GOES TO BOTTOM OF STACK ON POP'S)
 57:A  000171                    XCHS    EQU   0171         EXCHANGE TOS AND NOS   SINGLE        9
 58:A  000071                    XCHD    EQU   071              .    .   .   .     DOUBLE       13
 59:A  000031                    XCHF    EQU   031              .    .   .   .     FLOATING     13
 60:A  000032                    PUPI    EQU   032          PUSH FLOATING POINT PI ONTO STACK    8
 61:A  000000                    NOP     EQU   000          NOP, EXEPT CLEAR STATUS              2
 62:A                            .
 63:A                            .
 64:A                            .* EQU'S AND EXECUTION TIME FOR SOFTWARE COMMANDS ARE AS FOLLOWS!  *
 65:A                            ********************************************************************
 66:A  000200                    EXIT    EQU   0200         END OF STRING                       132
 67:A                            .                          *** DATA HANDLING INSTRUCTIONS ********
 68:A  000201                    LDSI    EQU   0201         LOAD SINGLE IMMEDIATE              115
 69:A  000202                    LDDI    EQU   0202         LOAD DOUBLE IMMEDIATE              134
 70:A  000202                    LDFI    EQU   0202         LOAD FLOATING IMMEDIATE            134
 71:A  000203                    LDS     EQU   0203         LOAD SINGLE                        150
 72:A  000204                    LDD     EQU   0204         LOAD DOUBLE                        169
 73:A  000204                    LDF     EQU   0204         LOAD FLOATING                      169
 74:A  000205                    STS     EQU   0205         STORE SINGLE                       155
 75:A  000206                    STD     EQU   0206         STORE DOUBLE                       174
 76:A  000206                    STF     EQU   0206         STORE FLOATING                     174
 77:A                            .                          *** BRANCHING INSTRUCTIONS ************
 78:A  000207                    BR      EQU   0207         BRANCH                             136
 79:A  000210                    BRZ     EQU   0210         BRANCH IF ZERO                     136
 80:A  000211                    BRC     EQU   0211         BRANCH IF CARRY                    136
 81:A  000212                    BRS     EQU   0212         BRANCH IF SIGN (NEGATIVE)          136
 82:A  000213                    BRE     EQU   0213         BRANCH IF ERROR                    136
 83:A                            .*************** END OF COMMAND LIST ***********************************
 84:A                            .
 85:A                            .
 86:A                            .  THE DECLARE STATEMENTS
 87:A                            .
 88:A                            .  THE EQUATES
 89:A                            .
 90:A  144365                    CF731R  EQU   CB00050
 91:A                            .
 92:A                            .
 93:A  144000                    AF1ADA  EQU   CB15000
 94:A  144001                    AF1ADB  EQU   CB15010
 95:A                            .
 96:A  023367                            ARTX  0,EXEC
 97:A  061614                            ARTX  7,FDXVAL
 98:A  063533                            ARTX  8,FK1VAL
 99:A  057576                            ARTX  9,RTCCND
100:A                            .
101:A  020220 000 174 001 001 370 371           AIS   CB00080,CB00090,1,10
102:A  020226 031 174 001 001 340 341           AIS   CB01000,CB01010,1,10
103:A                            .
104:A                            .
105:A                            . EQUR COMPLETE
106:A                            .
107:A                            .
108:A                            . INPUT DISCRETE
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109:A
        020234 062 174
        020236 350 003 000 000 001 040
        020244 000
        020245 360 366 000
        020250 360
110:A   076065          S1A1    EQUR  0     ICE DETECTION BLADE #1            ( 4 00 ) I00000
111:A   076066          S1A2    EQUR  1     ICE DETECTION BLADE #2            ( 4 01 ) I00001
112:A   076067          S1A3    EQUR  2     HIGH TEMPERATURE BLADE #1         (      ) I00010
113:A   076070          S1A4    EQUR  3     HIGH TEMPERATURE BLADE #2         (      ) I00009
114:A   076071          S1A5    EQUR  4     HIGH STRAIN BLADE #1              (      ) I00008
115:A   076072          S1A6    EQUR  5     HIGH STRAIN BLADE #2              (      ) I00007
116:A   076073          S2A3    EQUR  6     ROTOR HYDRAULICS LEVEL            ( 4 02 ) I00613
117:A   076074          S2A4    EQUR  7     ROTOR HYDRAULICS OIL FILTER       ( 4 03 ) I00614
118:A   076075          S2A5    EQUR  8     ROTOR HYDRAULICS OIL TEMPERATURE  ( 4 04 ) I00305
119:A   076076          S2A14   EQUR  9     ROTOR HYDRAULICS ACCUM PRESSURE   ( 4 09 ) I00308
120:A   076077          S2A6    EQUR  10    ROTOR HYDRAULICS PUMP PRESSURE    ( 4 05 ) I00615
121:A   076100          S2A30   EQUR  11    AILERON LATCHES                   ( 4 10 ) I00300
122:A   076101          S2A31   EQUR  12    AILERON PRESSURES                 ( 4 11 ) I00301
123:A   076102          S2A7    EQUR  13    TEETER BRAKE ACCUM'S PRESSURE     ( 4 06 ) I00410
124:A   076103          S2A12   EQUR  14    TEETER BRAKE H.P. SOLENOID ON     ( 4 08 ) I00306
125:A   076104          S3A3    EQUR  15    ROTOR VIBRATION                   ( 4 13 ) I00307
126:A   076105          S3A11   EQUR  16    ROTOR POSITIONER DRIVE            ( 4 14 ) I00201
127:A   076106          S3A1    EQUR  17    ROTOR BRAKE HIGH SPEED SHAFT      ( 4 12 ) I00610
128:A   076107          S3A12   EQUR  18    ROTOR BRAKE LOW SPD SHAFT STAGE 1 ( 4 15 ) I00612
129:A   076110          S3A13   EQUR  19    ROTOR BRAKE LOW SPD SHAFT STAGE 2 ( 5 00 ) I00611
130:A   076111          S3A14   EQUR  20    ROTOR BRAKE ACCUM PRESSURE        ( 5 01 ) I00314
131:A   076112          S4A11   EQUR  21    LUBE RESV. LEVEL                  ( 5 02 ) I00400
132:A   076113          S4A26   EQUR  22    LUBE RESV. HIGH TEMPERATURE       ( 5 07 ) I00405
133:A   076114          S4A27   EQUR  23    LUBE RESV. LOW TEMPERATURE        ( 5 08 ) I00406
134:A   076115          S4A28   EQUR  24    LUBE SUPPLY TEMPERATURE HIGH      ( 5 09 ) I00407
135:A   076116          S4A29   EQUR  25    LUBE SUPPLY TEMPERATURE HIGH-HIGH ( 5 10 ) I00408
136:A   076117          S4A23   EQUR  26    LUBE SUPPLY PRESSURE "A"          ( 5 04 ) I00402
137:A   076120          S4A24   EQUR  27    LUBE SUPPLY PRESSURE "B"          ( 5 05 ) I00403
138:A   076121          S4A25   EQUR  28    LUBE SUPPLY PRESSURE "C"          ( 5 06 ) I00404
139:A   076122          S4A14   EQUR  29    LUBE SUPPLY FILTER                ( 5 03 ) I00401
140:A   076123          S4A30   EQUR  30    SHAFT LUBE PUMP PRESSURE          ( 5 11 ) I00409
141:A   076124          S5A6    EQUR  31    GENERATOR RESV. LUBE LEVEL        ( 5 15 ) I00412
142:A   076125          S5A7    EQUR  32    GENERATOR RESV. LUBE TEMPERATURE  ( 6 00 ) I00411
143:A   076126          S5A2    EQUR  33    GENERATOR LUBE PRESSURE           ( 5 13 ) I00414
144:A   076127          S5A8    EQUR  34    GENERATOR BEARING TEMPERATURE     ( 6 01 ) I00006
145:A   076130          S5A1    EQUR  35    GENERATOR WINDING TEMPERATURE     ( 5 12 ) I00005
146:A   076131          S5A3    EQUR  36    GENERATOR VIBRATION               ( 5 14 ) I00413
147:A   076132          S6A8    EQUR  37    YAW FILTER STATUS                 ( 6 08 ) I00313
148:A   076133          S6A9    EQUR  38    YAW HOLDING BRAKE STATUS          ( 6 09 ) I00505
149:A   076134          S6A10   EQUR  39    YAW GRIPPER STATUS                ( 6 10 ) I00606
150:A   076135          S6A2    EQUR  40    YAW HOLDING BRAKE ACCUM PRESSURE  ( 6 02 ) I00607
151:A   076136          S6A13   EQUR  41    YAW MAIN ACCUM PRESSURE           ( 6 12 ) I00609
152:A   076137          S6A3    EQUR  42    YAW OIL LEVEL                     ( 6 03 ) I00312
153:A   076140          S6A12   EQUR  43    YAW OIL TEMPERATURE               ( 6 11 ) I00608
154:A   076141          S6A4    EQUR  44    +Z CYLINDERS CW POSITION          ( 10 12 ) I00500
155:A   076142          S6A5    EQUR  45    +Z CYLINDERS CCW POSITION         ( 10 13 ) I00501
156:A   076143          S6A6    EQUR  46    -Z CYLINDERS CW POSITION          ( 10 14 ) I00502
157:A   076144          S6A7    EQUR  47    -Z CYLINDERS CCW POSITION         ( 10 15 ) I00503
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158:A   076145                  S7A4    EQUR  48        ESD SYSTEM READY                    ( FSE   ) I00015
159:A   076146                  S7A13   EQUR  49        FEATHER VALVE A-1 CMD STATUS        (       ) I00013
160:A   076147                  S7A14   EQUR  50        FEATHER VALVE A-2 CMD STATUS        (       ) I00014
161:A   076150                  S8A1    EQUR  51        LOCKOUT RELAY STATUS                ( 7 02  ) I00201
162:A   076151                  S8A3    EQUR  52        STATOR TIE STATUS                   ( 7 03  ) I00310
163:A   076152                  S8A4    EQUR  53        STATOR SHORT STATUS                 ( 7 04  ) I00203
164:A   076153                  S8A5    EQUR  54        CYCLOCONVERTER TIE STATUS           ( 7 05  ) I00200
165:A   076154                  S8A2    EQUR  55        CONVERTER READY                     ( 8 02  ) I00415
166:A   076155                  S8A6    EQUR  56        UTILITY POWER PRESENT               ( 7 06  ) I00311
167:A   076156                  S9A1    EQUR  57        INTRUSION ALARM                     ( 7 07  ) I00202
168:A   076157                  S9A2    EQUR  58        OIS/EIS STATUS                      ( 7 08  ) I00302
169:A   076160                  S9A3    EQUR  59        CHARGER STATUS                      ( 7 09  ) I00303
170:A   076161                  S9A10   EQUR  60        UPS BATTERY STATUS                  ( 7 11  ) I00207
171:A   076162                  S9A11   EQUR  61        UPS INVERTER STATUS                 ( 7 12  ) I00208
172:A   076163                  S9A17   EQUR  62        MANUAL KEY SWITCH                   ( 7 10  ) I00115
173:A   076164                  S9A18   EQUR  63        LOCKOUT KEY SWITCH                  (       ) I00114
174:A   076165                  S9A19   EQUR  64        AUTOMATIC KEY SWITCH                ( 4 07  ) I00113
175:A   076166                  S9A20   EQUR  65        RESET KEY SWITCH                    ( 8 03  ) I00112
176:A   076167                  S9A12   EQUR  66        NACELLE FIRE ALARM                  ( 7 13  ) I00304
177:A   076170                  S9A13   EQUR  67        C.E.C. AIR FLOW                     ( 7 14  ) I00004
178:A   076171                  S9A14   EQUR  68        C.E.C. TEMPERATURE HIGH             (       ) I00002
179:A   076172                  S9A15   EQUR  69        C.E.C. TEMPERATURE HIGH-HIGH        (       ) I00003
180:A   076173                  S9A21   EQUR  70        C.E.C. TEMPERATURE LOW              (       ) I00011
181:A   076174                  S9A22   EQUR  71        C.E.C. TEMPERATURE LOW-LOW          (       ) I00012
182:A   076175                  S9A16   EQUR  72        AIRCRAFT STROBE STATUS              ( 8 01  ) I00315
183:A                           .
184:A                           . DISCRETE INPUT SENSORS STOP HERE
185:A                           .
186:A   076205                  S2A19   EQUR  80        TEETER ANGLE LIMIT SWITCH-2.5 DEG
187:A   076206                  S2A20   EQUR  81        TEETER ANGLE LIMIT SWITCH - 5 DEG
188:A   076207                  S2A13   EQUR  82        TEETER HIGH FORCE BRAKE PRESSURE
189:A   076210                  S2A29   EQUR  83        TEETER LOW FORCE BRAKE PRESSURE
190:A   076211                  S5A11   EQUR  84        GENERATOR LUBE FILTER
191:A   076212                  S6A15   EQUR  85        YAW MAIN ACCUM PRESSURE
192:A   076213                  S6A16   EQUR  86        YAW HOLDING BRAKE ACCUM PRESSURE
193:A   076214                  S6A17   EQUR  87        ROTOR BRAKE ACCUM PRESSURE
194:A   076215                  S7A8    EQUR  88        NACELLE EMERGENCY STOP              ( 6 15  )
195:A   076216                  S7A9    EQUR  89        GROUND EMERGENCY STOP               ( 7 00  )
196:A   076217                  S7A10   EQUR  90        GENERATOR SPEED HIGH-HIGH           ( 7 01  )
197:A   076220                  S7A2    EQUR  91        ROTOR SPEED HIGH-HIGH               ( 6 13  )
198:A                           .
199:A                           . ANALOG INPUT SENSORS
200:A                           .
201:A   076465                  S2A21   EQUR  256       AILERON POSITION #1 (-5 TO 95 DEGREES) AI00094
202:A   076467                  S2A23   EQUR  258       AILERON POSITION #2 (-5 TO 95 DEGREES) AI01017
203:A   076471                  S2A18   EQUR  260       TEETER ANGLE (-10 TO 10 DEG)    ( 2 2 ) AI00095
204:A   076473                  S3A4    EQUR  262       ROTOR SPEED (0 TO 25 RPM)               AI00092
205:A   076475                  S5A9    EQUR  264       GENERATOR SPEED (0 TO 25 RPM)           AI00096
206:A   076477                  S5A5    EQUR  266       GENERATED POWER (-2.679 TO 13.39 MW)    AI00097
207:A   076501                  S9A4    EQUR  268       WIND SPEED #1 (0 TO 100 MPH)    ( 1 0 ) AI01012
208:A   076503                  S9A5    EQUR  270       YAW ERROR #1 (-180 TO 180 DEG)  ( 1 2 ) AI01010
209:A   076505                  S9A6    EQUR  272       WIND SPEED #2 (0 TO 100 MPH)    ( 1 1 ) AI01013
210:A   076507                  S9A7    EQUR  274       YAW ERROR #2(-180 TO 180 DEG)   ( 1 3 ) AI01011
211:A                           .
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212:A                          . ANALOG INPUT SENSORS STOP HERE
213:A                          .
214:A  076515                  S2A22   EQUR  280        AILERON POSITION 1-2
215:A  076517                  S2A24   EQUR  282        AILERON POSITION 1-4
216:A  076521                  S2A25   EQUR  284        AILERON POSITION 2-1
217:A  076523                  S2A26   EQUR  286        AILERON POSITION 2-2
218:A  076525                  S2A27   EQUR  288        AILERON POSITION 2-3
219:A  076527                  S2A28   EQUR  290        AILERON POSITION 2-4
220:A  076531                  S3A10   EQUR  292        ROTOR POSITION
221:A  076533                  S3A15   EQUR  294        ROTOR SPEED (11.5 - 17.5 RPM)
222:A  076535                  S5A4    EQUR  296        GENERATOR SPEED (0 - 2000 RPM)
223:A  076537                  S5A10   EQUR  298        GENERATED REACTIVE POWER
224:A  076541                  S6A14   EQUR  300        YAW POSITION
225:A                          .
226:A                          . DISCRETE OUTPUT CMD
227:A                          .
228:A  077065                  C1A1    EQUR  512        ICE DETECTOR TEST BLADE #1      ( 8 06  ) 000100
229:A  077066                  C1A2    EQUR  513        ICE DETECTOR TEST BLADE #2      ( 8 07  ) 000101
230:A  077067                  C2A4    EQUR  514        ROTOR HYDRAULIC PUMP ON CMD     ( 8 08  ) 000506
231:A  077070                  C2A25   EQUR  515        G SWITCH TEST ENABLE            ( 8 11  ) 000110
232:A  077071                  C2A26   EQUR  516        "G" SWITCH BLADE #1             ( 8 12  ) 000109
233:A  077072                  C2A27   EQUR  517        "G" SWITCH BLADE #2             ( 8 13  ) 000108
234:A  077073                  C2A28   EQUR  518        "G" SWITCH TEST #1              ( 8 14  ) 000107
235:A  077074                  C2A29   EQUR  519        "G" SWITCH TEST #2              ( 8 15  ) 000106
236:A  077075                  C2A30   EQUR  520        "G" SWITCH RESET CMD            ( 9 00  ) 000105
237:A  077076                  C2A11   EQUR  521        TEETER BRAKE A-C POWER ON       ( 8 09  ) 000509
238:A  077077                  C2A12   EQUR  522        TEETER HIGH FORCE BRAKES OFF    ( 8 10  ) 000605
239:A  077100                  C3A1    EQUR  523        ROTOR BRAKE (STG 2 & HI SPEED)  ( 9 02  ) 000600
240:A  077101                  C3A2    EQUR  524        ROTOR BRAKE (STAGE 1)           ( 9 03  ) 000601
241:A  077102                  C4A1    EQUR  525        GEARBOX LUBE PUMP CMD           ( 9 04  ) 000507
242:A  077103                  C4A6    EQUR  526        ROTOR POSITIONER DRIVE CMD      ( 9 05  ) 000602
243:A  077104                  C5A2    EQUR  527        TURBINE READY CMD               ( 9 06  ) 000510
244:A  077105                  C5A3    EQUR  528        START/MOTOR CMD                 ( 9 07  ) 000511
245:A  077106                  C5A4    EQUR  529        SYNCHRONIZE/GENERATE CMD        ( 9 08  ) 000512
246:A  077107                  C5A7    EQUR  530        LOCKOUT RELAY CMD               ( 9 09  ) 000513
247:A  077110                  C5A8    EQUR  531        CYCLOCONVERTER TIE CLOSE        ( 9 10  ) 000514
248:A  077111                  C5A9    EQUR  532        CYCLOCONVERTER TIE TRIP         ( 9 11  ) 000515
249:A  077112                  C6A1    EQUR  533        YAW CW CMD                      ( 9 12  ) 000212
250:A  077113                  C6A2    EQUR  534        YAW CCW CMD                     ( 9 13  ) 000213
251:A  077114                  C6A3    EQUR  535        YAW MOTIVE BRAKE CMD            ( 9 14  ) 000214
252:A  077115                  C6A4    EQUR  536        YAW HOLDING BRAKE CMD           ( 9 15  ) 000215
253:A  077116                  C6A5    EQUR  537        YAW PUMP ENABLE                 ( 10 00 ) 000211
254:A  077117                  C7A5    EQUR  538        ENABLE FEATHER VALVE A-1        ( FSE   ) 000103
255:A  077120                  C7A6    EQUR  539        ENABLE FEATHER VALVE A-2        ( FSE   ) 000102
256:A  077121                  C9A1    EQUR  540        ENABLE ESD CMD                  ( FSE   ) 000111
257:A                          .
258:A                          . DISCRETE OUTPUT CMDS STOP HERE
259:A                          .
260:A  077133                  C3A3    EQUR  550        TEETER LOW FORCE BRAKE CMD
261:A  077134                  C3A4    EQUR  551        TEETER HIGH FORCE BRAKE CMD
262:A  077135                  C7A3    EQUR  552        FEATHER VALVE A-1 CMD           ( 10 03 )
263:A  077136                  C7A4    EQUR  553        FEATHER VALVE A-2 CMD           ( 10 04 )
264:A  077137                  C7A7    EQUR  554        FEATHER VALVE B-1 CMD
265:A  077140                  C7A8    EQUR  555        FEATHER VALVE B-2 CMD
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266:A
267:A                          .
268:A                          . ANALOG OUTPUT CMDS
269:A   077465                 .
270:A   077467                 C2A21   EQUR  768          AILERON CONTROL SET #1          A000100
271:A   077471                 C2A24   EQUR  770          AILERON CONTROL SET #4          A000101
272:A                          C5A5    EQUR  772          GENERATOR REFERENCE             A000102
273:A                          .
274:A                          . ANALOG OUTPUT CMDS STOP HERE
275:A   077473                 .
276:A   077475                 C2A22   EQUR  774          AILERON CONTROL SET #2
277:A   077477                 C2A23   EQUR  776          AILERON CONTROL SET #3
278:A                          C5A6    EQUR  778          VAR SET POINT
279:A                          .
280:A                          . RAM FOR SITE TERMINAL DATA COMMUNICATION
281:A   077501                 .
282:A   077502                 PACK1   EQUR  780          +1 PACKED DISCRETES FROM DATA PROCESSING
283:A   077503                 PACK2   EQUR  781          +1
284:A   077504                 PACK3   EQUR  782          +1
285:A   077505                 PACK4   EQUR  783          +1
286:A   077506                 PACK5   EQUR  784          +1
287:A   077507                 PACK6   EQUR  785          +1
288:A   077510                 PACK7   EQUR  786          +1
289:A   077511                 PACK8   EQUR  787          +1
290:A   077512                 PACK9   EQUR  788          +1
291:A   077513                 PACK10  EQUR  789          +1
292:A   077514                 PACK11  EQUR  790          +1
293:A   077515                 PACK12  EQUR  791          +1
294:A                          PACK13  EQUR  792          +1
295:A                          .
296:A                          . RAM FOR ANALOG INPUTS AND OUTPUTS IN 8 BITS
297:A   077516                 .
298:A                          ARCTEM  EQUR  793          +13 CONTAINS 8 BIT ANALOG OUTPUT AND INPUT
299:A                          .                                (S2.21 - S9.7, C2.21, C2.24, C5.5)
300:A                          .
301:A                          . GLOBAL
302:A   100065                 .
303:A   100071                 BC      EQUR  1024         +4 CONTROL ANGLE DEGREES TO CNTS (100/4095)
304:A   100075                 PEC     EQUR  1028         +4 POWER MW TO CNTS (10.5/4095)
305:A   100101                 VWC     EQUR  1032         +4 WIND SPEED MPH TO CNTS (100/4095)
306:A   100105                 NC      EQUR  1036         +4 ROTOR AND GENERATOR SPEED RPM TO CNTS (25/4095)
307:A   100111                 VDC     EQUR  1040         +4 WIND DIRECTION DEGREES TO CNTS (360/4095)
308:A   100112                 TIME    EQUR  1044         +1 MINUTES
309:A   100113                 TM2     EQUR  1045         +1 HOURS
310:A   100114                 DATE    EQUR  1046         +1 DAY
311:A   100115                 DT2     EQUR  1047         +1 MONTH
312:A   100116                 T1      EQUR  1048         +1 SIX SECOND TIMER
313:A   100120                 T2      EQUR  1049         +2 ONE MINUTE TIMER
314:A   100124                 DT      EQUR  1051         +4 CYCLE TIME IN APU
315:A   100126                 WVOUT   EQUR  1055         +2 WIND VELOCITY IN MPH*10 FOR OUTPUT
316:A   100130                 PKOUT   EQUR  1057         +2 POWER IN MW*100 FOR OUTPUT
317:A   100134                 POFFST  EQUR  1059         +4 POWER OFFSET IN APU
318:A                          TC      EQUR  1063         +4 TEETER ANGLE CONVERSION FACTOR
319:A                          .
                               . EXEC LOCAL
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320:A
321:A  100465                  RHFACT  EQUR  1280        ACTIVATION FLAG TABLE
322:A  100466                  NSD     EQUR  1281
323:A  100467                  ESD     EQUR  1282
324:A  100470                  ALMACT  EQUR  1283
325:A  100471                  YAWACT  EQUR  1284
326:A  100472                  RAMP    EQUR  1285
327:A  100473                  STRTUP  EQUR  1286
328:A  100474                  CDSACT  EQUR  1287
329:A  100475                  CDSIN   EQUR  1288
330:A  100476                  DATCSO  EQUR  1289
331:A  100477                  DATCRO  EQUR  1290
332:A  100500                  DCSRI   EQUR  1291
333:A  100501                  MANUAL  EQUR  1292
334:A  100502                  PWRGEN  EQUR  1293
335:A  100503                  DATAA   EQUR  1294
336:A  100505                  RHFCNT  EQUR  1296        SEGMENT TABLE
337:A  100506                  NSDCNT  EQUR  1297
338:A  100507                  ESDCNT  EQUR  1298
339:A  100510                  ALMCNT  EQUR  1299
340:A  100511                  YAWCNT  EQUR  1300
341:A  100512                  RAMCNT  EQUR  1301
342:A  100513                  STRCNT  EQUR  1302
343:A  100514                  CDSOCT  EQUR  1303
344:A  100515                  CDSICT  EQUR  1304
345:A  100516                  DCSOCT  EQUR  1305
346:A  100517                  DCROCT  EQUR  1306
347:A  100520                  DCSRCT  EQUR  1307
348:A  100521                  MANCNT  EQUR  1308
349:A  100522                  PWRCNT  EQUR  1309
350:A  100523                  DACNT   EQUR  1310
351:A
352:A                          . MODE LOCAL (2/10/84)
353:A
354:A  101044                  ONSDCF  EQUR  1519        +1 RISING EDGE DETECTOR ON NSD COMPLETE
355:A  101045                  OESDCF  EQUR  1520        +1 RISING EDGE DETECTOR ON ESD COMPLETE
356:A  101046                  OTNSDC  EQUR  1521        +1 OUTPUT FOR R.E.D. ON NSD COMPLETE
357:A  101047                  OTESDC  EQUR  1522        +1 OUTPUT FOR R.E.D. ON ESD COMPLETE
358:A  101050                  RHFCLR  EQUR  1523        +1 FLAG THAT RHF MODULE IS DONE TO CLEAR LATCH
359:A  101051                  SBENB   EQUR  1524        +1 STANDBY ENABLE FLAG
360:A  101052                  SBINH   EQUR  1525        +1 STANDBY INHIBIT FLAG
361:A  101053                  LO      EQUR  1526        +1 LOCKOUT FLAG
362:A  101054                  OTIENB  EQUR  1527        +1 OUTPUT FOR R.E.D. ON OPERATOR ENABLE
363:A  101055                  OTSBI   EQUR  1528        +1 OUTPUT FOR R.E.D. ON STANDBY INHIBIT
364:A  101056                  OTSBE   EQUR  1529        +1 OUTPUT FOR R.E.D. ON STANDBY ENABLE
365:A  101057                  OTLO    EQUR  1530        +1 OUTPUT FOR R.E.D. ON LOCKOUT
366:A  101060                  OTREM   EQUR  1531        +1 OUTPUT FOR R.E.D. ON REMOTE TERMINAL ON
367:A  101061                  OTSTE   EQUR  1532        +1 OUTPUT FOR R.E.D. ON SITE TERMINAL ON
368:A  101062                  OTCDS   EQUR  1533        +1 OUTPUT FOR R.E.D. ON CDS TERMINAL ON
369:A  101063                  WDAV01  EQUR  1534        +2 1 MINUTE OLD AVERAGE WIND DIRECTION
370:A  101065                  WDAV02  EQUR  1536        +2 1 SECOND OLD AVERAGE WIND DIRECTION
371:A  101067                  NSRSE   EQUR  1538        +1 NORMAL SHUTDOWN TO STAND-BY ENABLE
372:A  101070                  NSDSI   EQUR  1539        +1 NORMAL SHUTDOWN TO STAND-BY INHIBIT
373:A  101071                  NSDLO   EQUR  1540        +1 NORMAL SHUTDOWN TO LOCKOUT
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374:A  101072          SEENB   EQUR  1541          +1 STAND-BY ENABLE ENABLE FLAG
375:A  101073          SIENB   EQUR  1542          +1 STAND-BY INHIBIT ENABLE FLAG
376:A  101074          LOENB   EQUR  1543          +1 LOCKOUT ENABLE FLAG
377:A  101075          RST     EQUR  1544          +1 FLAG TO RESET LATCHES
378:A  101076          IMODER  EQUR  1545          +1 NUMBER OF CURRENT MODE
379:A  101077          TEMP    EQUR  1546          +2 TEMPORARY STORAGE
380:A  101101          OOTENB  EQUR  1548          +1 RISING EDGE DETECTOR ON OPERATOR ENABLE
381:A  101102          OSBINH  EQUR  1549          +1 RISING EDGE DETECTOR ON STAND-BY INHIBIT
382:A  101103          OSBENB  EQUR  1550          +1 RISING EDGE DETECTOR ON STAND-BY ENABLE
383:A  101104          OLO     EQUR  1551          +1 RISING EDGE DETECTOR ON LOCKOUT
384:A  101105          OREMON  EQUR  1552          +1 RISING EDGE DETECTOR ON REMOTE TERMINAL ON
385:A  101106          OSITEON EQUR  1553          +1 RISING EDGE DETECTOR ON SITE TERMINAL ON
386:A  101107          OCDSON  EQUR  1554          +1 RISING EDGE DETECTOR ON CDS TERMINAL ON
387:A  101110          CNTR1   EQUR  1555          +2 5 MINUTE TIMER FOR NSDE1
388:A  101112          CNTR2   EQUR  1557          +1 5 SECOND TIMER FOR NSDE2
389:A  101113          CNTR3   EQUR  1558          +1 8 SECOND TIMER FOR ALRM4
390:A  101114          CNTR4   EQUR  1559          +1 5 SECOND TIMER FOR ALRM9
391:A  101115          CNTR5   EQUR  1560          +1 5 SECOND TIMER FOR ALRM29
392:A  101116          CNTR6   EQUR  1561          +1 8 SECOND TIMER FOR ALRM30
393:A  101117          CNTR7   EQUR  1562          +1 5 SECOND TIMER FOR ALRM31
394:A  101120          CNTR8   EQUR  1563          +1 5 SECOND TIMER FOR ALRM23
395:A  101121          CNTR9   EQUR  1564          +2 1 MINUTE TIMER FOR NSDL22
396:A  101123          CNTR10  EQUR  1566          +2 5 MINUTE TIMER FOR NSDL23
397:A  101125          CNTR11  EQUR  1568          +1 5 SECOND TIMER FOR NSDL24
398:A  101126          CNTR12  EQUR  1569          +1 1 SECOND TIMER FOR NSDL26
399:A  101127          CNTR13  EQUR  1570          +1 5 SECOND TIMER FOR NSDL28
400:A  101130          CNTR14  EQUR  1571          +1 5 SECOND TIMER FOR NSDL30
401:A  101131          CNTR15  EQUR  1572          +1 5 SECOND TIMER FOR ARCHIVE COMPLETE
402:A  101132          CNTR16  EQUR  1573          +1 5 SECOND TIMER FOR RPM OVERSPEED
403:A  101133          CNTR17  EQUR  1574          +1 5 SECOND TIMER FOR NSDL07
404:A  101134          CNTR18  EQUR  1575          +1 5 SECOND TIMER FOR NSDL08
405:A  101135          CNTR19  EQUR  1576          +1 5 SECOND TIMER FOR NSDL04
406:A  101136          CNTR20  EQUR  1577          +2 4 MINUTE TIMER ON WIND AVERAGE FOR STARTUP
407:A                  . ALARMS FOR PRINTOUT FROM LEAST CRITICAL TO MOST
408:A  101166          ALRM1   EQUR  1601          +1 ALARM TABLE
409:A  101167          ALRM2   EQUR  1602          +1
410:A  101170          ALRM3   EQUR  1603          +1
411:A  101171          ALRM4   EQUR  1604          +1
412:A  101172          ALRM5   EQUR  1605          +1
413:A  101173          ALRM6   EQUR  1606          +1
414:A  101174          ALRM7   EQUR  1607          +1
415:A  101175          ALRM8   EQUR  1608          +1
416:A  101176          ALRM9   EQUR  1609          +1
417:A  101177          ALRM10  EQUR  1610          +1
418:A  101200          ALRM11  EQUR  1611          +1
419:A  101201          ALRM12  EQUR  1612          +1
420:A  101202          ALRM13  EQUR  1613          +1
421:A  101203          ALRM14  EQUR  1614          +1
422:A  101204          ALRM15  EQUR  1615          +1
423:A  101205          ALRM16  EQUR  1616          +1
424:A  101206          ALRM17  EQUR  1617          +1
425:A  101207          ALRM18  EQUR  1618          +1
426:A  101210          ALRM19  EQUR  1619          +1
427:A  101211          ALRM20  EQUR  1620          +1
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428:A   101212          ALRM21  EQUR  1621        +1
429:A   101213          ALRM22  EQUR  1622        +1
430:A   101214          ALRM23  EQUR  1623        +1
431:A   101215          ALRM24  EQUR  1624        +1
432:A   101216          ALRM25  EQUR  1625        +1
433:A   101217          ALRM26  EQUR  1626        +1
434:A   101220          ALRM27  EQUR  1627        +1
435:A   101221          ALRM28  EQUR  1628        +1
436:A   101222          ALRM29  EQUR  1629        +1
437:A   101223          ALRM30  EQUR  1630        +1
438:A   101224          ALRM31  EQUR  1631        +1
439:A   101225          ALRM32  EQUR  1632        +1
440:A   101226          ALRM33  EQUR  1633        +1
441:A   101227          ALRM34  EQUR  1634        +1 SOMETHING DURING NSD NOT VERIFIED
442:A                   .
443:A   101236          NSDE1   EQUR  1641        +1 NORMAL SHUTDOWN TO STAND-BY ENABLE #41
444:A   101237          NSDE2   EQUR  1642        +1
445:A   101240          NSDE3   EQUR  1643        +1
446:A   101241          NSDE4   EQUR  1644        +1
447:A   101242          NSDE5   EQUR  1645        +1 AFTER STARTUP WIND OUT OF RANGE FOR > 30 MIN
448:A                   .
449:A   101250          NSDI1   EQUR  1651        +1 NORMAL SHUTDOWN TO STAND-BY INHIBIT #51
450:A   101251          NSDI2   EQUR  1652        +1
451:A   101252          NSDI3   EQUR  1653        +1
452:A   101253          NSDI4   EQUR  1654        +1
453:A   101254          NSDI5   EQUR  1655        +1
454:A   101255          NSDI6   EQUR  1656        +1
455:A   101256          NSDI7   EQUR  1657        +1
456:A   101257          NSDI8   EQUR  1658        +1 BLADE TEMP HI FOR > 30 MIN IN RAMP
457:A                   .
458:A   101262          NSDL01  EQUR  1661        +1 NORMAL SHUTDOWN TO LOCKOUT #61
459:A   101263          NSDL02  EQUR  1662        +1 ERROR IN STARTUP CHECKS
460:A   101264          NSDL03  EQUR  1663        +1
461:A   101265          NSDL04  EQUR  1664        +1
462:A   101266          NSDL05  EQUR  1665        +1
463:A   101267          NSDL06  EQUR  1666        +1
464:A   101270          NSDL07  EQUR  1667        +1
465:A   101271          NSDL08  EQUR  1668        +1
466:A   101272          NSDL09  EQUR  1669        +1
467:A   101273          NSDL10  EQUR  1670        +1
468:A   101274          NSDL11  EQUR  1671        +1
469:A   101275          NSDL12  EQUR  1672        +1
470:A   101276          NSDL13  EQUR  1673        +1
471:A   101277          NSDL14  EQUR  1674        +1
472:A   101300          NSDL15  EQUR  1675        +1
473:A   101301          NSDL16  EQUR  1676        +1
474:A   101302          NSDL17  EQUR  1677        +1
475:A   101303          NSDL18  EQUR  1678        +1
476:A   101304          NSDL19  EQUR  1679        +1
477:A   101305          NSDL20  EQUR  1680        +1
478:A   101306          NSDL21  EQUR  1681        +1
479:A   101307          NSDL22  EQUR  1682        +1
480:A   101310          NSDL23  EQUR  1683        +1
481:A   101311          NSDL24  EQUR  1684        +1
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402:A   101312                  NSDL25  EQUR  1685          +1
403:A   101313                  NSDL26  EQUR  1686          +1
404:A   101314                  NSDL27  EQUR  1687          +1
405:A   101315                  NSDL28  EQUR  1688          +1
406:A   101316                  NSDL29  EQUR  1689          +1
407:A   101317                  NSDL30  EQUR  1690          +1
408:A   101320                  NSDL31  EQUR  1691          +1 IN RAMP STATOR SHORT BREAKER STILL CLOSED
409:A   101321                  NSDL32  EQUR  1692          +1 IN RAMP H.F. TEETER BRAKES ERROR
490:A   101322                  NSDL33  EQUR  1693          +1 IN RAMP SYNC NOT COMPLETED
491:A                           .
492:A   101332                  ESDLO1  EQUR  1701          +1 EMERGENCY SHUTDOWN TO LOCKOUT
493:A                           .
494:A                           . AILERON CONTROL
495:A                           .
496:A   101475                  NERR    EQUR  1800          +2 SPEED ERROR
497:A   101477                  NERRO   EQUR  1802          +2 OLD SPEED ERROR
498:A   101501                  NREF    EQUR  1804          +2 SPEED REFERENCE
499:A   101503                  KP      EQUR  1806          +2 PROPORTIONAL CONSTANT IN DELTA CALCULATION
500:A   101505                  DELP    EQUR  1808          +2 PROPORTIONAL PART OF DELTA CALCULATION
501:A   101507                  KI      EQUR  1810          +2 INTEGRAL CONSTANT IN DELTA CALCULATION
502:A   101511                  DELI    EQUR  1812          +2 INTEGRAL PART OF DELTA CALCULATION
503:A   101513                  DELIO   EQUR  1814          +2 OLD INTEGRAL PART OF DELTA CALCULATION
504:A   101515                  K1      EQUR  1816          +4 K1/(K2+C2A21)  IN DELTA CALCULATION
505:A   101521                  K2      EQUR  1820          +4 K1/(K2+C2A21)  IN DELTA CALCULATION
506:A   101525                  DRATE   EQUR  1824          +2 CHANGE IN CONTROL ANGLE RATE IN COUNTS/CYCLE
507:A                           .
508:A                           . PITCH OR POWER GENERATION MODULE
509:A                           .
510:A   101545                  PMANU   EQUR  1840          +2 POWER SET POINT IN COUNTS
511:A   101547                  NREFL1  EQUR  1842          +2 LOW SPEED REFERENCE LEVEL IN COUNTS (13.8)
512:A   101551                  NREFL2  EQUR  1844          +2 HIGH SPEED REFERENCE LEVEL IN COUNTS (16.8)
513:A                           .
514:A                           . NORMAL / EMERGENCY SHUTDOWN MODULE
515:A                           .
516:A   101571                  NSDCPL  EQUR  1860          +1 FLAG WHEN NORMAL SHUTDOWN IS COMPLETE
517:A   101572                  NSTOP   EQUR  1861          +2 RPM TO INCREMENT SEGMENT AT DURING DOWN RAMP
518:A   101574                  ESDCPL  EQUR  1863          +1 FLAG WHEN EMERGENCY SHUTDOWN IS COMPLETE
519:A                           .
520:A                           . ROTOR HYDRAULIC PUMP MODULE
521:A                           .
522:A   101615                  RCNTR   EQUR  1880          +2 TWO MINUTE COUNTER TO KEEP PUMP ON FOR
523:A                           .
524:A                           . ALARM MODULE  (11/18/83)
525:A                           .
526:A   101623                  AINC    EQUR  1886          +2   WRITING LOCATION IN THE ALARM TABLE
527:A   101625                  ACINC   EQUR  1888          +2   READ OUT LOCATION FOR CDS IN ALARM TABLE
528:A   101627                  ASINC   EQUR  1890          +2   READ OUT LOCATION FOR SITE IN ALARM TABLE
529:A   101631                  ARINC   EQUR  1892          +2   READ OUT LOCATION FOR REMOTE IN ALARM TABLE
530:A   101633                  ONADDR  EQUR  1894          +2   ADDRESS OF OLD VALUES OF THE ALARMS
531:A   101635                  RADDR   EQUR  1896          +2   ADDRESS OF THE RISING EDGE DETECTORS
532:A   101637                  FADDR   EQUR  1898          +2   ADDRESS OF THE FALLING EDGE DETECTORS
533:A   101641                  NADDR   EQUR  1900          +2   ADDRESS OF THE ALARMS
534:A   101643                  ADIR    EQUR  1902          +1   DIRECTION OF WRITING IN ALARM TABLE
535:A   101644                  ACDIR   EQUR  1903          +1   DIRECTION OF READ OUT FOR CDS IN ALARM TABLE
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536:A   101645                  ASDIR   EQUR  1904          +1   DIRECTION OF READ OUT FOR SITE IN ALARM TABLE
537:A   101646                  AKDIR   EQUR  1905          +1   DIRECTION OF READ OUT FOR KEM IN ALARM TABLE
538:A   101647                  ANUMB   EQUR  1906          +1   VALUE OF THE CURRENT ALARM
539:A   101650                  ONSDL1  EQUR  1907          +110  THE VALUE OF THE ALARMS THE LAST CYCLE
540:A   102026                  RNSDL1  EQUR  2017          +110  RISING EDGE DETECTOR ON ALARMS
541:A   102204                  FNSDL1  EQUR  2127          +110  FALLING EDGE DETECTOR ON ALARMS
542:A   102362                  ALRMS   EQUR  2237          +220  ALARM TABLE  (NEXT IS AT LEAST 2457)
543:A                           .
544:A                           . YAW MODULE (2/2/84)
545:A                           .
546:A   104575                  CMDOFD  EQUR  3400          +1 FLAG=1 AFTER 5 SECONDS WHEN CW OR CCW CMD -> 0
547:A   104576                  YCNTR1  EQUR  3401          +1 COUNTER FOR CMDOFD
548:A   104577                  OFLAG1  EQUR  3402          +1 FLAGS TO DEFINE CMDOFD
549:A   104600                  OFLAG2  EQUR  3403          +1 FLAGS TO DEFINE CMDOFD
550:A   104601                  OFLAG3  EQUR  3404          +1 FLAGS TO DEFINE CMDOFD
551:A   104602                  YAWCW   EQUR  3405          +1 FLAG TO SAY WHICH WAY TO YAW
552:A   104603                  YAWSTP  EQUR  3406          +1 FLAG TO STOP YAW ACTION
553:A   104604                  YWCNTR  EQUR  3407          +2 TIME TO DO MANUAL IN SEC*10
554:A                           .
555:A                           . START-UP MODULE
556:A                           .
557:A   104621                  SUCMPL  EQUR  3420          +1 FLAG FOR WHEN STARTUP IS COMPLETE
558:A   104622                  SUFAIL  EQUR  3421          +1 FLAG FOR WHEN STARTUP DETECTS AN ERROR
559:A                           .
560:A                           . RAMP MODULE  (2/20/84)
561:A                           .
562:A   104645                  RMPCPL  EQUR  3440          +1 FLAG FOR WHEN RAMP IS COMPLETE
563:A   104646                  RMPFL   EQUR  3441          +1 FLAG FOR WHEN RAMP RATE CAN'T BE HELD
564:A   104647                  RPECNT  EQUR  3442          +2 CNTR FOR # TIMES FAILED RAMP RATE
565:A   104651                  NSET    EQUR  3444          +2 SPEED SET POINT
566:A   104653                  RMPFMF  EQUR  3446          +1 FLAG FOR NR#9 AND PUMP PRESSURE LOW
567:A   104654                  VWO     EQUR  3447          +2 1 MINUTE WIND SPEED AVERAGE BEFORE ROTATION
568:A   104656                  DELCMD  EQUR  3449          +2 TIP ANGLE TARGET & RAMP RATE FROM 4 TO NSET-.6
569:A   104660                  RDELAY  EQUR  3451          +2 COUNTER TO DELAY
570:A   104662                  RFLAG   EQUR  3453          +1 FLAG SET ONCE CHECKED SHAFT PUMP PRESSURE
571:A                           .
572:A                           . DATA PROCESSING MODULE  (12/5/83)
573:A                           .
574:A   105011                  TOTTME  EQUR  3540          +4 TOTAL TIME IN DAY
575:A   105015                  LOTME   EQUR  3544          +4 TIME IN LOCKOUT
576:A   105021                  APER    EQUR  3548          +2 AVAILABILITY PERCENTILE *10 FOR TRANSMITTING
577:A   105023                  EPR     EQUR  3550          +4 ENERGY PRODUCED SUMMATION IN APU
578:A   105027                  EP      EQUR  3554          +2 ENERGY PRODUCED *10 TO TRANSMIT
579:A   105031                  BIAS1   EQUR  3556          +4 BETA1 = (B1 - BIAS1) * SLOPE1
580:A   105035                  SLOPE1  EQUR  3560          +4   .    .    .    .    .
581:A   105041                  BIAS2   EQUR  3564          +4 BETA2 = (B2 - BIAS2) * SLOPE2
582:A   105045                  SLOPE2  EQUR  3568          +4   .    .    .    .    .
583:A   105051                  DTEOLD  EQUR  3572          +1 DATE OF DAY ON PREVIOUS CYCLE
584:A   105052                  EPY     EQUR  3573          +2 ENERGY PRODUCED YESTERDAY
585:A   105054                  EPYR    EQUR  3575          +2 ENERGY PRODUCED TO DATE
586:A   105056                  EPYRO   EQUR  3577          +2 AT MIDNIGHT, THE NUMBER TO UPDATE EPYR
587:A                           . THESE NEXT RAM ARE USED IN THE CALLING OF THE AVERAGING SUBROUTINE
588:A   105060                  CNT1A   EQUR  3579          +1 # CYCLES FOR SUMMATION (MUST BE <=8)
589:A   105061                  CNT2A   EQUR  3580          +1 # SUMMATIONS FOR FIRST AVERAGES
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590:A   105062                  CNT3A   EQUR  3581          +1 # FIRST AVERAGES TO YIELD SECOND AVERAGE
591:A                                                         (0 - NO 2ND AVERAGE, 1 - 2ND AVG = 1ST AVG)
592:A                           .     ALL CNT_A MUST BE EITHER  0, 1, POWER OF 2, BUT ALWAYS <=128
593:A   105063                  AMT1A   EQUR  3582          +2 LOCATION OF ARRAY OF SUMMATION/CNT1A/CNT2A
594:A   105065                  AMT2A   EQUR  3584          +2 LOCATION OF ARRAY OF FIRST AVARAGE/CNT3A
595:A   105067                  AVGC1   EQUR  3586          +2 LOCATION OF CURRENT COUNT FOR SUMMATION
596:A   105071                  AVG1    EQUR  3588          +2 LOCATION OF SUMMATION VALUE
597:A   105073                  VALAVG  EQUR  3590          +2 VALUE OF ANALOG THAT WILL BE AVERAGED
598:A   105075                  AVGTMP  EQUR  3592          +2 TEMPORARY AVERAGE VALUE
599:A                           . THESE NEXT RAM ARE USED TO AVERAGE WIND SPEED
600:A   105077                  WV1A    EQUR  3594          +16 ARRAY OF SUMMATION/CNT1A/CNT2A
601:A   105117                  WV2A    EQUR  3610          +16 ARRAY OF FIRST AVERAGE/CNT3A
602:A   105137                  WVS     EQUR  3626          +2 SUMMATION VALUE
603:A   105141                  WV1AVG  EQUR  3628          +2 FIRST AVERAGE WIND SPEED
604:A   105143                  WV2AVG  EQUR  3630          +2 SECOND AVERAGE WIND SPEED
605:A   105145                  WVC1    EQUR  3632          +1 CURRENT COUNT FOR SUMMATION
606:A   105146                  WVC2    EQUR  3633          +1 CURRENT COUNT FOR FIRST AVERAGE
607:A   105147                  WVC3    EQUR  3634          +1 CURRENT COUNT FOR SECOND AVERAGE
608:A                           . THESE NEXT RAM ARE USED TO AVERAGE WIND DIRECTION
609:A   105150                  WD1A    EQUR  3635          +16 ARRAY OF SUMMATION/CNT1A/CNT2A
610:A   105170                  WD2A    EQUR  3651          +16 ARRAY OF FIRST AVERAGE/CNT3A
611:A   105210                  WDS     EQUR  3667          +2 SUMMATION VALUE
612:A   105212                  WD1AVG  EQUR  3669          +2 FIRST AVERAGE WIND DIRECTION
613:A   105214                  WD2AVG  EQUR  3671          +2 SECOND AVERAGE WIND DIRECTION
614:A   105216                  WDC1    EQUR  3673          +1 CURRENT COUNT FOR SUMMATION
615:A   105217                  WDC2    EQUR  3674          +1 CURRENT COUNT FOR FIRST AVERAGE
616:A   105220                  WDC3    EQUR  3675          +1 CURRENT COUNT FOR SECOND AVERAGE
617:A                           . THESE NEXT RAM ARE USED TO AVERAGE POWER
618:A   105221                  PR1A    EQUR  3676          +16 ARRAY OF SUMMATION/CNT1A/CNT2A
619:A   105241                  PR2A    EQUR  3692          +4 ARRAY OF FIRST AVERAGE/CNT3A
620:A   105245                  PRS     EQUR  3696          +2 SUMMATION VALUE
621:A   105247                  PR1AVG  EQUR  3698          +2 FIRST AVERAGE POWER
622:A   105251                  PR2AVG  EQUR  3700          +2 SECOND AVERAGE POWER
623:A   105253                  PRC1    EQUR  3702          +1 CURRENT COUNT FOR SUMMATION
624:A   105254                  PRC2    EQUR  3703          +1 CURRENT COUNT FOR FIRST AVERAGE
625:A   105255                  PRC3    EQUR  3704          +1 CURRENT COUNT FOR SECOND AVERAGE
626:A                           .
627:A                           . MANUAL MODULE   (1/6/83)
628:A                           .
629:A   105275                  MANCMD  EQUR  3720          +1 FLAG IF COMMAND FROM SITE TERMINAL FOR MANUAL
630:A   105276                  DMPTMP  EQUR  3721          +2 TEMPORARY ANALOG STORAGE FOR DATA DUMP
631:A   105300                  ARLOC1  EQUR  3723          +2 ADDRESS IN ARCHIVING WHERE DATA DUMP IS AT
632:A   105302                  ARCOUT  EQUR  3725          +50 USED FOR DATA DUMP OF ONE CYCLE
633:A   105364                  DMPI10  EQUR  3775          +1 COUNTER USED IN DATA DUMP FOR ANALOG DUMP
634:A   105365                  MANON   EQUR  3776          +1 FLAG IF MANUAL IS OPERATIONAL
635:A   105366                  MANDR   EQUR  3777          +1 FLAG FOR MANUAL DRIVING OF YAW
636:A   105367                  MANDIR  EQUR  3778          +1 FLAG FOR DIRECTION OF MANUAL DRIVING OF YAW
637:A   105370                  ARCLOC  EQUR  3779          +2 ADDRESS OF DATA USED FOR TXT DATA DUMP
638:A   105372                  DMPINC  EQUR  3781          +2 COUNTER FOR OUTPUT OF ONE BATCH OF DATA DUMP
639:A   105374                  DMPI2   EQUR  3783          +2   .   .   .   .   .   .   .   .   .
640:A   105376                  IPT     EQUR  3785          +2 ADDRESS OF DISCRETE OUTPUT FOR DATA DUMP
641:A   105400                  DMPCNT  EQUR  3787          +2 NUMBER OF LINES OUTPUT FOR DATA DUMP
642:A   105402                  ARLOC2  EQUR  3789          +2 LOCATION OF OUTPUT FOR DATA DUMP
643:A   105404                  VARI    EQUR  3791          +2 INPUT AS EVERY VARI LINE TO BE PRINTED
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644:A  105406                ARCLN1  EQUR  3793          +1 # OF LINES TO BE PRINTED FOR ONGOING D.D.
645:A  105407                ARCLN2  EQUR  3794          +1 # OF LINES TO BE PRINTED FOR 1/1 SEC D.D.
646:A  105410                ARCLN3  EQUR  3795          +1 # OF LINES TO BE PRINTED FOR 1/2 SEC D.D.
647:A  105411                ARCLN4  EQUR  3796          +1 # OF LINES TO BE PRINTED FOR 1/5 SEC D.D.
648:A  105412                A11     EQUR  3797          +2 DISCRETE BITS 0-3 FOR PRINTING
649:A  105414                A12     EQUR  3799          +2 DISCRETE BITS 4-7 FOR PRINTING
650:A  105416                AFLG    EQUR  3801          +1 FLAG FOR PRINTING OF CONTINUOUS LINES OF D.D.
651:A  105417                ALINE   EQUR  3802          +2 NUMBER OF FIRST LINE TO BE PRINTED IN D.D.
652:A  105421                ANOL    EQUR  3804          +2 NUMBER OF LINES TO PRINT FOR D.D.
653:A  105423                AFLG1   EQUR  3806          +1 AFLG ONE CYCLE OLD
654:A  105424                AOFLG   EQUR  3807          +1 OLD OUTPUT FOR R.E.D.
655:A  105425                SLNCNT  EQUR  3808          +2 NUMBER OF TOTAL LINES OUTPUT BY D.D.
656:A  105427                TIPCMD  EQUR  3810          +2 MANUAL COMMANDED TIP ANGLE IN DEGREES AND COUNT
657:A                        .
658:A                        . CDS COMMUNICATION MODULE   (12/29/83)
659:A                        .
660:A  105477                FDXBZ   EQUR  3850          +3 BUSY FLAG FOR CDS COMMUNICATION
661:A  105502                CDSON   EQUR  3853          +1 FLAG IF CDS IS CONNECTED(1) OR DISCONNECTED(0)
662:A  105503                CDSCNT  EQUR  3854          +1 COUNTER FOR OUTPUT OF CDS DATA STREAM
663:A  105504                CERRO   EQUR  3855          +1 FLAG FOR OUTPUT ERROR FOR CDS COMMUNICATION
664:A  105505                CERRI   EQUR  3856          +1 FLAG FOR INPUT ERROR FOR CDS COMMUNICATION
665:A  105506                IALRM   EQUR  3857          +1 NUMBER OF ALARMS TO SEND IN CDS DATA STREAM
666:A  105507                CDSID   EQUR  3858          +1 I. D. NUMBER FOR CDS MESSAGE BOTH IN AND OUT
667:A  105510                CDSVAL  EQUR  3859          +4 WHERE RAM VALUES DESIRED FOR CDS ARE STORED
668:A  105514                CDSCMD  EQUR  3863          +6 DESTINATION OF MESSAGE FROM CDS
669:A  105515                CDSC2   EQUR  3864             SECOND WORD OF MESSAGE
670:A  105516                CDSC3   EQUR  3865             THIRD WORD
671:A  105517                CDSC4   EQUR  3866             FOURTH WORD
672:A  105520                CDSC5   EQUR  3867             FIFTH WORD
673:A  105521                CDSC6   EQUR  3868             SIXTH WORD
674:A  105522                CDSOUT  EQUR  3869          +33 (AT LEAST) RAM THAT IS OUTPUT TO CDS
675:A  105563                FDXTBL  EQUR  3902          +162 CDS BUFFER (40+PBUF(100)+KBUF(22))  4064
676:A                        .
677:A                        . SITE TERMINAL COMMUNICATION MODULE  (1/3/84)
678:A                        .
679:A  106401                STEIN   EQUR  4300          +6 SITE TERMINAL INPUT DESTINATION
680:A  106402                STE2    EQUR  4301            SECOND WORD
681:A  106403                STE3    EQUR  4302            THIRD WORD
682:A  106404                STE4    EQUR  4303            FOURTH WORD
683:A  106405                STE5    EQUR  4304            FIFTH WORD
684:A  106406                STE6    EQUR  4305            SIXTH WORD
685:A  106407                SUICON  EQUR  4306          +1 FLAG FOR SITE OPERATOR CONTROL
686:A  106410                KYFLGS  EQUR  4307          +1 FLAG IF KEY IN FOR SITE TERMINAL IS COMPLETE
687:A  106411                PSSWRD  EQUR  4308          +1 FLAG IF PASSWORD WAS ENTERED
688:A  106412                PK1BZ   EQUR  4309          +1 PRINT/KEYIN BUSY FLAG FOR SITE TERMINAL
689:A  106413                DSCCNT  EQUR  4310          +2 COUNTER FOR PERIODIC OUTPUT OF UPDATE MESSAGE
690:A  106415                LNSCNT  EQUR  4312          +1 LINE COUNT FOR SITE TERMINAL
691:A  106416                SRC     EQUR  4313          +1 FLAG IF REQUEST TO REMOTE FOR CONTROL WAS SENT
692:A  106417                IREQSC  EQUR  4314          +1 FLAG TO SEND REQUEST FOR SITE CONTROL TO REMOTE
693:A  106420                STLON   EQUR  4315          +1 FLAG IF SITE TERMINAL IS ON
694:A  106421                STE     EQUR  4316          +1 FLAG IF COMMAND CAME FROM SITE TERMINAL
695:A  106422                OMODES  EQUR  4317          +2 NUMBER OF MODE LAST PRINTED BY SITE TERMINAL
696:A  106424                PK1TBL  EQUR  4319          +60 PRINT/KEYIN BUFFER FOR SITE TERMINAL
697:A                        .
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698:A                          . REMOTE TERMINAL COMMUNICATION MODULE   (1/3/84)
699:A                          .
700:A  106533                  FKBZ    EQUR  4390        +1 PRINT/KEYIN BUSY FLAG FOR REMOTE TERMINAL
701:A  106534                  KBUF    EQUR  4391        +6 REMOTE TERMINAL INPUT DESTINATION
702:A  106535                  KBUF2   EQUR  4392          SECOND WORD
703:A  106536                  KBUF3   EQUR  4393          THIRD WORD
704:A  106537                  KBUF4   EQUR  4394          FOURTH WORD
705:A  106540                  KBUF5   EQUR  4395          FIFTH WORD
706:A  106542                  LNECNT  EQUR  4397        +1 LINE COUNTER FOR REMOTE TERMINAL
707:A  106543                  DRCCNT  EQUR  4398        +2 COUNTER FOR PERIODIC OUTPUT OF UPDATE MESSAGE
708:A  106545                  KEYFLG  EQUR  4400        +1 FLAG IF KEYIN FOR REMOTE TERMINAL IS COMPLETE
709:A  106546                  RDTCON  EQUR  4401        +1 FLAG FOR REMOTE OPERATOR CONTROL
710:A  106547                  IREQRC  EQUR  4402        +1 FLAG TO SEND REQUEST FOR REMOTE CONTROL TO SITE
711:A  106550                  PSWRD   EQUR  4403        +1 FLAG IF PASSWORD WAS ENTERED
712:A  106551                  RRC     EQUR  4404        +1 FLAG IF REQUEST FOR REMOTE CONTROL WAS SENT
713:A  106552                  REMON   EQUR  4405        +1 FLAG IF REMOTE TERMINAL IS ON
714:A  106553                  KEM     EQUR  4406        +1 FLAG IF COMMAND CAME FROM REMOTE TERMINAL
715:A  106554                  OMODER  EQUR  4407        +2 NUMBER OF MODE LAST PRINTED BY REMOTE TERMINAL
716:A                          .
717:A                          . SITE/REMOTE COMMUNICATION  (1/3/84)
718:A                          .
719:A  106565                  OTSDR   EQUR  4416        +1 OPERATOR TERMINAL SHUTDOWN REQUEST
720:A  106566                  OTENB   EQUR  4417        +1 OPERATOR TERMINAL ENABLE
721:A  106567                  ALRM    EQUR  4418        +2 TEMPORARY ALARM NUMBER FOR OUTPUT
722:A  106571                  DATEMO  EQUR  4420        +2 MONTH WHEN CUMM. ENERGY WAS ZEROED
723:A  106573                  DATEDO  EQUR  4422        +2 DAY WHEN CUMM. ENERGY WAS ZEROED
724:A  106575                  PWRSET  EQUR  4424        +2 POWER SET POINT * 10 TO OUTPUT
725:A  106577                  SPDSET  EQUR  4426        +2 SPEED SET POINT * 10 TO OUTPUT
726:A  106601                  SPTMP   EQUR  4428        +2 TEMPORARY ARRAY FOR CALC. PWR & SPEED SET POINT
727:A  106602                  SPTMP2  EQUR  4429          SECOND WORD
728:A  106603                  GETIN   EQUR  4430        +2 SPEED AND POWER SET POINTS IN COUNTS AS INPUT
729:A  106605                  TIMEM   EQUR  4432        +2 MINUTE TIME FOR OUTPUT COMMUNICATIONS
730:A  106607                  TIMEH   EQUR  4434        +2 HOUR TIME FOR OUTPUT COMMUNICATIONS
731:A  106611                  DATED   EQUR  4436        +2 DAY DATE FOR OUTPUT COMMUNICATIONS
732:A  106613                  DATEM   EQUR  4438        +2 MONTH DATE FOR OUTPUT COMMUNICATIONS
733:A  106615                  TSEC    EQUR  4440        +2 SECONDS FOR OUTPUT COMMUNICATIONS
734:A  106617                  TIMEM2  EQUR  4442        +2 MINUTE TIME FOR 1/1 SEC DATA DUMP
735:A  106621                  TIMEH2  EQUR  4444        +2 HOUR TIME FOR 1/1 SEC DATA DUMP
736:A  106623                  DATED2  EQUR  4446        +2 DAY DATE FOR 1/1 SEC DATA DUMP
737:A  106625                  DATEM2  EQUR  4448        +2 MONTH DATE FOR 1/1 SEC DATA DUMP
738:A  106627                  TSEC2   EQUR  4450        +2 SECONDS FOR 1/1 SEC DATA DUMP
739:A  106631                  TIMEM3  EQUR  4452        +2 MINUTE TIME FOR 1/2 SEC DATA DUMP
740:A  106633                  TIMEH3  EQUR  4454        +2 HOUR TIME FOR 1/2 SEC DATA DUMP
741:A  106635                  DATED3  EQUR  4456        +2 DAY DATE FOR 1/2 SEC DATA DUMP
742:A  106637                  DATEM3  EQUR  4458        +2 MONTH DATE FOR 1/2 SEC DATA DUMP
743:A  106641                  TSEC3   EQUR  4460        +2 SECONDS FOR 1/2 SEC DATA DUMP
744:A  106643                  TIMEM4  EQUR  4462        +2 MINUTE TIME FOR 1/5 SEC DATA DUMP
745:A  106645                  TIMEH4  EQUR  4464        +2 HOUR TIME FOR 1/5 SEC DATA DUMP
746:A  106647                  DATED4  EQUR  4466        +2 DAY DATE FOR 1/5 SEC DATA DUMP
747:A  106651                  DATEM4  EQUR  4468        +2 MONTH DATE FOR 1/5 SEC DATA DUMP
748:A  106653                  TSEC4   EQUR  4470        +2 SECONDS FOR 1/5 SEC DATA DUMP
749:A                          .
750:A                          . I/O COMD EQUATES
751:A                          .
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752:A  000116                .  FDXMOD  EQU   0116          SUPPLY MODE BYTE FROM TABLE IN DOCUMENTATION
753:A  000244                   FDXSPD  EQU   0244            *   SPEED  *   *   *   *   *
754:A  000001                   FDXDIV  EQU   1             SUPPLY DEVICE NUMBER (1 TO 15)
755:A  000026                   KBFSIZ  EQU   22            KEYIN BUFFER SIZE (256 MAX)
756:A  000144                   PBFSIZ  EQU   100           PRINT BUFFER SIZE (256 MAX)
757:A                           .
758:A  000001                   ONE     EQU   1
759:A  000002                   FDXEFW  EQU   ONE<FDXDIV
760:A  137700                   BAS717  EQU   0137700       BASE CP717 ADDRESS
761:A  000004                   FDXDV4  EQU   FDXDIV<2      DEVICE # *4
762:A  137704                   FDXDAT  EQU   BAS717+FDXDV4 ADDRESS OF SELECTED CP717
763:A  000020                   FDXBKF  EQU   020           SET TO 020 IF USING A TIMES 16 OR 64 CLOCK, TO 010
764:A                           .                           IF TIMES 1 CLOCK
765:A  137705                   FDXCS1  EQU   FDXDAT+1      CMD/STAT#1 ADR
766:A  137706                   FDXCS2  EQU   FDXDAT+2      CMD/STAT#2 ADR
767:A  137707                   FDXC3   EQU   FDXDAT+3      CMD#3 ADR
768:A  105601                   FDXKBA  EQU   FDXTBL+14     KEYIN BUFFER ADR
769:A  105603                   FDXKBL  EQU   FDXTBL+16       *     *   LENGTH
770:A  105604                   FDXKBC  EQU   FDXTBL+17       *     *   COUNTER
771:A  105605                   FDXKAA  EQU   FDXTBL+18       *   ATTENTION ADR
772:A  105607                   FDXTMR  EQU   FDXTBL+20     INTRPTS ON DELAY TIMER
773:A  105610                   FDXEST  EQU   FDXTBL+21     ERROR STATE FLAG
774:A  105611                   FDXESR  EQU   FDXTBL+22     ERROR # SHIFT REGISTER
775:A  105621                   FDXESP  EQU   FDXTBL+30       *   *   *   *     POINTER
776:A  105623                   RAMKBL  EQU   FDXTBL+32     COUNT STORAGE
777:A  105624                   RAMKBC  EQU   FDXTBL+33     COUNT STORAGE
778:A  105625                   CXCNT   EQU   FDXTBL+34     COUNT STORAGE FOR TRANSMITTER
779:A  105626                   CRCNT   EQU   FDXTBL+35     COUNT STORAGE FOR RECEIVER
780:A  105627                   CXCTR   EQU   FDXTBL+36     TRANSMITTER COUNTER
781:A  105630                   CRCTR   EQU   FDXTBL+37     RECEIVER COUNTER
782:A  105631                   COMID   EQU   FDXTBL+38     BLOCK I.D. CODE
783:A  105632                   INHFG   EQU   FDXTBL+39     KEYIN INHIBIT FLAG
784:A  105633                   FDXKBF  EQU   FDXTBL+40     KEYIN BUFFER
785:A  106441                   FDXPBF  EQU   FDXKBF+KBFSIZ  PRINT BUFFER
786:A  000567                   SETER1  EQU   0567
787:A  000615                   PRSTER  EQU   0615
788:A  000620                   PRRSER  EQU   0620
789:A  000626                   BLKTER  EQU   0626
790:A                           .
791:A                           . PRINT/KEYIN EQUATES
792:A                           .
793:A  000116                   PR1MOD  EQU   0116          SUPPLY MODE BYTE FROM TABLE IN DOCUMENTATION
794:A  000022                   PR1SPD  EQU   022             *   SPEED  *   *   *   *   *
795:A  000003                   PR1DIV  EQU   3             SUPPLY DEVICE NUMBER (1 TO 15)
796:A  000010                   PR1EFW  EQU   ONE<PR1DIV
797:A  000000                   ZERO    EQU   0
798:A  000014                   PR1DV4  EQU   PR1DIV<2      DEVICE # *4
799:A  137714                   PR1DAT  EQU   BAS717+PR1DV4 ADDRESS OF SELECTED CP717
800:A  000020                   PR1BKF  EQU   020           SET TO 020 IF USING A TIMES 16 OR 64 CLOCK, TO 010
801:A  137715                   PR1CS1  EQU   PR1DAT+1      CMD/STAT#1 ADR
802:A  137716                   PR1CS2  EQU   PR1DAT+2      CMD/STAT#2 ADR
803:A  137717                   PR1C3   EQU   PR1DAT+3      CMD#3 ADR
804:A  106442                   PR1KBA  EQU   PR1TBL+14     KEYIN BUFFER ADR
805:A  106444                   PR1KBL  EQU   PR1TBL+16       *     *   LENGTH
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106445                        PK1KBC   EQU   PK1TBL+17      .     .   COUNTER
106446                        PK1KAA   EQU   PK1TBL+18      .   ATTENTION ADR
106450                        PK1TMR   EQU   PK1TBL+20     INTRPTS ON DELAY TIMER
106451                        PK1EST   EQU   PK1TBL+21     ERROR STATE FLAG  .
106452                        PK1ESK   EQU   PK1TBL+22     ERROR # SHIFT REGISTER
106462                        PK1ESP   EQU   PK1TBL+30       .    .    .     .     POINTER
106464                        PK1BUF   EQU   PK1TBL+32     UNPACKED P.D.N. BUFFER
106476                        PK1A1    EQU   PK1TBL+42
106477                        PK1HL1   EQU   PK1TBL+43
106501                        PK1HL2   EQU   PK1TBL+45
                              .
000443                        BIN2AS   EQU   0443
000446                        PK1DEC   EQU   0446
000451                        PK1DE2   EQU   0451
000534                        ALG2EU   EQU   0534
007416                        RTCFLG   EQU   07416
                              .
                              . DATA ARCHIVING MODULE
                              .
107152                        ARCCPL   EQUR  4661          +1 ARCHIVE COMPLETE FLAG AFTER SD
107153                        ARCINC   EQUR  4662          +2 FINE POINTER FOR ARCHIVE INCREMENTAL LOCATION
107155                        ARCRMI   EQUR  4664          +2 COARSE POINTER FOR ARCHIVE INCREMENTAL LOCATION
107157                        ARCCNT   EQUR  4666          +1 COUNTER PUT INTO ARCHIVE RAM TO KEEP TRACK
                              .                                OF CHRONOLOGICAL ORDER OF ARCHIVE
107160                        ACOUNT   EQUR  4667          +2 COUNTER FOR ARCHIVE FOR WRITTING ARCHIVE
107162                        ARCTIM   EQUR  4669          +2 TIME DELAY FOR ARCHIVE TO BE WRITTEN
                              .                                (10=1/SEC, 20=1/2 SEC, 50=1/5 SEC)
107164                        IIARC    EQUR  4671          +1 =1 IF SD WAS SENSED AND SD ARCHIVE HAS NON-ZERO
                              .                               VALUES ! =0 IF NO SD SENSED AND SD ARCHIVE = 0
107165                        ACNT1    EQUR  4672          +1 CURRENT COUNT FOR WHOLE SD
107166                        TIMDEC   EQUR  4673          +2 LOCATION IN ATIME.FOR START OF SECTION OF
                              . ARCHIVING (0-5 ONGOING, 6-11 1/SEC SD, 12-17 1/2 SEC SD, 18-23 1/5 SEC SD)
107170                        ATIME    EQUR  4675          +24 TIME FOR EACH SECTION OF ARCHIVING
                              .                    (MINUTE, HOUR, DAY, MONTH, 6 SEC TIMER, 1 MINUTE TIMER)
                              .ARCRAM   EQUR  4699           +9000 START OF THE ARCHIVE RAM AREA
                              .ARCR1    EQUR  13699          +3000 START OF THE 1ST ARCHIVE AREA AFTER SD
                              .ARCR2    EQUR  16699          +3000 START OF THE 2ND ARCHIVE AREA AFTER SD
                              .ARCR3    EQUR  19699          +1000 START OF THE 3RD ARCHIVE AREA AFTER SD
107220                        ARCRAM   EQUR  4699          +900 OF ONGOING (18 SECONDS)
111024                        ARCR1    EQUR  5599          +300 OF 1/SEC    (6 SECONDS)
111500                        ARCR2    EQUR  5899          +300 OF 1/2 SEC (12 SECONDS)
112154                        ARCR3    EQUR  6199          +100 OF 1/5 SEC (10 SECONDS)
                              .
020251 204 030 213 215 056    HDGT     TXT   0204,0030,DATEM,056
020256 204 120 211 215                 TXT   0204,0120,DATED
020262 204 040 207 215 056             TXT   0204,0040,TIMEH,056
020267 204 120 205 215 056             TXT   0204,0120,TIMEM,056
020274 204 120 215 215                 TXT   0204,0120,TSEC
020300 040 040 040 115 117 104         TXT      'MOD 5A SUMMARY DATA  UNIT SN 001'
020306 040 065 101 040 123 125
020314 115 115 101 122 131 040
020322 104 101 124 101 040 040
020330 125 116 111 124 040 123
020336 116 040 060 060 061
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855:A  020343 015 012 012                          TXT   015,012,012
856:A  020346 040 040 040 040 040 040              TXT   040,040,040,040,040,040,040
       020354 040
857:A  020355 040 040 040 040 040 040              TXT   040,040,040,040,040,040,040,040
       020363 040 040
858:A  020365 115 127 110 040 120 122              TXT   'MWH PRODUCED',040,040,040,040,040,040
       020373 117 104 125 103 105 104
       020401 040 040 040 040 040 040
859:A  020407 040 040 040 040 040 040              TXT   040,040,040,040,040,040,040
       020415 040
860:A  020416 123 105 124 040 120 117              TXT   'SET POINTS',015,012,040,040
       020424 111 116 124 123 015 012
       020432 040 040
861:A  020434 103 117 116 124 122 117              TXT   'CONTROL YESTER',040,040,040
       020442 114 040 131 105 123 124
       020450 105 122 040 040 040
862:A  020455 103 125 115 115 040 040              TXT   'CUMM   FROM',040,040,040
       020463 040 106 122 117 115 040
       020471 040 040
863:A  020473 124 101 045 040 040 040              TXT   'TA',045,040,040,040,040
       020501 040
864:A  020502 115 127 040 040 040 040              TXT   'MW     RPM',015,012
       020510 040 122 120 115 015 012
865:A  020516 040 040 040 040 210 271              TXT   040,040,040,040,0210,CNTRL,0203
       020524 113 203
866:A  020526 122 105 115 040 202 146 CNREM        TXT   'REM',040,*CONT,0203
       020534 041 203
867:A  020536 123 111 124 105 202 146 CNSTE        TXT   'SITE',*CONT,0203
       020544 041 203
868:A  020546 040 040 040 204 051 052 CONT         TXT   040,040,040,0204,0051,EPY,040,040
       020554 212 040 040
869:A  020557 204 052 054 212 040 040              TXT   0204,0052,EPYR,040,040,0204,0020,DATEMO
       020565 204 020 171 215
870:A  020571 056 204 120 173 215 040              TXT   056,0204,0120,DATEDO,040,040
       020577 040
871:A  020600 204 051 021 212 040                  TXT   0204,0051,APER,040
872:A  020605 204 051 175 215 040 040              TXT   0204,0051,PWRSET,040,040,040
       020613 040
873:A  020614 204 041 177 215 015 012              TXT   0204,0041,SPDSET,015,012,012
       020622 012
874:A  020623 040 040 040 040 124 111              TXT   '    TIME',040,040,040,040
       020631 115 105 040 040 040 040
875:A  020637 101 114 122 115 040 040              TXT   'ALRM   MPH',040,040,040,040
       020645 040 115 120 110 040 040
       020653 040 040
876:A  020655 115 127 040 040 040 040              TXT   'MW    MWH   MODE'
       020663 115 127 110 040 040 040
       020671 115 117 104 105
877:A  020676 015 012 040 040 040 040 040          TXT   015,012,040,040,040,040,055,055,055,055
       020703 055 055 055 055
878:A  020707 040 040 040 040 055 055              TXT   040,040,040,040,055,055,055,055,040,040
       020715 055 055 040 040
879:A  020721 040 055 055 055 040 040              TXT   040,055,055,055,040,040,040,040
       020727 040 040
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880:A  020731 055 055 040 040 040 040          TXT   055,055,040,040,040,040
881:A  020737 055 055 055 040 040 040          TXT   055,055,055,040,040,040
882:A  020745 055 055 055 055 015 012          TXT   055,055,055,055,015,012,0203
       020753 203
883:A  020754 204 040 207 215 056      FTALRM  TXT   0204,0040,TIMEH,056
884:A  020761 204 120 205 215 056              TXT   0204,0120,TIMEM,056
885:A  020766 204 120 215 215 040 040          TXT   0204,0120,TSEC,040,040,0210,FMALRM,0203
       020774 210 366 113 203
886:A  021000 053 202 012 042 203      FALRM   TXT   053,*FNSH1,0203
887:A  021005 055 202 012 042 203      NALRM   TXT   055,*FNSH1,0203
888:A  021012 204 030 167 215 015 012 FNSH1   TXT   0204,0030,ALRM,015,012,0203
       021020 203
889:A  021021 204 040 207 215 056 204 FNUMB   TXT   0204,0040,TIMEH,056,0204,0120,TIMEM
       021027 120 205 215
890:A  021032 056 204 120 215 215 040          TXT   056,0204,0120,TSEC,040,040
       021040 040
891:A  021041 204 040 167 215 040 040          TXT   0204,0040,ALRM,040,040
892:A  021047 204 051 124 200 040 040          TXT   0204,0051,WVOUT,040,040
893:A  021055 204 042 126 200 040 040          TXT   0204,0042,FROUT,040,040
894:A  021063 204 051 027 212 040 040          TXT   0204,0051,EP,040,040,0210,IMODE,0203
       021071 210 305 113 203
895:A  021075 040 114 117 202 165 042 LOPT    TXT   040,'LO',*FNSH,0203
       021103 203
896:A  021104 123 102 111 202 165 042 SBIPT   TXT   'SBI',*FNSH,0203
       021112 203
897:A  021113 123 102 105 202 165 042 SBEPT   TXT   'SBE',*FNSH,0203
       021121 203
898:A  021122 040 123 125 202 165 042 SUPT    TXT   040,'SU',*FNSH,0203
       021130 203
899:A  021131 122 115 120 202 165 042 RMPPT   TXT   'RMP',*FNSH,0203
       021137 203
900:A  021140 120 127 122 202 165 042 PWRPT   TXT   'PWR',*FNSH,0203
       021146 203
901:A  021147 116 123 104 202 165 042 NSDPT   TXT   'NSD',*FNSH,0203
       021155 203
902:A  021156 105 123 104 202 165 042 ESDPT   TXT   'ESD',*FNSH,0203
       021164 203
903:A  021165 015 012 203              FNSH    TXT   015,012,0203
904:A  021170 012 115 101 116 125 101 MANOP   TXT   012,'MANUAL OPERATIONAL'
       021176 114 040 117 120 105 122
       021204 101 124 111 117 116 101
       021212 114
905:A  021213 040 040 040 040 040 040 CMDTME  TXT   040,040,040,040,040,040,040,040,040,040
       021221 040 040 040 040
906:A  021225 040 040 040 040 040 040          TXT   040,040,040,040,040,040,040,040,040,040
       021233 040 040 040 040
907:A  021237 204 040 207 215 056 204          TXT   0204,0040,TIMEH,056,0204,0120,TIMEM
       021245 120 205 215
908:A  021250 056 204 120 215 215 015          TXT   056,0204,0120,TSEC,015,012,0203
       021256 012 203
909:A  021260 012 115 101 116 125 101 MANOUT  TXT   012,'MANUAL DONE',*CMDTME,0203
       021266 114 040 104 117 116 105
       021274 302 213 042 203
910:A  021300 012 123 111 124 105 040 STEDNE  TXT   012,'SITE CMD DONE',*CMDTME,0203
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                021306 103 115 104 040 104 117
                021314 116 105 202 213 042 203
911:A           021322 012 122 105 115 117 124 RTEDNE   TXT   012,'REMOTE CMD DONE',*CMDTME,0203
                021330 105 040 103 115 104 040
                021336 104 117 116 105 202 213
                021344 042 203
912:A           021346 012 203                  FSKIP   TXT   012,0203
913:A           021350 012 052 052 040 103 115 CMDNO    TXT   012,052,052,040,'CMD INVALID',040,052,052,015,012,0203
                021356 104 040 111 116 126 101
                021364 114 111 104 040 052 052
                021372 015 012 203
914:A           021375 012 123 111 124 105 040 REQ      TXT   012,'SITE TERMINAL REQUESTS CONTROL',015,012,0203
                021403 124 105 122 115 111 116
                021411 101 114 040 122 105 121
                021417 125 105 123 124 123 040
                021425 103 117 116 124 122 117
                021433 114 015 012 203
915:A           021437 012 122 105 115 117 124 REQC     TXT   012,'REMOTE TERMINAL REQUESTS CONTROL',015,012,0203
                021445 105 040 124 105 122 115
                021453 111 116 101 114 040 122
                021461 105 121 125 105 123 124
                021467 123 040 103 117 116 124
                021475 122 117 114 015 012 203
916:A           021503 015 012 012 040 040 040 DMPHD1   TXT   015,012,012,'
                021511 040 040 040 040 040 040
                021517 040 040 040 040 040 040
                021525 040 040 040 040 040 040
                021533 040 040 040 040 040 040
                021541 040 040 040
917:A           021544 052 052 052 052 052 040          TXT   '***** DATA DUMP *****',015,012
                021552 104 101 124 101 040 104
                021560 125 115 120 040 052 052
                021566 052 052 052 015 012
918:A           021573 124 110 122 105 105 040          TXT   'THREE MINUTES OF ONGOING DATA AT 1 SEC RATE'
                021601 115 111 116 125 124 105
                021607 123 040 117 106 040 117
                021615 116 107 117 111 116 107
                021623 040 104 101 124 101 040
                021631 101 124 040 061 040 123
                021637 105 103 040 122 101 124
                021645 105
919:A           021646 040 123 124 101 122 124          TXT   ' STARTING AT  ',0204,0030,DATEM,056
                021654 111 116 107 040 101 124
                021662 040 040 204 030 213 215
                021670 056
920:A           021671 204 120 211 215                  TXT   0204,0120,DATED
921:A           021675 204 040 207 215 056 204          TXT   0204,0040,TIMEH,056,0204,0120,TIMEM,056
                021703 120 205 215 056
922:A           021707 204 120 215 215 012 015          TXT   0204,0120,TSEC,012,015,0203
                021715 203
923:A           021716 015 012 012 117 116 105 DMPHD2   TXT   015,012,012,'ONE MINUTE OF DATA AT 1 SEC RATE '
                021724 040 115 111 116 125 124
                021732 105 040 117 106 040 104
                021740 101 124 101 040 101 124
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                021746 040 061 040 123 105 103
                021754 040 122 101 124 105 040
 924:A          021762 123 124 101 122 124 111          TXT   'STARTING AT  ',0204,0030,DATEM2,056
                021770 116 107 040 101 124 040
                021776 040 204 030 225 215 056
 925:A          022004 204 120 223 215 204 040          TXT   0204,0120,DATED2,0204,0040,TIMEH2,056
                022012 221 215 056
 926:A          022015 204 120 217 215 056 204          TXT   0204,0120,TIMEM2,056,0204,0120,TSEC2,015,012,0203
                022023 120 227 215 015 012 203
 927:A          022031 015 012 012 124 127 117 DMPHD3   TXT   015,012,012,'TWO MINUTES OF DATA AT 2 SEC RATE '
                022037 040 115 111 116 125 124
                022045 105 123 040 117 106 040
                022053 104 101 124 101 040 101
                022061 124 040 062 040 123 105
                022067 103 040 122 101 124 105
                022075 040
 928:A          022076 123 124 101 122 124 111          TXT   'STARTING AT  ',0204,0030,DATEM3,056
                022104 116 107 040 101 124 040
                022112 040 204 030 237 215 056
 929:A          022120 204 120 235 215 204 040          TXT   0204,0120,DATED3,0204,0040,TIMEH3,056
                022126 233 215 056
 930:A          022131 204 120 231 215 056 204          TXT   0204,0120,TIMEM3,056,0204,0120,TSEC3,015,012,0203
                022137 120 241 215 015 012 203
 931:A          022145 015 012 012 117 116 105 DMPHD4   TXT   015,012,012,'ONE MINUTE FORTY SECONDS OF DATA '
                022153 040 115 111 116 125 124
                022161 105 040 106 117 122 124
                022167 131 040 123 105 103 117
                022175 116 104 123 040 117 106
                022203 040 104 101 124 101 040
 932:A          022211 101 124 040 065 040 123          TXT   'AT 5 SEC RATE STARTING AT  ',0204,0030,DATEM4,056
                022217 105 103 040 122 101 124
                022225 105 040 123 124 101 122
                022233 124 111 116 107 040 101
                022241 124 040 040 204 030 251
                022247 215 056
 933:A          022251 204 120 247 215 204 040          TXT   0204,0120,DATED4,0204,0040,TIMEH4,056
                022257 245 215 056
 934:A          022262 204 120 243 215 056 204          TXT   0204,0120,TIMEM4,056,0204,0120,TSEC4,015,012,0203
                022270 120 253 215 015 012 203
 935:A          022276 015 012 205 372 212 000 DMPANA   TXT   015,012,0205,DMPINC,0,0
                022304 000
 936:A          022305 204 261 370 212 040 040 DMP1     TXT   0204,0261,ARCLOC,040,040
 937:A          022313 206 372 212 016 000 305          TXT   0206,DMPINC,14,0,DMP1
                022321 044
 938:A          022322 015 012 205 372 212 000          TXT   015,012,0205,DMPINC,0,0
                022330 000
 939:A          022331 210 240 133 203          DMP2    TXT   0210,DMPS1,0203
 940:A          022335 204 340 376 212          DMP3    TXT   0204,0340,IPT
 941:A          022341 206 374 212 001 000 335          TXT   0206,DMPI2,1,0,DMP3
                022347 014
 942:A          022350 040 205 374 212 000 000          TXT   040,0205,DMPI2,0,0
 943:A          022356 206 372 212 013 000 331          TXT   0206,DMPINC,11,0,DMP2
                022364 044
 944:A          022365 040 040 204 240 370 212          TXT   040,040,0204,0240,ARCLOC,015,0203
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                022373 015 203
945:A           022375 015 115 115 115 115 115 COVER   TXT   015,'MMMMMMMMMM',015,'0000000000',015,'EEEEEEEEEE'
                022403 115 115 115 115 115 015
                022411 060 060 060 060 060 060
                022417 060 060 060 060 015 105
                022425 105 105 105 105 105 105
                022433 105 105 105
946:A           022436 015 124 124 124 124 124         TXT   015,'TTTTTTTTTT',015,012,0203
                022444 124 124 124 124 124 015
                022452 012 203
947:A           022454 116 022 133 215                 PK    0116,022,PKBZ      222  TO INHIBIT EPTAK ECHO
948:A                                                  .
949:A                                                  .
950:A                                                  . ***** END OF DECLARES *****
951:A                                                  .
952:A                                                  .
                022460 315 010 001 315 347 000
                022466 315 013 001 041 112 001
                022474 315 367 046 315 371 000
                022502 315 010 001 315 371 000
                022510 315 010 001 315 371 000
                022516 315 010 001 315 371 000
                022524 315 010 001 315 371 000
                022532 315 010 001 315 371 000
                022540 315 010 001 315 371 000
                022546 315 010 001 041 112 001
                022554 315 214 143 315 371 000
                022562 315 010 001 041 112 001
                022570 315 133 147 315 371 000
                022576 315 010 001 041 112 001
                022604 315 176 137 303 374 000
953:A           022612 076 001                 CLDST   LOAD  1
954:A           022614 062 070 201                     STO   ALMACT        ALARM MODULE IS ALWAYS ACTIVE
955:A           022617 062 074 201                     STO   CDSACT        CDS MODULE ALWAYS ACTIVE
956:A           022622 062 076 201                     STO   DATCSO        SITE OUTPUT COMMUNICATION MODULE ALWAYS ACTIVE
957:A           022625 062 077 201                     STO   DATCRO        REM OUTPUT COMMUNICATION MODULE ALWAYS ACTIVE
958:A           022630 062 007 215                     STO   SOTCON        SITE TERMINAL HAS DEFAULT CONTROL
959:A           022633 062 102 213                     STO   CDSON         CDS IS INITIALLY CONNECTED
960:A           022636 062 020 215                     STO   STEON         REMOTE TERMINAL IS INITIALLY CONNECTED
961:A           022641 062 053 202                     STO   LO           START IN LOCKOUT MODE
962:A           022644 041 012 000                     LDAD  10
963:A           022647 042 162 216                     STOD  ARCTIM       ARCHIVE SAMPLE TIME (10 =.1/SEC)
964:A           022652 053                             DCX   H
965:A           022653 042 160 216                     STOD  ACOUNT       STARTS DATA ARCHIVING FIRST RUN THROUGH
966:A           022656 041 314 014                     LDAD  3276
967:A           022661 042 251 211                     STOD  NSET         INITIAL SPEED SET POINT OF 20 RPM
968:A           022664 041 324 010                     LDAD  2260
969:A           022667 042 147 203                     STOD  NREFL1       SET LOW SPEED REFERENCE LEVEL TO 13.8
970:A           022672 041 300 012                     LDAD  2752
971:A           022675 042 151 203                     STOD  NREFL2       SET HIGH SPEED REFERENCE LEVEL TO 16.8
972:A           022700 315 015 143                     CALL  FDXCLD       INITIALIZE CDS COMMUNICATION PACKAGE
973:A           022703 315 376 146                     CALL  FRICLD       INITIALIZE SITE COMMUNICATION PACKAGE
974:A           022706 076 062                         LOAD  50           INITIALIZE COUNTERS TO FIVE MINUTES
975:A           022710 062 112 202                     STO   CNTR2
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 976:A  022713 062 114 202                    STO   CNTR4
 977:A  022716 062 117 202                    STO   CNTR7
 978:A  022721 062 120 202                    STO   CNTR8
 979:A  022724 062 127 202                    STO   CNTR13
 980:A  022727 062 130 202                    STO   CNTR14
 981:A  022732 062 133 202                    STO   CNTR17
 982:A  022735 062 134 202                    STO   CNTR18
 983:A  022740 062 135 202                    STO   CNTR19
 984:A  022743 076 120                        LOAD  80          INITIALIZE COUNTERS TO 8 SECONDS
 985:A  022745 062 113 202                    STO   CNTR3
 986:A  022750 062 115 202                    STO   CNTR5
 987:A  022753 062 116 202                    STO   CNTR6
 988:A  022756 062 125 202                    STO   CNTR11
 989:A  022761 076 012                        LOAD  10          INITIALIZE COUNTER TO 1 SECOND
 990:A  022763 062 126 202                    STO   CNTR12
 991:A  022766 041 130 002                    LDAD  600         INITIALIZE COUNTER TO 1 MINUTE
 992:A  022771 042 121 202                    STOD  CNTR9
 993:A  022774 041 270 013                    LDAD  3000        INITIALIZE COUNTERS TO 5 MINUTES
 994:A  022777 042 110 202                    STOD  CNTR1
 995:A  023002 042 123 202                    STOD  CNTR10
 996:A  023005 041 140 011                    LDAD  2400
 997:A  023010 042 136 202                    STOD  CNTR20      INITIALIZE COUNTER TO 4 MINUTES
 998:A  023013 041 357 011                    LDAD  2543
 999:A  023016 042 145 203                    STOD  PMANU       SET POWER SET POINT TO 7.3 MW
1000:A  023021 041 036 000                    LDAD  30
1001:A  023024 042 103 203                    STOD  KP          SET PROPORTIONAL CONSTANT IN RAMP
1002:A  023027 041 005 000                    LDAD  5
1003:A  023032 042 107 203                    STOD  KI          SET INTEGRAL CONSTANT IN RAMP
1004:A  023035 041 377 017                    LDAD  4095        INITIALIZE CONTROL ANGLES TO 95 DEGREES
1005:A  023040 042 065 177                    STOD  C2A21
1006:A  023043 042 073 177                    STOD  C2A22
1007:A  023046 042 075 177                    STOD  C2A23
1008:A  023051 042 067 177                    STOD  C2A24
1009:A  023054 076 001                        LOAD  1
1010:A  023056 062 114 176                    STO   C6A3        YAW GRIPPER ON
1011:A  023061 062 115 176                    STO   C6A4        YAW BRAKE ON
1012:A  023064 062 107 176                    STO   C5A7        LOCKOUT RELAY CMD
1013:A  023067 041 024 000                    LDAD  20
1014:A  023072 042 125 203                    STOD  DRATE       DELTA RATE OF 20 COUNTS/CYCLE
1015:A  023075 021 104 046                    DE    IDATA1      APU VARIABLES TO INITIALIZE
1016:A  023100 315 137 001                    CALL  APUSTR
1017:A  023103 311                            RET
1018:A
1019:A                                  ; *** APU SUBROUTINE TO INITIALIZE APU CONSTANTS ***
1020:A
1021:A  023104 202 131 225 200 171 206 IDATA1 DBYTE LDFI,89,149,128,121,STF,*PEC    PEC=.0039240537 (16.069 MW/4095)
        023112 071 200
1022:A  023114 202 274 164 253 002 206         DBYTE LDFI,188,116,171,2,STF,*POFFST POFFST=2.679
        023122 130 200
1023:A  023124 202 201 014 310 173 206         DBYTE LDFI,129,12,200,123,STF,*BC    BC = .02442  (100 DEG/4095)
        023132 065 200
1024:A  023134 202 201 014 310 173 206         DBYTE LDFI,129,12,200,123,STF,*VWC   VWC= .02442  (100 MPH/4095)
        023142 075 200
1025:A  023144 202 201 014 310 171 206         DBYTE LDFI,129,12,200,121,STF,*NC    NC =.0061050061 (25 RPM/4095)
```

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                023152 101 200
1026:A          023154 202 100 013 264 175 206          DBYTE LDFI,64,11,180,125,STF,*VDC       VDC=.0879120579 (360 DEG/4095)
                023162 105 200
1027:A          023164 202 000 012 240 171 206          DBYTE LDFI,0,10,160,121,STF,*TC         TC=.004884005 (20/4095)
                023172 134 200
1028:A          023174 202 215 150 243 004 206          DBYTE LDFI,141,104,163,4,STF,*BIAS1     BIAS1=10.21302578
                023202 031 212
1029:A          023204 202 111 315 377 007 206          DBYTE LDFI,73,205,255,7,STF,*BIAS2      BIAS2=127.9009498
                023212 041 212 ;
1030:A          023214 202 000 142 204 001 206          DBYTE LDFI,0,98,132,1,STF,*SLOPE1       SLOPE1=1.034240808
                023222 035 212
1031:A          023224 202 140 303 227 001 206          DBYTE LDFI,96,195,151,1,STF,*SLOPE2     SLOPE2=1.185649936
                023232 045 212
1032:A          023234 202 000 000 200 004 027          DBYTE LDFI,0,0,128,4,FTOF,STF,*K1,STF,*K2    K1=8 & K2=8
                023242 206 115 203 206 121 203
1033:A          023250 202 314 314 314 175 206          DBYTE LDFI,204,204,204,125,STF,*DT      DT=.1 (CYCLE TIME)
                023256 120 200
1034:A          023260 203 145 203 035                  DBYTE LDS,*PMANU,FLTS                   POWER SET POINT IN COUNTS
1035:A          023264 204 071 200 022                  DBYTE LDF,*PEC,FMUL                     INTO MW
1036:A          023270 204 130 200 021                  DBYTE LDF,*POFFST,FSUB                  - OFFSET
1037:A          023274 202 000 000 240 004 022          DBYTE LDFI,0,0,160,4,FMUL               *10 FOR OUTPUT
1038:A          023302 037 205 175 215                  DBYTE FIXS,STS,*PWRSET
1039:A          023306 203 251 211 035                  DBYTE LDS,*NSET,FLTS                    ROTOR SET POINT IN COUNTS
1040:A          023312 204 101 200 022                  DBYTE LDF,*NC,FMUL                      INTO RPM
1041:A          023316 202 000 000 240 004 022          DBYTE LDFI,0,0,160,4,FMUL               *10 FOR OUTPUT
1042:A          023324 037 205 177 215                  DBYTE FIXS,STS,*SPDSET
1043:A          023330 200                              DBYTE EXIT
1044:A
1045:A                                                  .
1046:A          023331 315 107 141              START   CALL  COMINT            CDS COMMUNICATION PACKAGE
1047:A          023334 076 125                  STRT1   LOAD  0125              RESET WATCH DOG TIMER
1048:A          023336 062 365 310                      STO   CP731R
1049:A          023341 076 252                          LOAD  0252
1050:A          023343 062 365 310                      STO   CP731R
1051:A          023346 303 334 046                      JMP   STRT1
1052:A                                                  .
1053:A          023351 315 230 141              NTRP5   CALL  FDXINT
1054:A          023354 315 006 144                      CALL  FK1INT
1055:A          023357 311                              RET
1056:A                                                  .
1057:A          023360 315 023 143              WRMST   CALL  FDXINI
1058:A          023363 315 004 147                      CALL  FK1INI
1059:A          023366 311                              RET
1060:A                                                  .
1061:A                                                  .          MOD5A EXECUTIVE
1062:A                                                  .
1063:A          023367 373                      EXEC    EI
1064:A          023370 041 240 017                      LDAD  4000              USED IN TIMING
1065:A          023373 021 372 317 315 016 001          STOD  A000103
1066:A          023401 315 173 071                      CALL  ISM
1067:A          023404 315 015 066                      CALL  DPSI1
1068:A          023407 315 213 050                      CALL  MODE
1069:A          023412 016 017                          LC    15                LOAD NUMBER OF MODULES
1070:A          023414 006 000                          LB    0
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1071:A  023416 041 064 201          EXEC1   HL    RHFACT-1      POINT TO ACTIVE TABLE
1072:A  023421 011                          DAD   B             VECTOR TO CURRENT MODULE
1073:A  023422 176                          LAM                 LOAD ACTIVE FLAG
1074:A  023423 376 000                      CPI   0             MODULE ACTIVE
1075:A  023425 312 066 047                  JTZ   EXEC3         NO, CONTINUE
1076:A  023430 041 105 047                  HL    MODVTB-2      YES, POINT TO MODULE VECT TABLE
1077:A  023433 011                          DAD   B             VECTOR TO CURRENT MODULE
1078:A  023434 011                          DAD   B
1079:A  023435 136                          LEM                 LOAD SEGMENT TABLE ADDRESS
1080:A  023436 043                          INX   H
1081:A  023437 126                          LDM
1082:A  023440 325                          PUSH  D             SAVE
1083:A  023441 041 104 201                  HL    RHFCNT-1      POINT TO SEGMENT COUNTER TABLE
1084:A  023444 011                          DAD   B             VECTOR TO CURRENT MODULE
1085:A  023445 136                          LEM                 FETCH COUNT
1086:A  023446 026 000                      LD    0
1087:A  023450 341                          POP   H             RESTORE SEGMENT TABLE ADDRESS
1088:A  023451 031                          DAD   D             ADD COUNT
1089:A  023452 031                          DAD   D             *2
1090:A  023453 136                          LEM                 FETCH SEGMENT ADDRESS
1091:A  023454 043                          INX   H
1092:A  023455 126                          LDM
1093:A  023456 305                          PUSH  B             SAVE MODULE COUNTER
1094:A  023457 041 065 047                  HL    EXEC2         POINT TO RETURN POINT
1095:A  023462 345                          PUSH  H             PUSH FOR RETURN ADDRESS
1096:A  023463 353                          DEHL                PLACE SEGMENT ADDRESS INTO
1097:A  023464 351                          PCHL                JUMP TO SEGMENT
1098:A  023465 301                  EXEC2   POP   B             RESTORE MODULE COUNTER
1099:A  023466 015                  EXEC3   DCC                 DECREMENT MODULE COUNTER
1100:A  023467 302 016 047                  JFZ   EXEC1         LOOP BACK IF NOT DONE
1101:A  023472 315 303 072                  CALL  OSM
1102:A  023475 041 000 000                  LHAD  0             USED IN TIMING
1103:A  023500 021 372 317 315 016 001      STOD  A000103
1104:A  023506 311                          RET                 ALL DONE, RETURN TO EXEC
1105:A
1106:A                                      MOD5A EXECUTIVE TABLES
1107:A
1108:A  023507 145 047              MODVTB  DC    RHPST
1109:A  023511 151 047                      DC    NSDST
1110:A  023513 171 047                      DC    ESDST
1111:A  023515 211 047                      DC    ALMST
1112:A  023517 213 047                      DC    YAWST
1113:A  023521 215 047                      DC    RMPST
1114:A  023523 257 047                      DC    STOPST
1115:A  023525 005 050                      DC    CDSOST
1116:A  023527 007 050                      DC    CDSIST
1117:A  023531 025 050                      DC    DCSOST
1118:A  023533 035 050                      DC    DCROST
1119:A  023535 045 050                      DC    DLSRST
1120:A  023537 101 050                      DC    MANST
1121:A  023541 171 050                      DC    PWRST
1122:A  023543 205 050                      DC    BAST
1123:A  023545 373 107              RHPST   DC    RHPS1         SET DELAY TIMER TO 2 MIN AND TURN ON ROTOR PUMP
1124:A  023547 013 110                      DC    RHPS2         DELAY AND SHUT OFF PUMP
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1125:A  023551 037 103          NSDST   DC    NSDS1     INITIALIZE DELI FOR SPEED CONTROL
1126:A  023553 113 103                  DC    NSDS2     RAMP SPEED REFS DOWN @ 10 RPM/MIN TO 11.4, NO SYNC
1127:A  023555 214 103                  DC    NSDS3     CONTINUE RAMP, DELAY, AND VERIFY TIE TRIPPED
1128:A  023557 266 103                  DC    NSDS4     CONTINUE RAMP UNTIL 9 RPM, TURN AC LUBE PUMP ON
1129:A  023561 317 103                  DC    NSDS5     CONTINUE RAMP UNTIL .2 RPM
1130:A  023563 335 103                  DC    NSDSD     RAMP CONTROL ANGLE TO 90 DEG @ 5 DEG / SEC
1131:A  023565 057 104                  DC    NSDS6     DELAY 5 SEC AND VERIFY TEETER BRAKES
1132:A  023567 125 104                  DC    NSDS7     SET NSDCPL AND TURN OFF ALARMS
1133:A  023571 037 103          ESDST   DC    NSDS1     INITIALIZE DELI FOR SPEED CONTROL
1134:A  023573 113 103                  DC    NSDS2     RAMP SPEED REFS DOWN @ 10 RPM/MIN TO 11.4, NO SYNC
1135:A  023575 214 103                  DC    NSDS3     CONTINUE RAMP, DELAY, AND VERIFY TIE TRIPPED
1136:A  023577 266 103                  DC    NSDS4     CONTINUE RAMP UNTIL 9 RPM, TURN AC LUBE PUMP ON
1137:A  023601 317 103                  DC    NSDS5     CONTINUE RAMP UNTIL .2 RPM
1138:A  023603 335 103                  DC    NSDSD     RAMP CONTROL ANGLE TO 90 DEG @ 5 DEG / SEC
1139:A  023605 057 104                  DC    NSDS6     DELAY 5 SEC AND VERIFY TEETER BRAKES
1140:A  023607 125 104                  DC    NSDS7     SET NSDCPL AND TURN OFF ALARMS
1141:A  023611 042 110          ALMST   DC    ALMS1     ALARM MODULE
1142:A  023613 177 106          YAWST   DC    YAWS1     YAW MODULE
1143:A  023615 141 076          RMFST   DC    RMFS1     RELEASE ROTOR BRAKES, SET VWO, DELCMD, INIT DELCMD
1144:A  023617 221 076                  DC    RMFS2     CNTRL ANGLES TO DELCMD AT 5 DEG/SEC & START MOTOR
1145:A  023621 317 076                  DC    RMFS3     NG REF TO 4 AT 3.7 RPM/MIN UNTIL NR > 3.7
1146:A  023623 006 077                  DC    RMFS4     ROTOR SPEED CONTROL TO 4 AT 3.7 RPM/MIN
1147:A  023625 043 077                  DC    RMFS5     HOLD NR REF ON 4 UNTIL POWER = 0 THEN REMOVE MOTOR
1148:A  023627 111 077                  DC    RMFSD     DELAY 2 SEC WITH NR REF = 4
1149:A  023631 134 077                  DC    RMFS6     NR REF = 4, VERIFY STATOR SHORT IS OPEN
1150:A  023633 172 077                  DC    RMFS7     NR REF = 4, VERIFY BLADE TEMP OK
1151:A  023635 302 077                  DC    RMFS8     RAMP NR REF & NG REF TO NR = 6 AT .145*VWO
1152:A  023637 354 077                  DC    RMFS9     CONT RAMP, TEETER ANGLE<2.4 INCR. SEQ. & SHAFT
1153:A  023641 060 100                  DC    RMFS10    CONT RAMP, CLOSE H.F. OFF RELAY & SHAFT PRESS
1154:A  023643 135 100                  DC    RMFS11    CONT RAMP, VERIFY TEETER BRAKE ON & SHAFT PRESS
1155:A  023645 237 100                  DC    RMFS12    CONT RAMP, DELAY, VERIFY TEETER BRAKE ON & SHAFT
1156:A  023647 331 100                  DC    RMFS13    CONT RAMP TO NREFL1 - .6 & SHAFT PRESSURE
1157:A  023651 030 101                  DC    RMFS14    CHANGE RAMP RATE TO 1 RPM/MIN UNTIL NR REF = NREFL
1158:A  023653 124 101                  DC    RMFS15    HOLD AT NREFL1 FOR 10 SEC AND SYNC/GENERATE
1159:A  023655 163 101                  DC    RMFS16    HOLD VERIFY STATOR TIE CLOSE & DONE
1160:A  023657 143 073          STUPST  DC    SUS1      PUMPS ON
1161:A  023661 232 073                  DC    SUSD      WAIT 5 SECONDS
1162:A  023663 247 073                  DC    SUS2      VERIFY PUMPS ON & CONVERTER READY, ISSUE CMDS
1163:A  023665 232 073                  DC    SUSD      WAIT 5 SECONDS
1164:A  023667 345 073                  DC    SUS3      VERIFY CONVERTER TIE CLOSED & ESD OK, RESET G SW
1165:A  023671 232 073                  DC    SUSD      WAIT 5 SECONDS
1166:A  023673 012 074                  DC    SUS4      VERIFY LATCHES RELEASED, SET DELCMD TO 80 DEGREES
1167:A  023675 051 074                  DC    SUST      CONTROL ANGLE TRAVEL TO DELCMD
1168:A  023677 232 073                  DC    SUSD      WAIT 5 SECONDS
1169:A  023701 144 074                  DC    SUSV      VERIFY ABS(DELCMD-DEL SENSED) < 5 DEGREES
1170:A  023703 251 074                  DC    SUS5      G SWITCH #1 TEST #1
1171:A  023705 232 073                  DC    SUSD      WAIT 5 SECONDS
1172:A  023707 144 074                  DC    SUSV      VERIFY 80 DEGREES
1173:A  023711 273 074                  DC    SUS6      G SWITCH #1 TEST #2
1174:A  023713 232 073                  DC    SUSD      WAIT 5 SECONDS
1175:A  023715 144 074                  DC    SUSV      VERIFY 95 DEGREES
1176:A  023717 324 074                  DC    SUS7      RESET G SWITCH
1177:A  023721 232 073                  DC    SUSD      WAIT 5 SECONDS
1178:A  023723 012 074                  DC    SUS4      VERIFY LATCHES RELEASED, SET DELCMD TO 80 DEGREES
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1179:A  023725 051 074                      DC   SUST      CONTROL ANGLE TRAVEL TO DELCMD
1180:A  023727 232 073                      DC   SUSD      WAIT 5 SECONDS
1181:A  023731 144 074                      DC   SUSV      VERIFY ABS(DELCMD-DEL SENSED) < 5 DEGREES
1182:A  023733 366 074                      DC   SUS8      G SWITCH #2 TEST #1
1183:A  023735 232 073                      DC   SUSD      WAIT 5 SECONDS
1184:A  023737 144 074                      DC   SUSV      VERIFY 80 DEGREES
1185:A  023741 010 075                      DC   SUS9      G SWITCH #2 TEST #2
1186:A  023743 232 073                      DC   SUSD      WAIT 5 SECONDS
1187:A  023745 144 074                      DC   SUSV      VERIFY 95 DEGREES
1188:A  023747 041 075                      DC   SUS10     RESET G SWITCH
1189:A  023751 232 073                      DC   SUSD      WAIT 5 SECONDS
1190:A  023753 111 075                      DC   SUS11     VERIFY FTHR VALVES RELEASED, DELCMD = 70 DEG
1191:A  023755 145 075                      DC   SUS12     CONTROL ANGLE TRAVEL TO 70 @ 5 DEG/SEC, VERIFY RHP
1192:A  023757 232 073                      DC   SUSD      WAIT 5 SECONDS
1193:A  023761 144 074                      DC   SUSV      VERIFY 70 DEGREES
1194:A  023763 363 075                      DC   SUS13     REMOVE FTHR VALVE A-1 & A-2 ENABLE
1195:A  023765 232 073                      DC   SUSD      WAIT 5 SECONDS
1196:A  023767 144 074                      DC   SUSV      VERIFY 95 DEGREES
1197:A  023771 313 075                      DC   SUS14     ENABLE ESD PANEL
1198:A  023773 051 074                      DC   SUST      TRAVEL TO 90 DEGREES
1199:A  023775 360 075                      DC   SUS15     VERIFY ESD OK, TEETER ACCUM PRESS, & TEETER PWR
1200:A  023777 232 073                      DC   SUSD      WAIT 5 SECONDS
1201:A  024001 017 076                      DC   SUS16     VERIFY H.F. TEETER BREAKES ON
1202:A  024003 045 076                      DC   SUS17     CHECK  14< VWIND <55, SET SUCMPL
1203:A  024005 103 123          CDSOST      DC   CDSOS1    SEND DATA TO CDS EVERY SECOND
1204:A  024007 165 124          CDSIST      DC   CDSIS1    CHECK SINGLE RAM
1205:A  024011 173 124                      DC   CDSIS2    CHECK DOUBLE RAM
1206:A  024013 201 124                      DC   CDSIS3    CHECK APU RAM
1207:A  024015 207 124                      DC   CDSIS4    CHANGE SINGLE RAM
1208:A  024017 222 124                      DC   CDSIS5    CHANGE DOUBLE RAM
1209:A  024021 235 124                      DC   CDSIS6    CHANGE APU RAM
1210:A  024023 250 124                      DC   CDSIS7    CONNECT/DISCONNECT CDS TERMINAL
1211:A  024025 057 114          DCSOST      DC   DCSOS1    PUT TOP OF PAGE FORMAT ON SITE TERMINAL
1212:A  024027 140 114                      DC   DCSOS2    PRINT ALARMS
1213:A  024031 133 116                      DC   DCSOS3    PRINT DATA
1214:A  024033 225 116                      DC   DCSOS4    SKIP TO TOP OF NEXT PAGE IF 50 LINES ARE PRINTED
1215:A  024035 123 111          DCROST      DC   DCROS1    PUT TOP OF PAGE FORMAT ON REMOTE TERMINAL
1216:A  024037 204 111                      DC   DCROS2    PRINT ALARMS
1217:A  024041 072 113                      DC   DCROS3    PRINT DATA
1218:A  024043 164 113                      DC   DCROS4    SKIP TO TOP OF NEXT PAGE IF 50 LINES PRINTED
1219:A  024045 277 116          DCSRST      DC   DCSS1     PRINT TIME AND DECIDE
1220:A  024047 006 117                      DC   DCSS3     SBENB
1221:A  024051 067 117                      DC   DCSS4     SPEED SET POINT
1222:A  024053 272 117                      DC   DCSS5     POWER SET POINT
1223:A  024055 077 120                      DC   DCSS6     NSD
1224:A  024057 146 120                      DC   DCSS7     ESD
1225:A  024061 224 120                      DC   DCSS9     REQUEST SITE/REMOTE TERMINAL CONTROL
1226:A  024063 322 120                      DC   DCSS10    ENABLE REMOTE/SITE TERMINAL CONTROL
1227:A  024065 052 121                      DC   DCSSZ     ZERO OUT COMM. ENERGY
1228:A  024067 146 121                      DC   DCSST     SET TIME
1229:A  024071 326 121                      DC   DCSSM     SET MONTH AND DAY
1230:A  024073 131 122                      DC   DCSS12    PRINT LINE
1231:A  024075 211 122                      DC   DCSS11    CMD NOT VALID
1232:A  024077 302 122                      DC   DCSS17    COVER PASSWORD
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1243:A   024101 347 124          . MANST   DC     MANC1          CHECK MANUAL SWITCH
1244:A   024103 027 125                    DC     MANC2          CODE FROM COMMUNICATIONS
1245:A   024105 200 125                    DC     MANC3          ROTOR HYDRAULIC PUMP
1246:A   024107 236 125                    DC     MANC4          YAW PUMP
1247:A   024111 274 125                    DC     MANC5          LUBE PUMP
1248:A   024113 332 125                    DC     MANC6          SHAFT BRAKE
1249:A   024115 006 126                    DC     MANC8          HIGH PRESSURE TEETER BRAKE
1240:A   024117 065 126                    DC     MANC9          YAW BRAKES
1241:A   024121 123 126                    DC     MANC10         LATCH TIP #1
1242:A   024123 201 126                    DC     MANC11         LATCH TIP #2
1243:A   024125 257 126                    DC     MANC12         TIP #1 BETA CMD
1244:A   024127 012 127                    DC     MANC13         TIP #2 BETA CMD
1245:A   024131 145 127                    DC     MANC14         TURNING GEAR
1246:A   024133 272 127                    DC     MANC17         ENABLE FSE RESET
1247:A   024135 337 127                    DC     MANC18         SET TIME FOR YAW TO BE ENABLED
1248:A   024137 060 130                    DC     MCSS8          DATA DUMP
1249:A   024141 262 130                    DC     MANC15         CMD INVALID PRINT
1250:A   024143 315 130                    DC     MANC19         TIP #1 ANGLE CHANGE SEGMENT
1251:A   024145 024 131                    DC     MANC20         TIP #2 ANGLE CHANGE SEGMENT
1252:A   024147 133 131                    DC     MANC21         FSE RESET OFF
1253:A   024151 157 131                    DC     MCSS16         DUMP ARCHIVE ONGOING HEADING
1254:A   024153 071 132                    DC     MCSS18         DUMP ARCHIVE ONGOING NUMBERS
1255:A   024155 241 132                    DC     MCSS19         DUMP ARCHIVE 1/1 SEC HEADING
1256:A   024157 270 132                    DC     MCSS20         DUMP ARCHIVE 1/1 SEC NUMBERS
1257:A   024161 335 132                    DC     MCSS21         DUMP ARCHIVE 1/2 SEC HEADING
1258:A   024163 364 132                    DC     MCSS22         DUMP ARCHIVE 1/2 SEC NUMBERS
1259:A   024165 031 133                    DC     MCSS23         DUMP ARCHIVE 1/5 SEC HEADING
1260:A   024167 060 133                    DC     MCSS24         DUMP ARCHIVE 1/5 SEC NUMBERS
1261:A   024171 026 102          PWRST     DC     PWRS1          SET NG REF TARGET AND ZERO RPECNT
1262:A   024173 075 102                    DC     PWRS2          DECREASE NG REF TO TARGET
1263:A   024175 156 102                    DC     PWRS3          LOW SPEED OPERATION
1264:A   024177 211 102                    DC     PWRS4          RAMP UP TO HIGH SPEED OPERATION
1265:A   024201 247 102                    DC     PWRS5          HIGH SPEED OPERATION
1266:A   024203 322 102                    DC     PWRS6          RAMP DOWN TO LOW SPEED OPERATION
1267:A   024205 316 135          DAST      DC     ARCH1          DATA ARCHIVE
1268:A   024207 327 136                    DC     ARCH2          DATA ARCHIVE RAM SET TO ZERO
1269:A   024211 011 137                    DC     ARCH3          RESET INITIAL CONDITIONS
1270:A                                   .
1271:A                                   .
1272:A                                   . ***** MODE MODULE *****
1273:A                                   .
1274:A                                   .
1275:A   024213 072 102 201      MODE      LOAD   PWRGEN         ** NSDE1
1276:A   024216 267                       ORA
1277:A   024217 302 227 050               JFZ    MD1
1278:A   024222 076 000                   LA     0
1279:A   024224 303 275 050               JMP    MD2
1280:A   024227 052 077 175      MD1       LOAD   SSAS
1281:A   024232 453                       DEHL
1282:A   024233 041 253 002               LOAD   203            COUNT THAT = 0 MW
1283:A   024236 315 162 137               CALL   NEGNUM
1284:A   024241 031                       DAD    D              ADD TO CURRENT POWER
1285:A   024242 174                       LAH                   CHECK IF NEGATIVE
1286:A   024243 007                       SLC
```

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1287:A  024244 332 254 050              JTC   MD3          JUMP IF S5A5 .LT. 0 MW
1288:A  024247 076 000                  LOAD  0
1289:A  024251 303 275 050              JMP   MD2
1290:A  024254 052 110 202      MD3     LDAD  CNTR1
1291:A  024257 174                      LAH
1292:A  024260 265                      ORL
1293:A  024261 076 001                  LA    1
1294:A  024263 312 275 050              JTZ   MD2
1295:A  024266 053                      DCX   H
1296:A  024267 042 110 202              STOD  CNTR1
1297:A  024272 303 306 050              JMP   MD44
1298:A  024275 062 236 202      MD2     STO   NSDE1
1299:A  024300 041 270 013              LDAD  3000
1300:A  024303 042 110 202              STOD  CNTR1
1301:A                          .
1302:A  024306 072 102 201      MD44    LOAD  PWRGEN       ** NSDE2
1303:A  024311 267                      ORA
1304:A  024312 302 322 050              JFZ   MD4
1305:A  024315 076 000                  LA    0
1306:A  024317 303 374 050              JMP   MD5
1307:A  024322 021 272 065      MD4     DE    CNCALC
1308:A  024325 315 137 001              CALL  APUSTR       CALCULATE 33 - 12 * PWR SET POINT IN DEGREE COUNT
1309:A  024330 052 077 202              LDAD  TEMP         IN COUNTS
1310:A  024333 353                      DEHL
1311:A  024334 052 065 177              LDAD  C2A21
1312:A  024337 315 162 137              CALL  NEGNUM
1313:A  024342 031                      DAD   D            ADD TO 33-12*PSP
1314:A  024343 174                      LAH                CHECK IF NEGATIVE
1315:A  024344 007                      SLC
1316:A  024345 332 355 050              JTC   MD6
1317:A  024350 076 000                  LA    0
1318:A  024352 303 374 050              JMP   MD5
1319:A  024355 072 112 202      MD6     LOAD  CNTR2
1320:A  024360 267                      ORA
1321:A  024361 312 373 050              JTZ   MD97
1322:A  024364 075                      DCA
1323:A  024365 062 112 202              STO   CNTR2
1324:A  024370 303 004 051              JMP   MD7
1325:A  024373 074              MD97    INA
1326:A  024374 062 237 202      MD5     STO   NSDE2
1327:A  024377 076 062                  LOAD  50
1328:A  024401 062 112 202              STO   CNTR2
1329:A                          .
1330:A  024404 000              MD7     NOP
1331:A  024405 072 072 201              LOAD  RAMP         ** NSDE3
1332:A  024410 041 246 211 246          AND   RMPFL
1333:A  024414 062 240 202              STO   NSDE3
1334:A                          .
1335:A  024417 072 102 201              LOAD  PWRGEN       ** NSDE4
1336:A  024422 267                      ORA
1337:A  024423 312 152 051              JTZ   MD8
1338:A  024426 041 214 212              HL    WDJAVG       LOCATION OF AVERAGE YAW ERROR
1339:A  024431 315 371 065              CALL  ABSWDA       GET ABSOLUTE VALUE OF YAW ERROR (0 TO 180 DEGREE)
1340:A  024434 102                      LBD
```

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1341:A  024435 113                          LCE
1342:A
1343:A  024436 041 063 007                  LDAD  1843          45 MPH
1344:A  024441 315 162 137                  CALL  NEGNUM
1345:A  024444 353                          DEHL
1346:A  024445 052 141 212                  LDAD  WV1AVG
1347:A  024450 031                          DAD   D
1348:A  024451 174                          LAH
1349:A  024452 007                          SLC
1350:A  024453 332 100 051                  JFC   MD9           JUMP IF WV > 45
1351:A  024456 041 000 002                  LDAD  S12           45 DEGREES
1352:A  024461 315 162 137                  CALL  NEGNUM
1353:A  024464 011                          DAD   B             ADD TO ABSOLUTE WD
1354:A  024465 174                          LAH                 CHECK IF NEGATIVE
1355:A  024466 007                          SLC
1356:A  024467 076 000                      LA    0
1357:A  024471 332 152 051                  JTC   MD8           JUMP IF WD < 45 DEG
1358:A  024474 074                          INA
1359:A  024475 303 152 051                  JMP   MD8
1360:A  024500 021 244 065          MD9     DE    YECALC
1361:A  024503 315 137 001                  CALL  APUSTR        CALCULATE 145 - 7.7 * CONTROL ANGLE
1362:A  024506 041 162 000                  LDAD  114           LOWER LIMIT OF 10 DEG
1363:A  024511 104                          LBH
1364:A  024512 115                          LCL
1365:A  024513 041 377 017                  LDAD  4095          UPPER LIMIT OF 180 DEGREES
1366:A  024516 353                          DEHL
1367:A  024517 052 077 202                  LDAD  TEMP
1368:A  024522 315 072 106                  CALL  LIMCHK        CALL SUBROUTINE TO LIMIT HL
1369:A  024525 315 162 137                  CALL  NEGNUM
1370:A  024530 104                          LBH
1371:A  024531 115                          LCL
1372:A  024532 041 214 212                  HL    WD2AVG
1373:A  024535 315 371 065                  CALL  ABSWDA
1374:A  024540 353                          DEHL
1375:A  024541 011                          DAD   B
1376:A  024542 174                          LAH                 CHECK IF NEGATIVE
1377:A  024543 007                          SLC
1378:A  024544 076 000                      LA    0
1379:A  024546 332 152 051                  JTC   MD8           JUMP IF WD < 145-7.7*CONTROL ANGLE
1380:A  024551 074                          INA
1381:A  024552 062 241 202          MD8     STO   NSDE4
1382:A
1383:A  024555 072 073 201                  LOAD  STRTUP        ** NSDI1
1384:A  024560 041 072 201 266              IOR   RAMP
1385:A  024564 041 102 201 266              IOR   PWRGEN
1386:A  024570 041 051 202 266              IOR   SBENB
1387:A  024574 041 066 201 266              IOR   NSD
1388:A  024600 041 165 215 246              AND   DISDR
1389:A  024604 062 250 202                  STO   NSDI1
1390:A
1391:A  024607 072 222 211                  LOAD  SUFAIL        ** NSDI2
1392:A  024612 041 073 201 246              AND   STRTUP
1393:A  024616 062 251 202                  STO   NSDI2
1394:A
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1395:A   024621 072 247 211
1396:A   024624 376 003
1397:A   024626 302 241 051
1398:A   024631 076 001
1399:A   024633 062 252 202
1400:A   024636 303 246 051
1401:A   024641 076 000
1402:A   024643 062 252 202          MD23
1403:A
1404:A   024646 072 065 174          MD24
1405:A   024651 041 066 174 266
1406:A   024655 062 253 202
1407:A
1408:A   024660 072 130 174
1409:A   024663 062 254 202
1410:A
1411:A   024666 072 155 174 057 346 001
1412:A   024674 062 255 202
1413:A
1414:A   024677 072 150 174
1415:A   024702 157 072 151 174 057 346
         024710 001 245
1416:A   024712 041 102 201 246
1417:A   024716 062 256 202
1418:A
1419:A   024721 072 175 174 057 346 001
1420:A   024727 062 166 202
1421:A
1422:A   024732 072 167 174
1423:A   024735 062 167 202
1424:A
1425:A   024740 072 171 174
1426:A   024743 041 173 174 266
1427:A   024747 062 170 202
1428:A
1429:A   024752 052 101 175
1430:A   024755 353
1431:A   024756 041 232 001
1432:A   024761 315 162 137
1433:A   024764 031
1434:A   024765 174
1435:A   024766 007
1436:A   024767 076 000
1437:A   024771 332 051 052
1438:A   024774 052 105 175
1439:A   024777 315 162 137
1440:A   025002 031
1441:A   025003 174
1442:A   025004 007
1443:A   025005 332 013 052
1444:A   025010 315 152 137
1445:A   025013 353
1446:A   025014 041 315 000          MD11
1447:A   025017 315 162 137

         LOAD  RPECNT          ** NSDI3
         COMP  3
         JPZ   MD23
         LOAD  1
         STO   NSDI3
         JMP   MD24
         LOAD  0
         STO   NSDI3

         LOAD  S1A1            ** NSDI4
         IOR   S1A2
         STO   NSDI4

         LOAD  S5A1            ** NSDI5
         STO   NSDI5

         CLOAD S8A6            ** NSDI6
         STO   NSDI6

         LOAD  S8A1            ** NSDI7
         CAND  S8A3

         AND   PWRGEN
         STO   NSDI7

         CLOAD S9A16           ** ALRM1
         STO   ALRM1

         LOAD  S9A12           ** ALRM2
         STO   ALRM2

         LOAD  S9A14           ** ALRM3
         IOR   S9A21
         STO   ALRM3

         LOAD  S9A4            ** ALRM4
         DEHL
         LOAD  410             10 MPH
         CALL  NEGNUM
         DAD   D
         LAH
         SLC
         LA    0
         JTC   MD10            JUMP IF WV < 10 MPH
         LOAD  S9A6
         CALL  NEGNUM
         DAD   D
         LAH
         SLC
         JTC   MD11            JUMP IF DIFFERENCE OF WV'S IS NOT NEGATIVE
         CALL  POSNUM          GET ABSOLUTE VALUE
         DEHL
         LOAD  205             5 MPH
         CALL  NEGNUM
```

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1448:A  025022 031                          DAD   D
1449:A  025023 174                          LAH
1450:A  025024 007                          SLC
1451:A  025025 076 000                      LA    0
1452:A  025027 332 051 052                  JTC   MD10          JUMP IF DIFERENCE < 5 MPH
1453:A  025032 072 113 202                  LOAD  CNTR3
1454:A  025035 267                          ORA
1455:A  025036 312 050 052                  JTZ   MD45
1456:A  025041 075                          DCA
1457:A  025042 062 113 202                  STO   CNTR3
1458:A  025045 303 061 052                  JMP   MD12
1459:A  025050 074                  MD45    INA
1460:A  025051 062 171 202          MD10    STO   ALRM4
1461:A  025054 076 120                      LOAD  80
1462:A  025056 062 113 202                  STO   CNTR3
1463:A
1464:A  025061 072 074 174          MD12    LOAD  S2A4          ** ALRM5
1465:A  025064 062 172 202                  STO   ALRM5
1466:A
1467:A  025067 072 076 174 057 346 001      CLOAD S2A14         ** ALRM6
1468:A  025075 062 173 202                  STO   ALRM6
1469:A
1470:A  025100 072 073 174 057 346 001      CLOAD S2A3          ** ALRM7
1471:A  025106 062 174 202                  STO   ALRM7
1472:A
1473:A  025111 072 075 174                  LOAD  S2A5          ** ALRM8
1474:A  025114 062 175 202                  STO   ALRM8
1475:A
1476:A  025117 072 067 176                  LOAD  C2A4          ** ALRM9
1477:A  025122 157 072 077 174 057 346      CAND  S2A6
        025130 001 245
1478:A  025132 312 154 052                  JTZ   MD13
1479:A  025135 072 114 202                  LOAD  CNTR4
1480:A  025140 267                          ORA
1481:A  025141 312 153 052                  JTZ   MD46
1482:A  025144 075                          DCA
1483:A  025145 062 114 202                  STO   CNTR4
1484:A  025150 303 164 052                  JMP   MD47
1485:A  025153 074                  MD46    INA
1486:A  025154 062 176 202          MD13    STO   ALRM9
1487:A  025157 076 062                      LOAD  50
1488:A  025161 062 114 202                  STO   CNTR4
1489:A
1490:A  025164 052 071 175          MD47    LDAD  S2A18         ** ALRM10
1491:A  025167 353                          DEHL
1492:A  025170 041 000 010                  LDAD  2048          GET ABSOLUTE TEETER ANGLE
1493:A  025173 315 162 137                  CALL  NEGNUM
1494:A  025176 031                          DAD   D
1495:A  025177 174                          LAH
1496:A  025200 007                          SLC
1497:A  025201 322 207 052                  JFC   MD100
1498:A  025204 315 152 137                  CALL  POSNUM
1499:A  025207 353                  MD100   DEHL
1500:A  025210 041 063 003                  LDAD  819           TEETER ANGLE = 4 DEGREES
```

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1501:A*  025213 315 162 137                      CALL   NEGNUM
1502:A   025216 031                              DAD    D
1503:A   025217 174                              LAH
1504:A   025220 007                              SLC
1505:A   025221 076 000                          LA     0
1506:A   025223 332 227 052                      JTC    MD14            JUMP IF < 4 DEGREES
1507:A   025226 074                              INA
1508:A   025227 062 177 202              MD14    STO    ALRM10
1509:A
1510:A   025232 072 102 174 057 346 001          CLOAD  S2A7            ** ALRM11
1511:A   025240 062 200 202                      STO    ALRM11
1512:A
1513:A   025243 072 067 174                      LOAD   S1A3            ** ALRM12
1514:A   025246 041 070 174 266                  IOR    S1A4
1515:A   025252 062 201 202                      STO    ALRM12
1516:A
1517:A   025255 072 117 174                      LOAD   S4A23           ** ALRM13
1518:A   025260 041 120 174 246                  AND    S4A24
1519:A   025264 041 121 174 246                  AND    S4A25
1520:A   025270 057 346 001                      INV
1521:A   025273 107                              LBA
1522:A   025274 072 072 201                      LOAD   RAMP
1523:A   025277 041 102 201 266                  IOR    PWRGEN
1524:A   025303 240                              NOP
1525:A   025304 062 202 202                      STO    ALRM13
1526:A
1527:A   025307 072 253 211                      LOAD   RMPFMP          ** ALRM14
1528:A   025312 041 102 201 266                  IOR    PWRGEN
1529:A   025316 041 123 174 246                  AND    S4A30
1530:A   025322 062 203 202                      STO    ALRM14
1531:A
1532:A   025325 072 122 174                      LOAD   S4A14           ** ALRM15
1533:A   025330 062 204 202                      STO    ALRM15
1534:A
1535:A   025333 072 115 174                      LOAD   S4A28           ** ALRM16
1536:A   025336 062 205 202                      STO    ALRM16
1537:A
1538:A   025341 072 116 174                      LOAD   S4A29           ** ALRM17
1539:A   025344 062 206 202                      STO    ALRM17
1540:A
1541:A   025347 072 113 174                      LOAD   S4A26           ** ALRM18
1542:A   025352 062 207 202                      STO    ALRM18
1543:A
1544:A   025355 072 114 174                      LOAD   S4A27           ** ALRM19
1545:A   025360 062 210 202                      STO    ALRM19
1546:A
1547:A   025363 072 112 174 057 346 001          CLOAD  S4A11           ** ALRM20
1548:A   025371 062 211 202                      STO    ALRM20
1549:A
1550:A   025374 072 124 174 057 346 001          CLOAD  S5A6            ** ALRM21
1551:A   025402 062 212 202                      STO    ALRM21
1552:A
1553:A   025405 072 211 174                      LOAD   S5A11           ** ALRM22
1554:A   025410 062 213 202                      STO    ALRM22
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1555:A
1556:A  025413 072 101 176                      LOAD  C3A2          ** ALRM23
1557:A  025416 041 107 174 256                  XOR   S3A12
1558:A  025422 107                              LBA
1559:A  025423 072 053 202                      LOAD  LD
1560:A  025426 041 051 202 266                  IOR   SBENB
1561:A  025432 041 052 202 266                  IOR   SBINH
1562:A  025436 240                              NDB
1563:A  025437 312 061 053                      JTZ   MD25
1564:A  025442 072 120 202                      LOAD  CNTR8
1565:A  025445 267                              ORA
1566:A  025446 312 060 053                      JTZ   MD98
1567:A  025451 075                              DCA
1568:A  025452 062 120 202                      STO   CNTR8
1569:A  025455 303 071 053                      JMP   MD50
1570:A  025460 074                      MD98    INA
1571:A  025461 062 214 202              MD25    STO   ALRM23
1572:A  025464 076 062                          LOAD  50
1573:A  025466 062 120 202                      STO   CNTR8
1574:A
1575:A  025471 072 135 174              MD50    LOAD  S6A2          ** ALRM24
1576:A  025474 062 215 202                      STO   ALRM24
1577:A
1578:A  025477 072 136 174                      LOAD  S6A13         ** ALRM25
1579:A  025502 062 216 202                      STO   ALRM25
1580:A
1581:A  025505 072 132 174                      LOAD  S6A8          ** ALRM26
1582:A  025510 062 217 202                      STO   ALRM26
1583:A
1584:A  025513 072 140 174                      LOAD  S6A12         ** ALRM27
1585:A  025516 062 220 202                      STO   ALRM27
1586:A
1587:A  025521 072 137 174 057 346 001          CLOAD S6A3          ** ALRM28
1588:A  025527 062 221 202                      STO   ALRM28
1589:A
1590:A  025532 072 114 176                      LOAD  C6A3          ** ALRM29
1591:A  025535 041 134 174 256                  XOR   S6A10
1592:A  025541 312 163 053                      JTZ   MD15
1593:A  025544 072 115 202                      LOAD  CNTR5
1594:A  025547 267                              ORA
1595:A  025550 312 162 053                      JTZ   MD48
1596:A  025553 075                              DCA
1597:A  025554 062 115 202                      STO   CNTR5
1598:A  025557 303 173 053                      JMP   MD26
1599:A  025562 074                      MD48    INA
1600:A  025563 062 222 202              MD15    STO   ALRM29
1601:A  025566 076 120                          LOAD  80
1602:A  025570 062 115 202                      STO   CNTR5
1603:A
1604:A  025573 052 101 175              MD26    LDAD  S7A4          ** ALRM30
1605:A  025576 353                              DLHI
1606:A  025577 041 232 001                      LDAD  410           10 MPH
1607:A  025602 315 162 137                      CALL  NEGNUM
1608:A  025605 031                              DAD   D
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1609:A  025606 174                      LAH
1610:A  025607 007                      SLC
1611:A  025610 076 000                  LA    0
1612:A  025612 332 276 053              JTC   MD16          JUMP IF WV < 10 MPH
1613:A  025615 052 103 175              LDAD  S9A5
1614:A  025620 353                      DEHL
1615:A  025621 052 107 175              LDAD  S9A7
1616:A  025624 315 162 137              CALL  NEGNUM
1617:A  025627 031                      DAD   D             DIFFERENCE OF WIND DIRECTION SENSORS
1618:A  025630 174                      LAH
1619:A  025631 007                      SLC
1620:A  025632 322 240 053              JFC   MD17          JUMP IF DIFFERENCE IS POSITIVE
1621:A  025635 315 152 137              CALL  POSNUM
1622:A  025640 353                MD17  DEHL
1623:A  025641 041 162 000              LDAD  114           10 DEGREES
1624:A  025644 315 162 137              CALL  NEGNUM
1625:A  025647 031                      DAD   D
1626:A  025650 174                      LAH
1627:A  025651 007                      SLC
1628:A  025652 076 000                  LA    0
1629:A  025654 332 276 053              JTC   MD16          JUMP IF WD1 - WD2 < 10 DEGREES
1630:A  025657 072 116 202              LOAD  CNTR6
1631:A  025662 267                      ORA
1632:A  025663 312 275 053              JTZ   MD49
1633:A  025666 075                      DCA
1634:A  025667 062 116 202              STO   CNTR6
1635:A  025672 303 306 053              JMP   MD18
1636:A  025675 074                MD49  INA
1637:A  025676 062 223 202        MD16  STO   ALRM30
1638:A  025701 076 120                  LOAD  80
1639:A  025703 062 116 202              STO   CNTR6
1640:A
1641:A  025706 072 106 174        MD18  LOAD  S3A1          ** ALRM31
1642:A  025711 041 110 174 246          AND   S3A13
1643:A  025715 041 100 176 256          XOR   C3A1
1644:A  025721 107                      LBA
1645:A  025722 072 053 202              LOAD  LO
1646:A  025725 041 051 202 266          IOR   SBENB
1647:A  025731 041 052 202 266          IOR   SBINH
1648:A  025735 240                      NOB
1649:A  025736 312 360 053              JTZ   MD19
1650:A  025741 072 117 202              LOAD  CNTR7
1651:A  025744 267                      ORA
1652:A  025745 312 357 053              JTZ   MD36
1653:A  025750 075                      DCA
1654:A  025751 062 117 202              STO   CNTR7
1655:A  025754 303 370 053              JMP   MD53
1656:A  025757 074                MD36  INA
1657:A  025760 062 224 202        MD19  STO   ALRM31
1658:A  025763 076 062                  LOAD  50
1659:A  025765 062 117 202              STO   CNTR7
1660:A
1661:A  025770 072 111 174        MD53  LOAD  S3A14         ** ALRM32
1662:A  025773 062 225 202              STO   ALRM32
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1663:A
1664:A  025776 072 170 174                      LOAD  S9A13         ** ALRM33
1665:A  026061 062 226 202                      STO   ALRM33
1666:A
1667:A  026004 072 073 201                      LOAD  STRTUP        ** ESDL01
1668:A  026007 041 067 201 266                  IOR   ESD
1669:A  026013 041 051 202 266                  IOR   SBENB
1670:A  026017 041 052 202 266                  IOR   SBINH
1671:A  026023 041 053 202 266                  IOR   LO
1672:A  026027 041 066 201 266                  IOR   NSD
1673:A  026033 057 346 001                      INV
1674:A  026036 107                              LBA
1675:A  026037 157 072 145 174 057 346          CAND  S7A4
        026045 001 245
1676:A  026047 117                              LCA
1677:A  026050 072 117 176                      LOAD  C7A5
1678:A  026053 041 120 176 246                  AND   C7A6
1679:A  026057 057 346 001                      INV
1680:A  026062 240                              NDB
1681:A  026063 261                              ORC
1682:A  026064 062 332 202                      STO   ESDL01
1683:A
1684:A  026067 072 156 174                      LOAD  S9A1          ** NSDL01
1685:A  026072 062 262 202                      STO   NSDL01
1686:A
1687:A  026075 072 172 174                      LOAD  S9A15         ** NSDL03
1688:A  026100 041 174 174 266                  IOR   S9A22
1689:A  026104 062 264 202                      STO   NSDL03
1690:A
1691:A  026107 052 075 175                      LDAD  S5A9          ** NSDL04
1692:A  026112 353                              DEHL
1693:A  026113 052 073 175                      LDAD  S3A4
1694:A  026116 315 162 137                      CALL  NEGNUM
1695:A  026121 031                              DAD   D
1696:A  026122 174                              LAH
1697:A  026123 007                              SLC
1698:A  026124 322 132 054                      JFC   MD20
1699:A  026127 315 152 137                      CALL  POSNUM
1700:A  026132 353                      MD20    DEHL
1701:A  026133 041 102 000                      LDAD  66            .4 RPM
1702:A  026136 315 162 137                      CALL  NEGNUM
1703:A  026141 031                              DAD   D
1704:A  026142 174                              LAH
1705:A  026143 007                              SLC
1706:A  026144 322 161 054                      JFC   MD220         JUMP IF > .4 RPM
1707:A  026147 076 062                          LOAD  50            .
1708:A  026151 062 135 202                      STO   CNTR19
1709:A  026154 076 000                          LOAD  0
1710:A  026156 303 202 054                      JMP   MD221
1711:A  026161 072 135 202              MD220   LOAD  CNTR19
1712:A  026164 075                              DCA
1713:A  026165 062 135 202                      STO   CNTR19
1714:A  026170 302 205 054                      JFZ   MD222
1715:A  026173 076 062                          LOAD  50
```

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1716:A  026175 062 135 202              STO   CNTR19
1717:A  026200 076 001                  LOAD  1
1718:A  026202 062 265 202        MD221 STO   NSDL04
1719:A
1720:A  026205 072 072 201        MD222 LOAD  RAMP          ** NSDL05
1721:A  026210 041 102 201 266          IOR   PWRGEN
1722:A  026214 041 066 201 266          IOR   NSD
1723:A  026220 157 072 101 174 057 346  CAND  S2A31
        026226 001 245
1724:A  026230 062 266 202              STO   NSDL05
1725:A
1726:A  026233 052 065 177              LDAD  C2A21       ** NSDL06
1727:A  026236 353                      DEHL
1728:A  026237 052 065 175              LDAD  S2A21
1729:A  026242 315 162 137              CALL  NEGNUM
1730:A  026245 031                      DAD   D
1731:A  026246 174                      LAH
1732:A  026247 007                      SLC
1733:A  026250 322 256 054              JFC   MD21        JUMP IF POSITIVE
1734:A  026253 315 152 137              CALL  POSNUM      MAKE IT POSITIVE
1735:A  026256 353                MD21  DEHL
1736:A  026257 041 232 001              LDAD  410         10 DEGREES
1737:A  026262 315 162 137              CALL  NEGNUM
1738:A  026265 031                      DAD   D
1739:A  026266 174                      LAH
1740:A  026267 007                      SLC
1741:A  026270 076 000                  LA    0
1742:A  026272 332 321 054              JTC   MD109       JUMP IF DIFFERENCE < 10 DEGREES
1743:A  026275 074                      INA
1744:A  026276 107                      LBA
1745:A  026277 072 073 201              LOAD  STRTUP
1746:A  026302 041 067 201 266          IOR   ESD
1747:A  026306 041 101 201 266          IOR   MANUAL
1748:A  026312 057 346 001              INV
1749:A  026315 240                      NDB
1750:A  026316 302 333 054              JFZ   MD107
1751:A  026321 076 062            MD109 LOAD  50
1752:A  026323 062 133 202              STO   CNTR17
1753:A  026326 076 000                  LOAD  0
1754:A  026330 303 354 054              JMP   MD22
1755:A  026333 072 133 202        MD107 LOAD  CNTR17
1756:A  026336 075                      DLA
1757:A  026337 062 133 202              STO   CNTR17
1758:A  026342 302 357 054              JFZ   MD108
1759:A  026345 076 062                  LOAD  50
1760:A  026347 062 133 202              STO   CNTR17
1761:A  026352 076 001                  LOAD  1
1762:A  026354 062 267 202        MD22  STO   NSDL06
1763:A
1764:A  026357 041 065 175        MD108 HL    S2A21       ** NSDL07
1765:A  026362 021 067 175              DE    S2A23       FIRST CONTROL ANGLES SENSED
1766:A  026365 315 332 065              CALL  CDIFFS
1767:A  026370 174                      LAH
1768:A  026371 007                      SLC
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1769:A  026372 076 001                      LA    1
1770:A  026374 322 011 055                  JFC   MD28
1771:A  026377 076 062              MD111   LOAD  50
1772:A  026401 062 134 202                  STO   CNTR18
1773:A  026404 076 000                      LOAD  0
1774:A  026406 303 051 055                  JMP   MD110
1775:A  026411 107                  MD28    LIA
1776:A  026412 042 073 201                  LOAD  STRTUP
1777:A  026415 041 101 201 266              IOR   MANUAL
1778:A  026421 057 346 001                  INV
1779:A  026424 240                          NOP
1780:A  026425 312 377 054                  JTZ   MD111
1781:A  026430 072 134 202                  LOAD  CNTR18
1782:A  026433 075                          DCA
1783:A  026434 062 134 202                  STO   CNTR18
1784:A  026437 302 054 055                  JFZ   MD112
1785:A  026442 076 062                      LOAD  50
1786:A  026444 062 134 202                  STO   CNTR18
1787:A  026447 076 001                      LOAD  1
1788:A  026451 062 270 202          MD110   STO   NSDLO7
1789:A
1790:A  026454 072 102 201          MD112   LOAD  PWRGEN          ** NSDLO8
1791:A  026457 041 066 201 266              IOR   NSD
1792:A  026463 041 103 174 246              AND   S2A12
1793:A  026467 312 135 055                  JTZ   MD29
1794:A  026472 052 071 175                  LDAD  S2A18
1795:A  026475 353                          DEHL
1796:A  026476 041 000 010                  LDAD  2048            GET ABSOLUTE TEETER ANGLE
1797:A  026501 315 162 137                  CALL  NEGNUM
1798:A  026504 031                          DAD   D
1799:A  026505 174                          LAH
1800:A  026506 007                          SLC
1801:A  026507 322 115 055                  JFC   MD101
1802:A  026512 315 152 137                  CALL  POSNUM
1803:A  026515 353                  MD101   DEHL
1804:A  026516 041 000 004                  LDAD  1024            5 DEGREES TEETER ANGLE
1805:A  026521 315 162 137                  CALL  NEGNUM
1806:A  026524 031                          DAD   D
1807:A  026525 174                          LAH
1808:A  026526 007                          SLC
1809:A  026527 076 000                      LA    0
1810:A  026531 312 135 055                  JTZ   MD29
1811:A  026534 074                          INA
1812:A  026535 062 271 202          MD29    STO   NSDLO8
1813:A
1814:A  026540 072 072 201                  LOAD  RAMP            ** NSDLO9
1815:A  026543 157 072 103 174 057 346      CAND  S2A12
        026551 001 245
1816:A  026554 312 201 055                  JTZ   MD30
1817:A  026557 052 073 175                  LDAD  S3A4
1818:A  026561 353                          DEHL
1819:A  026562 041 000 010                  LDAD  2048
1820:A  026565 315 162 137                  CALL  NEGNUM          12.5 RPM  (0->25 RPM)
1821:A  026570 031                          DAD   D
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1822:A  026571 174                      LAH
1823:A  026572 007                      SLC
1824:A  026573 076 000                  LA      0
1825:A  026575 332 201 055              JTC     MD30
1826:A  026600 074                      INA
1827:A  026601 062 272 202      MD30    STO     NSDL09
1828:A
1829:A  026604 072 102 201              LOAD    PWRGEN          ** NSDL10
1830:A  026607 267                      ORA
1831:A  026610 312 256 055              JTZ     MD31
1832:A  026613 052 071 175              LDAD    S2A18
1833:A  026616 353                      DEHL
1834:A  026617 041 000 010              LDAD    2048            GET ABSOLUTE TEETER ANGLE
1835:A  026622 315 162 137              CALL    NEGNUM
1836:A  026625 031                      DAD     D
1837:A  026626 174                      LAH
1838:A  026627 007                      SLC
1839:A  026630 322 236 055              JFC     MD102
1840:A  026633 315 152 137              CALL    POSNUM
1841:A  026636 353              MD102   DEHL
1842:A  026637 041 063 005              LDAD    1331            6.5 DEGREE TEETER ANGLE
1843:A  026642 315 162 137              CALL    NEGNUM
1844:A  026645 031                      DAD     D
1845:A  026646 174                      LAH
1846:A  026647 007                      SLC
1847:A  026650 076 000                  LA      0
1848:A  026652 332 256 055              JTC     MD31
1849:A  026655 074                      INA
1850:A  026656 062 273 202      MD31    STO     NSDL10
1851:A
1852:A  026661 052 073 175              LDAD    S3A4            ** NSDL11
1853:A  026664 353                      DEHL
1854:A  026665 041 204 013              LDAD    2948            18.0 RPM  (0->25 RPM)
1855:A  026670 315 162 137              CALL    NEGNUM
1856:A  026673 031                      DAD     D
1857:A  026674 174                      LAH
1858:A  026675 007                      SLC
1859:A  026676 332 325 055              JTC     MD32
1860:A  026701 072 132 202              LOAD    CNTR16
1861:A  026704 075                      DCA
1862:A  026705 062 132 202              STO     CNTR16
1863:A  026710 302 337 055              JFZ     MD106
1864:A  026713 076 062                  LOAD    50
1865:A  026715 062 132 202              STO     CNTR16
1866:A  026720 076 001                  LA      1
1867:A  026722 303 334 055              JMP     MD105
1868:A  026725 076 062          MD32    LOAD    50
1869:A  026727 062 132 202              STO     CNTR16
1870:A  026732 076 000                  LA      0
1871:A  026734 062 274 202      MD105   STO     NSDL11
1872:A
1873:A  026737 072 104 174      MD106   LOAD    S3A3            ** NSDL12
1874:A  026742 062 275 202              STO     NSDL12
1875:A
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1876:A   026745 072 071 174                LOAD  S1A5          ** NSDL13
1877:A   026750 041 072 174 266            IOR   S1A6
1878:A   026754 062 276 202                STO   NSDL13
1879:A
1880:A   026757 072 117 174                LOAD  S4A23         ** NSDL14
1881:A   026762 057 346 001                INV
1882:A   026765 107                        LBA
1883:A   026766 072 120 174                LOAD  S4A24
1884:A   026771 057 346 001                INV
1885:A   026774 117                        LCA
1886:A   026775 072 121 174                LOAD  S4A25
1887:A   027000 057 346 001                INV
1888:A   027003 127                        LDA
1889:A   027004 170                        LAB
1890:A   027005 241                        NDC
1891:A   027006 137                        LEA
1892:A   027007 171                        LAC
1893:A   027010 242                        NDD
1894:A   027011 263                        ORE
1895:A   027012 137                        LEA
1896:A   027013 172                        LAD
1897:A   027014 240                        NDB
1898:A   027015 263                        ORE
1899:A   027016 107                        LBA
1900:A   027017 072 072 201                LOAD  RAMP
1901:A   027022 041 102 201 266            IOR   PWRGEN
1902:A   027026 240                        NDB
1903:A   027027 062 277 202                STO   NSDL14
1904:A
1905:A   027032 072 115 174                LOAD  S4A28         ** NSDL15
1906:A   027035 041 116 174 246            AND   S4A29
1907:A   027041 107                        LBA
1908:A   027042 072 116 174                LOAD  S4A29
1909:A   027045 041 113 174 246            AND   S4A26
1910:A   027051 260                        ORB
1911:A   027052 107                        LBA
1912:A   027053 072 113 174                LOAD  S4A26
1913:A   027056 041 115 174 246            AND   S4A28
1914:A   027062 260                        ORB
1915:A   027063 062 300 202                STO   NSDL15
1916:A
1917:A   027066 072 126 174                LOAD  S5A2          ** NSDL16
1918:A   027071 062 301 202                STO   NSDL16
1919:A
1920:A   027074 072 125 174                LOAD  S5A7          ** NSDL17
1921:A   027077 062 302 202                STO   NSDL17
1922:A
1923:A   027102 072 127 174                LOAD  S5A8          ** NSDL18
1924:A   027105 062 303 202                STO   NSDL18
1925:A
1926:A   027110 072 131 174                LOAD  S5A3          ** NSDL19
1927:A   027113 062 304 202                STO   NSDL19
1928:A
1929:A   027116 072 151 174 057 346 001    CLOAD S8A3          ** NSDL20
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1930:A   027124 157 072 150 174 057 346          CAND  SBA1
         027132 001 245
1931:A   027134 062 305 202                      STO   NSDL20
1932:A
1933:A   027137 072 072 201                      LOAD  RAMF          ** NSDL21
1934:A   027142 041 102 201 266                  IOR   PWRGEN
1935:A   027146 157 072 154 174 057 346          CAND  SBA2
         027154 001 245
1936:A   027156 062 306 202                      STO   NSDL21
1937:A
1938:A   027161 052 121 202                      LDAD  CNTR9         ** NSDL22
1939:A   027164 053                              DCX   H
1940:A   027165 042 121 202                      STOD  CNTR9
1941:A   027170 174                              LAH
1942:A   027171 265                              ORL
1943:A   027172 302 312 056                      JFZ   MD34
1944:A   027175 041 130 002                      LDAD  600
1945:A   027200 042 121 202                      STOD  CNTR9
1946:A   027203 072 073 201                      LOAD  STRTUP
1947:A   027206 267                              ORA
1948:A   027207 312 301 056                      JTZ   MD35
1949:A   027212 041 212 212                      HL    WD1AVG
1950:A   027215 315 371 065                      CALL  ABSWDA
1951:A   027220 041 120 000                      LDAD  80            7 DEGREE YAW ERROR
1952:A   027223 315 162 137                      CALL  NEGNUM
1953:A   027226 031                              DAD   D
1954:A   027227 174                              LAH
1955:A   027230 007                              SLC
1956:A   027231 076 000                          LA    0
1957:A   027233 332 301 056                      JTC   MD35
1958:A   027236 052 063 202                      LDAD  WDAV01
1959:A   027241 353                              DEHL
1960:A   027242 052 212 212                      LDAD  WD1AVG
1961:A   027245 315 162 137                      CALL  NEGNUM
1962:A   027250 031                              DAD   D
1963:A   027251 174                              LAH
1964:A   027252 007                              SLC
1965:A   027253 322 261 056                      JFC   MD54
1966:A   027256 315 152 137                      CALL  POSNUM
1967:A   027261 353                      MD54    DEHL
1968:A   027262 041 027 000                      LDAD  23            2 DEGREE YAW ERROR
1969:A   027265 315 162 137                      CALL  NEGNUM
1970:A   027270 031                              DAD   D
1971:A   027271 174                              LAH
1972:A   027272 007                              SLC
1973:A   027273 076 000                          LA    0
1974:A   027275 332 301 056                      JTC   MD35
1975:A   027300 074                              INA
1976:A   027301 042 307 202             MD35     STO   NSDL22
1977:A   027304 052 212 212                      LDAD  WD1AVG
1978:A   027307 042 063 202                      STOD  WDAV01
1979:A
1980:A   027312 072 072 201             MD34     LOAD  RAMF          ** NSDL23
1981:A   027315 041 102 201 266                  IOR   PWRGEN
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1982:A  027321 312 371 056                      JTZ   MD52
1983:A  027324 041 212 217                      NL    WD1AVG
1984:A  027327 315 371 065                      CALL  ABSWDA          ABSOLUTE YAW ERROR
1985:A  027332 041 120 000                      LOAD  80              7 DEGREE YAW ERROR
1986:A  027335 315 162 137                      CALL  NEGNUM
1987:A  027340 031                              DAD   D
1988:A  027341 174                              LAH
1989:A  027342 007                              SLC
1990:A  027343 076 000                          LA    0
1991:A  027345 332 371 056                      JTC   MD52
1992:A  027350 052 123 202                      LOAD  CNTR10
1993:A  027353 174                              LAH
1994:A  027354 265                              ORL
1995:A  027355 312 367 056                      JTZ   MD33
1996:A  027360 053                              DCX   H
1997:A  027361 042 123 202                      STOD  CNTR10
1998:A  027364 303 002 057                      JMP   MD38
1999:A  027367 076 001                  MD33    LA    1
2000:A  027371 062 310 202              MD52    STO   NSDL23
2001:A  027374 041 270 013                      LOAD  3000
2002:A  027377 042 123 202                      STOD  CNTR10
2003:A
2004:A  027402 072 115 176              MD38    LOAD  C6A4            ** NSDL24
2005:A  027405 041 133 174 256                  XOR   S6A9
2006:A  027411 312 033 057                      JTZ   MD43
2007:A  027414 072 125 202                      LOAD  CNTR11
2008:A  027417 267                              ORA
2009:A  027420 312 032 057                      JTZ   MD41
2010:A  027423 075                              DCA
2011:A  027424 062 125 202                      STO   CNTR11
2012:A  027427 303 043 057                      JMP   MD42
2013:A  027432 074                      MD41    INA
2014:A  027433 062 311 202              MD43    STO   NSDL24
2015:A  027436 076 120                          LOAD  80
2016:A  027440 062 125 202                      STO   CNTR11
2017:A
2018:A  027443 072 133 174              MD42    LOAD  S6A9            ** NSDL25
2019:A  027446 057 346 001                      INV
2020:A  027451 157 072 134 174 057 346          CAND  S6A10
        027457 001 245
2021:A  027461 062 312 202                      STO   NSDL25
2022:A
2023:A  027464 072 126 202                      LOAD  CNTR12          ** NSDL26
2024:A  027467 075                              DCA
2025:A  027470 062 126 202                      STO   CNTR12
2026:A  027473 302 203 057                      JFZ   MD55
2027:A  027476 076 012                          LOAD  10
2028:A  027500 062 126 202                      STO   CNTR12
2029:A  027503 072 071 201                      LOAD  YAWACT
2030:A  027506 267                              ORA
2031:A  027507 312 175 057                      JTZ   MD114
2032:A  027512 072 302 211                      LOAD  YAWCW
2033:A  027515 267                              ORA
2034:A  027516 312 137 057                      JTZ   MD115
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2035:A  027521 052 212 212              LOAD  WD1AVG
2036:A  027524 315 162 137              CALL  NEGNUM
2037:A  027527 353                      DEHL
2038:A  027530 052 065 202              LOAD  WDAVD2
2039:A  027533 031                      DAD   D
2040:A  027534 303 152 057              JMP   MD57
2041:A  027537 052 212 212      MD115   LOAD  WD1AVG
2042:A  027542 353                      DEHL
2043:A  027543 052 065 202              LOAD  WDAVD2
2044:A  027546 315 162 137              CALL  NEGNUM
2045:A  027551 031                      DAD   D
2046:A  027552 353              MD57    DEHL
2047:A  027553 041 162 000              LOAD  114               10 DEGREE YAW ERROR
2048:A  027556 315 162 137              CALL  NEGNUM
2049:A  027561 031                      DAD   D
2050:A  027562 174                      LAH
2051:A  027563 007                      SLC
2052:A  027564 076 000                  LA    0
2053:A  027566 332 172 057              JTC   MD58
2054:A  027571 074                      INA
2055:A  027572 062 313 202      MD58    STO   NSDL26
2056:A  027575 052 212 212      MD114   LOAD  WD1AVG
2057:A  027600 042 065 202              STOD  WDAVD2
2058:A                          .
2059:A  027603 072 223 202      MD55    LOAD  ALRM30            ** NSDL27
2060:A  027606 041 241 202 246          AND   NSDE4
2061:A  027612 062 314 202              STO   NSDL27
2062:A                          .
2063:A  027615 072 106 174              LOAD  S3A1              ** NSDL28
2064:A  027620 041 110 174 246          AND   S3A13
2065:A  027624 041 100 176 256          XOR   C3A1
2066:A  027630 107                      LBA
2067:A  027631 072 072 201              LOAD  RAMP
2068:A  027634 041 102 201 266          IOR   PWRGEN
2069:A  027640 041 066 201 266          IOR   NSD
2070:A  027644 240                      NDB
2071:A  027645 312 267 057              JTZ   MD78
2072:A  027650 072 127 202              LOAD  CNTR13
2073:A  027653 267                      OKA
2074:A  027654 312 266 057              JTZ   MD63
2075:A  027657 075                      DLA
2076:A  027660 062 127 202              STO   CNTR13
2077:A  027663 303 277 057              JMP   MD59
2078:A  027666 074              MD63    INA
2079:A  027667 062 315 202      MD78    STO   NSDL28
2080:A  027672 076 062                  LOAD  50
2081:A  027674 062 127 202              STO   CNTR13
2082:A                          .
2083:A  027677 072 163 174      MD59    LOAD  S9A17             ** NSDL29
2084:A  027702 041 164 174 266          IOR   S9A18
2085:A  027706 157 072 053 202 057 346  CAND  LO
        027714 001 245
2086:A  027716 062 316 202              STO   NSDL29
2087:A                          .
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2088:A  027721 072 107 174                      LOAD  SJA12       ** NSDL30
2089:A  027724 041 101 176 256                  XOR   C3A2
2090:A  027730 107                              LBA
2091:A  027731 072 072 201                      LOAD  RAMF
2092:A  027734 041 102 201 266                  IOR   PWRGEN
2093:A  027740 041 066 201 266                  IOR   NSD
2094:A  027744 240                              NOB
2095:A  027745 312 367 057                      JTZ   MD61
2096:A  027750 072 130 202                      LOAD  CNTR14
2097:A  027753 267                              ORA
2098:A  027754 312 366 057                      JTZ   MD73
2099:A  027757 075                              DCA
2100:A  027760 062 130 202                      STO   CNTR14
2101:A  027763 303 377 057                      JMP   MD64
2102:A  027766 074                      MD73    INA
2103:A  027767 062 317 202              MD61    STO   NSDL30
2104:A  027772 076 062                          LOAD  50
2105:A  027774 062 130 202                      STO   CNTR14
2106:A
2107:A  027777 072 236 202              MD64    LOAD  NSDE1       ** NSDSE & SEENB
2108:A  030002 041 237 202 266                  IOR   NSDE2
2109:A  030006 041 240 202 266                  IOR   NSDE3
2110:A  030012 041 241 202 266                  IOR   NSDE4
2111:A  030016 041 242 202 266                  IOR   NSDE5
2112:A  030022 062 067 202                      STO   NSDSE
2113:A  030025 041 072 202 266                  IOR   SEENB
2114:A  030031 157 072 075 202 057 346          CAND  RST
        030037 001 245
2115:A  030041 062 072 202                      STO   SEENB
2116:A
2117:A  030044 072 250 202                      LOAD  NSDI1       ** NSDSI & SIENB
2118:A  030047 041 251 202 266                  IOR   NSDI2
2119:A  030053 041 252 202 266                  IOR   NSDI3
2120:A  030057 041 253 202 266                  IOR   NSDI4
2121:A  030063 041 254 202 266                  IOR   NSDI5
2122:A  030067 041 255 202 266                  IOR   NSDI6
2123:A  030073 041 256 202 266                  IOR   NSDI7
2124:A  030077 041 257 202 266                  IOR   NSDI8
2125:A  030103 062 070 202                      STO   NSDSI
2126:A  030106 041 073 202 266                  IOR   SIENB
2127:A  030113 157 072 075 202 057 346          CAND  RST
        030120 001 245
2128:A  030122 062 073 202                      STO   SIENB
2129:A
2130:A  030125 006 040                          LB    32          ** NSDLO & LOENB
2131:A  030127 041 262 202                      HL    NSDLO1
2132:A  030132 176                              LAM
2133:A  030133 043                      MD65    INX   H
2134:A  030134 266                              ORM
2135:A  030135 005                              DCB
2136:A  030136 302 133 060                      JFZ   MD65
2137:A  030141 062 071 202                      STO   NSDLO
2138:A  030144 041 332 202 266                  IOR   ESDLO1
2139:A  030150 041 074 202 266                  IOR   LOENB
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2140:A  030154 157 072 075 202 057 346          CAND  RST
        030162 001 245
2141:A  030164 062 074 202                      STO   LOENB
2142:A
2143:A  030167 072 332 202                      LOAD  ESDLO1        ** ESD
2144:A  030172 041 067 201 266                  IOR   ESD
2145:A  030176 157 072 075 202 057 346          CAND  RST
        030204 001 245
2146:A  030206 062 067 201                      STO   ESD
2147:A  030211 302 217 060                      JFZ   MD103
2148:A  030214 062 107 201                      STO   ESDCNT
2149:A
2150:A  030217 072 174 203              MD103   LOAD  ESDCPL        ** ESDCPL
2151:A  030222 041 045 202 256                  XOR   OESDCP
2152:A  030226 041 174 203 246                  AND   ESDCPL
2153:A  030232 157 072 047 202 057 346          CAND  OTESDC
        030240 001 245
2154:A  030242 062 047 202                      STO   OTESDC
2155:A  030245 041 067 201 246                  AND   ESD
2156:A  030251 107                              LBA
2157:A  030252 072 174 203                      LOAD  ESDCPL
2158:A  030255 062 045 202                      STO   OESDCP
2159:A  030260 072 067 201                      LOAD  ESD
2160:A  030263 057 346 001                      INV
2161:A  030266 260                              ORB
2162:A  030267 062 174 203                      STO   ESDCPL
2163:A
2164:A  030272 072 067 202                      LOAD  NSDSE         ** NSD
2165:A  030275 041 070 202 266                  IOR   NSDSI
2166:A  030301 041 071 202 266                  IOR   NSDLO
2167:A  030305 107                              LBA
2168:A  030306 072 073 201                      LOAD  STRTUP
2169:A  030311 041 072 201 266                  IOR   RAMF
2170:A  030315 041 102 201 266                  IOR   PWRGEN
2171:A  030321 157 072 067 201 057 346          CAND  ESD
        030327 001 245
2172:A  030331 240                              NDB
2173:A  030332 041 066 201 266                  IOR   NSD
2174:A  030336 157 072 075 202 057 346          CAND  RST
        030344 001 245
2175:A  030346 062 066 201                      STO   NSD
2176:A  030351 302 357 060                      JFZ   MD66
2177:A  030354 062 106 201                      STO   NSDCNT
2178:A
2179:A  030357 072 171 203              MD66    LOAD  NSDCPL        ** NSDCPL
2180:A  030362 041 044 202 256                  XOR   ONSDCP
2181:A  030366 041 171 203 246                  AND   NSDCPL
2182:A  030372 157 072 046 202 057 346          CAND  OTNSDC
        030400 001 245
2183:A  030402 062 046 202                      STO   OTNSDC
2184:A  030405 041 066 201 246                  AND   NSD
2185:A  030411 107                              LBA
2186:A  030412 072 171 203                      LOAD  NSDCPL
2187:A  030415 062 044 202                      STO   ONSDCP
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2188:A  030420 072 066 201              LOAD  NSD
2189:A  030423 057 346 001              INV
2190:A  030426 260                      ORB
2191:A  030427 062 171 203              STO   NSDCPL
2192:A
2193:A  030432 072 072 201              LOAD  RAMP          ** PWRGEN
2194:A  030435 041 245 211 246          AND   RMPCPL
2195:A  030441 041 102 201 266          IOR   PWRGEN
2196:A  030445 157 072 066 201 057 346  CAND  NSD
        030453 001 245
2197:A  030455 157 072 067 201 057 346  CAND  ESD
        030463 001 245
2198:A  030465 062 102 201              STO   PWRGEN
2199:A  030470 302 076 061              JFZ   MD67
2200:A  030473 062 122 201              STO   PWRCNT
2201:A
2202:A  030476 072 073 201        MD67  LOAD  STRTUP        ** RAMP
2203:A  030501 041 221 211 246          AND   SUCMPL
2204:A  030505 041 072 201 266          IOR   RAMP
2205:A  030511 107                      LBA
2206:A  030512 072 102 201              LOAD  PWRGEN
2207:A  030515 041 066 201 266          IOR   NSD
2208:A  030521 041 067 201 266          IOR   ESD
2209:A  030525 057 346 001              INV
2210:A  030530 240                      NDB
2211:A  030531 062 072 201              STO   RAMP
2212:A  030534 302 142 061              JFZ   MD68
2213:A  030537 062 112 201              STO   RAMCNT
2214:A
2215:A  030542 072 072 201        MD68  LOAD  RAMP          ** RMPCPL
2216:A  030545 057 346 001              INV
2217:A  030550 062 245 211              STO   RMPCPL
2218:A
2219:A  030553 072 051 202              LOAD  SHENB         ** STRTUP
2220:A  030556 041 073 201 266          IOR   STRTUP
2221:A  030562 107                      LBA
2222:A  030563 072 073 201              LOAD  STRTUP        IF IN STRTUP COUNT = 4 MINUTES, IF NOT DO COUNT
2223:A  030566 267                      ORA
2224:A  030567 076 000                  LOAD  0
2225:A  030571 302 240 061              JFZ   MD201         JUMP IF IN STARTUP
2226:A  030574 052 143 212              LDAD  WV2AVG        LATCH
2227:A  030577 353                      DLHL
2228:A  030600 041 075 002              LDAD  573           14 MPH
2229:A  030603 315 162 137              CALL  NEGNUM
2230:A  030606 031                      DAD   D
2231:A  030607 174                      LAH
2232:A  030610 007                      SLC
2233:A  030611 076 001                  LA    1
2234:A  030613 332 240 061              JTC   MD201         JUMP IF < 14 MPH
2235:A  030616 052 143 212              LDAD  WV2AVG
2236:A  030621 353                      DLHL
2237:A  030622 041 036 011              LDAD  2334          57 MPH
2238:A  030625 315 162 137              CALL  NEGNUM
2239:A  030630 031                      DAD   D
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2240:A  030631 174                          LAH
2241:A  030632 007                          SLC
2242:A  030633 332 251 061                  JTC   MD69        JUMP IF < 57 MPH AND > 14 MPH
2243:A  030636 076 001                      LA    1
2244:A  030640 041 140 011          MD201   LOAD  2400
2245:A  030643 042 136 202                  STOD  CNTR20
2246:A  030646 303 276 061                  JMP   MD200
2247:A  030651 052 136 202          MD69    LOAD  CNTR20
2248:A  030654 053                          DCX   H
2249:A  030655 042 136 202                  STOD  CNTR20
2250:A  030660 174                          LAH
2251:A  030661 265                          ORI
2252:A  030662 076 001                      LOAD  1
2253:A  030664 302 276 061                  JFZ   MD200
2254:A  030667 075                          DCA
2255:A  030670 041 140 011                  LOAD  2400
2256:A  030673 042 136 202                  STOD  CNTR20
2257:A  030676 041 066 201 266      MD200   IOR   NSD
2258:A  030702 041 072 201 266              IOR   RAMF
2259:A  030706 041 164 216 266              IOR   IIARC
2260:A  030712 057 346 001                  INV
2261:A  030715 240                          NDB
2262:A  030716 062 073 201                  STO   STRTUF
2263:A  030721 302 327 061                  JFZ   MD70
2264:A  030724 062 113 201                  STO   STRCNT
2265:A
2266:A  030727 072 073 201          MD70    LOAD  STRTUF      ** SUCMFL
2267:A  030732 057 346 001                  INV
2268:A  030735 062 221 211                  STO   SUCMFL
2269:A
2270:A  030740 072 166 215                  LOAD  OTENB       ** R.E.D. ON OTENB INTO OTTENB
2271:A  030743 041 101 202 256              XOR   OOTENB
2272:A  030747 041 166 215 246              AND   OTENB
2273:A  030753 157 072 054 202 057 346      CAND  OTTENB
        030761 001 245
2274:A  030763 062 054 202                  STO   OTTENB
2275:A  030766 072 166 215                  LOAD  OTENB       UPDATE INPUT
2276:A  030771 062 101 202                  STO   OOTENB
2277:A
2278:A  030774 072 066 201                  LOAD  NSD         ** SBENB
2279:A  030777 041 171 203 246              AND   NSMCFL
2280:A  031003 041 072 202 246              AND   SEENB
2281:A  031007 107                          LBA
2282:A  031010 072 074 202                  LOAD  LOENB
2283:A  031013 041 073 202 266              IOR   SIENB
2284:A  031017 057 346 001                  INV
2285:A  031022 240                          NDB
2286:A  031023 107                          LBA
2287:A  031024 072 054 202                  LOAD  OTTENB
2288:A  031027 041 052 202 246              AND   SBINH
2289:A  031033 260                          ORR
2290:A  031034 041 051 202 266              IOR   SBENB
2291:A  031040 107                          LBA
2292:A  031041 072 074 202                  LOAD  LOENB       LATCH
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2293:A  031044 041 073 202 266          IOR   SIENB
2294:A  031050 041 051 202 246          AND   SBENB
2295:A  031054 041 073 201 266          IOR   STRTUP
2296:A  031060 057 346 001              INV
2297:A  031063 240                      NOR
2298:A  031064 062 051 202              STO   SBENB
2299:A
2300:A  031067 072 066 201              LOAD  NSD             ** SBINH
2301:A  031072 041 171 203 246          AND   NSDCPL
2302:A  031076 041 073 202 246          AND   SIENB
2303:A  031102 157 072 074 202 057 346  CAND  LOENB
        031110 001 245
2304:A  031112 107                      LBA
2305:A  031113 072 053 202              LOAD  LO
2306:A  031116 041 166 174 246          AND   S9A20
2307:A  031122 260                      ORB
2308:A  031123 107                      LBA
2309:A  031124 072 073 202              LOAD  SIENB
2310:A  031127 041 103 202 246          AND   OSBENB
2311:A  031133 260                      ORB
2312:A  031134 041 052 202 266          IOR   SBINH
2313:A  031140 107                      LBA
2314:A  031141 072 052 202              LOAD  SBINH           LATCH
2315:A  031144 041 054 202 246          AND   OITENB
2316:A  031150 117                      LCA
2317:A  031151 072 051 202              LOAD  SBENB
2318:A  031154 157 072 073 202 057 346  CAND  SIENB
        031162 001 245
2319:A  031164 261                      ORC
2320:A  031165 117                      LCA
2321:A  031166 072 074 202              LOAD  LOENB
2322:A  031171 041 052 202 246          AND   SBINH
2323:A  031175 261                      ORC
2324:A  031176 057 346 001              INV
2325:A  031201 240                      NOR
2326:A  031202 062 052 202              STO   SBINH
2327:A
2328:A  031205 072 066 201              LOAD  NSD             ** LO
2329:A  031210 041 171 203 246          AND   NSDCPL
2330:A  031214 107                      LBA
2331:A  031215 072 067 201              LOAD  ESD
2332:A  031220 041 174 203 246          AND   ESDCPL
2333:A  031224 260                      ORB
2334:A  031225 107                      LBA
2335:A  031226 072 103 202              LOAD  OSBENB
2336:A  031231 041 102 202 266          IOR   OSBINH
2337:A  031235 041 074 202 246          AND   LOENB
2338:A  031241 260                      ORB
2339:A  031242 041 053 202 266          IOR   LO
2340:A  031246 107                      LBA
2341:A  031247 072 051 202              LOAD  SBENB           LATCH
2342:A  031252 041 052 202 266          IOR   SBINH
2343:A  031256 157 072 074 202 057 346  CAND  LOENB
        031264 001 245
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2344:A  031266 117                              LCA
2345:A  031267 072 053 202                      LOAD  LO
2346:A  031272 041 166 174 246                  AND   S9A20
2347:A  031276 261                              ORC
2348:A  031277 057 346 001                      INV
2349:A  031302 240                              NDB
2350:A  031303 062 053 202                      STO   LO
2351:A
2352:A  031306 072 052 202                      LOAD  SBINH         ** R.E.D. ON SBINH INTO OTSBI
2353:A  031311 041 102 202 256                  XOR   OSBINH
2354:A  031315 041 052 202 246                  AND   SBINH
2355:A  031321 157 072 055 202 057 346          CAND  OTSBI
        031327 001 245
2356:A  031331 062 055 202                      STO   OTSBI
2357:A  031334 072 052 202                      LOAD  SBINH         UPDATE INPUT
2358:A  031337 062 102 202                      STO   OSBINH
2359:A
2360:A  031342 072 051 202                      LOAD  SBENB         ** R.E.D. ON SBENB INTO OTSBE
2361:A  031345 041 103 202 256                  XOR   OSBENB
2362:A  031351 041 051 202 246                  AND   SBENB
2363:A  031355 157 072 056 202 057 346          CAND  OTSBE
        031363 001 245
2364:A  031365 062 056 202                      STO   OTSBE
2365:A  031370 072 051 202                      LOAD  SBENB         UPDATE INPUT
2366:A  031373 062 103 202                      STO   OSBENB
2367:A
2368:A  031376 072 053 202                      LOAD  LO            ** R.E.D. ON LO INTO OTLO
2369:A  031401 041 104 202 256                  XOR   OLO
2370:A  031405 041 053 202 246                  AND   LO
2371:A  031411 157 072 057 202 057 346          CAND  OTLO
        031417 001 245
2372:A  031421 062 057 202                      STO   OTLO
2373:A  031424 072 053 202                      LOAD  LO            UPDATE INPUT
2374:A  031427 062 104 202                      STO   OLO
2375:A
2376:A  031432 072 055 202                      LOAD  OTSBI         ** RESET
2377:A  031435 041 056 202 266                  IOR   OTSBE
2378:A  031441 041 057 202 266                  IOR   OTLO
2379:A  031445 062 075 202                      STO   RST
2380:A  031450 312 071 063                      JTZ   MD71
2381:A  031453 076 000                          LOAD  0
2382:A  031455 062 165 215                      STO   OTSDR
2383:A  031460 062 166 215                      STO   OTENB
2384:A  031463 041 140 011                      LOAD  2400
2385:A  031466 042 136 202                      STOD  CNTR20        SET STARTUP COUNTER TO 4 MINUTES
2386:A
2387:A  031471 076 000                  MD71    LOAD  0             ** YAWSTP & YAWCW
2388:A  031473 062 202 211                      STO   YAWCW
2389:A  031476 041 161 201 266                  IOR   MANUAL
2390:A  031502 302 157 063                      JFZ   MD74
2391:A  031505 052 214 212                      LDAD  WD2AVG
2392:A  031510 353                              NEGL
2393:A  031511 041 330 007                      LDAD  2008          -3.5 DEGREES YAW ERROR
2394:A  031514 315 162 137                      CALL  NEGNUM
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2395:A  031517 031                              DAD   D
2396:A  031520 174                              LAH
2397:A  031521 007                              SLC
2398:A  031522 332 171 063                      JTC   MD75
2399:A  031525 076 001                          LOAD  1
2400:A  031527 062 202 211                      STO   YAWCW
2401:A  031532 052 214 212                      LDAD  WD2AVG
2402:A  031535 353                              DEHL
2403:A  031536 041 050 010                      LDAD  2088          3.5 DEGREES YAW ERROR
2404:A  031541 315 162 137                      CALL  NEGNUM
2405:A  031544 031                              DAD   D
2406:A  031545 174                              LAH
2407:A  031546 007                              SLC
2408:A  031547 322 171 063                      JFC   MD75
2409:A  031552 076 001                          LOAD  1
2410:A  031554 303 173 063                      JMP   MD76
2411:A  031557 072 101 201              MD74    LOAD  MANUAL
2412:A  031562 041 367 212 246                  AND   MANDIR
2413:A  031566 062 202 211                      STO   YAWCW
2414:A  031571 076 000                  MD75    LOAD  0
2415:A  031573 041 066 201 266          MD76    TOR   NSD
2416:A  031577 157 072 101 201 057 346          CAND  MANUAL
        031605 001 245
2417:A  031607 107                              LBA
2418:A  031610 072 101 201                      LOAD  MANUAL
2419:A  031613 157 072 366 212 057 346          CAND  MANDR
        031621 001 245
2420:A  031623 260                              OKB
2421:A  031624 062 203 211                      STO   YAWSTP
2422:A
2423:A  031627 052 143 212                      LDAD  WV2AVG        ** YAWACT
2424:A  031632 353                              DEHL
2425:A  031633 041 353 001                      LDAD  491           12 MPH
2426:A  031636 315 162 137                      CALL  NEGNUM
2427:A  031641 031                              DAD   D
2428:A  031642 174                              LAH
2429:A  031643 007                              SLC
2430:A  031644 076 000                          LA    0
2431:A  031646 332 275 063                      JTC   MD77
2432:A  031651 052 143 212                      LDAD  WV2AVG
2433:A  031654 353                              DEHL
2434:A  031655 041 314 010                      LDAD  2252          57 MPH
2435:A  031660 315 162 137                      CALL  NEGNUM
2436:A  031663 031                              DAD   D
2437:A  031664 174                              LAH
2438:A  031665 007                              SLC
2439:A  031666 076 000                          LA    0
2440:A  031670 322 275 063                      JFC   MD77
2441:A  031673 076 001                          LOAD  1
2442:A  031675 041 051 202 246          MD77    AND   SBENB
2443:A  031701 041 073 201 266                  TOR   STRTUP
2444:A  031705 041 072 201 266                  TOR   RAMP
2445:A  031711 041 102 201 266                  TOR   PWRGEN
2446:A  031715 107                              LBA
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C-57

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2447:A  031716 041 214 212                      HL    WD2AVG      LOCATION OF AVERAGE
2448:A  031721 315 371 065                      CALL  ABSWDA      GET ABSOLUTE WIND DIRECTION (0 TO 180)
2449:A  031724 041 120 000                      LOAD  80          7 DEGREES YAW ERROR
2450:A  031727 315 162 137                      CALL  NEGNUM
2451:A  031732 031                              DAD   H
2452:A  031733 174                              LAH
2453:A  031734 007                              SLC
2454:A  031735 076 000 ;                        LA    0
2455:A  031737 332 343 063                      JTC   MD72
2456:A  031742 074                              INA
2457:A  031743 240                      MD72    NDB
2458:A  031744 107                              LBA
2459:A  031745 072 101 201                      LOAD  MANUAL
2460:A  031750 041 366 212 246                  AND   MANDR
2461:A  031754 312 002 064                      JTZ   MD79
2462:A  031757 052 204 211                      LOAD  YWCNTR
2463:A  031762 053                              DCX   H
2464:A  031763 042 204 211                      STOD  YWCNTR
2465:A  031766 174                              LAH
2466:A  031767 265                              ORL
2467:A  031770 302 000 064                      JFZ   MD80
2468:A  031773 076 000                          LOAD  0
2469:A  031775 062 366 212                      STO   MANDR
2470:A  032000 076 001                  MD80    LOAD  1
2471:A  032002 260                      MD79    ORB
2472:A  032003 041 071 201 266                  IOR   YAWACT
2473:A  032007 107                              LBA
2474:A  032010 072 133 174                      LOAD  S6A9
2475:A  032013 041 134 174 246                  AND   S6A10
2476:A  032017 041 114 176 246                  AND   C6A3
2477:A  032023 041 115 176 246                  AND   C6A4
2478:A  032027 041 203 211 246                  AND   YAWSTF
2479:A  032033 057 346 001                      INV
2480:A  032036 240                              NDB
2481:A  032037 062 071 201                      STO   YAWACT
2482:A
2483:A  032042 072 051 202                      LOAD  SBENB       ** RHFACT
2484:A  032045 041 052 202 266                  IOR   SBINH
2485:A  032051 041 053 202 266                  IOR   LO
2486:A  032055 157 072 102 174 057 346          CAND  S2A7
        032063 001 245
2487:A  032065 041 065 201 266                  IOR   RHFACT
2488:A  032071 157 072 050 202 057 346          CAND  RHFCLR
        032077 001 245
2489:A  032101 062 065 201                      STO   RHFACT
2490:A  032104 302 112 064                      JFZ   MD104
2491:A  032107 062 105 201                      STO   RHFCNT
2492:A
2493:A  032112 072 050 202              MD104   LOAD  RHFCLR      ** RHFCLR
2494:A  032115 267                              ORA
2495:A  032116 312 145 064                      JTZ   MD96
2496:A  032121 072 215 203                      LOAD  RCNTR
2497:A  032124 074                              INA
2498:A  032125 062 215 203                      STO   RCNTR
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2499:A   032130 376 062          COMP  50
2500:A   032132 302 145 064      JFZ   MD96
2501:A   032135 076 000          LOAD  0
2502:A   032137 062 215 203      STO   RCNTR
2503:A   032142 062 050 202      STO   RHPCLR
2504:A
2505:A   032145 072 053 202 MD96 LOAD  LO          ** SET MODE NUMBER
2506:A   032150 267              ORA
2507:A   032151 312 164 064      JTZ   MD81
2508:A   032154 076 001          LOAD  1
2509:A   032156 062 076 202      STO   IMODER
2510:A   032161 303 332 064      JMP   MD88
2511:A   032164 072 052 202 MD81 LOAD  SBINH
2512:A   032167 267              ORA
2513:A   032170 312 203 064      JTZ   MD82
2514:A   032173 076 002          LOAD  2
2515:A   032175 062 076 202      STO   IMODER
2516:A   032200 303 332 064      JMP   MD88
2517:A   032203 072 051 202 MD82 LOAD  SBENB
2518:A   032206 267              ORA
2519:A   032207 312 222 064      JTZ   MD83
2520:A   032212 076 003          LOAD  3
2521:A   032214 062 076 202      STO   IMODER
2522:A   032217 303 332 064      JMP   MD88
2523:A   032222 072 073 201 MD83 LOAD  STRTUP
2524:A   032225 267              ORA
2525:A   032226 312 241 064      JTZ   MD84
2526:A   032231 076 004          LOAD  4
2527:A   032233 062 076 202      STO   IMODER
2528:A   032236 303 332 064      JMP   MD88
2529:A   032241 072 072 201 MD84 LOAD  RAMP
2530:A   032244 267              ORA
2531:A   032245 312 260 064      JTZ   MD85
2532:A   032250 076 005          LOAD  5
2533:A   032252 062 076 202      STO   IMODER
2534:A   032255 303 332 064      JMP   MD88
2535:A   032260 072 102 201 MD85 LOAD  PWRGEN
2536:A   032263 267              ORA
2537:A   032264 312 277 064      JTZ   MD86
2538:A   032267 076 006          LOAD  6
2539:A   032271 062 076 202      STO   IMODER
2540:A   032274 303 332 064      JMP   MD88
2541:A   032277 072 066 201 MD86 LOAD  NSD
2542:A   032302 267              ORA
2543:A   032303 312 316 064      JTZ   MD87
2544:A   032306 076 007          LOAD  7
2545:A   032310 062 076 202      STO   IMODER
2546:A   032313 303 332 064      JMP   MD88
2547:A   032316 072 067 201 MD87 LOAD  ESD
2548:A   032321 267              ORA
2549:A   032322 312 332 064      JTZ   MD88
2550:A   032325 076 010          LOAD  8
2551:A   032327 062 076 202      STO   IMODER
2552:A
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2553:A  032332 072 163 174          MD88   LOAD  SYA17        ** MANUAL
2554:A  032335 062 101 201                 STO   MANUAL
2555:A  032340 267                         ORA
2556:A  032341 302 347 064                 JFZ   MD89
2557:A  032344 062 121 201                 STO   MANCNT
2558:A
2559:A  032347 072 051 202          MD89   LOAD  SBENB        ** DATA ARCHIVE ACTIVATION
2560:A  032352 041 103 201 266             IOR   DATAA
2561:A  032356 157 072 152 216 057 346     CAND  ARCCPL
        032364 001 245
2562:A  032366 062 103 201                 STO   DATAA
2563:A  032371 302 377 064                 JFZ   MD90
2564:A  032374 062 123 201                 STO   DACNT
2565:A
2566:A  032377 072 152 216          MD90   LOAD  ARCCPL       ** ARCCPL
2567:A  032402 267                         ORA
2568:A  032403 302 016 065                 JFZ   MD91
2569:A  032406 076 000                     LOAD  0
2570:A  032410 062 131 202                 STO   CNTR15
2571:A  032413 303 042 065                 JMP   MD92
2572:A  032416 072 131 202          MD91   LOAD  CNTR15
2573:A  032421 074                         INA
2574:A  032422 062 131 202                 STO   CNTR15
2575:A  032425 376 062                     COMP  50
2576:A  032427 302 042 065                 JFZ   MD92
2577:A  032432 076 000                     LOAD  0
2578:A  032434 062 152 216                 STO   ARCCPL
2579:A  032437 062 131 202                 STO   CNTR15
2580:A
2581:A  032442 072 152 215          MD92   LOAD  REMON        ** R.E.D. ON REMOTE TERMINAL ON
2582:A  032445 041 105 202 256             XOR   OREMON
2583:A  032451 041 152 215 246             AND   REMON
2584:A  032455 157 072 060 202 057 346     CAND  OTREM
        032463 001 245
2585:A  032465 062 060 202                 STO   OTREM
2586:A  032470 312 107 065                 JTZ   MD93
2587:A  032473 052 223 203                 LDAD  AINC
2588:A  032476 042 231 203                 STOD  ARINC
2589:A  032501 072 243 203                 LOAD  ADIR
2590:A  032504 062 246 203                 STO   ARDIR
2591:A  032507 072 152 215          MD93   LOAD  REMON
2592:A  032512 062 105 202                 STO   OREMON
2593:A
2594:A  032515 072 020 215                 LOAD  STEON        ** R.E.D. ON SITE TERMINAL ON
2595:A  032520 041 106 202 256             XOR   OSTEON
2596:A  032524 041 020 215 246             AND   STEON
2597:A  032530 157 072 061 202 057 346     CAND  OTSTE
        032536 001 245
2598:A  032540 062 061 202                 STO   OTSTE
2599:A  032543 312 152 065                 JTZ   MD94
2600:A  032546 052 223 203                 LDAD  AINC
2601:A  032551 042 227 203                 STOD  ASINC
2602:A  032554 072 243 203                 LOAD  ADIR
2603:A  032557 062 245 203                 STO   ASDIR
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2604:A  032562 072 020 215          MD94    LOAD  STEON
2605:A  032565 062 106 202                  STO   OSTEON
2606:A                              .
2607:A  032570 072 102 213                  LOAD  CDSON          ** R.E.D. ON CDS TERMINAL ON
2608:A  032573 041 107 202 256              XOR   OCDSON
2609:A  032577 041 102 213 246              AND   CDSON
2610:A  032603 157 072 062 202 057 346      LAND  OTCDS
        032611 001 245
2611:A  032613 062 062 202                  STO   OTCDS
2612:A  032616 312 235 065                  JTZ   MD95
2613:A  032621 052 223 203                  LOAD  AINC
2614:A  032624 042 225 203                  STOD  ACINC
2615:A  032627 072 243 203                  LOAD  ADIR
2616:A  032632 062 244 203                  STO   ACDIR
2617:A  032635 072 102 213          MD95    LOAD  CDSON
2618:A  032640 062 107 202                  STO   OCDSON
2619:A                              .
2620:A  032643 311                          RET
2621:A                              .
2622:A                              . *** MODE SUBROUTINES ***
2623:A                              .
2624:A                              . SUBROUTINE TO CHECK FOR LARGE YAW ERROR FOR NSDE4
2625:A                              .   145 - 7.7 * CONTROL ANGLE    IN DEGREES
2626:A                              .   4174.625 - 4.27778 * CONTROL ANGLE   IN COUNTS
2627:A                              .
2628:A  032644 203 065 177 035      YECALC  DBYTE LDS,*C2A21,FLTS          CONTROL ANGLE
2629:A  032650 202 216 343 210 003 022      DBYTE LDFI,142,227,136,3,FMUL   * 4.27777778
2630:A  032656 025                          DBYTE CHSF
2631:A  032657 202 000 165 202 015 020      DBYTE LDFI,0,117,130,13,FADD    + 4174.625
2632:A  032665 037 205 077 202              DBYTE FIXS,STS,*TEMP
2633:A  032671 200                          DBYTE EXIT
2634:A                              .
2635:A                              . SUBROUTINE TO CHECK FOR LOW WIND SHUTDOWN FOR NSDE2
2636:A                              .
2637:A  032672 203 145 203 035      CNCALC  DBYTE LDS,*PMANU,FLTS                  POWER SET POINT IN COUNTS
2638:A  032676 202 000 360 236 014 023      DBYTE LDFI,0,240,158,12,FDIV            /2543 (7.3 MW)
2639:A  032704 202 000 000 300 004 022      DBYTE LDFI,0,0,192,4,FMUL               *12
2640:A  032712 025                          DBYTE CHSF                               CHANGE SIGN
2641:A  032713 202 000 000 370 006 020      DBYTE LDFI,0,0,248,6,FADD                +62 (5745)
2642:A  032721 204 065 200 023              DBYTE LDB,#BC,FDIV                       PUT INTO COUNTS
2643:A  032725 037 205 077 202              DBYTE FIXS,STS,*TEMP
2644:A  032731 200                          DBYTE EXIT
2645:A                              .
2646:A                              . SUBROUTINE TO TAKE THE ABSOLUTE VALUE OF THE DIFFERENCE BETWEEN DE AND HL
2647:A                              .   AND SUBTRACT 5 DEGREES CONTROL ANGLE.  USED IN NSDL07.
2648:A                              .
2649:A  032732 116                  CDIFF5  LCM
2650:A  032733 043                          INX   H
2651:A  032734 106                          LBM
2652:A  032735 140                          LMB
2653:A  032736 151                          LIC
2654:A  032737 315 162 137                  CALL  NEGNUM
2655:A  032742 353                          DCHL
2656:A  032743 116                          LCM
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2657:A  032744 043                      INX   H
2658:A  032745 106                      LBM
2659:A  032746 353                      DCHL
2660:A  032747 011                      DAD   B
2661:A  032750 174                      LAH
2662:A  032751 007                      SLC
2663:A  032752 322 360 065              JFC   MD27
2664:A  032755 315 152 137              CALL  POSNUM
2665:A  032760 353                MD27  DCHL
2666:A  032761 041 315 000              LDAD  205             5 DEGREES YAW ERROR
2667:A  032764 315 162 137              CALL  NEGNUM
2668:A  032767 031                      DAD   D
2669:A  032770 311                      RET
2670:A                            .
2671:A                            . SUBROUTINE TO TAKE WIND DIRECTION AVERAGE (HL IS THE LOCATION) (-180 TO +180)
2672:A                            .   AND ADD 180 AND TAKE THE ABSOLUTE VALUE AND PUT RESULT INTO DE.
2673:A                            .
2674:A  032771 136                ABSWDA LEM
2675:A  032772 043                      INX   H
2676:A  032773 126                      LDM
2677:A  032774 041 000 010              LDAD  2048            180 YAW ERROR
2678:A  032777 315 162 137              CALL  NEGNUM
2679:A  033002 031                      DAD   D
2680:A  033003 174                      LAH
2681:A  033004 007                      SLC
2682:A  033005 322 013 066              JFC   MD37
2683:A  033010 315 152 137              CALL  POSNUM
2684:A  033013 353                MD37  DCHL
2685:A  033014 311                      RET
2686:A                            .
2687:A                            .
2688:A                            . ***** DATA PROCESSING MODULE *****
2689:A                            .
2690:A                            .
2691:A                            .     DATA PROCESSING IS RESPONSIBLE FOR 7 THINGS.
2692:A                            . 1) AT MIDNIGHT
2693:A                            .    A) ZERO OUT TOTAL TIME IN DAY
2694:A                            .    B) ZERO OUT TIME IN LO TODAY
2695:A                            .    C) ZERO OUT ONGOING ENERGY PRODUCED TODAY
2696:A                            .    D) UPDATE ENERGY PRODUCED YESTERDAY
2697:A                            .    E) UPDATE ENERGY PRODUCED TO DATE
2698:A                            . 2) CALCULATE ONGOING ENERGY (POWER*DT)
2699:A                            . 3) CALCULATE DELTA1 AND DELTA2 TIP CORRECTION
2700:A                            . 4) PACK GROUPS OF 8 DISCRETES INTO 8 BIT WORDS
2701:A                            . 5) 12 SECOND NOMINAL POWER AVERAGE
2702:A                            . 6) 50 SECOND NOMINAL WIND SPEED AVERAGE
2703:A                            . 7) 50 SECOND NOMINAL WIND DIRECTION AVERAGE
2704:A                            .
2705:A  033015 072 051 212        DPS11  LOAD  DTOLD          LOAD DATE FROM LAST CYCLE
2706:A  033020 041 113 200              HL    DATE            CHECK WITH CURRENT DATE
2707:A  033023 226                      SUM
2708:A  033024 312 106 066              JTZ   DP7             JUMP IF DATE HAS NOT CHANGED
2709:A  033027 021 154 071              DE    DPS13           MIDNIGHT, CALL APU SUBROUTINE
2710:A  033032 315 137 001              CALL  APUSTK
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2711:A  033035 001 011 212          BC      TOTTME      ZERO OUT 32 BIT RAM TOTAL TIME
2712:A  033040 315 346 067          CALL    ZAPU        CALL SUBROUTINE TO DO IT
2713:A  033043 001 015 212          BC      LOTME       ZERO OUT 32 BIT RAM TIME IN LO
2714:A  033046 315 346 067          CALL    ZAPU        CALL SUBROUTINE TO DO IT
2715:A  033051 001 023 212          BC      EPR         ZERO OUT 32 BIT RAM ONGOING ENERGY PRODUCED DAILY
2716:A  033054 315 346 067          CALL    ZAPU        CALL SUBROUTINE TO DO IT
2717:A  033057 052 027 212          LDAD    EP          UPDATE ENERGY PRODUCED YESTERDAY
2718:A  033062 042 052 212          STOD    EPY
2719:A  033065 052 054 212          LDAD    EPYRD       UPDATE ENERGY PRODUCED TO DATE
2720:A  033070 353                  DEHL
2721:A  033071 052 054 212          LDAD    EPYR
2722:A  033074 031                  DAD     D
2723:A  033075 042 054 212          STOD    EPYR
2724:A  033100 072 113 200          LOAD    DATE
2725:A  033103 062 051 212          STO     DTEOLD
2726:A
2727:A  033106 001 011 212  DP7     BC      TOTTME      INCREMENT 32 BIT TOTAL TIME TODAY RAM
2728:A  033111 315 361 067          CALL    AD1DBL      CALL SUBROUTINE TO DO IT
2729:A  033114 072 053 202          LOAD    LO          LOAD LO FLAG
2730:A  033117 267                  ORA
2731:A  033120 312 131 066          JTZ     DP2         JUMP IF IT IS NOT IN LO
2732:A  033123 001 015 212          BC      LOTME       INCREMENT 32 BIT TIME IN LO TODAY RAM
2733:A  033126 315 361 067          CALL    AD1DBL      CALL SUBROUTINE TO DO IT
2734:A  033131 052 065 175  DP2     LDAD    S2A21       FIRST AILERON ANGLE
2735:A  033134 353                  DEHL
2736:A  033135 041 377 017          LDAD    4095        OVERANGE VALUE ?
2737:A  033140 315 162 137          CALL    NEGNUM
2738:A  033143 031                  DAD     D
2739:A  033144 174                  LAH
2740:A  033145 265                  ORL
2741:A  033146 302 157 066          JFZ     DP1         JUMP IF NOT OVERANGE
2742:A  033151 041 155 017          LDAD    3949        WHEN BIAS1 AND SLOPE1 GO ON THIS = 4095
2743:A  033154 042 065 175          STOD    S2A21
2744:A  033157 052 067 175  DP1     LDAD    S2A23       SECOND AILERON ANGLE
2745:A  033162 353                  DEHL
2746:A  033163 041 377 017          LDAD    4095        OVERANGE VALUE ?
2747:A  033166 315 162 137          CALL    NEGNUM
2748:A  033171 031                  DAD     D
2749:A  033172 174                  LAH
2750:A  033173 265                  ORL
2751:A  033174 302 205 066          JFZ     DP3         JUMP IF NOT OVERANGE
2752:A  033177 041 376 014          LDAD    3326        WHEN BIAS1 AND SLOPE1 GO ON THIS = 4095
2753:A  033202 042 067 175          STOD    S2A23
2754:A  033205 021 011 071  DP3     DE      DFST2       AVAILABILITY %, ENERGY TODAY, BETA CORRECTION
2755:A  033210 315 137 001          CALL    APUSTR
2756:A
2757:A  033213 041 065 174          HL      S1A1        * DIGITAL PACKING
2758:A  033216 006 010              LB      8           PACK1 - S1.1 THRU S2.4
2759:A  033220 315 320 067          CALL    DISPKR
2760:A  033223 062 101 177          STO     PACK1
2761:A  033226 041 075 174          HL      S2A5        PACK2 - S2.5 THRU S3.3
2762:A  033231 006 010              LB      8
2763:A  033233 315 320 067          CALL    DISPKR
2764:A  033236 062 102 177          STO     PACK2
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2765:A  033241 041 105 174      NL    S3A11       PACK3 - S3.11 THRU S4.27
2766:A  033244 006 010          LB    8
2767:A  033246 315 320 067      CALL  DISPKR
2768:A  033251 062 103 177      STO   PACK3
2769:A  033254 041 115 174      NL    S4A28       PACK4 - S4.28 THRU S5.6
2770:A  033257 006 010          LB    8
2771:A  033261 315 320 067      CALL  DISPKR
2772:A  033264 062 104 177      STO   PACK4
2773:A  033267 041 125 174      NL    S5A7        PACK5 - S5.7 THRU S6.10
2774:A  033272 006 010          LB    8
2775:A  033274 315 320 067      CALL  DISPKR
2776:A  033277 062 105 177      STO   PACK5
2777:A  033302 041 135 174      NL    S6A2        PACK6 - S6.2 THRU S6.7
2778:A  033305 006 010          LB    8
2779:A  033307 315 320 067      CALL  DISPKR
2780:A  033312 062 106 177      STO   PACK6
2781:A  033315 041 145 174      NL    S7A4        PACK7 - S7.4 THRU S8.2
2782:A  033320 006 010          LB    8
2783:A  033322 315 320 067      CALL  DISPKR
2784:A  033325 062 107 177      STO   PACK7
2785:A  033330 041 155 174      NL    S8A6        PACK8 - S8.6 THRU S9.18
2786:A  033333 006 010          LB    8
2787:A  033335 315 320 067      CALL  DISPKR
2788:A  033340 062 110 177      STO   PACK8
2789:A  033343 041 165 174      NL    S9A19       PACK9 - S9.19 THRU S9.22
2790:A  033346 006 010          LB    8
2791:A  033350 315 320 067      CALL  DISPKR
2792:A  033353 062 111 177      STO   PACK9
2793:A  033356 041 065 176      NL    C1A1        PACK10 - C1.1 THRU C2.29
2794:A  033361 006 010          LB    8
2795:A  033363 315 320 067      CALL  DISPKR
2796:A  033366 062 112 177      STO   PACK10
2797:A  033371 041 075 176      NL    C2A30       PACK11 - C2.30 THRU C5.2
2798:A  033374 006 010          LB    8
2799:A  033376 315 320 067      CALL  DISPKR
2800:A  033401 062 113 177      STO   PACK11
2801:A  033404 041 105 176      NL    C5A3        PACK12 - C5.3 THRU C6.3
2802:A  033407 006 010          LB    8
2803:A  033411 315 320 067      CALL  DISPKR
2804:A  033414 062 114 177      STO   PACK12
2805:A  033417 041 115 176      NL    C6A4        PACK13 - C6.4 THRU C9.1
2806:A  033422 006 005          LB    5
2807:A  033424 315 320 067      CALL  DISPKR
2808:A  033427 062 115 177      STO   PACK13
2809:A
2810:A  033432 052 101 175      LDAD  S9A4        * WIND SPEED AVERAGE
2811:A  033435 042 073 212      STOD  VALAVG      LOAD CURRENT VALUE AND STORE IT
2812:A  033440 006 010          LDAD  8
2813:A  033442 062 060 212      STO   CNT1A       # OF CYCLES FOR SUMMATION
2814:A  033445 062 061 212      STO   CNT2A       # OF SUMMATIONS FOR FIRST AVERAGES
2815:A  033450 062 062 212      STO   CNT3A       # OF FIRST AVERAGES FOR SECOND AVERAGE
2816:A  033453 041 137 212      NL    WVS         LOCATION OF SUMMATION VALUE
2817:A  033456 042 071 212      STOD  AVG1        STORE IT
2818:A  033461 041 145 212      NL    WVC1        LOCATION OF CURRENT COUNTER FOR SUMMATION
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2819:A  033464 042 067 212              STOD  AVGC1
2820:A  033467 041 077 212              HL    WV1A      LOCATION OF ARRAY OF SUMMATION/CNT1A/CNT2A
2821:A  033472 042 063 212              STOD  AMT1A
2822:A  033475 041 117 212              HL    WV2A      LOCATION OF ARRAY OF FIRST AVERAGE/CNT3A
2823:A  033500 042 065 212              STOD  AMT2A
2824:A  033503 315 017 070              CALL  SUBAVG    CALL SUBROUTINE TO DO AVERAGING
2825:A
2826:A  033506 052 101 175              LDAD  SYA4      * WIND DIRECTION LESS THAN 5 MPH
2827:A  033511 353                      DEHL
2828:A  033512 041 315 000              LDAD  205       COMPARE WIND SPEED TO 5 MPH
2829:A  033515 315 162 137              CALL  NEGNUM
2830:A  033520 031                      DAD   D
2831:A  033521 174                      LAH
2832:A  033522 007                      SLC
2833:A  033523 322 165 067              JFC   DP11      JUMP IF GREATER THAN 5 MPH
2834:A  033526 041 000 010              LDAD  2048      WIND SPEED < 5 MPH SET WIND DIRECTION = 0 DEG
2835:A  033531 042 212 212              STOD  WD1AVG    STORE IN FIRST AVERAGE
2836:A  033534 042 214 212              STOD  WD2AVG    STORE IN SECOND AVERAGE
2837:A  033537 006 040                  LB    32        # OF LOCATION IN TWO ARRAYS
2838:A  033541 041 150 212              HL    WD1A      STARTING LOCATION OF THE ARRAYS
2839:A  033544 353                      DEHL
2840:A  033545 076 000          DP10    LA    0         STORE 256 (2048/8) IN ARRAYS
2841:A  033547 022                      LMAR  B         LSB
2842:A  033550 023                      INX   D
2843:A  033551 005                      DCB
2844:A  033552 076 001                  LA    1         MSB
2845:A  033554 022                      LMAR  B
2846:A  033555 023                      INX   D
2847:A  033556 005                      DCB             DECREMENT # IN ARRAYS
2848:A  033557 302 145 067              JFZ   DP10      JUMP IF NOT DONE
2849:A  033562 303 241 067              JMP   DP12      JUMP TO SKIP AVERAGING
2850:A  033565 052 103 175      DP11    LDAD  SYA5      * WIND DIRECTION AVERAGE
2851:A  033570 042 073 212              STOD  VALAVG    STORE CURRENT VALUE OF DIRECTION
2852:A  033573 076 010                  LOAD  8
2853:A  033575 062 060 212              STO   CNT1A     # OF CYCLES FOR SUMMATION
2854:A  033600 062 061 212              STO   CNT2A     # OF SUMMATIONS FOR FIRST AVERAGE
2855:A  033603 062 062 212              STO   CNT3A     # OF FIRST AVERAGES FOR SECOND AVERAGE
2856:A  033606 041 210 212              HL    WD5       LOCATION OF SUMMATION VALUE
2857:A  033611 042 071 212              STOD  AVG1
2858:A  033614 041 216 212              HL    WDC1      LOCATION OF CURRENT COUNTER FOR SUMATION
2859:A  033617 042 067 212              STOD  AVGC1
2860:A  033622 041 150 212              HL    WD1A      LOCATION OF ARRAY OF SUMMATION/CNT1A/CNT2A
2861:A  033625 042 063 212              STOD  AMT1A
2862:A  033630 041 170 212              HL    WD2A      LOCATION OF ARRAY OF FIRST AVERAGE/CNT3A
2863:A  033633 042 065 212              STOD  AMT2A
2864:A  033636 315 017 070              CALL  SUBAVG    CALL SUBROUTINE TO DO AVERAGING
2865:A
2866:A  033641 052 077 175      DP12    LDAD  SYA5      * POWER AVERAGE
2867:A  033644 042 073 212              STOD  VALAVG    STORE CURRENT VALUE
2868:A  033647 076 010                  LOAD  8
2869:A  033651 062 060 212              STO   CNT1A     # OF CYCLES FOR SUMMATION
2870:A  033654 062 061 212              STO   CNT2A     # OF SUMMATIONS FOR FIRST AVERAGE
2871:A  033657 076 002                  LOAD  2
2872:A  033661 062 062 212              STO   CNT3A     # OF FIRST AVERAGES FOR SECOND AVERAGE
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2873:A   033664 041 245 212          HL    PKS          LOCATION OF SUMMATION VALUE
2874:A   033667 042 071 212          STOD  AVG1
2875:A   033672 041 253 212          HL    PRC1         LOCATION OF CURRENT COUNTER FOR SUMMATION
2876:A   033675 042 067 212          STOD  AVGC1
2877:A   033700 041 221 212          HL    PR1A         LOCATION OF ARRAY OF SUMMATION/CNT1A/CNT2A
2878:A   033703 042 063 212          STOD  AMT1A
2879:A   033706 041 241 212          HL    PK2A         LOCATION OF ARRAY OF FIRST AVERAGE/CNT3A
2880:A   033711 042 065 212          STOD  AMT2A
2881:A   033714 315 017 070          CALL  SUBAVG       CALL SUBROUTINE TO DO AVERAGING
2882:A   033717 311                  RET                RETURN
2883:A                          .
2884:A                          . ** DATA PROCESSING SUBROUTINES **
2885:A                          .
2886:A                          .    THIS SUBROUTINE PACKS UP TO 8 DISCRETES INTO ONE 8-BIT WORD
2887:A                          .      THE RIGHT MOST BIT WILL BE THE ONE DEFINED BY THE HL STATEMENT
2888:A                          .
2889:A   033720 110              DISPKR  LCB                PUTS INTO C THE # TO PACK
2890:A   033721 257                      XRA                ZEROS ACCUMULATOR
2891:A   033722 137              PACK    LEA                PUTS A INTO E
2892:A   033723 170                      LAB                PUTS # TO BE PACKED INTO ACCUMULATOR
2893:A   033724 221                      SUC                A-C (SUBTRACT # DONE TO GET SHIFT)
2894:A   033725 127                      LDA                STORE SHIFT AMOUNT INTO D
2895:A   033726 176                      LAM                LOAD ACCUMULATOR WITH CURRENT SIGNAL
2896:A   033727 312 337 067             JTZ   ENDSHF       TEST IF ANY SHIFTING
2897:A   033732 007              SHIFT   SLC                SHIFT ACCUMULATOR LEFT ONE
2898:A   033733 025                      DCD                DECREMENT SHIFT #
2899:A   033734 302 332 067             JFZ   SHIFT        DONE SHIFTING ?
2900:A   033737 263              ENDSHF  ORE                ADDS A INTO PREVIOUS WORD
2901:A   033740 015                      DCC                DECREMENT # OF SIGNALS TO PACK
2902:A   033741 310                      RTZ
2903:A   033742 043                      INX   H            INCREMENT TO GET NEXT SIGNAL
2904:A   033743 303 322 067             JMP   PACK
2905:A                          .
2906:A                          .   SUBROUTINE TO ZERO OUT 4 RAM LOCATIONS STARTING AT BC
2907:A                          .
2908:A   033746 046 004         ZAPU    LH    4
2909:A   033750 076 000                  LOAD  0
2910:A   033752 002              ZA1     LMAR  B            STORE THE VALUE OF ACCUMULATOR
2911:A   033753 003                      INX   B            NEXT RAM
2912:A   033754 045                      DCH                DECREMENT COUNTER
2913:A   033755 302 352 067             JFZ   ZA1          JUMP IF NOT DONE WITH ALL RAM
2914:A   033760 311                      RET
2915:A                          .
2916:A                          .   SUBROUTINE TO ADD 1 TO 32 BIT FIXED FORMAT RAM AT BC AND RESTORE IT
2917:A                          .
2918:A   033761 026 004         AD1DBL  LD    4
2919:A   033763 012              AD11    LAMR  B            GET THE LSB VALUE
2920:A   033764 306 001                  AD    1            INCREMENT IT
2921:A   033766 002                      LMAR  B            RESTORE IT
2922:A   033767 010                      RFC                RETURN IF NO OVERFLOW
2923:A   033770 025                      DCD                DECREMENT COUNTER
2924:A   033771 310                      RTZ                RETURN IF DONE WITH ALL RAM
2925:A   033772 003                      INX   B            NEXT RAM LOCATION
2926:A   033773 303 363 067             JMP   AD11         JUMP TO INCREMENT NEXT RAM VALUE
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2927:A                                  .
2928:A                                  .   SUBROUTINE TO CALCULATE HOW MANY SHIFTS ARE EQUIVALENT TO /ACCUMULATOR
2929:A                                  .     B WHEN EXITING = # OF SHIFTS      A=POWER OF 2 , <=128
2930:A                                  .
2931:A  034000 376 006 000              NBSHF   LB      0
2932:A  034002 376 001                          COMP    1               /1
2933:A  034004 310                              RTZ                     RETURN IF /1 , # SHIFTS = 0
2934:A  034005 267                              ORA                     0
2935:A  034006 310                              RTZ                     RETURN IF /0 , # SHIFTS = 0
2936:A  034007 017                      NB1     SRC                     SHIFT RIGHT ONCE
2937:A  034010 346 177                          AND     127             MAKE SURE THAT 7TH BIT = 0
2938:A  034012 004                              INB                     INCREMENT # SHIFTS
2939:A  034013 376 001                          COMP    1
2940:A  034015 302 005 070                      JFZ     NB1             JUMP IF ACCUMULATOR SHIFTED .NE. 1
2941:A  034020 311                              RET
2942:A                                  .
2943:A                                  .   SUBROUTINE TO AVERAGE ANY VALUE BASED ON INPUT TO THIS SUBROUTINE AS
2944:A                                  . DESCRIBED IN THE DECLARES.
2945:A                                  .
2946:A  034021 052 071 212              SUBAVG  LDAD    AVG1            LOAD ADDRESS OF SUMMATION
2947:A  034026 353                              DEHL
2948:A  034027 032                              LAMR    D               GET LSB OF THIS VALUE
2949:A  034030 117                              LCA
2950:A  034031 023                              INX     D
2951:A  034032 032                              LAMR    D               GET MSB
2952:A  034033 107                              LBA                     STORE INTO BC
2953:A  034034 052 073 212                      LDAD    VALAVG          LOAD CURRENT VALUE TO BE AVERAGED
2954:A  034037 011                              DAD     B               ADD IT TO SUMMATION
2955:A  034040 042 075 212                      STOD    AVGTMP          TEMPORARILY STORE SUMMATION VALUE
2956:A  034043 174                              LAH
2957:A  034044 022                              LMAR    D               RESAVE MSB OF SUMMATION
2958:A  034045 033                              DCX     D
2959:A  034046 175                              LAL
2960:A  034047 022                              LMAR    D               RESAVE LSB
2961:A  034050 052 067 212                      LDAD    AVGC1           LOAD ADDRESS OF CURRENT COUNT OF SUMMATION
2962:A  034053 353                              DEHL
2963:A  034054 032                              LAMR    D               GET VALUE
2964:A  034055 074                              INA                     INCREMENT IT
2965:A  034056 022                              LMAR    D               RESAVE IT
2966:A  034057 041 040 212                      HL      CNT1A           LOCATION OF # OF CYCLES FOR SUMMATION
2967:A  034062 276                              CPM                     COMPARE # CURRENT CYCLES TO DESIRED
2968:A  034063 300                              RNZ                     RETURN IF NOT EQUAL
2969:A  034064 076 000                          LOAD    0
2970:A  034066 022                              LMAR    D               ZERO OUT CURRENT # OF CYCLES FOR SUMMATION
2971:A  034067 353                              DEHL
2972:A  034070 032                              LAMR    D               LOAD # OF CYCLES FOR SUMMATION
2973:A  034071 315 376 067                      CALL    NBSHF           CALCULATE # SHIFTS THIS EQUALS
2974:A  034074 052 075 212                      LDAD    AVGTMP          LOAD SUMMATION VALUE
2975:A  034077 315 117 137                      CALL    SHIFTR          SHIFT HL RIGHT B TIMES
2976:A  034102 023                              INX     D               LOCATION OF # SUMMATIONS FOR FIRST AVERAGE
2977:A  034103 032                              LAMR    D               LOAD VALUE
2978:A  034104 315 376 067                      CALL    NBSHF           CALCULATE # OF SHIFTS THIS EQUALS
2979:A  034107 315 117 137                      CALL    SHIFTR          SHIFT HL RIGHT B TIMES AGAIN
2980:A  034112 042 075 212                      STOD    AVGTMP
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2981:A  034111 052 071 212          LDAD  AVG1          LOCATION OF SUMMATION VALUE
2982:A  034114 353                  DEHL
2983:A  034115 076 000              LOAD  0             ZERO OUT SUMMATION RAMS
2984:A  034117 022                  LMAR  D
2985:A  034120 023                  INX   D
2986:A  034121 022                  LMAR  D
2987:A                        . GET FIRST AVERAGE
2988:A  034122 052 067 212          LDAD  AVGC1         ADDRESS OF COUNTER FOR SUMMATION
2989:A  034125 043                  INX   H             ADDRESS OF COUNTER FOR FIRST AVERAGE
2990:A  034126 345                  PUSH  H             STORE IT IN THE STACK
2991:A  034127 353                  DEHL
2992:A  034130 032                  LAMR  D             GET VALUE OF COUNT
2993:A  034131 117                  LCA
2994:A  034132 006 000              LB    0             STORE IT IN BC
2995:A  034134 052 063 212          LDAD  AMT1A         LOCATION OF ARRAY OF SUMMATION/CNT1A/CNT2A
2996:A  034137 011                  DAD   B
2997:A  034140 011                  DAD   B             GET TO CURRENT ENTRY
2998:A  034141 345                  PUSH  H             STORE LOCATION IN STACK
2999:A  034142 353                  DEHL
3000:A  034143 032                  LAMR  D             GET LSB
3001:A  034144 157                  LLA
3002:A  034145 023                  INX   D
3003:A  034146 032                  LAMR  D             GET MSB
3004:A  034147 147                  LHA                 HL : VALUE OF CURRENT ENTRY
3005:A  034150 353                  DEHL                DE : VALUE OF CURRENT ENTRY
3006:A  034151 052 071 212          LDAD  AVG1          LOCATION OF SUMMATION VALUE
3007:A  034154 043                  INX   H
3008:A  034155 043                  INX   H             LOCATION OF FIRST AVERAGE
3009:A  034156 104                  LBH
3010:A  034157 115                  LCL                 BC : LOCATION OF FIRST AVERAGE
3011:A  034160 012                  LAMR  B             GET AVG LSB
3012:A  034161 157                  LLA
3013:A  034162 003                  INX   B
3014:A  034163 012                  LAMR  B             GET AVG MSB
3015:A  034164 147                  LHA                 HL : FIRST AVERAGE VALUE
3016:A  034165 353                  DEHL                SWAP DE & HL
3017:A  034166 315 162 137          CALL  NEGNUM        MAKE HL A NEGATIVE NUMBER
3018:A  034171 031                  DAD   D
3019:A  034172 353                  DEHL
3020:A  034173 052 075 212          LDAD  AVGTMP        HL = SUMMATION / CNT1A / CNT2A
3021:A  034176 031                  DAD   D             HL = NEW FIRST AVERAGE
3022:A  034177 353                  DEHL
3023:A  034200 172                  LAD
3024:A  034201 002                  LMAR  B             RESAVE MSB INTO FIRST AVERAGE VALUE
3025:A  034202 013                  DCX   B
3026:A  034203 173                  LAE
3027:A  034204 002                  LMAR  B             RESAVE LSB INTO FIRST AVERAGE VALUE
3028:A  034205 301                  POP   B             RECALL LOCATION OF CURRENT ENTRY
3029:A  034206 052 075 212          LDAD  AVGTMP        UPDATE CURRENT ENTRY IN SUMMATION/CNT1A/CNT2A
3030:A  034211 175                  LAL
3031:A  034212 002                  LMAR  B             LSB
3032:A  034213 003                  INX   B
3033:A  034214 174                  LAH
3034:A  034215 002                  LMAR  B             MSB
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3035:A   034216 301                  POP   B            RECALL ADDRESS OF COUNT FOR FIRST AVERAGE
3036:A   034217 012                  LAMR  B            LOAD COUNT
3037:A   034220 074                  INA                INCREMENT IT
3038:A   034221 002                  LMAR  B            RESAVE IT
3039:A   034222 041 061 212          HL    CNT2A        LOCATION OF # OF CYCLES FOR FIRST AVERAGE
3040:A   034225 276                  CPM
3041:A   034226 300                  RFZ                RETURN IF .NE. CURRENT COUNT
3042:A   034227 076 000              LOAD  0            ZERO OUT COUNT FOR FIRST AVERAGE
3043:A   034231 002                  LMAR  B
3044:A   034232 353                  DEHL               DE : LOCATION OF # OF SUMMATIONS FOR FIRST AVERAGE
3045:A   034233 023                  INX   D            LOCATION OF # 1ST AVERAGES TO YIELD SECOND AVERAGE
3046:A   034234 032                  LAMR  D            GET VALUE
3047:A   034235 267                  ORA
3048:A   034236 310                  RTZ                RETURN IF NO SECOND AVERAGE IS DESIRED (CNT3A=0)
3049:A   034237 376 001              COMP  1
3050:A   034241 302 264 070          JFZ   SBA1         JUMP IF CNT3A .NE. 1
3051:A   034244 104                  LBH                CNT3A=1    MEANS SECOND AVERAGE = FIRST AVERAGE
3052:A   034245 115                  LCL                BC : NEW FIRST AVERAGE
3053:A   034246 052 071 212          LDAD  AVG1         LOCATION OF SUMMATION VALUE
3054:A   034251 043                  INX   H
3055:A   034252 043                  INX   H            LOCATION OF FIRST AVERAGE
3056:A   034253 043                  INX   H
3057:A   034254 043                  INX   H            LOCATION OF SECOND AVERAGE
3058:A   034255 353                  DEHL
3059:A   034256 171                  LAC                STORE LSB OF NEW FIRST AVERAGE INTO SECOND AVERAGE
3060:A   034257 022                  LMAR  D
3061:A   034260 023                  INX   D
3062:A   034261 170                  LAB                GET MSB
3063:A   034262 022                  LMAR  D            SAVE IT
3064:A   034263 311                  RET
3065:A                       . HL : NEW FIRST AVERAGE   A : # OF FIRST AVERAGES FOR SECOND AVERAGES
3066:A   034264 315 376 067  SBA1    CALL  NBSHF        CALCULATE # OF SHIFTS OF FIRST AVERAGE
3067:A   034267 315 117 137          CALL  SHIFTR       SHIFT HL TO THE RIGHT B TIMES
3068:A   034272 042 075 212          STOD  AVGTMP
3069:A                       . GET SECOND AVERAGE
3070:A   034275 052 067 212          LDAD  AVGC1        ADDRESS OF COUNT FOR SUMMATION
3071:A   034300 043                  INX   H            ADDRESS OF COUNT FOR FIRST AVERAGE
3072:A   034301 043                  INX   H            ADDRESS OF COUNT FOR SECOND AVERAGE
3073:A   034302 345                  PUSH  H            STORE IT IN STACK
3074:A   034303 353                  DEHL
3075:A   034304 032                  LAMR  D            GET THE VALUE
3076:A   034305 117                  LCA
3077:A   034306 006 000              LB    0            STORE IT IN BC
3078:A   034310 052 065 212          LDAD  AMT2A        LOCATION OF ARRAY OF FIRST AVERAGE/CNT3A
3079:A   034313 011                  DAD   B
3080:A   034314 011                  DAD   B            GET TO CURRENT ENTRY
3081:A   034315 345                  PUSH  H            STORE LOCATION IN STACK
3082:A   034316 353                  DEHL
3083:A   034317 032                  LAMR  D            GET LSB
3084:A   034320 157                  LLA
3085:A   034321 023                  INX   D
3086:A   034322 032                  LAMR  D            GET MSB
3087:A   034323 147                  LHA
3088:A   034324 353                  DEHL               DE : VALUE OF CURRENT ENTRY
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3089:A  034325 052 071 212          LDAD  AVG1          LOCATION OF SUMMATION VALUE
3090:A  034330 043                  INX   H
3091:A  034331 043                  INX   H             LOCATION OF FIRST AVERAGE
3092:A  034332 043                  INX   H
3093:A  034333 043                  INX   H             LOCATION OF SECOND AVERAGE
3094:A  034334 104                  LBH
3095:A  034335 115                  LCL                 BC : LOCATION OF SECOND AVERAGE
3096:A  034336 012                  LAMR  B             GET AVG LSB
3097:A  034337 157                  LLA
3098:A  034340 003                  INX   B
3099:A  034341 012                  LAMR  B             GET AVG MSB
3100:A  034342 147                  LHA                 STORE IT IN HL
3101:A  034343 353                  DEHL                SWAP DE & HL
3102:A  034344 315 162 137          CALL  NEGNUM        MAKE HL NEGATIVE
3103:A  034347 031                  DAD   D
3104:A  034350 353                  DEHL
3105:A  034351 052 075 212          LDAD  AVGTMP        LOAD FIRST AVERAGE / CNT3A
3106:A  034354 031                  DAD   D             HL = NEW SECOND AVERAGE
3107:A  034355 353                  DEHL
3108:A  034356 172                  LAD
3109:A  034357 002                  LMAR  B             RESAVE MSB INTO SECOND AVERAGE
3110:A  034360 013                  DCX   B
3111:A  034361 173                  LAE
3112:A  034362 002                  LMAR  B             RESAVE LSB
3113:A  034363 301                  POP   B             RECALL LOCATION OF CURRENT ENTRY
3114:A  034364 052 075 212          LDAD  AVGTMP        UPDATE CURRENT ENTRY IN FIRST AVERAGE / CNT3A
3115:A  034367 175                  LAL
3116:A  034370 002                  LMAR  B             LSB
3117:A  034371 003                  INX   B
3118:A  034372 174                  LAH
3119:A  034373 002                  LMAR  B             MSB
3120:A  034374 301                  POP   B             RECALL ADDRESS OF COUNT FOR SECOND AVERAGE
3121:A  034375 012                  LAMR  B             LOAD COUNT
3122:A  034376 074                  INA                 INCREMENT
3123:A  034377 002                  LMAR  B             RESAVE IT
3124:A  034400 041 062 212          HL    CNT3A         LOCATION OF # FIRST AVERAGES FOR SECOND AVERAGE
3125:A  034403 276                  CPM
3126:A  034404 300                  RFZ                 RETURN IF .NE. CURRENT AMOUNT
3127:A  034405 076 000              LOAD  0             ZERO OUT COUNT FOR SECOND AVERAGE
3128:A  034407 002                  LMAR  B
3129:A  034410 311                  RET
3130:A
3131:A                          ; APU SUBROUTINES
3132:A                          ;
3133:A  034411 204 015 212 034  DPST2 DBYTE LDD,*LOTME,FLTD      * CALCULATE AVAILABILITY
3134:A  034415 204 011 212 034        DBYTE LDD,*TOTTME,FLTD    LOAD 32 BIT FIXED TOTAL TIME AND LO TIME
3135:A  034421 023                    DBYTE FDIV                LOTME/TOTTME
3136:A  034422 025                    DBYTE FNSF                -LOTME/TOTTME
3137:A  034423 202 000 000 200 001 020 DBYTE LDFI,0,0,128,1,FADD 1-LOTME/TOTTME
3138:A  034431 202 000 000 372 012 022 DBYTE LDFI,0,0,250,10,FMUL *1000 (100*10) PUT IN PERCENTILE AND 1
3139:A                                                            DECIMAL POINT TO TRANSMIT
3140:A  034437 037                    DBYTE FIXS
3141:A  034440 305 021 212            DBYTE STS,*APER           STORE AVAILABILITY PERCENTILE*10 FOR
3142:A                                                            TRANSMITTING
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3143:A
3144:A  034443 203 077 175 035              DBYTE LDS,*S5A5,FLTS          * CALCULATE ENERGY PRODUCED
3145:A  034447 204 071 200 022              DBYTE LDF,*PEC,FMUL           GET POWER IN MW
3146:A  034453 204 130 200 021              DBYTE LDF,*POFFST,FSUB        POWER SCALING OFFSET
3147:A  034457 204 120 200 022              DBYTE LDF,*DT,FMUL            PWR*CYCLE TIME(.1)  (MW*SEC)
3148:A  034463 202 000 000 341 014 023      DBYTE LDFI,0,0,225,12,FDIV    /3600   (MW*HR)
3149:A  034471 204 023 212 020              DBYTE LDF,*EPR,FADD           ADD TO PREVIOUS ENERGY PRODUCED
3150:A  034475 027                          DBYTE FTOF
3151:A  034476 206 023 212                  DBYTE STF,*EPR                 EPR=EPR + PWR*.1/3600   (MW*HR)
3152:A  034501 202 000 000 240 004 022      DBYTE LDFI,0,0,160,4,FMUL     TRANSMIT AS 1 DECIMAL POINT
3153:A  034507 037                          DBYTE FIXS
3154:A  034510 205 027 212                  DBYTE STS,*EP                 EP IS IN MW*HR*10 TO TRANSMIT
3155:A
3156:A  034513 203 065 175 035              DBYTE LDS,*S2A21,FLTS          * CALCULATE DELTA1 CORRECTION
3157:A  034517 204 031 212 020              DBYTE LDF,*BIAS1,FADD
3158:A  034523 204 035 212 022              DBYTE LDF,*SLOPE1,FMUL
3159:A  034527 037                          DBYTE FIXS
3160:A  034530 205 065 175                  DBYTE STS,*S2A21
3161:A  034533 203 067 175 035              DBYTE LDS,*S2A23,FLTS          * CALCULATE DELTA2 CORRECTION
3162:A  034537 204 041 212 020              DBYTE LDF,*BIAS2,FADD
3163:A  034543 204 045 212 022              DBYTE LDF,*SLOPE2,FMUL
3164:A  034547 037                          DBYTE FIXS
3165:A  034550 205 067 175                  DBYTE STS,*S2A23
3166:A  034553 200                          DBYTE EXIT
3167:A
3168:A  034554 203 027 212          DPST3   DBYTE LDS,*EP                  * MIDNIGHT SUBROUTINE
3169:A  034557 035                          DBYTE FLTS                     LOAD ENERGY PRODUCED
3170:A  034560 202 000 000 310 007 023      DBYTE LDFI,0,0,200,7,FDIV      /100 (/1000*10) IN GW*HR*10 TO TRANSMIT
3171:A  034566 037                          DBYTE FIXS
3172:A  034567 205 056 212                  DBYTE STS,*EPYRO               EPYRO = EP/1000*10
3173:A  034572 200                          DBYTE EXIT
3174:A
3175:A
3176:A                              . ***** INPUT SIGNAL MANAGER MODULE *****
3177:A                              .
3178:A                              .
3179:A                              .   ISM IS RESPONSIBLE FOR GETTING ALL SENSOR VALUES, DISCRETE AND ANALOG,
3180:A                              . FROM THE TRACK I/O RAM TO THE CONTROLLER RAM.  ISM IS ALSO RESPONSIBLE FOR
3181:A                              . TAKING ALL ANALOG SIGNALS, REFORMATTING THEM FROM A 12 BIT WORD TO AN 8 BIT
3182:A                              . WORD USING AN1218, AND STORING THIS WORD DIRECTLY AFTER THE PACKED DISCRETES.
3183:A                              .
3184:A  034573 016 111              ISM     LC    /3              LOAD NUMBER OF DISCRETE INPUTS
3185:A  034575 006 000                      LB    0
3186:A  034577 041 014 072          IN1     HL    IADDR-2         POINT TO INPUT ADDRESS TABLE
3187:A  034602 011                          DAD   B
3188:A  034603 011                          DAD   B               VECTOR TO CURRENT ADDRESS
3189:A  034604 353                          DEHL                  PUTS ADDRESS OF INPUT INTO D[E]
3190:A  034605 032                          LAMK  D               LOADS VALUE AT DE ADDRESS INTO A
3191:A  034606 157                          LLA                   LOADS A INTO L
3192:A  034607 023                          INX   D               INCREMENT D
3193:A  034610 032                          LAMK  D               LOADS VALUE AT DE ADDRESS INTO A
3194:A  034611 147                          LHA                   LOADS A INTO H
3195:A  034612 033                          DCX   D               DECREMENT D
3196:A  034613 353                          DEHL                  PUTS NEW ADDRESS IN DE (HL TO DE & DE TO HL)
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3197:A  034614 032                      LAMR  D          LOADS VALUE AT DE ADDRESS INTO A
3198:A  034615 365                      PUSH  A          STORES D/INPUT VALUE IN STACK
3199:A  034616 041 064 174              HL    S1A1-1     POINT TO VALUE ADDRESS TABLE
3200:A  034621 011                      DAD   B          ADD COUNT TO ADDRESS
3201:A  034622 353                      DEHL             PUTS NEW ADDRESS IN DE (HL TO DE & DE TO HL)
3202:A  034623 361                      POP   A          LOADS D/INPUT VALUE INTO ACCUMULATOR
3203:A  034624 022                      LMAR  D          LOAD ACCUMULATOR VALUE INTO DE ADDRESS
3204:A  034625 015                      DCC              DECREMENTS B
3205:A  034626 302 177 071              JFZ   IN1        JUMP IF NOT ALL READ
3206:A
3207:A  034631 016 012                  LC    10         LOAD # OF ANALOG INPUTS
3208:A  034633 006 000                  LB    0
3209:A  034635 041 236 072      IN2     HL    IADDR1-2   POINT TO INPUT ADDRESS TABLE
3210:A  034640 011                      DAD   D          ADD COUNT TO ADDRESS
3211:A  034641 011                      DAD   B          VECTOR TO CURRENT ADDRESS
3212:A  034642 353                      DEHL             PUTS NEW ADDRESS IN DE (HL TO DE & DE TO HL)
3213:A  034643 032                      LAMR  D          LOADS VALUE AT DE ADDRESS INTO A
3214:A  034644 157                      LLA              LOADS A INTO L
3215:A  034645 023                      INX   D          INCREMENT D
3216:A  034646 032                      LAMR  D          LOADS VALUE AT DE ADDRESS INTO A
3217:A  034647 147                      LHA              LOADS A INTO H
3218:A  034650 353                      DEHL             PUTS NEW ADDRESS IN DE (HL TO DE & DE TO HL)
3219:A  034651 032                      LAMR  D          LOADS VALUE AT DE ADDRESS INTO A
3220:A  034652 157                      LLA              LOADS A INTO L
3221:A  034653 023                      INX   D          INCREMENT D
3222:A  034654 032                      LAMR  D          LOADS VALUE AT DE ADDRESS INTO A
3223:A  034655 147                      LHA              LOADS A INTO H
3224:A  034656 353                      DEHL             ADJUSTS FOR UNDER & OVER RANGE AI'S
3225:A  034657 041 000 040              LOAD  8192
3226:A  034662 315 162 137              CALL  NEGNUM
3227:A  034665 031                      DAD   D
3228:A  034666 174                      LAH
3229:A  034667 265                      ORL
3230:A  034670 312 307 071              JTZ   UV         IF UNDER RANGE CALC CONT.  (0 IN HL).
3231:A  034673 174                      LAH
3232:A  034674 007                      SLC
3233:A  034675 332 306 071              JTC   GV         IF # IS IN RANGE 8192 WILL BE ADDED
3234:A  034700 041 377 017              LOAD  4095       IF OVER RANGE  4095 (MAX) IS IN HL
3235:A  034703 303 307 071              JMP   UV         CONT. CALC
3236:A  034706 353              GV      DEHL
3237:A  034707 345              UV      PUSH  H          STORES A/INPUT IN STACK
3238:A  034710 345                      PUSH  H          STORES A/INPUT IN STACK
3239:A  034711 041 063 175              HL    S2A21-2    POINT TO VALUE ADDRESS TABLE
3240:A  034714 011                      DAD   B          ADD COUNT TO ADDRESS
3241:A  034715 011                      DAD   B          ADD COUNT TO ADDRESS
3242:A  034716 353                      DEHL             PUTS NEW ADDRESS IN DE (HL TO DE & DE TO HL)
3243:A  034717 341                      POP   H          LOADS A/INPUT INTO HL REGISTER
3244:A  034720 175                      LAL              LOADS L INTO A
3245:A  034721 022                      LMAR  D          LOAD ACCUMULATOR VALUE INTO DE ADDRESS
3246:A  034722 023                      INX   D          INCREMENT D
3247:A  034723 174                      LAH              LOADS H INTO A
3248:A  034724 022                      LMAR  D          LOAD ACCUMULATOR VALUE INTO DE ADDRESS
3249:A
                        START OF ARCHIVING PART
3250:A  034725 041 115 177              HL    ARCIEM-1   BEGINNING OF DESTINATION OF 8 BIT ANALOG INPUT
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3251:A  034730 011                      DAD   B               DESTINATION OF CURRENT
3252:A  034731 353                      DEHL
3253:A  034732 341                      POP   H               LOADS A/INPUT INTO HL REGISTER
3254:A  034733 315 116 073              CALL  AN12T8          MAKE 12 BIT ANALOG INTO AN 8 BIT ANALOG
3255:A  034736 022                      LMAR  D               SAVES 8 BIT ANALOG INTO DESTINATION
3256:A                          . END OF ARCHIVING PART
3257:A  034737 015                      DCC                   DECREMENTS B
3258:A  034740 302 235 071              JFZ   IN2
3259:A                                  .
3260:A  034743 052 077 175              LDAD  S5A5            FUDGE FACTOR ON POWER TO GET SCALING
3261:A  034746 353                      DEHL
3262:A  034747 041 253 002              LDAD  683             0 MW
3263:A  034752 315 162 137              CALL  NEGNUM
3264:A  034755 031                      DAD   D
3265:A  034756 042 077 175              STOD  S5A5
3266:A  034761 021 264 072              DE    FDG1            CALL APU SUBROUTINE TO *.78481
3267:A  034764 315 137 001              CALL  APUSTR
3268:A  034767 052 077 175              LDAD  S5A5
3269:A  034772 353                      DEHL
3270:A  034773 041 253 002              LDAD  683             0 MW
3271:A  034776 031                      DAD   D
3272:A  034777 042 077 175              STOD  S5A5
3273:A  035002 041 123 177              HL    ARCITEM45       UPDATE POWER ARCHIVE VALUE
3274:A  035005 353                      DEHL
3275:A  035006 052 077 175              LDAD  S5A5
3276:A  035011 315 116 073              CALL  AN12T8
3277:A  035014 022                      LMAR  D
3278:A  035015 311                      RET
3279:A                                  .
3280:A  035016 000 300          IADDR   DC    I00000          INPUT ADDRESS TABLE
3281:A  035020 001 300                  DC    I00001
3282:A  035022 012 300                  DC    I00010
3283:A  035024 011 300                  DC    I00009
3284:A  035026 010 300                  DC    I00008
3285:A  035030 007 300                  DC    I00007
3286:A  035032 155 300                  DC    I00613
3287:A  035034 156 300                  DC    I00614
3288:A  035036 065 300                  DC    I00305
3289:A  035040 070 300                  DC    I00308
3290:A  035042 157 300                  DC    I00615
3291:A  035044 060 300                  DC    I00300
3292:A  035046 061 300                  DC    I00301
3293:A  035050 112 300                  DC    I00410
3294:A  035052 066 300                  DC    I00306
3295:A  035054 067 300                  DC    I00307
3296:A  035056 044 300                  DC    I00204
3297:A  035060 152 300                  DC    I00610
3298:A  035062 154 300                  DC    I00612
3299:A  035064 153 300                  DC    I00611
3300:A  035066 076 300                  DC    I00414
3301:A  035070 100 300                  DC    I00100
3302:A  035072 105 300                  DC    I00405
3303:A  035074 106 300                  DC    I00406
3304:A  035076 107 300                  DC    I00407
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3305:A  035100 110 300                  DC    I00408
3306:A  035102 102 300                  DC    I00402
3307:A  035104 103 300                  DC    I00403
3308:A  035106 104 300                  DC    I00404
3309:A  035110 101 300                  DC    I00401
3310:A  035112 111 300                  DC    I00409
3311:A  035114 114 300                  DC    I00412
3312:A  035116 113 300                  DC    I00411
3313:A  035120 116 300                  DC    I00414
3314:A  035122 006 300                  DC    I00006
3315:A  035124 005 300                  DC    I00005
3316:A  035126 115 300                  DC    I00413
3317:A  035130 075 300                  DC    I00313
3318:A  035132 125 300                  DC    I00505
3319:A  035134 146 300                  DC    I00606
3320:A  035136 147 300                  DC    I00607
3321:A  035140 151 300                  DC    I00609
3322:A  035142 074 300                  DC    I00312
3323:A  035144 150 300                  DC    I00608
3324:A  035146 120 300                  DC    I00500
3325:A  035150 121 300                  DC    I00501
3326:A  035152 122 300                  DC    I00502
3327:A  035154 123 300                  DC    I00503
3328:A  035156 017 300                  DC    I00015
3329:A  035160 015 300                  DC    I00013
3330:A  035162 016 300                  DC    I00014
3331:A  035164 041 300                  DC    I00201
3332:A  035166 072 300                  DC    I00310
3333:A  035170 043 300                  DC    I00203
3334:A  035172 040 300                  DC    I00200
3335:A  035174 117 300                  DC    I00415
3336:A  035176 073 300                  DC    I00311
3337:A  035200 042 300                  DC    I00202
3338:A  035202 062 300                  DC    I00302
3339:A  035204 063 300                  DC    I00303
3340:A  035206 047 300                  DC    I00207
3341:A  035210 050 300                  DC    I00208
3342:A  035212 037 300                  DC    I00115
3343:A  035214 036 300                  DC    I00114
3344:A  035216 035 300                  DC    I00113
3345:A  035220 034 300                  DC    I00112
3346:A  035222 064 300                  DC    I00304
3347:A  035224 004 300                  DC    I00004
3348:A  035226 002 300                  DC    I00002
3349:A  035230 003 300                  DC    I00003
3350:A  035232 013 300                  DC    I00011
3351:A  035234 014 300                  DC    I00012
3352:A  035236 077 300                  DC    I00315
3353:A  035240 021 174          IADDR1  DC    A100074     ANALOG INPUT ADDRESS TABLE
3354:A  035242 060 174                  DC    A101017
3355:A  035244 024 174                  DC    A100095
3356:A  035246 015 174                  DC    A100092
3357:A  035250 025 174                  DC    A100076
3358:A  035252 027 174                  DC    A100097
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3359:A  035254 046 174                          DC    AI01012
3360:A  035256 042 174                          DC    AI01010
3361:A  035260 050 174                          DC    AI01013
3362:A  035262 044 174                          DC    AI01011
3363:A                                  .
3364:A                                  . *** ISM SUBROUTINE TO FUDGE THE INPUT VALUE OF POWER
3365:A                                  .
3366:A  035264 203 077,175 035          FUG1    DBYTE LDS,*S5A5,FLTS            LOAD POWER
3367:A  035270 202 116'351 310 000 022          DBYTE LDFI,78,233,200,0,FMUL    *.78481
3368:A  035276 037 205 077 175                  DBYTE FIXS,STS,*S5A5
3369:A  035302 200                              DBYTE EXIT
3370:A                                  .
3371:A                                  .
3372:A                                  . ***** OUTPUT SIGNAL MANAGER MODULE *****
3373:A                                  .
3374:A                                  .
3375:A                                  .     OSM IS RESPONSIBLE FOR GETTING ALL COMMANDS, DISCRETE AND ANALOG, FROM
3376:A                                  . THE CONTROLLER RAM TO I/O RAM.  OSM IS ALSO RESPONSIBLE FOR TAKING ALL ANALOG
3377:A                                  . COMMANDS, REFORMATTING THEM FROM A 12 BIT WORD TO AN 8 BIT WORD USING AN12T8,
3378:A                                  . AND STORING THIS WORD DIRECTLY AFTER THE 8 BIT ANALOG SIGNALS.
3379:A                                  .
3380:A  035303 016 035                  OSM     LC    29                LOAD NUMBER OF DIGITAL OUTPUTS
3381:A  035305 006 000                          LB    0
3382:A  035307 041 064 176              OUT1    HL    C1A1-1
3383:A  035312 011                              DAD   B                 ADD COUNT TO ADDRESS
3384:A  035313 353                              DEHL                    PUTS NEW ADDRESS IN DE (HL TO DE & DE TO HL)
3385:A  035314 032                              LAMR  D                 LOADS VALUE AT DE ADDRESS INTO A
3386:A  035315 365                              PUSH  A                 STORES D/OUTPUT VALUE IN ACCUMULATOR INTO STACK
3387:A  035316 041 022 073                      HL    OADDR-2           POINT TO D/OUTPUT ADDRESS TABLE
3388:A  035321 011                              DAD   B                 ADD COUNT TO ADDRESS
3389:A  035322 011                              DAD   B                 ADD COUNT TO ADDRESS
3390:A  035323 353                              DEHL                    PUTS NEW ADDRESS IN DE (HL TO DE & DE TO HL)
3391:A  035324 032                              LAMR  D                 LOADS VALUE AT DE ADDRESS INTO A
3392:A  035325 157                              LLA                     LOADS A INTO L
3393:A  035326 023                              INX   D                 INCREMENT D
3394:A  035327 032                              LAMR  D                 LOADS VALUE AT DE ADDRESS INTO A
3395:A  035330 147                              LHA                     LOADS A INTO H
3396:A  035331 353                              DEHL                    PUTS NEW ADDRESS IN DE (HL TO DE & DE TO HL)
3397:A  035332 361                              POP   A                 LOADS VALUE OF INPUT INTO ACCUMULATOR
3398:A  035333 022                              LMAR  D                 LOAD ACCUMULATOR VALUE INTO DE ADDRESS
3399:A  035334 013                              DCX   B                 DECREMENTS B
3400:A  035335 171                              LAC                     LOADS C INTO A
3401:A  035336 376 000                          CPI   0                 TEST IF ALL INPUTS HAVE BEEN READ
3402:A  035340 302 307 072                      JFZ   OUT1
3403:A                                  .
3404:A  035343 052 065 177                      LDAD  C2A21             OUTPUT ANALOGS
3405:A  035346 021 372 314 315 016 001          STOD  A000100
3406:A  035354 315 116 073                      CALL  AN12T8            CHANGE 12 BIT TO 8 BIT
3407:A  035357 021 130 177                      DE    ARCTEM+10         LOAD LOCATION OF 8 BIT ANALOG FOR ARCHIVE
3408:A  035362 022                              LMAR  D                 STORE THE 8 BIT
3409:A  035363 052 067 177                      LDAD  C2A24
3410:A  035366 021 372 315 315 016 001          STOD  A000101
3411:A  035374 315 116 073                      CALL  AN12T8            CHANGE 12 BIT TO 8 BIT
3412:A  035377 021 131 177                      DE    ARCTEM+11         LOAD LOCATION OF 8 BIT ANALOG FOR ARCHIVE
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3413:A  035402 022                      LMAR   D              STORE THE 8 BIT
3414:A  035403 052 071 177              LDAD   C5A5
3415:A  035406 021 372 316 315 016 001  STOD   A000102
3416:A  035414 315 116 073              CALL   AN12TB          CHANGE 12 BIT TO 8 BIT
3417:A  035417 021 132 177              DE     ARCTEM+12       LOAD LOCATION OF 8 BIT ANALOG FOR ARCHIVE
3418:A  035422 022                      LMAR   D              STORE THE 8 BIT
3419:A  035423 311                      RET
341A:A                          .
341B:A  035424 020 300          OADDR  DC     000100          OUTPUT ADDRESS TABLE
341C:A  035426 021 300                 DC     000101
341D:A  035430 126 300                 DC     000506
341E:A  035432 032 300                 DC     000110
341F:A  035434 031 300                 DC     000109
3420:A  035436 030 300                 DC     000108
3421:A  035440 027 300                 DC     000107
3422:A  035442 026 300                 DC     000106
3423:A  035444 025 300                 DC     000105
3424:A  035446 131 300                 DC     000509
3425:A  035450 145 300                 DC     000605
3426:A  035452 140 300                 DC     000600
3427:A  035454 141 300                 DC     000601
3428:A  035456 127 300                 DC     000507
3429:A  035460 142 300                 DC     000602
342A:A  035462 132 300                 DC     000510
342B:A  035464 133 300                 DC     000511
342C:A  035466 134 300                 DC     000512
342D:A  035470 135 300                 DC     000513
342E:A  035472 136 300                 DC     000514
342F:A  035474 137 300                 DC     000515
3430:A  035476 054 300                 DC     000212
3431:A  035500 055 300                 DC     000213
3432:A  035502 056 300                 DC     000214
3433:A  035504 057 300                 DC     000215
3434:A  035506 053 300                 DC     000211
3435:A  035510 023 300                 DC     000103
3436:A  035512 022 300                 DC     000102
3437:A  035514 033 300                 DC     000111
3438:A                          .
3439:A                          . *** ISM/OSM SUBROUTINE ***
343A:A                          .
343B:A                          . SUBROUTINE TO CHANGE A 12 BIT ANALOG WORD (HL) TO AN 8 BIT WORD (ACCUMULATOR)
343C:A                          .
343D:A  035516 305              AN12TB PUSH   B              SAVE VALUE FROM BC ONTO STACK
343E:A  035517 174                     LAH
343F:A  035520 346 017                 AND    15             DO THE MOST SIGNIFICANT BYTE
3440:A  035522 007                     SLC
3441:A  035523 007                     SLC
3442:A  035524 007                     SLC
3443:A  035525 007                     SLC
3444:A  035526 346 360                 ND     240
3446:A  035530 107                     LBA
3447:A  035531 175                     LAL                   LEAST SIGNIFICANT BYTE
3448:A  035532 017                     SRC
3449:A  035533 017                     SRC
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3467:A  035534 017                      SRC
3468:A  035535 017                      SRC
3469:A  035536 346 017                  ND    15
3470:A  035540 260                      ORB                 COMBINE THEM
3471:A  035541 301                      POP   B             RECALL VALUE IN BC
3472:A  035542 311                      RET
3473:A
3474:A                                  .
3475:A                                  . ***** STARTUP SEGMENTS *****
3476:A                                  .
3477:A                                  .
3478:A  035543 041 377 017      SUS1    LOAD  4095          CONTROL ANGLES TO 95 DEGREES
3479:A  035546 042 065 177              STOD  C2A21
3480:A  035551 042 073 177              STOD  C2A22
3481:A  035554 042 075 177              STOD  C2A23
3482:A  035557 042 067 177              STOD  C2A24
3483:A  035562 076 000                  LOAD  0
3484:A  035564 062 166 215              STO   OTENB         ZERO OUT OPERATOR TERMINAL ENABLE
3485:A  035567 062 071 176              STO   C2A26         G SWITCH BLADE #1
3486:A  035572 062 072 176              STO   C2A27         G SWITCH BLADE #2
3487:A  035575 062 073 176              STO   C2A28         G SWITCH TEST #1
3488:A  035600 062 074 176              STO   C2A29         G SWITCH TEST #2
3489:A  035603 062 075 176              STO   C2A30         G SWITCH RESET
3490:A  035606 074                      INA
3491:A  035607 062 070 176              STO   C2A25         G SWITCH TEST ENABLE
3492:A  035612 062 067 176              STO   C2A4          ROTOR HYDRAULIC PUMP
3493:A  035615 062 102 176              STO   C4A1          GEARBOX LUBE PUMP
3494:A  035620 076 062                  LOAD  50
3495:A  035622 062 260 211              STO   RDELAY        SET DELAY TO 5 SEC
3496:A  035625 041 113 201              ML    STRCNT        INCREMENT SEGMENT COUNTER
3497:A  035630 064                      INM
3498:A  035631 311                      RET
3499:A
3500:A  035632 072 260 211      SUSB    LOAD  RDELAY        DECREMENT DELAY TIMER
3501:A  035635 075                      DCA
3502:A  035636 062 260 211              STO   RDELAY
3503:A  035641 300                      RFZ                 RETURN IF TIMER NOT ELAPSED
3504:A  035642 041 113 201              ML    STRCNT        INCREMENT SEGMENT COUNTER
3505:A  035645 064                      INM
3506:A  035646 311                      RET
3507:A
3508:A  035647 072 154 174      SUS2    LOAD  S8A2          CONVERTER READY
3509:A  035652 041 076 174 246          AND   S2A14         ROTOR HYDRAULIC ACCUMULATOR PRESSURE
3510:A  035656 107                      LBA
3511:A  035657 072 117 174              LOAD  S4A23         2 OUT OF 3 LUBE PRESSURES
3512:A  035662 041 120 174 246          AND   S4A24
3513:A  035666 117                      LCA
3514:A  035667 072 120 174              LOAD  S4A24
3515:A  035672 041 121 174 246          AND   S4A25
3516:A  035676 241                      NDC
3517:A  035677 117                      LCA
3518:A  035700 072 117 174              LOAD  S4A23
3519:A  035703 041 121 174 246          AND   S4A25
3520:A  035707 241                      NDC
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3521:A  035710 240                      NOP
3522:A  035711 312 340 073              JTZ     SU1             JUMP IF NOT OK
3523:A  035714 062 104 176              STO     C5A2            TURBINE READY CMD
3524:A  035717 062 110 176              STO     C5A8            CONVERTER TIE CLOSE
3525:A  035722 075                      DCA
3526:A  035723 062 111 176              STO     C5A9            CONVERTER TIE NOT TRIPPED
3527:A  035726 076 062                  LOAD    50
3528:A  035730 062 260 211              STO     RDELAY          SET TIME DELAY FOR 5 SEC
3529:A  035733 041 113 201              HL      STRCNT          INCREMENT SEGMENT COUNTER
3530:A  035736 064                      INM
3531:A  035737 311                      RET
3532:A  035740 074              SU1     INA
3533:A  035741 062 263 202              STO     NSDLO2          SET NORMAL SHUTDOWN TO LOCKOUT FLAG
3534:A  035744 311                      RET
3535:A
3536:A  035745 072 153 174      SUS3    LOAD    S8A5            CONVERTER TIE STATUS
3537:A  035750 041 145 174 246          AND     S7A4            ESD SYSTEM READY
3538:A  035754 312 005 074              JTZ     SU2             JUMP IF NOT OK
3539:A  035757 062 075 176              STO     C2A30           RESET G SWITCH
3540:A  035762 062 117 176              STO     C7A5            ENABLE FEATHER VALVE A-1
3541:A  035765 062 120 176              STO     C7A6            ENABLE FEATHER VALVE A-2
3542:A  035770 062 121 176              STO     C9A1            ENABLE ESD FLICK ON
3543:A  035773 076 062                  LOAD    50
3544:A  035775 062 260 211              STO     RDELAY          SET TIME DELAY FOR 5 SEC
3545:A  036000 041 113 201              HL      STRCNT          INCREMENT SEGMENT COUNTER
3546:A  036003 064                      INM
3547:A  036004 311                      RET
3548:A  036005 074              SU2     INA
3549:A  036006 062 263 202              STO     NSDLO2          SET NORMAL SHUTDOWN TO LOCKOUT FLAG
3550:A  036011 311                      RET
3551:A
3552:A  036012 076 000          SUS4    LOAD    0
3553:A  036014 062 075 176              STO     C2A30           ZERO OUT G SWITCH RESET
3554:A  036017 062 121 176              STO     C9A1            ENABLE ESD FLICK OFF
3555:A  036022 072 100 174              LOAD    S2A30           AILERON LATCHES
3556:A  036025 267                      ORA
3557:A  036026 312 044 074              JTZ     SU3             JUMP IF LATCHES NOT RELEASED
3558:A  036031 041 314 014              LDAD    3276            80 DEGREES
3559:A  036034 042 256 211              STOD    DELCMD          SET CONTROL ANGLE TARGET
3560:A  036037 041 113 201              HL      STRCNT          INCREMENT SEGMENT COUNTER
3561:A  036042 064                      INM
3562:A  036043 311                      RET
3563:A  036044 074              SU3     INA
3564:A  036045 062 222 211              STO     SUFAIL          SET FLICK FAIL FLAG
3565:A  036050 311                      RET
3566:A
3567:A  036051 052 065 177      SUST    LDAD    C2A21           AILERON ANGLE COMMAND
3568:A  036054 053                      DCX     H
3569:A  036055 053                      DCX     H               4 CNTS/CYC = 1 DEG/SEC
3570:A  036056 053                      DCX     H
3571:A  036057 053                      DCX     H
3572:A  036060 042 065 177              STOD    C2A21
3573:A  036063 453                      DLHL
3574:A  036064 052 256 211              LDAD    DELCMD          SEE IF AT TARGET DELTA
```

5 SEC

T #2
DE #2
T ENABLE

5 SO PUT CMD THERE

5 SEC
COUNTER

CT

COUNTER

FLAG

NGLE

G/SEC

IL FILTER DELTA P

T


```
        CALL   NEGNUM
        DAD    D
        LAH
        SLC
        JTC    SU4             JUMP IF PAST TARGET
        DEHL
        STOD   C2A22           AILERON #2 ANGLE CMD
        STOD   C2A23           AILERON #3 ANGLE CMD
        STOD   C2A24           AILERON #4 ANGLE CMD
        RET
SU4     LDAD   DELCMD          FORCE AILERON ANGLE TO BE TERGET ANGLE
        STOD   C2A21           AILERON #1 ANGLE CMD
        STOD   C2A22           AILERON #2 ANGLE CMD
        STOD   C2A23           AILERON #3 ANGLE CMD
        STOD   C2A24           AILERON #4 ANGLE CMD
        HL     STRCNT          INCREMENT SEGMENT COUNTER
        INM
        LOAD   50
        STO    RDELAY          SET TIMER DELAY TO 5 SEC
        RET

SUSV    LDAD   DELCMD          TARGET AILERON ANGLE
        CALL   NEGNUM
        LBH
        LCL                    STORE IN BC
        LDAD   S2A21           FIRST AILERON ANGLE TO CHECK
        DAD    B               ADD TO -DELCMD
        LAH
        SLC                    GET ABSOLUTE VALUE
        JFC    SU5             JUMP IF POSITIVE
        CALL   POSNUM
SU5     DEHL
        LDAD   205             5 DEGREES
        CALL   NEGNUM
        DAD    D
        LAH
        SLC
        JFC    SU6             JUMP IF DELCMD - DEL SENSED > 5
        LDAD   S2A23           SECOND AILERON ANGLE TO CHECK
        DAD    B               ADD TO -DELCMD
        LAH
        SLC                    GET ABSOLUTE VALUE
        JFC    SU7             JUMP IF POSITIVE
        CALL   POSNUM
SU7     DEHL
        LDAD   205             5 DEGREES
        CALL   NEGNUM
        DAD    D
        LAH
        SLC
        JFC    SU6             JUMP IF DELCMD - DEL SENSED > 5
        HL     STRCNT          INCREMENT SEGMENT COUNTER
        INM
        RET
```

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3737:A  036607 353                      DEHL
3738:A  036610 042 073 177              STOD  C2A22         AILERON ANGLE #2 CMD
3739:A  036613 042 075 177              STOD  C2A23         AILERON ANGLE #3 CMD
3740:A  036616 042 067 177              STOD  C2A24         AILERON ANGLE #4 CMD
3741:A  036621 311                      RET
3742:A  036622 052 256 211      SU11    LOAD  DELCMD        FORCE CONTROL ANGLE TO TARGET
3743:A  036625 042 065 177              STOD  C2A21         AILERON ANGLE #1 CMD
3744:A  036630 042 073 177              STOD  C2A22         AILERON ANGLE #2 CMD
3745:A  036633 042 075 177              STOD  C2A23         AILERON ANGLE #3 CMD
3746:A  036636 042 067 177              STOD  C2A24         AILERON ANGLE #4 CMD
3747:A  036641 041 113 201              ML    STRCNT        INCREMENT SEGMENT COUNTER
3748:A  036644 064                      INM
3749:A  036645 076 062                  LOAD  50
3750:A  036647 062 260 211              STO   RDELAY        SET TIME DELAY FOR 5 SEC
3751:A  036652 311                      RET
3752:A  036653 062 222 211      SU10    STO   SUFAIL        SET STARTUP FLICK FLAG
3753:A  036656 353                      DEHL
3754:A  036657 042 065 177              STOD  C2A21         SET AILERON ANGLE TO PREVIOUS
3755:A  036662 311                      RET
3756:A
3757:A  036663 076 000          SUS13   LOAD  0
3758:A  036665 062 117 176              STO   C7A5          FEATHER VALVE A-1 ENABLE
3759:A  036670 062 120 176              STO   C7A6          FEATHER VALVE A-2 ENABLE
3760:A  036673 041 113 201              ML    STRCNT        INCREMENT SEGMENT COUNTER
3761:A  036676 064                      INM
3762:A  036677 041 377 017              LOAD  4095          95 DEGREES
3763:A  036702 042 256 211              STOD  DELCMD        TARGET DELTA
3764:A  036705 076 062                  LOAD  50
3765:A  036707 062 260 211              STO   RDELAY        SET TIME DELAY FOR 5 SEC
3766:A  036712 311                      RET
3767:A
3768:A  036713 076 001          SUS14   LOAD  1
3769:A  036715 062 117 176              STO   C7A5          ENABLE FEATHER VALVE A-1
3770:A  036720 062 120 176              STO   C7A6          ENABLE FEATHER VALVE A-2
3771:A  036723 062 121 176              STO   C9A1          ENABLE ESD FLICK ON
3772:A  036726 041 377 017              LOAD  4095          TIP ANGLES ARE AT 95 SO PUT CMD THERE
3773:A  036731 042 065 177              STOD  C2A21
3774:A  036734 042 073 177              STOD  C2A22
3775:A  036737 042 075 177              STOD  C2A23
3776:A  036742 042 067 177              STOD  C2A24
3777:A  036745 041 062 017              LOAD  3990          90 DEGREES
3778:A  036750 042 256 211              STOD  DELCMD        TARGET CONTROL ANGLE
3779:A  036753 041 113 201              ML    STRCNT        INCREMENT SEGMENT COUNTER
3780:A  036756 064                      INM
3781:A  036757 311                      RET
3782:A
3783:A  036760 072 145 174      SUS15   LOAD  S7A4          ESD STATUS
3784:A  036763 041 100 174 246          AND   S2A30         AILERON LATCHES
3785:A  036767 041 102 174 246          AND   S2A7          TEETER BRAKE ACCUM PRESSURE
3786:A  036773 312 013 076              JTZ   SU12          JUMP IF ERROR
3787:A  036776 062 076 176              STO   C2A11         TEETER BRAKE POWER ON
3788:A  037001 075                      DCA
3789:A  037002 062 121 176              STO   C9A1          ENABLE ESD FLICK OFF
3790:A  037005 041 113 201              ML    STRCNT        INCREMENT SEGMENT COUNTER
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3791:A  037010 064                      INM
3792:A  037011 311                      RET
3793:A  037012 074              SU12    INA
3794:A  037013 062 222 211              STO   SUFAIL          SET STARTUP FLICK FLAG
3795:A  037016 311                      RET
3796:A                          .
3797:A  037017 072 103 174      SUS16   LOAD  S2A12          TEETER BRAKE H.F. SOLENOID ON
3798:A  037022 067                      OKA
3799:A  037023 302 041 076              JFZ   SU13            JUMP IF TEETER BRAKES OFF
3800:A  037026 041 113 201              ML    STRCNT          INCREMENT SEGMENT COUNTER
3801:A  037031 064                      INM
3802:A  037032 041 120 106              LDAD  18000           SET TIME DELAY COUNTER TO 15 MINUTES
3803:A  037035 042 260 211              STOD  RDELAY
3804:A  037040 311                      RET
3805:A  037041 062 222 211      SU13    STO   SUFAIL          SET STARTUP FLICK FLAG
3806:A  037044 311                      RET
3807:A                          .
3808:A  037045 052 143 212      SUS17   LDAD  WV2AVG          WIND SPEED AVERAGE
3809:A  037050 315 162 137              CALL  NEGNUM
3810:A  037053 353                      DEHL
3811:A  037054 041 075 002              LDAD  573             14 MPH
3812:A  037057 031                      DAD   D
3813:A  037060 174                      LAH                   = 14 MPH
3814:A  037061 265                      ORI
3815:A  037062 312 102 076              JTZ   SU18            JUMP IF = 14 MPH
3816:A  037065 007                      SLC
3817:A  037066 322 121 076              JFC   SU14            JUMP IF BELOW 14 MPH
3818:A  037071 041 036 011              LDAD  2334            57 MPH
3819:A  037074 031                      DAD   D
3820:A  037075 174                      LAH
3821:A  037076 007                      SLC
3822:A  037077 332 121 076              JTC   SU14            JUMP IF > 57
3823:A  037102 041 000 000      SU18    LDAD  0
3824:A  037105 042 260 211              STOD  RDELAY          ZERO TIME DELAY
3825:A  037110 042 256 211              STOD  DELCMD          ZERO TARGET DELTA
3826:A  037113 076 001                  LOAD  1
3827:A  037115 062 221 211              STO   SUCMPL          SET STARTUP COMPLETE
3828:A  037120 311                      RET
3829:A  037121 052 260 211      SU14    LDAD  RDELAY          DECREMENT TIME DELAY COUNTER
3830:A  037124 053                      DCX   H
3831:A  037125 042 260 211              STOD  RDELAY
3832:A  037130 174                      LAH
3833:A  037131 265                      ORI
3834:A  037132 300                      RFZ                   RETURN IF TIME HAS NOT ELAPSED
3835:A  037133 076 001                  LOAD  1
3836:A  037135 062 242 202              STO   NSDE5           SET NORMAL SHUTDOWN TO STANDBY ENABLE
3837:A  037140 311                      RET
3838:A                          .
3839:A                          .
3840:A                          . ***** RAMP SEGMENTS *****
3841:A                          .
3842:A                          .
3843:A  037141 041 000 000      RMPS1   LDAD  0
3844:A  037144 042 071 177              STOD  C5A5            ZERO OUT NG REF
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3845:A  037147 042 101 203          STOD  NREF        ZERO OUT NR REF
3846:A  037152 042 075 203          STOD  NERR        ZERO OUT SPEED ERROR
3847:A  037155 076 001              LOAD  1           RELEASE ROTOR BRAKES
3848:A  037157 062 100 176          STO   C3A1
3849:A  037162 062 101 176          STO   C3A2
3850:A  037165 052 143 212          LDAD  WV.AVG      SET WIND SPEED AVERAGE BEFORE ROTATION
3851:A  037170 042 254 211          STOD  VWO
3852:A  037173 021 225 101          DE    RMPC1       CALL APU SUBROUTINE TO HELP GET CONTROL ANGLE
3853:A  037176 315 137 001          CALL  APUSTR       STARTING POSITION
3854:A  037201 052 256 211          LDAD  DELCMD
3855:A  037204 353                  DEHL
3856:A  037205 041 232 005          LDAD  1434        30 DEGREES
3857:A  037210 031                  DAD   D
3858:A  037211 042 256 211          STOD  DELCMD      THE TARGET CONTROL ANGLE
3859:A  037214 041 112 201          HL    RAMCNT      INCREMENT SEGMENT
3860:A  037217 064                  INM
3861:A  037220 311                  RET
3862:A
3863:A  037221 052 065 177  RMPS2    LDAD  C2A21       RAMP CONTROL ANGLE TO DELCMD
3864:A  037224 353                  DEHL
3865:A  037225 041 024 000          LDAD  20          RAMP AT 5 DEG/SEC = 20 CNTS/CYCLES
3866:A  037230 315 162 137          CALL  NEGNUM
3867:A  037233 031                  DAD   D
3868:A  037234 042 065 177          STOD  C2A21
3869:A  037237 353                  DEHL
3870:A  037240 052 256 211          LDAD  DELCMD      COMPARE THIS TO THE TARGET TIP ANGLE
3871:A  037243 315 162 137          CALL  NEGNUM
3872:A  037246 031                  DAD   D
3873:A  037247 174                  LAH
3874:A  037250 007                  SLC
3875:A  037251 353                  DEHL
3876:A  037252 322 305 076          JFC   RMP1        JUMP IF NOT THERE YET
3877:A  037255 076 001              LOAD  1
3878:A  037257 062 105 176          STO   C5A3        ISSUE START MOTOR CMD
3879:A  037262 041 112 201          HL    RAMCNT      INCREMENT SEGMENT
3880:A  037265 064                  INM
3881:A  037266 052 256 211          LDAD  DELCMD      FORCE CONTROL ANGLES TO DELCMD
3882:A  037271 042 065 177          STOD  C2A21
3883:A  037274 021 130 106          HL    ALINIT      INITIALIZE INTEGRAL FOR DELTA CALCULATIONS
3884:A  037277 315 137 001          CALL  APUSTR
3885:A  037302 052 256 211          LDAD  DELCMD
3886:A  037305 042 073 177  RMP1    STOD  C2A23
3887:A  037310 042 075 177          STOD  C2A33
3888:A  037313 042 067 177          STOD  C2A24
3889:A  037316 311                  RET
3890:A
3891:A  037317 052 071 177  RMPS3    LDAD  C5A5        RAMP NG REF UNTIL NR > 3.7
3892:A  037322 043                  INX   H           RAMP AT 3.7 RPM/MIN = 1 CNT/CYC
3893:A  037323 042 071 177          STOD  C5A5
3894:A  037326 353                  DEHL
3895:A  037327 041 217 002          LDAD  655         CHECK IF NG REF > 4.0 RPM
3896:A  037332 315 162 137          CALL  NEGNUM
3897:A  037335 031                  DAD   D
3898:A  037336 174                  LAH
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3899:A  037337 007                      SLC
3900:A  037340 330 351 076              JTC   RMF12          JUMP IF < 4.0
3901:A  037343 041 217 002              LDAD  655            FORCE TO 4.0 RPM
3902:A  037346 042 071 177              STOD  C5A5
3903:A  037351 052 073 175      RMF12   LDAD  S3A4           CHECK ROTOR RPM
3904:A  037354 353                      DEHL
3905:A  037355 041 135 002              LDAD  605            COMPARE TO 3.7 RPM
3906:A  037360 315 162 137              CALL  NEGNUM
3907:A  037363 031                      DAD   D
3908:A  037364 174                      LAH
3909:A  037365 007                      SLC
3910:A  037366 330                      RTC                  RETURN IF < 3.7
3911:A  037367 353                      DEHL                 SET NR REF TO CURRENT RPM
3912:A  037370 042 101 203              STOD  NREF
3913:A  037373 041 135 002              LDAD  605            SET NG REF TO 3.7
3914:A  037376 042 071 177              STOD  C5A5
3915:A  037401 041 112 201              ML    RAMCNT         INCREMENT SEGMENT
3916:A  037404 064                      INM
3917:A  037405 311                      RET
3918:A
3919:A  037406 052 101 203      RMPS4   LDAD  NREF           RAMP NR REF TO 4.0
3920:A  037411 043                      INX   H              RAMP AT 3.7 RPM/MIN = 1 CNT/CYC
3921:A  037412 042 101 203              STOD  NREF
3922:A  037415 315 357 104              CALL  ALRON          AILERON CONTROL BY SPEED PROPORTIONAL AND INTEGRAL
3923:A  037420 052 101 203              LDAD  NREF           COMPARE NREF TO 4.0
3924:A  037423 353                      DEHL
3925:A  037424 041 217 002              LDAD  655            4.0
3926:A  037427 315 162 137              CALL  NEGNUM
3927:A  037432 031                      DAD   D
3928:A  037433 174                      LAH
3929:A  037434 007                      SLC
3930:A  037435 330                      RTC                  RETURN IF < 4.0
3931:A  037436 041 112 201              ML    RAMCNT         INCREMENT SEGMENT
3932:A  037441 064                      INM
3933:A  037442 311                      RET
3934:A
3935:A  037443 041 217 002      RMPS5   LDAD  655            SET NREF TO 4.0 RPM
3936:A  037446 042 101 203              STOD  NREF
3937:A  037451 315 357 104              CALL  ALRON          AILERON CONTROL BY SPEED PROPORTIONAL AND INTEGRAL
3938:A  037454 052 077 175              LDAD  S5A5           CHECK POWER
3939:A  037457 353                      DEHL
3940:A  037460 041 236 002              LDAD  670            -.05 MW
3941:A  037463 315 162 137              CALL  NEGNUM
3942:A  037466 031                      DAD   D
3943:A  037467 174                      LAH
3944:A  037470 007                      SLC
3945:A  037471 330                      RTC                  RETURN IF < -.05
3946:A  037472 041 112 201              ML    RAMCNT         INCREMENT SEGMENT
3947:A  037475 064                      INM
3948:A  037476 076 000                  LOAD  0
3949:A  037500 042 105 176              STO   C5A3           REMOVE START MOTOR CMD
3950:A  037503 076 036                  LOAD  30
3951:A  037505 042 260 211              STO   RDELAY         SET DELAY FOR 3 SEC
3952:A  037510 311                      RET
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3953:A
3954:A  037511 315 263 101          RMPSD   CALL    RMPCHK      CHECK IF HOLDING RAMP RATE +/- 1 RPM
3955:A  037514 315 357 104                  CALL    ALRON       AILERON CONTROL BY SPEED PROPORTIONAL AND INTEGRAL
3956:A  037517 072 260 211                  LOAD    RDELAY
3957:A  037522 075                          DCA
3958:A  037523 062 260 211                  STO     RDELAY      IS DELAY TIME UP ??
3959:A  037526 300                          RFZ                 RETURN IF NOT
3960:A  037527 041 112 201                  HL      RAMCNT      INCREMENT SEGMENT
3961:A  037532 064                          INM
3962:A  037533 311                          RET
3963:A
3964:A  037534 315 263 101          RMPS6   CALL    RMPCHK      CHECK IF HOLDING RAMP RATE +/- 1 RPM
3965:A  037537 315 357 104                  CALL    ALRON       AILERON CONTROL BY SPEED PROPORTIONAL AND INTEGRAL
3966:A  037542 072 152 174                  LOAD    SBA4        CHECK STATOR SHORT BRAEAKER
3967:A  037545 267                          ORA
3968:A  037546 312 157 077                  JTZ     RMP4        JUMP IF OPEN
3969:A  037551 076 001                      LOAD    1
3970:A  037553 062 320 202                  STO     NSDL31      SET NORMAL SHUTDOWN TO LOCKOUT FLAG
3971:A  037556 311                          RET
3972:A  037557 041 112 201          RMP4    HL      RAMCNT      INCREMENT SEGMENT
3973:A  037562 064                          INM
3974:A  037563 041 120 106                  LOAD    18000
3975:A  037566 042 260 211                  STOD    RDELAY      SET DELAY FOR 30 MIN
3976:A  037571 311                          RET
3977:A
3978:A  037572 315 263 101          RMPS7   CALL    RMPCHK      CHECK IF HOLDING RAMP RATE +/- 1 RPM
3979:A  037575 315 357 104                  CALL    ALRON       AILERON CONTROL BY SPEED PROPORTIONAL AND INTEGRAL
3980:A  037600 072 067 174                  LOAD    S1A3        CHECK IF BOTH BLADE TEMPS ARE OK (0)
3981:A  037603 057 346 001                  INV
3982:A  037606 157 072 070 174 057 346      CAND    S1A4
        037614 001 245
3983:A  037616 312 262 077                  JTZ     RMPS        JUMP IF NOT OK
3984:A  037621 041 112 201                  HL      RAMCNT      INCREMENT SEGMENT
3985:A  037624 064                          INM
3986:A  037625 041 000 000                  LOAD    0
3987:A  037630 042 260 211                  STOD    RDELAY      ZERO OUT DELAY TIME
3988:A  037633 052 101 203                  LOAD    NREF
3989:A  037636 042 071 177                  STOD    CSAS        SET NG REF TO NREF
3990:A  037641 021 244 101                  DE      RMPC2       APU SUBROUTINE TO CALCULATE RAMP RATE NOW
3991:A  037644 315 137 001                  CALL    ADUSTR
3992:A  037647 052 256 211                  LOAD    DELCMD      CHECK IF RAMP RATE IS 0
3993:A  037652 174                          LAH
3994:A  037653 265                          ORL
3995:A  037654 300                          RFZ                 RETURN IF NOT 0
3996:A  037655 043                          INX     H           SET RAMP RATE TO AT LEAST 1 CNT/CYC
3997:A  037656 042 256 211                  STOD    DELCMD
3998:A  037661 311                          RET
3999:A  037662 052 260 211          RMPS    LOAD    RDELAY      DECREMENT TIMER
4000:A  037665 053                          DCX     H
4001:A  037666 042 260 211                  STOD    RDELAY
4002:A  037671 174                          LAH
4003:A  037672 265                          ORL                 CHECK IF 0
4004:A  037673 300                          RFZ                 RETURN IF NOT 0
4005:A  037674 076 001                      LOAD    1
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4006:A  037676 042 257 202          STO   NSDIS     SET NORMAL SHUTDOWN TO STANDBY INHIBIT
4007:A  037701 311                  RET
4008:A
4009:A  037702 315 263 101    RMPSB CALL  RMPCHK    CHECK IF HOLDING RAMP RATE +/- 1 RPM
4010:A  037705 052 101 203          LDAD  NREF      RAMP NREF AT DELCMD RATE
4011:A  037710 353                  DEHL
4012:A  037711 052 256 211          LDAD  DELCMD
4013:A  037714 031                  DAD   D         INCREMENT NREF BY DELCMD
4014:A  037715 042 101 203          STOD  NREF
4015:A  037720 042 071 177          STOD  CSA5
4016:A  037723 315 000 102          CALL  RMPSP     CHECK IF NREF > NSET AND FORCE REFERENCES IF SO
4017:A  037726 315 357 104          CALL  ALRON     AILERON CONTROL BY SPEED PROPORTIONAL AND INTEGRAL
4018:A  037731 052 073 175          LDAD  S3A4      CHECK ROTOR SPEED
4019:A  037734 353                  DEHL
4020:A  037735 041 326 003          LDAD  982       6 RPM
4021:A  037740 315 162 137          CALL  NEGNUM
4022:A  037743 031                  DAD   D
4023:A  037744 174                  LAH
4024:A  037745 007                  SLC
4025:A  037746 330                  RTC             RETURN IF < 6
4026:A  037747 041 112 201          HL    RAMCNT    INCREMENT SEGMENT
4027:A  037752 064                  INM
4028:A  037753 311                  RET
4029:A
4030:A  037754 315 263 101    RMPS9 CALL  RMPCHK    CHECK IF HOLDING RAMP RATE +/- 1 RPM
4031:A  037757 052 101 203          LDAD  NREF      RAMP NREF AT DELCMD RATE
4032:A  037762 353                  DEHL
4033:A  037763 052 256 211          LDAD  DELCMD
4034:A  037766 031                  DAD   D         INCREMENT NREF BY DELCMD
4035:A  037767 042 101 203          STOD  NREF
4036:A  037772 042 071 177          STOD  CSA5
4037:A  037775 315 000 102          CALL  RMPSP     CHECK IF NREF > NSET AND FORCE REFERENCES IF SO
4038:A  040000 315 357 104          CALL  ALRON     AILERON CONTROL BY SPEED PROPORTIONAL AND INTEGRAL
4039:A  040003 052 071 175          LDAD  S2A18     TEETER ANGLE
4040:A  040006 353                  DEHL
4041:A  040007 041 000 010          LDAD  2048      TO GET ABSOLUTE ANGLE
4042:A  040012 315 162 137          CALL  NEGNUM
4043:A  040015 031                  DAD   D
4044:A  040016 174                  LAH             GET ABSOLUTE VALUE
4045:A  040017 007                  SLC
4046:A  040020 322 026 100          JFC   RMP6      JUMP IF POSITIVE ALREADY
4047:A  040023 315 152 137          CALL  POSNUM
4048:A  040026 353            RMP6  DEHL
4049:A  040027 041 353 001          LDAD  491       2.4 DEGREES
4050:A  040032 315 162 137          CALL  NEGNUM
4051:A  040035 031                  DAD   D
4052:A  040036 174                  LAH
4053:A  040037 007                  SLC
4054:A  040040 322 050 100          JFC   RMP7      JUMP IF < 2.4
4055:A  040043 041 112 201          HL    RAMCNT    INCREMENT SEGMENT
4056:A  040046 064                  INM
4057:A  040047 311                  RET
4058:A  040050 072 262 211    RMP7  LDAD  RFLAG     CHECK IF SHAFT LUBE PRESSURE WAS CHECKED YET
4059:A  040053 267                  ORA
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4060:A  040054 314 333 101          CTZ   RMPC3      CALL SUBROUTINE TO CHECK SHAFT LUBE PRESSURE
4061:A  040057 311                  RET
4062:A
4063:A  040060 315 263 101  RMPS10  CALL  RMPCHK     CHECK IF HOLDING RAMP RATE +/- 1 RPM
4064:A  040063 052 101 203          LOAD  NREF       RAMP NREF AT DELCMD RATE
4065:A  040066 353                  DEHL
4066:A  040067 052 256 211          LOAD  DELCMD
4067:A  040072 031                  DAD   D          INCREMENT NREF BY DELCMD
4068:A  040073 042 101 203          STOD  NREF
4069:A  040076 042 071 177          STOD  C5A5
4070:A  040101 315 000 102          CALL  RMPSF      CHECK IF NREF > NSET AND FORCE REFERENCES IF SO
4071:A  040104 315 357 104          CALL  ALRON      AILERON CONTROL BY SPEED PROPORTIONAL AND INTEGRAL
4072:A  040107 072 262 211          LOAD  RFLAG      CHECK IF SHAFT LUBE PRESSURE WAS CHECKED YET
4073:A  040112 267                  ORA
4074:A  040113 314 333 101          CTZ   RMPC3      CALL SUBROUTINE TO CHECK SHAFT LUBE PRESSURE
4075:A  040116 076 001              LOAD  1
4076:A  040120 062 077 176          STO   C2A12      CLOSE H.F. TEETER BRAKE RELAY OFF
4077:A  040123 076 062              LOAD  50
4078:A  040125 062 260 211          STO   RDELAY     SET DELAY TIMER TO 5 SEC
4079:A  040130 041 112 201          HL    RAMCNT     INCREMENT SEGMENT
4080:A  040133 064                  INM
4081:A  040134 311                  RET
4082:A
4083:A  040135 315 263 101  RMPS11  CALL  RMPCHK     CHECK IF HOLDING RAMP RATE +/- 1 RPM
4084:A  040140 052 101 203          LOAD  NREF       RAMP NREF AT DELCMD RATE
4085:A  040143 353                  DEHL
4086:A  040144 052 256 211          LOAD  DELCMD
4087:A  040147 031                  DAD   D          INCREMENT NREF BY DELCMD
4088:A  040150 042 101 203          STOD  NREF
4089:A  040153 042 071 177          STOD  C5A5
4090:A  040156 315 000 102          CALL  RMPSF      CHECK IF NREF > NSET AND FORCE REFERENCES IF SO
4091:A  040161 315 357 104          CALL  ALRON      AILERON CONTROL BY SPEED PROPORTIONAL AND INTEGRAL
4092:A  040164 072 262 211          LOAD  RFLAG      CHECK IF SHAFT LUBE PRESSURE WAS CHECKED YET
4093:A  040167 267                  ORA
4094:A  040170 314 333 101          CTZ   RMPC3      CALL SUBROUTINE TO CHECK SHAFT LUBE PRESSURE
4095:A  040173 072 103 174          LOAD  S2A12      CHECK H.F. TEETER BRAKES
4096:A  040176 267                  ORA
4097:A  040177 302 220 100          JFZ   RMP9       JUMP IF BRAKES OFF
4098:A  040202 072 260 211          LOAD  RDELAY     DECREMENT DELAY TIMER
4099:A  040205 075                  DCA
4100:A  040206 062 260 211          STO   RDELAY
4101:A  040211 300                  RFZ              RETURN IF TIME NOT ELAPSED
4102:A  040212 076 001              LOAD  1
4103:A  040214 062 321 202          STO   NSDL32     SET NORMAL SHUTDOWN TO LOCKOUT
4104:A  040217 311                  RET
4105:A  040220 041 112 201  RMP9    HL    RAMCNT     INCREMENT SEGMENT
4106:A  040223 064                  INM
4107:A  040224 076 024              LOAD  20
4108:A  040226 062 260 211          STO   RDELAY     SET DELAY TIMER TO 2 SEC
4109:A  040231 076 000              LOAD  0
4110:A  040233 062 077 176          STO   C2A12      OPEN H.F. TEETER BRAKE OFF RELAY
4111:A  040236 311                  RET
4112:A
4113:A  040237 315 263 101  RMPS12  CALL  RMPCHK     CHECK IF HOLDING RAMP RATE +/- 1 RPM
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4114:A  010242 052 101 203          LDAD  NREF        RAMP NREF AT DELCMD RATE
4115:A  040245 353                  DEHL
4116:A  040246 052 256 211          LDAD  DELCMD
4117:A  040251 031                  DAD   D           INCREMENT NREF BY DELCMD
4118:A  040252 042 101 203          STOD  NREF
4119:A  040255 042 071 177          STOD  C5A5
4120:A  040260 315 000 102          CALL  RMPSP       CHECK IF NREF > NSET AND FORCE REFERENCES IF SO
4121:A  040263 315 357 104          CALL  ALRON       AILERON CONTROL BY SPEED PROPORTIONAL AND INTEGRAL
4122:A  040266 072 262 211          LDAD  RFLAG       CHECK IF SHAFT LUBE PRESSURE WAS CHECKED YET -
4123:A  040271 267                  ORA
4124:A  040272 314 333 101          CTZ   RMPC3       CALL SUBROUTINE TO CHECK SHAFT LUBE PRESSURE
4125:A  040275 072 260 211          LDAD  RDELAY      DECREMENT DELAY TIMER
4126:A  040300 075                  DCA
4127:A  040301 062 260 211          STO   RDELAY
4128:A  040304 300                  RFZ               RETURN IF TIME HAS NOT ELAPSED
4129:A  040305 076 004              LOAD  4
4130:A  040307 062 260 211          STO   RDELAY      SET DELAY TO 4 CYCLES
4131:A  040312 041 112 201          HL    RAMCNT      INCREMENT SEGMENT
4132:A  040315 064                  INM
4133:A  040316 072 103 174          LDAD  S2A12       CHECK THAT H.F. TEETER BRAKES STILL OFF
4134:A  040321 267                  ORA
4135:A  040322 300                  RFZ               RETURN IF OFF
4136:A  040323 076 001              LOAD  1
4137:A  010325 062 321 202          STO   NSDL32      SET NORMAL SHUTDOWN TO LOCKOUT
4138:A  040330 311                  RET
4139:A
4140:A  040331 315 263 101  RMPS13  CALL  RMPCHK     CHECK IF HOLDING RAMP RATE +/- 1 RPM
4141:A  040334 072 262 211          LDAD  RFLAG       CHECK IF SHAFT LUBE PRESSURE WAS CHECKED YET
4142:A  040337 267                  ORA
4143:A  040340 314 333 101          CTZ   RMPC3       CALL SUBROUTINE TO CHECK SHAFT LUBE PRESSURE
4144:A  040343 052 101 203          LDAD  NREF        RAMP NREF AT DELCMD RATE
4145:A  040346 353                  DEHL
4146:A  040347 052 256 211          LDAD  DELCMD
4147:A  040352 031                  DAD   D           INCREMENT NREF BY DELCMD
4148:A  040353 042 101 203          STOD  NREF
4149:A  040356 042 071 177          STOD  C5A5
4150:A  040361 052 147 203          LDAD  NREFL1      CHECK NREF WITH FIRST REFERENCE LEVEL
4151:A  040364 353                  DEHL
4152:A  040365 041 142 000          LDAD  98          .6 RPM
4153:A  040370 315 162 137          CALL  NEGNUM
4154:A  040373 031                  DAD   D
4155:A  040374 353                  DEHL
4156:A  040375 052 101 203          LDAD  NREF
4157:A  040400 315 162 137          CALL  NEGNUM
4158:A  040403 031                  DAD   D
4159:A  040404 174                  LAH
4160:A  040405 007                  SLC
4161:A  040406 322 024 101          JFC   RMP10       JUMP IF NREFL1 - .6 > NREF
4162:A  040411 353                  DEHL
4163:A  040412 042 101 203          STOD  NREF        FORCE NREF TO NSET - .6
4164:A  040415 042 071 177          STOD  C5A5        FORCE NG REF TO NSET - .6
4165:A  040420 041 112 201          HL    RAMCNT      INCREMENT SEGMENT COUNTER
4166:A  010423 064                  INM
4167:A  040424 315 357 104  RMP10   CALL  ALRON       AILERON CONTROL BY SPEED PROPORTIONAL AND INTEGRAL
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4168:A  040427 311                          RET
4169:A
4170:A  040430 072 260 211          RMFS14  LOAD  RDELAY        DECREMENT CYCLE DELAY
4171:A  040433 075                          DCA
4172:A  040434 062 260 211                  STO   RDELAY
4173:A  040437 302 120 101                  JFZ   RMF3          JUMP IF IT IS NOT TIME TO UPDATE NREF & NG REF
4174:A  040442 076 004                      LOAD  4
4175:A  040444 062 260 211                  STO   RDELAY        SET DELAY TIMER TO 4 CYCLES
4176:A  040447 052 101 203                  LDAD  NREF          RAMP UP NREF
4177:A  040452 043                          INX   H             AT 1 CNT/4 CYC = .91 RPM/MIN
4178:A  040453 042 101 203                  STOD  NREF
4179:A  040456 042 071 177                  STOD  C5A5
4180:A  040461 353                          DEHL
4181:A  040462 052 147 203                  LDAD  NREFL1        CHECK WITH FIRST REFERENCE LEVEL
4182:A  040465 315 162 137                  CALL  NEGNUM
4183:A  040470 031                          DAD   D
4184:A  040471 174                          LAH
4185:A  040472 007                          SLC
4186:A  040473 332 120 101                  JTC   RMF3          JUMP IF NREF < NSET
4187:A  040476 052 147 203                  LDAD  NREFL1        FORCE NREF & NG REF TO NREFL1
4188:A  040501 042 101 203                  STOD  NREF
4189:A  040504 042 071 177                  STOD  C5A5
4190:A  040507 076 012                      LOAD  10
4191:A  040511 062 260 211                  STO   RDELAY        SET DELAY TIMER TO 1 SEC
4192:A  040514 041 112 201                  HL    RAMCNT        INCREMENT SEGMENT COUNTER
4193:A  040517 064                          INM
4194:A  040520 315 357 104          RMF3    CALL  ALRON         AILERON CONTROL BY SPEED PROPORTIONAL AND INTEGRAL
4195:A  040523 311                          RET
4196:A
4197:A  040524 315 357 104          RMFS15  CALL  ALRON         AILERON CONTROL BY SPEED PROPORTIONAL AND INTEGRAL
4198:A  040527 072 260 211                  LOAD  RDELAY
4199:A  040532 075                          DCA                 DECREMENT DELAY TIMER
4200:A  040533 062 260 211                  STO   RDELAY
4201:A  040536 300                          RFZ                 RETURN IF TIME NOT ELAPSED
4202:A  040537 062 262 211                  STO   RFLAG         ZERO FLAG THAT SHAFT LUBE PRESSURE WAS CHECKED
4203:A  040542 062 253 211                  STO   RMPPMP        ZERO FLAG THAT PRESSURE WAS LO IN RAMP
4204:A  040545 074                          INA
4205:A  040546 062 106 176                  STO   C5A4          ISSUE SYNC/GENERATE CMD
4206:A  040551 076 226                      LOAD  150
4207:A  040553 062 260 211                  STO   RDELAY        SET DELAY TIMER FOR 15 SEC
4208:A  040556 041 112 201                  HL    RAMCNT        INCREMENT SEGMENT COUNTER
4209:A  040561 064                          INM
4210:A  040562 311                          RET
4211:A
4212:A  040563 315 357 104          RMFS16  CALL  ALRON         AILERON CONTROL BY SPEED PROPORTIONAL AND INTEGRAL
4213:A  040566 072 151 174                  LOAD  S8A3          CHECK STATOR TIE CLOSE
4214:A  040571 267                          OPA
4215:A  040572 312 207 101                  JTZ   RMF11         JUMP IF STATOR TIE IS OPEN
4216:A  040575 076 000                      LOAD  0
4217:A  040577 062 260 211                  STO   RDELAY        ZERO OUT DELAY TIMER
4218:A  040602 074                          INA
4219:A  040603 062 245 211                  STO   RMPCPL        SET RAMP IS DONE FLAG
4220:A  040606 311                          RET
4221:A  040607 072 260 211          RMF11   LOAD  RDELAY        DECREMENT TIMER DELAY
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4222:A  040612 075                      DCA
4223:A  040613 062 260 211              STO   RDELAY
4224:A  040616 300                      RFZ                     RETURN IF TIME HAS NOT ELAPSED
4225:A  040617 076 001                  LOAD  1
4226:A  040621 062 322 202              STO   NSDL33            SET NORMAL SHUTDOWN TO LOCKOUT
4227:A  040624 311                      RET
4228:A                                  .
4229:A                                  . *** RAMP SUBROUTINES ***
4230:A                                  .
4231:A                                  . SUBROUTINE TO PARTIALLY CALCULATE AILERON TARGET BASED ON WIND AVERAGE
4232:A                                  .
4233:A  040625 203 254 211 035  RMPC1   DBYTE LDS,*VWO,FLTS                  VWO
4234:A  040631 202 042 333 271 177 022  DBYTE LDFI,34,219,185,127,FMUL        *.363
4235:A  040637 037 205 256 211          DBYTE FIXS,STS,*DELCMD
4236:A  040643 200                      DBYTE EXIT
4237:A                                  .
4238:A                                  . SUBROUTINE TO CALCULATE NREF RATE FROM 4 TO SPEED SET POINT
4239:A                                  .
4240:A  040644 203 254 211 035  RMPC2   DBYTE LDS,*VWO,FLTS                  VWO
4241:A  040650 202 105 176 375 166 022  DBYTE LDFI,69,126,253,118,FMUL       *.000967
4242:A  040656 037 205 256 211          DBYTE FIXS,STS,*DELCMD
4243:A  040662 200                      DBYTE EXIT
4244:A                                  .
4245:A                                  . SUBROUTINE TO CHECK THAT ABS(NREF-NR) < 1 RPM
4246:A                                  .
4247:A  040663 052 101 203              RMPCHK  LDAD  NREF          LOAD SPEED REFERENCE
4248:A  040666 353                      DEHL
4249:A  040667 052 073 175              LDAD  S3A4              ROTOR RPM
4250:A  040672 315 162 137              CALL  NEGNUM
4251:A  040675 031                      DAD   D
4252:A  040676 174                      LAH
4253:A  040677 007                      SLC                     GET ABSOLUTE VALUE
4254:A  040700 322 306 101              JFC   RMP2              JUMP IF POSITIVE
4255:A  040703 315 152 137              CALL  POSNUM
4256:A  040706 353                      RMP2    DEHL
4257:A  040707 041 244 000              LDAD  164               1 RPM
4258:A  040712 315 162 137              CALL  NEGNUM
4259:A  040715 031                      DAD   D
4260:A  040716 174                      LAH
4261:A  040717 007                      SLC
4262:A  040720 330                      RTC                     RETURN IF DIFFERENCE < 1
4263:A  040721 041 247 211              HL    RPECNT            INCREMENT CNTR FOR # TIMES NOT ABLE TO KEEP RAMP
4264:A  040724 064                      INM
4265:A  040725 076 001                  LOAD  1
4266:A  040727 062 246 211              STO   RMPFL             SET FLAG THAT NOT ABLE TO KEEP RAMP RATE
4267:A  040732 311                      RET
4268:A                                  .
4269:A                                  . SUBROUTINE TO CHECK SHAFT LUBE PRESSURE IF RPM > 9
4270:A                                  .
4271:A  040733 052 073 175              RMPC3   LDAD  S3A4              ROTOR RPM
4272:A  040736 353                      DEHL
4273:A  040737 041 302 005              LDAD  1474              9 RPM
4274:A  040742 315 162 137              CALL  NEGNUM
4275:A  040745 031                      DAD   D
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4276:A  040746 174                      LAH
4277:A  040747 007                      SLC
4278:A  040750 330                      RTC             RETURN IF LESS THAN 9 RPM
4279:A  040751 076 001                  LOAD  1
4280:A  040753 062 262 211              STO   RFLAG     SET FLAG THAT SHAFT LUBE PRESSURE WAS CHECKED
4281:A  040756 072 123 174              LOAD  S4A30     CHECK SHAFT LUBE PUMP PRESSURE
4282:A  040761 267                      ORA
4283:A  040762 302 373 101              JNZ   RMPB      JUMP IF OK
4284:A  040765 076 001                  LOAD  1
4285:A  040767 062 253 211              STO   RMPFMP    SET FLAG THAT WAS LO
4286:A  040772 311                      RET
4287:A  040773 075              RMPB    DCA
4288:A  040774 062 102 176              STO   C4A1      TURN OFF GEARBOX LUBE PUMP
4289:A  040777 311                      RET
4290:A                          .
4291:A                          . SUBROUTINE MAKE SURE NREF DOES NOT GO ABOVE NSET - .6
4292:A                          .
4293:A  041000 052 251 211      RMPSP   LOAD  NSET      LOAD SPEED SET POINT
4294:A  041003 353                      DEHL
4295:A  041004 052 101 203              LOAD  NREF      SPEED REFERENCE
4296:A  041007 315 162 137              CALL  NEGNUM
4297:A  041012 031                      DAD   D
4298:A  041013 174                      LAH
4299:A  041014 007                      SLC
4300:A  041015 320                      RFC             RETURN IF NSET > NREF
4301:A  041016 353                      DEHL
4302:A  041017 042 101 203              STOD  NREF      FORCE NREF & NG REF TO BE SPEED SET POINT
4303:A  041022 042 071 177              STOD  C5A5
4304:A  041025 311                      RET
4305:A                          .
4306:A                          .
4307:A                          . ***** POWER GENERATION SEGMENTS *****
4308:A                          .
4309:A                          .
4310:A  041026 315 357 104      PWRS1   CALL  ALRON     AILERON CONTROL BY SPEED PROPORTIONAL AND INTEGRAL
4311:A  041031 021 012 103              DE    PWRC1     CALCULATE POWER SET POINT (0 TO 1)
4312:A  041034 315 137 001              CALL  AFUSTR
4313:A  041037 052 147 203              LOAD  NREFL1    13.8 RPM DEFAULT
4314:A  041042 353                      DEHL
4315:A  041043 052 256 211              LOAD  DELCMD    .6 * POWER SET POINT
4316:A  041046 315 162 137              CALL  NEGNUM
4317:A  041051 031                      DAD   D         TO GET VALUE TO RAMP NG REF TO
4318:A  041052 042 256 211              STOD  DELCMD
4319:A  041055 076 004                  LOAD  4
4320:A  041057 062 260 211              STO   RDELAY    SET RAMP RATE TO 1 CNT/4 CYCLES
4321:A  041062 041 000 000              LOAD  0
4322:A  041065 042 247 211              STOD  RPFCNT    ZERO NUMBER OF TIMES DID NOT REACH PWRGEN
4323:A  041070 041 122 201              DL    PWRCNT    INCREMENT SEGMENT COUNTER
4324:A  041073 064                      INM
4325:A  041074 311                      RET
4326:A                          .
4327:A  041075 072 260 211      PWRS2   LOAD  RDELAY    DECREMENT DELAY TIMER
4328:A  041100 075                      DCA
4329:A  041101 062 260 211              STO   RDELAY
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4340:A  041104 302 152 102          JFZ   PWR1          JUMP IF NOT TIME TO RAMP AGAIN
4341:A  041107 076 004              LOAD  4
4342:A  041111 062 260 211          STO   RDELAY        SET RAMP RATE TO 1 CNT/4 CYCLES
4343:A  041114 052 071 177          LDAD  CSAS          NG REF
4344:A  041117 053                  DCX   H             RAMP DOWN AT 1 CNT/4 CYCLES
4345:A  041120 042 071 177          STOD  CSAS
4346:A  041123 353                  DEHL
4347:A  041124 052 256 211          LDAD  DELCMD        CHECK IF AT TARGET
4350:A  041127 315 162 137          CALL  NEGNUM
4351:A  041132 031                  DAD   D
4340:A  041133 174                  LAH
4341:A  041134 007                  SLC
4342:A  041135 322 152 102          JFC   PWR1          JUMP IF NOT DONE RAMPING DOWN
4343:A  041140 052 256 211          LDAD  DELCMD        FORCE NG REF TO TARGET
4344:A  041143 042 071 177          STOD  CSAS
4345:A  041146 041 122 201          HL    PWRCNT        INCREMENT SEGMENT COUNTER
4346:A  041151 064                  INM
4347:A  041152 315 357 104  PWR1    CALL  ALRON         AILERON CONTROL BY SPEED PROPORTIONAL AND INTEGRAL
4348:A  041155 311                  RET
4349:A
4350:A  041156 315 357 104  PWRS3   CALL  ALRON         AILERON CONTROL BY SPEED PROPORTIONAL AND INTEGRAL
4351:A  041161 052 251 212          LDAD  PR2AVG        AVERAGE POWER
4352:A  041164 353                  DEHL
4353:A  041165 041 045 007          LDAD  1829          4.5 MW
4354:A  041170 315 162 137          CALL  NEGNUM
4355:A  041173 031                  DAD   D
4356:A  041174 174                  LAH
4357:A  041175 007                  SLC
4358:A  041176 330                  RTC                 RETURN IF < 4.5 MW
4359:A  041177 076 004              LOAD  4
4360:A  041201 062 260 211          STO   RDELAY        SET RAMP RATE TO 1 CNT/4 CYCLES
4361:A  041204 041 122 201          HL    PWRCNT        INCREMENT SEGMENT COUNTER
4362:A  041207 064                  INM
4363:A  041210 311                  RET
4364:A
4365:A  041211 315 357 104  PWRS4   CALL  ALRON         AILERON CONTROL BY SPEED PROPORTIONAL AND INTEGRAL
4366:A  041214 072 260 211          LDAD  RDELAY        DECREMRNT DELAY TIMER
4367:A  041217 075                  DCA
4368:A  041220 062 260 211          STO   RDELAY
4369:A  041223 300                  RFZ                 RETRUN IF NOT READY TO RAMP AGAIN
4370:A  041224 076 004              LOAD  4
4371:A  041226 062 260 211          STO   RDELAY        SET RAMP RATE AT 1 CNT/4 CYCLES
4372:A  041231 052 071 177          LDAD  CSAS          RAMP UP NG REF
4373:A  041234 043                  INX   H
4374:A  041235 042 071 177          STOD  CSAS
4375:A  041240 052 101 203          LDAD  NREF          RAMP NREF
4376:A  041243 043                  INX   H
4377:A  041244 042 101 203          STOD  NREF
4378:A  041247 353                  DEHL
4379:A  041250 052 151 203          LDAD  NRPTL2        CHECK AGAINST HIGH SPEED REFERENCE LEVEL
4380:A  041253 315 162 137          CALL  NEGNUM
4381:A  041256 031                  DAD   D
4382:A  041257 174                  LAH
4383:A  041260 007                  SLC
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4384:A*  041261 330                          RTC
4385:A   041262 041 122 201                  NL    PWRCNT          INCREMENT SEGMENT COUNTER
4386:A   041265 064                          INM
4387:A   041266 311                          RET
4388:A
4389:A   041267 315 357 104          PWRS5   CALL  ALRON           AILERON CONTROL BY SPEED PROPORTIONAL AND INTEGRAL
4390:A   041272 052 251 212                  LDAD  PR2AVG          AVERAGE POWER
4391:A   041275 353                          DEHL
4392:A   041276 041 247 005                  LDAD  1447            3.0 MW
4393:A   041301 315 162 137                  CALL  NEGNUM
4394:A   041304 031                          DAD   D
4395:A   041305 174                          LAH
4396:A   041306 007                          SLC
4397:A   041307 320                          RFC                   RETURN IF POWER > 3.0
4398:A   041310 076 004                      LOAD  4
4399:A   041312 062 260 211                  STO   RDELAY          SET RAMP RATE TO 1 CNT/4 CYCLES
4400:A   041315 041 122 201                  NL    PWRCNT          INCREMENT SEGMENT COUNTER
4401:A   041320 064                          INM
4402:A   041321 311                          RET
4403:A
4404:A   041322 315 357 104          PWRS6   CALL  ALRON           AILERON CONTROL BY SPEED PROPORTIONAL AND INTEGRAL
4405:A   041325 072 260 211                  LOAD  RDELAY          DECREMENT DELAY TIMER
4406:A   041330 075                          DCA
4407:A   041331 062 260 211                  STO   RDELAY
4408:A   041334 300                          RFZ                   RETURN IF NOT TIME TO RAMP
4409:A   041335 076 004                      LOAD  4
4410:A   041337 062 260 211                  STO   RDELAY          SET RAMP RATE AT 1 CNT/4 CYCLES
4411:A   041342 052 101 203                  LDAD  NREF            RAMP DOWN NREF
4412:A   041345 053                          DCX   H
4413:A   041346 042 101 203                  STOD  NREF
4414:A   041351 353                          DEHL
4415:A   041352 052 147 203                  LDAD  NREFL1          CHECK IF AT LOW SPEED REFERENCE LEVEL (13.8)
4416:A   041355 315 162 137                  CALL  NEGNUM
4417:A   041360 031                          DAD   D
4418:A   041361 174                          LAH
4419:A   041362 007                          SLC
4420:A   041363 332 376 102                  JTC   PWR3            JUMP IF AT LOW SPEED REFERENCE LEVEL
4421:A   041366 052 071 177                  LDAD  C5A5            DECREMENT NG REF
4422:A   041371 053                          DCX   H
4423:A   041372 042 071 177                  STOD  C5A5
4424:A   041375 311                          RET
4425:A   041376 052 147 203          PWR3    LDAD  NREFL1          FORCE NREF TO LOW SPEED REFERENCE LEVEL
4426:A   041401 042 101 203                  STOD  NREF
4427:A   041404 076 002                      LOAD  2
4428:A   041406 062 122 201                  STO   PWRCNT          SET SEGMENT COUNTER TO 2
4429:A   041411 311                          RET
4430:A
4431:A                                       . *** POWER GENERATION SUBROUTINE ***
4432:A
4433:A   041412 203 145 203 035      PWRC1   DBYTE LDS,*FMANU,FLTS                POWER SET POINT IN COUNTS
4434:A   041416 202 000 360 236 014 023      DBYTE LDFI,0,240,158,12,FDIV          /2543 (7.3 MW)
4435:A   041424 202 000 000 304 007 022      DBYTE LDFI,0,0,196,7,FMUL               *98 (.6 RPM)
4436:A   041432 037 205 256 211              DBYTE FIXS,STS,*DELCMD
4437:A   041436 200                          DBYTE EXIT
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4438:A
4439:A
4440:A
4441:A
4442:A
4443:A   041437 021 130 106          .
4444:A   041442 315 137 001          .
4445:A   041445 041 000 000          . ***** NORMAL AND EMERGENCY SHUTDOWN SEGMENTS *****
4446:A   041450 042 075 203          .
4447:A   041453 315 357 104          .
4448:A   041456 052 071 177  NSDS1   DE    ALINIT          INITIALIZE INTEGRATOR
4449:A   041461 353                  CALL  APUSTR
4450:A   041462 052 101 203          LDAD  0
4451:A   041465 315 162 137          STOD  NERR            ZERO OUT SPEED ERROR
4452:A   041470 031                  CALL  ALRUN           SPEED CONTROL OF CONTROL ANGLES TO MAINTAIN RPM
4453:A   041471 042 256 211          LDAD  C5A5            CALCULATE AND SAVE DIFFERENCE OF NREF AND NG REF
4454:A   041474 041 302 005          DEHL
4455:A   041477 042 172 203          LDAD  NREF
4456:A   041502 076 000              CALL  NEGNUM
4457:A   041504 062 262 211          DAD   D
4458:A   041507 315 336 104          STOD  DELCMD
4459:A   041512 311                  LDAD  1474            SET TO CHANGE SEGMENTS AT 9 RPM
4460:A                               STOD  NSTOP
4461:A   041513 315 227 104          LDAD  0
4462:A   041516 052 101 203          STO   RFLAG           ZERO FLAG THAT ROTOR BRAKES PUT ON
4463:A   041521 353                  CALL  SDINCR          INCREMENT CORRESPONDING SEGMENT COUNTER
4464:A   041522 052 256 211          RET
4465:A   041525 031
4466:A   041526 353          NSDS2   CALL  NSDRMP          RAMP DOWN AT 10 RPM/MIN TO NSTOP
4467:A   041527 041 113 007          LDAD  NREF            RAMP DOWN NG REF TO FOLLOW NREF
4468:A   041532 315 162 137          DEHL
4469:A   041535 031                  LDAD  DELCMD
4470:A   041536 174                  DAD   D
4471:A   041537 007                  DEHL                  THIS IS VALUE OF NG REF
4472:A   041540 322 154 103          LDAD  1867            BUT LIMIT VALUE TO 11.4 MINIMUM
4473:A   041543 041 113 007          CALL  NEGNUM
4474:A   041546 042 071 177          DAD   D
4475:A   041551 303 160 103          LAH
4476:A   041554 353                  SLC
4477:A   041555 042 071 177          JFC   NSD2            JUMP IF NG REF > 11.4
4478:A   041560 052 247 212          LDAD  1867            FORCE TO 11.4
4479:A   041563 353                  STOD  C5A5
4480:A   041564 041 052 003          JMP   NSD3
4481:A   041567 315 162 137  NSD2    DEHL
4482:A   041572 031                  STOD  C5A5            SET NEW NG REF
4483:A   041573 174          NSD3    LDAD  PR1AVG          6.4 SEC POWER AVERAGE
4484:A   041574 007                  DEHL
4485:A   041575 320                  LDAD  B10             .5 MW
4486:A   041576 315 336 104          CALL  NEGNUM
4487:A   041601 076 000              DAD   D
4488:A   041603 062 106 176          LAH
4489:A   041606 076 062              SLC
4490:A   041610 062 260 211          RFC                   RETURN IF PWR > .5 MW
4491:A   041613 311                  CALL  SDINCR          INCREMENT CORRECT SEGMENT COUNTER
                                     LDAD  0
                                     STO   C5A4            CMD SYNC/GENERATE OFF
                                     LDAD  50
                                     STO   RDELAY          SET DELAY FOR 5 SECONDS
                                     RET
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4492:A
4493:A  041614 315 227 104      NSDS3   CALL    NSDRMP          RAMP DOWN AT 10 RPM/MIN TO NSTOP
4494:A  041617 052 101 203              LDAD    NREF            GEN RPM
4495:A  041622 042 071 177              STOD    C5A5
4496:A  041625 322 235 103              JFC     NSD7            JUMP IF NR > NSTOP
4497:A  041630 076 001                  LOAD    1
4498:A  041632 062 102 176              STO     C4A1            TURN ON GEARBOX AC LUBE PUMP
4499:A  041635 072 260 211      NSD7    LOAD    RDELAY
4500:A  041640 075                      DCA                     DECREMENT 5 SECOND TIMER
4501:A  041641 062 260 211              STO     RDELAY
4502:A  041644 300                      RFZ                     RETURN IF 5 SECONDS IS NOT UP
4503:A  041645 315 336 104              CALL    SDINCR          INCREMENT CORRECT SEGMENT COUNTER
4504:A  041650 072 067 201              LOAD    ESD             ESD ACTIVATION FLAG
4505:A  041653 267                      ORA
4506:A  041654 300                      RFZ                     RETURN IF ESD
4507:A  041655 072 151 174              LOAD    S8A3            VERIFY STATOR TIE BREAKER TRIPPED
4508:A  041660 267                      ORA
4509:A  041661 310                      RTZ                     RETURN IF TRIPPED
4510:A  041662 062 227 202              STO     ALRM34          SET ALARM
4511:A  041665 311                      RET
4512:A
4513:A  041666 315 227 104      NSDS4   CALL    NSDRMP          RAMP DOWN AT 10 RPM/MIN TO NSTOP
4514:A  041671 052 101 203              LDAD    NREF            GEN RPM
4515:A  041674 042 071 177              STOD    C5A5
4516:A  041677 320                      RFC                     RETURN IF NR > NSTOP
4517:A  041700 315 336 104              CALL    SDINCR          INCREMENT CORRECT SEGMENT COUNTER
4518:A  041703 041 122 000              LDAD    82              SET RPM INCREMENT POINT TO .5 RPM
4519:A  041706 042 172 203              STOD    NSTOP
4520:A  041711 076 001                  LOAD    1               TURN GEARBOX AC LUBE PUMP ON
4521:A  041713 062 102 176              STO     C4A1
4522:A  041716 311                      RET
4523:A
4524:A  041717 315 227 104      NSDS5   CALL    NSDRMP          RAMP DOWN AT 10 RPM/MIN TO NSTOP
4525:A  041722 052 101 203              LDAD    NREF            GEN RPM
4526:A  041725 042 071 177              STOD    C5A5
4527:A  041730 320                      RFC                     RETURN IF NR > NSTOP
4528:A  041731 315 336 104              CALL    SDINCR          INCREMENT CORRECT SEGMENT COUNTER
4529:A  041734 311                      RET
4530:A
4531:A  041735 052 065 177      NSDSD   LDAD    C2A21           RAMP CONTROL ANGLES TO FEATHER
4532:A  041740 353                      DEHL
4533:A  041741 041 024 000              LDAD    20              5 DEGREES / SECOND
4534:A  041744 031                      DAD     D
4535:A  041745 353                      DEHL
4536:A  041746 041 062 017              LDAD    3890            90 DEGREES ?
4537:A  041751 315 162 137              CALL    NEGNUM
4538:A  041754 031                      DAD     D
4539:A  041755 174                      LAH
4540:A  041756 007                      RLC
4541:A  041757 353                      DEHL
4542:A  041760 332 042 104              JTC     NSDB            JUMP IF NOT AT 90 DEGREES
4543:A  041763 315 336 104              CALL    SDINCR
4544:A  041766 076 062                  LOAD    50
4545:A  041770 062 172 203              STO     NSTOP           SET 5 SEC DELAY
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4546:A  041773 076 000                      LOAD  0
4547:A  041775 062 117 176                  STO   C7A5          DE-ENERGIZE FEATHER VALVE A-1
4548:A  042000 062 120 176                  STO   C7A6          DE-ENERGIZE FEATHER VALVE A-2
4549:A  042003 062 110 176                  STO   C5A8          CMD CONVERTER TIE CLOSE OFF
4550:A  042006 062 104 176                  STO   C5A2          REMOVE TURBINE READY SIGNAL
4551:A  042011 062 076 176                  STO   C2A11         OPEN TEETER BRAKE POWER ON/OFF RELAY
4552:A  042014 062 102 176                  STO   C4A1          TURN OFF GEARBOX AC LUBE PUMP
4553:A  042017 062 067 176                  STO   C2A4          TURN OFF ROTOR HYDRAULIC PUMP
4554:A  042022 074                          INA
4555:A  042023 062 111 176                  STO   C5A9          CMD CONVERTER TIE TRIP
4556:A  042026 041 000 000                  LOAD  0
4557:A  042031 042 101 203                  STOD  NREF          ZERO SPEED REFERENCE
4558:A  042034 042 071 177                  STOD  C5A5          ZERO NG REF
4559:A  042037 041 062 017                  LOAD  3890
4560:A  042042 042 065 177          NSD8    STOD  C2A21
4561:A  042045 042 073 177                  STOD  C2A22
4562:A  042050 042 075 177                  STOD  C2A23
4563:A  042053 042 067 177                  STOD  C2A24
4564:A  042056 311                          RET
4565:A
4566:A  042057 072 067 201          NSDS6   LOAD  ESD           ESD ACTIVATION FLAG
4567:A  042062 267                          ORA
4568:A  042063 302 113 104                  JFZ   NSD5          JUMP IF ESD
4569:A  042066 072 172 203                  LOAD  NSTOP         DECREMENT DELAY COUNTER
4570:A  042071 075                          DCA
4571:A  042072 062 172 203                  STO   NSTOP
4572:A  042075 300                          RFZ                 RETURN IF TIME DELAY NOT ELAPSED
4573:A  042076 072 153 174                  LOAD  S8A5          VERIFY TIE BREAKER TRIPPED
4574:A  042101 041 103 174 266              IOR   S2A12         VERIFY TEETER HF BRAKES ON
4575:A  042105 312 113 104                  JTZ   NSD5          JUMP IF OK
4576:A  042110 062 227 202                  STO   ALRM34        SET ALARM CONDITION
4577:A  042113 315 336 104          NSD5    CALL  SDINCR        INCREMENT CORRECT SEGMENT COUNTER
4578:A  042116 041 000 000                  LOAD  0
4579:A  042121 042 172 203                  STOD  NSTOP         ZERO NSTOP
4580:A  042124 311                          RET
4581:A
4582:A  042125 076 000              NSDS7   LOAD  0
4583:A  042127 062 246 211                  STO   RMPFL         ZERO RAMP RATE COULD NOT BE MAINTAINED IN RAMP
4584:A  042132 062 253 211                  STO   RMPPMP        ZERO SHAFT PUMP NOT ADEQUATE TO KEEP PRESSURE
4585:A  042135 062 262 211                  STO   RFLAG         ZERO FLAG
4586:A  042140 062 222 211                  STO   SUFAIL        ZERO FLICK FAIL IN STARTUP
4587:A  042143 062 320 202                  STO   NSDL31        ZERO NORMAL SHUTDOWN TO LOCKOUT FLAG
4588:A  042146 062 321 202                  STO   NSDL32        ZERO NORMAL SHUTDOWN TO LOCKOUT FLAG
4589:A  042151 062 322 202                  STO   NSDL33        ZERO NORMAL SHUTDOWN TO LOCKOUT FLAG
4590:A  042154 062 263 202                  STO   NSDL02        ZERO NORMAL SHUTDOWN TO LOCKOUT FLAG
4591:A  042157 062 257 202                  STO   NSDI8         ZERO NORMAL SHUTDOWN TO INHIBIT FLAG
4592:A  042162 062 227 202                  STO   ALRM34        ZERO ALARM FLAG
4593:A  042165 062 242 202                  STO   NSDE5         ZERO NORMAL SHUTDOWN TO ENABLE IN STARTUP
4594:A  042170 041 377 017                  LOAD  4095          SET CMD CONTROL ANGLES TO 75 DEGREES
4595:A  042173 042 065 177                  STOD  C2A21
4596:A  042176 042 073 177                  STOD  C2A22
4597:A  042201 042 075 177                  STOD  C2A23
4598:A  042204 042 067 177                  STOD  C2A24
4599:A  042207 072 067 201                  LOAD  ESD
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4600:A  042212 267                      ORA
4601:A  042213 312 222 104              JTZ   NSD6          JUMP IF NSD
4602:A  042216 062 174 203              STO   ESDCFL        SET ESD COMPLETE
4603:A  042221 311                      RET
4604:A  042222 074              NSD6    INA
4605:A  042223 062 171 203              STO   NSDCFL        SET NORMAL SHUTDOWN COMPLETE
4606:A  042226 311                      RET
4607:A
4608:A                          . *** NORMAL AND EMERGENCY SHUTDOWN SUBROUTINES ***
4609:A
4610:A                          . SUBROUTINE TO RAMP NREF DOWN BY 10 RPM/MIN
4611:A
4612:A  042227 072 262 211      NSDRMP  LOAD  RFLAG         SEE IF ROTOR BRAKES PUT ON YET
4613:A  042232 267                      ORA
4614:A  042233 314 303 104              CTZ   NSDC1         CALL IF ROTOR BRAKES NOT ON
4615:A  042236 052 101 203              LDAD  NREF
4616:A  042241 053                      DCX   H
4617:A  042242 053                      DCX   H
4618:A  042243 053                      DCX   H             RAMP DOWN AT 3 CNTS/CYCLE
4619:A  042244 042 101 203              STOD  NREF
4620:A  042247 174                      LAH                 CHECK IF NEGATIVE
4621:A  042250 007                      SLC
4622:A  042251 322 262 104              JFC   NSD4          JUMP IF POSITIVE
4623:A  042254 041 000 000              LDAD  0
4624:A  042257 042 101 203              STOD  NREF          FORCE NREF TO ZERO
4625:A  042262 315 357 104      NSD4    CALL  ALRON         SPEED CONTROL OF AILERON ANGLES
4626:A  042265 052 073 175              LDAD  S3A4          CHECK RPM WITH NSTOP
4627:A  042270 353                      DEHL
4628:A  042271 052 172 203              LDAD  NSTOP
4629:A  042274 315 162 137              CALL  NEGNUM
4630:A  042277 031                      DAD   D
4631:A  042300 174                      LAH
4632:A  042301 007                      SLC
4633:A  042302 311                      RET
4634:A
4635:A                          . SUBROUTINE TO CHECK IF AILERON ANGLES > 70 IF SO PUT ON BRAKES
4636:A
4637:A  042303 052 065 177      NSDC1   LDAD  C2A21         AILERON CONTROL ANGLE
4638:A  042306 353                      DEHL
4639:A  042307 041 377 013              LDAD  3071          70 DEGREES
4640:A  042312 315 162 137              CALL  NEGNUM
4641:A  042315 031                      DAD   D
4642:A  042316 174                      LAH
4643:A  042317 007                      SLC
4644:A  042320 330                      RTC                 RETURN IF < 70
4645:A  042321 076 001                  LOAD  1
4646:A  042323 062 262 211              STO   RFLAG         SET ROTOR BRAKE FLAG ON
4647:A  042326 075                      DCA
4648:A  042327 062 101 176              STO   L3A2          CMD ROTOR BRAKE STAGE 1 ON
4649:A  042332 062 100 176              STO   C3A1          CMD ROTOR BRAKE STAGE 2 ON
4650:A  042335 311                      RET
4651:A
4652:A                          . SUBROUTINE TO INCREMENT CORRECT SEGMENT COUNTER
4653:A                          .
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4654:A  042336 072 066 201          SDINCR  LDAD  NSD          NSD ACTIVATION FLAG
4655:A  042341 267                          ORA
4656:A  042342 312 352 104                  JTZ   NSD1         JUMP IF ESD ACTIVE
4657:A  042345 041 106 201                  NL    NSDCNT       INCREMENT NSD SEGMENT COUNTER
4658:A  042350 064                          INM
4659:A  042351 311                          RET
4660:A  042352 041 107 201          NSD1    NL    ESDCNT       INCREMENT NSD SEGMENT COUNTER
4661:A  042355 064                          INM
4662:A  042356 311                          RET
4663:A                              .
4664:A                              .
4665:A                              . ***** AILERON CONTROL SUBROUTINES *****
4666:A                              .
4667:A                              .
4668:A  042357 052 075 203          AILRUN  LDAD  NERR         UPDATE OLD SPEED ERROR
4669:A  042362 042 077 203                  STOD  NERRO
4670:A  042365 052 101 203                  LDAD  NREF         CALCULATE NEW SPEED ERROR
4671:A  042370 315 162 137                  CALL  NEGNUM       NERR = RPM - NREF
4672:A  042373 353                          DEHL
4673:A  042374 052 073 175                  LDAD  S3A4
4674:A  042377 031                          DAD   D
4675:A  042400 042 075 203                  STOD  NERR
4676:A                              .                          ** CHECK ON DEADBAND
4677:A  042403 174                          LAH                CHECK FOR SIGN
4678:A  042404 007                          SLC
4679:A  042405 322 013 105                  JFC   AIL1         JUMP IF POSITIVE
4680:A  042410 315 152 137                  CALL  POSNUM       MAKE NEGATIVE NUMBER POSITIVE
4681:A  042413 353                  AIL1    DEHL
4682:A  042414 041 013 000                  LDAD  11           .07 RPM
4683:A  042417 315 162 137                  CALL  NEGNUM       IF < .07 RPM THEN NERR = 0
4684:A  042422 031                          DAD   D
4685:A  042423 174                          LAH                CHECK FOR SIGN
4686:A  042424 007                          SLC
4687:A  042425 041 000 000                  LDAD  0
4688:A  042430 332 036 105                  JTC   AIL2         JUMP IF > .07 RPM
4689:A  042433 052 075 203                  LDAD  NERR
4690:A                              .                          ** CALCULATE PROPORTIONAL PART OF DELTA
4691:A  042436 353 052 103 203 353 315 AIL2 MULT  KP           NERR * KP
        042444 005 001
4692:A  042446 174                          LAH                CHECK IF A NEGATIVE NUMBER
4693:A  042447 007                          SLC
4694:A  042450 332 063 105                  JTC   AIL3         JUMP IF NEGATIVE TO DIVIDE BY 8
1695:A  042453 006 002                      LB    2            DIVIDE BY 4 BY SHIFTING TWICE
4696:A  042455 315 117 137                  CALL  SHIFTR
4697:A  042460 303 071 105                  JMP   AIL4
4698:A  042463 021 004 000 315 054 001 AIL3 DIVID 4
4699:A  042471 353                  AIL4    DEHL
4700:A  042472 041 315 000                  LDAD  205          # 205
1701:A  042475 031                          DAD   D
4702:A  042476 042 105 203                  STOD  DELP         STORE PROPORTIONAL PART OF DELTA CALCULATIONS
4703:A                              .                          ** CALCULATE INTEGRAL PART OF DELTA
4704:A  042501 052 111 203                  LDAD  DELI         UPDATE OLD DELTA CALCULATED BY INTEGRAL
4705:A  042504 042 113 203                  STOD  DELIO
4706:A  042507 052 075 203                  LDAD  NERR         CALCULATE INTEGRAL PART OF DELTA
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4707:A*  042512 353                              DEHL
4708:A   042513 052 077 203                      LDAD  NERRO
4709:A   042516 031                              DAD   D              NERR + NERRO
4710:A   042517 353 052 107 203 353 315          MULT  KI             * KI
         042525 005 001
4711:A   042527 021 012 000 315 054 001          DIVID 10             * DT
4712:A   042535 174                              LAH                  CHECK IF NEGATIVE
1713:A   042536 007                              SLC
4714:A   042537 322 153 105                      JFC   AIL5
4715:A   042542 021 010 000 315 054 001          DIVID 8
4716:A   042550 303 160 105                      JMP   AIL6
4717:A   042553 006 003                  AIL5    LB    3
4718:A   042555 315 117 137                      CALL  SHIFTR         / 8 BY SHIFTING RIGHT 3 TIMES
4719:A   042560 353                      AIL6    DEHL
4720:A   042561 052 113 203                      LDAD  DELIO
4721:A   042564 031                              DAD   D              + OLD DELTA INTEGRAL
4722:A   042565 042 111 203                      STOD  DELI           = DELTA INTEGRAL
1723:A                                           ** CHECK ON LIMITS
4724:A   042570 041 244 000                      LDAD  164            -1 DEGREES
4725:A   042573 104                              LBH
4726:A   042574 115                              LCL
4727:A   042575 041 312 060                      LDAD  12490          300 DEGRFES
4728:A   042600 353                              DEHL
4729:A   042601 052 111 203                      LDAD  DELI           VALUE TO ENFORCE LIMIT ON
4730:A   042604 315 072 106                      CALL  LIMCHK
4731:A   042607 042 111 203                      STOD  DELI
4732:A                                           ** CALCULATE DELTA
4733:A   042612 052 105 203                      LDAD  DELP
4734:A   042615 353                              DEHL
4735:A   042616 052 111 203                      LDAD  DELI           DELP + DELI
4736:A   042621 031                              DAD   D
4737:A   042622 353                              DEHL
4738:A   042623 041 232 001                      LDAD  410
4739:A   042626 315 162 137                      CALL  NEGNUM
4740:A   042631 031                              DAD   D              - 410
4741:A   042632 042 077 202                      STOD  TEMP
4742:A   042635 021 006 106                      DE    ALCALC         USE APU TO CALCULATE K1/(K2+DELTA)
4743:A   042640 315 137 001                      CALL  APUSTR
4744:A   042643 052 077 202                      LDAD  TEMP
4745:A   042646 353                              DEHL
4746:A   042647 041 315 000                      LDAD  205
1747:A   042652 031                              DAD   D              + 205
4748:A   042653 042 077 202                      STOD  TEMP
4749:A                                           ** CHECK ON LIMITS
4750:A   042656 041 244 000                      LDAD  164            -1 DEGREES
4751:A   042661 104                              LBH
4752:A   042662 115                              LCL
4753:A   042663 041 062 017                      LDAD  3090           90 DEGREES
4754:A   042666 353                              DEHL
4755:A   042667 052 077 202                      LDAD  TEMP           VALUE TO ENFORCE LIMITS ON
4756:A   042672 315 072 106                      CALL  LIMCHK
4757:A   042675 042 077 202                      STOD  TEMP           STORE LIMITED VALUE
4758:A
4759:A   042700 353                              DEHL                 CHECK ON RATE OF DELTA CHANGE
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4760:A  042701 052 065 177              LDAD  C2A21           OLD DELTA
4761:A  042704 315 162 137              CALL  NEGNUM
4762:A  042707 031                      DAD   D
4763:A  042710 104                      LBH                   SAVE FLAG
4764:A  042711 174                      LAH
4765:A  042712 007                      SLC
4766:A  042713 322 321 105              JFC   AIL7            GET ABSOLUTE VALUE
4767:A  042716 315 152 137              CALL  POSNUM
4768:A  042721 353                AIL7  DEHL
4769:A  042722 052 125 203              LDAD  DRATE           RATE
4770:A  042725 315 162 137              CALL  NEGNUM
4771:A  042730 031                      DAD   D
4772:A  042731 174                      LAH
4773:A  042732 007                      SLC
4774:A  042733 052 077 202              LDAD  TEMP
4775:A  042736 332 371 105              JTC   AIL8            JUMP IF CHANGE IS LESS THAN RATE
4776:A  042741 170                      LAB                   RECALL FLAG
4777:A  042742 007                      SLC
4778:A  042743 052 065 177              LDAD  C2A21
4779:A  042746 332 361 105              JTC   AIL9            JUMP IF DELTA SHOULD BE DECREASING AT MAX RATE
4780:A  042751 353                      DEHL
4781:A  042752 052 125 203              LDAD  DRATE
4782:A  042755 031                      DAD   D
4783:A  042756 303 371 105              JMP   AIL8
4784:A  042761 353                AIL9  DEHL
4785:A  042762 052 125 203              LDAD  DRATE
4786:A  042765 315 162 137              CALL  NEGNUM
4787:A  042770 031                      DAD   D
4788:A  042771 042 065 177        AIL8  STDD  C2A21
4789:A  042774 042 073 177              STDD  C2A22
4790:A  042777 042 075 177              STDD  C2A23
4791:A  043002 042 067 177              STDD  C2A24
4792:A  043005 311                      RET
4793:A                                  .
4794:A                                  . AILERON SUBROUTINE TO CALCULATE K1 / (K2 + DELTA)
4795:A                                  .
4796:A  043006 203 065 177 035    ALCALC  DBYTE LDS,*C2A21,FLTS                 DELTA
4797:A  043012 204 065 200 022            DBYTE LDF,*BC,FMUL                    PUT IN DEGREES
4798:A  043016 202 000 000 240 003 021    DBYTE LDFI,0,0,160,3,FSUB             - 5 DEGREES
4799:A  043024 204 121 203 020            DBYTE LDF,*K2,FADD                    + 8
4800:A  043030 204 115 203 031 023 027    DBYTE LDF,*K1,XCHF,FDIV,FTOF          K1/(K2+DELTA)
4801:A  043036 202 231 231 231 177 021    DBYTE LDFI,153,153,153,127,FSUB       CHECK ON RANGE MUST BE < .3
4802:A  043044 212 053 106                DBYTE BRS,*ALC1                       JUMP IF < .3
4803:A  043047 030                        DBYTE FOFF                            RETAIN CALCULATED VALUE
4804:A  043050 207 060 106                DBYTE BR,*ALC2
4805:A  043053 202 231 231 231 177  ALC1  DBYTE LDFI,153,153,153,127            FORCE TO .3
4806:A  043060 203 077 202 035 022  ALC2  DBYTE LDS,*TEMP,FLTS,FMUL                 *(DELP+DELI-410)
4807:A  043065 037 205 077 202            DBYTE FIXS,STO,*TEMP
4808:A  043071 200                        DBYTE EXIT
4809:A                                  .
4810:A                                  . AILERON SUBROUTINE TO CHECK LIMIT OF HL.  BC IS THE LOWER LIMIT.
4811:A                                  .   DE IS UPPER LIMIT.
4812:A                                  .
4813:A  043072 345                LIMCHK  PUSH  H               TEMP STORAGE
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4814:A  043073 315 162 137                      CALL  NEGNUM
4815:A  043076 031                              DAD   D              UPPER LIMIT - VALUE
4816:A  043077 174                              LAH                  CHECK UPPER LIMIT
4817:A  043100 007                              SLC
4818:A  043101 322 107 106                      JFC   LIM1            JUMP IF UNDER LIMIT
4819:A  043104 353                              DEHL                 PUT UPPER LIMIT IN HL
4820:A  043105 321                              POP   D              RECALL TEMP VALUE
4821:A  043106 311                              RET
4822:A  043107 341                      LIM1    POP   H              RECALL VALUE
4823:A  043110 345                              PUSH  H              TEMP STORAGE
4824:A  043111 315 162 137                      CALL  NEGNUM
4825:A  043114 011                              DAD   B              LOWER LIMIT - VALUE
4826:A  043115 174                              LAH                  CHECK ON LOWER LIMIT
4827:A  043116 007                              SLC
4828:A  043117 332 126 106                      JFC   LIM2           JUMP IF ABOVE LOWER LIMIT
4829:A  043122 321                              POP   D
4830:A  043123 140                              LHB                  PUT LOWER LIMIT IN HL
4831:A  043124 151                              LLC
4832:A  043125 311                              RET
4833:A  043126 341                      LIM2    POP   H              RECALL VALUE
4834:A  043127 311                              RET
4835:A                                  .
4836:A                                  . SUBROUTINE TO INITIALIZE INTEGRATOR WITH DELTA * (K2 + DELTA) / K1
4837:A                                  .
4838:A  043130 203 065 177 035          ALINIT  DBYTE LDS,*C2A21,FLTS                DELTA IN COUNTS
4839:A  043134 204 065 200 022                  DBYTE LDF,*BC,FMUL
4840:A  043140 202 000 000 240 003 021          DBYTE LDFI,0,0,160,3,FSUB            DELTA IN DEGREES
4841:A  043146 027                              DBYTE PTOF
4842:A  043147 204 121 203 020                  DBYTE LDF,*K2,FADD                    + B
4843:A  043153 022                              DBYTE FMUL                             * DELTA
4844:A  043154 204 115 203 023                  DBYTE LDF,*K1,FDIV                     /.8
4845:A  043160 202 000 000 240 003 020          DBYTE LDFI,0,0,160,3,FADD
4846:A  043166 204 065 200 023                  DBYTE LDF,*BC,FDIV                   INITIAL CONDITION IN COUNTS
4847:A  043172 037 205 111 203                  DBYTE FIXS,STS,*DELI
4848:A  043176 200                              DBYTE EXIT
4849:A                                  .
4850:A                                  .
4851:A                                  . ***** YAW MODULE *****
4852:A                                  .
4853:A                                  .
4854:A                                  .
4855:A                                  . C6A1  CW CMD
4856:A  043177 072 141 174              YAWS1   LOAD  S6A4
4857:A  043202 041 143 174 246                  AND   S6A6
4858:A  043206 157 072 202 211 057 346          CAND  YAWCW
        043214 001 245
4859:A  043216 107                              LBA
4860:A  043217 072 141 174                      LOAD  S6A4
4861:A  043222 041 143 174 266                  IOR   S6A6
4862:A  043226 041 202 211 246                  AND   YAWCW
4863:A  043232 260                              ORB
4864:A  043233 041 203 211 266                  IOR   YAWSTP
4865:A  043237 041 113 176 266                  IOR   C6A2
4866:A  043243 057 346 001                      INV
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4867:A  043246 117                              LCA
4868:A  043247 072 133 174 057 346 001          CLOAD S6A9
4869:A  043255 041 202 211 246                  AND   YAWCW
4870:A  043261 107                              LBA
4871:A  043262 072 202 211 057 346 001          CLOAD YAWCW
4872:A  043270 157 072 134 174 057 346          CAND  S6A10
        043276 001 245
4873:A  043300 260                              ORB
4874:A  043301 041 112 176 266                  IOR   C6A1
4875:A  043305 241                              NDC
4876:A  043306 062 112 176                      STO   C6A1
4877:A                                  . C6A2  CCW CMD
4878:A  043311 072 142 174                      LOAD  S6A5
4879:A  043314 041 144 174 246                  AND   S6A7
4880:A  043320 041 202 211 246                  AND   YAWCW
4881:A  043324 107                              LBA
4882:A  043325 072 142 174                      LOAD  S6A5
4883:A  043330 041 144 174 266                  IOR   S6A7
4884:A  043334 157 072 202 211 057 346          CAND  YAWCW
        043342 001 245
4885:A  043344 260                              ORB
4886:A  043345 041 203 211 266                  IOR   YAWSTP
4887:A  043351 041 112 176 266                  IOR   C6A1
4888:A  043355 057 346 001                      INV
4889:A  043360 117                              LCA
4890:A  043361 072 202 211                      LOAD  YAWCW
4891:A  043364 157 072 134 174 057 346          CAND  S6A10
        043372 001 245
4892:A  043374 107                              LBA
4893:A  043375 072 202 211 057 346 001          CLOAD YAWCW
4894:A  043403 157 072 133 174 057 346          CAND  S6A9
        043411 001 245
4895:A  043413 260                              ORB
4896:A  043414 041 113 176 266                  IOR   C6A2
4897:A  043420 241                              NDC
4898:A  043421 062 113 176                      STO   C6A2
4899:A
4900:A  043424 041 112 176 266                  IOR   C6A1
4901:A  043430 057 346 001                      INV
4902:A  043433 267                              DKA
4903:A  043434 302 051 107                      JFZ   YAW1
4904:A  043437 076 062                          LA    50
4905:A  043441 062 176 211                      STO   YCNTR1
4906:A  043444 076 000                          LA    0
4907:A  043446 303 066 107                      JMP   YAW2
4908:A  043451 072 176 211              YAW1    LOAD  YCNTR1
4909:A  043454 075                              DCA
4910:A  043455 062 176 211                      STO   YCNTR1
4911:A  043460 076 377                          LA    255
4912:A  043462 312 066 107                      JTZ   YAW2
4913:A  043465 074                              INA
4914:A  043466 107                      YAW2    LBA
4915:A  043467 072 175 211                      LOAD  CMDOFD
4916:A  043472 057 346 001                      INV
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4917:A   043475 267                              ORA
4918:A   043476 312 102 107                      JTZ   YAW3
4919:A   043501 240                              NDB
4920:A   043502 062 175 211              YAW3    STO   CMDOFD
4921:A                                  . CMDOFD
4922:A   043505 072 112 176                      LOAD  C6A1
4923:A   043510 041 113 176 266                  IOR   C6A2
4924:A   043514 157 072 201 211 057 346          COR   OFLAG3
         043522 001 265
4925:A   043524 157 072 203 211 057 346          CAND  YAWSTP
         043532 001 245
4926:A   043534 057 346 001                      INV
4927:A   043537 062 201 211                      STO   OFLAG3
4928:A   043542 041 177 211 256                  XOR   OFLAG1
4929:A   043546 041 201 211 246                  AND   OFLAG3
4930:A   043552 157 072 200 211 057 346          CAND  OFLAG2
         043560 001 245
4931:A   043562 062 200 211                      STO   OFLAG2
4932:A   043565 041 175 211 266                  IOR   CMDOFD
4933:A   043571 062 175 211                      STO   CMDOFD
4934:A
4935:A   043574 072 201 211                      LOAD  OFLAG3
4936:A   043577 062 177 211                      STO   OFLAG1
4937:A
4938:A   043602 072 141 174                      LOAD  S6A4
4939:A   043605 041 143 174 266                  IOR   S6A6
4940:A   043611 041 202 211 246                  AND   YAWCW
4941:A   043615 107                              LBA
4942:A   043616 072 142 174                      LOAD  S6A5
4943:A   043621 041 144 174 266                  IOR   S6A7
4944:A   043625 157 072 202 211 057 346          CAND  YAWCW
         043633 001 245
4945:A   043635 260                              ORB
4946:A   043636 107                              LBA
4947:A   043637 057 346 001                      INV
4948:A   043642 127                              LDA
4949:A                                  . C6A3 GRIPPER COMMAND
4950:A   043643 072 133 174                      LOAD  S6A9
4951:A   043646 157 072 203 211 057 346          CAND  YAWSTP
         043654 001 245
4952:A   043656 240                              NDB
4953:A   043657 057 346 001                      INV
4954:A   043662 107                              LBA
4955:A   043663 072 142 174                      LOAD  S6A5
4956:A   043666 041 144 174 246                  AND   S6A7
4957:A   043672 041 202 211 246                  AND   YAWCW
4958:A   043676 117                              LCA
4959:A   043677 072 141 174                      LOAD  S6A4
4960:A   043702 041 141 174 246                  AND   S6A4
4961:A   043706 157 072 202 211 057 346          CAND  YAWCW
         043714 001 245
4962:A   043716 261                              ORC
4963:A   043717 041 203 211 266                  IOR   YAWSTP
4964:A   043723 041 175 211 246                  AND   CMDOFD
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4965:A  043727 041 114 176 266                  IOR   C6A3
4966:A  043733 240                              NOP
4967:A  043734 062 114 176                      STO   C6A3
4968:A                                  . C6A4  BRAKE COMMAND
4969:A  043737 072 134 174                      LOAD  S6A10
4970:A  043742 157 072 203 211 057 346          CAND  YAWSTP
        043750 001 245
4971:A  043752 242                              NOP
4972:A  043753 057 346 001                      INV
4973:A  043756 107                              LBA
4974:A  043757 072 175 211                      LOAD  CMDOFD
4975:A  043762 041 115 176 266                  IOR   C6A4
4976:A  043766 240                              NOP
4977:A  043767 062 115 176                      STO   C6A4
4978:A  043772 311                              RET
4979:A                                  .
4980:A                                  .
4981:A                                  . ***** ROTOR HYDRAULIC PUMP SEGMENT *****
4982:A                                  .
4983:A                                  .
4984:A  043773 076 001                  RHPS1   LOAD  1
4985:A  043775 062 067 176                      STO   C2A4          TURN ON ROTOR HYDRAULIC PUMP
4986:A  044000 041 260 004                      LOAD  1200          SET 2 MIN DELAY TIMER
4987:A  044003 042 215 203                      STOD  RCNTR
4988:A  044006 041 105 201                      ML    RHPCNT        INCREMENT SEGMENT COUNTER
4989:A  044011 064                              INM
4990:A  044012 311                              RET
4991:A                                  .
4992:A  044013 052 215 203              RHPS2   LOAD  RCNTR         2 MIN DELAY TIMER
4993:A  044016 053                              DCX   H
4994:A  044017 042 215 203                      STOD  RCNTR
4995:A  044022 174                              LAH
4996:A  044023 265                              ORL
4997:A  044024 300                              RFZ                 RETURN IF TIME HAS NOT ELAPSED
4998:A  044025 076 000                          LOAD  0
4999:A  044027 062 067 176                      STO   C2A4          TURN OFF ROTOR HYDRAULIC PUMP
5000:A  044032 062 105 201                      STO   RHPCNT        ZERO SEGMENT COUNTER
5001:A  044035 074                              INA
5002:A  044036 062 050 202                      STO   RHPCLR        TURN OFF RHP ACTIVATION FLAG
5003:A  044041 311                              RET
5004:A                                  .
5005:A                                  .
5006:A                                  . ***** ALARM MODULE *****
5007:A                                  .
5008:A                                  .
5009:A                                  .       THIS MODULE IS RESPONSIBLE FOR DETECTING THE RISING AND FALLING OF ALL
5010:A                                  . ALARMS.  IF THERE ARE ANY RISING OR FALLING ALARMS THEN A NUMBER IS ASSIGNED
5011:A                                  . DEPENDING ON THE ALARMS LOCATION IN ASSIGNED RAM.  FIRST ALARM HAS ALARM #1
5012:A                                  . IF RISING, 129(10000001) IF FALLING.  FOURTEENTH ALARM HAS ALARM #14 IF RISING,
5013:A                                  . 142(10001110) IF FALLING.  THIS ALARM NUMBER IS STORED IN AN ALARM TABLE AS
5014:A                                  . LONG AS THERE WILL NOT BE AN OVERWRITTING OF AN ALARM NOT OUTPUT BY CDS,
5015:A                                  . STIL, OR REMOTE TERMINAL.
5016:A                                  . ** ALL ALARMS MUST BE IN SEQUENTIAL RAM LOCATION AFTER THE FIRST ONE.
5017:A                                  . ** RISING AND FALLING EDGE DETECTOR VALUES MUST BE IN SEQUENTIAL RAM AFTER
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5018:A'                                    .     THE FIRST RISING EDGE VALUE.
5019:A                                     .
5020:A                                     .
5021:A   044042 016 156                    ALMS1   LC     110          RISING AND FALLING EDGE DETECTOR ON ALL(110)ALARMS
5022:A   044044 041 250 203                        HL     ONSDL1       STORE THE ADDRESS OF THE FIRST OF THE OLD
5023:A   044047 042 233 203                        STOD   ONADDR        ALARM VALUES
5024:A   044052 041 166 202                        HL     ALRM1        STORE THE ADDRESS OF THE FIRST ALARM
5025:A   044055 042 241 203                        STOD   NADDR         *** NOTE ALL ALARMS MUST BE IN SEQUENTIAL RAMS.
5026:A   044060 041 026 204                        HL     RNSDL1       STORE THE ADDRESS OF THE FIRST RISING EDGE
5027:A   044063 042 235 203                        STOD   RADDR         DETECTOR
5028:A   044066 041 204 204                        HL     FNSDL1       STORE THE ADDRESS OF THE FIRST FALLING EDGE
5029:A   044071 042 237 203                        STOD   FADDR         DETECTOR
5030:A   044074 052 241 203                AL3     LDAD   NADDR        * RISING EDGE DETECTOR
5031:A   044077 353                                DEHL                LOAD ALARM
5032:A   044100 032                                LAMR   D
5033:A   044101 052 233 203                        LDAD   ONADDR       XOR OLD ALARM
5034:A   044104 256                                XRM
5035:A   044105 353                                DEHL                AND ALARM
5036:A   044106 246                                NDM
5037:A   044107 107                                LBA                 CAND RISING EDGE VALUE
5038:A   044110 052 235 203                        LDAD   RADDR
5039:A   044113 353                                DEHL
5040:A   044114 032                                LAMR   D
5041:A   044115 057                                CMA
5042:A   044116 346 001                            ND     1
5043:A   044120 240                                NDB
5044:A   044121 022                                LMAR   D            STO RISING EDGE VALUE
5045:A
5046:A   044122 052 241 203                        LDAD   NADDR        * FALLING EDGE DETECTOR
5047:A   044125 353                                DEHL                LOAD ALARM
5048:A   044126 032                                LAMR   D
5049:A   044127 052 233 203                        LDAD   ONADDR       XOR OLD ALARM
5050:A   044132 256                                XRM
5051:A   044133 246                                NDM                 AND OLD ALARM
5052:A   044134 107                                LBA                 CAND FALLING EDGE VALUE
5053:A   044135 052 237 203                        LDAD   FADDR
5054:A   044140 353                                DEHL
5055:A   044141 032                                LAMR   D
5056:A   044142 057                                CMA
5057:A   044143 346 001                            ND     1
5058:A   044145 240                                NDB
5059:A   044146 022                                LMAR   D            STO FALLING EDGE VALUE
5060:A
5061:A   044147 052 241 203                        LDAD   NADDR        * UPDATE OLD VALUE OF ALARM
5062:A   044152 353                                DEHL                LOAD ALARM
5063:A   044153 032                                LAMR   D
5064:A   044154 052 233 203                        LDAD   ONADDR
5065:A   044157 353                                DEHL
5066:A   044160 022                                LMAR   D            STO OLD ALARM
5067:A
5068:A   044161 052 233 203                        LDAD   ONADDR       * INCREMENT ALL ADDRESSES
5069:A   044164 043                                INX    H            OLD ALARM ADDRESS
5070:A   044165 042 233 203                        STOD   ONADDR
5071:A   044170 052 241 203                        LDAD   NADDR        ALARM ADDRESS
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ORIGINAL PAGE IS
OF POOR QUALITY

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5072:A  044173 043                      INX   H
5073:A  044174 042 241 203              STOD  NADDR
5074:A  044177 052 235 203              LDAD  RADDR           RISING EDGE ADDRESS
5075:A  044202 043                      INX   H
5076:A  044203 042 235 203              STOD  RADDR
5077:A  044206 052 237 203              LDAD  FADDR           FALLING EDGE ADDRESS
5078:A  044211 043                      INX   H
5079:A  044212 042 237 203              STOD  FADDR
5080:A  044215 015                      DCC                   * DONE WITH ALL (12) THE ALARMS ??
5081:A  044216 302 074 110              JFZ   AL3             JUMP IF NOT DONE
5082:A                          . ARE THERE ANY ALARMS RISING OR FALLING
5083:A  044221 016 333                  LC    219             # OF RISING AND FALLING EDGE VALUES - 1
5084:A                          . RISING AND FALLING EDGE VALUES MUST BE IN SEQUENTIAL RAM BEGINING WITH RISING
5085:A  044223 072 026 204              LOAD  RNSDL1          LOAD FIRST VALUE OF RISING EDGE DETECTOR
5086:A  044226 041 026 204              HL    RNSDL1          GET ADDRESS OF FIRST RISING EDGE DETECTOR
5087:A  044231 043              AL1     INX   H               INCREMENT ADDRESS OF EDGE DETECTORS
5088:A  044232 266                      ORM                   IOR ISING EDGE VALUE, IOR FALLING EDGE VALUE
5089:A  044233 302 245 110              JFZ   AL2             JUMP IF ALARM FALLING OR RISING
5090:A  044236 015                      DCC                   DONE WITH ALL FALLING OR RISING
5091:A  044237 302 231 110              JFZ   AL1             JUMP IF NOT DONE
5092:A  044242 303 122 111              JMP   AL4             JUMP IF NO ALARMS RISING OR FALLING
5093:A                          .
5094:A  044245 016 001          AL2     LC    1               * PUT ALARMS IN MEMORY FOR OUTPUT
5095:A  044247 006 000                  LB    0               INITIALIZE LOOP FOR ALL RISING AND FALLING ALARMS
5096:A  044251 041 025 204              HL    RNSDL1-1        GET AND STORE THE ADDRESS OF FIRST RISING EDGE - 1
5097:A  044254 042 235 203              STOD  RADDR
5098:A  044257 041 203 204              HL    FNSDL1-1        GET AND STORE ADDRESS OF FIRST RISING EDGE - 1
5099:A  044262 042 237 203              STOD  FADDR
5100:A  044265 052 235 203      AL5     LDAD  RADDR           LOAD RISING EDGE VALUE
5101:A  044270 011                      DAD   B
5102:A  044271 353                      DEHL
5103:A  044272 032                      LAMR  D
5104:A  044273 052 237 203              LDAD  FADDR           IOR FALLING EDGE VALUE
5105:A  044276 011                      DAD   B
5106:A  044277 266                      ORM
5107:A  044300 312 113 111              JTZ   AL6             JUMP IF BOTH = 0
5108:A  044303 052 235 203              LDAD  RADDR           LOAD RISING EDGE VALUE
5109:A  044306 011                      DAD   B
5110:A  044307 353                      DEHL
5111:A  044310 032                      LAMR  D
5112:A  044311 267                      ORA                   COMPARE TO 0
5113:A  044312 [illegible]              LAC                   THIS IS THE ALARM NUMBER IF RISING
5114:A  044313 302 320 110              JFZ   AL7             JUMP IF IT IS RISING EDGE DETECTOR
5115:A  044316 366 200                  IOR   128             THIS IS THE ALARM NUMBER IF FALLING
5116:A  044320 062 247 203      AL7     STO   ANUMB           STORE ALARM NUMBER
5117:A                          . MAKE SURE YOU DO NOT OVERWRITE
5118:A  044323 072 102 213              LOAD  CDSON           IS CDS ON ??
5119:A  044326 267                      ORA
5120:A  044327 312 [illegible] 110      JTZ   AL8             JUMP IF NOT ON
5121:A  044332 072 223 203              LOAD  AINC            IS BOTH CDS CNT AND ALARM CNT AT SAME LOCATION ??
5122:A  044335 041 225 203 256          XOR   ACINC
5123:A  044341 [illegible] 110          JFZ   AL8             JUMP IF THEY ARE DIFFERENT
5124:A  044344 072 243 203              LOAD  ADIR            ARE THE TWO DIRECTIONS THE SAME ??
5125:A  044347 041 244 203 256          XOR   ACDIR
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5126:A   044353 302 122 111              JFZ   AL4          JUMP IF THEY ARE THE SAME TO IGNORE THIS ALARM
5127:A   044356 072 152 215      AL8     LOAD  REMON        IS REMOTE TERMINAL ON ??
5128:A   044361 267              ORA
5129:A   044362 312 011 111              JTZ   AL9          JUMP IF NOT ON
5130:A   044365 072 223 203              LOAD  AINC         IS BOTH REM CNT AND ALARM CNT AT SAME LOCATION ??
5131:A   044370 041 231 203 256          XOR   AAINC
5132:A   044374 302 011 111              JFZ   AL9          JUMP IF THEY ARE DIFFERENT
5133:A   044377 072 243 203              LOAD  ADIR         ARE THE TWO DIRECTIONS THE SAME ??
5134:A   044402 041 245 203 256          XOR   AADIR
5135:A   044406 302 122 111              JFZ   AL4          JUMP IF THEY ARE THE SAME TO IGNORE THIS ALARM
5136:A   044411 072 020 215      AL9     LOAD  SITEN        IS SITE TERMINAL ON ??
5137:A   044414 267              ORA
5138:A   044415 312 044 111              JTZ   AL10         JUMP IF NOT ON
5139:A   044420 072 223 203              LOAD  AINC         IS BOTH SITE CNT AND ALARM CNT AT SAME LOCATION ??
5140:A   044423 041 227 203 256          XOR   ASINC
5141:A   044427 302 044 111              JFZ   AL10         JUMP IF THEY ARE DIFFERENT
5142:A   044432 072 243 203              LOAD  ADIR         ARE THE TWO DIRECTIONS THE SAME ??
5143:A   044435 041 245 203 256          XOR   ASDIR
5144:A   044441 302 122 111              JFZ   AL4          JUMP IF THEY ARE THE SAME TO IGNORE THIS ALARM
5145:A                           ; WRITE IN ALARM TABLE
5146:A   044444 072 223 203      AL10    LOAD  AINC         WHAT IS THE LOCATION
5147:A   044447 353                      DEHL
5148:A   044450 041 362 204              LXI   ALRMS
5149:A   044453 031                      DAD   D
5150:A   044454 353                      DEHL
5151:A   044455 072 247 203              LOAD  ANUMB        WHAT IS THE VALUE
5152:A   044460 022                      LBAR  D            STORE IT
5153:A   044461 072 223 203              LOAD  AINC         WHAT IS THE NEXT WRITTING POINTER
5154:A   044464 074                      INA
5155:A   044465 062 223 203              STO   AINC
5156:A   044470 376 334                  COMP  220          IS IT LARGER THAN ALLOWED RAM ??
5157:A   044472 332 113 111              JTC   AL6          JUMP IF IT IS IN RANGE
5158:A   044475 076 000                  LOAD  0            START UP AT THE TOP
5159:A   044477 062 223 203              STO   AINC
5160:A   044502 072 243 203              LOAD  ADIR         RESET DIRECTION
5161:A   044505 057 346 001              INV
5162:A   044510 062 243 203              STO   ADIR
5163:A                           ;
5164:A   044513 014              AL6     INC                NEXT ALARM
5165:A   044514 171                      LAC
5166:A   044515 376 157                  COMP  111          WERE THEY ALL (110) DONE ??
5167:A   044517 302 265 110              JFZ   AL5          JUMP IF NOT ALL DONE
5168:A   044522 311              AL4     RET
5169:A                           ;
5170:A                           ;
5171:A                           ; ***** DATA COMMUNICATION REMOTE TERMINAL OUT *****
5172:A                           ;
5173:A                           ;
5174:A                           ;                          ** PRINT TOP OF PAGE HEADING
5175:A   044523 072 152 215      DCRO51  LOAD  REMON        CHECK TO SEE IF REMOTE TERMINAL IS ON
5176:A   044526 267                      ORA
5177:A   044527 312 177 111              JTZ   L9           JUMP IF OFF
5178:A   044532 072 133 215              LOAD  PKBZ         IS PK BUSY ??
5179:A   044535 376 001                  COMP  1
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5180:A  044537 310                          RTZ             RETURN IF BUSY
5181:A  044540 046 000                      LH    0         GET DATE FOR TOP OF PAGE HEADING
5182:A  044542 072 113 200                  LOAD  DATE
5183:A  044545 157                          LLA
5184:A  044546 042 211 215                  STOD  DATED
5185:A  044551 072 114 200                  LOAD  DT2
5186:A  044554 157                          LLA
5187:A  044555 042 213 215                  STOD  DATEM
5188:A  044560 315 234 113                  CALL  TCALC       GET TIME FOR OUTPUT
5189:A  044563 041 251 040 315 150 001      PRINT HDGT        PRINT TOP OF PAGE NOW
5190:A  044571 041 047 043                  LOAD  8999        SET PERIODIC OUTPUT COUNTER TO OUTPUT NEXT CYCLE
5191:A  044574 042 143 215                  STOD  DRCCNT
5192:A  044577 041 117 201          L9      HL    DCPUCT      INCREMENT SEGMENT COUNTER
5193:A  044602 064                          INM
5194:A  044603 311                          RET
5195:A                                  ** OUTPUT ALARMS, CHECK FOR MODE CHANGES, PERIODIC OUTPUT
5196:A  044604 072 152 215          DCROS2  LOAD  REMON       CHECK IF REMOTE TERMINAL IS ON
5197:A  044607 267                          ORA
5198:A  044610 312 057 112                  JTZ   L1          JUMP IF OFF
5199:A  044613 072 142 215                  LOAD  LNECNT      CHECK IF LINE COUNT IS AT BOTTOM OF PAGE
5200:A  044616 376 062                      COMP  50
5201:A  044620 362 064 113                  JFS   L10         JUMP IF AT BOTTOM
5202:A  044623 052 143 215                  LDAD  DRCCNT      INCREMENT PERIODIC OUTPUT COUNTER
5203:A  044626 043                          INX   H
5204:A  044627 042 143 215                  STOD  DRCCNT
5205:A  044632 353                          DEHL              15 MINUTES UP ??
5206:A  044633 041 050 043                  LDAD  9000
5207:A  044636 315 162 137                  CALL  NEGNUM
5208:A  044641 031                          DAD   D
5209:A  044642 171                          LAH
5210:A  044643 007                          SLC
5211:A  044644 322 051 113                  JFC   DCR1        JUMP IF TIME IS UP
5212:A
5213:A  044647 072 133 215                  LOAD  FKBZ        IS FK BUSY ??
5214:A  044652 376 001                      COMP  1
5215:A  044654 312 057 112                  JTZ   L1          JUMP IF BUSY
5216:A
5217:A  044657 072 223 203                  LOAD  AINC        ARE THERE ANY ALARMS TO OUTPUT ??
5218:A  044662 041 231 203 276              LOMP  ARINC
5219:A  044666 302 303 111                  JFZ   L11         JUMP IF COUNTERS ARE NOT THE SAME
5220:A  044671 072 243 203                  LOAD  ADIR
5221:A  044674 041 246 203 256              XOR   ARDIR       ARE THE DIRECTIONS THE SAME
5222:A  044700 312 002 112                  JTZ   L5          JUMP IF DIRECTIONS ARE THE SAME
5223:A  044703 052 231 203          L11     LDAD  ARINC       LOAD REMOTE POINTER IN ALARM TABLE
5224:A  044706 353                          DEHL
5225:A  044707 041 362 204                  HL    ALRMS       POINT TO BEGINNING OF ALARM TABLE
5226:A  044712 031                          DAD   D           INCREMENT DOWN TO ALARM TO OUTPUT
5227:A  044713 353                          DEHL
5228:A  044714 032                          LDAX  D           GET THE ALARM NUMBER
5229:A  044715 046 000                      LH    0
5230:A  044717 157                          LLA
5231:A  044720 042 167 215                  STOD  ALRM        STORE THE ALARM
5232:A  044723 315 234 113                  CALL  TCALC       CALCULATE THE TIME FOR OUTPUT
5233:A  044726 041 354 041 315 150 001      PRINT PTALRM      PRINT THE ALARM
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5234:A   044734 072 231 203              LOAD  ARINC          UPDATE THE REMOTE ALARM POINTER
5235:A   044737 074                      INA
5236:A   044740 062 231 203              STO   ARINC
5237:A   044743 376 334                  COMP  220            IS IT BELOW BOTTOM OF ALARM TABLE ??
5238:A   044745 332 366 111              JTC   L12            JUMP IF NOT
5239:A   044750 076 000                  LOAD  0
5240:A   044752 062 231 203              STO   ARINC          SET REMOTE ALARM POINTER TO TOP OF TABLE
5241:A   044755 072 246 203              LOAD  ARDIR          TOGGLE DIRECTION
5242:A   044760 057 346 001              INV
5243:A   044763 062 246 203              STO   ARDIR
5244:A   044766 072 142 215        L12   LOAD  LNECNT         INCREMENT LINE COUNT
5245:A   044771 074                      INA
5246:A   044772 062 142 215              STO   LNECNT
5247:A   044775 376 062                  COMP  50
5248:A   044777 362 064 113              JFS   L10            JUMP IF AT BOTTOM OF PAGE
5249:A                                   .
5250:A   045002 072 076 202        L5    LOAD  IMODER         HAS THERE BEEN A MODE CHANGE SINCE LAST CYCLE ??
5251:A   045005 041 154 215 276          COMP  UMODER
5252:A   045011 302 051 113              JFZ   DCR1           JUMP IF SO
5253:A                                   .
5254:A   045014 072 017 215              LOAD  IREQSC         HAS SITE REQUESTED CONTROL ??
5255:A   045017 267                      ORA
5256:A   045020 312 057 112              JTZ   L1             JUMP IF NO REQUEST
5257:A   045023 041 375 042 315 150 001   PRINT REQ            PRINT THE REQUEST
5258:A   045031 076 000                  LOAD  0
5259:A   045033 062 017 215              STO   IREQSC         ZERO OUT REQUEST NEEDED FLAG
5260:A   045036 074                      INA
5261:A   045037 062 016 215              STO   SRC            SET FLAG THAT REQUEST MESSAGE WAS SENT
5262:A   045042 072 142 215              LOAD  LNECNT         INCREMENT LINE COUNT
5263:A   045045 074                      INA
5264:A   045046 074                      INA
5265:A   045047 062 142 215              STO   LNECNT
5266:A   045052 376 062                  COMP  50
5267:A   045054 362 064 113              JFS   L10            JUMP IF AT BOTTOM OF PAGE
5268:A                                   .
5269:A   045057 072 133 215        L1    LOAD  PKBZ           CHECK IF CONTROLLER SET TO RECEIVE MESSAGE
5270:A   045062 041 145 215 266          IOR   KEYFLG
5271:A   045066 041 100 201 266          IOR   DCSR1
5272:A   045072 302 111 112              JFZ   L2             JUMP IF CONTROLLER HAS BEEN SET
5273:A   045075 041 134 215 076 006 021   KEYIN KBUF,6,DCR1    SET CONTROLLER TO LOOK FOR MESSAGE FROM REMOTE
         045103 223 113 315 153 001
5274:A   045110 311                      RET
5275:A   045111 072 145 215        L2    LOAD  KEYFLG         HAS MESSAGE BEEN RECEIVED FROM REMOTE ??
5276:A   045114 267                      ORA
5277:A   045115 310                      RTZ                  RETURN IF NO MESSAGE
5278:A   045116 076 000                  LOAD  0
5279:A   045120 062 145 215              STO   KEYFLG         ZERO OUT MESSAGE RECEIVED FLAG
5280:A                                   .
5281:A                                   . THIS IS WHERE COMMANDS FROM THE REMOTE TERMINAL ARE OPERATED ON
5282:A                                   .
5283:A   045123 072 152 215              LOAD  REMON          CHECK IF REMOTE TERMINAL IS ON
5284:A   045126 267                      ORA
5285:A   045127 302 201 112              JFZ   L13            JUMP IF ON
5286:A   045132 072 134 215              LOAD  KBUF           CHECK IF TRYING TO TURN IT ON.  LOAD FIRST WORD
```

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5287:A  045135 376 073                          COMP  59          I.D. OF REMOTE TURN ON/OFF MESSAGE
5288:A  045137 300                              RFZ               MESSAGE IS NOT RECOGNIZED
5289:A  045140 072 135 215                      LOAD  KBUF2       LOAD SECOND WORD
5290:A  045143 376 061                          COMP  49          (1) TO TURN ON
5291:A  045145 300                              RFZ               RETURN IF NOT TRYING TO TURN ON
5292:A  045146 076 001                          LOAD  1
5293:A  045150 062 152 215                      STO   REMON       SET FLAG TO REMOTE TERMINAL ON
5294:A  045153 315 234 113                      CALL  TCALC       CALCULATE TIME FOR OUTPUT
5295:A  045156 041 213 042 315 150 001          PRINT CMDTME      PRINT TIME TAG
5296:A  045164 072 142 215                      LOAD  LNECNT      INCREMENT LINE COUNT
5297:A  045167 074                              INA
5298:A  045170 062 142 215                      STO   LNECNT
5299:A  045173 076 000                          LOAD  0
5300:A  045175 062 117 201                      STO   DCRDCT      SET SEGMENT COUNTER TO PRINT TOP OF PAGE HEADING
5301:A  045200 311                              RET
5302:A  045201 072 134 215              L13     LOAD  KBUF        LOAD FIRST WORD OF MESSAGE
5303:A  045204 376 073                          COMP  59          I.D. OF REMOTE TURN ON/OFF
5304:A  045206 302 255 112                      JFZ   L14         JUMP IF NOT
5305:A  045211 072 135 215                      LOAD  KBUF2       LOAD SECOND WORD
5306:A  045214 376 060                          COMP  48          (0) TO TURN OFF
5307:A  045216 300                              RFZ               RETURN IF NOT TURNING OFF
5308:A  045217 076 000                          LOAD  0
5309:A  045221 062 152 215                      STO   REMON       SET FLAG TO REMOTE TERMINAL OFF
5310:A  045224 062 150 215                      STO   PSRWRD      ZERO OUT PASSWORD DONE FLAG
5311:A  045227 315 234 113                      CALL  TCALC       CALCULATE TIME FOR OUTPUT
5312:A  045232 041 213 042 315 150 001          PRINT CMDTME      PRINT TIME TAG ON COMMAND
5313:A  045240 072 142 215                      LOAD  LNECNT      INCREMENT LINE COUNT
5314:A  045243 074                              INA
5315:A  045244 062 142 215                      STO   LNECNT
5316:A  045247 376 062                          COMP  50          BOTTOM OF PAGE ??
5317:A  045251 362 064 113                      JFS   L10         JUMP IF AT BOTTOM
5318:A  045254 311                              RET
5319:A
5320:A  045255 072 150 215              L14     LOAD  PSRWRD      HAS PASSWORD BEEN ENTERED
5321:A  045260 376 001                          COMP  1
5322:A  045262 312 344 112                      JTZ   L6          JUMP IF ENTERED ALREADY
5323:A  045265 072 134 215                      LOAD  KBUF        LOAD FIRST WORD OF MESSAGE TO CHECK FOR PASSWORD
5324:A  045270 376 122                          COMP  82          (R)
5325:A  045272 300                              RFZ               RETURN IF NOT PASSWORD
5326:A  045273 072 135 215                      LOAD  KBUF2       LOAD SECOND WORD
5327:A  045276 376 103                          COMP  67          (C)
5328:A  045300 300                              RFZ               RETURN IF NOT PASSWORD
5329:A  045301 072 136 215                      LOAD  KBUF3       LOAD THIRD WORD
5330:A  045304 376 115                          COMP  77          (M)
5331:A  045306 300                              RFZ               RETURN IF NOT PASSWORD
5332:A  045307 072 137 215                      LOAD  KBUF4       LOAD FOURTH WORD
5333:A  045312 376 104                          COMP  68          (D)
5334:A  045314 300                              RFZ               RETURN IF NOT PASSWORD
5335:A  045315 072 140 215                      LOAD  KBUF5       LOAD FIFTH WORD
5336:A  045320 376 203                          COMP  131         (CR)
5337:A  045322 300                              RFZ               RETURN IF NOT PASSWORD
5338:A  045323 076 001                          LOAD  1
5339:A  045325 062 150 215                      STO   PSRWRD      SET FLAG TO PASSWORD ENETRED
5340:A  045330 062 100 201                      STO   DCSR1       ACTIVATION FOR COMMAND INPUT
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5341:A  045333 062 153 215              STO   REM          STORE FLAG FOR COMMAND FROM REMOTE TERMINAL
5342:A  045336 076 015                  LOAD  13
5343:A  045340 062 120 201              STO   DCSRCT       SET SEGMENT COUNTER TO COVER PASSWORD
5344:A  045343 311                      RET
5345:A
5346:A  045344 072 134 215        L6    LOAD  KBUF         LOAD FIRST WORD OF MESSAGE
5347:A  045347 376 073                  COMP  59           CHECK IF IN RANGE
5348:A  045351 362 365 112              JFS   L8           JUMP IF ABOVE RANGE
5349:A  045354 076 001                  LOAD  1
5350:A  045356 062 100 201              STO   DCSRI        SET INPUT COMMAND ACTIVATION FLAG
5351:A  045361 062 153 215              STO   REM          SET FLAG FOR COMMAND FROM REMOTE TERMINAL
5352:A  045364 311                      RET
5353:A  045365 072 134 215        L8    LOAD  KBUF         LOAD FIRST WORD OF MESSAGE TO SEE IF SIGNING OFF
5354:A  045370 376 102                  COMP  66           (B)
5355:A  045372 300                      RFZ                RETURN IF NOT
5356:A  045373 072 135 215              LOAD  KBUF2        LOAD SECOND WORD
5357:A  045376 376 131                  COMP  89           (Y)
5358:A  045400 300                      RFZ                RETURN IF NOT
5359:A  045401 072 136 215              LOAD  KBUF3        LOAD THIRD WORD
5360:A  045404 376 105                  COMP  69           (E)
5361:A  045406 300                      RFZ                RETURN IF NOT
5362:A  045407 072 137 215              LOAD  KBUF4        LOAD FOURTH WORD
5363:A  045412 376 203                  COMP  131          (CR)
5364:A  045414 300                      RFZ                RETURN IF NOT
5365:A  045415 315 234 113              CALL  TCALC        CALCULATE TIME FOR OUTPUT
5366:A  045420 041 322 042 315 150 001  PRINT RTEDNE      PRINT 'REMOTE CMD DONE'
5367:A  045426 076 000                  LOAD  0
5368:A  045430 062 150 215              STO   PSRWRD       ZERO OUT PASSWORD FLAG
5369:A  045433 072 142 215              LOAD  LNECNT       INCREMENT LINE COUNT
5370:A  045436 074                      INA
5371:A  045437 074                      INA
5372:A  045440 062 142 215              STO   LNECNT
5373:A  045443 376 062                  COMP  50
5374:A  045445 362 064 113              JFS   L10          JUMP IF AT BOTTOM OF PAGE
5375:A  045450 311                      RET
5376:A  045451 072 100 201        DCR1  LOAD  DCSRI        CHECK IF COMMAND BEING OPERATED ON
5377:A  045454 376 001                  COMP  1
5378:A  045456 310                      RTZ                RETURN IF SO
5379:A  045457 041 117 201              ML    DCROCT       INCREMENT SEGMENT COUNTER TO OUTPUT DATA
5380:A  045462 064                      INM
5381:A  045463 311                      RET
5382:A  045464 041 117 201        L10   ML    DCROCT       INCREMENT SEGMENT COUNTER TO SKIP TO TOP OF PAGE
5383:A  045467 064                      INM
5384:A  045470 064                      INM
5385:A  045471 311                      RET
5386:A                                  **OUTPUT DATA
5387:A  045472 072 133 215        DCROS3 LOAD  PKBZ         BUSY ?
5388:A  045475 376 001                  COMP  1
5389:A  045477 310                      RTZ                RETURN IF BUSY
5390:A  045500 041 000 000              LOAD  0
5391:A  045503 042 143 215              STOD  DRCCNT       ZERO OUT PERIODIC OUTPUT COUNTER
5392:A  045506 042 167 215              STOD  ALRM         ZERO OUT ALARM NUMBER
5393:A  045511 072 076 202              LOAD  IMODER       UPDATE MODE
5394:A  045514 062 154 215              STO   UMODER
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5395:A  045517 021 006 114                      DC    CONVRT          AFU SUBROUTINE TO CONVERT WIND SPEED AND POWER
5396:A  045522 315 137 001                      CALL  AFUSTR           TO ENGR UNITS FOR OUTPUT
5397:A  045525 315 234 113                      CALL  TCALC           CALCULATE TIME FOR OUTPUT
5398:A  045530 041 021 042 315 150 001          PRINT PNUMB           PRINT DATA
5399:A  045536 072 142 215                      LOAD  LNECNT          INCREMENT LINE COUNT
5400:A  045541 074                              INA
5401:A  045542 062 142 215                      STO   LNECNT
5402:A  045545 376 062                          COMP  50              PAGE FULL ?
5403:A  045547 372 157 113                      JTS   DCR4            JUMP IF NOT FULL
5404:A  045552 041 117 201                      HL    DCROCT          INCREMENT SEGMENT COUNTER TO SKIP TO TOP OF PAGE
5405:A  045555 064                              INM
5406:A  045556 311                              RET
5407:A  045557 041 117 201              DCR4    HL    DCROCT          DECREMENT SESMENT COUNTER
5408:A  045562 065                              DCM
5409:A  045563 311                              RET
5410:A                                  .                             ** SKIP TO TOP OF NEXT PAGE
5411:A  045564 072 133 215              DCROS4  LOAD  PKBZ            BUSY ?
5412:A  045567 376 001                          COMP  1
5413:A  045571 310                              RTZ                   RETURN IF BUSY
5414:A  045572 072 142 215                      LOAD  LNECNT          INCREMENT LINE COUNT TO TOP OF NEXT PAGE
5415:A  045575 074                              INA
5416:A  045576 062 142 215                      STO   LNECNT
5417:A  045601 326 073                          SU    59
5418:A  045603 362 215 113                      JFS   DCR5A           JUMP IF AT TOP OF PAGE
5419:A  045606 041 346 042 315 150 001          PRINT PSKIP           SKIP TO TOP OF NEXT PAGE
5420:A  045614 311                              RET
5421:A  045615 076 000                  DCR5A   LOAD  0
5422:A  045617 062 142 215                      STO   LNECNT          ZERO OUT LINE COUNTE
5423:A  045622 062 117 201                      STO   DCROCT          SET SEGMENT COUNTER TO PRINT TOP OF PAGE HEADING
5424:A  045625 311                              RET
5425:A                                  .
5426:A                                  . ** SUBROUTINES FOR DATA COMMUNICATION REMOTE TERMINAL OUTPUT
5427:A                                  .
5428:A                                  . SUBROUTINE IS CALLED WHEN MESSAGE IS RECEIVED FROM THE REMOTE TERMINAL
5429:A                                  .
5430:A  045626 076 001                  DCRI    LOAD  1
5431:A  045630 062 145 215                      STO   KEYFLG          SET FLAG THAT A MESSAGE FROM REMOTE RECEIVED
5432:A  045633 311                              RET
5433:A                                  .
5434:A                                  . SUBROUTINE TO PUT TIME FROM REAL TIME CLOCK INTO FORMAT FOR OUTPUT
5435:A                                  .
5436:A  045634 046 000                  TCALC   LHI   0               PUTS TIME IN FORM FOR OUTPUT
5437:A  045636 072 111 200                      LOAD  TIME            MINUTES
5438:A  045641 157                              LLA
5439:A  045642 042 205 215                      STOD  TIMEM
5440:A  045645 072 112 200                      LOAD  TM2             HOURS
5441:A  045650 157                              LLA
5442:A  045651 042 207 215                      STOD  TIMEH
5443:A  045654 062 116 200                      LOAD  T2              HUNDRDS. SECONDS
5444:A  045657 021 006 000 315 005 001          MULT  6
5445:A  045665 042 215 215                      STOD  TSEC
5446:A  045670 311                              RET
5447:A                                  .
5448:A                                  . SUBROUTINE CALLED BY TXT TO DECIDE WHICH TERMINAL HAS CONTROL
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5449:A
5450:A  045671 021 136 041          CNTRL   DE      CNSTE           SITE TERMINAL MESSAGE
5451:A  045674 072 146 215                  LOAD    KOTCON
5452:A  045677 267                          ORA
5453:A  045700 310                          RTZ
5454:A  045701 021 126 041                  DE      CNREM           REMOTE TERMINAL MESSAGE
5455:A  045704 311                          RET
5456:A
5457:A                              ; SUBROUTINE CALLED BY TXT TO DECIDE WHICH MODE TO PRINT
5458:A                              ;
5459:A  045705 021 075 042          IMODE   DE      LOPT            LOCKOUT
5460:A  045710 072 076 202                  LOAD    IMODER
5461:A  045713 376 001                      COMP    1
5462:A  045715 310                          RTZ
5463:A  045716 021 104 042                  DE      SBIPT           STAND-BY INHIBIT MESSAGE
5464:A  045721 376 002                      COMP    2
5465:A  045723 310                          RTZ
5466:A  045724 021 113 042                  DE      SBEPT           STAND-BY ENABLE
5467:A  045727 376 003                      COMP    3
5468:A  045731 310                          RTZ
5469:A  045732 021 122 042                  DE      SUPT            STARTUP
5470:A  045735 376 004                      COMP    4
5471:A  045737 310                          RTZ
5472:A  045740 021 131 042                  DE      RMPPT           RAMP
5473:A  045743 376 005                      COMP    5
5474:A  045745 310                          RTZ
5475:A  045746 021 140 042                  DE      PWRPT           POWER GENERATION
5476:A  045751 376 006                      COMP    6
5477:A  045753 310                          RTZ
5478:A  045754 021 147 042                  DE      NSDPT           NORMAL SHUTDOWN
5479:A  045757 376 007                      COMP    7
5480:A  045761 310                          RTZ
5481:A  045762 021 156 042                  DE      ESDPT           EMERGENCY SHUTDOWN
5482:A  045765 311                          RET
5483:A
5484:A                              ; SUBROUTINE TO PRINT + OR - IN FRONT OF ALARM NUMBER
5485:A                              ;
5486:A  045766 021 000 042          PMALRM  DE      PALRM           RISING ALARM
5487:A  045771 072 167 215                  LOAD    ALRM            LOAD ALARM NUMBER
5488:A  045774 326 200                      SU      128             FIRST FALLING ALARM NUMBER
5489:A  045776 330                          RTC                     RETURN IF RISING
5490:A  045777 062 167 215                  STO     ALRM            RESAVE ALARM NUMBER
5491:A  046002 021 005 042                  DE      NALRM           FALLING ALARM
5492:A  046005 311                          RET
5493:A
5494:A                              ; SUBROUTINE TO GET WIND SPEED AND POWER IN ENGR UNITS FOR OUTPUT
5495:A                              ;
5496:A  046006 203 141 212 035      CONVRT  DBYTE LDS,#WV1AVG,FLTS          WIND SPEED IN COUNTS
5497:A  046012 204 075 200 022              DBYTE LDF,#VWC,FMUL             IN ENGR UNITS
5498:A  046016 202 000 000 240 004 022      DBYTE LDFI,0,0,150,4,FMUL       *10 FOR OUTPUT
5499:A  046024 037 205 124 200              DBYTE FIXS,STS,#WVOUT
5500:A  046030 203 247 212 035              DBYTE LDS,#PR1AVG,FLTS          POWER IN COUNTS
5501:A  046034 204 071 200 022              DBYTE LDF,#PEC,FMUL             IN ENGR UNITS
5502:A  046040 204 130 200 021              DBYTE LDF,#POFFST,FSUB          POWER OFFSET
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5503:A  046044 202 000 000 310 007 022          DBYTE LDFI,0,0,200,7,FMUL      *100 FOR OUTPUT
5504:A  046052 037 205 126 200                  DBYTE FIXS,STS,*FKOUT
5505:A  046056 200                              DBYTE EXIT
5506:A                                  .
5507:A                                  .
5508:A                                  . ***** DATA COMMUNICATION SITE TERMINAL OUT *****
5509:A                                  .
5510:A                                  .                               ** PRINTS TOP OF PAGE FORMAT
5511:A  046057 072 020 215              DCSOS1  LOAD    STEON           LOAD FLAG TO SEE IF SITE TERMINAL IS TURNED ON
5512:A  046062 267                              ORA
5513:A  046063 312 133 114                      JTZ     L9S             JUMP IF TURNED OFF (0)
5514:A  046066 072 012 215                      LOAD    FK1BZ           IS FK PRINTING ?
5515:A  046071 376 001                          COMP    1
5516:A  046073 310                              RTZ                     RETURN IF BUSY
5517:A  046074 046 000                          LH      0
5518:A  046076 072 113 200                      LOAD    DATE            GET DATE AND STORE IT FOR THE PRINTOUT
5519:A  046101 157                              LLA
5520:A  046102 042 211 215                      STOD    DATED
5521:A  046105 072 114 200                      LOAD    DT2
5522:A  046110 157                              LLA
5523:A  046111 042 213 215                      STOD    DATEM
5524:A  046114 315 234 113                      CALL    TCALC           CALL SUBROUTINE TO CALCULATE CURRENT TIME
5525:A  046117 041 251 040                      LDAA    HDGT            PRINT TOP OF PAGE NOW
5526:A  046122 315 366 145                      CALL    FK1PRT
5527:A  046125 041 100 037                      LDAB    8000
5528:A  046130 042 013 215                      STOD    DSCCNT          SET COUNTER TO PRINT NEXT UPDATE IN 100 SECONDS
5529:A  046133 041 116 201              L9S     HL      DCSOCT          INCREMENT SEGMENT COUNTER TO PRINT DATA
5530:A  046136 064                              INM
5531:A  046137 311                              RET
5532:A                                  .                               ** PRINT DATA EVERY 15 MINUTES, MODE CHANGE, ALARM
5533:A  046140 072 020 215              DCSOS2  LOAD    STEON           LOAD FLAG TO SEE IF SITE TERMINAL TURNED ON
5534:A  046143 267                              ORA
5535:A  046144 312 075 115                      JTZ     L1S             JUMP IF NOT ON
5536:A  046147 072 015 215                      LOAD    LNSCNT          CHECK NUMBER OF LINES ON PAGE
5537:A  046152 376 062                          COMP    50
5538:A  046154 362 125 116                      JFS     L10S            JUMP IF AT BOTTOM OF PAGE
5539:A  046157 052 013 215                      LDAB    DSCCNT          LOAD COUNTER
5540:A  046162 043                              INX     H               INCREMENT
5541:A  046163 042 013 215                      STOD    DSCCNT          STORE COUNTER
5542:A  046166 021 050 043 315 341 000          MINUS   9000            IS 15 MINUTES UP ??
5543:A  046174 362 112 116                      JFS     DCS1            JUMP TO OUTPUT DATA
5544:A                                  .
5545:A  046177 072 012 215                      LOAD    FK1BZ           IS F/K BUSY ??
5546:A  046202 376 001                          COMP    1
5547:A  046204 312 075 115                      JTZ     L1S             JUMP IF BUSY
5548:A                                  .                               .
5549:A  046207 072 223 203                      LOAD    AINC            ARE THERE ANY ALARMS TO OUTPUT ??
5550:A  046212 041 227 203 276                  COMP    ASINC
5551:A  046216 302 235 114                      JTZ     L11S            JUMP IF COUNTERS ARE NOT THE SAME
5552:A  046221 072 243 203                      LOAD    ADIR
5553:A  046224 041 245 203 256                  XOR     ASDIR           ARE THE DIRECTIONS THE SAME ??
5554:A  046230 312 332 114                      JTZ     L5S             JUMP IF DIRECTIONS ARE THE SAME
5555:A  046233 052 227 203              L11S    LDAB    ASINC           LOAD SITE ALARM POINTER
5556:A  046236 353                              DEHL
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5557:A  046237 041 362 204          HL    ALRMS     POINT TO TOP OF ALARM TABLE
5558:A  046242 031                  DAD   D         INCREMENT TO NEXT LOCATION TO OUTPUT
5559:A  046243 353                  DEHL
5560:A  046244 032                  LAMR  D         GET VALUE OF ALARM
5561:A  046245 046 000              LH    0
5562:A  046247 157                  LLA
5563:A  046250 042 167 215          STOD  ALRM      SAVE ALARM TO OUTPUT
5564:A  046253 315 234'113          CALL  TCALC     CALCULATE THE TIME TO OUTPUT
5565:A  046256 041 354 041          LDAA  PTALRM
5566:A  046261 315 366 145          CALL  PRTPRT    PRINT IT
5567:A  046264 072 227 203          LOAD  ASINC     UPDATE SITE POINTER
5568:A  046267 074                  INA
5569:A  046270 062 227 203          STO   ASINC
5570:A  046273 376 030              COMP  24        ARE YOU BELOW BOTTOM OF TABLE
5571:A  046275 372 316 114          JTS   L12S      JUMP IF NOT AT BOTTOM
5572:A  046300 076 000              LOAD  0
5573:A  046302 062 227 203          STO   ASINC     SET SITE POINTER TO TOP OF TABLE
5574:A  046305 072 245 203          LOAD  ASDIR     TOGGLE DIRECTION
5575:A  046310 057 346 001          INV
5576:A  046313 062 245 203          STO   ASDIR
5577:A
5578:A  046316 072 015 215    L12S  LOAD  LNSCNT    INCREMENT LINE COUNT
5579:A  046321 074                  INA
5580:A  046322 062 015 215          STO   LNSCNT
5581:A  046325 376 062              COMP  50        IS PAGE FULL ??
5582:A  046327 362 125 116          JFS   L10S      JUMP IF FULL
5583:A
5584:A  046332 072 076 202    L5S   LOAD  IMODER    CHECK IF LAST CYCLE MODE IS THE SAME AS NOW
5585:A  046335 041 022 215 276      COMP  DMODES
5586:A  046341 302 112 116          JFZ   DCS1      JUMP IF NOT THE SAME TO OUTPUT NEW MODE
5587:A
5588:A  046344 072 365 212          LOAD  MANON     CHECK TO SEE IF MANUAL WAS DISABLED
5589:A  046347 041 163 174 256      XOR   S9A17
5590:A  046353 041 365 212 246      AND   MANON
5591:A  046357 312 031 115          JTZ   L7S       JUMP IF MANUAL WAS NOT DISABLED
5592:A  046362 041 377 017          LDAD  4095      CONTROL ANGLES TO FULL FEATHER
5593:A  046365 042 065 177          STOD  C2A21
5594:A  046370 042 073 177          STOD  C2A22
5595:A  046373 042 075 177          STOD  C2A23
5596:A  046376 042 077 177          STOD  C2A24
5597:A  046401 041 220 042          LDAA  MANOUT
5598:A  046404 315 366 145          CALL  PRTPRT    PRINT 'MANUAL DONE'
5599:A  046407 076 000              LOAD  0
5600:A  046411 062 365 212          STO   MANON     RESET MANUAL FLAG
5601:A  046414 072 015 215          LOAD  LNSCNT    INCREMENT LINE COUNT
5602:A  046417 074                  INA
5603:A  046420 074                  INA
5604:A  046421 062 015 215          STO   LNSCNT
5605:A  046424 376 062              COMP  50
5606:A  046426 362 125 116          JFS   L10S      JUMP IF AT BOTTOM OF PAGE
5607:A
5608:A  046431 072 147 215    L7S   LOAD  IREQRC    CHECK IF REMOTE TERMINAL IS REQUESTED CONTROL
5609:A  046434 067                  ORA             REMOTE TERMINAL REQUEST
5610:A  046435 312 075 115          JTZ   L1S       JUMP IF NOT
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5611:A  046440 041 037 043              LDAA  REQC
5612:A  046443 315 366 145              CALL  PK1PRT        PRINT 'REMOTE TERMINAL REQUESTS CONTROL'
5613:A  046446 076 000                  LOAD  0
5614:A  046450 062 147 215              STO   IREQRC        RESET FLAG TO SEND REQUEST
5615:A  046453 076 001                  LOAD  1
5616:A  046455 062 151 215              STO   RRC           SET FLAG THAT REQUEST WAS SENT
5617:A  046460 072 015 215              LOAD  LNSCNT        INCREMENT LINE COUNT
5618:A  046463 074                      INA
5619:A  046464 074                      INA
5620:A  046465 062 015 215              STO   LNSCNT
5621:A  046470 376 062                  COMP  50
5622:A  046472 362 125 116              JFS   L10S          JUMP IF AT BOTTOM OF PAGE
5623:A
5624:A  046475 072 012 215      L1S     LOAD  PK1DZ         CHECK IF CONTROLLER CAN RECEIVE MESSAGE FROM SITE
5625:A  046500 041 010 215 266          IOR   KYFLGS
5626:A  046504 041 100 201 266          IOR   DCSKI
5627:A  046510 302 127 115              JFZ   L2S           DON'T JUMP IF CONTROLLER WAS NOT SET UP TO RECEIVE
5628:A  046513 041 001 215              LDAA  STEIN         DESTINATION OF SITE MESSAGE
5629:A  046516 076 006                  LOAD  6             MAXIMUM LENGTH OF MESSAGE
5630:A  046520 021 271 116              LDAS  DCSI          SUBROUTINE TO CALL WHEN MESSAGE RECEIVED
5631:A  046523 315 346 146              CALL  PK1KYN        START CONTROLLER LOOKING FOR MESSAGE
5632:A  046526 311                      RET
5633:A  046527 072 010 215      L2S     LOAD  KYFLGS        LOAD FLAG SET WHEN MESSAGE WAS RECEIVED
5634:A  046532 267                      ORA
5635:A  046533 310                      RTZ                 RETURN IF NO MESSAGE THERE
5636:A  046534 076 000                  LOAD  0
5637:A  046536 062 010 215              STO   KYFLGS        RESET MESSAGE IN FLAG
5638:A
5639:A                          ; THIS IS WHERE COMMANDS FROM THE SITE TERMINAL ARE OPERATED ON
5640:A
5641:A  046541 072 020 215              LOAD  STEON         CHECK TO SEE IF SITE TERMINAL IS ON
5642:A  046544 267                      ORA
5643:A  046545 302 224 115              JFZ   L13S          JUMP IF SITE TERMINAL IS ON
5644:A  046550 072 001 215              LOAD  STEIN         CHECK FIRST WORD OF MESSAGE IN TO SEE IF TRYING
5645:A  046553 376 073                  COMP  59             TO TURN SITE TERMINAL ON
5646:A  046555 300                      RFZ                 RETURN IF I.D. NOT FOR SITE ON/OFF
5647:A  046556 072 002 215              LOAD  STE2          LOAD SECOND WORD
5648:A  046561 376 061                  COMP  49
5649:A  046563 300                      RFZ                 RETURN IF NOT SITE ON
5650:A  046564 076 001                  LOAD  1
5651:A  046566 062 020 215              STO   STEON         SET SITE TERMINAL ON FLAG
5652:A  046571 315 234 113              CALL  TCALC         CALCULATE TIME FOR OUTPUT
5653:A  046574 041 213 042              LDAA  CMDTME        MESSAGE TO BE SENT
5654:A  046577 315 366 145              CALL  PK1PRT        SEND THE TIME TAG ON THE COMMAND
5655:A  046602 072 015 215              LOAD  LNSCNT        INCREMENT LINE COUNT
5656:A  046605 074                      INA
5657:A  046606 062 015 215              STO   LNSCNT
5658:A  046611 376 062                  COMP  50
5659:A  046613 362 125 116              JFS   L10S          JUMP IF AT BOTTOM OF PAGE
5660:A  046616 076 000                  LOAD  0
5661:A  046620 062 116 201              STO   DCSOCT        SET SEGMENT COUNTER TO PRINT TOP OF PAGE HEADING
5662:A  046623 311                      RET
5663:A  046624 072 001 215      L13S    LOAD  STEIN         LOAD FIRST WORD OF MESSAGE
5664:A  046627 376 073                  COMP  59            CHECK IF I.D. IS FOR TURNING SITE TERMINAL ON/OFF
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5665:A  046631 302 300 115              JFZ   L14S        JUMP IF NOT THAT I.D.
5666:A  046634 072 002 215              LOAD  STE2        LOAD SECOND WORD OF MESSAGE
5667:A  046637 376 060                  COMP  48          IS SITE TERMINAL BEING TURNED OFF ??
5668:A  046641 300                      RFZ               RETURNED IF NOT
5669:A  046642 076 000                  LOAD  0
5670:A  046644 062 020 215              STO   STEON       TURN SITE TERMINAL OFF
5671:A  046647 062 011 215              STO   PSSWRD      ZERO OUT PASSWORD FLAG
5672:A  046652 315 234 113              CALL  TCALC       CALCULATE TIME FOR OUTPUT
5673:A  046655 041 213 042              LXAA  CMDTME      MESSAGE TO BE SENT
5674:A  046660 315 366 145              CALL  FK1PRT      SEND THE TIME TAG ON THE COMMAND
5675:A  046663 072 015 215              LOAD  LNSCNT      INCREMENT LINE COUNT
5676:A  046666 074                      INA
5677:A  046667 062 015 215              STO   LNSCNT
5678:A  046672 376 062                  COMP  50
5679:A  046674 362 125 116              JFS   L10S        JUMP IF AT BOTTOM OF PAGE
5680:A  046677 311                      RET
5681:A
5682:A  046700 072 011 215      L14S    LOAD  PSSWRD      HAS PASSWORD BEEN ENTERED
5683:A  046703 376 001                  COMP  1
5684:A  046705 312 367 115              JTZ   L6S         JUMP IF ENTERED ALREADY
5685:A  046710 072 001 215              LOAD  STEIN       WHAT IS PASSWORD
5686:A  046713 376 123                  COMP  83          (S)
5687:A  046715 300                      RFZ               RETURN IF WRONG
5688:A  046716 072 002 215              LOAD  STE2
5689:A  046721 376 103                  COMP  67          (C)
5690:A  046723 300                      RFZ               RETURN IF WRONG
5691:A  046724 072 003 215              LOAD  STE3
5692:A  046727 376 115                  COMP  77          (M)
5693:A  046731 300                      RFZ               RETURN IF WRONG
5694:A  046732 072 004 215              LOAD  STE4
5695:A  046735 376 104                  COMP  68          (D)
5696:A  046737 300                      RFZ               RETURN IF WRONG
5697:A  046740 072 005 215              LOAD  STE5
5698:A  046743 376 203                  COMP  131         (CR)
5699:A  046745 300                      RFZ               RETURN IF WRONG
5700:A  046746 076 001                  LOAD  1           PASSWORD ENTERED CORRECT
5701:A  046750 062 011 215              STO   PSSWRD      SET FLAG
5702:A  046753 062 100 201              STO   DCSRI       SET INPUT ACTIVATION FLAG
5703:A  046756 062 021 215              STO   STE         COMMAND CAME FROM SITE TERMINAL
5704:A  046761 076 015                  LOAD  13
5705:A  046763 062 120 201              STO   DCSKCT      SET SEGMENT COUNTER TO COVER PASSWORD
5706:A  046766 311                      RET
5707:A  046767 072 001 215      L6S     LOAD  STEIN       IS I.D. ABOVE THE RANGE  (CHECK FOR BYE OR MANUAL)
5708:A  046772 376 073                  COMP  59
5709:A  046774 362 010 116              JFS   L8S         JUMP IF ABOVE OUR RANGE
5710:A  046777 076 001                  LOAD  1
5711:A  047001 062 100 201              STO   DCSRI       SET INPUT ACTIVATION FLAG
5712:A  047004 062 021 215              STO   STE         SET CMD CAME FROM SITE
5713:A  047007 311                      RET
5714:A  047010 072 001 215      L8S     LOAD  STEIN       LOAD FIRST WORD OF MESSAGE IN
5715:A  047013 376 102                  COMP  66          (B)
5716:A  047015 302 104 116              JTZ   L3S         JUMP TO MANUAL COMMAND PRESENT
5717:A  047020 072 002 215              LOAD  STE2        LOAD SECOND WORD
5718:A  047023 376 131                  COMP  89          (Y)
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5719:A  047035 302 104 116              JFZ   L3S          JUMP TO MANUAL COMMAND PRESENT
5720:A  047038 072 003 215              LOAD  STE3         THIRD WORD
5721:A  047041 376 105                  COMP  69           (E)
5722:A  047043 302 104 116              JFZ   L3S          JUMP TO MANUAL COMMAND PRESENT
5723:A  047046 072 004 215              LOAD  STE4         FOURTH WORD
5724:A  047051 376 203                  COMP  131          (CR)
5725:A  047053 302 104 116              JFZ   L3S          JUMP TO MANUAL COMMAND PRESENT
5726:A  047056 315 234 113              CALL  TCALC        CALL SUBROUTINE TO CALCULATE TIME TO OUTPUT
5727:A  047061 041 300 042              LDAA  STEDNE       MESSAGE TO BE SENT
5728:A  047064 315 366 145              CALL  PRTPRT       PRINT 'SITE CMD DONE'
5729:A  047067 076 000                  LOAD  0
5730:A  047071 062 011 215              STO   PSSWRD       ZERO OUT PASSWORD
5731:A  047074 072 015 215              LOAD  LNSCNT       INCREMENT LINE COUNT
5732:A  047077 074                      INA
5733:A  047100 074                      INA
5734:A  047101 062 015 215              STO   LNSCNT
5735:A  047104 376 062                  COMP  50
5736:A  047106 362 125 116              JFS   L10S         JUMP IF AT BOTTOM OF PAGE
5737:A  047111 311                      RET
5738:A  047112 076 001          L3S     LOAD  1
5739:A  047114 062 275 212              STO   MANCMD       SET MANUAL COMMAND PRESENT
5740:A  047117 311                      RET
5741:A  047120 072 100 201      DCS1    LOAD  DCSKI
5742:A  047123 376 001                  COMP  1            CHECK IF INPUT COMMAND BEING WORKED ON NOW
5743:A  047125 310                      RTZ                RETURN IF SO
5744:A  047126 041 116 201              HL    DCSOCT       INCREMENT SEGMENT COUNTER TO PRINT DATA
5745:A  047131 064                      INM
5746:A  047132 311                      RET
5747:A  047133 041 116 201      L10S    HL    DCSOCT       INCREMENT SEGMENT COUNTER TO SKIP TO TOP OF PAGE
5748:A  047136 064                      INM
5749:A  047137 064                      INM
5750:A  047140 311                      RET
5751:A                                                     ** PRINT DATA
5752:A  047141 072 012 215      DCSOS3  LOAD  PRTBZ        BUSY ?
5753:A  047144 376 001                  COMP  1
5754:A  047146 310                      RTZ                RETURN IF BUSY
5755:A  047147 041 000 000              LDAD  0
5756:A  047152 042 013 215              STOD  DSCCNT       ZERO OUT PERIODIC OUTPUT COUNTER
5757:A  047155 042 167 215              STOD  ALRM         ZERO OUT ALARM NUMBER
5758:A  047160 072 076 202              LOAD  IMOBER       UPDATE MODE THAT SITE TERMINAL HAS PRINTED
5759:A  047163 062 022 215              STO   OMODES
5760:A  047166 021 006 114              DE    CONVRT       APU SUBROUTINE TO PUT WIND SPEED AND POWER IN
5761:A  047171 315 137 001              CALL  APUSTR        ENGR UNITS FOR OUTPUT
5762:A  047174 315 234 113              CALL  TCALC        CALCULATE TIME FOR OUTPUT
5763:A  047177 041 021 042              LDAA  PNUMB        MESSAGE TO PRINT
5764:A  047202 315 366 145              CALL  PRTPRT       PRINT DATA
5765:A  047205 072 015 215              LOAD  LNSCNT       INCREMENT LINE COUNT
5766:A  047210 074                      INA
5767:A  047211 062 015 215              STO   LNSCNT
5768:A  047214 376 062                  COMP  50           PAGE FULL ?
5769:A  047216 362 220 116              JFS   DCS4         JUMP IF NOT FULL
5770:A  047221 041 116 201              HL    DCSOCT       SET SEGMENT COUNTER TO SKIP TO TOP OF PAGE
5771:A  047224 064                      INM
5772:A  047225 311                      RET
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5773:A  047220 041 116 201              DCS4    HL      DCSOCT          NO, BACK TO 15 MINUTE UPDATE
5774:A  047223 065                              DCM
5775:A  047224 311                              RET
5776:A                                  .                               ** SKIP TO TOP OF PAGE
5777:A  047225 072 012 215              DCSOS4  LOAD    FK1BZ           BUSY ?
5778:A  047230 376 001                          COMP    1
5779:A  047232 310                              RTZ                     RETURN IF BUSY
5780:A  047233 072 015 215                      LOAD    LNSCNT          INCREMENT LINE COUNT
5781:A  047236 074                              INA
5782:A  047237 062 015 215                      STO     LNSCNT
5783:A  047242 326 073                          SU      59              ARE 59 LINES ON THIS PAGE ??
5784:A  047244 362 256 116                      JFS     DCS5A           JUMP IF YES
5785:A  047247 041 346 042                      LDAA    PSKIP           MESSAGE TO SKIP A LINE
5786:A  047252 315 366 145                      CALL    FK1PRT          SEND THE MESSAGE
5787:A  047255 311                              RET
5788:A  047256 076 000                  DCS5A   LOAD    0
5789:A  047260 062 015 215                      STO     LNSCNT          ZERO OUT LINE COUNT
5790:A  047263 076 000                          LOAD    0
5791:A  047265 062 116 201                      STO     DCSOCT          SET SEGMENT COUNTER TO PRINT TOP OF PAGE
5792:A  047270 311                              RET
5793:A                                  .
5794:A                                  . ** THIS SUBROUTINE CALLED WHEN A MESSAGE HAS BEEN RECEIVED BY CONTROLLER
5795:A                                  .     FROM SITE TERMINAL
5796:A                                  .
5797:A  047271 076 001                  DCSI    LOAD    1
5798:A  047273 062 010 215                      STO     KYFLGS
5799:A  047276 311                              RET
5800:A                                  .
5801:A                                  .
5802:A                                  . ***** SITE AND REMOTE TERMINAL COMMANDS ARE DONE IN THESE SEGMENTS *****
5803:A                                  .
5804:A                                  .                               ** PRINT TIME TAG AND DECIDE WHAT SEGMENT TO CALL
5805:A  047277 072 012 215              DCSS1   LOAD    FK1BZ           ARE ANY OF THE FKS BUSY ??
5806:A  047302 041 133 215 266                  IOR     FKBZ
5807:A  047306 376 001                          COMP    1
5808:A  047310 310                              RTZ                     RETURN IF BUSY
5809:A  047311 315 234 113                      CALL    TCALC           CALCULATE TIME FOR OUTPUT
5810:A  047314 072 021 215                      LOAD    STE             WAS IT SITE THAT SENT CMD ??
5811:A  047317 267                              ORA
5812:A  047320 312 343 116                      JTZ     DCS32           JUMP IF FROM REMOTE
5813:A  047323 041 213 042                      LDAA    CMDTME          MESSAGE TO BE PRINTED AT SITE
5814:A  047326 315 366 145                      CALL    FK1PRT          PRINT TIME TAG
5815:A  047331 041 015 215                      HL      LNSCNT          INCREMENT LINE COUNT
5816:A  047334 064                              INM
5817:A  047335 072 001 215                      LOAD    STEIN           LOAD I.D.
5818:A  047340 303 360 116                      JMP     DCS33
5819:A  047343 041 213 042 315 150 001  DCS32   PRINT   CMDTME          PRINT TIME TAG AT REMOTE TERMINAL
5820:A  047351 041 142 215                      HL      LNECNT          INCREMENT LINE COUNT
5821:A  047354 064                              INM
5822:A  047355 072 134 215                      LOAD    KBDI            LOAD I.D.
5823:A  047360 376 060                  DCS33   COMP    48              CHECK RANGE     LOWER LIMIT
5824:A  047362 372 372 116                      JTS     DCS2            JUMP IF BELOW LOWER LIMIT
5825:A  047365 376 073                          COMP    59              UPPER LIMIT
5826:A  047367 372 000 117                      JTS     DCS93           JUMP IF IN RANGE
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5827:A  047372 076 014              DCS2    LOAD  12
5830:A  047374 062 120 201                  STD   DCSRCT      SET SEGMENT COUNTER TO PRINT CMD INVALID
5829:A  047377 311                          RET
5830:A  047400 326 057              DCS93   SU    47          CALCULATE SEGMENT TO GO TO
5831:A  047402 062 120 201                  STD   DCSRCT      STORE SEGMENT COUNTER
5832:A  047405 311                          RET
5833:A                              .                         ** COMMAND STAND-BY ENABLE
5834:A  047406 315 043 123          DCS3    CALL  STEREM      CALL SUBROUTINE TO GET LOCATION OF MESSAGE IN BC
5835:A  047411 012                          LAMR  B           GET VALUE OF SECOND WORD
5836:A  047412 376 061                      COMP  49
5837:A  047414 302 061 117                  JFZ   DCS14       JUMP IF MESSAGE WRONG
5838:A  047417 003                          INX   B           LOCATION OF THIRD WORD
5839:A  047420 012                          LAMR  B           THIRD WORD
5840:A  047421 376 203                      COMP  131
5841:A  047423 302 061 117                  JFZ   DCS14       JUMP IF MESSAGE WRONG
5842:A  047426 315 062 123                  CALL  SRCHK       CHECK IF MODE IS CORRECT
5843:A  047431 041 052 202 246              AND   SBINH
5844:A  047435 312 061 117                  JTZ   DCS14       JUMP IF NOT CORRECT
5845:A  047440 062 166 215                  STD   DTENB       STORE OPERATOR ENABLE
5846:A  047443 075                          DCA
5847:A  047444 062 120 201                  STD   DCSRCT      ZERO OUT SEGMENT COUNTER
5848:A  047447 062 100 201                  STD   DCSRI       ZERO OUT ACTIVATION FLAG
5849:A  047452 062 021 215                  STD   STE         ZERO OUT CMD FROM SITE
5850:A  047455 062 153 215                  STD   REM         ZERO OUT CMD FROM REMOTE
5851:A  047460 311                          RET
5852:A  047461 076 014              DCS14   LOAD  12
5853:A  047463 062 120 201                  STD   DCSRCT      SET SEGMENT COUNTER TO PRINT CMD INVALID
5854:A  047466 311                          RET
5855:A                              .                         ** SPEED SET POINT
5856:A  047467 315 043 123          DCS4    CALL  STEREM      GET LOCATION OF SECOND WORD OF MESSAGE
5857:A  047472 012                          LAMR  B           GET VALUE
5858:A  047473 046 000                      LH    0
5859:A  047475 326 060                      SU    48
5860:A  047477 157                          LLA               CALCULATE TENS DIGIT OF SPEED SET POINT
5861:A  047500 021 144 000 315 005 001      MULT  100
5862:A  047506 345                          PUSH  H           TEMP STORAGE
5863:A  047507 046 000                      LH    0
5864:A  047511 003                          INX   B           LOCATION OF THIRD WORD
5865:A  047512 012                          LAMR  B           VALUE OF THIRD WORD
5866:A  047513 326 060                      SU    48
5867:A  047515 157                          LLA               ONES DIGIT OF POWER SET POINT
5868:A  047516 021 012 000 315 005 001      MULT  10
5869:A  047524 321                          POP   D           RECALL TENS DIGIT
5870:A  047525 031                          DAD   D           ADD TO ONES DIGIT
5871:A  047526 345                          PUSH  H           TEMP STORAGE
5872:A  047527 046 000                      LH    0
5873:A  047531 003                          INX   B           LOCATION OF FOURTH WORD
5874:A  047532 012                          LAMR  B           FOURTH WORD
5875:A  047533 326 060                      SU    48
5876:A  047535 157                          LLA               TENTHS DIGIT
5877:A  047536 321                          POP   D           RECALL VALUE
5878:A  047537 031                          DAD   D           GET SPEED SET POINT * 10
5879:A  047540 042 201 215                  STOD  SPTMP       TEMP STORAGE
5880:A  047543 021 371 122                  DL    CSUMP1      CALL APU SUBROUTINE TO GET SPEED SET POINT IN
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5881:A  047546 315 137 001                      CALL  AFUSTR        COUNTS
5882:A  047551 072 052 202                      LOAD  SRINH         CHECK THAT MODE IS CORRECT
5883:A  047554 041 053 202 266                  IOR   LO
5884:A  047560 041 051 202 266                  IOR   SRENB
5885:A  047564 041 073 201 266                  IOR   STRTUP
5886:A  047570 041 072 201 266                  IOR   RAMP
5887:A  047574 062 077 202                      STO   TEMP          TEMP STORAGE
5888:A  047577 315 062 123                      CALL  SRCHK         CHECK SITE AND REMOTE CONDITIONS
5889:A  047602 041 077 202 246                  AND   TEMP
5890:A  047606 312 264 117                      JTZ   DCS16         WRONG STATE
5891:A  047611 041 165 013                      LOAD  2933          CHECK RANGE OF SPEED SET POINT  2932 IS 17.9 RPM
5892:A  047614 353                              DEHL
5893:A  047615 052 203 215                      LOAD  SETIN
5894:A  047620 315 162 137                      CALL  NEGNUM
5895:A  047623 031                              DAD   D
5896:A  047624 174                              LAH
5897:A  047625 007                              SLC
5898:A  047626 332 264 117                      JTC   DCS16         JUMP IF ABOVE MAX RPM
5899:A  047631 052 201 215                      LOAD  SPTMP
5900:A  047634 042 177 215                      STOD  SPDSET        SAVE SPEED SET POINT * 10 FOR OUTPUT
5901:A  047637 052 203 215                      LOAD  SETIN
5902:A  047642 042 251 211                      STOD  NSET          SAVE SPEED SET POINT FOR USE IN RAMP
5903:A  047645 076 000                          LOAD  0
5904:A  047647 062 120 201                      STO   DCSRCT        ZERO SEGMENT COUNTER
5905:A  047652 062 100 201                      STO   DCSRI         ZERO ACTIVATION FLAG
5906:A  047655 062 021 215                      STO   SIE           ZERO OUT CMD FROM SITE
5907:A  047660 062 153 215                      STO   REM           ZERO OUT CMD FROM REMOTE
5908:A  047663 311                              RET
5909:A  047664 076 014                  DCS16   LOAD  12
5910:A  047666 062 120 201                      STO   DCSRCT        SET SEGMENT COUNTER TO PRINT CMD INVALID
5911:A  047671 311                              RET
5912:A                                          ** POWER SET POINT
5913:A  047672 315 043 123              DCSS5   CALL  STEREM        GET LOCATION OF SECOND WORD OF MESSAGE
5914:A  047675 012                              LAMR  B             GET VALUE
5915:A  047676 046 000                          LH    0
5916:A  047700 326 060                          SU    48
5917:A  047702 157                              LLA                 TENS DIGIT
5918:A  047703 021 144 000 315 005 001          MULT  100
5919:A  047711 345                              PUSH  H             TEMP STORAGE
5920:A  047712 046 000                          LH    0
5921:A  047714 003                              INX   B             LOCATION OF THIRD WORD
5922:A  047715 012                              LAMR  B             THIRD WORD
5923:A  047716 326 060                          SU    48
5924:A  047720 157                              LLA                 ONES DIGIT
5925:A  047721 021 012 000 315 005 001          MULT  10
5926:A  047727 321                              POP   D             RECALL TENS DIGIT
5927:A  047730 031                              DAD   D             ADD TO ONES DIGIT
5928:A  047731 345                              PUSH  H             TEMP STORAGE
5929:A  047732 046 000                          LH    0
5930:A  047734 003                              INX   B             LOCATION OF FOURTH WORD
5931:A  047735 012                              LAMR  B             FOURTH WORD
5932:A  047736 157                              LLA                 TENTHS DIGIT
5933:A  047737 353                              DEHL
5934:A  047740 041 060 000                      LOAD  48
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5945:A  047744 315 162 137              CALL  NEGNUM
5946:A  047746 031                      DAD   D
5947:A  047747 321                      POP   D             RECALL VALUE
5948:A  047750 031                      DAD   D             ADD 10 TENTHS DIGIT.
5949:A  047751 042 201 215              STOD  SPTMP         TEMP STORAGE OF POWER SET POINT * 10
5940:A  047754 021 014 123              DE    CSCMP2        CALL APU SUBROUTINE TO GET POWER SET POINT * 10
5941:A  047757 315 137 001              CALL  APUSTR         INTO COUNTS
5942:A  047762 072 053 202              LOAD  LO
5943:A  047765 041 052 202 266          IOR   SBINH
5944:A  047771 041 051 202 266          IOR   SBENB
5945:A  047775 041 073 201 266          IOR   STRTUP
5946:A  050001 062 077 202              STO   TEMP
5947:A  050004 315 062 123              CALL  SRCHK         CHECK ON CONDITIONS AT SITE AND REMOTE
5948:A  050007 041 077 202 246          AND   TEMP
5949:A  050013 312 071 120              JTZ   DCS18         WRONG STATE
5950:A  050016 052 203 215              LDAD  SETIN         CHECK AGAINST UPPER VALUE OF POWER
5951:A  050021 353                      DEHL
5952:A  050022 041 360 011              LDAD  2544          7.3 MW
5953:A  050025 315 162 137              CALL  NEGNUM
5954:A  050030 031                      DAD   D
5955:A  050031 174                      LAH
5956:A  050032 007                      SLC
5957:A  050033 322 071 120              JFC   DCS18         JUMP IF > 7.3 MW
5958:A  050036 052 201 215              LDAD  SPTMP
5959:A  050041 042 175 215              STOD  PWRSET        STORE POWER SET POINT * 10 FOR OUTPUT
5960:A  050044 052 203 215              LDAD  SETIN
5961:A  050047 042 145 203              STOD  FMANU         STORE POWER SET POINT FOR USE IN POWER GEN
5962:A  050052 076 000                  LOAD  0
5963:A  050054 062 120 201              STO   DCSKCT        ZERO SEGMENT COUNTER
5964:A  050057 062 100 201              STO   DCSRI         ZERO ACTIVATION FLAG
5965:A  050062 062 021 215              STO   STE           ZERO OUT CMD FROM SITE
5966:A  050065 062 153 215              STO   REM           ZERO OUT CMD FROM REMOTE
5967:A  050070 311                      RET
5968:A  050071 076 014          DCS18   LOAD  12
5969:A  050073 062 120 201              STO   DCSKCT        SET SEGMENT COUNTER TO PRINT CMD INVALID
5970:A  050076 311                      RET
5971:A                                  ** NORMAL SHUTDOWN
5972:A  050077 315 043 123      DCS56   CALL  STEREM        GET LOCATION OF SECOND WORD OF MESSAGE
5973:A  050102 012                      LAMR  B             GET VALUE
5974:A  050103 376 061                  COMP  49
5975:A  050105 302 140 120              JTZ   DCS22         JUMP, WRONG COMMAND
5976:A  050110 315 062 123              CALL  SRCHK         CHECK CONDITIONS AT SITE AND REMOTE TERMINAL
5977:A  050113 267                      ORA
5978:A  050114 312 140 120              JTZ   DCS22         JUMP, WRONG STATE
5979:A  050117 062 165 215              STO   OTSDR         SET OPERATOR SHUTDOWN FLAG
5980:A  050122 075                      DCA
5981:A  050123 062 100 201              STO   DCSRI         ZERO ACTIVATION FLAG
5982:A  050126 062 120 201              STO   DCSKCT        ZERO SEGMENT COUNTER
5983:A  050131 062 021 215              STO   STE           ZERO FLAG THAT CMD CAME FROM SITE
5984:A  050134 062 153 215              STO   REM           ZERO FLAG THAT CMD CAME FROM REMOTE
5985:A  050137 311                      RET
5986:A  050140 076 014          DCS22   LOAD  12
5987:A  050142 062 120 201              STO   DCSKCT        SET SEGMENT COUNTER TO PRINT CMD INVALID
5988:A  050145 311                      RET
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5989:A
5990:A  050146 315 043 123          DCSS7   CALL    STEREM          ** EMERGENCY SHUTDOWN
5991:A  050151 012                          LAMR    B               GET LOCATION OF SECOND WORD OF MESSAGE
5992:A  050152 376 061                      COMP    49              GET VALUE
5993:A  050154 302 216 120                  JFZ     DCS24           JUMP, WRONG COMMAND
5994:A  050157 315 062 123                  CALL    SRCHK           CHECK STATE AT SITE AND REMOTE TERMINALS
5995:A  050162 376 001                      COMP    1
5996:A  050164 302 216 120                  JFZ     DCS24           JUMP, WRONG STATE
5997:A  050167 076 000                      LOAD    0
5998:A  050171 062 117 176                  STO     C7A5            CMD FEATHER VALVE A1
5999:A  050174 062 120 176                  STO     C7A6            CMD FEATHER VALVE A2
6000:A  050177 076 000                      LOAD    0
6001:A  050201 062 100 201                  STO     DCSRI           ZERO ACTIVATION FLAG
6002:A  050204 062 120 201                  STO     DCSRCT          ZERO SEGMENT COUNTER
6003:A  050207 062 021 215                  STO     STE             ZERO FLAG THAT CMD CAME FROM SITE
6004:A  050212 062 153 215                  STO     REM             ZERO FLAG THAT CMD CAME FROM REMOTE
6005:A  050215 311                          RET
6006:A  050216 076 014              DCS24   LOAD    12
6007:A  050220 062 120 201                  STO     DCSRCT          SET SEGMENT COUNTER TO PRINT CMD INVALID
6008:A  050223 311                          RET
6009:A
6010:A  050224 315 043 123          DCSS9   CALL    STEREM          ** REQUEST SITE/REMOTE CONTROL
6011:A  050227 012                          LAMR    B               GET LOCATION OF SECOND WORD OF MESSAGE
6012:A  050230 376 061                      COMP    49              GET VALUE
6013:A  050232 302 314 120                  JFZ     DCS28           JUMP, WRONG COMMAND
6014:A  050235 072 021 215                  LOAD    STE             WAS CMD FROM SITE ??
6015:A  050240 267                          ORA
6016:A  050241 312 262 120                  JTZ     DCS34           JUMP IF NOT FROM SITE
6017:A  050244 072 007 215                  LOAD    SOTCON          DOES SITE TERMINAL HAVE CONTROL ??
6018:A  050247 267                          ORA
6019:A  050250 302 314 120                  JFZ     DCS28           JUMP IF YES
6020:A  050253 074                          INA
6021:A  050254 062 017 215                  STO     IREQSC          SET FLAG FOR PRINTING OF REQUEST
6022:A  050257 303 275 120                  JMP     DCS35
6023:A  050262 072 146 215          DCS34   LOAD    ROTCON          DOES REMOTE TERMINAL HAVE CONTROL ??
6024:A  050265 267                          ORA
6025:A  050266 302 314 120                  JTZ     DCS28           JUMP IF YES
6026:A  050271 074                          INA
6027:A  050272 062 147 215                  STO     IREQRC          SET FLAG FOR PRINTING OF REQUEST
6028:A  050275 076 000              DCS35   LOAD    0
6029:A  050277 062 120 201                  STO     DCSRCT          ZERO SEGMENT COUNTER
6030:A  050302 062 100 201                  STO     DCSRI           ZERO ACTIVATION FLAG
6031:A  050305 062 021 215                  STO     STE             ZERO CMD FROM SITE
6032:A  050310 062 153 215                  STO     REM             ZERO CMD FROM REMOTE
6033:A  050313 311                          RET
6034:A  050314 076 014              DCS28   LOAD    12
6035:A  050316 062 120 201                  STO     DCSRCT          SET SEGMENT COUNTER TO PRINT CMD INVALID
6036:A  050321 311                          RET
6037:A
6038:A  050322 315 043 123          DCSS10  CALL    STEREM          ** ENABLE REMOTE/SITE CONTROL
6039:A  050325 012                          LAMR    B               GET LOCATION OF SECOND WORD OF MESSAGE
6040:A  050326 376 061                      COMP    49              GET VALUE
6041:A  050330 302 044 121                  JFZ     DCS30           JUMP, WRONG COMMAND
6042:A  050333 072 021 215                  LOAD    STE             CHECK IF CMD CAME FROM SITE
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6043:A  050336 267                      URA
6044:A  050337 312 376 120              JTZ     DCS36           JUMP IF FROM REMOTE
6045:A  050342 072 007 215              LOAD    SOTCON          DOES SITE HAVE CONTROL
6046:A  050345 041 151 215 246          AND     RRC             AND WAS REQUEST GIVEN
6047:A  050351 312 044 121              JTZ     DCS30           JUMP, WRONG STATE
6048:A  050354 076 001                  LOAD    1
6049:A  050356 062 146 215              STO     ROTCON          GIVE REMOTE TERMINAL CONTROL
6050:A  050361 075                      DCA
6051:A  050362 062 007 215              STO     SOTCON          ZERO SITE CONTROL
6052:A  050365 062 151 215              STO     RRC             ZERO REQUEST SENT FLAG
6053:A  050370 062 011 215              STO     PSSWRD          ZERO PASSWORD
6054:A  050373 303 027 121              JMP     DCS37
6055:A  050376 072 146 215      DCS36   LOAD    ROTCON          DOES REMOTE HAVE CONTROL ??
6056:A  050401 041 016 215 246          AND     SRC             AND WAS REUEST SENT
6057:A  050405 312 044 121              JTZ     DCS30           JUMP, WRONG STATE
6058:A  050410 076 001                  LOAD    1
6059:A  050412 062 007 215              STO     SOTCON          GIVE SITE TERMINAL CONTROL
6060:A  050415 075                      DCA
6061:A  050416 062 146 215              STO     ROTCON          ZERO REMOTE CONTROL
6062:A  050421 062 016 215              STO     SRC             ZERO REQUEST SENT FLAG
6063:A  050424 062 150 215              STO     PSRWRD          ZERO PASSWORD
6064:A  050427 062 100 201      DCS37   STO     DCSRI           ZERO ACTIVATION FLAG
6065:A  050432 062 120 201              STO     DCSRCT          ZERO SEGMENT COUNTER
6066:A  050435 062 021 215              STO     SIE             ZERO CMD FROM SITE
6067:A  050440 062 153 215              STO     REM             ZERO CMD FROM REMOTE
6068:A  050443 311                      RET
6069:A  050444 076 014          DCS30   LOAD    12
6070:A  050446 062 120 201              STO     DCSRCT          SET SEGMENT COUNTER TO PRINT CMD INVALID
6071:A  050451 311                      RET
6072:A                                  .                       ** ZERO ENERGY FOR YEAR
6073:A  050452 315 043 123      DCSSZ   CALL    STEREM          GET LOCATION OF SECOND WORD OF MESSAGE
6074:A  050455 012                      LAMR    B               GET VALUE
6075:A  050456 376 061                  COMP    49
6076:A  050460 302 140 121              JFZ     DCS80           JUMP, WRONG MESSAGE
6077:A  050463 315 062 123              CALL    SRCHK           CHECK STATE AT SITE AND REMOTE
6078:A  050466 376 001                  COMP    1
6079:A  050470 302 140 121              JFZ     DCS80           JUMP, WRONG STATE
6080:A  050473 041 000 000              LOAD    0
6081:A  050476 042 054 212              STOD    EPYR            ZERO CUMM. ENERGY
6082:A  050501 046 000                  LH      0
6083:A  050503 072 113 200              LOAD    DATE            UPDATE DATE WHEN CUMM. ENERGY FROM
6084:A  050506 157                      LLA
6085:A  050507 042 173 215              STOD    DATEDO
6086:A  050512 072 114 200              LOAD    DT2             UPDATE MONTH
6087:A  050515 157                      LLA
6088:A  050516 042 171 215              STOD    DATEMO
6089:A  050521 076 000                  LOAD    0
6090:A  050523 062 100 201              STO     DCSRI           ZERO ACTIVATION FLAG
6091:A  050526 062 120 201              STO     DCSRCT          ZERO SEGMENT COUNTER
6092:A  050531 062 021 215              STO     SIE             ZERO CMD FROM SITE
6093:A  050534 062 153 215              STO     REM             ZERO CMD FROM REMOTE
6094:A  050537 311                      RET
6095:A  050540 076 014          DCS80   LOAD    12
6096:A  050542 062 120 201              STO     DCSRCT          SET SEGMENT COUNTER TO PRINT CMD INVALID
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6097:A  050545 311                              RET
6098:A                                          ** SET TIME
6099:A  050546 315 062 123              DCSST   CALL  SRCHK     CHECK STATE AT SITE AND REMOTE
6100:A  050551 267                              ORA
6101:A  050552 312 320 121                      JTZ   DCS70     JUMP, WRONG STATE
6102:A  050555 315 043 123                      CALL  STEREM    GET LOCATIO OF SECOND WORD OF MESSAGE
6103:A  050560 012                              LAMR  B         GET VALUE
6104:A  050561 046 000                          LH    0         CALCULATE HOURS
6105:A  050563 326 060                          SU    48
6106:A  050565 157                              LLA             GET TENS DIGIT
6107:A  050566 021 012 000 315 005 001          MULT  10
6108:A  050574 345                              PUSH  H         TEMP STORAGE
6109:A  050575 046 000                          LH    0
6110:A  050577 003                              INX   B         LOCATION OF THIRD WORD
6111:A  050600 012                              LAMR  B         THIRD WORD
6112:A  050601 326 060                          SU    48
6113:A  050603 157                              LLA             GET ONES DIGIT
6114:A  050604 321                              POP   D         RECALL TENS DIGIT
6115:A  050605 031                              DAD   D         ADD TO ONES DIGIT
6116:A  050606 175                              LAL
6117:A  050607 062 201 215                      STO   SFTMP     TEMP STORAGE OF HOURS
6118:A  050612 376 030                          COMP  24        HOURS LESS THAN 24 ??
6119:A  050614 322 320 121                      JFC   DCS70     JUMP IF ? 24
6120:A  050617 046 000                          LH    0         GET MINUTES
6121:A  050621 003                              INX   B         LOCATION OF FOURTH WORD
6122:A  050622 012                              LAMR  B         FOURTH WORD
6123:A  050623 326 060                          SU    48
6124:A  050625 157                              LLA             GET TENS DIGIT
6125:A  050626 021 012 000 315 005 001          MULT  10
6126:A  050633 345                              PUSH  H         TEMP STORAGE
6127:A  050635 046 000                          LH    0
6128:A  050637 003                              INX   B         LOCATION OF FIFTH WORD
6129:A  050640 012                              LAMR  B         FIFTH WORD
6130:A  050641 326 060                          SU    48
6131:A  050643 157                              LLA             GET ONES DIGIT
6132:A  050644 321                              POP   D         RECALL TENS DIGIT
6133:A  050645 031                              DAD   D         ADD TO ONES DIGIT
6134:A  050646 175                              LAL
6135:A  050647 062 202 215                      STO   SFTMP2    TEMP STORAGE OF MINUTES
6136:A  050652 376 074                          COMP  60
6137:A  050654 322 320 121                      JFC   DCS70     JUMP IF ? 60 MINUTES
6138:A  050657 072 201 215                      LOAD  SFTMP
6139:A  050662 062 112 200                      STO   TM2       SET HOURS
6140:A  050665 072 202 215                      LOAD  SFTMP2
6141:A  050670 062 111 200                      STO   TIME      SET MINUTES
6142:A  050673 076 000                          LOAN  0
6143:A  050675 062 115 200                      STO   T1        ZERO SECONDS
6144:A  050700 062 116 200                      STO   T2        ZERO SECONDS
6145:A  050703 062 100 201                      STO   DCSK1     ZERO ACTIVATION FLAG
6146:A  050706 062 150 201                      STO   DCSRCT     ZERO SEGMENT COUNTER
6147:A  050711 062 021 215                      STO   SIE       ZERO CMD FROM SITE
6148:A  050714 062 153 215                      STO   REM       ZERO CMD FROM REMOTE
6149:A  050717 311                              RET
6150:A  050720 076 014                  DCS70   LOAN  12
```

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6151:A  050722 062 120 201                      STO   DCSRCT    SET SEGMENT COUNTER TO PRINT CMD INVALID
6152:A  050725 311                              RET
6153:A                                                        ** SET MONTH AND DAY
6154:A  050726 315 062 123              DCSSM   CALL  SRCHK    CHECK CONDITIONS AT SITE AND REMOTE
6155:A  050731 376 000                          COMP  0
6156:A  050733 312 123 122                      JTZ   DCS71    JUMP IF WRONG CONDITIONS
6157:A  050736 315 043 123                      CALL  STEREM   GET LOCATION OF SECOND WORD OF MESSAGE
6158:A  050741 012                              LAMR  B        GET VALUE OF SECOND WORD
6159:A  050742 046 000                          LH    0
6160:A  050744 326 060                          SU    48
6161:A  050746 157                              LLA            CALCULATE VALUE OF MONTH
6162:A  050747 021 012 000 315 005 001          MULT  10
6163:A  050755 345                              PUSH  H        TEMP STORAGE OF TENS DIGIT
6164:A  050756 046 000                          LH    0
6165:A  050760 003                              INX   B        LOCATION OF THIRD WORD OF MESSAGE
6166:A  050761 012                              LAMR  B        THIRD VALUE
6167:A  050762 326 060                          SU    48
6168:A  050764 157                              LLA
6169:A  050765 321                              POP   D        RECALL TENS DIGIT
6170:A  050766 031                              DAD   D        ADD TO ONES DIGIT
6171:A  050767 175                              LAL
6172:A  050770 062 201 215                      STO   SPTMP    STORE MONTH
6173:A  050773 265                              ORL
6174:A  050774 312 123 122                      JTZ   DCS71    JUMP IF MONTH DESIRED IS ZERO
6175:A  050777 353                              DCHL
6176:A  051000 041 015 000                      LDAD  13
6177:A  051003 315 162 137                      CALL  NEGNUM
6178:A  051006 031                              DAD   D
6179:A  051007 174                              LAH
6180:A  051010 007                              SLC
6181:A  051011 332 123 122                      JFC   DCS71    JUMP IF MONTH > 12
6182:A  051014 046 000                          LH    0        GET VALUE OF DAY
6183:A  051016 003                              INX   B        LOCATION OF FOURTH VALUE
6184:A  051017 012                              LAMR  B        FOURTH VALUE
6185:A  051020 326 060                          SU    48
6186:A  051022 157                              LLA
6187:A  051023 021 012 000 315 005 001          MULT  10
6188:A  051031 345                              PUSH  H        TEMP STORAGE OF TENS DIGIT
6189:A  051032 046 000                          LH    0
6190:A  051034 003                              INX   B        LOCATION OF FIFTH VALUE
6191:A  051035 012                              LAMR  B        FIFTH VALUE
6192:A  051036 326 060                          SU    48
6193:A  051040 157                              LLA
6194:A  051041 321                              POP   D        RECALL TENS DIGIT
6195:A  051042 031                              DAD   D        ADD TO ONES DIGIT
6196:A  051043 175                              LAL
6197:A  051044 062 202 215                      STO   SPTMP2   SAVE DAY
6198:A  051047 265                              ORL
6199:A  051050 312 123 122                      JTZ   DCS71    JUMP IF DAY = 0
6200:A  051053 353                              DCHL
6201:A  051054 041 040 000                      LDAD  32
6202:A  051057 315 162 137                      CALL  NEGNUM
6203:A  051062 031                              DAD   D
6204:A  051063 174                              LAH
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6205:A  051064 007                          SLC
6206:A  051065 332 123 122                  JFC   DCS71          JUMP IF DAY > 31
6207:A  051070 072 201 215                  LOAD  SFTMF          UPDATE MONTH
6208:A  051073 062 114 200                  STO   DT2
6209:A  051076 072 202 215                  LOAD  SFTMF2         UPDATE DAY
6210:A  051101 062 113 200                  STO   DATE
6211:A  051104 076 000                      LOAD  0
6212:A  051106 062 100 201                  STO   DCSRI          ZERO ACTIVATION FLAG
6213:A  051111 062 120 201                  STO   DCSRCT         ZERO SEGMENT COUNTER
6214:A  051114 062 021 215                  STO   STE            ZERO CMD FROM SITE
6215:A  051117 062 153 215                  STO   REM            ZERO CMD FROM REMOTE
6216:A  051122 311                          RET
6217:A  051123 076 014              DCS71   LOAD  12
6218:A  051125 062 120 201                  STO   DCSRCT         SET SEGMENT COUNTER TO PRINT CMD INVALID
6219:A  051130 311                          RET
6220:A
6221:A  051131 315 043 123          DCSS12  CALL  STEREM         GET LOCATION OF SECOND WORD OF MESSAGE
6222:A  051134 012                          LAMR  B              GET VALUE OF SECOND WORD
6223:A  051135 376 061                      COMP  49
6224:A  051137 302 203 122                  JFZ   DCS3           JUMP IF MESSAGE IS WRONG
6225:A  051142 072 021 215                  LOAD  STE            WHICH TERMINAL IS MESSAGE COMING FROM
6226:A  051145 267                          ORA
6227:A  051146 076 002                      LOAD  2
6228:A  051150 312 161 122                  JTZ   DCS5           JUMP IF FROM REMOTE TERMINAL
6229:A  051153 062 116 201                  STO   DCSDCT         SET SEGMENT COUNTER FOR REMOTE OUT
6230:A  051156 303 164 122                  JMP   DCS6
6231:A  051161 062 117 201          DCS5    STO   DCRDCT         SET SEGMENT COUNTER FOR SITE OUT
6232:A  051164 076 000              DCS6    LOAD  0
6233:A  051166 062 100 201                  STO   DCSRI          ZERO ACTIVATION FLAG
6234:A  051171 062 120 201                  STO   DCSRCT         ZERO SEGMENT COUNTER
6235:A  051174 062 021 215                  STO   STE            ZERO CMD FROM SITE
6236:A  051177 062 153 215                  STO   REM            ZERO CMD FROM REMOTE
6237:A  051202 311                          RET
6238:A  051203 076 014              DCS3    LOAD  12
6239:A  051205 062 120 201                  STO   DCSRCT         SET SEGMENT COUNTER TO PRINT CMD INVALID
6240:A  051210 311                          RET
6241:A
6242:A  051211 072 133 215          DCSS11  LOAD  PKBZ           ** PRINT 'CMD NOT VALID'
6243:A  051214 041 012 215 266              IOR   PK1BZ          CHECK PRINT/KEYIN PACKAGES ARE BUSY
6244:A  051220 376 001                      COMP  1
6245:A  051222 310                          RTZ                  RETURN IF PRINTING
6246:A  051223 072 021 215                  LOAD  STE            CHECK WHERE CMD CAME FROM
6247:A  051226 267                          ORA
6248:A  051227 312 250 122                  JTZ   DCS40          JUMP IF CMD FROM REMOTE
6249:A  051232 041 350 042                  LXAA  CMDNO          LOCATION OF MESSAGE
6250:A  051235 315 366 145                  CALL  PK1PRT         PRINT IT AT SITE TERMINAL
6251:A  051240 041 015 215                  HL    LNSCNT         INCREMENT LINE COUNT
6252:A  051243 064                          INM
6253:A  051244 064                          INM
6254:A  051245 303 263 122                  JMP   DCS41
6255:A  051250 041 350 042 315 150 001 DCS40 PRINT CMDNO          PRINT CMD INVALID TO REMOTE TERMINAL
6256:A  051256 041 142 215                  HL    LNECNT         INCREMENT LINE COUNT
6257:A  051261 064                          INM
6258:A  051262 064                          INM
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6259:A  051263 076 000                  DCS41   LOAD  0
6260:A  051265 062 120 201                      STO   DCSRCT          ZERO SEGMENT COUNTER
6261:A  051270 062 100 201                      STO   DCSRI           ZERO ACTIVATION FLAG
6262:A  051273 062 021 215                      STO   STE             STORE CMD FROM SITE
6263:A  051276 062 153 215                      STO   REM             STORE CMD FROM REMOTE
6264:A  051301 311                              RET
6265:A                                  .                             ** COVER PASSWORD
6266:A  051302 072 012 215              DCSS17  LOAD  PKIBZ           CHECK IF ANY TERMINAL IS PRINTING
6267:A  051305 041 133 215 266                  IOR   PKBZ
6268:A  051311 376 001 .                        COMP  1
6269:A  051313 310                              RTZ                   RETURN IF PRINTING
6270:A  051314 072 021 215                      LOAD  STE             CHECK WHERE MESSAGE CAME FROM
6271:A  051317 267                              ORA
6272:A  051320 312 340 122                      JTZ   DCS42           JUMP IF FROM REMOTE
6273:A  051323 041 375 044                      LDAA  COVER           LOCATION OF MESSAGE TO PRINT
6274:A  051326 315 366 145                      CALL  PKIPRT          PRINT MESSAGE
6275:A  051331 041 015 215                      HL    LNSCNT          INCREMENT LINE COUNT
6276:A  051334 064                              INM
6277:A  051335 303 352 122                      JMP   DCS43
6278:A  051340 041 375 044 315 150 001  DCS42   PRINT COVER           COVER PASSWORD ENTERED AT REMOTE
6279:A  051346 041 142 215                      HL    LNECNT          INCREMENT LINE COUNT
6280:A  051351 064                              INM
6281:A  051352 076 000                  DCS43   LOAD  0
6282:A  051354 062 100 201                      STO   DCSRI           ZERO ACTIVATION FLAG
6283:A  051357 062 120 201                      STO   DCSRCT          ZERO SEGMENT COUNTER
6284:A  051362 062 021 215                      STO   STE             STORE CMD FROM SITE
6285:A  051365 062 153 215                      STO   REM             STORE CMD FROM REMOTE
6286:A  051370 311                              RET
6287:A                                  .
6288:A                                  . *** APU SUBROUTINE TO PUT SPEED SET POINT INTO COUNTS
6289:A                                  .
6290:A  051371 203 201 215 035          CSCMP1  DBYTE LDS,*SPTMP,FLTS
6291:A  051375 202 000 000 240 004 023          DBYTE LDFI,0,0,160,4,FDIV
6292:A  051403 204 101 200 023                  DBYTE LDF,*NC,FDIV
6293:A  051407 037                              DBYTE FIXS
6294:A  051410 205 203 215                      DBYTE STS,*SETIN
6295:A  051413 200                              DBYTE EXIT
6296:A                                  .
6297:A                                  . *** APU SUBROUTINE TO PUT POWER SET POINT INTO COUNTS
6298:A                                  .
6299:A  051414 203 201 215 035          CSCMP2  DBYTE LDS,*SPTMP,FLTS
6300:A  051420 202 000 000 240 004 023          DBYTE LDFI,0,0,160,4,FDIV           /10
6301:A  051426 204 130 200 020                  DBYTE LDF,*POFFST,FADD              POWER OFFSET
6302:A  051432 204 071 200 023                  DBYTE LDF,*PEC,FDIV
6303:A  051436 037                              DBYTE FIXS
6304:A  051437 205 203 215                      DBYTE STS,*SETIN
6305:A  051442 200                              DBYTE EXIT
6306:A                                  .
6307:A                                  . *** SUBROUTINE TO SET BC TO LOCATION OF SECOND WORD OF MESSAGE ENTERED
6308:A                                  .
6309:A  051443 072 021 215              STEREM  LOAD  STE             CHECK WHERE MESSAGE CAME FROM
6310:A  051446 267                              ORA
6311:A  051447 312 056 123                      JTZ   SR1             JUMP IF CMD FROM REMOTE
6312:A  051452 001 002 215                      BC    SIE2            LOCATION OF SITE MESSAGE
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6313:A  051455 311                          RET
6314:A  051456 001 135 215          SR1     BC      NBUF2           LOCATION OF REMOTE MESSAGE
6315:A  051461 311                          RET
6316:A
6317:A                              . *** SUBROUTINE TO CHECK ! IF MESSAGE FROM SITE THAT SITE HAS CONTROL  OR
6318:A                              .   IF MESSAGE FROM REMOTE THAT REMOTE HAS CONTROL.
6319:A                              .
6320:A  051462 072 021 215          SRCHK   LOAD    STE             MESSAGE FROM SITE FLAG
6321:A  051465 041 007 215 246              AND     SOTCON          SITE OPERATOR HAS CONTROL
6322:A  051471 107                          LBA                     STORE INTO B
6323:A  051472 072 153 215                  LOAD    REM             MESSAGE FROM REMOTE FLAG
6324:A  051475 041 146 215 246              AND     ROTCON          REMOTE OPERATOR HAS CONTROL
6325:A  051501 260                          ORB
6326:A  051502 311                          RET
6327:A
6328:A                              .
6329:A                              . ***** DATA COMMUNICATIONS CDS *****
6330:A                              .
6331:A                              .
6332:A  051503 072 102 213          CDSDS1  LOAD    CDSON           LOAD CDS CONNECT FLAG
6333:A  051506 267                          ORA                     IS IT DISCONNECTED
6334:A  051507 312 065 124                  JTZ     CDS12           JUMP IF DISCONNECTED
6335:A  051512 072 103 213                  LOAD    CDSCNT          INCREMENT CDS COUNTER
6336:A  051515 074                          INA
6337:A  051516 062 103 213                  STO     CDSCNT
6338:A  051521 376 050                      COMP    40              IS 4 SECONDS UP ??
6339:A  051523 302 065 124                  JFZ     CDS12           JUMP IF NOT UP
6340:A  051526 076 000                      LOAD    0               ZERO OUT CDS COUNTER
6341:A  051530 062 103 213                  STO     CDSCNT
6342:A                              .                               PUT I/O RAM INTO CDS OUTPUT RAM LOCATIONS
6343:A  051533 016 032                      LC      26              LOAD NUMBER OF I/O RAM
6344:A  051535 006 000                      LB      0
6345:A  051537 021 153 213                  DE      CDSOUT425       LAST RAM FOR CDS I/O OUTPUT
6346:A  051542 041 100 177                  HL      PACK1-1         ADDRESS OF FIRST I/O RAM
6347:A  051545 011                          DAD     B               INCREMENT TO FIRST I/O RAM TO SAVE
6348:A  051546 176                  CDS3    LAM                     GET VALUE OF I/O
6349:A  051547 022                          LMAR    D               SAVE IT IN CDS OUTPUT RAM
6350:A  051550 053                          DCX     H               DECREMENT I/O ADDRESS
6351:A  051551 033                          DCX     D               DECREMENT CDSOUT ADDRESS
6352:A  051552 013                          DCX     B               DECREMENT COUNTER FOR I/O
6353:A  051553 171                          LAC
6354:A  051554 267                          ORA                     DONE WITH ALL I/O ??
6355:A  051555 302 146 123                  JFZ     CDS3            JUMP IF NOT DONE
6356:A                              .
6357:A  051560 076 000                      LOAD    0               ZERO OUT COMMUNICATION ERROR FLAG OUT
6358:A  051562 062 104 213                  STO     CERRO           .
6359:A                              .                               SET UP MESSAGE
6360:A  051565 041 032 000                  LOAD    26              LOAD NUMBER OF I/O TO OUTPUT
6361:A  051570 353                          DEHL
6362:A  051571 041 122 213                  HL      CDSOUT          ADDRESS OF CDS OUTPUT RAM
6363:A  051574 031                          DAD     D               INCREMENT TO ONE PAST I/O RAM
6364:A  051575 104                          LBH                     SAVE IN BC
6365:A  051576 115                          LCL
6366:A  051577 072 223 203                  LOAD    AINC            ARE THERE ANY ALARMS ??
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6367:A  051602 041 225 203 276          CDMP   ACINC          ARE COUNTERS ON ALARMS THE SAME ??
6368:A  051606 302 223 123              JFZ    CDS13          JUMP IF THEY ARE DIFFERENT
6369:A  051611 072 243 203              LOAD   ADIR           ARE DIRECTIONS THE SAME ??
6370:A  051614 041 244 203 256          XOR    ACDIR
6371:A  051620 312 304 123              JTZ    CDS4           JUMP IF DIRECTIONS ARE THE SAME
6372:A  051623 052 225 203              LDAD   ACINC          GET FIRST ALARM LOCATION
6373:A  051626 353                      DEHL
6374:A  051627 041 362 204              HL     ALRMS
6375:A  051632 031                      DAD    D
6376:A  051633 176                      LAM                   GET FIRST ALARM
6377:A  051634 002                      LMAR   B              STORE IN MESSAGE
6378:A  051635 003                      INX    B              INCREMENT MESSAGE POINTER
6379:A  051636 076 001                  LOAD   1              LOAD NUMBER OF ALARMS IN CDS DATA STREAM
6380:A  051640 062 106 213              STO    IALRM
6381:A
6382:A  051643 072 225 203              LOAD   ACINC          IS THERE ANOTHER ALARM ??
6383:A  051646 074                      INA                   UPDATE ALARM COUNTER
6384:A  051647 376 030                  COMP   24
6385:A  051651 372 256 123              JTS    CDS14
6386:A  051654 076 000                  LOAD   0
6387:A  051656 041 223 203 276  CDS14   COMP   AINC
6388:A  051662 312 304 123              JTZ    CDS4           JUMP IF NO OTHER ALARM
6389:A  051665 137                      LEA
6390:A  051666 026 000                  LD     0
6391:A  051670 041 362 204              HL     ALRMS          FIND SECOND ALARM LOCATION
6392:A  051673 031                      DAD    D
6393:A  051674 176                      LAM                   GET SECOND ALARM
6394:A  051675 002                      LMAR   B              STORE IN MESSAGE
6395:A  051676 003                      INX    B              INCREMENT MESSAGE POINTER
6396:A  051677 076 002                  LOAD   2              LOAD NUMBER OF ALARMS IN DATA STREAM
6397:A  051701 062 106 213              STO    IALRM
6398:A
6399:A  051704 072 107 213      CDS4    LOAD   CDSID          MESSAGE FOR RAM VALUES
6400:A  051707 346 376                  AND    254
6401:A  051711 312 332 123              JTZ    CDS6           JUMP IF NO RAM VALUES TO SEND
6402:A  051714 017                      SRC
6403:A  051715 017                      SRC
6404:A  051716 147                      LHA                   C = NUMBER OF RAM VALUES TO TRANSMIT
6405:A  051717 021 110 213              DE     CDSVAL         LOCATION OF RAM VALUES
6406:A  051722 032              CDS7    LAMR   D              GET RAM VALUE
6407:A  051723 002                      LMAR   B              SAVE IT IN CDS OUTPUT RAM
6408:A  051724 003                      INX    B              INCREMENT CDS RAM POINTER.
6409:A  051725 023                      INX    D              INCREMENT RAM VALUE POINTER
6410:A  051726 045                      DCN                   DONE WITH ALL RAM VALUES
6411:A  051727 302 322 123              JFZ    CDS7           JUMP IF NOT DONE
6412:A
6413:A  051732 072 107 213      CDS6    LOAD   CDSID          SEND OUT HOW MANY WORDS ???
6414:A  051735 346 376                  AND    254
6415:A  051737 017                      SRC
6416:A  051740 017                      SRC
6417:A  051741 117                      LCA
6418:A  051742 072 106 213              LOAD   IALRM
6419:A  051745 201                      ADC
6420:A  051746 306 032                  AD     26
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6421:A  051750 117                      LCA             STORE NUMBER OF WORDS TO SEND IN C
6422:A
6423:A  051751 072 107 213              LOAD    CDSID   FIGURE OUT I. D.
6424:A  051754 346 376                  AND     254
6425:A  051756 107                      LBA
6426:A  051757 072 106 213              LOAD    IALRM
6427:A  051762 200                      ADB
6428:A  051763 107                      LBA             STORE I. D. IN B
6429:A
6430:A  051764 041 122 213              HL      CDSOUT  SEND THESE TO CONTROL DATA SYSTEM
6431:A  051767 076 001                  LA      1       GENERAL DATA
6432:A  051771 315 022 140              CALL    COMXMT  TRANSMIT MESSAGE
6433:A  051774 332 060 124              JTC     CDS5    JUMP IF THERE WAS AN ERROR
6434:A
6435:A  051777 072 106 213              LOAD    IALRM   MESSAGE SENT OK
6436:A  052002 247                      ORA             WHERE ANY ALARMS SENT ??
6437:A  052003 312 065 124              JTZ     CDS12   JUMP IF NO ALARMS SENT
6438:A  052006 117                      LCA             STORE NUMBER OF ALARMS SENT IN C
6439:A  052007 072 225 203      CDS16   LOAD    ACINC   INCREMENT CDS POINTER IN ALARM TABLE
6440:A  052012 074                      INA
6441:A  052013 062 225 203              STO     ACINC
6442:A  052016 376 030                  COMP    24      ARE YOU OUTSIDE TABLE ??
6443:A  052020 372 041 124              JTS     CDS15   JUMP IF YOU ARE NOT OUTSIDE
6444:A  052023 076 000                  LOAD    0       START AT TOP AGAIN
6445:A  052025 062 225 203              STO     ACINC
6446:A  052030 072 244 203              LOAD    ACDIR   RESET CDS DIRECTION FLAG
6447:A  052033 057 346 001              INV
6448:A  052036 062 244 203              STO     ACDIR
6449:A  052041 015              CDS15   DLC             DO IT IALRM TIMES
6450:A  052042 302 007 124              JFZ     CDS16   JUMP IF NOT DONE
6451:A  052045 076 000                  LOAD    0       ZERO OUT CDS I.D. AND NUMBER OF ALARMS
6452:A  052047 062 107 213              STO     CDSID
6453:A  052052 062 106 213              STO     IALRM
6454:A  052055 303 065 124              JMP     CDS12
6455:A  052060 076 377          CDS5    LOAD    255     ERROR IN SENDING
6456:A  052062 062 104 213              STO     CERRO   TRIED TO OUTPUT TOO MUCH OR CP717 WAS BUSY
6457:A  052065 072 075 201      CDS12   LOAD    CDSIN   INPUT MESSAGE FROM CDS
6458:A  052070 376 001                  COMP    1       IS A MESSAGE BEING ACTED ON ??
6459:A  052072 310                      RTZ             RETURN IF SO
6460:A  052073 076 000                  LOAD    0       ZERO OUT INPUT ERROR FLAG
6461:A  052075 062 105 213              STO     CERRI
6462:A  052100 041 114 213              HL      CDSCMD  DESTINATION OF MESSAGE IN
6463:A  052103 315 241 140              CALL    COMRCV  CHECK IF MESSAGE IS THERE
6464:A  052106 322 117 124              JFC     CDS2    JUMP IF NO ERROR IN MESSAGE RECEPTION
6465:A  052111 076 377                  LOAD    255     SET ERROR IN RECEIVING FLAG
6466:A  052113 062 105 213              STO     CERRI
6467:A  052116 311                      RET
6468:A  052117 310              CDS2    RTZ             RETURN IF MESSAGE STILL BEING SENT
6469:A  052120 062 107 213              STO     CDSID   STORE THE I.D. OF MESSAGE SENT
6470:A  052123 346 376                  AND     254     CALCULATE SEGMENT COUNTER FOR CDSIN
6471:A  052125 017                      SRC              USING I.D. OF MESSAGE SENT FROM CDS
6472:A  052126 017                      SRC
6473:A  052127 376 004                  COMP    4
6474:A  052131 302 136 124              JFZ     CDS8
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6475:A  052134 076 003                  LOAD  3
6476:A  052136 117              CDS8    LCA
6477:A  052137 072 107 213              LOAD  CDSID
6478:A  052142 346 001                  AND   1
6479:A  052144 312 151 124              JTZ   CDS9
6480:A  052147 076 003                  LOAD  3
6481:A  052151 201              CDS9    ADC
6482:A  052152 326 001                  SU    1
6483:A  052154 062 115 201              STO   CDSICT          ASSIGN COUNTER FOR CDS MESSAGE
6484:A  052157 076 001                  LOAD  1               ACTIVATE CDS INPUT
6485:A  052161 062 075 201              STO   CDSIN
6486:A  052164 311                      RET
6487:A                          .
6488:A                          .
6489:A                          . ***** DATA COMMUNICATION CDS INPUT *****
6490:A                          .
6491:A                          .
6492:A  052165 016 001          CDSIS1  LC    1               CHECK SINGLE RAM
6493:A  052167 315 267 124              CALL  LOKVAL          CALL SUBROUTINE TO CHECK VALUE
6494:A  052172 311                      RET
6495:A                          .
6496:A  052173 016 002          CDSIS2  LC    2               CHECK DOUBLE RAM
6497:A  052175 315 267 124              CALL  LOKVAL          CALL SUBROUTINE TO CHECK VALUE
6498:A  052200 311                      RET
6499:A                          .
6500:A  052201 016 004          CDSIS3  LC    4               CHECK APU RAM
6501:A  052203 315 267 124              CALL  LOKVAL          CALL SUBROUTINE TO CHECK VALUE
6502:A  052206 311                      RET
6503:A                          .
6504:A  052207 016 001          CDSIS4  LC    1               CHANGE SINGLE RAM NUMBER
6505:A  052211 315 323 124              CALL  STRVAL          CALL SUBROUTINE TO STORE THE VALUE
6506:A  052214 016 001                  LC    1
6507:A  052216 315 267 124              CALL  LOKVAL          CALL SUBROUTINE TO CHECK VALUE
6508:A  052221 311                      RET
6509:A                          .
6510:A  052222 016 002          CDSIS5  LC    2               CHANGE DOUBLE RAM NUMBER
6511:A  052224 315 323 124              CALL  STRVAL          CALL SUBROUTINE TO STORE THE VALUE
6512:A  052227 016 002                  LC    2
6513:A  052231 315 267 124              CALL  LOKVAL          CALL SUBROUTINE TO CHECK VALUE
6514:A  052234 311                      RET
6515:A                          .
6516:A  052235 016 004          CDSIS6  LC    4               CHANGE APU RAM
6517:A  052237 315 323 124              CALL  STRVAL          CALL SUBROUTINE TO STORE THE VALUE
6518:A  052242 016 004                  LC    4
6519:A  052244 315 267 124              CALL  LOKVAL          CALL SUBROUTINE TO CHECK THE VALUE
6520:A  052247 311                      RET
6521:A                          .
6522:A  052250 072 114 213      CDSIS7  LOAD  CDSCMD          CDS CONNECT OR DISCONNECT
6523:A  052253 062 102 213              STO   CDSON           1 - CONNECT   0 - DISCONNECT
6524:A  052256 076 000                  LOAD  0
6525:A  052260 062 075 201              STO   CDSIN           ZERO OUT ACTIVATION FLAG
6526:A  052263 062 115 201              STO   CDSICT          ZERO OUT SEGMENT COUNTER
6527:A  052266 311                      RET
6528:A                          .
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6539:A                                  . *** CDS SUBROUTINES ***
6540:A                                  .
6541:A                                  . SUBROUTINE TO CHECK VALUE OF RAM LOCATION AT 'CDSCMD' RAM NUMBER AND
6542:A                                  . SAVE THEM AT 'CDSVAL'.  C CONTAINS THE NUMBER OF RAM LOCATIONS TO LOOK AT.
6543:A                                  .
6544:A  052267 052 114 213              LOKVAL  LDAD  CDSCMD          LOAD THE RAM NUMBER
6545:A  052272 353                              DEHL
6546:A  052273 041 065 174                      HL    S1A1            LOCATION OF RAM 0
6547:A  052276 031                              DAD   D               INCREMENT DOWN TO RAM LOCATION DESIRED
6548:A  052277 021 110 213                      DE    CDSVAL          LOCATION OF STORAGE RAM
6549:A  052302 176                      LK1     LAM                   GET VALUE
6550:A  052303 022                              LMAR  D               STORE IT
6551:A  052304 043                              INX   H               INCREMENT RAM LOCATION DESIRED
6552:A  052305 023                              INX   D               INCREMENT STORAGE LOCATION
6553:A  052306 015                              DCC                   ARE WE DONE YET ??
6554:A  052307 302 302 124                      JFZ   LK1             JUMP IF NOT DONE
6555:A  052312 076 000                          LOAD  0
6556:A  052314 062 075 201                      STO   CDSIN           ZERO OUT ACTIVATION FLAG
6557:A  052317 062 115 201                      STO   CDSICT          ZERO OUT SEGMENT COUNTER
6558:A  052322 311                              RET
6559:A                                  .
6560:A                                  . SUBROUTINE TO SAVE 'CDSC3' AT RAM LOCATION 'CDSCMD' RAM NUMBER.
6561:A                                  . C CONTAINS THE NUMBER OF RAM LOCATIONS TO LOOK AT.
6562:A                                  .
6563:A  052323 052 114 213              STRVAL  LDAD  CDSCMD          LOAD THE RAM NUMBER
6564:A  052326 353                              DEHL
6565:A  052327 041 065 174                      HL    S1A1            LOCATION OF RAM 0
6566:A  052332 031                              DAD   D               INCREMENT DOWN TO RAM LOCATION DESIRED
6567:A  052333 021 116 213                      DE    CDSC3           LOCATION WHERE NEW RAM VALUE IS
6568:A  052336 032                      ST1     LAMK  D               GET VALUE
6569:A  052337 167                              LMA                   STORE IT
6570:A  052340 043                              INX   H               INCREMENT RAM LOCATION DESIRED CHANGED
6571:A  052341 023                              INX   D               INCREMENT RAM VALUE LOCATION
6572:A  052342 015                              DCC                   ARE WE DONE YET ??
6573:A  052343 302 336 124                      JFZ   ST1             JUMP IF NOT DONE
6574:A  052346 311                              RET
6575:A                                  .
6576:A                                  .
6577:A                                  . ***** MANUAL COMMANDS MODULE *****
6578:A                                  .
6579:A                                  .                             ** CHECK ON STATE AND SEND SD REQUEST IF NEEDED
6580:A  052347 072 053 202              MANC1   LOAD  LO              CHECK IF IN LOCKOUT MODE
6581:A  052352 267                              ORA
6582:A  052353 302 371 124                      JFZ   Q12             JUMP IF IN LO
6583:A  052356 072 066 201                      LOAD  NSD             SEE IF IT IS IN THE PROCESS OF NSD
6584:A  052361 267                              ORA
6585:A  052362 300                              RFZ                   IF IT IS RETURN
6586:A  052363 076 001                          LOAD  1               SEND SD REQUEST
6587:A  052365 062 165 215                      STO   OTSDR
6588:A  052370 311                              RET
6589:A  052371 072 012 215              Q12     LOAD  PRIBZ           CHECK IF PRINTING
6590:A  052374 376 001                          COMP  1               OPERATOR HAS ACCESS TO THE MACHINE
6591:A  052376 310                              RTZ                   RETURN IF PRINTING
6592:A  052377 315 234 113                      CALL  TCALC           CALCULATE TIME FOR OUTPUT
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6583:A  052402 041 170 042          LDAA  MANOP     MESSAGE TO BE SENT
6584:A  052405 315 366 145          CALL  PK1PRT    SEND MANUAL OPERATIONAL MESSAGE
6585:A  052410 041 015 215          NL    LNSCNT    INCREMENT LINE COUNT
6586:A  052413 064                  INM
6587:A  052414 064                  INM
6588:A  052415 076 001              LOAD  1
6589:A  052417 062 365 212          STO   MANON     MANUAL IS OPERATIONAL
6590:A  052422 041 121 201          NL    MANCNT    INCREMENT SEGMENT COUNTER
6591:A  052425 064                  INM
6592:A  052426 311                  RET
6593:A
6594:A  052427 072 053 202  MANC2   LOAD  LO        CHECK ON STATE
6595:A  052432 267                  ORA
6596:A  052433 302 107 125          JFZ   Q22       JUMP IF IN LO
6597:A  052436 072 012 215          LOAD  PK1BZ     CHECK IF TERMINAL PRINTING
6598:A  052441 376 001              COMP  1
6599:A  052443 310                  RTZ           RETURN IF BUSY
6600:A  052444 041 377 017          LDAD  4095      TIP ANGLES TO FULL FEATHER
6601:A  052447 042 065 177          STOD  C2A21
6602:A  052452 042 073 177          STOD  C2A22
6603:A  052455 042 075 177          STOD  C2A23
6604:A  052460 042 067 177          STOD  C2A24
6605:A  052463 315 234 113          CALL  TCALC     CALCULATE TIME FOR OUTPUT
6606:A  052466 041 260 042          LDAA  MANOUT    MESSAGE TO PRINT
6607:A  052471 315 366 145          CALL  PK1PRT    PRINT MANUAL DISABLED
6608:A  052474 041 015 215          NL    LNSCNT    INCREMENT LINE COUNT
6609:A  052477 064                  INM
6610:A  052500 064                  INM
6611:A  052501 076 000              LOAD  0
6612:A  052503 062 121 201          STO   MANCNT    ZERO SEGMENT COUNTER
6613:A  052506 311                  RET
6614:A  052507 072 275 212  Q22      LOAD  MANCMD    CHECK IF COMMAND IS BEING ACTED ON
6615:A  052512 267                  ORA
6616:A  052513 310                  RTZ           RETURN IF NO CMD ENTERED
6617:A  052514 072 012 215          LOAD  PK1BZ     CHECK IF TERMINAL IS PRINTING
6618:A  052517 376 001              COMP  1
6619:A  052521 310                  RTZ           RETURN IF BUSY
6620:A  052522 315 234 113          CALL  TCALC     CALCULATE TIME FOR OUTPUT
6621:A  052525 041 213 042          LDAA  CMDTME    MESSAGE TO PRINT
6622:A  052530 315 366 145          CALL  PK1PRT    PRINT TIME TAG ON CMD
6623:A  052533 041 015 215          NL    LNSCNT    INCREMENT LINE COUNT
6624:A  052536 064                  INM
6625:A  052537 072 002 215          LOAD  STE2      LOAD SECOND WORD OF MESSAGE
6626:A  052542 326 060              SU    48        PUT IN 0 OR 1
6627:A  052544 062 002 215          STO   STE2
6628:A  052547 072 001 215          LOAD  STEIN     LOAD MESSAGE I.D.
6629:A  052552 376 101              COMP  65        CHECK ON LOWER RANGE
6630:A  052554 372 164 125          JTS   Q50       JUMP IF UNDER LOWER LIMIT
6631:A  052557 376 121              COMP  81        CHECK ON UPPER LIMIT
6632:A  052561 372 172 125          JTS   Q55       JUMP IF WITHIN LIMITS
6633:A  052564 076 020      Q50     LOAD  16
6634:A  052566 062 121 201          STO   MANCNT    SET SEGMENT COUNTER TO PRINT 'CMD INVALID'
6635:A  052571 311                  RET
6636:A  052572 326 077      Q55     SU    63        CALCULATE SEGMENT TO CALL FROM I.D.
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6637:A  052574 062 121 201          STO   MANCNT      STORE SEGMENT COUNTER
6638:A  052577 311                  RET
6639:A                              .                 ** ROTOR HYDRAULIC PUMP CONTROL
6640:A  052600 072 003 215  MANC3   LOAD  STE3        CHECK MESSAGE
6641:A  052603 376 203              COMP  131         (CR)
6642:A  052605 312 216 125          JTZ   Q23         JUMP IF CORRECT
6643:A  052610 076 020              LOAD  16
6644:A  052612 062 121 201          STO   MANCNT      SET SEGMENT COUNTER TO PRINT CMD INVALID
6645:A  052615 311                  RET
6646:A  052616 072 002 215  Q23     LOAD  STE2        LOAD STATE DESIRED FROM MESSAGE
6647:A  052621 062 067 176          STO   C2A4        SEND THAT COMMAND
6648:A  052624 076 000              LOAD  0
6649:A  052626 062 275 212          STO   MANCMD      SET FLAG TO MANUAL CMD DONE
6650:A  052631 074                  INA
6651:A  052632 062 121 201          STO   MANCNT      SET SEGMENT COUNTER TO LOOK FOR ANOTHER CMD
6652:A  052635 311                  RET
6653:A                              .                 ** YAW PUMP CONTROL
6654:A  052636 072 003 215  MANC4   LOAD  STE3        CHECK ON MESSAGE
6655:A  052641 376 203              COMP  131         (CR)
6656:A  052643 312 254 125          JTZ   Q25         JUMP IF CORRECT
6657:A  052646 076 020              LOAD  16
6658:A  052650 062 121 201          STO   MANCNT      SET SEGMENT COUNTER TO PRINT CMD INVALID
6659:A  052653 311                  RET
6660:A  052654 072 002 215  Q25     LOAD  STE2        LOAD STATE DESIRED FROM MESSAGE
6661:A  052657 062 116 176          STO   C6A5        SEND THAT COMMAND
6662:A  052662 076 000              LOAD  0
6663:A  052664 062 275 212          STO   MANCMD      SET FLAG TO MANUAL CMD DONE
6664:A  052667 074                  INA
6665:A  052670 062 121 201          STO   MANCNT      SET SEGMENT COUNTER TO LOOK FOR ANOTHER CMD
6666:A  052673 311                  RET
6667:A                              .                 ** LUBE PUMP CONTROL
6668:A  052674 072 003 215  MANC5   LOAD  STE3        CHECK ON MESSAGE
6669:A  052677 376 203              COMP  131         (CR)
6670:A  052701 312 312 125          JTZ   Q91         JUMP IF CORRECT
6671:A  052704 076 020              LOAD  16
6672:A  052706 062 121 201          STO   MANCNT      SET SEGMENT COUNTER TO PRINT CMD INVALID
6673:A  052711 311                  RET
6674:A  052712 072 002 215  Q91     LOAD  STE2        LOAD STATE DESIRED FROM MESSAGE
6675:A  052715 062 102 176          STO   C4A1        SEND THAT COMMAND
6676:A  052720 076 000              LOAD  0
6677:A  052722 062 275 212          STO   MANCMD      SET FLAG TO MANUAL CMD DONE
6678:A  052725 074                  INA
6679:A  052726 062 121 201          STO   MANCNT      SET SEGMENT COUNTER TO LOOK FOR ANOTHER CMD
6680:A  052731 311                  RET
6681:A                              .                 ** SHAFT BRAKE CONTROL
6682:A  052732 072 003 215  MANC6   LOAD  STE3        CHECK ON MESSAGE
6683:A  052735 376 203              COMP  131         (CR)
6684:A  052737 302 360 125          JNZ   Q29         JUMP IF NOT CORRECT
6685:A  052742 072 002 215          LOAD  STE2        DESIRE TO RELEASE BRAKE ??
6686:A  052745 267                  ORA
6687:A  052746 312 366 125          JTZ   Q32         JUMP IF DESIRED TO ENGAGE
6688:A  052751 072 100 174          LOAD  S2A30       AILERONS NOT LATCHED ??
6689:A  052754 267                  ORA
6690:A  052755 302 366 125          JNZ   Q32         IF BOTH ARE LATCHED JUMP
```

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6691:A   052760 076 020              Q29     LOAD  16
6692:A   052762 062 121 201                  STO   MANCNT      SET SEGMENT COUNTER TO PRINT CMD INVALID
6693:A   052765 311                          RET
6694:A   052766 072 002 215          Q32     LOAD  STE2        LOAD STATE DESIRED FROM MESSAGE
6695:A   052771 062 100 176                  STO   C3A1        SEND THAT COMMAND
6696:A   052774 076 000                      LOAD  0
6697:A   052776 062 275 212                  STO   MANCMD      SET FLAG TO MANUAL CMD DONE
6698:A   053001 074                          INA
6699:A   053002 062 121 201                  STO   MANCNT      SET SEGMENT COUNTER TO LOOK FOR ANOTHER CMD
6700:A   053005 311                          RET
6701:A                                       .                 ** HIGH PRESSURE TEETER BRAKE CONTROL
6702:A   053006 072 003 215          MANC8   LOAD  STE3        CHECK ON MESSAGE
6703:A   053011 376 203                      COMP  131         (CR)
6704:A   053013 302 040 126                  JFZ   Q41         JUMP IF NOT CORRECT
6705:A   053016 072 002 215                  LOAD  STE2        CHECK IF TURNING ON
6706:A   053021 267                          ORA
6707:A   053022 302 046 126                  JFZ   Q42         JUMP IF TURNING ON
6708:A   053025 076 001                      LOAD  1
6709:A   053027 062 076 176                  STO   C2A11       TEETER AC PWR
6710:A   053032 062 077 176                  STO   C2A12       TEETER H.F. BRAKE OFF
6711:A   053035 303 053 126                  JMP   Q10
6712:A   053040 076 020              Q41     LOAD  16
6713:A   053042 062 121 201                  STO   MANCNT      SET SEGMENT COUNTER TO PRINT CMD INVALID
6714:A   053045 311                          RET
6715:A   053046 076 000              Q42     LOAD  0
6716:A   053050 062 076 176                  STO   C2A11       SEND THAT COMMAND
6717:A   053053 076 000              Q10     LOAD  0
6718:A   053055 062 275 212                  STO   MANCMD      SET FLAG TO MANUAL CMD DONE
6719:A   053060 074                          INA
6720:A   053061 062 121 201                  STO   MANCNT      SET SEGMENT COUNTER TO LOOK FOR ANOTHER CMD
6721:A   053064 311                          RET
6722:A                                       .                 ** YAW BRAKE CONTROL
6723:A   053065 072 003 215          MANC9   LOAD  STE3        CHECK ON MESSAGE
6724:A   053070 376 203                      COMP  131         (CR)
6725:A   053072 312 103 126                  JTZ   Q38         JUMP IF CORRECT
6726:A   053075 076 020                      LOAD  16
6727:A   053077 062 121 201                  STO   MANCNT      SET SEGMENT COUNTER TO PRINT CMD INVALID
6728:A   053102 311                          RET
6729:A   053103 072 002 215          Q38     LOAD  STE2        LOAD STATE DESIRED FROM MESSAGE
6730:A   053106 062 115 176                  STO   C6A1        SEND THAT COMMAND
6731:A   053111 076 000                      LOAD  0
6732:A   053113 062 275 212                  STO   MANCMD      SET FLAG TO MANUAL CMD DONE
6733:A   053116 074                          INA
6734:A   053117 062 121 201                  STO   MANCNT      SET SEGMENT COUNTER TO LOOK FOR ANOTHER CMD
6735:A   053122 311                          RET
6736:A                                       .                 ** FEATHER VALVE A-1
6737:A   053123 072 003 215          MANC10  LOAD  STE3        CHECK ON MESSAGE
6738:A   053126 376 203                      COMP  131         (CR)
6739:A   053130 312 141 126                  JTZ   Q40C        JUMP IF CORRECT
6740:A   053133 076 020              Q40A    LOAD  16
6741:A   053135 062 121 201                  STO   MANCNT      SET SEGMENT COUNTER TO PRINT CMD INVALID
6742:A   053140 311                          RET
6743:A   053141 052 065 175          Q40C    LOAD  S2A21       CHECK CONTROL ANGLE
6744:A   053144 353                          DEHL
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16cl

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6745:A  053145 041 146 016                LDAD   3686          85 DEGREES
6746:A  053150 315 162 137                CALL   NEGNUM
6747:A  053153 031                        DAD    D
6748:A  053154 174                        LAH
6749:A  053155 007                        SLC
6750:A  053156 332 133 126                JTC    Q40A          JUMP IF < 85
6751:A  053161 072 002 215                LOAD   STE2          LOAD STATE DESIRED FROM MESSAGE
6752:A  053164 062 117 176                STO    C7A5          SEND THAT COMMAND
6753:A  053167 076 000                    LOAD   0
6754:A  053171 062 275 212                STO    MANCMD        SET FLAG TO MANUAL CMD DONE
6755:A  053174 074                        INA
6756:A  053175 062 121 201                STO    MANCNT        SET SEGMENT COUNTER TO LOOK FOR ANOTHER CMD
6757:A  053200 311                        RET
6758:A                                                          ** FEATHER VALVE A-2
6759:A  053201 072 003 215          MANC11 LOAD   STE3          CHECK ON MESSAGE
6760:A  053204 376 203                     COMP   131           (CR)
6761:A  053206 312 217 126                 JTZ    Q44C          JUMP IF CORRECT
6762:A  053211 076 020              Q44A   LOAD   16
6763:A  053213 062 121 201                 STO    MANCNT        SET SEGMENT COUNTER TO PRINT CMD INVALID
6764:A  053216 311                         RET
6765:A  053217 072 067 175          Q44C   LDAD   S2A23         CHECK CONTROL ANGLE
6766:A  053222 353                         DEHL
6767:A  053223 041 146 016                 LDAD   3686          85 DEGREES
6768:A  053226 315 162 137                 CALL   NEGNUM
6769:A  053231 031                         DAD    D
6770:A  053232 174                         LAH
6771:A  053233 007                         SLC
6772:A  053234 332 211 126                 JTC    Q44A          JUMP IF < 85
6773:A  053237 072 002 215                 LOAD   STE2          LOAD STATE DESIRED FROM MESSAGE
6774:A  053242 062 120 176                 STO    C7A6          SEND THAT COMMAND
6775:A  053245 076 000                     LOAD   0
6776:A  053247 062 275 212                 STO    MANCMD        SET FLAG TO MANUAL CMD DONE
6777:A  053252 074                         INA
6778:A  053253 062 121 201                 STO    MANCNT        SET SEGMENT COUNTER TO LOOK FOR ANOTHER CMD
6779:A  053256 311                         RET
6780:A                                                          ** CHANGE CONTROL ANGLE #1
6781:A  053257 072 004 215          MANC12 LOAD   STE4          CHECK ON MESSAGE
6782:A  053262 376 203                     COMP   131           (CR)
6783:A  053264 302 004 127                 JFZ    Q52           JUMP IF NOT CORRECT
6784:A  053267 072 077 174                 LOAD   S2A6          ROTOR HYDRAULIC PUMP PRESS OK ??
6785:A  053272 157 072 106 174 057 346     CAND   S3A1          IS SHAFT BRAKE ON ? (0)
        053300 001 245
6786:A  053302 107                         LBA
6787:A  053303 072 117 174                 LOAD   S4A23         2 OUT OF 3 LUBE PRESSURES
6788:A  053306 041 120 174 246             AND    S4A24
6789:A  053312 117                         LCA
6790:A  053313 072 120 174                 LOAD   S4A24
6791:A  053316 041 121 174 246             AND    S4A25
6792:A  053322 261                         ORC
6793:A  053323 117                         LCA
6794:A  053324 072 121 174                 LOAD   S4A25
6795:A  053327 041 117 174 246             AND    S4A23
6796:A  053333 261                         ORC
6797:A  053334 240                         NDD
```

```
053335 312 004 127                    JTZ   Q52      IF ANY ARE FALSE, ERROR & JMP
053340 046 000                        LH    0        DECIPHER TIP COMMAND
053342 072 002 215                    LOAD  STE2
053345 157                            LLA            GET TENS DIGIT
053346 021 012 000 315 005 001        MULT  10
053354 345                            PUSH  H        TEMP STORAGE
053355 072 003 215                    LOAD  STE3
053360 326 060                        SU    48
053362 157                            LLA            GET ONES DIGIT
053363 321                            POP   D        RECALL TENS DIGIT
053364 031                            DAD   D        ADD TO ONES DIGIT
053365 042 027 213                    STOD  TIPCMD
053370 021 171 133                    DE    MANTIP   GET IT IN COUNTS
053373 315 137 001                    CALL  APUSTR
053376 076 021                        LOAD  17
053400 062 121 201                    STO   MANCNT   SET SEGMENT COUNTER TO CHANGE CONTROL#1 TO TIPCMD
053403 311                            RET
053404 076 020                 Q52    LOAD  16
053406 062 121 201                    STO   MANCNT   SET SEGMENT COUNTER TO PRINT CMD INVALID
053411 311                            RET
                                                     ** CHANGE CONTROL ANGLE #2
053412 072 004 215             MANC13 LOAD  STE4     CHECK MESSAGE
053415 376 203                        COMP  131      (CR)
053417 302 137 127                    JFZ   Q62      JUMP IF MESSAGE IS WRONG
053422 072 077 174                    LOAD  S2A6     ROTOR HYDRAULIC PUMP PRESS OK
053425 157 072 106 174 057 346        CAND  S3A1     IS SHAFT BRAKE ON ? (0)
053433 001 245
053435 107                            LBA
053436 072 117 174                    LOAD  S4A23    2 OUT OF 3 LUBE PRESSURES
053441 041 120 174 246                AND   S4A24
053445 117                            LCA
053446 072 120 174                    LOAD  S4A24
053451 041 121 174 246                AND   S4A25
053455 261                            ORC
053456 117                            LCA
053457 072 121 174                    LOAD  S4A25
053462 041 117 174 246                AND   S4A23
053466 261                            ORC
053467 240                            NDB
053470 312 137 127                    JTZ   Q62      IF ANY ARE FALSE, ERROR & JMP
053473 046 000                        LH    0        DECIPHER TIP COMMAND
053475 072 002 215                    LOAD  STE2
053500 157                            LLA            GET TENS DIGIT
053501 021 012 000 315 005 001        MULT  10
053507 345                            PUSH  H        TEMP STORAGE
053510 072 003 215                    LOAD  STE3
053513 326 060                        SU    48
053515 157                            LLA            GET ONES DIGIT
053516 321                            POP   D        RECALL TENS DIGIT
053517 031                            DAD   D        AND TO ONES DIGIT
053520 042 027 213                    STOD  TIPCMD
053523 021 171 133                    DE    MANTIP   PUT IT IN COUNTS
053526 315 137 001                    CALL  APUSTR
053531 076 022                        LOAD  18
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6851:A  053533 062 121 201              STO   MANCNT       SET SEGMENT COUNTER TO CHANGE CONTROL#2 TO TIPCMD
6852:A  053536 311                      RET
6853:A  053537 076 020          Q62     LOAD  16
6854:A  053541 062 121 201              STO   MANCNT       SET SEGMENT COUNTER TO PRINT CMD INVALID
6855:A  053544 311                      RET
6856:A                                  ** TURNING GEAR CONTROL
6857:A  053545 072 003 215      MANC14  LOAD  STE3         CHECK MESSAGE
6858:A  053550 376 203                  COMP  131          (CR)
6859:A  053552 302 252 127              JFZ   Q72          JUMP IF WRONG
685A:A  053555 072 002 215              LOAD  STE2         LOAD MESSAGE
685B:A  053560 267                      ORA                ENGAGE OR DISENGAGE
685C:A  053561 302 200 127              JFZ   Q71          JUMP IF ENGAGE
685D:A  053564 062 103 176              STO   C4A6         DISABLE TURNING GEAR ENGAGE
685E:A  053567 057 346 001              INV
685F:A  053572 062 100 176              STO   C3A1         ENABLE SHAFT BRAKE
6860:A  053575 303 260 127              JMP   Q73
6861:A  053600 041 062 000      Q71     LOAD  50
6864:A  053603 353                      DEHL
6865:A  053604 052 073 175              LOAD  S3A4         SEE IF RPM > .3
6868:A  053607 315 162 137              CALL  NEGNUM
686B:A  053612 031                      DAD   D
686C:A  053613 174                      LAH
686D:A  053614 007                      SLC
686E:A  053615 332 252 127              JTC   Q72          IF SO JUMP
6871:A  053620 072 106 174              LOAD  S3A1         SHAFT BRAKE OFF ?
6874:A  053623 041 100 174 246          AND   S2A30        AILERON LATCHED ?
6878:A  053627 157 072 105 174 057 346  CAND  S3A11        TURNING GEAR DRIVE OFF ?
        053635 001 245
687C:A  053637 312 252 127              JTZ   Q72          JUMP IF ERROR
687F:A  053642 076 001                  LOAD  1
6881:A  053644 062 103 176              STO   C4A6         ENABLE TURNING GEAR ENGAGE
6884:A  053647 303 260 127              JMP   Q73          JUMP SO AS TO COMPLETE S.K.
6887:A  053652 076 020          Q72     LOAD  16
6889:A  053654 062 121 201              STO   MANCNT       SET SEGMENT COUNTER TO PRINT CMD INVALID
688C:A  053657 311                      RET
688D:A  053660 076 000          Q73     LOAD  0
6890:A  053662 062 275 212              STO   MANCMD       MANUAL CMD DONE
6893:A  053665 074                      INA
6894:A  053666 062 121 201              STO   MANCNT       SET SEGMENT COUNTER TO LOOK FOR ANOTHER MESSAGE
6897:A  053671 311                      RET
6898:A                                  ** ENABLE THE FAIL SAFE ELECTRONICS
6899:A  053672 072 003 215      MANC17  LOAD  STE3         CHECK MESSAGE
689C:A  053675 376 203                  COMP  131          (CR)
689D:A  053677 302 331 127              JFZ   Q84          JUMP IF ERROR
68A0:A  053702 072 002 215              LOAD  STE2         ENABLE ??
68A3:A  053705 267                      ORA
68A4:A  053706 312 331 127              JTZ   Q84          JUMP IF NO ENABLE
68A7:A  053711 076 001                  LOAD  1            ENABLE FSE
68AA:A  053713 062 121 176              STO   C7A1
68AD:A  053716 076 062                  LOAD  50
68B0:A  053720 062 000 213              STO   DMPCNT       SET COUNTER TO TURN FSE ENABLE OFF IN 5 SEC
68B3:A  053723 076 023                  LOAD  19
68B6:A  053725 062 121 201              STO   MANCNT       SET SEGMENT COUNTER TO TURN OFF FSE ENABLE
68B9:A  053730 311                      RET
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6904:A  053731 076 020                  Q84     LOAD  16
6905:A  053733 062 121 201                      STO   MANCNT        SET SEGMENT COUNTER TO PRINT CMD INVALID
6906:A  053736 311                              RET
6907:A                                  .                           ** YAW CONTROL
6908:A  053737 072 005 215              MANC18  LOAD  STE5          CHECK MESSAGE
6909:A  053742 376 203                          COMP  131           (CR)
6910:A  053744 302 366 127                      JFZ   Q88           JUMP IF WRONG
6911:A  053747 072 002 215                      LOAD  STE2          LOAD SECOND WORD OF MESSAGE
6912:A  053752 376 373                          COMP  251           (+=43, 43-48= -5 = 251)
6913:A  053754 312 374 127                      JTZ   Q86           JUMP IF + DIRECTION
6914:A  053757 376 375                          COMP  253           (-=45, 45-48= -3 = 253)
6915:A  053761 076 000                          LOAD  0
6916:A  053763 312 376 127                      JTZ   Q87           JUMP IF - DIRECTION
6917:A  053766 076 020                  Q88     LOAD  16
6918:A  053770 062 121 201                      STO   MANCNT        SET SEGMENT COUNTER TO PRINT CMD INVALID
6919:A  053773 311                              RET
6920:A  053774 076 001                  Q86     LOAD  1
6921:A  053776 062 367 212              Q87     STO   MANDIR
6922:A  054001 046 000                          LH    0             CHECK FOR HOW LONG
6923:A  054003 072 003 215                      LOAD  STE3          GET TENS DIGIT OF SECONDS
6924:A  054006 326 060                          SU    48
6925:A  054010 157                              LLA
6926:A  054011 021 144 000 315 005 001          MULT  100
6927:A  054017 345                              PUSH  H             TEMP STORAGE
6928:A  054020 046 000                          LH    0
6929:A  054022 072 004 215                      LOAD  STE4          GET ONES DIGIT OF SECONDS
6930:A  054025 326 060                          SU    48
6931:A  054027 157                              LLA
6932:A  054030 021 012 000 315 005 001          MULT  10
6933:A  054036 321                              POP   D             RECALL TENS DIGIT
6934:A  054037 031                              DAD   D             ADD TO ONES DIGIT
6935:A  054040 042 204 211                      STOD  YWCNTR
6936:A  054043 076 001                          LOAD  1
6937:A  054045 062 366 212                      STO   MANDR         SET FLAG TO DRIVE YAW MANUALLY
6938:A  054050 062 121 201                      STO   MANCNT        SEGMENT COUNTER SET TO LOOK FOR NEW CMD
6939:A  054053 075                              DCA
6940:A  054054 062 275 212                      STO   MANCMD        MANUAL CMD DONE
6941:A  054057 311                              RET
6942:A                                  .                           ** DUMP ARCHIVE
6943:A  054060 072 004 215              MCSS8   LOAD  STE4          CHECK ON METHOD OF DUMP
6944:A  054063 376 203                          COMP  131           (CR)
6945:A  054065 302 130 130                      JFZ   DCS26A        JUMP IF # LINES TO PRINT IN MESSAGE
6946:A  054070 072 002 215                      LOAD  STE2          MESSAGE TELLS EVERY X CYCLES TO PRINT
6947:A  054073 046 000                          LH    0             GET TENS DIGIT OF PERIODIC NUMBER
6948:A  054075 157                              LLA
6949:A  054076 021 012 000 315 005 001          MULT  10
6950:A  054104 345                              PUSH  H             TEMP STORAGE
6951:A  054105 072 003 215                      LOAD  STE3          GET ONES DIGIT
6952:A  054110 326 060                          SU    48
6953:A  054112 157                              LLA
6954:A  054113 321                              POP   D             RECALL TENS DIGIT
6955:A  054114 031                              DAD   D             ADD TO ONES DIGIT
6956:A  054115 042 004 213                      STOD  VARI
6957:A  054120 174                              LAH
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6958:A  054121 265                          ORL
6959:A  054122 312 254 130                  JTZ   DCS26          0 IS NOT A VALID NUMBER
6960:A  054125 303 246 130                  JMP   DCS26B
6961:A  054130 072 006 215          DCS26A  LOAD  STE6           CHECK MESSAGE
6962:A  054133 376 203                      COMP  131            (CR)
6963:A  054135 302 254 130                  JFZ   DCS26          JUMP IF WRONG
6964:A  054140 072 002 215                  LOAD  STE2           START ARCHIVE PRINTOUT AT LINE # ALINE
6965:A  054143 046 000                      LH    0                (1-320)  AND PRINT ANOL TIMES (1-9)
6966:A  054145 157                          LLA                  GET HUNDREDS DIGIT OF ALINE
6967:A  054146 021 144 000 315 005 001      MULT  100
6968:A  054154 345                          PUSH  H              TEMP STORAGE
6969:A  054155 072 003 215                  LOAD  STE3
6970:A  054160 046 000                      LH    0              GET TENS DIGIT OF ALINE
6971:A  054162 326 060                      SU    48
6972:A  054164 157                          LLA
6973:A  054165 021 012 000 315 005 001      MULT  10
6974:A  054173 321                          POP   D              RECALL HUNDREDS DIGIT
6975:A  054174 031                          DAD   D              ADD TO TENS DIGIT
6976:A  054175 345                          PUSH  H
6977:A  054176 072 004 215                  LOAD  STE4
6978:A  054201 326 060                      SU    48
6979:A  054203 157                          LLA                  GET ONES DIGIT OF ALINE
6980:A  054204 321                          POP   D              RECALL HUNDREDS AND TENS DIGIT
6981:A  054205 031                          DAD   D              ADD TO ONES DIGIT
6982:A  054206 042 017 213                  STOD  ALINE
6983:A  054211 353                          DEHL
6984:A  054212 041 041 000                  LOAD  33             TEMPORARY    !!!!!!!!!!!
6985:A                                       LOAD  321           TOTAL # OF LINES IN ARCHIVE
6986:A  054215 315 162 137                  CALL  NEGNUM
6987:A  054220 031                          DAD   D
6988:A  054221 174                          LAH
6989:A  054222 007                          SLC
6990:A  054223 322 254 130                  JFC   DCS26          JUMP IF > # LINES IN ARCHIVE
6991:A  054226 072 005 215                  LOAD  STE5           GET NUMBER OF LINES TO PRINT ANOL
6992:A  054231 046 000                      LH    0
6993:A  054233 326 057                      SU    47             47 & NOT 48 BECAUSE LINE 1 WILL ALWAYS BE PRINTED
6994:A  054235 157                          LLA
6995:A  054236 042 021 213                  STOD  ANOL
6996:A  054241 076 001                      LOAD  1              SET FLAG TO PROCESS SELECTED LINE ARCHIVE PRINT
6997:A  054243 062 016 213                  STO   AFLG
6998:A  054246 076 024              DCS26B  LOAD  20
6999:A  054250 062 121 201                  STO   MANCNT         SET SEGMENT COUNTER TO NEXT DUMP SEGMENT
7000:A  054253 311                          RET
7001:A  054254 076 020              DCS26   LOAD  16
7002:A  054256 062 121 201                  STO   MANCNT         SET SEGMENT COUNTER TO PRINT CMD INVALID
7003:A  054261 311                          RET
7004:A                                      ** PRINT CMD INVALID
7005:A  054262 072 012 215          MANC15  LOAD  PRTBZ          CHECK IF TERMINAL IS PRINTING
7006:A  054265 376 001                      COMP  1
7007:A  054267 310                          RTZ                  RETURN IF SO
7010:A  054270 041 350 042                  LDAA  CMDNO          MESSAGE TO PRINT
7011:A  054273 315 166 145                  CALL  PRTPRT         PRINT CMD INVALID
7012:A  054276 041 015 215                  HL    LINCNT         INCREMENT LINE COUNT
7013:A  054301 064                          INM
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7012:A  054302 064                      INM
7013:A  054303 076 000                  LOAD  0
7014:A  054305 062 275 212              STO   MANCMD          MANUAL CMD DONE
7015:A  054310 074                      INA
7016:A  054311 062 121 201              STO   MANCNT          SET SEGMENT COUNTER TO LOOK FOR MESSAGE
7017:A  054314 311                      RET
7018:A                                                        ** CHANGE CONTROL ANGLE #1 TO TIPCMD
7019:A  054315 052 027 213      MANC19  LDAD  TIPCMD          GET THE COMMANDED ANGLE
7020:A  054320 353                      DEHL
7021:A  054321 052 065 177              LDAD  C2A21
7022:A  054324 315 162 137              CALL  NEGNUM
7023:A  054327 031                      DAD   D
7024:A  054330 174                      LAH
7025:A  054331 007                      SLC
7026:A  054332 332 365 130              JTC   Q51             JUMP IF HAVE TO DECREASE ANGLE
7027:A  054335 353                      DEHL
7028:A  054336 041 051 000              LDAD  41              SEE IF < 1 DEGREE DIFFERENCE
7029:A  054341 315 162 137              CALL  NEGNUM
7030:A  054344 031                      DAD   D
7031:A  054345 174                      LAH
7032:A  054346 007                      SLC
7033:A  054347 332 012 131              JTC   Q53             JUMP IF < 1
7034:A  054352 052 065 177              LDAD  C2A21           INCREMENT CMD CONTROL ANGLE AT 1 DEG / SEC RATE
7035:A  054355 043                      INX   H
7036:A  054356 043                      INX   H
7037:A  054357 043                      INX   H
7038:A  054360 043                      INX   H
7039:A  054361 042 065 177              STOD  C2A21
7040:A  054364 311                      RET
7041:A  054365 353              Q51     DEHL
7042:A  054366 041 051 000              LDAD  41              WITHIN 1 DEGREE DIFFERENCE
7043:A  054371 031                      DAD   D
7044:A  054372 174                      LAH
7045:A  054373 007                      SLC
7046:A  054374 322 012 131              JFC   Q53             JUMP IF < 1
7047:A  054377 052 065 177              LDAD  C2A21           DECREMENT CMD CONTROL ANGLE AT 1 DEG / SEC RATE
7048:A  054402 053                      DCX   H
7049:A  054403 053                      DCX   H
7050:A  054404 053                      DCX   H
7051:A  054405 053                      DCX   H
7052:A  054406 042 065 177              STOD  C2A21
7053:A  054411 311                      RET
7054:A  054412 076 000          Q53     LOAD  0
7055:A  054414 062 275 212              STO   MANCMD          MANUAL CMD DONE
7056:A  054417 074                      INA
7057:A  054420 062 121 201              STO   MANCNT          SET SEGMENT COUNTER TO LOOK FOR CMD
7058:A  054423 311                      RET
7059:A                                                        ** CONTROL ANGLE #2 TO TIPCMD
7060:A  054424 052 027 213      MANC20  LDAD  TIPCMD          CONTROL ANGLE COMMANDED
7061:A  054427 353                      DEHL
7062:A  054430 052 067 177              LDAD  C2A24           CURRENT CMD
7063:A  054433 315 162 137              CALL  NEGNUM
7064:A  054436 031                      DAD   D
7065:A  054437 174                      LAH
```

```
7066:A  054440 007
7067:A  054441 332 074 131
7065:A  054444 353
7069:A  054445 041 051 000
7070:A  054450 315 162 137
7071:A  054453 031
7072:A  054454 174
7073:A  054455 007
7074:A  054456 332 121 131
7075:A  054461 052 067 177
7076:A  054464 043
7077:A  054465 043
7078:A  054466 043
7079:A  054467 043
7080:A  054470 042 067 177
7081:A  054473 311
7082:A  054474 353
7083:A  054475 041 051 000
7084:A  054500 031
7085:A  054501 174
7086:A  054502 007
7087:A  054503 322 121 131
7088:A  054506 052 067 177
7089:A  054511 053
7090:A  054512 053
7091:A  054513 053
7092:A  054514 053
7093:A  054515 042 067 177
7094:A  054520 311
7095:A  054521 076 000
7096:A  054523 062 275 212
7097:A  054526 074
7098:A  054527 062 121 201
7099:A  054532 311
7100:A
7101:A  054533 072 000 213
7102:A  054536 075
7103:A  054537 062 000 213
7104:A  054542 267
7105:A  054543 300
7106:A  054544 062 121 176
7107:A  054547 062 275 212
7108:A  054552 074
7109:A  054553 062 121 201
7110:A  054556 311
7111:A
7112:A  054557 072 012 215
7113:A  054562 376 001
7114:A  054564 310
7115:A  054565 041 103 043
7116:A  054570 315 366 145
7117:A  054573 076 000
7118:A  054575 062 000 213
7119:A  054600 076 004
```

```
        SLC
        JTC   Q61       JUMP IF MUST DECREASE ANGLE
        DEHL
        LOAD  41        SEE IF < 1 DEGREE DIFFERENCE
        CALL  NEGNUM
        DAD   D
        LAH
        SLC
        JTC   Q63       JUMP IF < 1
        LOAD  C2A24     INCREMENT CMD CONTROL ANGLE AT 1 DEG / SEC RATE
        INX   H
        INX   H
        INX   H
        INX   H
        STOD  C2A24
        RET
Q61     DEHL
        LOAD  41        WITHIN 1 DEGREE
        DAD   D
        LAH
        SLC
        JFC   Q63       JUMP IF < 1
        LOAD  C2A24     DECREMENT CMD CONTROL ANGLE AT 1 DEG / SEC RATE
        DCX   H
        DCX   H
        DCX   H
        DCX   H
        STOD  C2A24
        RET
Q63     LOAD  0
        STO   MANCMD    MANUAL CMD DONE
        INA
        STO   MANCNT    SET SEGMENT COUNTER TO LOOK FOR CMD
        RET

MANC21  LOAD  DMPCNT    ** TURN OFF FSE ENABLE AFTER DMPCNT CYCLES
        DCA             LOAD COUNTER
        STO   DMPCNT    DECREMENT IT
        ORA
        NFZ
        SIO   C9A1      RETURN IF NOT ZERO
        STO   MANCMD    TURN OFF FSE ENABLE
        INA             MANUAL CMD DONE
        STO   MANCNT    SET SEGMENT COUNTER TO LOOK FOR MESSAGE
        RET

MCSS16  LOAD  FK1BZ     ** ONGOING HEADING AND CALCULATE TIMES
        COMP  1         TERMINAL PRINTING ??
        RTZ
        LDGA  DGPHB1    RETURN IF PRINTING
        CALL  PK1PRT    MESSAGE TO PRINT
        LOAD  0         PRINT HEADING
        STO   DMPCNT
        LOAD  4
```

```
7120:A  054602 062 077 202                      STO   TEMP        FOUR ARCHIVING PARTS
7121:A  054605 001 170 216                      RC    ATIME       LOCATION OF ARCHIVING TIMES
7122:A  054610 041 205 215                      HL    TIMEM       DESTINATION LOCATION OF TIMES
7123:A  054613 026 004                  Q64     LD    4           MINUTE, HOUR, DAY, AND MONTH
7124:A  054615 012                      Q48     LAMR  B           GET VALUE
7125:A  054616 003                              INX   B           INCREMENT LOCATION
7126:A  054617 167                              LMA               STORE VALUE
7127:A  054620 043                              INX   H           INCREMENT LOCATION
7128:A  054621 025                              DCD               DONE ??
7129:A  054622 302 215 131                      JFZ   Q48         JUMP IF NOT DONE
7130:A  054625 345                              PUSH  H           TEMP STORAGE OF DESTINATION
7131:A  054626 046 000                          LH    0           CALCULATE SECONDS
7132:A  054630 012                              LAMR  B           GET VALUE
7133:A  054631 003                              INX   B           INCREMENT LOCATION
7134:A  054632 157                              LLA
7135:A  054633 021 012 000 315 054 001          DIVID 10
7136:A  054641 345                              PUSH  H           TEMP STORAGE OF SEC
7137:A  054642 046 000                          LH    0
7138:A  054644 012                              LAMR  B           GET VALUE
7139:A  054645 003                              INX   B           INCREMENT LOCATION
7140:A  054646 157                              LLA
7141:A  054647 021 006 000 315 005 001          MULT  6
7142:A  054655 321                              POP   D           RECALL VALUE
7143:A  054656 031                              DAD   D
7144:A  054657 353                              DEHL              PUT IN DE
7145:A  054660 341                              POP   H           RECALL LOCATION
7146:A  054661 173                              LAE
7147:A  054662 167                              LMA               SAVE LSB OF SEC
7148:A  054663 043                              INX   H           INCREMENT LOCATION
7149:A  054664 172                              LAD
7150:A  054665 167                              LMA               SAVE MSB OF SEC
7151:A  054666 043                              INX   H           INCREMENT LOCATION
7152:A  054667 072 077 202                      LOAD  TEMP        DECREMENT COUNTER
7153:A  054672 075                              DCA
7154:A  054673 062 077 202                      STO   TEMP
7155:A  054676 267                              ORA
7156:A  054677 302 213 131                      JFZ   Q64         JUMP IF NOT DONE WITH ALL TIMES OF ARCHIVING
7157:A
7158:A  054702 072 016 213                      LOAD  AFLG        CHECK WHAT KIND OF DUMP
7159:A  054705 267                              ORA
7160:A  054706 302 031 132                      JFZ   DD4         JUMP IF TO START AT ALINE AND PRINT ANOL LINES
7161:A  054711 041 022 000                      LDAD  18          TEMPORARY !!!!!
7162:A                                           LDAD  130
7163:A  054714 353 052 004 213 353 315          DIVID VARI        CALCULATE HOW MANY-LINES TO PRINT IN FIRST SECTION
        054722 054 001
7164:A  054724 312 330 131                      JTZ   DD1         JUMP IF IT DIVIDES WITH NO FRACTION
7165:A  054727 043                              INX   H
7166:A  054730 345                      DD1     PUSH  H           TEMP STORAGE
7167:A  054731 175                              LAI
7168:A  054732 062 006 213                      STO   ARCLN1      # OF LINES TO BE PRINTED FOR ONGOING
7169:A  054735 041 006 000                      LDAD  6           TEMPORARY
7170:A                                           LDAD  60
7171:A  054742 353 052 004 213 353 315          DIVID VARI
        054746 054 001
```

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7172:A  054750 312 354 131              JTZ   DD2       JUMP IF IT DIVIDES WITH NO FRACTION
7173:A  054753 043                      INX   H
7174:A  054754 345                DD2   PUSH  H         TEMP STORAGE
7175:A  054755 175                      LAL
7176:A  054756 062 007 213              STO   ARCLN2    # OF LINES TO BE PRINTED OF 1/ 1 SEC
7177:A  054761 062 010 213              STO   ARCLN3                    1/ 2 SEC
7178:A  054764 041 002 000              LDAD  2         TEMPORARY
7179:A                                  LDAD  20
7180:A  054767 353 052 004 213 353 315  DIVID VARI
        054775 054 001
7181:A  054777 312 003 132              JTZ   DD3       JUMP IF IT DIVIDES WITH NO FRACTION
7182:A  055002 043                      INX   H
7183:A  055003 345                DD3   PUSH  H         TEMP STORAGE
7184:A  055004 175                      LAL
7185:A  055005 062 011 213              STO   ARCLN4    # OF LINES TO BE PRINTED OF 1/ 5 SEC
7186:A                                  CALCULATE TOTAL LINES TO PRINT
7187:A  055010 341                      POP   H         RECALL # LINES FOR 1/5 SEC
7188:A  055011 321                      POP   D         RECALL # LINES FOR 1/2 SEC
7189:A  055012 031                      DAD   D         ADD
7190:A  055013 031                      DAD   D         ADD # LINES FOR 1/1 SEC
7191:A  055014 321                      POP   D         RECALL # LINES FOR ONGOING
7192:A  055015 031                      DAD   D         ADD
7193:A  055016 315 214 133              CALL  MLT2      MULTIPLY HL BY 2 USING SHIFTS
7194:A  055021 353                      DEHL
7195:A  055022 041 015 000              LDAD  13
7196:A  055025 031                      DAD   D         ADD 13
7197:A  055026 303 043 132              JMP   DD5
7198:A  055031 052 021 213        DD4   LDAD  ANOL      CALCULATE # LINES FOR STRAIGHT PRINT
7199:A  055034 315 214 133              CALL  MLT2      MULTIPLY HL BY 2 USING SHIFTS
7200:A  055037 043                      INX   H
7201:A  055040 043                      INX   H
7202:A  055041 043                      INX   H
7203:A  055042 043                      INX   H         PLUS 4
7204:A  055043 353                DD5   DEHL
7205:A  055044 072 015 215              LDAB  LNSCNT    CALCULATE LINE COUNT AFTER DUMP
7206:A  055047 046 000                  LH    0
7207:A  055051 355                      LLA
7208:A  055052 031                      DAD   D         ADD NUMBER OF LINES TO PRINT
7209:A  055053 042 025 213              STDB  LNCNT     STORE LINE COUNT AFTER DUMP
7210:A  055056 041 220 216              HL    ARCRAM    LOCATION OF BEGINNING OF ARCHIVING
7211:A  055061 042 300 212              STDB  ARLOC1
7212:A  055064 041 121 201              HL    MANCNT    INCREMENT SEGMENT COUNTER
7213:A  055067 064                      INM
7214:A  055070 311                      RET
7215:A                                  ** PRINT ONGOING NUMBERS
7216:A  055071 072 012 215        MCSS18 LOAD  FK1BZ     IS TERMINAL PRINTING
7217:A  055074 376 001                  COMP  1
7218:A  055076 310                      RTZ             NO - IT IS BUSY
7219:A  055077 315 102 134              CALL  CNVRT     CALL SUBROUTINE TO CALCULATE ENGR. UNITS OF ANA
7220:A                                  OF ONE CYCLE OF ARCHIVING FOR DUMP
7221:A  055102 041 276 044              LDAA  DMPANA    MESSAGE TO PRINT
7222:A  055105 315 366 145              CALL  FK1PRT    PRINT NUMBER
7223:A  055110 072 023 213              LOAD  AFLG1     CK. F ON WHAT TYPE OF DUMP
7224:A  055113 041 016 213 266          IOR   AFLG
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7225:A  055117 312 213 132                      JTZ     DCSD2A          JUMP IF VARIABLE PRINT
7226:A  055122 072 023 213                      LOAD    AFLG1
7227:A  055125 041 016 213 [illegible]           XOR     AFLG
7230:A  055131 041 0[illegible]13 246            AND     AFLG1
7229:A  055[illegible] 072 024 213 057 346       CAND    AOFLG
        055143 001 245
7[illegible]:A  055145 062 024 213                      STO     AOFLG           RED FOR ARCHIVE
7231:A  055150 072 016 213                      LOAD    AFLG
7232:A  055153 062 023 213                      STO     AFLG1
7233:A  055156 072 024 213                      LOAD    AOFLG
7234:A  055161 267                              ORA
7235:A  055162 [illegible]                      RTZ                     RETURN IF NOT DONE WITH STRAIGHT DUMP
7236:A  055163 072 025 213                      LOAD    SLNCNT          UPDATE LINE COUNT
7237:A  055166 062 015 215                      STO     LNSCNT
7238:A  055171 076 003                          LOAD    3
7239:A  055173 062 116 201                      STO     DCSOCT          SET SEGMENT COUNTER TO SKIP TO TOP OF PAGE
7240:A  055176 076 000                          LOAD    0               WHEN ALL #'S (ANOL) HAVE BEEN PRINTED,
7241:A  [illegible]                             STO     DMPCNT            GET OUT OF DATA COMMUNICATIONS
7242:A  055203 062 275 212                      STO     MANCMD          MANUAL CMD DONE
7243:A  055206 074                              INA
7244:A  055207 062 121 201                      STO     MANCNT          SET SEGMENT COUNTER TO LOOK FOR CMD
7245:A  055212 311                              RET
7246:A  055213 072 000 213              DCSD2A  LOAD    DMPCNT          VARIABLE DUMP
7247:A  [illegible]                             INA                     INCREMENT AMOUNT DUMPED
7248:A  055217 062 000 213                      STO     DMPCNT
7249:A  055222 041 006 213 276                  COMP    ARCLN1          ARE WE DONE WITH ALL IN ONGOING DUMP
7250:A  055226 300                              RFZ                     RETURN IF NOT DONE
7251:A  055227 041 121 201                      NL      MANCNT          INCREMENT SEGMENT COUNTER
7252:A  [illegible]                             INM
7253:A  055233 076 000                          LOAD    0
7254:A  055235 062 000 213                      STO     DMPCNT
7255:A  055240 311                              RET
7256:A
7257:A  055241 072 012 215              MCSS19  LOAD    PK1BZ           ** 1/1 SEC HEADING
7258:A  055244 376 001                          COMP    1               CHECK IF TERMINAL IS PRINTING
7259:A  [illegible]                             RTZ                     RETURN IF BUSY
7260:A  055247 041 316 043                      LDAA    DMPHD2          MESSAGE TO PRINT
7261:A  055252 315 366 145                      CALL    PK1PRT          PRINT HEADING FOR 1/1 SEC DATA
7262:A  055255 041 024 222                      NL      ARCR1           LOCATION OF BEGINNING OF 1/1 SEC ARCHIVE
7263:A  055260 042 300 [illegible]               STOD    ARLOC1
7264:A  055[illegible] 041 121 201                      NL      MANCNT          INCREMENT SEGMENT COUNTER
7265:A  055266 064                              INM
7266:A  055267 311                              RET
7267:A
7268:A  055270 072 012 215              MCSS20  LOAD    PK1BZ           ** DUMP 1/1 SEC NUMBERS
72691A  055273 376 001                          COMP    1               CHECK IF TERMINAL IS PRINTING
7270:A  055275 310                              RTZ                     RETURN IF BUSY
7271:A  [illegible]                             CALL    CNVRT           CONVERT ANALOG TO ENGR. UNITS FOR DUMP
7272:A  055301 041 276 044                      LDAA    DMPANA          MESSAGE TO PRINT
7273:A  055304 315 366 145                      CALL    PK1PRT          PRINT DATA
7274:A  055307 072 000 213                      LOAD    DMPCNT          INCREMENT NUMBER DUMPED THIS AREA
7275:A  055312 074                              INA
7276:A  [illegible]                             STO     DMPCNT
72[illegible]:A  055316 041 007 213 276                  COMP    ARCLN2          ARE WE DONE
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7278:A  055322 300                      RFZ             RETURN IF NOT DONE
7279:A  055323 041 121 201              HL      MANCNT  INCREMENT SEGMENT COUNTER
7280:A  055326 064                      INM
7281:A  055327 076 000                  LOAD    0
7282:A  055331 062 000 213              STO     DMPCNT  ZERO LINE COUNTER
7283:A  055334 311                      RET
7284:A                          .                       ** PRINT 1/2 SEC HEADING
7285:A  055335 072 012 215      MCSS21  LOAD    PK1BZ   CHECK IF TERMINAL IS PRINTING
7286:A  055340 376 001                  COMP    1
7287:A  055342 310                      RTZ             RETURN IF BUSY
7288:A  055343 041 031 044              LDAA    DMPHD3  MESSAGE TO PRINT
7289:A  055346 315 366 145              CALL    PK1PRT  PRINT HEADING
7290:A  055351 041 100 223              HL      ARCR2   LOCATION OF BEGINNING OF 1/2 SEC ARCHIVE DATA
7291:A  055354 042 300 212              STOD    ARLOC1
7292:A  055357 041 121 201              HL      MANCNT  INCREMENT SEGMENT COUNTER
7293:A  055362 064                      INM
7294:A  055363 311                      RET
7295:A                          .                       ** PRINT 1/2 SEC NUMBERS
7296:A  055364 072 012 215      MCSS22  LOAD    PK1BZ   CHECK IF TERMINAL IS PRINTING
7297:A  055367 376 001                  COMP    1
7298:A  055371 310                      RTZ             RETURN IF BUSY
7299:A  055372 315 102 134              CALL    CNVRT   CONVERT ANALOG TO ENGR. FOR OUTPUT
7300:A  055375 041 276 044              LDAA    DMPANA  MESSAGE TO PRINT
7301:A  055400 315 366 145              CALL    PK1PRT  PRINT 1/2 SEC NUMBERS
7302:A  055403 072 000 213              LOAD    DMPCNT  INCREMENT NUMBER OF LINES DUMPED
7303:A  055406 074                      INA
7304:A  055407 062 000 213              STO     DMPCNT
7305:A  055412 041 010 213 276          COMP    ARCLN3  DID WE DUMP ALL THAT WERE REQUIRED
7306:A  055416 300                      RFZ             RETURN IF NOT DONE
7307:A  055417 041 121 201              HL      MANCNT  INCREMENT SEGMENT COUNTER
7308:A  055422 064                      INM
7309:A  055423 076 000                  LOAD    0
7310:A  055425 062 000 213              STO     DMPCNT  ZERO OUT COUNTER
7311:A  055430 311                      RET
7312:A                          .                       ** PRINT 1/5 SEC HEADING
7313:A  055431 072 012 215      MCSS23  LOAD    PK1BZ   CHECK IF TERMINAL IS PRINTING
7314:A  055434 376 001                  COMP    1
7315:A  055436 310                      RTZ             RETURN IF BUSY
7316:A  055437 041 145 044              LDAA    DMPHD4  MESSAGE TO PRINT
7317:A  055442 315 366 145              CALL    PK1PRT  PRINT 1/5 SEC HEADING
7318:A  055445 041 154 224              HL      ARCR3   LOCATION OF START OF 1/5 SEC ARCHIVE
7319:A  055450 042 300 212              STOD    ARLOC1
7320:A  055453 041 121 201              HL      MANCNT  INCREMENT SEGMENT COUNTER
7321:A  055456 064                      INM
7322:A  055457 311                      RET
7323:A                          .                       ** PRINT 1/5 SEC NUMBERS
7324:A  055460 072 012 215      MCSS24  LOAD    PK1BZ   CHECK IF TERMINAL IS PRINTING
7325:A  055463 376 001                  COMP    1
7326:A  055465 310                      RTZ             RETURN IF BUSY
7327:A  055466 315 102 134              CALL    CNVRT   CONVERT ANALOG TO ENGR. UNITS
7328:A  055471 041 276 044              LDAA    DMPANA  MESSAGE TO PRINT
7329:A  055474 315 366 145              CALL    PK1PRT  PRINT 1/5 SEC NUMBERS
7330:A  055477 072 000 213              LOAD    DMPCNT  INCREMENT NUMBER OF DUMP LINES PRINTED
7331:A  055502 074                      INA
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7332:A   055503 042 000 213              STO   DMPCNT
7333:A   055506 041 011 213 276          COMP  ARCEN4          DID WE PRINT ALL THAT ARE REQUIRED
7341:A   055512 300                      RFZ                   RETURN IF NOT DONE
7342:A   055513 052 025 213        DC1   LDAD  SLNCNT          UPDATE LINE COUNT TO BE WITHIN 66 RANGE
7345:A   055516 353                      DEHL
7346:A   055517 041 102 000              LDAD  66
7351:A   055522 315 162 137              CALL  NEGNUM
7354:A   055525 031                      DAD   D
7355:A   055526 174                      LAH
7356:A   055527 007                      SLC
7357:A   055530 332 141 133              JTC   DC2             JUMP IF WITHIN RANGE
7362:A   055533 042 025 213              STOD  SLNCNT          STORE LINE COUNT
7365:A   055536 303 113 133              JMP   DC1
7370:A   055541 072 025 213        DC2   LOAD  SLNCNT          UPDATE LINE COUNT
7373:A   055544 062 015 215              STO   LNSCNT
7376:A   055547 076 003                  LOAD  3
7401:A   055551 062 116 201              STO   DCSOCT          SET SEGMENT COUNTER TO SKIP TO TOP OF PAGE
7404:A   055554 076 000                  LOAD  0
7406:A   055556 062 000 213              STO   DMPCNT          ZERO DUMP LINE COUNT
7411:A   055561 062 275 212              STO   MANCMD          MANUAL CMD DONE
7414:A   055564 074                      INA
7415:A   055565 062 121 201              STO   MANCNT          SET SEGMENT COUNTER TO LOOK FOR CMD
7420:A   055570 311                      RET
7421:A
7422:A                                   .
7423:A                                   . *** SUBROUTINE TO PUT ENGR. UNIT TIP CMD INTO COUNTS
7424:A                                   .
7425:A   055571 203 027 213 035    MANTIP DBYTE LDS,*TIPCMD,FLTS      LOADS TIP COMMAND IN DEG.
7431:A   055575 202 000 000 240 003 020  DBYTE LDFI,0,0,160,3,FADD    (DEG+5) / DC = DEGREES IN COUNTS
7437:A   055603 204 065 200 023          DBYTE LDF,*DC,FDIV
7443:A   055607 037 205 027 213          DBYTE FIXS,STS,*TIPCMD     CONV. TO 16 B FIX P & STORE AS
7447:A   055613 200                      DBYTE EXIT                     TIPCC  (TIP COMMAND IN COUNTS)
7450:A
7451:A                                   .
7452:A                                   . *** SUBROUTINE TO MULTIPLY HL BY 2 BY SHIFTING
7453:A                                   .
7454:A   055614 174                MLT2  LAH                  MSB
7455:A   055615 007                      SLC
7456:A   055616 346 376                  AND   254             ZERO OUT 1
7461:A   055620 147                      LHA                   RESTORE IT
7462:A   055621 175                      LAL                   LSB
7463:A   055622 007                      SLC
7464:A   055623 157                      LLA                   RESTORE
7465:A   055624 322 233 133              JFC   DD6             JUMP IF NO CARRY
7470:A   055627 174                      LAH                   MSB
7471:A   055630 346 001                  IOR   1               ADJUST FOR CARRY
7474:A   055632 147                      LHA
7475:A   055633 175                DD6   LAL                   LSB
7476:A   055634 346 376                  AND   254
7501:A   055636 157                      LLA
7502:A   055637 311                      RET
7503:A
7504:A                                   .
7505:A                                   . *** SUBROUTINE TO UNPACK A PACKED DISCRETE INTO 0-3 AND 4-7
7506:A                                   .
7507:A   055640 052 370 212        DMPS1 LDAD  ARCLOC          LOCATION OF PACKED DISCRETE
7512:A   055643 353                      DEHL
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7386:A   055644 032                          LAMR  B          GET VALUE
7387:A   055645 042 077 202                  STO   TEMP       TEMP STORAGE
7388:A   055650 346 001                      AND   1          B0
7389:A   055652 046 000                      LH    0
7390:A   055654 157                          LLA
7391:A   055655 021 350 003 315 005 001      MULT  1000
7392:A   055661 345                          PUSH  H          TEMP STORAGE
7393:A   055662 072 077 202                  LOAD  TEMP       RECALL VALUE
7394:A   055667 346 002                      AND   2          B1
7395:A   055671 017                          SRC
7396:A   055672 046 000                      LH    0
7397:A   055674 157                          LLA
7398:A   055675 021 144 000 315 005 001      MULT  100
7399:A   055703 321                          POP   D          RECALL B0*1000
7400:A   055704 031                          DAD   D          ADD TO B1*100
7401:A   055705 345                          PUSH  H          TEMP STORAGE
7402:A   055706 072 077 202                  LOAD  TEMP       RECALL VALUE
7403:A   055711 346 004                      AND   4          B2
7404:A   055713 017                          SRC
7405:A   055714 017                          SRC
7406:A   055715 046 000                      LH    0
7407:A   055717 157                          LLA
7408:A   055720 021 012 000 315 005 001      MULT  10
7409:A   055726 321                          POP   D          RECALL B0*1000+B1*100
7410:A   055727 031                          DAD   D          ADD TO B2*10
7411:A   055730 345                          PUSH  H          TEMP STORAGE
7412:A   055731 072 077 202                  LOAD  TEMP       RECALL VALUE
7413:A   055734 346 010                      AND   8          B3
7414:A   055736 017                          SRC
7415:A   055737 017                          SRC
7416:A   055740 017                          SRC
7417:A   055741 046 000                      LH    0
7418:A   055743 157                          LLA
7419:A   055744 321                          POP   D          RECALL B0*1000+B1*100+B2*10
7420:A   055745 031                          DAD   D          ADD TO B3
7421:A   055746 042 012 213                  STOD  AI1        STORE RESULT
7422:A   055751 072 077 202                  LOAD  TEMP       RECALL VALUE
7423:A   055754 346 020                      AND   16         B4
7424:A   055756 017                          SRC
7425:A   055757 017                          SRC
7426:A   055760 017                          SRC
7427:A   055761 017                          SRC
7428:A   055762 046 000                      LH    0
7429:A   055764 157                          LLA
7430:A   055765 021 350 003 315 005 001      MULT  1000
7431:A   055773 345                          PUSH  H          TEMP STORAGE
7432:A   056774 072 077 202                  LOAD  TEMP       RECALL VALUE
7433:A   056777 346 040                      AND   32         B5
7434:A   057001 017                          SRC
7435:A   057002 017                          SRC
7436:A   057003 017                          SRC
7437:A   057004 046 000                      LH    0
7438:A   057006 157                          LLA
7439:A   057007 021 144 000 315 005 001      MULT  100
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7410:A  056015 321                      POP   D               RECALL B4*1000
7411:A  056016 031                      DAD   D               ADD TO B5*100
7412:A  056017 345                      PUSH  H               TEMP STORAGE
7413:A  056020 072 077 202              LOAD  TEMP            RECALL VALUE
7414:A  056023 346 100                  AND   64              B6
7415:A  056025 007                      SLC
7416:A  056026 007                      SLC                   0
7417:A  056027 046 000                  LH    0
7418:A  056031 157                      LLA
7419:A  056032 021 012 000 315 005 001  MULT  10
7420:A  056040 321                      POP   D               RECALL B4*1000+B5*100
7421:A  056041 031                      DAD   D               ADD TO B6*10
7422:A  056042 345                      PUSH  H               TEMP STORAGE
7423:A  056043 072 077 202              LOAD  TEMP            RECALL VALUE
7424:A  056046 346 200                  AND   128             B7
7425:A  056050 007                      SLC
7426:A  056051 046 000                  LH    0
7427:A  056053 157                      LLA
7428:A  056054 321                      POP   D               RECALL B4*1000+B5*100+B6*10
7429:A  056055 031                      DAD   D               ADD TO B7
7430:A  056056 042 014 213              STOD  AI2             STORE VALUE
7431:A  056061 041 012 213              HL    AI1             FIRST LOCATION OF UNPACKED DISCRETES
7432:A  056064 042 376 212              STOD  IPT             STORE FOR USE IN TXT STATEMENTS
7433:A  056067 052 370 212              LDAD  ARCLOC          INCREMENT ARCHIVE LOCATION
7434:A  056072 043                      INX   H
7435:A  056073 042 370 212              STOD  ARCLOC
7436:A  056076 021 335 044              LDAS  DMP3            TXT MESSAGE TO RETURN TO
7437:A  056101 311                      RET
7438:A
7439:A
7440:A
7441:A  056102 041 302 212      CNVRT   HL    ARCOUT          START OF 50 BYTE RAM LOCATION
7442:A  056105 042 370 212              STOD  ARCLOC
7443:A  056110 052 300 212              LDAD  ARLOC1          CURRENT ARCHIVE RAM LOCATION
7444:A  056113 042 002 213              STOD  ARLOC2
7445:A  056116 076 000                  LOAD  0
7446:A  056120 062 364 212              STO   DMPI10          ZERO COUNTER
7447:A
7448:A  056123 041 032 000              LDAD  26              13 ANALOG RAM LOCATIONS
7449:A  056126 353                      DEHL
7450:A  056127 041 302 212              HL    ARCOUT          LOCATION OF RAM FOR OUTPUT OF DUMP
7451:A  056132 031                      DAD   D
7452:A  056133 353                      DEHL
7453:A  056134 052 002 213              LDAD  ARLOC2          LOCATION IN ARCHIVE
7454:A  056137 104                      LBH                   STORE IN BC
7455:A  056140 115                      LCL
7456:A  056141 013                      DCX   B               DECREMENT ARCHIVE LOCATION
7457:A  056142 046 015                  LH    13              SAVE 13 PACKED DISCRETES
7458:A  056144 063              DMP99   INX   B               INCREMENT ARCHIVE LOCATION
7459:A  056145 012                      LDAR  B               GET ARCHIVE VALUE
7460:A  056146 002                      STAR  B               STORE IT IN ARCOUT
7461:A  056147 023                      INX   D               INCREMENT ARCOUT LOCATION
7462:A  056150 045                      DCH                   DECREMENT COUNTER
7463:A  056151 302 144 134              JFZ   DMP99           JUMP IF NOT DONE
```

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7494:A
7495:A  056154 052 002 213          LDAD  ARLOC2      BEGINING OF LOCATION IN ARCHIVE
7496:A  056157 353                  DEHL
7497:A  056160 041 015 000          LDAD  13          13 PACKED DISCRETES
7498:A  056163 031                  DAD   D
7499:A  056164 042 002 213          STOD  ARLOC2      BEGINING OF ANALOGS
7500:A
7501:A  056167 052 002 213    CNV1  LDAD  ARLOC2      LOAD CURRENT ARCHIVE ADDRESS
7502:A  056172 104                  LBH               STORE IN BC
7503:A  056173 115                  LCL
7504:A  056174 012                  LAMK  B           GET B BIT VALUE
7505:A  056175 365                  PUSH  A           TEMP STORAGE
7506:A  056176 017                  SRC               MULT BY 16 TO GET IN 12 BIT WORD
7507:A  056177 017                  SRC               MSB
7508:A  056200 017                  SRC
7509:A  056201 017                  SRC
7510:A  056202 346 017              AND   15
7511:A  056204 147                  LHA               STORE MSB IN H
7512:A  056205 361                  POP   A           RECALL VALUE
7513:A  056206 007                  SLC               LSB
7514:A  056207 007                  SLC
7515:A  056210 007                  SLC
7516:A  056211 007                  SLC
7517:A  056212 346 360              AND   240
7518:A  056214 157                  LLA               STORE LSB IN L
7519:A  056215 042 276 212          STOD  DMPTMP      STORE VALUE
7520:A  056220 052 002 213          LDAD  ARLOC2      INCREMENT LOCATION IN ARCHIVE
7521:A  056223 043                  INX   H
7522:A  056224 042 002 213          STOD  ARLOC2
7523:A  056227 052 364 212          LDAD  DMP110      CHECK COUNTER TO DECIDE WHAT KIND OF CONVERSION
7524:A  056232 376 002              COMP  2
7525:A  056234 332 262 134          JTC   CNV2        JUMP IF S2.21 OR S2.23
7526:A  056237 302 250 134          JFZ   CNV3        JUMP IF NOT S2.18
7527:A  056242 021 143 135          DE    DMPS3       S2.18 (TEETER ANGLE)
7528:A  056245 303 344 134          JMP   CNV13
7529:A  056250 376 012        CNV3  COMP  10
7530:A  056252 312 262 134          JTZ   CNV2        JUMP IF C2.21
7531:A  056255 376 013              COMP  11
7532:A  056257 302 270 134          JFZ   CNV4        JUMP IF NOT C2.24
7533:A  056262 021 117 135    CNV2  DE    DMPS2       S2.21, S2.23, C2.21, & C2.24 (CONTROL ANGLES)
7534:A  056265 303 344 134          JMP   CNV13
7535:A  056270 376 005        CNV4  COMP  5
7536:A  056272 332 305 134          JTC   CNV5        JUMP IF S3.4 OR S5.9
7537:A  056275 312 313 134          JTZ   CNV10       JUMP IF S5.5
7538:A  056300 376 014              COMP  12
7539:A  056302 302 321 134          JFZ   CNV7        JUMP IF NOT C5.5
7540:A  056305 021 217 135    CNV5  DE    DMPS5       S3.4, S5.9, AND C5.5 (GENERATOR & ROTOR SPEEDS)
7541:A  056310 303 344 134          JMP   CNV13
7542:A  056313 021 170 135    CNV10 DE    DMPS4       S5.5 (POWER)
7543:A  056316 303 344 134          JMP   CNV13
7544:A  056321 376 006        CNV7  COMP  6
7545:A  056323 312 343 134          JTZ   CNV8         JUMP IF S9.4
7546:A  056326 376 010              COMP  8
7547:A  056330 302 341 134          JFZ   CNV9        JUMP IF NOT S9.6
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7548:A  056333 021 273 135          CNV8    DE    DMPS7         S9.4 & S9.6 (WIND SPEED)
7549:A  056336 303 344 134                  JMP   CNV13
7550:A  056341 021 242 135          CNV9    DE    DMPS6         S9.5 & S9.7 (WIND DIRECTION)
7551:A  056344 315 137 001          CNV13   CALL  APUSTR
7552:A  056347 072 364 212                  LOAD  DMPI10
7553:A  056352 007                          SLC                 MULT 2
7554:A  056353 346 376                      AND   254
7555:A  056355 026 000                      LD    0
7556:A  056357 137                          LEA
7557:A  056360 041 302 212                  HL    ARCOUT        LOCATION OF TEMP RAM FOR OUTPUT OF ARCHIVE
7558:A  056363 031                          DAD   D             ADD TO DMPI10*2
7559:A  056364 353                          DEHL
7560:A  056365 041 015 000                  LOAD  13            13 PACKED DISCRETES
7561:A  056370 031                          DAD   D
7562:A  056371 353                          DEHL
7563:A  056372 052 276 212                  LOAD  DMPTMP        LOAD COUNT VALUE OF ANALOG
7564:A  056375 175                          LAL
7565:A  056376 022                          LMAR  D             STORE MSB
7566:A  056377 023                          INX   D             INCREMENT TEMP RAM LOCATION
7567:A  056400 174                          LAH
7568:A  056401 022                          LMAR  D             STORE LSB
7569:A  056402 072 364 212                  LOAD  DMPI10        INCREMENT COUNTER
7570:A  056405 074                          INA
7571:A  056406 062 364 212                  STO   DMPI10
7572:A  056411 376 015                      COMP  13            CHECK IF DONE WITH ALL ANALOGS
7573:A  056413 302 167 134                  JFZ   CNV1          JUMP IF NOT DONE
7574:A
7575:A  056416 072 016 213                  LOAD  AFLG          CHECK ON KIND OF DUMP
7576:A  056421 267                          ORA
7577:A  056422 312 070 135                  JTZ   DMP98         JUMP IF INTERVAL DUMP
7578:A  056425 052 017 213                  LOAD  ALINE         DECREMENT LINE NUMBER TO PRINT
7579:A  056430 053                          DCX   H
7580:A  056431 021 062 000 315 005 001      MULT  50
7581:A  056437 353                          DEHL
7582:A  056440 041 002 000                  LOAD  2             PUT IN SO THAT ARLOC1 INCREASED ONLY BY 50
7583:A  056443 042 017 213                  STOD  ALINE
7584:A  056446 052 021 213                  LOAD  ANOL          # OF LINES TO PRINT
7585:A  056451 053                          DCX   H             DECREMENT # LINES TO PRINT
7586:A  056452 042 021 213                  STOD  ANOL
7587:A  056455 302 102 135                  JFZ   DMP97         JUMP IF NOT DONE
7588:A  056460 076 000                      LOAD  0
7589:A  056462 062 016 213                  STO   AFLG          SET FLAG TO BEING DONE
7590:A  056465 303 102 135                  JMP   DMP97
7591:A  056470 052 004 213          DMP98   LOAD  VARI          LOAD INCREMENT TO GET NEXT LINE
7592:A  056473 021 062 000 315 005 001      MULT  50
7593:A  056501 353                          DEHL
7594:A  056502 052 300 212          DMP97   LOAD  ARLOC1
7595:A  056505 031                          DAD   D
7596:A  056506 042 300 212                  STOD  ARLOC1        YIELDS NEXT LINE TO DUMP
7597:A  056511 311                          RET
7598:A
7599:A                              . *** SUBROUTINES TO CONVER COUNTS TO ENGR UNITS
7600:A                              .
7601:A  056512 203 276 212 035      DMPS2   DBYTE LDS,*DMPTMP,FLTS      TIP ANGLE
```

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7602:A  056516 204 065 200 022          DBYTE LDF,*BC,FMUL
7603:A  056522 202 000 000 240 003 021  DBYTE LDFI,0,0,160,3,FSUB      -5
7604:A  056530 202 000 000 240 004 022  DBYTE LDFI,0,0,160,4,FMUL      *10
7605:A  056536 037                      DBYTE FIXS
7606:A  056537 205 276 212              DBYTE STS,*DMPTMP
7607:A  056542 200                      DBYTE EXIT
7608:A                                  .
7609:A  056543 203 276 212 035  DMPS3   DBYTE LDS,*DMPTMP,FLTS          TEETER ANGLE
7610:A  056547 204 134 200 022          DBYTE LDF,*TC,FMUL
7611:A  056553 202 000 000 240 004 027  DBYTE LDFI,0,0,160,4,PIOF,FSUB  -10 DEG
        056561 021
7612:A  056562 022                      DBYTE FMUL                      *10
7613:A  056563 037                      DBYTE FIXS
7614:A  056564 205 276 212              DBYTE STS,*DMPTMP
7615:A  056567 200                      DBYTE EXIT
7616:A                                  .
7617:A  056570 203 276 212 035  DMPS4   DBYTE LDS,*DMPTMP,FLTS          S5.5
7618:A  056574 204 071 200 022          DBYTE LDF,*PEC,FMUL
7619:A  056600 204 130 200 021          DBYTE LDF,*POFFST,FSUB          - OFFSET
7620:A  056604 202 000 000 240 004 022  DBYTE LDFI,0,0,160,4,FMUL      *10
7621:A  056612 037                      DBYTE FIXS
7622:A  056613 205 276 212              DBYTE STS,*DMPTMP
7623:A  056616 200                      DBYTE EXIT
7624:A                                  .
7625:A  056617 203 276 212 035  DMPS5   DBYTE LDS,*DMPTMP,FLTS          S3.4
7626:A  056623 204 101 200 022          DBYTE LDF,*NC,FMUL
7627:A  056627 202 000 000 240 004 022  DBYTE LDFI,0,0,160,4,FMUL      *10
7628:A  056635 037                      DBYTE FIXS
7629:A  056636 205 276 212              DBYTE STS,*DMPTMP
7630:A  056641 200                      DBYTE EXIT
7631:A                                  .
7632:A  056642 203 276 212 035  DMPS6   DBYTE LDS,*DMPTMP,FLTS          S9.5 & S9.7
7633:A  056646 204 105 200 022          DBYTE LDF,*VDC,FMUL
7634:A  056652 202 000 000 264 010 021  DBYTE LDFI,0,0,180,8,FSUB      -180
7635:A  056660 202 000 000 240 004 022  DBYTE LDFI,0,0,160,4,FMUL      *10
7636:A  056666 037                      DBYTE FIXS
7637:A  056667 205 276 212              DBYTE STS,*DMPTMP
7638:A  056672 200                      DBYTE EXIT
7639:A                                  .
7640:A  056673 203 276 212 035  DMPS7   DBYTE LDS,*DMPTMP,FLTS          S9.4 & S9.6
7641:A  056677 204 075 200 022          DBYTE LDF,*VWC,FMUL
7642:A  056703 202 000 000 240 004 022  DBYTE LDFI,0,0,160,4,FMUL      *10
7643:A  056711 037                      DBYTE FIXS
7644:A  056712 205 276 212              DBYTE STS,*DMPTMP
7645:A  056715 200                      DBYTE EXIT
7646:A                                  .
7647:A                                  .
7648:A                                  . ***** DATA ARCHIVING MODULE *****
7649:A                                  .
7650:A                                  .
7651:A                                  .   DATA ARCHIVING SAVES DISCRETE PACKED WORDS AND ANALOG INPUT AND OUTPUT
7652:A                                  . 8 BIT WORDS EVERY ARCTIM CYCLES.  THERE ARE 4 SEPARATE ARCHIVE RAM : ONGOING
7653:A                                  . ARCHIVE AND 3 ARCHIVES FILLED AFTER A NSD TO LO.  SEGMENT ARCH1 HAS THE ABOVE
7654:A                                  . RESPONSIBILITY.  SEGMENT ARCH2 ZEROES OUT ALL ARCHIVE RAM IN A DEFINED
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7655:A                                  . NUMBER OF CYCLES.  SEGMENT ARCH3 RESETS THE INITIAL CONDITIONS.
7656:A                                  .
7657:A  056716 072 051 202              ARCH1   LOAD  SBENB       CHECK IF IT IS IN STANDBY ENABLE
7658:A  056721 041 164 216 246                  AND   IIARC       = 1 IF SD HAS OCCURED AND RAM NOT ZEROED
7659:A  056725 312 350 135                      JTZ   ARC1A       JUMP IF NOT
7660:A  056730 041 123 201                      HL    DACNT
7661:A  056733 064                              INM               SET SEGMENT COUNTER TO ZERO OUT ALL ARCHIVE RAM
7662:A  056734 041 000 000                      LDAD  0
7663:A  056737 042 153 216                      STOD  ARCINC      ZERO OUT ARCHIVING RAM 116 BYTES PER CYCLE AND
7664:A  056742 076 016                          LOAD  14           TAKE 14 CYCLES TO DO IT
7665:A  056744 062 155 216                      STO   ARCRMI
7666:A  056747 311                              RET
7667:A                                  .
7668:A  056750 052 160 216              ARC1A   LDAD  ACOUNT      LOAD CYCLE COUNTER
7669:A  056753 043                              INX   H           INCREMENT
7670:A  056754 042 160 216                      STOD  ACOUNT      STORE NEW VALUE
7671:A  056757 353                              DEHL
7672:A  056760 052 162 216                      LDAD  ARCTIM      COMPARE TO DESIRED CYCLE COUNT
7673:A  056763 315 162 137                      CALL  NEGNUM      MAKE IT A NEGATIVE NUMBER
7674:A  056766 031                              DAD   D           ADD
7675:A  056767 175                              LAL               CHECK IF ZERO
7676:A  056770 264                              ORH
7677:A  056771 300                              RFZ               RETURN IF NOT EQUAL
7678:A                                  .
7679:A  056772 041 000 000                      LDAD  0           * REAL START OF DATA ARCHIVING
7680:A  056775 042 160 216                      STOD  ACOUNT      RESET THE COUNT FOR ACTIVE TIMING
7681:A  057000 072 066 201                      LOAD  NSD         SHUTDOWN FLAG
7682:A  057003 041 074 202 246                  AND   LOENB       AND WITH LOCKOUT ENABLE FLAG
7683:A  057007 157 072 164 216 057 346          CAND  IIARC       AND IF SD HAS BEEN SENSED BY ARCHIVE ALREADY
        057015 001 245
7684:A  057017 312 053 136                      JTZ   ARC1        JUMP IF NO SD OR SD SENSED ALREADY
7685:A                                  ...         LDAD  9000        START OF FLAGED SD ARCHIVE RAM
7686:A  057022 041 204 003                      LDAD  900         ONGOING ARCHIVE IS 900 BYTES LONG
7687:A  057025 042 153 216                      STOD  ARCINC      STORE FINE AND COARSE POINTER TO THE TOP OF SD
7688:A  057030 042 155 216                      STOD  ARCRMI       ARCHIVE
7689:A  057033 076 000                          LOAD  0           RESETS ARCHIVE CHRONOLOGICAL COUNTER FOR ARCHIVE
7690:A  057035 062 157 216                      STO   ARCCNT
7691:A  057040 041 013 000                      LDAD  11          LOCATIONS 5 - 11 IN ATIME TIME WHEN SD ARCHIVE
7692:A  057043 042 166 216                      STOD  TIMDEC       BEGINS
7693:A  057046 076 001                          LOAD  1           SET IIARCH TO SD SENSED STATE, SD ARCHIVE WILL
7694:A  057050 062 164 216                      STO   IIARC       HAVE NO ZERO NUMBERS
7695:A  057053 072 157 216              ARC1    LOAD  ARCCNT      INCREMENT CHRONOLOGICAL COUNTER
7696:A  057056 074                              INA
7697:A  057057 062 157 216                      STO   ARCCNT
7698:A  057062 016 032                          LC    26          NO. OF I/O DISCRETES AND ANALOGS
7699:A  057064 006 000                          LB    0            (C2.2, C2.1, S4.10 THRU S2.1, PACK12 THRU PACK1)
7700:A  057066 041 100 177              ARC3    HL    PACK1-1     SET POINTER AT BEGINNING OF ARCHIVE MATERIAL
7701:A  057071 011                              DAD   B           INCREMENT DOWN TO THE CURRENT ONE
7702:A  057072 353                              DEHL
7703:A  057073 032                              LDAR  D           GET THE VALUE
7704:A  057074 052 153 216                      LDAD  ARCINC      LOAD INCREMENT TO ARCHIVE RAM LOCATION
7705:A  057077 353                              DEHL
7706:A  057100 041 220 216                      HL    ARCRAM      POINTER AT BEGINING OF ARCHIVE
7707:A  057104 031                              DAD   D           GET POINTER TO THE DESTINATION IN ARCHIVE
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7708:A  057104 353                      DEHL
7709:A  057105 022                      LMAR   D          STORE I/O VALUE IN ARCHIVE RAM
7710:A  057106 052 153 216              LDAD   ARCINC     INCREMENT FINE COUNTER TO ARCHIVE
7711:A  057111 043                      INX    H
7712:A  057112 042 153 216              STOD   ARCINC
7713:A  057115 013                      DCX    B
7714:A  057116 171                      LAC
7715:A  057117 267                      ORA
7716:A  057120 302 066 136              JFZ    ARC3
7717:A  057123 072 157 216              LDAD   ARCCNT     PUTS ARCCNT IN ARCHIVE TO KEEP TRACK OF
7718:A  057126 022                      LMAR   D           CHRONOLOGICAL ORDER
7719:A  057127 041 062 000              LDAD   50         INCREMENT COARSE COUNTER BY AT LEAST # OF VALUES
7720:A  057132 353                      DEHL               WRITTEN IN ARCHIVE
7721:A  057133 052 155 216              LDAD   ARCRMI
7722:A  057136 031                      DAD    D
7723:A  057137 042 155 216              STOD   ARCRMI
7724:A  057142 353                      DEHL
7725:A  057143 041 204 003              LDAD   900        COMPARE TO SIZE OF ONGOING RAM
7726:A                          ...        LDAD  9000
7727:A  057146 315 162 137              CALL   NEGNUM
7728:A  057151 031                      DAD    D
7729:A  057152 174                      LAH
7730:A  057153 007                      SLC
7731:A  057154 332 311 136              JTC    ARC8       JUMP IF IN MIDDLE OF ONGOING ARCHIVE
7732:A  057157 302 206 136              JFZ    ARC5       JUMP IF .GT. SIZE OF ONGOING (IN SD ARCHIVE)
7733:A  057162 076 000                  LOAD   0          IF HERE, ONGOING ARCHIVE RAM IS FULL SO START
7734:A  057164 062 157 216              STO    ARCCNT      UP AT THE TOP AGAIN
7735:A  057167 041 000 000              LDAD   0          SET COARSE POINTER FOR TOP OF ONGOING
7736:A  057172 042 155 216              STOD   ARCRMI
7737:A  057175 041 005 000              LDAD   5          SET TIME FOR BEGINING OF ONGOING
7738:A  057200 042 166 216              STOD   TIMDEC
7739:A  057203 303 311 136              JMP    ARC8
7740:A  057206 072 165 216      ARC5    LDAD   ACNT1      INCREMENT COUNTER FOR SD ARCHIVE WRITTING
7741:A  057211 074                      INA
7742:A  057212 062 165 216              STO    ACNT1
7743:A  057215 075                      DCA
7744:A  057216 326 006                  SU     6          SD DATA WRITTEN 6 TIMES
7745:A                          ...        SU     60          1ST MIN AT  (1/1 SEC)
7746:A  057220 372 311 136              JTS    ARC8       JUMP IF DATA WRITTEN LESS THAN 6 TIMES
7747:A  057223 312 256 136              JTZ    ARC6       JUMP IF DATA WRITTEN 6 TIMES
7748:A                          ...        SU     60          2ND & 3RD MIN AT (1/2 SEC)
7749:A  057226 326 006                  SU     6          TEMPORARY
7750:A  057230 372 311 136              JTS    ARC8       JUMP IF DATA WRITTEN LESS THAN 12 TIMES
7751:A  057233 312 275 136              JTZ    ARC7       JUMP IF DATA WRITTEN 12 TIMES
7752:A                          ...        SU     20          4TH + MIN AT  (1 / 5 SEC)
7753:A  057236 326 002                  SU     2          TEMPORARY
7754:A  057240 372 311 136              JTS    ARC8       JUMP IF DATA WRITTEN LESS THAN 14 TIMES
7755:A  057243 312 311 136              JTZ    ARC8       JUMP IF DATA WRITTEN 14 TIMES
7756:A  057246 076 001                  LOAD   1          ARCHIVING IS DONE, ALL SD ARCHIVE IS FULL
7757:A  057250 042 152 216              STO    ARCOFL
7760:A  057253 303 311 136              JMP    ARC8
7761:A  057256 041 021 000      ARC6    LDAD   17         STARTING 1/2 SEC SD ARCHIVE
7762:A  057261 042 166 216              STOD   TIMDEC     SET TIME LOCATION COUNTER
7763:A  057264 041 024 000              LDAD   20
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7762:A  057267 042 162 216              STOD  ARCTIM        ARCHIVE WRITTEN 1/2 SEC
7763:A  057272 303 311 136              JMP   ARC8
7764:A  057275 041 027 000      ARC7    LDAD  23            STARTING 1/5 SEC SD ARCHIVE
7765:A  057300 042 166 216              STOD  TIMDEC        SET TIME LOCATION COUNTER
7766:A  057303 041 062 000              LDAD  50
7767:A  057306 042 162 216              STOD  ARCTIM        ARCHIVE WRITTEN 1/5 SEC
7768:A  057311 052 155 216      ARC8    LDAD  ARCRMI        UPDATE FINE POINTER TO VALUE OF COARSE POINTER
7769:A  057314 042 153 216              STOD  ARCINC
7770:A  057317 072 166 216              LOAD  TIMDEC
7771:A  057322 267                      ORA                 SEE IF AT BEGINING OF SECTION
7772:A  057323 304 047 137              CFZ   TIMARC        IF SO CALL TO SAVE TIME
7773:A  057326 311                      RET
7774:A                          .
7775:A                          .
7776:A  057327 052 153 216      ARCH2   LDAD  ARCINC        SEGMENT TO ZERO OUT ARCHIVE RAM
7777:A  057332 353                      DEHL
7778:A  057333 041 170 216              HL    ATIME         POINT TO BEGINING OF ARCHIVE
7779:A  057336 031                      DAD   D             INCREMENT POINTER TO RAM THAT IS TO BE ZEROED NEXT
7780:A  057337 104                      LBH
7781:A  057340 115                      LCL
7782:A                          ...       LL    105           361 BYTES SET TO 0 (DONE 25 TIMES)
7783:A                          ...       LH    1               105 + 256 = 361
7784:A  057341 056 164                  LL    116           TEMPORARY 116 BYTES SET TO 0 (14 TIMES)
7785:A  057343 046 000                  LH    0
7786:A  057345 076 000          AAA     LOAD  0             LOAD 0 INTO THE ACCUMULATOR
7787:A  057347 002                      LMAR  B             STORE 0 INTO ARCHIVE RAM AT POINTER
7788:A  057350 003                      INX   B             NEXT RAM LOCATION
7789:A  057351 055                      DCL                 WAS IT DONE 116 TIMES
7790:A  057352 302 345 136              JFZ   AAA           JUMP IF NOT DONE
7791:A  057355 041 164 000              LDAD  116           INCREMENT POINTER TO NEXT BUNCH TO ZERO
7792:A                          ...       LDAD  361
7793:A  057360 353                      DEHL
7794:A  057361 052 153 216              LDAD  ARCINC
7795:A  057364 031                      DAD   D
7796:A  057365 042 153 216              STOD  ARCINC        RESAVE THE VALUE
7797:A  057370 072 155 216              LOAD  ARCRMI        LOAD # OF CYCLES TO ZERO OUT
7798:A  057373 075                      DCA                 DECREMENT IT
7799:A  057374 042 155 216              STO   ARCRMI        RESAVE IT
7800:A  057377 267                      ORA
7801:A  057400 300                      RNZ                 RETURN IF NOT DONE
7802:A  057401 072 123 201              LOAD  DACNT         INCREMENT SEGMENT COUNTER
7803:A  057404 074                      INA
7804:A  057405 062 123 201              STO   DACNT
7805:A  057410 311                      RET
7806:A                          .
7807:A  057411 076 000          ARCH3   LOAD  0             SET UP INITIAL CONDITIONS
7808:A  057413 062 123 201              STO   DACNT         SEGMENT COUNTER
7809:A  057416 062 164 216              STO   IIARC         ARCHIVE IS ZEROED OUT
7810:A  057421 041 000 000              LDAD  0
7811:A  057424 042 165 216              STOD  ACNT1
7812:A  057427 042 160 216              STOD  ACOUNT
7813:A  057432 042 153 216              STOD  ARCINC
7814:A  057435 042 155 216              STOD  ARCRMI
7815:A  057440 041 012 000              LDAD  10
```

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7816:A  057443 042 162 216              STOD  ARCTIM          RESET TIMER TO 1/SEC
7817:A  057446 311                      RET
7818:A
7819:A                                  .
7820:A                                  . ** SUBROUTINE **
7821:A                                  .
7822:A                                  .    SUBROUTINE WILL PUT STARTING TIME FOR ARCHIVE SECTION IN ATIME(TIMDEC-5)
7823:A                                  . THRU ATIME(TIMDEC).
7824:A                                  .
7824:A  057447 016 006                  TIMARC  LC    6
7825:A  057451 006 000                        LB    0               LOAD # OF RAM LOCATIONS FOR TIME
7826:A  057453 041 110 200              TMA1    HL    TIME-1          POINT TO CURRENT TIME ARRAY
7827:A  057456 011                            DAD   B               POINT TO THE RAM WANTED NOW
7828:A  057457 353                            DEHL
7829:A  057460 032                            LAMR  D               GET VALUE OF RAM
7830:A  057461 052 166 216                    LDAD  TIMDEC          LOAD LOCATION IN ATIME THAT IS DESTINATION
7831:A  057464 353                            DEHL
7832:A  057465 041 170 216                    HL    ATIME           POINT TO ATIME
7833:A  057470 031                            DAD   D               POINT TO THE CURRENT LOCATION
7834:A  057471 353                            DEHL
7835:A  057472 022                            LMAR  D               SAVE VALUE OF RAM IN ATIME
7836:A  057473 052 166 216                    LDAD  TIMDEC
7837:A  057476 053                            DCX   H               DECREMENT DESTINATION IN ATIME
7838:A  057477 042 166 216                    STOD  TIMDEC
7839:A  057502 013                            DCX   B
7840:A  057503 171                            LAC
7841:A  057504 267                            ORA                   ARE ALL THE TIMES AND DATES SAVED ?
7842:A  057505 302 053 137                    JFZ   TMA1            JUMP IF THEY ARE NOT
7843:A  057510 041 000 000                    LDAD  0               ZERO OUT DESTINATION IN ATIME
7844:A  057513 042 166 216                    STOD  TIMDEC
7845:A  057516 311                            RET
7846:A                                  .
7847:A                                  . *** GENERAL SUBROUTINES ***
7848:A                                  .
7849:A                                  . SUBROUTINE TO SHIFT HL TO THE RIGHT B TIMES.  HL IS THE OUTPUT VALUE.
7850:A                                  .
7851:A  057517 170                      SHIFTR  LAB                   PUT NUMBER OF SHIFTS INTO ACCUMULATOR
7852:A  057520 267                            ORA
7853:A  057521 310                            RTZ                   RETURN IF NO SHIFTS REQUIRED
7854:A  057522 175                      SFT2    LAL                   LOAD LSB
7855:A  057523 017                            SRC                   SHIFT IT
7856:A  057524 346 177                        AND   127             CLEAR 7TH BIT
7857:A  057526 157                            LLA                   RESTORE IT
7858:A  057527 174                            LAH                   LOAD MSB
7859:A  057530 017                            SRC                   SHIFT IT
7860:A  057531 147                            LHA                   RESTORE IT
7861:A  057532 322 141 137                    JFC   SFT1            JUMP IF BEFORE SHIFT THERE WAS NOT A 1 IN 0TH BIT
7862:A  057535 175                            LAL                   LOAD LSB SHIFTED
7863:A  057536 366 200                        IOR   128             PUT A 1 IN THE 7TH BIT
7864:A  057540 157                            LLA                   RESTORE IT
7865:A  057541 174                      SFT1  LAH                   LOAD MSB SHIFTED
7866:A  057542 346 177                        AND   127             CLEAR 7TH BIT
7867:A  057544 147                            LHA                   RESTORE IT
7868:A  057545 005                            DCB                   DECREMENT # OF SHIFTS
7869:A  057546 302 122 137                    JFZ   SFT2            JUMP IF MORE SHIFTS TO BE DONE
```

```
7870:A   057551 311                        RET
7871:A
7872:A                                .
7873:A                                . SUBROUTINE TO TAKE A NEGATIVE NUMBER IN HL AND TAKE THE ABSOLUTE VALUE OF IT
7874:A                                .   AND STORE RESULT IN HL.
7875:A                                .
7876:A   057552 174                   POSNUM  LAH
7877:A   057553 057                           CMA
7878:A   057554 147                           LHA
7879:A   057555 175                           LAL
7880:A   057556 057                           CMA
7881:A   057557 157                           LLA
7882:A   057560 043                           INX   H
7883:A   057561 311                           RET
7884:A                                .
7885:A                                . SUBROUTINE TO TAKE POSITIVE NUMBER IN HL AND MAKE IT A NEGATIVE NUMBER OF
7886:A                                .   SAME MAGNITUDE AND STORE RESULT IN HL.
7887:A                                .
7888:A   057562 053                   NEGNUM  DCX   H
7889:A   057563 174                           LAH
7890:A   057564 057                           CMA
7891:A   057565 147                           LHA
7892:A   057566 175                           LAL
7893:A   057567 057                           CMA
7894:A   057570 157                           LLA
7895:A   057571 311                           RET
7896:A   057572 062 116 201                   STO   DCSOCT          SET SEGMENT COUNTER TO PRINT TOP OF PAGE
7897:A   057575 311                           RET
7898:A                                .
7899:A                                .
7900:A                                . SL709-6015-00   RTCCND, RTC CLOCK/CALENDAR   4-5-77   DBS
7901:A                                . SL709-6015-01   RTCCND, RTC CLOCK/CALENDAR  12-12-78  BWK
7902:A                                . COPYRIGHT 1977
7903:A                                . EAGLE SIGNAL DIVISION
7904:A                                . GULF+WESTERN MANUFACTURING COMPANY
                                      .
                                      .
8801:A                                .
8802:A                                . SL709-6037-01   CP7COMD, CP717 COMM. PKG.   30JUL81
8803:A                                . COPYRIGHT 1981
8804:A                                . EAGLE SIGNAL DIVISION
8805:A                                .
8806:A                                . SL709-6034-01   PRTKYND, TYPE D PRINT/KEYIN   30JUL81
8807:A                                . COPYRIGHT 1981
8808:A                                . EAGLE SIGNAL DIVISION INDUSTRIAL CONTROL SYSTEMS
8809:A                                . GULF + WESTERN MANUFACTURING COMPANY
8810:A                                .
```

VENDOR SOFTWARE

```
          020000 000 245 040 060 045 006
          020006 013 001 000 000 000 000
          020014 000 000 000 000 000 000
          020022 000 000 000 000 000 000
          020030 000 000 000 000 000 000
          020036 065 174 000 234 040 065
          020044 174 000 000 000 234 040
          020052 000 220 040 002 000 174
          020060 065 174 000 000 245 040
          020066 000 000 000 000 000 000
          020074 245 040 065 174 000 174
          020102 230 040 174 004 045 040
          020110 000
          020140 311 000 000
          020143 311 000 000
          020146 303 212 045
          020151 303 360 046
          020154 303 351 046
          020157 303 331 046
          020162 311 000 000
          020165 311 000 000
          020170 311 000 000
          020173 311 000 000
          020176 311 000 000
WARNINGS
```

SIZE		SHEET	REV
A	47A382285	1 OF 107	A

REVISIONS

LTR	DESCRIPTION	DATE	APPROVED
A	REVISED PER AN-1	9/29/83	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES. TOLERANCES ON:

FRACTIONS ± DECIMALS ± ANGLES ±

ALL SURFACES √

MATL—

SIGNATURES	DAY	MO	YR
DRAWN	18	4	83
CHECKED N/A			
ISSUED	25	4	83
ENGRG	29	4	83
MFG	25	4	83
[redacted] STRESS N/A			
AERO ENG.	25	4	83
QA.	25	4	83
CHIEF ENG.	25	4	83

GENERAL ELECTRIC

AEPD DEPT LOC V.F. PA

AERODYNAMIC PROFILE COORDINATES ROTOR BLADE ~ MOD 5A, WTG

SIZE	CODE IDENT NO.	
A	—	47A382285

SCALE — SHEET 1 OF 107

GENERAL NOTES

(1) This drawing defines the basic outside aerodynamic profile of the MOD-5A model type 304 Rotor Blade, based on a modified NACA 64XXX series airfoil.

(2) Section profile external coordinates herein to be used in conjunction with GE drawings:

47J382287 Center Blade Section
(Later) Inboard Blade Section and
(Later) Outboard Blade Section.

(3) TABLE 1 - SHEETS 6 THROUGH 81

This table delineates the outside aerodynamic profile from blade station 600 (25% of span) to blade station 2400 (100% of span). Section external profiles are given at 24 inch intervals along span (one per page, i.e. 1.0% of span) between the above noted blade stations.

The profile of cambered sections may extend beyond the leading edge of the chord line (x=0, y=0). This is implied by finite values of the slope at the leading edge of the chord. Leading edges faired through the given coordinates and respecting the given slopes are acceptable.

TABLE II - SHEETS 82 THROUGH 107

This table delineates the outside blade profile from STA 0.0 (0% Span) to STA 600 (25% of Span). For 0 to 60% of chord only.

NOTE: Remaining 40% of chord (T/E Section) to added later.

TABLE II - SHEETS 82 THROUGH 107 (continued)

The blade outside profile shall be faired into a smooth profile through the basic coordinates given in Tables I and II, both in the chordwise and spanwise directions.

(4) Finished aerodynamic profile tolerances to be as noted in GE Drawing 47E382460.

(5) Table definitions as follows: (see Figure 1)

Radius Ratio	=	% of Span/100
R	=	Radius of station from center of rotation (inches) (ie: station line)
C	=	Chord Length (measured parallel to chord line)
T	=	Total thickness of airfoil
T/C	=	Ratio of thickness to chord length
T.T.U.	=	Trailing edge thickness upper (dist. from chord line to upper surface trailing edge)
T.T.L.	=	Trailing edge thickness lower (dist. from chord line to lower surface trailing edge)
DESIGN CL	=	Section design lift coefficient (camber)
X UPPER	=	Dist. along chord line from leading edge (for upper coordinates)
Y UPPER	=	Coordinate offset from chord line for upper surface (normal to chord line)
X LOWER	=	Dist. along chord line from L.E. for lower coordinates
Y LOWER	=	Coordinate offset from chord line for lower surface (normal to chord line)
X ZERO	=	Offset of "X" axis from a plane of 90° to rotation plane coincident with 30% of chord
Y ZERO	=	Offset of "Y" axis from the rotational plane

(5) Table definitions as follows: (see Figure 1) - CONTINUED

DYU/DXU = Local chordwise slope at designated coordinate - upper surface

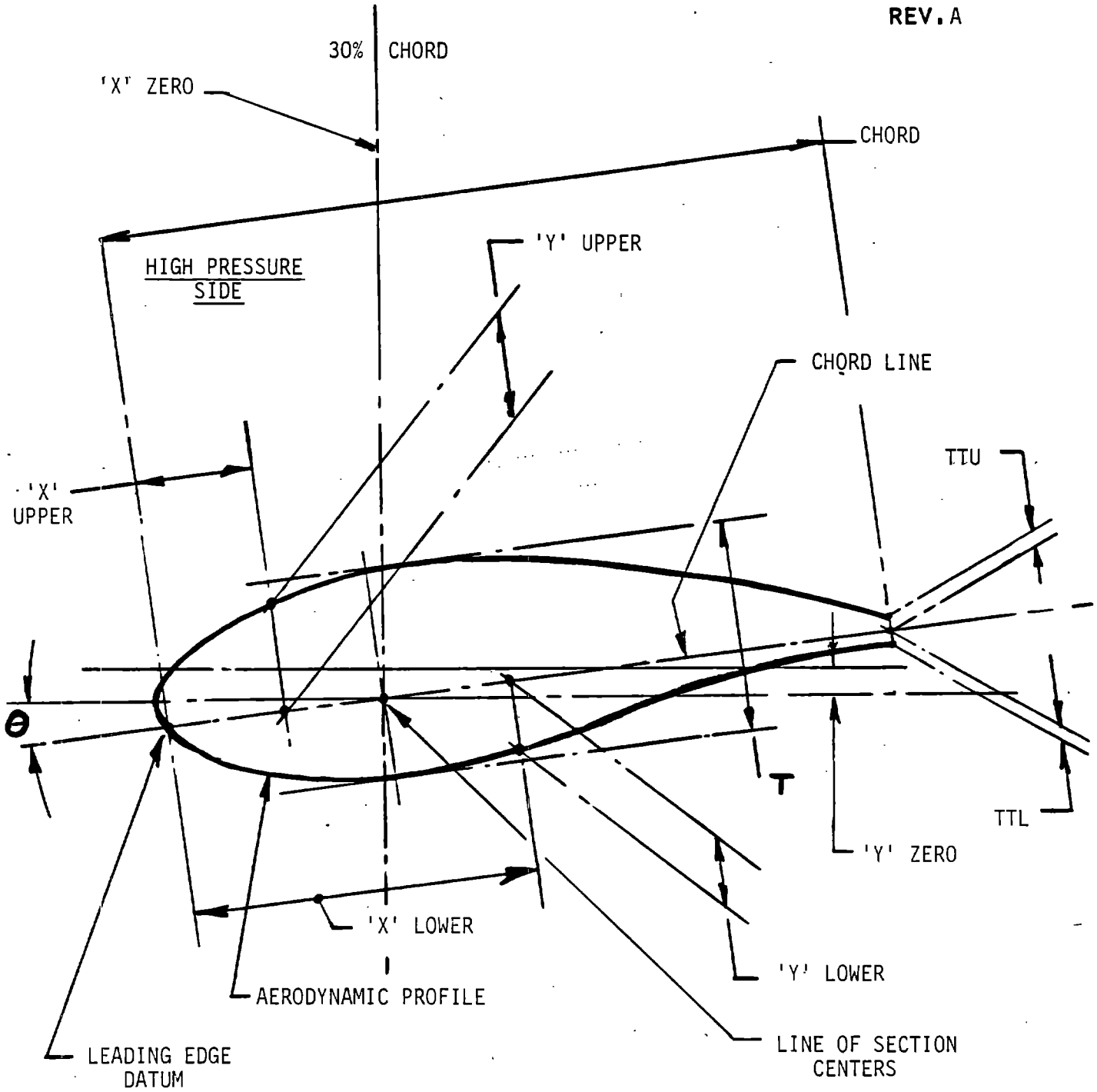
DYL/DXL = Local chordwise slope at designated coordinate - lower surface

CHORD LINE = A straight line joining the leading edge to trailing edge

THETA (θ) = Angle of the local chord line to the true rotational plane of blade, referenced to and rotated about the 30% of chord. (Angle of profile twist with respect to angle of rotation - positive angles forward, upwind).

L.S.C. = Line of section centers is a line extending outboard through which the sta. chord plane and twist plane pass (i.e.) coincident with 30% of chord.

(6) Section external profiles shall be referenced to and aligned spanwise along the 30% chord points.
i.e. The 30% chord points shall form a line 90° to center line of rotation. See GE drawing 47D382406.



HIGH PRESSURE SIDE

FIGURE 1

TABLE I - 1

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.250

R= 600.00" C= 300.00" T= 85.80" T/C= 0.2860

TTU= 17.05" TTL= -0.06"

THETA= 5.00 DEG DESIGN CL= 0.

XZERO= 0. " YZERO= 0. "

% CHORD	X,UPPER (INCH)	Y,UPPER (INCH)	DYU/DXU	X,LOWER (INCH)	Y,LOWER (INCH)	DYL/DXL
0.	0.	0.	**********	0.	0.	**********
0.25	0.7500	4.5123	2.9390	0.7500	-4.5123	-2.9390
0.50	1.5000	6.2959	2.0085	1.5000	-6.2959	-2.0085
0.75	2.2500	7.6277	1.5982	2.2500	-7.6277	-1.5982
1.25	3.7500	9.6951	1.2231	3.7500	-9.6951	-1.2231
2.00	6.0000	12.1351	0.9828	6.0000	-12.1351	-0.9828
2.50	7.5000	13.5479	0.9083	7.5000	-13.5479	-0.9083
3.00	9.0000	14.8675	0.8530	9.0000	-14.8675	-0.8530
3.50	10.5000	16.1084	0.8022	10.5000	-16.1084	-0.8022
4.00	12.0000	17.2788	0.7577	12.0000	-17.2788	-0.7577
4.50	13.5000	18.3818	0.7144	13.5000	-18.3818	-0.7144
5.00	15.0000	19.4220	0.6744	15.0000	-19.4220	-0.6744
7.50	22.5000	23.8712	0.5269	22.5000	-23.8712	-0.5269
10.00	30.0000	27.4731	0.4393	30.0000	-27.4731	-0.4393
15.00	45.0000	33.1170	0.3205	45.0000	-33.1170	-0.3205
20.00	60.0000	37.2499	0.2336	60.0000	-37.2499	-0.2336
25.00	75.0000	40.1925	0.1591	75.0000	-40.1925	-0.1591
30.00	90.0000	42.0663	0.0915	90.0000	-42.0663	-0.0915
35.00	105.0000	42.8857	0.0132	105.0000	-42.8857	-0.0132
40.00	120.0000	42.5432	-0.0525	120.0000	-42.3121	0.0870
45.00	135.0000	41.4105	-0.0953	135.0000	-40.4354	0.1579
50.00	150.0000	39.7456	-0.1255	150.0000	-37.6768	0.2080
55.00	165.0000	37.6784	-0.1488	165.0000	-34.2516	0.2465
60.00	180.0000	35.3119	-0.1655	180.0000	-30.3306	0.2742
65.00	195.0000	32.7356	-0.1769	195.0000	-26.0619	0.2931
70.00	210.0000	30.0299	-0.1827	210.0000	-21.5788	0.3027
75.00	225.0000	27.2834	-0.1823	225.0000	-17.0281	0.3021
80.00	240.0000	24.5975	-0.1744	240.0000	-12.5778	0.2890
85.00	255.0000	22.0838	-0.1597	255.0000	-8.4129	0.2647
90.00	270.0000	19.8501	-0.1366	270.0000	-4.7119	0.2264
95.00	285.0000	18.0487	-0.1000	285.0000	-1.7270	0.1656
100.00	300.0000	17.0450	-0.0067	300.0000	-0.0640	0.0111

TABLE I - 2

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.260

R= 624.00" C= 296.97" T= 84.70" T/C= 0.2852

TTU= 15.48" TTL= -0.12"

THETA= 4.96 DEG DESIGN CL= 0.022

XZERO= 0. " YZERO= 0.3196"

% CHORD	X,UPPER (INCH)	Y,UPPER (INCH)	DYU/DXU	X,LOWER (INCH)	Y,LOWER (INCH)	DYL/DXL
0.	0.	0.	-107.9096	0.	0.	-107.9096
0.25	0.7424	4.5880	2.9339	0.7424	-4.3248	-2.9407
0.50	1.4849	6.3528	1.9937	1.4849	-6.0905	-2.0003
0.75	2.2273	7.6616	1.5890	2.2273	-7.4110	-1.5991
1.25	3.7121	9.6988	1.2228	3.7121	-9.4567	-1.2172
2.00	5.9394	12.1162	0.9853	5.9394	-11.8570	-0.9751
2.50	7.4243	13.5188	0.9111	7.4243	-13.2435	-0.9004
3.00	8.9091	14.8288	0.8552	8.9091	-14.5383	-0.8455
3.50	10.3939	16.0602	0.8041	10.3939	-15.7560	-0.7953
4.00	11.8788	17.2214	0.7593	11.8788	-16.9044	-0.7513
4.50	13.3637	18.3151	0.7157	13.3637	-17.9875	-0.7085
5.00	14.8485	19.3469	0.6756	14.8485	-19.0083	-0.6689
7.50	22.2728	23.7605	0.5284	22.2728	-23.3749	-0.5221
10.00	29.6970	27.3353	0.4408	29.6970	-26.9082	-0.4351
15.00	44.5455	32.9419	0.3217	44.5455	-32.4403	-0.3173
20.00	59.3940	37.0502	0.2346	59.3940	-36.4893	-0.2311
25.00	74.2425	39.9780	0.1601	74.2425	-39.3700	-0.1572
30.00	89.0910	41.8464	0.0924	89.0910	-41.2009	-0.0901
35.00	103.9395	42.6702	0.0141	103.9395	-41.9967	-0.0126
40.00	118.7880	42.3219	-0.0549	118.7880	-41.4238	0.0871
45.00	133.6365	41.1464	-0.1001	133.6365	-39.5679	0.1575
50.00	148.4850	39.4129	-0.1322	148.4850	-36.8456	0.2072
55.00	163.3335	37.2560	-0.1569	163.3335	-33.4697	0.2453
60.00	178.1820	34.7830	-0.1748	178.1820	-29.6101	0.2725
65.00	193.0305	32.0869	-0.1872	193.0305	-25.4132	0.2910
70.00	207.8790	29.2510	-0.1936	207.8790	-21.0108	0.3001
75.00	222.7275	26.3673	-0.1936	222.7275	-16.5485	0.2990
80.00	237.5760	23.5412	-0.1857	237.5760	-12.1927	0.2855
85.00	252.4245	20.8886	-0.1706	252.4245	-8.1267	0.2605
90.00	267.2730	18.5212	-0.1468	267.2730	-4.5288	0.2216
95.00	282.1215	16.5954	-0.1089	282.1215	-1.6519	0.1598
100.00	296.9700	15.4800	-0.0163	296.9700	-0.1150	-0.0034

TABLE I - 3

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.270

R= 648.00" C= 293.95" T= 83.57" T/C= 0.2843

TTU= 13.97" TTL= -0.16"

THETA= 4.92 DEG DESIGN CL= 0.043

XZERO= 0. " YZERO= 0.6203"

% CHORD	X,UPPER (INCH)	Y,UPPER (INCH)	DYU/DXU	X,LOWER (INCH)	Y,LOWER (INCH)	DYL/DXL
0.	0.	0.	-55.2096	0.	0.	-55.2096
0.25	0.7349	4.6574	2.9236	0.7349	-4.1528	-2.9315
0.50	1.4698	6.4018	1.9697	1.4698	-5.8976	-1.9889
0.75	2.2046	7.6869	1.5785	2.2046	-7.2038	-1.5982
1.25	3.6744	9.6931	1.2218	3.6744	-9.2230	-1.2123
2.00	5.8790	12.0865	0.9871	5.8790	-11.5834	-0.9685
2.50	7.3487	13.4780	0.9132	7.3487	-12.9451	-0.8927
3.00	8.8185	14.7775	0.8568	8.8185	-14.2153	-0.8380
3.50	10.2882	15.9984	0.8054	10.2882	-15.4100	-0.7884
4.00	11.7580	17.1497	0.7603	11.7580	-16.5367	-0.7447
4.50	13.2278	18.2334	0.7165	13.2278	-17.5998	-0.7025
5.00	14.6975	19.2560	0.6764	14.6975	-18.6015	-0.6632
7.50	22.0463	23.6312	0.5295	22.0463	-22.8862	-0.5172
10.00	29.3950	27.1766	0.4419	29.3950	-26.3505	-0.4309
15.00	44.0925	32.7420	0.3227	44.0925	-31.7709	-0.3141
20.00	58.7900	36.8226	0.2356	58.7900	-35.7369	-0.2286
25.00	73.4875	39.7332	0.1609	73.4875	-38.5563	-0.1554
30.00	88.1850	41.5946	0.0931	88.1850	-40.3452	-0.0888
35.00	102.8825	42.4219	0.0149	102.8825	-41.1185	-0.0119
40.00	117.5800	42.0694	-0.0570	117.5800	-40.5478	0.0872
45.00	132.2775	40.8561	-0.1046	132.2775	-38.7136	0.1571
50.00	146.9750	39.0607	-0.1385	146.9750	-36.0287	0.2063
55.00	161.6725	36.8223	-0.1647	161.6725	-32.7032	0.2440
60.00	176.3700	34.2521	-0.1837	176.3700	-28.9056	0.2708
65.00	191.0675	31.4459	-0.1970	191.0675	-24.7807	0.2888
70.00	205.7650	28.4897	-0.2040	205.7650	-20.4587	0.2974
75.00	220.4625	25.4789	-0.2044	220.4625	-16.0841	0.2959
80.00	235.1600	22.5219	-0.1965	235.1600	-11.8212	0.2819
85.00	249.8575	19.7389	-0.1811	249.8575	-7.8519	0.2565
90.00	264.5550	17.2449	-0.1567	264.5550	-4.3540	0.2170
95.00	279.2525	15.2000	-0.1178	279.2525	-1.5808	0.1542
100.00	293.9500	13.9740	-0.0264	293.9500	-0.1630	-0.0173

TABLE I - 4

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.280

R= 672.00" C= 290.92" T= 82.48" T/C= 0.2835

TTU= 12.51" TTL= -0.21"

THETA= 4.88 DEG DESIGN CL= 0.064

XZERO= 0. " YZERO= 0.8997"

% CHORD	X,UPPER (INCH)	Y,UPPER (INCH)	DYU/DXU	X,LOWER (INCH)	Y,LOWER (INCH)	DYL/DXL
0.	0.	0.	-37.0939	0.	0.	-37.0939
0.25	0.7273	4.7234	2.9209	0.7273	-3.9910	-2.9147
0.50	1.4546	6.4473	1.9514	1.4546	-5.7113	-1.9777
0.75	2.1819	7.7115	1.5685	2.1819	-7.0021	-1.5976
1.25	3.6365	9.6881	1.2208	3.6365	-8.9961	-1.2075
2.00	5.8184	12.0578	0.9891	5.8184	-11.3174	-0.9621
2.50	7.2730	13.4385	0.9156	7.2730	-12.6547	-0.8852
3.00	8.7276	14.7277	0.8587	8.7276	-13.9011	-0.8308
3.50	10.1822	15.9386	0.8070	10.1822	-15.0733	-0.7817
4.00	11.6368	17.0803	0.7616	11.6368	-16.1788	-0.7383
4.50	13.0914	18.1542	0.7176	13.0914	-17.2226	-0.6968
5.00	14.5460	19.1681	0.6774	14.5460	-18.2056	-0.6578
7.50	21.8190	23.5063	0.5308	21.8190	-22.4105	-0.5126
10.00	29.0920	27.0234	0.4432	29.0920	-25.8075	-0.4269
15.00	43.6380	32.5492	0.3238	43.6380	-31.1191	-0.3110
20.00	58.1840	36.6034	0.2366	58.1840	-35.0043	-0.2262
25.00	72.7300	39.4976	0.1618	72.7300	-37.7638	-0.1536
30.00	87.2760	41.3523	0.0940	87.2760	-39.5115	-0.0875
35.00	101.8220	42.1830	0.0157	101.8220	-40.2624	-0.0112
40.00	116.3680	41.8272	-0.0591	116.3680	-39.6935	0.0872
45.00	130.9140	40.5783	-0.1090	130.9140	-37.8804	0.1568
50.00	145.4600	38.7243	-0.1446	145.4600	-35.2313	0.2055
55.00	160.0060	36.4084	-0.1723	160.0060	-31.9549	0.2427
60.00	174.5520	33.7453	-0.1925	174.5520	-28.2175	0.2691
65.00	189.0980	30.8335	-0.2067	189.0980	-24.1625	0.2867
70.00	203.6440	27.7615	-0.2143	203.6440	-19.9188	0.2948
75.00	218.1900	24.6276	-0.2152	218.1900	-15.6296	0.2929
80.00	232.7360	21.5435	-0.2074	232.7360	-11.4574	0.2785
85.00	247.2820	18.6330	-0.1917	247.2820	-7.5825	0.2526
90.00	261.8280	16.0143	-0.1668	261.8280	-4.1823	0.2125
95.00	276.3740	13.8505	-0.1269	276.3740	-1.5104	0.1487
100.00	290.9200	12.5110	-0.0375	290.9200	-0.2090	-0.0310

TABLE I - 5

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.290

R= 696.00" C= 287.89" T= 81.39" T/C= 0.2827

TTU= 11.08" TTL= -0.25"

THETA= 4.84 DEG DESIGN CL= 0.083

XZERO= 0. " YZERO= 1.1552"

% CHORD	X,UPPER (INCH)	Y,UPPER (INCH)	DYU/DXU	X,LOWER (INCH)	Y,LOWER (INCH)	DYL/DXL
0.	0.	0.	-28.6026	0.	0.	-28.6026
0.25	0.7197	4.7797	2.9107	0.7197	-3.8476	-2.8933
0.50	1.4394	6.4742	1.9388	1.4394	-5.5360	-1.9718
0.75	2.1592	7.7198	1.5616	2.1592	-6.8137	-1.5973
1.25	3.5986	9.6704	1.2194	3.5986	-8.7841	-1.2025
2.00	5.7578	12.0156	0.9906	5.7578	-11.0674	-0.9560
2.50	7.1973	13.3846	0.9175	7.1973	-12.3811	-0.8782
3.00	8.6367	14.6628	0.8601	8.6367	-13.6044	-0.8240
3.50	10.0761	15.8628	0.8082	10.0761	-14.7550	-0.7755
4.00	11.5156	16.9944	0.7625	11.5156	-15.8400	-0.7322
4.50	12.9550	18.0581	0.7183	12.9550	-16.8649	-0.6913
5.00	14.3945	19.0627	0.6781	14.3945	-17.8299	-0.6526
7.50	21.5917	23.3617	0.5319	21.5917	-21.9575	-0.5082
10.00	28.7890	26.8486	0.4443	28.7890	-25.2898	-0.4231
15.00	43.1835	32.3312	0.3247	43.1835	-30.4969	-0.3080
20.00	57.5780	36.3560	0.2374	57.5780	-34.3044	-0.2239
25.00	71.9725	39.2315	0.1626	71.9725	-37.0067	-0.1519
30.00	86.3670	41.0777	0.0947	86.3670	-38.7152	-0.0862
35.00	100.7615	41.9103	0.0164	100.7615	-39.4450	-0.0106
40.00	115.1560	41.5515	-0.0611	115.1560	-38.8787	0.0873
45.00	129.5505	40.2695	-0.1133	129.5505	-37.0875	0.1564
50.00	143.9450	38.3603	-0.1506	143.9450	-34.4744	0.2047
55.00	158.3395	35.9713	-0.1797	158.3395	-31.2466	0.2415
60.00	172.7340	33.2202	-0.2011	172.7340	-27.5684	0.2676
65.00	187.1285	30.2084	-0.2162	187.1285	-23.5817	0.2847
70.00	201.5230	27.0266	-0.2245	201.5230	-19.4139	0.2924
75.00	215.9175	23.7760	-0.2257	215.9175	-15.2068	0.2901
80.00	230.3120	20.5711	-0.2180	230.3120	-11.1212	0.2753
85.00	244.7065	17.5391	-0.2021	244.7065	-7.3357	0.2489
90.00	259.1010	14.8013	-0.1767	259.1010	-4.0270	0.2083
95.00	273.4955	12.5238	-0.1359	273.4955	-1.4485	0.1436
100.00	287.8900	11.0750	-0.0484	287.8900	-0.2520	-0.0435

TABLE I - 6

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.300

R= 720.00" C= 284.87" T= 80.28" T/C= 0.2818

TTU= 9.65" TTL= -0.29"

THETA= 4.80 DEG DESIGN CL= 0.100

XZERO= 0. " YZERO= 1.3845"

% CHORD	X,UPPER (INCH)	Y,UPPER (INCH)	DYU/DXU	X,LOWER (INCH)	Y,LOWER (INCH)	DYL/DXL
0.	0.	0.	-23.7401	0.	0.	-23.7401
0.25	0.7122	4.8241	2.8937	0.7122	-3.7144	-2.8804
0.50	1.4243	6.4850	1.9276	1.4243	-5.3753	-1.9645
0.75	2.1365	7.7106	1.5570	2.1365	-6.6342	-1.5987
1.25	3.5609	9.6380	1.2172	3.5609	-8.5833	-1.1978
2.00	5.6974	11.9571	0.9913	5.6974	-10.8299	-0.9498
2.50	7.1217	13.3131	0.9184	7.1217	-12.1203	-0.8713
3.00	8.5461	14.5792	0.8608	8.5461	-13.3211	-0.8172
3.50	9.9704	15.7674	0.8087	9.9704	-14.4503	-0.7692
4.00	11.3948	16.8878	0.7628	11.3948	-15.5152	-0.7262
4.50	12.8191	17.9403	0.7184	12.8191	-16.5215	-0.6859
5.00	14.2435	18.9348	0.6782	14.2435	-17.4687	-0.6474
7.50	21.3652	23.1910	0.5324	21.3652	-21.5200	-0.5038
10.00	28.4870	26.6446	0.4450	28.4870	-24.7886	-0.4194
15.00	42.7305	32.0787	0.3254	42.7305	-29.8934	-0.3052
20.00	56.9740	36.0700	0.2380	56.9740	-33.6251	-0.2218
25.00	71.2175	38.9236	0.1632	71.2175	-36.2718	-0.1502
30.00	85.4610	40.7589	0.0953	85.4610	-37.9425	-0.0851
35.00	99.7045	41.5920	0.0171	99.7045	-38.6526	-0.0101
40.00	113.9480	41.2306	-0.0630	113.9480	-38.0902	0.0872
45.00	128.1915	39.9177	-0.1174	128.1915	-36.3224	0.1559
50.00	142.4350	37.9565	-0.1565	142.4350	-33.7467	0.2038
55.00	156.6785	35.4985	-0.1870	156.6785	-30.5685	0.2402
60.00	170.9220	32.6641	-0.2095	170.9220	-26.9500	0.2659
65.00	185.1655	29.5575	-0.2255	185.1655	-23.0315	0.2827
70.00	199.4090	26.2715	-0.2345	199.4090	-18.9388	0.2901
75.00	213.6525	22.9098	-0.2361	213.6525	-14.8121	0.2874
80.00	227.8960	19.5899	-0.2284	227.8960	-10.8105	0.2723
85.00	242.1395	16.4421	-0.2124	242.1395	-7.1106	0.2455
90.00	256.3830	13.5907	-0.1864	256.3830	-3.8883	0.2044
95.00	270.6265	11.2044	-0.1447	270.6265	-1.3965	0.1390
100.00	284.8700	9.6510	-0.0592	284.8700	-0.2940	-0.0546

TABLE I - 7

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.310

R= 744.00" C= 281.84" T= 79.20" T/C= 0.2810

TTU= 8.24" TTL= -0.33"

THETA= 4.76 DEG DESIGN CL= 0.116

XZERO= 0. " YZERO= 1.5940"

% CHORD	X,UPPER (INCH)	Y,UPPER (INCH)	DYU/DXU	X,LOWER (INCH)	Y,LOWER (INCH)	DYL/DXL
0.	0.	0.	-20.4656	0.	0.	-20.4656
0.25	0.7046	4.8629	2.8752	0.7046	-3.5903	-2.8695
0.50	1.4092	6.4909	1.9162	1.4092	-5.2249	-1.9575
0.75	2.1138	7.6967	1.5525	2.1138	-6.4656	-1.5993
1.25	3.5230	9.6009	1.2152	3.5230	-8.3921	-1.1939
2.00	5.6368	11.8942	0.9920	5.6368	-10.6041	-0.9440
2.50	7.0460	13.2373	0.9195	7.0460	-11.8721	-0.8649
3.00	8.4552	14.4912	0.8615	8.4552	-13.0512	-0.8110
3.50	9.8644	15.6677	0.8092	9.8644	-14.1600	-0.7635
4.00	11.2736	16.7771	0.7631	11.2736	-15.2055	-0.7207
4.50	12.6828	17.8186	0.7187	12.6828	-16.1940	-0.6808
5.00	14.0920	18.8030	0.6784	14.0920	-17.1241	-0.6427
7.50	21.1380	23.0169	0.5330	21.1380	-21.1023	-0.4998
10.00	28.1840	26.4374	0.4457	28.1840	-24.3099	-0.4160
15.00	42.2760	31.8232	0.3260	42.2760	-29.3169	-0.3025
20.00	56.3680	35.7809	0.2386	56.3680	-32.9760	-0.2197
25.00	70.4600	38.6124	0.1638	70.4600	-35.5695	-0.1487
30.00	84.5520	40.4364	0.0958	84.5520	-37.2043	-0.0840
35.00	98.6440	41.2692	0.0178	98.6440	-37.8955	-0.0096
40.00	112.7360	40.9053	-0.0650	112.7360	-37.3370	0.0871
45.00	126.8280	39.5621	-0.1216	126.8280	-35.5919	0.1554
50.00	140.9200	37.5502	-0.1624	140.9200	-33.0525	0.2030
55.00	155.0120	35.0247	-0.1943	155.0120	-29.9222	0.2391
60.00	169.1040	32.1090	-0.2180	169.1040	-26.3613	0.2644
65.00	183.1960	28.9096	-0.2349	183.1960	-22.5084	0.2809
70.00	197.2880	25.5217	-0.2445	197.2880	-18.4878	0.2879
75.00	211.3800	22.0513	-0.2465	211.3800	-14.4384	0.2849
80.00	225.4720	18.6186	-0.2390	225.4720	-10.5170	0.2695
85.00	239.5640	15.3574	-0.2227	239.5640	-6.8987	0.2423
90.00	253.6560	12.3944	-0.1962	253.6560	-3.7584	0.2008
95.00	267.7480	9.9009	-0.1536	267.7480	-1.3483	0.1347
100.00	281.8400	8.2440	-0.0701	281.8400	-0.3330	-0.0650

TABLE I - 8

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.320

R= 768.00" C= 278.81" T= 78.09" T/C= 0.2801

TTU= 6.89" TTL= -0.37"

THETA= 4.72 DEG DESIGN CL= 0.132

XZERO= 0. " YZERO= 1.7908"

% CHORD	X,UPPER (INCH)	Y,UPPER (INCH)	DYU/DXU	X,LOWER (INCH)	Y,LOWER (INCH)	DYL/DXL
0.	0.	0.	-17.9849	0.	0.	-17.9849
0.25	0.6970	4.9001	2.8522	0.6970	-3.4708	-2.8537
0.50	1.3941	6.4938	1.9032	1.3941	-5.0779	-1.9484
0.75	2.0911	7.6794	1.5471	2.0911	-6.2992	-1.5987
1.25	3.4851	9.5598	1.2126	3.4851	-8.1999	-1.1905
2.00	5.5762	11.8265	0.9923	5.5762	-10.3787	-0.9378
2.50	6.9703	13.1561	0.9201	6.9703	-11.6241	-0.8582
3.00	8.3643	14.3973	0.8618	8.3643	-12.7812	-0.8045
3.50	9.7584	15.5615	0.8095	9.7584	-13.8693	-0.7574
4.00	11.1524	16.6594	0.7632	11.1524	-14.8952	-0.7149
4.50	12.5465	17.6895	0.7187	12.5465	-15.8655	-0.6755
5.00	13.9405	18.6635	0.6784	13.9405	-16.7783	-0.6376
7.50	20.9108	22.8335	0.5335	20.9108	-20.6820	-0.4956
10.00	27.8810	26.2195	0.4462	27.8810	-23.8278	-0.4123
15.00	41.8215	31.5548	0.3265	41.8215	-28.7357	-0.2998
20.00	55.7620	35.4775	0.2391	55.7620	-32.3214	-0.2176
25.00	69.7025	38.2857	0.1643	69.7025	-34.8611	-0.1472
30.00	83.6430	40.0976	0.0964	83.6430	-36.4596	-0.0829
35.00	97.5835	40.9299	0.0184	97.5835	-37.1320	-0.0091
40.00	111.5240	40.5650	-0.0667	111.5240	-36.5778	0.0870
45.00	125.4645	39.1955	-0.1256	125.4645	-34.8561	0.1549
50.00	139.4050	37.1381	-0.1680	139.4050	-32.3539	0.2021
55.00	153.3455	34.5515	-0.2013	153.3455	-29.2725	0.2378
60.00	167.2860	31.5614	-0.2261	167.2860	-25.7703	0.2628
65.00	181.2265	28.2768	-0.2439	181.2265	-21.9839	0.2789
70.00	195.1670	24.7945	-0.2542	195.1670	-18.0362	0.2856
75.00	209.1075	21.2229	-0.2566	209.1075	-14.0645	0.2823
80.00	223.0480	17.6845	-0.2492	223.0480	-10.2237	0.2666
85.00	236.9885	14.3159	-0.2328	236.9885	-6.6871	0.2391
90.00	250.9290	11.2465	-0.2059	250.9290	-3.6286	0.1972
95.00	264.8695	8.6493	-0.1626	264.8695	-1.2996	0.1304
100.00	278.8100	6.8890	-0.0816	278.8100	-0.3700	-0.0754

TABLE I - 9

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.330

R= 792.00" C= 275.79" T= 77.03" T/C= 0.2793

TTU= 5.62" TTL= -0.41"

THETA= 4.68 DEG DESIGN CL= 0.147

XZERO= 0. " YZERO= 1.9739"

% CHORD	X,UPPER (INCH)	Y,UPPER (INCH)	DYU/DXU	X,LOWER (INCH)	Y,LOWER (INCH)	DYL/DXL
0.	0.	0.	-16.1497	0.	0.	-16.1497
0.25	0.6895	4.9250	2.8416	0.6895	-3.3606	-2.8376
0.50	1.3789	6.4922	1.8904	1.3789	-4.9416	-1.9387
0.75	2.0684	7.6580	1.5419	2.0684	-6.1433	-1.5975
1.25	3.4474	9.5150	1.2102	3.4474	-8.0185	-1.1872
2.00	5.5158	11.7554	0.9927	5.5158	-10.1652	-0.9321
2.50	6.8947	13.0717	0.9208	6.8947	-11.3888	-0.8520
3.00	8.2737	14.3003	0.8623	8.2737	-12.5250	-0.7984
3.50	9.6526	15.4525	0.8098	9.6526	-13.5933	-0.7518
4.00	11.0316	16.5390	0.7634	11.0316	-14.6005	-0.7095
4.50	12.4105	17.5580	0.7188	12.4105	-15.5534	-0.6706
5.00	13.7895	18.5217	0.6785	13.7895	-16.4496	-0.6330
7.50	20.6843	22.6484	0.5340	20.6843	-20.2824	-0.4917
10.00	27.5790	26.0007	0.4468	27.5790	-23.3692	-0.4090
15.00	41.3685	31.2860	0.3271	41.3685	-28.1828	-0.2972
20.00	55.1580	35.1737	0.2397	55.1580	-31.6985	-0.2156
25.00	68.9475	37.9587	0.1649	68.9475	-34.1870	-0.1457
30.00	82.7370	39.7583	0.0969	82.7370	-35.7510	-0.0818
35.00	96.5265	40.5895	0.0191	96.5265	-36.4056	-0.0086
40.00	110.3160	40.2241	-0.0684	110.3160	-35.8556	0.0869
45.00	124.1055	38.8315	-0.1293	124.1055	-34.1566	0.1544
50.00	137.8950	36.7334	-0.1734	137.8950	-31.6904	0.2013
55.00	151.6845	34.0920	-0.2080	151.6845	-28.6561	0.2366
60.00	165.4740	31.0348	-0.2339	165.4740	-25.2102	0.2613
65.00	179.2635	27.6731	-0.2525	179.2635	-21.4877	0.2771
70.00	193.0530	24.1051	-0.2634	193.0530	-17.6098	0.2834
75.00	206.8425	20.4413	-0.2663	206.8425	-13.7124	0.2798
80.00	220.6320	16.8063	-0.2591	220.6320	-9.9485	0.2639
85.00	234.4215	13.3391	-0.2425	234.4215	-6.4895	0.2361
90.00	248.2110	10.1713	-0.2152	248.2110	-3.5083	0.1938
95.00	262.0005	7.4775	-0.1712	262.0005	-1.2554	0.1264
100.00	275.7900	5.6190	-0.0931	275.7900	-0.4050	-0.0851

TABLE I -10

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.340

R= 816.00" C= 272.76" T= 75.96" T/C= 0.2785

TTU= 4.46" TTL= -0.44"

THETA= 4.64 DEG DESIGN CL= 0.162

XZERO= 0. " YZERO= 2.1420"

% CHORD	X,UPPER (INCH)	Y,UPPER (INCH)	DYU/DXU	X,LOWER (INCH)	Y,LOWER (INCH)	DYL/DXL
0.	0.	0.	-14.6544	0.	0.	-14.6544
0.25	0.6819	4.9469	2.8336	0.6819	-3.2522	-2.8234
0.50	1.3638	6.4894	1.8765	1.3638	-4.8091	-1.9279
0.75	2.0457	7.6352	1.5362	2.0457	-5.9905	-1.5956
1.25	3.4095	9.4685	1.2077	3.4095	-7.8399	-1.1837
2.00	5.4552	11.6825	0.9930	5.4552	-9.9543	-0.9264
2.50	6.8190	12.9853	0.9215	6.8190	-11.1564	-0.8457
3.00	8.1828	14.2013	0.8627	8.1828	-12.2717	-0.7924
3.50	9.5466	15.3412	0.8101	9.5466	-13.3203	-0.7461
4.00	10.9104	16.4158	0.7635	10.9104	-14.3089	-0.7041
4.50	12.2742	17.4235	0.7189	12.2742	-15.2445	-0.6657
5.00	13.6380	18.3768	0.6787	13.6380	-16.1243	-0.6283
7.50	20.4570	22.4602	0.5345	20.4570	-19.8864	-0.4878
10.00	27.2760	25.7793	0.4474	27.2760	-22.9146	-0.4057
15.00	40.9140	31.0143	0.3276	40.9140	-27.6344	-0.2946
20.00	54.5520	34.8669	0.2402	54.5520	-31.0806	-0.2137
25.00	68.1900	37.6284	0.1654	68.1900	-33.5184	-0.1443
30.00	81.8280	39.4155	0.0974	81.8280	-35.0481	-0.0808
35.00	95.4660	40.2454	0.0197	95.4660	-35.6851	-0.0081
40.00	109.1040	39.8812	-0.0698	109.1040	-35.1393	0.0868
45.00	122.7420	38.4707	-0.1327	122.7420	-33.4628	0.1540
50.00	136.3800	36.3400	-0.1782	136.3800	-31.0323	0.2004
55.00	150.0180	33.6533	-0.2140	150.0180	-28.0449	0.2355
60.00	163.6560	30.5403	-0.2409	163.6560	-24.6548	0.2599
65.00	177.2940	27.1134	-0.2604	177.2940	-20.9956	0.2753
70.00	190.9320	23.4724	-0.2719	190.9320	-17.1870	0.2813
75.00	204.5700	19.7292	-0.2753	204.5700	-13.3632	0.2774
80.00	218.2080	16.0100	-0.2683	218.2080	-9.6753	0.2612
85.00	231.8460	12.4559	-0.2516	231.8460	-6.2930	0.2331
90.00	245.4840	9.1999	-0.2241	245.4840	-3.3880	0.1904
95.00	259.1220	6.4175	-0.1796	259.1220	-1.2099	0.1224
100.00	272.7600	4.4650	-0.1048	272.7600	-0.4370	-0.0948

TABLE I -11

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.350

R= 840.00" C= 269.73" T= 74.88" T/C= 0.2776

TTU= 3.46" TTL= -0.47"

THETA= 4.60 DEG DESIGN CL= 0.175

XZERO= 0. " YZERO= 2.2941"

% CHORD	X,UPPER (INCH)	Y,UPPER (INCH)	DYU/DXU	X,LOWER (INCH)	Y,LOWER (INCH)	DYL/DXL
0.	0.	0.	-13.5658	0.	0.	-13.5658
0.25	0.6743	4.9554	2.8224	0.6743	-3.1555	-2.8071
0.50	1.3486	6.4723	1.8628	1.3486	-4.6880	-1.9165
0.75	2.0230	7.5986	1.5302	2.0230	-5.8490	-1.5924
1.25	3.3716	9.4074	1.2046	3.3716	-7.6720	-1.1797
2.00	5.3946	11.5937	0.9926	5.3946	-9.7538	-0.9207
2.50	6.7433	12.8816	0.9214	6.7433	-10.9345	-0.8397
3.00	8.0919	14.0833	0.8624	8.0919	-12.0294	-0.7865
3.50	9.4405	15.2099	0.8099	9.4405	-13.0587	-0.7406
4.00	10.7892	16.2720	0.7631	10.7892	-14.0289	-0.6988
4.50	12.1378	17.2680	0.7185	12.1378	-14.9474	-0.6608
5.00	13.4865	18.2102	0.6782	13.4865	-15.8110	-0.6236
7.50	20.2297	22.2472	0.5345	20.2297	-19.5034	-0.4839
10.00	26.9730	25.5300	0.4476	26.9730	-22.4740	-0.4024
15.00	40.4595	30.7097	0.3279	40.4595	-27.1020	-0.2921
20.00	53.9460	34.5231	0.2405	53.9460	-30.4803	-0.2118
25.00	67.4325	37.2582	0.1658	67.4325	-32.8687	-0.1429
30.00	80.9190	39.0305	0.0978	80.9190	-34.3655	-0.0798
35.00	94.4055	39.8577	0.0202	94.4055	-34.9860	-0.0077
40.00	107.8920	39.4963	-0.0710	107.8920	-34.4457	0.0866
45.00	121.3785	38.0748	-0.1354	121.3785	-32.7931	0.1534
50.00	134.8650	35.9216	-0.1822	134.8650	-30.3997	0.1995
55.00	148.3515	33.2030	-0.2191	148.3515	-27.4600	0.2342
60.00	161.8380	30.0495	-0.2469	161.8380	-24.1262	0.2584
65.00	175.3245	26.5749	-0.2671	175.3245	-20.5303	0.2735
70.00	188.8110	22.8795	-0.2792	188.8110	-16.7901	0.2792
75.00	202.2975	19.0762	-0.2830	202.2975	-13.0383	0.2751
80.00	215.7840	15.2925	-0.2762	215.7840	-9.4240	0.2587
85.00	229.2705	11.6707	-0.2596	229.2705	-6.1150	0.2303
90.00	242.7570	8.3449	-0.2319	242.7570	-3.2817	0.1873
95.00	256.2435	5.4907	-0.1870	256.2435	-1.1722	0.1188
100.00	269.7300	3.4590	-0.1155	269.7300	-0.4670	-0.1032

TABLE I -12

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.360

R= 864.00" C= 266.71" T= 73.83" T/C= 0.2768

TTU= 2.66" TTL= -0.49"

THETA= 4.56 DEG DESIGN CL= 0.188

XZERO= 0. " YZERO= 2.4355"

% CHORD	X,UPPER (INCH)	Y,UPPER (INCH)	DYU/DXU	X,LOWER (INCH)	Y,LOWER (INCH)	DYL/DXL
0.	0.	0.	-12.6277	0.	0.	-12.6277
0.25	0.6668	4.9657	2.8088	0.6668	-3.0630	-2.7896
0.50	1.3335	6.4559	1.8495	1.3335	-4.5713	-1.9050
0.75	2.0003	7.5633	1.5243	2.0003	-5.7119	-1.5892
1.25	3.3339	9.3483	1.2018	3.3339	-7.5089	-1.1759
2.00	5.3342	11.5066	0.9929	5.3342	-9.5590	-0.9153
2.50	6.6678	12.7801	0.9218	6.6678	-10.7190	-0.8339
3.00	8.0013	13.9686	0.8625	8.0013	-11.7941	-0.7809
3.50	9.3348	15.0827	0.8099	9.3348	-12.8047	-0.7353
4.00	10.6684	16.1327	0.7629	10.6684	-13.7571	-0.6938
4.50	12.0019	17.1175	0.7184	12.0019	-14.6590	-0.6561
5.00	13.3355	18.0491	0.6781	13.3355	-15.5070	-0.6193
7.50	20.0032	22.0414	0.5348	20.0032	-19.1315	-0.4804
10.00	26.6710	25.2891	0.4479	26.6710	-22.0462	-0.3993
15.00	40.0065	30.4155	0.3282	40.0065	-26.5860	-0.2898
20.00	53.3420	34.1914	0.2409	53.3420	-29.8986	-0.2100
25.00	66.6775	36.9009	0.1662	66.6775	-32.2392	-0.1415
30.00	80.0130	38.6590	0.0983	80.0130	-33.7039	-0.0789
35.00	93.3485	39.4835	0.0208	93.3485	-34.3084	-0.0073
40.00	106.6840	39.1268	-0.0717	106.6840	-33.7730	0.0865
45.00	120.0195	37.7016	-0.1375	120.0195	-32.1433	0.1529
50.00	133.3550	35.5372	-0.1853	133.3550	-29.7853	0.1987
55.00	146.6905	32.8008	-0.2232	146.6905	-26.8915	0.2331
60.00	160.0260	29.6235	-0.2518	160.0260	-23.6120	0.2570
65.00	173.3615	26.1192	-0.2726	173.3615	-20.0770	0.2719
70.00	186.6970	22.3886	-0.2852	186.6970	-16.4030	0.2773
75.00	200.0325	18.5453	-0.2894	200.0325	-12.7208	0.2729
80.00	213.3680	14.7168	-0.2829	213.3680	-9.1779	0.2562
85.00	226.7035	11.0461	-0.2663	226.7035	-5.9400	0.2276
90.00	240.0390	7.6676	-0.2386	240.0390	-3.1762	0.1843
95.00	253.3745	4.7562	-0.1937	253.3745	-1.1334	0.1153
100.00	266.7100	2.6550	-0.1260	266.7100	-0.4940	-0.1115

TABLE I -13

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.370

R= 888.00" C= 263.68" T= 72.78" T/C= 0.2760

TTU= 2.06" TTL= -0.52"

THETA= 4.52 DEG DESIGN CL= 0.201

XZERO= 0. " YZERO= 2.5719"

% CHORD	X,UPPER (INCH)	Y,UPPER (INCH)	DYU/DXU	X,LOWER (INCH)	Y,LOWER (INCH)	DYL/DXL
0.	0.	0.	-11.8110	0.	0.	-11.8110
0.25	0.6592	4.9757	2.7922	0.6592	-2.9736	-2.7704
0.50	1.3184	6.4322	1.8413	1.3184	-4.4573	-1.8930
0.75	1.9776	7.5261	1.5184	1.9776	-5.5769	-1.5858
1.25	3.2960	9.2867	1.1992	3.2960	-7.3481	-1.1719
2.00	5.2736	11.4172	0.9933	5.2736	-9.3664	-0.9098
2.50	6.5920	12.6768	0.9221	6.5920	-10.5059	-0.8281
3.00	7.9104	13.8521	0.8626	7.9104	-11.5612	-0.7753
3.50	9.2288	14.9537	0.8100	9.2288	-12.5532	-0.7301
4.00	10.5472	15.9915	0.7628	10.5472	-13.4878	-0.6888
4.50	11.8656	16.9651	0.7182	11.8656	-14.3727	-0.6515
5.00	13.1840	17.8860	0.6780	13.1840	-15.2050	-0.6149
7.50	19.7760	21.8335	0.5350	19.7760	-18.7626	-0.4768
10.00	26.3680	25.0461	0.4483	26.3680	-21.6219	-0.3961
15.00	39.5520	30.1190	0.3286	39.5520	-26.0741	-0.2874
20.00	52.7360	33.8570	0.2413	52.7360	-29.3215	-0.2082
25.00	65.9200	36.5409	0.1666	65.9200	-31.6145	-0.1402
30.00	79.1040	38.2846	0.0987	79.1040	-33.0475	-0.0779
35.00	92.2880	39.1062	0.0213	92.2880	-33.6360	-0.0068
40.00	105.4720	38.7565	-0.0721	105.4720	-33.1056	0.0864
45.00	118.6560	37.3361	-0.1389	118.6560	-31.4985	0.1524
50.00	131.8400	35.1733	-0.1875	131.8400	-29.1758	0.1979
55.00	145.0240	32.4352	-0.2260	145.0240	-26.3277	0.2320
60.00	158.2080	29.2525	-0.2552	158.2080	-23.1021	0.2556
65.00	171.3920	25.7391	-0.2766	171.3920	-19.6277	0.2702
70.00	184.5760	21.9952	-0.2897	184.5760	-16.0192	0.2753
75.00	197.7600	18.1341	-0.2942	197.7600	-12.4062	0.2707
80.00	210.9440	14.2831	-0.2880	210.9440	-8.9339	0.2538
85.00	224.1280	10.5849	-0.2716	224.1280	-5.7664	0.2249
90.00	237.3120	7.1731	-0.2441	237.3120	-3.0711	0.1813
95.00	250.4960	4.2211	-0.1994	250.4960	-1.0941	0.1118
100.00	263.6800	2.0620	-0.1360	263.6800	-0.5190	-0.1199

TABLE I -14

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.380

R= 912.00" C= 260.65" T= 71.70" T/C= 0.2751

TTU= 1.65" TTL= -0.54"

THETA= 4.48 DEG DESIGN CL= 0.213

XZERO= 0. " YZERO= 2.7026"

% CHORD	X,UPPER (INCH)	Y,UPPER (INCH)	DYU/DXU	X,LOWER (INCH)	Y,LOWER (INCH)	DYL/DXL
0.	0.	0.	-11.1456	0.	0.	-11.1456
0.25	0.6516	4.9778	2.7731	0.6516	-2.8897	-2.7513
0.50	1.3033	6.4004	1.8327	1.3033	-4.3471	-1.8829
0.75	1.9549	7.4795	1.5127	1.9549	-5.4475	-1.5816
1.25	3.2581	9.2133	1.1976	3.2581	-7.1924	-1.1675
2.00	5.2130	11.3180	0.9932	5.2130	-9.1785	-0.9042
2.50	6.5163	12.5630	0.9219	6.5163	-10.2974	-0.8222
3.00	7.8195	13.7243	0.8621	7.8195	-11.3330	-0.7696
3.50	9.1228	14.8127	0.8095	9.1228	-12.3058	-0.7247
4.00	10.4260	15.8378	0.7622	10.4260	-13.2227	-0.6837
4.50	11.7293	16.7995	0.7177	11.7293	-14.0910	-0.6467
5.00	13.0325	17.7092	0.6774	13.0325	-14.9079	-0.6104
7.50	19.5488	21.6095	0.5349	19.5488	-18.3985	-0.4732
10.00	26.0650	24.7850	0.4483	26.0650	-21.2025	-0.3929
15.00	39.0975	29.8010	0.3288	39.0975	-25.5673	-0.2850
20.00	52.1300	33.4986	0.2415	52.1300	-28.7498	-0.2063
25.00	65.1625	36.1549	0.1669	65.1625	-30.9956	-0.1388
30.00	78.1950	37.8828	0.0991	78.1950	-32.3974	-0.0770
35.00	91.2275	38.7008	0.0219	91.2275	-32.9705	-0.0064
40.00	104.2600	38.3601	-0.0721	104.2600	-32.4459	0.0862
45.00	117.2925	36.9518	-0.1395	117.2925	-30.8625	0.1519
50.00	130.3250	34.8020	-0.1886	130.3250	-28.5760	0.1970
55.00	143.3575	32.0767	-0.2277	143.3575	-25.7742	0.2308
60.00	156.3900	28.9057	-0.2574	156.3900	-22.6031	0.2541
65.00	169.4225	25.4021	-0.2792	169.4225	-19.1894	0.2685
70.00	182.4550	21.6651	-0.2926	182.4550	-15.6465	0.2734
75.00	195.4875	17.8073	-0.2975	195.4875	-12.1020	0.2685
80.00	208.5200	13.9549	-0.2917	208.5200	-8.6992	0.2515
85.00	221.5525	10.2499	-0.2756	221.5525	-5.6005	0.2223
90.00	234.5850	6.8243	-0.2483	234.5850	-2.9715	0.1785
95.00	247.6175	3.8494	-0.2039	247.6175	-1.0569	0.1085
100.00	260.6500	1.6470	-0.1451	260.6500	-0.5410	-0.1275

TABLE I -15

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.390

R= 936.00" C= 257.63" T= 70.67" T/C= 0.2743

TTU= 1.38" TTL= -0.56"

THETA= 4.44 DEG DESIGN CL= 0.226

XZERO= 0. " YZERO= 2.8271"

% CHORD	X,UPPER (INCH)	Y,UPPER (INCH)	DYU/DXU	X,LOWER (INCH)	Y,LOWER (INCH)	DYL/DXL
0.	0.	0.	-10.5045	0.	0.	-10.5045
0.25	0.6441	4.9864	2.7528	0.6441	-2.8047	-2.7328
0.50	1.2882	6.3743	1.8243	1.2882	-4.2347	-1.8748
0.75	1.9322	7.4378	1.5079	1.9322	-5.3177	-1.5774
1.25	3.2204	9.1466	1.1965	3.2204	-7.0367	-1.1632
2.00	5.1526	11.2268	0.9936	5.1526	-8.9912	-0.8987
2.50	6.4408	12.4579	0.9222	6.4408	-10.0895	-0.8165
3.00	7.7289	13.6060	0.8621	7.7289	-11.1052	-0.7640
3.50	9.0171	14.6819	0.8096	9.0171	-12.0598	-0.7195
4.00	10.3052	15.6950	0.7620	10.3052	-12.9595	-0.6787
4.50	11.5934	16.6454	0.7176	11.5934	-13.8114	-0.6421
5.00	12.8815	17.5445	0.6773	12.8815	-14.6133	-0.6061
7.50	19.3223	21.4002	0.5352	19.3223	-18.0381	-0.4696
10.00	25.7630	24.5408	0.4487	25.7630	-20.7877	-0.3898
15.00	38.6445	29.5034	0.3291	38.6445	-25.0666	-0.2826
20.00	51.5260	33.1632	0.2419	51.5260	-28.1849	-0.2045
25.00	64.4075	35.7938	0.1673	64.4075	-30.3842	-0.1375
30.00	77.2890	37.5072	0.0995	77.2890	-31.7549	-0.0760
35.00	90.1705	38.3221	0.0224	90.1705	-32.3124	-0.0060
40.00	103.0520	37.9916	-0.0718	103.0520	-31.7926	0.0860
45.00	115.9335	36.6004	-0.1396	115.9335	-30.2314	0.1514
50.00	128.8150	34.4709	-0.1892	128.8150	-27.9795	0.1962
55.00	141.6965	31.7678	-0.2286	141.6965	-25.2223	0.2297
60.00	154.5780	28.6193	-0.2587	154.5780	-22.1038	0.2528
65.00	167.4595	25.1371	-0.2809	167.4595	-18.7493	0.2668
70.00	180.3410	21.4195	-0.2946	180.3410	-15.2702	0.2715
75.00	193.2225	17.5778	-0.2999	193.2225	-11.7929	0.2664
80.00	206.1040	13.7366	-0.2945	206.1040	-8.4588	0.2491
85.00	218.9855	10.0365	-0.2787	218.9855	-5.4283	0.2196
90.00	231.8670	6.6076	-0.2519	231.8670	-2.8657	0.1755
95.00	244.7485	3.6181	-0.2080	244.7485	-1.0145	0.1050
100.00	257.6300	1.3770	-0.1544	257.6300	-0.5600	-0.1359

TABLE I -16

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.400

R= 960.00" C= 254.60" T= 69.63" T/C= 0.2735

TTU= 1.22" TTL= -0.58"

THETA= 4.40 DEG DESIGN CL= 0.238

XZERO= 0. " YZERO= 2.9449"

% CHORD	X,UPPER (INCH)	Y,UPPER (INCH)	DYU/DXU	X,LOWER (INCH)	Y,LOWER (INCH)	DYL/DXL
0.	0.	0.	-9.9748	0.	0.	-9.9748
0.25	0.6365	4.9860	2.7354	0.6365	-2.7258	-2.7139
0.50	1.2730	6.3421	1.8159	1.2730	-4.1291	-1.8662
0.75	1.9095	7.3885	1.5040	1.9095	-5.1912	-1.5759
1.25	3.1825	9.0738	1.1951	3.1825	-6.8875	-1.1589
2.00	5.0920	11.1289	0.9937	5.0920	-8.8103	-0.8935
2.50	6.3650	12.3457	0.9222	6.3650	-9.8880	-0.8114
3.00	7.6380	13.4803	0.8620	7.6380	-10.8850	-0.7587
3.50	8.9110	14.5433	0.8094	8.9110	-11.8218	-0.7145
4.00	10.1840	15.5441	0.7617	10.1840	-12.7047	-0.6739
4.50	11.4570	16.4831	0.7173	11.4570	-13.5406	-0.6375
5.00	12.7300	17.3714	0.6770	12.7300	-14.3277	-0.6018
7.50	19.0950	21.1814	0.5353	19.0950	-17.6880	-0.4662
10.00	25.4600	24.2861	0.4489	25.4600	-20.3845	-0.3867
15.00	38.1900	29.1936	0.3294	38.1900	-24.5795	-0.2803
20.00	50.9200	32.8143	0.2422	50.9200	-27.6355	-0.2027
25.00	63.6500	35.4180	0.1677	63.6500	-29.7895	-0.1362
30.00	76.3800	37.1160	0.0999	76.3800	-31.1301	-0.0751
35.00	89.1100	37.9272	0.0229	89.1100	-31.6727	-0.0056
40.00	101.8400	37.6075	-0.0714	101.8400	-31.1581	0.0859
45.00	114.5700	36.2372	-0.1394	114.5700	-29.6194	0.1509
50.00	127.3000	34.1344	-0.1892	127.3000	-27.4020	0.1954
55.00	140.0300	31.4618	-0.2289	140.0300	-24.6891	0.2287
60.00	152.7600	28.3456	-0.2592	152.7600	-21.6227	0.2514
65.00	165.4900	24.8963	-0.2817	165.4900	-18.3263	0.2653
70.00	178.2200	21.2103	-0.2957	178.2200	-14.9100	0.2696
75.00	190.9500	17.3977	-0.3014	190.9500	-11.4983	0.2643
80.00	203.6800	13.5811	-0.2963	203.6800	-8.2307	0.2468
85.00	216.4100	9.8991	-0.2808	216.4100	-5.2661	0.2171
90.00	229.1400	6.4801	-0.2545	229.1400	-2.7670	0.1728
95.00	241.8700	3.4883	-0.2114	241.8700	-0.9754	0.1018
100.00	254.6000	1.2200	-0.1626	254.6000	-0.5770	-0.1435

TABLE I -17

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.410

R= 984.00" C= 251.57" T= 68.58" T/C= 0.2726

TTU= 1.11" TTL= -0.59"

THETA= 4.36 DEG DESIGN CL= 0.250

XZERO= 0. " YZERO= 3.0576"

% CHORD	X,UPPER (INCH)	Y,UPPER (INCH)	DYU/DXU	X,LOWER (INCH)	Y,LOWER (INCH)	DYL/DXL
0.	0.	0.	-9.4960	0.	0.	-9.4960
0.25	0.6289	4.9820	2.7176	0.6289	-2.6488	-2.6932
0.50	1.2578	6.3069	1.8066	1.2578	-4.0251	-1.8565
0.75	1.8868	7.3360	1.4995	1.8868	-5.0653	-1.5739
1.25	3.1446	8.9973	1.1933	3.1446	-6.7387	-1.1541
2.00	5.0314	11.0266	0.9935	5.0314	-8.6276	-0.8888
2.50	6.2893	12.2287	0.9219	6.2893	-9.6861	-0.8059
3.00	7.5471	13.3493	0.8615	7.5471	-10.6642	-0.7531
3.50	8.8049	14.3991	0.8090	8.8049	-11.5829	-0.7091
4.00	10.0628	15.3873	0.7611	10.0628	-12.4488	-0.6688
4.50	11.3206	16.3144	0.7167	11.3206	-13.2684	-0.6327
5.00	12.5785	17.1916	0.6765	12.5785	-14.0405	-0.5973
7.50	18.8677	20.9546	0.5353	18.8677	-17.3353	-0.4626
10.00	25.1570	24.0222	0.4490	25.1570	-19.9778	-0.3835
15.00	37.7355	28.8730	0.3296	37.7355	-24.0877	-0.2779
20.00	50.3140	32.4531	0.2425	50.3140	-27.0805	-0.2009
25.00	62.8925	35.0292	0.1680	62.8925	-29.1886	-0.1349
30.00	75.4710	36.7112	0.1003	75.4710	-30.4989	-0.0742
35.00	88.0495	37.5183	0.0235	88.0495	-31.0266	-0.0052
40.00	100.6280	37.2102	-0.0708	100.6280	-30.5176	0.0857
45.00	113.2065	35.8632	-0.1389	113.2065	-29.0019	0.1504
50.00	125.7850	33.7906	-0.1888	125.7850	-26.8197	0.1946
55.00	138.3635	31.1527	-0.2287	138.3635	-24.1518	0.2275
60.00	150.9420	28.0740	-0.2593	150.9420	-21.1383	0.2500
65.00	163.5205	24.6630	-0.2820	163.5205	-17.9006	0.2636
70.00	176.0990	21.0146	-0.2964	176.0990	-14.5476	0.2677
75.00	188.6775	17.2371	-0.3024	188.6775	-11.2019	0.2622
80.00	201.2560	13.4512	-0.2977	201.2560	-8.0013	0.2445
85.00	213.8345	9.7934	-0.2826	213.8345	-5.1025	0.2146
90.00	226.4130	6.3896	-0.2568	226.4130	-2.6667	0.1700
95.00	238.9915	3.4005	-0.2144	238.9915	-0.9343	0.0985
100.00	251.5700	1.1090	-0.1707	251.5700	-0.5910	-0.1512

TABLE I -18

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.420

R= 1008.00" C= 248.55" T= 67.56" T/C= 0.2718

TTU= 1.00" TTL= -0.60"

THETA= 4.32 DEG DESIGN CL= 0.262

XZERO= 0. " YZERO= 3.1663"

% CHORD	X,UPPER (INCH)	Y,UPPER (INCH)	DYU/DXU	X,LOWER (INCH)	Y,LOWER (INCH)	DYL/DXL
0.	0.	0.	-9.0611	0.	0.	-9.0611
0.25	0.6214	4.9745	2.7079	0.6214	-2.5749	-2.6723
0.50	1.2427	6.2729	1.7974	1.2427	-3.9241	-1.8474
0.75	1.8641	7.2850	1.4953	1.8641	-4.9433	-1.5720
1.25	3.1069	8.9228	1.1919	3.1069	-6.5942	-1.1495
2.00	4.9710	10.9271	0.9936	4.9710	-8.4502	-0.8844
2.50	6.2138	12.1149	0.9219	6.2138	-9.4900	-0.8006
3.00	7.4565	13.2220	0.8613	7.4565	-10.4497	-0.7477
3.50	8.6992	14.2591	0.8088	8.6992	-11.3510	-0.7040
4.00	9.9420	15.2350	0.7607	9.9420	-12.2003	-0.6640
4.50	11.1847	16.1507	0.7165	11.1847	-13.0042	-0.6282
5.00	12.4275	17.0172	0.6762	12.4275	-13.7618	-0.5930
7.50	18.6412	20.7348	0.5354	18.6412	-16.9933	-0.4591
10.00	24.8550	23.7666	0.4493	24.8550	-19.5837	-0.3805
15.00	37.2825	28.5625	0.3299	37.2825	-23.6113	-0.2755
20.00	49.7100	32.1035	0.2428	49.7100	-26.5429	-0.1991
25.00	62.1375	34.6527	0.1684	62.1375	-28.6067	-0.1336
30.00	74.5650	36.3192	0.1007	74.5650	-29.8875	-0.0733
35.00	86.9925	37.1224	0.0240	86.9925	-30.4006	-0.0048
40.00	99.4200	36.8253	-0.0702	99.4200	-29.8968	0.0856
45.00	111.8475	35.5007	-0.1385	111.8475	-28.4031	0.1499
50.00	124.2750	33.4572	-0.1886	124.2750	-26.2547	0.1938
55.00	136.7025	30.8529	-0.2287	136.7025	-23.6301	0.2265
60.00	149.1300	27.8105	-0.2595	149.1300	-20.6675	0.2487
65.00	161.5575	24.4366	-0.2825	161.5575	-17.4866	0.2620
70.00	173.9850	20.8248	-0.2971	173.9850	-14.1947	0.2659
75.00	186.4125	17.0815	-0.3034	186.4125	-10.9129	0.2602
80.00	198.8400	13.3254	-0.2991	198.8400	-7.7771	0.2423
85.00	211.2675	9.6913	-0.2844	211.2675	-4.9422	0.2121
90.00	223.6950	6.3024	-0.2592	223.6950	-2.5678	0.1672
95.00	236.1225	3.3161	-0.2174	236.1225	-0.8929	0.0953
100.00	248.5500	1.0020	-0.1789	248.5500	-0.6030	-0.1588

TABLE I -19

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.430

R= 1032.00" C= 245.52" T= 66.54" T/C= 0.2710

TTU= 0.91" TTL= -0.61"

THETA= 4.28 DEG DESIGN CL= 0.274

XZERO= 0. " YZERO= 3.2697"

% CHORD	X,UPPER (INCH)	Y,UPPER (INCH)	DYU/DXU	X,LOWER (INCH)	Y,LOWER (INCH)	DYL/DXL
0.	0.	0.	-8.6643	0.	0.	-8.6643
0.25	0.6138	4.9663	2.6962	0.6138	-2.5031	-2.6505
0.50	1.2276	6.2377	1.7879	1.2276	-3.8250	-1.8379
0.75	1.8414	7.2328	1.4909	1.8414	-4.8235	-1.5284
1.25	3.0690	8.8470	1.1904	3.0690	-6.4513	-1.1449
2.00	4.9104	10.8261	0.9937	4.9104	-8.2747	-0.8799
2.50	6.1380	11.9996	0.9219	6.1380	-9.2959	-0.7954
3.00	7.3656	13.0931	0.8611	7.3656	-10.2374	-0.7424
3.50	8.5932	14.1174	0.8086	8.5932	-11.1213	-0.6989
4.00	9.8208	15.0811	0.7604	9.8208	-11.9543	-0.6592
4.50	11.0484	15.9854	0.7162	11.0484	-12.7425	-0.6237
5.00	12.2760	16.8411	0.6760	12.2760	-13.4857	-0.5888
7.50	18.4140	20.5132	0.5355	18.4140	-16.6542	-0.4556
10.00	24.5520	23.5091	0.4495	24.5520	-19.1928	-0.3774
15.00	36.8280	28.2498	0.3302	36.8280	-23.1387	-0.2732
20.00	49.1040	31.7515	0.2431	49.1040	-26.0095	-0.1974
25.00	61.3800	34.2738	0.1688	61.3800	-28.0293	-0.1323
30.00	73.6560	35.9247	0.1011	73.6560	-29.2809	-0.0724
35.00	85.9320	36.7236	0.0245	85.9320	-29.7796	-0.0044
40.00	98.2080	36.4375	-0.0697	98.2080	-29.2809	0.0855
45.00	110.4840	35.1355	-0.1380	110.4840	-27.8090	0.1495
50.00	122.7600	33.1217	-0.1883	122.7600	-25.6940	0.1930
55.00	135.0360	30.5518	-0.2286	135.0360	-23.1124	0.2254
60.00	147.3120	27.5465	-0.2597	147.3120	-20.2000	0.2475
65.00	159.5880	24.2109	-0.2829	159.5880	-17.0753	0.2605
70.00	171.8640	20.6368	-0.2978	171.8640	-13.8438	0.2641
75.00	184.1400	16.9291	-0.3044	184.1400	-10.6251	0.2582
80.00	196.4160	13.2044	-0.3005	196.4160	-7.5531	0.2401
85.00	208.6920	9.5953	-0.2862	208.6920	-4.7813	0.2097
90.00	220.9680	6.2230	-0.2615	220.9680	-2.4672	0.1645
95.00	233.2440	3.2409	-0.2205	233.2440	-0.8488	0.0921
100.00	245.5200	0.9060	-0.1870	245.5200	-0.6110	-0.1665

TABLE I -20

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.440

R= 1056.00" C= 242.49" T= 65.50" T/C= 0.2701

TTU= 0.83" TTL= -0.62"

THETA= 4.24 DEG DESIGN CL= 0.286

XZERO= 0. " YZERO= 3.3668"

% CHORD	X,UPPER (INCH)	Y,UPPER (INCH)	DYU/DXU	X,LOWER (INCH)	Y,LOWER (INCH)	DYL/DXL
0.	0.	0.	-8.3007	0.	0.	-8.3007
0.25	0.6062	4.9559	2.6821	0.6062	-2.4330	-2.6274
0.50	1.2124	6.1995	1.7775	1.2124	-3.7274	-1.8275
0.75	1.8187	7.1773	1.4859	1.8187	-4.7049	-1.4825
1.25	3.0311	8.7675	1.1885	3.0311	-6.3077	-1.1404
2.00	4.8498	10.7208	0.9934	4.8498	-8.0993	-0.8750
2.50	6.0623	11.8796	0.9216	6.0623	-9.1015	-0.7898
3.00	7.2747	12.9590	0.8606	7.2747	-10.0246	-0.7367
3.50	8.4871	13.9702	0.8081	8.4871	-10.8909	-0.6935
4.00	9.6996	14.9214	0.7598	9.6996	-11.7072	-0.6540
4.50	10.9121	15.8138	0.7157	10.9121	-12.4795	-0.6188
5.00	12.1245	16.6585	0.6755	12.1245	-13.2080	-0.5842
7.50	18.1867	20.2837	0.5355	18.1867	-16.3127	-0.4519
10.00	24.2490	23.2427	0.4496	24.2490	-18.7987	-0.3742
15.00	36.3735	27.9267	0.3304	36.3735	-22.6618	-0.2708
20.00	48.4980	31.3878	0.2434	48.4980	-25.4711	-0.1955
25.00	60.6225	33.8823	0.1691	60.6225	-27.4462	-0.1309
30.00	72.7470	35.5168	0.1014	72.7470	-28.6684	-0.0715
35.00	84.8715	36.3115	0.0251	84.8715	-29.1526	-0.0040
40.00	96.9960	36.0367	-0.0690	96.9960	-28.6594	0.0853
45.00	109.1205	34.7584	-0.1374	109.1205	-27.2099	0.1490
50.00	121.2450	32.7759	-0.1878	121.2450	-25.1290	0.1922
55.00	133.3695	30.2425	-0.2283	133.3695	-22.5909	0.2243
60.00	145.4940	27.2768	-0.2596	145.4940	-19.7295	0.2461
65.00	157.6185	23.9820	-0.2830	157.6185	-16.6615	0.2589
70.00	169.7430	20.4485	-0.2982	169.7430	-13.4909	0.2623
75.00	181.8675	16.7793	-0.3052	181.8675	-10.3356	0.2561
80.00	193.9920	13.0889	-0.3016	193.9920	-7.3278	0.2378
85.00	206.1165	9.5078	-0.2878	206.1165	-4.6189	0.2072
90.00	218.2410	6.1547	-0.2636	218.2410	-2.3651	0.1618
95.00	230.3655	3.1795	-0.2234	230.3655	-0.8026	0.0889
100.00	242.4900	0.8260	-0.1951	242.4900	-0.6160	-0.1741

TABLE I -21

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.450

R= 1080.00" C= 239.47" T= 64.49" T/C= 0.2693

TTU= 0.77" TTL= -0.62"

THETA= 4.20 DEG DESIGN CL= 0.297

XZERO= 0. " YZERO= 3.4565"

% CHORD	X,UPPER (INCH)	Y,UPPER (INCH)	DYU/DXU	X,LOWER (INCH)	Y,LOWER (INCH)	DYL/DXL
0.	0.	0.	-7.9933	0.	0.	-7.9933
0.25	0.5987	4.9414	2.6672	0.5987	-2.3665	-2.6099
0.50	1.1973	6.1578	1.7679	1.1973	-3.6366	-1.8176
0.75	1.7960	7.1189	1.4813	1.7960	-4.5939	-1.4391
1.25	2.9934	8.6856	1.1868	2.9934	-6.1723	-1.1362
2.00	4.7894	10.6135	0.9932	4.7894	-7.9331	-0.8705
2.50	5.9868	11.7577	0.9213	5.9868	-8.9171	-0.7848
3.00	7.1841	12.8233	0.8602	7.1841	-9.8226	-0.7316
3.50	8.3814	13.8215	0.8078	8.3814	-10.6721	-0.6887
4.00	9.5788	14.7603	0.7594	9.5788	-11.4726	-0.6494
4.50	10.7761	15.6411	0.7153	10.7761	-12.2298	-0.6144
5.00	11.9735	16.4749	0.6751	11.9735	-12.9444	-0.5801
7.50	17.9602	20.0541	0.5355	17.9602	-15.9882	-0.4486
10.00	23.9470	22.9766	0.4497	23.9470	-18.4243	-0.3712
15.00	35.9205	27.6042	0.3306	35.9205	-22.2087	-0.2686
20.00	47.8940	31.0249	0.2436	47.8940	-24.9597	-0.1938
25.00	59.8675	33.4915	0.1694	59.8675	-26.8926	-0.1297
30.00	71.8410	35.1097	0.1018	71.8410	-28.0870	-0.0706
35.00	83.8145	35.8994	0.0256	83.8145	-28.5576	-0.0036
40.00	95.7880	35.6352	-0.0684	95.7880	-28.0698	0.0852
45.00	107.7615	34.3802	-0.1369	107.7615	-26.6417	0.1486
50.00	119.7350	32.4289	-0.1873	119.7350	-24.5933	0.1915
55.00	131.7085	29.9323	-0.2279	131.7085	-22.0968	0.2234
60.00	143.6820	27.0068	-0.2594	143.6820	-19.2839	0.2449
65.00	155.6555	23.7541	-0.2831	155.6555	-16.2697	0.2575
70.00	167.6290	20.2628	-0.2985	167.6290	-13.1568	0.2607
75.00	179.6025	16.6341	-0.3057	179.6025	-10.0615	0.2543
80.00	191.5760	12.9806	-0.3026	191.5760	-7.1141	0.2358
85.00	203.5495	9.4306	-0.2891	203.5495	-4.4643	0.2049
90.00	215.5230	6.1003	-0.2654	215.5230	-2.2667	0.1593
95.00	227.4965	3.1362	-0.2260	227.4965	-0.7558	0.0859
100.00	239.4700	0.7700	-0.2025	239.4700	-0.6150	-0.1812

TABLE I -22

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.460

R= 1104.00" C= 236.44" T= 63.46" T/C= 0.2684

TTU= 0.72" TTL= -0.61"

THETA= 4.16 DEG DESIGN CL= 0.308

XZERO= 0. " YZERO= 3.5395"

% CHORD	X,UPPER (INCH)	Y,UPPER (INCH)	DYU/DXU	X,LOWER (INCH)	Y,LOWER (INCH)	DYL/DXL
0.	0.	0.	-7.7078	0.	0.	-7.7078
0.25	0.5911	4.9191	2.5562	0.5911	-2.3001	-2.5942
0.50	1.1822	6.1130	1.7575	1.1822	-3.5468	-1.8068
0.75	1.7733	7.0571	1.4762	1.7733	-4.4859	-1.4272
1.25	2.9555	8.5998	1.1847	2.9555	-6.0363	-1.1317
2.00	4.7288	10.5016	0.9926	4.7288	-7.7664	-0.8656
2.50	5.9110	11.6307	0.9207	5.9110	-8.7319	-0.7794
3.00	7.0932	12.6821	0.8594	7.0932	-9.6195	-0.7262
3.50	8.2754	13.6669	0.8071	8.2754	-10.4520	-0.6835
4.00	9.4576	14.5930	0.7586	9.4576	-11.2364	-0.6444
4.50	10.6398	15.4618	0.7146	10.6398	-11.9783	-0.6097
5.00	11.8220	16.2845	0.6744	11.8220	-12.6786	-0.5756
7.50	17.7330	19.8161	0.5353	17.7330	-15.6605	-0.4450
10.00	23.6440	22.7009	0.4497	23.6440	-18.0459	-0.3681
15.00	35.4660	27.2704	0.3306	35.4660	-21.7504	-0.2662
20.00	47.2880	30.6495	0.2438	47.2880	-24.4421	-0.1920
25.00	59.1100	33.0873	0.1696	59.1100	-26.3323	-0.1283
30.00	70.9320	34.6884	0.1021	70.9320	-27.4984	-0.0697
35.00	82.7540	35.4730	0.0261	82.7540	-27.9555	-0.0033
40.00	94.5760	35.2197	-0.0677	94.5760	-27.4733	0.0850
45.00	106.3980	33.9890	-0.1362	106.3980	-26.0672	0.1481
50.00	118.2200	32.0702	-0.1867	118.2200	-24.0521	0.1908
55.00	130.0420	29.6120	-0.2274	130.0420	-21.5979	0.2224
60.00	141.8640	26.7288	-0.2591	141.8640	-18.8342	0.2437
65.00	153.6860	23.5203	-0.2829	153.6860	-15.8746	0.2560
70.00	165.5080	20.0735	-0.2986	165.5080	-12.8199	0.2590
75.00	177.3300	16.4877	-0.3062	177.3300	-9.7851	0.2524
80.00	189.1520	12.8735	-0.3034	189.1520	-6.8985	0.2338
85.00	200.9740	9.3569	-0.2903	200.9740	-4.3079	0.2026
90.00	212.7960	6.0518	-0.2672	212.7960	-2.1664	0.1568
95.00	224.6180	3.1009	-0.2284	224.6180	-0.7068	0.0830
100.00	236.4400	0.7240	-0.2098	236.4400	-0.6110	-0.1882

TABLE I -23

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.470

R= 1128.00" C= 233.41" T= 62.46" T/C= 0.2676

TTU= 0.67" TTL= -0.61"

THETA= 4.12 DEG DESIGN CL= 0.319

XZERO= 0. " YZERO= 3.6171"

% CHORD	X,UPPER (INCH)	Y,UPPER (INCH)	DYU/DXU	X,LOWER (INCH)	Y,LOWER (INCH)	DYL/DXL
0.	0.	0.	-7.4420	0.	0.	-7.4420
0.25	0.5835	4.8971	2.4224	0.5835	-2.2360	-2.5783
0.50	1.1671	6.0684	1.7482	1.1671	-3.4598	-1.7959
0.75	1.7506	6.9966	1.4714	1.7506	-4.3813	-1.4192
1.25	2.9176	8.5158	1.1830	2.9176	-5.9036	-1.1278
2.00	4.6682	10.3921	0.9923	4.6682	-7.6040	-0.8611
2.50	5.8353	11.5065	0.9204	5.8353	-8.5516	-0.7743
3.00	7.0023	12.5441	0.8590	7.0023	-9.4219	-0.7210
3.50	8.1694	13.5159	0.8067	8.1694	-10.2379	-0.6786
4.00	9.3364	14.4297	0.7581	9.3364	-11.0066	-0.6397
4.50	10.5035	15.2869	0.7142	10.5035	-11.7336	-0.6053
5.00	11.6705	16.0987	0.6741	11.6705	-12.4202	-0.5715
7.50	17.5057	19.5842	0.5354	17.5057	-15.3421	-0.4417
10.00	23.3410	22.4324	0.4499	23.3410	-17.6784	-0.3652
15.00	35.0115	26.9454	0.3309	35.0115	-21.3055	-0.2640
20.00	46.6820	30.2839	0.2441	46.6820	-23.9398	-0.1903
25.00	58.3525	32.6937	0.1700	58.3525	-25.7886	-0.1271
30.00	70.0230	34.2781	0.1025	70.0230	-26.9275	-0.0688
35.00	81.6935	35.0575	0.0266	81.6935	-27.3713	-0.0029
40.00	93.3640	34.8146	-0.0671	93.3640	-26.8943	0.0849
45.00	105.0345	33.6070	-0.1355	105.0345	-25.5093	0.1477
50.00	116.7050	31.7195	-0.1861	116.7050	-23.5263	0.1901
55.00	128.3755	29.2983	-0.2270	128.3755	-21.1128	0.2214
60.00	140.0460	26.4557	-0.2589	140.0460	-18.3968	0.2425
65.00	151.7165	23.2897	-0.2829	151.7165	-15.4900	0.2547
70.00	163.3870	19.8858	-0.2989	163.3870	-12.4919	0.2574
75.00	175.0575	16.3415	-0.3067	175.0575	-9.5156	0.2506
80.00	186.7280	12.7653	-0.3043	186.7280	-6.6880	0.2318
85.00	198.3985	9.2810	-0.2915	198.3985	-4.1551	0.2004
90.00	210.0690	6.0003	-0.2690	210.0690	-2.0681	0.1543
95.00	221.7395	3.0622	-0.2310	221.7395	-0.6583	0.0801
100.00	233.4100	0.6750	0.	233.4100	-0.6060	-0.1953

TABLE I -24

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.480

R= 1152.00" C= 230.39" T= 61.47" T/C= 0.2668

TTU= 0.63" TTL= -0.60"

THETA= 4.08 DEG DESIGN CL= 0.329

XZERO= 0. " YZERO= 3.6891"

% CHORD	X,UPPER (INCH)	Y,UPPER (INCH)	DYU/DXU	X,LOWER (INCH)	Y,LOWER (INCH)	DYL/DXL
0.	0.	0.	-7.2158	0.	0.	-7.2158
0.25	0.5760	4.8693	2.3289	0.5760	-2.1765	-2.5626
0.50	1.1520	6.0172	1.7412	1.1520	-3.3778	-1.7854
0.75	1.7279	6.9313	1.4666	1.7279	-4.2823	-1.4115
1.25	2.8799	8.4270	1.1811	2.8799	-5.7768	-1.1238
2.00	4.6078	10.2776	0.9919	4.6078	-7.4481	-0.8566
2.50	5.7598	11.3771	0.9199	5.7598	-8.3780	-0.7694
3.00	6.9117	12.4007	0.8584	6.9117	-9.2314	-0.7161
3.50	8.0637	13.3593	0.8062	8.0637	-10.0313	-0.6739
4.00	9.2156	14.2606	0.7575	9.2156	-10.7849	-0.6353
4.50	10.3676	15.1061	0.7137	10.3676	-11.4974	-0.6011
5.00	11.5195	15.9069	0.6735	11.5195	-12.1705	-0.5675
7.50	17.2792	19.3453	0.5352	17.2792	-15.0341	-0.4385
10.00	23.0390	22.1566	0.4499	23.0390	-17.3226	-0.3624
15.00	34.5585	26.6120	0.3310	34.5585	-20.8746	-0.2619
20.00	46.0780	29.9090	0.2442	46.0780	-23.4534	-0.1887
25.00	57.5975	32.2900	0.1702	57.5975	-25.2620	-0.1259
30.00	69.1170	33.8570	0.1028	69.1170	-26.3747	-0.0680
35.00	80.6365	34.6306	0.0270	80.6365	-26.8060	-0.0025
40.00	92.1560	34.3975	-0.0665	92.1560	-26.3346	0.0848
45.00	103.6755	33.2127	-0.1350	103.6755	-24.9708	0.1473
50.00	115.1950	31.3561	-0.1856	115.1950	-23.0197	0.1894
55.00	126.7145	28.9717	-0.2266	126.7145	-20.6465	0.2205
60.00	138.2340	26.1699	-0.2586	138.2340	-17.9774	0.2414
65.00	149.7535	23.0470	-0.2829	149.7535	-15.1223	0.2533
70.00	161.2730	19.6867	-0.2991	161.2730	-12.1794	0.2559
75.00	172.7925	16.1849	-0.3071	172.7925	-9.2602	0.2489
80.00	184.3120	12.6481	-0.3050	184.3120	-6.4896	0.2299
85.00	195.8315	9.1980	-0.2927	195.8315	-4.0119	0.1984
90.00	207.3510	5.9440	-0.2706	207.3510	-1.9767	0.1520
95.00	218.8705	3.0219	-0.2333	218.8705	-0.6135	0.0774
100.00	230.3900	0.6290	0.	230.3900	-0.6000	-0.2017

TABLE I -25

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.490

R= 1176.00" C= 227.36" T= 60.46" T/C= 0.2659

TTU= 0.59" TTL= -0.59"

THETA= 4.04 DEG DESIGN CL= 0.340

XZERO= 0. " YZERO= 3.7554"

% CHORD	X,UPPER (INCH)	Y,UPPER (INCH)	DYU/DXU	X,LOWER (INCH)	Y,LOWER (INCH)	DYL/DXL
0.	0.	0.	-6.9824	0.	0.	-6.9824
0.25	0.5684	4.8435	2.3066	0.5684	-2.1155	-2.5445
0.50	1.1368	5.9671	1.7334	1.1368	-3.2936	-1.7736
0.75	1.7052	6.8668	1.4611	1.7052	-4.1804	-1.4027
1.25	2.8420	8.3386	1.1789	2.8420	-5.6464	-1.1191
2.00	4.5472	10.1632	0.9912	4.5472	-7.2876	-0.8516
2.50	5.6840	11.2477	0.9193	5.6840	-8.1994	-0.7640
3.00	6.8208	12.2570	0.8577	6.8208	-9.0353	-0.7106
3.50	7.9576	13.2023	0.8055	7.9576	-9.8187	-0.6687
4.00	9.0944	14.0910	0.7568	9.0944	-10.5566	-0.6303
4.50	10.2312	14.9243	0.7130	10.2312	-11.2542	-0.5964
5.00	11.3680	15.7136	0.6730	11.3680	-11.9134	-0.5630
7.50	17.0520	19.1051	0.5351	17.0520	-14.7166	-0.4349
10.00	22.7360	21.8793	0.4499	22.7360	-16.9557	-0.3592
15.00	34.1040	26.2767	0.3311	34.1040	-20.4301	-0.2595
20.00	45.4720	29.5320	0.2444	45.4720	-22.9513	-0.1869
25.00	56.8400	31.8841	0.1705	56.8400	-24.7184	-0.1246
30.00	68.2080	33.4338	0.1031	68.2080	-25.8038	-0.0671
35.00	79.5760	34.2019	0.0275	79.5760	-26.2220	-0.0021
40.00	90.9440	33.9792	-0.0658	90.9440	-25.7561	0.0846
45.00	102.3120	32.8184	-0.1342	102.3120	-24.4139	0.1468
50.00	113.6800	30.9942	-0.1849	113.6800	-22.4953	0.1887
55.00	125.0480	28.6484	-0.2260	125.0480	-20.1634	0.2195
60.00	136.4160	25.8891	-0.2582	136.4160	-17.5423	0.2402
65.00	147.7840	22.8110	-0.2827	147.7840	-14.7402	0.2519
70.00	159.1520	19.4960	-0.2991	159.1520	-11.8540	0.2543
75.00	170.5200	16.0383	-0.3074	170.5200	-8.9933	0.2470
80.00	181.8880	12.5422	-0.3058	181.8880	-6.2815	0.2279
85.00	193.2560	9.1273	-0.2938	193.2560	-3.8608	0.1961
90.00	204.6240	5.9005	-0.2722	204.6240	-1.8794	0.1495
95.00	215.9920	2.9941	-0.2357	215.9920	-0.5648	0.0744
100.00	227.3600	0.5940	0.	227.3600	-0.5930	-0.2087

TABLE I -26

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.500

R= 1200.00" C= 224.33" T= 59.47" T/C= 0.2651

TTU= 0.58" TTL= -0.59"

THETA= 4.00 DEG DESIGN CL= 0.350

XZERO= 0. " YZERO= 3.8159"

% CHORD	X,UPPER (INCH)	Y,UPPER (INCH)	DYU/DXU	X,LOWER (INCH)	Y,LOWER (INCH)	DYL/DXL
0.	0.	0.	-6.7829	0.	0.	-6.7829
0.25	0.5608	4.8134	2.2859	0.5608	-2.0590	-2.5277
0.50	1.1216	5.9125	1.7279	1.1216	-3.2148	-1.7627
0.75	1.6825	6.7994	1.4562	1.6825	-4.0847	-1.3946
1.25	2.8041	8.2479	1.1770	2.8041	-5.5230	-1.1149
2.00	4.4866	10.0468	0.9907	4.4866	-7.1352	-0.8471
2.50	5.6083	11.1163	0.9188	5.6083	-8.0295	-0.7590
3.00	6.7299	12.1116	0.8571	6.7299	-8.8488	-0.7057
3.50	7.8515	13.0437	0.8050	7.8515	-9.6164	-0.6639
4.00	8.9732	13.9194	0.7562	8.9732	-10.3393	-0.6258
4.50	10.0948	14.7409	0.7125	10.0948	-11.0226	-0.5921
5.00	11.2165	15.5191	0.6726	11.2165	-11.6686	-0.5590
7.50	16.8247	18.8642	0.5350	16.8247	-14.4143	-0.4316
10.00	22.4330	21.6015	0.4499	22.4330	-16.6065	-0.3564
15.00	33.6495	25.9411	0.3312	33.6495	-20.0070	-0.2574
20.00	44.8660	29.1548	0.2446	44.8660	-22.4736	-0.1853
25.00	56.0825	31.4779	0.1707	56.0825	-24.2013	-0.1234
30.00	67.2990	33.0100	0.1034	67.2990	-25.2610	-0.0663
35.00	78.5155	33.7721	0.0280	78.5155	-25.6669	-0.0018
40.00	89.7320	33.5589	-0.0651	89.7320	-25.2063	0.0845
45.00	100.9485	32.4215	-0.1335	100.9485	-23.8853	0.1464
50.00	112.1650	30.6295	-0.1842	112.1650	-21.9983	0.1880
55.00	123.3815	28.3222	-0.2254	123.3815	-19.7062	0.2186
60.00	134.5980	25.6057	-0.2578	134.5980	-17.1312	0.2391
65.00	145.8145	22.5729	-0.2823	145.8145	-14.3801	0.2505
70.00	157.0310	19.3044	-0.2991	157.0310	-11.5481	0.2528
75.00	168.2475	15.8922	-0.3076	168.2475	-8.7434	0.2454
80.00	179.4640	12.4388	-0.3063	179.4640	-6.0874	0.2260
85.00	190.6805	9.0615	-0.2947	190.6805	-3.7207	0.1941
90.00	201.8970	5.8649	-0.2736	201.8970	-1.7897	0.1472
95.00	213.1135	2.9779	-0.2378	213.1135	-0.5201	0.0718
100.00	224.3300	0.5760	0.	224.3300	-0.5850	-0.2151

TABLE I -27

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.510

R= 1224.00" C= 221.31" T= 58.49" T/C= 0.2643

TTU= 0.57" TTL= -0.58"

THETA= 3.96 DEG DESIGN CL= 0.360

XZERO= 0. " YZERO= 3.8720"

% CHORD	X,UPPER (INCH)	Y,UPPER (INCH)	DYU/DXU	X,LOWER (INCH)	Y,LOWER (INCH)	DYL/DXL
0.	0.	0.	-6.5945	0.	0.	-6.5945
0.25	0.5533	4.7788	2.2715	0.5533	-2.0041	-2.5104
0.50	1.1065	5.8572	1.7226	1.1065	-3.1377	-1.7516
0.75	1.6598	6.7313	1.4514	1.6598	-3.9907	-1.3864
1.25	2.7664	8.1568	1.1750	2.7664	-5.4015	-1.1106
2.00	4.4262	9.9301	0.9902	4.4262	-6.9848	-0.8425
2.50	5.5328	10.9847	0.9183	5.5328	-7.8619	-0.7541
3.00	6.6393	11.9660	0.8565	6.6393	-8.6648	-0.7008
3.50	7.7458	12.8844	0.8044	7.7458	-9.4167	-0.6592
4.00	8.8524	13.7476	0.7557	8.8524	-10.1248	-0.6213
4.50	9.9589	14.5576	0.7121	9.9589	-10.7941	-0.5879
5.00	11.0655	15.3247	0.6722	11.0655	-11.4269	-0.5550
7.50	16.5982	18.6237	0.5349	16.5982	-14.1156	-0.4284
10.00	22.1310	21.3242	0.4500	22.1310	-16.2614	-0.3536
15.00	33.1965	25.6062	0.3313	33.1965	-19.5890	-0.2552
20.00	44.2620	28.7784	0.2448	44.2620	-22.0016	-0.1837
25.00	55.3275	31.0726	0.1710	55.3275	-23.6904	-0.1222
30.00	66.3930	32.5872	0.1037	66.3930	-24.7247	-0.0655
35.00	77.4585	33.3431	0.0284	77.4585	-25.1186	-0.0014
40.00	88.5240	33.1392	-0.0644	88.5240	-24.6633	0.0843
45.00	99.5895	32.0255	-0.1328	99.5895	-23.3632	0.1460
50.00	110.6550	30.2658	-0.1835	110.6550	-21.5073	0.1873
55.00	121.7205	27.9973	-0.2247	121.7205	-19.2547	0.2177
60.00	132.7860	25.3241	-0.2572	132.7860	-16.7254	0.2380
65.00	143.8515	22.3373	-0.2819	143.8515	-14.0245	0.2492
70.00	154.9170	19.1160	-0.2989	154.9170	-11.2462	0.2513
75.00	165.9825	15.7502	-0.3077	165.9825	-8.4967	0.2437
80.00	177.0480	12.3405	-0.3067	177.0480	-5.8959	0.2242
85.00	188.1135	9.0018	-0.2955	188.1135	-3.5823	0.1920
90.00	199.1790	5.8365	-0.2750	199.1790	-1.7009	0.1450
95.00	210.2445	2.9702	-0.2399	210.2445	-0.4754	0.0691
100.00	221.3100	0.5680	0.	221.3100	-0.5760	-0.2216

TABLE I -28

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.520

R= 1248.00" C= 218.28" T= 57.49" T/C= 0.2634

TTU= 0.56" TTL= -0.57"

THETA= 3.92 DEG DESIGN CL= 0.370

XZERO= 0. " YZERO= 3.9251"

% CHORD	X,UPPER (INCH)	Y,UPPER (INCH)	DYU/DXU	X,LOWER (INCH)	Y,LOWER (INCH)	DYL/DXL
0.	0.	0.	-6.4162	0.	0.	-6.4162
0.25	0.5457	4.7398	2.2592	0.5457	-1.9502	-2.4921
0.50	1.0914	5.7988	1.7167	1.0914	-3.0607	-1.7408
0.75	1.6371	6.6592	1.4467	1.6371	-3.8973	-1.3776
1.25	2.7285	8.0620	1.1727	2.7285	-5.2801	-1.1058
2.00	4.3656	9.8090	0.9893	4.3656	-6.8340	-0.8376
2.50	5.4570	10.8484	0.9174	5.4570	-7.6935	-0.7489
3.00	6.5484	11.8147	0.8557	6.5484	-8.4797	-0.6955
3.50	7.6398	12.7196	0.8036	7.6398	-9.2157	-0.6542
4.00	8.7312	13.5700	0.7549	8.7312	-9.9087	-0.6165
4.50	9.8226	14.3682	0.7113	9.8226	-10.5637	-0.5833
5.00	10.9140	15.1239	0.6716	10.9140	-11.1832	-0.5507
7.50	16.3710	18.3755	0.5346	16.3710	-13.8138	-0.4249
10.00	21.8280	21.0382	0.4498	21.8280	-15.9127	-0.3506
15.00	32.7420	25.2611	0.3313	32.7420	-19.1661	-0.2529
20.00	43.6560	28.3905	0.2449	43.6560	-21.5240	-0.1820
25.00	54.5700	30.6549	0.1712	54.5700	-23.1733	-0.1210
30.00	65.4840	32.1514	0.1040	65.4840	-24.1819	-0.0646
35.00	76.3980	32.9010	0.0289	76.3980	-24.5637	-0.0011
40.00	87.3120	32.7067	-0.0636	87.3120	-24.1140	0.0842
45.00	98.2260	31.6170	-0.1320	98.2260	-22.8355	0.1455
50.00	109.1400	29.8903	-0.1827	109.1400	-21.0116	0.1866
55.00	120.0540	27.6615	-0.2240	120.0540	-18.7991	0.2168
60.00	130.9680	25.0327	-0.2566	130.9680	-16.3163	0.2368
65.00	141.8820	22.0929	-0.2814	141.8820	-13.6666	0.2478
70.00	152.7960	18.9200	-0.2987	152.7960	-10.9426	0.2497
75.00	163.7100	15.6018	-0.3077	163.7100	-8.2490	0.2419
80.00	174.6240	12.2370	-0.3070	174.6240	-5.7038	0.2223
85.00	185.5380	8.9382	-0.2962	185.5380	-3.4437	0.1899
90.00	196.4520	5.8056	-0.2762	196.4520	-1.6120	0.1427
95.00	207.3660	2.9612	-0.2419	207.3660	-0.4304	0.0664
100.00	218.2800	0.5600	0.	218.2800	-0.5660	-0.2280

TABLE I -29

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.530

R= 1272.00" C= 215.25" T= 56.52" T/C= 0.2626

TTU= 0.55" TTL= -0.56"

THETA= 3.88 DEG DESIGN CL= 0.380

XZERO= 0. " YZERO= 3.9753"

% CHORD	X,UPPER (INCH)	Y,UPPER (INCH)	DYU/DXU	X,LOWER (INCH)	Y,LOWER (INCH)	DYL/DXL
0.	0.	0.	-6.2474	0.	0.	-6.2474
0.25	0.5381	4.7016	2.2470	0.5381	-1.8979	-2.4742
0.50	1.0763	5.7417	1.7111	1.0763	-2.9855	-1.7308
0.75	1.6144	6.5869	1.4438	1.6144	-3.8063	-1.3692
1.25	2.6906	7.9691	1.1707	2.6906	-5.1618	-1.1012
2.00	4.3050	9.6905	0.9887	4.3050	-6.6870	-0.8329
2.50	5.3813	10.7145	0.9169	5.3813	-7.5295	-0.7439
3.00	6.4575	11.6665	0.8552	6.4575	-8.2994	-0.6906
3.50	7.5337	12.5584	0.8031	7.5337	-9.0200	-0.6495
4.00	8.6100	13.3964	0.7543	8.6100	-9.6985	-0.6119
4.50	9.6862	14.1830	0.7109	9.6862	-10.3397	-0.5791
5.00	10.7625	14.9277	0.6712	10.7625	-10.9462	-0.5467
7.50	16.1437	18.1332	0.5345	16.1437	-13.5205	-0.4217
10.00	21.5250	20.7590	0.4499	21.5250	-15.5740	-0.3477
15.00	32.2875	24.9242	0.3315	32.2875	-18.7558	-0.2508
20.00	43.0500	28.0120	0.2451	43.0500	-21.0606	-0.1803
25.00	53.8125	30.2473	0.1715	53.8125	-22.6717	-0.1198
30.00	64.5750	31.7260	0.1043	64.5750	-23.6555	-0.0638
35.00	75.3375	32.4693	0.0294	75.3375	-24.0255	-0.0007
40.00	86.1000	32.2839	-0.0629	86.1000	-23.5810	0.0840
45.00	96.8625	31.2175	-0.1312	96.8625	-22.3234	0.1452
50.00	107.6250	29.5227	-0.1820	107.6250	-20.5304	0.1860
55.00	118.3875	27.3324	-0.2233	118.3875	-18.3570	0.2159
60.00	129.1500	24.7467	-0.2561	129.1500	-15.9194	0.2357
65.00	139.9125	21.8528	-0.2810	139.9125	-13.3193	0.2465
70.00	150.6750	18.7271	-0.2985	150.6750	-10.6483	0.2483
75.00	161.4375	15.4556	-0.3078	161.4375	-8.0090	0.2403
80.00	172.2000	12.1350	-0.3074	172.2000	-5.5181	0.2204
85.00	182.9625	8.8754	-0.2970	182.9625	-3.3100	0.1879
90.00	193.7250	5.7750	-0.2775	193.7250	-1.5267	0.1404
95.00	204.4875	2.9526	-0.2439	204.4875	-0.3877	0.0638
100.00	215.2500	0.5530	0.	215.2500	-0.5570	-0.2344

TABLE I -30

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.540

R= 1296.00" C= 212.23" T= 55.56" T/C= 0.2618

TTU= 0.55" TTL= -0.55"

THETA= 3.84 DEG DESIGN CL= 0.390

XZERO= 0. " YZERO= 4.0225"

% CHORD	X,UPPER (INCH)	Y,UPPER (INCH)	DYU/DXU	X,LOWER (INCH)	Y,LOWER (INCH)	DYL/DXL
0.	0.	0.	-6.0872	0.	0.	-6.0872
0.25	0.5306	4.6629	2.2345	0.5306	-1.8470	-2.4559
0.50	1.0611	5.6841	1.7053	1.0611	-2.9119	-1.7206
0.75	1.5917	6.5143	1.4407	1.5917	-3.7166	-1.3612
1.25	2.6529	7.8759	1.1687	2.6529	-5.0454	-1.0966
2.00	4.2446	9.5717	0.9881	4.2446	-6.5421	-0.8282
2.50	5.3058	10.5801	0.9164	5.3058	-7.3676	-0.7390
3.00	6.3669	11.5183	0.8547	6.3669	-8.1215	-0.6856
3.50	7.4280	12.3972	0.8025	7.4280	-8.8270	-0.6448
4.00	8.4892	13.2228	0.7538	8.4892	-9.4910	-0.6074
4.50	9.5503	13.9980	0.7104	9.5503	-10.1185	-0.5748
5.00	10.6115	14.7316	0.6708	10.6115	-10.7119	-0.5427
7.50	15.9172	17.8912	0.5345	15.9172	-13.2310	-0.4184
10.00	21.2230	20.4804	0.4499	21.2230	-15.2395	-0.3449
15.00	31.8345	24.5880	0.3316	31.8345	-18.3504	-0.2487
20.00	42.4460	27.6343	0.2453	42.4460	-20.6029	-0.1787
25.00	53.0575	29.8406	0.1717	53.0575	-22.1763	-0.1186
30.00	63.6690	31.3016	0.1046	63.6690	-23.1356	-0.0630
35.00	74.2805	32.0383	0.0299	74.2805	-23.4939	-0.0004
40.00	84.8920	31.8618	-0.0622	84.8920	-23.0548	0.0839
45.00	95.5035	30.8182	-0.1305	95.5035	-21.8178	0.1448
50.00	106.1150	29.1550	-0.1812	106.1150	-20.0555	0.1853
55.00	116.7265	27.0029	-0.2227	116.7265	-17.9208	0.2150
60.00	127.3380	24.4599	-0.2555	127.3380	-15.5279	0.2346
65.00	137.9495	21.6115	-0.2806	137.9495	-12.9771	0.2452
70.00	148.5610	18.5327	-0.2983	148.5610	-10.3584	0.2468
75.00	159.1725	15.3076	-0.3079	159.1725	-7.7730	0.2386
80.00	169.7840	12.0309	-0.3079	169.7840	-5.3355	0.2186
85.00	180.3955	8.8105	-0.2978	180.3955	-3.1789	0.1859
90.00	191.0070	5.7425	-0.2788	191.0070	-1.4431	0.1382
95.00	201.6185	2.9422	-0.2460	201.6185	-0.3460	0.0611
100.00	212.2300	0.5450	0.	212.2300	-0.5480	-0.2408

TABLE I -31

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.550

R= 1320.00" C= 209.20" T= 54.58" T/C= 0.2609

TTU= 0.54" TTL= -0.54"

THETA= 3.80 DEG DESIGN CL= 0.400

XZERO= 0. " YZERO= 4.0668"

% CHORD	X,UPPER (INCH)	Y,UPPER (INCH)	DYU/DXU	X,LOWER (INCH)	Y,LOWER (INCH)	DYL/DXL
0.	0.	0.	-5.9350	0.	0.	-5.9350
0.25	0.5230	4.6214	2.2211	0.5230	-1.7969	-2.4368
0.50	1.0460	5.6234	1.6990	1.0460	-2.8390	-1.7097
0.75	1.5690	6.4384	1.4373	1.5690	-3.6267	-1.3533
1.25	2.6150	7.7789	1.1663	2.6150	-4.9290	-1.0915
2.00	4.1840	9.4479	0.9874	4.1840	-6.3968	-0.8232
2.50	5.2300	10.4410	0.9156	5.2300	-7.2051	-0.7337
3.00	6.2760	11.3650	0.8539	6.2760	-7.9427	-0.6803
3.50	7.3220	12.2306	0.8017	7.3220	-8.6327	-0.6397
4.00	8.3680	13.0435	0.7530	8.3680	-9.2822	-0.6026
4.50	9.4140	13.8069	0.7097	9.4140	-9.8954	-0.5702
5.00	10.4600	14.5293	0.6702	10.4600	-10.4757	-0.5384
7.50	15.6900	17.6418	0.5342	15.6900	-12.9387	-0.4149
10.00	20.9200	20.1933	0.4498	20.9200	-14.9016	-0.3419
15.00	31.3800	24.2419	0.3316	31.3800	-17.9407	-0.2464
20.00	41.8400	27.2455	0.2454	41.8400	-20.1400	-0.1770
25.00	52.3000	29.4219	0.1719	52.3000	-21.6752	-0.1173
30.00	62.7600	30.8646	0.1049	62.7600	-22.6097	-0.0621
35.00	73.2200	31.5948	0.0303	73.2200	-22.9564	-0.0000
40.00	83.6800	31.4272	-0.0615	83.6800	-22.5228	0.0837
45.00	94.1400	30.4069	-0.1297	94.1400	-21.3072	0.1443
50.00	104.6000	28.7760	-0.1804	104.6000	-19.5763	0.1846
55.00	115.0600	26.6628	-0.2219	115.0600	-17.4811	0.2140
60.00	125.5200	24.1634	-0.2549	125.5200	-15.1340	0.2334
65.00	135.9800	21.3616	-0.2801	135.9800	-12.6331	0.2437
70.00	146.4400	18.3309	-0.2981	146.4400	-10.0677	0.2452
75.00	156.9000	15.1533	-0.3079	156.9000	-7.5367	0.2368
80.00	167.3600	11.9218	-0.3082	167.3600	-5.1534	0.2167
85.00	177.8200	8.7419	-0.2985	177.8200	-3.0485	0.1838
90.00	188.2800	5.7074	-0.2801	188.2800	-1.3605	0.1359
95.00	198.7400	2.9305	-0.2480	198.7400	-0.3051	0.0584
100.00	209.2000	0.5370	0.	209.2000	-0.5390	-0.2472

TABLE I -32

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.560

R= 1344.00" C= 206.17" T= 53.62" T/C= 0.2601

TTU= 0.53" TTL= -0.53"

THETA= 3.76 DEG DESIGN CL= 0.410

XZERO= 0. " YZERO= 4.1082"

% CHORD	X,UPPER (INCH)	Y,UPPER (INCH)	DYU/DXU	X,LOWER (INCH)	Y,LOWER (INCH)	DYL/DXL
0.	0.	0.	-5.7903	0.	0.	-5.7903
0.25	0.5154	4.5808	2.2077	0.5154	-1.7480	-2.4192
0.50	1.0308	5.5640	1.6930	1.0308	-2.7681	-1.6992
0.75	1.5463	6.3640	1.4341	1.5463	-3.5392	-1.3457
1.25	2.5771	7.6839	1.1642	2.5771	-4.8156	-1.0867
2.00	4.1234	9.3265	0.9870	4.1234	-6.2551	-0.8184
2.50	5.1543	10.3049	0.9151	5.1543	-7.0467	-0.7287
3.00	6.1851	11.2150	0.8534	6.1851	-7.7686	-0.6754
3.50	7.2160	12.0676	0.8012	7.2160	-8.4436	-0.6350
4.00	8.2468	12.8682	0.7525	8.2468	-9.0787	-0.5981
4.50	9.2776	13.6201	0.7092	9.2776	-9.6783	-0.5659
5.00	10.3085	14.3315	0.6698	10.3085	-10.2460	-0.5344
7.50	15.4627	17.3980	0.5341	15.4627	-12.6547	-0.4116
10.00	20.6170	19.9127	0.4499	20.6170	-14.5734	-0.3390
15.00	30.9255	23.9038	0.3318	30.9255	-17.5430	-0.2442
20.00	41.2340	26.8657	0.2456	41.2340	-19.6909	-0.1753
25.00	51.5425	29.0129	0.1722	51.5425	-21.1891	-0.1161
30.00	61.8510	30.4376	0.1052	61.8510	-22.0995	-0.0613
35.00	72.1595	31.1611	0.0308	72.1595	-22.4350	0.0003
40.00	82.4680	31.0020	-0.0608	82.4680	-22.0067	0.0835
45.00	92.7765	30.0041	-0.1289	92.7765	-20.8117	0.1439
50.00	103.0850	28.4044	-0.1797	103.0850	-19.1114	0.1839
55.00	113.3935	26.3290	-0.2213	113.3935	-17.0546	0.2131
60.00	123.7020	23.8720	-0.2544	123.7020	-14.7518	0.2323
65.00	134.0105	21.1155	-0.2797	134.0105	-12.2997	0.2424
70.00	144.3190	18.1317	-0.2979	144.3190	-9.7860	0.2437
75.00	154.6275	15.0006	-0.3080	154.6275	-7.3081	0.2352
80.00	164.9360	11.8133	-0.3086	164.9360	-4.9774	0.2148
85.00	175.2445	8.6731	-0.2993	175.2445	-2.9229	0.1817
90.00	185.5530	5.6718	-0.2814	185.5530	-1.2814	0.1336
95.00	195.8615	2.9182	-0.2500	195.8615	-0.2665	0.0558
100.00	206.1700	0.5290	0.	206.1700	-0.5310	-0.2536

TABLE I -33

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.570

R= 1368.00" C= 203.15" T= 52.66" T/C= 0.2592

TTU= 0.52" TTL= -0.52"

THETA= 3.72 DEG DESIGN CL= 0.420

XZERO= 0. " YZERO= 4.1466"

% CHORD	X,UPPER (INCH)	Y,UPPER (INCH)	DYU/DXU	X,LOWER (INCH)	Y,LOWER (INCH)	DYL/DXL
0.	0.	0.	-5.6524	0.	0.	-5.6524
0.25	0.5079	4.5378	2.1937	0.5079	-1.6996	-2.4015
0.50	1.0157	5.5020	1.6864	1.0157	-2.6982	-1.6879
0.75	1.5236	6.2871	1.4305	1.5236	-3.4527	-1.3375
1.25	2.5394	7.5860	1.1618	2.5394	-4.7027	-1.0815
2.00	4.0630	9.2018	0.9863	4.0630	-6.1137	-0.8133
2.50	5.0788	10.1651	0.9143	5.0788	-6.8884	-0.7234
3.00	6.0945	11.0611	0.8527	6.0945	-7.5943	-0.6701
3.50	7.1102	11.9005	0.8004	7.1102	-8.2542	-0.6299
4.00	8.1260	12.6885	0.7518	8.1260	-8.8746	-0.5933
4.50	9.1417	13.4287	0.7085	9.1417	-9.4607	-0.5613
5.00	10.1575	14.1290	0.6692	10.1575	-10.0155	-0.5300
7.50	15.2362	17.1487	0.5339	15.2362	-12.3693	-0.4081
10.00	20.3150	19.6260	0.4498	20.3150	-14.2435	-0.3360
15.00	30.4725	23.5582	0.3318	30.4725	-17.1427	-0.2419
20.00	40.6300	26.4776	0.2458	40.6300	-19.2387	-0.1736
25.00	50.7875	28.5950	0.1724	50.7875	-20.6997	-0.1148
30.00	60.9450	30.0014	0.1055	60.9450	-21.5859	-0.0604
35.00	71.1025	30.7181	0.0313	71.1025	-21.9100	0.0007
40.00	81.2600	30.5676	-0.0600	81.2600	-21.4874	0.0834
45.00	91.4175	29.5925	-0.1281	91.4175	-20.3134	0.1434
50.00	101.5750	28.0243	-0.1789	101.5750	-18.6441	0.1832
55.00	111.7325	25.9873	-0.2205	111.7325	-16.6263	0.2121
60.00	121.8900	23.5734	-0.2537	121.8900	-14.3683	0.2311
65.00	132.0475	20.8630	-0.2792	132.0475	-11.9654	0.2410
70.00	142.2050	17.9269	-0.2977	142.2050	-9.5039	0.2422
75.00	152.3625	14.8431	-0.3080	152.3625	-7.0793	0.2334
80.00	162.5200	11.7010	-0.3089	162.5200	-4.8016	0.2129
85.00	172.6775	8.6014	-0.3000	172.6775	-2.7975	0.1796
90.00	182.8350	5.6342	-0.2827	182.8350	-1.2024	0.1313
95.00	192.9925	2.9049	-0.2520	192.9925	-0.2276	0.0531
100.00	203.1500	0.5210	0.	203.1500	-0.5220	-0.2600

TABLE I -34

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.580

R= 1392.00" C= 200.12" T= 51.71" T/C= 0.2584

TTU= 0.51" TTL= -0.51"

THETA= 3.68 DEG DESIGN CL= 0.430

XZERO= 0. " YZERO= 4.1821"

% CHORD	X,UPPER (INCH)	Y,UPPER (INCH)	DYU/DXU	X,LOWER (INCH)	Y,LOWER (INCH)	DYL/DXL
0.	0.	0.	-5.5210	0.	0.	-5.5210
0.25	0.5003	4.4955	2.1797	0.5003	-1.6527	-2.3842
0.50	1.0006	5.4411	1.6801	1.0006	-2.6301	-1.6770
0.75	1.5009	6.2113	1.4272	1.5009	-3.3683	-1.3295
1.25	2.5015	7.4894	1.1598	2.5015	-4.5924	-1.0765
2.00	4.0024	9.0791	0.9860	4.0024	-5.9755	-0.8085
2.50	5.0030	10.0277	0.9139	5.0030	-6.7337	-0.7183
3.00	6.0036	10.9099	0.8522	6.0036	-7.4241	-0.6651
3.50	7.0042	11.7363	0.7999	7.0042	-8.0689	-0.6252
4.00	8.0048	12.5120	0.7513	8.0048	-8.6755	-0.5888
4.50	9.0054	13.2408	0.7081	9.0054	-9.2484	-0.5570
5.00	10.0060	13.9301	0.6689	10.0060	-9.7909	-0.5260
7.50	15.0090	16.9040	0.5338	15.0090	-12.0915	-0.4049
10.00	20.0120	19.3446	0.4499	20.0120	-13.9224	-0.3331
15.00	30.0180	23.2193	0.3320	30.0180	-16.7535	-0.2397
20.00	40.0240	26.0969	0.2460	40.0240	-18.7992	-0.1719
25.00	50.0300	28.1851	0.1727	50.0300	-20.2240	-0.1136
30.00	60.0360	29.5734	0.1058	60.0360	-21.0867	-0.0596
35.00	70.0420	30.2832	0.0317	70.0420	-21.3999	0.0011
40.00	80.0480	30.1408	-0.0593	80.0480	-20.9826	0.0832
45.00	90.0540	29.1876	-0.1274	90.0540	-19.8289	0.1430
50.00	100.0600	27.6502	-0.1782	100.0600	-18.1899	0.1825
55.00	110.0660	25.6506	-0.2199	110.0660	-16.2100	0.2112
60.00	120.0720	23.2787	-0.2532	120.0720	-13.9957	0.2300
65.00	130.0780	20.6135	-0.2788	130.0780	-11.6409	0.2397
70.00	140.0840	17.7241	-0.2975	140.0840	-9.2303	0.2407
75.00	150.0900	14.6869	-0.3081	150.0900	-6.8578	0.2317
80.00	160.0960	11.5893	-0.3093	160.0960	-4.6316	0.2111
85.00	170.1020	8.5300	-0.3008	170.1020	-2.6768	0.1776
90.00	180.1080	5.5966	-0.2840	180.1080	-1.1269	0.1290
95.00	190.1140	2.8918	-0.2541	190.1140	-0.1910	0.0504
100.00	200.1200	0.5140	0.	200.1200	-0.5140	-0.2664

TABLE I -35

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.590

R= 1416.00" C= 197.09" T= 50.77" T/C= 0.2576

TTU= 0.51" TTL= -0.51"

THETA= 3.64 DEG DESIGN CL= 0.440

XZERO= 0. " YZERO= 4.2146"

% CHORD	X,UPPER (INCH)	Y,UPPER (INCH)	DYU/DXU	X,LOWER (INCH)	Y,LOWER (INCH)	DYL/DXL
0.	0.	0.	-5.3955	0.	0.	-5.3955
0.25	0.4927	4.4525	2.1653	0.4927	-1.6069	-2.3667
0.50	0.9854	5.3794	1.6737	0.9854	-2.5624	-1.6673
0.75	1.4782	6.1348	1.4239	1.4782	-3.2850	-1.3218
1.25	2.4636	7.3907	1.1589	2.4636	-4.4837	-1.0715
2.00	3.9418	8.9558	0.9856	3.9418	-5.8390	-0.8036
2.50	4.9273	9.8896	0.9134	4.9273	-6.5809	-0.7133
3.00	5.9127	10.7580	0.8517	5.9127	-7.2559	-0.6602
3.50	6.8982	11.5715	0.7994	6.8982	-7.8858	-0.6205
4.00	7.8836	12.3349	0.7508	7.8836	-8.4787	-0.5843
4.50	8.8691	13.0523	0.7077	8.8691	-9.0386	-0.5527
5.00	9.8545	13.7308	0.6685	9.8545	-9.5688	-0.5220
7.50	14.7817	16.6589	0.5338	14.7817	-11.8167	-0.4016
10.00	19.7090	19.0628	0.4499	19.7090	-13.6047	-0.3302
15.00	29.5635	22.8800	0.3321	29.5635	-16.3684	-0.2376
20.00	39.4180	25.7158	0.2462	39.4180	-18.3643	-0.1703
25.00	49.2725	27.7746	0.1730	49.2725	-19.7534	-0.1124
30.00	59.1270	29.1448	0.1061	59.1270	-20.5929	-0.0587
35.00	68.9815	29.8476	0.0322	68.9815	-20.8953	0.0015
40.00	78.8360	29.7132	-0.0586	78.8360	-20.4834	0.0831
45.00	88.6905	28.7816	-0.1267	88.6905	-19.3500	0.1426
50.00	98.5450	27.2747	-0.1774	98.5450	-17.7410	0.1818
55.00	108.3995	25.3121	-0.2192	108.3995	-15.7988	0.2103
60.00	118.2540	22.9820	-0.2526	118.2540	-13.6279	0.2289
65.00	128.1085	20.3618	-0.2784	128.1085	-11.3208	0.2383
70.00	137.9630	17.5190	-0.2973	137.9630	-8.9606	0.2392
75.00	147.8175	14.5282	-0.3081	147.8175	-6.6398	0.2300
80.00	157.6720	11.4750	-0.3098	157.6720	-4.4647	0.2092
85.00	167.5265	8.4561	-0.3016	167.5265	-2.5585	0.1756
90.00	177.3810	5.5568	-0.2853	177.3810	-1.0531	0.1268
95.00	187.2355	2.8768	-0.2561	187.2355	-0.1554	0.0478
100.00	197.0900	0.5060	0.	197.0900	-0.5060	-0.2728

TABLE I -36

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.600

R= 1440.00" C= 194.07" T= 49.82" T/C= 0.2567

TTU= 0.50" TTL= -0.50"

THETA= 3.60 DEG DESIGN CL= 0.450

XZERO= 0. " YZERO= 4.2442"

% CHORD	X,UPPER (INCH)	Y,UPPER (INCH)	DYU/DXU	X,LOWER (INCH)	Y,LOWER (INCH)	DYL/DXL
0.	0.	0.	-5.2756	0.	0.	-5.2756
0.25	0.4852	4.4070	2.1503	0.4852	-1.5620	-2.3483
0.50	0.9703	5.3152	1.6668	0.9703	-2.4953	-1.6573
0.75	1.4555	6.0558	1.4201	1.4555	-3.2021	-1.3141
1.25	2.4259	7.2893	1.1577	2.4259	-4.3756	-1.0659
2.00	3.8814	8.8293	0.9849	3.8814	-5.7028	-0.7984
2.50	4.8518	9.7482	0.9126	4.8518	-6.4282	-0.7080
3.00	5.8221	10.6025	0.8509	5.8221	-7.0873	-0.6550
3.50	6.7925	11.4028	0.7986	6.7925	-7.7026	-0.6154
4.00	7.7628	12.1537	0.7500	7.7628	-8.2816	-0.5795
4.50	8.7332	12.8595	0.7070	8.7332	-8.8284	-0.5481
5.00	9.7035	13.5269	0.6679	9.7035	-9.3461	-0.5176
7.50	14.5552	16.4085	0.5336	14.5552	-11.5407	-0.3980
10.00	19.4070	18.7750	0.4499	19.4070	-13.2855	-0.3272
15.00	29.1105	22.5335	0.3322	29.1105	-15.9811	-0.2353
20.00	38.8140	25.3268	0.2463	38.8140	-17.9268	-0.1685
25.00	48.5175	27.3558	0.1732	48.5175	-19.2798	-0.1111
30.00	58.2210	28.7075	0.1064	58.2210	-20.0960	-0.0579
35.00	67.9245	29.4031	0.0327	67.9245	-20.3877	0.0018
40.00	77.6280	29.2767	-0.0579	77.6280	-19.9813	0.0829
45.00	87.3315	28.3671	-0.1259	87.3315	-18.8687	0.1422
50.00	97.0350	26.8911	-0.1766	97.0350	-17.2903	0.1811
55.00	106.7385	24.9662	-0.2185	106.7385	-15.3864	0.2093
60.00	116.4420	22.6784	-0.2520	116.4420	-13.2595	0.2276
65.00	126.1455	20.1039	-0.2779	126.1455	-11.0006	0.2369
70.00	135.8490	17.3084	-0.2971	135.8490	-8.6913	0.2376
75.00	145.5525	14.3649	-0.3081	145.5525	-6.4225	0.2283
80.00	155.2560	11.3570	-0.3101	155.2560	-4.2988	0.2073
85.00	164.9595	8.3793	-0.3023	164.9595	-2.4413	0.1735
90.00	174.6630	5.5151	-0.2865	174.6630	-0.9804	0.1245
95.00	184.3665	2.8608	-0.2581	184.3665	-0.1206	0.0451
100.00	194.0700	0.4980	0.	194.0700	-0.4980	-0.2792

TABLE I -37

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.610

R= 1464.00" C= 191.04" T= 48.89" T/C= 0.2559

TTU= 0.49" TTL= -0.49"

THETA= 3.56 DEG DESIGN CL= 0.460

XZERO= 0. " YZERO= 4.2709"

% CHORD	X,UPPER (INCH)	Y,UPPER (INCH)	DYU/DXU	X,LOWER (INCH)	Y,LOWER (INCH)	DYL/DXL
0.	0.	0.	-5.1609	0.	0.	-5.1609
0.25	0.4776	4.3623	2.1353	0.4776	-1.5184	-2.3304
0.50	0.9552	5.2519	1.6602	0.9552	-2.4300	-1.6477
0.75	1.4328	5.9780	1.4167	1.4328	-3.1212	-1.3067
1.25	2.3880	7.1894	1.1567	2.3880	-4.2700	-1.0607
2.00	3.8208	8.7048	0.9845	3.8208	-5.5697	-0.7935
2.50	4.7760	9.6089	0.9121	4.7760	-6.2790	-0.7029
3.00	5.7312	10.4495	0.8505	5.7312	-6.9226	-0.6501
3.50	6.6864	11.2369	0.7981	6.6864	-7.5237	-0.6107
4.00	7.6416	11.9756	0.7496	7.6416	-8.0893	-0.5750
4.50	8.5968	12.6700	0.7066	8.5968	-8.6233	-0.5437
5.00	9.5520	13.3266	0.6676	9.5520	-9.1290	-0.5136
7.50	14.3280	16.1625	0.5335	14.3280	-11.2719	-0.3947
10.00	19.1040	18.4924	0.4499	19.1040	-12.9748	-0.3243
15.00	28.6560	22.1934	0.3324	28.6560	-15.6044	-0.2331
20.00	38.2080	24.9449	0.2465	38.2080	-17.5015	-0.1669
25.00	47.7600	26.9445	0.1735	47.7600	-18.8195	-0.1099
30.00	57.3120	28.2778	0.1067	57.3120	-19.6131	-0.0570
35.00	66.8640	28.9663	0.0332	66.8640	-19.8944	0.0022
40.00	76.4160	28.8474	-0.0572	76.4160	-19.4934	0.0828
45.00	85.9680	27.9590	-0.1252	85.9680	-18.4008	0.1418
50.00	95.5200	26.5130	-0.1759	95.5200	-16.8522	0.1804
55.00	105.0720	24.6247	-0.2178	105.0720	-14.9854	0.2084
60.00	114.6240	22.3783	-0.2514	114.6240	-12.9014	0.2265
65.00	124.1760	19.8484	-0.2775	124.1760	-10.6894	0.2355
70.00	133.7280	17.0993	-0.2969	133.7280	-8.4298	0.2361
75.00	143.2800	14.2022	-0.3082	143.2800	-6.2116	0.2266
80.00	152.8320	11.2390	-0.3105	152.8320	-4.1379	0.2054
85.00	162.3840	8.3019	-0.3031	162.3840	-2.3278	0.1714
90.00	171.9360	5.4726	-0.2878	171.9360	-0.9102	0.1222
95.00	181.4880	2.8441	-0.2602	181.4880	-0.0870	0.0424
100.00	191.0400	0.4900	0.	191.0400	-0.4900	-0.2856

TABLE I -38

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.620

R= 1488.00" C= 188.01" T= 47.96" T/C= 0.2551

TTU= 0.48" TTL= -0.48"

THETA= 3.52 DEG DESIGN CL= 0.470

XZERO= 0. " YZERO= 4.2946"

% CHORD	X,UPPER (INCH)	Y,UPPER (INCH)	DYU/DXU	X,LOWER (INCH)	Y,LOWER (INCH)	DYL/DXL
0.	0.	0.	-5.0511	0.	0.	-5.0511
0.25	0.4700	4.3163	2.1207	0.4700	-1.4758	-2.3123
0.50	0.9400	5.1880	1.6534	0.9400	-2.3659	-1.6379
0.75	1.4101	5.8995	1.4132	1.4101	-3.0417	-1.2991
1.25	2.3501	7.0889	1.1558	2.3501	-4.1656	-1.0557
2.00	3.7602	8.5796	0.9841	3.7602	-5.4382	-0.7885
2.50	4.7003	9.4691	0.9116	4.7003	-6.1313	-0.6980
3.00	5.6403	10.2959	0.8500	5.6403	-6.7599	-0.6452
3.50	6.5803	11.0704	0.7976	6.5803	-7.3470	-0.6059
4.00	7.5204	11.7969	0.7491	7.5204	-7.8993	-0.5705
4.50	8.4605	12.4800	0.7062	8.4605	-8.4207	-0.5394
5.00	9.4005	13.1257	0.6673	9.4005	-8.9144	-0.5095
7.50	14.1007	15.9161	0.5335	14.1007	-11.0062	-0.3914
10.00	18.8010	18.2094	0.4500	18.8010	-12.6675	-0.3214
15.00	28.2015	21.8528	0.3325	28.2015	-15.2319	-0.2309
20.00	37.6020	24.5625	0.2468	37.6020	-17.0809	-0.1652
25.00	47.0025	26.5326	0.1737	47.0025	-18.3644	-0.1086
30.00	56.4030	27.8476	0.1071	56.4030	-19.1357	-0.0562
35.00	65.8035	28.5287	0.0336	65.8035	-19.4066	0.0026
40.00	75.2040	28.4173	-0.0565	75.2040	-19.0110	0.0826
45.00	84.6045	27.5499	-0.1244	84.6045	-17.9385	0.1414
50.00	94.0050	26.1336	-0.1752	94.0050	-16.4195	0.1798
55.00	103.4055	24.2818	-0.2171	103.4055	-14.5899	0.2075
60.00	112.8060	22.0766	-0.2509	112.8060	-12.5484	0.2254
65.00	122.2065	19.5913	-0.2771	122.2065	-10.3831	0.2342
70.00	131.6070	16.8886	-0.2967	131.6070	-8.1728	0.2346
75.00	141.0075	14.0380	-0.3083	141.0075	-6.0049	0.2249
80.00	150.4080	11.1196	-0.3109	150.4080	-3.9808	0.2036
85.00	159.8085	8.2236	-0.3039	159.8085	-2.2176	0.1694
90.00	169.2090	5.4295	-0.2891	169.2090	-0.8428	0.1199
95.00	178.6095	2.8274	-0.2622	178.6095	-0.0555	0.0398
100.00	188.0100	0.4830	0.	188.0100	-0.4830	-0.2920

TABLE I -39

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.630

R= 1512.00" C= 184.99" T= 47.02" T/C= 0.2542

TTU= 0.48" TTL= -0.48"

THETA= 3.48 DEG DESIGN CL= 0.480

XZERO= 0. " YZERO= 4.3154"

% CHORD	X,UPPER (INCH)	Y,UPPER (INCH)	DYU/DXU	X,LOWER (INCH)	Y,LOWER (INCH)	DYL/DXL
0.	0.	0.	-4.9459	0.	0.	-4.9459
0.25	0.4625	4.2674	2.1066	0.4625	-1.4341	-2.2935
0.50	0.9249	5.1206	1.6472	0.9249	-2.3027	-1.6275
0.75	1.3874	5.8173	1.4105	1.3874	-2.9631	-1.2910
1.25	2.3124	6.9858	1.1545	2.3124	-4.0618	-1.0502
2.00	3.6998	8.4515	0.9833	3.6998	-5.3071	-0.7832
2.50	4.6248	9.3260	0.9107	4.6248	-5.9835	-0.6930
3.00	5.5497	10.1388	0.8492	5.5497	-6.5973	-0.6400
3.50	6.4746	10.9002	0.7968	6.4746	-7.1702	-0.6009
4.00	7.3996	11.6143	0.7484	7.3996	-7.7091	-0.5657
4.50	8.3246	12.2859	0.7055	8.3246	-8.2177	-0.5348
5.00	9.2495	12.9206	0.6667	9.2495	-8.6993	-0.5051
7.50	13.8742	15.6646	0.5333	13.8742	-10.7395	-0.3879
10.00	18.4990	17.9206	0.4500	18.4990	-12.3589	-0.3184
15.00	27.7485	21.5056	0.3326	27.7485	-14.8574	-0.2286
20.00	36.9980	24.1727	0.2469	36.9980	-16.6579	-0.1634
25.00	46.2475	26.1128	0.1740	46.2475	-17.9066	-0.1074
30.00	55.4970	27.4091	0.1074	55.4970	-18.6555	-0.0553
35.00	64.7465	28.0827	0.0341	64.7465	-18.9162	0.0030
40.00	73.9960	27.9788	-0.0557	73.9960	-18.5262	0.0825
45.00	83.2455	27.1326	-0.1236	83.2455	-17.4742	0.1409
50.00	92.4950	25.7465	-0.1744	92.4950	-15.9852	0.1790
55.00	101.7445	23.9315	-0.2164	101.7445	-14.1930	0.2065
60.00	110.9940	21.7681	-0.2502	110.9940	-12.1947	0.2241
65.00	120.2435	19.3280	-0.2766	120.2435	-10.0765	0.2328
70.00	129.4930	16.6723	-0.2965	129.4930	-7.9157	0.2330
75.00	138.7425	13.8689	-0.3083	138.7425	-5.7984	0.2231
80.00	147.9920	10.9960	-0.3112	147.9920	-3.8239	0.2016
85.00	157.2415	8.1417	-0.3046	157.2415	-2.1078	0.1673
90.00	166.4910	5.3837	-0.2903	166.4910	-0.7755	0.1176
95.00	175.7405	2.8087	-0.2642	175.7405	-0.0237	0.0371
100.00	184.9900	0.4750	0.	184.9900	-0.4750	-0.2983

TABLE I -40

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.640

R= 1536.00" C= 181.96" T= 46.11" T/C= 0.2534

TTU= 0.47" TTL= -0.47"

THETA= 3.44 DEG DESIGN CL= 0.490

XZERO= 0. " YZERO= 4.3332"

% CHORD	X,UPPER (INCH)	Y,UPPER (INCH)	DYU/DXU	X,LOWER (INCH)	Y,LOWER (INCH)	DYL/DXL
0.	0.	0.	-4.8449	0.	0.	-4.8449
0.25	0.4549	4.2191	2.0926	0.4549	-1.3934	-2.2753
0.50	0.9098	5.0531	1.6424	0.9098	-2.2411	-1.6174
0.75	1.3647	5.7363	1.4081	1.3647	-2.8863	-1.2833
1.25	2.2745	6.8841	1.1535	2.2745	-3.9604	-1.0450
2.00	3.6392	8.3252	0.9829	3.6392	-5.1789	-0.7782
2.50	4.5490	9.1850	0.9102	4.5490	-5.8391	-0.6882
3.00	5.4588	9.9841	0.8488	5.4588	-6.4385	-0.6351
3.50	6.3686	10.7327	0.7963	6.3686	-6.9976	-0.5961
4.00	7.2784	11.4346	0.7479	7.2784	-7.5235	-0.5612
4.50	8.1882	12.0949	0.7051	8.1882	-8.0197	-0.5304
5.00	9.0980	12.7188	0.6664	9.0980	-8.4896	-0.5011
7.50	13.6470	15.4174	0.5333	13.6470	-10.4797	-0.3845
10.00	18.1960	17.6368	0.4501	18.1960	-12.0586	-0.3155
15.00	27.2940	21.1642	0.3328	27.2940	-14.4933	-0.2264
20.00	36.3920	23.7895	0.2471	36.3920	-16.2468	-0.1618
25.00	45.4900	25.7001	0.1743	45.4900	-17.4618	-0.1061
30.00	54.5880	26.9778	0.1077	54.5880	-18.1890	-0.0544
35.00	63.6860	27.6439	0.0346	63.6860	-18.4397	0.0032
40.00	72.7840	27.5470	-0.0551	72.7840	-18.0552	0.0823
45.00	81.8820	26.7213	-0.1229	81.8820	-17.0228	0.1405
50.00	90.9800	25.3646	-0.1737	90.9800	-15.5631	0.1783
55.00	100.0780	23.5854	-0.2158	100.0780	-13.8074	0.2056
60.00	109.1760	21.4631	-0.2497	109.1760	-11.8510	0.2230
65.00	118.2740	19.0672	-0.2762	118.2740	-9.7787	0.2314
70.00	127.3720	16.4577	-0.2963	127.3720	-7.6662	0.2315
75.00	136.4700	13.7008	-0.3084	136.4700	-5.5981	0.2214
80.00	145.5680	10.8728	-0.3116	145.5680	-3.6720	0.1998
85.00	154.6660	8.0599	-0.3054	154.6660	-2.0016	0.1652
90.00	163.7640	5.3378	-0.2915	163.7640	-0.7106	0.1153
95.00	172.8620	2.7902	-0.2662	172.8620	0.0068	0.0344
100.00	181.9600	0.4680	0.	181.9600	-0.4670	-0.3047

TABLE I -41

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.650

R= 1560.00" C= 178.93" T= 45.20" T/C= 0.2526

TTU= 0.46" TTL= -0.46"

THETA= 3.40 DEG DESIGN CL= 0.500

XZERO= 0. " YZERO= 4.3481"

% CHORD	X,UPPER (INCH)	Y,UPPER (INCH)	DYU/DXU	X,LOWER (INCH)	Y,LOWER (INCH)	DYL/DXL
0.	0.	0.	-4.7480	0.	0.	-4.7480
0.25	0.4473	4.1684	2.0814	0.4473	-1.3537	-2.2569
0.50	0.8947	4.9848	1.6375	0.8947	-2.1807	-1.6072
0.75	1.3420	5.6546	1.4057	1.3420	-2.8109	-1.2754
1.25	2.2366	6.7819	1.1525	2.2366	-3.8605	-1.0397
2.00	3.5786	8.1983	0.9825	3.5786	-5.0524	-0.7732
2.50	4.4733	9.0435	0.9097	4.4733	-5.6965	-0.6835
3.00	5.3679	9.8288	0.8483	5.3679	-6.2816	-0.6302
3.50	6.2625	10.5646	0.7958	6.2625	-6.8271	-0.5913
4.00	7.1572	11.2544	0.7475	7.1572	-7.3401	-0.5566
4.50	8.0518	11.9034	0.7048	8.0518	-7.8241	-0.5261
5.00	8.9465	12.5166	0.6661	8.9465	-8.2824	-0.4970
7.50	13.4197	15.1698	0.5333	13.4197	-10.2229	-0.3812
10.00	17.8930	17.3526	0.4502	17.8930	-11.7616	-0.3126
15.00	26.8395	20.8225	0.3329	26.8395	-14.1333	-0.2242
20.00	35.7860	23.4058	0.2474	35.7860	-15.8403	-0.1601
25.00	44.7325	25.2868	0.1745	44.7325	-17.0221	-0.1049
30.00	53.6790	26.5460	0.1080	53.6790	-17.7278	-0.0536
35.00	62.6255	27.2045	0.0351	62.6255	-17.9688	0.0036
40.00	71.5720	27.1144	-0.0544	71.5720	-17.5897	0.0822
45.00	80.5185	26.3087	-0.1222	80.5185	-16.5768	0.1401
50.00	89.4650	24.9812	-0.1730	89.4650	-15.1464	0.1777
55.00	98.4115	23.2377	-0.2151	98.4115	-13.4268	0.2047
60.00	107.3580	21.1560	-0.2491	107.3580	-11.5122	0.2219
65.00	116.3045	18.8042	-0.2759	116.3045	-9.4853	0.2301
70.00	125.2510	16.2407	-0.2962	125.2510	-7.4208	0.2300
75.00	134.1975	13.5301	-0.3084	134.1975	-5.4013	0.2197
80.00	143.1440	10.7471	-0.3120	143.1440	-3.5231	0.1979
85.00	152.0905	7.9757	-0.3062	152.0905	-1.8978	0.1632
90.00	161.0370	5.2897	-0.2928	161.0370	-0.6474	0.1130
95.00	169.9835	2.7699	-0.2683	169.9835	0.0363	0.0318
100.00	178.9300	0.4600	0.	178.9300	-0.4590	-0.3111

TABLE I -42

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.660

R= 1584.00" C= 175.91" T= 44.28" T/C= 0.2517

TTU= 0.45" TTL= -0.45"

THETA= 3.36 DEG DESIGN CL= 0.510

XZERO= 0. " YZERO= 4.3600"

% CHORD	X,UPPER (INCH)	Y,UPPER (INCH)	DYU/DXU	X,LOWER (INCH)	Y,LOWER (INCH)	DYL/DXL
0.	0.	0.	-4.6549	0.	0.	-4.6549
0.25	0.4398	4.1143	2.0716	0.4398	-1.3148	-2.2380
0.50	0.8796	4.9140	1.6325	0.8796	-2.1211	-1.5964
0.75	1.3193	5.5705	1.4029	1.3193	-2.7362	-1.2669
1.25	2.1989	6.6770	1.1512	2.1989	-3.7604	-1.0348
2.00	3.5182	8.0686	0.9817	3.5182	-4.9254	-0.7682
2.50	4.3978	8.8988	0.9089	4.3978	-5.5541	-0.6784
3.00	5.2773	9.6702	0.8475	5.2773	-6.1248	-0.6250
3.50	6.1568	10.3930	0.7951	6.1568	-6.6567	-0.5862
4.00	7.0364	11.0705	0.7468	7.0364	-7.1566	-0.5518
4.50	7.9160	11.7080	0.7041	7.9160	-7.6283	-0.5214
5.00	8.7955	12.3103	0.6656	8.7955	-8.0749	-0.4926
7.50	13.1932	14.9173	0.5331	13.1932	-9.9654	-0.3776
10.00	17.5910	17.0629	0.4501	17.5910	-11.4636	-0.3095
15.00	26.3865	20.4744	0.3330	26.3865	-13.7716	-0.2219
20.00	35.1820	23.0151	0.2475	35.1820	-15.4319	-0.1583
25.00	43.9775	24.8660	0.1748	43.9775	-16.5802	-0.1036
30.00	52.7730	26.1062	0.1083	52.7730	-17.2644	-0.0527
35.00	61.5685	26.7570	0.0356	61.5685	-17.4956	0.0040
40.00	70.3640	26.6738	-0.0536	70.3640	-17.1222	0.0820
45.00	79.1595	25.8884	-0.1214	79.1595	-16.1292	0.1396
50.00	87.9550	24.5906	-0.1722	87.9550	-14.7287	0.1769
55.00	96.7505	22.8831	-0.2144	96.7505	-13.0459	0.2037
60.00	105.5460	20.8427	-0.2485	105.5460	-11.1735	0.2206
65.00	114.3415	18.5355	-0.2754	114.3415	-9.1927	0.2286
70.00	123.1370	16.0188	-0.2959	123.1370	-7.1766	0.2284
75.00	131.9325	13.3552	-0.3084	131.9325	-5.2062	0.2179
80.00	140.7280	10.6179	-0.3123	140.7280	-3.3762	0.1960
85.00	149.5235	7.8887	-0.3069	149.5235	-1.7961	0.1611
90.00	158.3190	5.2397	-0.2940	158.3190	-0.5864	0.1107
95.00	167.1145	2.7485	-0.2703	167.1145	0.0640	0.0291
100.00	175.9100	0.4520	0.	175.9100	-0.4520	-0.3174

TABLE I -43

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.670

R= 1608.00" C= 172.88" T= 43.38" T/C= 0.2509

TTU= 0.44" TTL= -0.44"

THETA= 3.32 DEG DESIGN CL= 0.520

XZERO= 0. " YZERO= 4.3690"

% CHORD	X,UPPER (INCH)	Y,UPPER (INCH)	DYU/DXU	X,LOWER (INCH)	Y,LOWER (INCH)	DYL/DXL
0.	0.	0.	-4.5654	0.	0.	-4.5654
0.25	0.4322	4.0609	2.0621	0.4322	-1.2769	-2.2196
0.50	0.8644	4.8441	1.6279	0.8644	-2.0630	-1.5859
0.75	1.2966	5.4876	1.4005	1.2966	-2.6634	-1.2587
1.25	2.1610	6.5736	1.1501	2.1610	-3.6624	-1.0304
2.00	3.4576	7.9406	0.9813	3.4576	-4.8009	-0.7637
2.50	4.3220	8.7562	0.9084	4.3220	-5.4151	-0.6736
3.00	5.1864	9.5140	0.8471	5.1864	-5.9718	-0.6201
3.50	6.0508	10.2239	0.7946	6.0508	-6.4903	-0.5815
4.00	6.9152	10.8893	0.7464	6.9152	-6.9776	-0.5472
4.50	7.7796	11.5156	0.7038	7.7796	-7.4373	-0.5170
5.00	8.6440	12.1072	0.6653	8.6440	-7.8726	-0.4885
7.50	12.9660	14.6689	0.5331	12.9660	-9.7146	-0.3743
10.00	17.2880	16.7780	0.4502	17.2880	-11.1735	-0.3066
15.00	25.9320	20.1320	0.3332	25.9320	-13.4199	-0.2197
20.00	34.5760	22.6307	0.2477	34.5760	-15.0349	-0.1566
25.00	43.2200	24.4519	0.1751	43.2200	-16.1508	-0.1023
30.00	51.8640	25.6733	0.1086	51.8640	-16.8141	-0.0518
35.00	60.5080	26.3163	0.0360	60.5080	-17.0360	0.0044
40.00	69.1520	26.2396	-0.0530	69.1520	-16.6680	0.0819
45.00	77.7960	25.4737	-0.1206	77.7960	-15.6944	0.1392
50.00	86.4400	24.2045	-0.1715	86.4400	-14.3226	0.1762
55.00	95.0840	22.5323	-0.2138	95.0840	-12.6756	0.2028
60.00	103.7280	20.5322	-0.2479	103.7280	-10.8443	0.2195
65.00	112.3720	18.2688	-0.2750	112.3720	-8.9082	0.2273
70.00	121.0160	15.7978	-0.2957	121.0160	-6.9391	0.2269
75.00	129.6600	13.1806	-0.3085	129.6600	-5.0166	0.2162
80.00	138.3040	10.4884	-0.3127	138.3040	-3.2333	0.1941
85.00	146.9480	7.8011	-0.3077	146.9480	-1.6971	0.1590
90.00	155.5920	5.1888	-0.2953	155.5920	-0.5267	0.1084
95.00	164.2360	2.7264	-0.2723	164.2360	0.0914	0.0264
100.00	172.8800	0.4440	0.	172.8800	-0.4440	-0.3238

TABLE I -44

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.680

R= 1632.00" C= 169.85" T= 42.48" T/C= 0.2501

TTU= 0.44" TTL= -0.44"

THETA= 3.28 DEG DESIGN CL= 0.530

XZERO= 0. " YZERO= 4.3751"

% CHORD	X,UPPER (INCH)	Y,UPPER (INCH)	DYU/DXU	X,LOWER (INCH)	Y,LOWER (INCH)	DYL/DXL
0.	0.	0.	-4.4793	0.	0.	-4.4793
0.25	0.4246	4.0069	2.0524	0.4246	-1.2398	-2.2013
0.50	0.8493	4.7735	1.6232	0.8493	-2.0060	-1.5751
0.75	1.2739	5.4041	1.3980	1.2739	-2.5918	-1.2506
1.25	2.1231	6.4697	1.1491	2.1231	-3.5659	-1.0258
2.00	3.3970	7.8121	0.9808	3.3970	-4.6781	-0.7592
2.50	4.2463	8.6131	0.9079	4.2463	-5.2777	-0.6688
3.00	5.0955	9.3572	0.8466	5.0955	-5.8206	-0.6151
3.50	5.9448	10.0544	0.7942	5.9448	-6.3259	-0.5767
4.00	6.7940	10.7077	0.7460	6.7940	-6.8008	-0.5427
4.50	7.6432	11.3227	0.7034	7.6432	-7.2486	-0.5127
5.00	8.4925	11.9037	0.6651	8.4925	-7.6726	-0.4844
7.50	12.7387	14.4199	0.5331	12.7387	-9.4667	-0.3709
10.00	16.9850	16.4926	0.4503	16.9850	-10.8868	-0.3037
15.00	25.4775	19.7891	0.3334	25.4775	-13.0724	-0.2175
20.00	33.9700	22.2458	0.2480	33.9700	-14.6426	-0.1550
25.00	42.4625	24.0373	0.1754	42.4625	-15.7264	-0.1011
30.00	50.9550	25.2398	0.1090	50.9550	-16.3693	-0.0510
35.00	59.4475	25.8748	0.0365	59.4475	-16.5819	0.0047
40.00	67.9400	25.8045	-0.0523	67.9400	-16.2194	0.0818
45.00	76.4325	25.0580	-0.1199	76.4325	-15.2650	0.1387
50.00	84.9250	23.8171	-0.1708	84.9250	-13.9218	0.1756
55.00	93.4175	22.1802	-0.2131	93.4175	-12.3104	0.2019
60.00	101.9100	20.2203	-0.2474	101.9100	-10.5200	0.2184
65.00	110.4025	18.0005	-0.2746	110.4025	-8.6282	0.2260
70.00	118.8950	15.5754	-0.2956	118.8950	-6.7057	0.2254
75.00	127.3875	13.0045	-0.3086	127.3875	-4.8304	0.2145
80.00	135.8800	10.3576	-0.3131	135.8800	-3.0934	0.1923
85.00	144.3725	7.7124	-0.3084	144.3725	-1.6006	0.1570
90.00	152.8650	5.1373	-0.2966	152.8650	-0.4689	0.1061
95.00	161.3575	2.7043	-0.2744	161.3575	0.1179	0.0238
100.00	169.8500	0.4370	0.	169.8500	-0.4360	-0.3301

TABLE I -45

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.690

R= 1656.00" C= 166.83" T= 41.57" T/C= 0.2492

TTU= 0.43" TTL= -0.43"

THETA= 3.24 DEG DESIGN CL= 0.540

XZERO= 0. " YZERO= 4.3782"

% CHORD	X,UPPER (INCH)	Y,UPPER (INCH)	DYU/DXU	X,LOWER (INCH)	Y,LOWER (INCH)	DYL/DXL
0.	0.	0.	-4.3963	0.	0.	-4.3963
0.25	0.4171	3.9507	2.0422	0.4171	-1.2034	-2.1824
0.50	0.8342	4.7007	1.6181	0.8342	-1.9497	-1.5638
0.75	1.2512	5.3182	1.3951	1.2512	-2.5209	-1.2419
1.25	2.0854	6.3633	1.1477	2.0854	-3.4701	-1.0208
2.00	3.3366	7.6808	0.9800	3.3366	-4.5557	-0.7543
2.50	4.1708	8.4669	0.9071	4.1708	-5.1407	-0.6636
3.00	5.0049	9.1971	0.8459	5.0049	-5.6696	-0.6099
3.50	5.8390	9.8814	0.7934	5.8390	-6.1616	-0.5716
4.00	6.6732	10.5225	0.7453	6.6732	-6.6239	-0.5378
4.50	7.5073	11.1261	0.7028	7.5073	-7.0598	-0.5080
5.00	8.3415	11.6961	0.6646	8.3415	-7.4725	-0.4800
7.50	12.5122	14.1664	0.5329	12.5122	-9.2182	-0.3673
10.00	16.6830	16.2021	0.4503	16.6830	-10.5992	-0.3006
15.00	25.0245	19.4402	0.3335	25.0245	-12.7235	-0.2151
20.00	33.3660	21.8543	0.2481	33.3660	-14.2486	-0.1532
25.00	41.7075	23.6155	0.1756	41.7075	-15.3003	-0.0998
30.00	50.0490	24.7989	0.1093	50.0490	-15.9225	-0.0501
35.00	58.3905	25.4259	0.0370	58.3905	-16.1259	0.0051
40.00	66.7320	25.3619	-0.0515	66.7320	-15.7691	0.0816
45.00	75.0735	24.6350	-0.1191	75.0735	-14.8344	0.1382
50.00	83.4150	23.4228	-0.1700	83.4150	-13.5204	0.1748
55.00	91.7565	21.8214	-0.2124	91.7565	-11.9452	0.2009
60.00	100.0980	19.9021	-0.2468	100.0980	-10.1961	0.2171
65.00	108.4395	17.7265	-0.2741	108.4395	-8.3492	0.2245
70.00	116.7810	15.3477	-0.2953	116.7810	-6.4737	0.2238
75.00	125.1225	12.8238	-0.3086	125.1225	-4.6461	0.2127
80.00	133.4640	10.2228	-0.3134	133.4640	-2.9556	0.1903
85.00	141.8055	7.6204	-0.3091	141.8055	-1.5062	0.1549
90.00	150.1470	5.0832	-0.2978	150.1470	-0.4131	0.1038
95.00	158.4885	2.6803	-0.2763	158.4885	0.1425	0.0211
100.00	166.8300	0.4290	0.	166.8300	-0.4290	-0.3364

TABLE I -46

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.700

R= 1680.00" C= 163.80" T= 40.69" T/C= 0.2484

TTU= 0.42" TTL= -0.42"

THETA= 3.20 DEG DESIGN CL= 0.550

XZERO= 0. " YZERO= 4.3784"

% CHORD	X,UPPER (INCH)	Y,UPPER (INCH)	DYU/DXU	X,LOWER (INCH)	Y,LOWER (INCH)	DYL/DXL
0.	0.	0.	-4.3164	0.	0.	-4.3164
0.25	0.4095	3.8952	2.0321	0.4095	-1.1680	-2.1641
0.50	0.8190	4.6289	1.6133	0.8190	-1.8949	-1.5528
0.75	1.2285	5.2335	1.3925	1.2285	-2.4517	-1.2336
1.25	2.0475	6.2582	1.1467	2.0475	-3.3764	-1.0160
2.00	3.2760	7.5512	0.9796	3.2760	-4.4361	-0.7496
2.50	4.0950	8.3227	0.9066	4.0950	-5.0068	-0.6588
3.00	4.9140	9.0394	0.8454	4.9140	-5.5221	-0.6049
3.50	5.7330	9.7109	0.7930	5.7330	-6.0013	-0.5668
4.00	6.5520	10.3399	0.7449	6.5520	-6.4514	-0.5333
4.50	7.3710	10.9321	0.7025	7.3710	-6.8756	-0.5036
5.00	8.1900	11.4914	0.6644	8.1900	-7.2774	-0.4758
7.50	12.2850	13.9167	0.5330	12.2850	-8.9762	-0.3640
10.00	16.3800	15.9161	0.4504	16.3800	-10.3193	-0.2976
15.00	24.5700	19.0966	0.3337	24.5700	-12.3842	-0.2129
20.00	32.7600	21.4686	0.2484	32.7600	-13.8657	-0.1515
25.00	40.9500	23.2000	0.1759	40.9500	-14.8863	-0.0985
30.00	49.1400	24.3644	0.1096	49.1400	-15.4886	-0.0492
35.00	57.3300	24.9832	0.0375	57.3300	-15.6831	0.0055
40.00	65.5200	24.9251	-0.0509	65.5200	-15.3318	0.0815
45.00	73.7100	24.2172	-0.1184	73.7100	-14.4161	0.1378
50.00	81.9000	23.0329	-0.1693	81.9000	-13.1304	0.1742
55.00	90.0900	21.4661	-0.2118	90.0900	-11.5903	0.2000
60.00	98.2800	19.5865	-0.2462	98.2800	-9.8813	0.2160
65.00	106.4700	17.4542	-0.2737	106.4700	-8.0781	0.2232
70.00	114.6600	15.1209	-0.2951	114.6600	-6.2484	0.2222
75.00	122.8500	12.6433	-0.3086	122.8500	-4.4671	0.2111
80.00	131.0400	10.0876	-0.3138	131.0400	-2.8217	0.1885
85.00	139.2300	7.5276	-0.3099	139.2300	-1.4145	0.1528
90.00	147.4200	5.0281	-0.2991	147.4200	-0.3588	0.1015
95.00	155.6100	2.6556	-0.2784	155.6100	0.1669	0.0185
100.00	163.8000	0.4210	0.	163.8000	-0.4210	-0.3428

TABLE I -47

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.710

R= 1704.00" C= 160.77" T= 39.79" T/C= 0.2475

TTU= 0.41" TTL= -0.41"

THETA= 3.16 DEG DESIGN CL= 0.560

XZERO= 0. " YZERO= 4.3756"

% CHORD	X,UPPER (INCH)	Y,UPPER (INCH)	DYU/DXU	X,LOWER (INCH)	Y,LOWER (INCH)	DYL/DXL
0.	0.	0.	-4.2393	0.	0.	-4.2393
0.25	0.4019	3.8374	2.0215	0.4019	-1.1331	-2.1453
0.50	0.8039	4.5546	1.6081	0.8039	-1.8406	-1.5414
0.75	1.2058	5.1462	1.3896	1.2058	-2.3831	-1.2248
1.25	2.0096	6.1504	1.1452	2.0096	-3.2833	-1.0107
2.00	3.2154	7.4185	0.9787	3.2154	-4.3167	-0.7446
2.50	4.0193	8.1752	0.9058	4.0193	-4.8730	-0.6536
3.00	4.8231	8.8779	0.8447	4.8231	-5.3746	-0.5997
3.50	5.6270	9.5365	0.7922	5.6270	-5.8407	-0.5616
4.00	6.4308	10.1531	0.7443	6.4308	-6.2785	-0.5284
4.50	7.2347	10.7338	0.7020	7.2347	-6.6911	-0.4989
5.00	8.0385	11.2823	0.6639	8.0385	-7.0818	-0.4714
7.50	12.0577	13.6619	0.5328	12.0577	-8.7333	-0.3604
10.00	16.0770	15.6241	0.4504	16.0770	-10.0381	-0.2945
15.00	24.1155	18.7462	0.3338	24.1155	-12.0431	-0.2106
20.00	32.1540	21.0753	0.2485	32.1540	-13.4807	-0.1497
25.00	40.1925	22.7763	0.1761	40.1925	-14.4698	-0.0972
30.00	48.2310	23.9213	0.1099	48.2310	-15.0521	-0.0483
35.00	56.2695	24.5318	0.0380	56.2695	-15.2377	0.0059
40.00	64.3080	24.4797	-0.0501	64.3080	-14.8922	0.0813
45.00	72.3465	23.7909	-0.1176	72.3465	-13.9960	0.1373
50.00	80.3850	22.6349	-0.1685	80.3850	-12.7390	0.1734
55.00	88.4235	21.1032	-0.2110	88.4235	-11.2346	0.1990
60.00	96.4620	19.2640	-0.2456	96.4620	-9.5663	0.2147
65.00	104.5005	17.1756	-0.2732	104.5005	-7.8072	0.2217
70.00	112.5390	14.8886	-0.2949	112.5390	-6.0236	0.2206
75.00	120.5775	12.4581	-0.3086	120.5775	-4.2889	0.2093
80.00	128.6160	9.9485	-0.3141	128.6160	-2.6890	0.1865
85.00	136.6545	7.4318	-0.3106	136.6545	-1.3240	0.1507
90.00	144.6930	4.9709	-0.3003	144.6930	-0.3055	0.0992
95.00	152.7315	2.6296	-0.2804	152.7315	0.1906	0.0158
100.00	160.7700	0.4130	0.	160.7700	-0.4130	-0.3491

TABLE I -48

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.720

R= 1728.00" C= 157.75" T= 38.92" T/C= 0.2467

TTU= 0.41" TTL= -0.41"

THETA= 3.12 DEG DESIGN CL= 0.570

XZERO= 0. " YZERO= 4.3699"

% CHORD	X,UPPER (INCH)	Y,UPPER (INCH)	DYU/DXU	X,LOWER (INCH)	Y,LOWER (INCH)	DYL/DXL
0.	0.	0.	-4.1649	0.	0.	-4.1649
0.25	0.3944	3.7807	2.0112	0.3944	-1.0993	-2.1271
0.50	0.7888	4.4818	1.6032	0.7888	-1.7879	-1.5304
0.75	1.1831	5.0607	1.3870	1.1831	-2.3163	-1.2163
1.25	1.9719	6.0447	1.1441	1.9719	-3.1927	-1.0058
2.00	3.1550	7.2884	0.9783	3.1550	-4.2006	-0.7399
2.50	3.9437	8.0305	0.9053	3.9437	-4.7429	-0.6487
3.00	4.7325	8.7198	0.8443	4.7325	-5.2312	-0.5947
3.50	5.5213	9.3655	0.7918	5.5213	-5.6847	-0.5568
4.00	6.3100	9.9700	0.7439	6.3100	-6.1106	-0.5238
4.50	7.0987	10.5396	0.7017	7.0987	-6.5119	-0.4945
5.00	7.8875	11.0776	0.6637	7.8875	-6.8919	-0.4673
7.50	11.8312	13.4123	0.5329	11.8312	-8.4977	-0.3570
10.00	15.7750	15.3383	0.4506	15.7750	-9.7656	-0.2916
15.00	23.6625	18.4030	0.3340	23.6625	-11.7129	-0.2084
20.00	31.5500	20.6902	0.2488	31.5500	-13.1080	-0.1480
25.00	39.4375	22.3613	0.1764	39.4375	-14.0670	-0.0960
30.00	47.3250	23.4872	0.1103	47.3250	-14.6300	-0.0475
35.00	55.2125	24.0893	0.0384	55.2125	-14.8071	0.0063
40.00	63.1000	24.0429	-0.0495	63.1000	-14.4671	0.0812
45.00	70.9875	23.3725	-0.1168	70.9875	-13.5897	0.1369
50.00	78.8750	22.2438	-0.1678	78.8750	-12.3606	0.1727
55.00	86.7625	20.7463	-0.2104	86.7625	-10.8907	0.1981
60.00	94.6500	18.9462	-0.2451	94.6500	-9.2618	0.2136
65.00	102.5375	16.9007	-0.2728	102.5375	-7.5455	0.2204
70.00	110.4250	14.6589	-0.2947	110.4250	-5.8067	0.2191
75.00	118.3125	12.2744	-0.3087	118.3125	-4.1172	0.2076
80.00	126.2000	9.8101	-0.3145	126.2000	-2.5613	0.1847
85.00	134.0875	7.3361	-0.3114	134.0875	-1.2372	0.1487
90.00	141.9750	4.9134	-0.3015	141.9750	-0.2547	0.0969
95.00	149.8625	2.6032	-0.2824	149.8625	0.2130	0.0131
100.00	157.7500	0.4050	0.	157.7500	-0.4050	-0.3554

TABLE I -49

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.730

R= 1752.00" C= 154.72" T= 38.05" T/C= 0.2459

TTU= 0.40" TTL= -0.40"

THETA= 3.08 DEG DESIGN CL= 0.580

XZERO= 0. " YZERO= 4.3612"

% CHORD	X,UPPER (INCH)	Y,UPPER (INCH)	DYU/DXU	X,LOWER (INCH)	Y,LOWER (INCH)	DYL/DXL
0.	0.	0.	-4.0931	0.	0.	-4.0931
0.25	0.3868	3.7231	2.0007	0.3868	-1.0658	-2.1095
0.50	0.7736	4.4080	1.5982	0.7736	-1.7360	-1.5194
0.75	1.1604	4.9742	1.3844	1.1604	-2.2506	-1.2077
1.25	1.9340	5.9381	1.1431	1.9340	-3.1032	-1.0008
2.00	3.0944	7.1573	0.9778	3.0944	-4.0858	-0.7352
2.50	3.8680	7.8849	0.9048	3.8680	-4.6141	-0.6438
3.00	4.6416	8.5606	0.8438	4.6416	-5.0892	-0.5897
3.50	5.4152	9.1933	0.7914	5.4152	-5.5303	-0.5520
4.00	6.1888	9.7859	0.7436	6.1888	-5.9444	-0.5192
4.50	6.9624	10.3444	0.7014	6.9624	-6.3345	-0.4901
5.00	7.7360	10.8718	0.6635	7.7360	-6.7039	-0.4631
7.50	11.6040	13.1616	0.5329	11.6040	-8.2643	-0.3536
10.00	15.4720	15.0512	0.4507	15.4720	-9.4957	-0.2887
15.00	23.2080	18.0584	0.3342	23.2080	-11.3860	-0.2061
20.00	30.9440	20.3033	0.2490	30.9440	-12.7392	-0.1463
25.00	38.6800	21.9444	0.1767	38.6800	-13.6683	-0.0947
30.00	46.4160	23.0510	0.1106	46.4160	-14.2123	-0.0466
35.00	54.1520	23.6447	0.0389	54.1520	-14.3810	0.0067
40.00	61.8880	23.6036	-0.0488	61.8880	-14.0467	0.0811
45.00	69.6240	22.9515	-0.1161	69.6240	-13.1881	0.1365
50.00	77.3600	21.8500	-0.1671	77.3600	-11.9869	0.1721
55.00	85.0960	20.3866	-0.2098	85.0960	-10.5516	0.1972
60.00	92.8320	18.6257	-0.2445	92.8320	-8.9620	0.2125
65.00	100.5680	16.6231	-0.2724	100.5680	-7.2882	0.2190
70.00	108.3040	14.4267	-0.2945	108.3040	-5.5940	0.2176
75.00	116.0400	12.0885	-0.3088	116.0400	-3.9495	0.2059
80.00	123.7760	9.6699	-0.3149	123.7760	-2.4372	0.1828
85.00	131.5120	7.2388	-0.3122	131.5120	-1.1536	0.1467
90.00	139.2480	4.8549	-0.3028	139.2480	-0.2066	0.0947
95.00	146.9840	2.5767	-0.2844	146.9840	0.2334	0.0105
100.00	154.7200	0.3980	0.	154.7200	-0.3980	-0.3617

TABLE I -50

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.740

R= 1776.00" C= 151.69" T= 37.16" T/C= 0.2450

TTU= 0.39" TTL= -0.39"

THETA= 3.04 DEG DESIGN CL= 0.590

XZERO= 0. " YZERO= 4.3497"

% CHORD	X,UPPER (INCH)	Y,UPPER (INCH)	DYU/DXU	X,LOWER (INCH)	Y,LOWER (INCH)	DYL/DXL
0.	0.	0.	-4.0237	0.	0.	-4.0237
0.25	0.3792	3.6632	1.9898	0.3792	-1.0325	-2.0925
0.50	0.7585	4.3320	1.5928	0.7585	-1.6847	-1.5079
0.75	1.1377	4.8853	1.3814	1.1377	-2.1854	-1.1987
1.25	1.8961	5.8288	1.1416	1.8961	-3.0142	-0.9952
2.00	3.0338	7.0232	0.9770	3.0338	-3.9712	-0.7301
2.50	3.7923	7.7360	0.9040	3.7923	-4.4854	-0.6385
3.00	4.5507	8.3976	0.8432	4.5507	-4.9473	-0.5845
3.50	5.3092	9.0173	0.7907	5.3092	-5.3758	-0.5469
4.00	6.0676	9.5978	0.7430	6.0676	-5.7780	-0.5143
4.50	6.8261	10.1450	0.7009	6.8261	-6.1568	-0.4854
5.00	7.5845	10.6617	0.6631	7.5845	-6.5155	-0.4587
7.50	11.3767	12.9059	0.5328	11.3767	-8.0302	-0.3500
10.00	15.1690	14.7585	0.4507	15.1690	-9.2248	-0.2856
15.00	22.7535	17.7072	0.3343	22.7535	-11.0575	-0.2038
20.00	30.3380	19.9092	0.2492	30.3380	-12.3686	-0.1445
25.00	37.9225	21.5198	0.1770	37.9225	-13.2676	-0.0934
30.00	45.5070	22.6068	0.1109	45.5070	-13.7925	-0.0457
35.00	53.0915	23.1917	0.0394	53.0915	-13.9529	0.0071
40.00	60.6760	23.1560	-0.0481	60.6760	-13.6244	0.0809
45.00	68.2605	22.5225	-0.1153	68.2605	-12.7850	0.1360
50.00	75.8450	21.4486	-0.1663	75.8450	-11.6120	0.1713
55.00	83.4295	20.0195	-0.2090	83.4295	-10.2116	0.1962
60.00	91.0140	18.2984	-0.2439	91.0140	-8.6617	0.2112
65.00	98.5985	16.3392	-0.2719	98.5985	-7.0309	0.2176
70.00	106.1830	14.1887	-0.2943	106.1830	-5.3815	0.2160
75.00	113.7675	11.8975	-0.3087	113.7675	-3.7821	0.2041
80.00	121.3520	9.5252	-0.3152	121.3520	-2.3136	0.1809
85.00	128.9365	7.1380	-0.3129	128.9365	-1.0704	0.1445
90.00	136.5210	4.7936	-0.3040	136.5210	-0.1587	0.0923
95.00	144.1055	2.5481	-0.2864	144.1055	0.2539	0.0078
100.00	151.6900	0.3900	0.	151.6900	-0.3900	-0.3680

TABLE I -51

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.750

R= 1800.00" C= 148.67" T= 36.31" T/C= 0.2442

TTU= 0.38" TTL= -0.38"

THETA= 3.00 DEG DESIGN CL= 0.600

XZERO= 0. " YZERO= 4.3351"

% CHORD	X,UPPER (INCH)	Y,UPPER (INCH)	DYU/DXU	X,LOWER (INCH)	Y,LOWER (INCH)	DYL/DXL
0.	0.	0.	-3.9567	0.	0.	-3.9567
0.25	0.3717	3.6045	1.9791	0.3717	-1.0001	-2.0759
0.50	0.7433	4.2573	1.5878	0.7433	-1.6348	-1.4968
0.75	1.1150	4.7981	1.3787	1.1150	-2.1219	-1.1901
1.25	1.8584	5.7216	1.1405	1.8584	-2.9276	-0.9900
2.00	2.9734	6.8917	0.9765	2.9734	-3.8597	-0.7253
2.50	3.7167	7.5899	0.9035	3.7167	-4.3602	-0.6336
3.00	4.4601	8.2377	0.8428	4.4601	-4.8093	-0.5795
3.50	5.2035	8.8448	0.7904	5.2035	-5.2257	-0.5421
4.00	5.9468	9.4135	0.7427	5.9468	-5.6164	-0.5097
4.50	6.6902	9.9497	0.7006	6.6902	-5.9843	-0.4810
5.00	7.4335	10.4559	0.6630	7.4335	-6.3326	-0.4545
7.50	11.1502	12.6554	0.5328	11.1502	-7.8032	-0.3466
10.00	14.8670	14.4717	0.4508	14.8670	-8.9623	-0.2826
15.00	22.3005	17.3630	0.3345	22.3005	-10.7396	-0.2015
20.00	29.7340	19.5229	0.2495	29.7340	-12.0100	-0.1428
25.00	37.1675	21.1034	0.1773	37.1675	-12.8801	-0.0921
30.00	44.6010	22.1711	0.1113	44.6010	-13.3867	-0.0448
35.00	52.0345	22.7472	0.0399	52.0345	-13.5389	0.0075
40.00	59.4680	22.7167	-0.0474	59.4680	-13.2160	0.0808
45.00	66.9015	22.1009	-0.1146	66.9015	-12.3953	0.1356
50.00	74.3350	21.0536	-0.1657	74.3350	-11.2497	0.1706
55.00	81.7685	19.6581	-0.2084	81.7685	-9.8831	0.1953
60.00	89.2020	17.9756	-0.2433	89.2020	-8.3717	0.2101
65.00	96.6355	16.0587	-0.2715	96.6355	-6.7825	0.2163
70.00	104.0690	13.9532	-0.2941	104.0690	-5.1766	0.2145
75.00	111.5025	11.7080	-0.3088	111.5025	-3.6210	0.2024
80.00	118.9360	9.3812	-0.3156	118.9360	-2.1949	0.1790
85.00	126.3695	7.0371	-0.3136	126.3695	-0.9908	0.1425
90.00	133.8030	4.7319	-0.3053	133.8030	-0.1131	0.0901
95.00	141.2365	2.5190	-0.2885	141.2365	0.2734	0.0052
100.00	148.6700	0.3820	0.	148.6700	-0.3820	-0.3744

TABLE I -52

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.760

R= 1824.00" C= 145.64" T= 35.01" T/C= 0.2404

TTU= 0.37" TTL= -0.37"

THETA= 2.92 DEG DESIGN CL= 0.600

XZERO= 0. " YZERO= 4.2469"

% CHORD	X,UPPER (INCH)	Y,UPPER (INCH)	DYU/DXU	X,LOWER (INCH)	Y,LOWER (INCH)	DYL/DXL
0.	0.	0.	-3.9567	0.	0.	-3.9567
0.25	0.3641	3.4710	1.9668	0.3641	-0.9736	-2.0545
0.50	0.7282	4.1057	1.5741	0.7282	-1.5875	-1.4784
0.75	1.0923	4.6306	1.3649	1.0923	-2.0583	-1.1737
1.25	1.8205	5.5254	1.1274	1.8205	-2.8368	-0.9729
2.00	2.9128	6.6574	0.9639	2.9128	-3.7335	-0.7113
2.50	3.6410	7.3324	0.8915	3.6410	-4.2140	-0.6209
3.00	4.3692	7.9589	0.8315	4.3692	-4.6450	-0.5675
3.50	5.0974	8.5456	0.7798	5.0974	-5.0442	-0.5304
4.00	5.8256	9.0954	0.7329	5.8256	-5.4185	-0.4983
4.50	6.5538	9.6137	0.6915	6.5538	-5.7708	-0.4701
5.00	7.2820	10.1032	0.6544	7.2820	-6.1041	-0.4439
7.50	10.9230	12.2304	0.5261	10.9230	-7.5106	-0.3382
10.00	14.5640	13.9872	0.4453	14.5640	-8.6184	-0.2757
15.00	21.8460	16.7852	0.3305	21.8460	-10.3164	-0.1965
20.00	29.1280	18.8764	0.2466	29.1280	-11.5295	-0.1392
25.00	36.4100	20.4078	0.1754	36.4100	-12.3596	-0.0897
30.00	43.6920	21.4439	0.1104	43.6920	-12.8419	-0.0434
35.00	50.9740	22.0061	0.0403	50.9740	-12.9854	0.0075
40.00	58.2560	21.9853	-0.0456	58.2560	-12.6765	0.0790
45.00	65.5380	21.3983	-0.1120	65.5380	-11.8893	0.1328
50.00	72.8200	20.3929	-0.1626	72.8200	-10.7892	0.1673
55.00	80.1020	19.0499	-0.2050	80.1020	-9.4765	0.1916
60.00	87.3840	17.4283	-0.2396	87.3840	-8.0244	0.2061
65.00	94.6660	15.5784	-0.2676	94.6660	-6.4970	0.2122
70.00	101.9480	13.5443	-0.2902	101.9480	-4.9532	0.2106
75.00	109.2300	11.3730	-0.3050	109.2300	-3.4575	0.1986
80.00	116.5120	9.1204	-0.3121	116.5120	-2.0865	0.1757
85.00	123.7940	6.8481	-0.3105	123.7940	-0.9297	0.1396
90.00	131.0760	4.6106	-0.3027	131.0760	-0.0892	0.0877
95.00	138.3580	2.4587	-0.2867	138.3580	0.2752	0.0037
100.00	145.6400	0.3740	0.	145.6400	-0.3740	-0.3742

TABLE I -53

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.770

R= 1848.00" C= 142.61" T= 33.76" T/C= 0.2367

TTU= 0.37" TTL= -0.37"

THETA= 2.84 DEG DESIGN CL= 0.600

XZERO= 0. " YZERO= 4.1586"

% CHORD	X,UPPER (INCH)	Y,UPPER (INCH)	DYU/DXU	X,LOWER (INCH)	Y,LOWER (INCH)	DYL/DXL
0.	0.	0.	-3.9567	0.	0.	-3.9567
0.25	0.3565	3.3415	1.9544	0.3565	-0.9473	-2.0330
0.50	0.7131	3.9582	1.5606	0.7131	-1.5410	-1.4602
0.75	1.0696	4.4675	1.3513	1.0696	-1.9957	-1.1575
1.25	1.7826	5.3342	1.1147	1.7826	-2.7476	-0.9560
2.00	2.8522	6.4292	0.9517	2.8522	-3.6097	-0.6976
2.50	3.5653	7.0816	0.8799	3.5653	-4.0709	-0.6086
3.00	4.2783	7.6872	0.8206	4.2783	-4.4843	-0.5558
3.50	4.9913	8.2543	0.7696	4.9913	-4.8670	-0.5190
4.00	5.7044	8.7857	0.7234	5.7044	-5.2255	-0.4872
4.50	6.4175	9.2865	0.6826	6.4175	-5.5627	-0.4594
5.00	7.1305	9.7598	0.6461	7.1305	-5.8816	-0.4336
7.50	10.6957	11.8165	0.5196	10.6957	-7.2263	-0.3301
10.00	14.2610	13.5155	0.4398	14.2610	-8.2850	-0.2691
15.00	21.3915	16.2225	0.3267	21.3915	-9.9067	-0.1916
20.00	28.5220	18.2468	0.2439	28.5220	-11.0648	-0.1356
25.00	35.6525	19.7302	0.1736	35.6525	-11.8564	-0.0872
30.00	42.7830	20.7354	0.1095	42.7830	-12.3154	-0.0420
35.00	49.9135	21.2837	0.0408	49.9135	-12.4508	0.0075
40.00	57.0440	21.2720	-0.0438	57.0440	-12.1551	0.0773
45.00	64.1745	20.7123	-0.1095	64.1745	-11.4000	0.1301
50.00	71.3050	19.7474	-0.1596	71.3050	-10.3439	0.1641
55.00	78.4355	18.4553	-0.2016	78.4355	-9.0834	0.1880
60.00	85.5660	16.8926	-0.2359	85.5660	-7.6884	0.2022
65.00	92.6965	15.1078	-0.2638	92.6965	-6.2208	0.2082
70.00	99.8270	13.1432	-0.2864	99.8270	-4.7371	0.2066
75.00	106.9575	11.0441	-0.3013	106.9575	-3.2996	0.1950
80.00	114.0880	8.8637	-0.3087	114.0880	-1.9820	0.1724
85.00	121.2185	6.6619	-0.3075	121.2185	-0.8713	0.1368
90.00	128.3490	4.4908	-0.3001	128.3490	-0.0665	0.0854
95.00	135.4795	2.3990	-0.2850	135.4795	0.2765	0.0021
100.00	142.6100	0.3660	0.	142.6100	-0.3660	-0.3741

TABLE I -54

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.780

R= 1872.00" C= 139.59" T= 32.51" T/C= 0.2329

TTU= 0.36" TTL= -0.36"

THETA= 2.76 DEG DESIGN CL= 0.600

XZERO= 0. " YZERO= 4.0703"

% CHORD	X,UPPER (INCH)	Y,UPPER (INCH)	DYU/DXU	X,LOWER (INCH)	Y,LOWER (INCH)	DYL/DXL
0.	0.	0.	-3.9567	0.	0.	-3.9567
0.25	0.3490	3.2130	1.9414	0.3490	-0.9207	-2.0114
0.50	0.6979	3.8117	1.5465	0.6979	-1.4944	-1.4411
0.75	1.0469	4.3056	1.3372	1.0469	-1.9332	-1.1405
1.25	1.7449	5.1444	1.1015	1.7449	-2.6585	-0.9385
2.00	2.7918	6.2026	0.9391	2.7918	-3.4863	-0.6835
2.50	3.4897	6.8326	0.8681	3.4897	-3.9282	-0.5958
3.00	4.1877	7.4173	0.8095	4.1877	-4.3243	-0.5437
3.50	4.8856	7.9651	0.7592	4.8856	-4.6905	-0.5073
4.00	5.5836	8.4783	0.7137	5.5836	-5.0333	-0.4759
4.50	6.2815	8.9619	0.6736	6.2815	-5.3555	-0.4485
5.00	6.9795	9.4191	0.6376	6.9795	-5.6602	-0.4231
7.50	10.4692	11.4060	0.5130	10.4692	-6.9440	-0.3218
10.00	13.9590	13.0477	0.4343	13.9590	-7.9541	-0.2622
15.00	20.9385	15.6645	0.3227	20.9385	-9.5006	-0.1867
20.00	27.9180	17.6223	0.2411	27.9180	-10.6044	-0.1320
25.00	34.8975	19.0582	0.1718	34.8975	-11.3581	-0.0848
30.00	41.8770	20.0326	0.1086	41.8770	-11.7941	-0.0406
35.00	48.8565	20.5671	0.0412	48.8565	-11.9213	0.0075
40.00	55.8360	20.5640	-0.0420	55.8360	-11.6386	0.0756
45.00	62.8155	20.0314	-0.1069	62.8155	-10.9153	0.1274
50.00	69.7950	19.1066	-0.1566	69.7950	-9.9027	0.1608
55.00	76.7745	17.8649	-0.1982	76.7745	-8.6938	0.1843
60.00	83.7540	16.3606	-0.2322	83.7540	-7.3555	0.1982
65.00	90.7335	14.6401	-0.2599	90.7335	-5.9471	0.2041
70.00	97.7130	12.7447	-0.2823	97.7130	-4.5232	0.2025
75.00	104.6925	10.7174	-0.2975	104.6925	-3.1436	0.1912
80.00	111.6720	8.6089	-0.3051	111.6720	-1.8790	0.1690
85.00	118.6515	6.4772	-0.3044	118.6515	-0.8142	0.1338
90.00	125.6310	4.3723	-0.2975	125.6310	-0.0450	0.0830
95.00	132.6105	2.3403	-0.2831	132.6105	0.2768	0.0006
100.00	139.5900	0.3590	0.	139.5900	-0.3590	-0.3739

TABLE I -55

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.790

R= 1896.00" C= 136.56" T= 31.29" T/C= 0.2291

TTU= 0.35" TTL= -0.35"

THETA= 2.68 DEG DESIGN CL= 0.600

XZERO= 0. " YZERO= 3.9821"

% CHORD	X,UPPER (INCH)	Y,UPPER (INCH)	DYU/DXU	X,LOWER (INCH)	Y,LOWER (INCH)	DYL/DXL
0.	0.	0.	-3.9567	0.	0.	-3.9567
0.25	0.3414	3.0867	1.9278	0.3414	-0.8938	-1.9897
0.50	0.6828	3.6675	1.5323	0.6828	-1.4481	-1.4215
0.75	1.0242	4.1461	1.3229	1.0242	-1.8710	-1.1232
1.25	1.7070	4.9573	1.0884	1.7070	-2.5700	-0.9208
2.00	2.7312	5.9792	0.9266	2.7312	-3.3639	-0.6692
2.50	3.4140	6.5872	0.8563	3.4140	-3.7870	-0.5829
3.00	4.0968	7.1513	0.7984	4.0968	-4.1659	-0.5316
3.50	4.7796	7.6798	0.7489	4.7796	-4.5161	-0.4955
4.00	5.4624	8.1754	0.7040	5.4624	-4.8435	-0.4646
4.50	6.1452	8.6420	0.6646	6.1452	-5.1512	-0.4376
5.00	6.8280	9.0834	0.6291	6.8280	-5.4419	-0.4126
7.50	10.2420	11.0017	0.5064	10.2420	-6.6661	-0.3136
10.00	13.6560	12.5868	0.4287	13.6560	-7.6289	-0.2554
15.00	20.4840	15.1148	0.3188	20.4840	-9.1021	-0.1817
20.00	27.3120	17.0070	0.2382	27.3120	-10.1529	-0.1284
25.00	34.1400	18.3959	0.1699	34.1400	-10.8696	-0.0823
30.00	40.9680	19.3400	0.1076	40.9680	-11.2832	-0.0392
35.00	47.7960	19.8605	0.0416	47.7960	-11.4025	0.0075
40.00	54.6240	19.8657	-0.0403	54.6240	-11.1324	0.0739
45.00	61.4520	19.3593	-0.1044	61.4520	-10.4400	0.1247
50.00	68.2800	18.4735	-0.1536	68.2800	-9.4699	0.1575
55.00	75.1080	17.2811	-0.1948	75.1080	-8.3114	0.1806
60.00	81.9360	15.8341	-0.2284	81.9360	-7.0285	0.1943
65.00	88.7640	14.1770	-0.2560	88.7640	-5.6780	0.2001
70.00	95.5920	12.3497	-0.2783	95.5920	-4.3127	0.1985
75.00	102.4200	10.3929	-0.2937	102.4200	-2.9898	0.1874
80.00	109.2480	8.3555	-0.3016	109.2480	-1.7774	0.1656
85.00	116.0760	6.2930	-0.3013	116.0760	-0.7575	0.1309
90.00	122.9040	4.2534	-0.2948	122.9040	-0.0232	0.0806
95.00	129.7320	2.2810	-0.2813	129.7320	0.2778	-0.0010
100.00	136.5600	0.3510	0.	136.5600	-0.3510	-0.3738

TABLE I -56

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.800

R= 1920.00" C= 133.53" T= 30.10" T/C= 0.2254

TTU= 0.34" TTL= -0.34"

THETA= 2.60 DEG DESIGN CL= 0.600

XZERO= 0. " YZERO= 3.8938"

% CHORD	X,UPPER (INCH)	Y,UPPER (INCH)	DYU/DXU	X,LOWER (INCH)	Y,LOWER (INCH)	DYL/DXL
0.	0.	0.	-3.9567	0.	0.	-3.9567
0.25	0.3338	2.9642	1.9142	0.3338	-0.8673	-1.9682
0.50	0.6677	3.5275	1.5183	0.6677	-1.4024	-1.4022
0.75	1.0015	3.9911	1.3089	1.0015	-1.8099	-1.1060
1.25	1.6691	4.7752	1.0755	1.6691	-2.4831	-0.9033
2.00	2.6706	5.7619	0.9144	2.6706	-3.2441	-0.6553
2.50	3.3383	6.3484	0.8448	3.3383	-3.6489	-0.5704
3.00	4.0059	6.8925	0.7876	4.0059	-4.0114	-0.5198
3.50	4.6736	7.4023	0.7388	4.6736	-4.3460	-0.4841
4.00	5.3412	7.8806	0.6946	5.3412	-4.6587	-0.4536
4.50	6.0089	8.3309	0.6558	6.0089	-4.9523	-0.4271
5.00	6.6765	8.7569	0.6209	6.6765	-5.2297	-0.4025
7.50	10.0148	10.6082	0.4999	10.0148	-6.3967	-0.3056
10.00	13.3530	12.1384	0.4234	13.3530	-7.3140	-0.2489
15.00	20.0295	14.5798	0.3149	20.0295	-8.7169	-0.1769
20.00	26.7060	16.4082	0.2355	26.7060	-9.7168	-0.1249
25.00	33.3825	17.7512	0.1681	33.3825	-10.3981	-0.0800
30.00	40.0590	18.6655	0.1067	40.0590	-10.7903	-0.0379
35.00	46.7355	19.1722	0.0419	46.7355	-10.9019	0.0075
40.00	53.4120	19.1848	-0.0386	53.4120	-10.6438	0.0722
45.00	60.0885	18.7035	-0.1020	60.0885	-9.9812	0.1221
50.00	66.7650	17.8555	-0.1506	66.7650	-9.0520	0.1544
55.00	73.4415	16.7107	-0.1915	73.4415	-7.9421	0.1770
60.00	80.1180	15.3189	-0.2247	80.1180	-6.7125	0.1904
65.00	86.7945	13.7235	-0.2522	86.7945	-5.4181	0.1962
70.00	93.4710	11.9623	-0.2744	93.4710	-4.1095	0.1945
75.00	100.1475	10.0744	-0.2900	100.1475	-2.8415	0.1837
80.00	106.8240	8.1064	-0.2981	106.8240	-1.6797	0.1622
85.00	113.5005	6.1115	-0.2982	113.5005	-0.7032	0.1280
90.00	120.1770	4.1360	-0.2922	120.1770	-0.0027	0.0782
95.00	126.8535	2.2223	-0.2795	126.8535	0.2783	-0.0026
100.00	133.5300	0.3430	0.	133.5300	-0.3430	-0.3736

TABLE I -57

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.810

R= 1944.00" C= 130.51" T= 28.92" T/C= 0.2216

TTU= 0.34" TTL= -0.34"

THETA= 2.52 DEG DESIGN CL= 0.600

XZERO= 0. " YZERO= 3.8056"

% CHORD	X,UPPER (INCH)	Y,UPPER (INCH)	DYU/DXU	X,LOWER (INCH)	Y,LOWER (INCH)	DYL/DXL
0.	0.	0.	-3.9567	0.	0.	-3.9567
0.25	0.3263	2.8430	1.8998	0.3263	-0.8408	-1.9454
0.50	0.6526	3.3887	1.5036	0.6526	-1.3568	-1.3819
0.75	0.9788	3.8374	1.2943	0.9788	-1.7489	-1.0881
1.25	1.6314	4.5946	1.0622	1.6314	-2.3964	-0.8852
2.00	2.6102	5.5463	0.9020	2.6102	-3.1248	-0.6409
2.50	3.2627	6.1116	0.8331	3.2627	-3.5115	-0.5574
3.00	3.9153	6.6360	0.7766	3.9153	-3.8576	-0.5076
3.50	4.5678	7.1272	0.7286	4.5678	-4.1769	-0.4724
4.00	5.2204	7.5883	0.6851	5.2204	-4.4749	-0.4423
4.50	5.8730	8.0223	0.6468	5.8730	-4.7547	-0.4163
5.00	6.5255	8.4333	0.6125	6.5255	-5.0188	-0.3921
7.50	9.7882	10.2184	0.4933	9.7882	-6.1295	-0.2975
10.00	13.0510	11.6942	0.4179	13.0510	-7.0019	-0.2421
15.00	19.5765	14.0499	0.3110	19.5765	-8.3355	-0.1720
20.00	26.1020	15.8149	0.2327	26.1020	-9.2854	-0.1213
25.00	32.6275	17.1125	0.1662	32.6275	-9.9318	-0.0775
30.00	39.1530	17.9970	0.1058	39.1530	-10.3026	-0.0366
35.00	45.6785	18.4901	0.0423	45.6785	-10.4070	0.0075
40.00	52.2040	18.5091	-0.0368	52.2040	-10.1599	0.0705
45.00	58.7295	18.0532	-0.0995	58.7295	-9.5272	0.1194
50.00	65.2550	17.2423	-0.1477	65.2550	-8.6384	0.1511
55.00	71.7805	16.1444	-0.1880	71.7805	-7.5763	0.1733
60.00	78.3060	14.8074	-0.2210	78.3060	-6.3994	0.1864
65.00	84.8315	13.2731	-0.2483	84.8315	-5.1606	0.1921
70.00	91.3570	11.5775	-0.2704	91.3570	-3.9082	0.1905
75.00	97.8825	9.7578	-0.2862	97.8825	-2.6945	0.1799
80.00	104.4080	7.8586	-0.2945	104.4080	-1.5827	0.1588
85.00	110.9335	5.9309	-0.2951	110.9335	-0.6494	0.1250
90.00	117.4590	4.0192	-0.2895	117.4590	0.0176	0.0757
95.00	123.9845	2.1637	-0.2777	123.9845	0.2787	-0.0042
100.00	130.5100	0.3350	0.	130.5100	-0.3350	-0.3735

TABLE I -58

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.820

R= 1968.00" C= 127.48" T= 27.77" T/C= 0.2178

TTU= 0.33" TTL= -0.33"

THETA= 2.44 DEG DESIGN CL= 0.600

XZERO= 0. " YZERO= 3.7173"

% CHORD	X,UPPER (INCH)	Y,UPPER (INCH)	DYU/DXU	X,LOWER (INCH)	Y,LOWER (INCH)	DYL/DXL
0.	0.	0.	-3.9567	0.	0.	-3.9567
0.25	0.3187	2.7241	1.8849	0.3187	-0.8144	-1.9222
0.50	0.6374	3.2522	1.4888	0.6374	-1.3115	-1.3612
0.75	0.9561	3.6862	1.2797	0.9561	-1.6883	-1.0698
1.25	1.5935	4.4169	1.0489	1.5935	-2.3103	-0.8671
2.00	2.5496	5.3341	0.8895	2.5496	-3.0067	-0.6264
2.50	3.1870	5.8785	0.8214	3.1870	-3.3757	-0.5444
3.00	3.8244	6.3834	0.7656	3.8244	-3.7057	-0.4955
3.50	4.4618	6.8564	0.7183	4.4618	-4.0100	-0.4607
4.00	5.0992	7.3005	0.6755	5.0992	-4.2937	-0.4310
4.50	5.7366	7.7186	0.6379	5.7366	-4.5600	-0.4055
5.00	6.3740	8.1145	0.6041	6.3740	-4.8113	-0.3818
7.50	9.5610	9.8348	0.4867	9.5610	-5.8670	-0.2894
10.00	12.7480	11.2570	0.4124	12.7480	-6.6958	-0.2355
15.00	19.1220	13.5282	0.3070	19.1220	-7.9619	-0.1671
20.00	25.4960	15.2307	0.2299	25.4960	-8.8630	-0.1177
25.00	31.8700	16.4835	0.1644	31.8700	-9.4754	-0.0751
30.00	38.2440	17.3386	0.1049	38.2440	-9.8256	-0.0352
35.00	44.6180	17.8178	0.0426	44.6180	-9.9226	0.0076
40.00	50.9920	17.8432	-0.0350	50.9920	-9.6865	0.0687
45.00	57.3660	17.4117	-0.0970	57.3660	-9.0828	0.1168
50.00	63.7400	16.6370	-0.1446	63.7400	-8.2335	0.1479
55.00	70.1140	15.5851	-0.1845	70.1140	-7.2182	0.1695
60.00	76.4880	14.3021	-0.2172	76.4880	-6.0933	0.1824
65.00	82.8620	12.8280	-0.2444	82.8620	-4.9090	0.1880
70.00	89.2360	11.1969	-0.2664	89.2360	-3.7117	0.1864
75.00	95.6100	9.4445	-0.2823	95.6100	-2.5514	0.1761
80.00	101.9840	7.6134	-0.2909	101.9840	-1.4889	0.1553
85.00	108.3580	5.7522	-0.2919	108.3580	-0.5980	0.1220
90.00	114.7320	3.9036	-0.2868	114.7320	0.0361	0.0733
95.00	121.1060	2.1062	-0.2758	121.1060	0.2778	-0.0058
100.00	127.4800	0.3280	0.	127.4800	-0.3280	-0.3732

TABLE I -59

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.830

R= 1992.00" C= 124.45" T= 26.64" T/C= 0.2141

TTU= 0.32" TTL= -0.32"

THETA= 2.36 DEG DESIGN CL= 0.600

XZERO= 0. " YZERO= 3.6291"

% CHORD	X,UPPER (INCH)	Y,UPPER (INCH)	DYU/DXU	X,LOWER (INCH)	Y,LOWER (INCH)	DYL/DXL
0.	0.	0.	-3.9567	0.	0.	-3.9567
0.25	0.3111	2.6090	1.8698	0.3111	-0.7883	-1.8989
0.50	0.6222	3.1199	1.4741	0.6222	-1.2669	-1.3407
0.75	0.9334	3.5394	1.2652	0.9334	-1.6289	-1.0517
1.25	1.5556	4.2442	1.0359	1.5556	-2.2258	-0.8494
2.00	2.4890	5.1278	0.8775	2.4890	-2.8914	-0.6122
2.50	3.1112	5.6520	0.8101	3.1112	-3.2432	-0.5317
3.00	3.7335	6.1380	0.7550	3.7335	-3.5578	-0.4836
3.50	4.3557	6.5933	0.7084	4.3557	-3.8476	-0.4493
4.00	4.9780	7.0209	0.6662	4.9780	-4.1176	-0.4201
4.50	5.6003	7.4234	0.6293	5.6003	-4.3708	-0.3951
5.00	6.2225	7.8047	0.5960	6.2225	-4.6098	-0.3718
7.50	9.3338	9.4619	0.4803	9.3338	-5.6128	-0.2815
10.00	12.4450	10.8319	0.4070	12.4450	-6.3998	-0.2290
15.00	18.6675	13.0209	0.3032	18.6675	-7.6012	-0.1624
20.00	24.8900	14.6626	0.2271	24.8900	-8.4556	-0.1143
25.00	31.1125	15.8716	0.1626	31.1125	-9.0355	-0.0728
30.00	37.3350	16.6980	0.1040	37.3350	-9.3659	-0.0339
35.00	43.5575	17.1635	0.0428	43.5575	-9.4561	0.0076
40.00	49.7800	17.1944	-0.0333	49.7800	-9.2303	0.0671
45.00	56.0025	16.7858	-0.0946	56.0025	-8.6541	0.1143
50.00	62.2250	16.0461	-0.1417	62.2250	-7.8427	0.1447
55.00	68.4475	15.0388	-0.1810	68.4475	-6.8728	0.1658
60.00	74.6700	13.8081	-0.2136	74.6700	-5.7978	0.1786
65.00	80.8925	12.3921	-0.2406	80.8925	-4.6661	0.1841
70.00	87.1150	10.8238	-0.2625	87.1150	-3.5219	0.1825
75.00	93.3375	9.1368	-0.2786	93.3375	-2.4130	0.1724
80.00	99.5600	7.3719	-0.2874	99.5600	-1.3981	0.1519
85.00	105.7825	5.5755	-0.2888	105.7825	-0.5481	0.1191
90.00	112.0050	3.7888	-0.2842	112.0050	0.0543	0.0709
95.00	118.2275	2.0483	-0.2740	118.2275	0.2776	-0.0074
100.00	124.4500	0.3200	0.	124.4500	-0.3200	-0.3731

TABLE I -60

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.840

R= 2016.00" C= 121.43" T= 25.54" T/C= 0.2103

TTU= 0.31" TTL= -0.31"

THETA= 2.28 DEG DESIGN CL= 0.600

XZERO= 0. " YZERO= 3.5408"

% CHORD	X,UPPER (INCH)	Y,UPPER (INCH)	DYU/DXU	X,LOWER (INCH)	Y,LOWER (INCH)	DYL/DXL
0.	0.	0.	-3.9567	0.	0.	-3.9567
0.25	0.3036	2.4953	1.8540	0.3036	-0.7623	-1.8744
0.50	0.6072	2.9889	1.4588	0.6072	-1.2225	-1.3191
0.75	0.9107	3.3941	1.2503	0.9107	-1.5696	-1.0329
1.25	1.5179	4.0732	1.0226	1.5179	-2.1417	-0.8311
2.00	2.4286	4.9236	0.8651	2.4286	-2.7766	-0.5976
2.50	3.0358	5.4277	0.7984	3.0358	-3.1115	-0.5186
3.00	3.6429	5.8950	0.7441	3.6429	-3.4108	-0.4714
3.50	4.2501	6.3328	0.6982	4.2501	-3.6863	-0.4376
4.00	4.8572	6.7441	0.6568	4.8572	-3.9428	-0.4089
4.50	5.4643	7.1313	0.6204	5.4643	-4.1832	-0.3844
5.00	6.0715	7.4981	0.5877	6.0715	-4.4100	-0.3615
7.50	9.1072	9.0927	0.4738	9.1072	-5.3612	-0.2735
10.00	12.1430	10.4113	0.4015	12.1430	-6.1070	-0.2223
15.00	18.2145	12.5189	0.2993	18.2145	-7.2448	-0.1575
20.00	24.2860	14.1004	0.2243	24.2860	-8.0532	-0.1107
25.00	30.3575	15.2659	0.1607	30.3575	-8.6011	-0.0704
30.00	36.4290	16.0639	0.1031	36.4290	-8.9122	-0.0326
35.00	42.5005	16.5156	0.0431	42.5005	-8.9955	0.0077
40.00	48.5720	16.5519	-0.0316	48.5720	-8.7800	0.0654
45.00	54.6435	16.1658	-0.0923	54.6435	-8.2307	0.1117
50.00	60.7150	15.4605	-0.1387	60.7150	-7.4568	0.1414
55.00	66.7865	14.4973	-0.1775	66.7865	-6.5316	0.1620
60.00	72.8580	13.3183	-0.2098	72.8580	-5.5061	0.1746
65.00	78.9295	11.9599	-0.2367	78.9295	-4.4263	0.1800
70.00	85.0010	10.4536	-0.2585	85.0010	-3.3346	0.1784
75.00	91.0725	8.8315	-0.2747	91.0725	-2.2769	0.1686
80.00	97.1440	7.1324	-0.2838	97.1440	-1.3091	0.1484
85.00	103.2155	5.4005	-0.2855	103.2155	-0.4997	0.1161
90.00	109.2870	3.6755	-0.2815	109.2870	0.0710	0.0684
95.00	115.3585	1.9915	-0.2721	115.3585	0.2762	-0.0091
100.00	121.4300	0.3130	0.	121.4300	-0.3130	-0.3728

TABLE I -61

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.850

R= 2040.00" C= 118.40" T= 24.45" T/C= 0.2065

TTU= 0.30" TTL= -0.30"

THETA= 2.20 DEG DESIGN CL= 0.600

XZERO= 0. " YZERO= 3.4525"

% CHORD	X,UPPER (INCH)	Y,UPPER (INCH)	DYU/DXU	X,LOWER (INCH)	Y,LOWER (INCH)	DYL/DXL
0.	0.	0.	-3.9567	0.	0.	-3.9567
0.25	0.2960	2.3839	1.8375	0.2960	-0.7364	-1.8493
0.50	0.5920	2.8604	1.4433	0.5920	-1.1783	-1.2970
0.75	0.8880	3.2513	1.2352	0.8880	-1.5108	-1.0138
1.25	1.4800	3.9050	1.0091	1.4800	-2.0583	-0.8127
2.00	2.3680	4.7227	0.8527	2.3680	-2.6632	-0.5829
2.50	2.9600	5.2071	0.7869	2.9600	-2.9816	-0.5055
3.00	3.5520	5.6562	0.7332	3.5520	-3.2659	-0.4592
3.50	4.1440	6.0767	0.6881	4.1440	-3.5274	-0.4260
4.00	4.7360	6.4720	0.6473	4.7360	-3.7707	-0.3977
4.50	5.3280	6.8441	0.6116	5.3280	-3.9987	-0.3738
5.00	5.9200	7.1967	0.5794	5.9200	-4.2137	-0.3513
7.50	8.8800	8.7298	0.4673	8.8800	-5.1145	-0.2655
10.00	11.8400	9.9978	0.3961	11.8400	-5.8202	-0.2157
15.00	17.7600	12.0252	0.2954	17.7600	-6.8962	-0.1527
20.00	23.6800	13.5474	0.2215	23.6800	-7.6598	-0.1072
25.00	29.6000	14.6700	0.1589	29.6000	-8.1767	-0.0680
30.00	35.5200	15.4399	0.1022	35.5200	-8.4690	-0.0313
35.00	41.4400	15.8780	0.0433	41.4400	-8.5457	0.0078
40.00	47.3600	15.9191	-0.0300	47.3600	-8.3401	0.0638
45.00	53.2800	15.5548	-0.0899	53.2800	-7.8170	0.1092
50.00	59.2000	14.8830	-0.1357	59.2000	-7.0795	0.1382
55.00	65.1200	13.9629	-0.1740	65.1200	-6.1979	0.1583
60.00	71.0400	12.8344	-0.2061	71.0400	-5.2206	0.1706
65.00	76.9600	11.5324	-0.2328	76.9600	-4.1915	0.1759
70.00	82.8800	10.0870	-0.2546	82.8800	-3.1511	0.1744
75.00	88.8000	8.5287	-0.2708	88.8000	-2.1432	0.1647
80.00	94.7200	6.8944	-0.2801	94.7200	-1.2216	0.1449
85.00	100.6400	5.2261	-0.2823	100.6400	-0.4518	0.1130
90.00	106.5600	3.5620	-0.2788	106.5600	0.0880	0.0659
95.00	112.4800	1.9340	-0.2701	112.4800	0.2756	-0.0107
100.00	118.4000	0.3050	0.	118.4000	-0.3050	-0.3726

TABLE I -62

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.860

R= 2064.00" C= 115.37" T= 23.40" T/C= 0.2028

TTU= 0.30" TTL= -0.30"

THETA= 2.12 DEG DESIGN CL= 0.600

XZERO= 0. " YZERO= 3.3643"

% CHORD	X,UPPER (INCH)	Y,UPPER (INCH)	DYU/DXU	X,LOWER (INCH)	Y,LOWER (INCH)	DYL/DXL
0.	0.	0.	-3.9567	0.	0.	-3.9567
0.25	0.2884	2.2763	1.8210	0.2884	-0.7108	-1.8242
0.50	0.5768	2.7360	1.4280	0.5768	-1.1349	-1.2750
0.75	0.8653	3.1130	1.2204	0.8653	-1.4532	-0.9949
1.25	1.4421	3.7419	0.9960	1.4421	-1.9764	-0.7952
2.00	2.3074	4.5277	0.8407	2.3074	-2.5521	-0.5690
2.50	2.8842	4.9930	0.7756	2.8842	-2.8551	-0.4927
3.00	3.4611	5.4242	0.7227	3.4611	-3.1250	-0.4473
3.50	4.0379	5.8281	0.6782	4.0379	-3.3731	-0.4146
4.00	4.6148	6.2078	0.6381	4.6148	-3.6038	-0.3869
4.50	5.1916	6.5652	0.6030	5.1916	-3.8198	-0.3634
5.00	5.7685	6.9040	0.5713	5.7685	-4.0235	-0.3415
7.50	8.6528	8.3773	0.4609	8.6528	-4.8760	-0.2578
10.00	11.5370	9.5961	0.3907	11.5370	-5.5434	-0.2094
15.00	17.3055	11.5456	0.2915	17.3055	-6.5603	-0.1481
20.00	23.0740	13.0100	0.2188	23.0740	-7.2812	-0.1038
25.00	28.8425	14.0908	0.1570	28.8425	-7.7684	-0.0656
30.00	34.6110	14.8332	0.1013	34.6110	-8.0429	-0.0300
35.00	40.3795	15.2578	0.0435	40.3795	-8.1133	0.0079
40.00	46.1480	15.3031	-0.0284	46.1480	-7.9170	0.0622
45.00	51.9165	14.9595	-0.0876	51.9165	-7.4191	0.1068
50.00	57.6850	14.3199	-0.1327	57.6850	-6.7166	0.1350
55.00	63.4535	13.4413	-0.1707	63.4535	-5.8770	0.1547
60.00	69.2220	12.3617	-0.2025	69.2220	-4.9460	0.1668
65.00	74.9905	11.1143	-0.2290	74.9905	-3.9657	0.1720
70.00	80.7590	9.7280	-0.2507	80.7590	-2.9747	0.1704
75.00	86.5275	8.2318	-0.2670	86.5275	-2.0150	0.1609
80.00	92.2960	6.6606	-0.2766	92.2960	-1.1378	0.1414
85.00	98.0645	5.0545	-0.2792	98.0645	-0.4065	0.1100
90.00	103.8330	3.4500	-0.2761	103.8330	0.1037	0.0635
95.00	109.6015	1.8769	-0.2683	109.6015	0.2745	-0.0124
100.00	115.3700	0.2970	0.	115.3700	-0.2970	-0.3723

TABLE I -63

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.870

R= 2088.00" C= 112.35" T= 22.36" T/C= 0.1990

TTU= 0.29" TTL= -0.29"

THETA= 2.04 DEG DESIGN CL= 0.600

XZERO= 0. " YZERO= 3.2760"

% CHORD	X,UPPER (INCH)	Y,UPPER (INCH)	DYU/DXU	X,LOWER (INCH)	Y,LOWER (INCH)	DYL/DXL
0.	0.	0.	-3.9567	0.	0.	-3.9567
0.25	0.2809	2.1695	1.8055	0.2809	-0.6854	-1.7979
0.50	0.5618	2.6132	1.4120	0.5618	-1.0917	-1.2521
0.75	0.8426	2.9763	1.2050	0.8426	-1.3959	-0.9751
1.25	1.4044	3.5806	0.9825	1.4044	-1.8948	-0.7772
2.00	2.2470	4.3350	0.8283	2.2470	-2.4418	-0.5546
2.50	2.8088	4.7813	0.7641	2.8088	-2.7295	-0.4795
3.00	3.3705	5.1950	0.7119	3.3705	-2.9853	-0.4350
3.50	3.9323	5.5824	0.6681	3.9323	-3.2202	-0.4030
4.00	4.4940	5.9467	0.6287	4.4940	-3.4384	-0.3758
4.50	5.0558	6.2896	0.5942	5.0558	-3.6427	-0.3528
5.00	5.6175	6.6147	0.5631	5.6175	-3.8352	-0.3313
7.50	8.4262	8.0289	0.4544	8.4262	-4.6403	-0.2499
10.00	11.2350	9.1991	0.3853	11.2350	-5.2702	-0.2028
15.00	16.8525	11.0715	0.2876	16.8525	-6.2290	-0.1433
20.00	22.4700	12.4788	0.2160	22.4700	-6.9080	-0.1003
25.00	28.0875	13.5182	0.1552	28.0875	-7.3660	-0.0633
30.00	33.7050	14.2334	0.1004	33.7050	-7.6229	-0.0286
35.00	39.3225	14.6445	0.0437	39.3225	-7.6872	0.0080
40.00	44.9400	14.6937	-0.0267	44.9400	-7.5000	0.0607
45.00	50.5575	14.3704	-0.0853	50.5575	-7.0268	0.1043
50.00	56.1750	13.7625	-0.1298	56.1750	-6.3588	0.1318
55.00	61.7925	12.9248	-0.1672	61.7925	-5.5604	0.1510
60.00	67.4100	11.8933	-0.1988	67.4100	-4.6750	0.1629
65.00	73.0275	10.6999	-0.2251	73.0275	-3.7428	0.1679
70.00	78.6450	9.3721	-0.2467	78.6450	-2.8007	0.1663
75.00	84.2625	7.9373	-0.2631	84.2625	-1.8885	0.1570
80.00	89.8800	6.4285	-0.2729	89.8800	-1.0553	0.1378
85.00	95.4975	4.8841	-0.2759	95.4975	-0.3619	0.1069
90.00	101.1150	3.3386	-0.2733	101.1150	0.1191	0.0610
95.00	106.7325	1.8202	-0.2663	106.7325	0.2734	-0.0140
100.00	112.3500	0.2890	0.	112.3500	-0.2890	-0.3721

TABLE I -64

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.880

R= 2112.00" C= 109.32" T= 21.34" T/C= 0.1952

TTU= 0.28" TTL= -0.28"

THETA= 1.96 DEG DESIGN CL= 0.600

XZERO= 0. " YZERO= 3.1878"

% CHORD	X,UPPER (INCH)	Y,UPPER (INCH)	DYU/DXU	X,LOWER (INCH)	Y,LOWER (INCH)	DYL/DXL
0.	0.	0.	-3.9567	0.	0.	-3.9567
0.25	0.2733	2.0652	1.7892	0.2733	-0.6601	-1.7708
0.50	0.5466	2.4928	1.3958	0.5466	-1.0488	-1.2288
0.75	0.8199	2.8422	1.1896	0.8199	-1.3391	-0.9550
1.25	1.3665	3.4223	0.9690	1.3665	-1.8142	-0.7590
2.00	2.1864	4.1457	0.8160	2.1864	-2.3331	-0.5402
2.50	2.7330	4.5735	0.7526	2.7330	-2.6059	-0.4663
3.00	3.2796	4.9699	0.7011	3.2796	-2.8479	-0.4228
3.50	3.8262	5.3411	0.6581	3.8262	-3.0699	-0.3913
4.00	4.3728	5.6903	0.6194	4.3728	-3.2760	-0.3647
4.50	4.9194	6.0190	0.5854	4.9194	-3.4689	-0.3423
5.00	5.4660	6.3307	0.5548	5.4660	-3.6506	-0.3213
7.50	8.1990	7.6869	0.4479	8.1990	-4.4097	-0.2420
10.00	10.9320	8.8092	0.3798	10.9320	-5.0031	-0.1963
15.00	16.3980	10.6058	0.2837	16.3980	-5.9056	-0.1385
20.00	21.8640	11.9569	0.2131	21.8640	-6.5439	-0.0968
25.00	27.3300	12.9555	0.1533	27.3300	-6.9737	-0.0609
30.00	32.7960	13.6437	0.0994	32.7960	-7.2136	-0.0273
35.00	38.2620	14.0412	0.0438	38.2620	-7.2718	0.0081
40.00	43.7280	14.0942	-0.0251	43.7280	-7.0937	0.0591
45.00	49.1940	13.7904	-0.0830	49.1940	-6.6445	0.1019
50.00	54.6600	13.2135	-0.1268	54.6600	-6.0101	0.1286
55.00	60.1260	12.4158	-0.1638	60.1260	-5.2521	0.1473
60.00	65.5920	11.4313	-0.1951	65.5920	-4.4112	0.1589
65.00	71.0580	10.2910	-0.2212	71.0580	-3.5261	0.1638
70.00	76.5240	9.0206	-0.2427	76.5240	-2.6318	0.1622
75.00	81.9900	7.6463	-0.2591	81.9900	-1.7661	0.1530
80.00	87.4560	6.1991	-0.2692	87.4560	-0.9761	0.1342
85.00	92.9220	4.7156	-0.2726	92.9220	-0.3198	0.1038
90.00	98.3880	3.2286	-0.2706	98.3880	0.1326	0.0585
95.00	103.8540	1.7645	-0.2643	103.8540	0.2709	-0.0157
100.00	109.3200	0.2820	0.	109.3200	-0.2820	-0.3717

TABLE I -65

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.890

R= 2136.00" C= 106.29" T= 20.34" T/C= 0.1914

TTU= 0.27" TTL= -0.27"

THETA= 1.88 DEG DESIGN CL= 0.600

XZERO= 0. " YZERO= 3.0995"

% CHORD	X,UPPER (INCH)	Y,UPPER (INCH)	DYU/DXU	X,LOWER (INCH)	Y,LOWER (INCH)	DYL/DXL
0.	0.	0.	-3.9567	0.	0.	-3.9567
0.25	0.2657	1.9635	1.7727	0.2657	-0.6350	-1.7431
0.50	0.5315	2.3748	1.3801	0.5315	-1.0064	-1.2052
0.75	0.7972	2.7106	1.1748	0.7972	-1.2831	-0.9347
1.25	1.3286	3.2674	0.9554	1.3286	-1.7348	-0.7407
2.00	2.1258	3.9605	0.8037	2.1258	-2.2263	-0.5258
2.50	2.6572	4.3700	0.7411	2.6572	-2.4845	-0.4532
3.00	3.1887	4.7495	0.6903	3.1887	-2.7131	-0.4106
3.50	3.7201	5.1049	0.6481	3.7201	-2.9226	-0.3797
4.00	4.2516	5.4393	0.6100	4.2516	-3.1170	-0.3536
4.50	4.7831	5.7540	0.5767	4.7831	-3.2988	-0.3318
5.00	5.3145	6.0526	0.5466	5.3145	-3.4700	-0.3113
7.50	7.9718	7.3518	0.4414	7.9718	-4.1846	-0.2342
10.00	10.6290	8.4272	0.3744	10.6290	-4.7426	-0.1898
15.00	15.9435	10.1495	0.2798	15.9435	-5.5906	-0.1338
20.00	21.2580	11.4453	0.2103	21.2580	-6.1896	-0.0934
25.00	26.5725	12.4038	0.1515	26.5725	-6.5921	-0.0585
30.00	31.8870	13.0655	0.0984	31.8870	-6.8156	-0.0260
35.00	37.2015	13.4494	0.0440	37.2015	-6.8679	0.0083
40.00	42.5160	13.5059	-0.0235	42.5160	-6.6986	0.0576
45.00	47.8305	13.2210	-0.0807	47.8305	-6.2726	0.0994
50.00	53.1450	12.6740	-0.1239	53.1450	-5.6709	0.1255
55.00	58.4595	11.9151	-0.1604	58.4595	-4.9518	0.1436
60.00	63.7740	10.9766	-0.1914	63.7740	-4.1542	0.1550
65.00	69.0885	9.8881	-0.2173	69.0885	-3.3149	0.1597
70.00	74.4030	8.6740	-0.2387	74.4030	-2.4671	0.1581
75.00	79.7175	7.3587	-0.2552	79.7175	-1.6467	0.1491
80.00	85.0320	5.9720	-0.2655	85.0320	-0.8985	0.1306
85.00	90.3465	4.5483	-0.2693	90.3465	-0.2784	0.1006
90.00	95.6610	3.1188	-0.2678	95.6610	0.1463	0.0559
95.00	100.9755	1.7082	-0.2623	100.9755	0.2691	-0.0175
100.00	106.2900	0.2740	0.	106.2900	-0.2740	-0.3714

TABLE I -66

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.900

R= 2160.00" C= 103.27" T= 19.38" T/C= 0.1877

TTU= 0.27" TTL= -0.27"

THETA= 1.80 DEG DESIGN CL= 0.600

XZERO= 0. " YZERO= 3.0113"

% CHORD	X,UPPER (INCH)	Y,UPPER (INCH)	DYU/DXU	X,LOWER (INCH)	Y,LOWER (INCH)	DYL/DXL
0.	0.	0.	-3.9567	0.	0.	-3.9567
0.25	0.2582	1.8648	1.7589	0.2582	-0.6103	-1.7154
0.50	0.5164	2.2611	1.3645	0.5164	-0.9650	-1.1818
0.75	0.7745	2.5833	1.1606	0.7745	-1.2284	-0.9146
1.25	1.2909	3.1177	0.9421	1.2909	-1.6576	-0.7227
2.00	2.0654	3.7813	0.7918	2.0654	-2.1226	-0.5117
2.50	2.5818	4.1732	0.7299	2.5818	-2.3666	-0.4406
3.00	3.0981	4.5363	0.6799	3.0981	-2.5826	-0.3986
3.50	3.6145	4.8764	0.6383	3.6145	-2.7802	-0.3685
4.00	4.1308	5.1964	0.6009	4.1308	-2.9633	-0.3429
4.50	4.6472	5.4976	0.5682	4.6472	-3.1346	-0.3216
5.00	5.1635	5.7835	0.5386	5.1635	-3.2958	-0.3016
7.50	7.7453	7.0275	0.4351	7.7453	-3.9680	-0.2266
10.00	10.3270	8.0575	0.3691	10.3270	-4.4924	-0.1836
15.00	15.4905	9.7076	0.2760	15.4905	-5.2886	-0.1292
20.00	20.6540	10.9498	0.2076	20.6540	-5.8501	-0.0900
25.00	25.8175	11.8694	0.1496	25.8175	-6.2267	-0.0563
30.00	30.9810	12.5051	0.0975	30.9810	-6.4346	-0.0247
35.00	36.1445	12.8756	0.0441	36.1445	-6.4813	0.0084
40.00	41.3080	12.9350	-0.0220	41.3080	-6.3204	0.0561
45.00	46.4715	12.6680	-0.0785	46.4715	-5.9167	0.0971
50.00	51.6350	12.1497	-0.1210	51.6350	-5.3461	0.1224
55.00	56.7985	11.4278	-0.1571	56.7985	-4.6641	0.1401
60.00	61.9620	10.5339	-0.1878	61.9620	-3.9083	0.1512
65.00	67.1255	9.4954	-0.2135	67.1255	-3.1129	0.1558
70.00	72.2890	8.3356	-0.2348	72.2890	-2.3097	0.1541
75.00	77.4525	7.0777	-0.2514	77.4525	-1.5328	0.1453
80.00	82.6160	5.7496	-0.2619	82.6160	-0.8249	0.1271
85.00	87.7795	4.3842	-0.2660	87.7795	-0.2395	0.0976
90.00	92.9430	3.0108	-0.2651	92.9430	0.1587	0.0534
95.00	98.1065	1.6526	-0.2604	98.1065	0.2670	-0.0191
100.00	103.2700	0.2660	0.	103.2700	-0.2660	-0.3711

TABLE I -67

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.910

R= 2184.00" C= 100.24" T= 18.43" T/C= 0.1839

TTU= 0.26" TTL= -0.26"

THETA= 1.72 DEG DESIGN CL= 0.600

XZERO= 0. " YZERO= 2.9230"

% CHORD	X,UPPER (INCH)	Y,UPPER (INCH)	DYU/DXU	X,LOWER (INCH)	Y,LOWER (INCH)	DYL/DXL
0.	0.	0.	-3.9567	0.	0.	-3.9567
0.25	0.2506	1.7676	1.7438	0.2506	-0.5857	-1.6863
0.50	0.5012	2.1486	1.3485	0.5012	-0.9235	-1.1573
0.75	0.7518	2.4574	1.1460	0.7518	-1.1739	-0.8937
1.25	1.2530	2.9694	0.9285	1.2530	-1.5806	-0.7041
2.00	2.0048	3.6038	0.7795	2.0048	-2.0196	-0.4971
2.50	2.5060	3.9783	0.7185	2.5060	-2.2496	-0.4276
3.00	3.0072	4.3252	0.6692	3.0072	-2.4531	-0.3864
3.50	3.5084	4.6501	0.6283	3.5084	-2.6389	-0.3569
4.00	4.0096	4.9559	0.5916	4.0096	-2.8110	-0.3320
4.50	4.5108	5.2437	0.5595	4.5108	-2.9719	-0.3112
5.00	5.0120	5.5170	0.5304	5.0120	-3.1233	-0.2916
7.50	7.5180	6.7063	0.4286	7.5180	-3.7538	-0.2188
10.00	10.0240	7.6912	0.3637	10.0240	-4.2452	-0.1771
15.00	15.0360	9.2698	0.2721	15.0360	-4.9905	-0.1245
20.00	20.0480	10.4588	0.2048	20.0480	-5.5153	-0.0866
25.00	25.0600	11.3397	0.1478	25.0600	-5.8664	-0.0539
30.00	30.0720	11.9497	0.0965	30.0720	-6.0591	-0.0234
35.00	35.0840	12.3069	0.0442	35.0840	-6.1004	0.0086
40.00	40.0960	12.3687	-0.0206	40.0960	-5.9474	0.0547
45.00	45.1080	12.1194	-0.0763	45.1080	-5.5657	0.0947
50.00	50.1200	11.6290	-0.1182	50.1200	-5.0257	0.1193
55.00	55.1320	10.9439	-0.1537	55.1320	-4.3805	0.1365
60.00	60.1440	10.0940	-0.1842	60.1440	-3.6658	0.1473
65.00	65.1560	9.1050	-0.2096	65.1560	-2.9138	0.1517
70.00	70.1680	7.9989	-0.2308	70.1680	-2.1545	0.1500
75.00	75.1800	6.7978	-0.2474	75.1800	-1.4206	0.1413
80.00	80.1920	5.5280	-0.2582	80.1920	-0.7525	0.1235
85.00	85.2040	4.2204	-0.2627	85.2040	-0.2013	0.0944
90.00	90.2160	2.9029	-0.2622	90.2160	0.1706	0.0509
95.00	95.2280	1.5970	-0.2584	95.2280	0.2646	-0.0209
100.00	100.2400	0.2580	0.	100.2400	-0.2580	-0.3707

TABLE I -68

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.920

R= 2208.00" C= 97.21" T= 17.51" T/C= 0.1801

TTU= 0.25" TTL= -0.25"

THETA= 1.64 DEG DESIGN CL= 0.600

XZERO= 0. " YZERO= 2.8347"

% CHORD	X,UPPER (INCH)	Y,UPPER (INCH)	DYU/DXU	X,LOWER (INCH)	Y,LOWER (INCH)	DYL/DXL
0.	0.	0.	-3.9567	0.	0.	-3.9567
0.25	0.2430	1.6731	1.7279	0.2430	-0.5613	-1.6565
0.50	0.4860	2.0384	1.3331	0.4860	-0.8827	-1.1326
0.75	0.7291	2.3345	1.1311	0.7291	-1.1201	-0.8727
1.25	1.2151	2.8246	0.9147	1.2151	-1.5049	-0.6853
2.00	1.9442	3.4303	0.7672	1.9442	-1.9186	-0.4826
2.50	2.4302	3.7877	0.7071	2.4302	-2.1349	-0.4146
3.00	2.9163	4.1188	0.6585	2.9163	-2.3262	-0.3743
3.50	3.4024	4.4288	0.6184	3.4024	-2.5008	-0.3454
4.00	3.8884	4.7207	0.5823	3.8884	-2.6622	-0.3210
4.50	4.3745	4.9954	0.5507	4.3745	-2.8131	-0.3008
5.00	4.8605	5.2563	0.5222	4.8605	-2.9550	-0.2817
7.50	7.2908	6.3921	0.4221	7.2908	-3.5452	-0.2111
10.00	9.7210	7.3329	0.3583	9.7210	-4.0048	-0.1707
15.00	14.5815	8.8414	0.2682	14.5815	-4.7009	-0.1199
20.00	19.4420	9.9782	0.2020	19.4420	-5.1904	-0.0832
25.00	24.3025	10.8212	0.1459	24.3025	-5.5169	-0.0516
30.00	29.1630	11.4058	0.0955	29.1630	-5.6949	-0.0221
35.00	34.0235	11.7497	0.0442	34.0235	-5.7310	0.0087
40.00	38.8840	11.8134	-0.0192	38.8840	-5.5856	0.0533
45.00	43.7445	11.5809	-0.0740	43.7445	-5.2250	0.0922
50.00	48.6050	11.1179	-0.1154	48.6050	-4.7148	0.1163
55.00	53.4655	10.4687	-0.1504	53.4655	-4.1054	0.1330
60.00	58.3260	9.6616	-0.1805	58.3260	-3.4306	0.1434
65.00	63.1865	8.7209	-0.2057	63.1865	-2.7208	0.1476
70.00	68.0470	7.6674	-0.2268	68.0470	-2.0042	0.1460
75.00	72.9075	6.5220	-0.2435	72.9075	-1.3121	0.1374
80.00	77.7680	5.3093	-0.2544	77.7680	-0.6827	0.1198
85.00	82.6285	4.0585	-0.2593	82.6285	-0.1649	0.0912
90.00	87.4890	2.7960	-0.2594	87.4890	0.1816	0.0483
95.00	92.3495	1.5417	-0.2563	92.3495	0.2620	-0.0226
100.00	97.2100	0.2500	0.	97.2100	-0.2500	-0.3703

TABLE I -69

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.930

R= 2232.00" C= 94.19" T= 16.62" T/C= 0.1764

TTU= 0.24" TTL= -0.24"

THETA= 1.56 DEG DESIGN CL= 0.600

XZERO= 0. " YZERO= 2.7465"

% CHORD	X,UPPER (INCH)	Y,UPPER (INCH)	DYU/DXU	X,LOWER (INCH)	Y,LOWER (INCH)	DYL/DXL
0.	0.	0.	-3.9567	0.	0.	-3.9567
0.25	0.2355	1.5825	1.7117	0.2355	-0.5374	-1.6267
0.50	0.4709	1.9326	1.3178	0.4709	-0.8425	-1.1090
0.75	0.7064	2.2161	1.1165	0.7064	-1.0674	-0.8527
1.25	1.1774	2.6845	0.9018	1.1774	-1.4315	-0.6670
2.00	1.8838	3.2628	0.7553	1.8838	-1.8208	-0.4683
2.50	2.3547	3.6036	0.6960	2.3547	-2.0241	-0.4019
3.00	2.8257	3.9194	0.6481	2.8257	-2.2037	-0.3625
3.50	3.2966	4.2150	0.6087	3.2966	-2.3676	-0.3342
4.00	3.7676	4.4935	0.5733	3.7676	-2.5189	-0.3104
4.50	4.2386	4.7556	0.5423	4.2386	-2.6602	-0.2907
5.00	4.7095	5.0045	0.5143	4.7095	-2.7930	-0.2722
7.50	7.0642	6.0884	0.4158	7.0642	-3.3451	-0.2036
10.00	9.4190	6.9865	0.3530	9.4190	-3.7744	-0.1646
15.00	14.1285	8.4269	0.2644	14.1285	-4.4239	-0.1153
20.00	18.8380	9.5131	0.1993	18.8380	-4.8798	-0.0799
25.00	23.5475	10.3192	0.1441	23.5475	-5.1830	-0.0493
30.00	28.2570	10.8791	0.0946	28.2570	-5.3473	-0.0209
35.00	32.9665	11.2100	0.0443	32.9665	-5.3785	0.0089
40.00	37.6760	11.2752	-0.0178	37.6760	-5.2403	0.0520
45.00	42.3855	11.0585	-0.0717	42.3855	-4.8999	0.0899
50.00	47.0950	10.6217	-0.1126	47.0950	-4.4183	0.1133
55.00	51.8045	10.0070	-0.1472	51.8045	-3.8433	0.1294
60.00	56.5140	9.2412	-0.1769	56.5140	-3.2069	0.1396
65.00	61.2235	8.3471	-0.2019	61.2235	-2.5373	0.1437
70.00	65.9330	7.3444	-0.2230	65.9330	-1.8619	0.1420
75.00	70.6425	6.2530	-0.2396	70.6425	-1.2099	0.1335
80.00	75.3520	5.0958	-0.2507	75.3520	-0.6177	0.1162
85.00	80.0615	3.9005	-0.2560	80.0615	-0.1319	0.0881
90.00	84.7710	2.6917	-0.2566	84.7710	0.1903	0.0457
95.00	89.4805	1.4880	-0.2543	89.4805	0.2578	-0.0243
100.00	94.1900	0.2430	0.	94.1900	-0.2430	-0.3699

TABLE I -70

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.940

R= 2256.00" C= 91.16" T= 15.73" T/C= 0.1726

TTU= 0.23" TTL= -0.23"

THETA= 1.48 DEG DESIGN CL= 0.600

XZERO= 0. " YZERO= 2.6582"

% CHORD	X,UPPER (INCH)	Y,UPPER (INCH)	DYU/DXU	X,LOWER (INCH)	Y,LOWER (INCH)	DYL/DXL
0.	0.	0.	-3.9567	0.	0.	-3.9567
0.25	0.2279	1.4935	1.6941	0.2279	-0.5135	-1.5953
0.50	0.4558	1.8282	1.3017	0.4558	-0.8023	-1.0847
0.75	0.6837	2.0993	1.1013	0.6837	-1.0149	-0.8318
1.25	1.1395	2.5459	0.8888	1.1395	-1.3585	-0.6480
2.00	1.8232	3.0972	0.7431	1.8232	-1.7239	-0.4537
2.50	2.2790	3.4217	0.6846	2.2790	-1.9144	-0.3889
3.00	2.7348	3.7223	0.6375	2.7348	-2.0825	-0.3504
3.50	3.1906	4.0037	0.5988	3.1906	-2.2357	-0.3227
4.00	3.6464	4.2688	0.5640	3.6464	-2.3771	-0.2995
4.50	4.1022	4.5184	0.5336	4.1022	-2.5091	-0.2804
5.00	4.5580	4.7555	0.5061	4.5580	-2.6331	-0.2624
7.50	6.8370	5.7881	0.4094	6.8370	-3.1477	-0.1960
10.00	9.1160	6.6439	0.3476	9.1160	-3.5474	-0.1582
15.00	13.6740	8.0170	0.2605	13.6740	-4.1513	-0.1107
20.00	18.2320	9.0530	0.1964	18.2320	-4.5743	-0.0765
25.00	22.7900	9.8225	0.1422	22.7900	-4.8548	-0.0470
30.00	27.3480	10.3580	0.0936	27.3480	-5.0056	-0.0195
35.00	31.9060	10.6757	0.0444	31.9060	-5.0322	0.0091
40.00	36.4640	10.7422	-0.0165	36.4640	-4.9009	0.0506
45.00	41.0220	10.5410	-0.0694	41.0220	-4.5803	0.0874
50.00	45.5800	10.1299	-0.1098	45.5800	-4.1266	0.1103
55.00	50.1380	9.5490	-0.1439	50.1380	-3.5854	0.1259
60.00	54.6960	8.8238	-0.1733	54.6960	-2.9865	0.1358
65.00	59.2540	7.9755	-0.1981	59.2540	-2.3565	0.1396
70.00	63.8120	7.0232	-0.2190	63.8120	-1.7214	0.1379
75.00	68.3700	5.9851	-0.2356	68.3700	-1.1089	0.1295
80.00	72.9280	4.8828	-0.2470	72.9280	-0.5533	0.1125
85.00	77.4860	3.7423	-0.2527	77.4860	-0.0989	0.0849
90.00	82.0440	2.5869	-0.2537	82.0440	0.1995	0.0431
95.00	86.6020	1.4335	-0.2522	86.6020	0.2545	-0.0261
100.00	91.1600	0.2350	0.	91.1600	-0.2350	-0.3694

TABLE I -71

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.950

R= 2280.00" C= 88.13" T= 14.88" T/C= 0.1688

TTU= 0.23" TTL= -0.23"

THETA= 1.40 DEG DESIGN CL= 0.600

XZERO= 0. " YZERO= 2.5700"

% CHORD	X,UPPER (INCH)	Y,UPPER (INCH)	DYU/DXU	X,LOWER (INCH)	Y,LOWER (INCH)	DYL/DXL
0.	0.	0.	-3.9567	0.	0.	-3.9567
0.25	0.2203	1.4072	1.6757	0.2203	-0.4899	-1.5632
0.50	0.4407	1.7267	1.2852	0.4407	-0.7628	-1.0599
0.75	0.6610	1.9855	1.0860	0.6610	-0.9634	-0.8106
1.25	1.1016	2.4107	0.8757	1.1016	-1.2869	-0.6289
2.00	1.7626	2.9356	0.7308	1.7626	-1.6291	-0.4390
2.50	2.2032	3.2442	0.6732	2.2032	-1.8072	-0.3759
3.00	2.6439	3.5299	0.6269	2.6439	-1.9642	-0.3383
3.50	3.0845	3.7974	0.5889	3.0845	-2.1071	-0.3113
4.00	3.5252	4.0496	0.5548	3.5252	-2.2389	-0.2887
4.50	3.9658	4.2869	0.5250	3.9658	-2.3619	-0.2702
5.00	4.4065	4.5124	0.4980	4.4065	-2.4774	-0.2526
7.50	6.6098	5.4948	0.4030	6.6098	-2.9560	-0.1884
10.00	8.8130	6.3091	0.3422	8.8130	-3.3272	-0.1519
15.00	13.2195	7.6164	0.2566	13.2195	-3.8872	-0.1061
20.00	17.6260	8.6032	0.1936	17.6260	-4.2787	-0.0731
25.00	22.0325	9.3369	0.1403	22.0325	-4.5374	-0.0447
30.00	26.4390	9.8483	0.0925	26.4390	-4.6752	-0.0182
35.00	30.8455	10.1530	0.0444	30.8455	-4.6973	0.0093
40.00	35.2520	10.2205	-0.0151	35.2520	-4.5729	0.0493
45.00	39.6585	10.0340	-0.0672	39.6585	-4.2713	0.0851
50.00	44.0650	9.6477	-0.1071	44.0650	-3.8447	0.1073
55.00	48.4715	9.0997	-0.1406	48.4715	-3.3361	0.1223
60.00	52.8780	8.4140	-0.1696	52.8780	-2.7734	0.1319
65.00	57.2845	7.6104	-0.1942	57.2845	-2.1819	0.1356
70.00	61.6910	6.7072	-0.2150	61.6910	-1.5860	0.1338
75.00	66.0975	5.7212	-0.2316	66.0975	-1.0117	0.1255
80.00	70.5040	4.6727	-0.2432	70.5040	-0.4915	0.1088
85.00	74.9105	3.5861	-0.2492	74.9105	-0.0676	0.0816
90.00	79.3170	2.4832	-0.2508	79.3170	0.2076	0.0404
95.00	83.7235	1.3794	-0.2501	83.7235	0.2508	-0.0280
100.00	88.1300	0.2270	0.	88.1300	-0.2270	-0.3689

TABLE I -72

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.960

R= 2304.00" C= 85.11" T= 14.05" T/C= 0.1651

TTU= 0.22" TTL= -0.22"

THETA= 1.32 DEG DESIGN CL= 0.600

XZERO= 0. " YZERO= 2.4817"

% CHORD	X,UPPER (INCH)	Y,UPPER (INCH)	DYU/DXU	X,LOWER (INCH)	Y,LOWER (INCH)	DYL/DXL
0.	0.	0.	-3.9567	0.	0.	-3.9567
0.25	0.2128	1.3247	1.6571	0.2128	-0.4666	-1.5328
0.50	0.4255	1.6294	1.2688	0.4255	-0.7244	-1.0354
0.75	0.6383	1.8761	1.0708	0.6383	-0.9135	-0.7898
1.25	1.0639	2.2806	0.8630	1.0639	-1.2176	-0.6102
2.00	1.7022	2.7799	0.7189	1.7022	-1.5376	-0.4247
2.50	2.1277	3.0730	0.6622	2.1277	-1.7039	-0.3632
3.00	2.5533	3.3444	0.6166	2.5533	-1.8503	-0.3265
3.50	2.9788	3.5985	0.5793	2.9788	-1.9834	-0.3002
4.00	3.4044	3.8381	0.5458	3.4044	-2.1062	-0.2783
4.50	3.8299	4.0635	0.5165	3.8299	-2.2207	-0.2602
5.00	4.2555	4.2779	0.4901	4.2555	-2.3281	-0.2432
7.50	6.3832	5.2116	0.3967	6.3832	-2.7726	-0.1810
10.00	8.5110	5.9859	0.3370	8.5110	-3.1168	-0.1458
15.00	12.7665	7.2294	0.2528	12.7665	-3.6354	-0.1016
20.00	17.0220	8.1685	0.1909	17.0220	-3.9971	-0.0699
25.00	21.2775	8.8673	0.1385	21.2775	-4.2352	-0.0425
30.00	25.5330	9.3552	0.0915	25.5330	-4.3607	-0.0169
35.00	29.7885	9.6472	0.0444	29.7885	-4.3787	0.0094
40.00	34.0440	9.7153	-0.0138	34.0440	-4.2609	0.0481
45.00	38.2995	9.5428	-0.0651	38.2995	-3.9774	0.0827
50.00	42.5550	9.1802	-0.1044	42.5550	-3.5767	0.1044
55.00	46.8105	8.6636	-0.1374	46.8105	-3.0992	0.1189
60.00	51.0660	8.0156	-0.1661	51.0660	-2.5711	0.1281
65.00	55.3215	7.2553	-0.1904	55.3215	-2.0163	0.1316
70.00	59.5770	6.3994	-0.2112	59.5770	-1.4578	0.1299
75.00	63.8325	5.4637	-0.2277	63.8325	-0.9200	0.1216
80.00	68.0880	4.4674	-0.2395	68.0880	-0.4337	0.1052
85.00	72.3435	3.4330	-0.2459	72.3435	-0.0389	0.0784
90.00	76.5990	2.3812	-0.2480	76.5990	0.2145	0.0378
95.00	80.8545	1.3259	-0.2480	80.8545	0.2467	-0.0297
100.00	85.1100	0.2190	0.	85.1100	-0.2190	-0.3684

TABLE I -73

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.970

R= 2328.00" C= 82.08" T= 13.24" T/C= 0.1613

TTU= 0.21" TTL= -0.21"

THETA= 1.24 DEG DESIGN CL= 0.600

XZERO= 0. " YZERO= 2.3935"

% CHORD	X,UPPER (INCH)	Y,UPPER (INCH)	DYU/DXU	X,LOWER (INCH)	Y,LOWER (INCH)	DYL/DXL
0.	0.	0.	-3.9567	0.	0.	-3.9567
0.25	0.2052	1.2438	1.6370	0.2052	-0.4434	-1.5011
0.50	0.4104	1.5337	1.2517	0.4104	-0.6862	-1.0098
0.75	0.6156	1.7684	1.0551	0.6156	-0.8639	-0.7680
1.25	1.0260	2.1523	0.8497	1.0260	-1.1489	-0.5909
2.00	1.6416	2.6261	0.7069	1.6416	-1.4472	-0.4100
2.50	2.0520	2.9041	0.6508	2.0520	-1.6019	-0.3502
3.00	2.4624	3.1614	0.6060	2.4624	-1.7379	-0.3145
3.50	2.8728	3.4022	0.5694	2.8728	-1.8615	-0.2888
4.00	3.2832	3.6294	0.5366	3.2832	-1.9753	-0.2676
4.50	3.6936	3.8431	0.5079	3.6936	-2.0815	-0.2500
5.00	4.1040	4.0465	0.4819	4.1040	-2.1811	-0.2335
7.50	6.1560	4.9322	0.3903	6.1560	-2.5923	-0.1734
10.00	8.2080	5.6669	0.3316	8.2080	-2.9102	-0.1395
15.00	12.3120	6.8473	0.2489	12.3120	-3.3883	-0.0971
20.00	16.4160	7.7393	0.1881	16.4160	-3.7210	-0.0665
25.00	20.5200	8.4036	0.1367	20.5200	-3.9391	-0.0402
30.00	24.6240	8.8681	0.0905	24.6240	-4.0527	-0.0156
35.00	28.7280	9.1475	0.0444	28.7280	-4.0668	0.0097
40.00	32.8320	9.2159	-0.0125	32.8320	-3.9553	0.0469
45.00	36.9360	9.0569	-0.0629	36.9360	-3.6896	0.0804
50.00	41.0400	8.7175	-0.1016	41.0400	-3.3142	0.1014
55.00	45.1440	8.2317	-0.1342	45.1440	-2.8671	0.1154
60.00	49.2480	7.6209	-0.1624	49.2480	-2.3730	0.1242
65.00	53.3520	6.9032	-0.1866	53.3520	-1.8543	0.1275
70.00	57.4560	6.0939	-0.2072	57.4560	-1.3325	0.1258
75.00	61.5600	5.2080	-0.2237	61.5600	-0.8306	0.1175
80.00	65.6640	4.2633	-0.2357	65.6640	-0.3776	0.1015
85.00	69.7680	3.2807	-0.2424	69.7680	-0.0113	0.0751
90.00	73.8720	2.2796	-0.2450	73.8720	0.2207	0.0351
95.00	77.9760	1.2725	-0.2458	77.9760	0.2424	-0.0316
100.00	82.0800	0.2110	0.	82.0800	-0.2110	-0.3678

TABLE I -74

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.980

R= 2352.00" C= 79.05" T= 12.45" T/C= 0.1575

TTU= 0.20" TTL= -0.20"

THETA= 1.16 DEG DESIGN CL= 0.600

XZERO= 0. " YZERO= 2.3052"

% CHORD	X,UPPER (INCH)	Y,UPPER (INCH)	DYU/DXU	X,LOWER (INCH)	Y,LOWER (INCH)	DYL/DXL
0.	0.	0.	-3.9567	0.	0.	-3.9567
0.25	0.1976	1.1656	1.6161	0.1976	-0.4205	-1.4687
0.50	0.3953	1.4409	1.2342	0.3953	-0.6488	-0.9838
0.75	0.5929	1.6638	1.0392	0.5929	-0.8151	-0.7465
1.25	0.9881	2.0276	0.8364	0.9881	-1.0817	-0.5715
2.00	1.5810	2.4763	0.6949	1.5810	-1.3590	-0.3953
2.50	1.9763	2.7396	0.6396	1.9763	-1.5025	-0.3372
3.00	2.3715	2.9831	0.5955	2.3715	-1.6286	-0.3025
3.50	2.7668	3.2111	0.5596	2.7668	-1.7430	-0.2775
4.00	3.1620	3.4261	0.5274	3.1620	-1.8483	-0.2569
4.50	3.5573	3.6284	0.4993	3.5573	-1.9464	-0.2399
5.00	3.9525	3.8209	0.4738	3.9525	-2.0384	-0.2239
7.50	5.9288	4.6597	0.3838	5.9288	-2.4178	-0.1659
10.00	7.9050	5.3558	0.3262	7.9050	-2.7105	-0.1333
15.00	11.8575	6.4745	0.2450	11.8575	-3.1499	-0.0925
20.00	15.8100	7.3203	0.1853	15.8100	-3.4548	-0.0632
25.00	19.7625	7.9508	0.1348	19.7625	-3.6537	-0.0379
30.00	23.7150	8.3924	0.0894	23.7150	-3.7560	-0.0143
35.00	27.6675	8.6594	0.0444	27.6675	-3.7665	0.0099
40.00	31.6200	8.7277	-0.0113	31.6200	-3.6611	0.0456
45.00	35.5725	8.5816	-0.0607	35.5725	-3.4126	0.0780
50.00	39.5250	8.2646	-0.0989	39.5250	-3.0618	0.0984
55.00	43.4775	7.8087	-0.1309	43.4775	-2.6441	0.1119
60.00	47.4300	7.2342	-0.1588	47.4300	-2.1829	0.1203
65.00	51.3825	6.5579	-0.1827	51.3825	-1.6992	0.1235
70.00	55.3350	5.7942	-0.2032	55.3350	-1.2130	0.1216
75.00	59.2875	4.9570	-0.2196	59.2875	-0.7459	0.1135
80.00	63.2400	4.0627	-0.2318	63.2400	-0.3252	0.0978
85.00	67.1925	3.1311	-0.2389	67.1925	0.0135	0.0718
90.00	71.1450	2.1799	-0.2420	71.1450	0.2249	0.0324
95.00	75.0975	1.2204	-0.2436	75.0975	0.2366	-0.0334
100.00	79.0500	0.2040	0.	79.0500	-0.2040	-0.3671

TABLE I -75

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.990

R= 2376.00" C= 76.03" T= 11.69" T/C= 0.1538

TTU= 0.20" TTL= -0.20"

THETA= 1.08 DEG DESIGN CL= 0.600

XZERO= 0. " YZERO= 2.2169"

% CHORD	X,UPPER (INCH)	Y,UPPER (INCH)	DYU/DXU	X,LOWER (INCH)	Y,LOWER (INCH)	DYL/DXL
0.	0.	0.	-3.9567	0.	0.	-3.9567
0.25	0.1901	1.0910	1.5950	0.1901	-0.3981	-1.4366
0.50	0.3801	1.3521	1.2167	0.3801	-0.6124	-0.9580
0.75	0.5702	1.5635	1.0235	0.5702	-0.7678	-0.7255
1.25	0.9504	1.9078	0.8234	0.9504	-1.0168	-0.5525
2.00	1.5206	2.3322	0.6833	1.5206	-1.2742	-0.3809
2.50	1.9007	2.5811	0.6287	1.9007	-1.4071	-0.3245
3.00	2.2809	2.8115	0.5853	2.2809	-1.5237	-0.2908
3.50	2.6610	3.0270	0.5500	2.6610	-1.6294	-0.2665
4.00	3.0412	3.2303	0.5184	3.0412	-1.7267	-0.2466
4.50	3.4214	3.4216	0.4909	3.4214	-1.8172	-0.2301
5.00	3.8015	3.6037	0.4659	3.8015	-1.9020	-0.2146
7.50	5.7023	4.3972	0.3776	5.7023	-2.2514	-0.1587
10.00	7.6030	5.0558	0.3210	7.6030	-2.5203	-0.1273
15.00	11.4045	6.1148	0.2413	11.4045	-2.9233	-0.0881
20.00	15.2060	6.9159	0.1825	15.2060	-3.2022	-0.0599
25.00	19.0075	7.5137	0.1330	19.0075	-3.3831	-0.0357
30.00	22.8090	7.9329	0.0884	22.8090	-3.4748	-0.0130
35.00	26.6105	8.1877	0.0443	26.6105	-3.4819	0.0101
40.00	30.4120	8.2557	-0.0101	30.4120	-3.3824	0.0444
45.00	34.2135	8.1217	-0.0586	34.2135	-3.1502	0.0758
50.00	38.0150	7.8258	-0.0962	38.0150	-2.8225	0.0955
55.00	41.8165	7.3984	-0.1278	41.8165	-2.4328	0.1085
60.00	45.6180	6.8586	-0.1552	45.6180	-2.0030	0.1165
65.00	49.4195	6.2220	-0.1789	49.4195	-1.5524	0.1195
70.00	53.2210	5.5021	-0.1993	53.2210	-1.1000	0.1177
75.00	57.0225	4.7118	-0.2157	57.0225	-0.6659	0.1095
80.00	60.8240	3.8662	-0.2281	60.8240	-0.2757	0.0941
85.00	64.6255	2.9838	-0.2354	64.6255	0.0369	0.0685
90.00	68.4270	2.0811	-0.2391	68.4270	0.2288	0.0297
95.00	72.2285	1.1680	-0.2414	72.2285	0.2315	-0.0352
100.00	76.0300	0.1960	0.	76.0300	-0.1960	-0.3664

TABLE I -76

SECTION EXTERNAL PROFILE

RADIUS RATIO = 1.000

R= 2400.00" C= 73.00" T= 10.95" T/C= 0.1500

TTU= 0.19" TTL= -0.19"

THETA= 1.00 DEG DESIGN CL= 0.600

XZERO= 0. " YZERO= 2.1287"

% CHORD	X,UPPER (INCH)	Y,UPPER (INCH)	DYU/DXU	X,LOWER (INCH)	Y,LOWER (INCH)	DYL/DXL
0.	0.	0.	-3.9567	0.	0.	-3.9567
0.25	0.1825	1.0182	1.5724	0.1825	-0.3759	-1.4029
0.50	0.3650	1.2650	1.1985	0.3650	-0.5762	-0.9319
0.75	0.5475	1.4650	1.0072	0.5475	-0.7211	-0.7036
1.25	0.9125	1.7900	0.8099	0.9125	-0.9528	-0.5330
2.00	1.4600	2.1905	0.6713	1.4600	-1.1906	-0.3662
2.50	1.8250	2.4253	0.6175	1.8250	-1.3132	-0.3115
3.00	2.1900	2.6425	0.5748	2.1900	-1.4206	-0.2788
3.50	2.5550	2.8458	0.5402	2.5550	-1.5179	-0.2553
4.00	2.9200	3.0376	0.5093	2.9200	-1.6073	-0.2360
4.50	3.2850	3.2180	0.4823	3.2850	-1.6904	-0.2200
5.00	3.6500	3.3898	0.4578	3.6500	-1.7682	-0.2051
7.50	5.4750	4.1386	0.3712	5.4750	-2.0884	-0.1512
10.00	7.3000	4.7603	0.3156	7.3000	-2.3343	-0.1211
15.00	10.9500	5.7604	0.2374	10.9500	-2.7020	-0.0836
20.00	14.6000	6.5174	0.1797	14.6000	-2.9556	-0.0566
25.00	18.2500	7.0828	0.1311	18.2500	-3.1191	-0.0334
30.00	21.9000	7.4800	0.0873	21.9000	-3.2006	-0.0116
35.00	25.5500	7.7224	0.0443	25.5500	-3.2044	0.0103
40.00	29.2000	7.7900	-0.0089	29.2000	-3.1107	0.0433
45.00	32.8500	7.6676	-0.0565	32.8500	-2.8943	0.0735
50.00	36.5000	7.3923	-0.0935	36.5000	-2.5892	0.0925
55.00	40.1500	6.9929	-0.1246	40.1500	-2.2269	0.1051
60.00	43.8000	6.4872	-0.1516	43.8000	-1.8277	0.1126
65.00	47.4500	5.8896	-0.1750	47.4500	-1.4096	0.1155
70.00	51.1000	5.2128	-0.1953	51.1000	-0.9902	0.1135
75.00	54.7500	4.4686	-0.2117	54.7500	-0.5883	0.1055
80.00	58.4000	3.6712	-0.2243	58.4000	-0.2281	0.0903
85.00	62.0500	2.8375	-0.2319	62.0500	0.0590	0.0652
90.00	65.7000	1.9827	-0.2361	65.7000	0.2321	0.0270
95.00	69.3500	1.1158	-0.2392	69.3500	0.2261	-0.0371
100.00	73.0000	0.1880	0.	73.0000	-0.1880	-0.3656

TABLE II- 1

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.

R= 0. " C= 180.00" T= 85.80" T/C= 0.4767

TTU= N/A " TTL= N/A "

THETA= 0. DEG DESIGN CL= N/A

X,UPPER (INCH)	Y,UPPER (INCH)	X,LOWER (INCH)	Y,LOWER (INCH)
0.	0.	0.	0.
0.	9.502	0.	-10.168
0.	13.075	0.	-17.235
0.	16.928	0.	-19.436
0.	19.439	0.	-22.212
0.	23.032	0.	-24.179
0.	26.995	0.	-27.152
0.	31.162	0.	-30.586
0.	34.655	0.	-34.320
0.	37.697	0.	-37.519
0.	40.418	0.	-40.347
0.	42.900	0.	-42.900
6.652	42.900	6.767	-42.900
13.302	42.900	13.531	-42.900
19.953	42.900	20.297	-42.900
26.604	42.900	27.062	-42.900
33.255	42.900	33.828	-42.900
39.907	42.900	40.594	-42.900
46.557	42.900	47.359	-42.900
53.209	42.900	54.125	-42.900
59.859	42.900	60.889	-42.900
66.511	42.900	67.655	-42.900
73.160	42.900	74.421	-42.900
79.811	42.900	81.186	-42.900
86.462	42.900	87.952	-42.900
93.112	42.900	94.716	-42.900
99.763	42.900	101.482	-42.900
106.414	42.900	108.248	-42.900
113.065	42.900	115.012	-42.900
119.716	42.900	121.778	-42.900
126.367	42.900	128.543	-42.900
133.018	42.900	135.309	-42.900
139.669	42.900	142.075	-42.900
146.320	42.900	148.840	-42.900
152.971	42.900	155.606	-42.900
159.622	42.900	162.370	-42.900
166.273	42.900	169.136	-42.900
172.924	42.900	175.903	-42.900
180.000	42.900	180.000	-42.900
180.000	0.	180.000	0.

TABLE II- 2

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.010

R= 24.00" C= 180.00" T= 85.80" T/C= 0.4767

TTU= N/A " TTL= N/A "

THETA= 0.20 DEG DESIGN CL= N/A

X,UPPER (INCH)	Y,UPPER (INCH)	X,LOWER (INCH)	Y,LOWER (INCH)
0.	0.	0.	0.
0.033	9.501	-0.035	-10.169
0.046	13.074	-0.060	-17.236
0.059	16.927	-0.068	-19.437
0.068	19.438	-0.078	-22.213
0.080	23.031	-0.084	-24.180
0.094	26.994	-0.095	-27.153
0.109	31.161	-0.107	-30.587
0.121	34.654	-0.120	-34.321
0.132	37.696	-0.131	-37.520
0.141	40.417	-0.141	-40.348
0.150	42.899	-0.150	-42.900
6.802	42.899	6.617	-42.900
13.452	42.898	13.381	-42.900
20.103	42.898	20.147	-42.899
26.754	42.899	26.912	-42.900
33.405	42.899	33.678	-42.900
40.057	42.899	40.445	-42.899
46.707	42.898	47.210	-42.900
53.359	42.899	53.976	-42.900
60.009	42.899	60.740	-42.899
66.661	42.899	67.506	-42.900
73.310	42.900	74.272	-42.899
79.961	42.899	81.037	-42.899
86.612	42.899	87.803	-42.900
93.262	42.899	94.567	-42.899
99.913	42.900	101.333	-42.899
106.564	42.899	108.099	-42.899
113.215	42.899	114.863	-42.899
119.866	42.899	121.629	-42.899
126.518	42.900	128.394	-42.899
133.169	42.900	135.160	-42.899
139.820	42.899	141.926	-42.899
146.471	42.900	148.691	-42.899
153.122	42.900	155.457	-42.899
159.773	42.900	162.221	-42.898
166.424	42.899	168.987	-42.899
173.075	42.900	175.754	-42.899
180.151	42.900	179.851	-42.899
180.001	0.	180.001	0.

TABLE II- 3

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.020

R= 48.00" C= 180.00" T= 85.80" T/C= 0.4767

TTU= N/A " TTL= N/A "

THETA= 0.40 DEG DESIGN CL= N/A

X,UPPER (INCH)	Y,UPPER (INCH)	X,LOWER (INCH)	Y,LOWER (INCH)
0.	0.	0.	0.
0.066	9.500	-0.071	-10.169
0.091	13.073	-0.120	-17.236
0.118	16.927	-0.136	-19.437
0.136	19.437	-0.155	-22.213
0.161	23.031	-0.169	-24.180
0.188	26.993	-0.190	-27.153
0.218	31.160	-0.214	-30.587
0.242	34.652	-0.240	-34.321
0.263	37.694	-0.262	-37.520
0.282	40.415	-0.282	-40.348
0.299	42.897	-0.299	-42.900
6.952	42.897	6.468	-42.900
13.602	42.897	13.232	-42.900
20.253	42.897	19.998	-42.899
26.904	42.898	26.763	-42.900
33.555	42.897	33.529	-42.900
40.207	42.898	40.295	-42.899
46.858	42.897	47.061	-42.899
53.510	42.898	53.827	-42.899
60.160	42.898	60.591	-42.899
66.812	42.898	67.357	-42.899
73.461	42.899	74.123	-42.899
80.112	42.898	80.888	-42.898
86.764	42.899	87.655	-42.899
93.414	42.898	94.419	-42.898
100.065	42.899	101.185	-42.898
106.716	42.898	107.951	-42.898
113.367	42.899	114.715	-42.898
120.018	42.898	121.481	-42.898
126.670	42.899	128.247	-42.898
133.321	42.900	135.013	-42.897
139.972	42.899	141.779	-42.898
146.623	42.900	148.544	-42.898
153.274	42.899	155.310	-42.897
159.925	42.900	162.074	-42.897
166.577	42.899	168.841	-42.897
173.228	42.900	175.608	-42.897
180.304	42.900	179.705	-42.897
180.004	0.	180.004	0.

TABLE II- 4

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.030

R= 72.00" C= 180.01" T= 85.80" T/C= 0.4766

TTU= N/A " TTL= N/A "

THETA= 0.60 DEG DESIGN CL= N/A

X,UPPER (INCH)	Y,UPPER (INCH)	X,LOWER (INCH)	Y,LOWER (INCH)
0.	0.	0.	0.
0.099	9.499	-0.107	-10.170
0.137	13.072	-0.181	-17.237
0.177	16.926	-0.204	-19.436
0.204	19.436	-0.233	-22.212
0.241	23.029	-0.253	-24.180
0.283	26.991	-0.284	-27.153
0.326	31.158	-0.320	-30.587
0.363	34.651	-0.359	-34.321
0.395	37.692	-0.393	-37.519
0.423	40.413	-0.423	-40.347
0.449	42.895	-0.449	-42.899
7.102	42.894	6.318	-42.899
13.752	42.895	13.082	-42.899
20.403	42.895	19.849	-42.899
27.055	42.896	26.614	-42.899
33.706	42.896	33.381	-42.898
40.358	42.896	40.147	-42.898
47.009	42.896	46.912	-42.898
53.661	42.896	53.679	-42.898
60.312	42.896	60.443	-42.898
66.964	42.897	67.209	-42.898
73.613	42.897	73.976	-42.897
80.265	42.897	80.741	-42.897
86.916	42.897	87.508	-42.897
93.566	42.897	94.272	-42.897
100.218	42.897	101.038	-42.897
106.869	42.898	107.805	-42.897
113.520	42.898	114.569	-42.897
120.172	42.897	121.335	-42.896
126.823	42.898	128.101	-42.896
133.475	42.898	134.867	-42.896
140.126	42.898	141.634	-42.896
146.777	42.899	148.399	-42.896
153.429	42.899	155.165	-42.896
160.080	42.899	161.930	-42.896
166.731	42.899	168.696	-42.895
173.383	42.899	175.463	-42.895
180.459	42.899	179.561	-42.895
180.010	0.	180.010	0.

TABLE II- 5

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.040

R= 96.00" C= 180.02" T= 85.80" T/C= 0.4766

TTU= N/A " TTL= N/A "

THETA= 0.80 DEG DESIGN CL= N/A

X,UPPER (INCH)	Y,UPPER (INCH)	X,LOWER (INCH)	Y,LOWER (INCH)
0.	0.	0.	0.
0.133	9.494	-0.142	-10.163
0.182	13.065	-0.241	-17.228
0.236	16.916	-0.270	-19.426
0.272	19.427	-0.309	-22.201
0.323	23.018	-0.335	-24.169
0.380	26.979	-0.376	-27.141
0.440	31.146	-0.422	-30.573
0.491	34.637	-0.472	-34.306
0.535	37.679	-0.515	-37.504
0.575	40.399	-0.552	-40.331
0.612	42.879	-0.586	-42.882
7.262	42.881	6.181	-42.885
13.913	42.884	12.945	-42.886
20.565	42.886	19.712	-42.888
27.215	42.887	26.477	-42.889
33.867	42.889	33.243	-42.891
40.518	42.890	40.010	-42.891
47.169	42.891	46.774	-42.893
53.820	42.892	53.540	-42.893
60.472	42.894	60.305	-42.893
67.122	42.894	67.072	-42.894
73.772	42.895	73.838	-42.894
80.423	42.895	80.602	-42.895
87.074	42.895	87.369	-42.894
93.724	42.896	94.132	-42.895
100.376	42.896	100.899	-42.894
107.026	42.897	107.665	-42.894
113.678	42.896	114.429	-42.894
120.329	42.896	121.196	-42.893
126.980	42.896	127.961	-42.892
133.632	42.896	134.726	-42.892
140.283	42.895	141.493	-42.891
146.934	42.895	148.258	-42.889
153.585	42.895	155.023	-42.889
160.237	42.895	161.788	-42.887
166.888	42.894	168.555	-42.886
173.539	42.894	175.320	-42.885
180.615	42.893	179.418	-42.885
180.017	0.	180.017	0.

TABLE II- 6

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.050

R= 120.00" C= 180.02" T= 85.80" T/C= 0.4766

TTU= N/A " TTL= N/A "

THETA= 1.00 DEG DESIGN CL= N/A

X,UPPER (INCH)	Y,UPPER (INCH)	X,LOWER (INCH)	Y,LOWER (INCH)
0.	0.	0.	0.
0.166	9.462	-0.177	-10.115
0.229	13.023	-0.296	-17.160
0.300	16.864	-0.331	-19.354
0.347	19.369	-0.375	-22.124
0.416	22.953	-0.405	-24.088
0.496	26.908	-0.447	-27.054
0.584	31.067	-0.494	-30.482
0.661	34.555	-0.541	-34.208
0.729	37.593	-0.579	-37.402
0.792	40.310	-0.611	-40.224
0.850	42.789	-0.638	-42.771
7.498	42.805	6.126	-42.790
14.145	42.820	12.888	-42.805
20.792	42.833	19.652	-42.819
27.440	42.844	26.414	-42.831
34.088	42.854	33.178	-42.841
40.736	42.862	39.942	-42.851
47.383	42.869	46.703	-42.859
54.031	42.876	53.467	-42.866
60.679	42.882	60.227	-42.872
67.327	42.887	66.991	-42.877
73.973	42.890	73.754	-42.882
80.621	42.893	80.515	-42.885
87.269	42.896	87.278	-42.888
93.916	42.897	94.039	-42.889
100.564	42.897	100.802	-42.890
107.213	42.896	107.564	-42.889
113.861	42.894	114.325	-42.886
120.510	42.892	121.089	-42.883
127.158	42.889	127.850	-42.879
133.807	42.886	134.612	-42.873
140.456	42.882	141.374	-42.868
147.104	42.878	148.135	-42.861
153.753	42.873	154.897	-42.854
160.402	42.869	161.657	-42.846
167.050	42.864	168.421	-42.838
173.699	42.859	175.183	-42.830
180.773	42.853	179.277	-42.824
180.025	0.	180.025	0.

TABLE II- 7

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.060

R= 144.00" C= 180.03" T= 85.80" T/C= 0.4766

TTU= N/A " TTL= N/A "

THETA= 1.20 DEG DESIGN CL= N/A

X,UPPER (INCH)	Y,UPPER (INCH)	X,LOWER (INCH)	Y,LOWER (INCH)
0.	0.	0.	0.
0.197	9.379	-0.210	-9.982
0.275	12.910	-0.345	-16.975
0.366	16.725	-0.381	-19.158
0.430	19.215	-0.422	-21.914
0.529	22.781	-0.447	-23.869
0.650	26.717	-0.478	-26.822
0.787	30.860	-0.504	-30.234
0.911	34.336	-0.522	-33.944
1.027	37.365	-0.530	-37.125
1.135	40.073	-0.529	-39.936
1.240	42.543	-0.525	-42.472
7.877	42.599	6.233	-42.534
14.513	42.647	12.988	-42.586
21.151	42.690	19.743	-42.633
27.788	42.727	26.498	-42.674
34.425	42.760	33.253	-42.710
41.063	42.789	40.009	-42.742
47.702	42.814	46.762	-42.771
54.340	42.836	53.516	-42.795
60.979	42.855	60.269	-42.816
67.618	42.871	67.023	-42.835
74.255	42.883	73.777	-42.850
80.894	42.893	80.529	-42.863
87.534	42.900	87.282	-42.872
94.173	42.903	94.034	-42.878
100.813	42.902	100.786	-42.880
107.453	42.898	107.540	-42.877
114.093	42.892	114.290	-42.871
120.734	42.884	121.042	-42.859
127.375	42.873	127.793	-42.846
134.015	42.862	134.545	-42.829
140.656	42.849	141.296	-42.809
147.296	42.834	148.046	-42.788
153.937	42.819	154.797	-42.764
160.579	42.802	161.547	-42.739
167.220	42.784	168.298	-42.713
173.861	42.766	175.049	-42.684
180.927	42.746	179.138	-42.667
180.031	0.	180.031	0.

TABLE II- 8

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.070

R= 168.00" C= 180.04" T= 85.80" T/C= 0.4766

TTU= N/A " TTL= N/A "

THETA= 1.40 DEG DESIGN CL= N/A

X,UPPER (INCH)	Y,UPPER (INCH)	X,LOWER (INCH)	Y,LOWER (INCH)
0.	0.	0.	0.
0.227	9.226	-0.240	-9.733
0.323	12.702	-0.381	-16.633
0.441	16.467	-0.412	-18.792
0.529	18.929	-0.440	-21.523
0.671	22.459	-0.450	-23.461
0.853	26.361	-0.450	-26.390
1.072	30.473	-0.428	-29.773
1.275	33.926	-0.380	-33.456
1.469	36.937	-0.320	-36.611
1.656	39.631	-0.252	-39.400
1.838	42.088	-0.177	-41.917
8.454	42.216	6.565	-42.060
15.071	42.328	13.306	-42.183
21.688	42.426	20.047	-42.290
28.307	42.511	26.785	-42.385
34.926	42.588	33.524	-42.470
41.545	42.655	40.264	-42.544
48.166	42.713	47.000	-42.610
54.787	42.764	53.739	-42.668
61.408	42.808	60.474	-42.718
68.030	42.843	67.211	-42.761
74.650	42.872	73.947	-42.796
81.273	42.893	80.682	-42.825
87.896	42.908	87.417	-42.846
94.519	42.915	94.150	-42.860
101.143	42.913	100.884	-42.865
107.767	42.904	107.618	-42.860
114.392	42.889	114.349	-42.843
121.017	42.869	121.082	-42.819
127.643	42.845	127.813	-42.786
134.268	42.817	134.545	-42.748
140.894	42.787	141.276	-42.703
147.521	42.753	148.005	-42.655
154.147	42.717	154.736	-42.600
160.773	42.678	161.465	-42.542
167.400	42.637	168.195	-42.481
174.026	42.595	174.926	-42.416
181.077	42.548	179.001	-42.376
180.037	0.	180.037	0.

TABLE II- 9

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.080

R= 192.00" C= 180.04" T= 85.80" T/C= 0.4766

TTU= N/A " TTL= N/A "

THETA= 1.60 DEG DESIGN CL= N/A

X,UPPER (INCH)	Y,UPPER (INCH)	X,LOWER (INCH)	Y,LOWER (INCH)
0.	0.	0.	0.
0.255	9.008	-0.266	-9.380
0.370	12.406	-0.404	-16.145
0.519	16.100	-0.426	-18.272
0.636	18.523	-0.431	-20.966
0.835	22.002	-0.418	-22.880
1.100	25.855	-0.368	-25.775
1.426	29.923	-0.272	-29.121
1.738	33.345	-0.123	-32.761
2.039	36.329	0.038	-35.884
2.332	39.000	0.207	-38.643
2.620	41.436	0.382	-41.132
9.207	41.669	7.105	-41.390
15.797	41.870	13.824	-41.612
22.387	42.047	20.543	-41.807
28.979	42.203	27.259	-41.978
35.572	42.340	33.975	-42.131
42.165	42.461	40.690	-42.266
48.761	42.567	47.403	-42.385
55.356	42.659	54.117	-42.490
61.953	42.737	60.828	-42.580
68.550	42.802	67.540	-42.657
75.146	42.854	74.252	-42.722
81.745	42.893	80.960	-42.773
88.344	42.920	87.669	-42.812
94.944	42.932	94.376	-42.838
101.546	42.927	101.083	-42.847
108.148	42.911	107.790	-42.837
114.751	42.884	114.495	-42.808
121.353	42.848	121.200	-42.764
127.957	42.804	127.902	-42.705
134.562	42.755	134.604	-42.635
141.166	42.698	141.307	-42.555
147.771	42.638	148.007	-42.466
154.375	42.572	154.710	-42.368
160.981	42.502	161.409	-42.264
167.586	42.428	168.110	-42.152
174.192	42.352	174.810	-42.035
181.220	42.267	178.868	-41.963
180.040	0.	180.040	0.

TABLE II-10

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.090

R= 216.00" C= 180.04" T= 85.80" T/C= 0.4766

TTU= N/A " TTL= N/A "

THETA= 1.80 DEG DESIGN CL= N/A

X,UPPER (INCH)	Y,UPPER (INCH)	X,LOWER (INCH)	Y,LOWER (INCH)
0.	0.	0.	0.
0.280	8.738	-0.287	-8.944
0.415	12.039	-0.416	-15.541
0.600	15.646	-0.422	-17.629
0.751	18.019	-0.397	-20.279
1.016	21.437	-0.352	-22.164
1.380	25.229	-0.240	-25.016
1.837	29.241	-0.048	-28.314
2.277	32.621	0.227	-31.904
2.708	35.574	0.516	-34.987
3.130	38.216	0.812	-37.710
3.548	40.626	1.115	-40.164
10.101	40.988	7.812	-40.567
16.656	41.301	14.504	-40.912
23.214	41.576	21.194	-41.213
29.773	41.818	27.882	-41.480
36.334	42.031	34.569	-41.717
42.896	42.219	41.255	-41.926
49.459	42.384	47.938	-42.111
56.024	42.526	54.622	-42.274
62.590	42.648	61.301	-42.414
69.157	42.749	67.983	-42.534
75.724	42.829	74.662	-42.633
82.293	42.891	81.339	-42.714
88.864	42.933	88.016	-42.775
95.435	42.951	94.690	-42.814
102.008	42.944	101.365	-42.828
108.582	42.919	108.038	-42.812
115.157	42.877	114.709	-42.767
121.733	42.821	121.378	-42.698
128.310	42.754	128.046	-42.606
134.886	42.676	134.714	-42.498
141.464	42.589	141.381	-42.373
148.042	42.495	148.046	-42.234
154.620	42.393	154.712	-42.084
161.199	42.284	161.375	-41.921
167.779	42.171	168.039	-41.747
174.358	42.051	174.703	-41.565
181.359	41.920	178.739	-41.452
180.041	0.	180.041	0.

TABLE II-11

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.100

R= 240.00" C= 180.04" T= 85.80" T/C= 0.4766

TTU= N/A " TTL= N/A "

THETA= 2.00 DEG DESIGN CL= N/A

X,UPPER (INCH)	Y,UPPER (INCH)	X,LOWER (INCH)	Y,LOWER (INCH)
0.	0.	0.	0.
0.302	8.430	-0.302	-8.444
0.457	11.620	-0.416	-14.851
0.681	15.127	-0.404	-16.894
0.869	17.443	-0.342	-19.493
1.208	20.788	-0.261	-21.345
1.682	24.511	-0.074	-24.150
2.286	28.458	0.228	-27.393
2.874	31.792	0.652	-30.928
3.450	34.707	1.088	-33.964
4.019	37.316	1.532	-36.647
4.584	39.695	1.982	-39.063
11.097	40.205	8.649	-39.630
17.615	40.646	15.309	-40.115
24.134	41.032	21.967	-40.540
30.657	41.373	28.621	-40.915
37.182	41.674	35.274	-41.248
43.708	41.939	41.925	-41.541
50.236	42.171	48.574	-41.802
56.766	42.371	55.221	-42.030
63.298	42.542	61.866	-42.228
69.831	42.684	68.512	-42.396
76.364	42.799	75.155	-42.536
82.899	42.886	81.795	-42.649
89.437	42.945	88.436	-42.735
95.975	42.971	95.072	-42.789
102.515	42.962	101.709	-42.808
109.057	42.927	108.344	-42.787
115.601	42.867	114.976	-42.723
122.145	42.789	121.606	-42.624
128.691	42.694	128.234	-42.496
135.237	42.585	134.862	-42.342
141.784	42.463	141.488	-42.167
148.331	42.331	148.113	-41.971
154.878	42.187	154.737	-41.758
161.427	42.035	161.360	-41.528
167.975	41.875	167.983	-41.284
174.524	41.707	174.606	-41.028
181.493	41.522	178.616	-40.868
180.043	0.	180.043	0.

TABLE II-12

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.110

R= 264.00" C= 180.05" T= 85.80" T/C= 0.4765

TTU= N/A " TTL= N/A "

THETA= 2.20 DEG DESIGN CL= N/A

X,UPPER (INCH)	Y,UPPER (INCH)	X,LOWER (INCH)	Y,LOWER (INCH)
0.	0.	0.	0.
0.322	8.097	-0.314	-7.903
0.497	11.165	-0.407	-14.104
0.759	14.564	-0.375	-16.097
0.987	16.819	-0.272	-18.642
1.405	20.086	-0.149	-20.458
1.997	23.731	0.118	-23.212
2.758	27.609	0.542	-26.397
3.503	30.890	1.128	-29.872
4.238	33.762	1.725	-32.861
4.965	36.334	2.331	-35.502
5.687	38.679	2.943	-37.878
12.159	39.349	9.573	-38.622
18.636	39.929	16.198	-39.258
25.116	40.438	22.820	-39.816
31.600	40.886	29.437	-40.308
38.085	41.281	36.053	-40.744
44.574	41.630	42.667	-41.130
51.064	41.936	49.277	-41.472
57.557	42.200	55.886	-41.771
64.050	42.426	62.492	-42.031
70.547	42.612	69.098	-42.252
77.043	42.762	75.701	-42.435
83.543	42.878	82.303	-42.583
90.044	42.955	88.901	-42.694
96.547	42.990	95.498	-42.766
103.052	42.978	102.094	-42.791
109.560	42.932	108.687	-42.762
116.069	42.855	115.277	-42.678
122.579	42.752	121.865	-42.547
129.091	42.628	128.451	-42.378
135.603	42.485	135.035	-42.176
142.116	42.326	141.619	-41.944
148.630	42.152	148.200	-41.688
155.144	41.963	154.780	-41.406
161.659	41.764	161.359	-41.104
168.175	41.554	167.938	-40.784
174.691	41.334	174.517	-40.446
181.624	41.091	178.500	-40.235
180.045	0.	180.045	0.

TABLE II-13

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.120

R= 288.00" C= 180.05" T= 85.80" T/C= 0.4765

TTU= N/A " TTL= N/A "

THETA= 2.40 DEG DESIGN CL= N/A

X,UPPER (INCH)	Y,UPPER (INCH)	X,LOWER (INCH)	Y,LOWER (INCH)
0.	0.	0.	0.
0.338	7.750	-0.320	-7.339
0.534	10.694	-0.390	-13.327
0.835	13.978	-0.336	-15.270
1.103	16.169	-0.189	-17.759
1.602	19.354	-0.024	-19.539
2.315	22.919	0.328	-22.239
3.239	26.722	0.880	-25.366
4.147	29.949	1.634	-28.780
5.044	32.777	2.400	-31.720
5.935	35.309	3.174	-34.317
6.821	37.618	3.953	-36.652
13.251	38.454	10.547	-37.581
19.687	39.180	17.133	-38.375
26.128	39.814	23.717	-39.070
32.571	40.375	30.296	-39.684
39.017	40.870	36.872	-40.228
45.466	41.305	43.447	-40.709
51.918	41.686	50.017	-41.134
58.372	42.017	56.585	-41.508
64.828	42.299	63.151	-41.831
71.286	42.533	69.715	-42.106
77.744	42.720	76.278	-42.334
84.207	42.865	82.837	-42.518
90.671	42.962	89.394	-42.656
97.137	43.006	95.949	-42.746
103.607	42.992	102.502	-42.775
110.078	42.935	109.052	-42.739
116.552	42.839	115.597	-42.634
123.026	42.711	122.142	-42.470
129.502	42.557	128.684	-42.257
135.978	42.380	135.224	-42.005
142.457	42.181	141.763	-41.715
148.935	41.964	148.299	-41.394
155.414	41.730	154.835	-41.042
161.894	41.482	161.368	-40.664
168.375	41.219	167.902	-40.264
174.856	40.945	174.435	-39.842
181.753	40.643	178.391	-39.577
180.049	0.	180.049	0.

TABLE II-14

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.130

R= 312.00" C= 180.06" T= 85.80" T/C= 0.4765

TTU= N/A " TTL= N/A "

THETA= 2.60 DEG DESIGN CL= N/A

X,UPPER (INCH)	Y,UPPER (INCH)	X,LOWER (INCH)	Y,LOWER (INCH)
0.	0.	0.	0.
0.352	7.401	-0.322	-6.774
0.567	10.218	-0.366	-12.546
0.908	13.389	-0.290	-14.439
1.215	15.515	-0.099	-16.871
1.795	18.618	0.109	-18.614
2.630	22.100	0.548	-21.262
3.717	25.828	1.228	-24.331
4.788	28.999	2.152	-27.685
5.849	31.780	3.087	-30.577
6.904	34.272	4.031	-33.132
7.954	36.542	4.980	-35.427
14.344	37.547	11.535	-36.541
20.740	38.418	18.083	-37.492
27.140	39.181	24.627	-38.327
33.544	39.854	31.165	-39.062
39.951	40.448	37.702	-39.714
46.361	40.971	44.235	-40.291
52.775	41.430	50.765	-40.801
59.191	41.827	57.292	-41.248
65.609	42.166	63.816	-41.635
72.029	42.447	70.339	-41.964
78.451	42.674	76.859	-42.237
84.875	42.848	83.376	-42.457
91.302	42.965	89.891	-42.623
97.731	43.019	96.403	-42.728
104.164	43.003	102.914	-42.765
110.600	42.935	109.421	-42.718
117.036	42.821	115.923	-42.591
123.475	42.668	122.424	-42.394
129.915	42.483	128.921	-42.139
136.356	42.271	135.417	-41.835
142.799	42.033	141.911	-41.486
149.242	41.774	148.404	-41.100
155.686	41.493	154.894	-40.676
162.131	41.196	161.384	-40.223
168.576	40.882	167.872	-39.740
175.022	40.554	174.360	-39.234
181.881	40.192	178.288	-38.916
180.056	0.	180.056	0.

TABLE II-15

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.140

R= 336.00" C= 180.06" T= 85.80" T/C= 0.4765

TTU= N/A " TTL= N/A "

THETA= 2.80 DEG DESIGN CL= N/A

X,UPPER (INCH)	Y,UPPER (INCH)	X,LOWER (INCH)	Y,LOWER (INCH)
0.	0.	0.	0.
0.364	7.052	-0.321	-6.208
0.597	9.743	-0.338	-11.766
0.977	12.799	-0.239	-13.608
1.324	14.860	-0.004	-15.985
1.983	17.879	0.249	-17.692
2.939	21.280	0.774	-20.287
4.188	24.930	1.582	-23.298
5.423	28.044	2.677	-26.594
6.648	30.778	3.784	-29.439
7.866	33.228	4.897	-31.953
9.080	35.459	6.015	-34.210
15.430	36.632	12.532	-35.508
21.787	37.649	19.039	-36.617
28.148	38.540	25.542	-37.590
34.514	39.327	32.040	-38.447
40.883	40.021	38.536	-39.207
47.255	40.632	45.028	-39.879
53.630	41.169	51.516	-40.472
60.009	41.633	58.002	-40.994
66.389	42.028	64.484	-41.444
72.772	42.358	70.965	-41.827
79.157	42.623	77.443	-42.145
85.544	42.827	83.918	-42.401
91.935	42.966	90.390	-42.593
98.327	43.027	96.860	-42.715
104.724	43.010	103.328	-42.756
111.123	42.931	109.791	-42.701
117.523	42.799	116.251	-42.552
123.926	42.622	122.708	-42.321
130.330	42.407	129.162	-42.022
136.735	42.160	135.614	-41.666
143.142	41.884	142.064	-41.259
149.549	41.582	148.512	-40.807
155.958	41.256	154.959	-40.312
162.366	40.909	161.404	-39.782
168.776	40.543	167.848	-39.218
175.186	40.162	174.291	-38.626
182.008	39.740	178.193	-38.254
180.064	0.	180.064	0.

TABLE II-16

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.150

R= 360.00" C= 180.08" T= 85.80" T/C= 0.4765

TTU= N/A " TTL= N/A "

THETA= 3.00 DEG DESIGN CL= N/A

X,UPPER (INCH)	Y,UPPER (INCH)	X,LOWER (INCH)	Y,LOWER (INCH)
0.	0.	0.	0.
0.374	6.702	-0.315	-5.644
0.624	9.268	-0.304	-10.986
1.042	12.209	-0.181	-12.777
1.427	14.205	0.099	-15.098
2.165	17.140	0.395	-16.770
3.242	20.457	1.008	-19.315
4.654	24.029	1.944	-22.269
6.050	27.084	3.211	-25.507
7.439	29.771	4.488	-28.306
8.820	32.177	5.771	-30.781
10.198	34.368	7.060	-33.000
16.511	35.712	13.535	-34.483
22.829	36.873	20.002	-35.749
29.153	37.894	26.463	-36.860
35.481	38.794	32.920	-37.839
41.812	39.588	39.374	-38.706
48.148	40.287	45.823	-39.473
54.486	40.901	52.270	-40.151
60.826	41.433	58.713	-40.745
67.169	41.887	65.153	-41.259
73.516	42.264	71.592	-41.695
79.864	42.568	78.028	-42.058
86.215	42.801	84.461	-42.349
92.568	42.961	90.891	-42.568
98.925	43.033	97.318	-42.706
105.285	43.013	103.743	-42.751
111.647	42.925	110.164	-42.687
118.012	42.775	116.580	-42.516
124.378	42.574	122.994	-42.251
130.746	42.329	129.404	-41.908
137.116	42.047	135.813	-41.500
143.486	41.732	142.221	-41.034
149.857	41.388	148.625	-40.515
156.229	41.017	155.028	-39.950
162.602	40.621	161.430	-39.341
168.976	40.204	167.830	-38.696
175.351	39.769	174.229	-38.018
182.134	39.288	178.105	-37.592
180.075	0.	180.075	0.

TABLE II-17

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.160

R= 384.00" C= 180.09" T= 85.80" T/C= 0.4764

TTU= N/A " TTL= N/A "

THETA= 3.20 DEG DESIGN CL= N/A

X,UPPER (INCH)	Y,UPPER (INCH)	X,LOWER (INCH)	Y,LOWER (INCH)
0.	0.	0.	0.
0.381	6.354	-0.304	-5.078
0.648	8.792	-0.264	-10.207
1.102	11.619	-0.118	-11.948
1.526	13.549	0.207	-14.214
2.344	16.400	0.549	-15.849
3.541	19.633	1.248	-18.343
5.113	23.126	2.314	-21.241
6.672	26.121	3.752	-24.424
8.223	28.759	5.201	-27.179
9.768	31.120	6.655	-29.615
11.309	33.271	8.112	-31.798
17.585	34.783	14.545	-33.465
23.866	36.091	20.970	-34.889
30.153	37.240	27.390	-36.137
36.445	38.253	33.804	-37.237
42.740	39.148	40.215	-38.211
49.038	39.936	46.623	-39.072
55.340	40.628	53.027	-39.834
61.643	41.228	59.428	-40.503
67.950	41.739	65.826	-41.079
74.260	42.164	72.222	-41.568
80.572	42.509	78.615	-41.975
86.887	42.772	85.005	-42.301
93.203	42.952	91.392	-42.545
99.523	43.036	97.777	-42.701
105.847	43.014	104.160	-42.750
112.173	42.915	110.538	-42.677
118.502	42.749	116.911	-42.482
124.832	42.522	123.282	-42.184
131.163	42.247	129.650	-41.796
137.497	41.932	136.016	-41.336
143.831	41.579	142.380	-40.809
150.165	41.193	148.741	-40.226
156.502	40.776	155.102	-39.587
162.839	40.332	161.460	-38.902
169.177	39.865	167.817	-38.174
175.515	39.376	174.175	-37.410
182.260	38.836	178.024	-36.930
180.088	0.	180.088	0.

TABLE II-18

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.170

R= 408.00" C= 180.10" T= 85.80" T/C= 0.4764

TTU= N/A " TTL= N/A "

THETA= 3.40 DEG DESIGN CL= N/A

X,UPPER (INCH)	Y,UPPER (INCH)	X,LOWER (INCH)	Y,LOWER (INCH)
0.	0.	0.	0.
0.386	6.004	-0.290	-4.512
0.668	8.316	-0.219	-9.428
1.159	11.028	-0.049	-11.118
1.621	12.893	0.323	-13.329
2.517	15.659	0.707	-14.930
3.833	18.806	1.495	-17.374
5.566	22.219	2.691	-20.218
7.286	25.154	4.302	-23.345
9.000	27.741	5.921	-26.057
10.708	30.057	7.545	-28.455
12.412	32.166	9.174	-30.605
18.652	33.847	15.563	-32.455
24.898	35.302	21.945	-34.036
31.150	36.580	28.321	-35.421
37.405	37.707	34.693	-36.642
43.664	38.703	41.061	-37.723
49.926	39.580	47.425	-38.679
56.192	40.350	53.786	-39.524
62.460	41.017	60.145	-40.265
68.731	41.587	66.500	-40.904
75.004	42.061	72.853	-41.446
81.280	42.445	79.203	-41.897
87.558	42.738	85.551	-42.257
93.838	42.940	91.895	-42.528
100.123	43.033	98.237	-42.698
106.411	43.011	104.577	-42.752
112.700	42.903	110.912	-42.670
118.993	42.718	117.243	-42.453
125.286	42.468	123.572	-42.118
131.581	42.164	129.897	-41.687
137.878	41.815	136.221	-41.173
144.176	41.424	142.543	-40.587
150.475	40.995	148.861	-39.936
156.775	40.534	155.179	-39.226
163.074	40.041	161.496	-38.462
169.376	39.523	167.811	-37.653
175.678	38.981	174.126	-36.802
182.384	38.382	177.949	-36.269
180.104	0.	180.104	0.

TABLE II-19

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.180

R= 432.00" C= 180.12" T= 85.80" T/C= 0.4763

TTU= N/A " TTL= N/A "

THETA= 3.60 DEG DESIGN CL= N/A

X,UPPER (INCH)	Y,UPPER (INCH)	X,LOWER (INCH)	Y,LOWER (INCH)
0.	0.	0.	0.
0.389	5.655	-0.272	-3.948
0.686	7.841	-0.168	-8.649
1.212	10.437	0.027	-10.290
1.711	12.236	0.444	-12.446
2.684	14.916	0.874	-14.013
4.120	17.978	1.749	-16.407
6.013	21.310	3.076	-19.196
7.896	24.184	4.859	-22.270
9.771	26.719	6.650	-24.940
11.642	28.989	8.445	-27.303
13.509	31.053	10.244	-29.418
19.714	32.904	16.589	-31.452
25.925	34.507	22.927	-33.189
32.142	35.914	29.259	-34.712
38.362	37.155	35.587	-36.054
44.586	38.252	41.911	-37.241
50.813	39.217	48.232	-38.291
57.044	40.066	54.550	-39.219
63.276	40.802	60.865	-40.032
69.512	41.430	67.176	-40.734
75.749	41.953	73.487	-41.329
81.989	42.376	79.794	-41.822
88.232	42.700	86.099	-42.218
94.476	42.923	92.400	-42.514
100.724	43.028	98.700	-42.700
106.976	43.004	104.997	-42.758
113.229	42.888	111.290	-42.666
119.485	42.685	117.579	-42.425
125.743	42.411	123.865	-42.056
132.001	42.078	130.148	-41.578
138.261	41.695	136.430	-41.013
144.523	41.266	142.710	-40.366
150.785	40.796	148.987	-39.650
157.047	40.290	155.263	-38.865
163.312	39.751	161.537	-38.024
169.576	39.181	167.811	-37.132
175.841	38.587	174.083	-36.195
182.508	37.930	177.882	-35.607
180.122	0.	180.122	0.

TABLE II-20

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.190

R= 456.00" C= 180.14" T= 85.80" T/C= 0.4763

TTU= N/A " TTL= N/A "

THETA= 3.80 DEG DESIGN CL= N/A

X,UPPER (INCH)	Y,UPPER (INCH)	X,LOWER (INCH)	Y,LOWER (INCH)
0.	0.	0.	0.
0.390	5.307	-0.249	-3.383
0.701	7.365	-0.110	-7.871
1.261	9.846	0.109	-9.463
1.798	11.579	0.573	-11.564
2.848	14.173	1.047	-13.096
4.402	17.149	2.011	-15.442
6.455	20.398	3.469	-18.179
8.498	23.209	5.424	-21.200
10.535	25.690	7.386	-23.829
12.567	27.913	9.353	-26.156
14.598	29.933	11.323	-28.240
20.770	31.954	17.622	-30.457
26.949	33.704	23.914	-32.351
33.131	35.241	30.202	-34.010
39.317	36.597	36.485	-35.472
45.507	37.794	42.765	-36.766
51.699	38.850	49.042	-37.910
57.894	39.778	55.316	-38.921
64.092	40.582	61.587	-39.805
70.292	41.268	67.856	-40.569
76.495	41.840	74.122	-41.217
82.699	42.302	80.386	-41.753
88.906	42.658	86.649	-42.183
95.115	42.904	92.907	-42.505
101.328	43.018	99.164	-42.706
107.543	42.994	105.417	-42.766
113.760	42.868	111.669	-42.664
119.979	42.649	117.916	-42.400
126.200	42.351	124.160	-41.996
132.423	41.990	130.402	-41.473
138.646	41.574	136.642	-40.855
144.871	41.107	142.880	-40.148
151.096	40.597	149.116	-39.363
157.322	40.046	155.350	-38.506
163.548	39.458	161.584	-37.586
169.776	38.839	167.816	-36.611
176.005	38.190	174.048	-35.587
182.632	37.476	177.822	-34.945
180.143	0.	180.143	0.

TABLE II-21

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.200

R= 480.00" C= 180.17" T= 85.80" T/C= 0.4762

TTU= N/A " TTL= N/A "

THETA= 4.00 DEG DESIGN CL= N/A

X,UPPER (INCH)	Y,UPPER (INCH)	X,LOWER (INCH)	Y,LOWER (INCH)
0.	0.	0.	0.
0.390	4.958	-0.221	-2.819
0.713	6.889	-0.047	-7.094
1.307	9.255	0.197	-8.635
1.881	10.922	0.707	-10.683
3.008	13.428	1.228	-12.181
4.678	16.317	2.279	-14.479
6.891	19.483	3.869	-17.164
9.094	22.229	5.997	-20.134
11.292	24.658	8.131	-22.723
13.487	26.832	10.270	-25.017
15.680	28.806	12.411	-27.068
21.821	30.997	18.664	-29.469
27.966	32.895	24.910	-31.519
34.116	34.562	31.152	-33.315
40.269	36.032	37.390	-34.897
46.425	37.331	43.624	-36.297
52.584	38.476	49.857	-37.535
58.745	39.483	56.086	-38.627
64.908	40.355	62.313	-39.584
71.074	41.101	68.538	-40.410
77.241	41.722	74.761	-41.111
83.411	42.225	80.982	-41.689
89.583	42.612	87.199	-42.153
95.756	42.879	93.416	-42.499
101.933	43.006	99.629	-42.715
108.111	42.982	105.840	-42.779
114.293	42.846	112.049	-42.666
120.476	42.610	118.255	-42.378
126.660	42.290	124.457	-41.938
132.845	41.900	130.658	-41.371
139.032	41.450	136.857	-40.697
145.220	40.946	143.054	-39.930
151.407	40.394	149.249	-39.079
157.597	39.799	155.443	-38.148
163.787	39.164	161.636	-37.150
169.977	38.494	167.829	-36.092
176.168	37.795	174.020	-34.980
182.755	37.021	177.769	-34.283
180.167	0.	180.167	0.

TABLE II-22

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.210

R= 504.00" C= 180.19" T= 85.80" T/C= 0.4762

TTU= N/A " TTL= N/A "

THETA= 4.20 DEG DESIGN CL= N/A

X,UPPER (INCH)	Y,UPPER (INCH)	X,LOWER (INCH)	Y,LOWER (INCH)
0.	0.	0.	0.
0.388	4.610	-0.190	-2.254
0.723	6.414	0.021	-6.317
1.349	8.663	0.292	-7.810
1.959	10.263	0.849	-9.804
3.161	12.683	1.415	-11.267
4.949	15.484	2.556	-13.518
7.320	18.565	4.276	-16.152
9.684	21.247	6.578	-19.072
12.044	23.620	8.885	-21.624
14.400	25.744	11.196	-23.884
16.756	27.672	13.508	-25.906
22.865	30.033	19.712	-28.489
28.979	32.079	25.912	-30.695
35.097	33.875	32.107	-32.627
41.218	35.461	38.298	-34.329
47.341	36.862	44.487	-35.835
53.467	38.097	50.674	-37.165
59.594	39.182	56.859	-38.339
65.724	40.124	63.041	-39.369
71.856	40.929	69.222	-40.256
77.989	41.600	75.401	-41.009
84.123	42.143	81.578	-41.630
90.261	42.562	87.751	-42.127
96.398	42.851	93.925	-42.497
102.539	42.989	100.097	-42.728
108.683	42.964	106.265	-42.795
114.826	42.820	112.432	-42.671
120.974	42.568	118.596	-42.359
127.121	42.225	124.758	-41.884
133.270	41.807	130.917	-41.270
139.419	41.324	137.075	-40.543
145.570	40.783	143.232	-39.714
151.720	40.191	149.387	-38.795
157.873	39.552	155.541	-37.791
164.024	38.869	161.694	-36.714
170.177	38.150	167.847	-35.572
176.331	37.398	173.999	-34.373
182.878	36.567	177.724	-33.621
180.193	0.	180.193	0.

TABLE II-23

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.220

R= 528.00" C= 180.22" T= 85.80" T/C= 0.4761

TTU= N/A " TTL= N/A "

THETA= 4.40 DEG DESIGN CL= N/A

X,UPPER (INCH)	Y,UPPER (INCH)	X,LOWER (INCH)	Y,LOWER (INCH)
0.	0.	0.	0.
0.384	4.260	-0.152	-1.690
0.731	5.939	0.098	-5.540
1.389	8.071	0.393	-6.983
2.035	9.605	0.998	-8.924
3.312	11.937	1.610	-10.355
5.217	14.648	2.840	-12.558
7.745	17.644	4.692	-15.143
10.269	20.260	7.168	-18.014
12.790	22.578	9.648	-20.529
15.307	24.652	12.131	-22.758
17.824	26.531	14.614	-24.752
23.904	29.062	20.770	-27.517
29.988	31.256	26.920	-29.879
36.075	33.184	33.068	-31.947
42.164	34.884	39.213	-33.767
48.256	36.387	45.356	-35.379
54.348	37.712	51.497	-36.802
60.444	38.877	57.636	-38.059
66.540	39.888	63.774	-39.159
72.637	40.752	69.910	-40.107
78.738	41.473	76.044	-40.911
84.837	42.057	82.177	-41.575
90.940	42.507	88.308	-42.105
97.043	42.819	94.438	-42.500
103.148	42.969	100.566	-42.745
109.255	42.944	106.693	-42.814
115.364	42.792	112.818	-42.680
121.474	42.523	118.940	-42.342
127.584	42.158	125.061	-41.831
133.696	41.711	131.180	-41.172
139.808	41.196	137.298	-40.391
145.922	40.619	143.415	-39.500
152.036	39.985	149.530	-38.513
158.149	39.302	155.645	-37.435
164.264	38.573	161.759	-36.280
170.379	37.805	167.872	-35.053
176.495	37.000	173.985	-33.766
183.002	36.112	177.687	-32.959
180.223	0.	180.223	0.

TABLE II-24

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.230

R= 552.00" C= 180.26" T= 85.80" T/C= 0.4760

TTU= N/A " TTL= N/A "

THETA= 4.60 DEG DESIGN CL= N/A

X,UPPER (INCH)	Y,UPPER (INCH)	X,LOWER (INCH)	Y,LOWER (INCH)
0.	0.	0.	0.
0.379	3.912	-0.109	-1.127
0.737	5.464	0.181	-4.765
1.426	7.479	0.503	-6.159
2.107	8.946	1.156	-8.047
3.459	11.191	1.813	-9.445
5.480	13.812	3.133	-11.601
8.167	16.721	5.117	-14.137
10.849	19.270	7.767	-16.960
13.530	21.530	10.421	-19.440
16.208	23.552	13.075	-21.639
18.887	25.382	15.731	-23.604
24.939	28.085	21.835	-26.553
30.993	30.427	27.937	-29.069
37.051	32.484	34.036	-31.272
43.109	34.301	40.134	-33.213
49.169	35.906	46.230	-34.929
55.231	37.322	52.324	-36.445
61.293	38.566	58.418	-37.783
67.357	39.646	64.510	-38.954
73.422	40.571	70.601	-39.964
79.488	41.341	76.691	-40.819
85.555	41.966	82.780	-41.524
91.622	42.448	88.866	-42.087
97.690	42.783	94.953	-42.507
103.760	42.944	101.039	-42.766
109.831	42.921	107.123	-42.837
115.904	42.760	113.206	-42.691
121.977	42.476	119.288	-42.330
128.051	42.087	125.368	-41.781
134.126	41.614	131.447	-41.075
140.200	41.066	137.525	-40.240
146.277	40.452	143.602	-39.288
152.352	39.778	149.679	-38.233
158.429	39.051	155.755	-37.081
164.505	38.276	161.830	-35.845
170.582	37.457	167.905	-34.535
176.660	36.602	173.979	-33.160
183.126	35.657	177.659	-32.297
180.257	0.	180.257	0.

TABLE II-25

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.240

R= 576.00" C= 180.30" T= 85.80" T/C= 0.4759

TTU= N/A " TTL= N/A "

THETA= 4.80 DEG DESIGN CL= N/A

X,UPPER (INCH)	Y,UPPER (INCH)	X,LOWER (INCH)	Y,LOWER (INCH)
0.	0.	0.	0.
0.375	3.563	-0.059	-0.563
0.742	4.988	0.272	-3.989
1.463	6.888	0.621	-5.335
2.178	8.287	1.322	-7.170
3.605	10.443	2.026	-8.535
5.740	12.974	3.435	-10.648
8.584	15.795	5.552	-13.134
11.425	18.276	8.377	-15.911
14.266	20.478	11.203	-18.357
17.105	22.447	14.031	-20.527
19.944	24.227	16.858	-22.466
25.970	27.101	22.912	-25.596
31.997	29.592	28.963	-28.267
38.025	31.780	35.013	-30.606
44.053	33.712	41.062	-32.665
50.083	35.419	47.111	-34.486
56.114	36.925	53.158	-36.094
62.145	38.250	59.205	-37.513
68.176	39.400	65.251	-38.755
74.208	40.383	71.297	-39.825
80.241	41.204	77.342	-40.731
86.274	41.871	83.387	-41.479
92.308	42.385	89.429	-42.074
98.342	42.743	95.473	-42.517
104.376	42.917	101.515	-42.790
110.412	42.894	107.558	-42.863
116.449	42.725	113.599	-42.706
122.485	42.425	119.640	-42.319
128.521	42.014	125.680	-41.734
134.560	41.513	131.719	-40.981
140.596	40.933	137.758	-40.092
146.635	40.283	143.796	-39.077
152.673	39.570	149.835	-37.954
158.711	38.800	155.872	-36.727
164.750	37.978	161.910	-35.412
170.788	37.110	167.947	-34.017
176.827	36.204	173.983	-32.553
183.252	35.202	177.640	-31.635
180.296	0.	180.296	0.

TABLE II-26

SECTION EXTERNAL PROFILE

RADIUS RATIO = 0.250

R= 600.00" C= 180.34" T= 85.80" T/C= 0.4758

TTU= N/A " TTL= N/A "

THETA= 5.00 DEG DESIGN CL= N/A

X,UPPER (INCH)	Y,UPPER (INCH)	X,LOWER (INCH)	Y,LOWER (INCH)
0.	0.	0.	0.
0.375	3.216	-0.000	-0.000
0.750	4.513	0.375	-3.214
1.499	6.296	0.750	-4.512
2.250	7.628	1.500	-6.296
3.750	9.694	2.250	-7.627
6.000	12.134	3.750	-9.695
9.000	14.867	6.000	-12.135
12.000	17.278	9.001	-14.867
15.000	19.422	12.000	-17.279
18.000	21.335	15.000	-19.421
21.000	23.064	18.000	-21.336
27.000	26.110	24.000	-24.647
33.000	28.749	30.000	-27.472
39.000	31.068	36.000	-29.947
44.999	33.116	42.000	-32.124
51.000	34.926	48.000	-34.049
57.000	36.524	54.000	-35.749
63.000	37.928	60.000	-37.249
69.000	39.148	66.000	-38.562
75.000	40.192	72.000	-39.692
81.000	41.064	78.000	-40.649
87.000	41.771	84.000	-41.437
93.000	42.318	89.999	-42.066
98.999	42.699	95.999	-42.532
104.999	42.885	101.999	-42.818
110.999	42.863	107.999	-42.893
116.999	42.686	113.999	-42.723
122.999	42.372	119.999	-42.312
128.999	41.939	125.999	-41.689
134.999	41.410	131.999	-40.890
140.999	40.798	137.999	-39.945
146.999	40.113	143.999	-38.868
152.999	39.359	149.999	-37.677
158.999	38.546	155.999	-36.375
164.999	37.678	161.999	-34.979
170.999	36.762	167.999	-33.501
176.999	35.804	173.999	-31.949
183.383	34.745	177.633	-30.974
180.343	0.	180.343	0.

REVISIONS

A ISSUED REV "A" PER A.N.-1 dtd 4/3/84

REV "A"
APRIL 84

INSTRUMENTATION AND CONTROLS

SIGNAL LIST

FOR THE

MOD-5A WIND TURBINE GENERATOR

MAY 1983

Responsible Engineer — DATE: 8/2/83

Subsystems Engineer — DATE: 8-2-83

Systems Engineering — DATE: Aug. 2, 1983

Chief Engineer — DATE: 8/3/83

TOTAL NUMBER OF PAGES 20

WTG 516

PRINTS TO

REVISION LOG

This log identifies those portions of this document which have been revised since original issue.

Revision	Page No.	Line Number(s) Affected	Rev. Date	Approval
A	All	General Changes	4/2/84	AN-1 4/3/84

MOD-5A SENSORS

CONTROL SENSORS

LINE NO.	MEASURED ITEM	SENSOR TYPE	SIGNAL I.D.	RANGE OR TRIP POINT	ACC'Y.	OUTPUT A	OUTPUT D	COMMENTS
10	ICE DETECTION BL. 1	RESONANT PROBE	S1.1	0.2 IN.	±0.05 IN.		D	
20	ICE DETECTION BL. 2	RESONANT PROBE	S1.2	0.2 IN.	±0.05 IN.		D	
30	HI TEMP BL. 1	RTD	S1.3	105°F	±2%		D	(1)
40	HI TEMP BL. 2	RTD	S1.4	105°F	±2%		D	(1)
50	HI STRAIN BL.1	STRAIN GAGE	S1.5	TBD			D	(1)
60	HI STRAIN BL.2	STRAIN GAGE	S1.6	TBD			D	(1)
70	AILERON POSITION 1-1	LVDT	S2.21	0 TO 10 IN.	±.03 IN	A		
80	AILERON POSITION 1-2		S2.22			A		
90	AILERON POSITION 1-3		S2.23			A		
100	AILERON POSITION 1-4		S2.24			A		
110	AILERON POSITION 2-1		S2.25			A		
120	AILERON POSITION 2-2		S2.26			A		
130	AILERON POSITION 2-3		S2.27			A		
140	AILERON POSITION 2-4	LVDT	S2.28	0 TO 10 IN.	±.03 IN	A		
150	RHP HYD. RESV. LEVEL	PRESSURE SWITCH	S2.3	5 PSI	±2%		D	INDICATES LOW OIL LEVEL
160	RHP HYD. OIL FILTER	Δ PRESSURE SWITCH	S2.4	40 PSI	±5%		D	
170	RHP HYD. OIL TEMP.	TEMPERATURE SWITCH	S2.5	145°F	±1%		D	
180	RHP ACCUM PRESS.	PRESSURE SWITCH	S2.14	2000 PSI	±1%		D	
190	RHP PUMP PRESS.	PRESSURE SWITCH	S2.6	2000 PSI	±1%		D	
200	AILERON LATCHES	LIMIT SWITCHES	S2.30	-	-		D	8 SWS IN SERIES
210	AILERON PRESSURES	PRESSURE SWITCHES	S2.31	2000 PSI	±1%		D	8 SWS IN SERIES
220	TEETER BRAKE ACCUM'S. PRESS	PRESSURE SWITCHES	S2.7	1500 & 2750 PSI	±1%		D	2 SWS IN PARALLEL
230								
240	TEETER BRAKE H. F. SOLENOID 'ON'	VOLTAGE SENSE	S2.12	-	-		D	
250	TEETER ANGLE	SYNCHRO	S2.18	±10°	±2%	A		

NOTE: (1) Signal Conditioning and Limit Alarm Module required

CONTROL SENSORS

LINE NO.	MEASURED ITEM	SENSOR TYPE	SIGNAL I.D.	RANGE OR TRIP POINT	ACC'Y.	OUTPUT A	OUTPUT D	COMMENTS
260	TEETER ANGLE	LIMIT SWITCH	S2.19	±2.5°	±5%		D	
270	TEETER ANGLE	LIMIT SWITCH	S2.20	±5.0°	±5%		D	LOCAL
280	TEETER HIGH FORCE BRAKE PRESS	PRESSURE SWITCH	S2.13	1500 PSI	±1%		D	CONTROL
290	TEETER LOW FORCE BRAKE PRESS	PRESSURE SWITCH	S2.29	1500 PSI	±1%		D	
300	ROTOR VIBRATION	ACCELEROMETER	S3.3	0.1g	±2%		D	(1)
310	ROTOR SPEED	MAGNETIC	S3.4	0 → 30 RPM	±0.3%	A		
311	ROTOR SPEED	MAGNETIC	S3.15	11.5 → 17.5 RPM	±0.3%	A		
320	ROTOR POSITION	SYNCHRO	S3.10	0 TO 360°	±0.5%	A		
330	ROTOR POSITIONER DRIVE	LIMIT SWITCH	S3.11	-	-		D	
340	ROTOR BRAKE HI SPD SHAFT	PRESSURE SWITCH	S3.1	2000 PSI	±1%		D	
350	ROTOR BRAKE LO SPD SHAFT STG 1	PRESSURE SWITCH	S3.12	2000 PSI	±1%		D	
360	ROTOR BRAKE LO SPD SHAFT STG 2	PRESSURE SWITCH	S3.13	2000 PSI	±1%		D	
365	ROTOR BRAKE ACCUM PRESS	PRESSURE SWITCH	S3.14	1800 PSI	±1%		D	
370	LUBE RESV. LEV.	LEVEL SWITCH	S4.11	100 GAL	±5%		D	
380	LUBE RESV. HI TEMP.	TEMPERATURE SWITCH	S4.26	140°F	±2%		D	
390	LUBE RESV. LO TEMP.	TEMPERATURE SWITCH	S4.27	60°F	±2%		D	
400	LUBE SUPPLY TEMP. HI	TEMPERATURE SWITCH	S4.28	120°F	±1%		D	
410	LUBE SUPPLY TEMP. HI-HI	TEMPERATURE SWITCH	S4.29	135°F	±1%		D	
420	LUBE SUPPLY PRESS. "A"	PRESSURE SWITCH	S4.23	60 PSI	±1%		D	REDUNDANT SENSORS
430	LUBE SUPPLY PRESS. "B"	PRESSURE SWITCH	S4.24	60 PSI	±1%		D	
440	LUBE SUPPLY PRESS. "C"	PRESSURE SWITCH	S4.25	60 PSI	±1%		D	
450	LUBE SUPPLY FILT.	Δ PRESSURE SWITCH	S4.14	10 PSI	±5%		D	
460	SHAFT LUBE PUMP PRESS	PRESSURE SWITCH	S4.30	60 PSI	±1%		D	
470	GEN. RESV. LUBE LEVEL	LEVEL SWITCH	S5.6	5 GAL	±5%		D	
480	GEN. RESV. LUBE TEMP	TEMPERATURE SWITCH	S5.7	275°F	±1%		D	

NOTE: (1) Signal Conditioning and Limit Alarm Module required.

CONTROL SENSORS

LINE NO.	MEASURED ITEM	SENSOR TYPE	SIGNAL I.D.	RANGE OR TRIP POINT	ACC'Y.	OUTPUT A	OUTPUT D	COMMENTS
490	GEN. LUBE PRESS.	PRESSURE SWITCH	S5.2	TBD			D	
500	GEN. BEARING TEMP	RTD	S5.8	250°F	±1%		D	(1)
510	GEN. WINDING TEMP.	RTD	S5.1	275°F	±1%		D	(1)
520	GEN. VIBRATION	VIBRATION SWITCH	S5.3	0.2IN/SEC	±2%		D	
530	GENERATOR SPEED	MAGNETIC	S5.9	-	-		D	PULSE TRAIN TO CYCLOCONVERTER
540	GENERATOR SPEED	MAGNETIC	S5.4	0 → 2000 RPM	±0.5%	A		
550	GENERATED POWER	PT'S, CT'S, TRANSDUCER	S5.5	-500 → 10,000 KW	±0.5%	A		
560	GENERATED REACTIVE POWER	PT'S, CT'S, TRANSDUCER	S5.10	-500 → 5,000KW	±0.5%	A		ALSO TO CONVERTER
570	YAW FILTER STATUS	Δ PRESSURE SWITCH	S6.8	80 PSI	±5%		D	
580	YAW HOLDING BRAKES STATUS	PRESSURE SWITCH	S6.9	2000 PSI	±1%		D	
590	YAW MOTIVE BRAKES STATUS	PRESSURE SWITCH	S6.10	2000 PSI	±1%		D	
600								
610	YAW HOLDING BRAKE ACCUM PRESS.	PRESSURE SWITCH	S6.2	1800 PSI	±1%		D	
620	YAW MAN ACCUM PRESS.	PRESSURE SWITCH	S6.13	1800 PSI	±1%		D	
630	YAW OIL LEVEL	LEVEL SWITCH	S6.3	10 GAL	±10%		D	
631	YAW MAIN ACCUM PRESS	PRESSURE SWITCH	S6.15	2700 PSI	±1%		D	
632	YAW HOLDING BRAKE ACCUM PRESS	PRESSURE SWITCH	S6.16	2700 PSI	±1%		D	LOCAL CONTROL
633	ROTOR BRAKE ACCUM PRESS	PRESSURE SWITCH	S6.17	2700 PSI	±1%		D	
635	YAW POSITION	SYNCHRO	S6.14	0 TO 360°	±1%	A		
640	YAW OIL TEMPERATURE	TEMPERATURE SWITCH	S6.12	170°F	±1%		D	
650	+Z CYLS CW POS'N	LIMIT SWITCH	S6.4	-	-		D	
660	+Z CYLS CCW POS'N	LIMIT SWITCH	S6.5	-	-		D	
670	-Z CYLS CW POS'N	LIMIT SWITCH	S6.6	-	-		D	
680	-Z CYLS CCW POS'N	LIMIT SWITCH	S6.7	-	-		D	
690	ESD SYSTEM READY	120 VAC PRESENCE	S7.4				D	SEE NOTE LINE 720

NOTE: (1) Signal Conditioning and Limit Alarm Module required.

MOD-5A SENSORS

CONTROL SENSORS

LINE NO.	MEASURED ITEM	SENSOR TYPE	SIGNAL I.D.	RANGE OR TRIP POINT	ACC'Y.	OUTPUT A	OUTPUT D	COMMENTS
700	NACELLE EMERGENCY STOP	MANUAL SWITCH	S7.8	-	-		D	
710	GROUND EMERGENCY STOP	MANUAL SWITCH	S7.9	-	-		D	
720	GENERATOR SPEED HI-HI	MAGNETIC	S7.10	1544 RPM	±1%		D	(1) PART OF THE AUTONOMOUS ESD
730	ROTOR SPEED HI-HI	MAGNETIC	S7.2	18.8 RPM	±1%		D	(1) ELECTRONICS
740	FEATHER VLV. A-1 CMD STATUS	RELAY	S7.13	-	-		D	
750	FEATHER VLV. A-2 CMD STATUS	RELAY	S7.14	-	-		D	
760	LOCKOUT RELAY STATUS	SWITCH	S8.1	-	-		D	
770	STATOR TIE STATUS	SWITCH	S8.3	-	-		D	
780	STATOR SHORT STATUS	SWITCH	S8.4	-	-		D	
790	CYCLOCONVERTER TIE STATUS	SWITCH	S8.5	-	-		D	
795	CONVERTER READY	SWITCH	S8.2	-	-		D	
800	UTILITY POWER PRESENCE	POWER MONITOR	S8.6	-	-		D	
810	INTRUSION ALARM	MAGNETIC SWITCHES	S9.1	-	-		D	SWITCHES IN SERIES
820	OIS/EIS STATUS	RELAY	S9.2	-	-		D	
830	CHARGER STATUS	RELAY	S9.3	-	-		D	P/O CHARGER
840	UPS BATTERY STATUS	RELAY	S9.10	-	-		D	P/O UPS
850	UPS INVERTER STATUS	RELAY	S9.11	-	-		D	
860	WIND SPEED #1	D-C MAGNETO	S9.4	0 → 150 MPH	±2 MPH	A		
870	YAW ERROR #1	SYNCHRO	S9.5	0 → 540°	±2°	A		
880	WIND SPEED #2	D-C MAGNETO	S9.6	0 → 150 MPH	±2 MPH	A		
890	YAW ERROR #2	SYNCHRO	S9.7	0 → 540°	±2°	A		
900	MANUAL	SWITCH	S9.17	-	-		D	
910	LOCKOUT	SWITCH	S9.18	-	-		D	KEY OPERATED
920	AUTOMATIC	SWITCH	S9.19	-	-		D	SWITCH
930	RESET	SWITCH	S9.20	-	-		D	

NOTE: (1) Signal Conditioning and Limit Alarm Module required

MOD-5A SENSORS

CONTROL SENSORS

LINE NO.	MEASURED ITEM	SENSOR TYPE	SIGNAL I.D.	RANGE OR TRIP POINT	ACC'Y.	OUTPUT A	OUTPUT D	COMMENTS
940	NACELLE FIRE ALARM	SWITCH	S9.12	-	-		D	PART OF NACELLE FIRE EQUIPMENT
950	C.E.C. AIR FLOW	SWITCH	S9.13	250 FPM	±100 FPM		D	2 SWS IN SERIES
960	C.E.C. TEMP. HI	TEMPERATURE SWITCH	S9.14	104°F	±2°F		D	2 SWS IN PARALLEL
970	C.E.C. TEMP HI-HI	TEMPERATURE SWITCH	S9.15	122°F	±2°F		D	2 SWS IN PARALLEL
972	C.E.C. TEMPERATURE LO	TEMPERATURE SWITCH	S9.21	40°F	±2°F		D	2 SWS IN PARALLEL
973	C.E.C. TEMPERATURE LO-LO	TEMPERATURE SWITCH	S9.22	32°F	±2°F		D	2 SWS IN PARALLEL
980	AIRCRAFT STROBE STATUS	RELAY	S9.16	-	-		D	

MOD-5A COMMANDS

LINE NO.	COMMAND	COMMAND I.D.	OUTPUT A	OUTPUT D	COMMENTS
990	ICE DETECTOR TEST BL. 1	C1.1		D	
1000	ICE DETECTOR TEST BL. 2	C1,2		D	
1010	RHP HYDRAULIC PUMP ON CMD	C2.4		D	
1020	"G" SWITCH BL. #1 TEST #1	C2.5		D	
1030	"G" SWITCH BL. #2 TEST #1	C2.6		D	
1040	"G" SWITCH BL. #1 TEST #2	C2.7		D	
1050	"G" SWITCH BL. #2 TEST #2	C2.8		D	
1060	"G" SWITCH RESET CMD BL. 1	C2.9		D	
1070	"G" SWITCH RESET CMD BL. 2	C2.10		D	
1080	TEETER BRAKE A-C PWR 'ON'	C2.11		D	
1090	TEETER HI FORCE BRAKES OFF	C2.12		D	
1100	AILERON CONTROL SET #1	C2.21	A		
1110	AILERON CONTROL SET #2	C2.22	A		
1120	AILERON CONTROL SET #3	C2.23	A		
1130	AILERON CONTROL SET #4	C2.24	A		
1140	ROTOR BRAKE CMD (STAGE 2 & HI SPEED)	C3.1		D	
1150	ROTOR BRAKE CMD (STAGE 1)	C3.2		D	
1160	TEETER LOW FORCE BRAKE CMD	C3.3		D	LOCAL CONTROL
1170	TEETER HI FORCE BRAKE CMD	C3.4		D	
1180	GEARBOX LUBE PUMP CMD	C4.1		D	
1190	ROTOR POSITIONER DRIVE CMD	C4.6		D	
1200	TURBINE READY CMD	C5.2		D	
1210	START/MOTOR CMD	C5.3		D	
1220	SYNCHRONIZE/GENERATE CMD	C5.4		D	
1230	TORQUE REF.	C5.5	A		
1240	VOLT/VAR REF.	C5.6	A		

MOD-5A COMMANDS

LINE NO.	COMMAND	COMMAND I.D.	OUTPUT A	OUTPUT D	COMMENTS
1250	LOCKOUT RELAY CMD	C5.7		D	
1260	CYCLOCONVERTER TIE CLOSE	C5.8		D	
1270	CYCLOCONVERTER TIE TRIP	C5.9		D	
1275	GEN LUBE PUMP ON CMD	C5.10		D	
1280	YAW CW CMD	C6.1		D	
1290	YAW CCW CMD	C6.2		D	
1300	YAW MOTIVE BRAKE CMD	C6.3		D	
1310	YAW HOLDING BRAKE CMD	C6.4		D	
1320	YAW PUMP ENABLE	C6.5		D	
1330	FEATHER VALVE A-1 CMD	C7.3		D	FROM ESD
1340	FEATHER VALVE A-2 CMD	C7.4		D	ELECTRONICS
1350	ENABLE FEATHER VLV. A-1	C7.5		D	TO ESD
1360	ENABLE FEATHER VLV. A-2	C7.6		D	ELECTRONICS
1370	FEATHER VALVE B-1 CMD	C7.7		D	ACTIVATED DIRECTLY
1380	FEATHER VALVE B-2 CMD	C7.8		D	BY "G" SWITCH
1390	ENABLE ESD CMD	C9.1		D	

MOD-5A SENSORS

E.I.S. ROTOR MUX

LINE NO.	COMMAND		COMMAND I.D.			OUTPUT A D	COMMENTS
1400	BLADE 1 FLAP BEND @ 10%	STRAIN GAGES	ES1.1	$4x10^{-3}$ IN/IN	±5%	A	
1410	BLADE 1 CHORD BEND @ 10%		ES1.2			A	
1420	BLADE 1 STRAIN @ 10%		ES1.3			A	
1430	BLADE 1 FLAP BEND @ 25%		ES1.4			A	
1440	BLADE 1 CHORD BEND @ 25%		ES1.5			A	
1450	BLADE 1 STRAIN @ 25%		ES1.6			A	
1460	BLADE 1 FLAP BEND @ 40%		ES1.7			A	
1470	BLADE 1 CHORD BEND @ 40%		ES1.8			A	
1480	BLADE 1 STRAIN @ 40%		ES1.9			A	
1490	BLADE 1 FLAP BEND @ 60%		ES1.10			A	
1500	BLADE 1 CHORD BEND @ 60%		ES1.11			A	
1510	BLADE 1 STRAIN @ 60%		ES1.12			A	
1520							
1530	BLADE 1 FLAP BEND @ 80%		ES1.45			A	
1540	BLADE 1 CHORD BEND @ 80%		ES1.46			A	
1550	BLADE 1 STRAIN @ 80%		ES1.47			A	
1560	ACTUATOR 1-1 STRAIN		ES1.48			A	
1570	LINK 1-1 STRAIN		ES1.49			A	
1580	AILERON 1-1 STRAIN		ES1.50			A	
1590	AILERON 1-1 FLAP BEND		ES1.51			A	
1600	AILERON 1-1 CHORD BEND	STRAIN GAGES	ES1.52	$4x10^{-3}$ IN/IN	±5%	A	

MOD-5A SENSORS

E.I.S. ROTOR MUX

LINE NO.	MEASURED ITEM	SENSOR TYPE	SIGNAL I.D.	RANGE	ACC'Y.	OUTPUT A D	COMMENTS
1610	BLADE 2 FLAP BEND @ 10%	STRAIN GAGES	ES1.18	$4x10^{-3}$ IN/IN	±5%	A	
1620	BLADE 2 CHORD BEND @ 10%		ES1.19			A	
1630	BLADE 2 STRAIN @ 10%		ES1.20			A	
1640	BLADE 2 FLAP BEND @ 25%		ES1.21			A	
1650	BLADE 2 CHORD BEND @ 25%		ES1.22			A	
1660	BLADE 2 STRAIN @ 25%		ES1.23			A	
1670	BLADE 2 FLAP BEND @ 40%		ES1.24			A	
1680	BLADE 2 CHORD BEND @ 40%		ES1.25			A	
1690	BLADE 2 STRAIN @ 40%		ES1.26			A	
1700	BLADE 2 FLAP BEND @ 60%		ES1.27			A	
1710	BLADE 2 CHORD BEND @ 60%		ES1.28			A	
1720	BLADE 2 STRAIN @ 60%		ES1.29			A	
1730	BLADE 2 FLAP BEND @ 80%		ES1.53			A	
1740	BLADE 2 CHORD BEND @ 80%		ES1.54			A	
1750	BLADE 2 STRAIN @ 80%		ES1.55			A	
1760	ACTUATOR 2-1 STRAIN		ES1.56			A	
1770	ACTUATOR 2-2 STRAIN		ES1.57			A	
1780	ACTUATOR 2-3 STRAIN		ES1.58			A	
1790	ACTUATOR 2-4 STRAIN		ES1.59			A	
1800	LINK 2-1 STRAIN		ES1.60			A	
1810	LINK 2-2 STRAIN		ES1.61			A	
1820	LINK 2-3 STRAIN		ES1.62			A	
1830	LINK 2-4 STRAIN		ES1.63			A	
1840	AILERON 2-1 STRAIN		ES1.64			A	
1850	AILERON 2-2 STRAIN		ES1.65			A	
1860	AILERON 2-3 STRAIN		ES1.66			A	
1870	AILERON 2-4 STRAIN	STRAIN GAGES	ES1.67	$4x10^{-3}$ IN/IN	±5%	A	

E.I.S. ROTOR MUX

LINE NO.	MEASURED ITEM	SENSOR TYPE	SIGNAL I.D.	RANGE	ACC'Y.	OUTPUT A	OUTPUT D	COMMENTS
1880	TEETER BRAKE PRESS. HI PRESS.	PRESSURE TRANSDUCER	ES2.11	0 → 5000 PSI	±2%	A		
1890	TEETER BRAKE PRESS. LOW PRESS.	PRESSURE TRANSDUCER	ES2.12	0 → 5000 PSI	±2%	A		
1900	RHP PUMP DISCHARGE PRESS	PRESSURE TRANSDUCER	ES2.13	0 → 5000 PSI	±2%	A		
1910	RHP MAIN ACCUMULATOR PRESS	PRESSURE TRANSDUCER	ES2.14	0 → 5000 PSI	±2%	A		
1920	RHP PUMP DISCHARGE TEMP	RTD	ES2.15	0°F → 260°F	±5%	A		
1930	ACTUATOR EXTEND PRESS 1-1	PRESSURE TRANSDUCER	ES2.16	0 → 5000 PSI	±2%	A		
1940	ACTUATOR RETRACT PRESS 1-1	↓	ES2.17	↓	↓	A		
1950	EMER. FEATHER ACCUM PRESS 1-1		ES2.18			A		
1960	ACTUATOR EXTEND PRESS 1-2		ES2.19			A		
1970	ACTUATOR RETRACT PRESS 1-2		ES2.20			A		
1980	EMER. FEATHER ACCUM PRESS 1-2		ES2.21			A		
1990	ACTUATOR EXTEND PRESS 1-3		ES2.22			A		
2000	ACTUATOR RETRACT PRESS 1-3		ES2.23			A		
2010	EMER. FEATHER ACCUM PRESS 1-3		ES2.24			A		
2020	ACTUATOR EXTEND PRESS 1-4		ES2.25			A		
2030	ACTUATOR RETRACT PRESS 1-4		ES2.26			A		
2040	EMER. FEATHER ACCUM PRESS 1-4		ES2.27			A		
2050	ACTUATOR EXTEND PRESS 2-1		ES2.28			A		
2060	ACTUATOR RETRACT PRESS 2-1		ES2.29			A		
2070	EMER. FEATHER ACCUM PRESS 2-1		ES2.30			A		
2080	ACTUATOR EXTEND PRESS 2-2		ES2.31			A		
2090	ACTUATOR RETRACT PRESS 2-2		ES2.32			A		
2100	EMER. FEATHER ACCUM PRESS 2-2		ES2.33			A		
2110	ACTUATOR EXTEND PRESS 2-3		ES2.34			A		
2120	ACTUATOR RETRACT PRESS 2-3	PRESSURE TRANSDUCER	ES2.35	0 → 5000 PSI	±2%	A		

E.I.S. ROTOR MUX

LINE NO.	MEASURED ITEM	SENSOR TYPE	SIGNAL I.D.	RANGE	ACC'Y.	OUTPUT A	OUTPUT D	COMMENTS
2130	EMER. FEATHER ACCUM PRESS 2-3	PRESSURE TRANSDUCER	ES2.36	0 → 5000 PSI	±2%	A		
2140	ACTUATOR EXTEND PRESS 2-4		ES2.37			A		
2150	ACTUATOR RETRACT PRESS 2-4		ES2.38			A		
2160	EMER. FEATHER ACCUM PRESS 2-4		ES2.39			A		
2170	PILOT PRESS. BL. 1		ES2.40			A		
2180	PILOT PRESS BL. 2		ES2.41	0 → 5000 PSI		A		
2190	RHP RESERVOIR PRESS	PRESSURE TRANSDUCER	ES2.42	0 → 50 PSI	±2%	A		
2200	TEETER RADIAL BRNG. TEMP. +Y	RTD	ES3.1	-40 → +150°F	±2%	A		
2210	TEETER THRUST BRNG. TEMP. +Y	RTD	ES3.2	-40 → +150°F	±2%	A		
2220	TEETER RADIAL BRNG. TEMP. -Y	RTD	ES3.3	-40 → +150°F	±2%	A		
2230	TEETER THRUST BRNG. TEMP. -Y	RTD	ES3.4	-40 → +150°F	±2%	A		
2240	TEETER SHAFT RADIAL DISPL. ±Z @ +Y	LVDT	ES3.5	±0.5 in.	±2%	A		
2250	TEETER SHAFT RADIAL DISPL. ±X @ +Y	LVDT	ES3.6	±0.5 in.	±2%	A		
2260	TEETER SHAFT RADIAL DISPL. ±Z @ -Y	LVDT	ES3.7	±0.5 in.	±2%	A		
2270	TEETER SHAFT RADIAL DISPL. ±X @ -Y	LVDT	ES3.8	±0.5 in.	±2%	A		
2280	TEETER SHAFT AXIAL DISPL. ±Y @ +Y	LVDT	ES3.9	±0.5 in.	±2%	A		
2290	ROTOR SHAFT STRAIN	STRAIN GAGES	ES3.10	11 x 10^{-4} IN/IN	±5%	A		
2300	YOKE STRAIN #1		ES3.11			A		
2310	YOKE STRAIN #2		ES3.12			A		
2320	YOKE STRAIN #3		ES3.13			A		
2330	YOKE STRAIN #4		ES3.14			A		
2340	YOKE STRAIN #5		ES3.15			A		
2350	YOKE STRAIN #6		ES3.16			A		
2360	YOKE STRAIN #7		ES3.17			A		
2370	YOKE STRAIN #8	STRAIN GAGES	ES3.18	11 x 10^{-4} IN/IN	±5%	A		

MOD-5A SENSORS

E.I.S. ROTOR MUX

LINE NO.	MEASURED ITEM	SENSOR TYPE	SIGNAL I.D.	RANGE	ACC'Y.	OUTPUT A	OUTPUT D	COMMENTS
2380	YOKE STRAIN #9	STRAIN GAGES	ES3.19	11 x 10^{-6} IN/IN	±5%	A		
2390	YOKE STRAIN #10	↓	ES3.20	↓	↓	A		
2400	YOKE STRAIN #11	↓	ES3.21	↓	↓	A		
2410	YOKE STRAIN 12	STRAIN GAGES	ES3.22	11 x 10^{-6} IN/IN	±5%	A		

MOD-5A SENSORS

E.I.S. NACELLE MUX

LINE NO.	MEASURED ITEM	SENSOR TYPE	SIGNAL I.D.	SHARED BY C.S.	RANGE	ACC'Y.	OUTPUT A	OUTPUT D	COMMENTS
2420	HUB SPEED	MAGNETIC	ES3.23	X	0 ›30 RPM	± 1%	A		
2430	GENERATOR SPEED	MAGNETIC	ES5.1	X	0 ›2300 RPM	± 1%	A		
2440	TEETER ANGLE	SYNCHRO	ES3.24	X	±12°	± 2%	A		
2450	LUBE RESV. TEMP.	RTD	ES4.1		0 › 200°F	± 2%	A		
2460	LUBE PUMP PRESS., MOT.	PRESSURE TRANSDUCER	ES4.2		0 › 300 PSI	± 2%	A		
2470	LUBE PUMP PRESS., SHAFT	PRESSURE TRANSDUCER	ES4.3		0 › 300 PSI	± 2%	A		
2480	LUBE SUPPLY PRESSURE	PRESSURE TRANSDUCER	ES4.4		0 › 300 PSI	± 2%	A		
2490	LUBE SUPPLY TEMP.	RTD	ES4.5		0 › 200°	± 2%	A		
2500	MOTIVE ACCUM. PRESS.	PRESSURE TRANSDUCER	ES6.1		0 › 5000 PSI	± 2%	A		
2510	BRAKE ACCUM. PRESS.		ES6.2		0 › 3000 PSI	± 2%	A		
2520	YAW ACT. SUPPLY PRESS		ES6.3		0 › 5000 PSI	± 2%	A		
2530	YAW ACT. RETURN PRESS		ES6.4		0 › 5000 PSI	± 2%	A		
2540	YAW MOTIVE BRAKE PRESS		ES6.5		0 › 3000 PSI	± 2%	A		
2550	YAW HOLDING BRAKE PRESS.		ES6.6		0 › 3000 PSI	± 2%	A		
2560	ROTOR HOLDING BRAKE PRESS (H.S. SHAFT)		ES6.7		0 › 3000 PSI	± 2%	A		
2570	ROTOR HOLDING BRAKE PRESS. (STG. 2)		ES6.15		0 › 3000 PSI	± 2%	A		
2580	ROTOR HOLDING BRAKE PRESS. (STG. 1)		ES6.16		0 › 3000 PSI	± 2%	A		
2590	ROTOR BRAKE ACCUM. PRESS.	PRESSURE TRANSDUCER	ES6.17		0 › 3000 PSI	± 2%	A		
2600	NACELLE VIBRATION 1 (X)	ACCELEROMETER	ES9.1		±2.5g	±1%	A		1 TRIAX MOUNT
2610	NACELLE VIBRATION 1 (Y)		ES9.2		±2.5g	±1%	A		
2620	NACELLE VIBRATION 1 (Z)		ES9.3		±2.5g	±1%	A		
2630	NACELLE VIBRATION 2 (X)		ES9.4		±2.5g	±1%	A		1 TRIAX MOUNT
2640	NACELLE VIBRATION 2 (Y)		ES9.5		±2.5g	±1%	A		
2650	NACELLE VIBRATION 2 (Z)	ACCELEROMETER	ES9.6		±2.5g	±1%	A		

MOD-5A SENSORS

E.I.S. NACELLE MUX

LINE NO.	MEASURED ITEM	SENSOR TYPE	SIGNAL I.D.	SHARED BY C.S.	RANGE	ACC'Y.	OUTPUT A	OUTPUT D	COMMENTS
2660	NACELLE VIBRATION 3 (X)	ACCELEROMETER	ES9.7		±2.5g	±1%	A		
2670	NACELLE VIBRATION 3 (Y)	↓	ES9.8		±2.5g	±1%	A		1 TRIAX MOUNT
2680	NACELLE VIBRATION 3 (Z)	ACCELEROMETER	ES9.9		±2.5g	±1%	A		
2690	AILERON POSITION 1-1	LVDT	ES1.37	X	0 → 10 IN.	±.03 IN	A		
2700	1-2	↓	ES1.38	X	↓	↓	A		
2710	1-3		ES1.39	X			A		
2720	1-4		ES1.40	X			A		
2730	2-1		ES1.41	X			A		
2740	2-2		ES1.42	X			A		
2750	2-3		ES1.43	X			A		
2760	AILERON POSITION 2-4	LVDT	ES1.44	X	0 → 10 IN.	±.03 IN	A		
2770	WIND SPEED	D-C MAGNETO	ES9.10	X	0 → 150 MPH	±2 MPH	A		
2780	YAW ERROR	SYNCHRO	ES9.11	X	0 → 540°	±2°	A		
2790	NACELLE STRAIN 1	STRAIN GAGES	ES9.12		6.6 x 10^{-6} IN/IN	±5%	A		
2800	2	↓	ES9.13		↓	↓	A		
2810	3		ES9.14				A		
2820	4		ES9.15				A		
2830	5		ES9.16				A		
2840	6		ES9.17				A		
2850	7		ES9.18				A		
2860	8		ES9.19				A		
2870	9		ES9.20				A		
2880	NACELLE STRAIN 10	STRAIN GAGES	ES9.21		6.6 x 10^{-6} IN/IN	±5%	A		

MOD-5A SENSORS

E.I.S. NACELLE MUX

LINE NO.	MEASURED ITEM	SENSOR TYPE	SIGNAL I.D.	SHARED BY C.S.	RANGE	ACC'Y.	OUTPUT A	OUTPUT D	COMMENTS
2890	YAW HOUSING STRAIN 1	STRAIN GAGES	ES6.8		6.6 x 10^{-6} IN/IN	±5%	A		
2900	2		ES6.9				A		
2910	3		ES6.10				A		
2920	4		ES6.11				A		
2930	5		ES6.12				A		
2940	YAW HOUSING STRAIN 6	STRAIN GAGES	ES6.13		6.6 x 10^{-6} IN/IN	±5%	A		
2950	ROTOR POSITION	SYNCHRO	ES3.25	X	0 → 360°	±1%	A		
2960	YAW POSITION	SYNCHRO	ES6.14	X	0 → 360°	±1%	A		
2970	NACELLE AMBIENT TEMPERATURE	RTD	ES9.30		-40° → 150°F	±2%	A		
2980	NACELLE OUTSIDE AMB. TEMP.	RTD	ES9.31		-40° → 150°F	±2%	A		

MOD-5A SENSORS

E.I.S. GROUND MUX

LINE NO.	MEASURED ITEM	SENSOR TYPE	SIGNAL I.D.	SHARED BY C.S.	RANGE	ACC'Y.	OUTPUT A	OUTPUT D	COMMENTS
2990	BUS VOLTAGE (ØA-ØB)	TRANSDUCER	ES8.1		0 → 5 KV	±0.5%	A		
3000	BUS VOLTAGE (ØB-ØC)		ES8.2		0 → 5 KV		A		
3010	BUS VOLTAGE (ØC-ØA)		ES8.3		0 → 5 KV		A		
3020	BUS CURRENT (ØA)		ES8.4		0 → 1200 A		A		
3030	BUS CURRENT (ØB)		ES8.5		0 → 1200 A		A		
3040	BUS CURRENT (ØC)		ES8.6		0 → 1200 A		A		
3050	BUS POWER (KW)		ES8.7	X	-.5 → 10 MW		A		
3060	BUS POWER (KVAR)		ES8.8	X	-.5 → 10 MVAR		A		
3070	CYCLOCONVERTER CURRENT (ØA)		ES8.9		0 → 500 A		A		
3080	CYCLOCONVERTER CURRENT (ØB)		ES8.10		0 → 500 A		A		
3090	CYCLOCONVERTER CURRENT (ØC)		ES8.11		0 → 500 A		A		
3100	STATOR VOLTAGE (ØA-ØB)		ES8.12		0 → 5 KV		A		
3110	STATOR VOLTAGE (ØB-ØC)		ES8.13		0 → 5 KV		A		
3120	STATOR VOLTAGE (ØC-ØA)		ES8.14		0 → 5 KV		A		
3130	STATOR CURRENT (ØA)		ES8.15		-500 → 1200 A		A		
3140	STATOR CURRENT (ØB)		ES8.16		-500 → 1200 A		A		
3150	STATOR CURRENT (ØC)		ES8.17		-500 → 1200 A		A		
3160	STATOR POWER (KW)		ES8.18		-.5 → 10 MW		A		
3170	STATOR POWER (KVAR)		ES8.19		-.5 → 10 MVAR		A		
3180	STATOR FREQUENCY	TRANSDUCER	ES8.20		55 → 65 Hz	±0.5%	A		
3190	TOWER STRAIN AXIS 1	STRAIN GAGES	ES9.22		8×10^{-4} IN/IN	±5%	A		HEIGHT 1
3200	TOWER STRAIN AXIS 2		ES9.23				A		
3210	TOWER STRAIN AXIS 1		ES9.24				A		HEIGHT 2
3220	TOWER STRAIN AXIS 2	STRAIN GAGES	ES9.25		8×10^{-4} IN/IN	±5%	A		

E.I.S. GROUND MUX

LINE NO.	MEASURED ITEM	SENSOR TYPE	SIGNAL I.D.	SHARED BY C.S.	RANGE	ACC'Y.	OUTPUT A	OUTPUT D	COMMENTS
3230	TOWER STRAIN AXIS 1	STRAIN GAGES	ES9.26		8×10^{-4} IN/IN	±5%	A		HEIGHT 3
3240	TOWER STRAIN AXIS 2		ES9.27				A		
3250	TOWER STRAIN AXIS 1		ES9.28				A		HEIGHT 4
3260	TOWER STRAIN AXIS 2	STRAIN GAGES	ES9.29		8×10^{-4} IN/IN	±5%	A		

MET TOWER

LINE NO.	MEASURED ITEM	SENSOR TYPE	SIGNAL I.D.	RANGE	ACC'Y.	OUTPUT A	OUTPUT D	COMMENTS
3270	WIND VELOCITY 50'	MAGNETO	ES9.32	0 → 150 MPH	±2 MPH	A		
3280	WIND DIRECTION 50'	SYNCHRO	ES9.33	0 → 360°	± 2°	A		
3290								
3300	WIND VELOCITY 250'	MAGNETO	ES9.35	0 → 150 MPH	±2 MPH	A		
3310	WIND DIRECTION 250'	SYNCHRO	ES9.36	0 → 360°	± 2°	A		
3320	TEMPERATURE 250'	RTD	ES9.37	-40°C → + 60°C	±2%	A		
3330	PRESSURE 250'	PRESSURE TRANSDUCER	ES9.38	950 → 1050 mB	±2%	A		
3340	ICE DETECTOR 250'	RESONANT PROBE	ES9.39	0.2 IN	±.05 IN		D	
3350	WIND VELOCITY 450'	MAGNETO	ES9.40	0 → 150 MPH	±2 MPH	A		
3360	WIND DIRECTION 450'	SYNCHRO	ES9.41	0 → 360°	± 2°	A		
3370								

GENERAL ELECTRIC

AEP DEPT — KING OF PRUSSIA, PA LOCATION

TITLE WIRE LIST EMERGENCY SHUTDOWN PNL | CODE IDENT NO | COVER SHEET FOR DWG 47A387125 | SH NO 1 | CONT ON SHEET 2 | REV

REVISIONS

LTR	DESCRIPTION	DATE	APPD	LTR	DESCRIPTION	DATE	APPD

TOTAL No. SHEETS : 4

REVISION STATUS TABULATION

REV STATUS	REV																		
OF SHEETS	SH	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19

REV																				
SH	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	39
REV																				
SH	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61

MADE BY B. Schaper 11-11-83 — DATE ISSUED 7 DAY 2 MO 84 YR — DISTRIBUTION CODE WTG-512 — COVER SHEET FOR DWG 47A387125 — SH NO 1 — CONT ON SHEET 2 — REV

CONTRACT NO — CHECKED 11-11-83 K E McFarland — ENGINEER 11-11-83 K E McFarland — 2-7-84 L. Jarecka — 2-7-84 A. Cheddie

```
N   N  000  TTT  EEE  SSS
NN  N  0 0   T   E    S
N N N  0 0   T   EEE  SSS
N  NN  0 0   T   E      S
N   N  000   T   EEE  SSS
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1. ASSEMBLE AND WIRE PER 47A380052. 0180
0190
2. ALL HARDWARE REQUIRED FOR WIRING THIS ASSEMBLY IS SPECIFIED ON ASSEMBLY DRAWING 47D387121. 0200
0210
0220
3. LOWER CASE PIN DESIGNATIONS ARE INDICATED BY AN ASTERISK PRECEEDING THE LETTER. 0230
0250
0270
4. TWIST NUMBER - ALL TWISTED GROUPS ARE SERIALLY NUMBERED. CONDUCTORS ENCLOSED WITHIN A COMMON JACKET HAVE THE SAME SERIAL NUMBER. 0280
0290
0300
0310
5. USE AWG #20 GAUGE SOLID BUS WIRE FOR THIS CONNECTION. SLEEVE WITH AWG #20 TEFLON SLEEVING WHEN REQUIRED TO PREVENT SHORTING. 0330
0350
0360

WIRE LIST, EMERGENCY SHUTDOWN PANEL DRAWING NUMBER=47A387125 REVISION=0 DATE 10-6-83 SHT 3

LINE	FROM	TO	SIZE	COLOR	TYPE	TWIST	NOTES
0180	J1-A	K6-13	20	WHT	SC		
0190	J1-B	K2-13	20	WHT	SC		
0200	J1-C	K3-13	20	WHT	SC		
0210	J1-D	K1-5	20	WHT	SC		
0220	J1-E	K4-5	20	WHT	SC		
0230	J1-F	K5-5	20	WHT	SC		
0250	J1-H	K1-8	20	WHT	SC		
0270	J1-J	K1-14	20	WHT	SC		
0280	J1-K	J1-R	20		SC	5	
0290	J1-L	J1-M	20		SC	5	
0300	J1-M	J1-L	20		SC	5	
0310	J1-N	K7-5	20	WHT	SC		
0330	J1-P	TB1-12	20	WHT	SC		
0350	J1-R	J1-K	20		SC	5	
0360	J1-S						
0370	J1-T	K2-7	20	WHT	SC		
0380	J1-U	J1-W	20		SC	5	
0390	J1-V	K7-13	20	WHT	SC		
0400	J1-W	J1-U	20		SC	5	
0410	J1-X	K7-14	20	WHT	SC		
0431							
0432							
0440	K1-1						
0450	K1-2						
0460	K1-4						
0470	K1-5	J1-D	20	WHT	SC		
0480	K1-6						
0490	K1-7						
0500	K1-8	J1-H	20	WHT	SC		
0510	K1-8	K1-9	20		SC	5	
0520	K1-9	K1-8	20		SC	5	
0530	K1-9	K4-9	20	WHT	SC		
0540	K1-10						
0550	K1-11						
0560	K1-12	K2-5	20	WHT	SC		
0570	K1-13	K7-9	20	WHT	SC		
0580	K1-14	J1-J	20	WHT	SC		
0590	K1-14	K2-14	20	WHT	SC		
0600							
0610							
0620	K2-1						
0630	K2-2						
0640	K2-3						
0650	K2-4						
0660	K2-5	K1-12	20	WHT	SC		
0670	K2-5	K3-5	20	WHT	SC		
0680	K2-6						
0690	K2-7	J1-T	20	WHT	SC		
0700	K2-8						
0710	K2-9	K4-8	20	WHT	SC		
0720	K2-10						
0730	K2-11	K3-7	20	WHT	SC		
0740	K2-12						
0750	K2-13	J1-B	20	WHT	SC		
0760	K2-14	K1-14	20	WHT	SC		
0770	K2-14	K3-14	20	WHT	SC		
0780	K3-1						
0790	K3-2						
0800	K3-3						
0810	K3-4						
0820	K3-5	K2-5	20	WHT	SC		
0825	K3-5	K3-11	20		SC		5
0830	K3-6						
0840	K3-7	K2-11	20	WHT	SC		
0850	K3-8						
0860	K3-9	K5-8	20	WHT	SC		
0870	K3-10						
0880	K3-11	K3-5	20		SC		5
0890	K3-12						
0900	K3-13	J1-C	20	WHT	SC		
0910	K3-14	K2-14	20	WHT	SC		
0920	K3-14	K4-14	20	WHT	SC		
0930							
0940							
0950	K4-1						
0960	K4-2						
0970	K4-3						
0980	K4-4						
0990	K4-5	J1-E	20	WHT	SC		
1000	K4-6						
1010	K4-7						
1020	K4-8	K2-9	20	WHT	SC		
1030	K4-8	K6-8	20	WHT	SC		
1040	K4-9	K1-9	20	WHT	SC		
1050	K4-9	K5-9	20	WHT	SC		
1060	K4-10						
1070	K4-11						
1080	K4-12	K4-13	20		SC		5
1090	K4-13	K4-12	20		SC		5
1100	K4-13	K6-12	20	WHT	SC		

WIRE LIST,EMERGENCY SHUTDOWN PANEL DRAWING NUMBER=47A387125 REVISION=0 DATE 10-6-83 SHT 4

LINE	FROM	TO	SIZE	COLOR	TYPE	TWIST	NOTES
1110	K4-14	K3-14	20	WHT	SC		
1120	K4-14	K5-14	20	WHT	SC		
1130							
1140							
1150	K5-1						
1160	K5-2						
1170	K5-3						
1180	K5-4						
1190	K5-5	J1-F	20	WHT	SC		
1200	K5-6						
1210	K5-7						
1220	K5-8	K3-9	20	WHT	SC		
1230	K5-8	K6-5	20	WHT	SC		
1240	K5-9	K4-9	20	WHT	SC		
1250	K5-9	TB1-5	20	WHT	SC		
1260	K5-10						
1270	K5-11						
1280	K5-12	K5-13	20		SC	5	
1290	K5-13	K5-12	20		SC	5	
1300	K5-13	K6-9	20	WHT	SC		
1310	K5-14	K4-14	20	WHT	SC		
1320	K5-14	K6-14	20	WHT	SC		
1330							
1340							
1350	K6-1						
1360	K6-2						
1370	K6-3						
1380	K6-4						
1390	K6-5	K5-8	20	WHT	SC		
1400	K6-6						
1410	K6-7						
1420	K6-8	K4-8	20	WHT	SC		
1430	K6-9	K5-13	20	WHT	SC		
1440	K6-9	TB1-3	20	WHT	SC		
1450	K6-10						
1460	K6-11						
1470	K6-12	K4-13	20	WHT	SC		
1480	K6-12	TB1-1	20	WHT	SC		
1490	K6-13	J1-A	20	WHT	SC		
1500	K6-14	K5-14	20	WHT	SC		
1510	K6-14	TB1-4	20	WHT	SC		
1520							
1530							
1540	K7-1						
1550	K7-2						
1560	K7-3						
1570	K7-4						
1580	K7-5	J1-N	20	WHT	SC		
1590	K7-6						
1600	K7-8						
1610	K7-9	K1-13	20	WHT	SC		
1620	K7-10						
1630	K7-11						
1640	K7-12						
1650	K7-13	J1-V	20	WHT	SC		
1660	K7-14	J1-X	20	WHT	SC		
1670							
1680							
1690	TB1-1	K6-12	20	WHT	SC		
1700	TB1-2	TB1-4	20		SC		5
1710	TB1-3	K6-9	20	WHT	SC		
1720	TB1-4	TB1-2	20		SC		5
1730	TB1-4	K6-14	20	WHT	SC		
1740	TB1-5	K5-9	20	WHT	SC		
1750	TB1-6	TB1-7	20		SC		5
1760	TB1-7	TB1-6	20		SC		5
1770	TB1-8	TB1-9	20		SC		5
1780	TB1-9	TB1-8	20		SC		5
1790	TB1-10	TB1-11	20		SC		5
1800	TB1-11	TB1-10	20		SC		5
1810	TB1-12	J1-P	20	WHT	SC		
1820	TB1-13						
1830	TB1-14						
1840	TB1-15						

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16. Abstract

This report documents the design, development and analysis of the 7.3MW MOD-5A wind turbine generator covering work performed between July 1980 and June 1984. The report is divided into four volumes: Volume I summarizes the entire MOD-5A program, Volume II discusses the conceptual and preliminary design phases, Volume III describes the final design of the MOD-5A, and Volume IV contains the drawings and specifications developed for the final design.

Volume IV contains the drawings and specifications that were developed in preparation for building the MOD-5A wind turbine generator.

17. Key Words (Suggested by Author(s))	18. Distribution Statement
Renewable energy; Wind energy Wind power; Variable speed generator Wind turbine design; Wind turbine system; Wood rotor blades; Large scale wind turbine	Unclassified - unlimited STAR Category - 44 DOE Category - UC-60

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