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ECONOMIC ANALYSIS OF STANDARD INTERFACE MODULES FOR USE WITH THE MULTI-MISSION SPACECRAFT

VOLUME II

APPENDICES AND DRAWINGS

ECON INCORPORATED

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FINAL

ECONOMIC ANALYSIS OF STANDARD INTERFACE MODULES FOR USE WITH THE MULTI-MISSION SPACECRAFT

VOLUME II

APPENDICES AND DRAWINGS

Prepared for

National Aeronautics and Space Administration
Office of Applications
Washington, DC

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NOTE OF TRANSMITTAL

This economic analysis of Standard Interface Modules (SIM) for use with the Multi-Mission Spacecraft (MMS) was performed for NASA by ECON, Inc. under Contract No. NASW-2558. The Technical Officer for this study was Mr. Rondal Crawford of NASA Headquarters. ECON, Inc. was assisted in this study by Kaman Sciences Corporation. The study evaluates the cost savings that could be obtained by the use of SIM to perform certain sensor electrical interfacing functions that have historically been an integral part of the sensor.

The study concludes that reduction in both the nonrecurring and recurring costs of this sensor interface hardware could be achieved through the use of SIM, and that the development and use of certain power conditioning and data handling SIM units is economically justified. An important conclusion of this study is that greater cost savings could be realized by the extension of the SIM concept to the planned Spacelab missions, and that further study of the use of SIM in those manned missions is warranted.

The analysis of the sensor interface functions for the MMS missions was performed by Mr. Samuel Russell of ECON, Inc. Mr. Noel Becar of Kaman Sciences Corporation was responsible for the selection of functions to be standardized, and the development of the physical characteristics of the selected SIM. The costing and economic analysis was performed by Mr. Joel Greenberg of ECON, Inc. The RCA PRICE cost estimating program was used by ECON, Inc. to estimate the costs of both the SIM and integral design concept hardware.

The principal authors of this report were Mr. Joel Greenberg, Mr. B.P. Miller and Mr. Samuel Russell of ECON, Inc., and Mr. Noel Becar of Kaman Sciences Corporation.

B. P. Miller
Vice President

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8.1 PRICE Input Data Definitions

The PRICE method of cost computation uses a computerized mathematical model which can determine hardware development and production costs based upon relatively simple descriptions of the hardware and program elements. The algorithms used are based upon a large collection of historical data and are applicable for cost predictions of a wide assortment of equipment types.

The data needed to describe the hardware are used to establish the fundamental characteristics upon which cost is most dependent, namely, the complexity of the device and how much hardware of this complexity is to be developed and produced. Additional information is required on the schedule, previous hardware experience and environmental considerations, all of which are combined and interrelated to assess the total costs.

Examples of typical data sheets in the completed form are shown in Sections 8.2 and 8.3, along with the output data sheets. The following list establishes the meaning of the input and output terminology which appears in these sections. Numerical values used in the PRICE program to characterize the input variables are derived using the RCA PRICE User's Reference Manual.

Parameter	Explanation
General Data:	
ITEM	Name of unit.
QTY	Quantity of production units, exclusive of prototypes and engineering models.
PROTOS	Quantity of working and tested prototypes, exclusive of engineering models, exclusive of breadboard models.
WT	Total weight of the unit (pounds).

Parameter	Explanation
General Data (continued):	
VOL	Total volume of the unit (cubic feet).
MODE	Type of device being described, e.g., electromechanical (Mode 1), mechanical only (Mode 2), GFE (Mode 4), purchased unit (Mode 3).
QTY SYS	Quantity of production units used per system at next higher assembly level.
INTEGE	Level of electrical integration tasks required at the next higher assembly level, e.g., a. input power only, b. input/output data, c. input/output data plus calibration or tuning, d. (c) plus parts selection, replacement, corrections.
INTEGS	Level of mechanical integration tasks required at the next higher assembly level, a. one plane mounting, b. two or more plane mounting, c. drill at assembly, d. considerable machining and selective fit at assembly.
AMULTE	Mark-up of engineering direct costs to selling costs.
AMULTM	Mark-up of manufacturing direct costs to selling costs.
Mechanical/Structural Data:	
WS	Weight of the mechanical portion of the unit, e.g., enclosure, connectors, brackets, etc. (pounds).
MCPLXS	Coefficient for manufacturing complexity for mechanical portion of unit.
PRODS	Variable that defines mechanical producibility of the unit.

Parameter	Explanation
Mechanical/Structural Data (continued):	
NEWST	Magnitude of unique, conceptual mechanical design required for the unit.
DESRPS	Percentage of repetitiveness or redundancy contained in the mechanical design.
Electronics Data:	
USEVOL	Percentage of the unit volume occupied by electronics. Total volume and empty space, or space occupied by the mechanical portion of the unit is subtracted.
MCPLXE	Coefficient for manufacturing complexity for electrical portion of unit.
PRODE	Variable defining electrical producibility of the unit.
NEWEL	Magnitude of unique conceptual electrical design expressed in terms of percentage of design to be accomplished.
DESRPE	Percentage of repetitiveness or redundancy contained in the electrical design.
PWR	The average power dissipated by the unit - when operating (watts).
CMPNTS	Not used.
CMPID	Not used.
PWRFAC	Class of power-dissipating components used in the unit. Reference table required for description of component power classes.
CMPEFF	Not used.
Engineering Data:	
ENMTHS	Month of year engineering effort starts.
ENMTHP	Elapsed number of months required to complete the first prototype.

Parameter	Explanation
Engineering Data (continued):	
ENMTHT	Elapsed number of months required to complete the engineering scope of work.
ECMPLX	Variable describing the overall engineering complexity of the unit related to heritage. Reference table used for numerical value.
PRNF	Not used.
Production Data:	
PRMTHS	Number of months from start of year to start of production.
PRMTHF	Number of months from start of year to end of production.
LCURVE	Expected learning curve.
ECNE	Not used.
ECNS	Not used.
Global Data:	
YEAR	Calendar year in which effort begins.
ESC	Economic escalation to be applied to effort.
PROJCT	Level of project management expected during engineering effort (1 = typical).
DATA	Relative magnitude of engineering data generation requirements expected on the program (1 = typical).
TLGTST	Relative magnitude of tooling and test equipment needed to support engineering (1 = typical).
PLTFM	Variable relating reliability and testing requirements (2 = space application).
SYSTEM	Relative magnitude of system engineering effort required during effort (1 = typical).

Parameter	Explanation
Global Data (continued):	
PPROJ	Level of project management expected during production phase of effort (1 = typical).
PDATA	Relative magnitude of production data required on the program (1 = typical).
PTLGTS	Relative magnitude of tooling and test equipment required during production (1 = typical).

8.2 SIM Cost Estimation

The material in the following pages is a compilation of the PRICE System Input Worksheets containing the SIM nominal data. These input data sheets are then followed by the PRICE computed results.

PRICE System
Input Worksheet

Item: LPS

Date: 8/13/76

General	QTY: see note	PROTOS: 2	WT: 2.7	VOL: .03	MODE: 1
	QTYSYS: 1	INTEGE: .5	INTEGS: .5	AMULTE (%): 130	AMULTM (%): 130
Mechanical/ Structural	WS: 0.27	MCPLXS: -	PRODS: 5.2	NEWST: .5	DESRPS: .2
Electronics	USEVOL: .7	MCPLXE: -	PRODE: 4.2	NEWEL: .05	DESRPE: .5
	PWR: 7.5	CMPNTS: -	CMPID: -	PWRFAC: .3	CMPEFF: -
Engineering	ENMTHS: 1	ENMTHP: 4	ENMTHT: 5	ECMPLX: .1	PRNF: -
Production	PRMTHS: 5	PRMTHF: 29	LCURVE: .9	ECNE: -	ECNS: -
Purchased Item (Mode 3)	WS:	BVCOST:	LCURVE:		
GFE (Mode 4)	WS:	MCPLXE:	MCPLXS:		
Additional Data (Modes 9 & 10)	MCONST:	MEXP:	WECF:	TARCST (Mode 10 only):	
Global	YEAR: 1978	ESC: 0	PROJCT: 1.0	DATA: 1.0	TLGTST: 1.0
	PLTFM: 2.0	SYSTEM: 1.0	PPROJ: 1.0	PDATA: 1.0	PTLGTS: 1.0

MODES

0 PRINT TOTALS	6 MODIFIED PURCH ITEM
1 E/M ITEM	7 MODIFIED GFE ITEM
2 MECH ITEM	8 PARASYN
3 PURCH ITEM	9 E/M ITEM-CALC WT & VOL
4 GFE ITEM	10 GEOSYN
5 INTEG & TEST	

Notes: QTY = 55, 79, 103

PRICE System
Input Worksheet

Item RPS

Date 8/13/76

General	QTY: minute	PROTOS: 2	WT: 2.7	VOL: 0.03	MODE: 1
	QTYSYS: 1	INTEGE: .5	INTEGS: .5	AMULTE (%): 130	AMULTM (%): 130
Mechanical/ Structural	WS: 0.27	MCPLXS: -	PRODS: 5.2	NEWST: .5	DESRPS: .2
Electronics	USEVOL: .7	MCPLXE: -	PRODE: 4.2	NEWEL: 0.05	DESRPE: .5
	PWR: 7.5	CMPNTS: -	CMPID: -	PWRFAC: .3	CMPEFF: -
Engineering	ENMTHS: 1	ENMTHP: 4	ENMTHT: 5	ECMPLX: .1	PRNF: -
Production	PRMTHS: 5	PRMTHF: 29	LCURVE: .9	ECNE: -	ECNS: -
Purchased Item (Mode 3)	WS:	BVCOST:	LCURVE:		
GFE (Mode 4)	WS:	MCPLXE:	MCPLXS:		
Additional Data (Modes 9 & 10)	MCONST:	MEXP:	WECF:	TARCST (Mode 10 only):	
Global	YEAR: 1978	ESC: 0	PROJCT: 1.0	DATA: 1.0	TLGTST: 1.0
	PLTFM: 2.0	SYSTEM: 1.0	PPROJ: 1.0	PDATA: 1.0	PTLGTS: 1.0

MODES

0 PRINT TOTALS	6 MODIFIED PURCH ITEM
1 E/M ITEM	7 MODIFIED GFE ITEM
2 MECH ITEM	8 PARASYN
3 PURCH ITEM	9 E/M ITEM-CALC WT & VOL
4 GFE ITEM	10 GEOSYN
5 INTEG & TEST	

Notes: Qty : 267, 311, 355

PRICE System
Input Worksheet

Item: HVS

Date: 8/13/76

General	QTY: see work	PROTOS: 2	WT: 3.2	VOL: 0.035	MODE: 1
	QTYSYS: 1	INTEGE: .5	INTEGS: .5	AMULTE (%): 130	AMULTM (%): 130
Mechanical/ Structural	WS: .4	MCPLXS: -	PRODS: 5.3	NEWST: .5	DESRPS: .2
Electronics	USEVOL: .85	MCPLXE: -	PRODE: 4.3	NEWEL: .15	DESRPE: .5
	PWR: 2	CMPNTS: -	CMPID: -	PWRFAC: .3	CMPEFF: -
Engineering	ENMTHS: 1	ENMTHP: 9	ENMTHT: 11	ECMPLX: .4	PRNF: -
Production	PRMTHS: 11	PRMTHF: 35	LCURVE: 0	ECNE: -	ECNS: -
Purchased Item (Mode 3)	WS:	BVCOST:	LCURVE:		
GFE (Mode 4)	WS:	MCPLXE:	MCPLXS:		
Additional Data (Modes 9 & 10)	MCONST:	MEXP:	WECF:	TARCST (Mode 10 only):	
Global	YEAR: 1978	ESC: 0	PROJCT: 1	DATA: 1	TLGTST: 1
	PLTFM: 2.0	SYSTEM: 1	PPROJ: 1	PDATA: 1	PTLGTS: 1

MODES

0 PRINT TOTALS	6 MODIFIED PURCH ITEM
1 E/M ITEM	7 MODIFIED GFE ITEM
2 MECH ITEM	8 PARASYN
3 PURCH ITEM	9 E/M ITEM-CALC WT & VOL
4 GFE ITEM	10 GEOSYN
5 INTEG & TEST	

Notes: Qty = 116, 141, 166

PRICE System
Input Worksheet

Item: PPS UPS

Date: 8/13/76

General	QTY: see note	PROTOS: 2	WT: 9.0	VOL: 0.1	MODE: 1
	QTYSYS: 1	INTEGE: .5	INTEGS: .5	AMULTE (%): 130	AMULTM (%): 130
Mechanical/ Structural	WS: 2.0	MCPLXS: -	PRODS: 5.2	NEWST: .5	DESRPS: .2
Electronics	USEVOL: .7	MCPLXE: -	PRODE: 4.2	NEWEL: .05	DESRPE: .5
	PWR: 30	CMPNTS: -	CMPID: -	PWRFAC: .3	CMPEFF: -
Engineering	ENMTHS: 1	ENMTHP: 7	ENMTHT: 9	ECMPLX: .2	PRNF: -
Production	PRMTHS: 9	PRMTHF: 33	LCURVE: .9	ECNE: -	ECNS: -
Purchased Item (Mode 3)	WS:	BVCOST:	LCURVE:		
GFE (Mode 4)	WS:	MCPLXE:	MCPLXS:		
Additional Data (Modes 9 & 10)	MCONST:	MEXP:	WECF:	TARCST (Mode 10 only):	
Global	YEAR: 1978	ESC: 0	PROJCT: 1	DATA: 1	TLGTST: 1
	PLTFM: 2.0	SYSTEM: 1	PPROJ: 1	PDATA: 1	PTLGTS: 1

MODES

0 PRINT TOTALS
1 E/M ITEM
2 MECH ITEM
3 PURCH ITEM
4 GFE ITEM
5 INTEG & TEST
6 MODIFIED PURCH ITEM
7 MODIFIED GFE ITEM
8 PARASYN
9 E/M ITEM-CALC WT & VOL
10 GEOSYN

Notes:

QTY = 61, 85, 109

PRICE System
Input Worksheet

Item: DHU-C

Date: 8/13/76

General	QTY: see note	PROTOS: 2	WT: 1.75	VOL: 0.035	MODE: 1
	QTYSYS: 1	INTEGE: .5	INTEGS: .5	AMULTE (%): 130	AMULTM (%): 130
Mechanical/ Structural	WS: .15	MCPLXS: -	PRODS: 5.2	NEWST: .5	DESRPS: .2
Electronics	USEVOL: .85	MCPLXE: -	PRODE: 1.5	NEWEL: .5	DESRPE: .2
	PWR: .2	CMPNTS: -	CMPID: -	PWRFAC: 1.3	CMPEFF: -
Engineering	ENMTHS: 1	ENMTHP: 12	ENMTHT: 14	ECMPLX: .7	PRNF: -
Production	PRMTHS: 12	PRMTHF: 36	LCURVE: 0	ECNE: -	ECNS: -
Purchased Item (Mode 3)	WS:	BVCOST:	LCURVE:		
GFE (Mode 4)	WS:	MCPLXE:	MCPLXS:		
Additional Data (Modes 9 & 10)	MCONST:	MEXP:	WECF:	TARCST (Mode 10 only):	
Global	YEAR: 1978	ESC: 0	PROJCT: 1	DATA: 1	TLGTST: 1
	PLTFM: 2	SYSTEM: 1	PPROJ: 1	PDATA: 1	PTLGTS: 1

MODES

0 PRINT TOTALS
1 E/M ITEM
2 MECH ITEM
3 PURCH ITEM
4 GFE ITEM
5 INTEG & TEST
6 MODIFIED PURCH ITEM
7 MODIFIED GFE ITEM
8 PARASYN
9 E/M ITEM-CALC WT & VOL
10 GEOSYN

Notes: QTY = 40, 45, 50

PRICE System
Input Worksheet

Item: DHU - S

Date: 8/13/76

General	QTY: see note	PROTOS: 2	WT: 1.75	VOL: .035	MODE: 1
	QTYSYS: 1	INTEGE: .5	INTEGS: .5	AMULTE (%): 130	AMULTM (%): 130
Mechanical/ Structural	WS: .15	MCPLXS: -	PRODS: 5.2	NEWST: .5	DESRPS: .2
Electronics	USEVOL: .85	MCPLXE: -	PRODE: 5.45	NEWEL: .5	DESRPE: .2
	PWR: .2	CMPNTS: -	CMPID: -	PWRFAC: 1.3	CMPEFF: -
Engineering	ENMTHS: 1	ENMTHP: 12	ENMTHT: 14	ECMPLX: .2	PRNF: -
Production	PRMTHS: 12	PRMTHF: 36	LCURVE: 0	ECNE:	ECNS:
Purchased Item (Mode 3)	WS:	BVCOST:	LCURVE:		
GFE (Mode 4)	WS:	MCPLXE:	MCPLXS:		
Additional Data (Modes 9 & 10)	MCONST:	MEXP:	WECF:	TARCST (Mode 10 only):	
Global	YEAR: 1978	ESC: 0	PROJCT: 1	DATA: 1	TLGTST: 1
	PLTFM: 2	SYSTEM: 1	PPROJ: 1	PDATA: 1	PTLGTS: 1

MODES

0 PRINT TOTALS
1 E/M ITEM
2 MECH ITEM
3 PURCH ITEM
4 GFE ITEM
5 INTEG & TEST
6 MODIFIED PURCH ITEM
7 MODIFIED GFE ITEM
8 PARASYN
9 E/M ITEM-CALC WT & VOL
10 GEOSYN

Notes: QTY = 62, 73, 84

PRICE System
Input Worksheet

Item: MOSC -C

Date: 8/13/76

General	QTY: 1 unit	PROTOS: 2	WT: 1.31	VOL: .023	MODE: 1
	QTYSYS: 1	INTEGE: .5	INTEGS: .5	AMULTE (%): 130	AMULTM (%): 130
Mechanical/ Structural	WS: .15	MCPLXS: -	PRODS: 5.2	NEWST: .5	DESRPS: .2
Electronics	USEVOL: .85	MCPLXE: -	PRODE: 5.5	NEWEL: .5	DESRPE: .2
	PWR: .2	CMPNTS: -	CMPID: -	PWRFAC: 1.3	CMPEFF: -
Engineering	ENMTHS: 1	ENMTHP: 12	ENMTHT: 14	ECMPLX: .7	PRNF: -
Production	PRMTHS: 12	PRMTHF: 36	LCURVE: 0	ECNE: -	ECNS: -
Purchased Item (Mode 3)	WS:	BVCOST:	LCURVE:		
GFE (Mode 4)	WS:	MCPLXE:	MCPLXS:		
Additional Data (Modes 9 & 10)	MCONST:	MEXP:	WECF:	TARCST (Mode 10 only):	
Global	YEAR: 1978	ESC: 0	PROJCT: 1	DATA: 1	TLGTST: 1
	PLTFM: 2	SYSTEM: 1	PPROJ: 1	PDATA: 1	PTLGTS: 1

MODES

0 PRINT TOTALS
1 E/M ITEM
2 MECH ITEM
3 PURCH ITEM
4 GFE ITEM
5 INTEG & TEST
6 MODIFIED PURCH ITEM
7 MODIFIED GFE ITEM
8 PARASYN
9 E/M ITEM-CALC WT & VOL
10 GEOSYN

Notes: QTY = 21, 24, 27

PRICE System
Input Worksheet

Item: MDSC - 5

Date: 8/13/76

General	QTY: see note	PROTOS: 2	WT: 1,31	VOL: .023	MODE: 1
	QTYSYS: 1	INTEGE: .5	INTEGS: .5	AMULTE (%): 130	AMULTM (%): 130
Mechanical/ Structural	WS: .15	MCPLXS: -	PRODS: 5.2	NEWST: .5	DESRPS: .2
Electronics	USEVOL: .85	MCPLXE: -	PRODE: 5.5	NEWEL: .5	DESRPE: .2
	PWR: .2	CMPNTS: -	CMPID: -	PWRFAC: 1.3	CMPEFF: -
Engineering	ENMTHS: 1	ENMTHP: 12	ENMTHT: 14	ECMPLX: .2	PRNF: -
Production	PRMTHS: 12	PRMTHF: 36	LCURVE: 0	ECNE: -	ECNS: -
Purchased Item (Mode 3)	WS:	BVCOST:	LCURVE:		
GFE (Mode 4)	WS:	MCPLXE:	MCPLXS:		
Additional Data (Modes 9 & 10)	MCONST:	MEXP:	WECF:	TARCST (Mode 10 only):	
Global	YEAR: 1978	ESC: 0	PROJCT: 1	DATA: 1	TLGTST: 1
	PLTFM: 2	SYSTEM: 1	PPROJ: 1	PDATA: 1	PTLGTS: 1

MODES

0 PRINT TOTALS
1 E/M ITEM
2 MECH ITEM
3 PURCH ITEM
4 GFE ITEM
5 INTEG & TEST
6 MODIFIED PURCH ITEM
7 MODIFIED GFE ITEM
8 PARASYN
9 E/M ITEM-CALC WT & VOL
10 GEOSYN

Notes: QTY: 35, 41, 47

PRICE System
Input Worksheet

Item: DHU-S OPTION B

Date: 8/13/76

General	QTY: 1936	PROTOS: 2	WT: 1.5	VOL: .023	MODE: 1
	QTYSYS: 1	INTEGE: .5	INTEGS: .5	AMULTE (%): 130	AMULTM (%): 130
Mechanical/ Structural	WS: .15	MCPLXS: -	PRODS: 5.2	NEWST: .5	DESRPS: .2
Electronics	USEVOL: .85	MCPLXE: -	PRODE: 5.45	NEWEL: .5	DESRPE: .2
	PWR: .2	CMPNTS: -	CMPID: -	PWRFAC: 1.3	CMPEFF: -
Engineering	ENMTHS: 1	ENMTHP: 12	ENMTHT: 14	ECMPLX: .2	PRNF: -
Production	PRMTHS: 12	PRMTHF: 48	LCURVE: 0	ECNE: -	ECNS: -
Purchased Item (Mode 3)	WS:	BVCOST:	LCURVE:		
GFE (Mode 4)	WS:	MCPLXE:	MCPLXS:		
Additional Data (Modes 9 & 10)	MCONST:	MEXP:	WECF:	TARCST (Mode 10 only):	
Global	YEAR: 1978	ESC: 0	PROJCT: 1	DATA: 1	TLGTST: 1
	PLTFM: 2	SYSTEM: 1	PPROJ: 1	PDATA: 1	PTLGTS: 1

MODES

0 PRINT TOTALS	6 MODIFIED PURCH ITEM
1 E/M ITEM	7 MODIFIED GFE ITEM
2 MECH ITEM	8 PARASYN
3 PURCH ITEM	9 E/M ITEM-CALC WT & VOL
4 GFE ITEM	10 GEOSYN
5 INTEG & TEST	

Notes:

POWER SUPPLY TYPE LPS 8/26/76

INPUT DATA

QTY	79.	PROTOS	2.0	WT	2.700	VOL	0.030	MODE	1.
QTYSYS	1.	INTEGE	0.500	INTEGS	0.500	AMULTE	130.00%	AMULTM	130.00%

MECH/STRUCT

WS	0.270	MCPLXS	0.0	PRODS	5.200	NEWST	0.500	DESRPS	0.200

ELECTRONICS

USEVOL	0.700	MCPLXE	0.0	PRODE	4.200	NEWEL	0.050	DESRPE	0.500
PWR	7.500	CMPNTS	0.	CMPID	0.0	PWRFAC	0.300	CMPEFF	0.0

ENGINEERING

ENMTHS	1.0	ENMTHP	4.0	ENMTHT	5.0	ECMPLX	0.100	PRNF	0.0

PRODUCTION

PRMTHS	5.0	PRMTHF	29.0	LCURVE	0.900	ECNE	0.0	ECNS	0.0

GLOBAL

YEAR	1978.	ESC	0.0 %	PROJCT	1.000	DATA	1.000	TLGTST	1.000
PLATFN	2.000	SYSTEM	1.000	PPROJ	1.000	PDATA	1.000	PTLGTS	1.00

PROGRAM COST	DEVELOPMENT	PRODUCTION	TOTAL COST
ENGINEERING			
DRAFTING	1.	9.	10.
DESIGN	1.	26.	28.
SYSTEMS	0.	0.	0.
PROJ MGMT	7.	39.	46.
DATA	3.	3.	5.
SUBTOTAL(ENG)	12.	77.	89.
MANUFACTURING			
PRODUCTION	0.	765.	765.
PROTOTYPE	45.	0.	45.
TOOL-TEST EQ	2.	40.	43.
SUBTOTAL(MFG)	48.	805.	853.
TOTAL COST	59.	882.	942.

VOL	0.030	AVCOST	9.69	TOTAL AV PROD COST		11.17	LCURVE	0.900	
WT	2.700	ECNE	0.090	ECNS	0.031	DESRPE	0.500	DESPRS	0.200

MECH/STRUCT

WS	0.270	WSCF	9.000	MECID	0.0	PRODS	5.200	MCPLXS	6.778

ELECTRONICS

WE	2.430	WECF	115.714	CMPID	0.0	PRODE	4.200	MCPLXE	8.982
PWR	7.500	CMPNTS	28.			PWRFAC	0.300	CMPEFF	-26.551

SCHEDULES

ENMTHS	1.000	ENMTHP	4.000	ENMTHT	5.000	ECMPLX	0.100	PRNF	0.057
PRMTHS	5.000	PRMTHF	29.000	AVER. PROD RATE PER MONTH					3.292

COST RANGES	DEVELOPMENT	PRODUCTION	TOTAL COST
FROM	50.	752.	802.
CENTER	59.	882.	942.
TO	73.	1072.	1145.

POWER SUPPLY TYPE RPS 8/26/76

INPUT DATA

QTY	311.	PROTOS	2.0	WT	2.700	VOL	0.030	MODE	1.
QTYSYS	1.	INTEGE	0.500	INTEGS	0.500	AMULTE	130.00%	AMULTM	130.00%

MECH/STRUCT

WS	0.270	MCPLXS	0.0	PRODS	5.200	NEWST	0.500	DESRPS	0.200

ELECTRONICS

USEVOL	0.700	MCPLXE	0.0	PRODE	4.200	NEWEL	0.050	DESRPE	0.500
PWR	7.500	CMPNTS	0.	CMPID	0.0	PWRFAC	0.300	CMPEFF	0.0

ENGINEERING

ENMTHS	1.0	ENMTHP	4.0	ENMTHT	5.0	ECMPLX	0.100	PRMF	0.0

PRODUCTION

PRMTHS	5.0	PRMTHF	29.0	LCURVE	0.900	ECNE	0.0	ECNS	0.0

GLOBAL

YEAR	1978.	ESC	0.0 %	PROJCT	1.000	DATA	1.000	TLGTST	1.000
PLATFM	2.000	SYSTEM	1.000	PPROJ	1.000	PDATA	1.000	PTLGTS	1.00

PROGRAM COST	DEVELOPMENT	PRODUCTION	TOTAL COST
ENGINEERING			
DRAFTING	1.	10.	11.
DESIGN	1.	29.	30.
SYSTEMS	0.	0.	0.
PROJ MGMT	7.	122.	129.
DATA	3.	8.	11.
SUBTOTAL(ENG)	12.	169.	181.
MANUFACTURING			
PRODUCTION	0.	2523.	2523.
PROTOTYPE	45.	0.	45.
TOOL-TEST EQ	2.	143.	146.
SUBTOTAL(MFG)	48.	2666.	2714.
TOTAL COST	59.	2835.	2894.

VOL	0.030	AVCOST	8.11	TOTAL AV PROD COST		9.12	LCURVE	0.900	
WT	2.700	ECNE	0.099	ECNS	0.034	DESRPE	0.500	DESPRS	0.200

MECH/STRUCT

WS	0.270	WSCF	9.000	WECID	0.0	PRODS	5.200	MCPLXS	6.778

ELECTRONICS

WE	2.430	WECF	115.714	CMPID	0.0	PRODE	4.200	MCPLXE	8.982
PWR	7.500	CMPNTS	28.			PWRFAC	0.300	CMPEFF	-26.551

SCHEDULES

ENMTHS	1.000	ENMTHP	4.000	ENMTHT	5.000	ECMPLX	0.100	PRMF	0.057
PRMTHS	5.000	PRMTHF	29.000	AVER. PROD RATE PER MONTH					12.958

COST RANGES	DEVELOPMENT	PRODUCTION	TOTAL COST
FROM	50.	2409.	2459.
CENTER	59.	2835.	2894.
TO	73.	3456.	3529.

HIGH VOLTAGE POWER SUPPLY 8/26/76

INPUT DATA

QTY	141.	PROTOS	2.0	WT	3.200	VOL	0.035	MODE	1.
QTYSYS	1.	INTEGE	0.500	INTEGS	0.500	ANULTE	130.00%	ANULTM	130.00%

MECH/STRUCT

WS	0.400	MCPLXS	0.0	PRODS	5.300	MEWST	0.500	DESRPS	0.200

ELECTRONICS

USEVOL	0.850	MCPLXE	0.0	PRODE	4.300	MEWEL	0.150	DESRPE	0.500
PWR	2.000	CMPNTS	0.	CMPID	0.0	PWRFAC	0.300	CMPEFF	0.0

ENGINEERING

ENMTHS	1.0	ENMTHP	9.0	ENMTHT	11.0	ECMPLX	0.400	PRNF	0.0

PRODUCTION

PRMTHS	11.0	PRMTHF	35.0	LCURVE	0.0	ECNE	0.0	ECNS	0.0

GLOBAL

YEAR	1978.	ESC	0.0 %	PROJCT	1.000	DATA	1.000	TLGTST	1.000
PLATFM	2.000	SYSTEM	1.000	PPROJ	1.000	PDATA	1.000	PTLGTS	1.00

PROGRAM COST	DEVELOPMENT	PRODUCTION	TOTAL COST
ENGINEERING			
DRAFTING	7.	10.	17.
DESIGN	17.	29.	46.
SYSTEMS	1.	0.	1.
PROJ MGMT	6.	68.	73.
DATA	2.	5.	7.
SUBTOTAL(ENG)	32.	111.	144.
MANUFACTURING			
PRODUCTION	0.	1392.	1392.
PROTOTYPE	42.	0.	42.
TOOL-TEST EQ	5.	69.	74.
SUBTOTAL(MFG)	47.	1461.	1508.
TOTAL COST	80.	1572.	1652.

VOL	0.035	AVCOST	9.87	TOTAL AV PROD COST			11.15	LCURVE	0.901
WT	3.200	ECNE	0.088	ECNS	0.034	DESRPE	0.500	DESPRS	0.200

MECH/STRUCT

WS	0.400	WSCF	11.429	MECID	0.0	PRODS	5.300	MCPLXS	7.017

ELECTRONICS

WE	2.300	WECF	94.118	CMPID	0.0	PRODE	4.300	MCPLXE	8.897
PWR	2.000	CMPNTS	7.			PWRFAC	0.300	CMPEFF	-54.989

SCHEDULES

ENMTHS	1.000	ENMTHP	9.000	ENMTHT	11.000	ECMPLX	0.400	PRNF	0.115
PRMTHS	11.000	PRMTHF	35.000	AVER. PROD RATE PER MONTH					5.875

COST RANGES	DEVELOPMENT	PRODUCTION	TOTAL COST
FROM	68.	1338.	1406.
CENTER	80.	1572.	1652.
TO	96.	1908.	2004.

PULSE POWER SUPPLY 8/26/76

INPUT DATA

QTY	85.	PROTOS	2.0	WT	9.000	VOL	0.100	MODE	1.
QTYSYS	1.	INTEGE	0.500	INTEGS	0.500	AMULTE	130.00%	AMULTM	130.00%

MECH/STRUCT

WS	2.000	MCPLXS	0.0	PRODS	5.200	NEWST	0.500	DESRPS	0.200

ELECTRONICS

USEVOL	0.700	MCPLXE	0.0	PRODE	4.200	NEWEL	0.050	DESRPE	0.500
PWR	30.000	CMPNTS	0.	CMPID	0.0	PWRFAC	0.300	CMPEFF	0.0

ENGINEERING

ENMTHS	1.0	ENMTHP	7.0	ENMTHT	9.0	ECMPLX	0.200	PRNF	0.0

PRODUCTION

PRMTHS	9.0	PRMTHF	33.0	LCURVE	0.0	ECNE	0.0	ECNS	0.0

GLOBAL

YEAR	1978.	ESC	0.0 %	PROJCT	1.000	DATA	1.000	TLGTST	1.000
PLATFM	2.000	SYSTEM	1.000	PPROJ	1.000	PDATA	1.000	PTLGTS	1.00

PROGRAM COST	DEVELOPMENT	PRODUCTION	TOTAL COST
ENGINEERING			
DRAFTING	4.	17.	21.
DESIGN	8.	50.	59.
SYSTEMS	0.	0.	0.
PROJ MGMT	12.	93.	105.
DATA	4.	7.	10.
SUBTOTAL(ENG)	29.	167.	195.
MANUFACTURING			
PRODUCTION	0.	1879.	1879.
PROTOTYPE	102.	0.	102.
TOOL-TEST EQ	7.	75.	83.
SUBTOTAL(MFG)	109.	1955.	2064.
TOTAL COST	139.	2122.	2260.

VOL	0.100	AVCOST	22.11	TOTAL AV PROD COST			24.96	LCURVE	0.905
WT	9.000	ECNE	0.085	ECNS	0.036	DESRPE	0.500	DESPRS	0.200

MECH/STRUCT

WS	2.000	WSCF	20.000	MECID	0.0	PRODS	5.200	MCPLXS	7.139

ELECTRONICS

WE	7.000	WECF	100.000	CMPID	0.0	PRODE	4.200	MCPLXE	8.775
PWR	30.000	CMPNTS	111.			PWRFAC	0.300	CMPEFF	-19.023

SCHEDULES

ENMTHS	1.000	ENMTHP	7.000	ENMTHT	9.000	ECMPLX	0.200	PRNF	0.117
PRMTHS	9.000	PRMTHF	33.000	AVER. PROD RATE PER MONTH					3.542

COST RANGES	DEVELOPMENT	PRODUCTION	TOTAL COST
FROM	116.	1803.	1920.
CENTER	138.	2122.	2260.
TO	159.	2591.	2760.

DATA HANDLING UNIT TYPE SIMPLE 8/26/76

INPUT DATA

QTY	73.	PROTOS	2.0	WT	1.750	VOL	0.035	NODE	1.
QTYSYS	1.	INTEGE	0.500	INTEGS	0.500	ANULTE	130.00%	ANULTM	130.00%

MECH/STRUCT

WS	0.150	MCPLXS	0.0	PRODS	5.200	NEWST	0.500	DESRPS	0.200

ELECTRONICS

USEVOL	0.850	MCPLXE	0.0	PRODE	5.450	NEWEL	0.500	DESRPE	0.200
PWR	0.200	CMPNTS	0.	CMPID	0.0	PWRFAC	1.300	CMPEFF	0.0

ENGINEERING

ENMTHS	1.0	ENMTHP	12.0	ENMTHT	14.0	ECMPLX	0.200	PRNF	0.0

PRODUCTION

PRMTHS	12.0	PRMTHF	36.0	LCURVE	0.0	ECNE	0.0	ECNS	0.0

GLOBAL

YEAR	1978.	ESC	0.0 %	PROJCT	1.000	DATA	1.000	TLGTST	1.000
PLATFM	2.000	SYSTEM	1.000	PPROJ	1.000	PDATA	1.000	PTLGTS	1.00

PROGRAM COST	DEVELOPMENT	PRODUCTION	TOTAL COST
ENGINEERING			
DRAFTING	27.	28.	55.
DESIGN	57.	105.	161.
SYSTEMS	1.	0.	1.
PROJ MGNT	22.	78.	100.
DATA	7.	6.	13.
SUBTOTAL(ENG)	113.	216.	329.
MANUFACTURING			
PRODUCTION	0.	1537.	1537.
PROTOTYPE	120.	0.	120.
TOOL-TEST EQ	10.	75.	86.
SUBTOTAL(MFG)	130.	1612.	1742.
TOTAL COST	243.	1829.	2072.

VOL	0.035	AVCOST	21.05	TOTAL AV PROD COST			25.05	LCURVE	0.035
WT	1.750	ECNE	0.129	ECNS	0.027	DESRPE	0.200	DESPRS	0.200

MECH/STRUCT

WS	0.150	WSCF	4.286	MECID	0.0	PRODS	5.200	MCPLXS	6.459

ELECTRONICS

WE	1.600	WECF	53.781	CMPID	0.0	PRODE	5.450	MCPLXE	10.311
PWR	0.200	CMPNTS	7.			PWRFAC	1.300	CMPEFF	-81.963

SCHEDULES

ENMTHS	1.000	ENMTHP	12.000	ENMTHT	14.000	ECMPLX	0.200	PRNF	0.099
PRMTHS	12.000	PRMTHF	36.000	AVER. PROD RATE PER MONTH					3.042

COST RANGES	DEVELOPMENT	PRODUCTION	TOTAL COST
FROM	211.	1596.	1807.
CENTER	243.	1829.	2072.
TO	282.	2085.	2367.

DATA HANDLING UNIT TYPE COMPLEX 8/26/76

INPUT DATA

QTY	45.	PROTOS	2.0	WT	1.750	VOL	0.035	MODE	1.
QTYSYS	1.	INTEGE	0.500	INTEGS	0.500	AMULTE	130.00%	AMULTM	130.00%

MECH/STRUCT

WS	0.150	MCPLXS	0.0	PRODS	5.200	NEWST	0.500	DESRPS	0.200

ELECTRONICS

USEVOL	0.850	MCPLXE	0.0	PRODE	5.500	NEWEL	0.500	DESRPE	0.200
PWR	0.200	CMPNTS	0.	CMPID	0.0	PWRFAC	1.300	CMPEFF	0.0

ENGINEERING

ENMTHS	1.0	ENMTHP	12.0	ENMTHT	14.0	ECMPLX	0.700	PRNF	0.0

PRODUCTION

PRMTHS	12.0	PRMTHF	36.0	LCURVE	0.0	ECNE	0.0	ECNS	0.0

GLOBAL

YEAR	1978.	ESC	0.0 %	PROJCT	1.000	DATA	1.000	TLGTST	1.000
PLATFM	2.000	SYSTEM	1.000	PPROJ	1.000	PDATA	1.000	PTLGTS	1.00

PROGRAM COST	DEVELOPMENT	PRODUCTION	TOTAL COST
ENGINEERING			
DRAFTING	54.	29.	83.
DESIGN	168.	112.	280.
SYSTEMS	13.	0.	13.
PROJ MGMT	22.	60.	82.
DATA	8.	5.	13.
SUBTOTAL(ENG)	265.	205.	471.
MANUFACTURING			
PRODUCTION	0.	1089.	1089.
PROTOTYPE	84.	0.	84.
TOOL-TEST EQ	16.	52.	68.
SUBTOTAL(MFG)	100.	1141.	1241.
TOTAL COST	365.	1346.	1711.

VOL	0.035	AVCOST	24.19	TOTAL AV PROD COST			29.91	LCURVE	0.883
WT	1.750	ECNE	0.132	ECNS	0.027	DESRPE	0.200	DESPRS	0.200

MECH/STRUCT

WS	0.150	WSCF	4.286	MECID	0.0	PRODS	5.200	MCPLXS	6.459

ELECTRONICS

WE	1.600	WECF	53.781	CMPID	0.0	PRODE	5.500	MCPLXE	10.406
PWR	0.200	CMPNTS	7.			PWRFAC	1.300	CMPEFF	-82.281

SCHEDULES

ENMTHS	1.000	ENMTHP	12.000	ENMTHT	14.000	ECMPLX	0.700	PRNF	0.098
PRMTHS	12.000	PRMTHF	36.000	AVER. PROD RATE PER MONTH					1.875

COST RANGES	DEVELOPMENT	PRODUCTION	TOTAL COST
FROM	326.	1179.	1505.
CENTER	365.	1346.	1711.
TO	413.	1528.	1941.

DATA HANDLING UNIT TYPE MDSC-S 8/26/76

INPUT DATA

QTY	+1.	PROTOS	2.0	WT	1.300	VOL	0.023	MODE	1.
QTYSYS	1.	INTEGE	0.500	INTEGS	0.500	AMULTE	130.00%	AMULTM	130.00%

MECH/STRUCT

WS	0.150	MCPLXS	0.0	PRODS	5.200	NEWST	0.500	DESRPS	0.200

ELECTRONICS

USEVOL	0.850	MCPLXE	0.0	PRODE	5.500	NEWEL	0.500	DESRPE	0.200
PWR	0.200	CMPNTS	0.	CMPID	0.0	PWRFAC	1.300	CMPEFF	0.0

ENGINEERING

ENMTHS	1.0	ENMTHP	12.0	ENMTHT	14.0	ECMPLX	0.200	PRNF	0.0

PRODUCTION

PRMTHS	12.0	PRMTHF	36.0	LCURVE	0.0	ECNE	0.0	ECNS	0.0

GLOBAL

YEAR	1978.	ESC	0.0 %	PROJCT	1.000	DATA	1.000	TLGTST	1.000
PLATFM	2.000	SYSTEM	1.000	PPROJ	1.000	PDATA	1.000	PTLGTS	1.00

PROGRAM COST	DEVELOPMENT	PRODUCTION	TOTAL COST
ENGINEERING			
DRAFTING	23.	25.	49.
DESIGN	49.	97.	146.
SYSTEMS	0.	0.	0.
PROJ MGNT	19.	48.	67.
DATA	6.	4.	10.
SUBTOTAL(ENG)	98.	175.	272.
MANUFACTURING			
PRODUCTION	0.	855.	855.
PROTOTYPE	109.	0.	109.
TOOL-TEST EQ	10.	44.	54.
SUBTOTAL(MFG)	119.	898.	1017.
TOTAL COST	217.	1073.	1290.

VOL	0.023	AVCOST	20.84	TOTAL AV PROD COST		26.17	LCURVE	0.882	
WT	1.300	ECNE	0.137	ECNS	0.029	DESRPE	0.200	DESPRS	0.200

MECH/STRUCT

WS	0.150	WSCF	6.522	MECID	0.0	PRODS	5.200	MCPLXS	6.630

ELECTRONICS

WE	1.150	WECF	58.824	CMPID	0.0	PRODE	5.500	MCPLXE	10.556
PWR	0.200	CMPNTS	7.			PWRFAC	1.300	CMPEFF	-76.419

SCHEDULES

ENMTHS	1.000	ENMTHP	12.000	ENMTHT	14.000	ECMPLX	0.200	PRNF	0.097
PRMTHS	12.000	PRMTHF	36.000	AVER. PROD RATE PER MONTH					1.708

COST RANGES	DEVELOPMENT	PRODUCTION	TOTAL COST
FROM	188.	939.	1127.
CENTER	217.	1073.	1290.
TO	252.	1218.	1470.

DATA HANDLING UNIT TYPE MOSC-C 8/26/76

INPUT DATA

QTY	24.	PROTOS	2.0	WT	1.300	VOL	0.023	MODE	1.
QTYSYS	1.	INTEGE	0.500	INTEGS	0.500	AMULTE	130.00%	AMULTM	130.00%

MECH/STRUCT

WS	0.150	MCPLXS	0.0	PRODS	5.200	NEWST	0.500	DESRPS	0.200

ELECTRONICS

USEVOL	0.850	MCPLXE	0.0	PRODE	5.500	NEWEL	0.500	DESRPE	0.200
PWR	0.200	CMPNTS	0.	CMPID	0.0	PWRFAC	1.300	CMPEFF	0.0

ENGINEERING

ENMTHS	1.0	ENMTHP	12.0	ENMTHT	14.0	ECMPLX	0.700	PRNF	0.0

PRODUCTION

PRMTHS	12.0	PRMTHF	36.0	LCURVE	0.0	ECNE	0.0	ECNS	0.0

GLOBAL

YEAR	1978.	ESC	0.0 %	PROJCT	1.000	DATA	1.000	TLGTST	1.000
PLATFM	2.000	SYSTEM	1.000	PPROJ	1.000	PDATA	1.000	PTLGTS	1.00

PROGRAM COST	DEVELOPMENT	PRODUCTION	TOTAL COST
ENGINEERING			
DRAFTING	45.	25.	70.
DESIGN	140.	97.	238.
SYSTEMS	11.	0.	11.
PROJ MGMT	18.	34.	53.
DATA	7.	3.	10.
SUBTOTAL(ENG)	222.	160.	381.
MANUFACTURING			
PRODUCTION	0.	535.	535.
PROTOTYPE	71.	0.	71.
TOOL-TEST EQ	14.	26.	40.
SUBTOTAL(MFG)	84.	561.	646.
TOTAL COST	306.	721.	1027.

VOL	0.023	AVCOST	22.28	TOTAL AV PROD COST			30.04	LCURVE	0.881
WT	1.300	ECNE	0.137	ECNS	0.029	DESRPE	0.200	DESPRS	0.200

MECH/STRUCT

WS	0.150	WSCF	6.522	NECID	0.0	PRODS	5.200	MCPLXS	6.638

ELECTRONICS

WE	1.150	WECF	58.824	CMPID	0.0	PRODE	5.500	MCPLXE	10.556
PWR	0.200	CMPNTS	7.			PWRFAC	1.300	CMPEFF	-76.419

SCHEDULES

ENMTHS	1.000	ENMTHP	12.000	ENMTHT	14.000	ECMPLX	0.700	PRNF	0.097
PRMTHS	12.000	PRMTHF	36.000	AVER. PROD RATE PER MONTH					1.000

COST RANGES	DEVELOPMENT	PRODUCTION	TOTAL COST
FROM	273.	635.	908.
CENTER	306.	721.	1027.
TO	346.	815.	1161.

8.3 Sensor Subsystem Cost Estimation

The material in the following pages is a compilation of the PRICE System Input Worksheets containing the integrated subsystem (subsystems which are an integral part of the sensors and have equivalent functions as to SIM) nominal data. These input data sheets are then followed by the PRICE computed results.

PRICE System
Input Worksheet

Item: INTEGRATED CPS

Date: 8/16/76

General	QTY: see note	PROTOS: 1	WT: 0.8	VOL: .01	MODE: 1
	QTYSYS: 1	INTEGE: .5	INTEGS: .5	AMULTE (%): 130	AMULTM (%): 30
Mechanical/ Structural	WS: .1	MCPLXS: -	PRODS: 5.2	NEWST: .2	DESRPS: .2
Electronics	USEVOL: .7	MCPLXE: -	PRODE: 4.2	NEWEL: .1	DESRPE: .5
	PWR: 2	CMPNTS: -	CMPID: -	PWRFAC: .3	CMPEFF: -
Engineering	ENMTHS: 1	ENMTHP: 6	ENMTHT: 7	ECMPLX: .3	PRNF: -
Production	PRMTHS: 7	PRMTHF: 12	LCURVE: 0	ECNE: -	ECNS: -
Purchased Item (Mode 3)	WS:	BVCOST:	LCURVE:		
GFE (Mode 4)	WS:	MCPLXE:	MCPLXS:		
Additional Data (Modes 9 & 10)	MCONST:	MEXP:	WECF:	TARCST (Mode 10 only):	
Global	YEAR: 1978	ESC: 0	PROJCT: 0	DATA: 1	TLGTST: 1
	PLTFM: 2	SYSTEM: 1	PPROJ: 0	PDATA: 1	PTLGTS: 1

MODES

0 PRINT TOTALS
1 E/M ITEM
2 MECH ITEM
3 PURCH ITEM
4 GFE ITEM
5 INTEG & TEST
6 MODIFIED PURCH ITEM
7 MODIFIED GFE ITEM
8 PARASYN
9 E/M ITEM-CALC WT & VOL
10 GEOSYN

Notes: QTY = 1, 2, 3, 4, 5, 8

PRICE System
Input Worksheet

Item: RPS CONFIGURATION (INTEGRATED)

Date: 8/14/76

General	QTY: see notes	PROTOS: 1	WT: see notes	VOL: see notes	MODE: 1
	QTYSYS: 1	INTEGE: .5	INTEGS: .5	AMULTE (%): 130	AMULTM (%): 130
Mechanical/ Structural	WS: see notes	MCPLXS: -	PRODS: 5.2	NEWST: .6	DESRPS: .2
Electronics	USEVOL: .7	MCPLXE: -	PRODE: 4.2	NEWEL: .2	DESRPE: .5
	PWR: 2	CMPNTS: -	CMPID: -	PWRFAC: .3	CMPEFF: -
Engineering	ENMTHS: 1	ENMTHP: 4	ENMTHT: 5	ECMPLX: .07	PRNF: -
Production	PRMTHS: 5	PRMTHF: 12	LCURVE: 0	ECNE:	ECNS:
Purchased Item (Mode 3)	WS:	BVCOST:	LCURVE:		
GFE (Mode 4)	WS:	MCPLXE:	MCPLXS:		
Additional Data (Modes 9 & 10)	MCONST:	MEXP:	WECF:	TARCST (Mode 10 only):	
Global	YEAR: 1978	ESC: 0	PROJCT: 0	DATA: 1.0	TLGTST: 1.0
	PLTFM: 2.0	SYSTEM: 1.0	PPROJ: 0	PDATA: 1.0	PTLGTS: 1.0

MODES

0 PRINT TOTALS	6 MODIFIED PURCH ITEM
1 E/M ITEM	7 MODIFIED GFE ITEM
2 MECH ITEM	8 PARASYN
3 PURCH ITEM	9 E/M ITEM-CALC WT & VOL
4 GFE ITEM	10 GEOSYN
5 INTEG & TEST	

Notes:

A = 1/4	QTY = 3	WT = .8	VOL = .009	WS = .08
B = 1/2	= 1,2,3,4	1.6	= .018	.16
C = 1	= 1,2,3,5	2.7	= .03	.27
D = 2	= 1,2	3.8	= .042	.38
E = 4	= 4	7.5	= .083	.75
F = 5	= 1	9.4	= .104	.94

PRICE System
Input Worksheet

200

Item: INTEGRATED HVS CONFIGURATION

Date: 8/14/76

General	QTY: see note	PROTOS: 1	WT: see note	VOL: see note	MODE: 1
	QTYSYS: 1	INTEGE: .5	INTEGS: .5	AMULTE (%): 130	AMULTM (%): 130
Mechanical/ Structural	WS: see note	MCPLXS: -	PRODS: 5.2	NEWST: .6	DESRPS: .2
Electronics	USEVOL: .85	MCPLXE: -	PRODE: 4.2	NEWEL: .15	DESRPE: .5
	PWR: 2	CMPNTS: -	CMPID: -	PWRFAC: .3	CMPEFF: -
Engineering	ENMTHS: 1	ENMTHP: 8	ENMTHT: 9	ECMPLX: .2	PRNF:
Production	PRMTHS: 9	PRMTHF: 15	LCURVE: 0	ECNE: -	ECNS: -
Purchased Item (Mode 3)	WS:	BVCOST:	LCURVE:		
GFE (Mode 4)	WS:	MCPLXE:	MCPLXS:		
Additional Data (Modes 9 & 10)	MCONST:	MEXP:	WECF:	TARCST (Mode 10 only):	
Global	YEAR: 1978	ESC: 0	PROJCT: 01	DATA: 1.0	TLGTST: 1.0
	PLTFM: 2.0	SYSTEM: 1.0	PPROJ: 0	PDATA: 1.0	PTLGTS: 1.0

MODES

0 PRINT TOTALS	6 MODIFIED PURCH ITEM
1 E/M ITEM	7 MODIFIED GFE ITEM
2 MECH ITEM	8 PARASYN
3 PURCH ITEM	9 E/M ITEM-CALC WT & VOL
4 GFE ITEM	10 GEOSYN
5 INTEG & TEST	

Notes:

	QTY 1,2,3	WT	VOL	WS
A (½)	1,2,5	1.6	.017	.2
B (1)	1,2,5	3.2	.035	.4
C (2)	1,8	4.5	.05	.6
D (3)	5	6.7	.073	.84
E (4)	1	9.0	.098	1.1

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PRICE System
Input Worksheet

Item: INTEGRATED UPS CONFIG —

Date: 8/14/76

General	QTY: see note	PROTOS: 1	WT: see note	VOL: see note	MODE: 1
	QTYSYS: 1	INTEGE: .5	INTEGS: .5	AMULTE (%): 130	AMULTM (%): 130
Mechanical/ Structural	WS: see note	MCPLXS: -	PRODS: 5.2	NEWST: .3	DES: .2
Electronics	USEVOL: .7	MCPLXE: -	PRODE: 4.2	NEWEL: .03	DESRPE: .5
	PWR: 15	CMPNTS: -	CMPID: -	PWRFAC: .3	CMPEFF: -
Engineering	ENMTHS: 1	ENMTHP: 6	ENMTHT: 7	ECMPLX: .16	PRNF: -
Production	PRMTHS: 7	PRMTHF: 12	LCURVE: 0	ECNE:	ECNS:
Purchased Item (Mode 3)	WS:	BYCOST:	LCURVE:		
GFE (Mode 4)	WS:	MCPLXE:	MCPLXS:		
Additional Data (Modes 9 & 10)	MCONST:	MEXP:	WECF:	TARCST (Mode 10 only):	
Global	YEAR: 1978	ESC: 0	PROJCT: 0	DATA: 1	TLGTST: 1
	PLTFM: 2.0	SYSTEM: 1	PPROJ: 0	PDATA: 1	PTLGTS: 1

MODES

0 PRINT TOTALS
1 E/M ITEM
2 MECH ITEM
3 PURCH ITEM
4 GFE ITEM
5 INTEG & TEST
6 MODIFIED PURCH ITEM
7 MODIFIED GFE ITEM
8 PARASYN
9 E/M ITEM-CALC WT & VOL
10 GEOSYN

Notes:

	QTY	WT	VOL	WS
A(½)	1, 2	4.5	.05	1.0
B(1)	1, 2, 3, 5, 8	9.0	.1	2.0

PRICE System
Input Worksheet

Item: INTEGRATED DHU -

Date: 8/14/76

General	QTY: see note	PROTOS: 1	WT: 2.0	VOL: .031	MODE: 1
	QTYSYS: 1	INTEGE: .5	INTEGS: .5	AMULTE(%): 130	AMULTM(%): 130
Mechanical/ Structural	WS: .2	MCPLXS: -	PRODS: 5.2	NEWST: .5	DESRPS: .2
Electronics	USEVOL: .85	MCPLXE: -	PRODE: 5.4	NEWEL: .4	DESRPE: .2
	PWR: .2	CMPNTS: -	CMPID: -	PWRFAC: 1.3	CMPEFF: -
Engineering	ENMTHS: 1	ENMTHP: 8	ENMTHT: 9	ECMPLX: see note	PRNF:
Production	PRMTHS: 8	PRMTHF: 12	LCURVE: 0	ECNE: -	ECNS: -
Purchased Item (Mode 3)	WS:	BVCOST:	LCURVE:		
GFE (Mode 4)	WS:	MCPLXE:	MCPLXS:		
Additional Data (Modes 9 & 10)	MCONST:	MEXP:	WECF:	TARCST (Mode 10 only):	
Global	YEAR: 1978	ESC: 0	PROJCT: 0	DATA: 1	TLGTST: 1
	PLTFM: 2	SYSTEM: 1	PPROJ: 0	PDATA: 1	PTLGTS: 1

MODES

0 PRINT TOTALS
1 E/M ITEM
2 MECH ITEM
3 PURCH ITEM
4 GFE ITEM
5 INTEG & TEST
6 MODIFIED PURCH ITEM
7 MODIFIED GFE ITEM
8 PARASYN
9 E/M ITEM-CALC WT & VOL
10 GEOSYN

Notes:
DHU - simple complex = .3 QTY = 2, 4, 8
DHU - complex complex = .8 QTY = 2, 4, 8

GC 1595 2/75

INPUT DATA

QTY	1.	PROTOS	1.0	NT	0.800	VOL	0.010	MODE	1.
QTYSYS	1.	INTEGE	0.500	INTEGS	0.500	AMULTE	130.00%	AMULTM	130.00%

MECH/STRUCT

WS	0.100	MCPLXS	0.0	PRODS	5.200	NEWST	0.200	DESRPS	0.200

ELECTRONICS

USEVOL	0.700	MCPLXE	0.0	PRODE	4.200	NEWEL	0.100	DESRPE	0.500
PWR	2.000	CMPNTS	0.	CMPID	0.0	PWRFAC	0.300	CMPEFF	0.0

ENGINEERING

ENMTHS	1.0	ENMTHP	6.0	ENMTHT	7.0	ECMPLX	0.300	PRNF	0.0

PRODUCTION

PRMTHS	7.0	PRMTHF	12.0	LCURVE	0.0	ECNE	0.0	ECNS	0.0

GLOBAL

YEAR	1978.	ESC	0.0 %	PROJCT	0.0	DATA	1.000	TLGTST	1.000
PLATFM	2.000	SYSTEM	1.000	PPROJ	0.0	PDATA	1.000	PTLGTS	1.00

LCURVE IS BASED ON PRODUCTION SCHEDULE OF 5.29MONTHS.

PROGRAM COST	DEVELOPMENT	PRODUCTION	TOTAL COST
ENGINEERING			
DRAFTING	1.	2.	3.
DESIGN	2.	6.	9.
SYSTEMS	0.	0.	0.
PROJ MGMT	0.	0.	0.
DATA	0.	0.	0.
SUBTOTAL(ENG)	4.	8.	12.
MANUFACTURING			
PRODUCTION	0.	5.	5.
PROTOTYPE	6.	0.	6.
TOOL-TEST EQ	1.	0.	1.
SUBTOTAL(MFG)	6.	5.	12.
TOTAL COST	10.	13.	23.

VOL	0.010	AVCOST	4.80	TOTAL AV PROD COST		13.20	LCURVE	0.951	
WT	0.800	ECNE	0.051	ECNS	0.020	DESRPE	0.500	DESPRS	0.200

MECH/STRUCT

WS	0.100	WSCF	10.000	MECID	0.0	PRODS	5.200	MCPLXS	6.825

ELECTRONICS

WE	0.700	WECF	100.000	CMPID	0.0	PRODE	4.200	MCPLXE	8.775
PWR	2.000	CMPNTS	7.			PWRFAC	0.300	CMPEFF	-26.988

SCHEDULES

ENMTHS	1.000	ENMTHP	6.000	ENMTHT	7.000	ECMPLX	0.300	PRNF	0.0
PRMTHS	7.000	PRMTHF	12.000	AVER. PROD RATE PER MONTH					0.200

COST RANGES	DEVELOPMENT	PRODUCTION	TOTAL COST
FROM	9.	12.	21.
CENTER	10.	13.	23.
TO	12.	15.	28.

ADD =
NEXT BOX?: OK=

INPUT DATA

QTY	2.	PROTOS	1.0	WT	0.800	VOL	0.010	MODE	1.
QTYSYS	1.	INTEGE	0.500	INTEGS	0.500	AMULTE	130.00%	AMULTM	130.00%

MECH/STRUCT

WS	0.100	MCPLXS	0.0	PRODS	5.200	NEWST	0.200	DESRPS	0.200

ELECTRONICS

USEVOL	0.700	MCPLXE	0.0	PRODE	4.200	NEWEL	0.100	DESRPE	0.500
PWR	2.000	CMPNTS	0.	CMPID	0.0	PWRFAC	0.300	CMPEFF	0.0

ENGINEERING

ENNTHS	1.0	ENMTHP	6.0	ENNTHT	7.0	ECMPLX	0.300	PRNF	0.0

PRODUCTION

PRMTHS	7.0	PRMTHF	12.0	LCURVE	0.0	ECNE	0.0	ECNS	0.0

GLOBAL

YEAR	1978.	ESC	0.0 %	PROJCT	0.0	DATA	1.000	TLGTST	1.000
PLATFM	2.000	SYSTEM	1.000	PPROJ	0.0	PDATA	1.000	PTLGTS	1.00

LCURVE IS BASED ON PRODUCTION SCHEDULE OF 6.88MONTHS.

PROGRAM COST	DEVELOPMENT	PRODUCTION	TOTAL COST
ENGINEERING			
DRAFTING	1.	1.	2.
DESIGN	2.	3.	6.
SYSTEMS	0.	0.	0.
PROJ MGNT	0.	0.	0.
DATA	0.	0.	0.
SUBTOTAL(ENG)	4.	5.	8.
MANUFACTURING			
PRODUCTION	0.	9.	9.
PROTOTYPE	6.	0.	6.
TOOL-TEST EQ	1.	1.	2.
SUBTOTAL(MFG)	6.	10.	16.
TOTAL COST	10.	15.	25.

VOL	0.010	AVCOST	4.51	TOTAL AV PROD COST		7.31	LCURVE	0.953	
WT	0.800	ECNE	0.030	ECNS	0.012	DESRPE	0.500	DESPRS	0.200

MECH/STRUCT

WS	0.100	WSCF	10.000	MECID	0.0	PRODS	5.200	MCPLXS	6.825

ELECTRONICS

WE	0.700	WECF	100.000	CMPID	0.0	PRODE	4.200	MCPLXE	8.775
PWR	2.000	CMPNTS	7.			PWRFAC	0.300	CMPEFF	-26.988

SCHEDULES

ENNTHS	1.000	ENMTHP	6.000	ENNTHT	7.000	ECMPLX	0.300	PRNF	0.0
PRMTHS	7.000	PRMTHF	12.000	AVER. PROD RATE PER MONTH					0.400

COST RANGES	DEVELOPMENT	PRODUCTION	TOTAL COST
FROM	9.	13.	21.
CENTER	10.	15.	25.
TO	12.	17.	30.

ADD =
NEXT BOX?) OK=
ENTER &NL = <&NL &QTY=3&+EoND

INTEGRATED LPS


```
INPUT DATA
QTY          3. PROTOS     1.0 WT       0.300 VOL       0.010 MODE      1.
QTYSYS       1. INTEGE   0.500 INTEGS   0.500 AMULTE  130.00% AMULTM  130.00%

MECH/STRUCT
WS         0.100 MCPLXS    0.0   PRODS    5.200 NEWST     0.200 DESRPS    0.200

ELECTRONICS
USEVOL     0.700 MCPLXE    0.0   PRODE    4.200 NEWEL     0.100 DESRPE    0.500
PWR        2.000 CMPNTS      0.  CMPID    0.0   PWRFAC    0.300 CMPEFF    0.0

ENGINEERING
ENMTHS       1.0 ENMTHP      6.0 ENMTHT     7.0 ECMPLX    0.300 PRNF      0.0

PRODUCTION
PRMTHS       7.0 PRMTHF     12.0 LCURVE   0.0   ECNE      0.0   ECNS      0.0

GLOBAL
YEAR      1978.  ESC       0.0 % PROJCT   0.0   DATA      1.000 TLGTST    1.000
PLATFM     2.000 SYSTEM    1.000 PPROJ    0.0   PDATA     1.000 PTLGTS     1.00
LCURVE IS BASED ON PRODUCTION SCHEDULE OF      7.19MONTHS.


PROGRAM COST            DEVELOPMENT       PRODUCTION        TOTAL COST
ENGINEERING
 DRAFTING                        1.              1.                2.
 DESIGN                          2.              3.                5.
 SYSTEMS                         0.              0.                0.
 PROJ MGMT                       0.              0.                0.
 DATA                            0.              0.                0.
  SUBTOTAL(ENG)                  4.              5.                9.

MANUFACTURING
 PRODUCTION                      0.             14.               14.
 PROTOTYPE                       6.              0.                6.
 TOOL-TEST EQ                    1.              1.                2.
  SUBTOTAL(MFG)                  6.             15.               21.

  TOTAL COST                    10.             19.               30.

VOL        0.010 AVCOST     4.51 TOTAL AV PROD COST     6.46 LCURVE   0.952
WT         0.300 ECNE      0.030 ECNS      0.013 DESRPE 0.500 DESPRS  0.200

MECH/STRUCT
WS         0.100 WSCF     10.000 MECID     0.0   PRODS  5.200 MCPLXS  6.825
ELECTRONICS
WE         0.700 WECF    100.000 CMPID     0.0   PRODE  4.200 MCPLXE  8.775
PWR        2.000 CMPNTS        7.                PWRFAC 0.300 CMPEFF-26.988

SCHEDULES
ENMTHS     1.000 ENMTHP    6.000 ENMTHT   7.000 ECMPLX 0.300 PRNF      0.0
PRMTHS     7.000 PRMTHF   12.000 AVER. PROD RATE PER MONTH              0.600

COST RANGES             DEVELOPMENT       PRODUCTION        TOTAL COST
     FROM                        9.             17.               26.
     CENTER                     10.             19.               30.
     TO                         12.             23.               36.


ADD    =
NEXT JOB?) OK=
```

INTEGRATED LPS

INPUT DATA

QTY	4.	PROTOS	1.0	WT	0.800	VOL	0.010	MODE	1.
QTYSYS	1.	INTEGE	0.500	INTEGS	0.500	ANULTE	130.00%	ANULTM	130.00%

MECH/STRUCT

WS	0.100	MCPLXS	0.0	PRODS	5.200	NEWST	0.200	DESRPS	0.200

ELECTRONICS

USEVOL	0.700	MCPLXE	0.0	PRODE	4.200	NEWEL	0.100	DESRPE	0.500
PWR	2.000	CMPNTS	0.	CMPID	0.0	PWRFAC	0.300	CMPEFF	0.0

ENGINEERING

ENMTHS	1.0	ENMTHP	6.0	ENMTHT	7.0	ECMPLX	0.300	PRNF	0.0

PRODUCTION

PRMTHS	7.0	PRMTHF	12.0	LCURVE	0.0	ECNE	0.0	ECNS	0.0

GLOBAL

YEAR	1978.	ESC	0.0 %	PROJCT	0.0	DATA	1.000	TLGTST	1.000
PLATFM	2.000	SYSTEM	1.000	PPROJ	0.0	PDATA	1.000	PTLGTS	1.00

LCURVE IS BASED ON PRODUCTION SCHEDULE OF 7.40MONTHS.

PROGRAM COST	DEVELOPMENT	PRODUCTION	TOTAL COST
ENGINEERING			
DRAFTING	1.	1.	2.
DESIGN	2.	4.	6.
SYSTEMS	0.	0.	0.
PROJ MGMT	0.	0.	0.
DATA	0.	0.	0.
SUBTOTAL(ENG)	4.	5.	9.
MANUFACTURING			
PRODUCTION	0.	18.	18.
PROTOTYPE	5.	0.	5.
TOOL-TEST EQ	1.	1.	2.
SUBTOTAL(MFG)	6.	19.	26.
TOTAL COST	10.	24.	34.

VOL	0.010	AVCOST	4.44	TOTAL AV PROD COST		6.07	LCURVE	0.951	
WT	0.800	ECNE	0.033	ECNS	0.013	DESRPE	0.500	DESPRS	0.200

MECH/STRUCT

WS	0.100	WSCF	10.000	MECID	0.0	PRODS	5.200	MCPLXS	6.825

ELECTRONICS

WE	0.700	WECF	100.000	CMPID	0.0	PRODE	4.200	MCPLXE	0.775
PWR	2.000	CMPNTS	7.			PWRFAC	0.300	CMPEFF	-26.988

SCHEDULES

ENMTHS	1.000	ENMTHP	6.000	ENMTHT	7.000	ECMPLX	0.300	PRNF	0.0
PRMTHS	7.000	PRMTHF	12.000	AVER. PROD RATE PER MONTH					0.800

COST RANGES	DEVELOPMENT	PRODUCTION	TOTAL COST
FROM	9.	21.	30.
CENTER	10.	24.	34.
TO	12.	29.	41.

ADD =
NEXT BOX?; OK=

INPUT DATA
QTY 5. PROTOS 1.0 WT 0.800 VOL 0.010 MODE 1.
QTYSYS 1. INTEGE 0.500 INTEGS 0.500 AMULTE 130.00% AMULTM 130.00%

MECH/STRUCT
WS 0.100 MCPLXS 0.0 PRODS 5.200 NEWST 0.200 DESRPS 0.200

ELECTRONICS
USEVOL 0.700 MCPLXE 0.0 PRODE 4.200 NEWEL 0.100 DESRPE 0.500
PWR 2.000 CMPNTS 0. CMPID 0.0 PWRFAC 0.300 CMPEFF 0.0

ENGINEERING
ENMTHS 1.0 ENMTHP 6.0 ENMTHT 7.0 ECMPLX 0.300 PRNF 0.0

PRODUCTION
PRMTHS 7.0 PRMTHF 12.0 LCURVE 0.0 ECNE 0.0 ECNS 0.0

GLOBAL
YEAR 1978. ESC 0.0 % PROJCT 0.0 DATA 1.000 TLGTST 1.000
PLATFM 2.000 SYSTEM 1.000 PPROJ 0.0 PDATA 1.000 PTLGTS 1.00
LCURVE IS BASED ON PRODUCTION SCHEDULE OF 7.56MONTHS.

PROGRAM COST	DEVELOPMENT	PRODUCTION	TOTAL COST
ENGINEERING			
DRAFTING	1.	1.	2.
DESIGN	2.	4.	6.
SYSTEMS	0.	0.	0.
PROJ MGMT	0.	0.	0.
DATA	0.	0.	0.
SUBTOTAL(ENG)	4.	5.	9.
MANUFACTURING			
PRODUCTION	0.	22.	22.
PROTOTYPE	6.	0.	6.
TOOL-TEST EQ	1.	2.	2.
SUBTOTAL(MFG)	6.	24.	30.
TOTAL COST	10.	29.	39.

VOL 0.010 AVCOST 4.39 TOTAL AV PROD COST 5.81 LCURVE 0.950
WT 0.800 ECNE 0.034 ECNS 0.014 DESRPE 0.500 DESPRS 0.200

MECH/STRUCT
WS 0.100 WSCF 10.000 MECID 0.0 PRODS 5.200 MCPLXS 6.825
ELECTRONICS
WE 0.700 WECF 100.000 CMPID 0.0 PRODE 4.200 MCPLXE 8.775
PWR 2.000 CMPNTS 7. PWRFAC 0.300 CMPEFF-26.988

SCHEDULES
ENMTHS 1.000 ENMTHP 6.000 ENMTHT 7.000 ECMPLX 0.300 PRNF 0.0
PRMTHS 7.000 PRMTHF 12.000 AVER. PROD RATE PER MONTH 1.000

COST RANGES	DEVELOPMENT	PRODUCTION	TOTAL COST
FROM	9.	25.	34.
CENTER	10.	29.	39.
TO	12.	35.	47.

ADD =
NEXT BOX?! OK=
[illegible] =NL= QTY=88=END

INTEGRATED LPS

INPUT DATA

QTY	8.	PROTOS	1.0	WT	0.800	VOL	0.010	MODE	1.
QTYSYS	1.	INTEGE	0.500	INTEGS	0.500	ANULTE	130.00%	ANULTM	130.00%

MECH/STRUCT

WS	0.100	MCPLXS	0.0	PRODS	5.200	NEWST	0.200	DESRPS	0.200

ELECTRONICS

USEVOL	0.700	MCPLXE	0.0	PRODE	4.200	NEWEL	0.100	DESRPE	0.500
PWR	2.000	CMPNTS	0.	CMPID	0.0	PWRFAC	0.300	CMPEFF	0.0

ENGINEERING

ENMTHS	1.0	ENMTHP	6.0	ENMTHT	7.0	ECMPLX	0.300	PRNF	0.0

PRODUCTION

PRMTHS	7.0	PRMTHF	12.0	LCURVE	0.0	ECNE	0.0	ECNS	0.0

GLOBAL

YEAR	1978.	ESC	0.0 %	PROJCT	0.0	DATA	1.000	TLGTST	1.000
PLATFM	2.000	SYSTEM	1.000	PPROJ	0.0	PDATA	1.000	PTLGTS	1.00

LCURVE IS BASED ON PRODUCTION SCHEDULE OF 7.92MONTHS.

PROGRAM COST	DEVELOPMENT	PRODUCTION	TOTAL COST
ENGINEERING			
DRAFTING	1.	2.	3.
DESIGN	2.	4.	7.
SYSTEMS	0.	0.	0.
PROJ MGMT	0.	0.	0.
DATA	0.	0.	0.
SUBTOTAL(ENG)	4.	6.	10.
MANUFACTURING			
PRODUCTION	0.	34.	34.
PROTOTYPE	6.	0.	6.
TOOL-TEST EQ	1.	3.	3.
SUBTOTAL(MFG)	6.	37.	43.
TOTAL COST	10.	43.	53.

VOL	0.010	AVCOST	4.27	TOTAL AV PROD COST		5.35	LCURVE	0.948	
WT	0.800	ECNE	0.039	ECNS	0.016	DESRPE	0.500	DESPRS	0.200

MECH/STRUCT

WS	0.100	WSCF	10.000	MECID	0.0	PRODS	5.200	MCPLXS	6.825

ELECTRONICS

WE	0.700	WECF	100.000	CMPID	0.0	PRODE	4.200	MCPLXE	8.775
PWR	2.000	CMPNTS	7.			PWRFAC	0.300	CMPEFF	-26.988

SCHEDULES

ENMTHS	1.000	ENMTHP	6.000	ENMTHT	7.000	ECMPLX	0.300	PRNF	0.0
PRMTHS	7.000	PRMTHF	12.000	AVER. PROD RATE PER MONTH					1.600

COST RANGES	DEVELOPMENT	PRODUCTION	TOTAL COST
FROM	9.	37.	46.
CENTER	10.	43.	53.
TO	12.	52.	64.

ADD =

NEXT BOX?: OK= 73

INTEGRATED RPS CO 8/14/76 CONFIG 'A'

INPUT DATA

QTY	3.	PROTOS	1.0	WT	0.800	VOL	0.009	MODE	1.
QTYSYS	1.	INTEGE	0.500	INTEGS	0.500	AMULTE	130.00%	AMULTM	130.00%

MECH/STRUCT

WS	0.080	MCPLXS	0.0	PRODS	5.200	NEWST	0.600	DESRPS	0.200

ELECTRONICS

USEVOL	0.700	MCPLXE	0.0	PRODE	4.200	NEWEL	0.200	DESRPE	0.500
PWR	2.000	CMPNTS	0.	CMPID	0.0	PWRFAC	0.300	CMPEFF	0.0

ENGINEERING

ENMTHS	1.0	ENMTHP	4.0	ENMTHT	5.0	ECMPLX	0.070	PRNF	0.0

PRODUCTION

PRMTHS	5.0	PRMTHF	12.0	LCURVE	0.0	ECNE	0.0	ECNS	0.0

GLOBAL

YEAR	1978.	ESC	0.0 %	PROJCT	0.0	DATA	1.000	TLGTST	1.000
PLATFM	2.000	SYSTEM	1.000	PPROJ	0.0	PDATA	1.000	PTLGTS	1.00

LCURVE IS BASED ON PRODUCTION SCHEDULE OF 7.39MONTHS.

PROGRAM COST	DEVELOPMENT	PRODUCTION	TOTAL COST
ENGINEERING			
DRAFTING	1.	2.	3.
DESIGN	1.	5.	6.
SYSTEMS	0.	0.	0.
PROJ MGMT	0.	0.	0.
DATA	1.	0.	1.
SUBTOTAL(ENG)	3.	7.	9.
MANUFACTURING			
PRODUCTION	0.	16.	16.
PROTOTYPE	10.	0.	10.
TOOL-TEST EQ	0.	1.	2.
SUBTOTAL(MFG)	10.	17.	28.
TOTAL COST	13.	24.	37.

VOL	0.009	AVCOST	5.37	TOTAL AV PROD COST			7.97	LCURVE	0.951
WT	0.800	ECNE	0.039	ECNS	0.015	DESRPE	0.500	DESPRS	0.200

MECH/STRUCT

WS	0.080	WSCF	8.889	MECID	0.0	PRODS	5.200	MCPLXS	6.773

ELECTRONICS

WE	0.720	WECF	114.286	CMPID	0.0	PRODE	4.200	MCPLXE	8.965
PWR	2.000	CMPNTS	7.			PWRFAC	0.300	CMPEF	-28.521

SCHEDULES

ENMTHS	1.000	ENMTHP	4.000	ENMTHT	5.000	ECMPLX	0.070	PRNF	0.0
PRMTHS	5.000	PRMTHF	12.000	AVER. PROD RATE PER MONTH					0.429

COST RANGES	DEVELOPMENT	PRODUCTION	TOTAL COST

UDE2AO 8/14/76 RPS CONFIG B

INPUT DATA

QTY	1.	PROTOS	1.0	WT	1.600	VOL	0.018	MODE	1.
QTYSYS	1.	INTEGE	0.500	INTEGS	0.500	AMULTE	130.00%	AMULTM	130.00%

MECH/STRUCT

WS	0.160	MCPLXS	0.0	PRODS	5.200	NEWST	0.600	DESRPS	0.200

ELECTRONICS

USEVOL	0.700	MCPLXE	0.0	PRODE	4.200	NEWEL	0.200	DESRPE	0.500
PWR	2.000	CMPNTS	0.	CMPID	0.0	PWRFAC	0.300	CMPEFF	0.0

ENGINEERING

ENMTHS	1.0	ENMTHP	4.0	ENMTHT	5.0	ECMPLX	0.070	PRNF	0.0

PRODUCTION

PRMTHS	5.0	PRMTHF	12.0	LCURVE	0.0	ECNE	0.0	ECNS	0.0

GLOBAL

YEAR	1978.	ESC	0.0 %	PROJCT	0.0	DATA	1.000	TLGTST	1.000
PLATFM	2.000	SYSTEM	1.000	PPROJ	0.0	PDATA	1.000	PTLGTS	1.00

PROGRAM COST	DEVELOPMENT	PRODUCTION	TOTAL COST
ENGINEERING			
DRAFTING	2.	4.	5.
DESIGN	2.	11.	13.
SYSTEMS	0.	0.	0.
PROJ MGMT	0.	0.	0.
DATA	1.	0.	1.
SUBTOTAL(ENG)	5.	15.	20.
MANUFACTURING			
PRODUCTION	0.	11.	11.
PROTOTYPE	18.	0.	18.
TOOL-TEST EQ	1.	1.	2.
SUBTOTAL(MFG)	19.	11.	30.
TOTAL COST	24.	26.	50.

VOL	0.018	AVCOST	10.56	TOTAL AV PROD COST			26.19	LCURVE	0.942
WT	1.600	ECNE	0.055	ECNS	0.020	DESRPE	0.500	DESPRS	0.200

MECH/STRUCT

WS	0.160	WSCF	8.889	MECID	0.0	PRODS	5.200	MCPLXS	6.773

ELECTRONICS

WE	1.440	WECF	114.286	CMPID	0.0	PRODE	4.200	MCPLXE	8.965
PWR	2.000	CMPNTS	7.			PWRFAC	0.300	CMPEFF	-42.205

SCHEDULES

ENMTHS	1.000	ENMTHP	4.000	ENMTHT	5.000	ECMPLX	0.070	PRNF	0.0
PRMTHS	5.000	PRMTHF	12.000	AVER. PROD RATE PER MONTH					0.143

COST RANGES	DEVELOPMENT	PRODUCTION	TOTAL COST
FROM	20.	23.	43.
CENTER	24.	26.	50.
TO	30.	30.	60.

UDD3@0 8/14/76 RPS CONFIG B

INPUT DATA

QTY	2.	PROTOS	1.0	WT	1.600	VOL	0.018	MODE	1.
QTYSYS	1.	INTEGE	0.500	INTEGS	0.500	AMULTE	130.00%	AMULTM	130.00%

MECH/STRUCT

WS	0.160	MCPLXS	0.0	PRODS	5.200	NEWST	0.600	DESRPS	0.200

ELECTRONICS

USEVOL	0.700	MCPLXE	0.0	PRODE	4.200	NEWEL	0.200	DESRPE	0.500
PWR	2.000	CMPNTS	0.	CMPID	0.0	PWRFAC	0.300	CMPEFF	0.0

ENGINEERING

ENMTHS	1.0	ENMTHP	4.0	ENMTHT	5.0	ECMPLX	0.070	PRNF	0.0

PRODUCTION

PRMTHS	5.0	PRMTHF	12.0	LCURVE	0.0	ECNE	0.0	ECNS	0.0

GLOBAL

YEAR	1978.	ESC	0.0 %	PROJCT	0.0	DATA	1.000	TLGTST	1.000
PLATFM	2.000	SYSTEM	1.000	PPROJ	0.0	PDATA	1.000	PTLGTS	1.00

LCURVE IS BASED ON PRODUCTION SCHEDULE OF 7.10 MONTHS.

PROGRAM COST	DEVELOPMENT	PRODUCTION	TOTAL COST
ENGINEERING			
DRAFTING	2.	3.	4.
DESIGN	2.	8.	10.
SYSTEMS	0.	0.	0.
PROJ MGMT	0.	0.	0.
DATA	1.	0.	1.
SUBTOTAL(ENG)	5.	11.	16.
MANUFACTURING			
PRODUCTION	0.	20.	20.
PROTOTYPE	18.	0.	18.
TOOL-TEST EQ	1.	1.	2.
SUBTOTAL(MFG)	19.	22.	41.
TOTAL COST	24.	32.	56.

VOL	0.018	AVCOST	10.16	TOTAL AV PROD COST			16.22	LCURVE	0.953
WT	1.600	ECNE	0.039	ECNS	0.015	DESRPE	0.500	DESPRS	0.200

MECH/STRUCT

WS	0.160	WSCF	8.889	MECID	0.0	PRODS	5.200	MCPLXS	6.773

ELECTRONICS

WE	1.440	WECF	114.286	CMPID	0.0	PRODE	4.200	MCPLXE	8.965
PWR	2.000	CMPNTS	7.			PWRFAC	0.300	CMPEFF	-42.205

SCHEDULES

ENMTHS	1.000	ENMTHP	4.000	ENMTHT	5.000	ECMPLX	0.070	PRNF	0.0
PRMTHS	5.000	PRMTHF	12.000	AVER. PROD RATE PER MONTH					0.286

COST RANGES	DEVELOPMENT	PRODUCTION	TOTAL COST
FROM	20.	28.	48.
CENTER	24.	32.	56.
TO	30.	39.	68.

5INTEGRATED RPS CO 8/14/76 RPS CONFIG 13

INPUT DATA

QTY	3.	PROTOS	1.0	WT	1.600	VOL	0.018	MODE	1.
QTYSYS	1.	INTEGE	0.500	INTEGS	0.500	AMULTE	130.00%	AMULTM	130.00%

MECH/STRUCT

WS	0.160	MCPLXS	0.0	PRODS	5.200	NEWST	0.600	DESRPS	0.200

ELECTRONICS

USEVOL	0.700	MCPLXE	0.0	PRODE	4.200	NEWEL	0.200	DESRPE	0.500
PWR	2.000	CMPNTS	0.	CMPID	0.0	PWRFAC	0.300	CMPEFF	0.0

ENGINEERING

ENMTHS	1.0	ENMTHP	4.0	ENMTHT	5.0	ECMPLX	0.070	PRNF	0.0

PRODUCTION

PRMTHS	5.0	PRMTHF	12.0	LCURVE	0.0	ECNE	0.0	ECNS	0.0

GLOBAL

YEAR	1978.	ESC	0.0 %	PROJCT	0.0	DATA	1.000	TLGTST	1.000
PLATFM	2.000	SYSTEM	1.000	PPROJ	0.0	PDATA	1.000	PTLGTS	1.00

LCURVE IS BASED ON PRODUCTION SCHEDULE OF 7.43MONTHS.

PROGRAM COST	DEVELOPMENT	PRODUCTION	TOTAL COST
ENGINEERING			
DRAFTING	2.	3.	4.
DESIGN	2.	8.	10.
SYSTEMS	0.	0.	0.
PROJ MGMT	0.	0.	0.
DATA	1.	0.	1.
SUBTOTAL(ENG)	5.	11.	16.
MANUFACTURING			
PRODUCTION	0.	30.	30.
PROTOTYPE	18.	0.	18.
TOOL-TEST EQ	1.	2.	3.
SUBTOTAL(MFG)	19.	32.	51.
TOTAL COST	24.	43.	66.

VOL	0.018	AVCOST	9.94	TOTAL AV PROD COST			14.18	LCURVE	0.951
WT	1.600	ECNE	0.039	ECNS	0.015	DESRPE	0.500	DESPRS	0.200

MECH/STRUCT

WS	0.160	WSCF	8.809	MECID	0.0	PRODS	5.200	MCPLXS	6.773

ELECTRONICS

WE	1.440	WECF	114.286	CMPID	0.0	PRODE	4.200	MCPLXE	8.965
PWR	2.000	CMPNTS	7.			PWRFAC	0.300	CMPEFF	-42.205

SCHEDULES

ENMTHS	1.000	ENMTHP	4.000	ENMTHT	5.000	ECMPLX	0.070	PRNF	0.0
PRMTHS	5.000	PRMTHF	12.000	AVER. PROD RATE PER MONTH					0.429

COST RANGES	DEVELOPMENT	PRODUCTION	TOTAL COST
FROM	20.	37.	57.
CENTER	24.	43.	66.
TO	30.	51.	81.

5
INTEGRATED RPS CO 8/14/76 RPS CONFIG B

INPUT DATA

QTY	4.	PROTOS	1.0	WT	1.600	VOL	0.018	MODE	1.
QTYSYS	1.	INTEGE	0.500	INTEGS	0.500	AMULTE	130.00%	AMULTM	130.00%

MECH/STRUCT

WS	0.160	MCPLXS	0.0	PRODS	5.200	NEWST	0.600	DESRPS	0.200

ELECTRONICS

USEVOL	0.700	MCPLXE	0.0	PRODE	4.200	NEWEL	0.200	DESRPE	0.500
PWR	2.000	CMPNTS	0.	CMPID	0.0	PWRFAC	0.300	CMPEFF	0.0

ENGINEERING

ENMTHS	1.0	ENMTHP	4.0	ENMTHT	5.0	ECMPLX	0.070	PRNF	0.0

PRODUCTION

PRMTHS	5.0	PRMTHF	12.0	LCURVE	0.0	ECNE	0.0	ECNS	0.0

GLOBAL

YEAR	1978.	ESC	0.0 %	PROJCT	0.0	DATA	1.000	TLGTST	1.000
PLATFM	2.000	SYSTEM	1.000	PPROJ	0.0	PDATA	1.000	PTLGTS	1.00

LCURVE IS BASED ON PRODUCTION SCHEDULE OF 7.65MONTHS.

PROGRAM COST	DEVELOPMENT	PRODUCTION	TOTAL COST
ENGINEERING			
DRAFTING	2.	3.	4.
DESIGN	2.	8.	10.
SYSTEMS	0.	0.	0.
PROJ MGMT	0.	0.	0.
DATA	1.	0.	1.
SUBTOTAL(ENG)	5.	11.	16.
MANUFACTURING			
PRODUCTION	0.	39.	39.
PROTOTYPE	18.	0.	18.
TOOL-TEST EQ	1.	3.	3.
SUBTOTAL(MFG)	19.	42.	61.
TOTAL COST	24.	52.	76.

VOL	0.018	AVCOST	9.78	TOTAL AV PROD COST			13.10	LCURVE	0.950
WT	1.600	ECNE	0.039	ECNS	0.015	DESRPE	0.500	DESPRS	0.200

MECH/STRUCT

WS	0.160	WSCF	8.809	MECID	0.0	PRODS	5.200	MCPLXS	6.773

ELECTRONICS

WE	1.440	WECF	114.286	CMPID	0.0	PRODE	4.200	MCPLXE	8.965
PWR	2.000	CMPNTS	7.			PWRFAC	0.300	CMPEFF	-42.205

SCHEDULES

ENMTHS	1.000	ENMTHP	4.000	ENMTHT	5.000	ECMPLX	0.070	PRNF	0.0
PRMTHS	5.000	PRMTHF	12.000	AVER. PROD RATE PER MONTH					0.571

COST RANGES	DEVELOPMENT	PRODUCTION	TOTAL COST
FROM	20.	45.	65.
CENTER	24.	52.	76.

5INTEGRATED RPS CO 8/14/76 RPS CONFIG 'C'

INPUT DATA

QTY	1.	PROTOS	1.0	WT	2.700	VOL	0.030	MODE	1.
QTYSYS	1.	INTEGE	0.500	INTEGS	0.500	AMULTE	130.00%	AMULTM	130.00%

MECH/STRUCT

WS	0.270	MCPLXS	0.0	PRODS	5.200	NEWST	0.600	DESRPS	0.200

ELECTRONICS

USEVOL	0.700	MCPLXE	0.0	PRODE	4.200	NEWEL	0.200	DESRPE	0.500
PWR	2.000	CMPNTS	0.	CMPID	0.0	PWRFAC	0.300	CMPEFF	0.0

ENGINEERING

ENMTHS	1.0	ENMTHP	4.0	ENMTHT	5.0	ECMPLX	0.070	PRNF	0.0

PRODUCTION

PRMTHS	5.0	PRMTHF	12.0	LCURVE	0.0	ECNE	0.0	ECNS	0.0

GLOBAL

YEAR	1978.	ESC	0.0 %	PROJCT	0.0	DATA	1.000	TLGTST	1.000
PLATFM	2.000	SYSTEM	1.000	PPROJ	0.0	PDATA	1.000	PTLGTS	1.00

PROGRAM COST	DEVELOPMENT	PRODUCTION	TOTAL COST
ENGINEERING			
DRAFTING	2.	5.	8.
DESIGN	3.	16.	19.
SYSTEMS	0.	0.	0.
PROJ MGMT	0.	0.	0.
DATA	2.	0.	2.
SUBTOTAL(ENG)	7.	22.	29.
MANUFACTURING			
PRODUCTION	0.	17.	17.
PROTOTYPE	30.	0.	30.
TOOL-TEST EQ	1.	1.	2.
SUBTOTAL(MFG)	31.	18.	49.
TOTAL COST	38.	40.	78.

VOL	0.030	AVCOST	17.08	TOTAL AV PROD COST			39.97	LCURVE	0.942
WT	2.700	ECNE	0.055	ECNS	0.020	DESRPE	0.500	DESPRS	0.200

MECH/STRUCT

WS	0.270	WSCF	9.000	MECID	0.0	PRODS	5.200	MCPLXS	6.778

ELECTRONICS

WE	2.430	WECF	115.714	CMPID	0.0	PRODE	4.200	MCPLXE	8.982
PWR	2.000	CMPNTS	7.			PWRFAC	0.300	CMPEFF	-52.626

SCHEDULES

ENMTHS	1.000	ENMTHP	4.000	ENMTHT	5.000	ECMPLX	0.070	PRNF	0.0
PRMTHS	5.000	PRMTHF	12.000	AVER. PROD RATE PER MONTH					0.143

COST RANGES	DEVELOPMENT	PRODUCTION	TOTAL COST
FROM	32.	35.	67.
CENTER	38.	40.	78.
TO	47.	46.	94.

5INTEGRATED RPS CO 8/14/76 RPS CONFIG 'C'

INPUT DATA

QTY	2.	PROTOS	1.0	WT	2.700	VOL	0.030	MODE	1.
QTYSYS	1.	INTEGE	0.500	INTEGS	0.500	AMULTE	130.00%	AMULTM	130.00%

MECH/STRUCT

WS	0.270	MCPLXS	0.0	PRODS	5.200	NEWST	0.600	DESRPS	0.200

ELECTRONICS

USEVOL	0.700	MCPLXE	0.0	PRODE	4.200	NEWEL	0.200	DESRPE	0.500
PWR	2.000	CMPNTS	0.	CMPID	0.0	PWRFAC	0.300	CMPEFF	0.0

ENGINEERING

ENMTHS	1.0	ENMTHP	4.0	ENMTHT	5.0	ECMPLX	0.070	PRNF	0.0

PRODUCTION

PRMTHS	5.0	PRMTHF	12.0	LCURVE	0.0	ECNE	0.0	ECNS	0.0

GLOBAL

YEAR	1978.	ESC	0.0 %	PROJCT	0.0	DATA	1.000	TLGTST	1.000
PLATFM	2.000	SYSTEM	1.000	PPROJ	0.0	PDATA	1.000	PTLGTS	1.00

LCURVE IS BASED ON PRODUCTION SCHEDULE OF 7.15MONTHS.

PROGRAM COST	DEVELOPMENT	PRODUCTION	TOTAL COST
ENGINEERING			
DRAFTING	2.	4.	6.
DESIGN	3.	12.	15.
SYSTEMS	0.	0.	0.
PROJ MGMT	0.	0.	0.
DATA	2.	0.	2.
SUBTOTAL(ENG)	7.	16.	23.
MANUFACTURING			
PRODUCTION	0.	33.	33.
PROTOTYPE	30.	0.	30.
TOOL-TEST EQ	1.	2.	3.
SUBTOTAL(MFG)	31.	35.	66.
TOTAL COST	38.	51.	89.

VOL	0.030	AVCOST	16.42	TOTAL AV PROD COST		25.29	LCURVE	0.953	
WT	2.700	ECNE	0.039	ECNS	0.015	DESRPE	0.500	DESPRS	0.200

MECH/STRUCT

WS	0.270	WSCF	9.000	MECID	0.0	PRODS	5.200	MCPLXS	6.778

ELECTRONICS

WE	2.430	WECF	115.714	CMPID	0.0	PRODE	4.200	MCPLXE	8.982
PWR	2.000	CMPNTS	7.			PWRFAC	0.300	CMPEFF	-52.626

SCHEDULES

ENMTHS	1.000	ENMTHP	4.000	ENMTHT	5.000	ECMPLX	0.070	PRNF	0.0
PRMTHS	5.000	PRMTHF	12.000	AVER. PROD RATE PER MONTH					0.286

COST RANGES	DEVELOPMENT	PRODUCTION	TOTAL COST
FROM	32.	44.	76.
CENTER	38.	51.	89.
TO	47.	60.	108.

5INUGRATED RPS CO 8/14/76 RPS CONFIG 'C'

INPUT DATA

QTY	3.	PROTQS	1.0	WT	2.700	VOL	0.030	MODE	1.
QTYSYS	1.	INTEGE	0.500	INTEGS	0.500	AMULTE	130.00%	AMULTM	130.00%

MECH/STRUCT

WS	0.270	MCPLXS	0.0	PRODS	5.200	NEWST	0.600	DESRPS	0.200

ELECTRONICS

USEVOL	0.700	MCPLXE	0.0	PRODE	4.200	NEWEL	0.200	DESRPE	0.500
PWR	2.000	CMPNTS	0.	CMPID	0.0	PWRFAC	0.300	CMPEFF	0.0

ENGINEERING

ENMTHS	1.0	ENMTHP	4.0	ENMTHT	5.0	ECMPLX	0.070	PRNF	0.0

PRODUCTION

PRMTHS	5.0	PRMTHF	12.0	LCURVE	0.0	ECNE	0.0	ECNS	0.0

GLOBAL

YEAR	1978.	ESC	0.0	% PROJCT	0.0	DATA	1.000	TLGTST	1.000
PLATFM	2.000	SYSTEM	1.000	PPROJ	0.0	PDATA	1.000	PTLGTS	1.00

LCURVE IS BASED ON PRODUCTION SCHEDULE OF 7.48MONTHS.

PROGRAM COST	DEVELOPMENT	PRODUCTION	TOTAL COST
ENGINEERING			
DRAFTING	2.	4.	6.
DESIGN	3.	12.	15.
SYSTEMS	0.	0.	0.
PROJ MGMT	0.	0.	0.
DATA	2.	0.	2.
SUBTOTAL(ENG)	7.	16.	23.
MANUFACTURING			
PRODUCTION	0.	48.	48.
PROTOTYPE	30.	0.	30.
TOOL-TEST EQ	1.	3.	4.
SUBTOTAL(MFG)	31.	51.	82.
TOTAL COST	38.	67.	105.

VOL	0.030	AVCOST	16.07	TOTAL AV PROD COST			22.28	LCURVE	0.951
WT	2.700	ECNE	0.039	ECNS	0.015	DESRPE	0.500	DESPRS	0.200

MECH/STRUCT

WS	0.270	WSCF	9.000	MECID	0.0	PRODS	5.200	MCPLXS	6.778

ELECTRONICS

WE	2.430	WECF	115.714	CMPID	0.0	PRODE	4.200	MCPLXE	8.982
PWR	2.000	CMPNTS	7.			PWRFAC	0.300	CMPEFF	-52.626

SCHEDULES

ENMTHS	1.000	ENMTHP	4.000	ENMTHT	5.000	ECMPLX	0.070	PRNF	0.0
PRMTHS	5.000	PRMTHF	12.000	AVER. PROD RATE PER MONTH					0.429

COST RANGES	DEVELOPMENT	PRODUCTION	TOTAL COST
FROM	32.	58.	89.
CENTER	38.	67.	105.
TO	47.	80.	128.

5INTEGRATED RPS CO 8/14/76 RPS CONFIG 'C'

INPUT DATA

QTY	5.	PROTOS	1.0	WT	2.700	VOL	0.030	MODE	1.
QTYSYS	1.	INTEGE	0.500	INTEGS	0.500	AMULTE	130.00%	AMULTM	130.00%

MECH/STRUCT

WS	0.270	MCPLXS	0.0	PRODS	5.200	NEWST	0.600	DESRPS	0.200

ELECTRONICS

USEVOL	0.700	MCPLXE	0.0	PRODE	4.200	NEWEL	0.200	DESRPE	0.500
PWR	2.000	CMPNTS	0.	CMPID	0.0	PWRFAC	0.300	CMPEFF	0.0

ENGINEERING

ENMTHS	1.0	ENMTHP	4.0	ENMTHT	5.0	ECMPLX	0.070	PRNF	0.0

PRODUCTION

PRMTHS	5.0	PRMTHF	12.0	LCURVE	0.0	ECNE	0.0	ECNS	0.0

GLOBAL

YEAR	1978.	ESC	0.0 %	PROJCT	0.0	DATA	1.000	TLGTST	1.000
PLATFM	2.000	SYSTEM	1.000	PPROJ	0.0	PDATA	1.000	PTLGTS	1.00

LCURVE IS BASED ON PRODUCTION SCHEDULE OF 7.89MONTHS.

PROGRAM COST	DEVELOPMENT	PRODUCTION	TOTAL COST
ENGINEERING			
DRAFTING	2.	4.	6.
DESIGN	3.	12.	15.
SYSTEMS	0.	0.	0.
PROJ MGMT	0.	0.	0.
DATA	2.	0.	2.
SUBTOTAL(ENG)	7.	16.	23.
MANUFACTURING			
PRODUCTION	0.	78.	78.
PROTOTYPE	30.	0.	30.
TOOL-TEST EQ	1.	4.	6.
SUBTOTAL(MFG)	31.	83.	113.
TOTAL COST	38.	98.	136.

VOL	0.030	AVCOST	15.60	TOTAL AV PROD COST			19.66	LCURVE	0.949
WT	2.700	ECNE	0.039	ECNS	0.015	DESRPE	0.500	DESPRS	0.200

MECH/STRUCT

WS	0.270	WSCF	9.000	MECID	0.0	PRODS	5.200	MCPLXS	6.778

ELECTRONICS

WE	2.430	WECF	115.714	CMPID	0.0	PRODE	4.200	MCPLXE	8.982
PWR	2.000	CMPNTS	7.			PWRFAC	0.300	CMPEFF	-52.626

SCHEDULES

ENMTHS	1.000	ENMTHP	4.000	ENMTHT	5.000	ECMPLX	0.070	PRNF	0.0
PRMTHS	5.000	PRMTHF	12.000	AVER. PROD RATE PER MONTH					0.714

COST RANGES	DEVELOPMENT	PRODUCTION	TOTAL COST
FROM	32.	84.	116.
CENTER	38.	98.	136.
TO	47.	119.	167.

5-INTEGRATED RPS CO 8/14/76 RPS CONFIG 'D'

INPUT DATA

QTY	1.	PROTOS	1.0	WT	3.800	VOL	0.042	MODE	1.
QTYSYS	1.	INTEGE	0.500	INTEGS	0.500	AMULTE	130.00%	AMULTM	130.00%

MECH/STRUCT

WS	0.380	MCPLXS	0.0	PRODS	5.200	NEWST	0.600	DESRPS	0.200

ELECTRONICS

USEVOL	0.700	MCPLXE	0.0	PRODE	4.200	NEWEL	0.200	DESRPE	0.500
PWR	2.000	CMPNTS	0.	CMPID	0.0	PWRFAC	0.300	CMPEFF	0.0

ENGINEERING

ENMTHS	1.0	ENMTHP	4.0	ENMTHT	5.0	ECMPLX	0.070	PRNF	0.0

PRODUCTION

PRMTHS	5.0	PRMTHF	12.0	LCURVE	0.0	ECNE	0.0	ECNS	0.0

GLOBAL

YEAR	1978.	ESC	0.0 %	PROJCT	0.0	DATA	1.000	TLGTST	1.000
PLATFM	2.000	SYSTEM	1.000	PPROJ	0.0	PDATA	1.000	PTLGTS	1.00

PROGRAM COST	DEVELOPMENT	PRODUCTION	TOTAL COST
ENGINEERING			
DRAFTING	3.	7.	10.
DESIGN	4.	21.	25.
SYSTEMS	0.	0.	0.
PROJ MGMT	0.	0.	0.
DATA	2.	0.	3.
SUBTOTAL(ENG)	9.	28.	37.
MANUFACTURING			
PRODUCTION	0.	23.	23.
PROTOTYPE	41.	0.	41.
TOOL-TEST EQ	2.	1.	3.
SUBTOTAL(MFG)	42.	25.	67.
TOTAL COST	51.	53.	104.

VOL	0.042	AVCOST	23.29	TOTAL AV PROD COST			52.57	LCURVE	0.942
WT	3.800	ECNE	0.055	ECNS	0.020	DESRPE	0.500	DESPRS	0.200

MECH/STRUCT

WS	0.380	WSCF	9.048	MECID	0.0	PRODS	5.200	MCPLXS	6.780

ELECTRONICS

WE	3.420	WECF	116.327	CMPID	0.0	PRODE	4.200	MCPLXE	8.990
PWR	2.000	CMPNTS	7.			PWRFAC	0.300	CMPEFF	-59.411

SCHEDULES

ENMTHS	1.000	ENMTHP	4.000	ENMTHT	5.000	ECMPLX	0.070	PRNF	0.0
PRMTHS	5.000	PRMTHF	12.000	AVER. PROD RATE PER MONTH					0.143

COST RANGES	DEVELOPMENT	PRODUCTION	TOTAL COST
FROM	43.	47.	89.
CENTER	51.	53.	104.
TO	64.	61.	125.

5INTEGRATED RPS CO 8/14/76 RPS CONFIG 'D'

INPUT DATA

QTY	2.	PROTOS	1.0	WT	3.800	VOL	0.042	MODE	1.
QTYSYS	1.	INTEGE	0.500	INTEGS	0.500	AMULTE	130.00%	AMULTM	130.00%

MECH/STRUCT

WS	0.380	MCPLXS	0.0	PRODS	5.200	NEWST	0.600	DESRPS	0.200

ELECTRONICS

USEVOL	0.700	MCPLXE	0.0	PRODE	4.200	NEWEL	0.200	DESRPE	0.500
PWR	2.000	CMPNTS	0.	CMPID	0.0	PWRFAC	0.300	CMPEFF	0.0

ENGINEERING

ENMTHS	1.0	ENMTHP	4.0	ENMTHT	5.0	ECMPLX	0.070	PRNF	0.0

PRODUCTION

PRMTHS	5.0	PRMTHF	12.0	LCURVE	0.0	ECNE	0.0	ECNS	0.0

GLOBAL

YEAR	1978.	ESC	0.0 %	PROJCT	0.0	DATA	1.000	TLGTST	1.000
PLATFM	2.000	SYSTEM	1.000	PPROJ	0.0	PDATA	1.000	PTLGTS	1.00

LCURVE IS BASED ON PRODUCTION SCHEDULE OF 7.17MONTHS.

PROGRAM COST	DEVELOPMENT	PRODUCTION	TOTAL COST
ENGINEERING			
DRAFTING	3.	5.	8.
DESIGN	4.	15.	19.
SYSTEMS	0.	0.	0.
PROJ MGMT	0.	0.	0.
DATA	2.	0.	3.
SUBTOTAL(ENG)	9.	20.	29.
MANUFACTURING			
PRODUCTION	0.	45.	45.
PROTOTYPE	41.	0.	41.
TOOL-TEST EQ	2.	3.	4.
SUBTOTAL(MFG)	42.	47.	90.
TOTAL COST	51.	67.	119.

VOL	0.042	AVCOST	22.40	TOTAL AV PROD COST			33.75	LCURVE	0.953
WT	3.800	ECNE	0.040	ECNS	0.015	DESRPE	0.500	DESPRS	0.200

MECH/STRUCT

WS	0.380	WSCF	9.048	MECID	0.0	PRODS	5.200	MCPLXS	6.780

ELECTRONICS

WE	3.420	WECF	116.327	CMPID	0.0	PRODE	4.200	MCPLXE	8.990
PWR	2.000	CMPNTS	7.			PWRFAC	0.300	CMPEFF	-59.411

SCHEDULES

ENMTHS	1.000	ENMTHP	4.000	ENMTHT	5.000	ECMPLX	0.070	PRNF	0.0
PRMTHS	5.000	PRMTHF	12.000	AVER. PROD RATE PER MONTH					0.286

COST RANGES	DEVELOPMENT	PRODUCTION	TOTAL COST
FROM	43.	59.	101.
CENTER	51.	67.	119.
TO	64.	81.	145.

INTEGRATED RPS CO 8/14/76 RPS CONFIG 'E'

INPUT DATA

QTY	4.	PROTOS	1.0	WT	7.500	VOL	0.083	MODE	1.
QTYSYS	1.	INTEGE	0.500	INTEGS	0.500	AMULTE	130.00%	AMULTM	130.00%

MECH/STRUCT

WS	0.750	MCPLXS	0.0	PRODS	5.200	NEWST	0.600	DESRPS	0.200

ELECTRONICS

USEVOL	0.700	MCPLXE	0.0	PRODE	4.200	NEWEL	0.200	DESRPE	0.500
PWR	2.000	CMPNTS	0.	CMPID	0.0	PWRFAC	0.300	CMPEFF	0.0

ENGINEERING

ENMTHS	1.0	ENMTHP	4.0	ENMTHT	5.0	ECMPLX	0.070	PRNF	0.0

PRODUCTION

PRMTHS	5.0	PRMTHF	12.0	LCURVE	0.0	ECNE	0.0	ECNS	0.0

GLOBAL

YEAR	1978.	ESC	0.0 %	PROJCT	0.0	DATA	1.000	TLGTST	1.000
PLATFM	2.000	SYSTEM	1.000	PPROJ	0.0	PDATA	1.000	PTLGTS	1.00

LCURVE IS BASED ON PRODUCTION SCHEDULE OF 7.79 MONTHS.

PROGRAM COST	DEVELOPMENT	PRODUCTION	TOTAL COST
ENGINEERING			
DRAFTING	5.	8.	13.
DESIGN	7.	24.	30.
SYSTEMS	0.	0.	0.
PROJ MGMT	0.	0.	0.
DATA	4.	1.	5.
SUBTOTAL(ENG)	15.	32.	48.
MANUFACTURING			
PRODUCTION	0.	158.	158.
PROTOTYPE	74.	0.	74.
TOOL-TEST EQ	3.	8.	11.
SUBTOTAL(MFG)	77.	165.	242.
TOTAL COST	92.	198.	290.

VOL	0.083	AVCOST	39.38	TOTAL AV PROD COST			49.41	LCURVE	0.950
WT	7.500	ECNE	0.040	ECNS	0.015	DESRPE	0.500	DESPRS	0.200

MECH/STRUCT

WS	0.750	WSCF	9.036	MECID	0.0	PRODS	5.200	MCPLXS	6.780

ELECTRONICS

WE	6.750	WECF	116.179	CMPID	0.0	PRODE	4.200	MCPLXE	8.980
PWR	2.000	CMPNTS	7.			PWRFAC	0.300	CMPEFF	-72.824

SCHEDULES

ENMTHS	1.000	ENMTHP	4.000	ENMTHT	5.000	ECMPLX	0.070	PRNF	0.0
PRMTHS	5.000	PRMTHF	12.000	AVER. PROD RATE PER MONTH					0.571

COST RANGES	DEVELOPMENT	PRODUCTION	TOTAL COST
FROM	77.	169.	246.
CENTER	92.	198.	290.
TO	115.	240.	355.

5
INTEGRATED RPS CO 8/14/76 RPS CONCH F

INPUT DATA

QTY	1.	PROTOS	1.0	WT	9.400	VOL	0.104	MODE	1.
QTYSYS	1.	INTEGE	0.500	INTEGS	0.500	AMULTE	130.00%	AMULTM	130.00%

MECH/STRUCT

WS	0.940	MCPLXS	0.0	PRODS	5.200	NEWST	0.600	DESRPS	0.200

ELECTRONICS

USEVOL	0.700	MCPLXE	0.0	PRODE	4.200	NEWEL	0.200	DESRPE	0.500
PWR	2.000	CMPNTS	0.	CMPID	0.0	PWRFAC	0.300	CMPEFF	0.0

ENGINEERING

ENMTHS	1.0	ENMTHP	4.0	ENMTHT	5.0	ECMPLX	0.070	PRNF	0.0

PRODUCTION

PRMTHS	5.0	PRMTHF	12.0	LCURVE	0.0	ECNE	0.0	ECNS	0.0

GLOBAL

YEAR	1978.	ESC	0.0 %	PROJCT	0.0	DATA	1.000	TLGTST	1.000
PLATFM	2.000	SYSTEM	1.000	PPROJ	0.0	PDATA	1.000	PTLGTS	1.00

PROGRAM COST	DEVELOPMENT	PRODUCTION	TOTAL COST
ENGINEERING			
DRAFTING	5.	13.	19.
DESIGN	8.	39.	46.
SYSTEMS	0.	0.	0.
PROJ MGMT	0.	0.	0.
DATA	5.	1.	5.
SUBTOTAL(ENG)	18.	53.	71.
MANUFACTURING			
PRODUCTION	0.	52.	52.
PROTOTYPE	90.	0.	90.
TOOL-TEST EQ	4.	3.	6.
SUBTOTAL(MFG)	94.	55.	149.
TOTAL COST	112.	107.	219.

VOL	0.104	AVCOST	51.99	TOTAL AV PROD COST		107.27	LCURVE	0.942	
WT	9.400	ECNE	0.055	ECNS	0.020	DESRPE	0.500	DESPRS	0.200

MECH/STRUCT

WS	0.940	WSCF	9.038	MECID	0.0	PRODS	5.200	MCPLXS	6.780

ELECTRONICS

WE	8.460	WECF	116.209	CMPID	0.0	PRODE	4.200	MCPLXE	8.989
PWR	2.000	CMPNTS	7.			PWRFAC	0.300	CMPEFF	-77.283

SCHEDULES

ENMTHS	1.000	ENMTHP	4.000	ENMTHT	5.000	ECMPLX	0.070	PRNF	0.0
PRMTHS	5.000	PRMTHF	12.000	AVER. PROD RATE PER MONTH					0.143

COST RANGES	DEVELOPMENT	PRODUCTION	TOTAL COST
FROM	93.	95.	184.
CENTER	112.	107.	219.
TO	140.	125.	266.

INTEGRATED RPS CONFIG F

INPUT DATA

QTY	8.	PROTOS	1.0	WT	9.400	VOL	0.104	MODE	1.
QTYSYS	1.	INTEGE	0.500	INTEGS	0.500	AMULTE	130.00%	AMULTM	130.00%

MECH/STRUCT

WS(	0.940	MCPLXS	0.0	PRODS	5.200	NEWST	0.600	DESRPS	0.200

ELECTRONICS

USEVOL	0.700	MCPLXE	0.0	PRODE	4.200	NEWEL	0.200	DESRPE	0.500
PWR	2.000	CMPNTS	0.	CMPID	0.0	PWRFAC	0.300	CMPEFF	0.0

ENGINEERING

ENMTHS	1.0	ENMTHP	4.0	ENMTHT	5.0	ECMPLX	0.070	PRNF	0.0

PRODUCTION

PRMTHS	5.0	PRMTHF	12.0	LCURVE	0.0	ECNE	0.0	ECNS	0.0

GLOBAL

YEAR	1978.	ESC	0.0	% PROJCT	0.0	DATA	1.000	TLGTS	1.000
PLATFM	2.000	SYSTEM	1.000	PPROJ	0.0	PDATA	1.000	PTLGTS	1.00

LCURVE IS BASED ON PRODUCTION SCHEDULE OF 8.39 MONTHS.

PROGRAM COST	DEVELOPMENT	PRODUCTION	TOTAL COST
ENGINEERING			
DRAFTING	5.	10.	16.
DESIGN	8.	31.	38.
SYSTEMS	0.	0.	0.
PROJ MGMT	0.	0.	0.
DATA	5.	1.	6.
SUBTOTAL(ENG)	18.	42.	60.
MANUFACTURING			
PRODUCTION	0.	370.	370.
PROTOTYPE	90.	0.	90.
TOOL-TEST EQ	4.	16.	20.
SUBTOTAL(MFG)	94.	386.	480.
TOTAL COST	112.	429.	541.

VOL	0.104	AVCOST	46.23	TOTAL AV PROD COST			53.58	LCURVE	0.948
WT	9.400	ECNE	0.044	ECNS	0.016	DESRPE	0.500	DESRPS	0.200

MECH/STRUCT

WS	0.940	WSCF	9.038	MECID	0.0	PRODS	5.200	MCPLXS	6.780

ELECTRONICS

WE	8.460	WECF	116.209	CMPID	0.0	PRODE	4.200	MCPLXE	8.980
PWR	2.000	CMPNTS	7.			PWRFAC	0.300	CMPEFF	-77.283

SCHEDULES

ENMTHS	1.000	ENMTHP	4.000	ENMTHT	5.000	ECMPLX	0.070	PRNF	0.0
PRMTHS	5.000	PRMTHF	12.000	AVER. PROD RATE PER MONTH					1.143

COST RANGES	DEVELOPMENT	PRODUCTION	TOTAL COST

5. HVS CONFIG 'A'

8/14/76 INTEGRATED HVS

INPUT DATA

QTY	1.	PROTOS	1.0	WT	1.600	VOL	0.017	MODE	1.
QTYSYS	1.	INTEGE	0.500	INTEGS	0.500	AMULTE	130.00%	AMULTM	130.00%

MECH/STRUCT

WS	0.200	MCPLXS	0.0	PRODS	5.200	NEWST	0.600	DESRPS	0.200

ELECTRONICS

USEVOL	0.850	MCPLXE	0.0	PRODE	4.200	NEWEL	0.150	DESRPE	0.500
PWR	2.000	CMPNTS	0.	CMPID	0.0	PWRFAC	0.300	CMPEFF	0.0

ENGINEERING

ENMTHS	1.0	ENMTHP	8.0	ENMTHT	9.0	ECMPLX	0.200	PRNF	0.0

PRODUCTION

PRMTHS	9.0	PRMTHF	15.0	LCURVE	0.0	ECNE	0.0	ECNS	0.0

GLOBAL

YEAR	1978.	ESC	0.0 %	PROJCT	0.0	DATA	1.000	TLGTST	1.000
PLATFM	2.000	SYSTEM	1.000	PPROJ	0.0	PDATA	1.000	PTLGTS	1.00

PROGRAM COST	DEVELOPMENT	PRODUCTION	TOTAL COST
ENGINEERING			
DRAFTING	3.	3.	6.
DESIGN	5.	9.	15.
SYSTEMS	0.	0.	0.
PROJ MGMT	0.	0.	0.
DATA	1.	0.	1.
SUBTOTAL(ENG)	9.	13.	21.
MANUFACTURING			
PRODUCTION	0.	9.	9.
PROTOTYPE	13.	0.	13.
TOOL-TEST EQ	1.	1.	2.
SUBTOTAL(MFG)	15.	9.	24.
TOTAL COST	23.	22.	45.

VOL	0.017	AVCOST	8.59	TOTAL AV PROD COST			21.90	LCURVE	0.947
WT	1.600	ECNE	0.050	ECNS	0.021	DESRPE	0.500	DESPRS	0.200

MECH/STRUCT

WS	0.200	WSCF	11.765	MECID	0.0	PRODS	5.200	MCPLXS	6.897

ELECTRONICS

WE	1.400	WECF	96.886	CMPID	0.0	PRODE	4.200	MCPLXE	8.731
PWR	2.000	CMPNTS	7.			PWRFAC	0.300	CMPEFF	-40.441

SCHEDULES

ENMTHS	1.000	ENMTHP	8.000	ENMTHT	9.000	ECMPLX	0.200	PRNF	0.0
PRMTHS	9.000	PRMTHF	15.000	AVER. PROD RATE PER MONTH					0.167

COST RANGES	DEVELOPMENT	PRODUCTION	TOTAL COST
FROM	20.	20.	39.
CENTER	23.	22.	45.
TO	29.	25.	54.

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8/14/76 INTEGRATED HVS *HVS CONFIG 'A'*

INPUT DATA

QTY	2.	PROTOS	1.0	WT	1.600	VOL	0.017	MODE	1.
QTYSYS	1.	INTEGE	0.500	INTEGS	0.500	AMULTE	130.00%	AMULTM	130.00%

MECH/STRUCT

WS	0.200	MCPLXS	0.0	PRODS	5.200	NEWST	0.600	DESRPS	0.200

ELECTRONICS

USEVOL	0.850	MCPLXE	0.0	PRODE	4.200	NEWEL	0.150	DESRPE	0.500
PWR	2.000	CMPNTS	0.	CMPID	0.0	PWRFAC	0.300	CMPEFF	0.0

ENGINEERING

ENMTHS	1.0	ENMTHP	8.0	ENMTHT	9.0	ECMPLX	0.200	PRNF	0.0

PRODUCTION

PRMTHS	9.0	PRMTHF	15.0	LCURVE	0.0	ECNE	0.0	ECNS	0.0

GLOBAL

YEAR	1978.	ESC	0.0 %	PROJCT	0.0	DATA	1.000	TLGTST	1.000
PLATFM	2.000	SYSTEM	1.000	PPROJ	0.0	PDATA	1.000	PTLGTS	1.00

LCURVE IS BASED ON PRODUCTION SCHEDULE OF 6.0/MONTHS.

PROGRAM COST	DEVELOPMENT	PRODUCTION	TOTAL COST
ENGINEERING			
DRAFTING	3.	2.	5.
DESIGN	5.	6.	11.
SYSTEMS	0.	0.	0.
PROJ MGMT	0.	0.	0.
DATA	1.	0.	1.
SUBTOTAL(ENG)	9.	8.	17.
MANUFACTURING			
PRODUCTION	0.	17.	17.
PROTOTYPE	13.	0.	13.
TOOL-TEST EQ	1.	1.	2.
SUBTOTAL(MFG)	15.	18.	32.
TOTAL COST	23.	26.	49.

VOL	0.017	AVCOST	8.26	TOTAL AV PROD COST			13.03	LCURVE	0.954
WT	1.600	ECNE	0.033	ECNS	0.014	DESRPE	0.500	DESPRS	0.20

MECH/STRUCT

WS	0.200	WSCF	11.765	MECID	0.0	PRODS	5.200	MCPLXS	6.897

ELECTRONICS

WE	1.400	WECF	96.886	CMPID	0.0	PRODE	4.200	MCPLXE	8.731
PWR	2.000	CMPNTS	7.			PWRFAC	0.30	CMPEFF	-40.41

SCHEDULES

ENMTHS	1.000	ENMTHP	8.000	ENMTHT	9.000	ECMPLX	0.200	PRNF	0.0
PRMTHS	9.000	PRMTHF	15.000	AVER. PROD RATE PER MONTH					0.333

COST RANGES	DEVELOPMENT	PRODUCTION	TOTAL COST
FROM	20.	23.	43.
CENTER	23.	26.	49.

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8/14/76 INTEGRATED HVS HVS CONFIG 'A'

INPUT DATA

QTY	3.	PROTOS	1.0	WT	1.600	VOL	0.017	MODE	1.
QTYSYS	1.	INTEGE	0.500	INTEGS	0.500	AMULTE	130.00%	AMULTM	130.00%

MECH/STRUCT

WS	0.200	MCPLXS	0.0	PRODS	5.200	NEWST	0.600	DESRPS	0.200

ELECTRONICS

USEVOL	0.850	MCPLXE	0.0	PRODE	4.200	NEWEL	0.150	DESRPE	0.500
PWR	2.000	CMPNTS	0.	CMPID	0.0	PWRFAC	0.300	CMPEFF	0.0

ENGINEERING

ENMTHS	1.0	ENMTHP	8.0	ENMTHT	9.0	ECMPLX	0.200	PRNF	0.0

PRODUCTION

PRMTHS	9.0	PRMTHF	15.0	LCURVE	0.0	ECNE	0.0	ECNS	0.0

GLOBAL

YEAR	1978.	ESC	0.0 %	PROJCT	0.0	DATA	1.000	TLGTST	1.000
PLATFM	2.000	SYSTEM	1.000	PPROJ	0.0	PDATA	1.000	PTLGTS	1.00

LCURVE IS BASED ON PRODUCTION SCHEDULE OF 7.18MONTHS.

PROGRAM COST	DEVELOPMENT	PRODUCTION	TOTAL COST
ENGINEERING			
DRAFTING	3.	2.	5.
DESIGN	5.	6.	11.
SYSTEMS	0.	0.	0.
PROJ MGMT	0.	0.	0.
DATA	1.	0.	1.
SUBTOTAL(ENG)	9.	8.	17.
MANUFACTURING			
PRODUCTION	0.	24.	24.
PROTOTYPE	13.	0.	13.
TOOL-TEST EQ	1.	2.	3.
SUBTOTAL(MFG)	15.	26.	41.
TOTAL COST	23.	34.	58.

VOL	0.017	AVCOST	8.09	TOTAL AV PROD COST			11.43	LCURVE	0.952
WT	1.600	ECNE	0.033	ECNS	0.014	DESRPE	0.500	DESPRS	0.200

MECH/STRUCT

WS	0.200	WSCF	11.765	MECID	0.0	PRODS	5.200	MCPLXS	6.897

ELECTRONICS

WE	1.400	WECF	96.886	CMPID	0.0	PRODE	4.200	MCPLXE	8.731
PWR	2.000	CMPNTS	7.			PWRFAC	0.300	CMPEFF	-40.441

SCHEDULES

ENMTHS	1.000	ENMTHP	8.000	ENMTHT	9.000	ECMPLX	0.200	PRNF	0.0
PRMTHS	9.000	PRMTHF	15.000	AVER. PROD RATE PER MONTH					0.500

COST RANGES	DEVELOPMENT	PRODUCTION	TOTAL COST
FROM	20.	30.	50.
CENTER	23.	34.	58.

5
8/14/76 INTEGRATED HVS HVS CONFIG 13

INPUT DATA

QTY	1.	PROTOS	1.0	WT	3.200	VOL	0.035	MODE	1.
QTYSYS	1.	INTEGE	0.500	INTEGS	0.500	AMULTE	130.00%	AMULTM	130.00%

MECH/STRUCT

WS	0.400	MCPLXS	0.0	PRODS	5.200	NEWST	0.600	DESRPS	0.200

ELECTRONICS

USEVOL	0.850	MCPLXE	0.0	PRODE	4.200	NEWEL	0.150	DESRPE	0.500
PWR	2.000	CMPNTS	0.	CMPID	0.0	PWRFAC	0.300	CMPEFF	0.0

ENGINEERING

ENMTHS	1.0	ENMTHP	8.0	ENMTHT	9.0	ECMPLX	0.200	PRNF	0.0

PRODUCTION

PRMTHS	9.0	PRMTHF	15.0	LCURVE	0.0	ECNE	0.0	ECNS	0.0

GLOBAL

YEAR	1978.	ESC	0.0 %	PROJCT	0.0	DATA	1.000	TLGTST	1.000
PLATFM	2.000	SYSTEM	1.000	PPROJ	0.0	PDATA	1.000	PTLGTS	1.00

PROGRAM COST	DEVELOPMENT	PRODUCTION	TOTAL COST
ENGINEERING			
DRAFTING	4.	5.	9.
DESIGN	8.	15.	23.
SYSTEMS	0.	0.	0.
PROJ MGMT	0.	0.	0.
DATA	1.	0.	1.
SUBTOTAL(ENG)	14.	20.	34.
MANUFACTURING			
PRODUCTION	0.	15.	15.
PROTOTYPE	24.	0.	24.
TOOL-TEST EQ	2.	1.	3.
SUBTOTAL(MFG)	26.	16.	42.
TOTAL COST	40.	36.	76.

VOL	0.035	AVCOST	15.29	TOTAL AV PROD COST			36.27	LCURVE	0.947
WT	3.200	ECNE	0.050	ECNS	0.020	DESRPE	0.500	DESPRS	0.200

MECH/STRUCT

WS	0.400	WSCF	11.429	MECID	0.0	PRODS	5.200	MCPLXS	6.894

ELECTRONICS

WE	2.800	WECF	94.118	CMPID	0.0	PRODE	4.200	MCPLXE	8.690
PWR	2.000	CMPNTS	7.			PWRFAC	0.300	CMPEFF	-53.913

SCHEDULES

ENMTHS	1.000	ENMTHP	8.000	ENMTHT	9.000	ECMPLX	0.200	PRNF	0.0
PRMTHS	9.000	PRMTHF	15.000	AVER. PROD RATE PER MONTH					0.167

COST RANGES	DEVELOPMENT	PRODUCTION	TOTAL COST
FROM	34.	32.	66.
CENTER	40.	36.	76.
TO	49.	42.	91.

58/14/76 INTEGRATED HVS HVS CONFIG '13'

INPUT DATA

QTY	2.	PROTOS	1.0	WT	3.200	VOL	0.035	MODE	1.
QTYSYS	1.	INTEGE	0.500	INTEGS	0.500	AMULTE	130.00%	AMULTM	130.00%

MECH/STRUCT

WS	0.400	MCPLXS	0.0	PRODS	5.200	NEWST	0.600	DESRPS	0.200

ELECTRONICS

USEVOL	0.850	MCPLXE	0.0	PRODE	4.200	NEWEL	0.150	DESRPE	0.500
PWR	2.000	CMPNTS	0.	CMPID	0.0	PWRFAC	0.300	CMPEFF	0.0

ENGINEERING

ENMTHS	1.0	ENMTHP	8.0	ENMTHT	9.0	ECMPLX	0.200	PRNF	0.0

PRODUCTION

PRMTHS	9.0	PRMTHF	15.0	LCURVE	0.0	ECNE	0.0	ECNS	0.0

GLOBAL

YEAR	1978.	ESC	0.0	% PROJCT	0.0	DATA	1.000	TLGTST	1.000
PLATFM	2.000	SYSTEM	1.000	PPROJ	0.0	PDATA	1.000	PTLGTS	1.00

LCURVE IS BASED ON PRODUCTION SCHEDULE OF 6.86MONTHS.

PROGRAM COST	DEVELOPMENT	PRODUCTION	TOTAL COST
ENGINEERING			
DRAFTING	4.	3.	8.
DESIGN	8.	10.	18.
SYSTEMS	0.	0.	0.
PROJ MGMT	0.	0.	0.
DATA	1.	0.	1.
SUBTOTAL(ENG)	14.	13.	27.
MANUFACTURING			
PRODUCTION	0.	29.	29.
PROTOTYPE	24.	0.	24.
TOOL-TEST EQ	2.	2.	4.
SUBTOTAL(MFG)	26.	31.	57.
TOTAL COST	40.	44.	85.

VOL	0.035	AVCOST	14.71	TOTAL AV PROD COST			22.24	LCURVE	0.954
WT	3.200	ECNE	0.033	ECNS	0.014	DESRPE	0.500	DESPRS	0.200

MECH/STRUCT

WS	0.400	WSCF	11.429	MECID	0.0	PRODS	5.200	MCPLXS	6.864

ELECTRONICS

WE	2.800	WECF	94.118	CMPID	0.0	PRODE	4.200	MCPLXE	8.690
PWR	2.000	CMPNTS	7.			PWRFAC	0.300	CMPEFF	-53.913

SCHEDULES

ENMTHS	1.000	ENMTHP	8.000	ENMTHT	9.000	ECMPLX	0.200	PRNF	0.0
PRMTHS	9.000	PRMTHF	15.000	AVER. PROD RATE PER MONTH					0.333

COST RANGES	DEVELOPMENT	PRODUCTION	TOTAL COST
FROM	34.	39.	73.
CENTER	40.	44.	85.
TO	49.	53.	102.

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8/14/76 INTEGRATED HVS *HVS CONFIG 'B'*

INPUT DATA

QTY	5.	PROTOS	1.0	WT	3.200	VOL	0.035	MODE	1.
QTYSYS	1.	INTEGE	0.500	INTEGS	0.500	AMULTE	130.00%	AMULTM	130.00%

MECH/STRUCT

WS	0.400	MCPLXS	0.0	PRODS	5.200	NEWST	0.600	DESRPS	0.200

ELECTRONICS

USEVOL	0.850	MCPLXE	0.0	PRODE	4.200	NEWEL	0.150	DESRPE	0.500
PWR	2.000	CMPNTS	0.	CMPID	0.0	PWRFAC	0.300	CMPEFF	0.0

ENGINEERING

ENMTHS	1.0	ENMTHP	8.0	ENMTHT	9.0	ECMPLX	0.200	PRNF	0.0

PRODUCTION

PRMTHS	9.0	PRMTHF	15.0	LCURVE	0.0	ECNE	0.0	ECNS	0.0

GLOBAL

YEAR	1978.	ESC	0.0 %	PROJCT	0.0	DATA	1.000	TLGTST	1.000
PLATFM	2.000	SYSTEM	1.000	PPROJ	0.0	PDATA	1.000	PTLGTS	1.00

LCURVE IS BASED ON PRODUCTION SCHEDULE OF 7.57MONTHS.

PROGRAM COST	DEVELOPMENT	PRODUCTION	TOTAL COST
ENGINEERING			
DRAFTING	4.	3.	8.
DESIGN	8.	10.	19.
SYSTEMS	0.	0.	0.
PROJ MGMT	0.	0.	0.
DATA	1.	0.	1.
SUBTOTAL(ENG)	14.	14.	28.
MANUFACTURING			
PRODUCTION	0.	70.	70.
PROTOTYPE	24.	0.	24.
TOOL-TEST EQ	2.	4.	6.
SUBTOTAL(MFG)	26.	74.	100.
TOTAL COST	40.	88.	128.

VOL	0.035	AVCOST	14.00	TOTAL AV PROD COST			17.56	LCURVE	0.951
WT	3.200	ECNE	0.034	ECNS	0.015	DESRPE	0.500	DESPRS	0.200

MECH/STRUCT

WS	0.400	WSCF	11.429	MECID	0.0	PRODS	5.200	MCPLXS	6.884

ELECTRONICS

WE	2.800	WECF	94.118	CMPID	0.0	PRODE	4.200	MCPLXE	8.690
PWR	2.000	CMPNTS	7.			PWRFAC	0.300	CMPEFF	-53.913

SCHEDULES

ENMTHS	1.000	ENMTHP	8.000	ENMTHT	9.000	ECMPLX	0.200	PRNF	0.0
PRMTHS	9.000	PRMTHF	15.000	AVER. PROD RATE PER MONTH					0.833

COST RANGES	DEVELOPMENT	PRODUCTION	TOTAL COST
FROM	34.	76.	110.
CENTER	40.	88.	128.

58/14/76 - INTEGRATED HVS HVS CONFIG 'C'

INPUT DATA

QTY	1.	PROTOS	1.0	WT	4.500	VOL	0.050	MODE	1.
QTYSYS	1.	INTEGE	0.500	INTEGS	0.500	AMULTE	130.00%	AMULTM	130.00%

MECH/STRUCT

WS	0.600	MCPLXS	0.0	PRODS	5.200	NEWST	0.600	DESRPS	0.200

ELECTRONICS

USEVOL	0.850	MCPLXE	0.0	PRODE	4.200	NEWEL	0.150	DESRPE	0.500
PWR	2.000	CMPNTS	0.	CMPID	0.0	PWRFAC	0.300	CMPEFF	0.0

ENGINEERING

ENMTHS	1.0	ENMTHP	8.0	ENMTHT	9.0	ECMPLX	0.200	PRNF	0.0

PRODUCTION

PRMTHS	9.0	PRMTHF	15.0	LCURVE	0.0	ECNE	0.0	ECNS	0.0

GLOBAL

YEAR	1978.	ESC	0.0 %	PROJCT	0.0	DATA	1.000	TLGTST	1.000
PLATFM	2.000	SYSTEM	1.000	PPROJ	0.0	PDATA	1.000	PTLGTS	1.00

PROGRAM COST	DEVELOPMENT	PRODUCTION	TOTAL COST
ENGINEERING			
DRAFTING	5.	6.	12.
DESIGN	11.	18.	29.
SYSTEMS	0.	0.	0.
PROJ MGMT	0.	0.	0.
DATA	1.	0.	2.
SUBTOTAL(ENG)	18.	25.	42.
MANUFACTURING			
PRODUCTION	0.	20.	20.
PROTOTYPE	32.	0.	32.
TOOL-TEST EQ	2.	1.	4.
SUBTOTAL(MFG)	34.	21.	55.
TOTAL COST	52.	46.	97.

VOL	0.050	AVCOST	19.92	TOTAL AV PROD COST			45.71	LCURVE	0.947
WT	4.500	ECNE	0.049	ECNS	0.021	DESRPE	0.500	DESPRS	0.200

MECH/STRUCT

WS	0.600	WSCF	12.000	MECID	0.0	PRODS	5.200	MCPLXS	6.906

ELECTRONICS

WE	3.900	WECF	91.765	CMPID	0.0	PRODE	4.200	MCPLXE	8.655
PWR	2.000	CMPNTS	7.			PWRFAC	0.300	CMPEFF	-60.270

SCHEDULES

ENMTHS	1.000	ENMTHP	8.000	ENMTHT	9.000	ECMPLX	0.200	PRNF	0.0
PRMTHS	9.000	PRMTHF	15.000	AVER. PROD RATE PER MONTH					0.167

COST RANGES	DEVELOPMENT	PRODUCTION	TOTAL COST
FROM	44.	41.	85.
CENTER	52.	46.	97.
TO	63.	53.	116.

58/14/76 INTEGRATED HVS HVS CONFIG C

INPUT DATA

QTY	8.	PROTOS	1.0	WT	4.500	VOL	0.050	MODE	1.
QTYSYS	1.	INTEGE	0.500	INTEGS	0.500	AMULTE	130.00%	AMULTM	130.00%

MECH/STRUCT

WS	0.600	MCPLXS	0.0	PRODS	5.200	NEWST	0.600	DESRPS	0.200

ELECTRONICS

USEVOL	0.850	MCPLXE	0.0	PRODE	4.200	NEWEL	0.150	DESRPE	0.500
PWR	2.000	CMPNTS	0.	CMPID	0.0	PWRFAC	0.300	CMPEFF	0.0

ENGINEERING

ENMTHS	1.0	ENMTHP	8.0	ENMTHT	9.0	ECMPLX	0.200	PRNF	0.0

PRODUCTION

PRMTHS	9.0	PRMTHF	15.0	LCURVE	0.0	ECNE	0.0	ECNS	0.0

GLOBAL

YEAR	1978.	ESC	0.0 %	PROJCT	0.0	DATA	1.000	TLGTST	1.000
PLATFM	2.000	SYSTEM	1.000	PPROJ	0.0	PDATA	1.000	PTLGTS	1.00

LCURVE IS BASED ON PRODUCTION SCHEDULE OF 7.92 MONTHS.

PROGRAM COST	DEVELOPMENT	PRODUCTION	TOTAL COST
ENGINEERING			
DRAFTING	5.	5.	10.
DESIGN	11.	14.	25.
SYSTEMS	0.	0.	0.
PROJ MGMT	0.	0.	0.
DATA	1.	0.	2.
SUBTOTAL(ENG)	18.	19.	37.
MANUFACTURING			
PRODUCTION	0.	142.	142.
PROTOTYPE	32.	0.	32.
TOOL-TEST EQ	2.	7.	10.
SUBTOTAL(MFG)	34.	149.	183.
TOTAL COST	52.	169.	220.

VOL	0.050	AVCOST	17.76	TOTAL AV PROD COST			21.08	LCURVE	0.949
WT	4.500	ECNE	0.038	ECNS	0.016	DESRPE	0.500	DESPRS	0.200

MECH/STRUCT

WS	0.600	WSCF	12.000	MECID	0.0	PRODS	5.200	MCPLXS	6.906

ELECTRONICS

WE	3.900	WECF	91.765	CMPID	0.0	PRODE	4.200	MCPLXE	8.655
PWR	2.000	CMPNTS	7.			PWRFAC	0.300	CMPEFF	-60.270

SCHEDULES

ENMTHS	1.000	ENMTHP	8.000	ENMTHT	9.000	ECMPLX	0.200	PRNF	0.0
PRMTHS	9.000	PRMTHF	15.000	AVER. PROD RATE PER MONTH					1.335

COST RANGES	DEVELOPMENT	PRODUCTION	TOTAL COST
FROM	44.	145.	188.
CENTER	52.	169.	220.
TO	63.	204.	267.

5-8/14/76 - INTEGRATED HVS HVS CONFIG 'D'

INPUT DATA

QTY	5.	PROTOS	1.0	WT	6.700	VOL	0.073	MODE	1.
QTYSYS	1.	INTEGE	0.500	INTEGS	0.500	AMULTE	130.00%	AMULTM	130.00%

MECH/STRUCT

WS	0.840	MCPLXS	0.0	PRODS	5.200	NEWST	0.600	DESRPS	0.200

ELECTRONICS

USEVOL	0.850	MCPLXE	0.0	PRODE	4.200	NEWEL	0.150	DESRPE	0.500
PWR	2.000	CMPNTS	0.	CMPID	0.0	PWRFAC	0.300	CMPEFF	0.0

ENGINEERING

ENMTHS	1.0	ENMTHP	8.0	ENMTHT	9.0	ECMPLX	0.200	PRNF	0.0

PRODUCTION

PRMTHS	9.0	PRMTHF	15.0	LCURVE	0.0	ECNE	0.0	ECNS	0.0

GLOBAL

YEAR	1978.	ESC	0.0 %	PROJCT	0.0	DATA	1.000	TLGTST	1.000
PLATFM	2.000	SYSTEM	1.000	PPROJ	0.0	PDATA	1.000	PTLGTS	1.00

LCURVE IS BASED ON PRODUCTION SCHEDULE OF 7.63 MONTHS.

PROGRAM COST	DEVELOPMENT	PRODUCTION	TOTAL COST
ENGINEERING			
DRAFTING	7.	6.	13.
DESIGN	14.	17.	31.
SYSTEMS	0.	0.	0.
PROJ MGMT	0.	0.	0.
DATA	2.	0.	3.
SUBTOTAL(ENG)	24.	24.	47.
MANUFACTURING			
PRODUCTION	0.	135.	135.
PROTOTYPE	47.	0.	47.
TOOL-TEST EQ	4.	7.	10.
SUBTOTAL(MFG)	50.	142.	192.
TOTAL COST	74.	165.	239.

VOL	0.073	AVCOST	27.02	TOTAL AV PROD COST			33.07	LCURVE	0.951
WT	6.700	ECNE	0.034	ECNS	0.015	DESRPE	0.500	DESPRS	0.200

MECH/STRUCT

WS	0.840	WSCF	11.507	MECID	0.0	PRODS	5.200	MCPLXS	6.887

ELECTRONICS

WE	5.860	WECF	94.440	CMPID	0.0	PRODE	4.200	MCPLXE	8.695
PWR	2.000	CMPNTS	7.			PWRFAC	0.300	CMPEFF	-68.518

SCHEDULES

ENMTHS	1.000	ENMTHP	8.000	ENMTHT	9.000	ECMPLX	0.200	PRNF	0.0
PRMTHS	9.000	PRMTHF	15.000	AVER. PROD RATE PER MONTH					0.833

COST RANGES	DEVELOPMENT	PRODUCTION	TOTAL COST
FROM	63.	142.	204.
CENTER	74.	165.	239.
TO	91.	200.	291.

8/14/76 INTEGRATED HVS HVS CONFIG 'E'

INPUT DATA

QTY	1.	PROTOS	1.0	WT	9.000	VOL	0.098	MODE	1.
QTYSYS	1.	INTEGE	0.500	INTEGS	0.500	AMULTE	130.00%	AMULTM	130.00%

MECH/STRUCT

WS	1.100	MCPLXS	0.0	PRODS	5.200	NEWST	0.600	DESRPS	0.200

ELECTRONICS

USEVOL	0.850	MCPLXE	0.0	PRODE	4.200	NEWEL	0.150	DESRPE	0.500
PWR	2.000	CMPNTS	0.	CMPID	0.0	PWRFAC	0.300	CMPEFF	0.0

ENGINEERING

ENMTHS	1.0	ENMTHP	8.0	ENMTHT	9.0	ECMPLX	0.200	PRNF	0.0

PRODUCTION

PRMTHS	9.0	PRMTHF	15.0	LCURVE	0.0	ECNE	0.0	ECNS	0.0

GLOBAL

YEAR	1978.	ESC	0.0 %	PROJCT	0.0	DATA	1.000	TLGTST	1.000
PLATFM	2.000	SYSTEM	1.000	PPROJ	0.0	PDATA	1.000	PTLGTS	1.00

PROGRAM COST	DEVELOPMENT	PRODUCTION	TOTAL COST
ENGINEERING			
DRAFTING	9.	10.	19.
DESIGN	17.	31.	48.
SYSTEMS	0.	0.	0.
PROJ MGMT	0.	0.	0.
DATA	3.	0.	3.
SUBTOTAL(ENG)	29.	42.	71.
MANUFACTURING			
PRODUCTION	0.	39.	39.
PROTOTYPE	61.	0.	61.
TOOL-TEST EQ	5.	2.	7.
SUBTOTAL(MFG)	66.	41.	106.
TOTAL COST	95.	82.	177.

VOL	0.098	AVCOST	38.58	TOTAL AV PROD COST			82.41	LCURVE	0.947
WT	9.000	ECNE	0.050	ECNS	0.020	DESRPE	0.500	DESPRS	0.200

MECH/STRUCT

WS	1.100	WSCF	11.224	MECID	0.0	PRODS	5.200	MCPLXS	6.876

ELECTRONICS

WE	7.900	WECF	94.838	CMPID	0.0	PRODE	4.200	MCPLXE	8.701
PWR	2.000	CMPNTS	7.			PWRFAC	0.300	CMPEFF	74.406

SCHEDULES

ENMTHS	1.000	ENMTHP	8.000	ENMTHT	9.000	ECMPLX	0.200	PRNF	0.0
PRMTHS	9.000	PRMTHF	15.000	AVER. PROD RATE PER MONTH					0.167

COST RANGES	DEVELOPMENT	PRODUCTION	TOTAL COST
FROM	80.	73.	153.
CENTER	95.	82.	177.
TO	116.	96.	212.

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INTEGRATED UPS CON 8/14/76 UPS CONFIG A

INPUT DATA

QTY	1.	PROTOS	1.0	WT	4.500	VOL	0.050	MODE	1.
QTYSYS	1.	INTEGE	0.500	INTEGS	0.500	AMULTE	130.00%	AMULTM	130.00%

MECH/STRUCT

WS	1.000	MCPLXS	0.0	PRODS	5.200	NEWST	0.300	DESRPS	0.200

ELECTRONICS

USEVOL	0.700	MCPLXE	0.0	PRODE	4.200	NEWEL	0.030	DESRPE	0.500
PWR	15.000	CMPNTS	0.	CMPID	0.0	PWRFAC	0.300	CMPEFF	0.0

ENGINEERING

ENMTHS	1.0	ENMTHP	6.0	ENMTHT	7.0	ECMPLX	0.160	PRNF	0.0

PRODUCTION

PRMTHS	7.0	PRMTHF	12.0	LCURVE	0.0	ECNE	0.0	ECNS	0.0

GLOBAL

YEAR	1978.	ESC	0.0 %	PROJCT	0.0	DATA	1.000	TLGTST	1.000
PLATFM	2.000	SYSTEM	1.000	PPROJ	0.0	PDATA	1.000	PTLGTS	1.00

LCURVE IS BASED ON PRODUCTION SCHEDULE OF 5.29MONTHS.

PROGRAM COST	DEVELOPMENT	PRODUCTION	TOTAL COST
ENGINEERING			
DRAFTING	1.	6.	8.
DESIGN	2.	19.	21.
SYSTEMS	0.	0.	0.
PROJ MGMT	0.	0.	0.
DATA	1.	0.	1.
SUBTOTAL(ENG)	5.	25.	30.
MANUFACTURING			
PRODUCTION	0.	21.	21.
PROTOTYPE	31.	0.	31.
TOOL-TEST EQ	2.	1.	4.
SUBTOTAL(MFG)	33.	22.	55.
TOTAL COST	38.	47.	85.

VOL	0.050	AVCOST	20.79	TOTAL AV PROD COST		47.44	LCURVE	0.951	
WT	4.500	ECNE	0.051	ECNS	0.023	DESRPE	0.500	DESPRS	0.200

MECH/STRUCT

WS	1.000	WSCF	20.000	MECID	0.0	PRODS	5.200	MCPLXS	7.139

ELECTRONICS

WE	3.500	WECF	100.000	CMPID	0.0	PRODE	4.200	MCPLXE	8.775
PWR	15.000	CMPNTS	55.			PWRFAC	0.300	CMPEFF	-19.013

SCHEDULES

ENMTHS	1.000	ENMTHP	6.000	ENMTHT	7.000	ECMPLX	0.160	PRNF	0.0
PRMTHS	7.000	PRMTHF	12.000	AVER. PROD RATE PER MONTH					0.200

COST RANGES	DEVELOPMENT	PRODUCTION	TOTAL COST
FROM	32.	42.	74.

INTEGRATED UPS CON 8/14/76 UPS CONFIG A

INPUT DATA

QTY	2.	PROTOS	1.0	WT	4.500	VOL	0.050	MODE	1.
QTYSYS	1.	INTEGE	0.500	INTEGS	0.500	AMULTE	130.00%	AMULTM	130.00%

MECH/STRUCT

WS	1.000	MCPLXS	0.0	PRODS	5.200	NEWST	0.300	DESRPS	0.200

ELECTRONICS

USEVOL	0.700	MCPLXE	0.0	PRODE	4.200	NEWEL	0.030	DESRPE	0.500
PWR	15.000	CMPNTS	0.	CMPID	0.0	PWRFAC	0.300	CMPEFF	0.0

ENGINEERING

ENMTHS	1.0	ENMTHP	6.0	ENMTHT	7.0	ECMPLX	0.160	PRNF	0.0

PRODUCTION

PRMTHS	7.0	PRMTHF	12.0	LCURVE	0.0	ECNE	0.0	ECNS	0.0

GLOBAL

YEAR	1978.	ESC	0.0 %	PROJCT	0.0	DATA	1.000	TLGTST	1.000
PLATFM	2.000	SYSTEM	1.000	PPROJ	0.0	PDATA	1.000	PTLGTS	1.00

LCURVE IS BASED ON PRODUCTION SCHEDULE OF 6.96MONTHS.

PROGRAM COST	DEVELOPMENT	PRODUCTION	TOTAL COST
ENGINEERING			
DRAFTING	1.	4.	5.
DESIGN	2.	11.	13.
SYSTEMS	0.	0.	0.
PROJ MGMT	0.	0.	0.
DATA	1.	0.	1.
SUBTOTAL(ENG)	5.	15.	19.
MANUFACTURING			
PRODUCTION	0.	40.	40.
PROTOTYPE	31.	0.	31.
TOOL-TEST EQ	2.	2.	5.
SUBTOTAL(MFG)	33.	42.	76.
TOTAL COST	38.	57.	95.

VOL	0.050	AVCOST	19.97	TOTAL AV PROD COST			28.57	LCURVE	0.954
WT	4.500	ECNE	0.030	ECNS	0.014	DESRPE	0.500	DESPRS	0.200

MECH/STRUCT

WS	1.000	WSCF	20.000	MECID	0.0	PRODS	5.200	MCPLXS	7.139

ELECTRONICS

WE	3.500	WECF	100.000	CMPID	0.0	PRODE	4.200	MCPLXE	8.775
PWR	15.000	CMPNTS	55.			PWRFAC	0.300	CMPEFF	-19.013

SCHEDULES

ENMTHS	1.000	ENMTHP	6.000	ENMTHT	7.000	ECMPLX	0.160	PRNF	0.0
PRMTHS	7.000	PRMTHF	12.000	AVER. PROD RATE PER MONTH					0.400

COST RANGES	DEVELOPMENT	PRODUCTION	TOTAL COST
FROM	32.	50.	82.

5INTEGRATED UPS CON 8/14/76 UPS CONFIG B

INPUT.DATA

QTY	1.	PROTOS	1.0	WT	9.000	VOL	0.100	MODE	1.
QTYSYS	1.	INTEGE	0.500	INTEGS	0.500	AMULTE	130.00%	AMULTM	130.00%

MECH/STRUCT

WS	2.000	MCPLXS	0.0	PRODS	5.200	NEWST	0.300	DESRPS	0.200

ELECTRONICS

USEVOL	0.700	MCPLXE	0.0	PRODE	4.200	NEWEL	0.030	DESRPE	0.500
PWR	15.000	CMPNTS	0.	CMPID	0.0	PWRFAC	0.300	CMPEFF	0.0

ENGINEERING

ENMTHS	1.0	ENMTHP	6.0	ENMTHT	7.0	ECMPLX	0.160	PRNF	0.0

PRODUCTION

PRMTHS	7.0	PRMTHF	12.0	LCURVE	0.0	ECNE	0.0	ECNS	0.0

GLOBAL

YEAR	1978.	ESC	0.0 %	PROJCT	0.0	DATA	1.000	TLGTST	1.000
PLATFM	2.000	SYSTEM	1.000	PPROJ	0.0	PDATA	1.000	PTLGTS	1.00

LCURVE IS BASED ON PRODUCTION SCHEDULE OF 5.30MONTHS.

PROGRAM COST	DEVELOPMENT	PRODUCTION	TOTAL COST
ENGINEERING			
DRAFTING	2.	10.	12.
DESIGN	4.	30.	34.
SYSTEMS	0.	0.	0.
PROJ MGMT	0.	0.	0.
DATA	2.	0.	2.
SUBTOTAL(ENG)	8.	41.	49.
MANUFACTURING			
PRODUCTION	0.	38.	38.
PROTOTYPE	57.	0.	57.
TOOL-TEST EQ	4.	2.	6.
SUBTOTAL(MFG)	61.	41.	102.
TOTAL COST	69.	82.	151.

VOL	0.100	AVCOST	38.37	TOTAL AV PROD COST		81.74	LCURVE	0.951	
WT	9.000	ECNE	0.051	ECNS	0.023	DESRPE	0.500	DESPRS	0.200

MECH/STRUCT

WS	2.000	WSCF	20.000	MECID	0.0	PRODS	5.200	MCPLXS	7.139

ELECTRONICS

WE	7.000	WECF	100.000	CMPID	0.0	PRODE	4.200	MCPLXE	8.775
PWR	15.000	CMPNTS	55.			PWRFAC	0.300	CMPEFF	-32.697

SCHEDULES

ENMTHS	1.000	ENMTHP	6.000	ENMTHT	7.000	ECMPLX	0.160	PRNF	0.0
PRMTHS	7.000	PRMTHF	12.000	AVER. PROD RATE PER MONTH					0.200

COST RANGES	DEVELOPMENT	PRODUCTION	TOTAL COST
FROM	58.	72.	131.
CENTER	69.	82.	151.
TO	85.	95.	180.

5INTEGRATED UPS CON 8/14/76 UPS CONFIG 'B'

INPUT DATA

QTY	2.	PROTOS	1.0	WT	9.000	VOL	0.100	MODE	1.
QTYSYS	1.	INTEGE	0.500	INTEGS	0.500	AMULTE	130.00%	AMULTM	130.00%

MECH/STRUCT

WS	2.000	MCPLXS	0.0	PRODS	5.200	NEWST	0.300	DESRPS	0.200

ELECTRONICS

USEVOL	0.700	MCPLXE	0.0	PRODE	4.200	NEWEL	0.030	DESRPE	0.500
PWR	15.000	CMPNTS	0.	CMPID	0.0	PWRFAC	0.300	CMPEFF	0.0

ENGINEERING

ENMTHS	1.0	ENMTHP	6.0	ENMTHT	7.0	ECMPLX	0.160	PRNF	0.0

PRODUCTION

PRMTHS	7.0	PRMTHF	12.0	LCURVE	0.0	ECNE	0.0	ECNS	0.0

GLOBAL

YEAR	1978.	ESC	0.0	% PROJCT	0.0	DATA	1.000	TLGTST	1.000
PLATFM	2.000	SYSTEM	1.000	PPROJ	0.0	PDATA	1.000	PTLGTS	1.00

LCURVE IS BASED ON PRODUCTION SCHEDULE OF 7.00MONTHS.

PROGRAM COST	DEVELOPMENT	PRODUCTION	TOTAL COST
ENGINEERING			
DRAFTING	2.	6.	8.
DESIGN	4.	18.	21.
SYSTEMS	0.	0.	0.
PROJ MGMT-	0.	0.	0.
14:44:46 MSG FROM OPERATOR: SYSTEM COMING DOWN IN 15 MINS			
DATA	2.	0.	2.
SUBTOTAL(ENG)	8.	24.	32.
MANUFACTURING			
PRODUCTION	0.	74.	74.
PROTOTYPE	57.	0.	57.
TOOL-TEST EQ	4.	4.	8.
SUBTOTAL(MFG)	61.	78.	139.
TOTAL COST	69.	102.	171.

VOL	0.100	AVCOST	36.86	TOTAL AV PROD COST			50.86	LCURVE	0.954
WT	9.000	ECNE	0.030	ECNS	0.014	DESRPE	0.500	DESPRS	0.200

MECH/STRUCT

WS	2.000	WSCF	20.000	MECID	0.0	PRODS	5.200	MCPLXS	7.139

ELECTRONICS

WE	7.000	WECF	100.000	CMPID	0.0	PRODE	4.200	MCPLXE	8.775
PWR	15.000	CMPNTS	55.			PWRFAC	0.300	CMPEFF	-32.697

SCHEDULES

ENMTHS	1.000	ENMTHP	6.000	ENMTHT	7.000	ECMPLX	0.160	PRNF	0.0
PRMTHS	7.000	PRMTHF	12.000	AVER. PROD RATE PER MONTH					0.400

COST RANGES	DEVELOPMENT	PRODUCTION	TOTAL COST
FROM	58.	88.	146.
CENTER	69.	102.	171.

5INTEGRATED UPS CON 8/14/76 UPS CONFIG 'B'

INPUT DATA

QTY	3.	PROTOS	1.0	WT	9.000	VOL	0.100	MODE	1.
QTYSYS	1.	INTEGE	0.500	INTEGS	0.500	AMULTE	130.00%	AMULTM	130.00%

MECH/STRUCT

WS	2.000	MCPLXS	0.0	PRODS	5.200	NEWST	0.300	DESRPS	0.200

ELECTRONICS

USEVOL	0.700	MCPLXE	0.0	PRODE	4.200	NEWEL	0.030	DESRPE	0.500
PWR	15.000	CMPNTS	0.	CMPID	0.0	PWRFAC	0.300	CMPEFF	0.0

ENGINEERING

ENMTHS	1.0	ENMTHP	6.0	ENMTHT	7.0	ECMPLX	0.160	PRNF	0.0

PRODUCTION

PRMTHS	7.0	PRMTHF	12.0	LCURVE	0.0	ECNE	0.0	ECNS	0.0

GLOBAL

YEAR	1978.	ESC	0.0 %	PROJCT	0.0	DATA	1.000	TLGTST	1.000
PLATFM	2.000	SYSTEM	1.000	RPROJ	0.0	PDATA	1.000	PTLGTS	1.00

LCURVE IS BASED ON PRODUCTION SCHEDULE OF 7.34MONTHS.

PROGRAM COST	DEVELOPMENT	PRODUCTION	TOTAL COST
ENGINEERING			
DRAFTING	2.	6.	8.
DESIGN	4.	19.	22.
SYSTEMS	0.	0.	0.
PROJ MGMT	0.	0.	0.
DATA	2.	0.	2.
SUBTOTAL(ENG)	8.	25.	33.
MANUFACTURING			
PRODUCTION	0.	108.	108.
PROTOTYPE	57.	0.	57.
TOOL-TEST EQ	4.	6.	10.
SUBTOTAL(MFG)	61.	114.	175.
TOTAL COST	69.	139.	208.

VOL	0.100	AVCOST	36.10	TOTAL AV PROD COST		46.44	LCURVE	0.952	
WT	9.000	ECNE	0.031	ECNS	0.015	DESRPE	0.500	DESPRS	0.200

MECH/STRUCT

WS	2.000	WSCF	20.000	MECID	0.0	PRODS	5.200	MCPLXS	7.139

ELECTRONICS

WE	7.000	WECF	100.000	CMPID	0.0	PRODE	4.200	MCPLXE	8.775
PWR	15.000	CMPNTS	55.			PWRFAC	0.300	CMPEFF	-32.697

SCHEDULES

ENMTHS	1.000	ENMTHP	6.000	ENMTHT	7.000	ECMPLX	0.160	PRNF	0.0
PRMTHS	7.000	PRMTHF	12.000	AVER. PROD RATE PER MONTH					0.600

COST RANGES	DEVELOPMENT	PRODUCTION	TOTAL COST
FROM	58.	120.	178.
CENTER	69.	139.	208.
TO	85.	168.	253.

5
INTEGRATED UPS CONFIG B

INPUT DATA

QTY	4.	PROTOS	1.0	WT	9.000	VOL	0.100	MODE	1.
QTYSYS	1.	INTEGE	0.500	INTEGS	0.500	AMULTE	130.00%	AMULTM	130.00%

MECH/STRUCT

WS	2.000	MCPLXS	0.0	PRODS	5.200	NEWST	0.300	DESRPS	0.200

ELECTRONICS

USEVOL	0.700	MCPLXE	0.0	PRODE	4.200	NEWEL	0.030	DESRPE	0.500
PWR	15.000	CMPNTS	0.	CMPID	0.0	PWRFAC	0.300	CMPEFF	0.0

ENGINEERING

ENMTHS	1.0	ENMTHP	6.0	ENMTHT	7.0	ECMPLX	0.160	PRNF	0.0

PRODUCTION

PRMTHS	7.0	PRMTHF	12.0	LCURVE	0.0	ECNE	0.0	ECNS	0.0

GLOBAL

YEAR	1978.	ESC	0.0 %	PROJCT	0.0	DATA	1.000	TLGTST	1.000
PLATFM	2.000	SYSTEM	1.000	PPROJ	0.0	PDATA	1.000	PTLGTS	1.00

LCURVE IS BASED ON PRODUCTION SCHEDULE OF 7.57MONTHS.

PROGRAM COST	DEVELOPMENT	PRODUCTION	TOTAL COST
ENGINEERING			
DRAFTING	2.	7.	9.
DESIGN	4.	20.	24.
SYSTEMS	0.	0.	0.
PROJ MGMT	0.	0.	0.
DATA	2.	1.	2.
SUBTOTAL(ENG)	8.	27.	35.
MANUFACTURING			
PRODUCTION	0.	142.	142.
PROTOTYPE	57.	0.	57.
TOOL-TEST EQ	4.	7.	11.
SUBTOTAL(MFG)	61.	150.	211.
TOTAL COST	69.	177.	246.

VOL	0.100	AVCOST	35.55	TOTAL AV PROD COST			44.20	LCURVE	0.951
WT	9.000	ECNE	0.034	ECNS	0.016	DESRPE	0.500	DESRPS	0.200

MECH/STRUCT

WS	2.000	WSCF	20.000	MECID	0.0	PRODS	5.200	MCPLXS	7.139

ELECTRONICS

WE	7.000	WECF	100.000	CMPID	0.0	PRODE	4.200	MCPLXE	8.775
PWR	15.000	CMPNTS	55.			PWRFAC	0.300	CMPEF	-32.697

SCHEDULES

ENMTHS	1.000	ENMTHP	6.000	ENMTHT	7.000	ECMPLX	0.160	PRNF	0.0
PRMTHS	7.000	PRMTHF	12.000	AVER. PROD RATE PER MONTH					0.800

COST RANGES	DEVELOPMENT	PRODUCTION	TOTAL COST
FROM	58.	152.	210.
CENTER	69.	177.	246.

5
INTEGRATED UPS CON 8/14/76 UPS COMPIL 13

INPUT DATA

QTY	5.	PROTOS	1.0	WT	9.000	VOL	0.100	MODE	1.
QTYSYS	1.	INTEGE	0.500	INTEGS	0.500	AMULTE	130.00%	AMULTM	130.00%

MECH/STRUCT

WS	2.000	MCPLXS	0.0	PRODS	5.200	NEWST	0.300	DESRPS	0.200

ELECTRONICS

USEVOL	0.700	MCPLXE	0.0	PRODE	4.200	NEWEL	0.030	DESRPE	0.500
PWR	15.000	CMPNTS	0.	CMPID	0.0	PWRFAC	0.300	CMPEFF	0.0

ENGINEERING

ENMTHS	1.0	ENMTHP	6.0	ENMTHT	7.0	ECMPLX	0.160	PRNF	0.0

PRODUCTION

PRMTHS	7.0	PRMTHF	12.0	LCURVE	0.0	ECNE	0.0	ECNS	0.0

GLOBAL

YEAR	1978.	ESC	0.0 %	PROJCT	0.0	DATA	1.000	TLGTST	1.000
PLATFM	2.000	SYSTEM	1.000	PPROJ	0.0	PDATA	1.000	PTLGTS	1.00

LCURVE IS BASED ON PRODUCTION SCHEDULE OF 7.74MONTHS.

PROGRAM COST	DEVELOPMENT	PRODUCTION	TOTAL COST
ENGINEERING			
DRAFTING	2.	7.	9.
DESIGN	4.	21.	25.
SYSTEMS	0.	0.	0.
PROJ MGMT	0.	0.	0.
DATA	2.	1.	2.
SUBTOTAL(ENG)	8.	29.	37.
MANUFACTURING			
PRODUCTION	0.	176.	176.
PROTOTYPE	57.	0.	57.
TOOL-TEST EQ	4.	9.	13.
SUBTOTAL(MFG)	61.	185.	246.
TOTAL COST	69.	213.	282.

VOL	0.100	AVCOST	35.12	TOTAL AV PROD COST		42.68	LCURVE	0.950	
WT	9.000	ECNE	0.036	ECNS	0.016	DESRPE	0.500	DESPRS	0.200

MECH/STRUCT

WS	2.000	WSCF	20.000	MECID	0.0	PRODS	5.200	MCPLXS	7.139

ELECTRONICS

WE	7.000	WECF	100.000	CMPID	0.0	PRODE	4.200	MCPLXE	8.775
PWR	15.000	CMPNTS	55.			PWRFAC	0.300	CMPEFF	-32.697

SCHEDULES

ENMTHS	1.000	ENMTHP	6.000	ENMTHT	7.000	ECMPLX	0.160	PRNF	0.0
PRMTHS	7.000	PRMTHF	12.000	AVER. PROD RATE PER MONTH					1.000

COST RANGES	DEVELOPMENT	PRODUCTION	TOTAL COST
FROM	58.	183.	241.
CENTER	69.	213.	282.

5KLSDU UPS CON 8/14/76 — UPS CONFIG B

INPUT DATA

QTY	8.	PROTOS	1.0	WT	9.000	VOL	0.100	MODE	1.
QTYSYS	1.	INTEGE	0.500	INTEGS	0.500	AMULTE	130.00%	AMULTM	130.00%

MECH/STRUCT

WS	2.000	MCPLXS	0.0	PRODS	5.200	NEWST	0.300	DESRPS	0.200

ELECTRONICS

USEVOL	0.700	MCPLXE	0.0	PRODE	4.200	NEWEL	0.030	DESRPE	0.500
PWR	15.000	CMPNTS	0.	CMPID	0.0	PWRFAC	0.300	CMPEFF	0.0

ENGINEERING

ENMTHS	1.0	ENMTHP	6.0	ENMTHT	7.0	ECMPLX	0.160	PRNF	0.0

PRODUCTION

PRMTHS	7.0	PRMTHF	12.0	LCURVE	0.0	ECNE	0.0	ECNS	0.0

GLOBAL

YEAR	1978.	ESC	0.0 %	PROJCT	0.0	DATA	1.000	TLGTST	1.000
PLATFM	2.000	SYSTEM	1.000	PPROJ	0.0	PDATA	1.000	PTLGTS	1.00

LCURVE IS BASED ON PRODUCTION SCHEDULE OF 8.12 MONTHS.

PROGRAM COST	DEVELOPMENT	PRODUCTION	TOTAL COST
ENGINEERING			
DRAFTING	2.	8.	10.
DESIGN	4.	24.	28.
SYSTEMS	0.	0.	0.
PROJ MGMT	0.	0.	0.
DATA	2.	1.	3.
SUBTOTAL(ENG)	8.	33.	40.
MANUFACTURING			
PRODUCTION	0.	273.	273.
PROTOTYPE	57.	0.	57.
TOOL-TEST EQ	4.	14.	17.
SUBTOTAL(MFG)	61.	287.	348.
TOTAL COST	69.	320.	389.

VOL	0.100	AVCOST	34.18	TOTAL AV PROD COST			39.95	LCURVE	0.949
WT	9.000	ECNE	0.040	ECNS	0.018	DESRPE	0.500	DESPRS	0.200

MECH/STRUCT

WS	2.000	WSCF	20.000	MECID	0.0	PRODS	5.200	MCPLXS	7.139

ELECTRONICS

WE	7.000	WECF	100.000	CMPID	0.0	PRODE	4.200	MCPLXE	8.775
PWR	15.000	CMPNTS	55.			PWRFAC	0.300	CMPEFF	-32.697

SCHEDULES

ENMTHS	1.000	ENMTHP	6.000	ENMTHT	7.000	ECMPLX	0.160	PRNF	0.0
PRMTHS	7.000	PRMTHF	12.000	AVER. PROD RATE PER MONTH					1.600

COST RANGES	DEVELOPMENT	PRODUCTION	TOTAL COST
FROM	58.	273.	332.
CENTER	69.	320.	389.
TO	85.	388.	473.

SIMPLE

INTEGRATED DHU CONFUG-- 9/23/76

INPUT DATA

QTY	2.	PROTOS	1.0	NT	2.000	VOL	0.031	MODE	1.
QTYSYS	1.	INTEGE	0.500	INTEGS	0.500	AMULTE	130.00%	AMULTM	130.00%

MECH/STRUCT

WS	0.200	MCPLXS	0.0	PRODS	5.200	MENST	0.500	DESRPS	0.200

ELECTRONICS

USEVOL	0.850	MCPLXE	0.0	PRODE	5.400	MENEL	0.400	DESRPE	0.200
PWR	0.200	CMPNTS	0.	CMPID	0.0	PWRFAC	1.300	CMPEFF	0.0

ENGINEERING

ENMTHS	1.0	ENMTHP	8.0	ENMTHT	9.0	ECMPLX	0.300	PRMF	0.0

PRODUCTION

PRMTHS	8.0	PRMTHF	12.0	LCURVE	0.0	ECME	0.0	ECMS	0.0

GLOBAL

YEAR	1978.	ESC	0.0 %	PROJCT	0.0	DATA	1.000	TLGTST	1.000
PLATFM	2.000	SYSTEM	1.000	PPROJ	0.0	PDATA	1.000	PTLGTS	1.00

LCURVE IS BASED ON PRODUCTION SCHEDULE OF 8.80MONTHS.

PROGRAM COST	DEVELOPMENT	PRODUCTION	TOTAL COST
ENGINEERING			
DRAFTING	26.	15.	41.
DESIGN	62.	56.	118.
SYSTEMS	1.	0.	1.
PROJ MGMT	0.	0.	0.
DATA	5.	1.	6.
SUBTOTAL(ENG)	94.	72.	167.
MANUFACTURING			
PRODUCTION	0.	116.	116.
PROTOTYPE	67.	0.	67.
TOOL-TEST EQ	8.	7.	15.
SUBTOTAL(MFG)	76.	123.	198.
TOTAL COST	170.	195.	365.

VOL	0.031	AVCOST	57.88	TOTAL AV PROD COST		97.42	LCURVE	0.988	
WT	2.000	ECME	0.055	ECMS	0.013	DESRPE	0.200	DESPRS	0.200

MECH/STRUCT

WS	0.200	WSCF	6.452	MECID	0.0	PRODS	5.200	MCPLXS	6.633

ELECTRONICS

WE	1.000	WECF	68.311	CMPID	0.0	PRODE	5.400	MCPLXE	10.615
PWR	0.200	CMPNTS	7.			PWRFAC	1.300	CMPEFF	-85.517

SCHEDULES

ENMTHS	1.000	ENMTHP	8.000	ENMTHT	9.000	ECMPLX	0.300	PRMF	0.0
PRMTHS	8.000	PRMTHF	12.000	AVER. PROD RATE PER MONTH					0.500

COST RANGES	DEVELOPMENT	PRODUCTION	TOTAL COST
FROM	149.	174.	322.
CENTER	170.	195.	365.
TO	197.	218.	415.

ADD =

INTEGRATED DHU CONFUG-- 8/23/76

INPUT DATA

QTY	4.	PROTOS	1.0	NT	2.000	VOL	0.031	MODE	1.
QTYSYS	1.	INTEGE	0.500	INTEGS	0.500	ANULTE	130.00%	ANULTM	130.00%

MECH/STRUCT

WS	0.200	MCPLXS	0.0	PRODS	5.200	MENST	0.500	DESRPS	0.200

ELECTRONICS

USEVOL	0.850	MCPLXE	0.0	PRODE	5.400	MENEL	0.400	DESRPE	0.200
PWR	0.200	CMPNTS	0.	CMPID	0.0	PWRFAC	1.300	CMPEFF	0.0

ENGINEERING

ENMTHS	1.0	ENMTHP	8.0	ENMTHT	9.0	ECMPLX	0.300	PRNF	0.0

PRODUCTION

PRNTHS	8.0	PRNTHF	12.0	LCURVE	0.0	ECNE	0.0	ECNS	0.0

GLOBAL

YEAR	1978.	ESC	0.0 %	PROJCT	0.0	DATA	1.000	TLGTST	1.000
PLATFM	2.000	SYSTEM	1.000	PPROJ	0.0	PDATA	1.000	PTLGTS	1.00

LCURVE IS BASED ON PRODUCTION SCHEDULE OF 9.53MONTHS.

PROGRAM COST	DEVELOPMENT	PRODUCTION	TOTAL COST
ENGINEERING			
DRAFTING	26.	18.	44.
DESIGN	62.	67.	129.
SYSTEMS	1.	0.	1.
PROJ MGMT	0.	0.	0.
DATA	5.	1.	6.
SUBTOTAL(ENG)	94.	86.	180.
MANUFACTURING			
PRODUCTION	0.	221.	221.
PROTOTYPE	67.	0.	67.
TOOL-TEST EQ	8.	13.	21.
SUBTOTAL(MFG)	76.	234.	310.
TOTAL COST	170.	320.	490.

VOL	0.031	AVCOST	55.29	TOTAL AV PROD COST		79.98	LCURVE	0.936	
WT	2.000	ECNE	0.066	ECNS	0.015	DESRPE	0.200	DESPRS	0.200

MECH/STRUCT

WS	0.200	WSCF	6.452	MECID	0.0	PRODS	5.200	MCPLXS	6.633

ELECTRONICS

WE	1.800	WECF	68.311	CMPID	0.0	PRODE	5.400	MCPLXE	10.615
PWR	0.200	CMPNTS	7.			PWRFAC	1.300	CMPEFF	-85.517

SCHEDULES

ENMTHS	1.000	ENMTHP	9.000	ENMTHT	9.000	ECMPLX	0.300	PRNF	0.0
PRNTHS	8.000	PRMTHF	12.000	AVER. PROD RATE PER MONTH					1.000

COST RANGES	DEVELOPMENT	PRODUCTION	TOTAL COST
FROM	149.	283.	431.
CENTER	170.	320.	490.
TO	197.	361.	558.

INPUT DATA

QTY	8.	PROTOS	1.0	WT	2.000	VOL	0.031	MODE	1.
QTYSYS	1.	INTEGE	0.500	INTEGS	0.500	ANULTE	130.00%	ANULTM	130.00%

MECH/STRUCT

WS	0.200	MCPLXS	0.0	PRODS	5.200	NEWST	0.500	DESRPS	0.200

ELECTRONICS

USEVOL	0.850	MCPLXE	0.0	PRODE	5.400	NEWEL	0.400	DESRPE	0.200
PWR	0.200	CMPNTS	0.	CMPID	0.0	PWRFAC	1.300	CMPEFF	0.0

ENGINEERING

ENMTHS	1.0	ENMTHP	8.0	ENMTHT	9.0	ECMPLX	0.300	PRNF	0.0

PRODUCTION

PRMTHS	8.0	PRMTHF	12.0	LCURVE	0.0	ECNE	0.0	ECNS	0.0

GLOBAL

YEAR	1978.	ESC	0.0 %	PROJCT	0.0	DATA	1.000	TLGTST	1.000
PLATFN	2.000	SYSTEM	1.000	PPROJ	0.0	PDATA	1.000	PTLGTS	1.00

LCURVE IS BASED ON PRODUCTION SCHEDULE OF 10.26MONTHS.

PROGRAM COST	DEVELOPMENT	PRODUCTION	TOTAL COST
ENGINEERING			
DRAFTING	26.	21.	47.
DESIGN	62.	80.	142.
SYSTEMS	1.	0.	1.
PROJ MGMT	0.	0.	0.
DATA	5.	2.	6.
SUBTOTAL(ENG)	94.	102.	197.
MANUFACTURING			
PRODUCTION	0.	421.	421.
PROTOTYPE	67.	0.	67.
TOOL-TEST EQ	8.	24.	33.
SUBTOTAL(MFG)	76.	445.	521.
TOTAL COST	170.	547.	717.

VOL	0.031	AVCOST	52.63	TOTAL AV PROD COST		60.41	LCURVE	0.934	
WT	2.000	ECNE	0.078	ECNS	0.018	DESRPE	0.200	DESPRS	0.200

MECH/STRUCT

WS	0.200	WSCF	6.452	MECID	0.0	PRODS	5.200	MCPLXS	6.633

ELECTRONICS

WE	1.800	WECF	68.311	CMPID	0.0	PRODE	5.400	MCPLXE	10.615
PWR	0.200	CMPNTS	7.			PWRFAC	1.300	CMPEFF	-85.517

SCHEDULES

ENMTHS	1.000	ENMTHP	8.000	ENMTHT	9.000	ECMPLX	0.300	PRNF	0.0
PRMTHS	8.000	PRMTHF	12.000	AVER. PROD RATE PER MONTH					2.000

COST RANGES	DEVELOPMENT	PRODUCTION	TOTAL COST
FROM	149.	480.	628.
CENTER	170.	547.	717.
TO	197.	622.	819.

ADD =

INTEGRATED DHU CONFUG-- 8/23/76

INPUT DATA

QTY	2.	PROTOS	1.0	WT	2.000	VOL	0.031	MODE	1.
QTY'S/S	1.	INTEGE	0.500	INTEGS	0.500	AMULTE	130.00%	AMULTM	130.00%

MECH/STRUCT

WS	0.200	MCPLXS	0.0	PRODS	5.200	NEWST	0.500	DESRPS	0.200

ELECTRONICS

USEVOL	0.850	MCPLXE	0.0	PRODE	5.400	NEWEL	0.400	DESRPE	0.200
PWR	0.200	CMPNTS	0.	CMPID	0.0	PWRFAC	1.300	CMPEFF	0.0

ENGINEERING

ENMTHS	1.0	ENMTHP	0.0	ENMTHT	9.0	ECMPLX	0.800	PRMF	0.0

PRODUCTION

PRMTHS	8.0	PRMTHF	12.0	LCURVE	0.0	ECME	0.0	ECNS	0.0

GLOBAL

YEAR	1978.	ESC	0.0 %	PROJCT	0.0	DATA	1.000	TLGTST	1.000
PLATFM	2.000	SYSTEM	1.000	PPROJ	0.0	PDATA	1.000	PTLGTS	1.00

LCURVE IS BASED ON PRODUCTION SCHEDULE OF 8.80MONTHS.

MIN. ENG. SCHED. TIME SHOULD BE 11.41 MTHS.

OK = 1

LCURVE IS BASED ON PRODUCTION SCHEDULE OF 8.80MONTHS.

PROGRAM COST	DEVELOPMENT	PRODUCTION	TOTAL COST
ENGINEERING			
DRAFTING	41.	15.	56.
DESIGN	134.	56.	190.
SYSTEMS	12.	0.	12.
PROJ MGMT	0.	0.	0.
DATA	6.	1.	6.
SUBTOTAL(ENG)	193.	72.	265.
MANUFACTURING			
PRODUCTION	0.	116.	116.
PROTOTYPE	47.	0.	47.
TOOL-TEST EQ	12.	7.	19.
SUBTOTAL(MFG)	59.	123.	181.
TOTAL COST	252.	195.	447.

VOL	0.031	AVCOST	57.88	TOTAL AV PROD COST		97.42	LCURVE	0.938	
WT	2.000	ECME	0.055	ECNS	0.013	DESRPE	0.200	DESPRS	0.200

MECH/STRUCT

WS	0.200	WSCF	6.452	MECID	0.0	PRODS	5.200	MCPLXS	6.633

ELECTRONICS

WE	1.900	WECF	68.311	CMPID	0.0	PRODE	5.400	MCPLXE	10.615
PWR	0.200	CMPNTS	7.			PWRFAC	1.300	CMPEFF	-85.517

SCHEDULES

ENMTHS	1.000	ENMTHP	8.000	ENMTHT	9.000	ECMPLX	0.800	PRMF	0.0
PRMTHS	8.000	PRMTHF	12.000	AVER. PROD RATE PER MONTH					0.500

COST RANGES	DEVELOPMENT	PRODUCTION	TOTAL COST
FROM	225.	174.	399.
CENTER	252.	195.	447.
TO	285.	218.	503.

COMPLEX

INTEGRATED DHU CONFUG-- 8/23/76

INPUT DATA

QTY	4.	PROTOS	1.0	NT	2.000	VOL	0.031	MODE	1.
QTYSYS	1.	INTEGE	0.500	INTEGS	0.500	AMULTE	130.00%	AMULTM	130.00%

MECH/STRUCT

WS	0.200	MCPLXS	0.0	PRODS	5.200	NEWST	0.500	DESRPS	0.200

ELECTRONICS

USEVOL	0.850	MCPLXE	0.0	PRODE	5.400	NEWEL	0.400	DESRPE	0.200
PWR	0.200	CMPNTS	0.	CMPID	0.0	PWRFAC	1.300	CMPEFF	0.0

ENGINEERING

ENMTHS	1.0	ENMTHP	8.0	ENMTHT	9.0	ECMPLX	0.800	PRNF	0.0

PRODUCTION

PRMTHS	8.0	PRMTHF	12.0	LCURVE	0.0	ECNE	0.0	ECNS	0.0

GLOBAL

YEAR	1978.	ESC	0.0 %	PROJCT	0.0	DATA	1.000	TLGTST	1.000
PLATFN	2.000	SYSTEM	1.000	PPROJ	0.0	PDATA	1.000	PTLGTS	1.00

LCURVE IS BASED ON PRODUCTION SCHEDULE OF 9.53MONTHS.

MIN. ENG. SCHED. TIME SHOULD BE 11.41 MTHS.

OK = 1

LCURVE IS BASED ON PRODUCTION SCHEDULE OF 9.53MONTHS.

PROGRAM COST	DEVELOPMENT	PRODUCTION	TOTAL COST
ENGINEERING			
DRAFTING	41.	18.	59.
DESIGN	134.	67.	201.
SYSTEMS	12.	0.	12.
PROJ MGMT	0.	0.	0.
DATA	6.	1.	7.
SUBTOTAL(ENG)	193.	86.	279.
MANUFACTURING			
PRODUCTION	0.	221.	221.
PROTOTYPE	47.	0.	47.
TOOL-TEST EQ	12.	13.	25.
SUBTOTAL(MFG)	59.	234.	293.
TOTAL COST	252.	320.	572.

VOL	0.031	AVCOST	55.29	TOTAL AV PROD COST		79.99	LCURVE	0.936	
WT	2.000	ECNE	0.066	ECNS	0.015	DESRPE	0.200	DESPRS	0.200

MECH/STRUCT

WS	0.200	WSCF	6.452	MECID	0.0	PRODS	5.200	MCPLXS	6.633

ELECTRONICS

WE	1.800	WECF	68.311	CMPID	0.0	PRODE	5.400	MCPLXE	10.615
PWR	0.200	CMPNTS	7.			PWRFAC	1.300	CMPEFF	-85.517

SCHEDULES

ENMTHS	1.000	ENMTHP	8.000	ENMTHT	9.000	ECMPLX	0.800	PRNF	0.0
PRMTHS	8.000	PRMTHF	12.000	AVER. PROD RATE PER MONTH					1.000

COST RANGES	DEVELOPMENT	PRODUCTION	TOTAL COST
FROM	325.	283.	508.
CENTER	252.	320.	572.
TO	205.	361.	645.

COMPLEX

INTEGRATED DHU CONFUG-- 8/23/76

INPUT DATA

QTY	0.	PROTOS	1.0	WT	2.000	VOL	0.031	MODE	1.
QTYSYS	1.	INTEGE	0.500	INTEGS	0.500	AMULTE	130.00%	AMULTM	130.00%

MECH/STRUCT

WS	0.200	MCPLXS	0.0	PRODS	5.200	NEWST	0.500	DESRPS	0.200

ELECTRONICS

USEVOL	0.850	MCPLXE	0.0	PRODE	5.400	NEWEL	0.400	DESRPE	0.200
PWR	0.200	CMPNTS	0.	CMPID	0.0	PWRFAC	1.300	CMPEFF	0.0

ENGINEERING

ENMTHS	1.0	ENMTHP	8.0	ENMTHT	9.0	ECMPLX	0.800	PRNF	0.0

PRODUCTION

PRMTHS	8.0	PRMTHF	12.0	LCURVE	0.0	ECNE	0.0	ECNS	0.0

GLOBAL

YEAR	1978.	ESC	0.0 %	PROJCT	0.0	DATA	1.000	TLGTST	1.000
PLATFN	2.000	SYSTEM	1.000	PPROJ	0.0	PDATA	1.000	PTLGTS	1.00

LCURVE IS BASED ON PRODUCTION SCHEDULE OF 10.26MONTHS.

PROGRAM COST	DEVELOPMENT	PRODUCTION	TOTAL COST
ENGINEERING			
DRAFTING	41.	21.	62.
DESIGN	134.	80.	214.
SYSTEMS	12.	0.	12.
PROJ MGMT	0.	0.	0.
DATA	5.	2.	7.
SUBTOTAL(ENG)	193.	102.	295.
MANUFACTURING			
PRODUCTION	0.	421.	421.
PROTOTYPE	47.	0.	47.
TOOL-TEST EQ	12.	24.	36.
SUBTOTAL(MFG)	59.	445.	504.
TOTAL COST	252.	547.	799.

VOL	0.031	AVCOST	52.63	TOTAL AV PROD COST		68.41	LCURVE	0.934	
WT	2.000	ECNE	0.078	ECNS	0.013	DESRPE	0.200	DESPRS	0.200

MECH/STRUCT

WS	0.200	WSCF	6.452	MECID	0.0	PRODS	5.200	MCPLXS	6.633

ELECTRONICS

WE	1.800	WECF	68.311	CMPID	0.0	PRODE	5.400	MCPLXE	10.615
PWR	0.200	CMPNTS	7.			PWRFAC	1.300	CMPEFF	-85.517

SCHEDULES

ENMTHS	1.000	ENMTHP	8.000	ENMTHT	9.000	ECMPLX	0.800	PRNF	0.0
PRMTHS	8.000	PRMTHF	12.000	AVER. PROD RATE PER MONTH					2.000

COST RANGES	DEVELOPMENT	PRODUCTION	TOTAL COST
FROM	225.	490.	705.
CENTER	252.	547.	799.
TO	285.	622.	907.

ADD =

5
INTEGRATED [illegible] COMPLEX

INPUT DATA
QTY	16.	PROTOS	1.0 [illegible]		2.0 [illegible]	VOL	0.[illegible]31	MODE	1.
QTYSYS	1.	INTEGE	0.50[illegible]	INTEGS	0.50[illegible]	AMULTE	130.[illegible] %	AMULT[illegible]	130.[illegible] %

MECH/STRUCT
[illegible]S	0.20	MCPLXS	0.[illegible]	PRODS	5.20	NEWST	0.5[illegible]	DESR[illegible]	0.2

ELECTRONICS
USEVOL	0.850	MCPLXE	0.[illegible]	PRODE	5.40[illegible]	NEWEL	0.4[illegible]	DESR[illegible]	0.2[illegible]
PWR	0.20[illegible]	CMPUTS	0.	CMPID	0.[illegible]	PWREAC	1.30	CMPEF[illegible]	0.[illegible]

ENGINEERING
[illegible]MTHS	1.0	ENMTHP	8.0	ENMTH[illegible]	0.0	ECMPLX	0.8[illegible]	[illegible]	0.

PRODUCTION
PRMTHS	8.0	PRMTHF	12.0	LCURVE	0.[illegible]	ECNE	0.[illegible]	ECNS	0.

GLOBAL
YEAR	1978.	ESC	0.[illegible] %	PROJCT	0.	DATA	1.0	FLG[illegible]	1.[illegible]
SYSTEM	2.0	SYSTEM	1.0	[illegible]	0.	[illegible]	1.[illegible]	[illegible]	1.[illegible]

LCURVE IS BASED ON PRODUCTION SCHEDULE OF 1[illegible].07[illegible] MTHS.

MIN. ENG. SCHED. TIME SHOULD BE 1[illegible].4[illegible] MTHS.

[illegible] = 1
LCURVE IS BASED ON PRODUCTION SCHEDULE OF 1[illegible].07[illegible] MTHS.

PROGRAM COST [illegible]	DEVELOPMENT	PRODUCTION	TOTAL [illegible]
ENGINEERING	41.	25.	[illegible]
DESIGN	134.	94.	2[illegible]
SYSTEM	12.	0.	12.
PROJ MGMT	[illegible]	[illegible]	[illegible]
DATA	6.	2.	[illegible]
SUBTOTAL (ENG)	193.	12[illegible]	[illegible]
MANUFACTURING			
PRODUCTION	0.	79[illegible]	[illegible]
PROTOTYPE	47.	0.	47.
TOOLING-TEST EQ	12.	45.	[illegible]7.
SUBTOTAL (MFG)	59.	84[illegible]	[illegible]
TOTAL COST	25[illegible]	96[illegible]	12[illegible]

[illegible] 0.[illegible]31 AVQ[illegible] 80.[illegible]5 [illegible] 80.7[illegible] [illegible] 0.0[illegible]
[illegible] 2.0 [illegible] 1.03 [illegible] 2 [illegible]

MECH/STRUCT
[illegible] 0.20 [illegible] ECF 6.452 [illegible] 0. [illegible] 5.20 [illegible]

ELECTRONICS
[illegible] 1.[illegible] [illegible] 62.31[illegible] [illegible] 0.[illegible] [illegible] 5.4[illegible] [illegible]
[illegible] 7. [illegible] 1.3[illegible] [illegible]

8.4 General Economic Analysis Methodology--An Integer Program Approach to Cost Minimization

A general economic analysis methodology is summarized below for (a) assessing the economic worth of developing a family of standardized interface modules, (b) determining that family of standardized interface modules which minimizes the present value of the cost of performing a specified mission model, and (c) establishing the basic data required for the economic analysis.

A basic underlying assumption is that the objective of developing a family of standardized interface modules is the reduction of the present value of the cost of performing a specified mission model. A number of simplifying assumption and restrictions have been imposed so as to focus attention on the main issues. These assumptions impose limitations upon the described methodology, but allow for clearer presentation of the basic concepts which once understood can, as the need arises, be expanded upon. For example, uncertainty and risk considerations have been omitted, detailed learning effects have been omitted, the cost of carrying inventory has not been considered, incremental effects on transportation charges have not been considered, etc.

Referring to Figure 8.4.1, it is desired to compare the alternatives ranging from no standardization to a level of standardization which employs multiple standardized interface modules. It is assumed that there are j variants associated

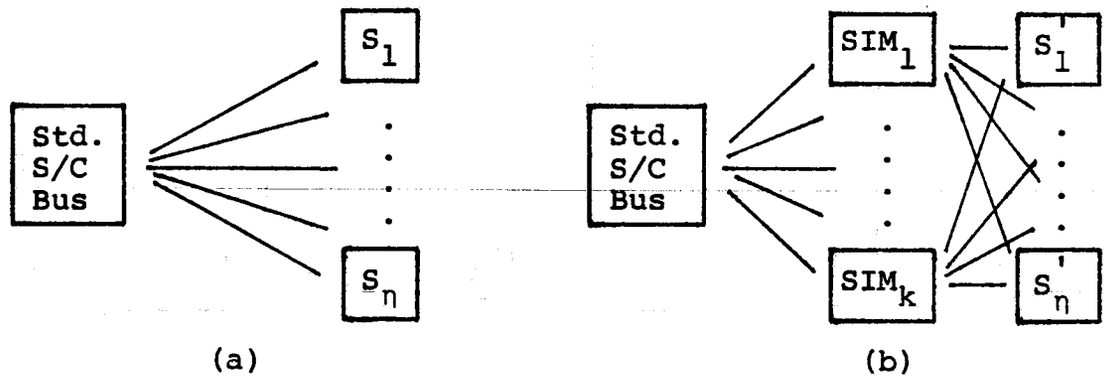


Figure 8.4.1 Generalized Alternatives: (a) no standardization, (b) standardization using standardized interface modules.

with each k standardized interface modules (SIM). The k^{th} SIM may be, for example, a voltage regulator where each of the j variants has a different level of capability in terms of degree of regulation, voltage levels, and others, and their combinations. Each of these j variants may have an impact on the design and hence cost the n^{th} sensor (experiment or payload). Let the incremental cost of the n^{th} sensor due to the use of $SIM_{j,k}$ with the n^{th} sensor be $\Delta C_{j,k,n}$ where the incremental cost is relative to the cost of the n^{th} sensor when there are no SIMs employed. It is assumed that these incremental costs are linearly additive.

In general the problem of selecting the best mix of standardized interface modules can be formulated as an integer programming problem where it is desired to minimize the present value of the cost of performing a specified mission model subject to a set of contraints. This can be expressed as the minimization of the following objective function (note that the following is for each value of k):

$$\text{Minimize} \left\{ \sum_{j} X_j D_j + \sum_{m,j} Y_{m,j} C_{m,j} \right\}$$

subject to the following constraints:

$$\sum_{j} Y_{m,j} = 1 \quad \text{for each } m$$

$$Y_{m,j} = 0 \text{ or } 1$$

$$X_j = 0 \text{ or } 1$$

$$\underline{\text{If}} \sum_{m} Y_{m,j} \geq 1 \quad \underline{\text{then}} \; X_j = 1, \text{ for each } j$$

$$\underline{\text{If}} \sum_{m} Y_{m,j} < 1 \quad \underline{\text{then}} \; X_j = 0, \text{ for each } j$$

The following notation has been employed:

m = index referring to missions.

j = index referring to standardized interface module variant.

D_j = present value of nonrecurring cost associated with the j^{th} SIM.

$C_{m,j}$ = present value of recurring cost of the m^{th} mission associated with the j^{th} SIM. If SIM j is not applicable to mission m, then $C_{m,j} \to \infty$.

$Y_{m,j}$ = control variable such that when equal to 1 the j^{th} SIM is used on the m^{th} mission.

X_j = control variable such that when equal to 1 the j^{th} SIM is developed.

J = maximum number of standardized interface module variants to be considered.

M = maximum number of missions to be considered.

The first term in the objective function represents the present value of nonrecurring cost of the SIM and the second term represents the present value of the recurring cost of the SIM and the recurring and nonrecurring costs of the sensors.

It should be noted that $J \geq M$ establishing the rule that each of the first $j = M$ SIMs are mission specialized (non-standardized) subsystem alternatives. Therefore, in general, the $Y_{m,j}$ and the X_j arrays appear as follows ($M = 3$, $J = 7$).

		j						
		1	2	3	4	5	6	7
m	1	$Y_{1,1}$	0	0	$Y_{1,4}$	$Y_{1,5}$	$Y_{1,6}$	$Y_{1,7}$
	2	0	$Y_{2,2}$	0	$Y_{2,4}$	$Y_{2,5}$	$Y_{2,6}$	$Y_{2,7}$
	3	0	0	$Y_{3,3}$	$Y_{3,5}$	$Y_{3,5}$	$Y_{3,6}$	$Y_{3,7}$

X_1	X_2	X_3	X_4	X_5	X_6	X_7

It is the purpose of the integer programming algorithm to determine the values (0 or 1) of $Y_{m,j}$ in the above table. Note that if the sum of the Y terms in each column exceeds zero then the associated X term is unity implying that the j^{th} SIM is developed. The Y terms indicate the use of the SIMs.

The following is a more detailed formulation of the problem in terms of the specific variables and data requirements.

For the case under consideration, the present value of recurring cost, PVR, and present value of nonrecurring cost, PVNR, are as follows:

$$PVR = \sum_{m=1}^{M} \delta_m \quad \text{(baseline or non-std. sensor cost)}_m - \text{(reduction in sensor cost because of SIM)}_m + \text{(recurring cost of selected SIMs)}_m$$

$$= \sum_{m=1}^{M} \delta_m \left\{ \sum_{\substack{j=1 \\ k=1 \\ n=1}}^{\substack{N \\ K \\ J}} Y_{m,j,k} \cdot SRC_{m,j,k,n} + \sum_{\substack{j=1 \\ k=1}}^{\substack{K \\ J}} Y_{m,j,k} \cdot SIMR_{j,k} \right\}$$

PVNR = (PV of non-recurring cost of all sensors without SIM) - (reduction in PV of sensor non-recurring cost because of SIMs) + (PV of non-recurring cost of selected SIMs)

$$= \sum_{\substack{m=1 \\ j=1 \\ k=1 \\ n=1}}^{\substack{N \\ K \\ J \\ M}} X_{j,k} \cdot SNR_{m,j,k,n} \cdot \gamma_{m,n} \cdot \alpha_{m,n} +$$

$$\sum_{\substack{j=1 \\ k=1}}^{\substack{K \\ J}} X_{j,k} \cdot SIMNR_{j,k} \cdot \beta_{j,k}$$

and the above terms are defined as follows:

δ_m = present value factor associated with the m^{th} mission and accounts for multiple payload acquisitions and their timing.

$\gamma_{m,n}$ = present value factor for the non-recurring cost for the n^{th} sensor for the m^{th} mission.

$\beta_{j,k}$ = present value factor for the non-recurring cost for the j^{th} SIM variant of the k^{th} type.

$SRC_{m,j,k,n}$ = unit recurring cost associated with the n^{th} sensor on the m^{th} mission resulting from the use of the j^{th} SIM of the k^{th} type.

$SIMR_{j,k}$ = unit recurring cost of the j^{th} SIM of the k^{th} type.

$SNR_{m,j,k,n}$ = non-recurring cost associated with the n^{th} sensor of the m^{th} mission resulting from the use of the j^{th} SIM variant of the k^{th} type.

$SIMNR_{j,k}$ = non-recurring cost of the j^{th} SIM variant of the k^{th} type.

$\alpha_{m,n}$ = $\begin{cases} 0 \text{ if the } n^{th} \text{ sensor was developed for a previous} \\ \text{mission. 1 if the } n^{th} \text{ sensor was not developed} \\ \text{for a previous mission.} \end{cases}$

$Y_{m,j,k}$ = control variable such that when equal to 1 the j^{th} SIM variant of the k^{th} functional type will be used on the m^{th} mission.

$X_{j,k}$ = control variable such that when equal to 1 the j^{th} SIM variant of the k^{th} functional type will be developed.

A mission is defined, for the purpose of this analysis, as a sequence of one or more identical spacecraft-payload acquisitions.

Since, as stated previously, it is desired to minimize the present value of the cost of performing the mission model, the above can be stated in the form of an integer programming problem as follows:

$$\text{Minimize} \left\{ \sum_{\substack{m=1 \\ j=1 \\ k=1 \\ n=1}}^{\substack{N \\ J \\ K \\ M}} X_{j,k} \cdot SNR_{m,j,k,n} \cdot \gamma_{m,n} \cdot \alpha_{m,n} + \sum_{\substack{j=1 \\ k=1}}^{\substack{K \\ J}} X_{j,k} \cdot SIMNR_{j,k} \cdot \beta_{j,k} + \sum_{\substack{m=1 \\ j=1 \\ k=1 \\ n=1}}^{\substack{N \\ K \\ J \\ M}} Y_{m,j,k} \cdot SRC_{m,j,k,n} \cdot \delta_m + \sum_{\substack{m=1 \\ j=1 \\ k=1}}^{\substack{K \\ J \\ M}} Y_{m,j,k} \cdot SIMR_{j,k} \cdot \delta_m \right\}$$

subject to:

$$\sum_{j=1}^{J} Y_{m,j,k} = 1 \text{ for each } m \text{ and } k$$

$$Y_{m,j,k} = 0 \text{ or } 1$$

$$X_{j,k} = 0 \text{ or } 1$$

$$\underline{\text{If}} \sum_{m} Y_{m,j,k} \geq 1 \ \underline{\text{then}} \ X_{j,k} = 1, \text{ for each } j \text{ and } k$$

$$\underline{\text{If}} \sum_{m} Y_{m,j,k} < 1 \ \underline{\text{then}} \ X_{j,k} = 0, \text{ for each } j \text{ and } k$$

8.5 The GO Methodology

8.5.1 Methodology

8.5.1.1 General

The Kaman Sciences GO methodology and computer codes have been developed over a period of years as part of a procedure for analyzing the reliability of complicated systems. The primary motivation was to produce a computer routine which could, with a minimum of scientific labor, quickly, economically and comprehensively analyze the reliability, safety and availability of complex hydraulic, pneumatic and electromechanical networks involving hundreds of components having two and often three or more modes of operation.

The GO methodology, which is a refinement of the classical approach to reliability, has been used extensively for several years. The modeling required corresponds in a natural way to the function drawings or schematics. Attention is focused individually on constituent subsystems or pieceparts identifying all possible operational modes, as differentiated from the fault-tree method which constrains the documentation to operational modes causing the defined event of interest.

Using this generalized approach the computer program, rather than the analyst as in the fault-tree or equation writing techniques, systematically creates and retains the various event combinations bearing on both the central problem and all other significant system operational modes. Because the logic, other than the component interactions, is handled automatically, significant savings in scientific labor are achieved, and increased knowledge of system responses is obtained as contrasted with either the classical equation writing or the fault-tree approaches to reliability assessment.

The methodology is extremely useful to provide insight into the sensitivity of a complex system to small changes in the reliability or availability of each component or system element. This type of evaluation can identify all significant strengths and weaknesses in the system under study.

8.5.1.2 Description

The GO program is a probabilistic combinatorial analysis procedure. Components are identified by their input signals, output signals, and probabilities of operation in different modes (success, premature and failure). The GO chart is a diagram of component interactions through the signal paths. The modeling required includes selection of the proper standard GO components to represent the physical components and the identification of signal paths. This modeling is direct and simple, since the chart can be drawn in one-to-one correspondence with the schematic, almost as an overlay.

The heart of the method is the computer program which follows all signal paths and combines probabilities from initial components to end results. Thus, the analyst need not concern himself with finding failure paths, identifying common mode failures, computing redundant or voting logic probabilities (parallel paths or m-out-of-n coincidences), etc., since the computer does this naturally. Sequential events can be included since the logic includes distinct time intervals (usually 8, although more can be used), for which probabilities can be assigned. In general, time period 0 is used to indicate the presence of input signals at the start of the problem (power on, water tank full, completion of maintenance, etc.), or for premature operation with regard to components or output signals. Time period 7 (if 8 periods are used) indicates 'never', which means a failure since the output signal never arrived. Time 7 can also be used for input initiators which indicates that the

input being represented never came. In some cases a system has several auxiliary circuits and the analyst may wish to examine the primary circuit only, even though the total model is available. The model and input deck could be modified, but in many cases it is easier to put perfect initiators at time 7 on the auxiliary circuits for early runs and change them to real times and probabilities later for complete system runs.

The probabilities of one or many events occurring as a function of time can be determined by selecting the desired signals to be retained as outputs. The code will retain a signal until it has been used for all necessary following inputs. Then the signal will be deleted from the problem (unless required as an output) in order to keep the array as small as possible. This deletion is one of the keys to the speed and economy of the method, since array size partly determines computer cost.

Another technique for improving speed and economy is the elimination of signal paths which lead to a failure probability less than a specified constant (perhaps 10^{-8} for 10^{-5}). These paths are deleted and not followed further, but all deleted probabilities are summed and the final sum of the "throwaway" is printed. Comparison of this value with the output for desired events will assure that an unusual combination of multiple events has not caused a significant error.

8.5.2 GO Modeling Techniques

8.5.2.1 Signals

The concept of a "Signal" is basic to the sequential analysis and combinatorial processes of the GO methodology. Components are identified by signal numbers, as are computations and results. However, the term "signal" is not constrained to current in a wire as in the electrical sense, or even to informational content as in logic flow diagrams. The "signal" could be water in a pipe leading to a valve,

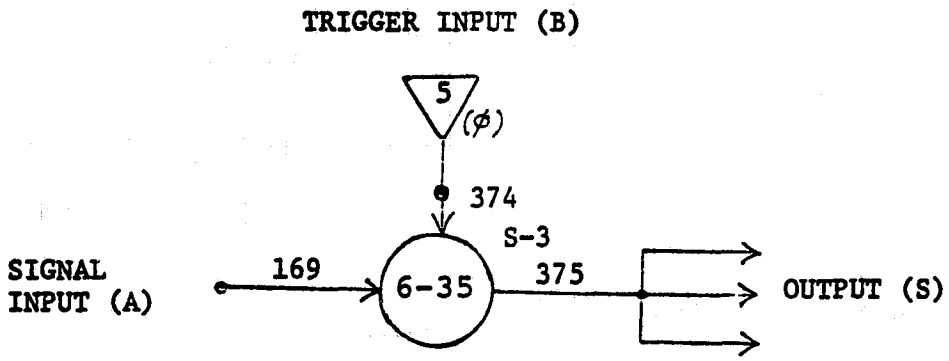
pneumatic pressure in an instrument air system, torque on a shaft, mechanical pressure on a lever or gear, or even the absence of a true signal. The code simply combines input probabilities (in the manner specified by the GO Type component used) with the component probabilities to determine the output probabilities in the discrete time periods allowed.

8.5.2.2 Components

Although many types of components exist in the various mechanical, hydraulic and electrical circuits of interest, it has been found that all of them can be modeled by proper application of only a few types of components. These few (17) have been chosen as standardized components and modeled in the code. They include components with a single input (Types 1 and 3), normally open and normally closed switches or contacts (Types 4, 6 and 7), perfect OR and AND gates (Types 2 and 10), perfect and probabilistic initiators (Types 5 and 11), time generators (Types 8 and 9), and multiple input/output devices. A description of some of the more common components is given in Section 3. These modeling components can be used separately or in a combination to represent any logical situation which can be designed or desired.

The nomenclature for a typical component is shown in Figure 8.5.1. The components are represented by circles for all components except the initiators (5 and 11) for which triangles are used. The type number is the first number in the circle. For imperfect components a second number (kind number) is used to distinguish between various kinds (rotary switch, toggle switch, relay contacts, etc.) which have different reliabilities.

The output signal number (375) is the unique identifier for this specific component. This output may go to several other components as indicated by the multiple arrows. The



169, 374, 375 : SIGNAL NUMBERS

6 : TYPE NUMBER (NORMALLY OPEN CONTACTS)

35 : KIND NUMBER

$T_S = MAX (T_A, T_B)$: NORMAL

$= T_A$: PREMATURE

$= \infty$: FAILURE

Figure 8.5.1 Component Identification

inputs A and B are the primary signal and the "trigger" (denoted by the small circle on the input arrow) which closes the contacts. These signals may come at different times and the output signal is not produced until both input signals arrive. Premature closure of the contacts will give an output at the time of Signal A. An additional identifier may be used by the analyst to help tie the GO chart to the logic diagram or schematic. In this case S3 is the identifier (for switch number 3), which is usually the same as the nomenclature on the schematic or an easily recognizable abbreviation thereof. This identifier is not used anywhere in the code - it is only a convenience for the analyst.

Each component kind has its own set of probabilities. For the type 6, the probabilities to be entered are:

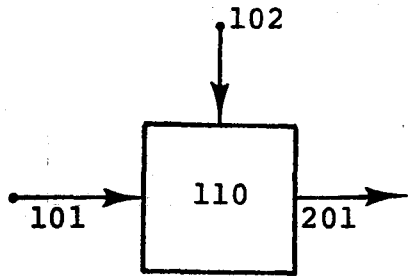
P1: Premature

P2: Success

The failure probability is computed internally as 1-(P1+P2). A 6-35 type component will carry the same probabilities throughout the model. If a different kind of component type 6 is used elsewhere with different probabilities, it is given a new kind number (perhaps 6-36) and the appropriate probabilities are entered for 6-36.

The GO code also employs the use of Supertypes which provide the programmer extreme flexibility in coding, i.e., if a complicated circuit is repeated many times in the overall system, it need be detailed only once and assigned a Supertype number. Whenever that circuit is subsequently used again, all that is necessary is to call out the proper Supertype number and provide appropriate signal numbers for the Supertype inputs and outputs. The GO program will automatically expand the circuit and include all Supertype details.

The Supertypes are identified on the GO schematics as square or rectangular elements with a specific supertype number in the box, e.g.,



8.5.2.3 GO Chart

Development of the GO chart consists of matching the circuit components, one for one, with equivalent GO components and connecting them with signal arrows to correspond to the logic flow diagram or schematic. Occasionally, pseudo-components are added to correctly represent the logic of the physical system.

In general, the library of GO modeling components allows one to simulate the physical system flow logic in a variety of ways. GO incorporates human interfaces in a very logical manner, just as though the interfaces were components of the system with the prescribed dependencies.

8.5.3 Type Definitions

On the following pages, all necessary information for each of the depicted operator types is given. Included for each type are:

1. a general description
2. the GO chart symbol
3. the ordered data that must be on the signal card
4. the ordered data that must be on the kind card
5. the exact logical operation of the type
6. comments where appropriate

The following symbols are used consistently (other symbols are defined when they occur):

S: the identification number of the output signal

S1, S2, ...: the identification numbers of the input signals

K: the kind indentification number

TS, TS1, ...: the time of occurrence of signal S, S1,....

P1, P2, ...: probabilities; the event having probability Pi is defined in item 4 (Kind Data) for each type.

Certain types (4, 6, 7 and 9) have non-symmetric inputs - that is, the inputs are not interchangeable (as they are in types 2 and 10). To differentiate between such inputs on the GO chart symbol we can use a full arrowhead for the primary input and a half arrowhead for the secondary one or indicate the primary input by the letter "a" and the secondary one by the letter "b". We will use both methods here.

TYPE 1.

1. General: This type models a "good/bad" component such as light bulb, resistor, connector pin, etc.

2. GO Chart Symbol: 

3. Signal Data: S, 1, K, S1

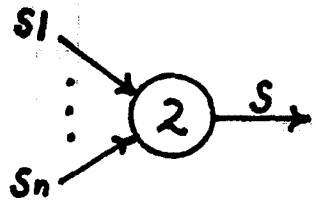
4. Kind Data: K, 1, P1
   P1: Component is good

5. Operation: TS=TS1, if the component is good
   = never, otherwise

TYPE 2.

1. General: This type determines the earliest time of several signals.

2. GO Chart Symbol:



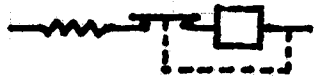
3. Signal Data: S, 2, n, S1, S2, ..., Sn
   n: number of input signals ($2 \leq n \leq 8$)

4. Kind Data: none

5. Operation: TS=min{TS1, ..., TSn}

6. Comment: This type is frequently thought of as an OR gate in the sense that S will occur as soon as S1 or S2 or ... or Sn occurs.

TYPE 3.

1. General: This type is used to model a triggered generator - e.g., a relay coil, accelerometer, etc. It was originally developed to represent a device consisting of the series combination of a resistor, a normally closed contact (which is opened by the actuator), and an actuator - i.e., 

2. GO Chart Symbol: 

3. Signal Data: S, 3, K, S1

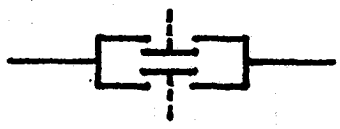
4. Kind Data: K, 3, P1, P2, P3, P4
   - P1: the resistor is good
   - P2: the normally closed contact opens prematurely
   - P3: the actuator operates prematurely
   - P4: the actuator operates normally if a signal reaches the actuator itself.

5. Operation: TS=0, if the actuator prematures
   - = never, if the resistor is bad, the contact opens prematurely, or the actuator fails
   - = TS1, otherwise

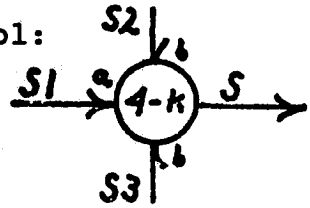
6. Comment:
   a. the resistor and/or the contact may be made perfect in many applications.
   b. If the device is perfect (P1=P4=1, P2=P3=0.0), it is equivalent to a Type 1.

TYPE 4.

1. General: This type models two normally open contacts in parallel, when the contacts are actuated by separate inputs:



2. GO Chart Symbol:



(note: the two secondary inputs are symmetric)

3. Signal Data: S, 4, K, S1, S2, S3

4. Kind Data: K, 4, P1, P2

   P1: a contact closes prematurely

   P2: a contact closes when its actuating signal arrives.

   (Note: both contacts have the same mode probabilities.)

5. Operation:

   TS=max{TS1, min{TS2, TS3}}, if both contacts are good

   = max{TS1, TS2}, if S2 contact is good and S3 contact fails

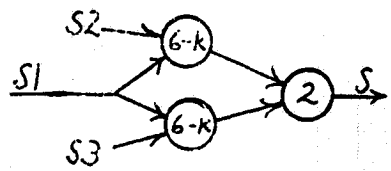
   = max{TS1, TS3}, if S3 contact is good and S2 contact fails

   = TS1, if either contact closes prematurely

   = never, otherwise

6. Comment:

   a. This type can be replaced by:



   b. This was developed because it occurs frequently in certain kinds of highly redundant control systems.

TYPE 5.

1. General: This type is a signal generator. It is used to create signals, including noise if needed.

2. GO Chart Symbol: 

3. Signal Data: S, 5, K

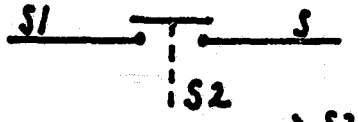
4. Kind Data: K, 5, n, T1, P1, ..., Tn, Pn
   - n: number of time points at which a signal is to be generated.
   - Ti: ith time value
   - Pi: probability for ith time value ($\sum_{i=1}^{n} Pi=1.0$)

5. Operation: TS=Ti with probability Pi, i=1, ..., n

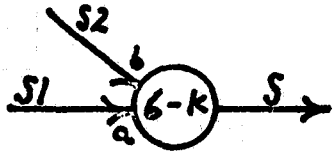
6. Comment: The most common use of a Type 5 is to generate a signal at just one time point. In this case, the kind data is: K, 5, 1, T, 1 where T is the desired time point. For this situation it is useful (but not necessary) to reserve the first few kind numbers so that T=K. By doing this, the signal generation time will automatically appear on the GO chart. If this practice is not followed, it may be convenient to include the time T within the GO chart symbol.

TYPE 6.

1. General: This type models a normally open contact:



2. GO Chart Symbol:



3. Signal Data: S, 6, K, S1, S2

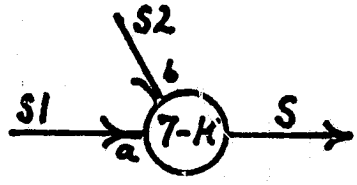
4. Kind Data: K, 6, P1, P2
   P1: contact closes prematurely
   P2: contact closes normally

5. Operation:
   TS = max{TS1, TS2}, if contact operates normally
   = TS1, if contact closes prematurely
   = never, if contact fails

TYPE 7.

1. General: This type models a normally closed contact.

2. GO Chart Symbol:



3. Signal Data: S, 7, K, S1, S2

4. Kind Data: K, 7, P1, P2
   P1: contact opens prematurely
   P2: contact opens normally

5. Operation:
   TS=TS1, if the contact fails, or if TS2>TS1 and the contact operates normally
   = never, otherwise

6. Comment: Note that our convention is that the simultaneous occurrence of S1 and S2 will cause S to occur at the common time.

TYPE 8.

1. General: This type models a timer or other device which generates an action a specified time after it is actuated.

2. GO Chart Symbol: 

3. Signal Data: S, 8, K, S1

4. Kind Data: K, 8, P1, P2, D
   P1: premature operation of the generator
   P2: normal operation of the generator
   D: time delay (number of time points); $D \geq 0$

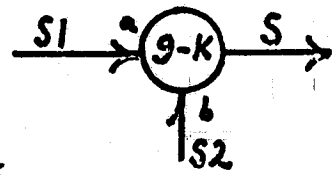
5. Operation:
   TS=0, if the generator operates prematurely
   = min{TS1+D, never} if the generator operates normally
   = never, otherwise

6. Comment:
   a. The value of D can be written in the GO chart circle if desired.
   b. Care must be exercised in using this type because the delay D is measured in number of time points which may bear no relationship (other than order) with clock time.

TYPE 9.

1. General: This is a general purpose operator used to handle complex timing situations. It is somewhat difficult to get acquainted with but has proved of great value in many situations.

2. GO Chart Symbol:



3. Signal Data: S, 9, K

4. Kind Data: K, 9, n, X1, Y1, ..., Xn, Yn

   n is the number of Xi, Yi pairs on the card

   Xi and Yi are time values. The set of Xi,Yi pairs define Yi as a function of Xi - i.e., Yi = f(Xi). $Xi \geq 0$, $Yi \geq 0$.

5. Operation:

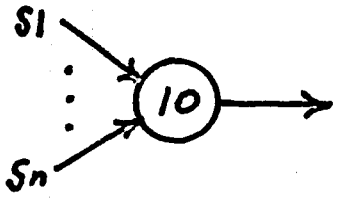
   TS=min{TS1+f(TS2-TS1), never}

   Note: f(x)=never if X is not explicitly stated on the kind card.

TYPE 10.

1. General: This type determines the latest time of several signals.

2. GO Chart Symbol:



3. Signal Data: S, 10, n, S1, ..., Sn ($2 \leq n \leq 8$)

4. Kind Data: none

5. Operation: TS=max{TS1, ..., TSn}

6. Comment: This type is frequently thought of as an AND gate in the sense that S will occur only when S1 and S2 and ... and Sn have all occurred.

8.5.4 Sensitivity

Sensitivity in the GO methodology is defined as the partial derivative of total system reliability (or availability) to component reliability (or availability). The determination of these partials serves two purposes;

a. It serves to eliminate from consideration those kinds of components which have only minimal impact on system reliability or availability, and;
b. It provides a mechanism for ordering the relative importance of those components which may have a significant impact on system reliability or availability.

A very accurate sensitivity analysis can be made by varying the reliability of each component a small amount about perfect. If the remainder of the system is assumed to be perfect, the computer running time for large and complicated systems can be quite minimal. Once the sensitive areas of the system are identified, those portions of the system can be explored in greater depth, and the remainder of the system assumed to be perfect, since the effects of changes in the balance of the system have been found to contribute negligibly to overall system reliability.

When the sensitivity analysis is completed, it will have identified these system elements which, if improved, will contribute most to the improvement of total system reliability; and hence to overall mission or system performance.

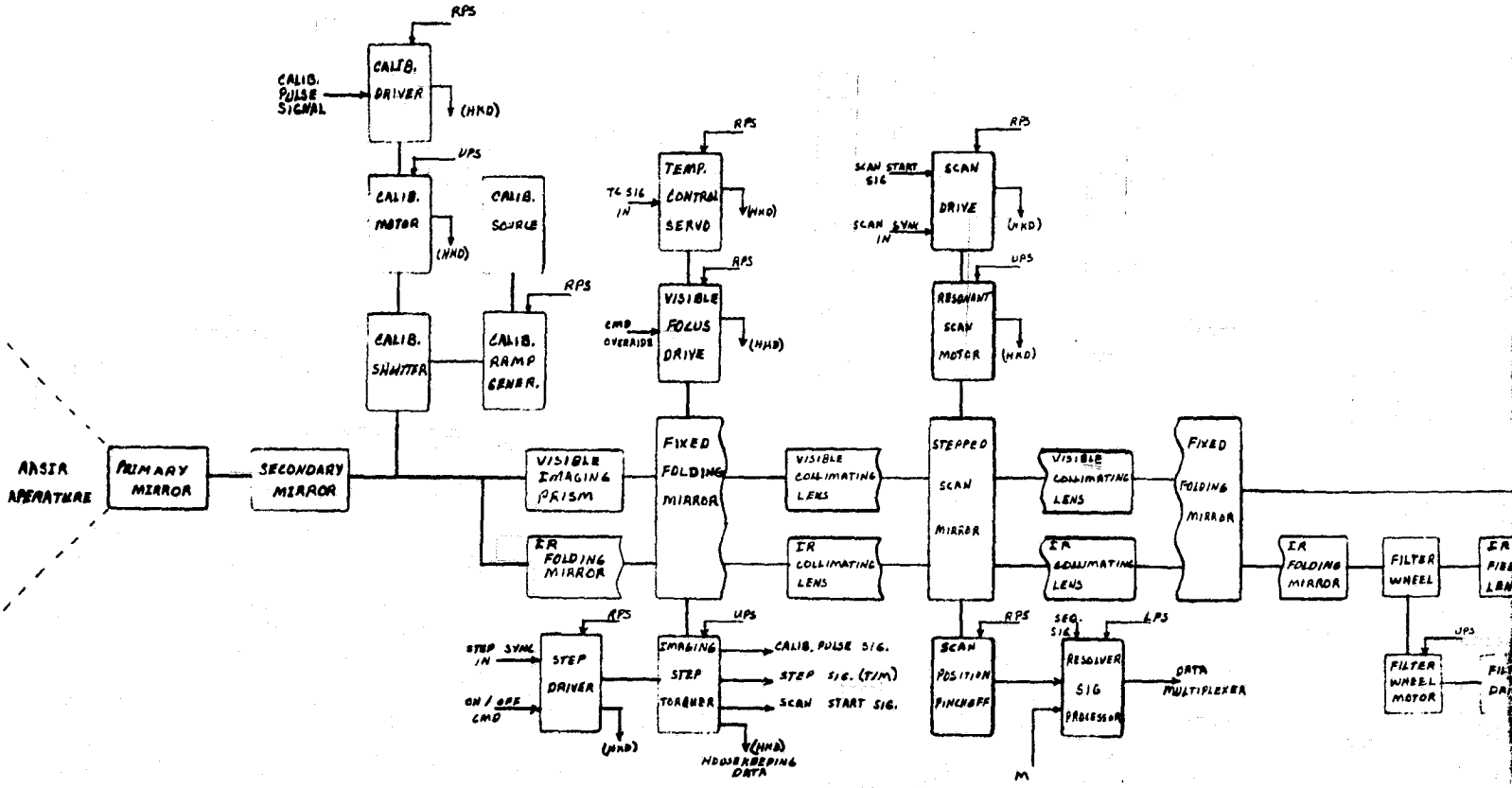
8.6 Functional Block Drawings and GO Diagrams

The following are the set of drawings which are referred to in Section 4.0. These drawings are indexed as follows:

A1-A3	STORMSAT	FUNCTIONAL BLOCK DRAWINGS
A4-A5	STORMSAT	GO LOGIC DIAGRAMS
B1-B3	LANDSAT	FUNCTIONAL BLOCK DRAWINGS
B4-B5	LANDSAT	GO LOGIC DIAGRAMS
C1-C4	TIROS	FUNCTIONAL BLOCK DRAWINGS
C5-C7	TIROS	GO LOGIC DIAGRAMS
D1-D2	HEATE-1	FUNCTIONAL BLOCK DRAWINGS
D3-D4	HEATE-1	GO LOGIC DIAGRAMS
E1-E2	HEATE-2	FUNCTIONAL BLOCK DRAWINGS
E3-E4	HEATE-2	GO LOGIC DIAGRAMS
F1-F2	GRE	FUNCTIONAL BLOCK DRAWINGS
F3-F4	GRE	GO LOGIC DIAGRAMS
G1	SEASAT	FUNCTIONAL BLOCK DRAWING

CONCEPTUAL BLOCK DIAGRAM - STORMSAT

ADVANCED ATMOSPHERIC SOUND



MICROWAVE ATMOSPHERIC SOU

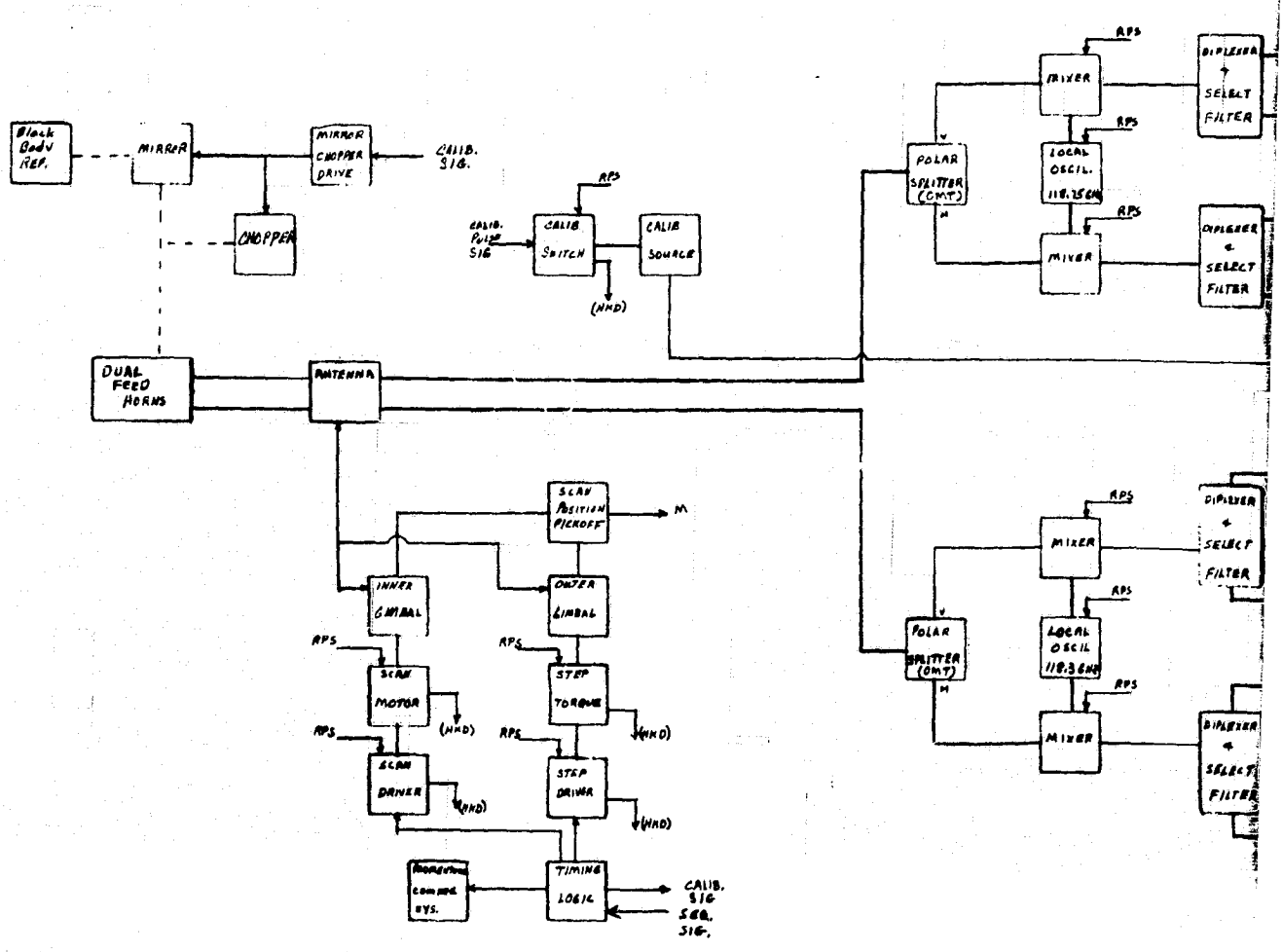
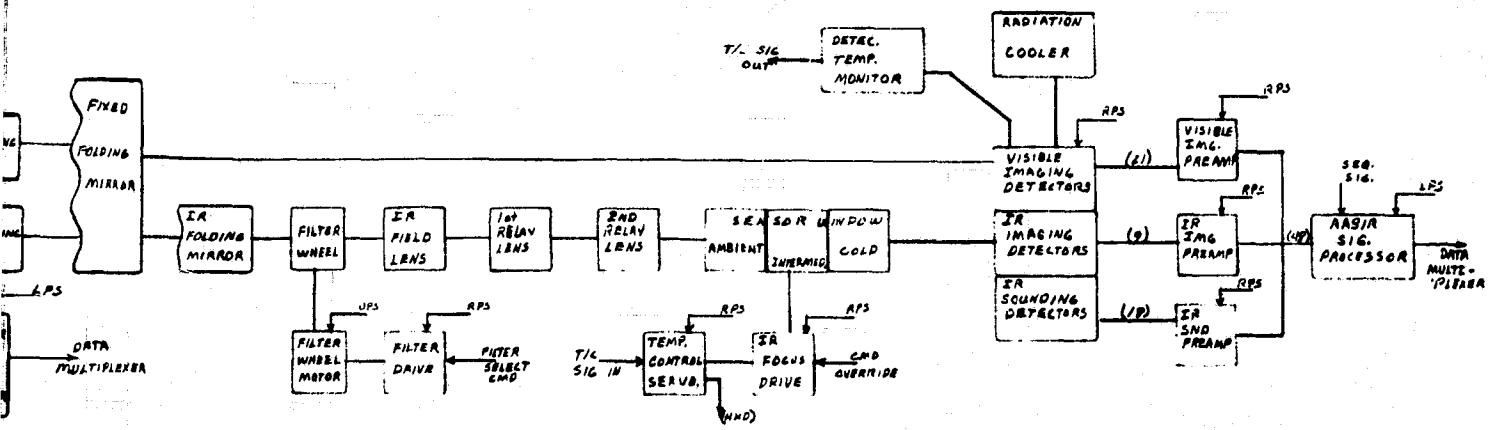
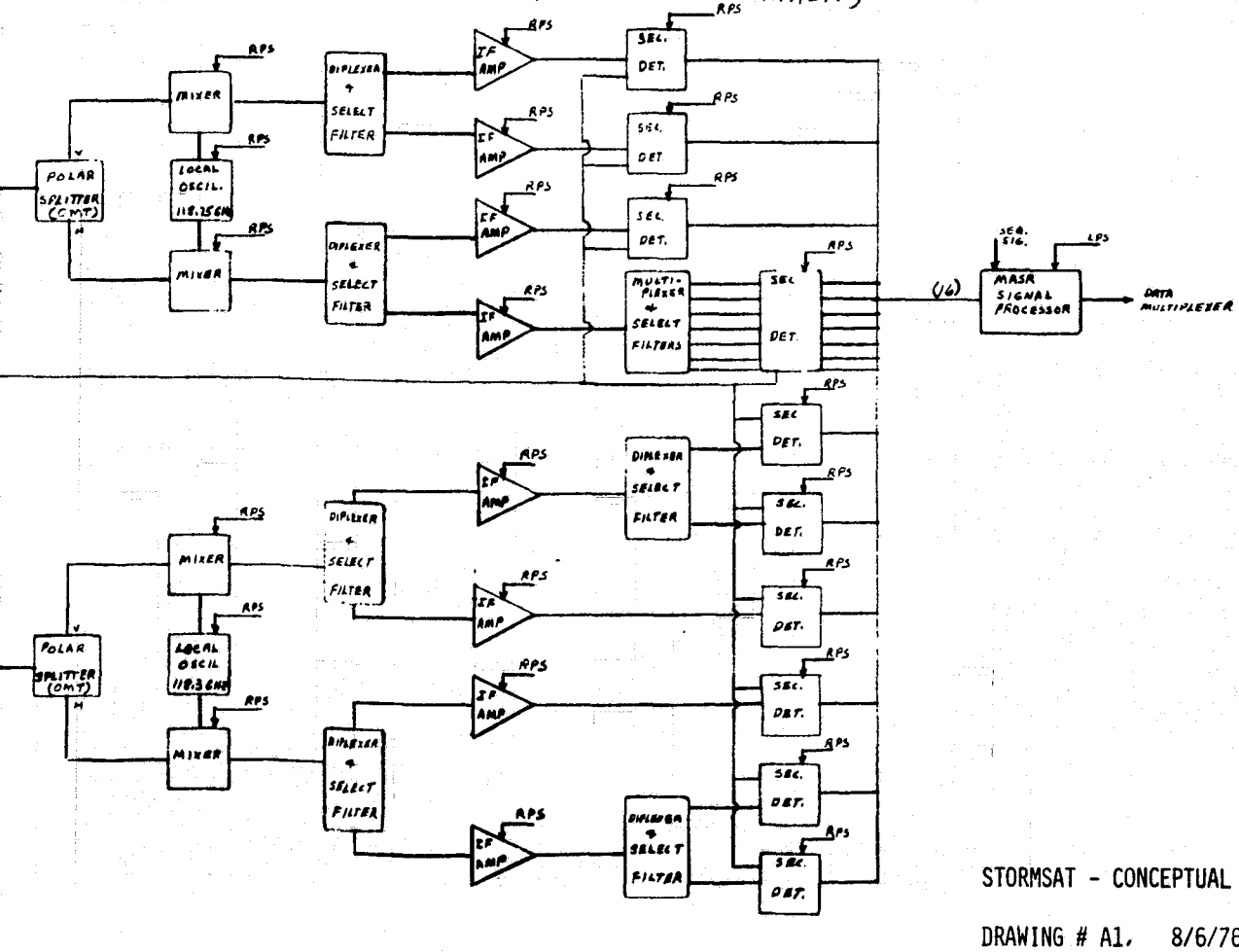


DIAGRAM - STORMSAT EXPERIMENTS

ED ATMOSPHERIC SOUNDING AND IMAGING RADIOMETER (AASIR)



WAVE ATMOSPHERIC SOUNDING RADIOMETER (MASR)

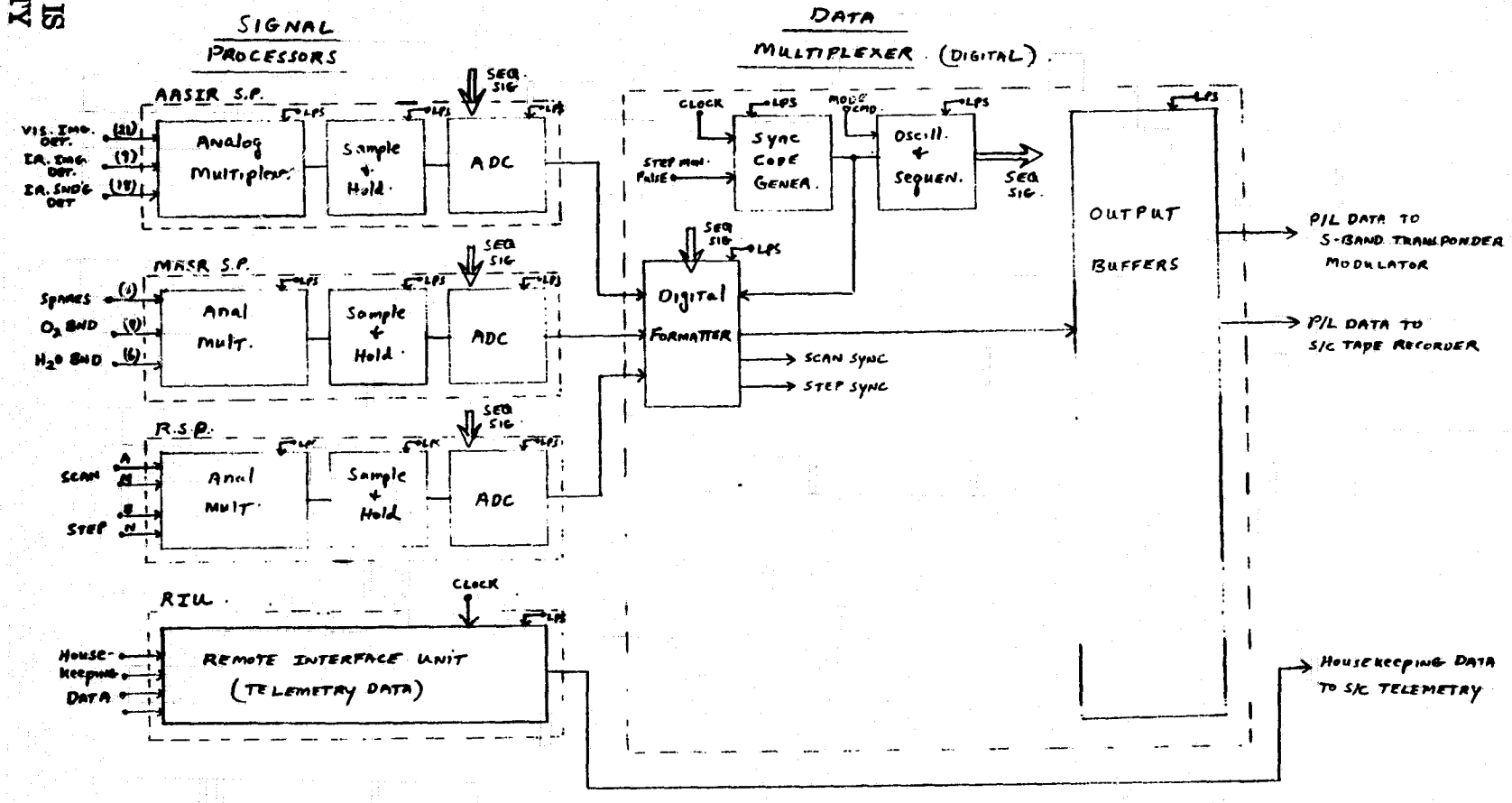


STORMSAT - CONCEPTUAL BLOCK DRAWING

DRAWING # A1. 8/6/76

FOLDOUT FRAME

STORMSAT SIGNAL PROCESSORS + DATA MULTIPLEXER



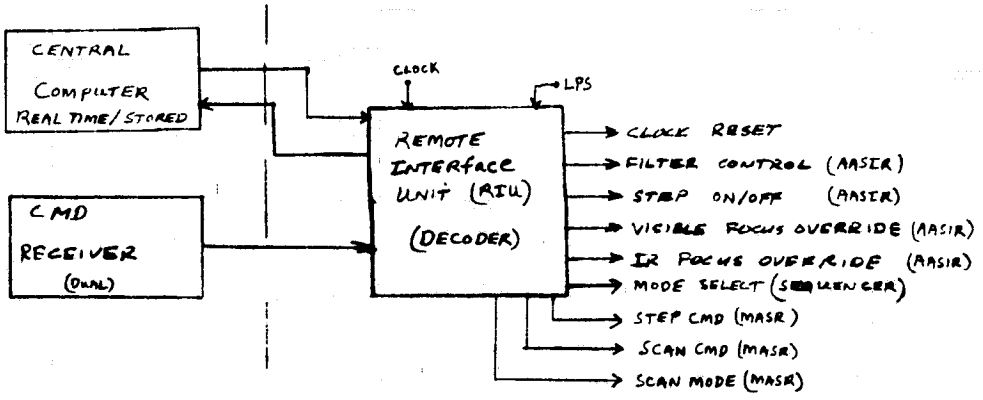
STORMSAT - CONCEPTUAL DRAWING

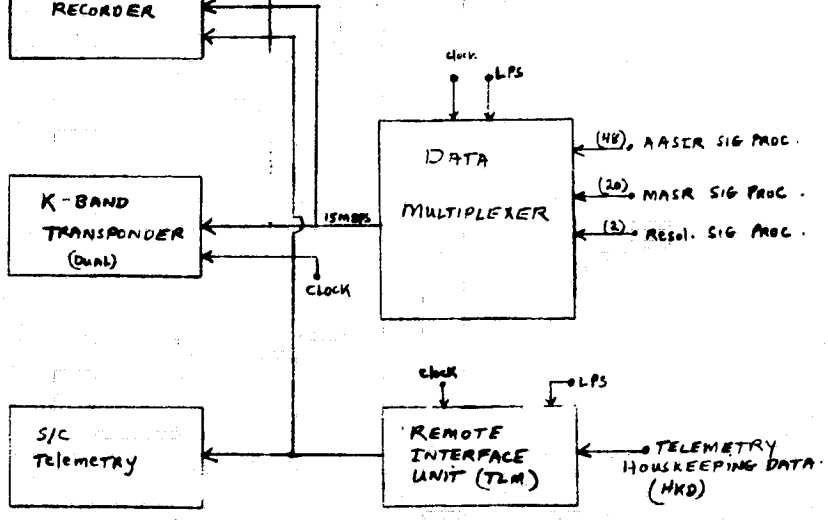
DRAWING # A2. 8/6/76

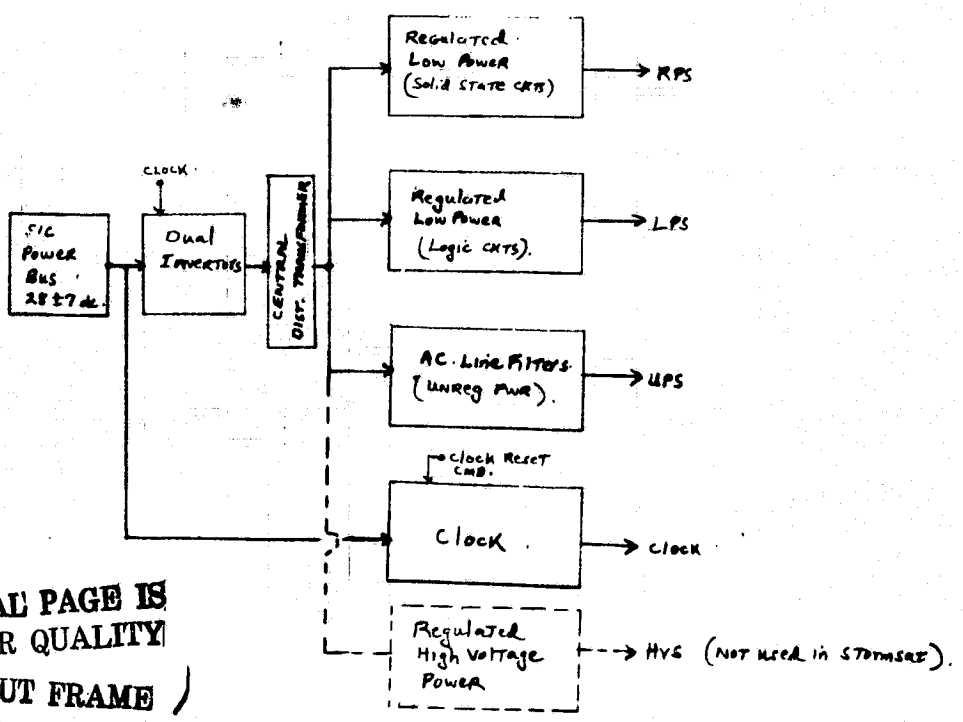
STORMSAT INTERFACE SUPPORT ELEMENTS

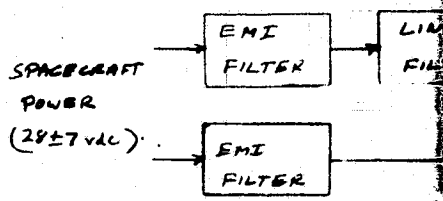
STORMSAT

SPACECRAFT EQUIPMENT | EXPERIMENT INSTRUMENT MODULES







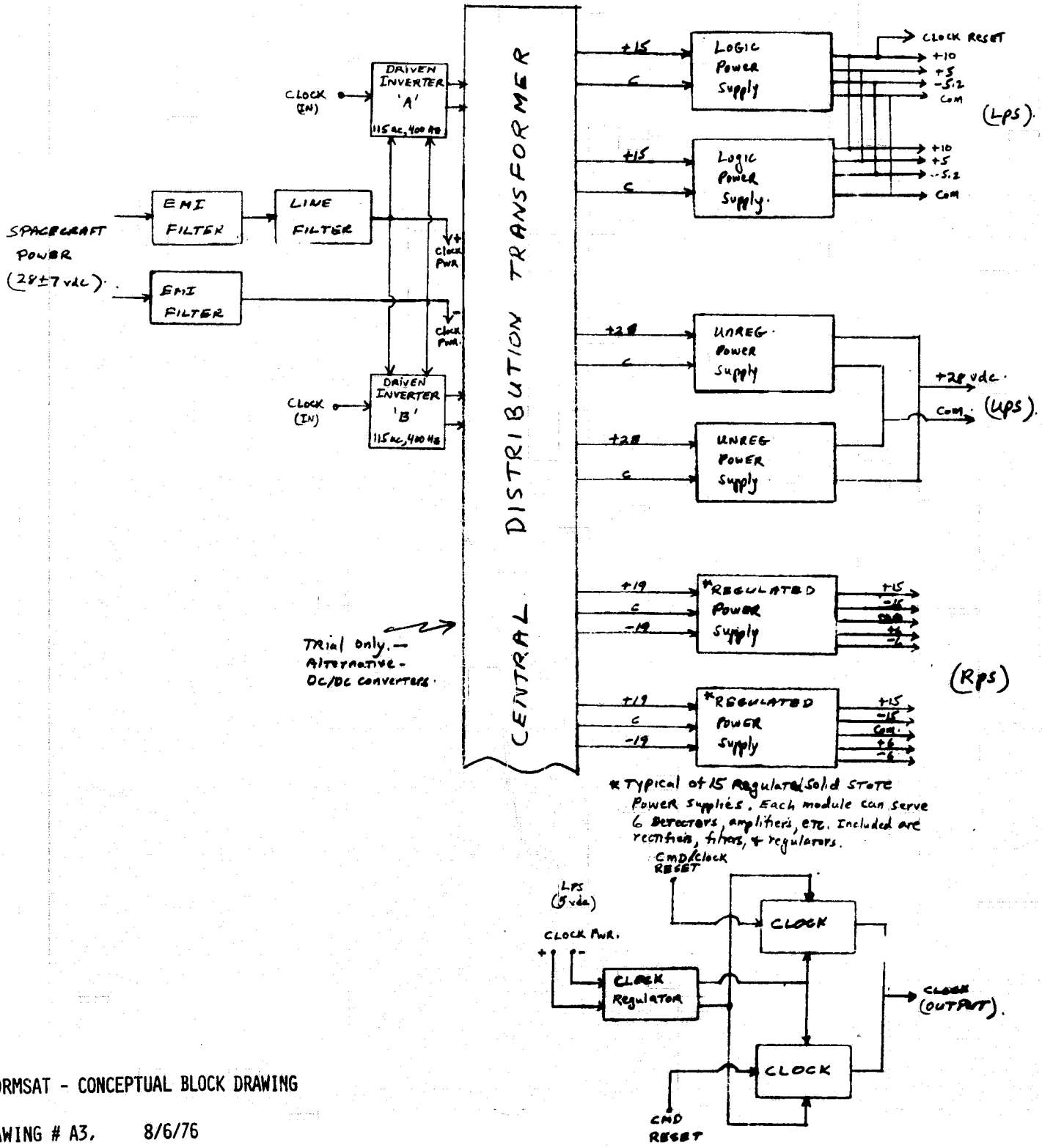


STORMSAT - CONCEPTUAL BLOCK DRAWING

DRAWING # A3, 8/6/76

STORMSAT

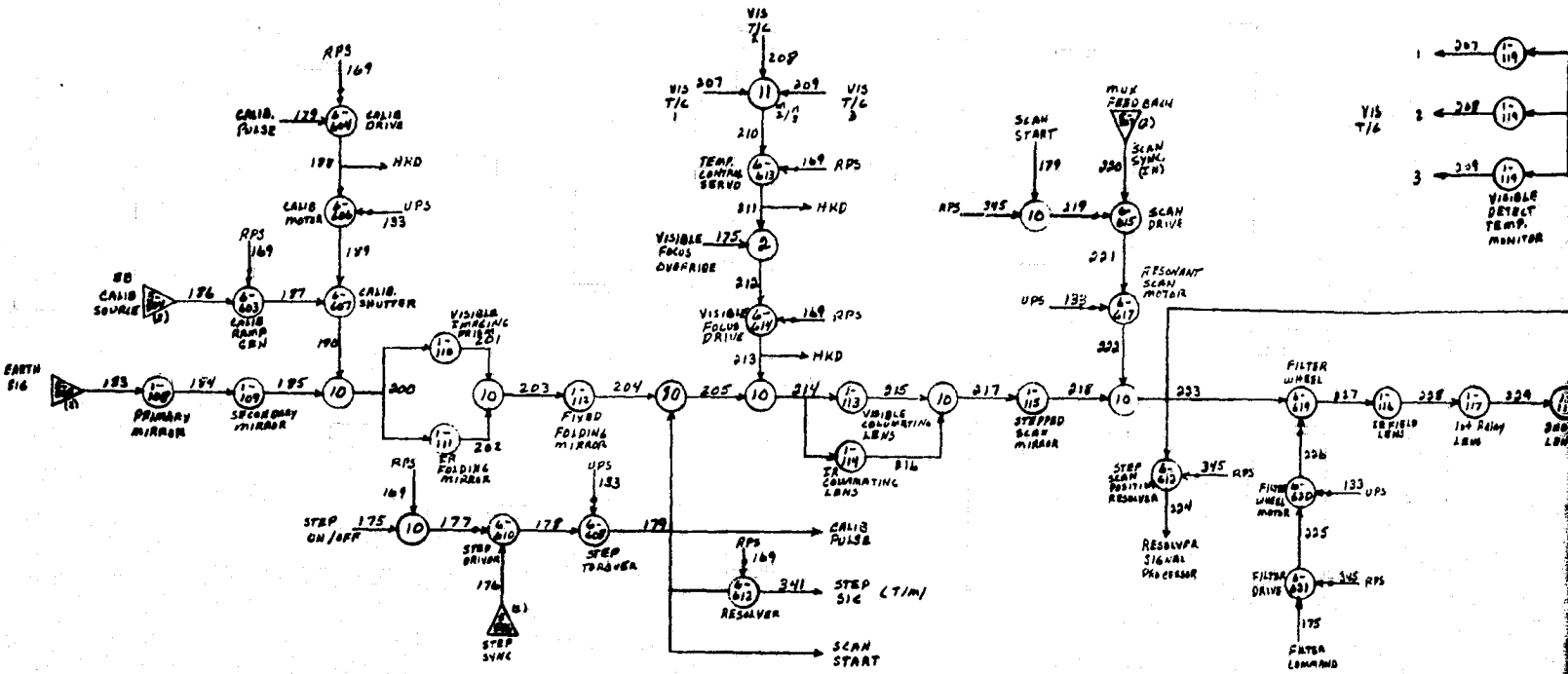
STORMSAT POWER SUPPLY SYSTEM AND CLOCK

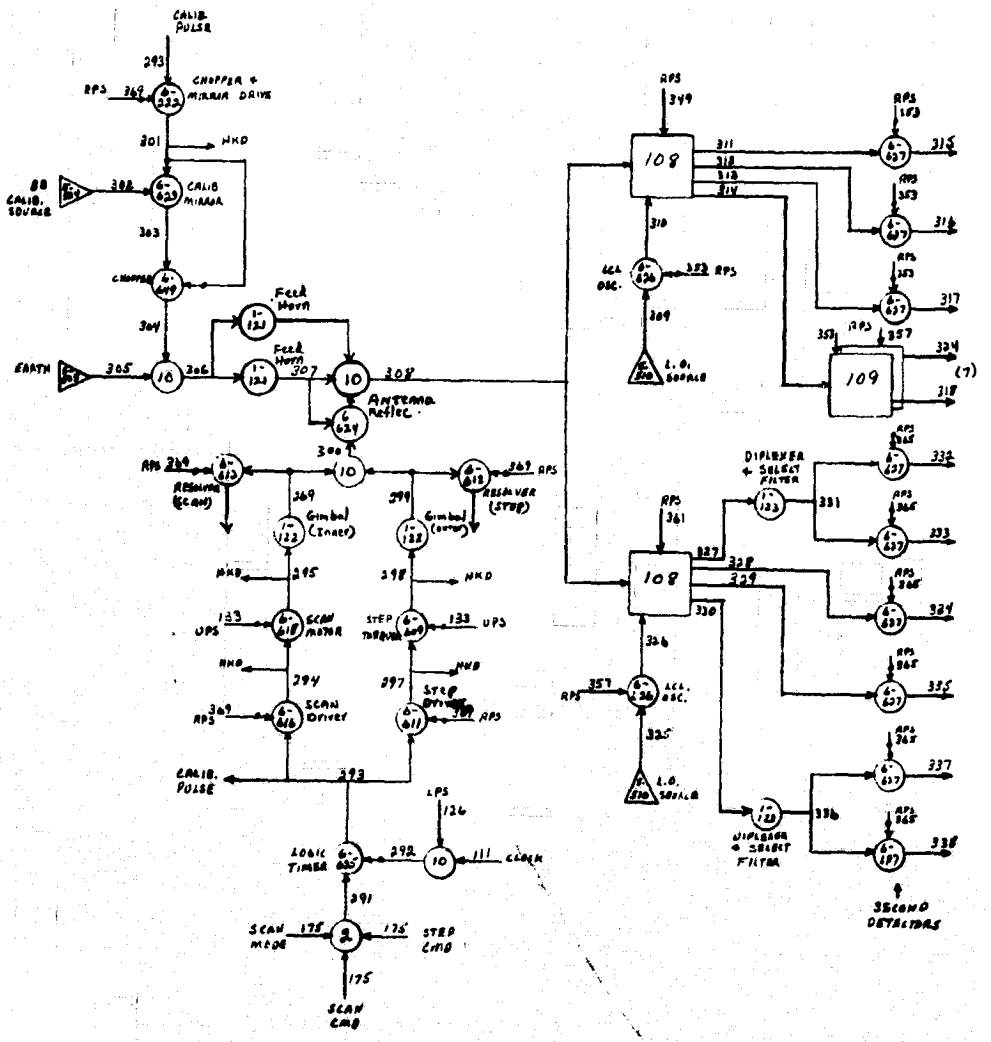


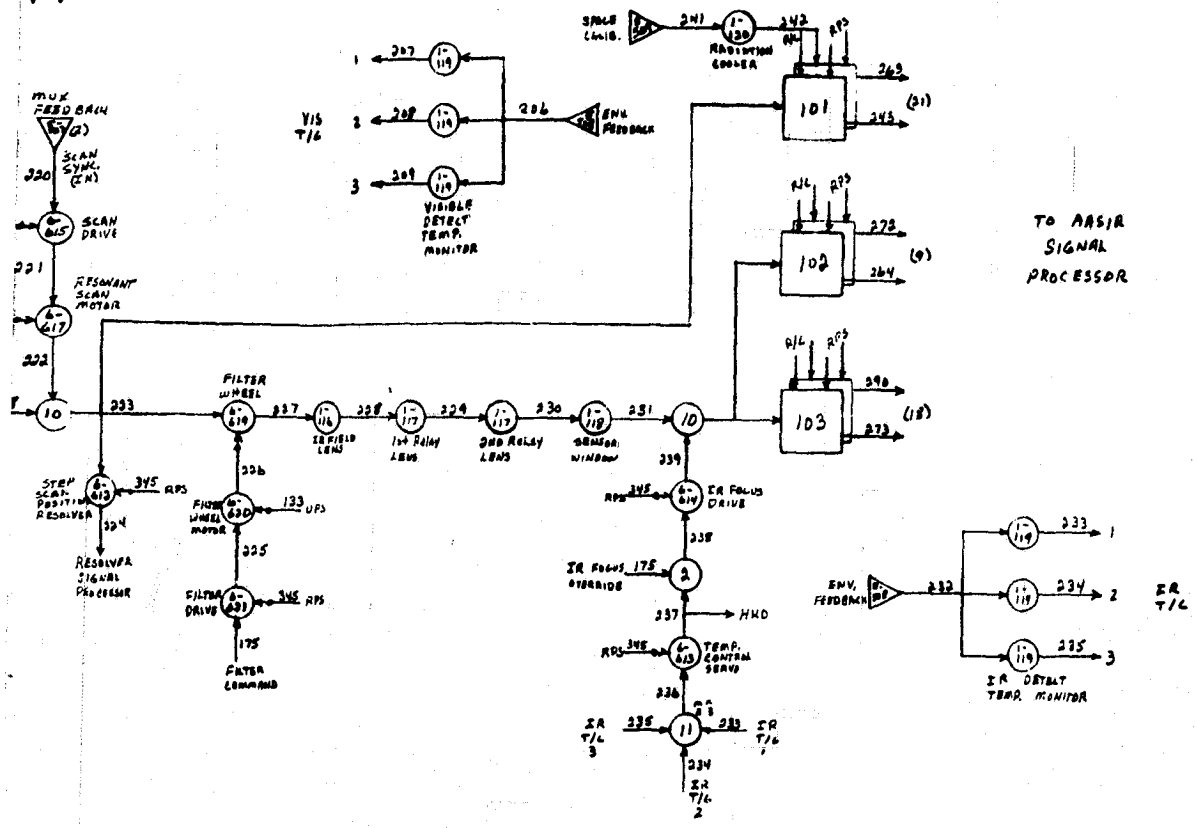
ORMSAT - CONCEPTUAL BLOCK DRAWING

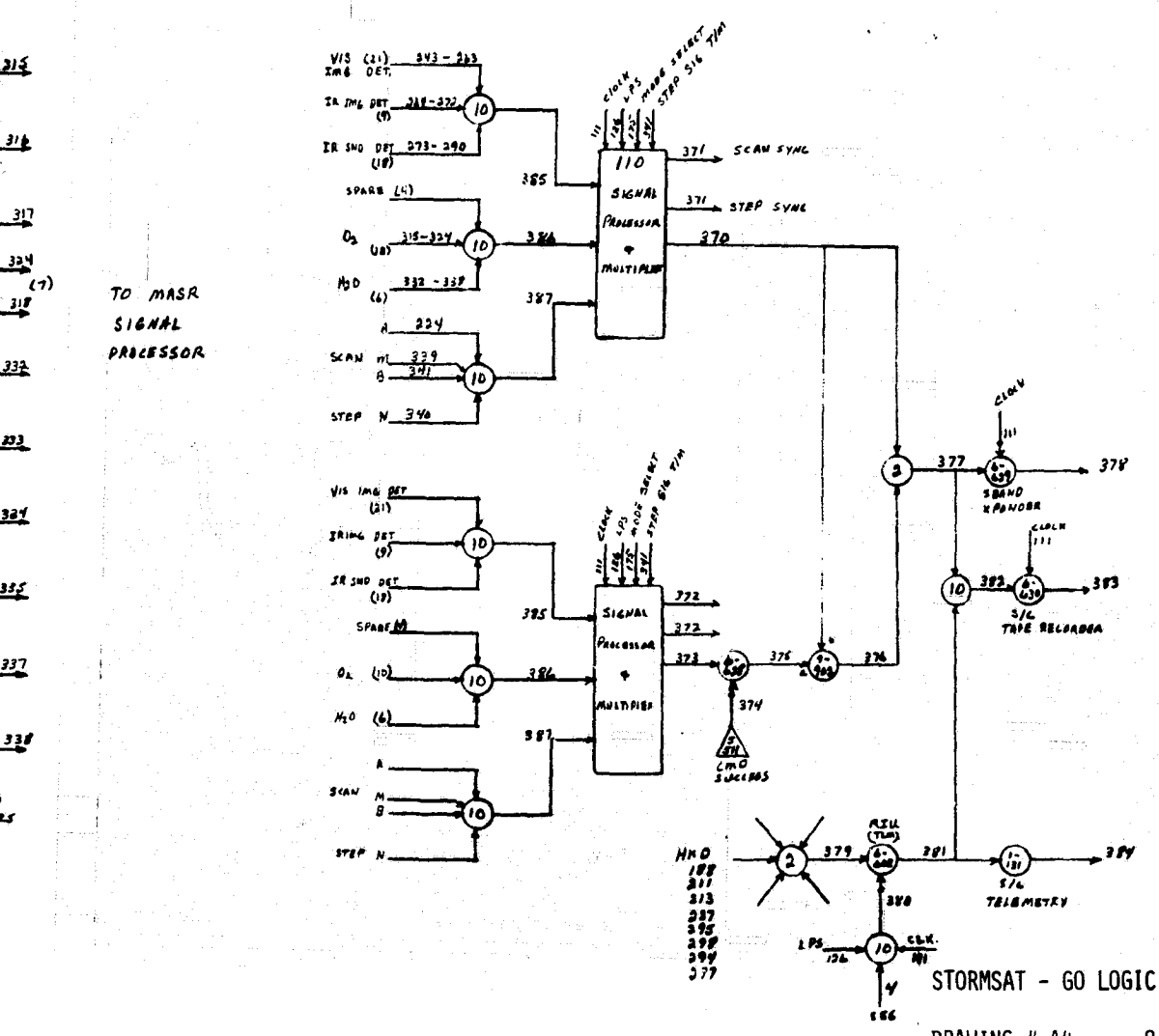
AWING # A3, 8/6/76

STORMSAT









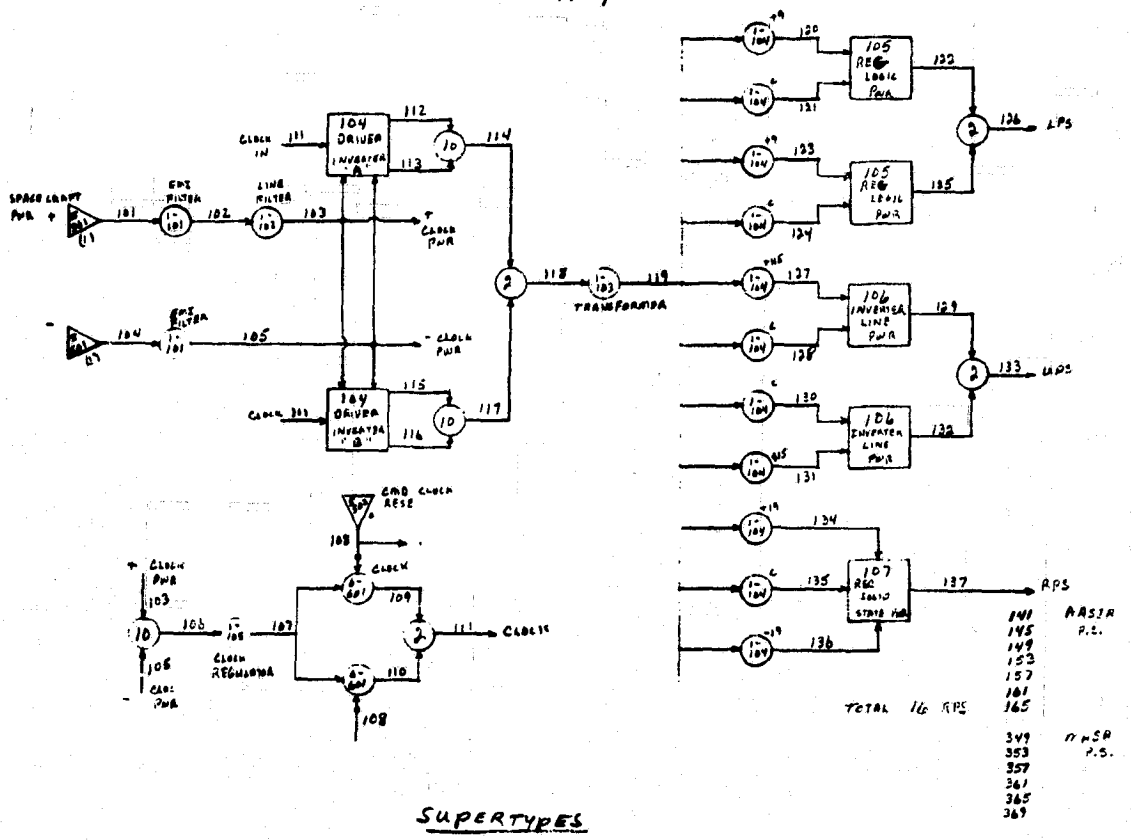
STORMSAT - GO LOGIC DIAGRAM

DRAWING # A4, 8/6/76

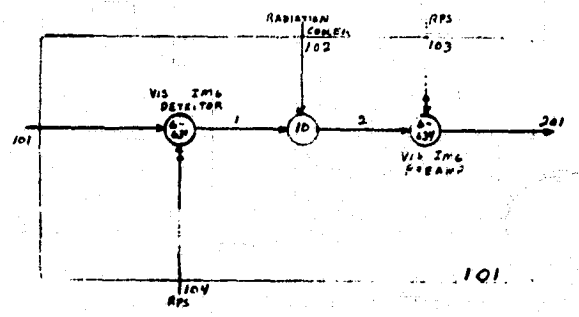
FOLDOUT FRAME 2

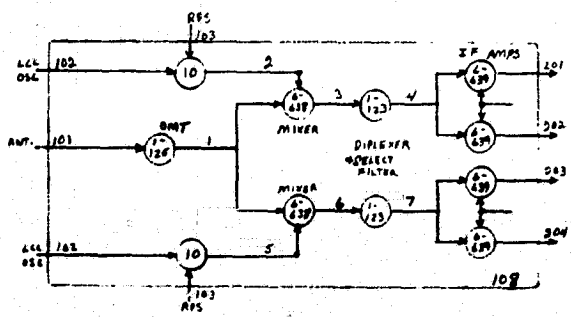
STORMSAT

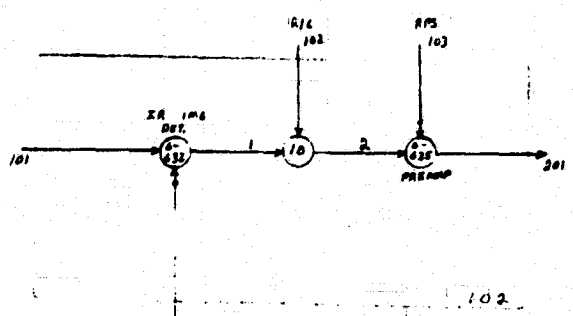
POWER SUPPLY SECTION

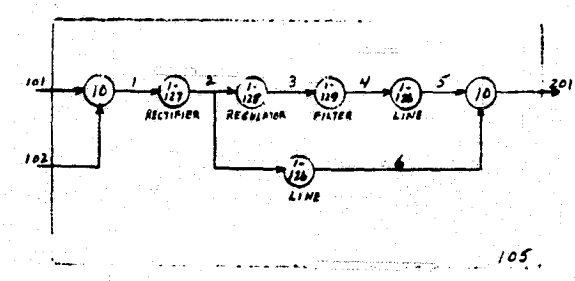


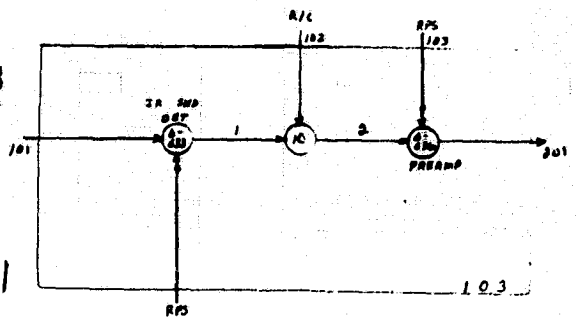
SUPERTYPES

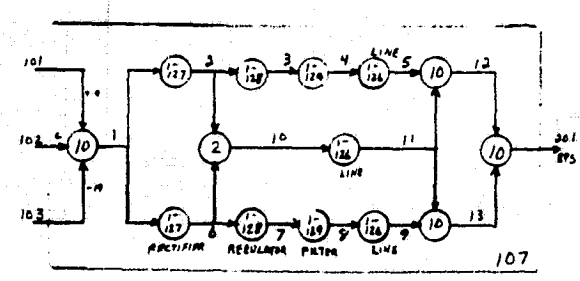


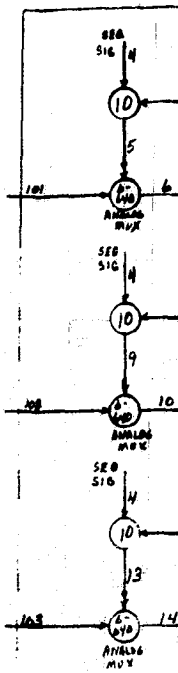




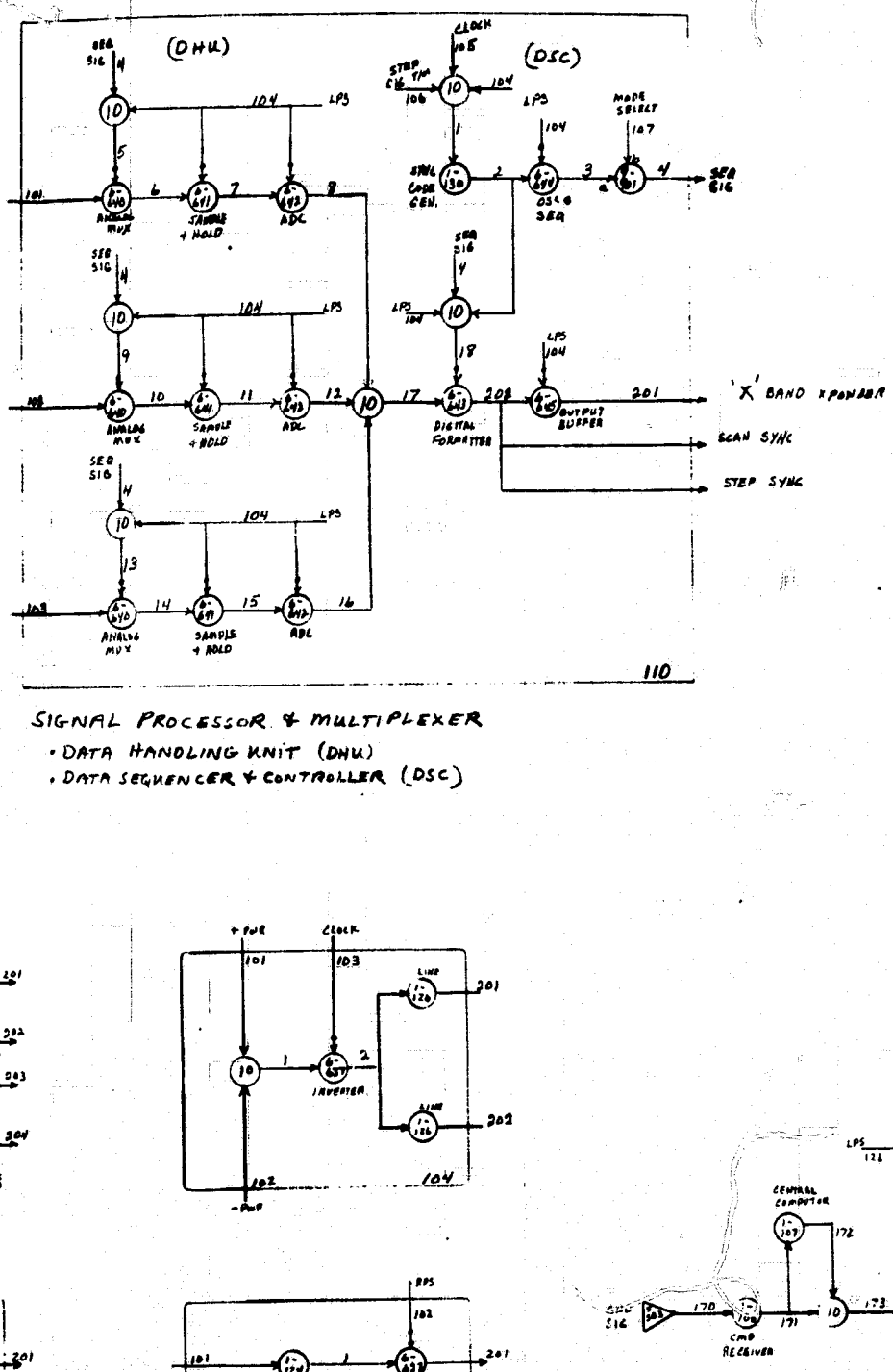






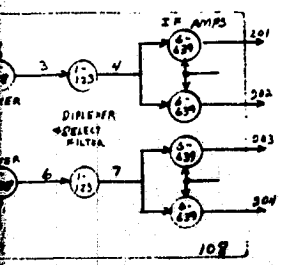


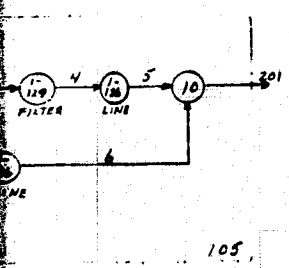
MSAT

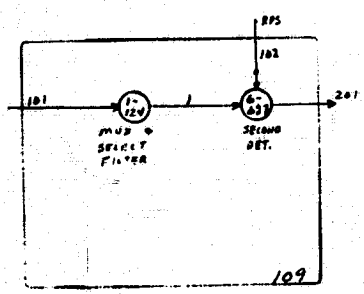


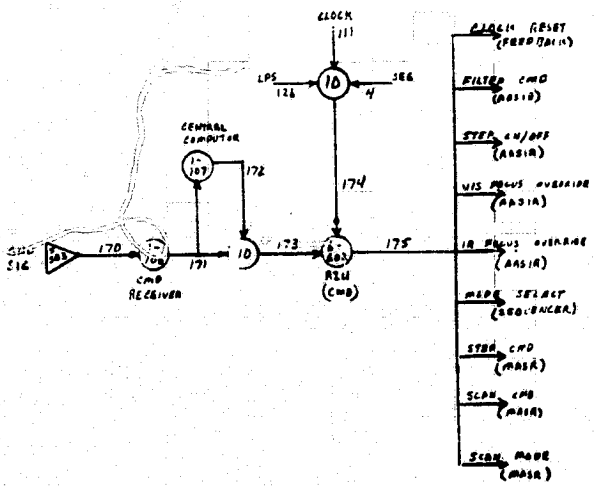
SIGNAL PROCESSOR & MULTIPLEXER

- DATA HANDLING UNIT (DHU)
- DATA SEQUENCER & CONTROLLER (DSC)

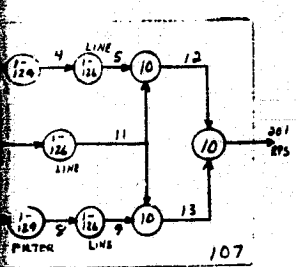


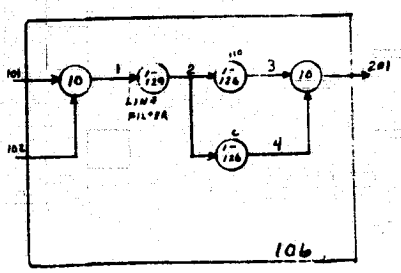






COMMAND SECTION





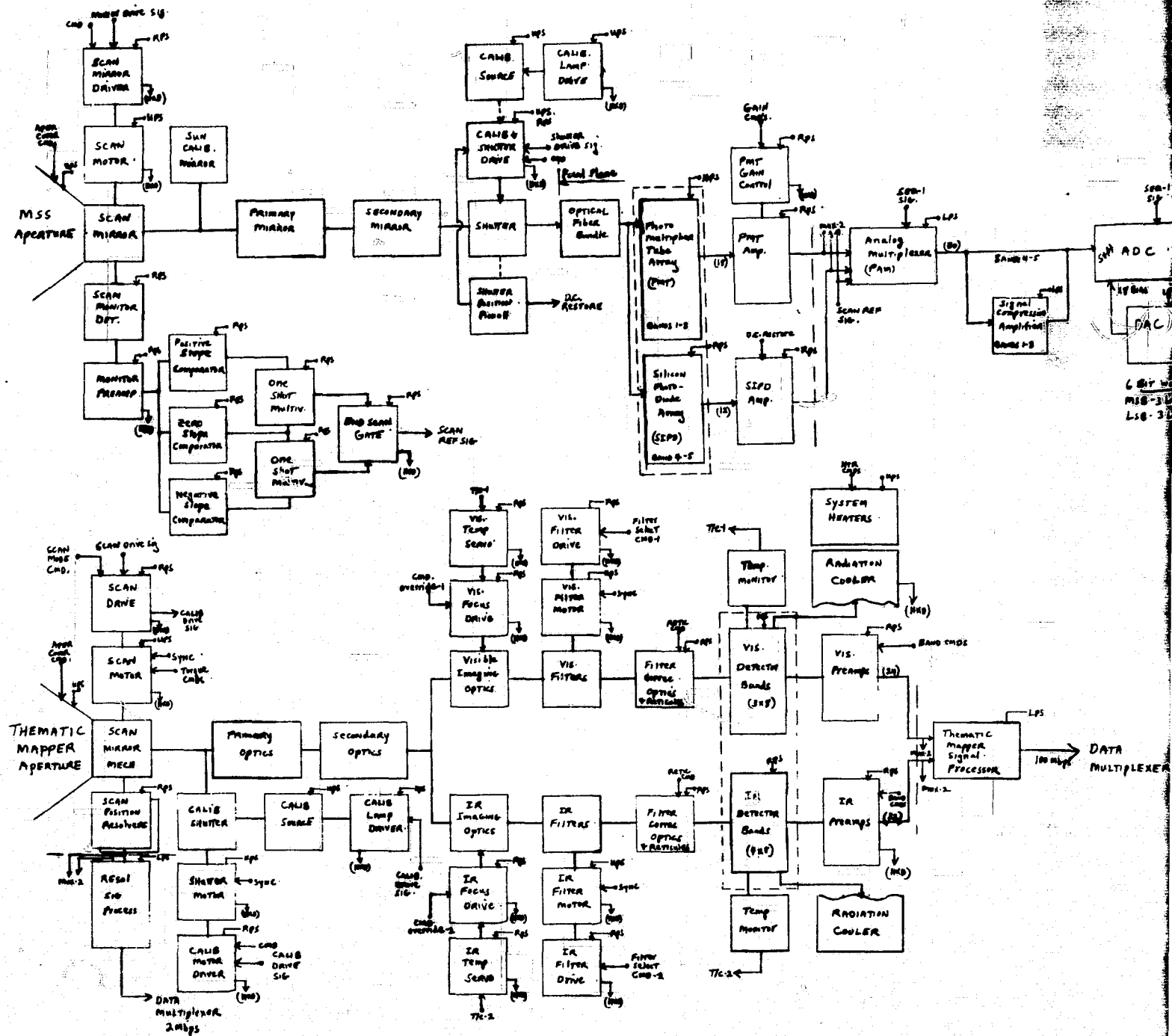
STORMSAT - GO LOGIC DIAGRAM

DRAWING # A5, 8/6/76

FOLDOUT FRAME 2

CONCEPTUAL BLOCK DIAGRAM — LANDSAT D' EXPERIMENT

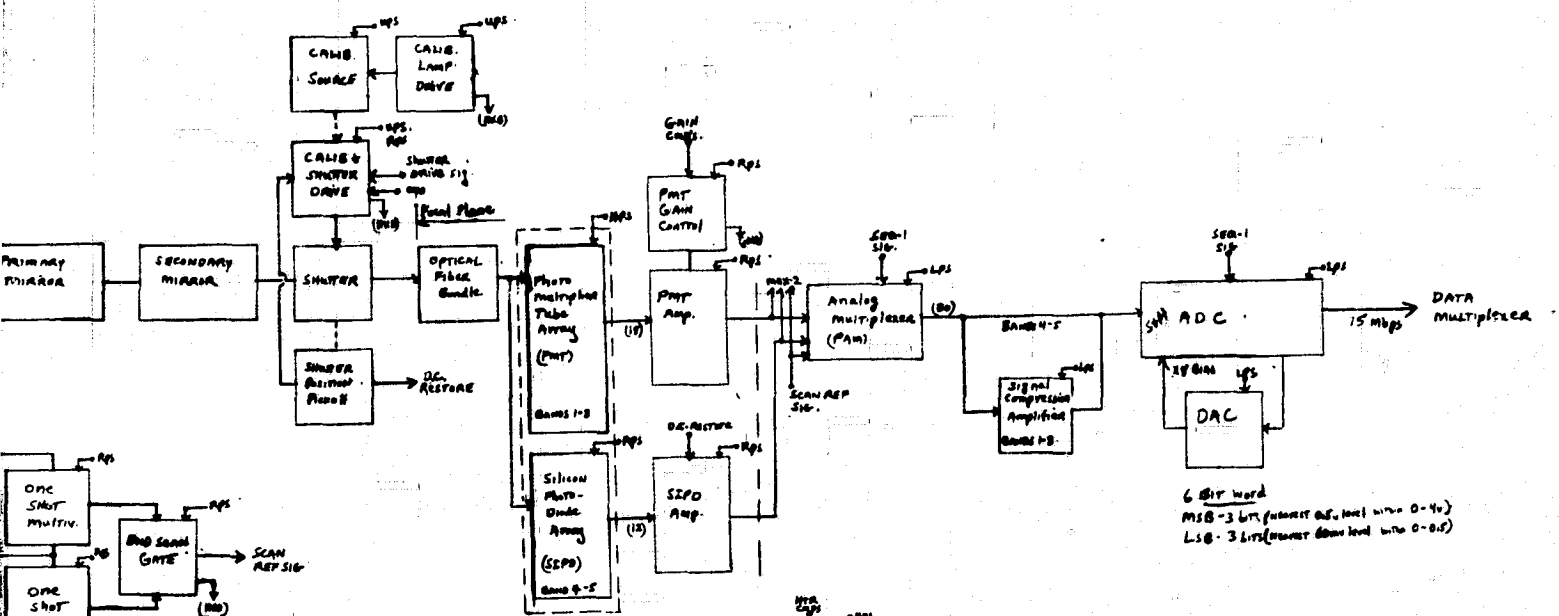
MULTISPECTRAL SCANNER SYSTEM (MSS)

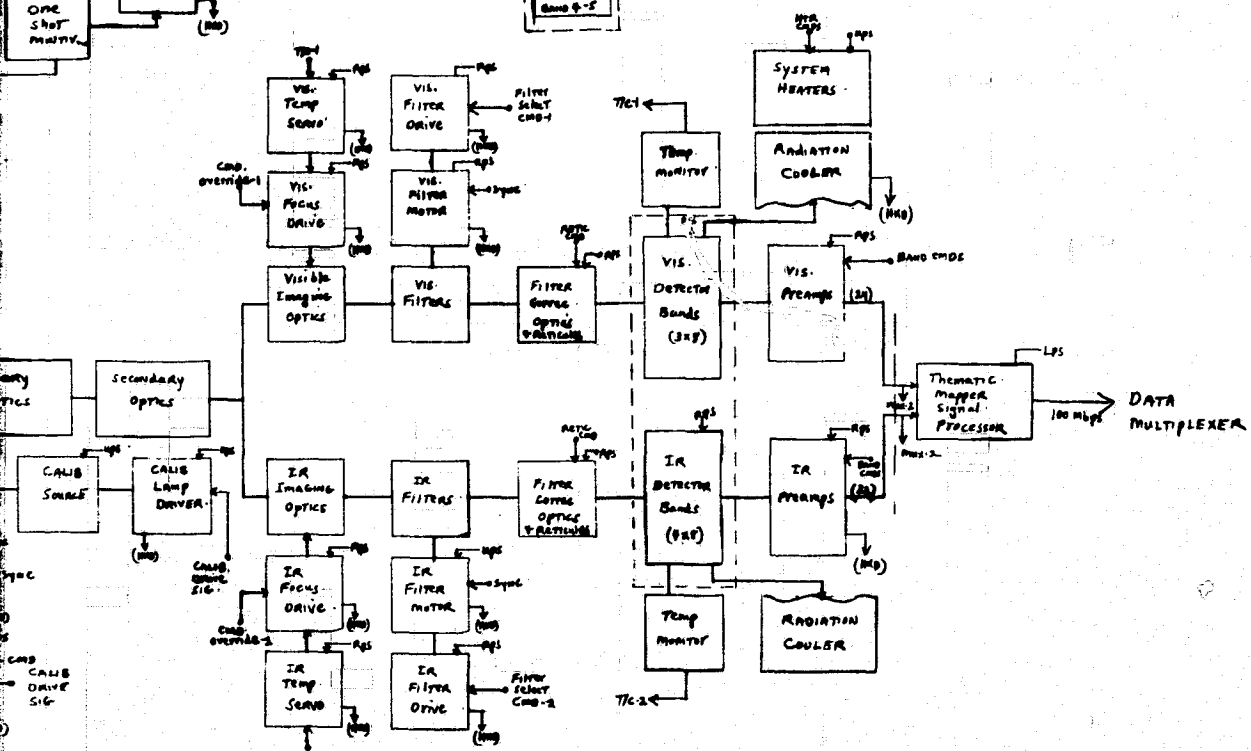


THEMATIC MAPPER SYSTEM (TMS)

NCEPTUAL BLOCK DIAGRAM — LANDSAT D' EXPERIMENT

MULTISPECTRAL SCANNER SYSTEM (MSS)



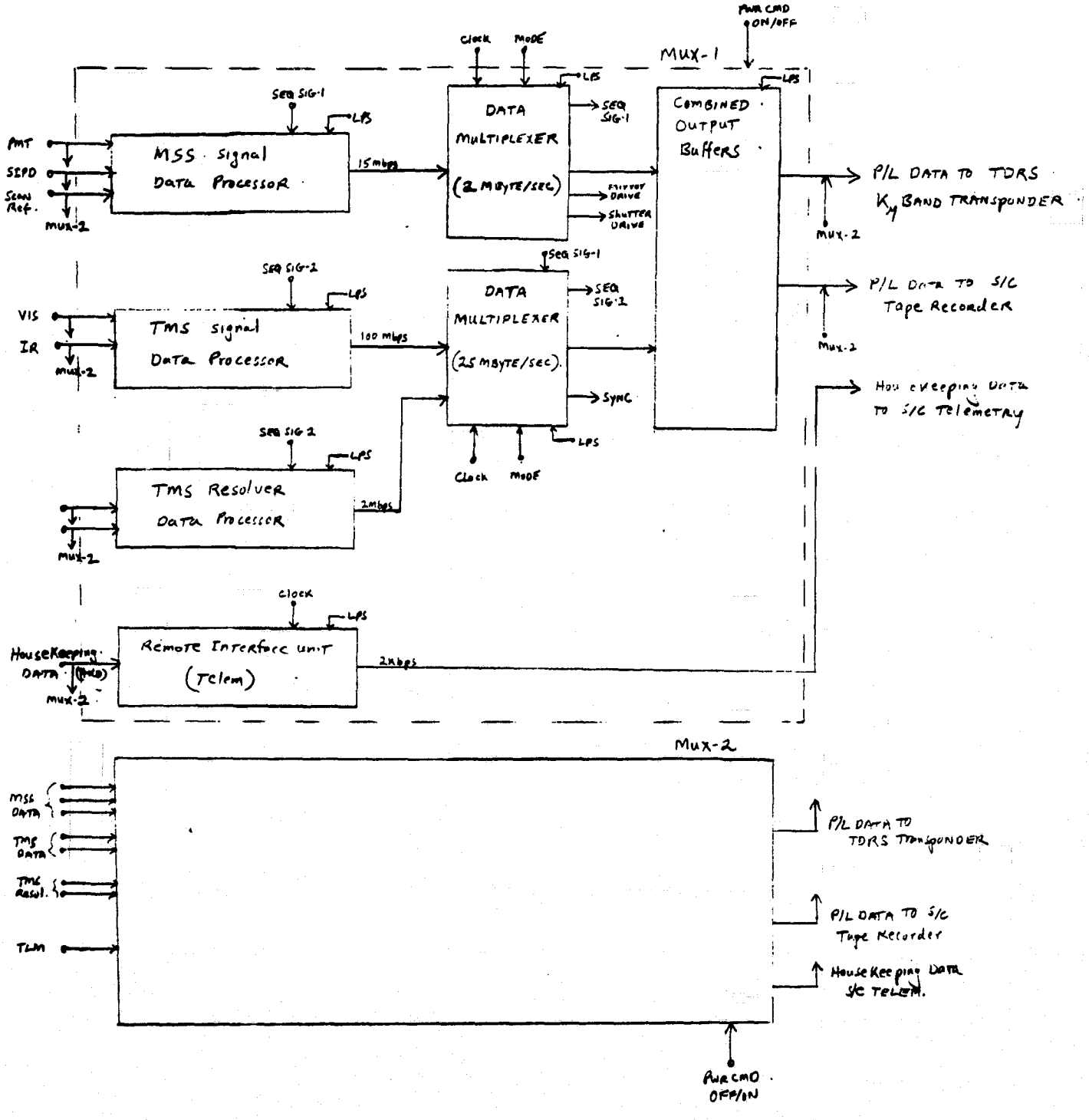


THEMATIC MAPPER SYSTEM (TMS)

LANDSAT - CONCEPTUAL BLOCK DRAWING

DRAWING # B1. 8/6/76

LANDSAT SIGNAL PROCESSORS & DATA MULTIPLEXER



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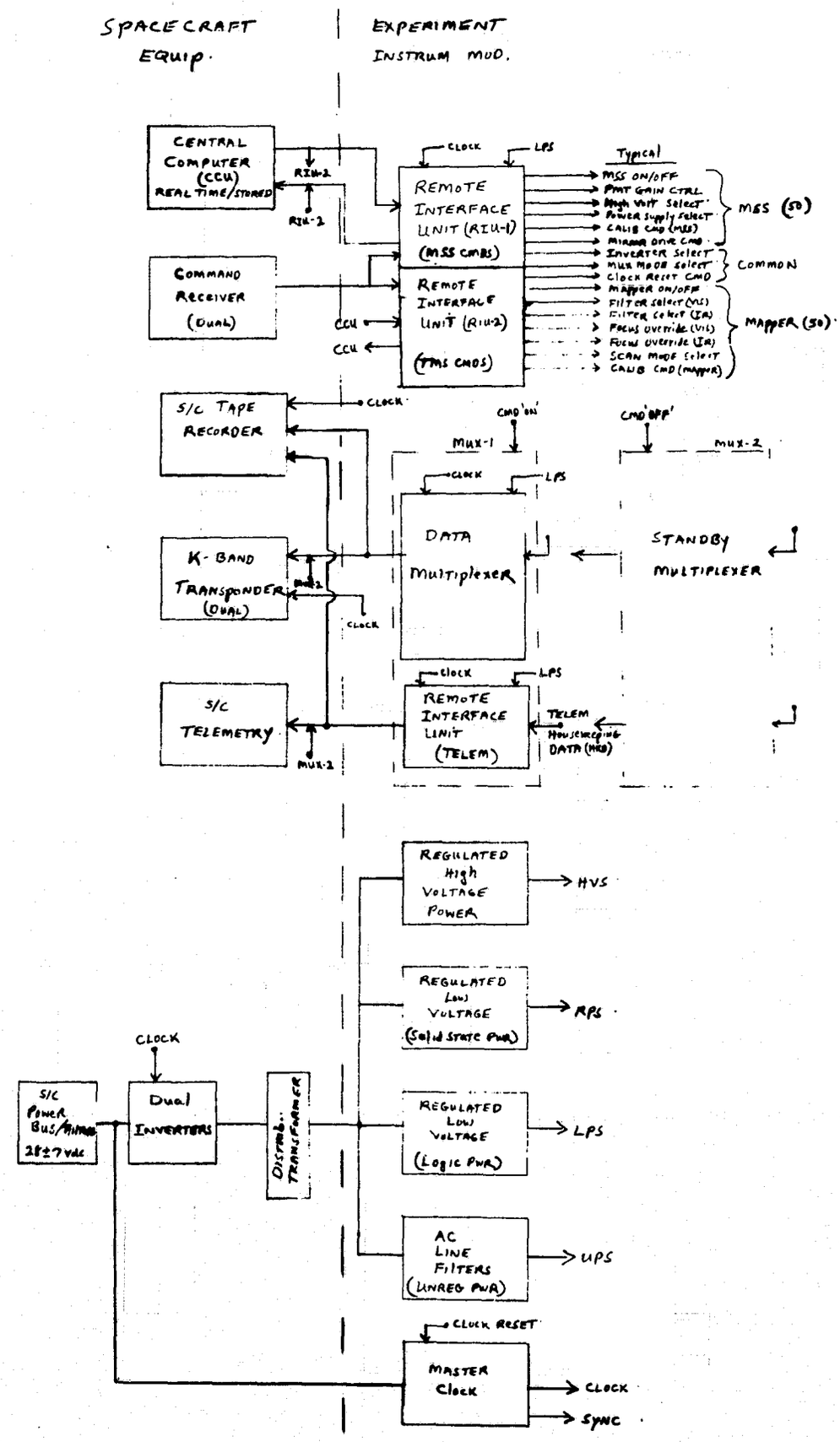
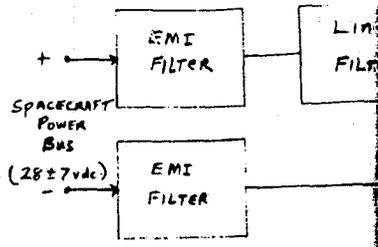
LANDSAT - CONCEPTUAL BLOCK DRAWING

DRAWING # B2. 8/6/76

LANDSAT INTERFACE SUPPORT ELEMENTS

LANDSAT



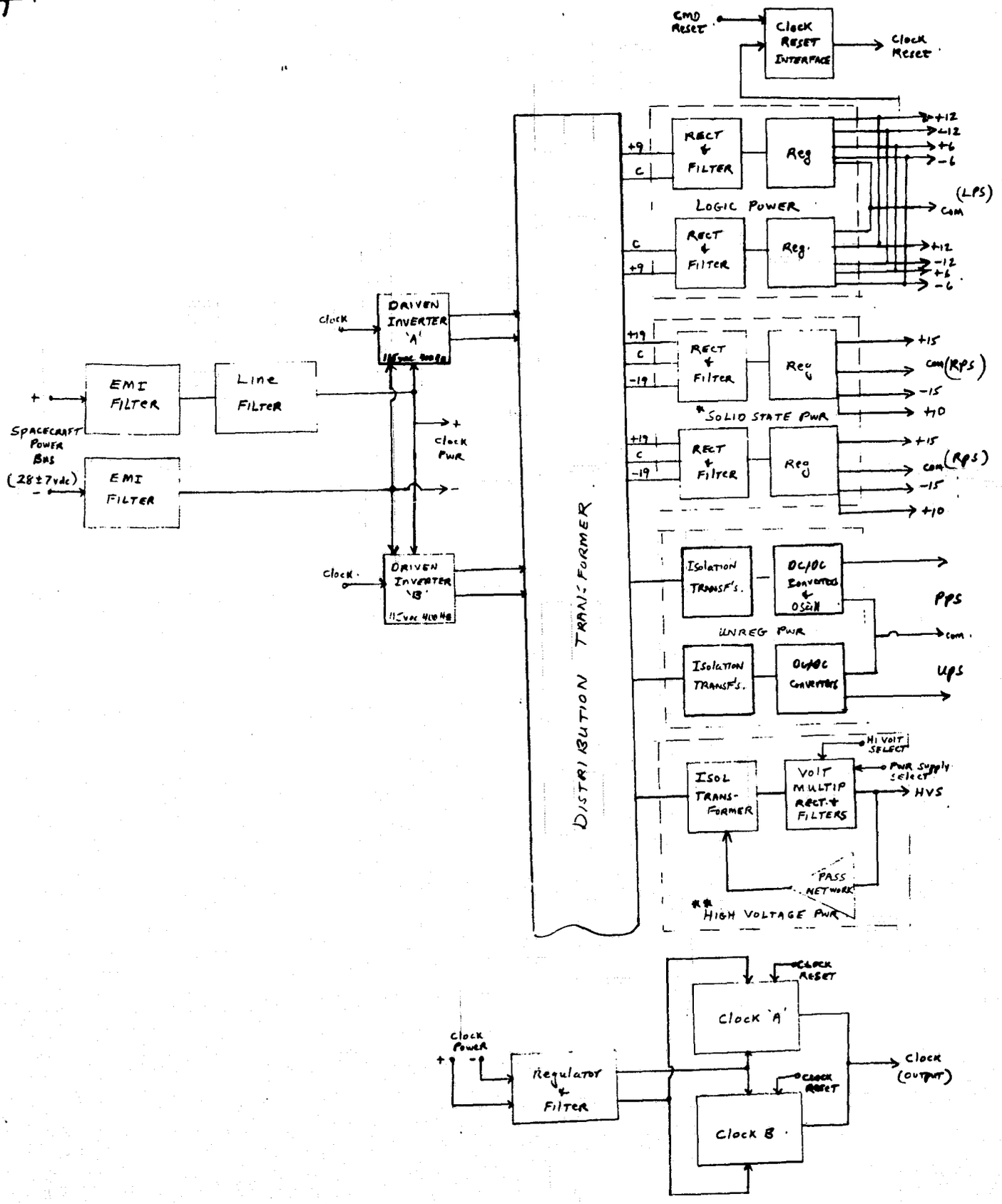


FOLDOUT FRAME

LANDSAT - CONCEPTUAL BLOCK DRA

DRAWING # B3, 8/6/76

LANDSAT POWER SUPPLY SYSTEM AND CLOCK.



* Typical of 19 Regulated Solid State Power Modules. Each module can serve 6 detectors, amplifiers, etc.

** Typical of 3 High voltage Power modules.

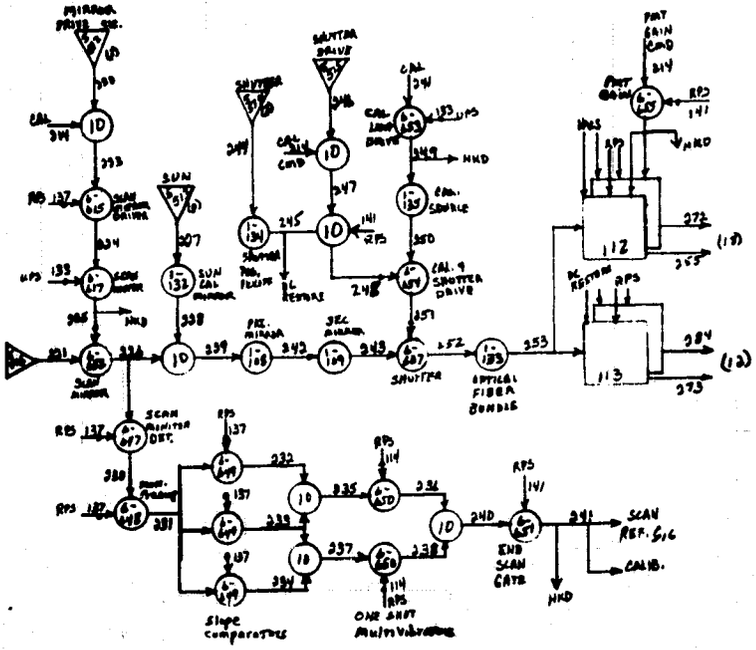
LANDSAT - CONCEPTUAL BLOCK DRAWING

DRAWING # B3, 8/6/76

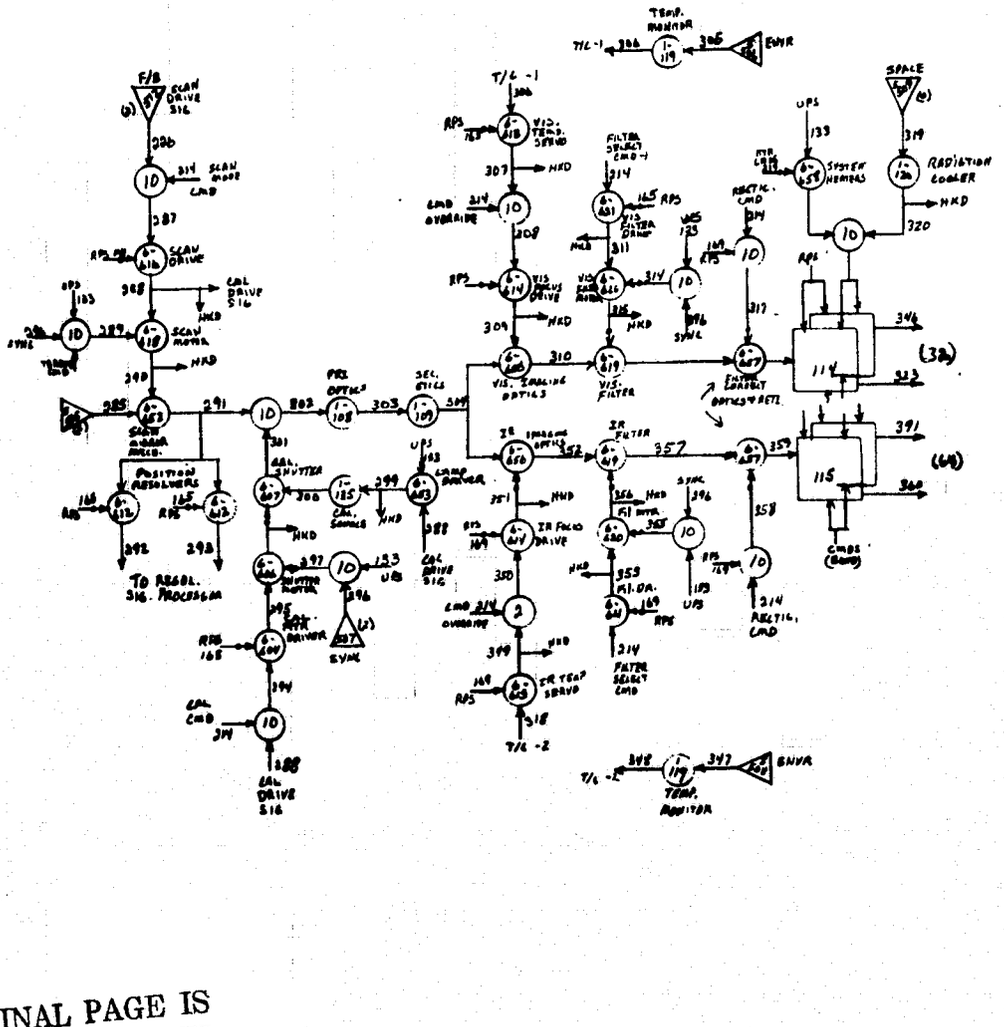
FOLDOUT FRAME 2

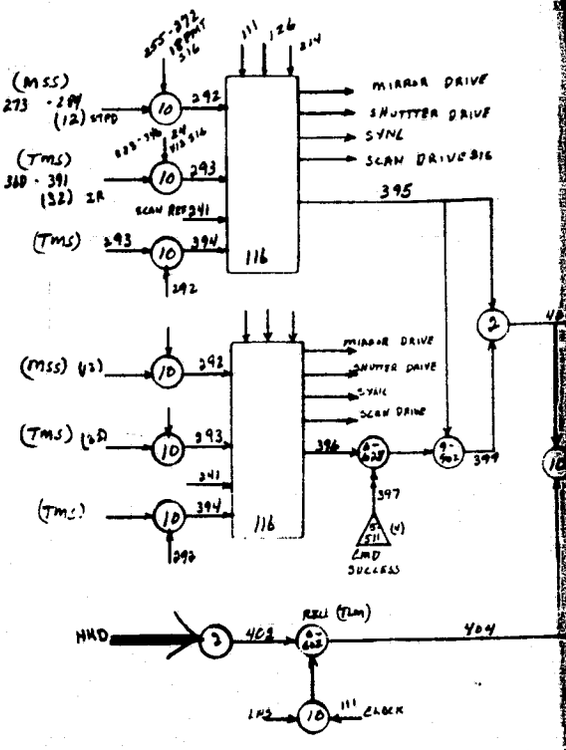
LANDSAT

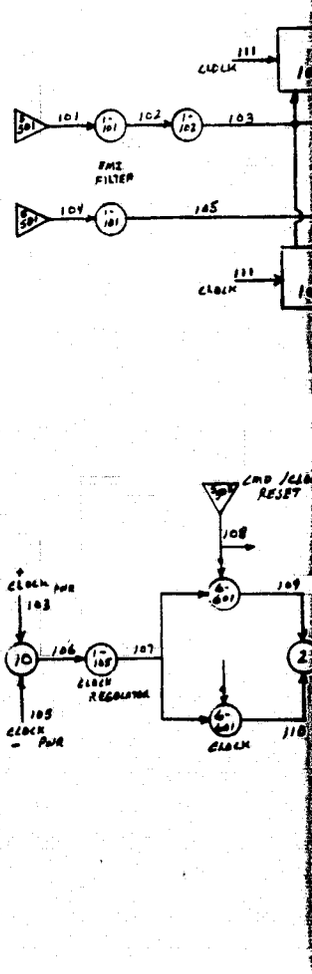
MULTISPECTRAL SCANNER



THEMATIC MAPPER







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FOLDOUT FRAME 1

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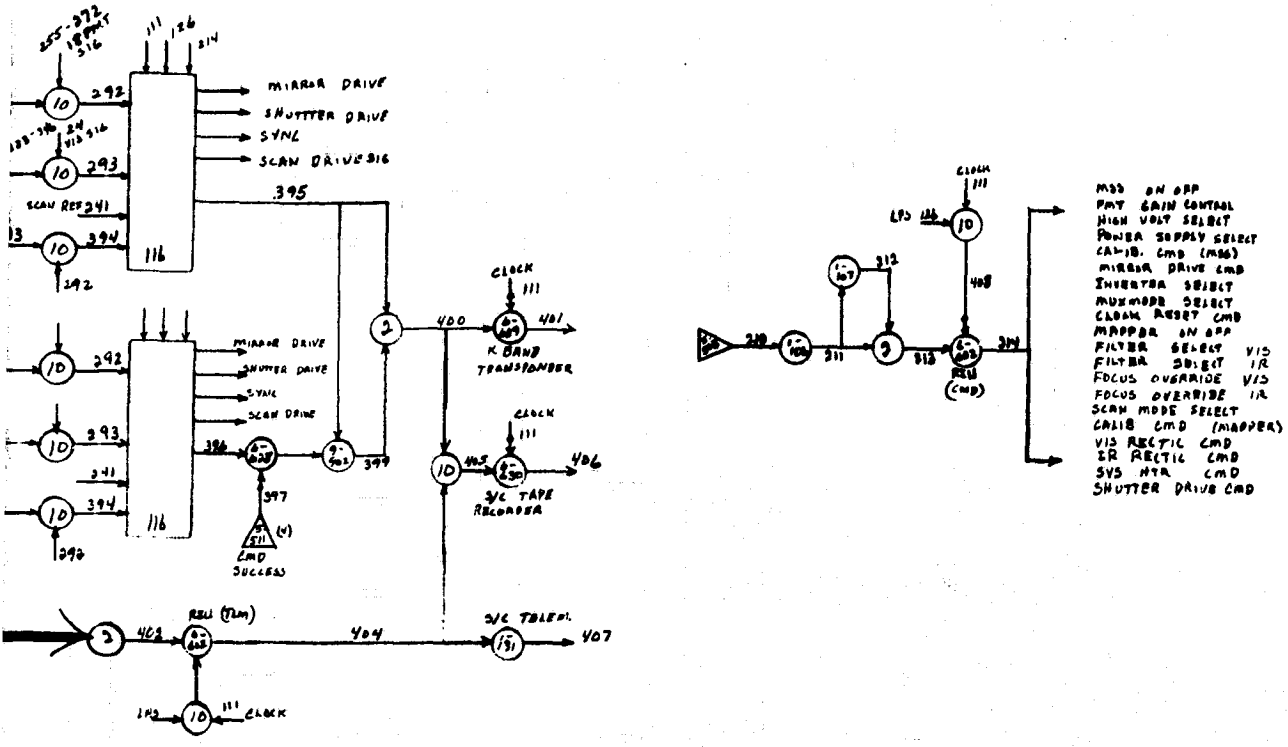
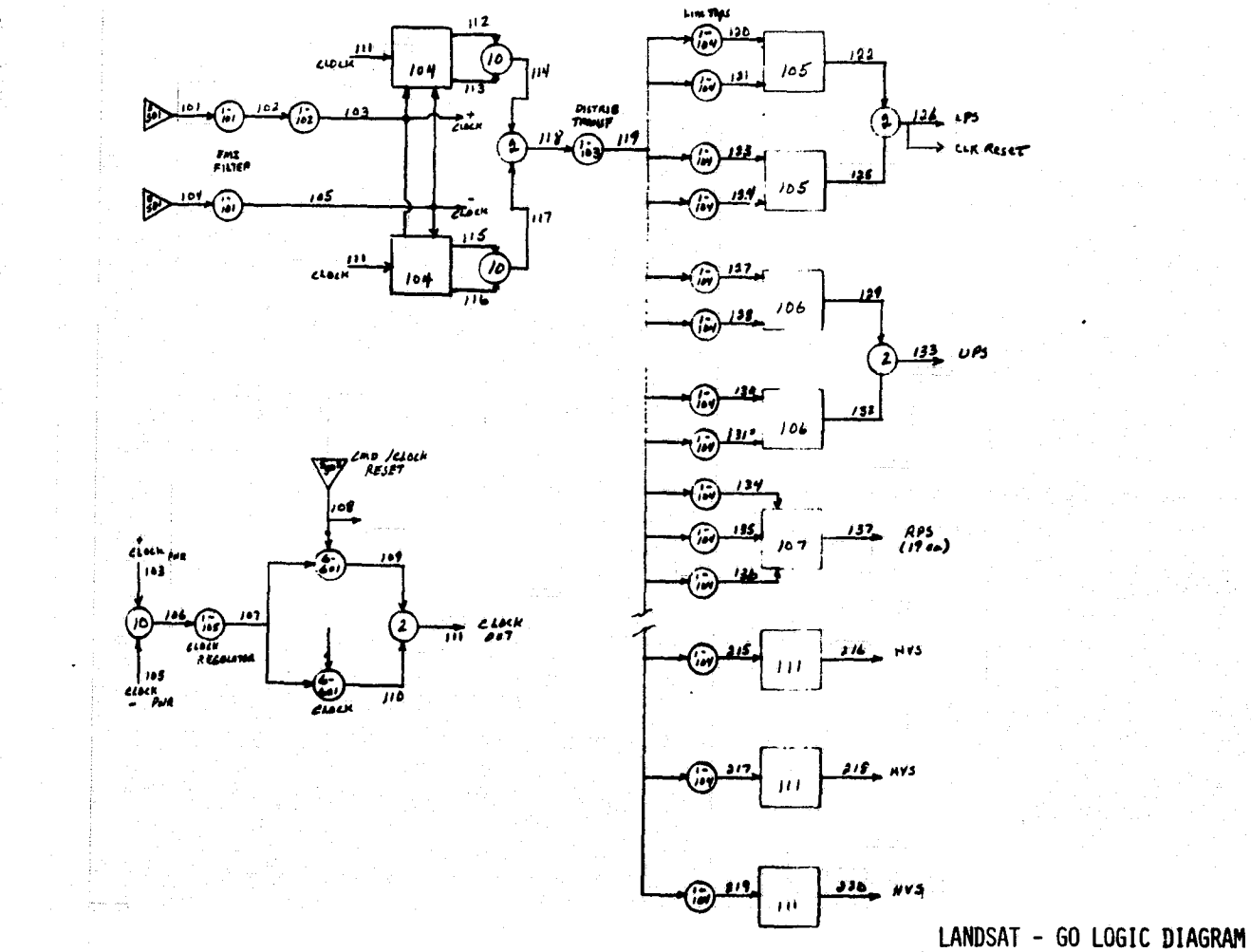


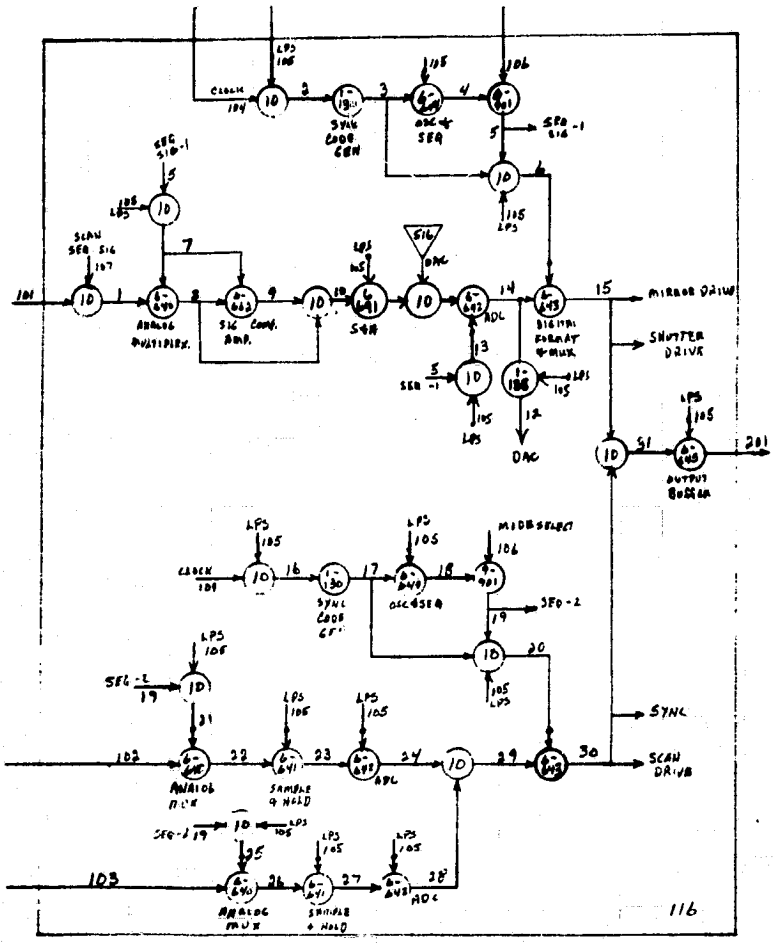


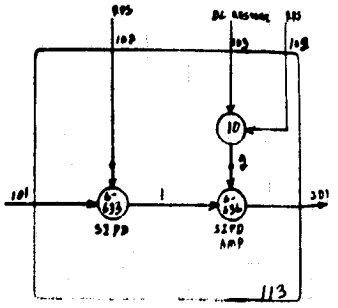
LANDSAT - GO LOGIC DIAGRAM

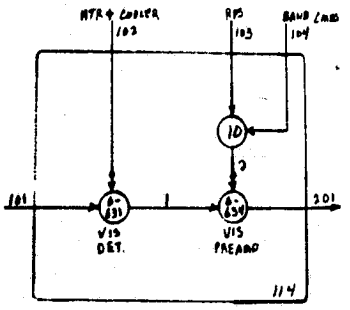
DRAWING # B4. 8/6/76

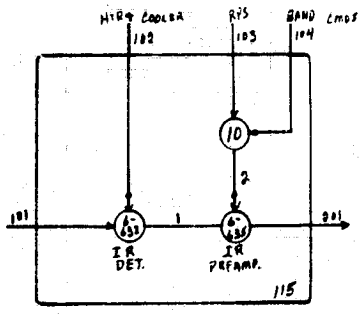
FOLDOUT FRAME 2

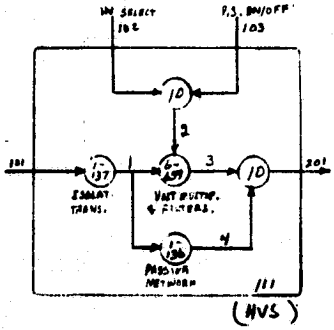
LANDSAT

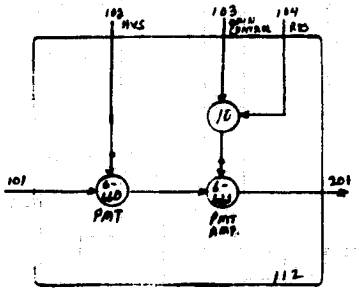


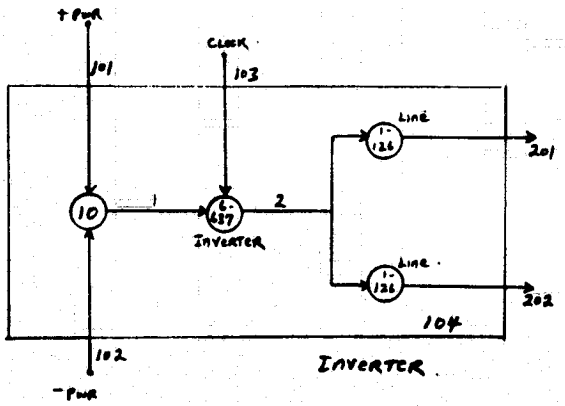


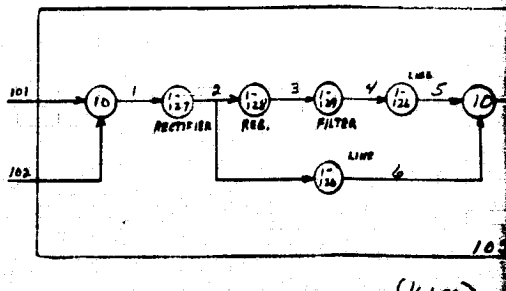












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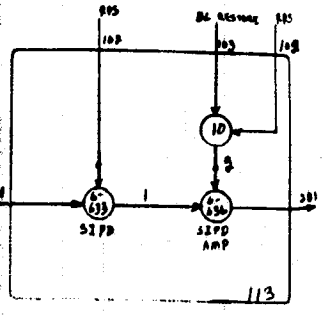
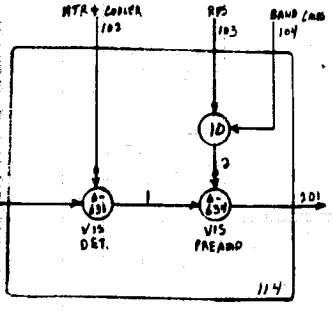
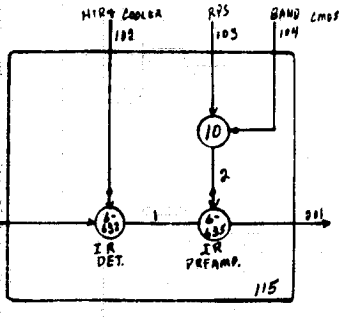
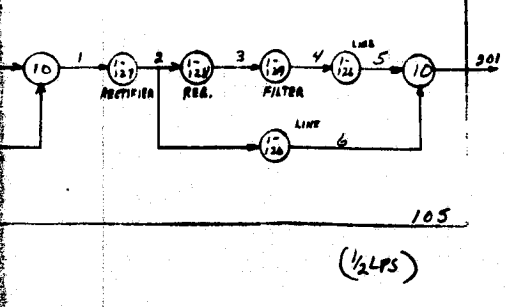
ANDSAT

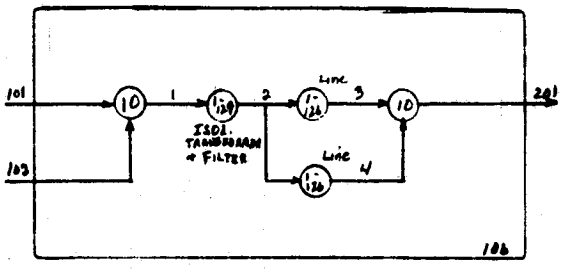




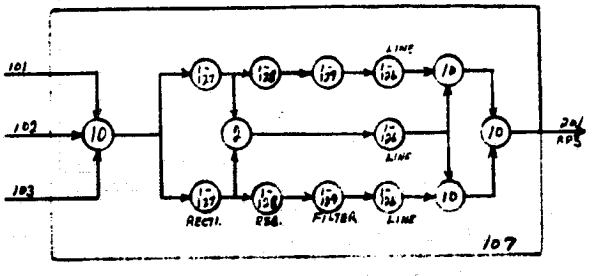




(½ LPS)



(½ UPS)



(RPS)

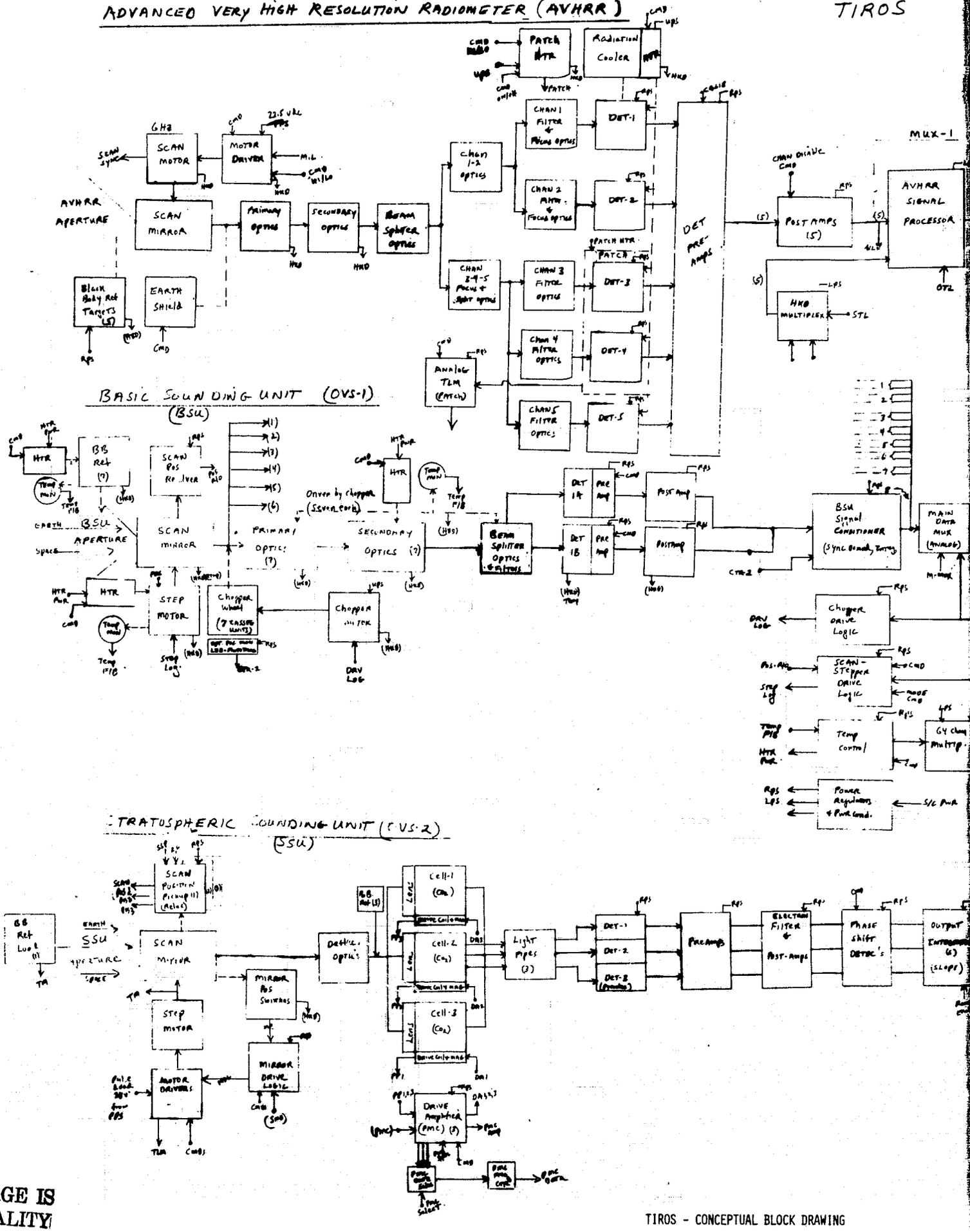
LANDSAT - GO LOGIC DIAGRAM

DRAWING # B5. 8/6/76

FOLDOUT FRAME 5

ADVANCED VERY HIGH RESOLUTION RADIOMETER (AVHRR)

TIROS



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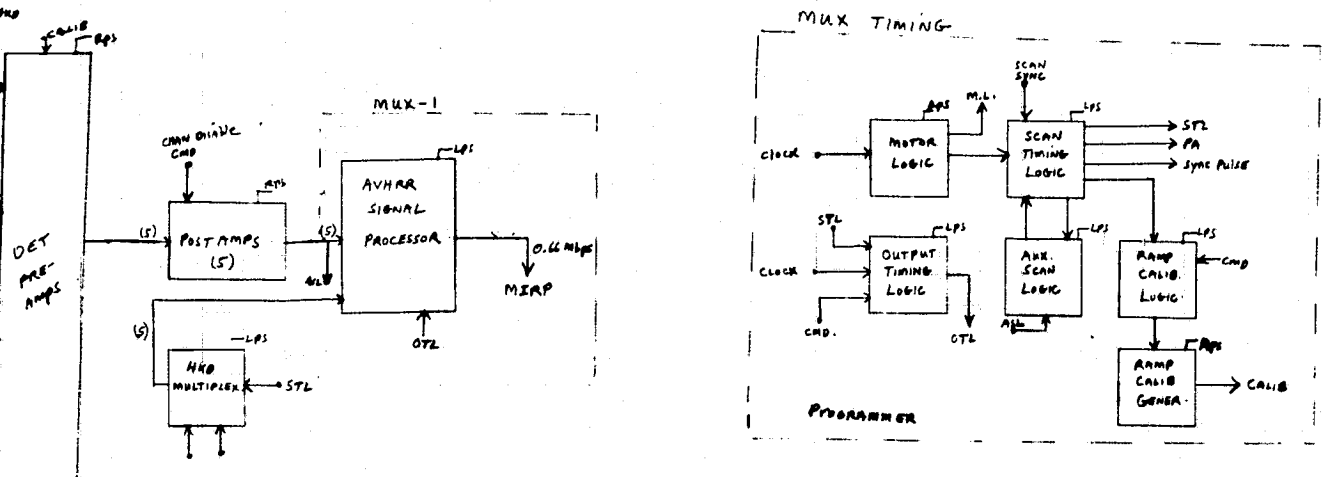
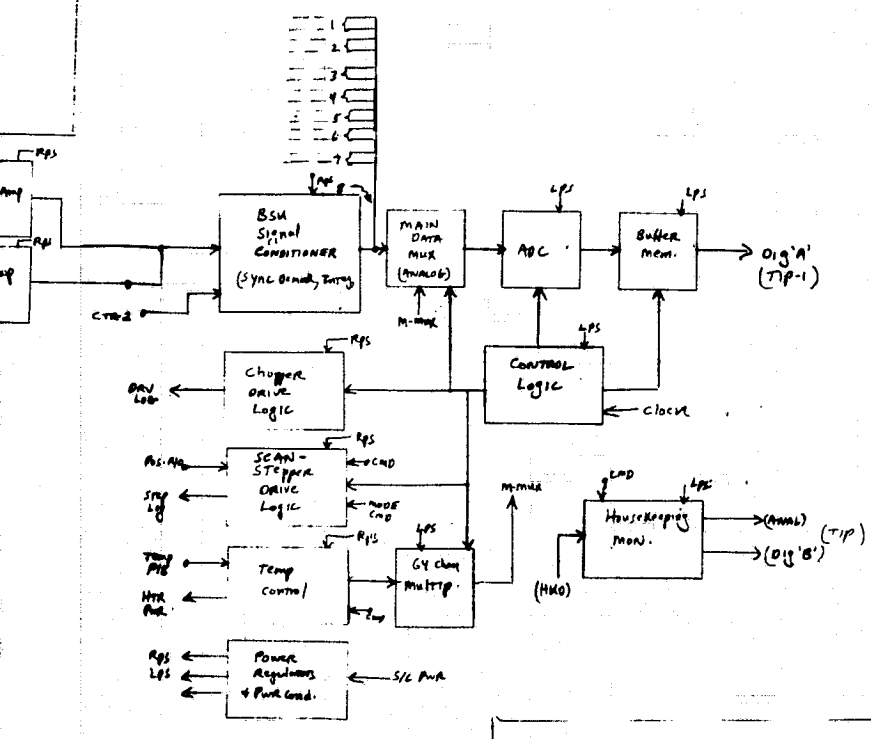
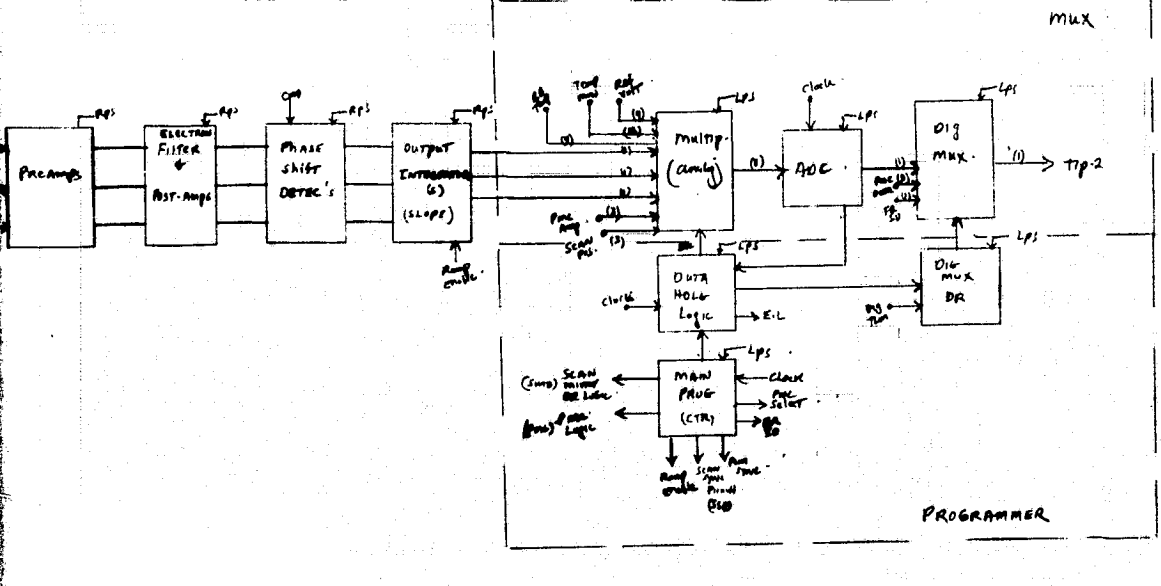
TIROS - CONCEPTUAL BLOCK DRAWING
DRAWING # C1. 8/6/76

TIROS







- CONCEPTUAL BLOCK DRAWING
NG # C1, 8/6/76

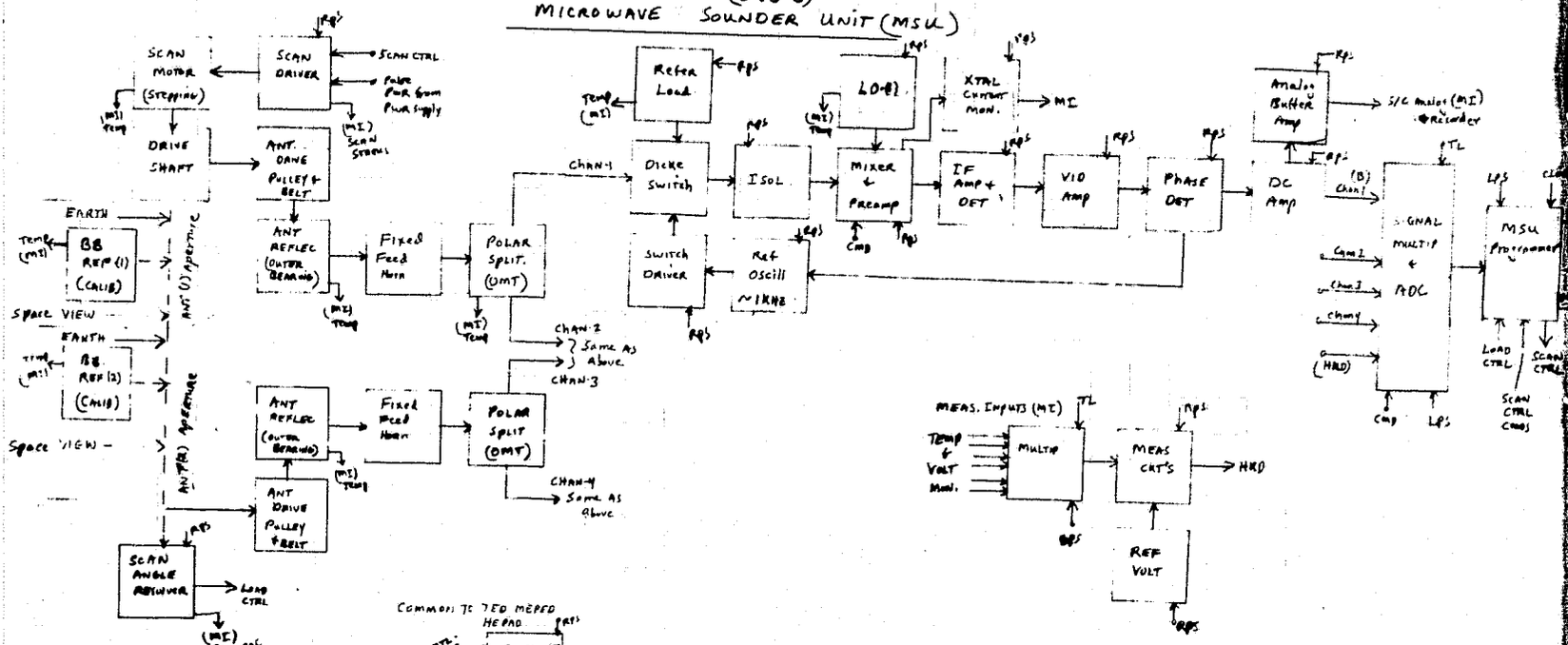
FOLDOUT FRAME 2

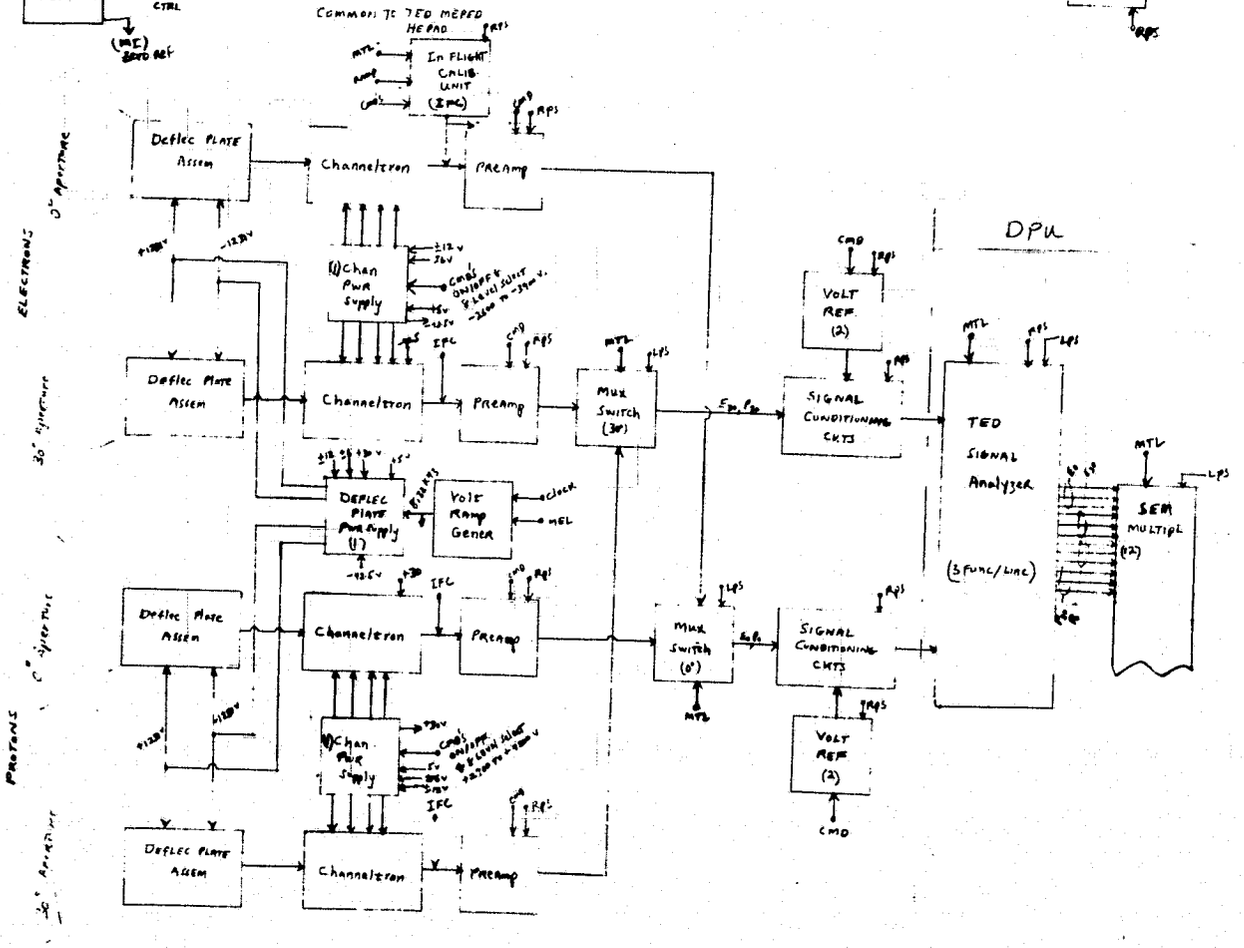
TIROS - EXPER (CONTINUED)

TIROS

(OVS-3)

MICROWAVE SOUNDER UNIT (MSU)





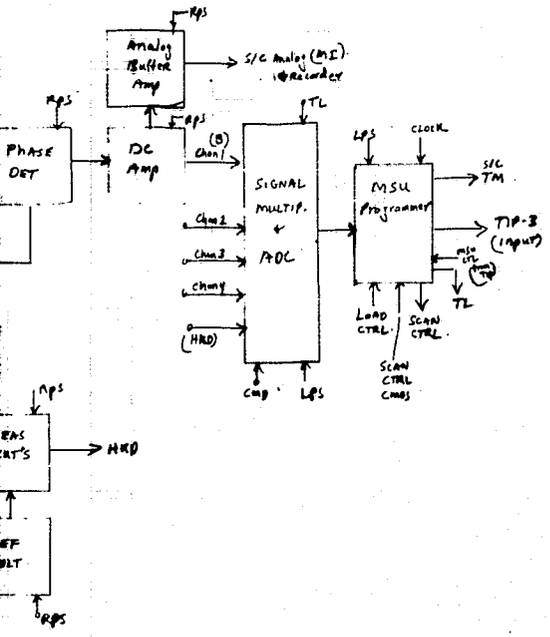
TOTAL ENERGY DETECTOR

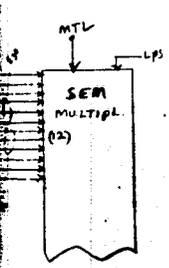
(SEM-1)

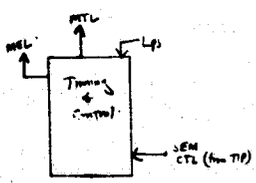
TIROS - CONCEPTUAL BLOCK DRAWING

DRAWING C2. 8/6/76

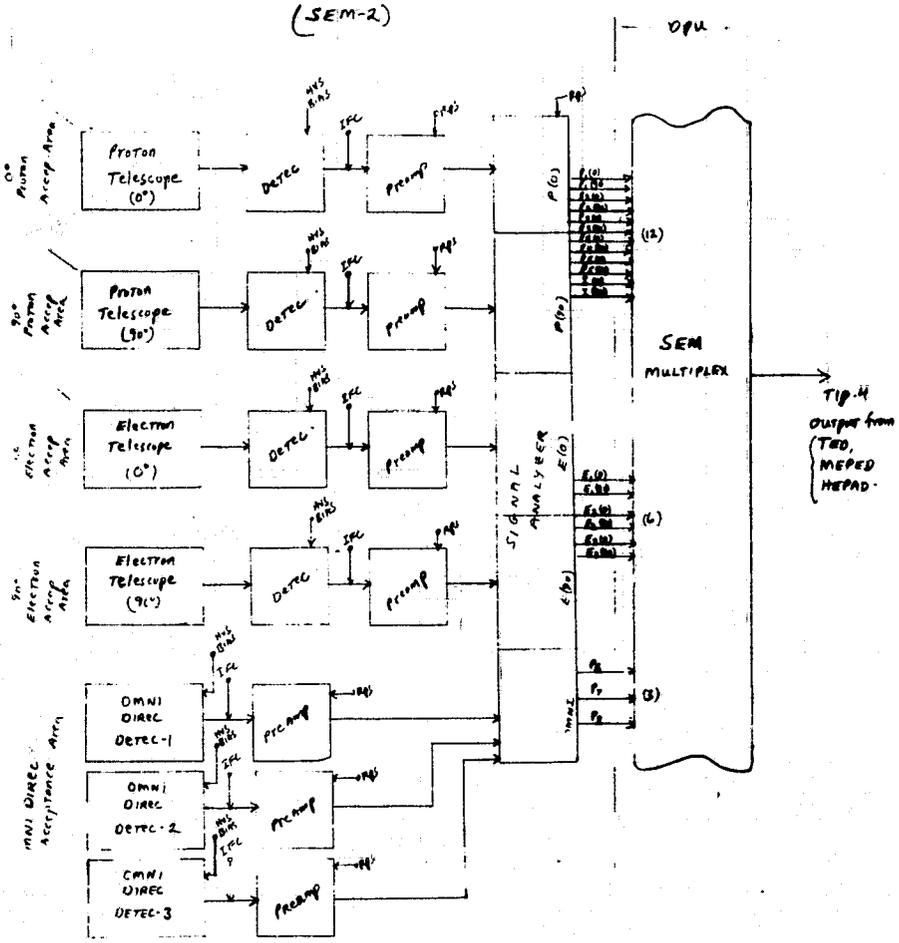
TIROS

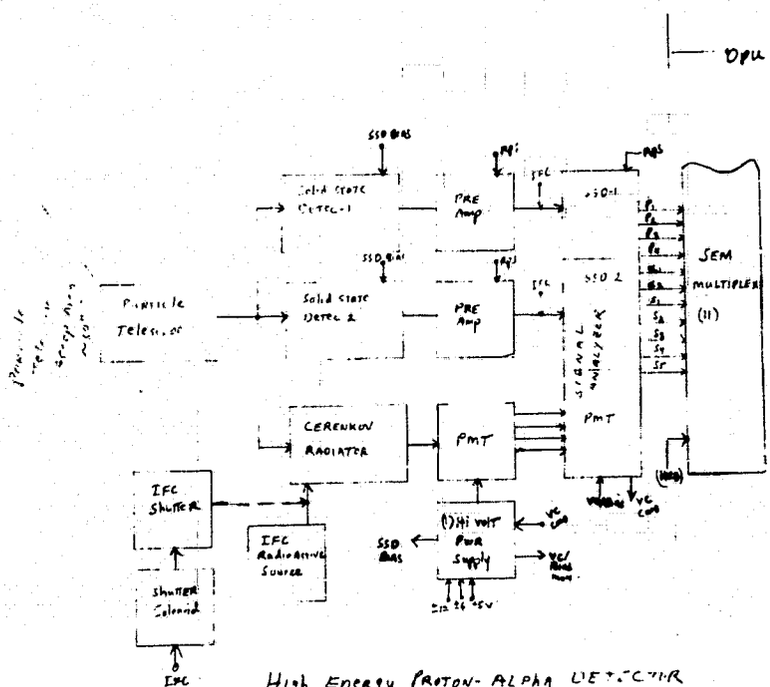






MEDIUM ENERGY PROTON-ELECTRON DETECTOR (SEM-2)





High Energy PROTON-ALPHA DETECTOR (SEM-3)

TIROS - CONCEPTUAL BLOCK DRAWING

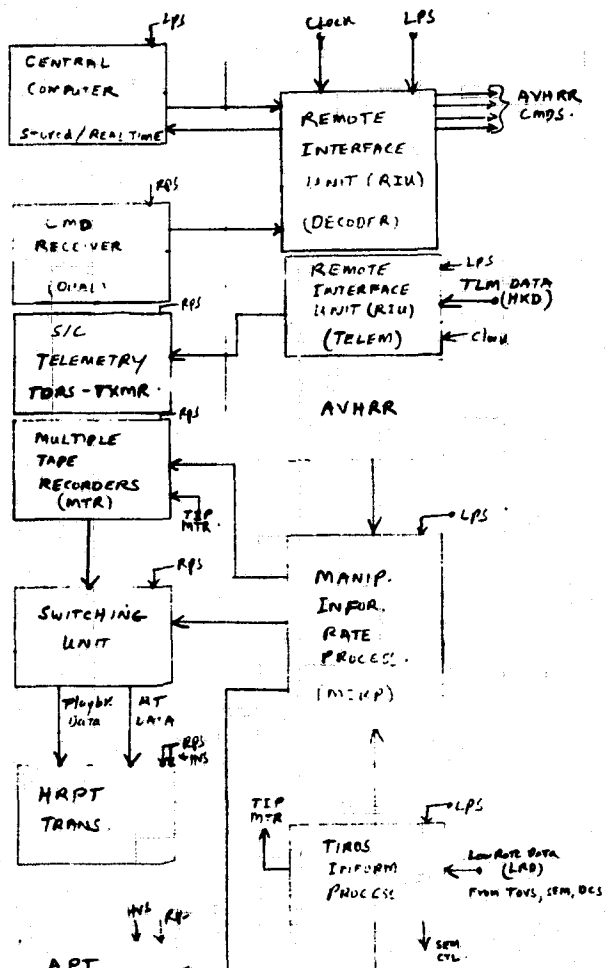
DRAWING C2. 8/6/76

FOLDOUT

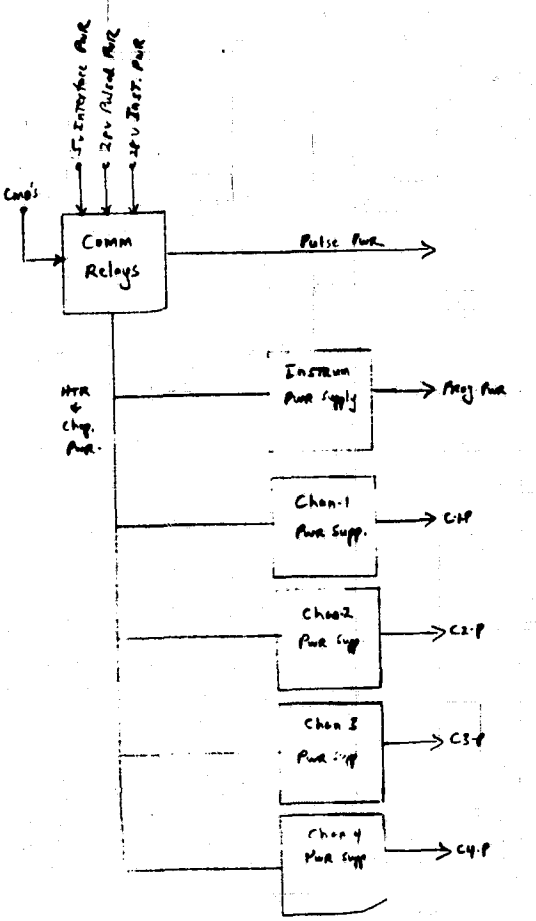
TIROS

TIROS INTERFACE SUPPORT ELEMENTS.

S/C EQUIP. | EXPER. INSTRUM MODULES.

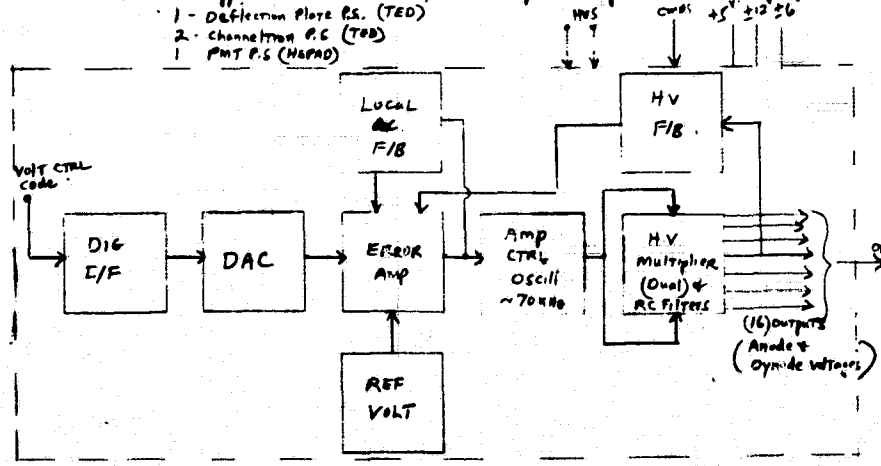


M.S.U. Aux PWR

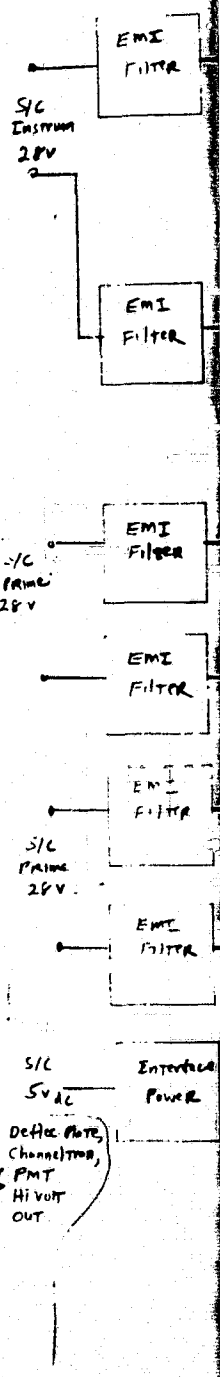


SEM - HI VOLT Supply

FOUR Supplies - identical except for output voltages
1 - Deflection Plate P.S. (TED)
2 - Channeltron P.S. (TED)
1 - PMT P.S (HSPAD)



TIROS POWER



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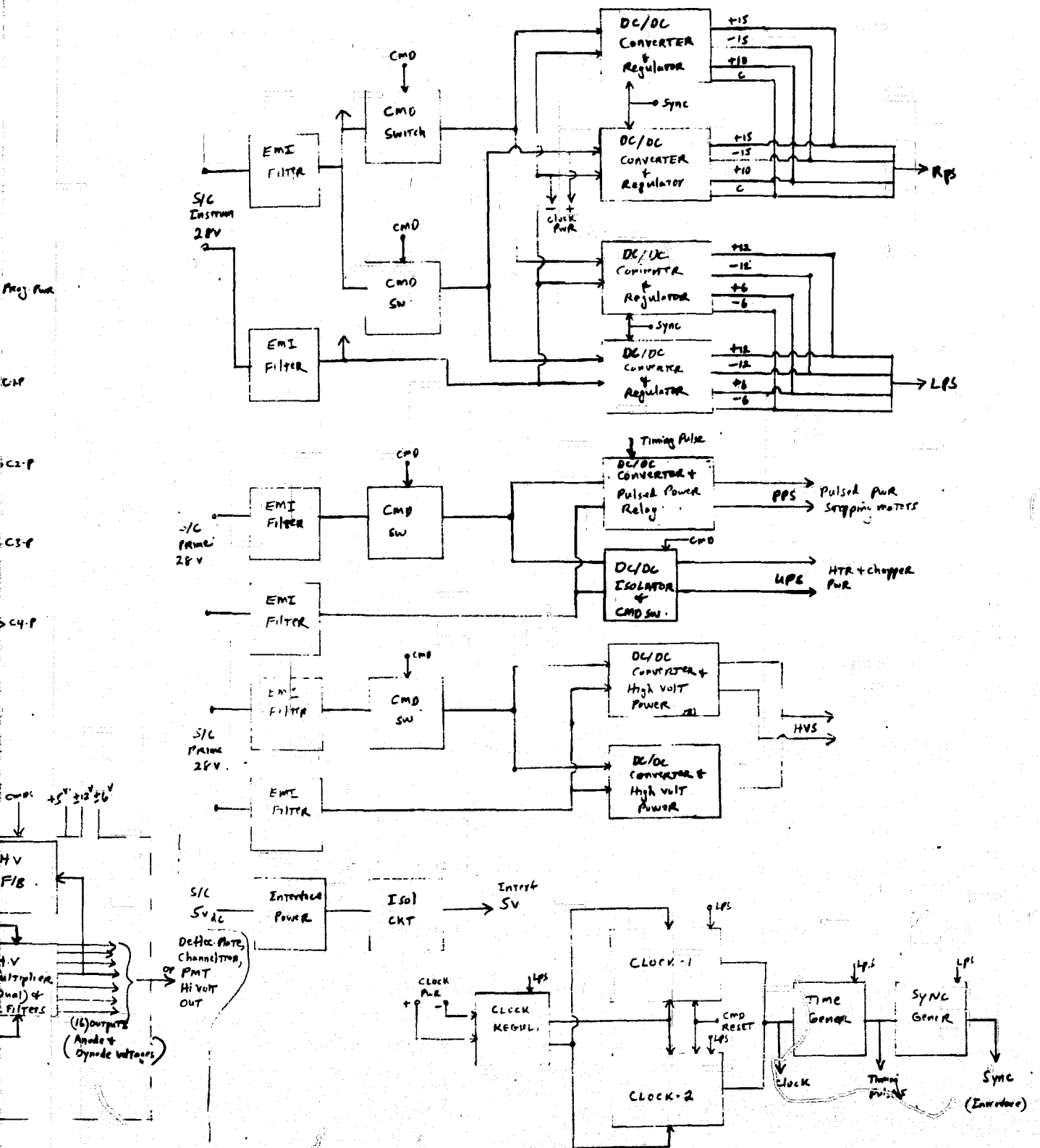
TIROS POWER SUPPLY SYSTEMS & CLOCK

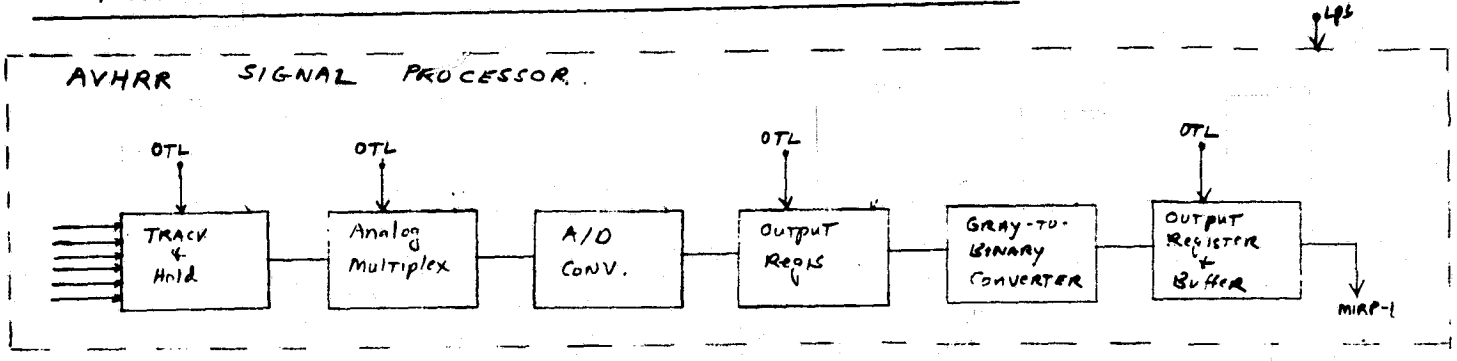


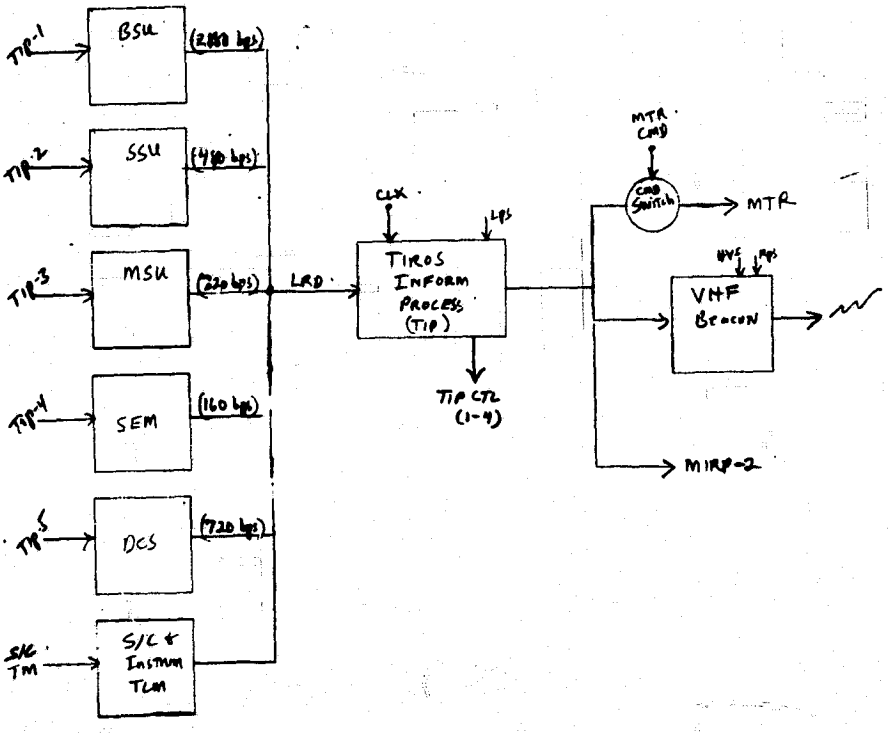
TIROS - CONCEPTUAL BLOCK DRAWING

DRAWING # C3. 8/6/76

FOLDOUT FRAME 2

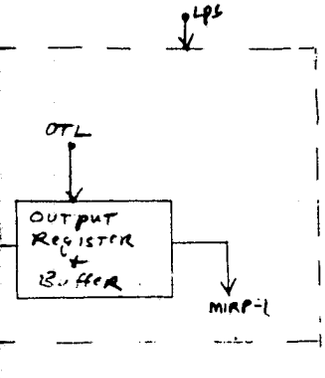
TIROS SIGNAL PROCESSORS & DATA MULTIPLEXERS

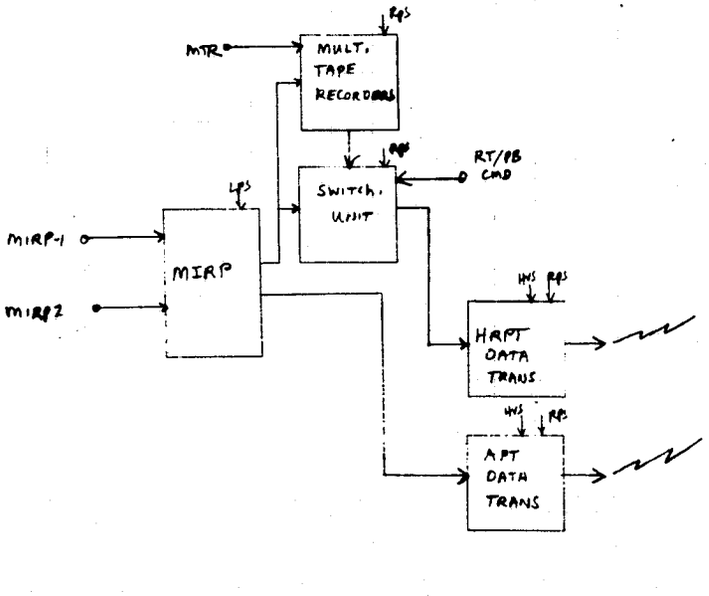




FOLDOUT FRAME 1

TIROS



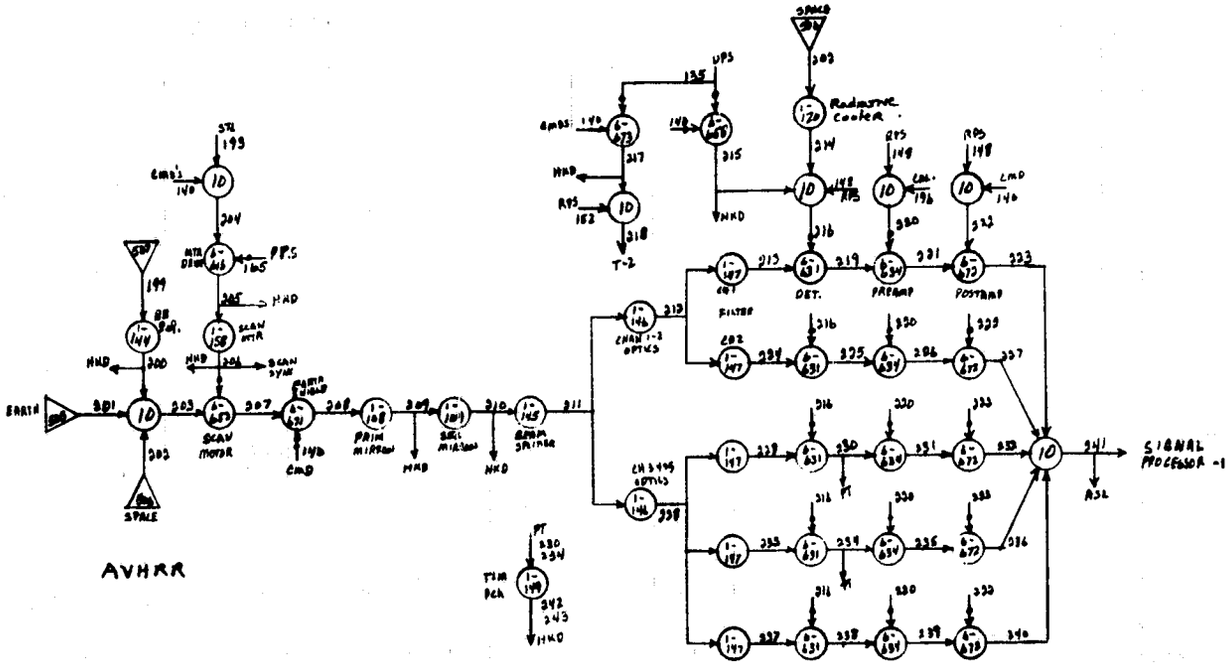


TIROS - CONCEPTUAL BLOCK DRAWING

DRAWING # C4, 8/6/76

FOLDOUT FRAME 2

TIROS



FOLDOUT FRAME

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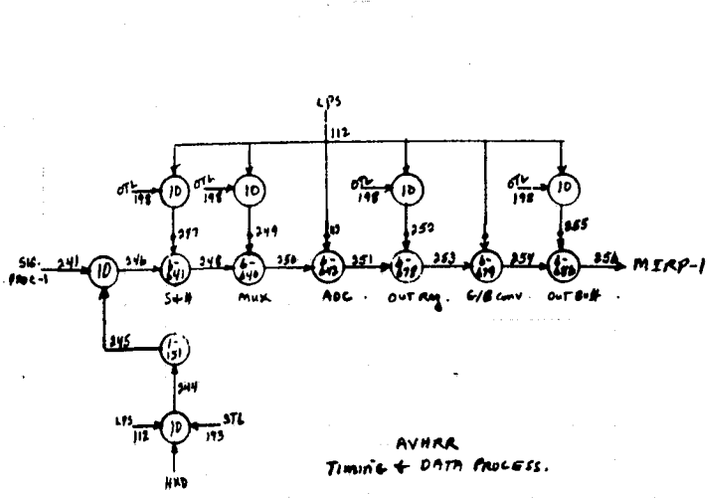
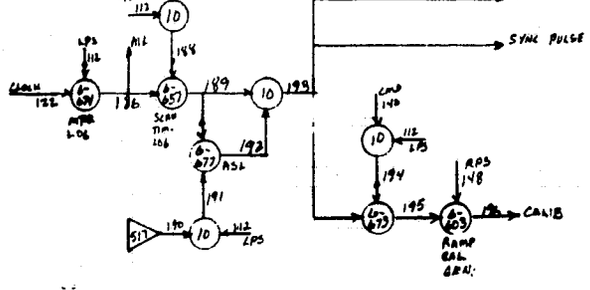
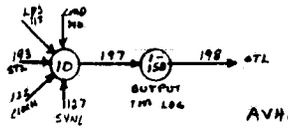
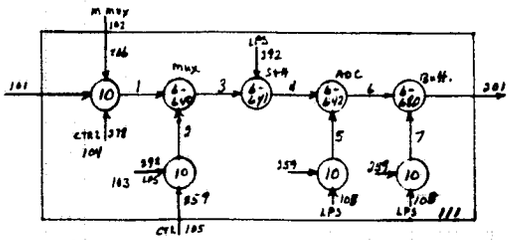
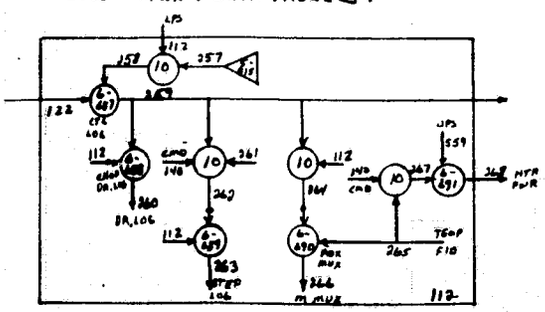








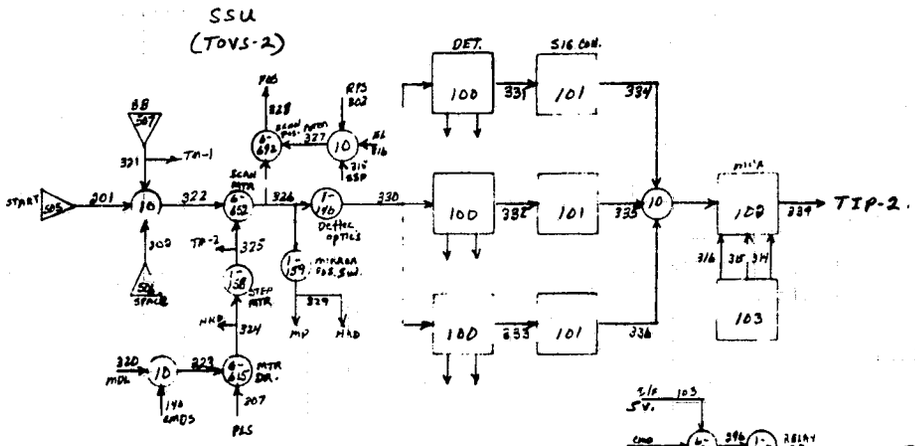


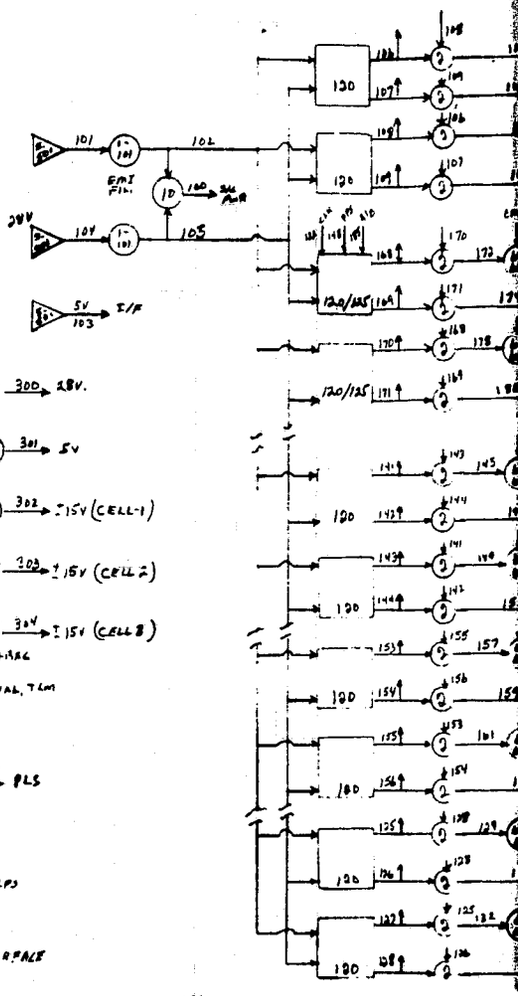
TIROS - GO LOGIC DIAGRAM

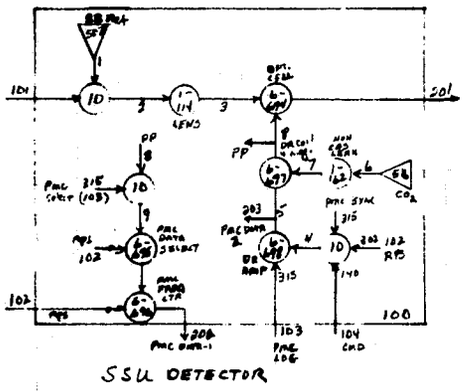
DRAWING # C5, 8/6/76

FOLDOUT FRAME 2

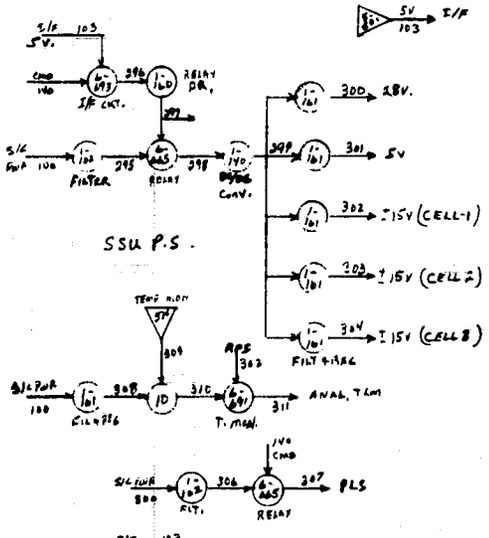
TIROS



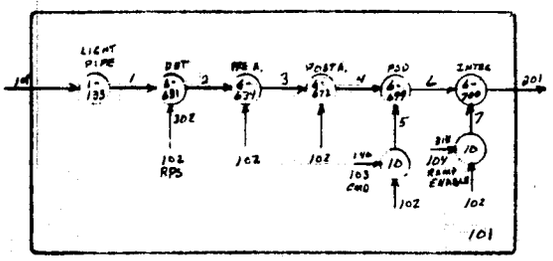




SSU DETECTOR



SSU P.S.



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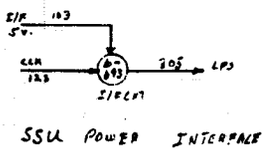
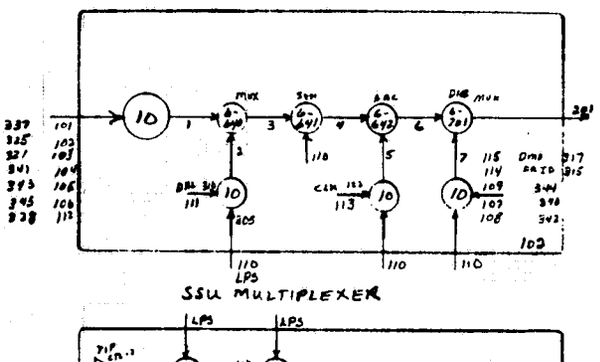
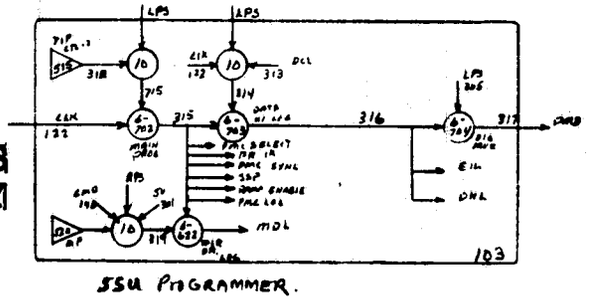


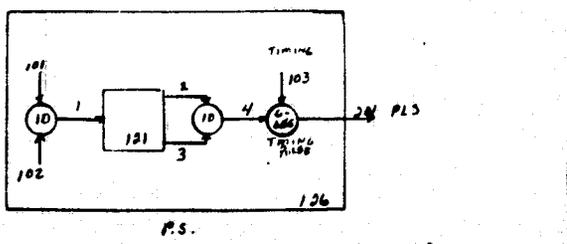
SSU POWER INTERFACE



SSU MULTIPLEXER



SSU PROGRAMMER.



P.S.

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OF POOR QUALITY

TIROS - GO LOGIC DIAGRAM

DRAWING # C6, 8/6/76

FOLDOUT FRAME 1

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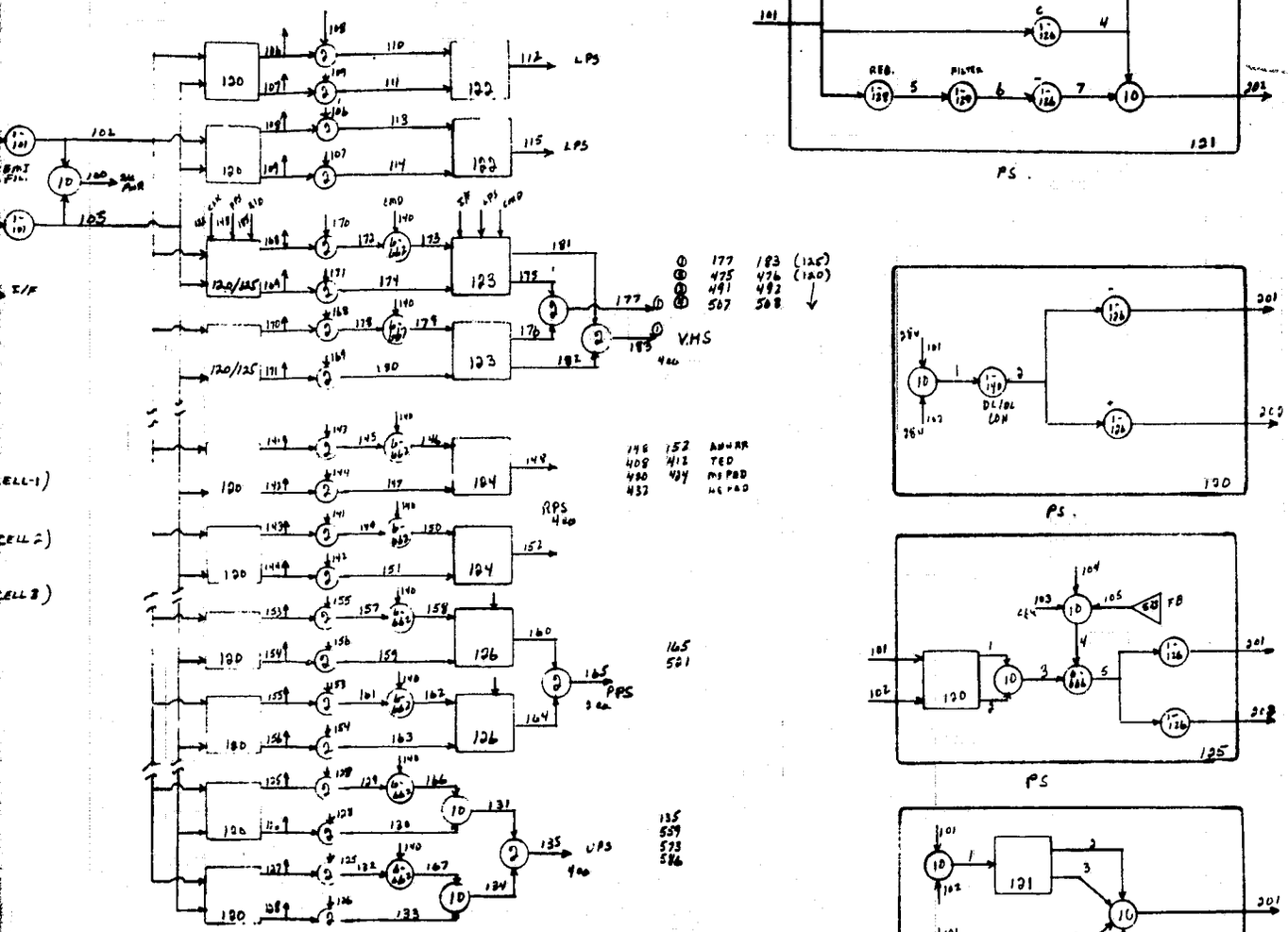
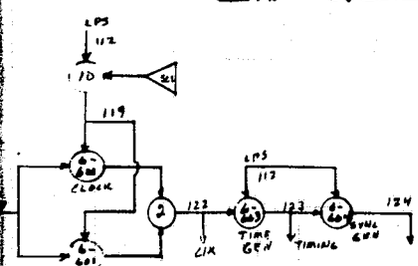
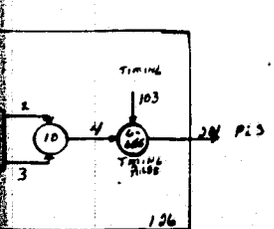
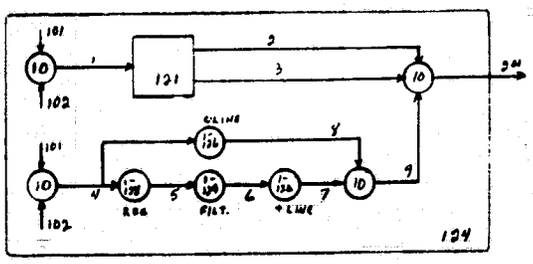






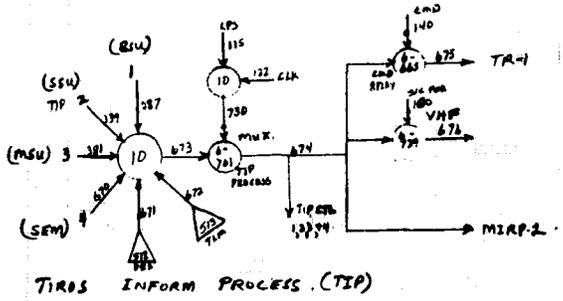


LOGIC DIAGRAM

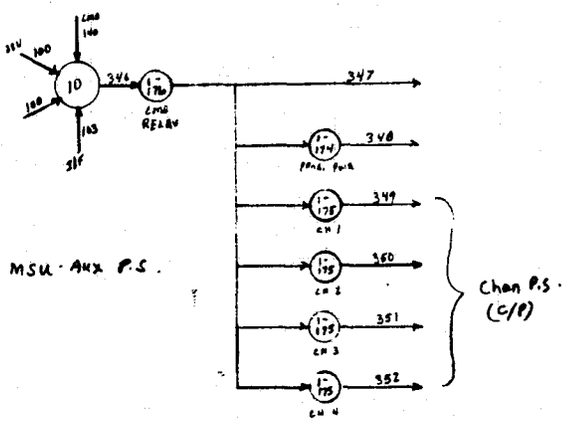
C6, 8/6/76

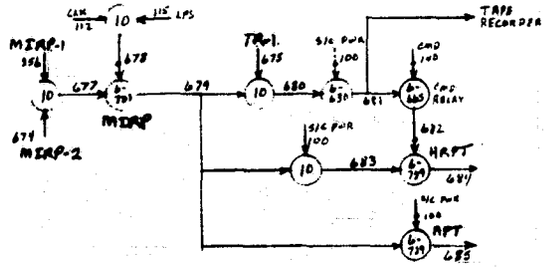
FOLDOUT FRAME 2

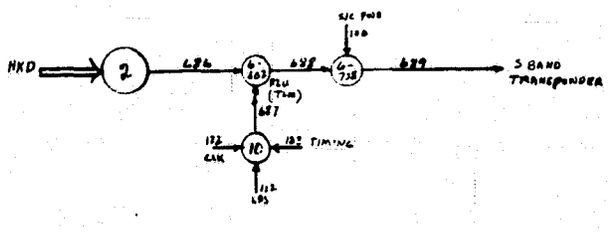
TIROS

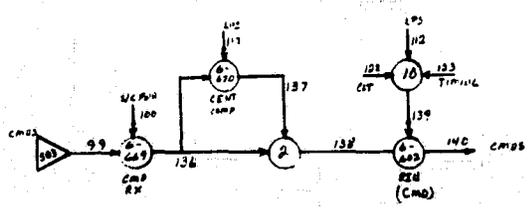


TIROS INFORM PROCESS. (TIP)

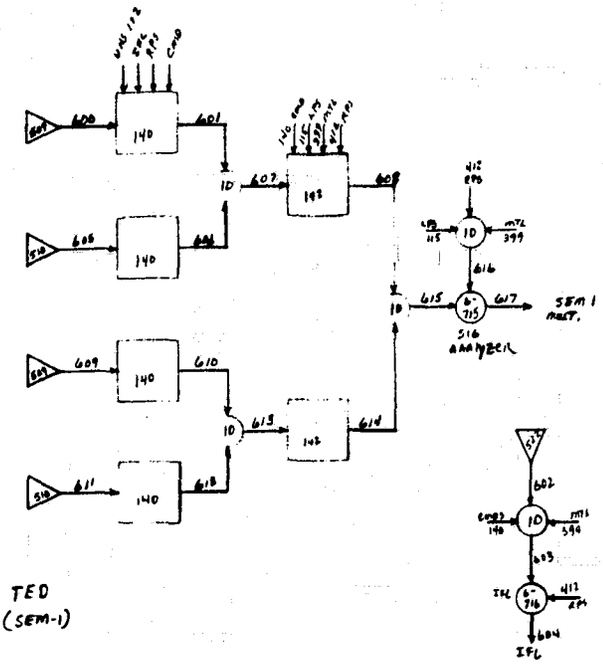








SYSTEM INTERFACE



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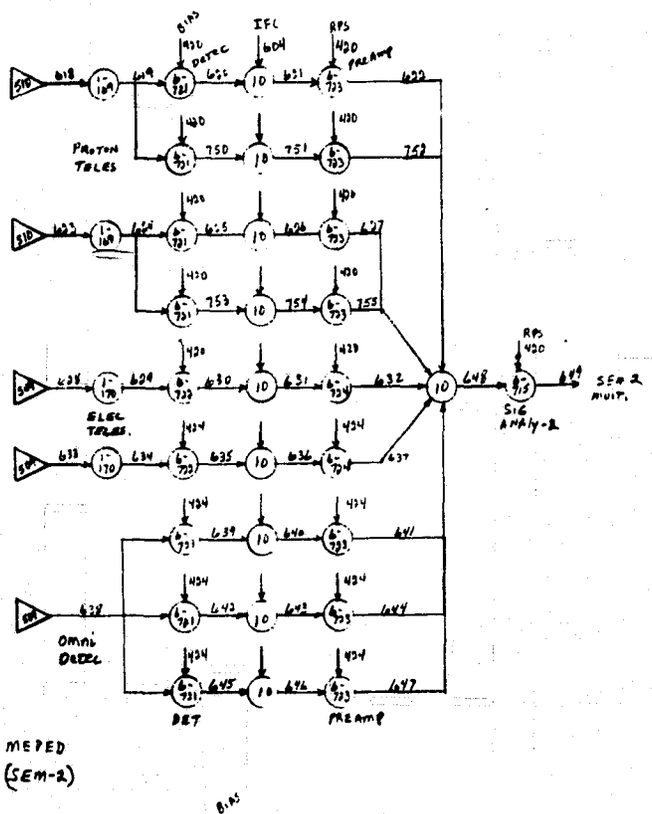
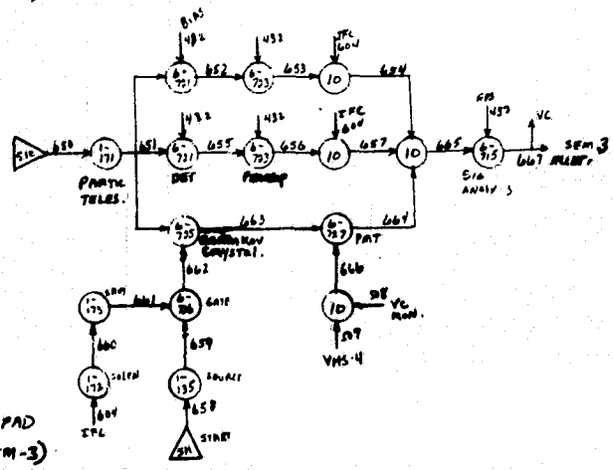


MEPED (SEM-2)



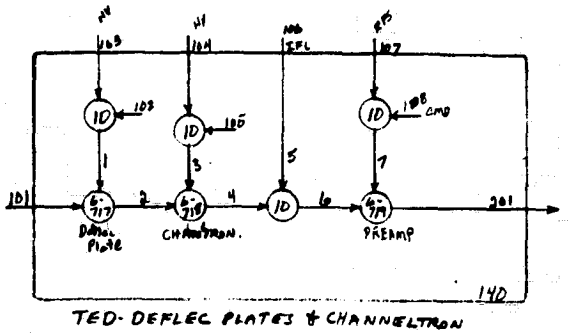
HEPAD (SEM-3)

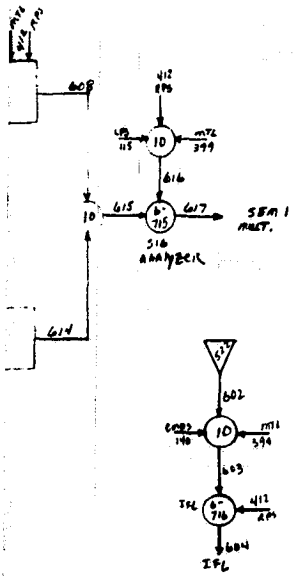
TIROS - GO LOGIC DIAGRAM

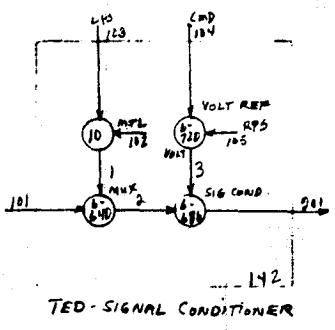
DRAWING # C7, 8/6/76

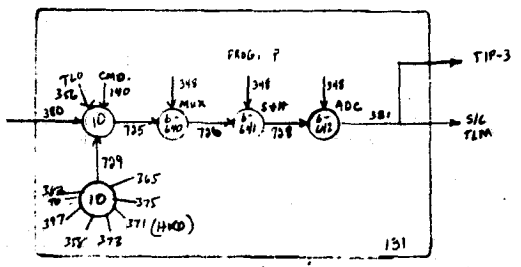
OLDOUT FRAME

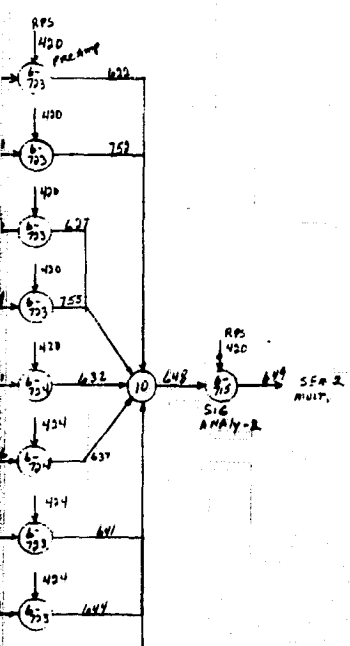
TIROS

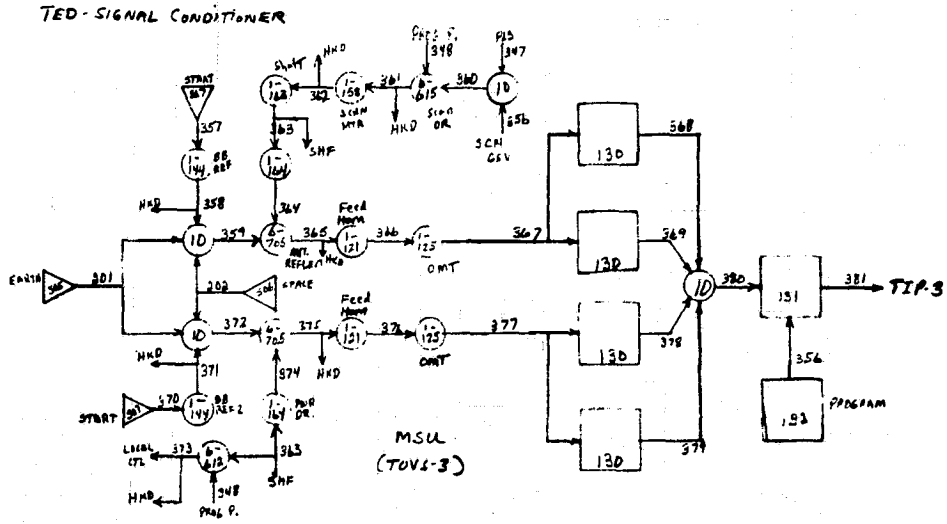


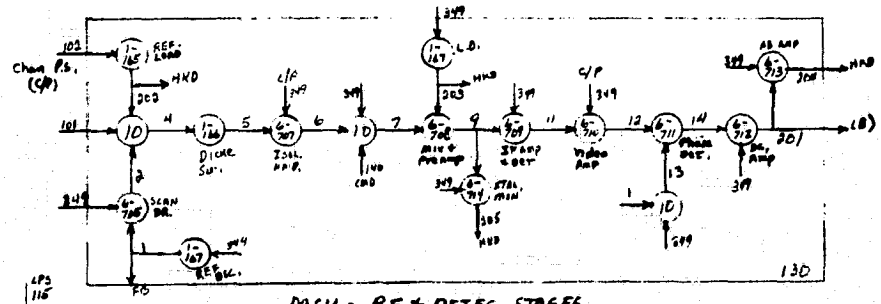


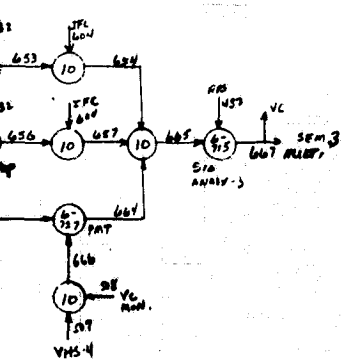


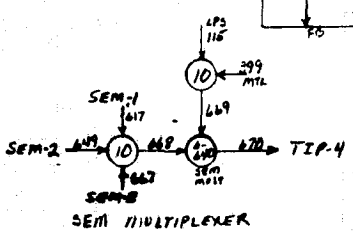


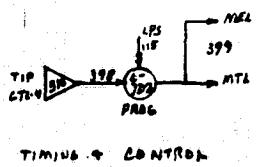


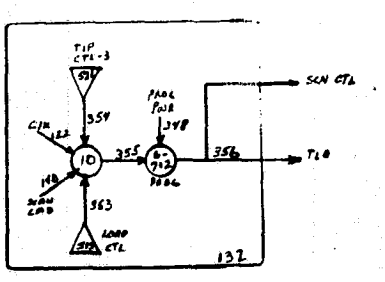












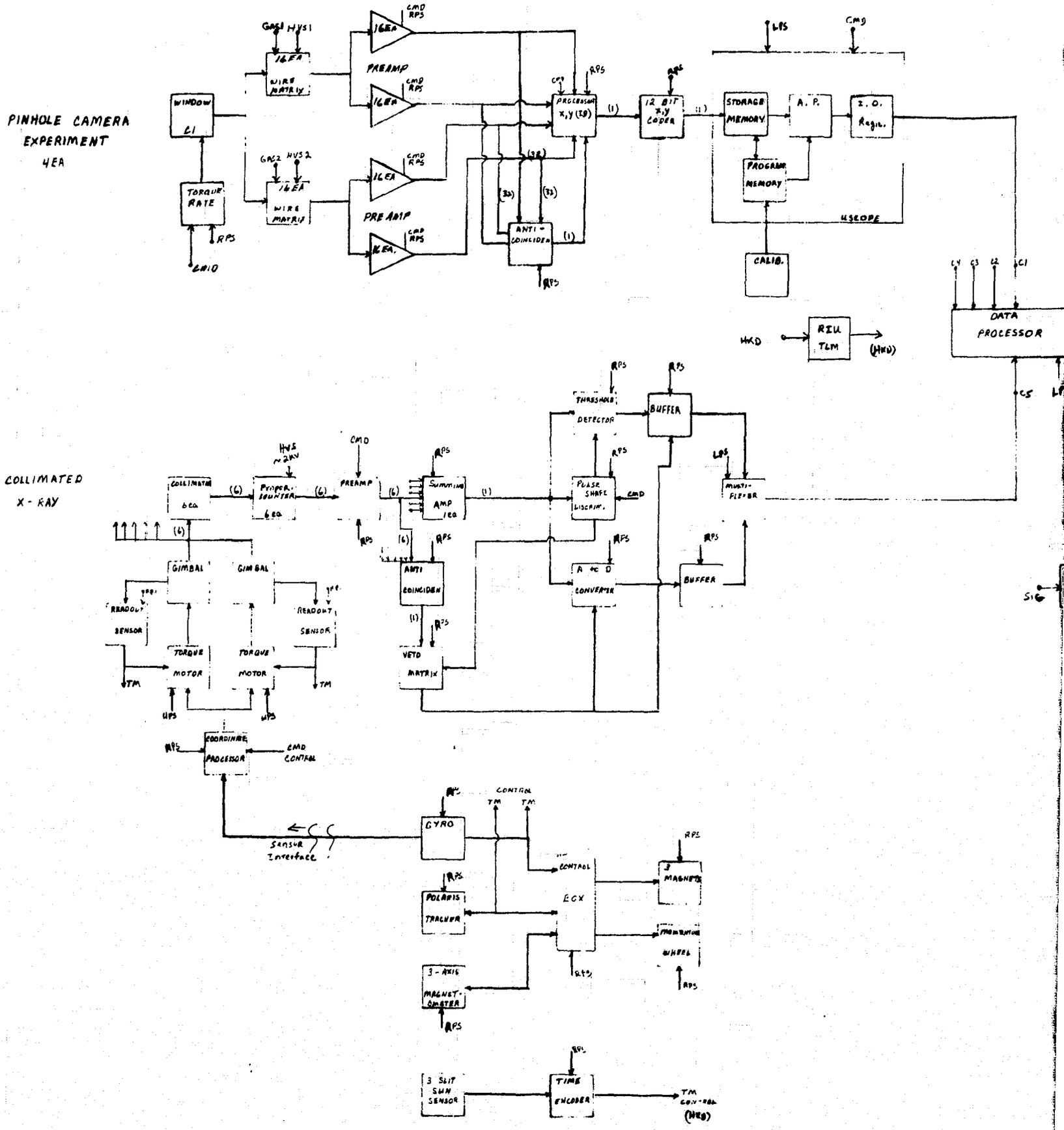
FOLDOUT FRAME 2

7

TEMPORAL X-RAY EXPLORER (HEATE-

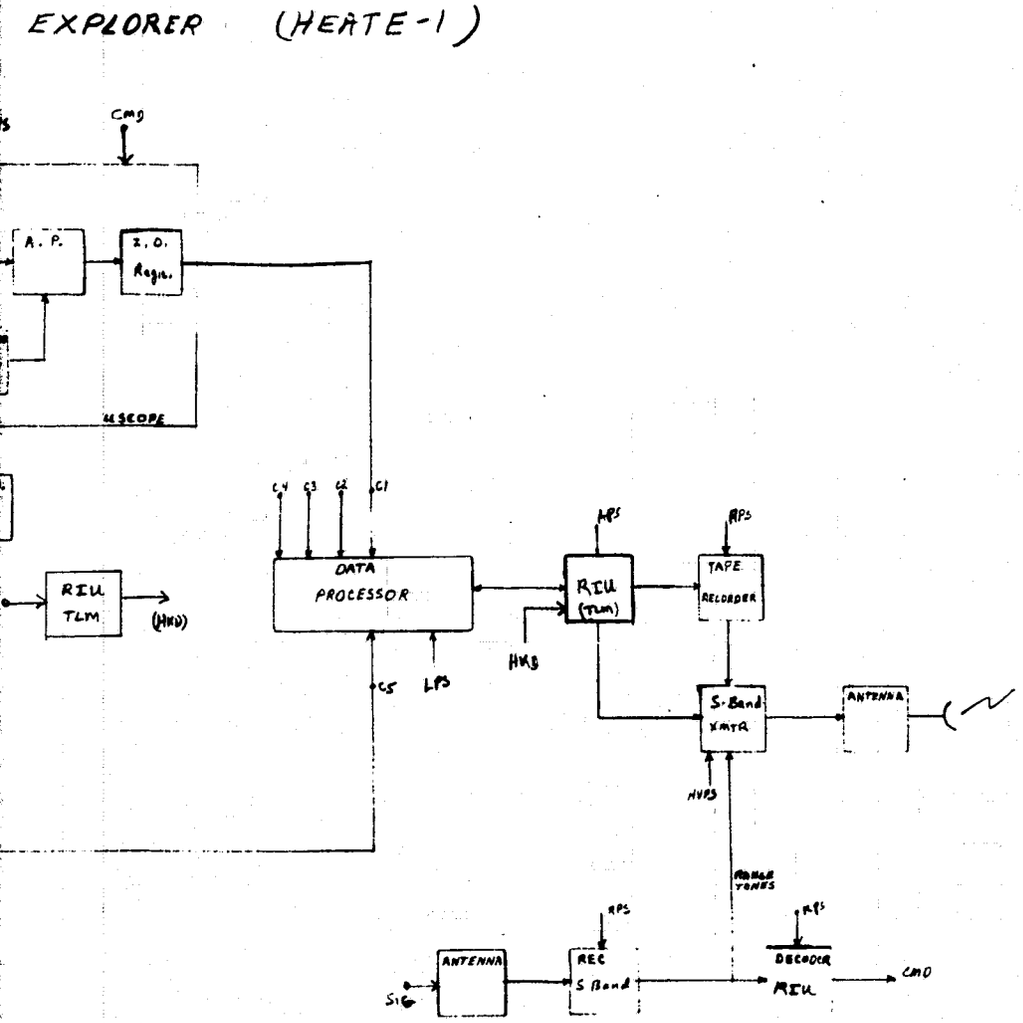
PINHOLE CAMERA EXPERIMENT 4EA

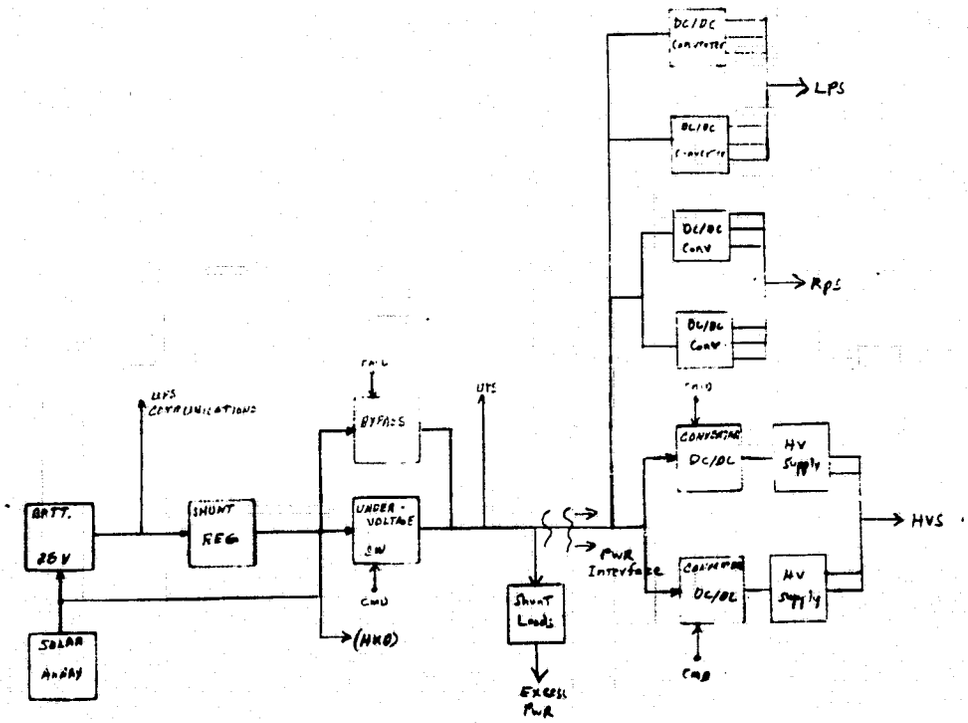
COLLIMATED X-RAY



FOLDOUT FRAME

EXPLORER (HEATE-1)

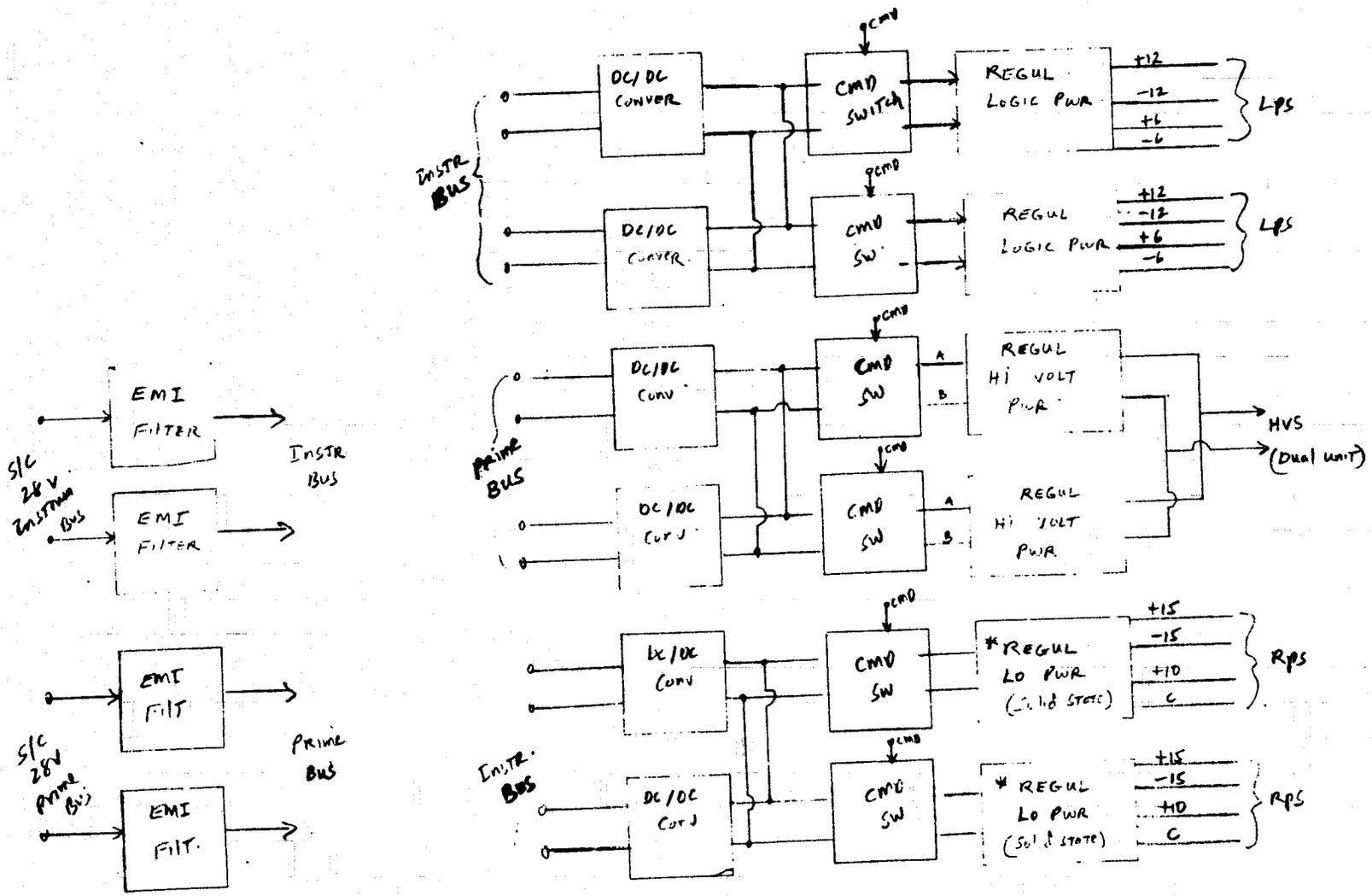


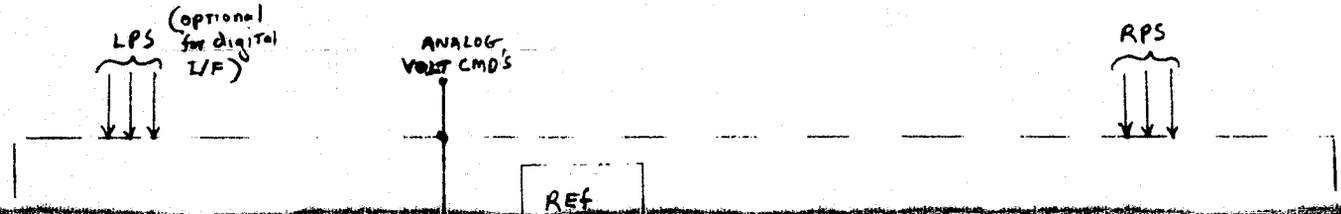


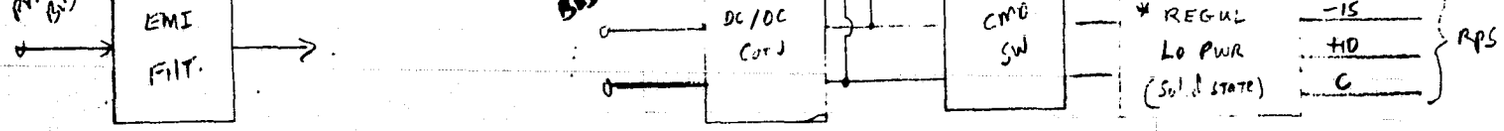
HEATE 1 - CONCEPTUAL BLOCK DRAWING

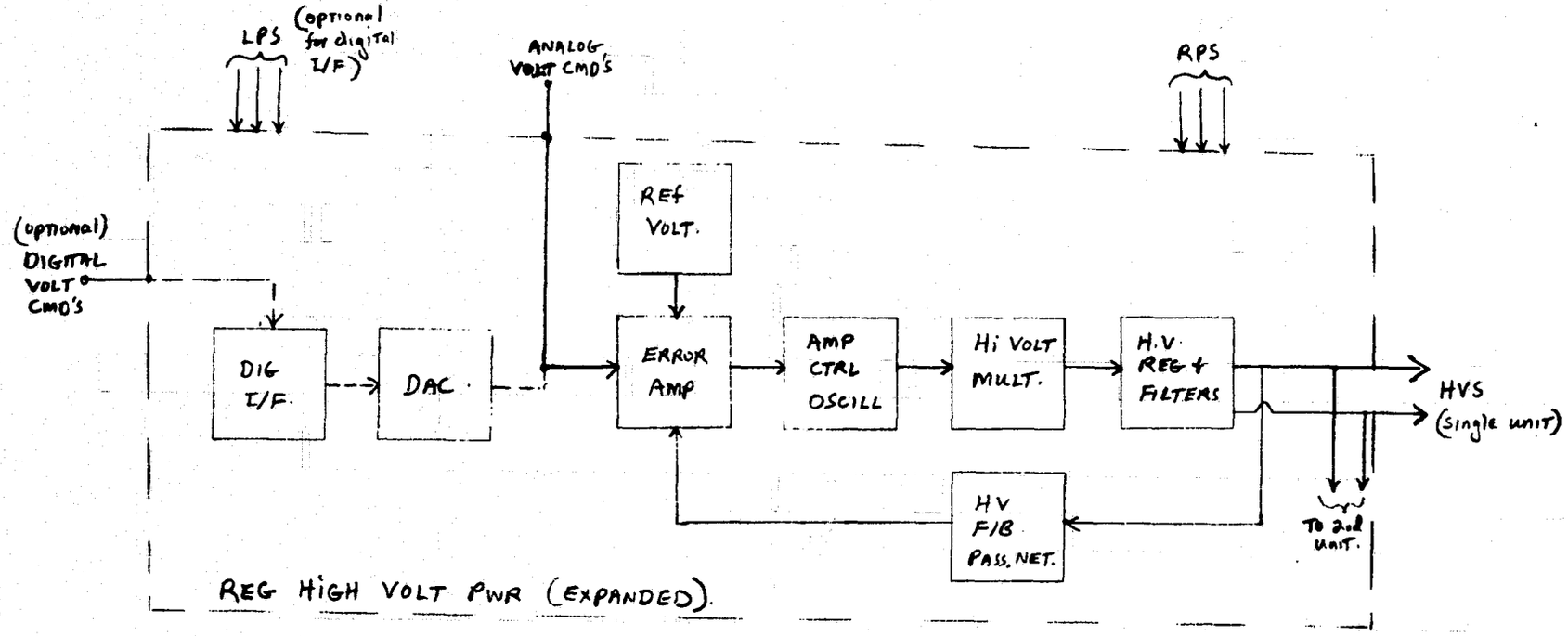
DRAWING # D1. 8/6/76

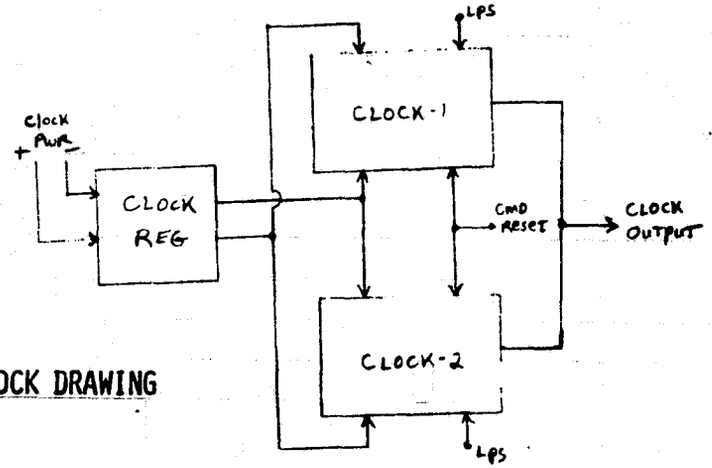
FOLDOUT FRAME 2









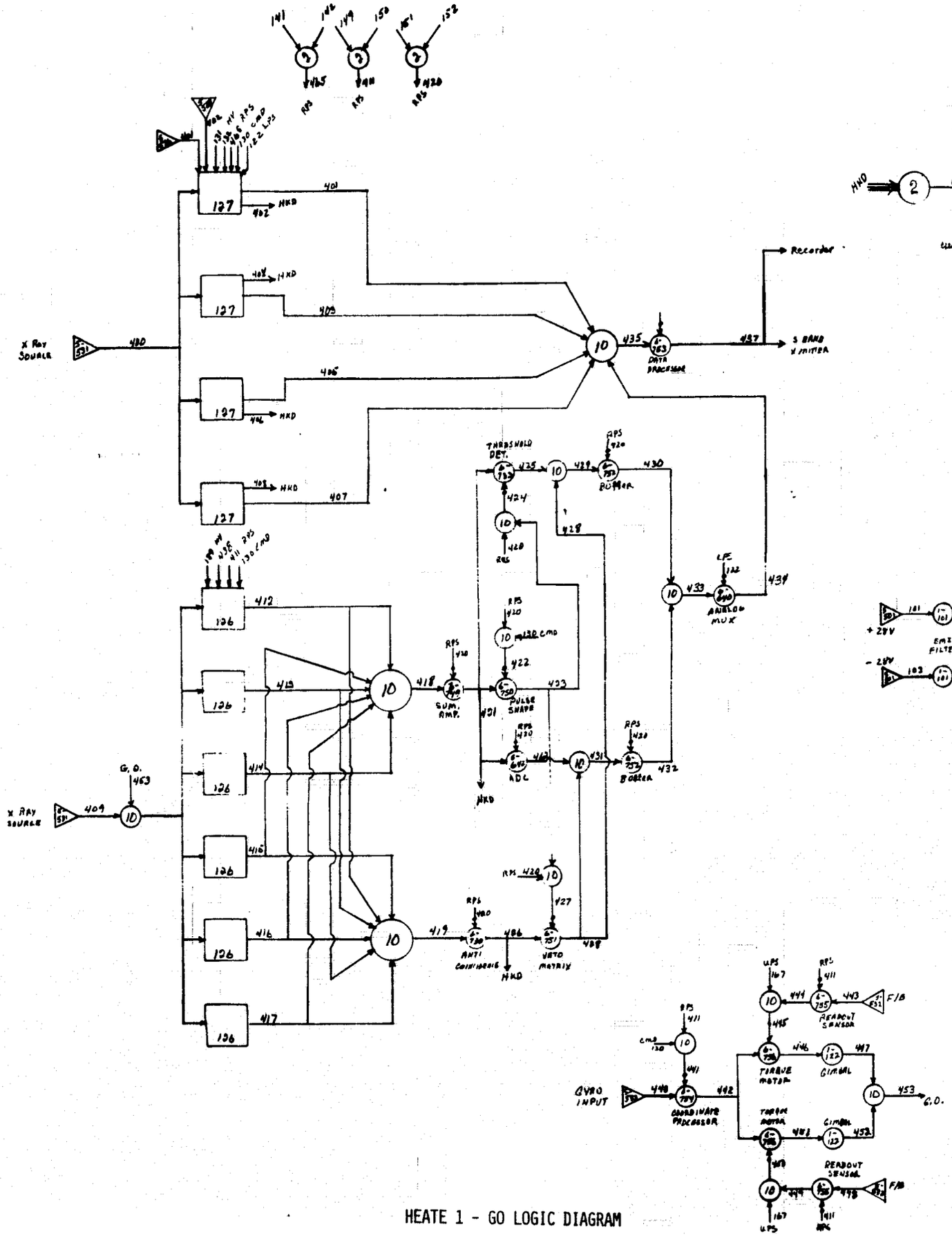


HEATE 1 - CONCEPTUAL BLOCK DRAWING

DRAWING # D2. 8/6/76

FOLD OUT FRAME

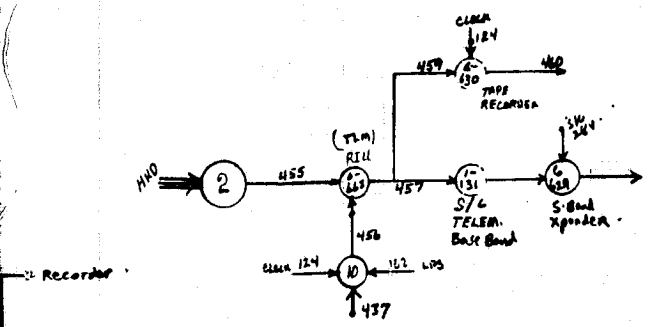
HEATE -1

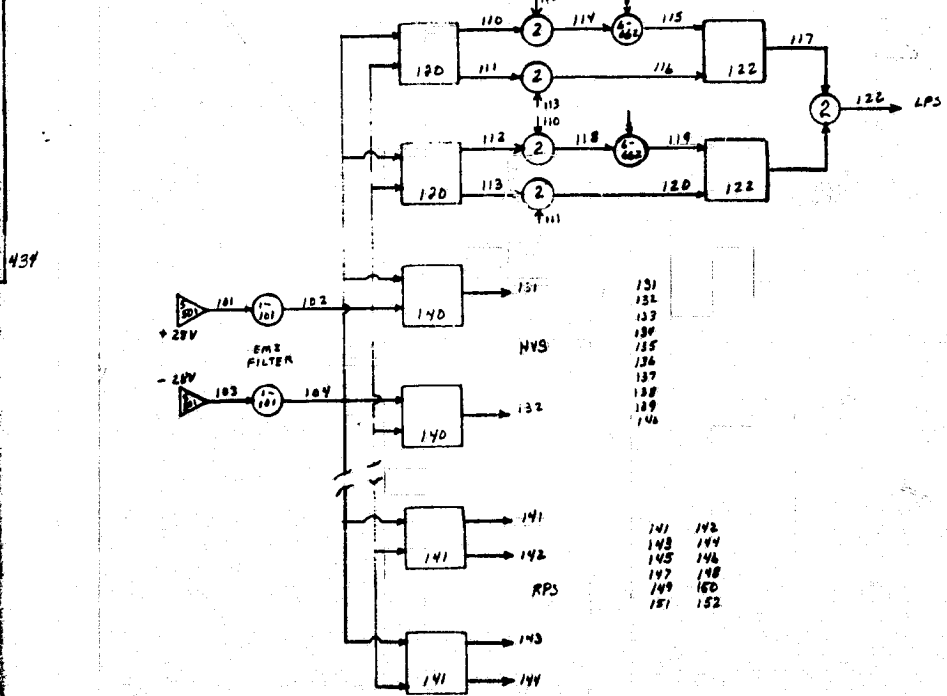


HEATE 1 - GO LOGIC DIAGRAM

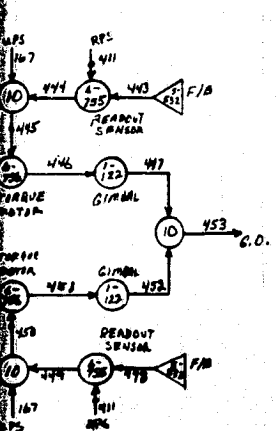
DRAWING # D3. 8/6/76

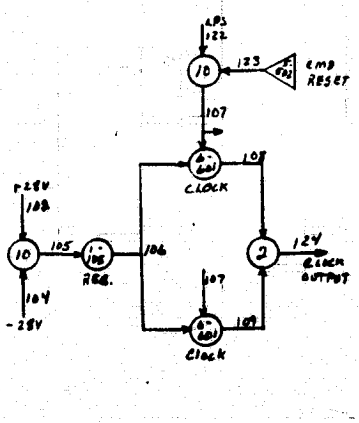
FOLDOUT FRAME 1

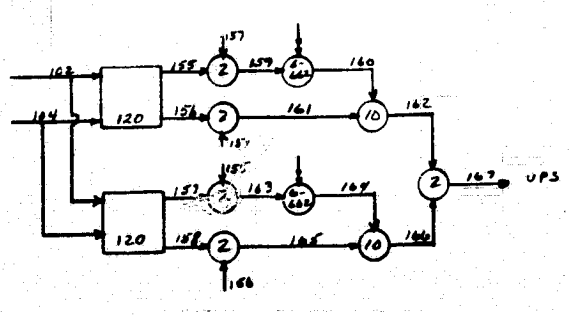




POWER SECTION

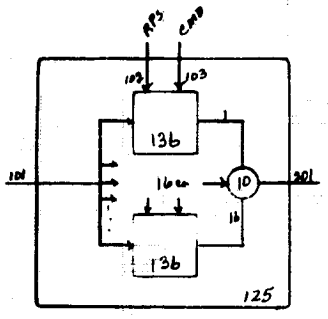


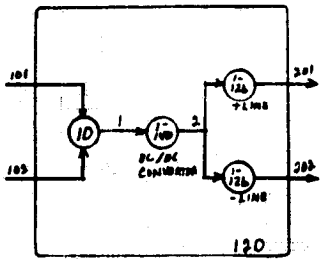


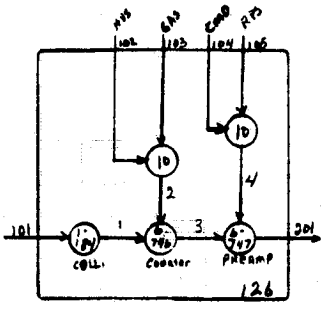


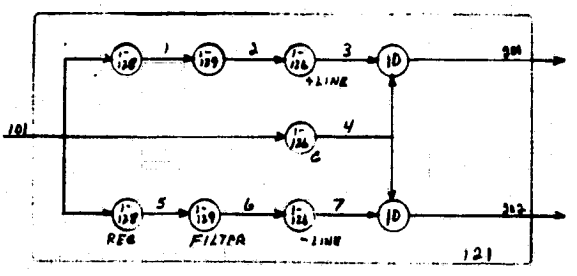
FOLDOUT FRAME

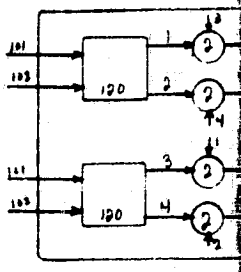
HEATE 1

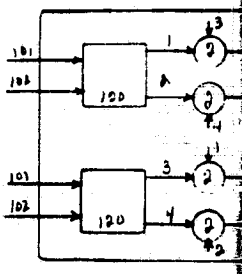


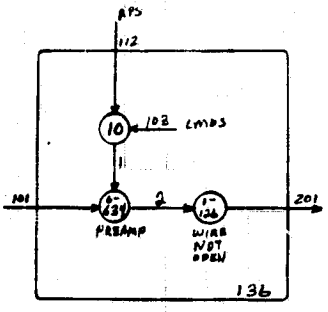


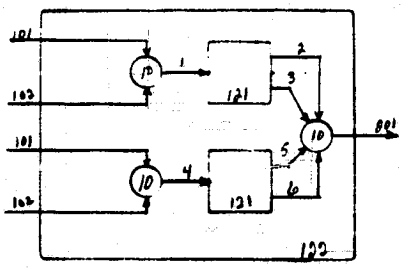


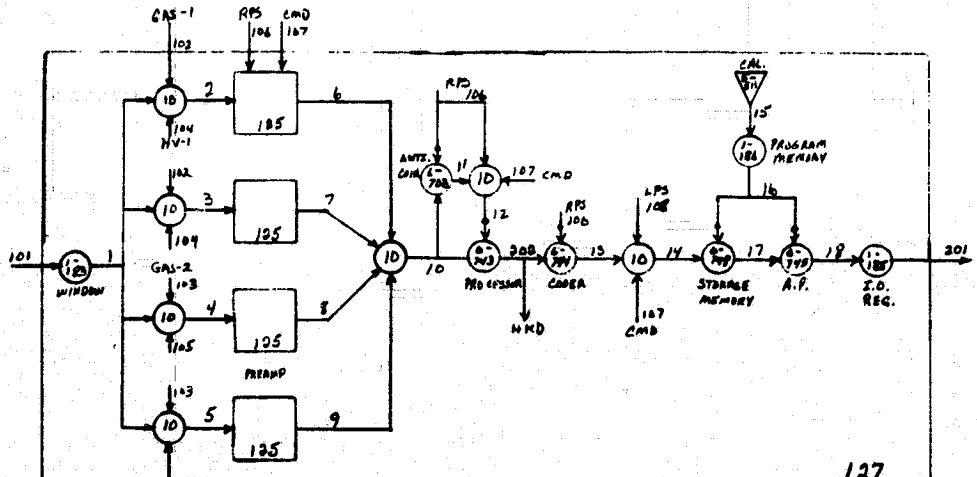


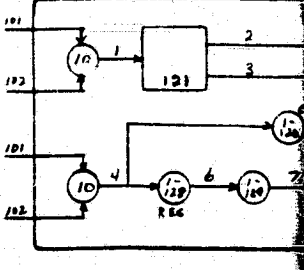






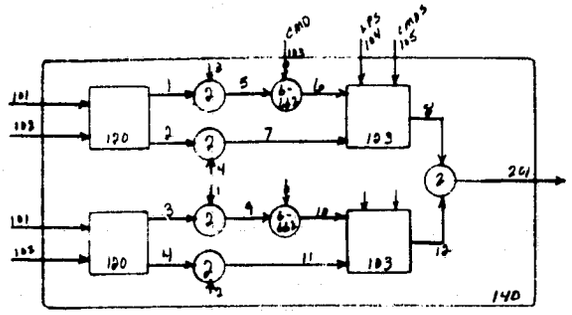


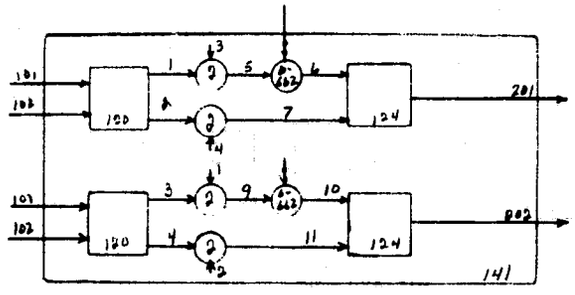


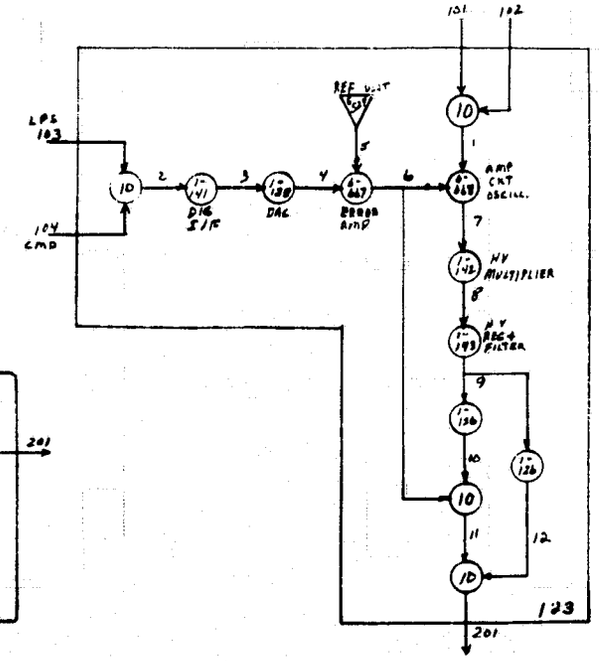


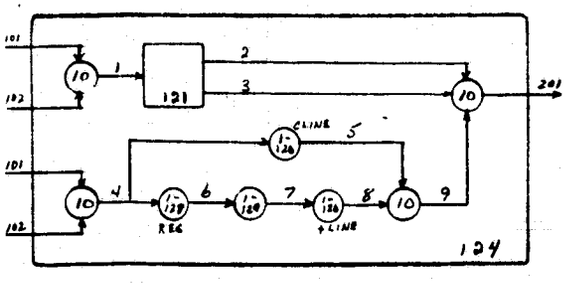
FOLDOUT FRAME

HEATE 1





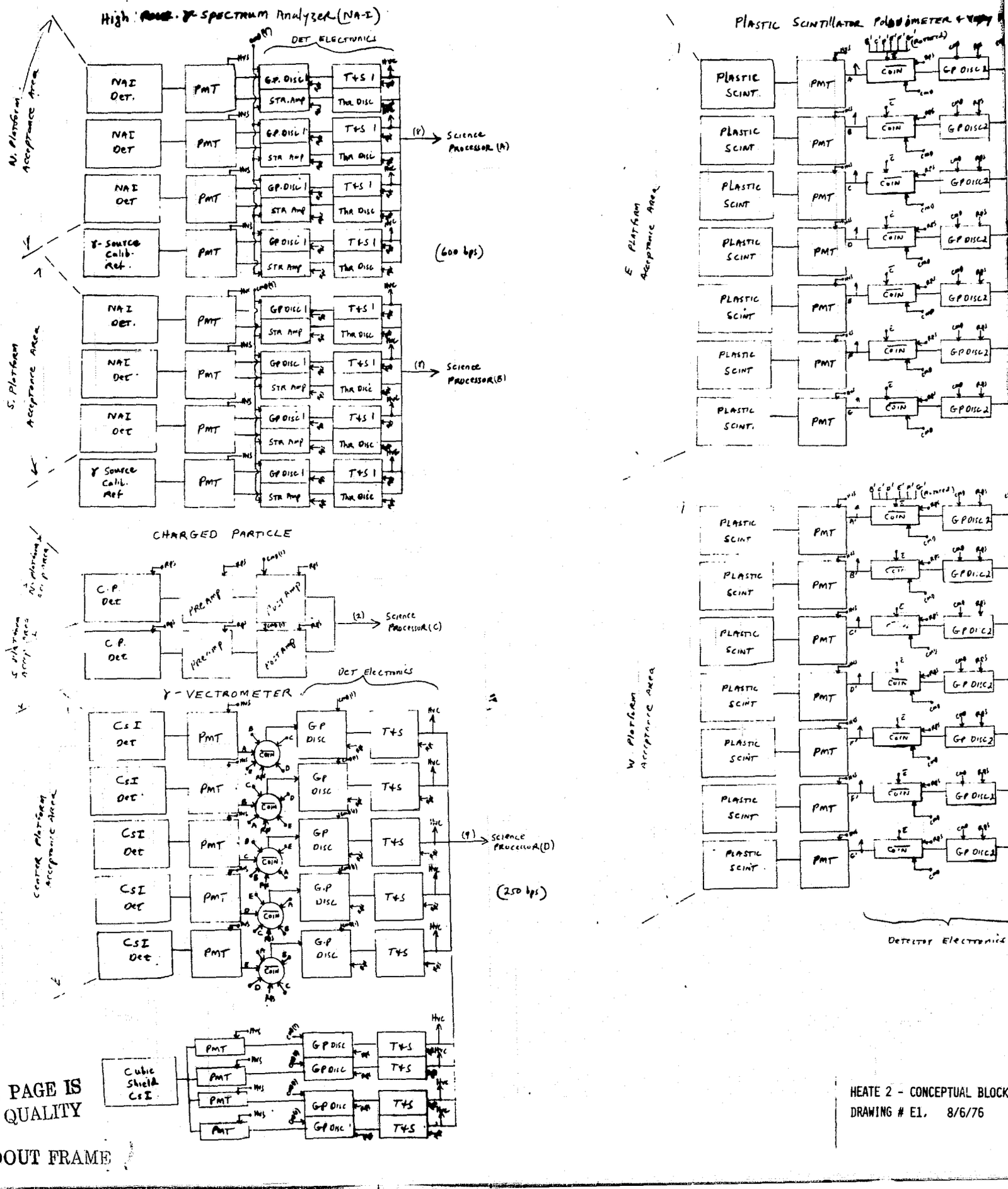




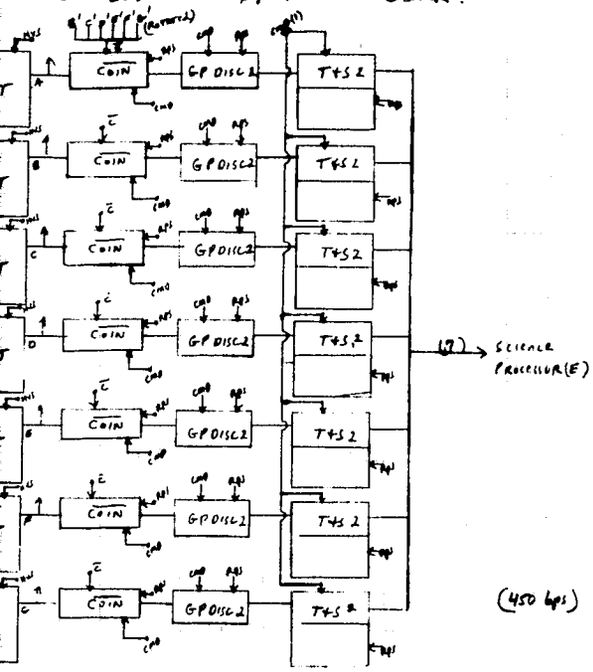
HEATE 1 - GO LOGIC DIAGRAM
DRAWING # D4, 8/6/76

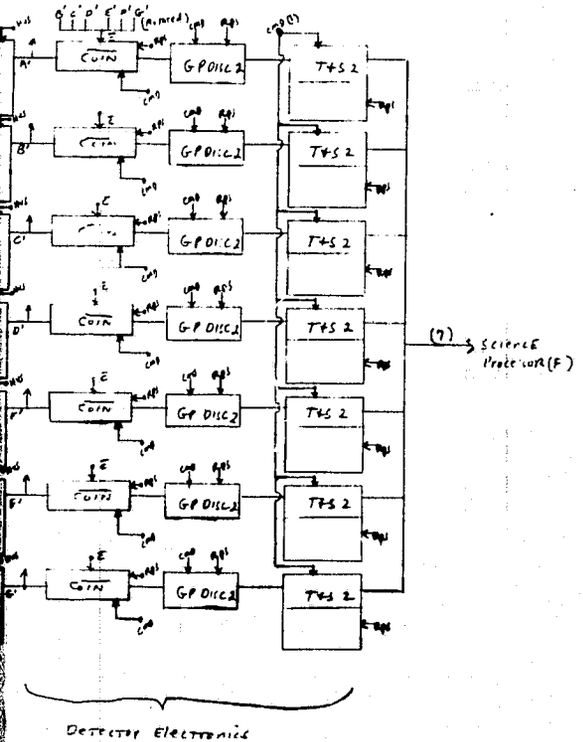
FOLDOUT FRAME 2

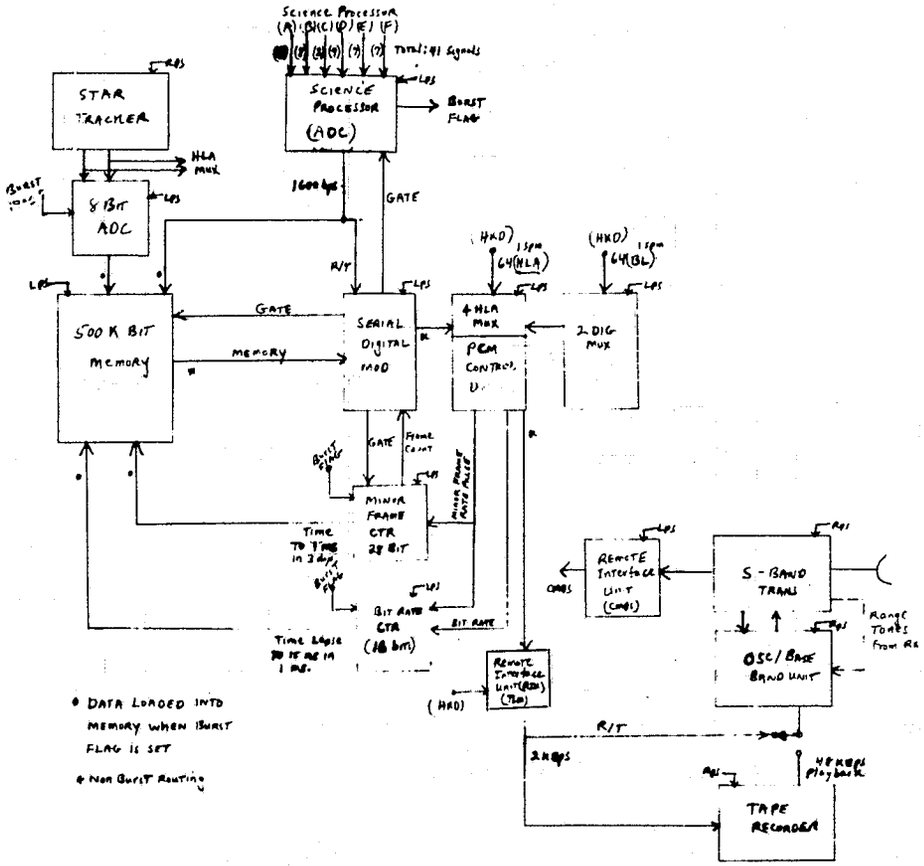
TRANSIENT Gamma-Ray Burst Explorer (HEATE-2)



HEATE 2 - CONCEPTUAL BLOCK
DRAWING # E1. 8/6/76







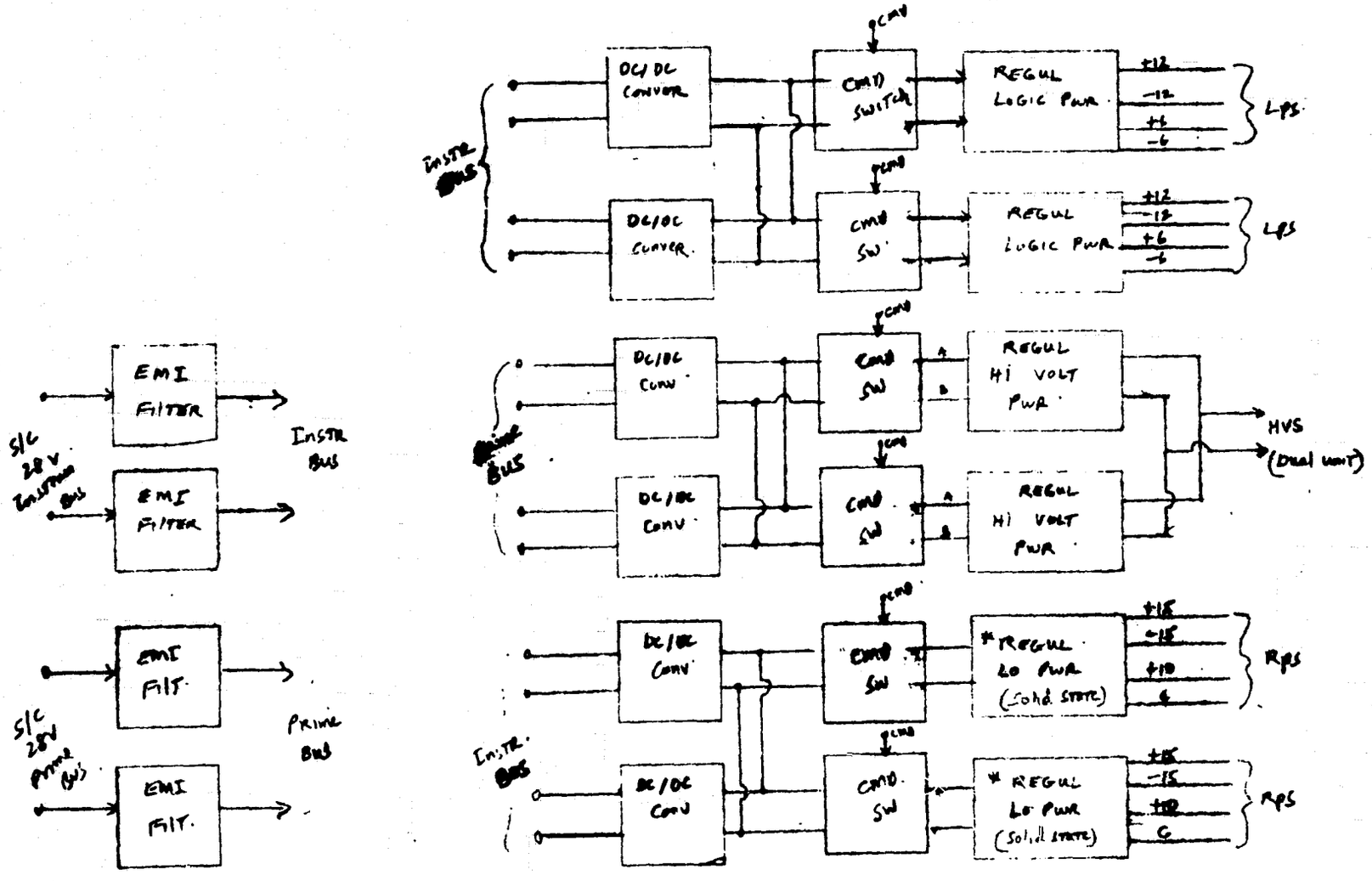
Science Hardware

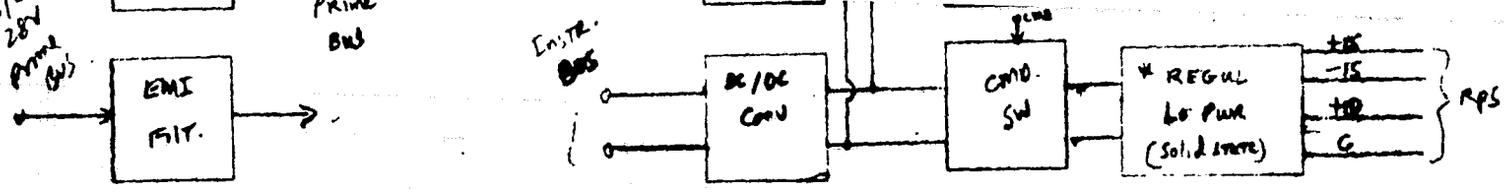
Total Power: 35 watts
Total weight: 90 Kg

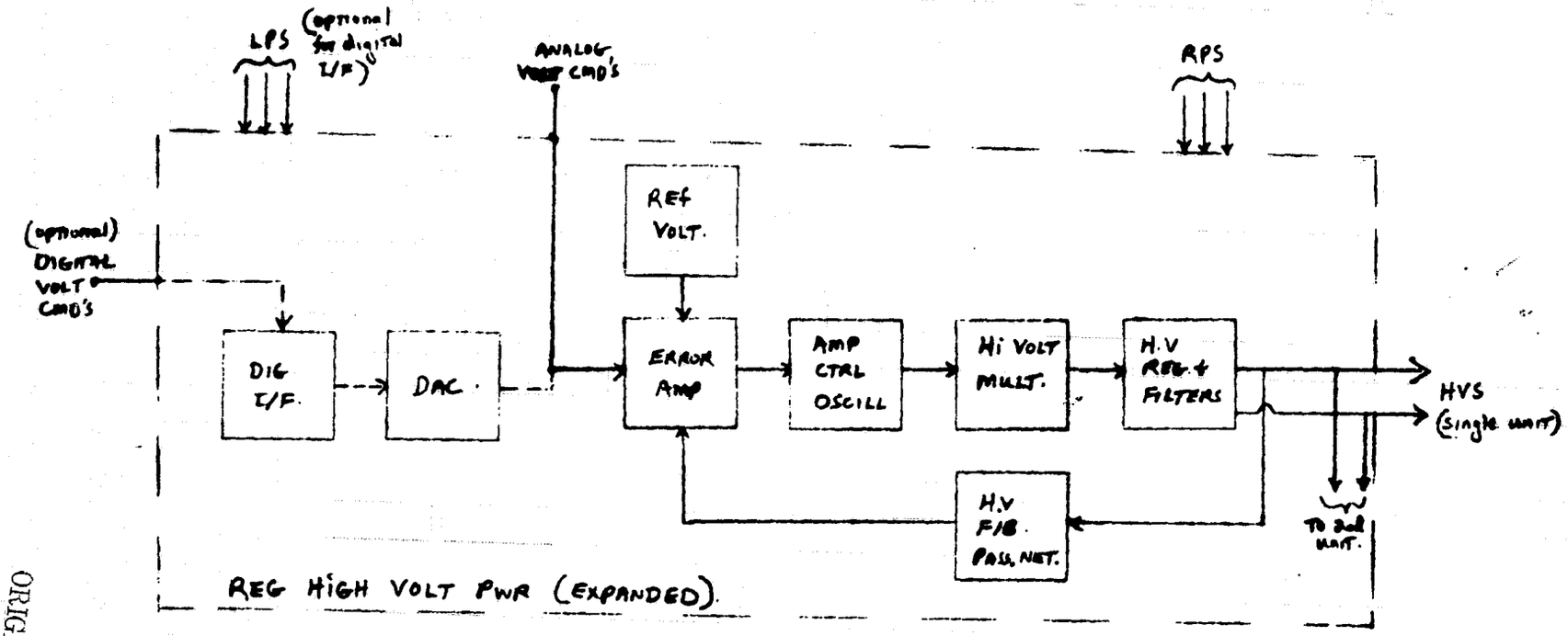
CREATE 2 - CONCEPTUAL BLOCK DRAWING
DRAWING # E1, 8/6/76

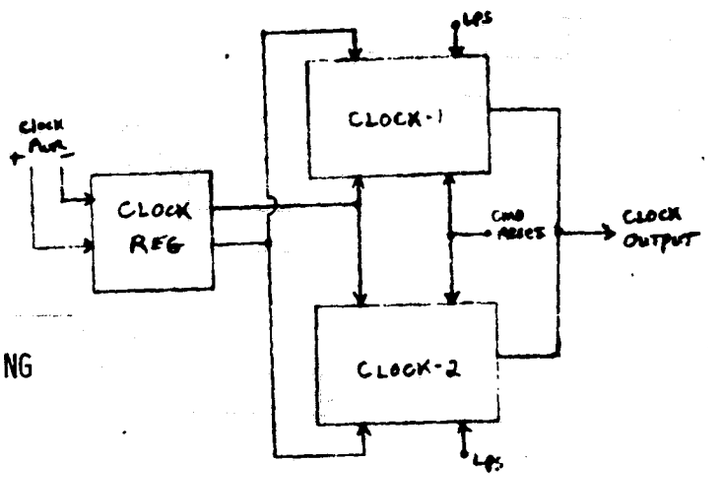
FOLDOUT FRAME 2

FOLDOUT FRAME





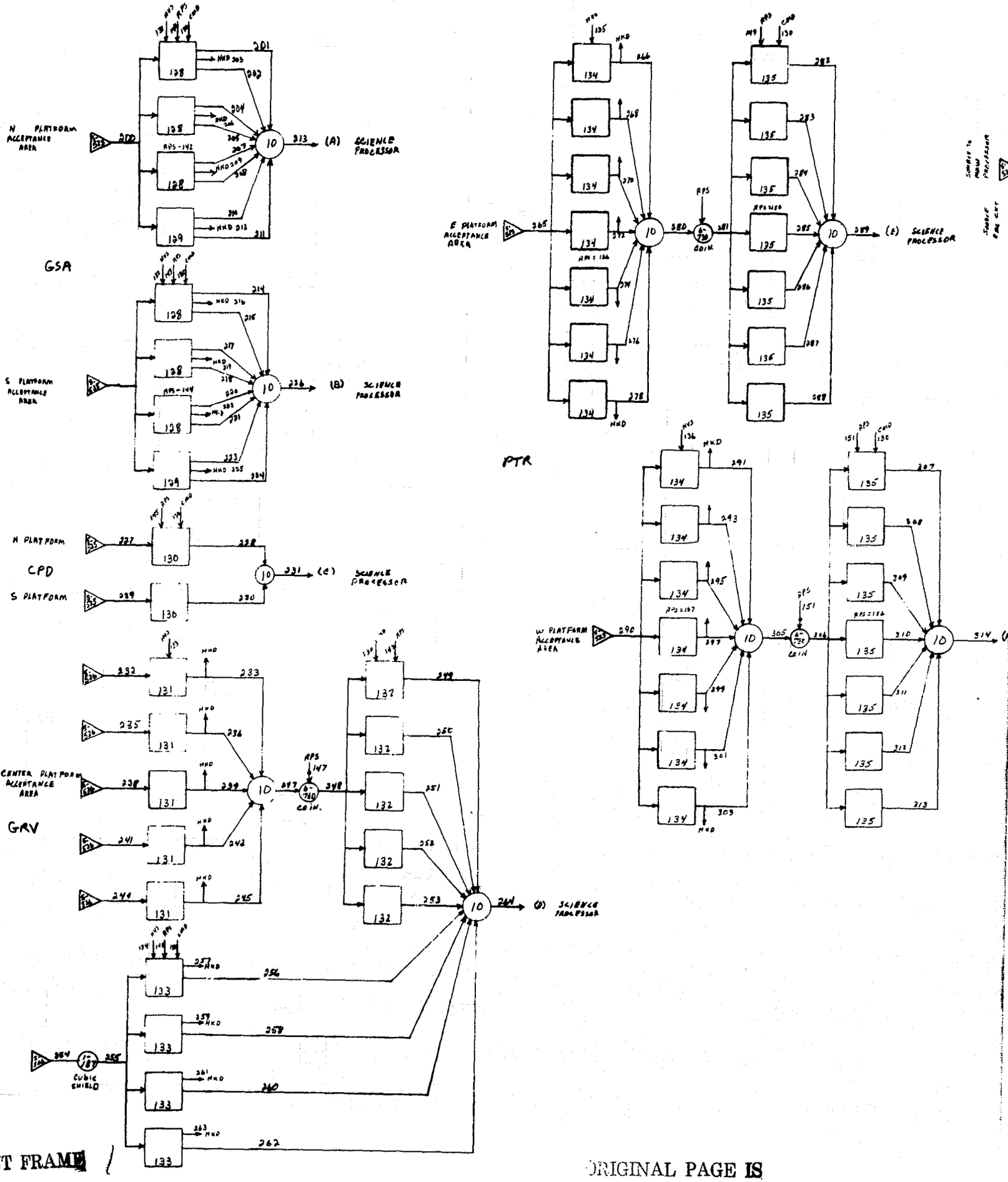




HEATE 2 - CONCEPTUAL BLOCK DRAWING

DRAWING # E2, 8/6/76

HEATE-2



FOLDOUT FRAME

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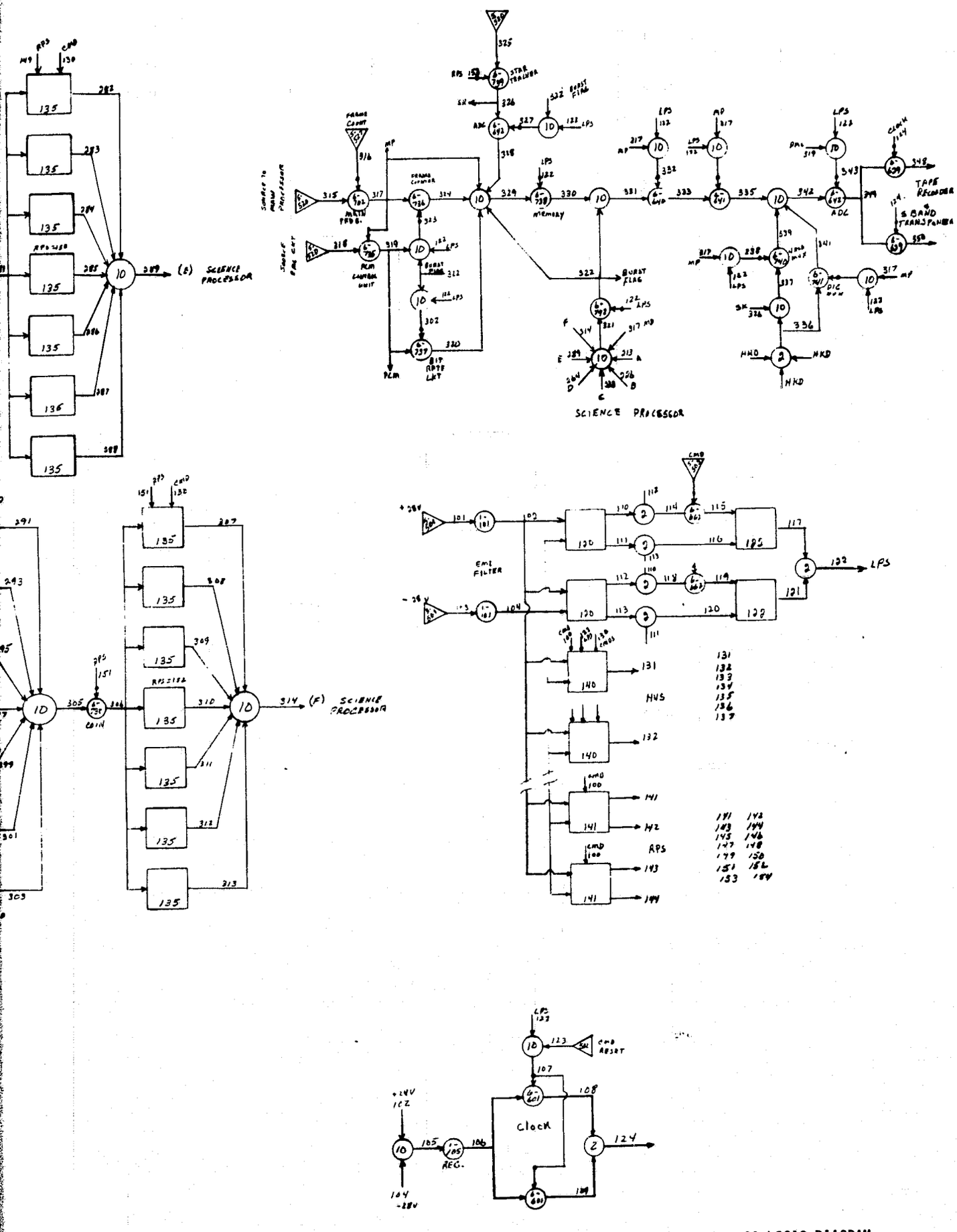
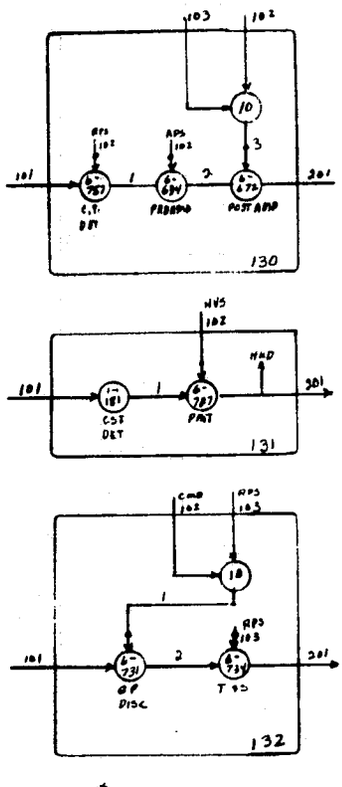
OF POOR QUALITY

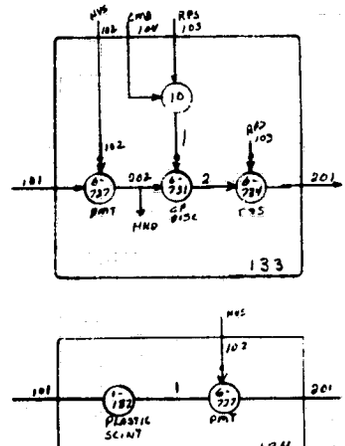


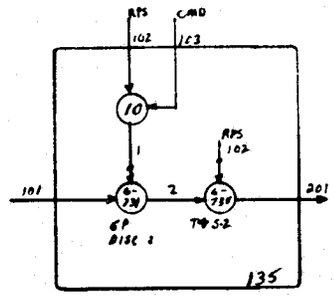
HEATE 2 - GO LOGIC DIAGRAM

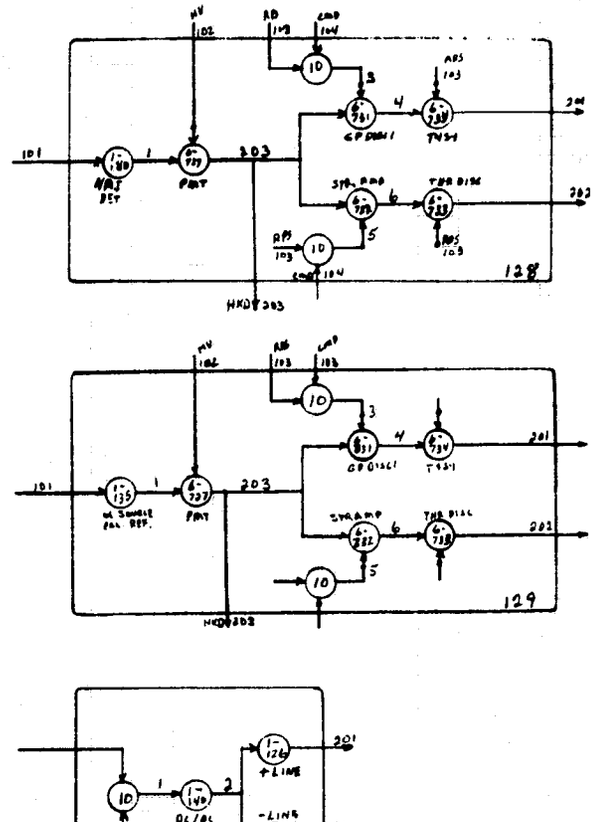
DRAWING # E3, 8/6/76

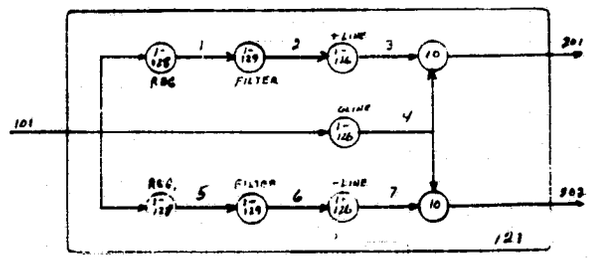
FOLDOUT FR

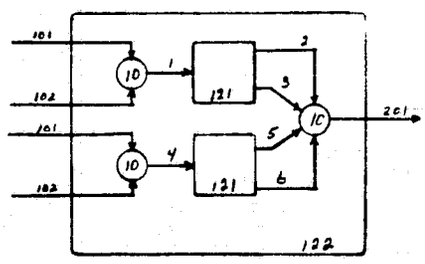






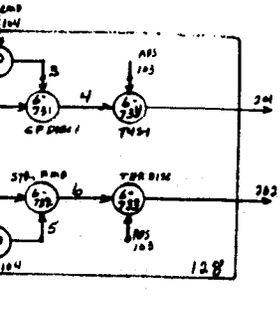


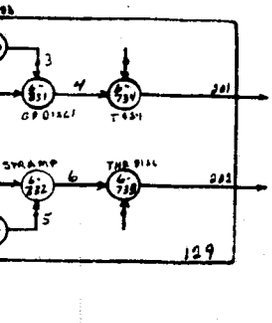


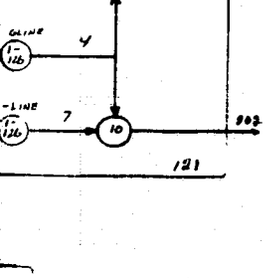


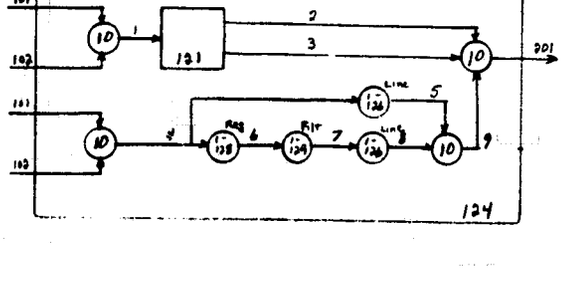
FOLDOUT FRAME 1

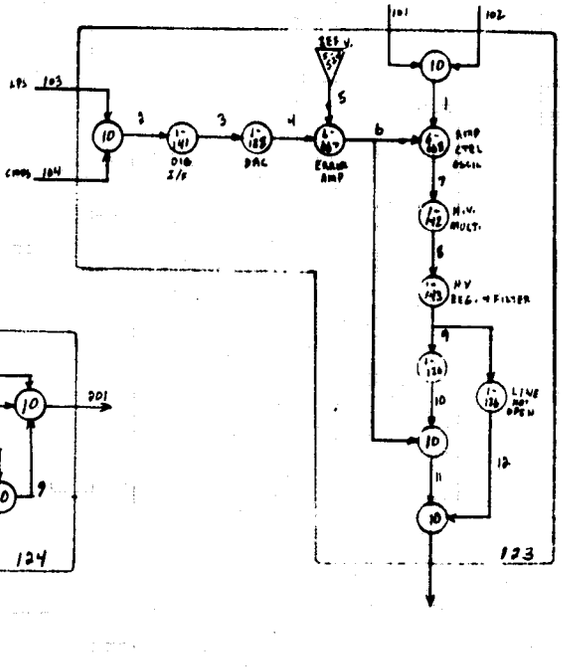
HEATE-2

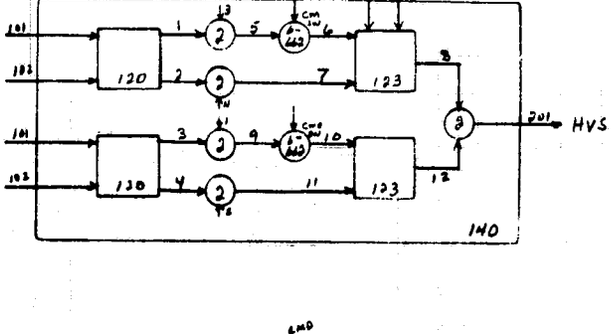


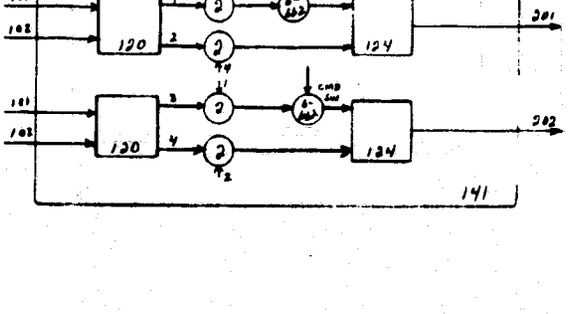








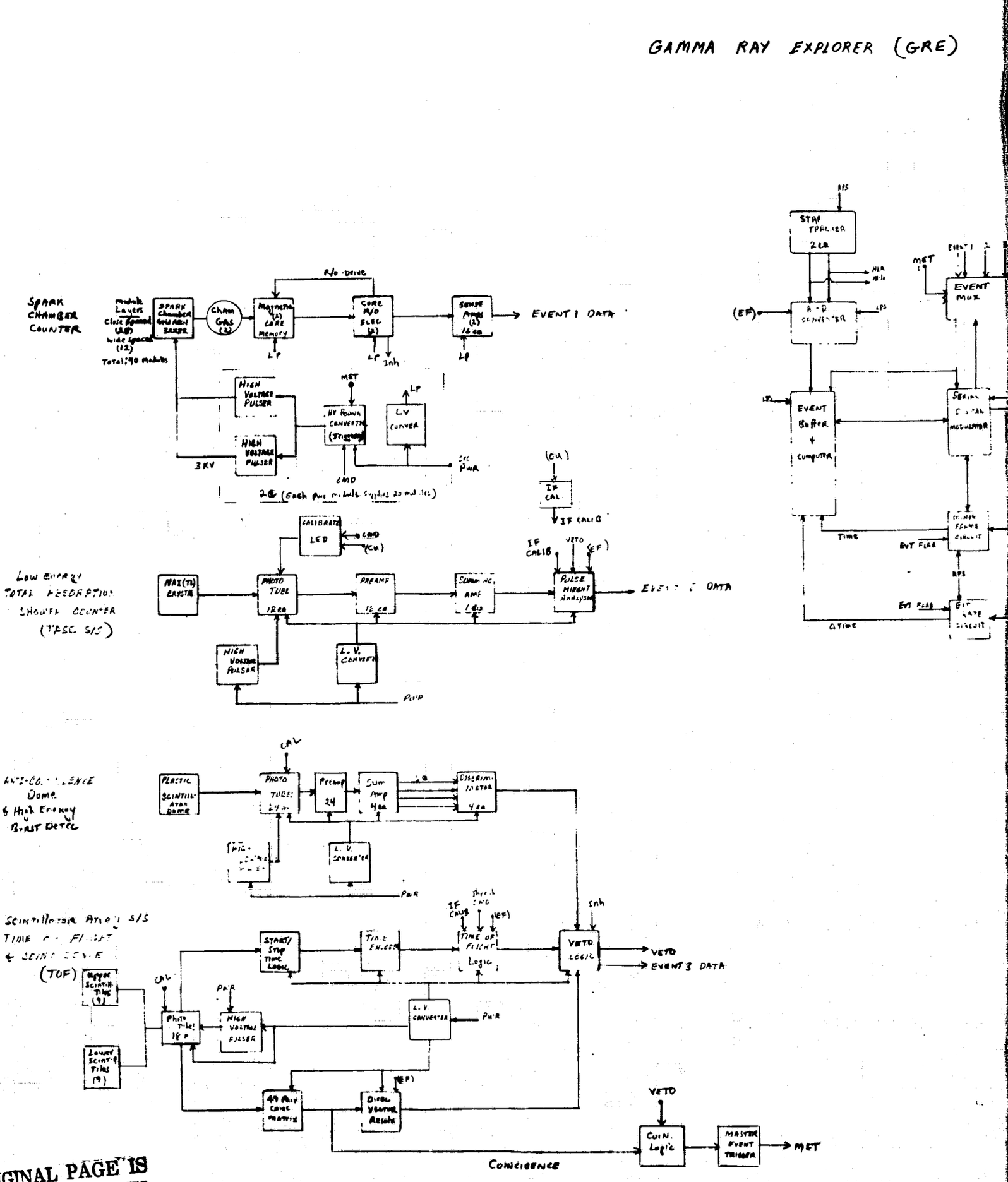




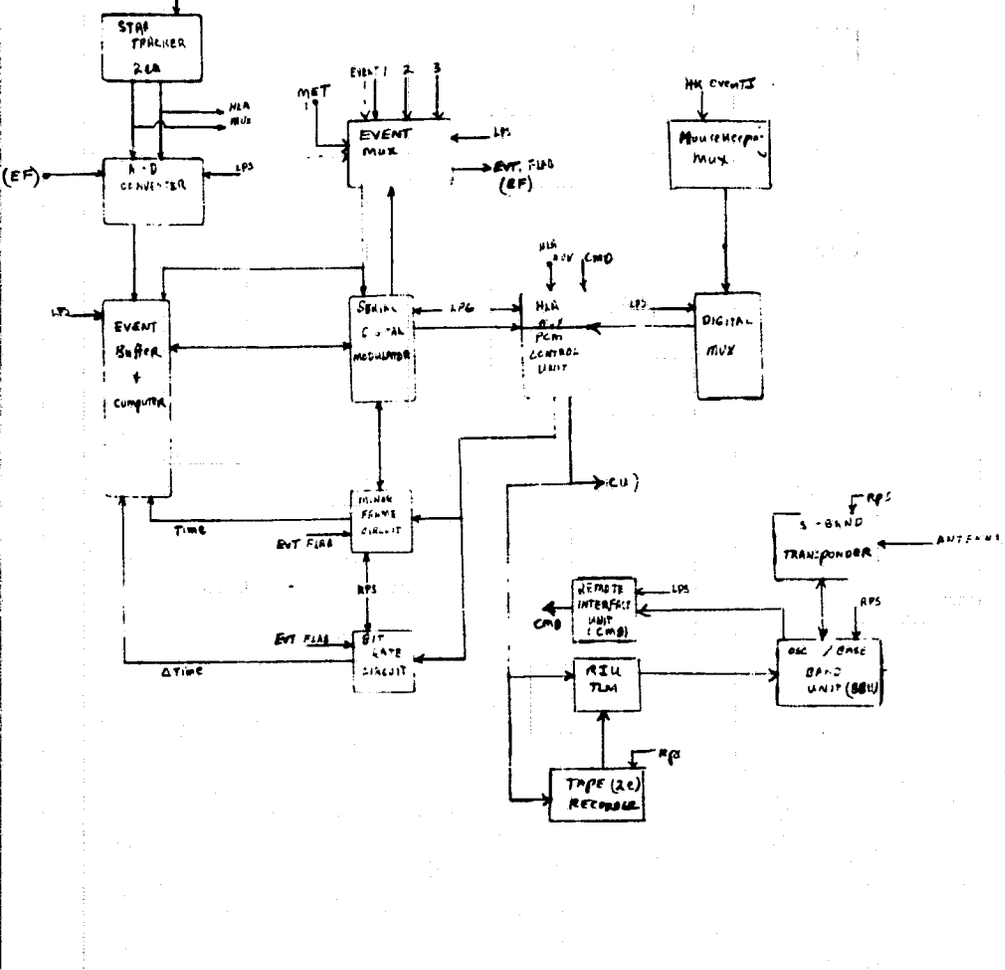
HEATE 2 - GO LOGIC DIAGRAM

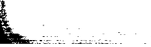
DRAWING # E4, 8/6/76

GAMMA RAY EXPLORER (GRE)



RAY EXPLORER (GRE)

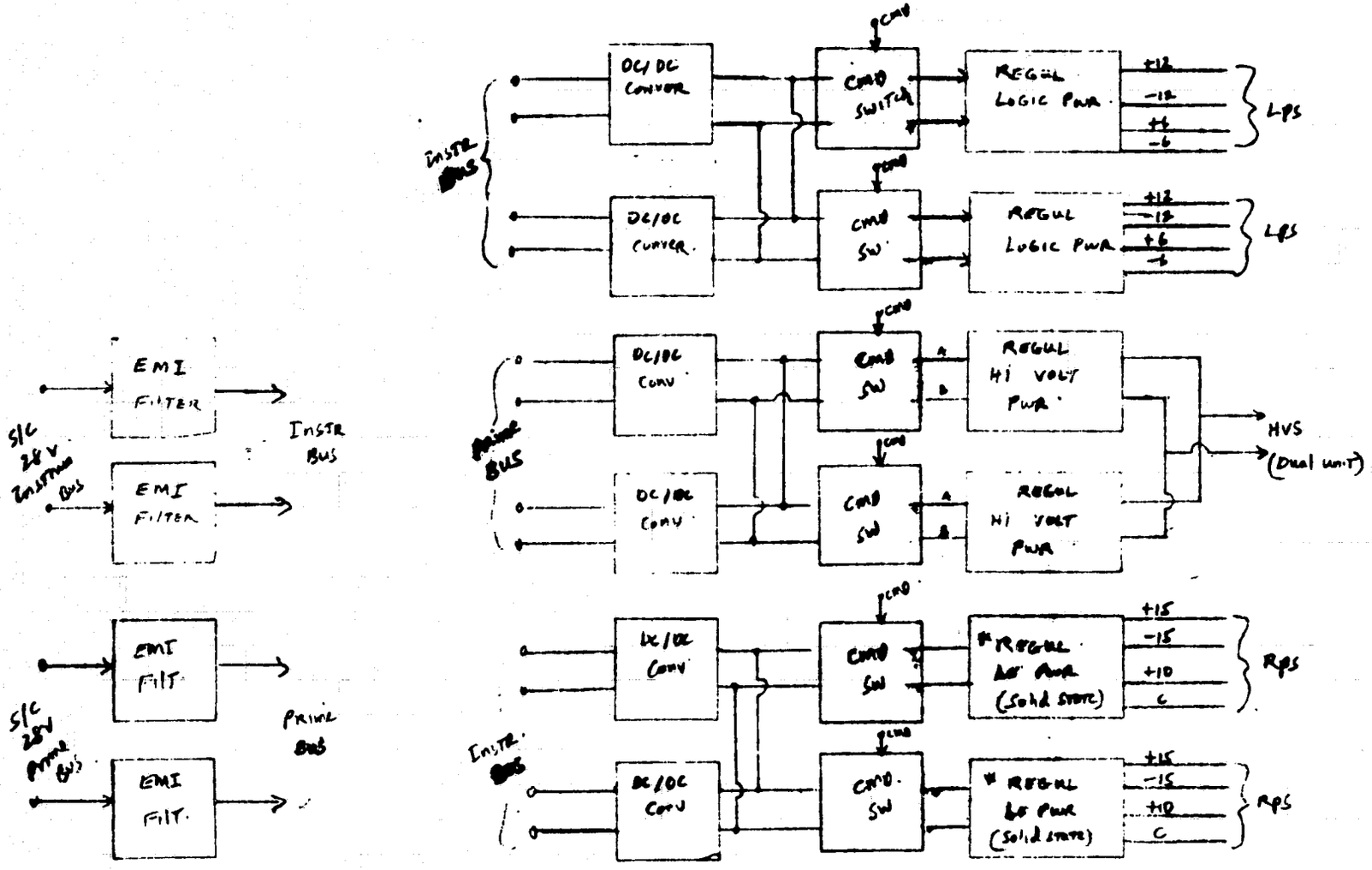


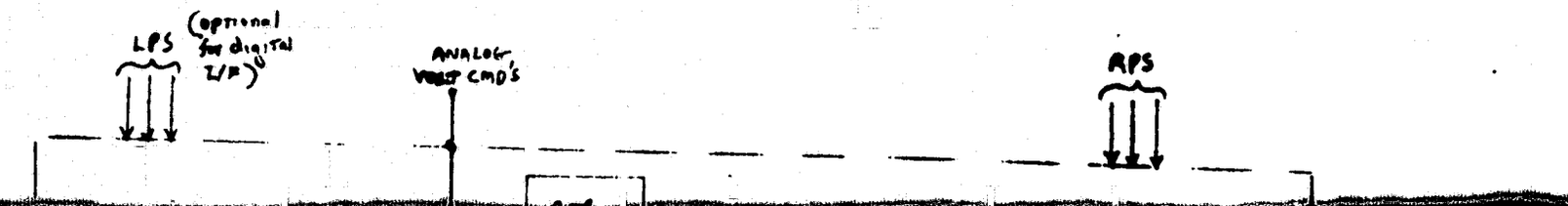


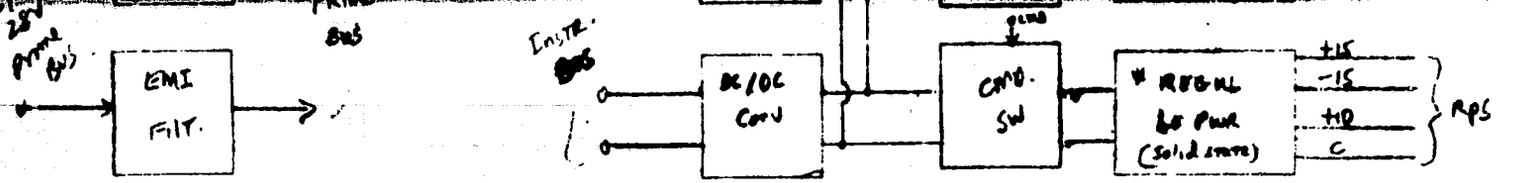
GRE - CONCEPTUAL BLOCK DRAWING FOLDOUT FR

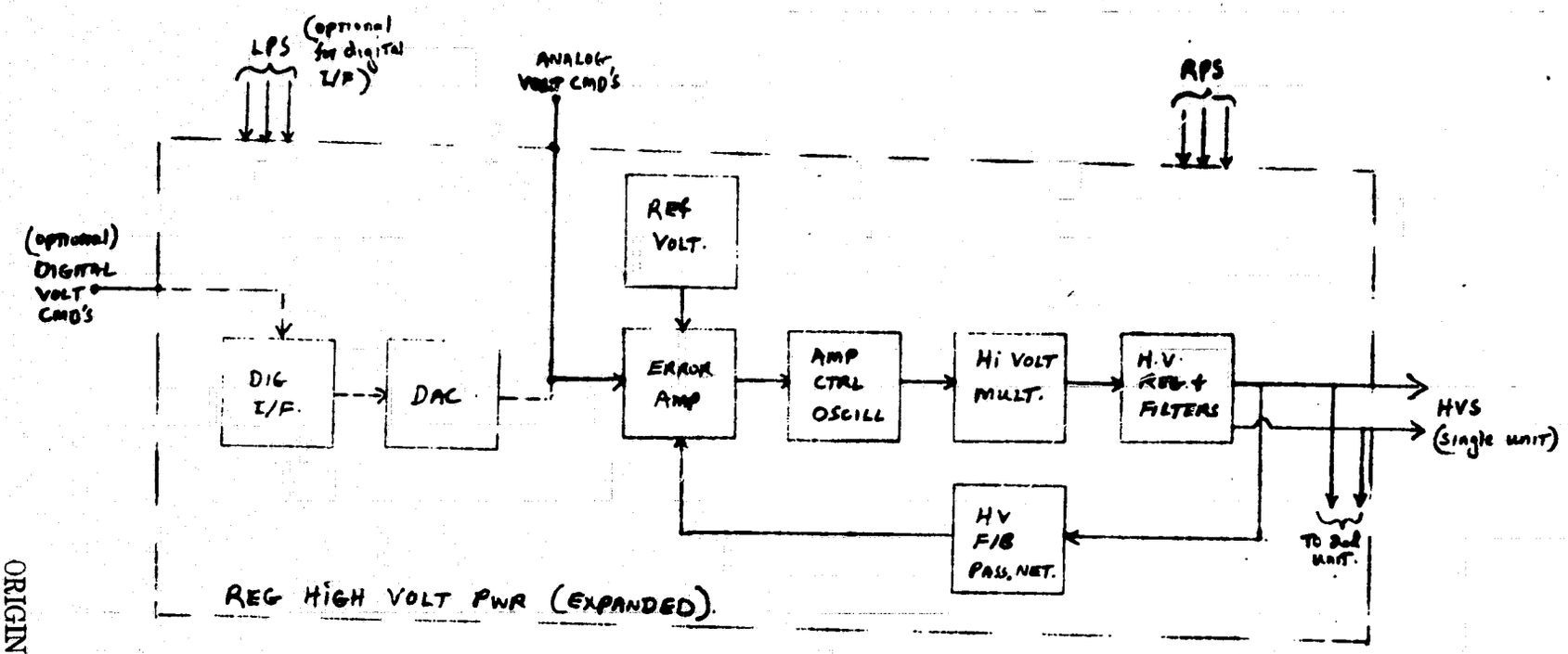
DRAWING # F1, 8/6/76

FOLDOUT FRAME

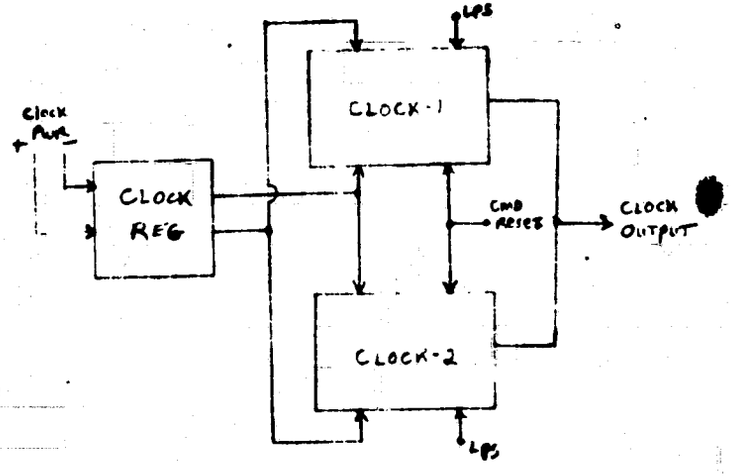








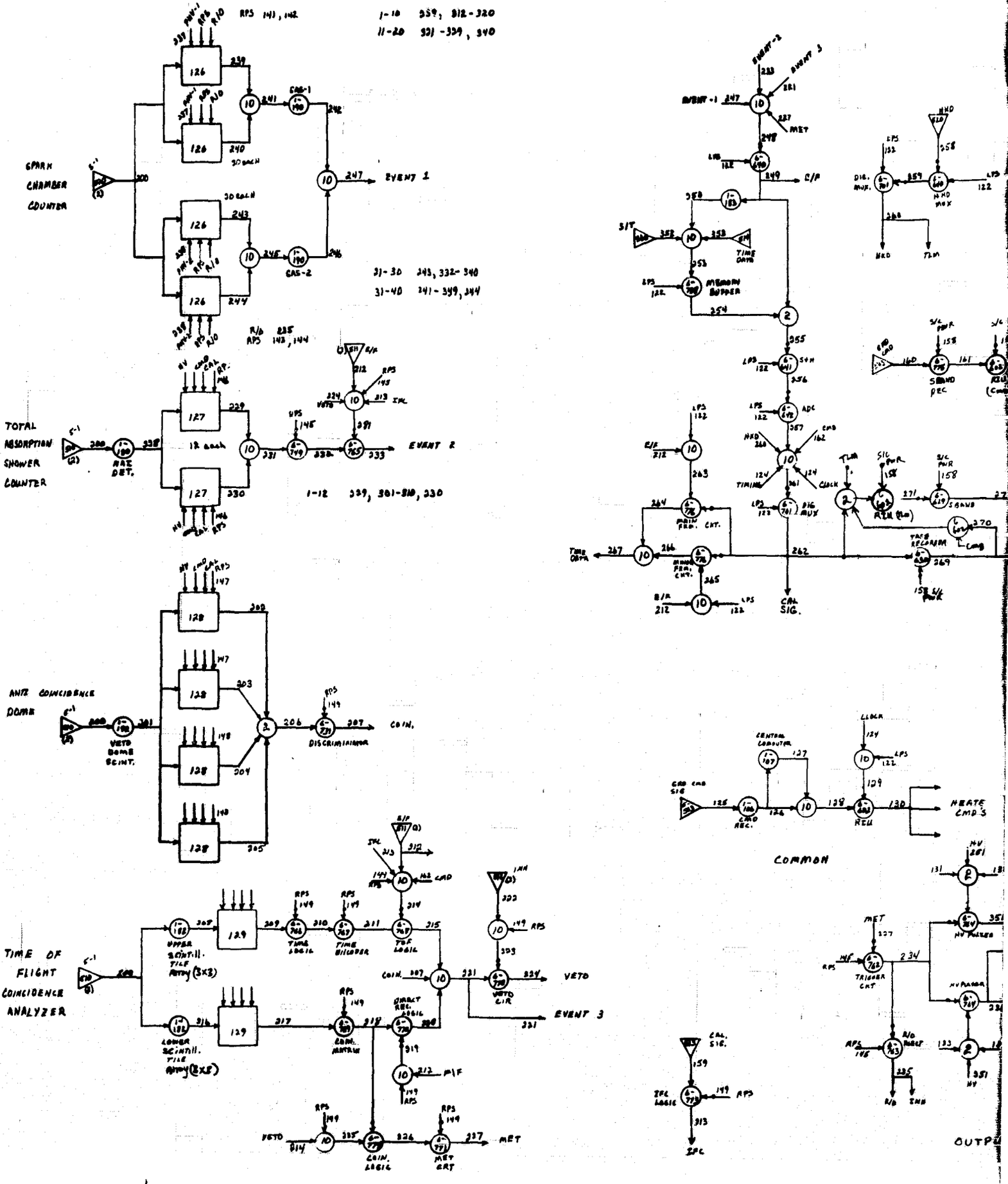
REG HIGH VOLT PWR (EXPANDED).



GRE - CONCEPTUAL BLOCK DRAWING

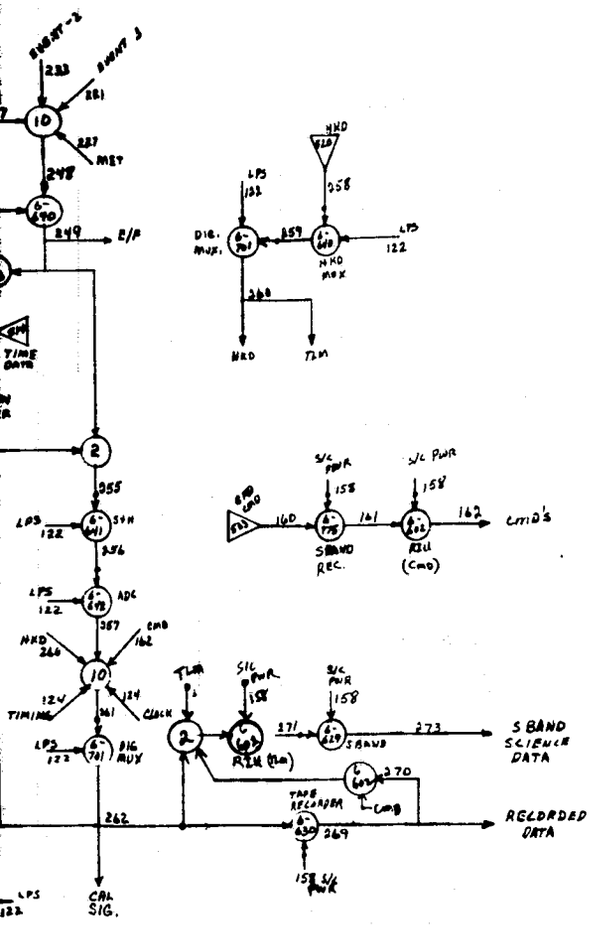
DRAWING # F2. 8/6/76

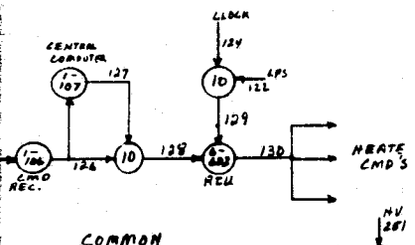
GAMMA RAY EXPLORER (GRE)



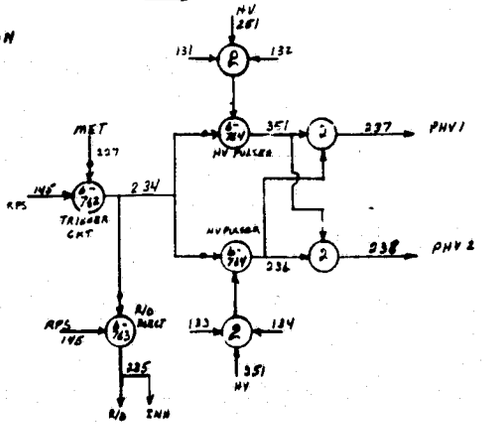
FOLDOUT FRAME 1

MA RAY EXPLORER (GRE)

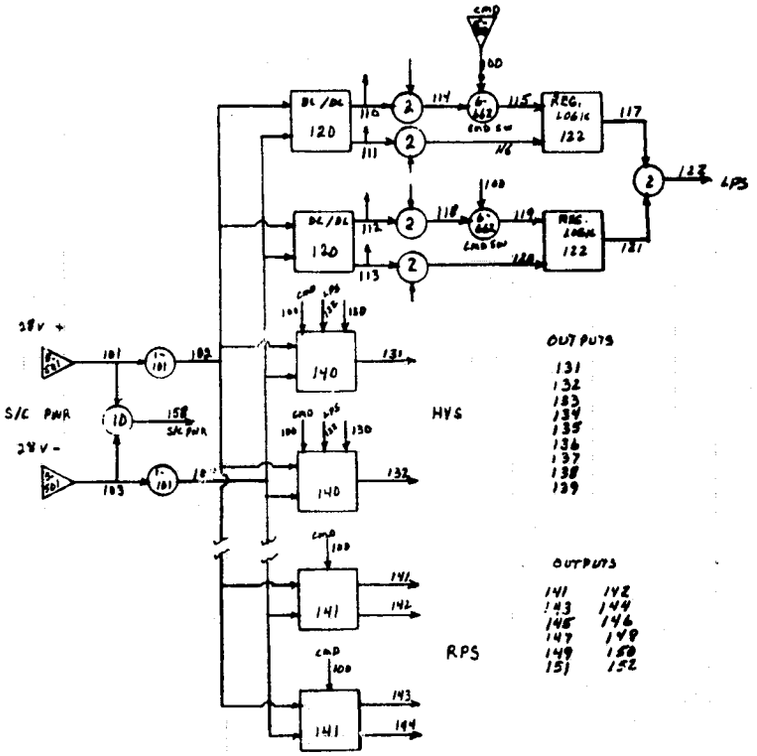


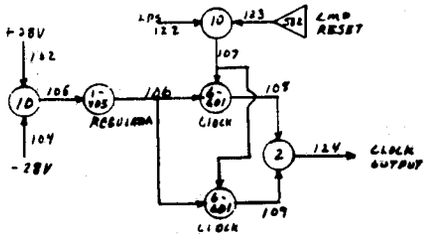


COMMON



OUTPUT

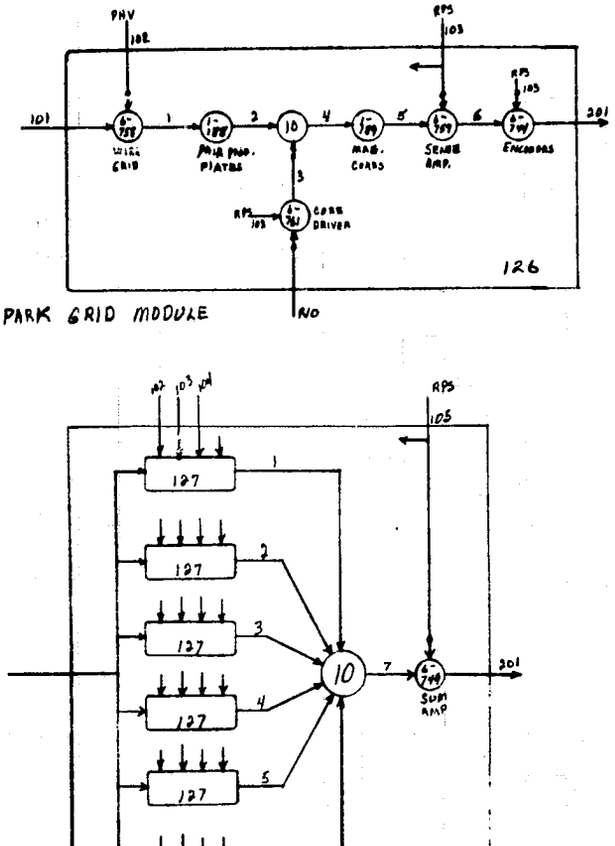




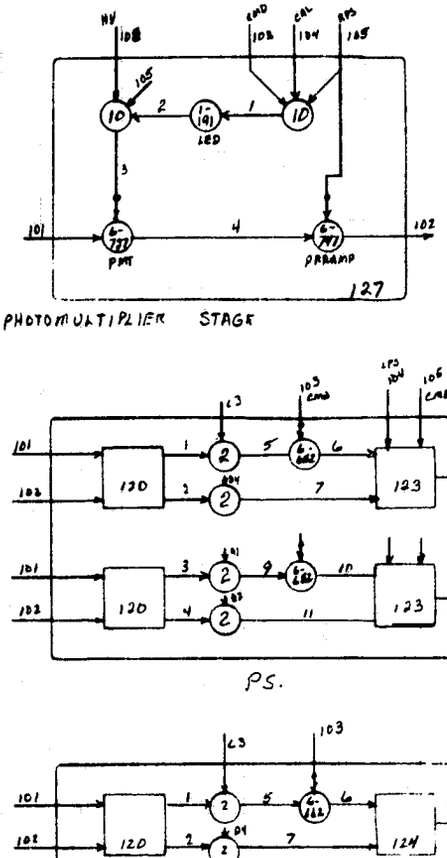
GRE - GO LOGIC DIAGRAM

DRAWING # F3, 8/6/76

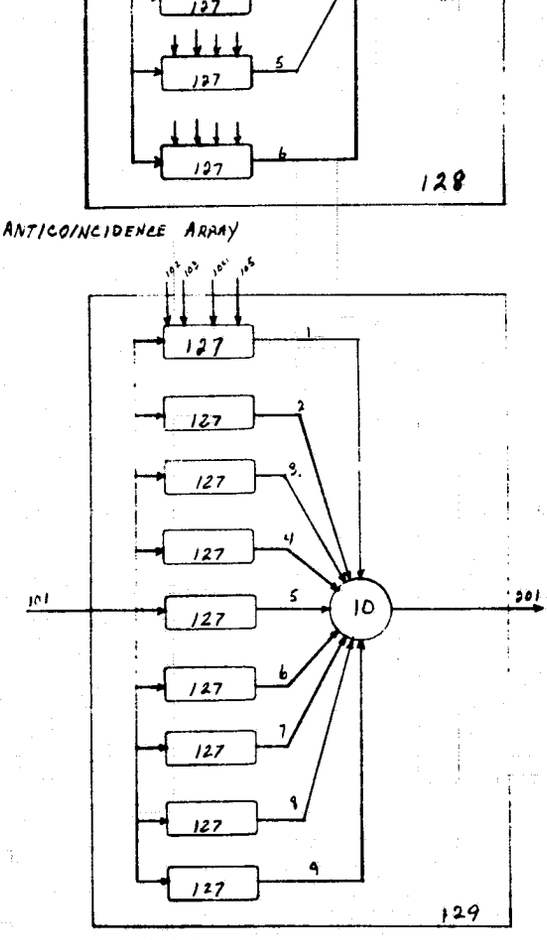
FOLDOUT FRAME 5



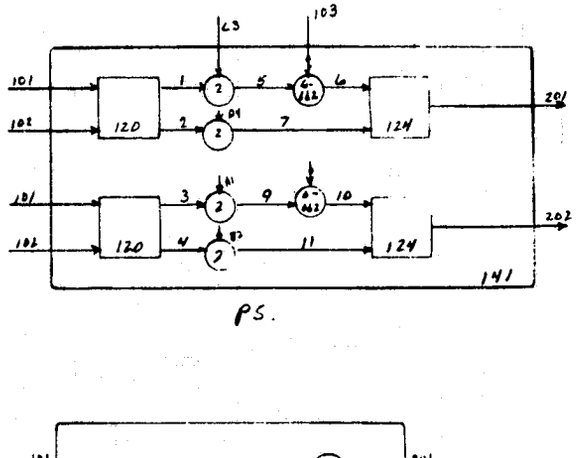
SPARK GRID MODULE



PHOTOMULTIPLIER STAGE



ANTICOINCIDENCE ARRAY



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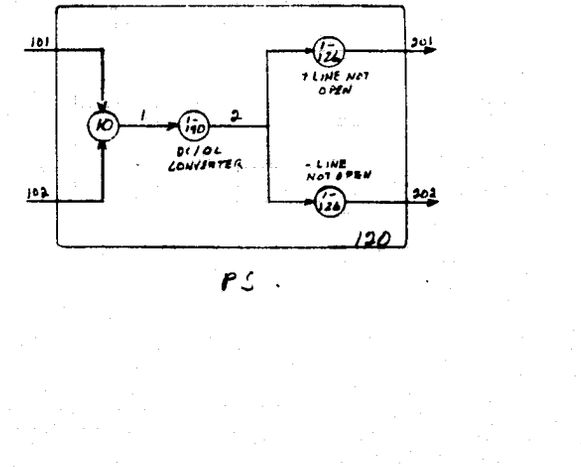

PS.

SCINTILLATION ARRAY

PS.

FOLDOUT FRAME

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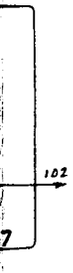
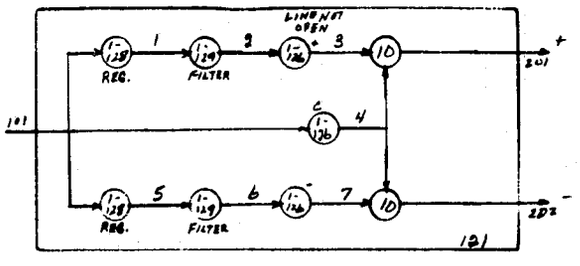
nma RAY EXPLORER (GRE)





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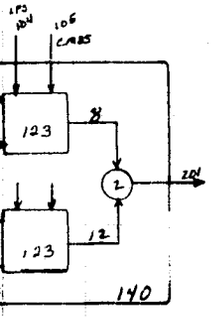

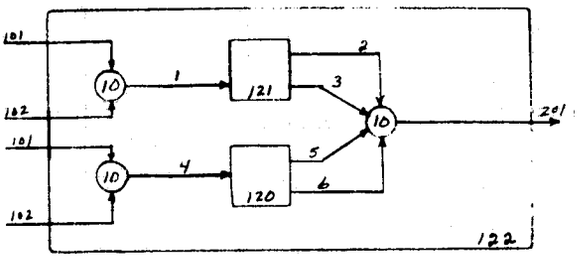

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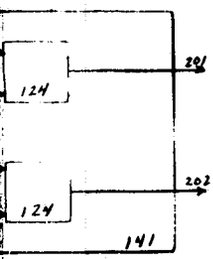
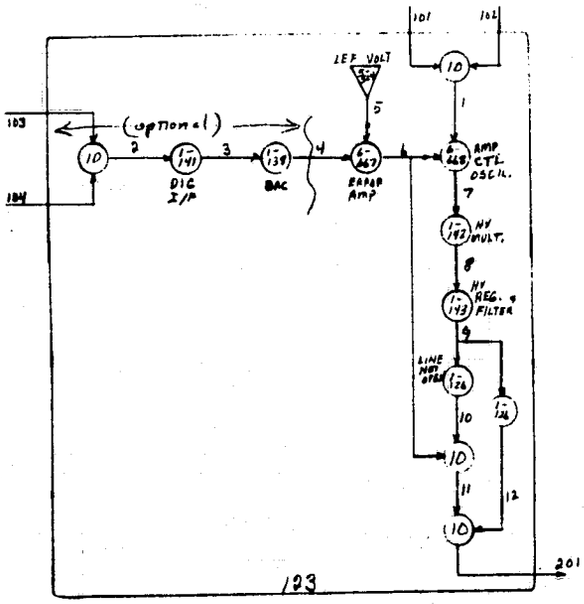
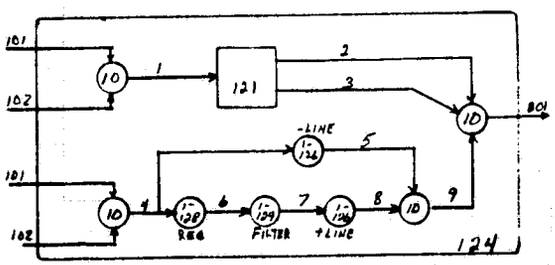




PS.



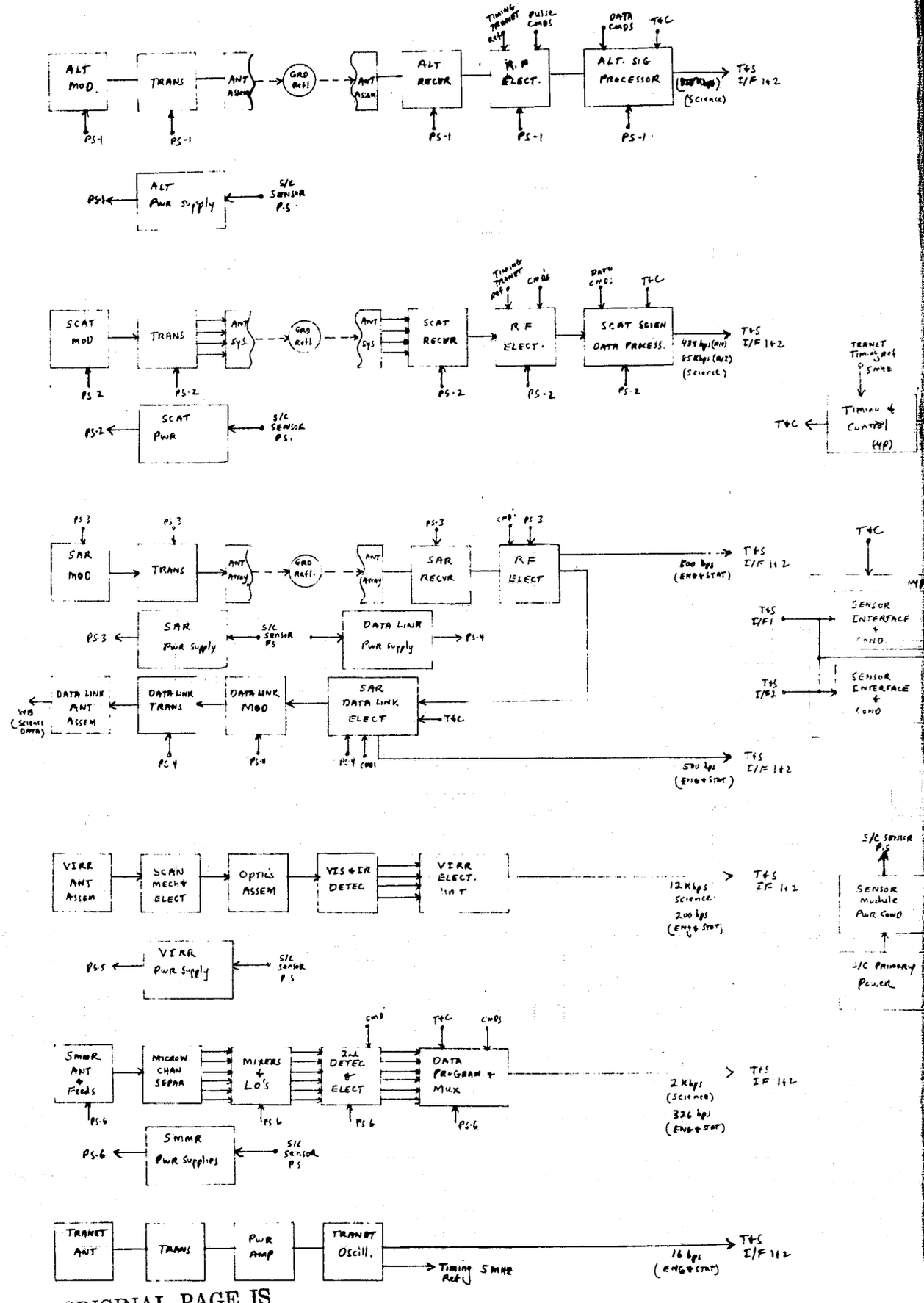
PS.

GRE - GO LOGIC DIAGRAM

DRAWING # F4 , 8/6/76

FOLDOUT FRAME

SEASAT



FOLDOUT FRAME

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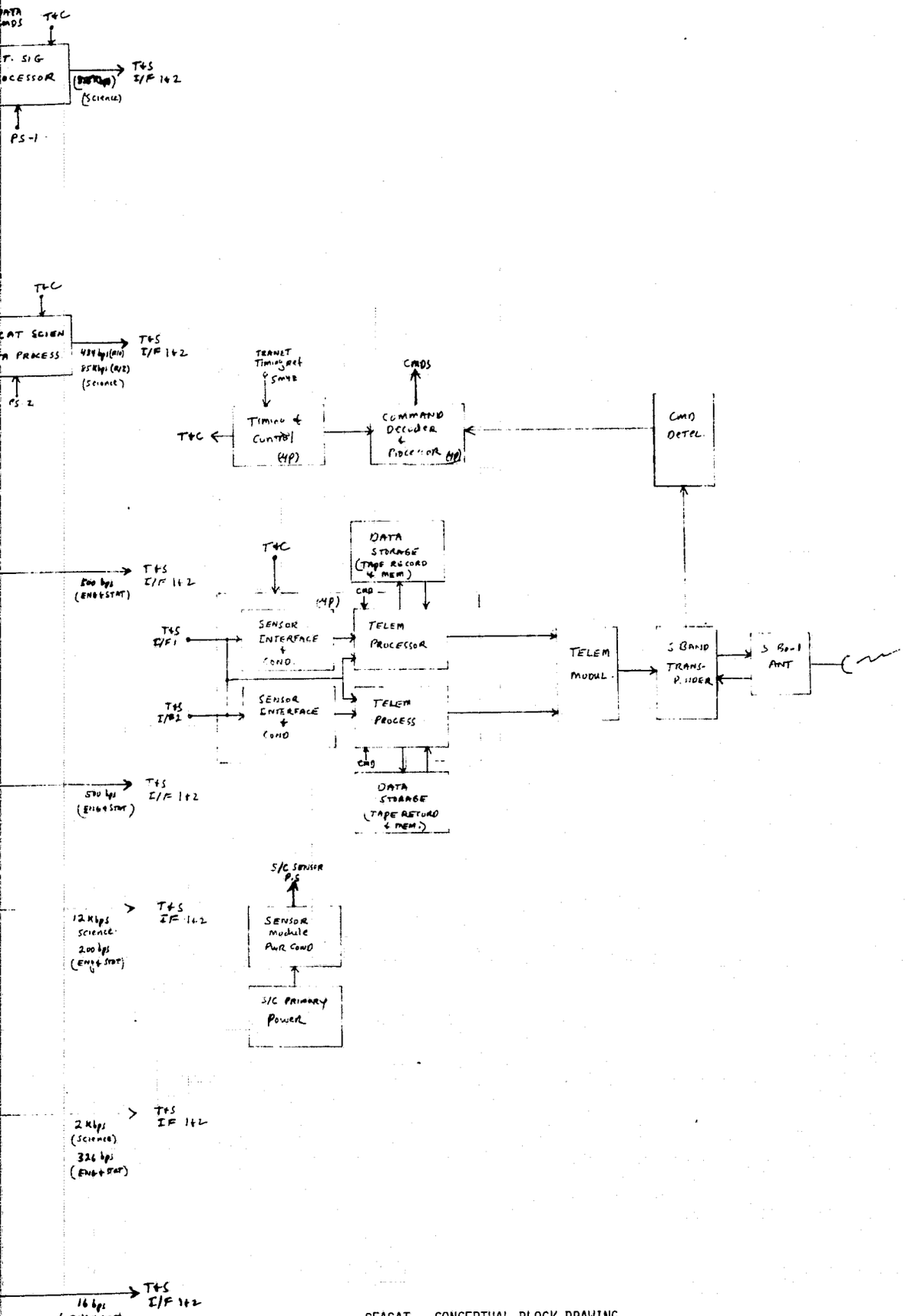
OF POOR QUALITY

SEASAT



SEASAT - CONCEPTUAL BLOCK DRAWING

DRAWING # G1, 8/6/67

FOLDOUT FRAME