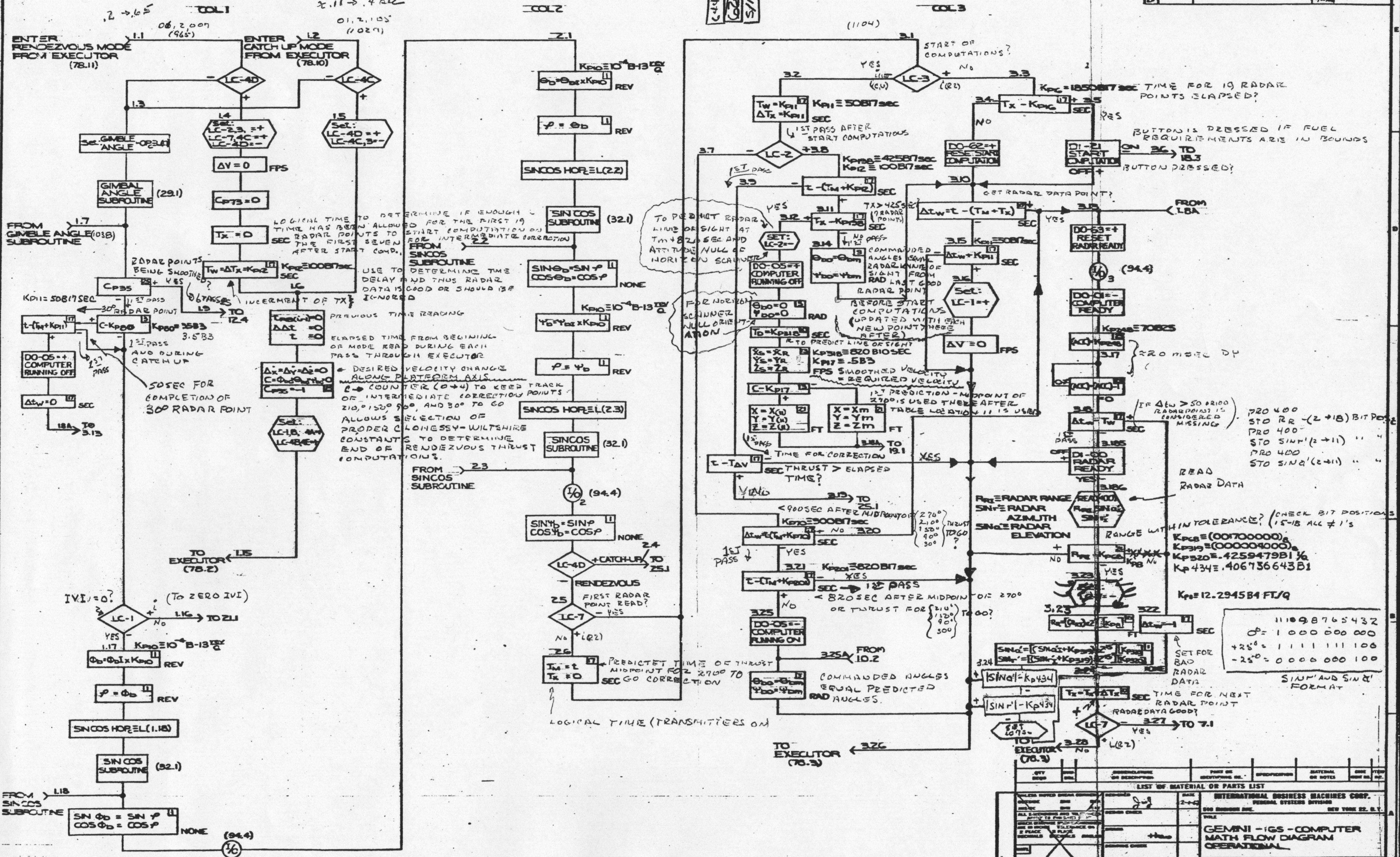


S.2524232221 201918 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 - BIT POSITION  
 S.1 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 - SCANNING POSITION

REVISIONS				
NO.	DESCRIPTION	DATE	BY	APPROVAL
A	RELEASE	3-9-64	SLG	
B		3-6-64	SLG	

GEMINI RENDEZVOUS DETAIL



PRO 400 STO RR (2+15) BIT POS  
 PRO 400 STO SIN<sup>2</sup>(2+11) " "  
 PRO 400 STO SIN<sup>2</sup>(2+11) " "  
 PRO 400 STO SIN<sup>2</sup>(2+11) " "

11098765432  
 0 = 1000000000  
 +25° = 1111111100  
 -25° = 0000000100  
 SIN<sup>2</sup> AND SIN<sup>2</sup> FORMAT

QTY	UNIT	DESCRIPTION	PART OR IDENTIFYING NO.	QUANTITY	DATE	BY

LIST OF MATERIAL OR PARTS LIST

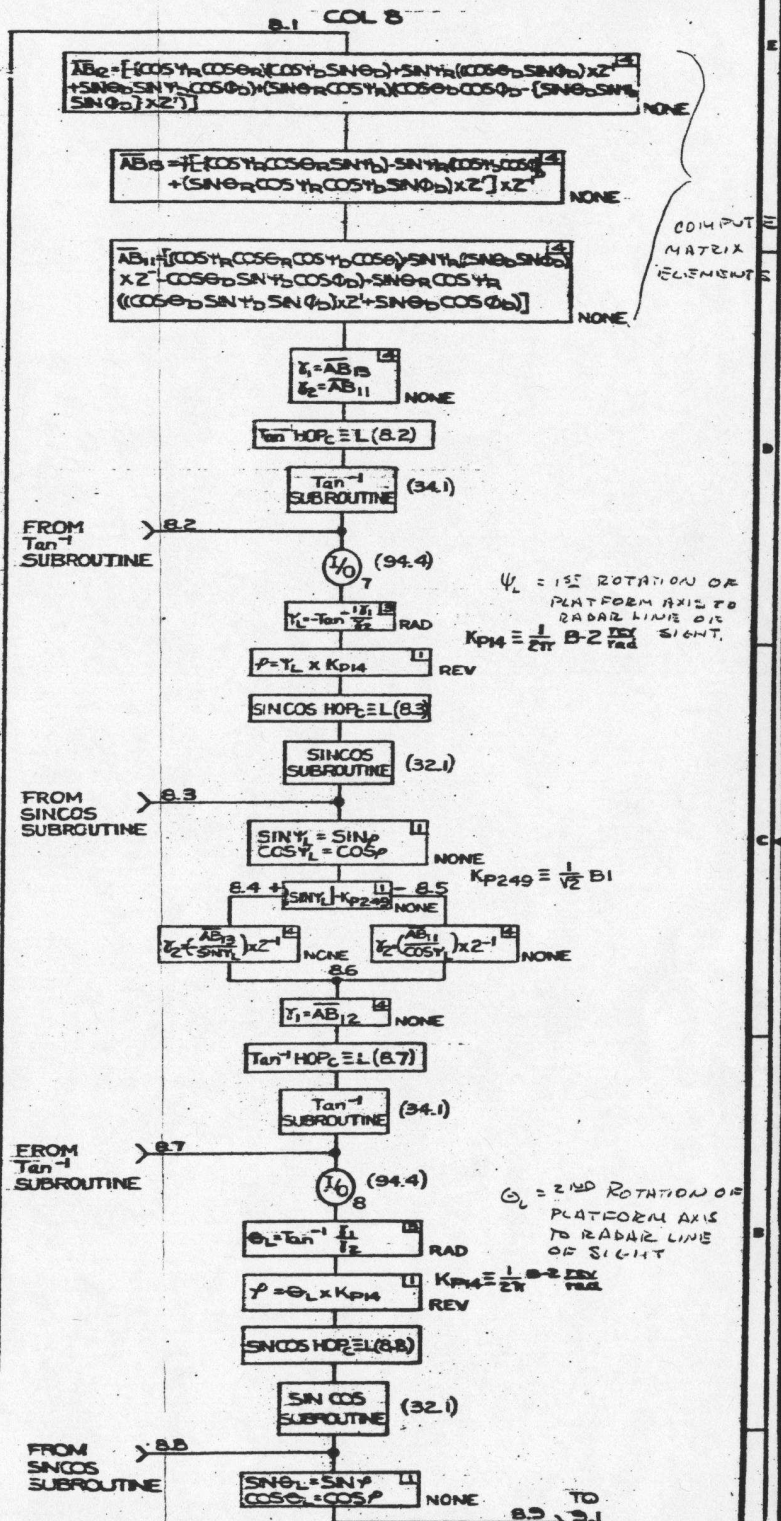
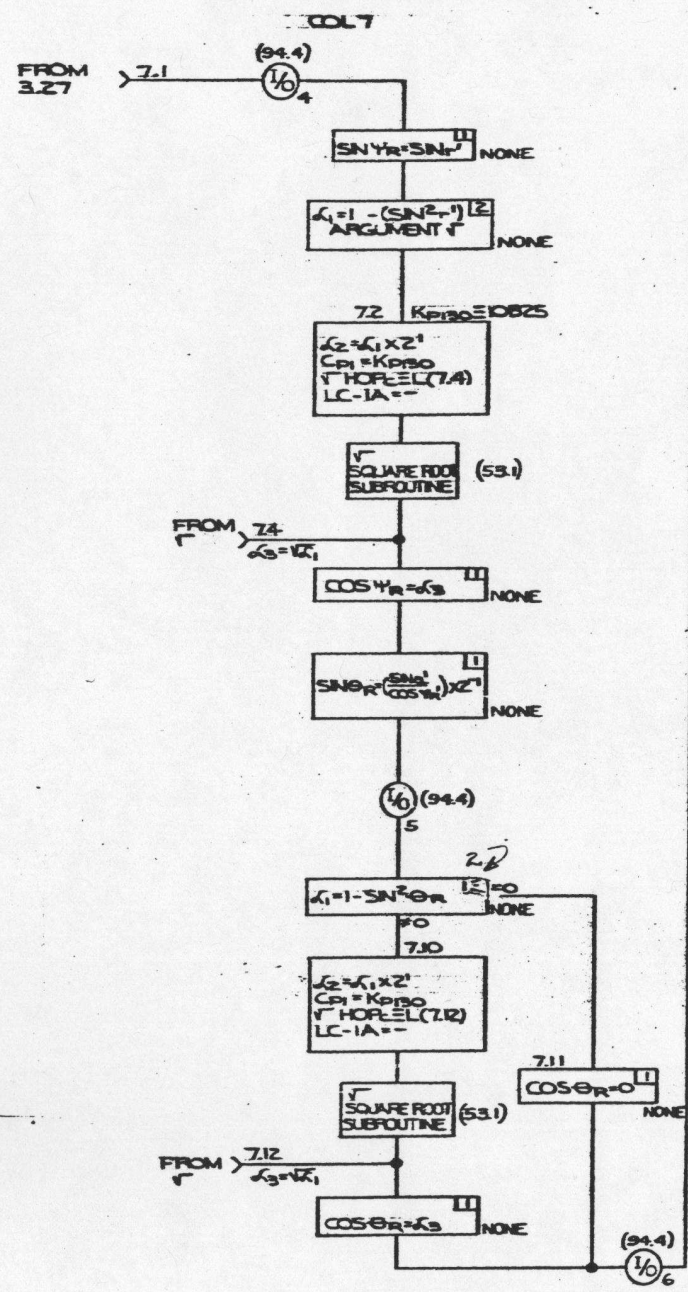
REV	DATE	DESCRIPTION
1		INTERNATIONAL BUSINESS MACHINES CORP. PERSONAL SYSTEMS DIVISION
2		GEMINI - IGS - COMPUTER MATH FLOW DIAGRAM OPERATIONAL

64454051R  
 03640 F 625123

6444340  
G2-542-3  
S/NZ

REVISIONS				
REV. NO.	DESCRIPTION	DATE	BY	APPROVAL
A	RELEASE			
B				

GEMINI RENDEZVOUS DETAIL



QTY REQD	SYMBOL	DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	INTERNAL OR NOTES	DATE	BY

LIST OF MATERIAL OR PARTS LIST

INTERNATIONAL BUSINESS MACHINES CORP.  
 GENERAL SYSTEMS DIVISION  
 590 MADISON AVE. NEW YORK 22, N.Y.

TITLE: GEMINI - K5 - COMPUTER MATH FLOW DIAGRAM OPERATIONAL

CONTRACT NO. 30-1000000-1-1000

DATE: 3-7-63

BY: [Signature]

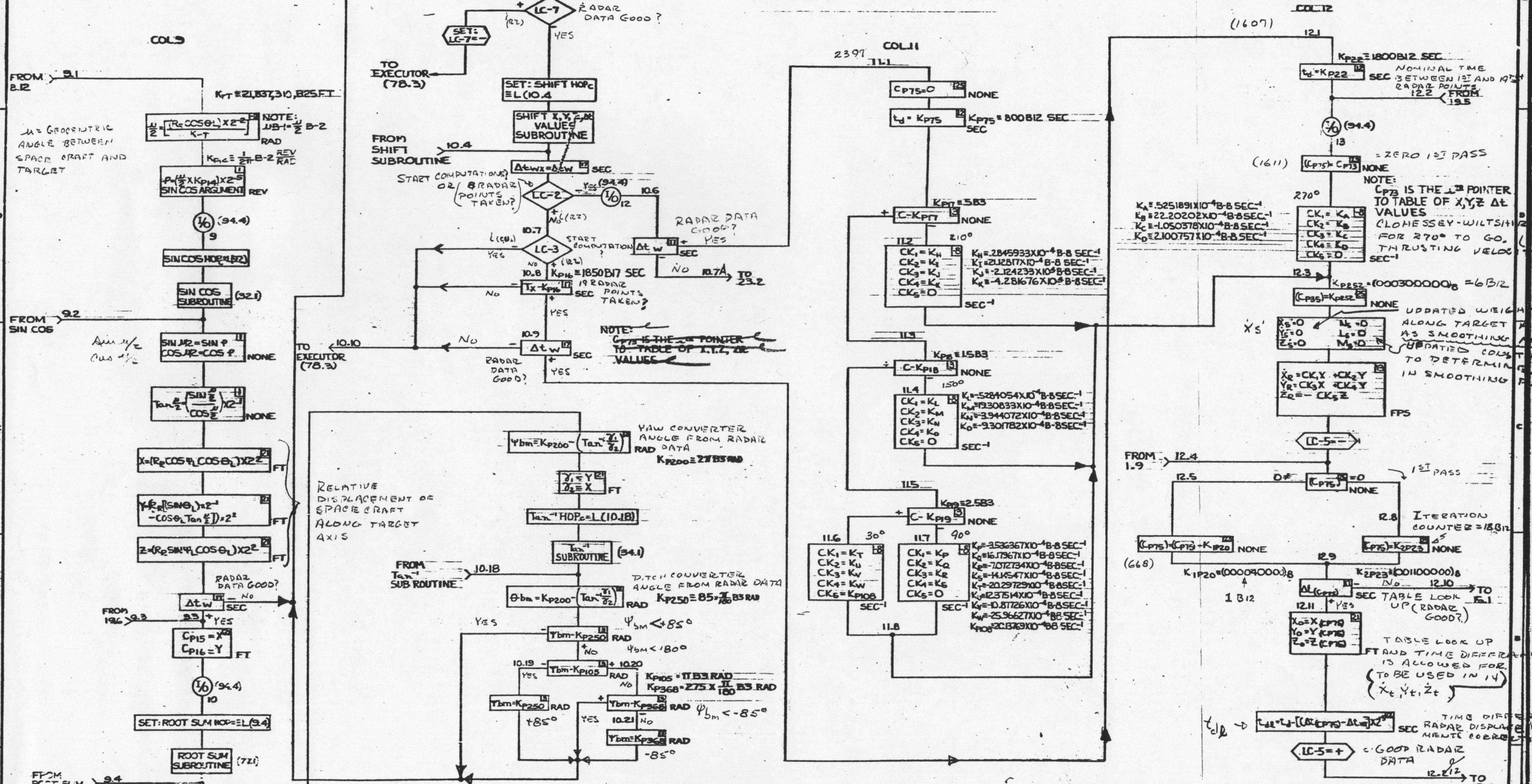
6444340S/NZ  
 G2-542-3

SCALE: NONE

SHEET 2

# GEMINI RENDEZVOUS DETAIL

REVISIONS				
REV	DESCRIPTION	DATE	CHK	APPROVAL
A	RELEASE	3-1-63		
B		4-1-63		

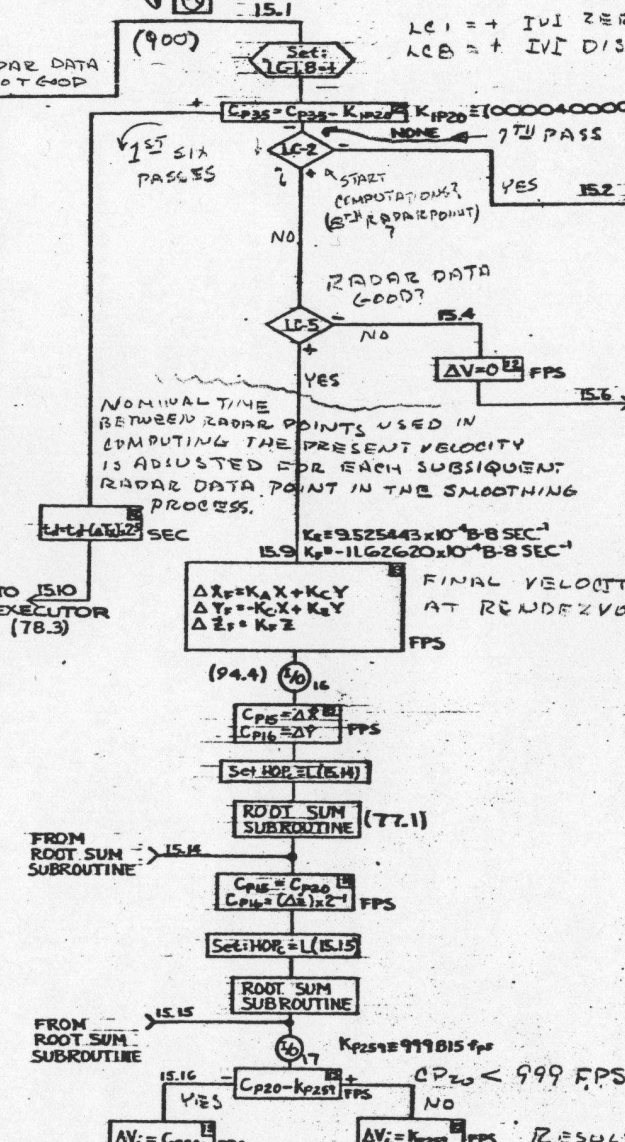
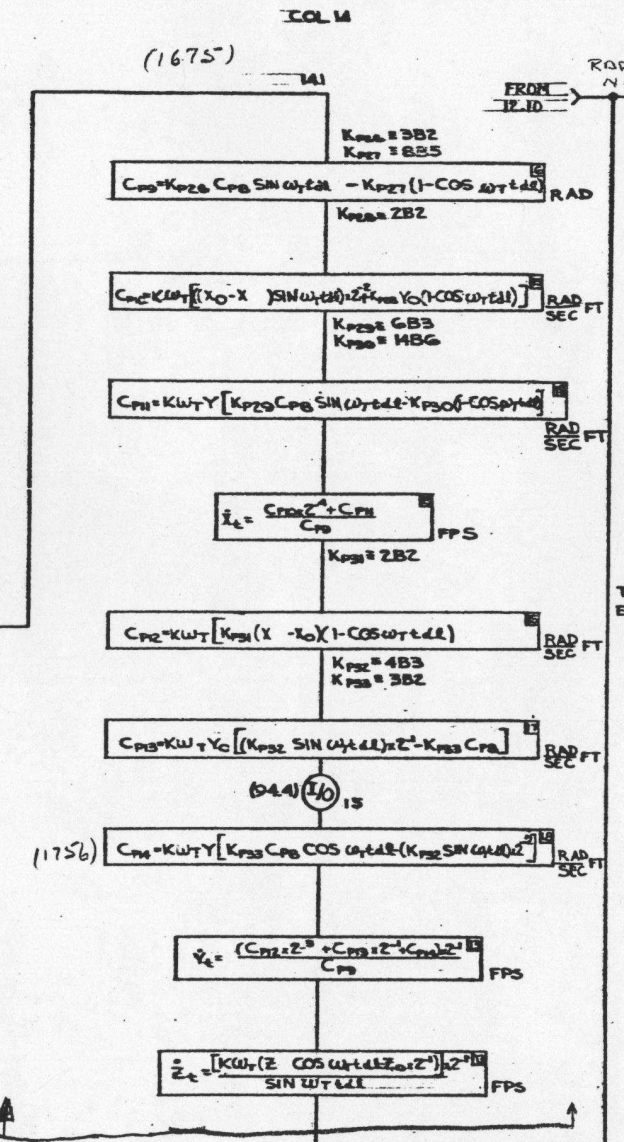
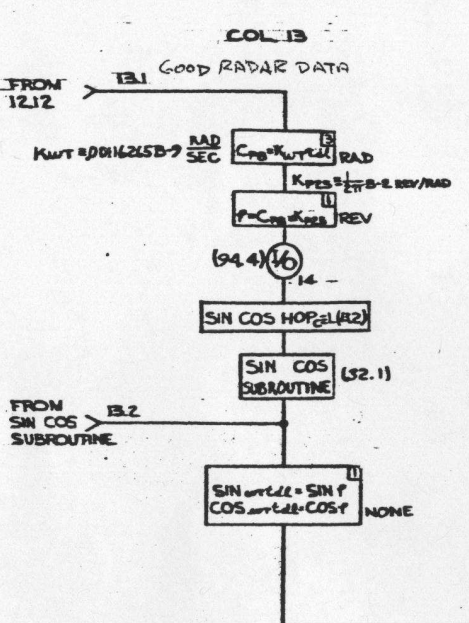


QTY REQD	SYM BOL	ABBREVIATION OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	INTERNAL CODES	DATE	ISS BY
LIST OF MATERIAL OR PARTS LIST							
UNLESS NOTED BREAK CORNER		DESIGNED	JWJ	DATE	12-10	INTERNATIONAL BUSINESS MACHINES CORP.	
ALL DIMENSIONS AND TOLERANCES APPLY TO FINISHED PART		DESIGN CHECK	JWJ			FEDERAL SYSTEMS DIVISION	
SMALL DIMENSIONS 1/16" - 3/8" ARE IN INCHES 1/16" INCHES OR SMALLER ARE IN MILLIMETERS		DRAWN	MUTUAL	7-6-63		GEMINI - IGS - COMPUTER - MATH	
2 PLACE DECIMALS RECIPROCAL ANGLES		CHECKING ENGINEER				FLOW DIAGRAM OPERATIONAL	
CASE DEPTH		APPROVAL				64445405N2	
						62542-3	
							SHEET 3

6444540  
62542-3  
S/N Z

00110  
00004

REVISIONS					
NO.	DESCRIPTION	DATE	BY	APPROVAL	
A	RELEASE				
B					

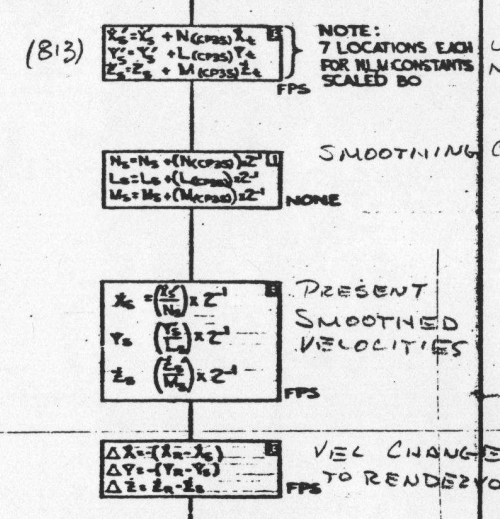


LCB = + IUI ZEROING  
LCB = + IUI DISPLAY DRIVE

$CP_{35}$  INITIALIZED = 777 777 776  
CHANGED IN (2.3) = 000 300 000 = 6812

BEGIN FUEL REQUIREMENTS COMPUTATION

VELOCITY OF SPACECRAFT BASED UPON RADAR POINT BEING USED



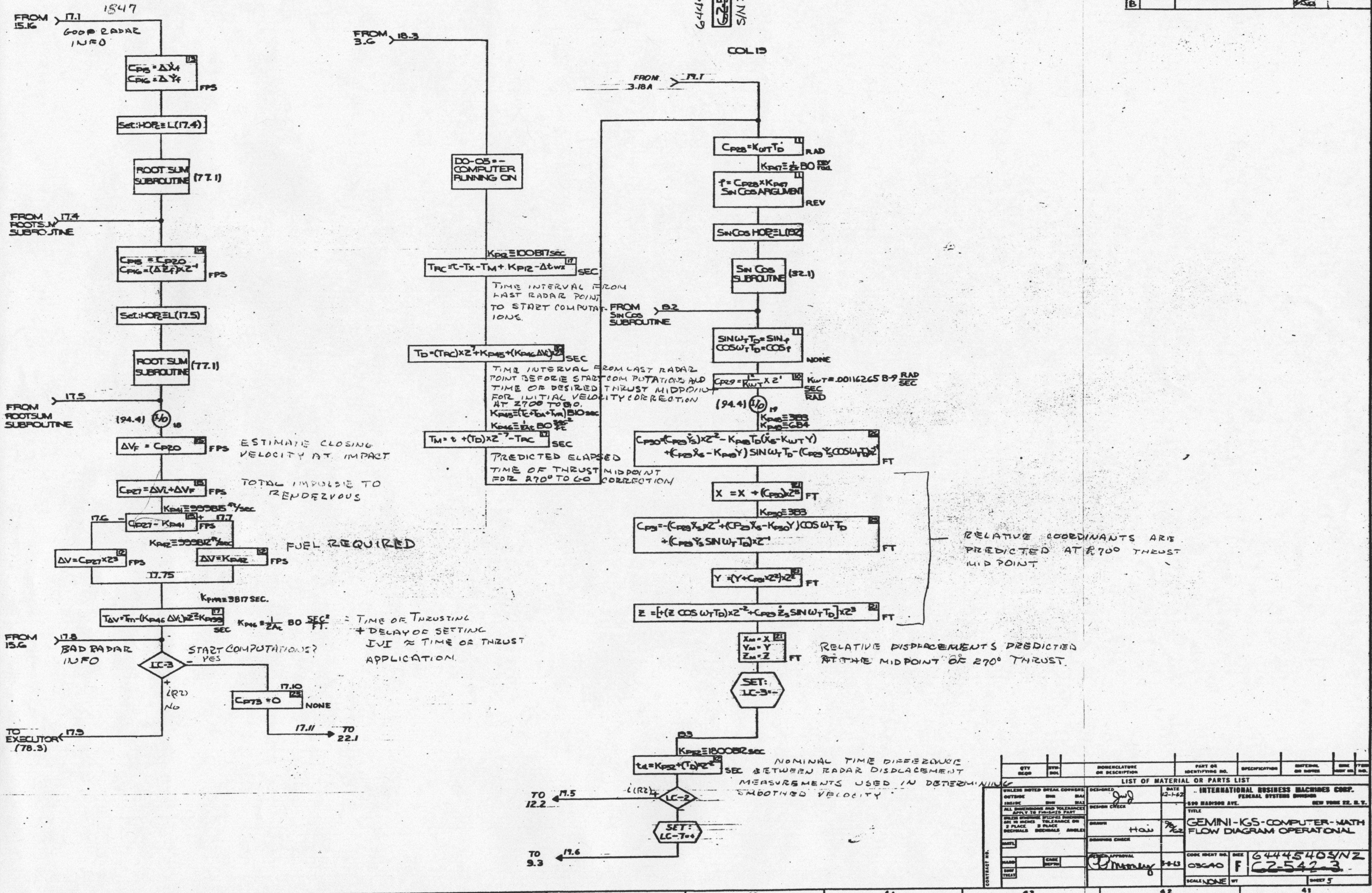
QTY	SYMBOL	DESCRIPTION	PART IDENTIFYING NO.	SPECIFICATION	DRAWING OR NOTES	DATE	BY	CHKD
LIST OF MATERIAL OR PARTS LIST								
UNLESS NOTED BY THE CHECKER	DESIGNED BY	JWJ	INTERNATIONAL BUSINESS MACHINES CORP.					
ALL DIMENSIONS AND TOLERANCES ARE TO BE PROVIDED BY THE MANUFACTURER	DRAWN BY	MUTUAL	FEDERAL SYSTEMS DIVISION					
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES	DATE	9562	NEW YORK 22, N.Y.					
DRAWING CHECKED	TITLE	GEMINI-16S-COMPUTER MATH FLOW DIAGRAM OPERATIONAL						
DRAWING APPROVED	CODE IDENT NO.	3005	64445405/NZ					
SCALE NONE	BY	F 62542-3						

GEMINI RENDEZVOUS DETAIL  
COL 17

COL 18

6444540  
62542-3  
S/N Z

REVISIONS			
REV	DESCRIPTION	DATE	BY
A	RELEASE	3-1-62	
B			



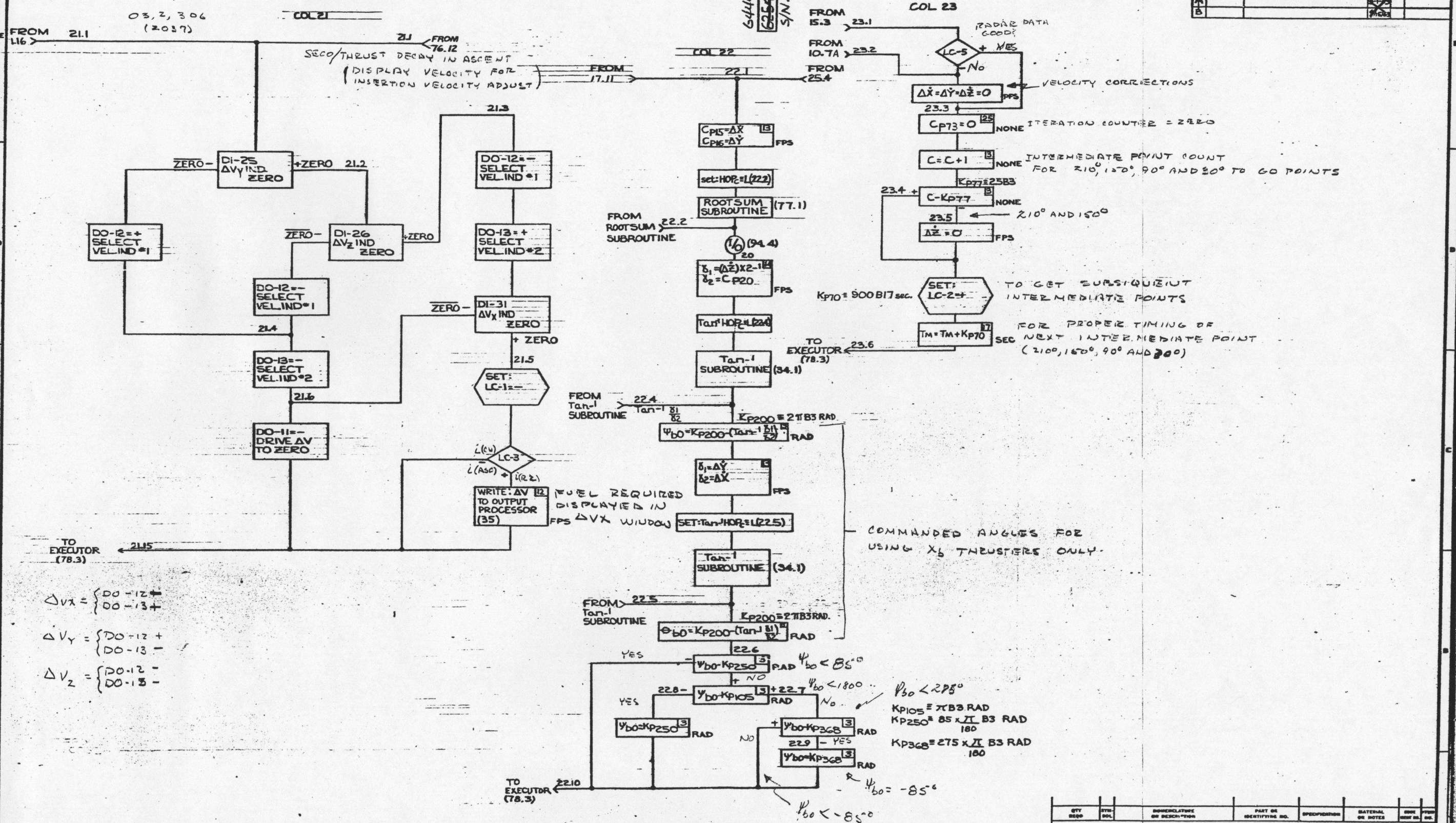
RELATIVE COORDINANTS ARE PREDICTED AT 2700 THRUST MID POINT

RELATIVE DISPLACEMENTS PREDICTED AT THE MIDPOINT OF 270° THRUST.

QTY	SYMBOL	DESCRIPTION OR IDENTIFYING NO.	PART OR IDENTIFYING NO.	SPECIFICATION	ISSUED ON MAPS	DATE	BY
LIST OF MATERIAL OR PARTS LIST							
INTERNATIONAL BUSINESS MACHINES CORP. FEDERAL SYSTEMS DIVISION							
500 MADISON AVE. NEW YORK 22, N.Y.							
GEMINI-KGS-COMPUTER-MATH FLOW DIAGRAM OPERATIONAL							
CODE IDENT NO. 6444540/S/N Z							
OSCAD OFFICE 62542-3							
SCALE NONE							

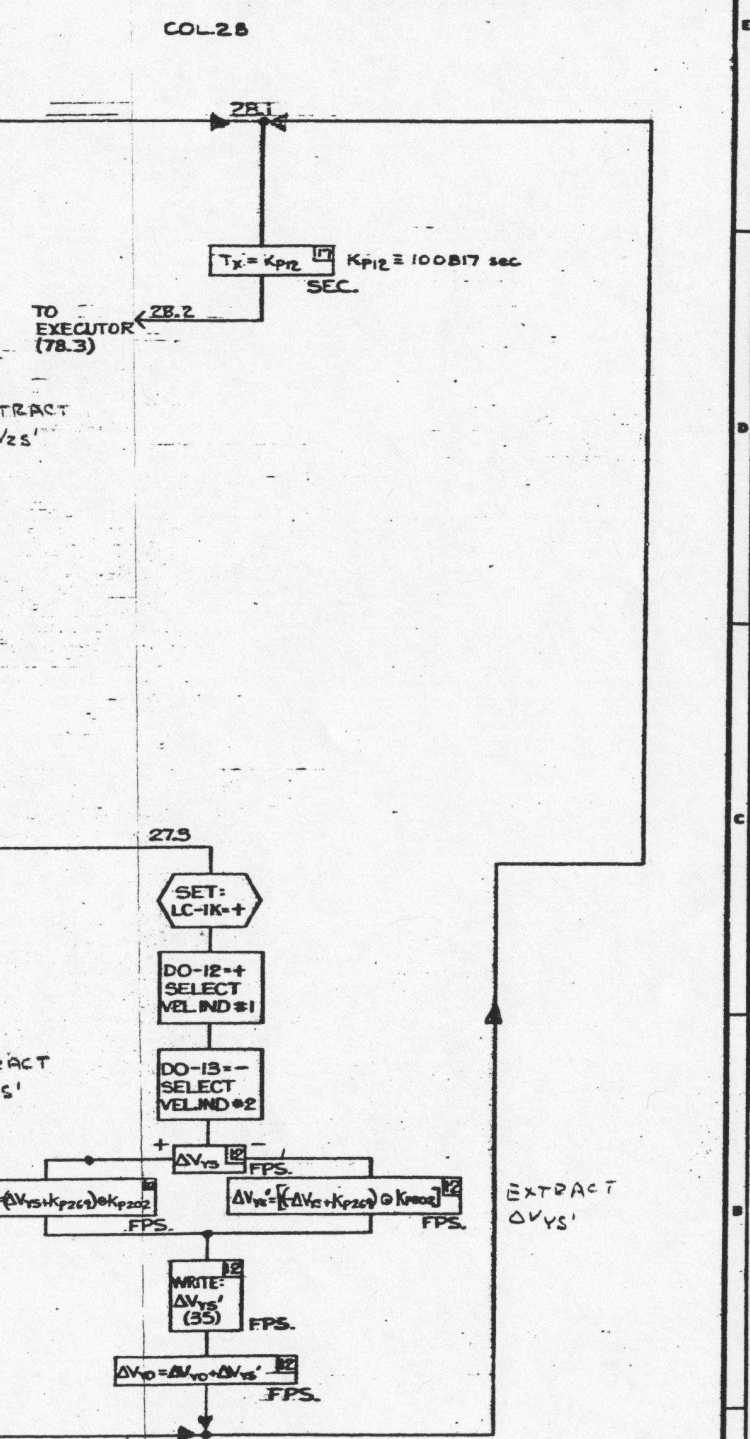
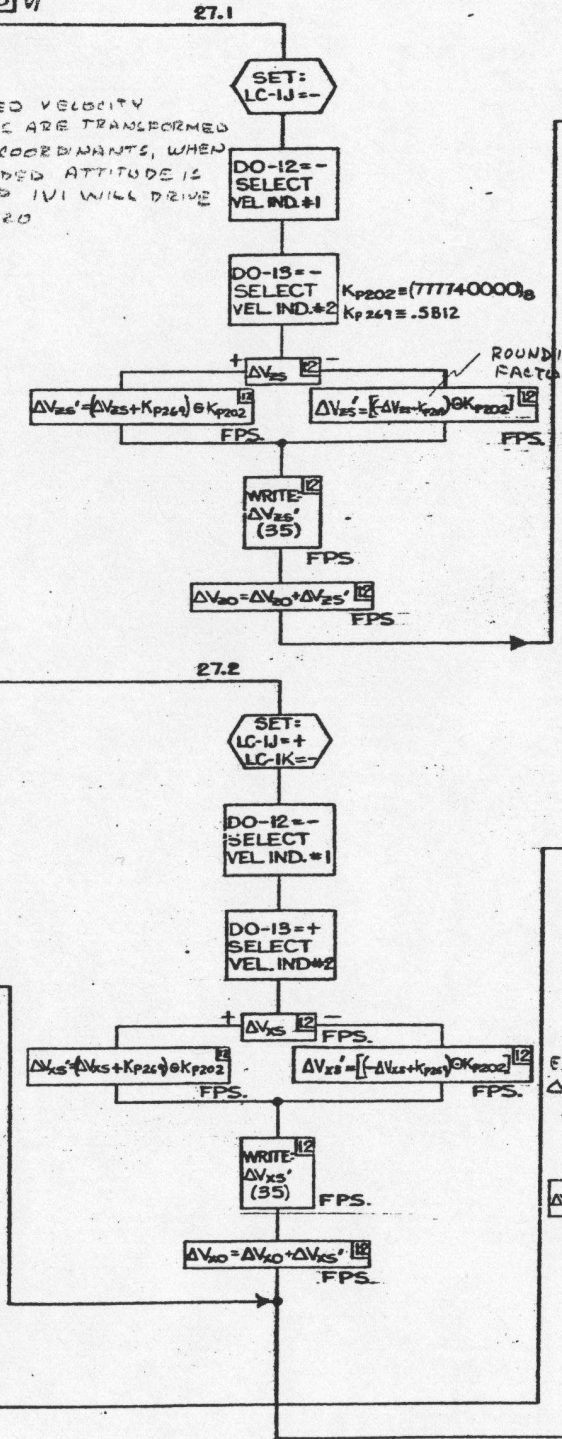
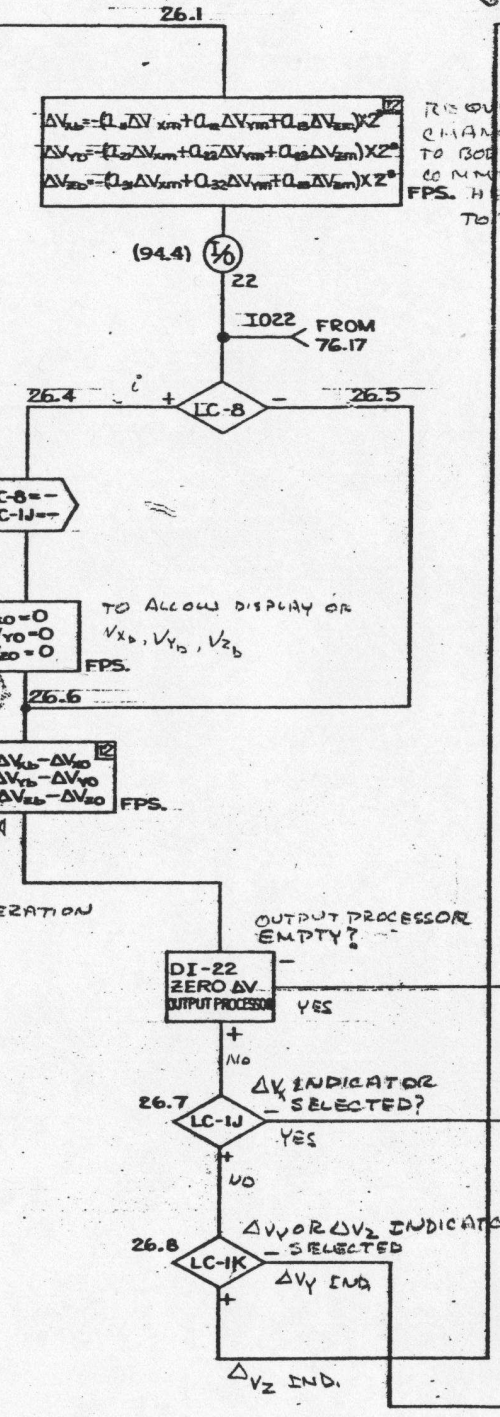
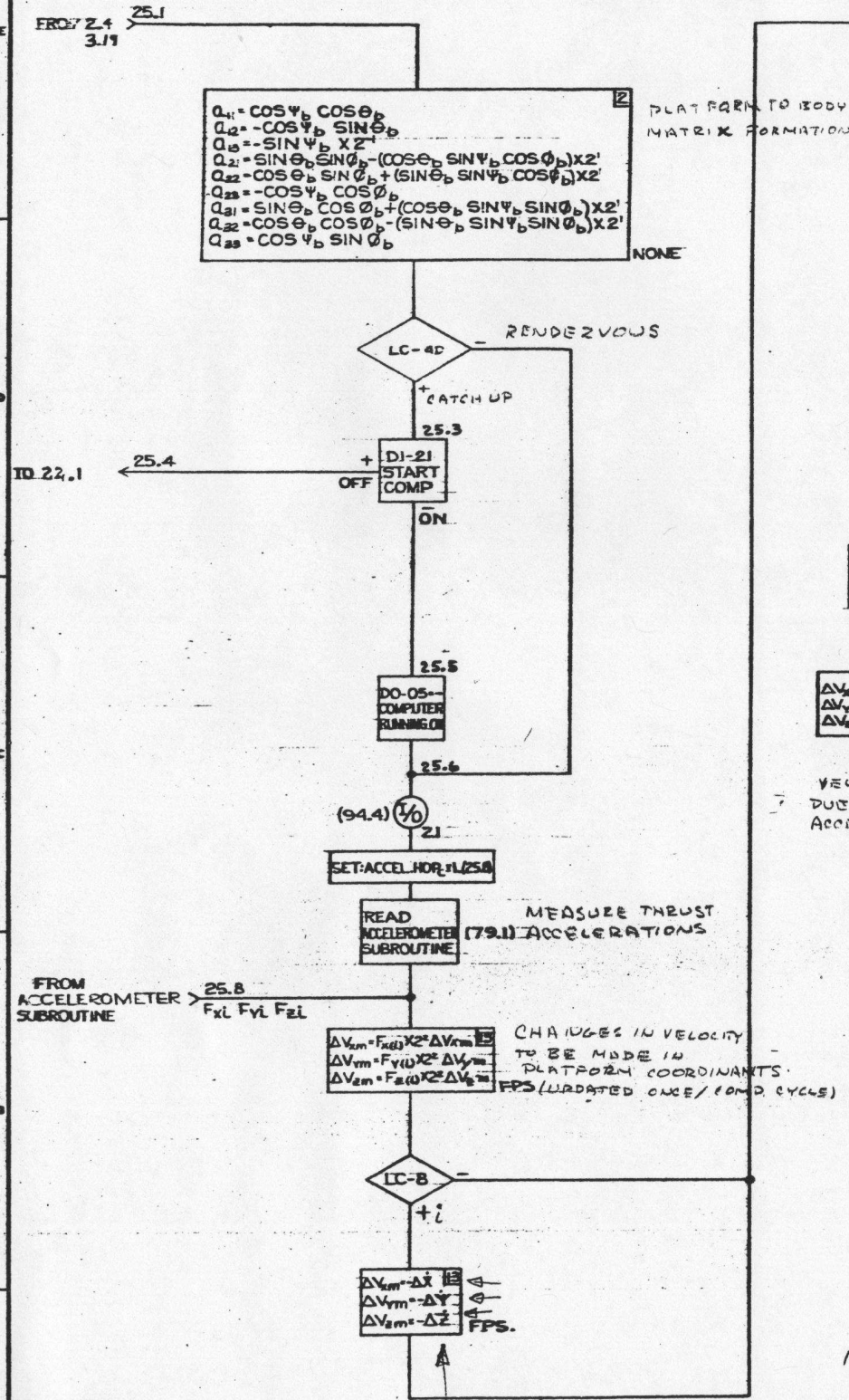
GEMINI RENDEZVOUS DETAIL

REVISIONS				
REV	DATE	DESCRIPTION	BY	APPROVAL
A		RELEASE		
B				



QTY REQD	SYM. DOL	NUMERICAL OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	DATE	BY
LIST OF MATERIAL OR PARTS LIST							
		DESIGNED	JWJ				
		DESIGN CHECK	JWJ				
		DRAWN	MUTUAL				
		DRAWING CHECK					
		SCALE APPROVAL	JWJ				
		DATE	3-1-63				
INTERNATIONAL BUSINESS MACHINES CORP. FEDERAL SYSTEMS DIVISION				590 MADISON AVE. NEW YORK 22, N.Y.			
TITLE				GEMINI-165 COMPUTER MATH FLOW DIAGRAM (DETAIL)			
CODE IDENT. NO.				64445-40 S/N 2			
SCALE				F 62542-3			
SHEET NO.				SHEET 6			

REVISIONS				
REV	DESCRIPTION	DATE	CHK	APPROVAL
A	RELEASE	3/1/63		
B		4/1/63		



NOTE: AFTER IVI IS SET AND THRUSTING TAKES PLACE  $\Delta V_{xm} \Delta V_{xb}$   
 $\Delta V_{ym} \Delta V_{yb}$   
 $\Delta V_{zm} \Delta V_{zb}$  AND  $\Delta V$  ALL EQUAL ZERO. ANY THRUSTING OR CHANGES FROM COMPUTED ATTITUDE WILL CAUSE THE IVI TO VARY, BUT WHEN THE IVI VALUES ALL EQUAL ZERO THE PROPER VELOCITY CHANGE WILL HAVE BEEN APPLIED

QTY	REQD	DESIGNATION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	DATE	BY
		DESIGNED BY	JWJ	DATE			
		CHECKED BY	JWJ	DATE			
		DRAWN BY	MUTUAL	DATE			
		APPROVED BY	JJ McCall	DATE			

LIST OF MATERIAL OR PARTS LIST

ITEM NO.	DESCRIPTION	QUANTITY	UNIT
1	GEMINI-16S - COMPUTER VATH FLOW DIAGRAM OPERATIONAL (DETAIL)	1	SET

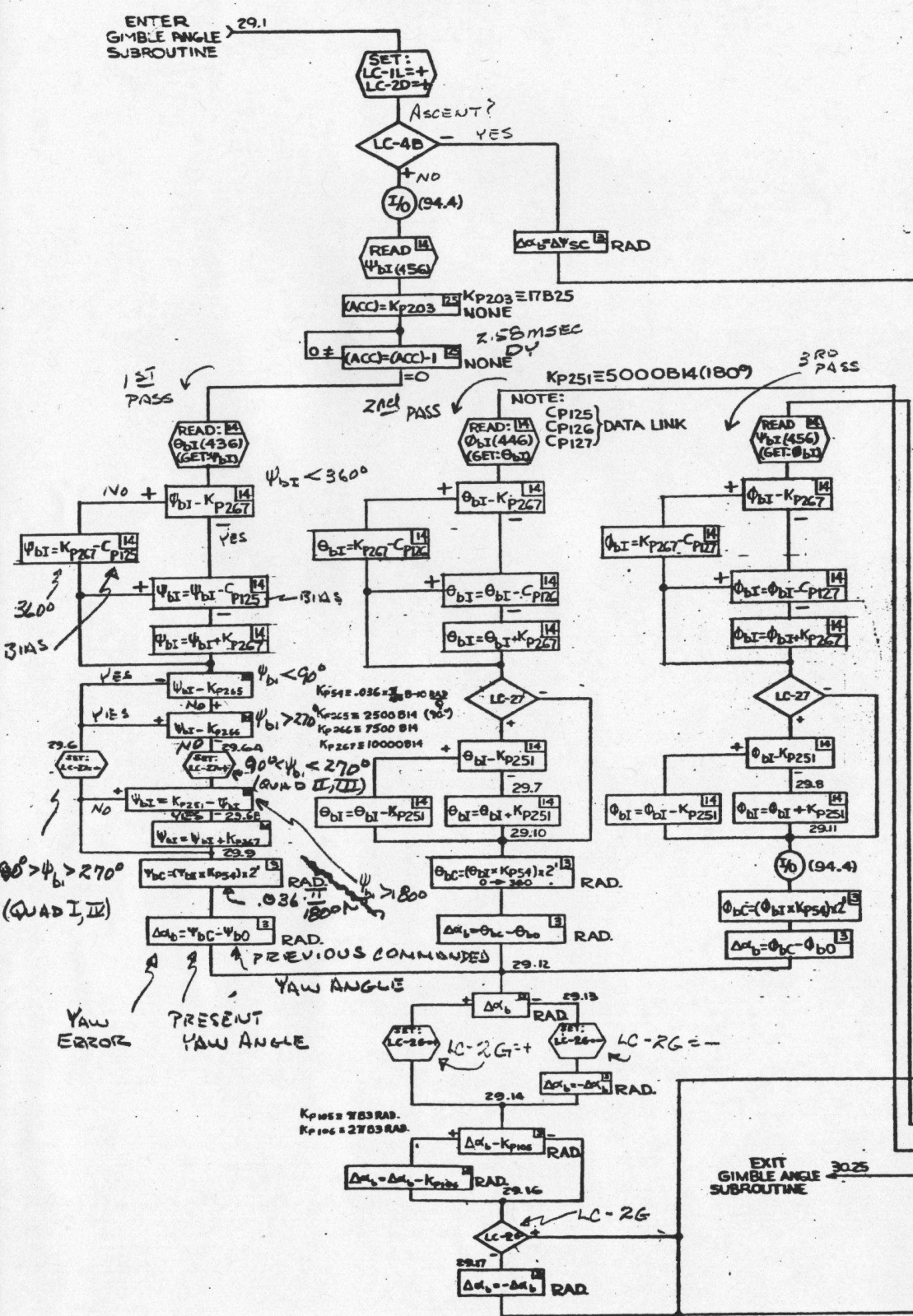
INTERNATIONAL BUSINESS MACHINES CORP. FEDERAL SYSTEMS DIVISION 500 MADISON AVE. NEW YORK 22, N.Y.

CODE SHEET NO. 6444540 S/N2  
PAGE 7

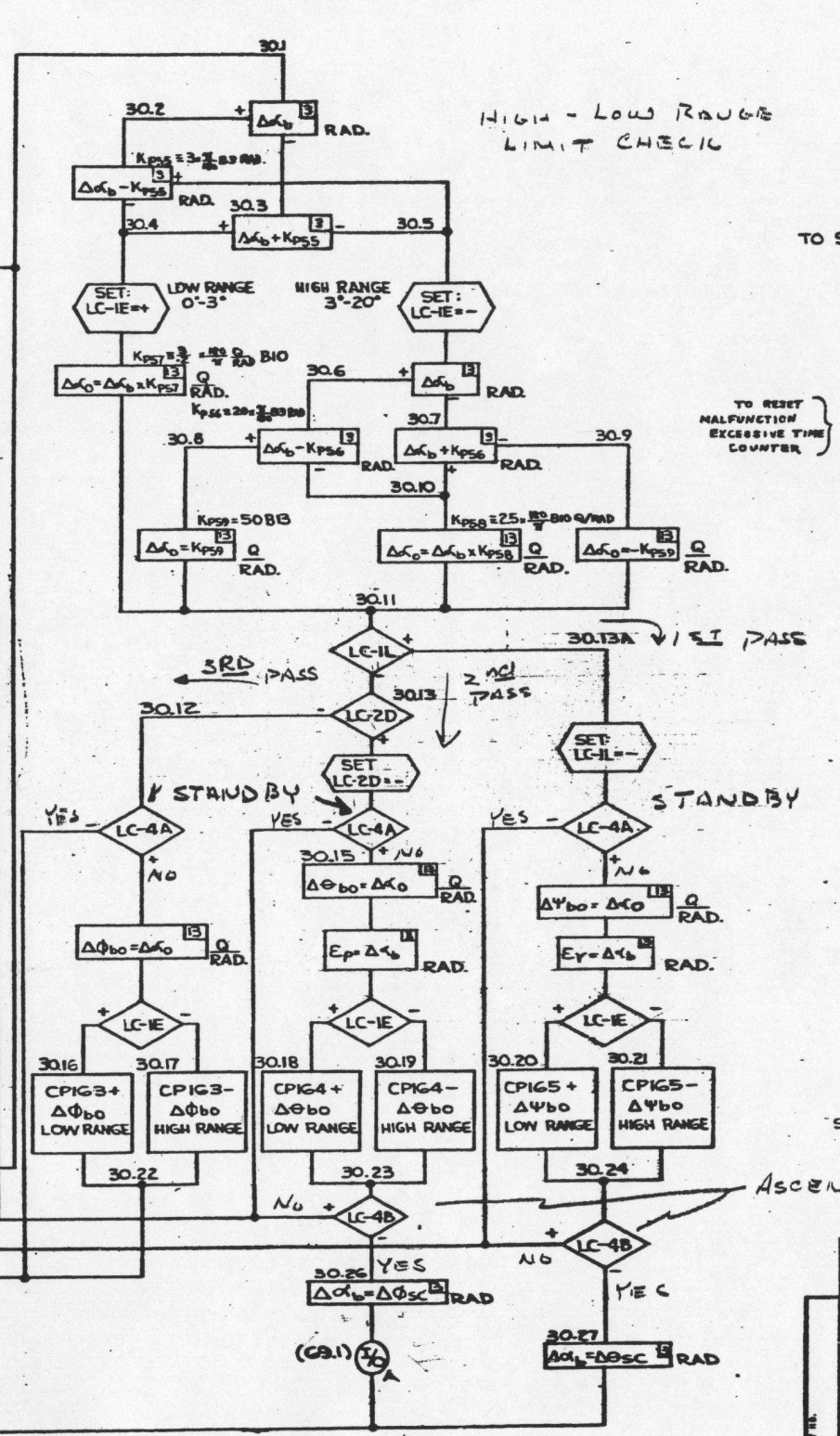
REVISIONS					
REV	CHANGE NOTICE	DESCRIPTION	DATE	CHK	APPROVAL
		RELEASE			

6444540 S/N 2

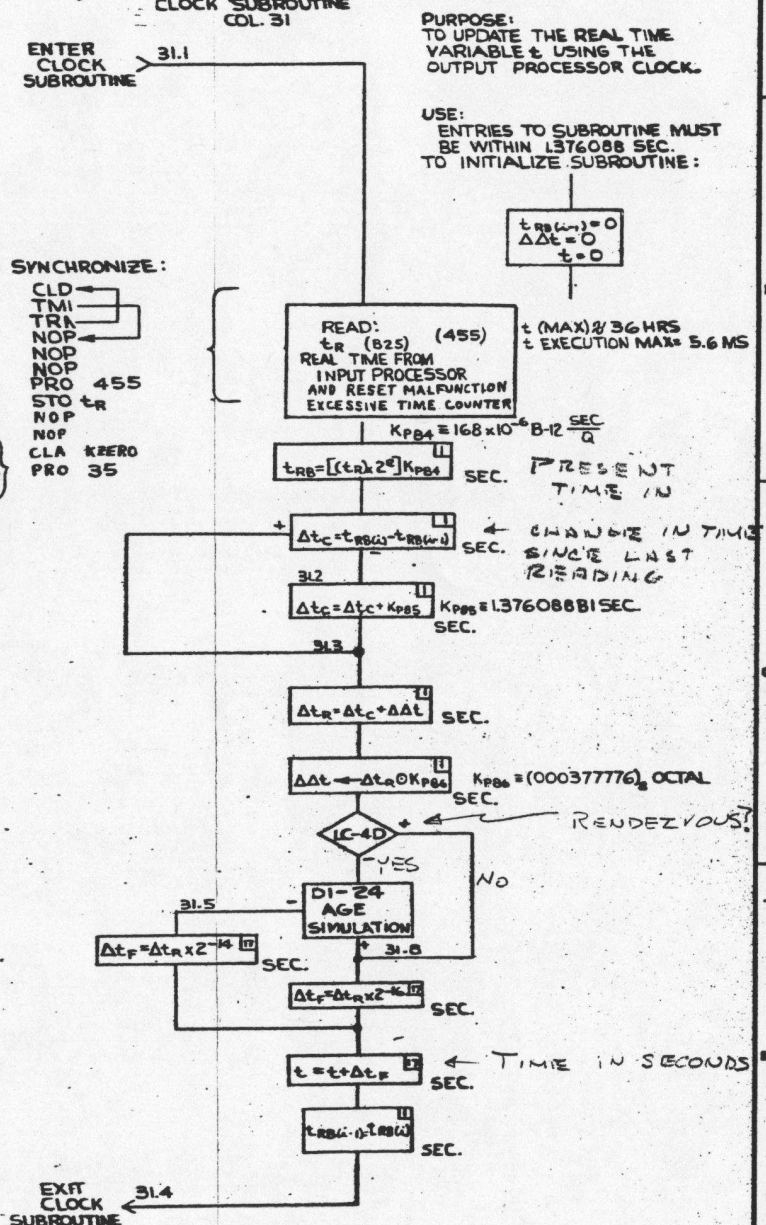
**GIMBLE ANGLE SUBROUTINE  
COL 29**



**GIMBLE ANGLE SUBROUTINE  
COL 30**



**CLOCK SUBROUTINE  
COL 31**



TO SYNCHRONIZE:

- CLD
- TMI
- TRN
- NOP
- PRO 455
- STO t<sub>R</sub>
- NOP
- CLA KRERO
- PRO 35

TO RESET MALFUNCTION EXCESSIVE TIME COUNTER

EXIT CLOCK SUBROUTINE

PURPOSE: TO UPDATE THE REAL TIME VARIABLE & USING THE OUTPUT PROCESSOR CLOCK.

USE: ENTRIES TO SUBROUTINE MUST BE WITHIN 1376088 SEC. TO INITIALIZE SUBROUTINE:

$$t_{RE(0)} = 0$$

$$\Delta t_c = 0$$

$$t = 0$$

READ: t<sub>R</sub> (B25) (455)  
REAL TIME FROM INPUT PROCESSOR AND RESET MALFUNCTION EXCESSIVE TIME COUNTER  
K<sub>p64</sub> = 168 × 10<sup>-6</sup> SEC  
t<sub>RE</sub> = [t<sub>TR</sub> × 2<sup>n</sup>] × K<sub>p64</sub>  
SEC. PRESENT TIME IN

+ Δt<sub>c</sub> = t<sub>RE(0)} - t<sub>RE(i)}</sub>  
SEC. CHANGE IN TIME SINCE LAST READING  
Δt<sub>c</sub> = Δt<sub>c</sub> + K<sub>p65</sub>  
K<sub>p65</sub> = 1.37608881 SEC.</sub>

Δt<sub>R</sub> = Δt<sub>c</sub> + ΔA1  
SEC.  
ΔA1 = Δt<sub>R</sub> × K<sub>p66</sub>  
K<sub>p66</sub> = (000377776)<sub>2</sub> OCTAL SEC.

RENDEZVOUS!  
DI-24 AGE SIMULATION  
Δt<sub>F</sub> = Δt<sub>R</sub> × 2<sup>n</sup>  
SEC.

← TIME IN SECONDS  
t = t + Δt<sub>F</sub>  
SEC.  
t<sub>RE(i)} = t<sub>RE(0)} + t</sub>  
SEC.</sub>

QTY REQD	SYM BOL	NUMERICAL OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	UNIT	STEP NO.
LIST OF MATERIAL OR PARTS LIST							
DESIGNED	CHKD	DATE	INTERNATIONAL BUSINESS MACHINES CORP. FEDERAL SYSTEMS DIVISION 590 BANGOR AVE. NEW YORK 22, N.Y.				
DESIGNED	CHKD	DATE	TITLE				
DESIGNED	CHKD	DATE	GEMINI-IGS-COMPUTER MATH FLOW DIAGRAM OPERATIONAL (DETAIL)				
DRAWN		SCALE	APPROVAL	DATE	CODE IDENT NO.	SIZE	
DRAWN		SCALE	APPROVAL	DATE	F	6444540 S/N 2	
SCALE NONE					SHEET		



REVISIONS				
REV	DESCRIPTION	DATE	BY	APPROVAL
A	RELEASE			
B				

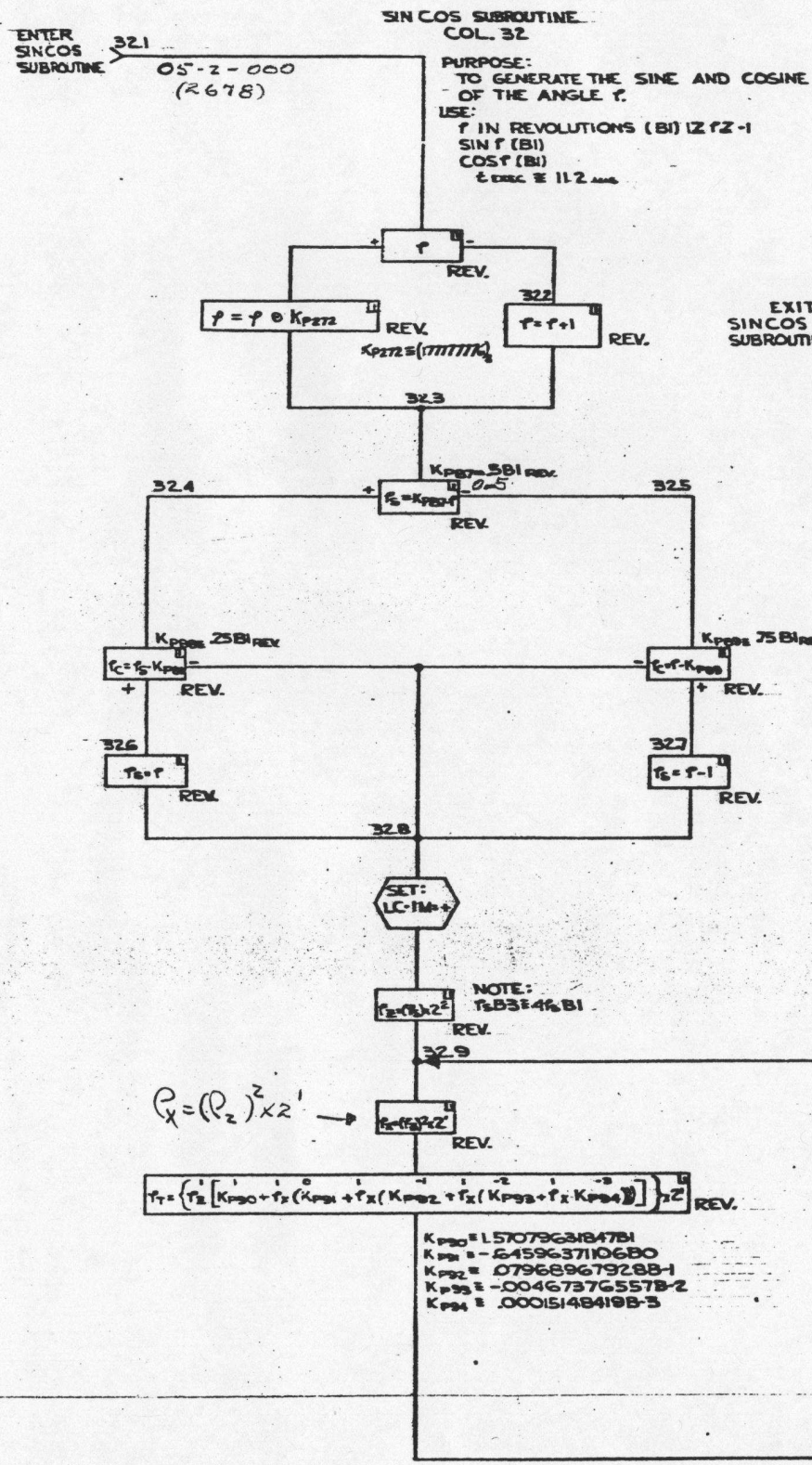
SIN COS SUBROUTINE  
COL. 33

6444542  
62542-3  
SIN COS

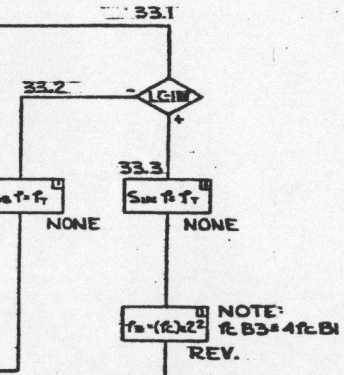
ENTER SIN COS SUBROUTINE  
05-2-000  
(R678)

SIN COS SUBROUTINE  
COL. 32

PURPOSE:  
TO GENERATE THE SINE AND COSINE  
OF THE ANGLE  $\tau$ .  
USE:  
 $\tau$  IN REVOLUTIONS (BI)  $\leq \tau \leq 1$   
SIN  $\tau$  (BI)  
COS  $\tau$  (BI)  
t EXEC  $\approx$  11.2 ms.



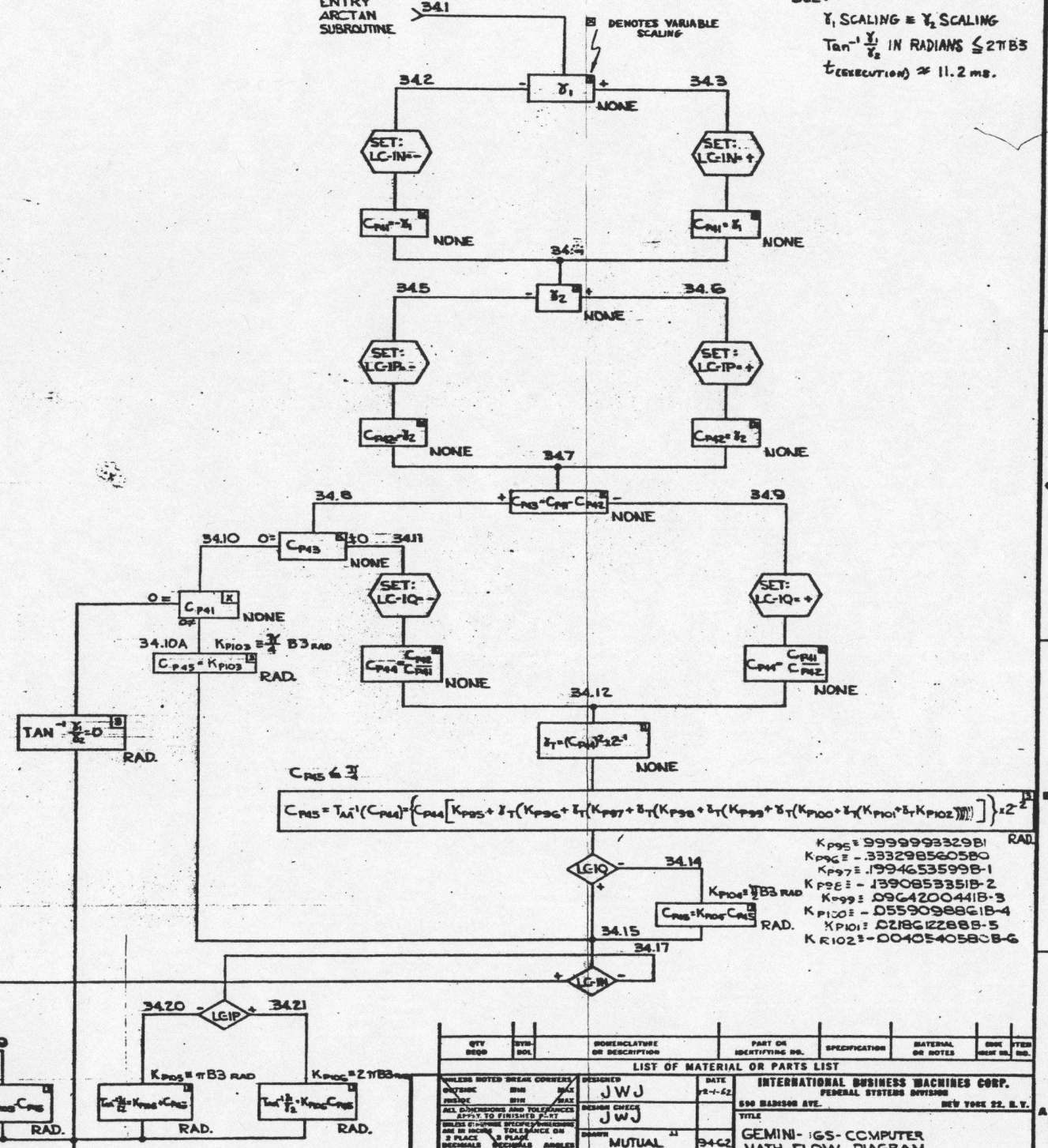
EXIT SIN COS SUBROUTINE  
33.4



ARCTAN SUBROUTINE  
COL. 34

PURPOSE:  
TO GENERATE THE ANGLE  $(\tan^{-1} \frac{Y}{X})$   
WHOSE TANGENT IS  $\frac{Y}{X}$ .  
USE:  
 $Y, SCALING \approx Y_2 SCALING$   
 $\tan^{-1} \frac{Y}{X}$  IN RADIAN  $\leq 2\pi B3$   
t EXECUTION  $\approx$  11.2 ms.

ENTRY ARCTAN SUBROUTINE



EXIT ARCTAN SUBROUTINE  
34.22

QTY REQD	REV. NO.	DESCRIPTION OR IDENTIFYING NO.	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	CHK. BY	DATE

DESIGNED	DATE	INTERNATIONAL BUSINESS MACHINES CORP.
JWJ	1-1-62	FEDERAL SYSTEMS DIVISION
DESIGNED BY	DATE	TITLE
JWJ	1-1-62	GEMINI-1GS-COMPUTER MATH FLOW DIAGRAM OPERATIONAL (DETAIL)
DESIGNED BY	DATE	CODE IDENT. NO.
MUTUAL	1-1-62	6444540512
DESIGNED BY	DATE	SCALE
MUTUAL	1-1-62	NONE

Kp95 = 9999993329B1 RAD.  
Kp96 = .3332985605B0  
Kp97 = .1994653599B-1  
Kp98 = .1390859351B-2  
Kp99 = .0964200441B-3  
Kp100 = .0559098861B-4  
Kp101 = .0218612288B-5  
Kp102 = .0040540580B-6

GEMINI RE-ENTRY DETAIL  
COL 35

06-2-000  
(8/42)

6444540  
62-542-3  
S/N 2

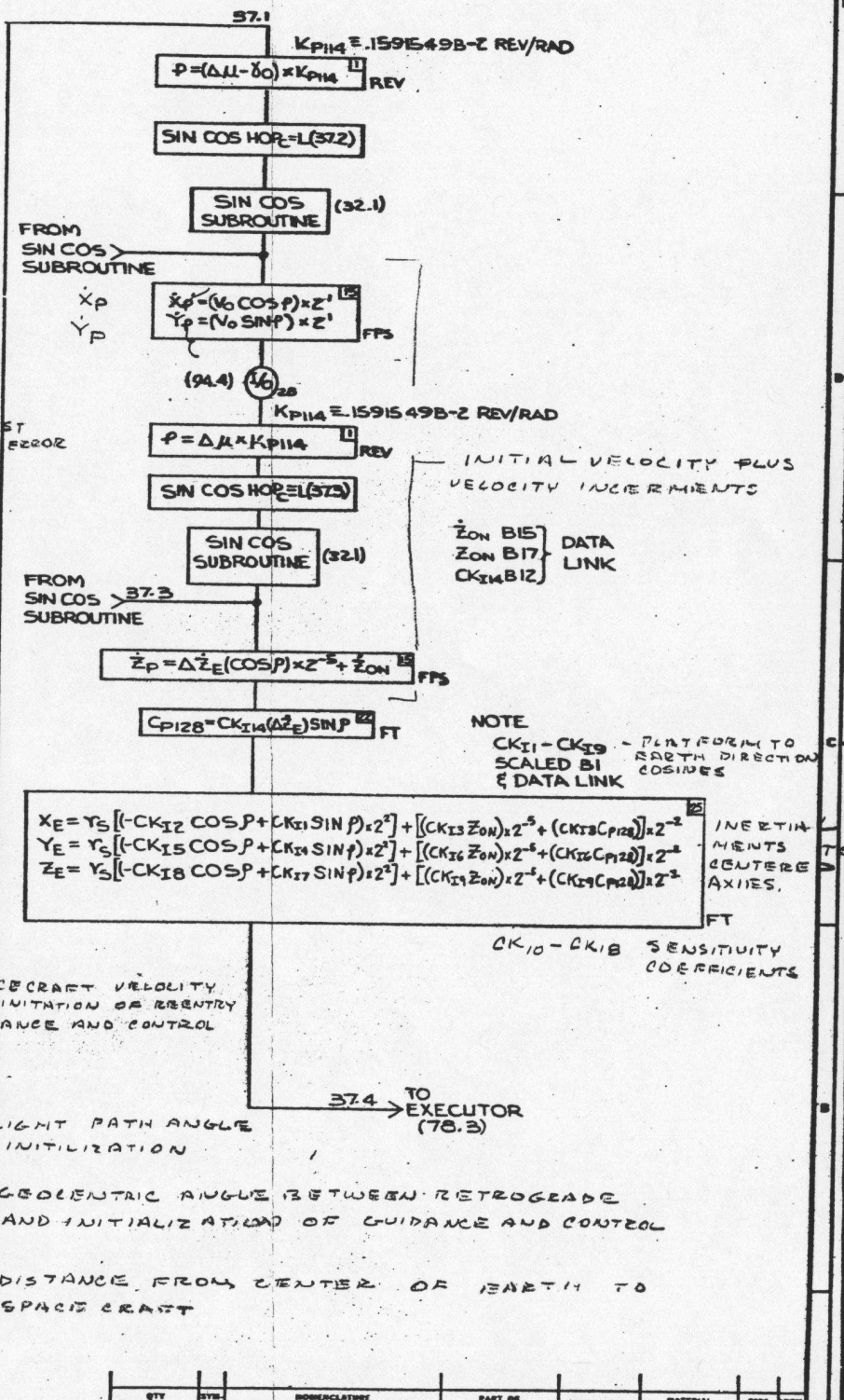
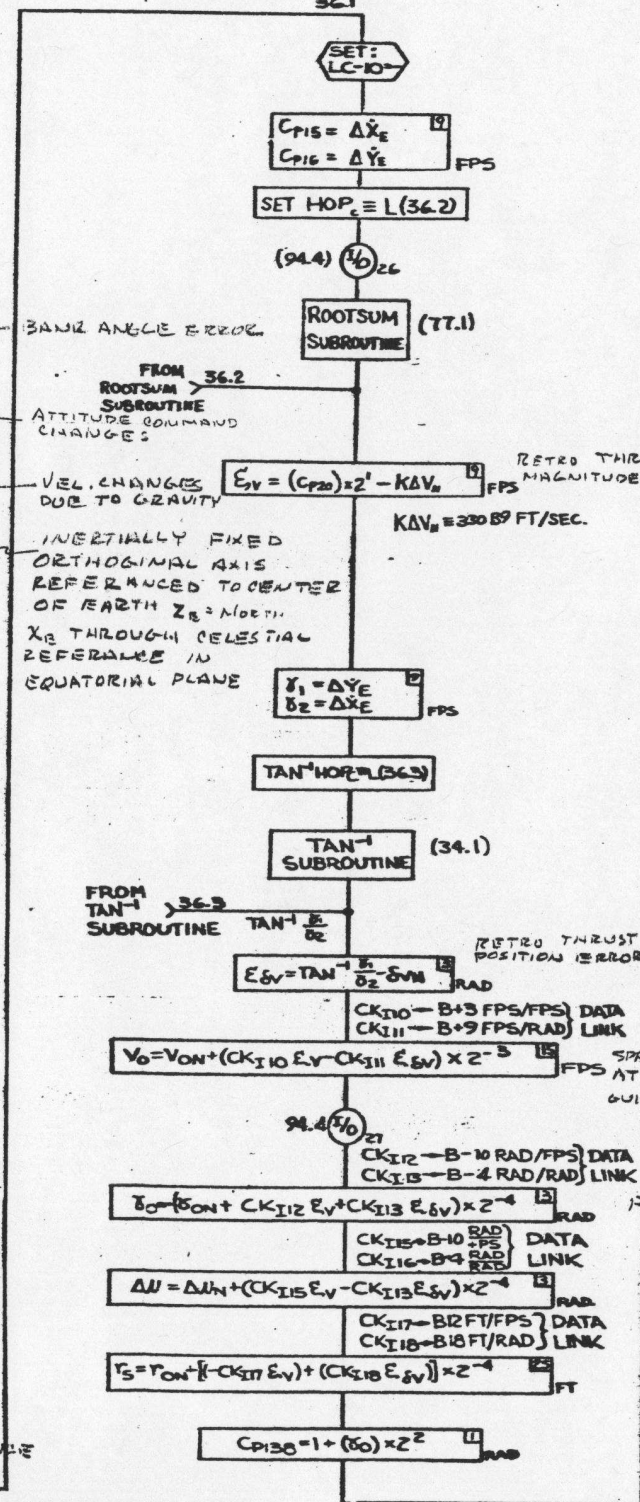
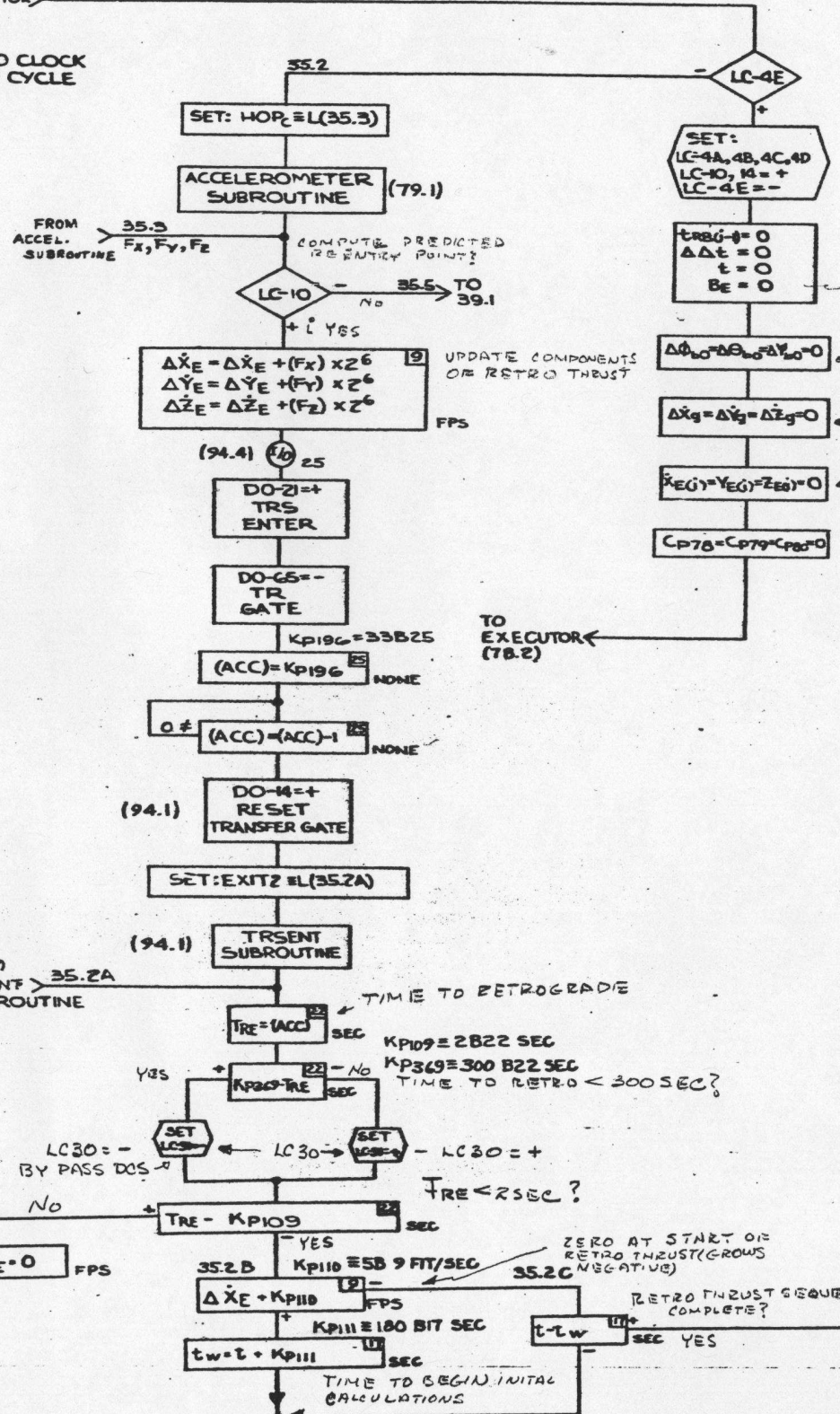
COL 36

COL 37

REVISIONS				
REV	DATE	BY	APP	DESCRIPTION
A				RELEASE
B	3/4/62			

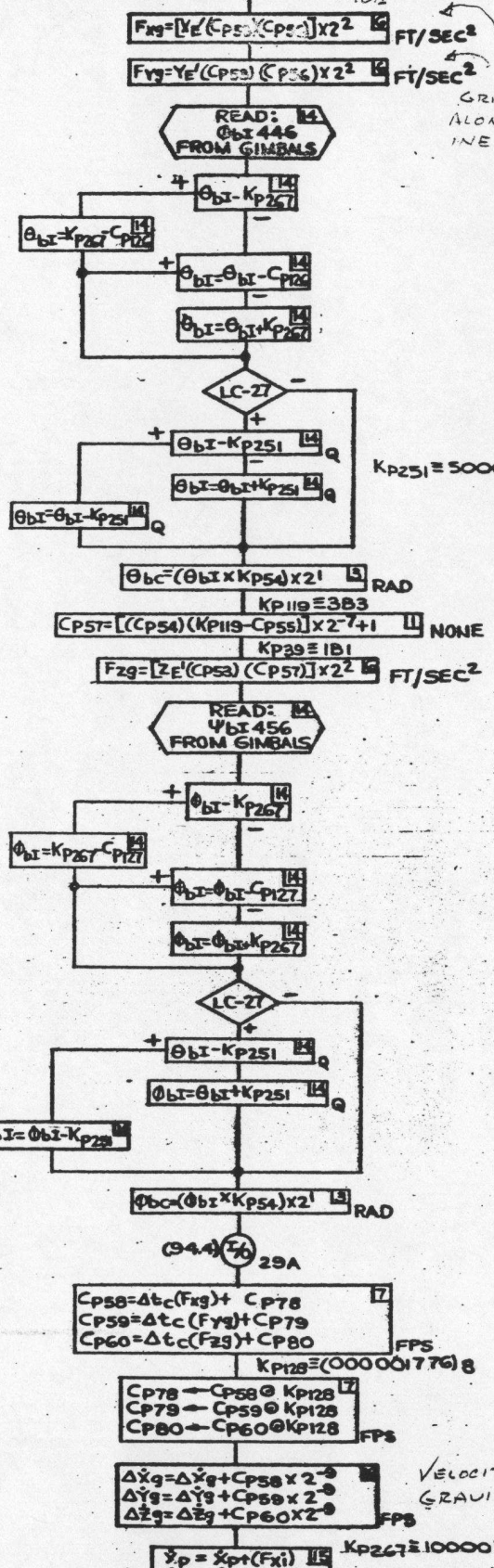
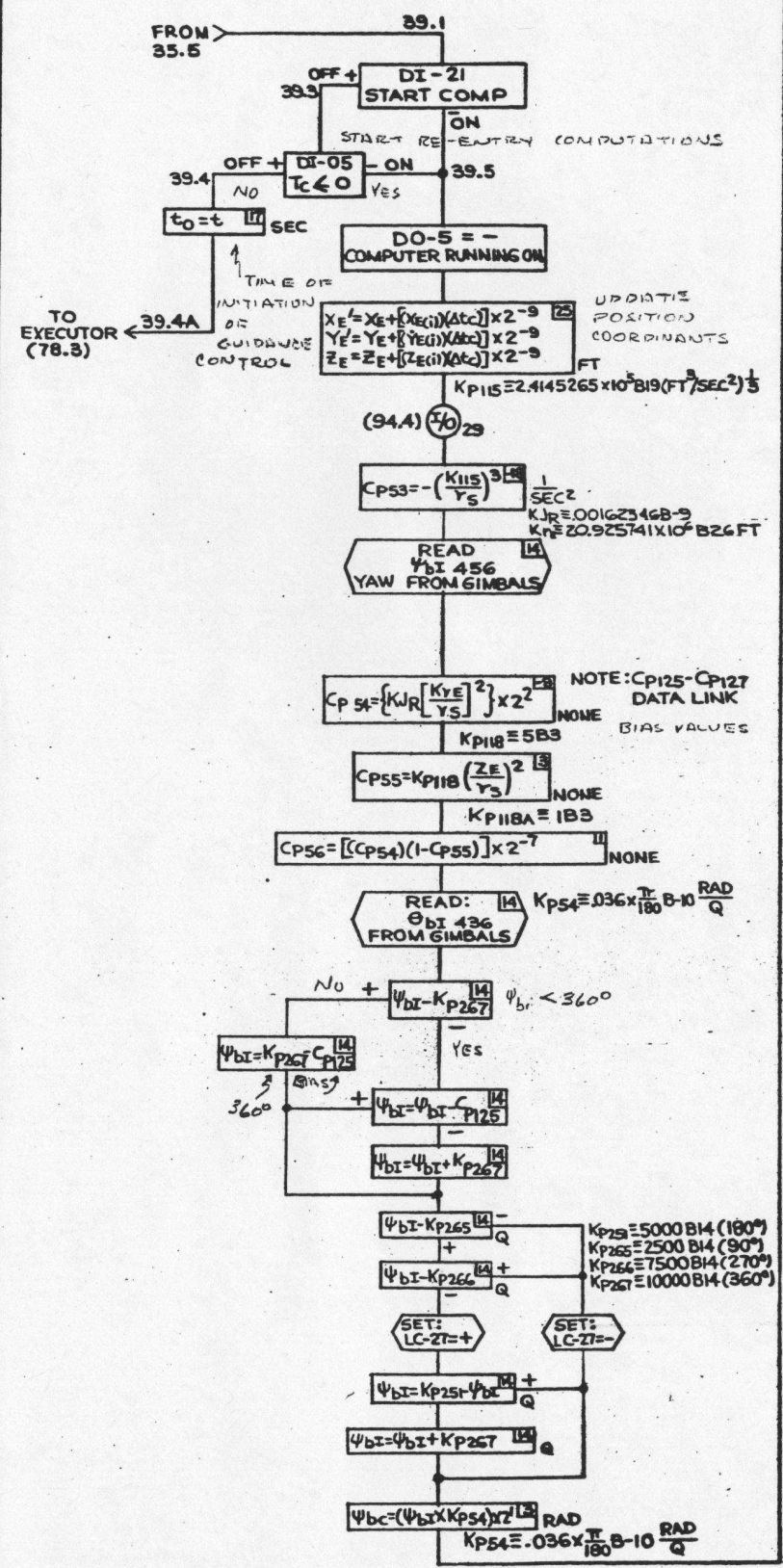
(NOTE:  
ONLY ONE ENTRY TO CLOCK  
SUBROUTINE/COMP CYCLE  
IN RE-ENTRY)

FROM EXECUTOR → 35.1 BEGIN RE-ENTRY



QTY	SYMBOL	DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	DATE	BY
LIST OF MATERIAL OR PARTS LIST							
INTERNATIONAL BUSINESS MACHINES CORP. GENERAL SYSTEMS DIVISION 500 MADISON AVE. NEW YORK 22, N.Y.							
GEMINI-1G5 COMPUTER MATH FLOW DIAGRAM OPERATIONAL (DETAIL)							
CONTRACT NO. 03640 F 62-542-3							
SCALE NONE BY SHEET 10							

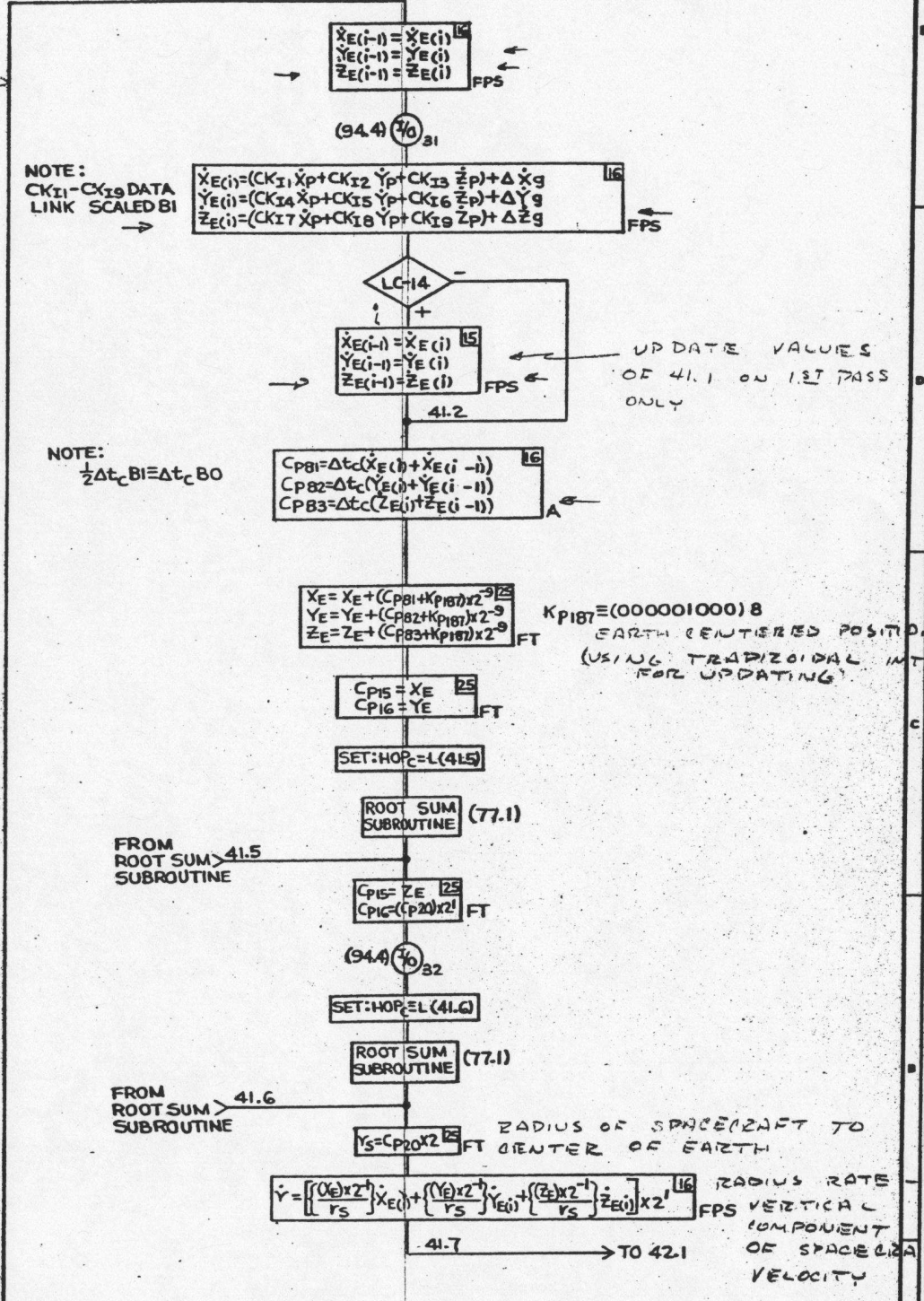
GEMINI RE-ENTRY DETAIL  
COL 39



ACCUMULATIONS DUE TO GRAVITATIONAL COMPONENTS ALONG EARTH ORIENTATED INERTIAL AXIS.

VELOCITY INCREMENTS DUE TO GRAVITY (USING RECTANGULAR INTEGRATION)

ACCUMULATED VELOCITY'S  
FPS INCREMENTS (MEASURED + INCREMENTS)



NOTE: CK11-CK19 DATA LINK SCALED B1

NOTE: 1/2 Delta t\_c B1 = Delta t\_c B0

UPDATE VALUES OF 41.1 ON 1ST PASS ONLY

K P187 = (0.00001000) B  
EARTH CENTERED POSITION (COORDINATE) USING TRAPAZOIDAL INTEGRATION FOR UPDATING

RADIUS OF SPACECRAFT TO CENTER OF EARTH

RADIUS RATE VERTICAL COMPONENT OF SPACECRAFT VELOCITY

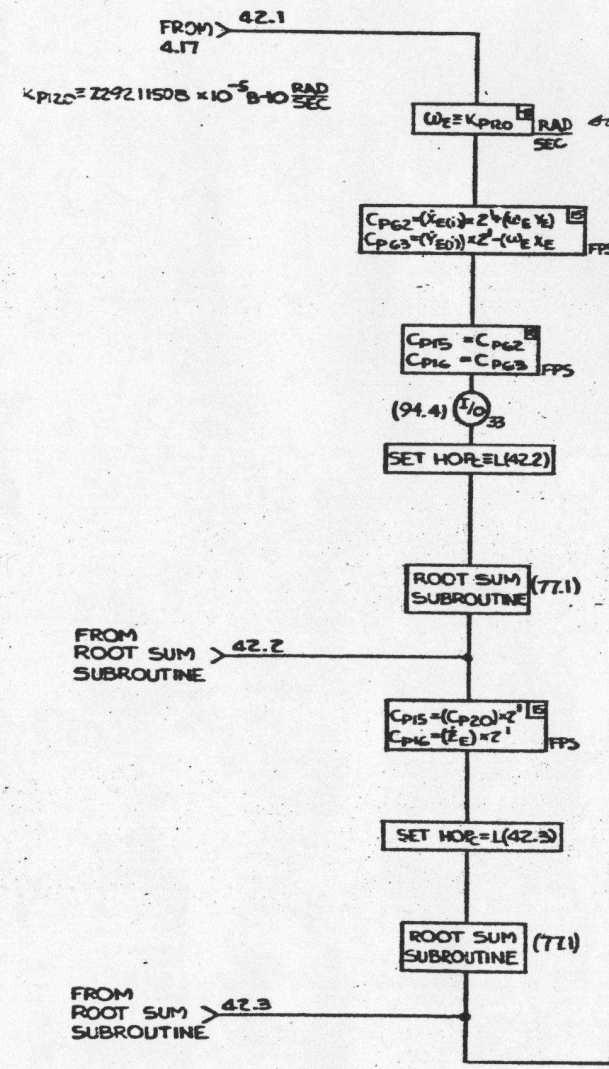
REVISIONS				
REV. NO.	DESCRIPTION	DATE	CHK	APPROVAL
1	RELEASE			

QTY	SYMBOL	NOMENCLATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	INTERNAL OR EXTERNAL	DATE	STEP
LIST OF MATERIAL OR PARTS LIST							
UNLESS NOTED BEAR OWNERS MARKS							
OUTSIDE DIMS							
INSIDE DIMS							
ALL DIMENSIONS AND TOLERANCES APPLY TO FINISHED PART							
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES							
DECIMALS							
ANGLES							
DRAWN: MDE							
CHECKED: [Signature]							
DATE: 5/1/68							
INTERNATIONAL BUSINESS MACHINES CORP. FEDERAL SYSTEMS DIVISION NEW YORK 22, N.Y.							
TITLE: GEMINI-IGS-COMPUTER MATH FLOW DIAGRAM OPERATIONAL (DETAIL)							
CODE IDENT NO. 03640							
SCALE: NONE							
SHEET 11							

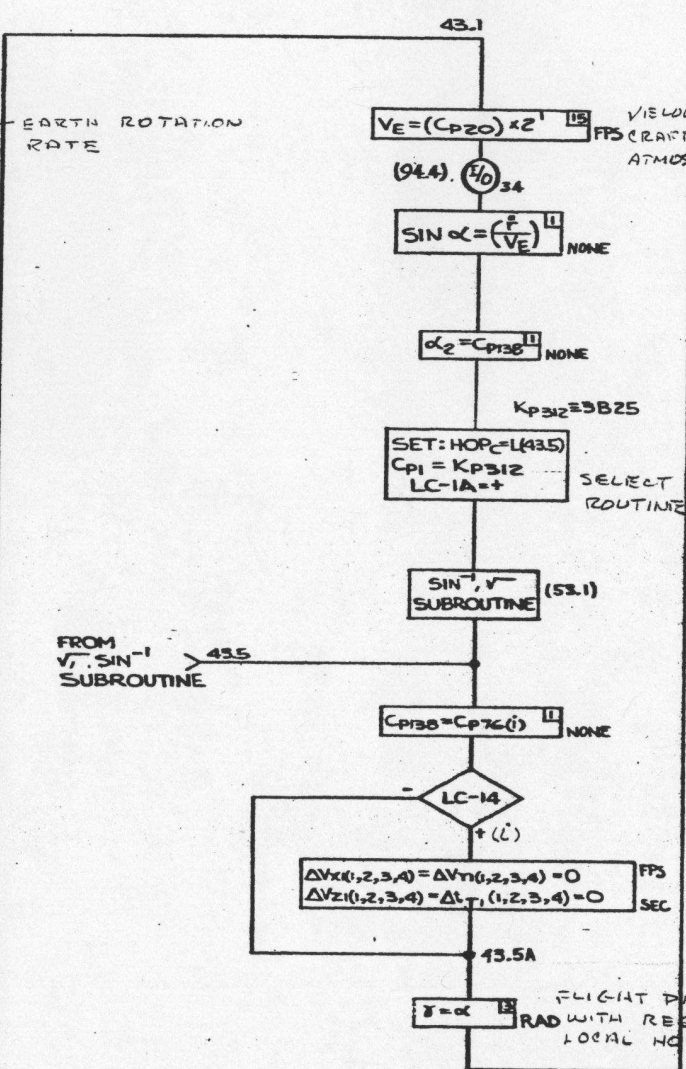
REVISIONS				
REV	DESCRIPTION	DATE	BY	APPROVAL
1	RELEASE	12-1-62		
2		12-1-62		

6444540  
 62-542-3  
 8/12

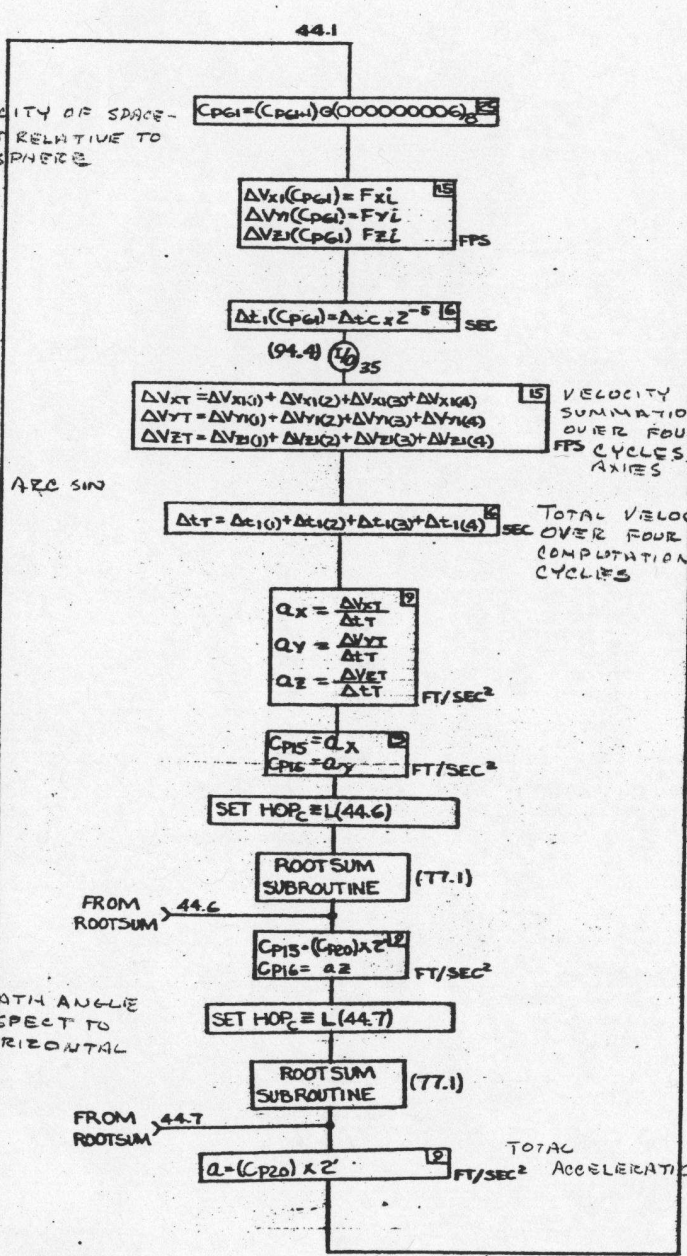
GEMINI RE-ENTRY DETAIL  
COL. 42



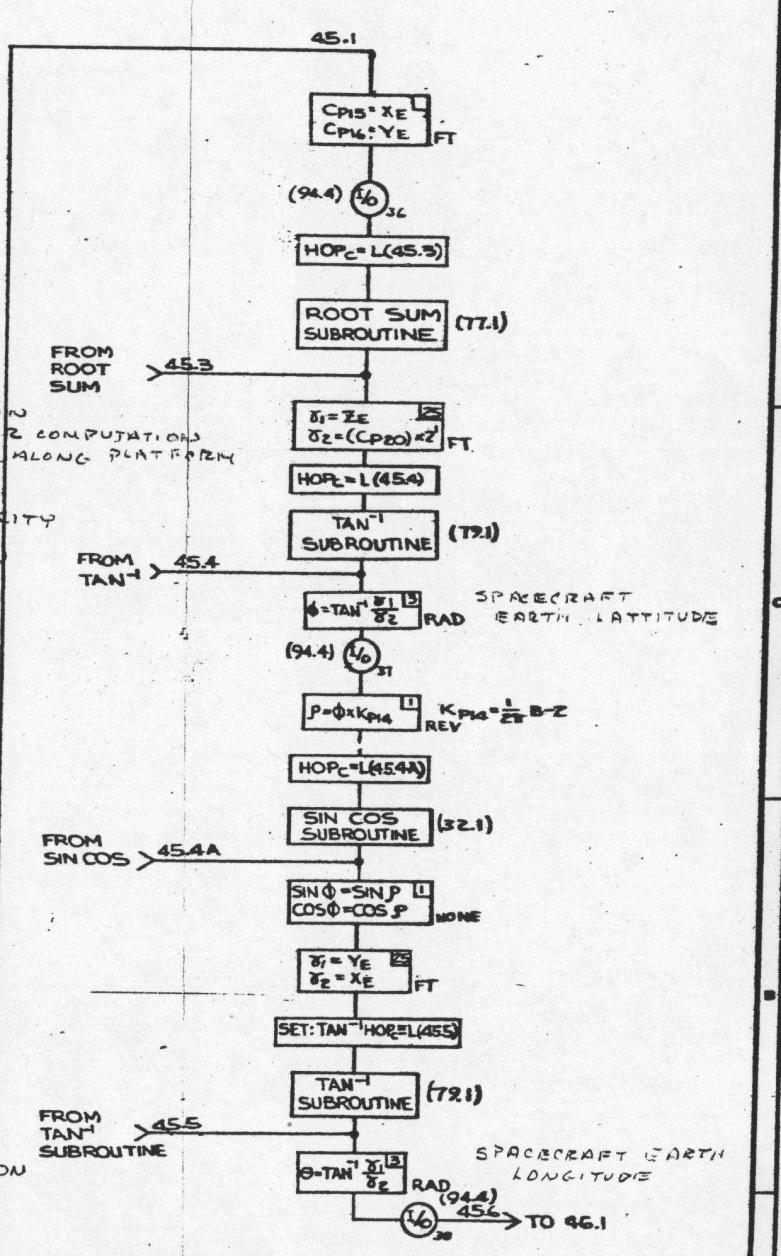
COL. 43



COL. 44



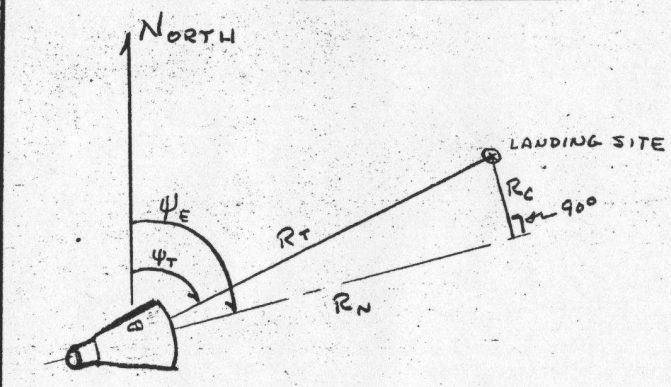
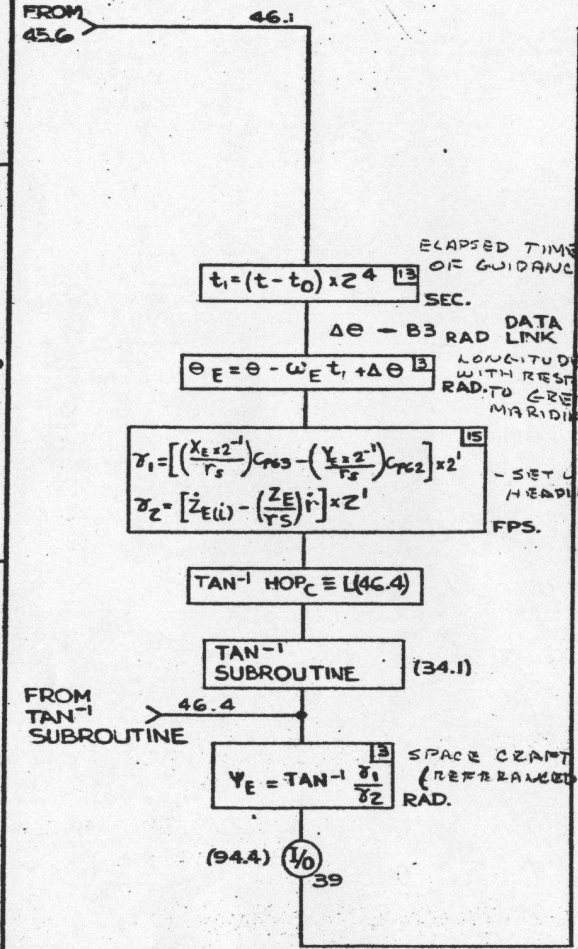
COL. 45



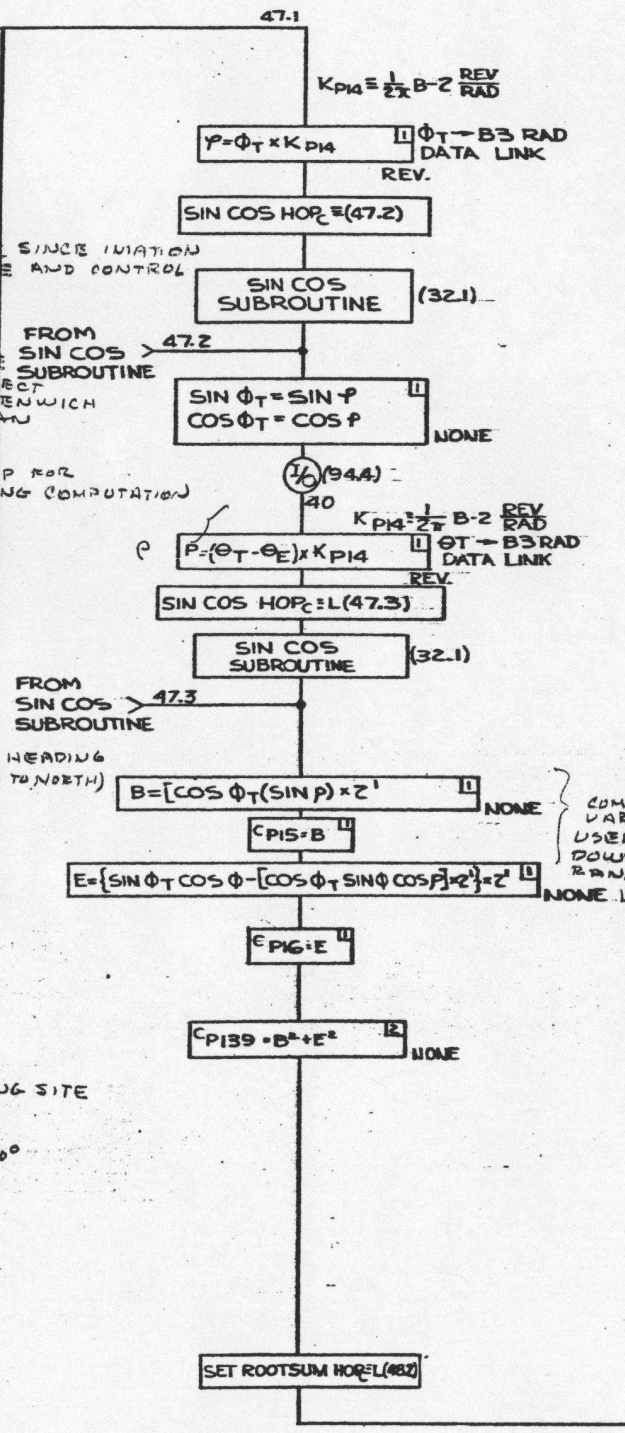
QTY	SYMBOL	DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATIONS	INTERNAL OR NOTES	DATE	BY
LIST OF MATERIAL OR PARTS LIST							
INTERNATIONAL BUSINESS MACHINES CORP. FEDERAL SYSTEMS DIVISION 590 BLDG 000 DUL.							
GEMINI, IGS-COMPUTER METH FLOW DIAGRAM OPERATIONAL (DETAIL)							
DATE		SCALE		BY		DRAWN	
12-1-62		ONE		F		8/12	

REVISIONS			
NO.	DESCRIPTION	DATE	APPROVAL
A	RELEASE	3/1/63	
B		4/16/63	

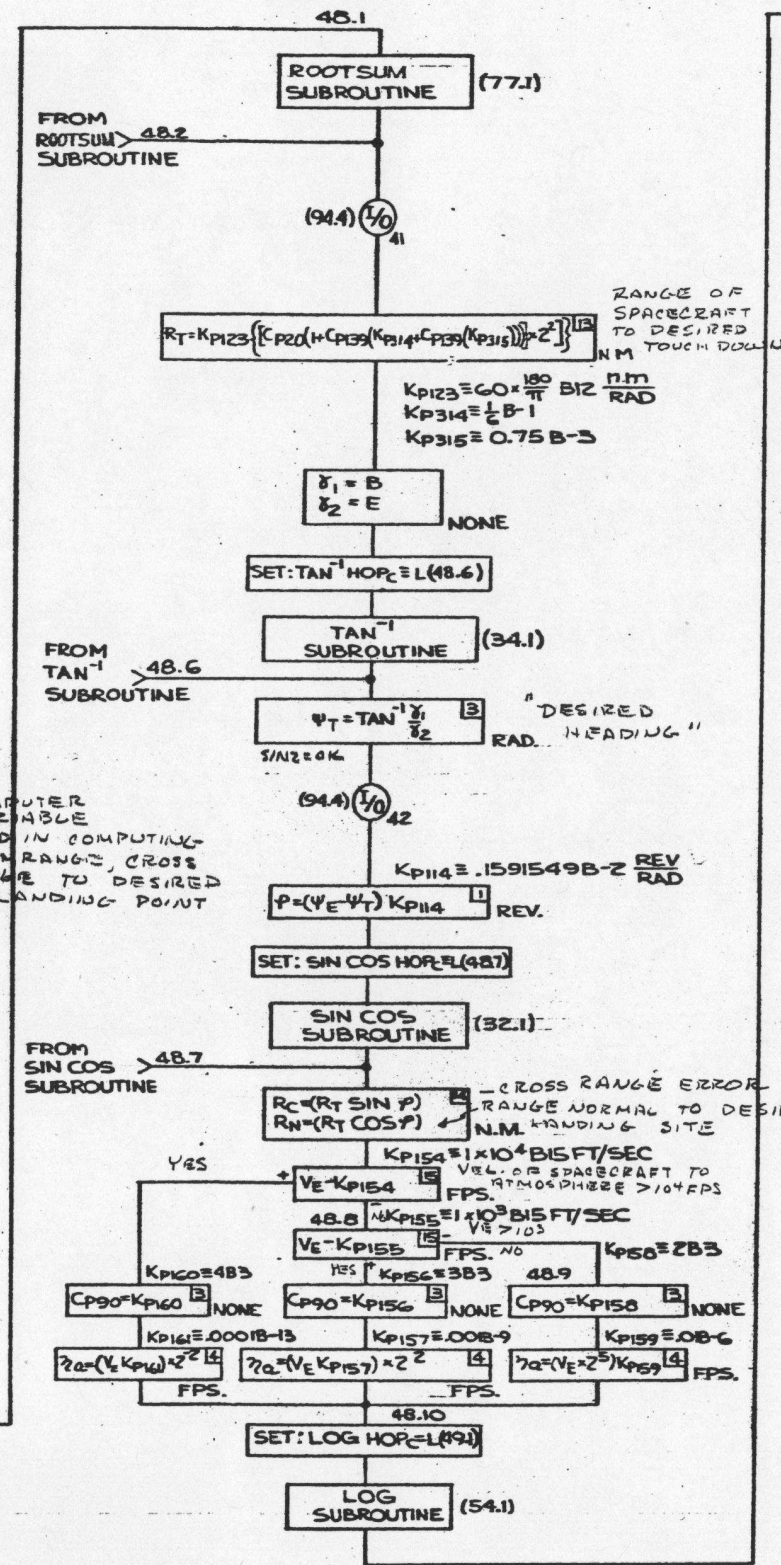
GEMINI RE-ENTRY DETAIL  
COL 46



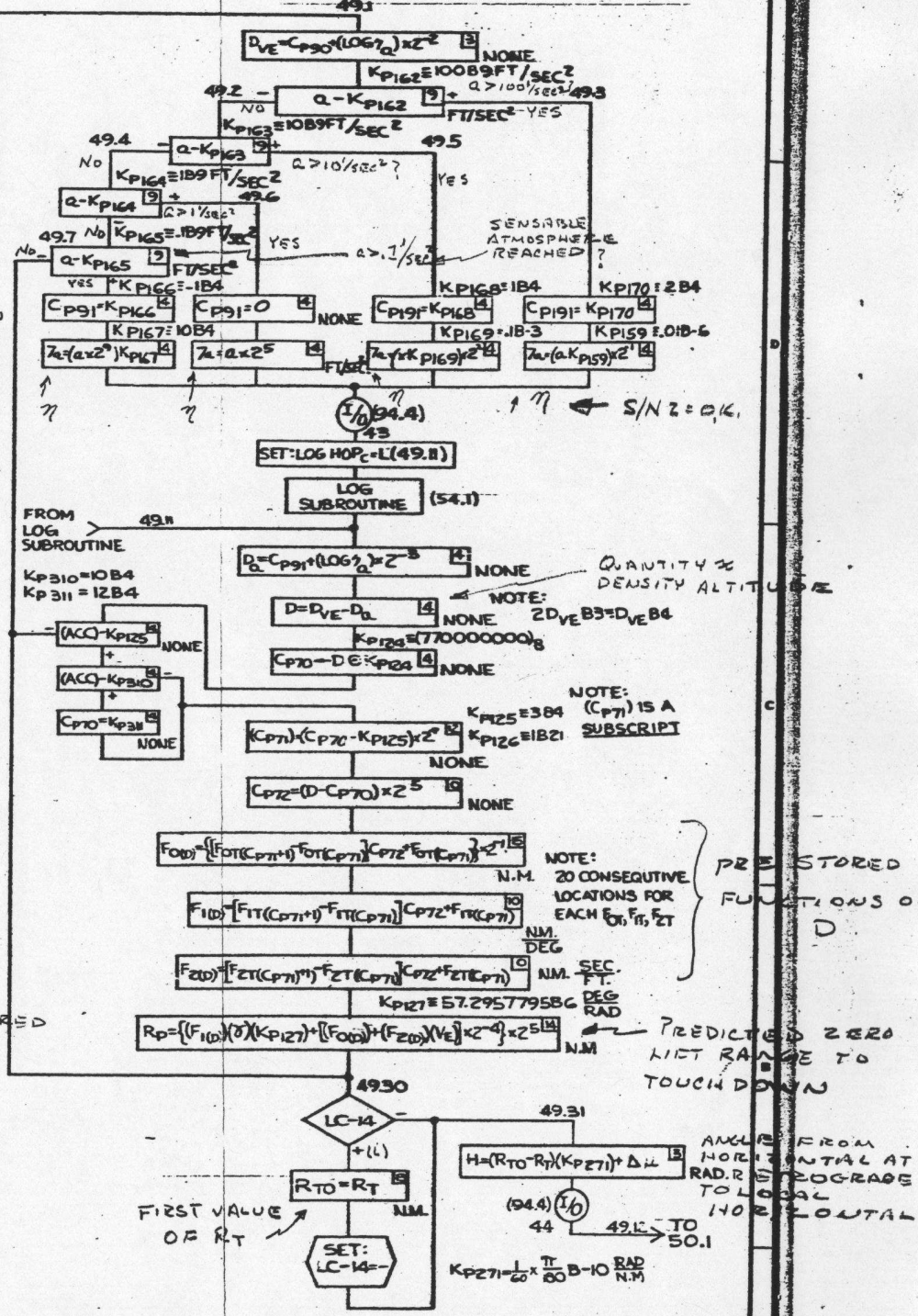
COL 47



COL 48



COL 49

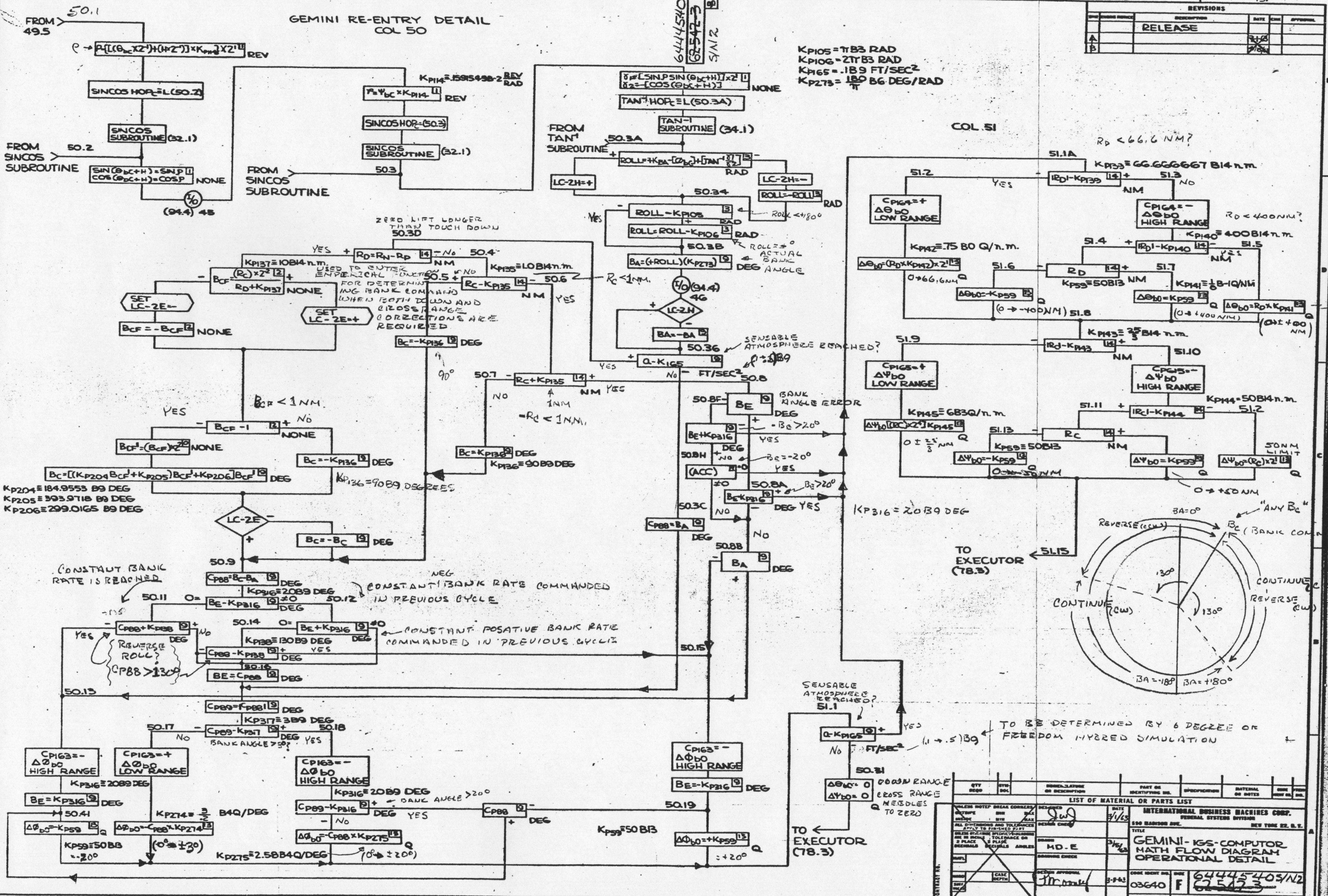


QTY	SYMBOL	DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	DATE	ITEM NO.
LIST OF MATERIAL OR PARTS LIST							
INTERNATIONAL BUSINESS MACHINES CORP. FEDERAL SYSTEMS DIVISION 500 BARDEN AVE. NEW YORK 22, N.Y.							
GEMINI-1G5-COMPUTER MATH FLOW DIAGRAM OPERATIONAL (DETAIL)							
CODE SHEET NO. 03640 F 644540S/N2 62-542-3							
SCALE NONE BY SHEET 13							

GEMINI RE-ENTRY DETAIL  
COL 50

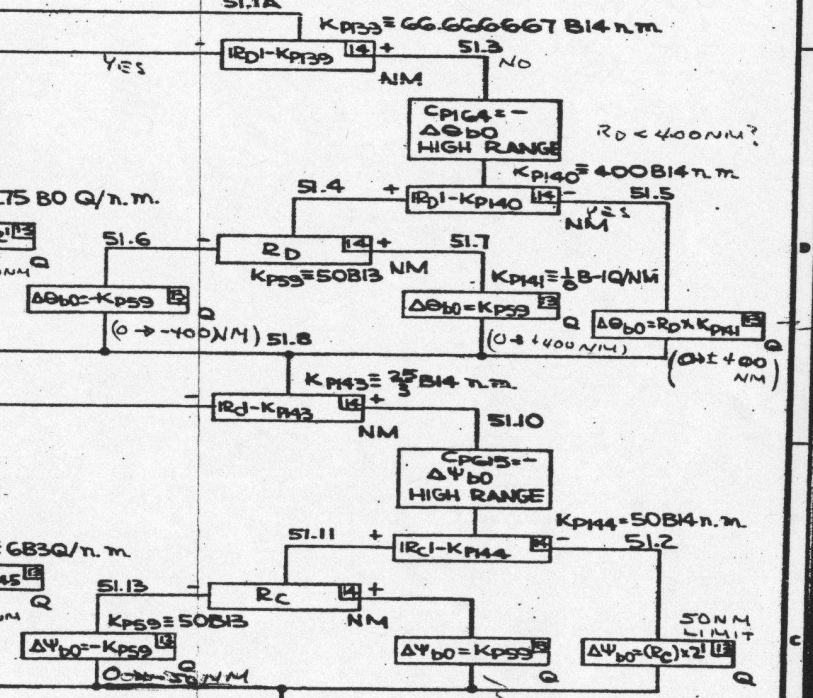
REVISIONS				
NO.	DESCRIPTION	DATE	BY	APPROVAL
A	RELEASE	3/15		
B		3/16		

KPI05 = 7183 RAD  
KPI06 = 21783 RAD  
KPI65 = .189 FT/SEC<sup>2</sup>  
KPI75 = 180 DEG/DEG/RAD



COL 51

Rd < 66.6 NM?



TO EXECUTOR (78.3)

TO EXECUTOR (78.3)

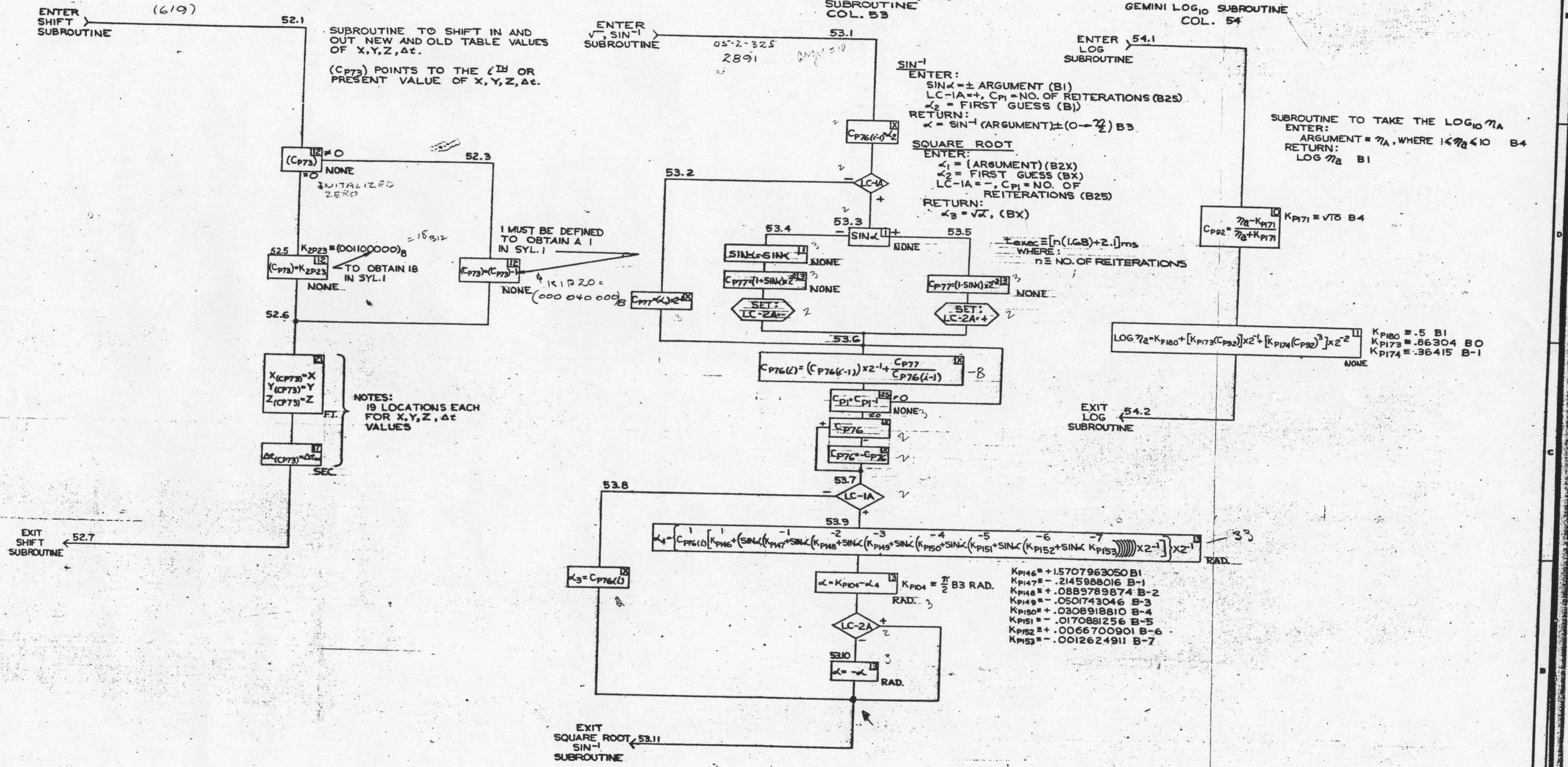
QTY REQD	SYM-BOL	DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATIONS	NATIONAL OR NOTES	DATE
		INTERNATIONAL BUSINESS MACHINES CORP.				3/15
		GEMINI-IGS-COMPUTOR MATH FLOW DIAGRAM OPERATIONAL DETAIL				3/16
						3/16

REVISIONS				
REV	CHG	DESCR	DATE	APPROVAL
A		RELEASE	3/1/63	
B			4/16/63	

GEMINI SHIFT SUBROUTINE  
COL. 52

GEMINI SQUARE ROOT, SIN<sup>-1</sup>  
SUBROUTINE  
COL. 53

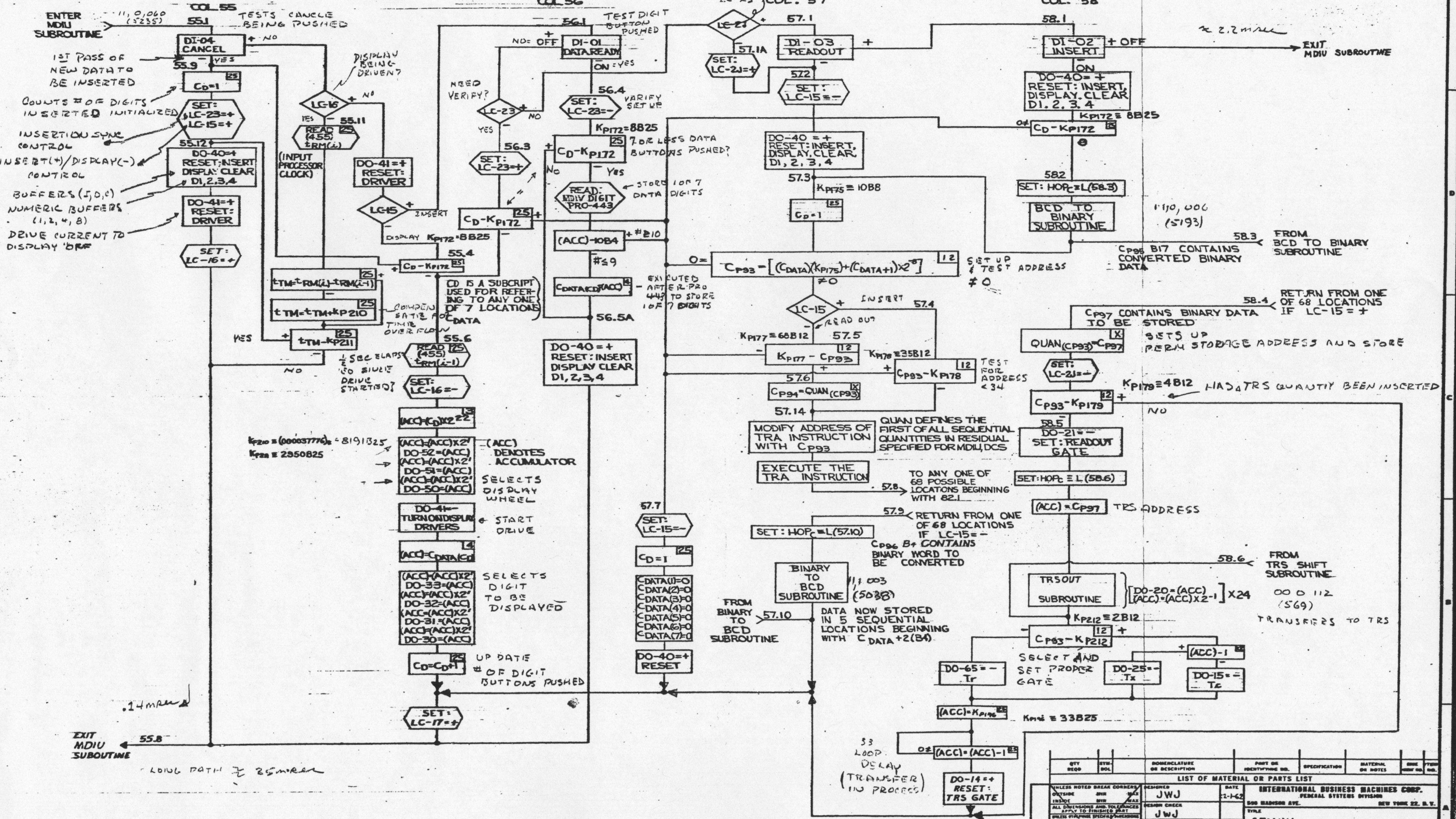
GEMINI LOG<sub>10</sub> SUBROUTINE  
COL. 54



QTY	SYN	DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	DATE	ITER
LIST OF MATERIAL OR PARTS LIST							
UNLESS NOTED BREAK CORNERS TO BE CHAMFERED							
DESIGNED BY J.W.J.							
CHECKED BY J.W.J.							
DRAWN BY LIG							
INTERNATIONAL BUSINESS MACHINES CORP. GENERAL SYSTEMS DIVISION 590 MADISON AVE. NEW YORK 22, N.Y.							
TITLE GEMINI - 465 - COMPUTER MATH FLOW DIAGRAM OPERATIONAL (DETAIL)							
APPROVED BY J. Mooney							
DATE 3-1-63							
CODE IDENT NO. 83648							
SIZE F							
SCALE NONE							
SHEET 15							

REVISIONS				
REV	DESCRIPTION	DATE	CHK	APPROVAL
1	RELEASE	3-1-68		
2		4-1-68		

GEMINI MDIU SUBROUTINE



ENTER MDIU SUBROUTINE  
 11,0,060 (5255)  
 1ST PASS OF NEW DATA TO BE INSERTED  
 COUNTS # OF DIGITS INSERTED INITIALIZED  
 INSERTION SYNC CONTROL  
 INSERT(+)/DISPLAY(-) CONTROL  
 BUFFERS (5,0,0)  
 NUMERIC BUFFERS (1,2,4,8)  
 DRIVE CURRENT TO DISPLAY 'DRF'

$Kp210 = (00003776)_{16} = 8191325$   
 $Kp211 = 2950825$

(ACC) DENOTES ACCUMULATOR  
 SELECTS DISPLAY WHEEL  
 START DRIVE  
 SELECTS DIGIT TO BE DISPLAYED  
 UP DATE # OF DIGIT BUTTONS PUSHED

QUAN DEFINES THE FIRST OF ALL SEQUENTIAL QUANTITIES IN RESIDUAL SPECIFIED FOR MDIU,DCS  
 TO ANY ONE OF 68 POSSIBLE LOCATIONS BEGINNING WITH 82.1  
 RETURN FROM ONE OF 68 LOCATIONS IF LC-15 = -

DATA NOW STORED IN 5 SEQUENTIAL LOCATIONS BEGINNING WITH C DATA + 2(B4)  
 FROM BINARY TO BCD SUBROUTINE (5038)  
 FROM BINARY TO BCD SUBROUTINE

QTY REQD	SYM. NO.	DESCRIPTION OR IDENTIFICATION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	DATE	BY
		INTERNATIONAL BUSINESS MACHINES CORP. FEDERAL SYSTEMS DIVISION 500 MADISON AVE. NEW YORK 22, N.Y.					
		TITLE: GEMINI - 165 - COMPUTER MATH FLOW DIAGRAM - OPERATIONAL (DETAIL)					
		DESIGNED BY	JWJ	DATE	2-1-68		
		DRAWN BY	JWJ				
		CHECKED BY	LIG				
		APPROVED BY	[Signature]				
		CONTRACT NO.					
		CASE NO.					
		DATE					
		SCALE	NONE				
		SHEET	16				

6444540  
 G2-542-3  
 S/N Z

1.4 min

LOW PATH 25 min

53 LOOP DELAY (TRANSFER) IN PROCESS

2.2 min

110,006 (5193)

Kp178 = 4B12

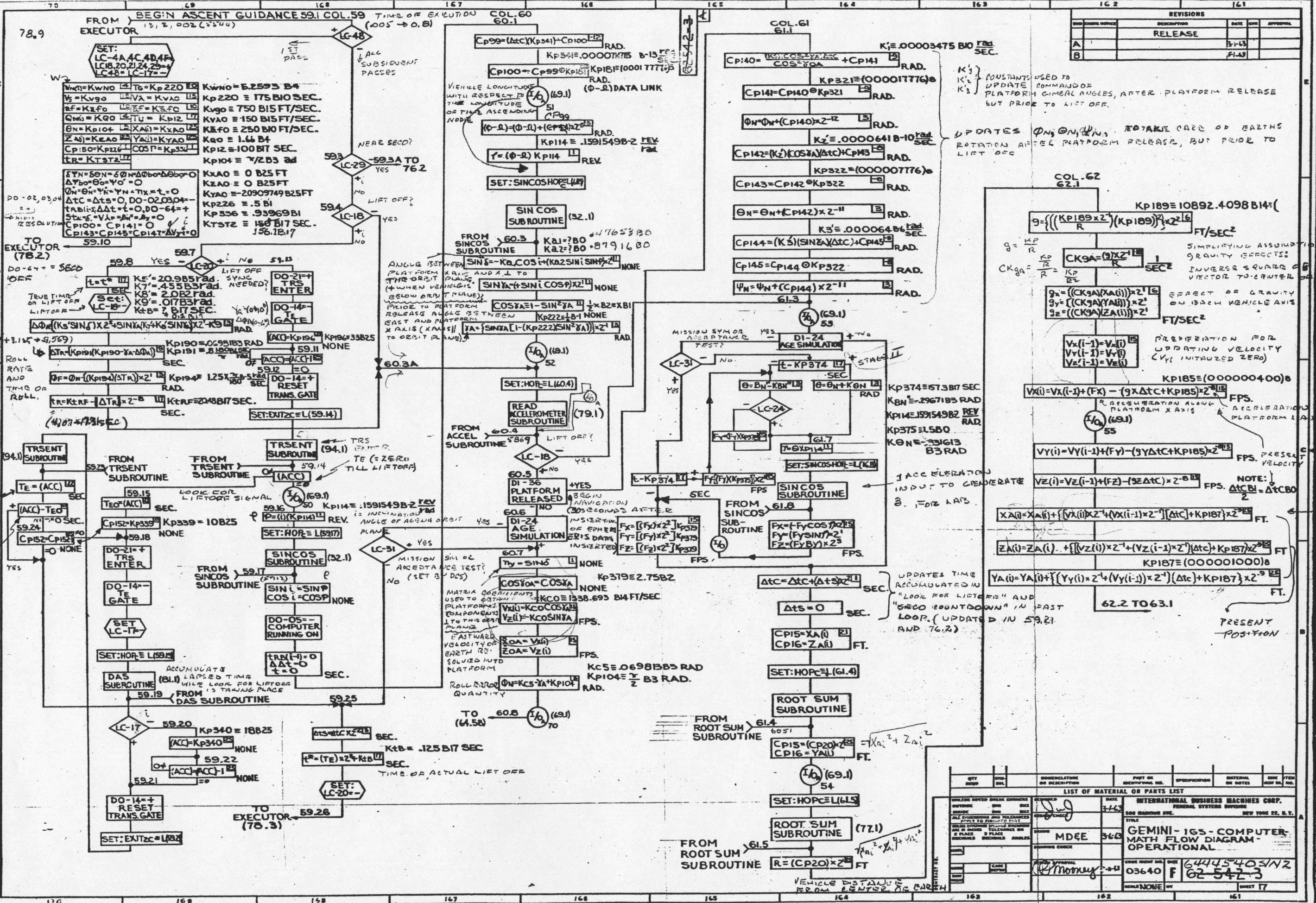
000112 (569)

Kp176 = 33B25



REVISIONS				
NO.	DESCRIPTION	DATE	BY	APPROVAL
A	RELEASE	3-1-63		
B		3-1-63		

SICCO  
317  
320



CONSTANTS USED TO UPDATE COMMAND OR PLATFORM GIMBAL ANGLES, AFTER PLATFORM RELEASE BUT PRIOR TO LIFT OFF.

UPDATES  $\phi_N, \theta_N, \psi_N$  TO TAKE CARE OF EARTH'S ROTATION AFTER PLATFORM RELEASE, BUT PRIOR TO LIFT OFF.

SIMPLIFYING ASSUMPTIONS: GRAVITY EFFECTS INVERSE SQUARE OF POSITION VECTOR TO CENTER OF EARTH.

EFFECT OF GRAVITY ON EACH VEHICLE AXIS

PREPARATION FOR UPDATING VELOCITY (V<sub>i</sub> INITIALIZED ZERO)

ACCELERATION ALONG PLATFORM X AXIS

PRESENT VELOCITY

NOTE:  $\Delta t C B = \Delta t C B O$

FT.

FT.

FT.

FT.

FT.

FT.

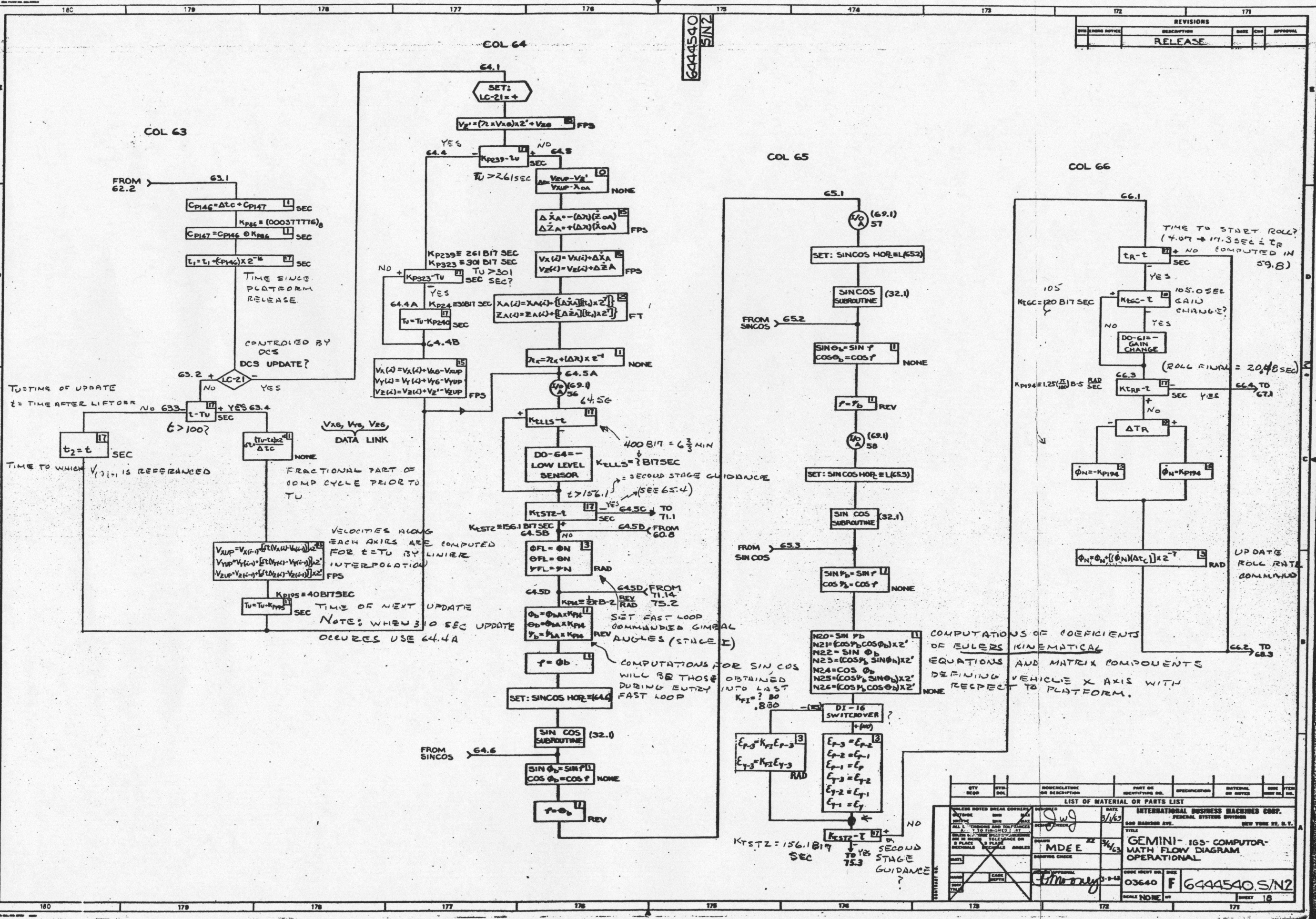
FT.

FT.

FT.

QTY	REV	DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	INTERNAL OR NOTES	DATE	BY	CHKD
LIST OF MATERIAL OR PARTS LIST								
1		INTERNATIONAL BUSINESS MACHINES CORP. GENERAL SYSTEMS DIVISION						
1		GEMINI-165-COMPUTER-MATH FLOW DIAGRAM-OPERATIONAL						
1		64454031N2						
1		62-547-3						

REVISIONS				
REV	DATE	DESCRIPTION	BY	APPROVAL
1		RELEASE		



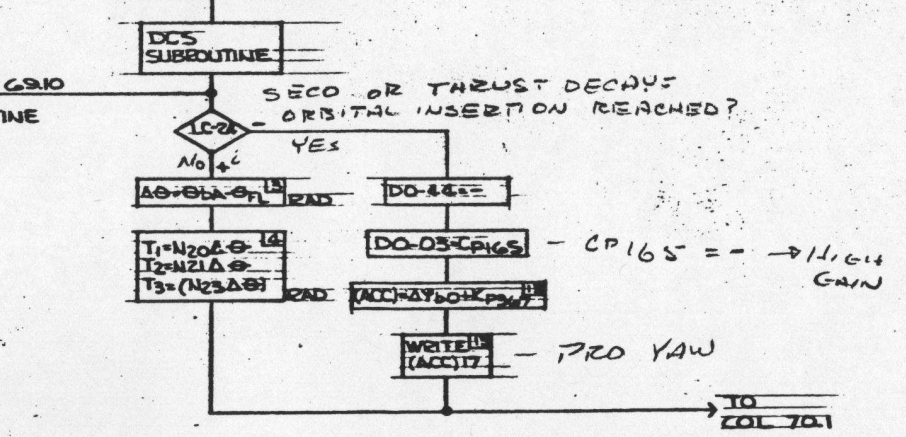
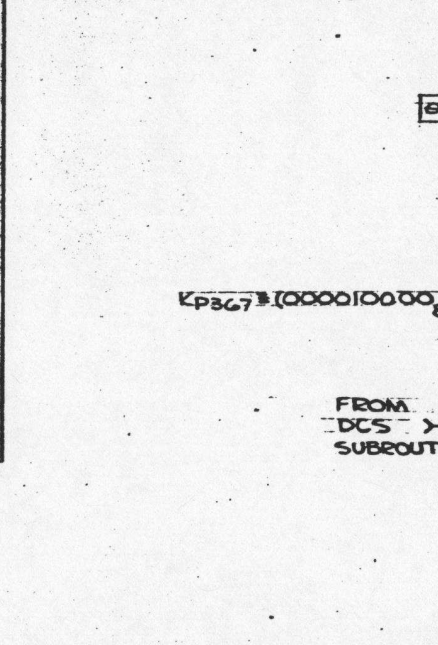
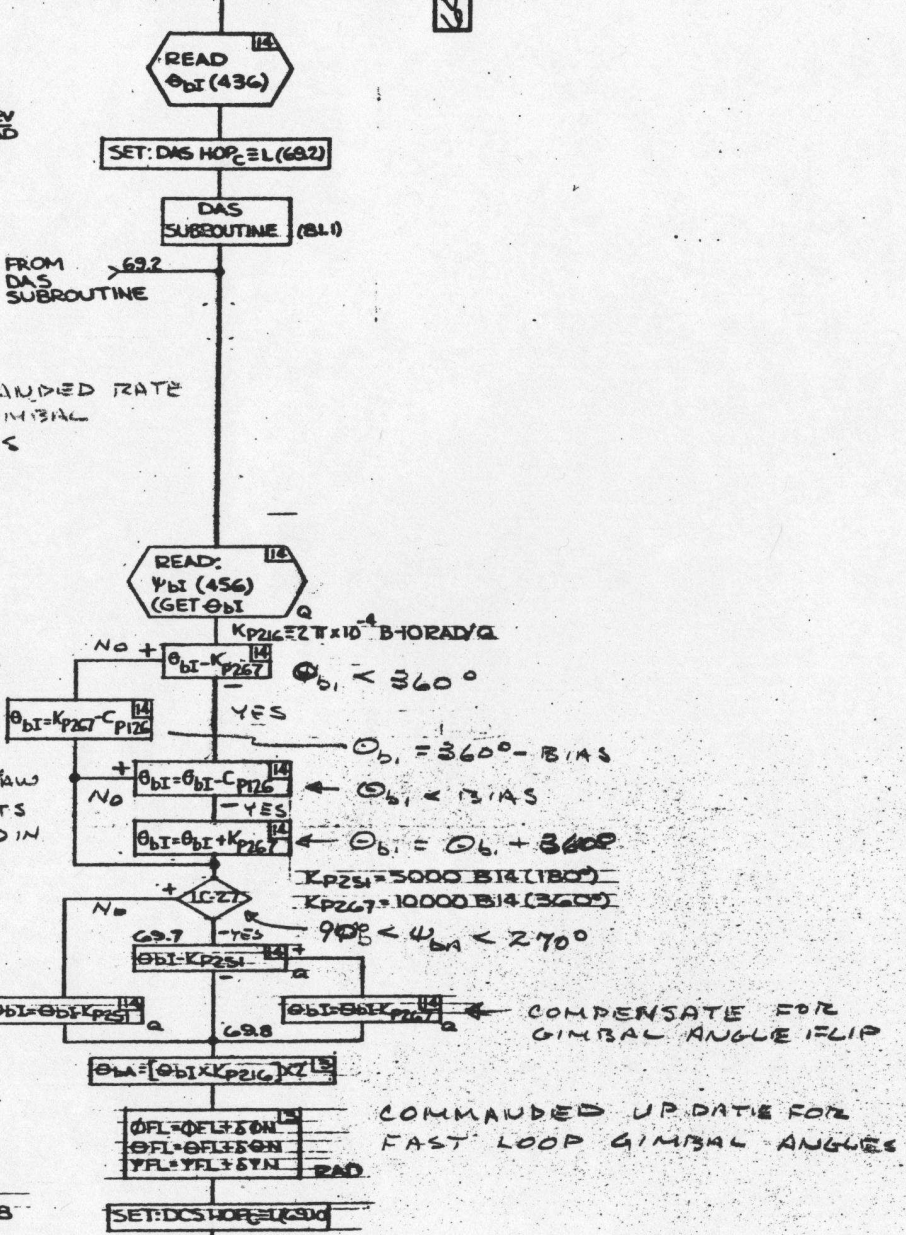
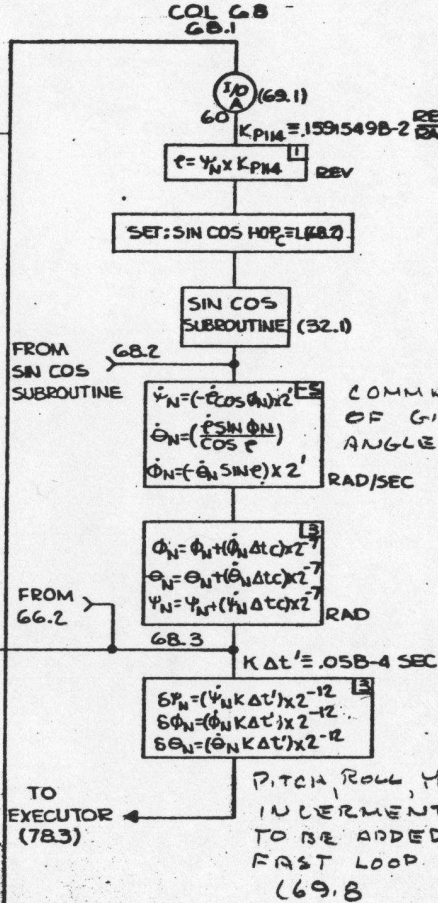
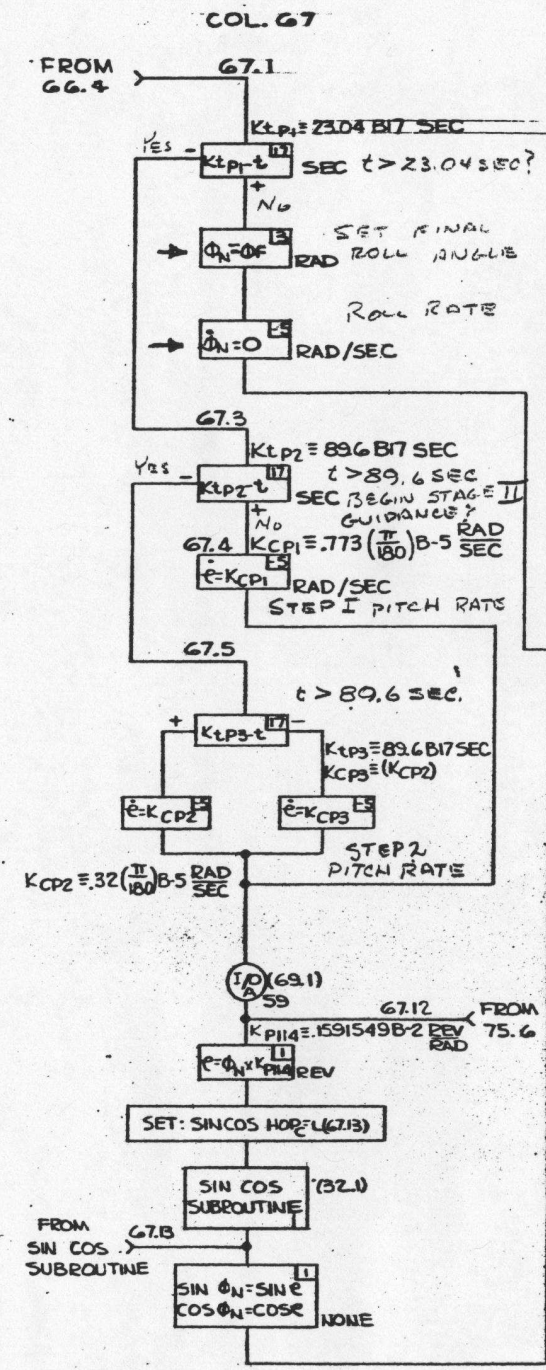
QTY REQD	SYM	DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	USE ITEM NO.
LIST OF MATERIAL OR PARTS LIST						
INTERNATIONAL BUSINESS MACHINES CORP. FEDERAL SYSTEMS DIVISION 540 MADISON AVE. NEW YORK 22, N.Y.						
TITLE: GEMINI-165-COMPUTOR-MATH FLOW DIAGRAM OPERATIONAL						
CODE: 03640 F 6444540 S/N2						

6444540 S/N2

REVISIONS			
REV. NO.	DESCRIPTION	DATE	BY
1	RELEASE		

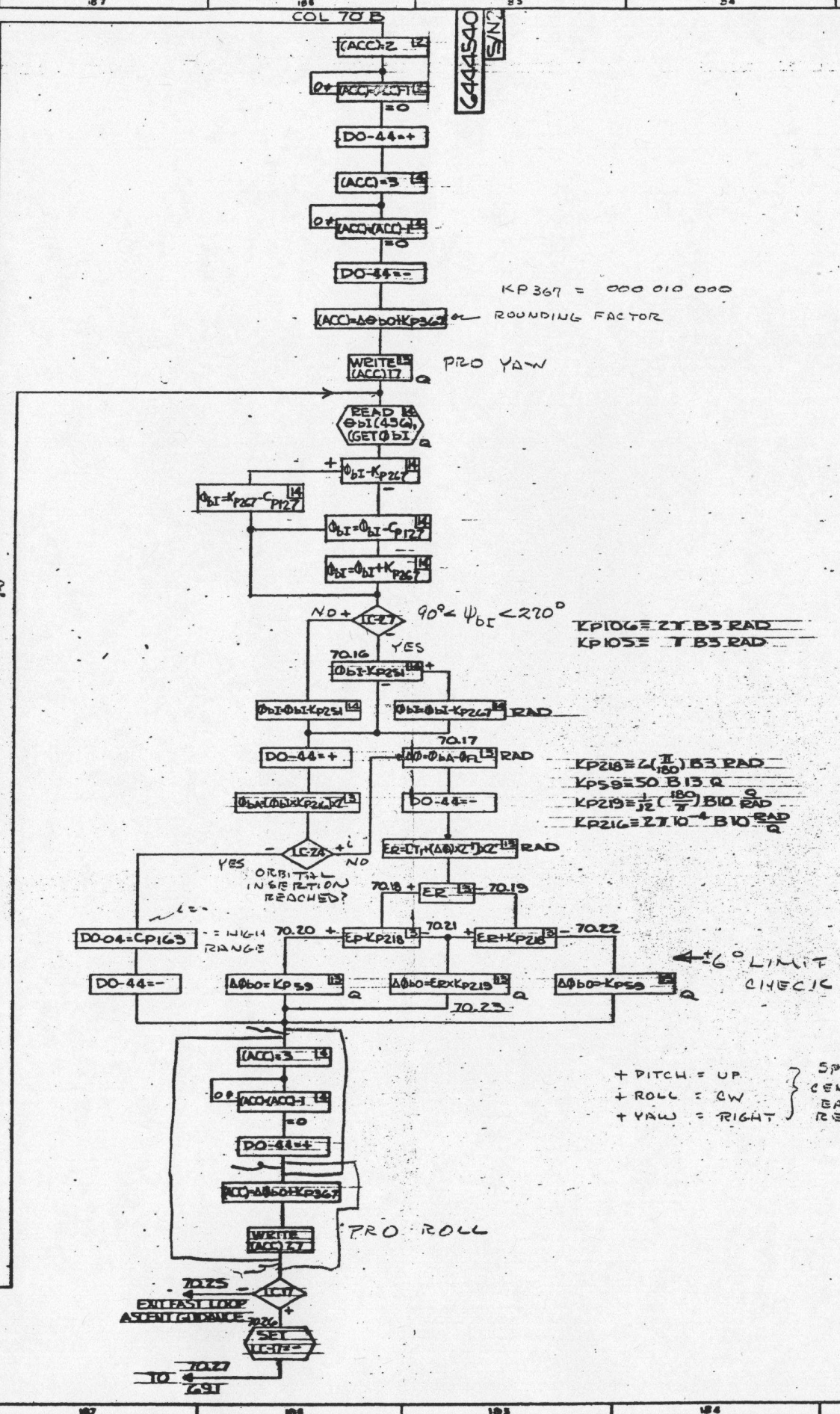
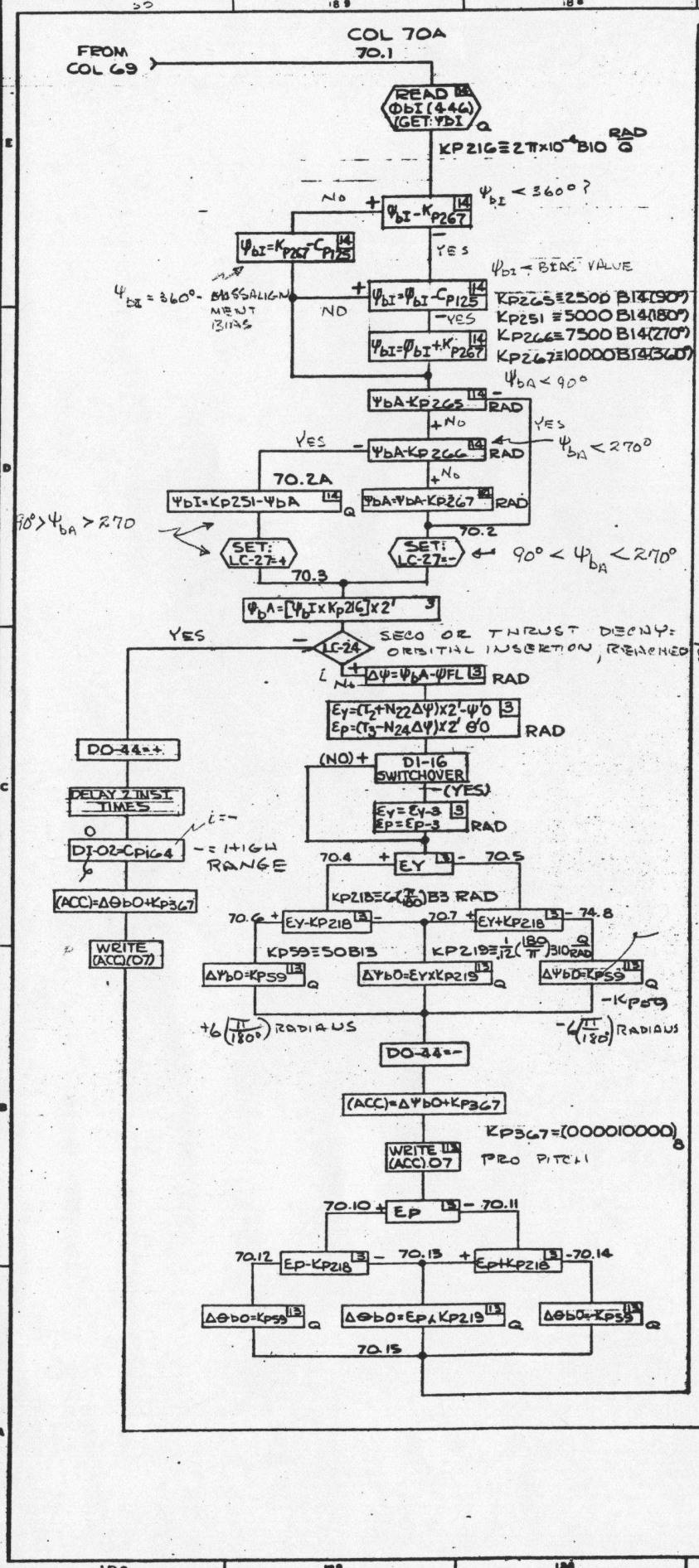
6444540 SN2

COL 69  
ENTER FAST LOOP ASCENT GUIDANCE FROM 70.27  
69.1

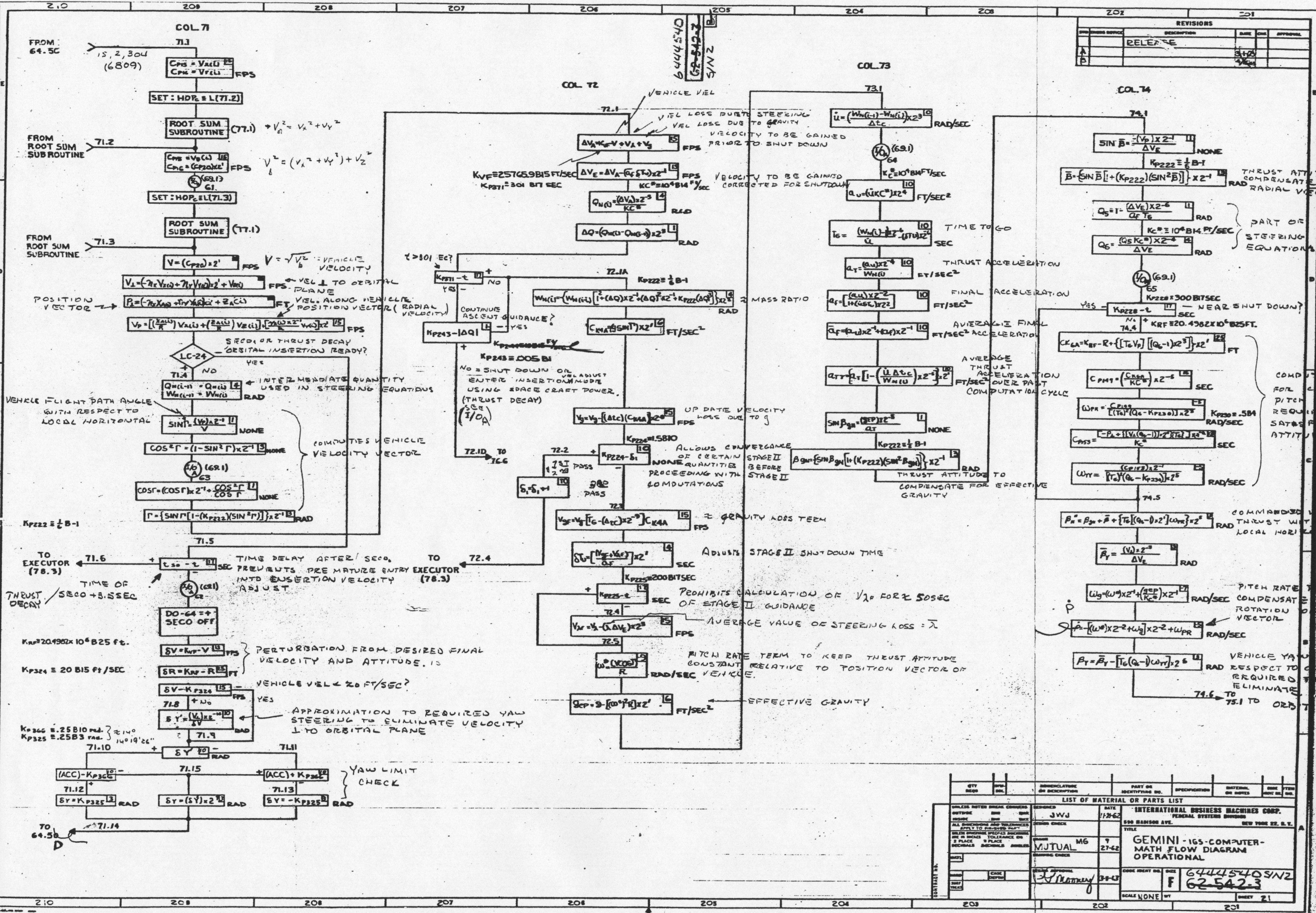


LIST OF MATERIAL OR PARTS LIST						
QTY	SYM	DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	DATE
		UNLESS NOTED BREAK CORNERS				
		OUTSIDE DIMS				
		INSIDE DIMS				
		ALL DIMENSIONS AND TOLERANCES APPLY TO FINISHED PART				
		UNLESS OTHERWISE SPECIFIED FINISHING SHALL BE TO 1/32" TOLERANCE ON 3 PLACE DECIMALS DECIMALS ANGLES				

REVISIONS				
REV	DATE	DESCRIPTION	APP'D	APPROVAL
1		RELEASE		



QTY	REV	DESCRIPTION	DATE	BY	APPROVAL
		INTERNATIONAL BUSINESS MACHINES CORP. FEDERAL SYSTEMS DIVISION 300 OAKWOOD AVE. NEW YORK 22, N.Y.			
		GEARMINI-165-COMPUTER MATH FLOW DIAGRAM OPERATIONAL			
		03640 F 6444540 5N2			



REVISIONS				
NO.	DESCRIPTION	DATE	BY	APPROVAL
A	RELEASE	3-1-62		
B		3-1-62		

QTY	UNIT	DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	DATE	BY

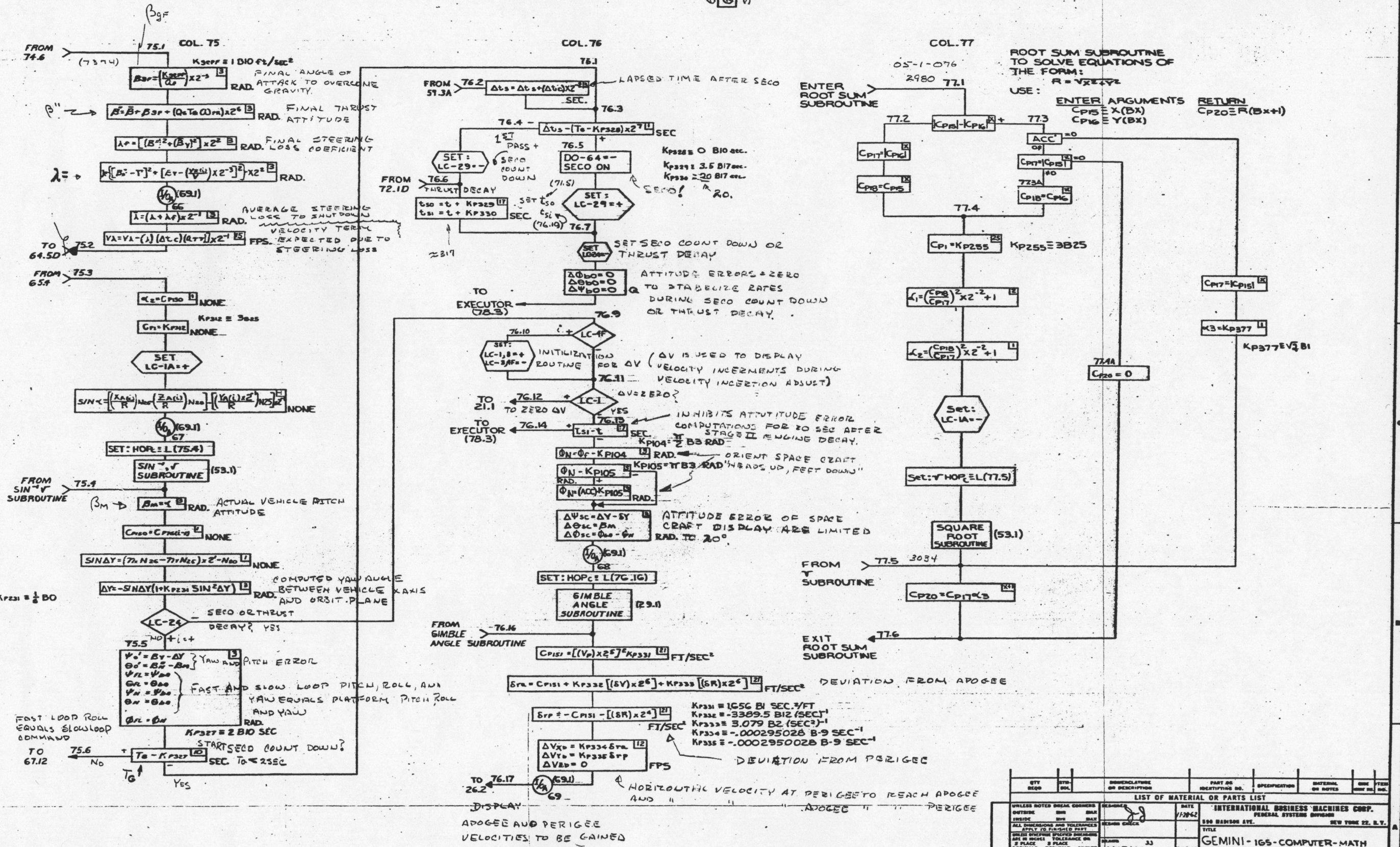
LIST OF MATERIAL OR PARTS LIST	
REVISED	DATE
JWJ	1-2-62
MUTUAL	2-7-62

INTERNATIONAL BUSINESS MACHINES CORP.	
FEDERAL SYSTEMS DIVISION	
500 MADISON AVE. NEW YORK 22, N.Y.	
TITLE	
GEMINI-165-COMPUTER-MATH FLOW DIAGRAM OPERATIONAL	
CODE IDENT NO.	DATE
F	6444540 SINZ
	62-542-3
SCALE	BY
NONE	
SHEET 21	

REVISIONS				
NO	DATE	DESCRIPTION	BY	APPVAL
1		RELEASE		

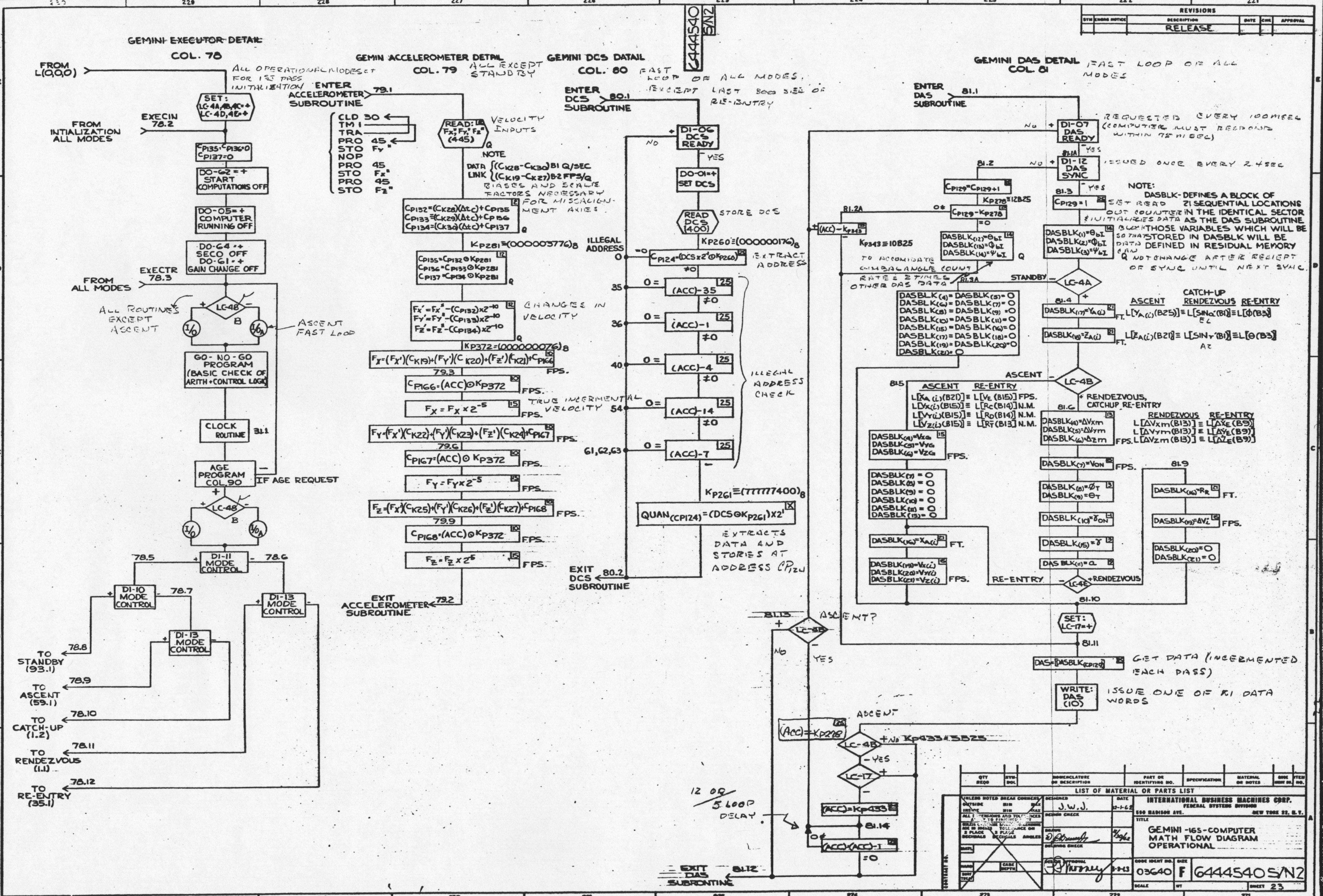
6444540  
62542-3  
S/N Z



CHANGES TO COME!

QTY REQD	SYMBOL	DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	EXTERNAL OR NOTES	REV. ITEM NO.
LIST OF MATERIAL OR PARTS LIST						
UNLESS NOTED OTHER QUANTITIES	INSIDE	DATE	INTERNATIONAL BUSINESS MACHINES CORP. FEDERAL SYSTEMS DIVISION			
ALL DIMENSIONS AND TOLERANCES APPLY TO FINISHED PART	33	7/28/62	590 MADISON AVE. NEW YORK 22, N.Y.			
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN DECIMAL INCHES	MUTUAL	33	GEMINI-165-COMPUTER-MATH FLOW DIAGRAM OPERATIONAL			
SCALE NONE	BY	DATE	CODE IDENT NO.	SIZE	DRAWING CHECKED	
			09640	F	6444540 S/N Z 62542-3	

REVISIONS				
REV	DATE	BY	APP	DESCRIPTION
1				RELEASE

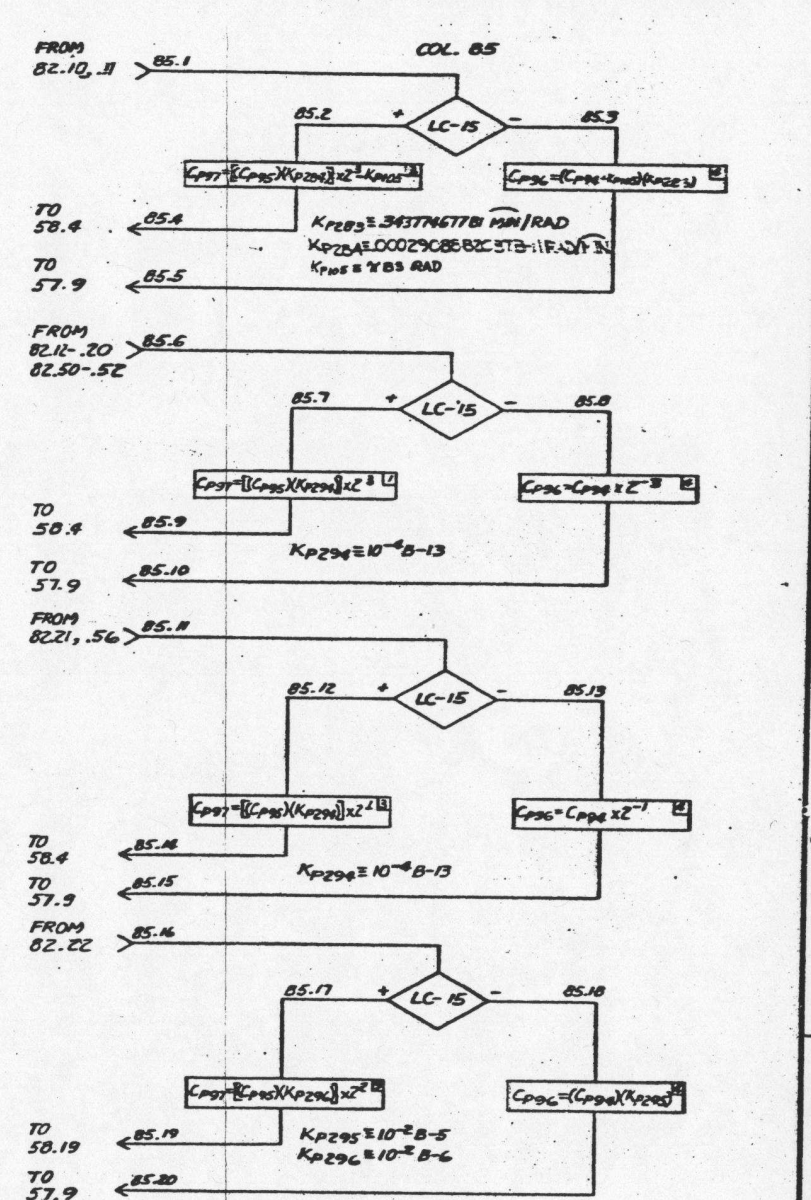
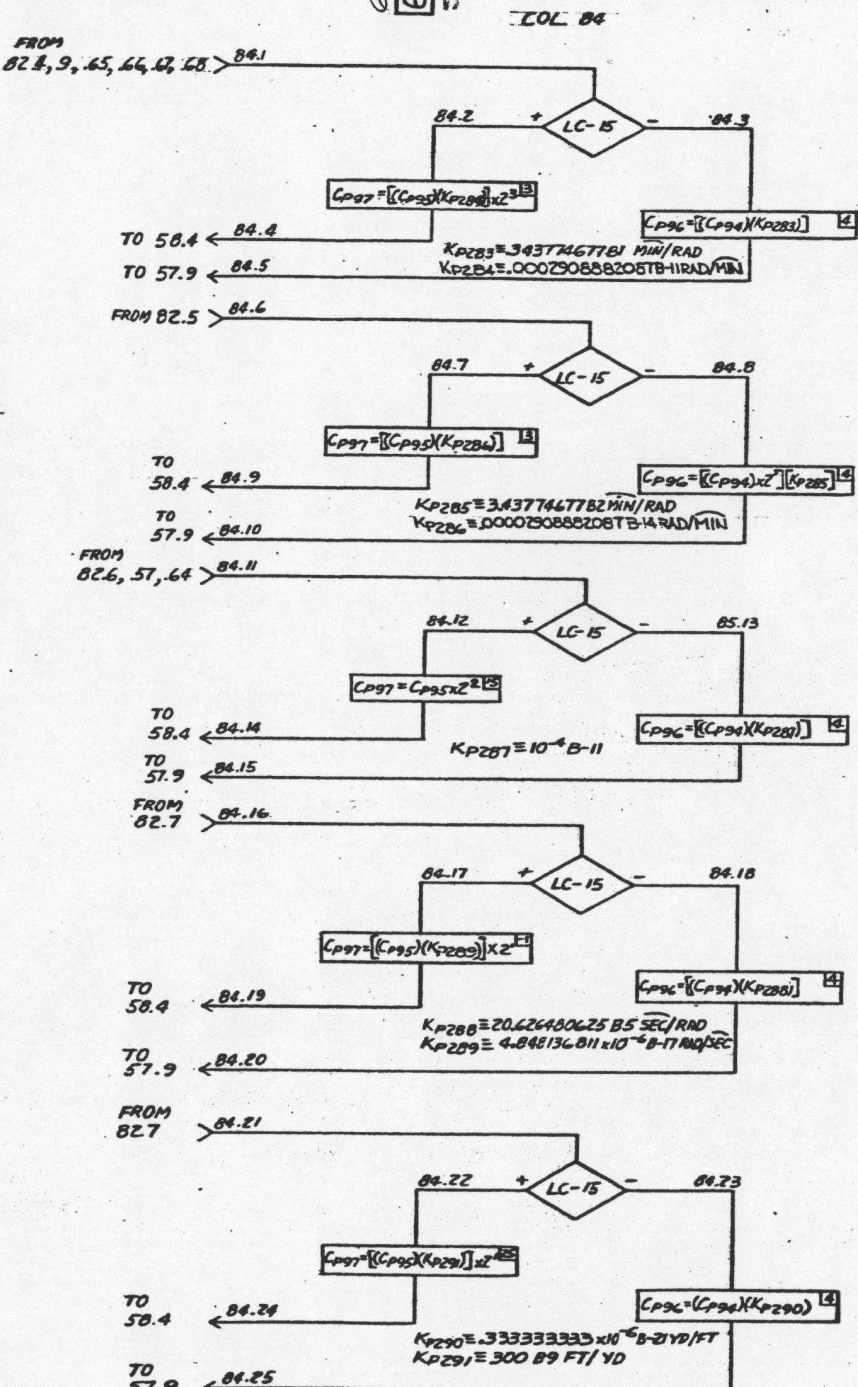
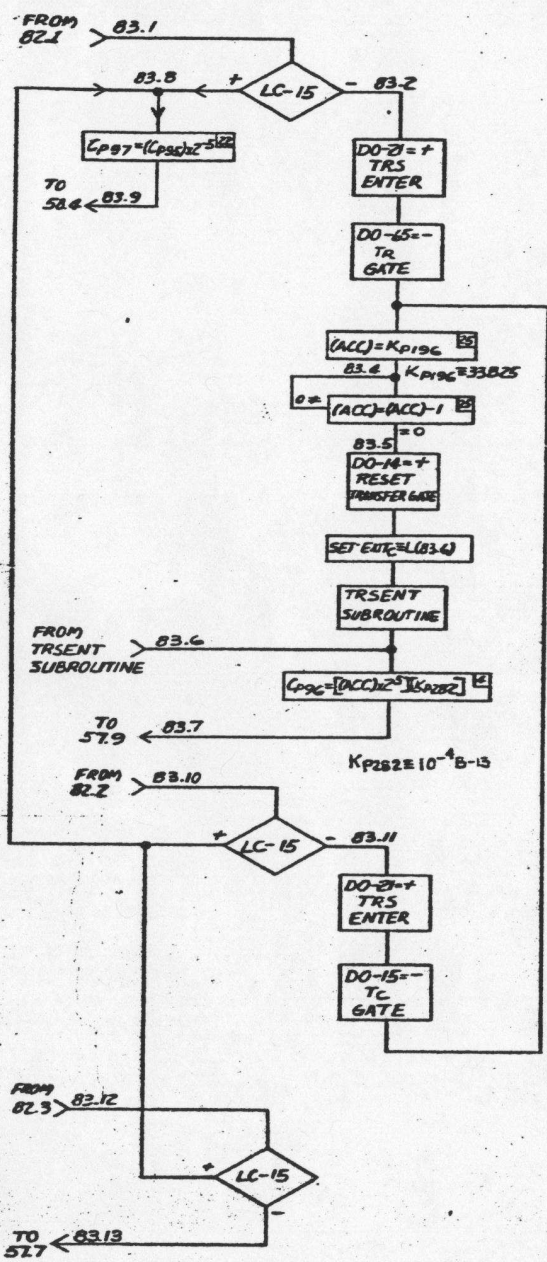


QTY	SYMBOL	ABBREVIATURE OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	DATE	ITEM NO.
<p>INTERNATIONAL BUSINESS MACHINES CORP.            FEDERAL SYSTEMS DIVISION            650 MADISON AVE.            NEW YORK 22, N.Y.</p> <p>TITLE  <b>GEMINI-165-COMPUTER MATH FLOW DIAGRAM</b></p> <p>CODE IDENT NO. <b>03640 F</b> DRAWING NO. <b>6444540 S/N2</b></p> <p>SCALE <b>BY</b> SHEET <b>23</b></p>							

GEMINI MDIU TRANSFER BLOCK  
COL. 82

GEMINI MDIU VARIABLE SCALING  
COL. 83

FROM ADDRESS	TO:
2	Tc B22(sec) → 83.10
3	Tc B22(sec) → 83.12
4	δw B3(rad) → 84.1
5	ΔM B3(rad) → 84.6
6	W B5(fps) → 84.11
7	Zw B1(rad) → 84.16
8	rw B25(fc) → 84.21
9	δT B3(rad) → 84.1
10	δr B3(rad) → 85.1
11	Δθ B3(rad) → 85.1
12	Cx1 B1 → 85.6
13	Cx2 B1 → 85.6
14	Cx3 B1 → 85.6
15	Cx4 B1 → 85.6
16	Cx5 B1 → 85.6
17	Cx6 B1 → 85.6
18	Cx7 B1 → 85.6
19	Cx8 B1 → 85.6
20	Cx9 B1 → 85.6
21	Cx10 B3 → 85.11
22	Cx11 B3(sec-rad) → 85.16
23	Cx12 B3(rad) → 86.1
24	Cx13 B4 → 86.6
25	Cx15 B10(rad) → 86.1
26	Cx16 B4 → 86.6
27	Cx17 B12(sec) → 86.11
28	Cx18 B10(rad) → 86.16
29	Δx B13(fps) → 87.1
30	Δy B13(fps) → 87.1
31	Δz B13(fps) → 87.1
32	Cx14 B12(sec) → 86.11
33	Zw B17(fc) → 88.7
34	Zw B15(fps) → 88.12
35	NOT ASSIGNED → 87.7
36	NOT ASSIGNED → 87.7
37	Cp126 B4(10 <sup>4</sup> rad) → 88.5
38	Cp125 B4(10 <sup>4</sup> rad) → 88.5
39	Cp127 B4(10 <sup>4</sup> rad) → 88.5
40	Rr B21(fc) → 87.6
41	Cx9 B-2(fps) → 87.8
42	Cx20 B-2(fps) → 87.8
43	Cx21 B-2(fps) → 87.8
44	Cx22 B-2(fps) → 87.8
45	Cx23 B-2(fps) → 87.8
46	Cx24 B-2(fps) → 87.8
47	Cx25 B-2(fps) → 87.8
48	Cx26 B-2(fps) → 87.8
49	Cx27 B-2(fps) → 87.8
50	Cx28 B1(rad) → 85.6
51	Cx29 B1(rad) → 85.6
52	Cx30 B1(rad) → 85.6
53	NOT ASSIGNED → 87.7
54	NOT ASSIGNED → 87.7
55	Δ B3(rad) → 87.12
56	δ-Δ B3(rad) → 85.11
57	1/6 B5(fps) → 87.14
58	1/6 B5(fps) → 87.14
59	1/6 B5(fps) → 87.14
60	LC-21(DCS) → 87.7
61	ΔV B12(fps) → 86.11
62	ΔV B12(fps) → 88.1
63	To B10(sec) → 88.3
64	V B15(fps) → 84.11
65	1/60 B3(rad) → 84.1
66	0.60 B3(rad) → 84.1
67	ΔV B3(rad) → 84.1
68	Δθ B3(rad) → 84.1



REVISIONS				
BY	DATE	DESCRIPTION	CHK	APPROVAL
A		RELEASE		
B			BHG	
				463

6444540  
62-542-3  
S/N 2

QTY	SYMBOL	DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR SOURCE	DATE	BY
LIST OF MATERIAL OR PARTS LIST							
DESIGNED		DATE		INTERNATIONAL BUSINESS MACHINES CORP.			
DRAWN		DATE		GENERAL SYSTEMS DIVISION			
CHECKED		DATE		590 MANHATTAN BLDG. NEW YORK 22, N.Y.			
TITLE		GEMINI-65-COMPUTER MATH FLOW DIAGRAM OPERATIONAL					
SCALE		DRAWN BY		CODE IDENT NO.		SHEET 24	
		J.W.J.		03640 F		6444540 S/N 2	
		R. Murray					



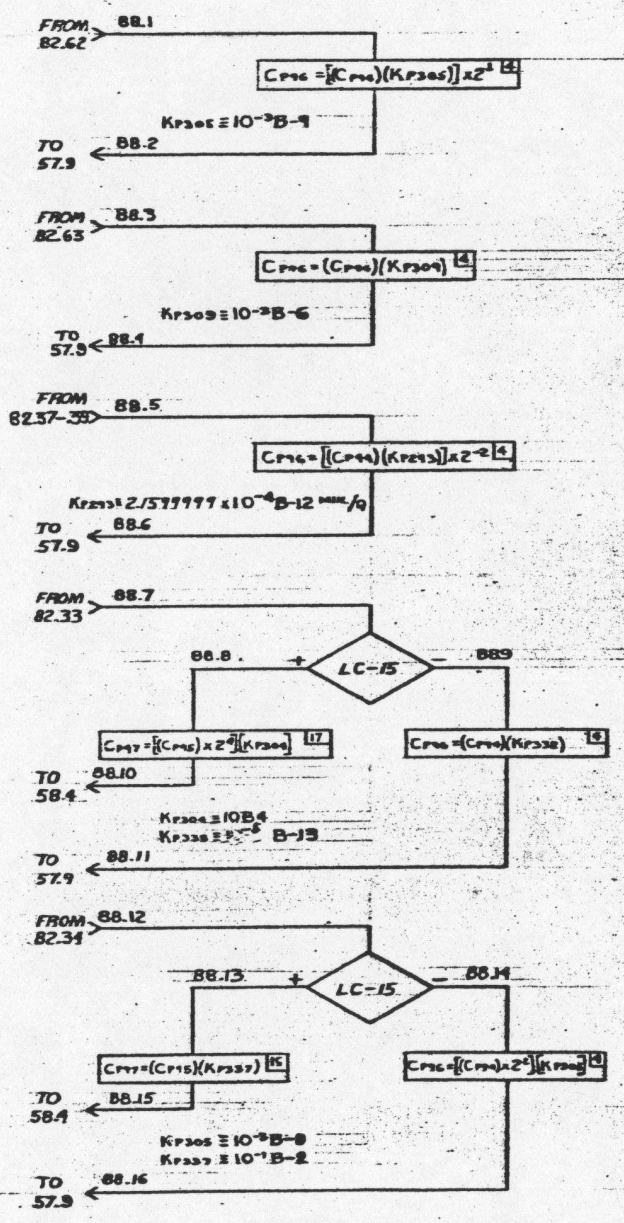
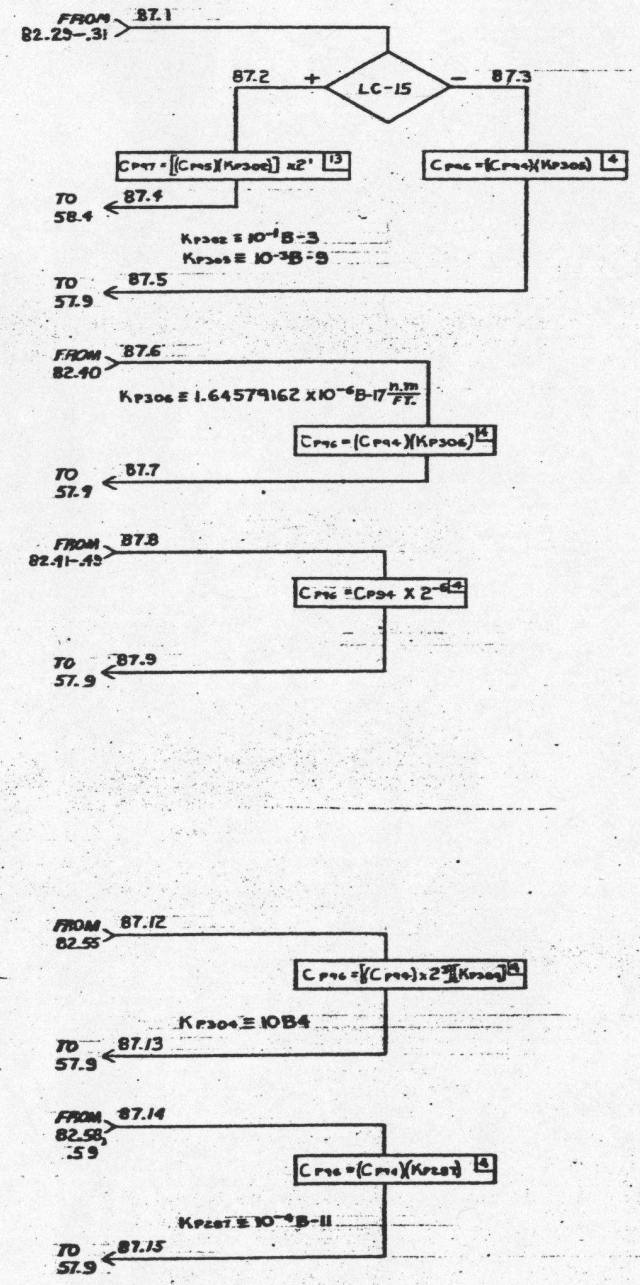
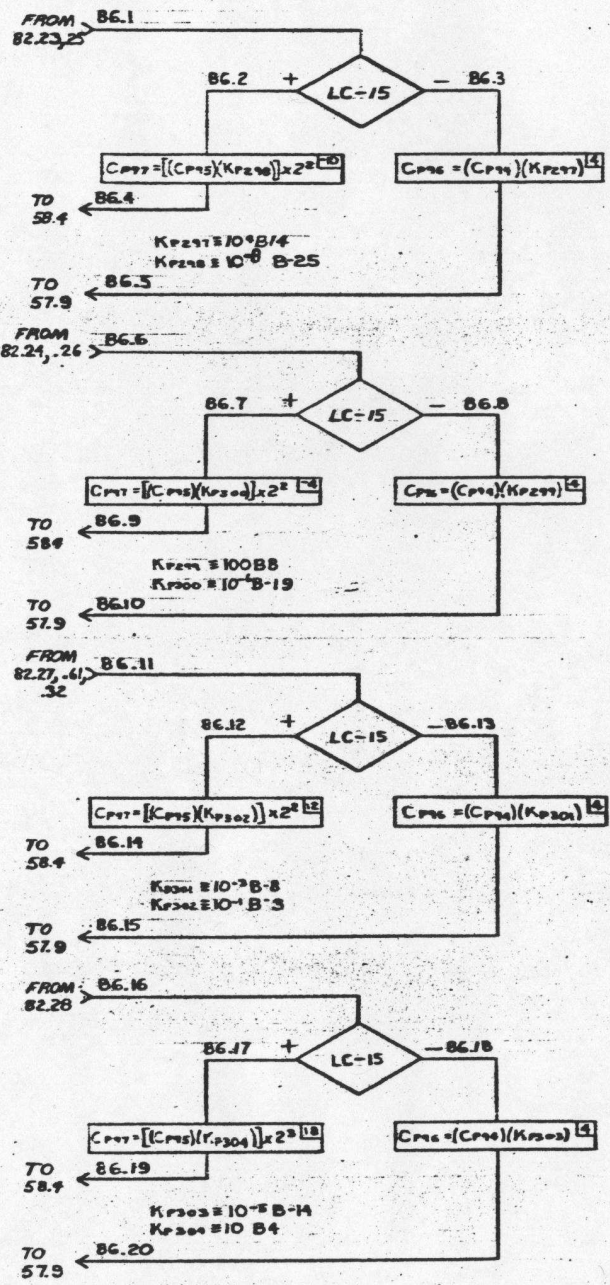
REVISIONS			
NO.	DESCRIPTION	DATE	APPROVAL
1	RELEASE		

6444540  
62-542-3  
S/N Z

GEMINI MDIU VARIABLE SCALING  
COL 86

COL 87

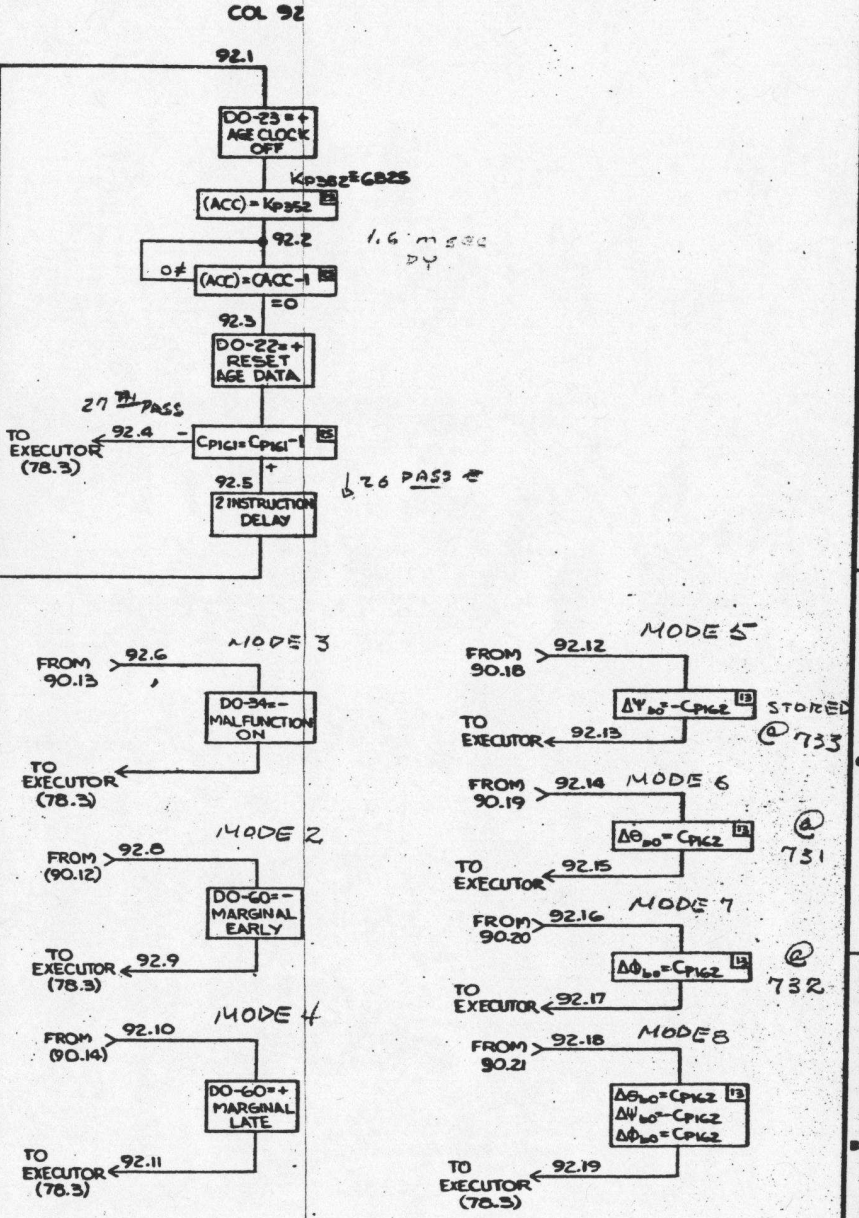
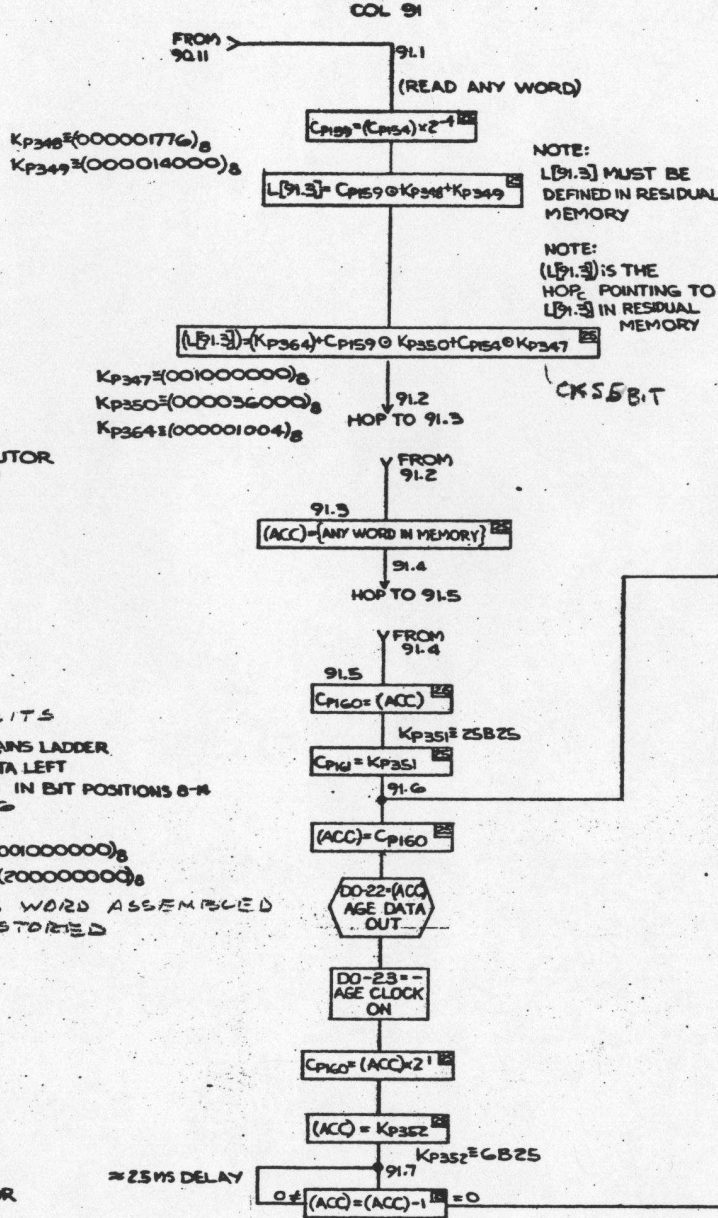
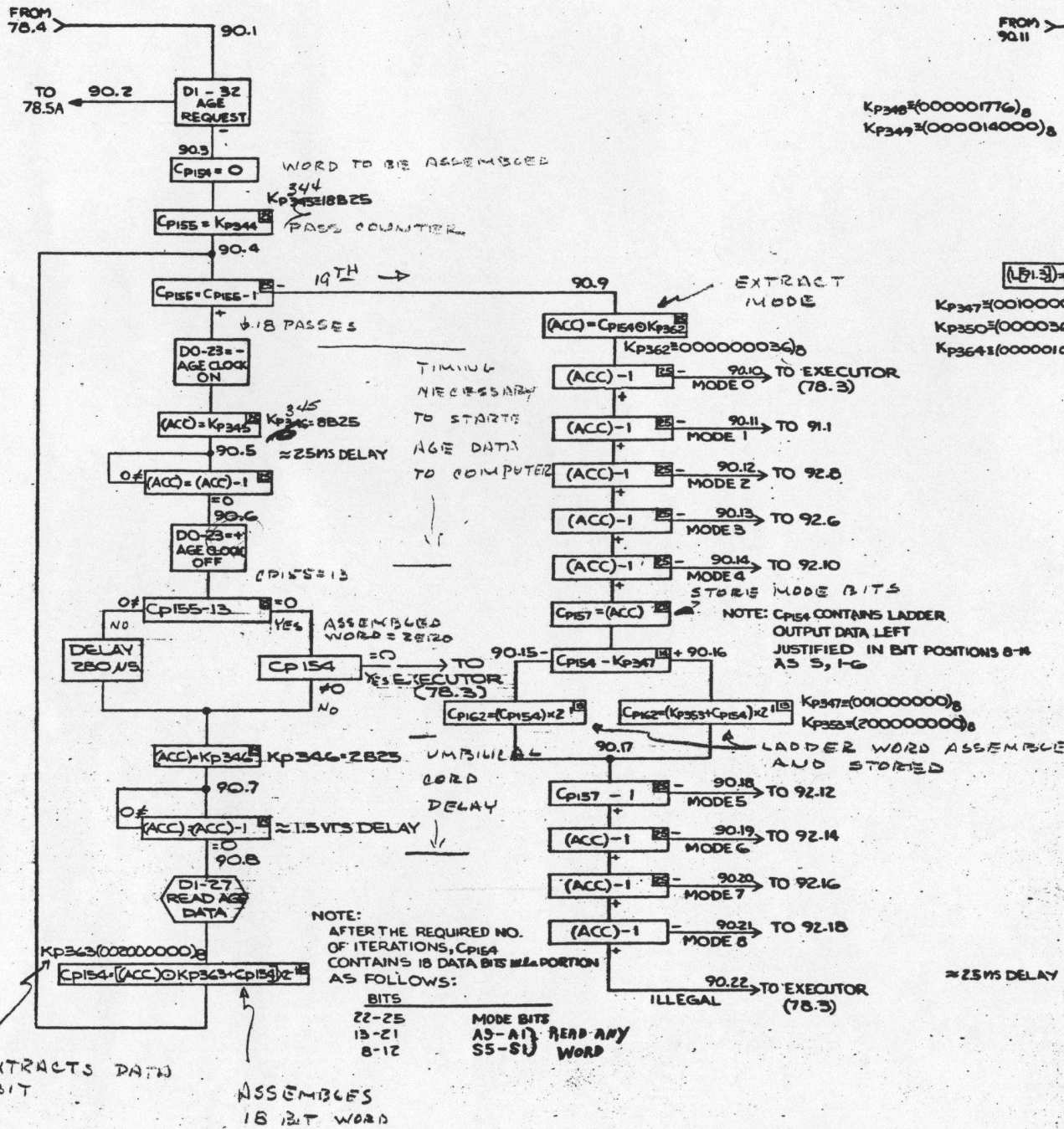
COL 88



QTY REQD	SYMBOL	ABBREVIATION OR DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	INTERNAL OR NOTES	DATE	ITEM NO.
LIST OF MATERIAL OR PARTS LIST							
DESIGNED BY		DATE		INTERNATIONAL BUSINESS MACHINES CORP. FEDERAL SYSTEMS DIVISION 500 MADISON AVE. NEW YORK 22, N.Y.			
CHECKED BY		DATE		TITLE			
DRAWN BY		DATE		GEMINI-16S-COMPUTER MATH FLOW DIAGRAM OPERATIONAL			
SCALE		DATE		DRAWN BY			
SCALE NONE		DATE		DRAWN BY			

REVISIONS				
REV. NO.	DATE	CHG.	APPROVAL	DESCRIPTION
1				RELEASE

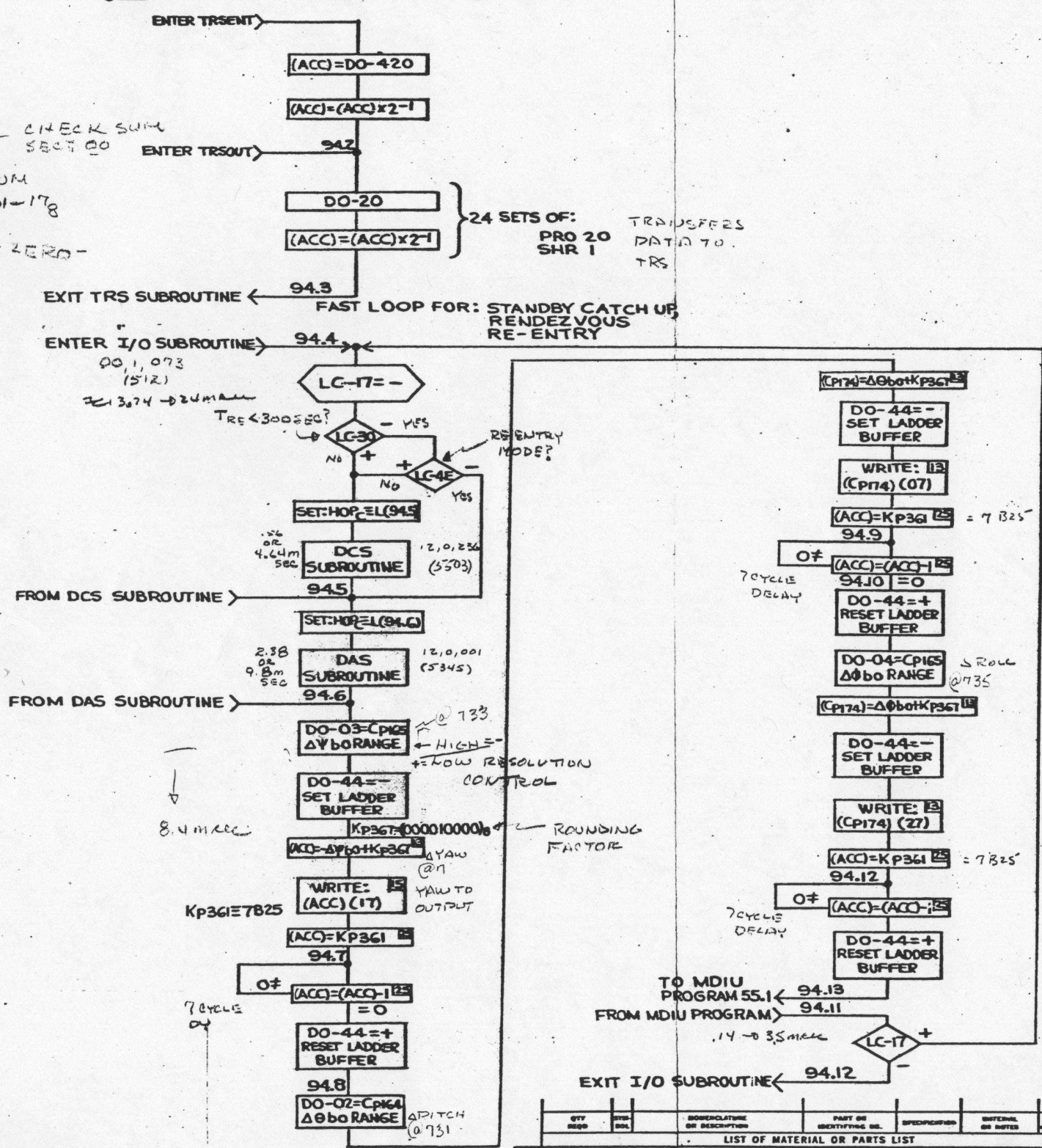
GEMINI AGE DETAIL  
COL. 90



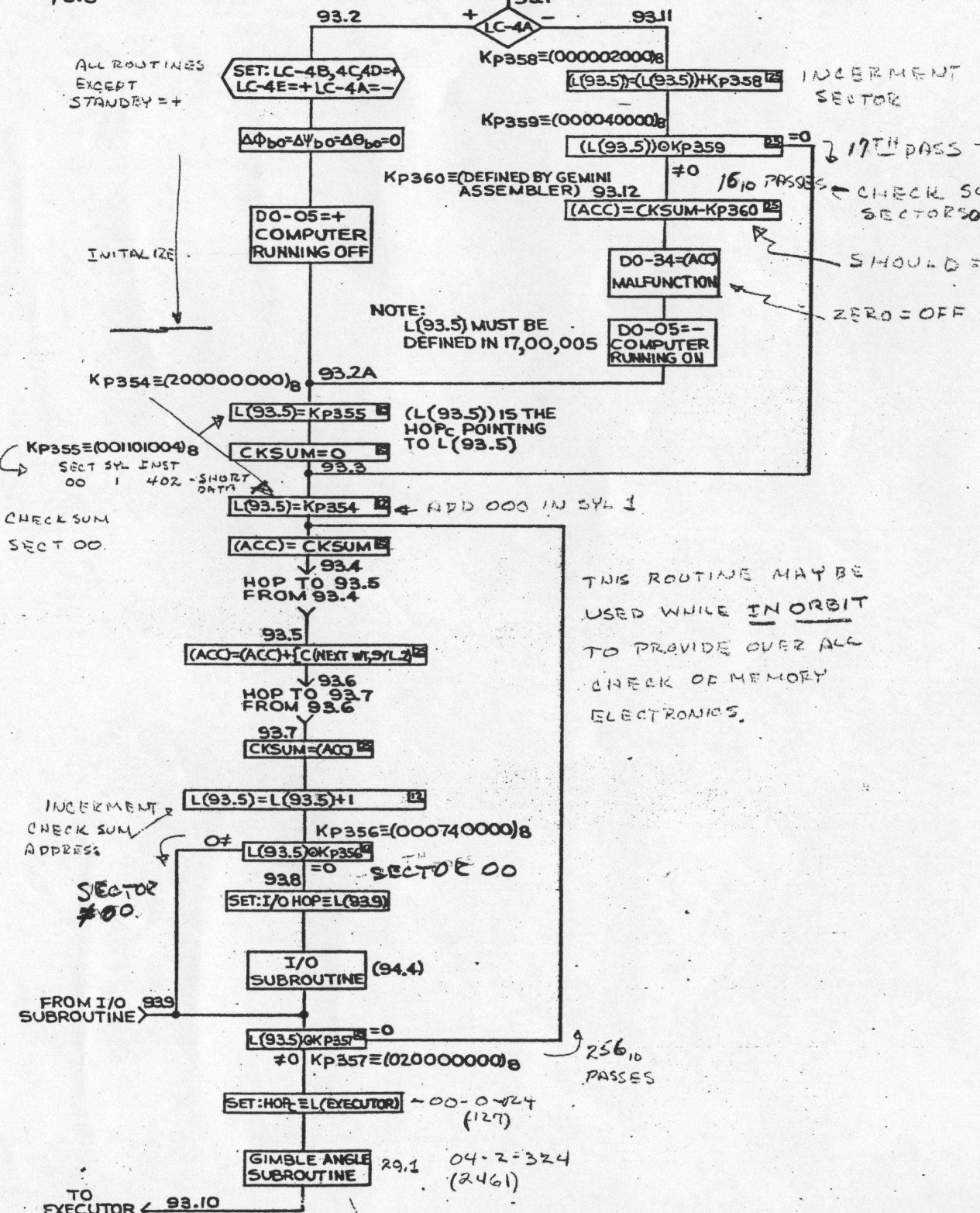
QTY	SYM.	DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	MATERIAL OR NOTES	DATE	BY	CHKD.
LIST OF MATERIAL OR PARTS LIST								
INTERNATIONAL BUSINESS MACHINES CORP. GENERAL SYSTEMS DIVISION 200 BROADWAY, NEW YORK 22, N.Y.								
GEMINI 16S COMPUTER MATH FLOW DIAGRAM OPERATIONAL								
03640 F 6444540SA.2								
SCALE NONE BY SHEET 2C								

REVISIONS				
REV	DATE	BY	CHK	APPROVAL
1				
2				
3				

GEMINI TRS+I/O SUBROUTINE  
COL. 94



GEMINI STANDBY DETAIL  
COL. 93



THIS ROUTINE MAY BE USED WHILE IN ORBIT TO PROVIDE OVER ALL CHECK OF MEMORY ELECTRONICS.

QTY	REQD	SYMBOL	DESCRIPTION	PART OR IDENTIFYING NO.	SPECIFICATION	INTERNAL OR NOTES	DATE	BY

LIST OF MATERIAL OR PARTS LIST			
QTY	REQD	SYMBOL	DESCRIPTION

UNLESS NOTED BREAK ORDERS OUTSIDE DIM MAX INSIDE ALL DIMENSIONS AND TOLERANCES APPLY TO FINISHED PART BREAK ORDERS SPECIFY DIMENSIONS TO 2 PLACE DECIMALS UNLESS OTHERWISE NOTED	DATE: 5/1/63 BY: J. J. MOONEY CHECKED: J. J. MOONEY DATE: 5/1/63	INTERNATIONAL BUSINESS MACHINES CORP. FEDERAL SYSTEMS DIVISION 500 MAIN ST. E. NEW YORK 22, N.Y.
TITLE: GEMINI, 165-COMPUTER MATH FLOW DIAGRAM OPERATIONAL		CODE SHEET NO.: 03640 SCALE: NONE SHEET: 27