TORQUE GYROS EXTENDED VERB (V42) LOGIC REV 04 11/27/68

PURPOSE: (1) TO FINE ALIGN THE STABLE MEMBER BY TORQUING THE GYROS.

(2) TO TERMINATE THE COARSE ALIGN MODE AND ENTER THE INERTIAL MODE.

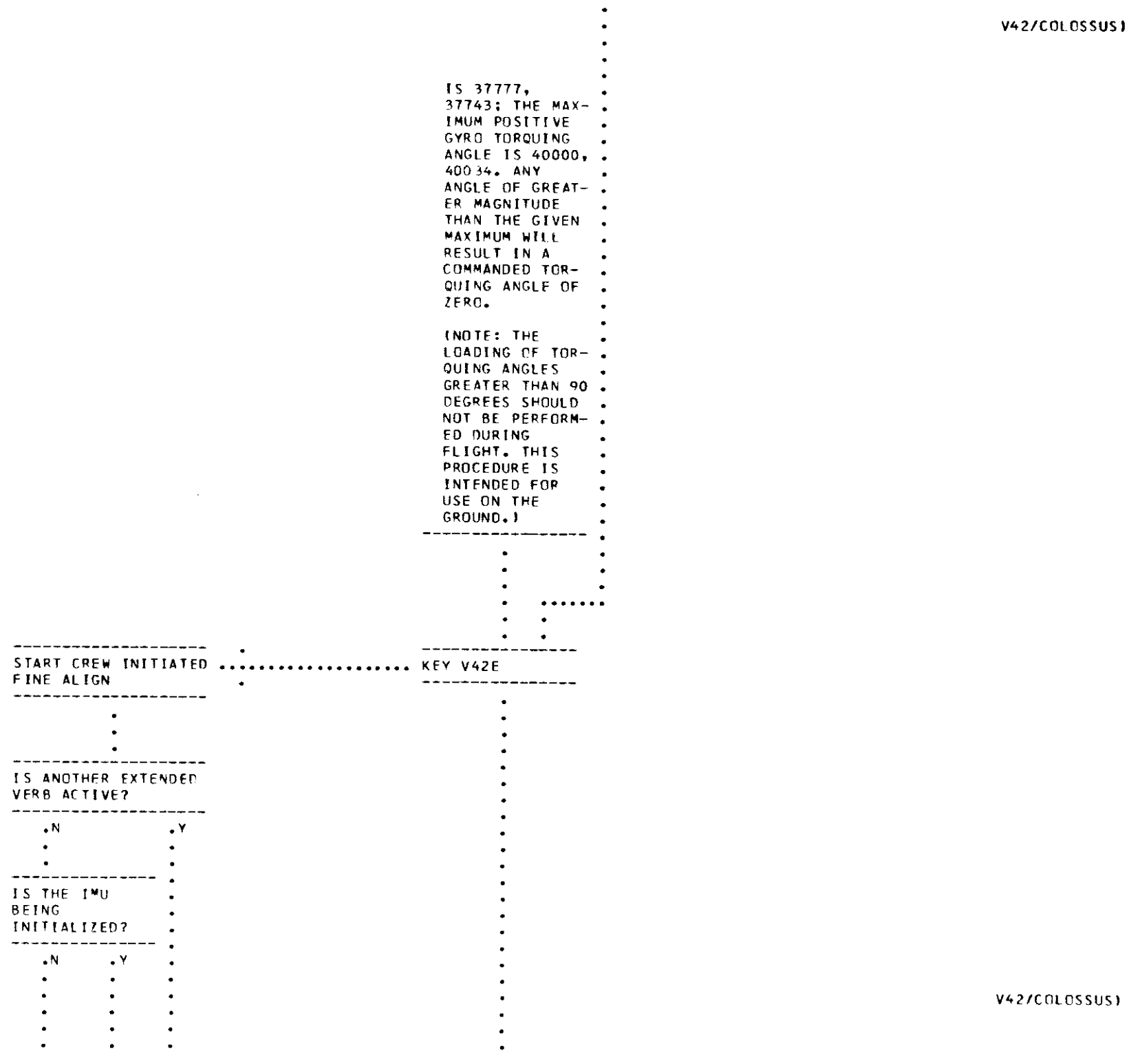
ASSUMPTIONS: (1) THE PROCESS IS CREW SELECTED BY DSKY ENTRY.

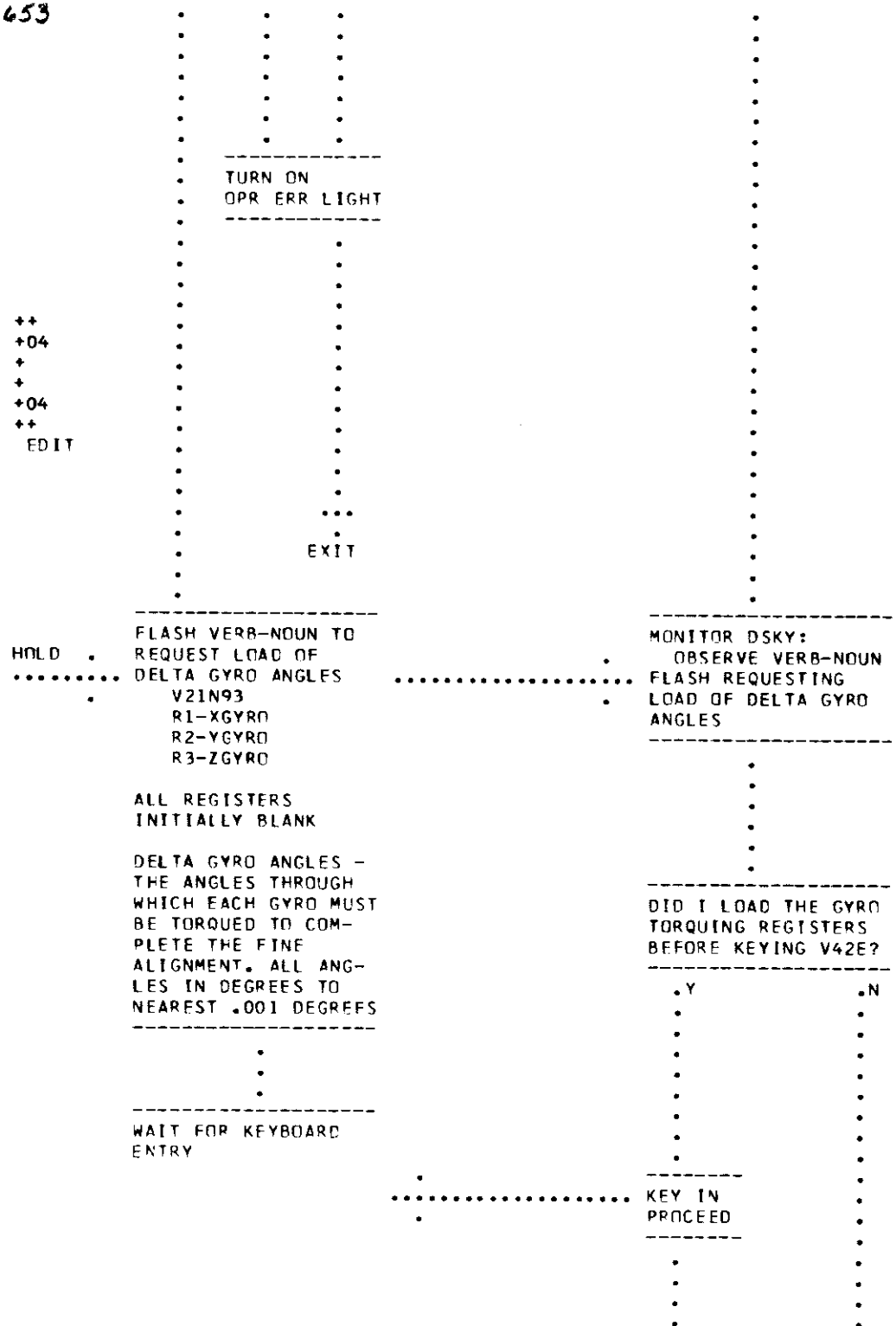
(2) THE PROCESS MAY BE SELECTED ONLY WHEN NO OTHER EXTENDED VERB IS ACTIVE.

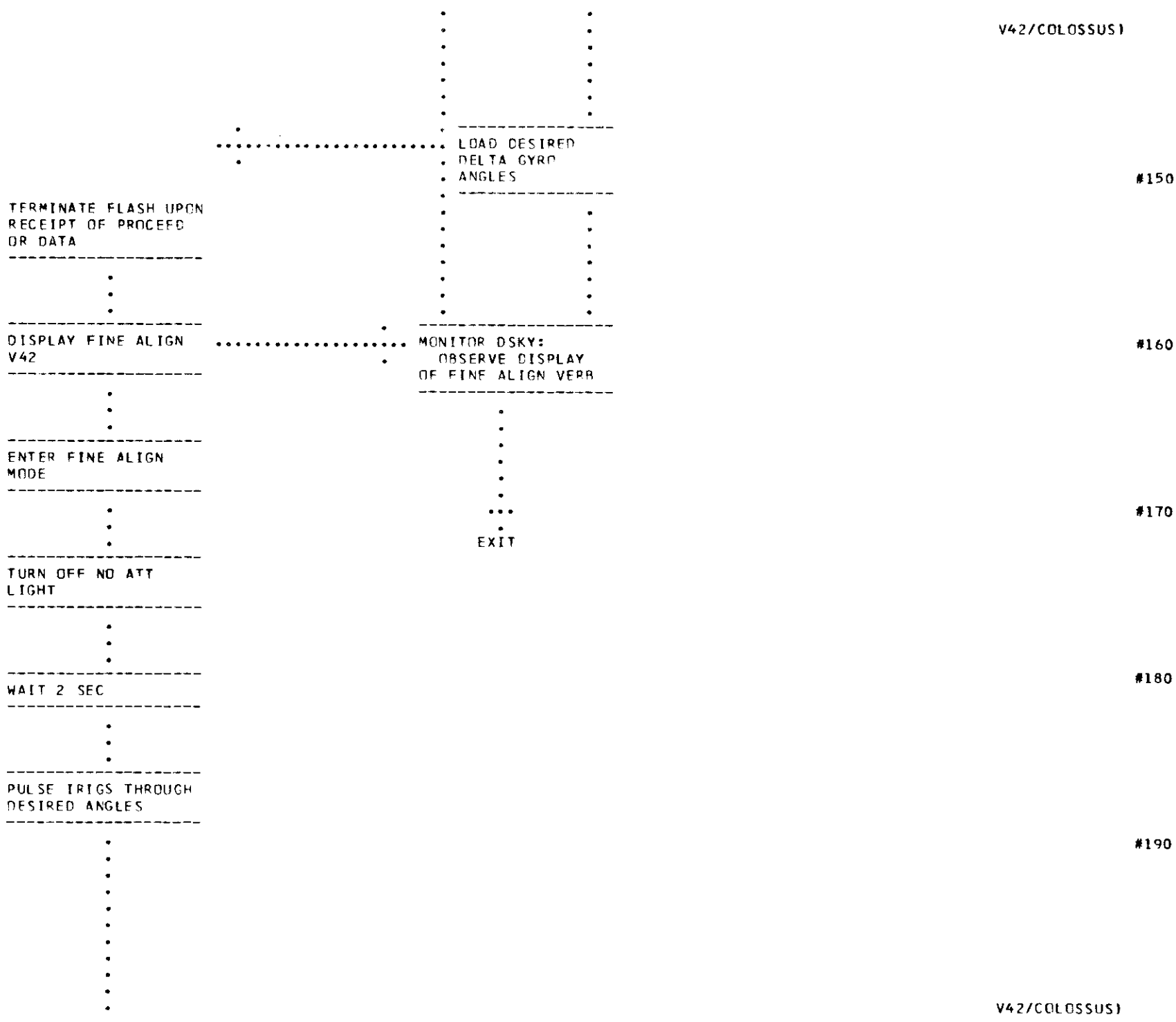
(3) THE PROCESS IS INTENDED PRIMARILY FOR USE ON THE GROUND.

PROG CONT	CMC	GROUND	CREW	CHECKLIST	TIME	TOTAL TIME
			DO I DESIRE TO LOAD A DELTA GYRO ANGLE GREATER THAN +99.999 DEGREES? -			
			.Y	.N		
			THE ASTRONAUT MUST LOAD THE THREE DOUBLE PRECISION OGC REGISTERS: KEY V21N02E 02757E XXXXXE N15E XXXXXEE YYYYYEE YYYYYEE ZZZZZEE ZZZZZE BIT 14 OF THE HIGH ORDER REPRESENTS 180 DEGREES; BIT 13, 90 DEGREES; ETC. THE MAXIMUM NEGATIVE GYRO TORQUING ANGLE			#10 #20 #30

V42/COLOSSUS)


IS 37777, 37743; THE MAXIMUM POSITIVE GYRO TORQUING ANGLE IS 40000, 40034. ANY ANGLE OF GREATER MAGNITUDE THAN THE GIVEN MAXIMUM WILL RESULT IN A COMMANDED TORQUING ANGLE OF ZERO.
(NOTE: THE LOADING OF TORQUING ANGLES GREATER THAN 90 DEGREES SHOULD NOT BE PERFORMED DURING FLIGHT. THIS PROCEDURE IS INTENDED FOR USE ON THE GROUND.)
START CREW INITIATED FINE ALIGN
KEY V42E
IS ANOTHER EXTENDED VERB ACTIVE?
.N
.Y
IS THE IMU BEING INITIALIZED?
.N
.Y
#40
#50
#60
#70
#80


V42/COLOSSUS1
#90
#100
#110
#120
#130
#140
TURN ON
OPR ERR LIGHT
EXIT
++
+04
+
+
+04
++
EDIT
HOLD
FLASH VERB-NOUN TO
REQUEST LOAD OF
DELTA GYRO ANGLES
V21N93
R1-XGYRO
R2-YGYRO
R3-ZGYRO
ALL REGISTERS
INITIALLY BLANK
DELTA GYRO ANGLES -
THE ANGLES THROUGH
WHICH EACH GYRO MUST
BE TORQUED TO COM-
PLETE THE FINE
ALIGNMENT. ALL ANG-
LES IN DEGREES TO
NEAREST .001 DEGREES
WAIT FOR KEYBOARD
ENTRY
MONITOR DSKY:
OBSERVE VERB-NOUN
FLASH REQUESTING
LOAD OF DELTA GYRO
ANGLES
DID I LOAD THE GYRO
TORQUING REGISTERS
BEFORE KEYING V42E?
.Y
.N
KEY IN
PROCEED
V42/COLOSSUS1


LOAD DESIRED DELTA GYRO ANGLES
#150
TERMINATE FLASH UPON RECEIPT OF PROCEED OR DATA
DISPLAY FINE ALIGN V42
MONITOR DSKY: OBSERVE DISPLAY OF FINE ALIGN VERB
#160
ENTER FINE ALIGN MODE
#170
EXIT
TURN OFF NO ATT LIGHT
WAIT 2 SEC
#180
PULSE IRIGS THROUGH DESIRED ANGLES
#190

++
+04
++
EDIT

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    .
    .
    .
    .
    .
    .
   ...
    .
EXIT
```

CHANGE CONTROL NOTES

REV 03 PCR 206
    04 EDITORIAL

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LOAD FDAI ERROR NEEDLES EXTENDED VERB (V43) LOGIC REV 04 11/27/68

PURPOSE: (1) TO LOAD ASTRONAUT SPECIFIED ANGLES INTO THE FDAI ERROR NEEDLES.

ASSUMPTIONS: (1) THE PROCESS IS CREW SELECTED BY DSKY ENTRY.

(2) IF LIFTOFF HAS OCCURRED, THE PROCESS MAY BE SELECTED ONLY WHEN NO OTHER EXTENDED VERB IS ACTIVE. IF LIFTOFF HAS NOT OCCURRED, ANY OTHER EXTENDED VERB IN PROCESS WILL BE OVERRIDDEN.

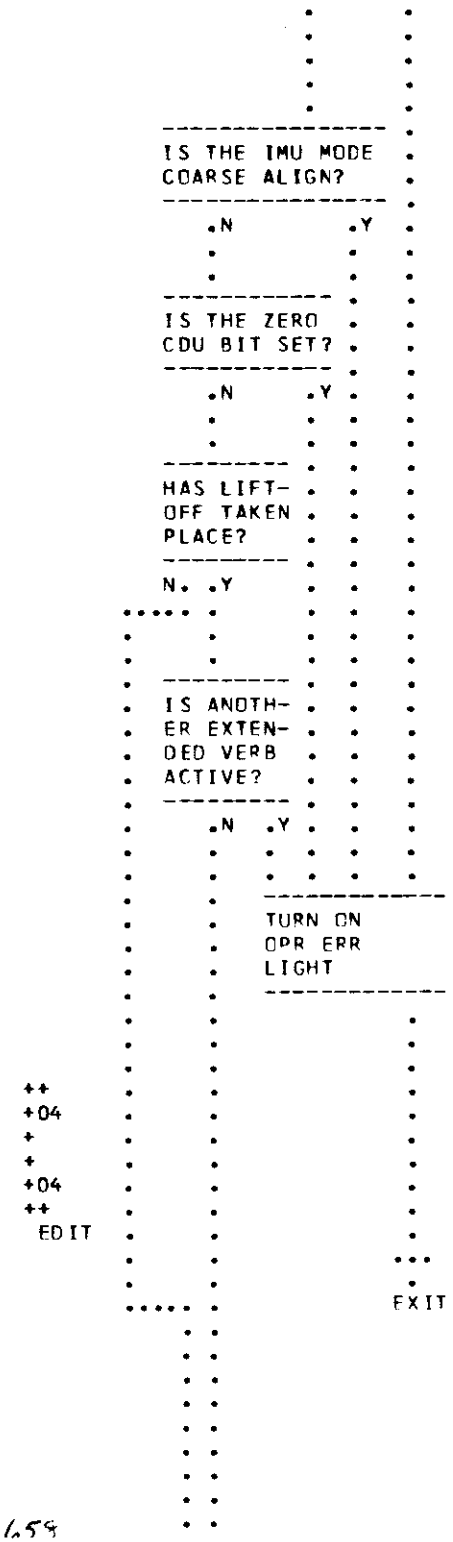
(3) THE PROCESS MAY NOT BE SELECTED IF THE IMU IS IN THE COARSE ALIGN OR ZERO ICDU MODE.

(4) THE PROCESS IS INTENDED PRIMARILY FOR USE ON THE GROUND.

(5) THE MAXIMUM ERROR ANGLE WHICH MAY BE LOADED IS +/- 16.88 DEGREES. ANY VALUE GREATER THAN THIS MAXIMUM WILL BE INTERPRETED AS =16.88 DEGREES. THE ASTRONAUT SHOULD SELECT THE FDAI SCALE APPROPRIATE TO THE ERROR ANGLES HE WISHES DISPLAYED. THE MAXIMUM ANGLES WHICH MAY BE SHOWN ON THE ERROR NEEDLES ARE: PITCH AND YAW -15 DEGREES; ROLL -50 DEGREES.

(6) THE PROCESS MAY BE SELECTED ONLY IN P00.

PROG CONT	CMC	GROUND	CREW	CHECKLIST	TIME	TOTAL TIME
			CREW PROG. SELECTION			
	START CREW INITIATED LOAD IMU ATTITUDE ERROR NEEDLES		KEY IN V43E			#10
	IS THE CMC IDLING PROGRAM (P00) IN PROCESS?					#20
	.Y	.N			V43/COLOSSUS	


IS THE IMU MODE COARSE ALIGN?
.N
.Y
IS THE ZERO CDU BIT SET?
.N
.Y
HAS LIFT-OFF TAKEN PLACE?
N. .Y
IS ANOTH-ER EXTEN-DED VERB ACTIVE?
.N
.Y
TURN ON OPR ERR LIGHT
++
+04
+
+
+04
++
EDIT
EXIT

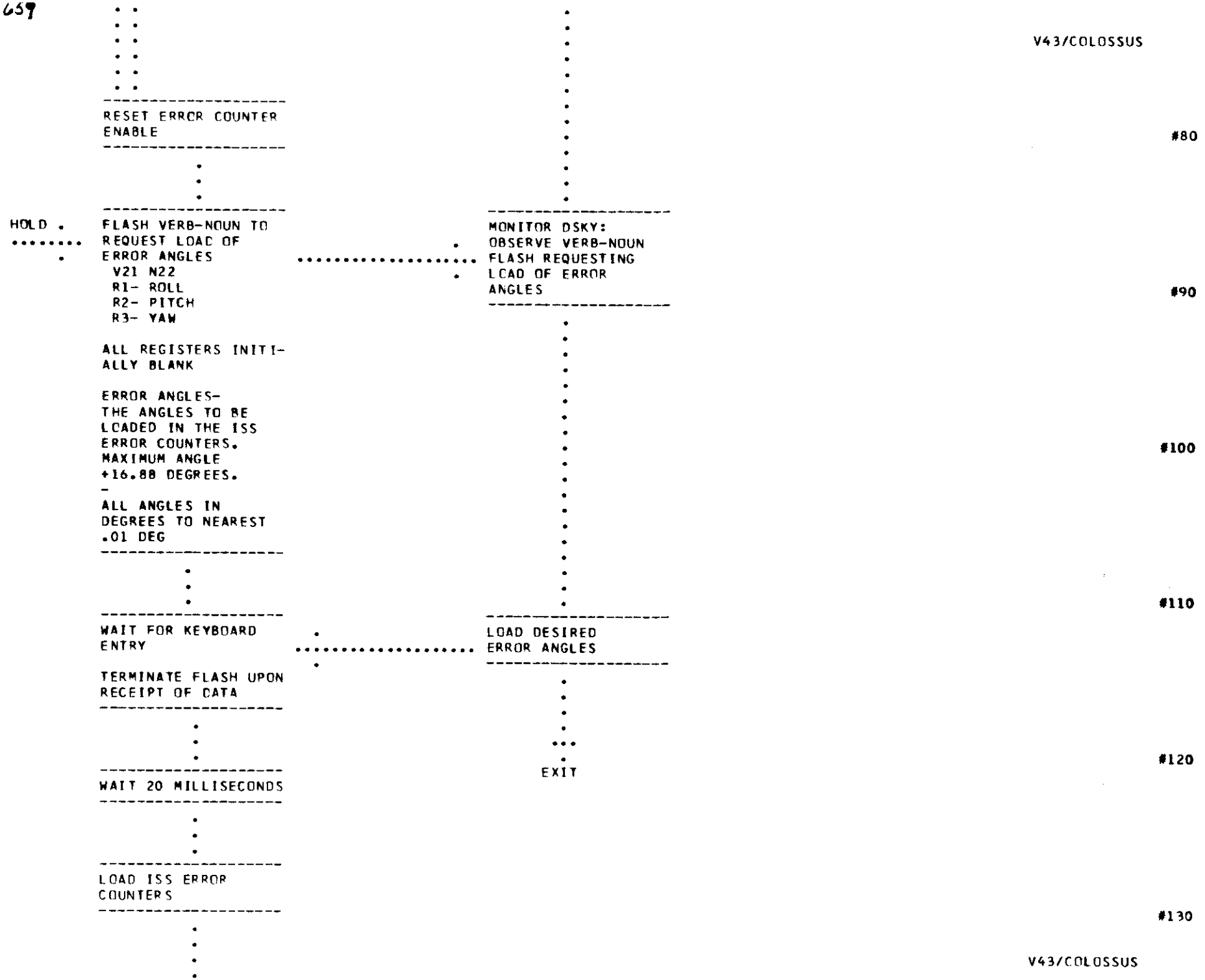
#30

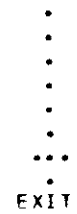
#40

#50

#60

#70


RESET ERROR COUNTER ENABLE
HOLD
FLASH VERB-NOUN TO REQUEST LOAD OF ERROR ANGLES
V21 N22
R1- ROLL
R2- PITCH
R3- YAW
ALL REGISTERS INITIALLY BLANK
ERROR ANGLES- THE ANGLES TO BE LOADED IN THE ISS ERROR COUNTERS. MAXIMUM ANGLE +16.88 DEGREES.
-
ALL ANGLES IN DEGREES TO NEAREST .01 DEG
WAIT FOR KEYBOARD ENTRY
TERMINATE FLASH UPON RECEIPT OF DATA
WAIT 20 MILLISECONDS
LOAD ISS ERROR COUNTERS
MONITOR DSKY: OBSERVE VERB-NOUN FLASH REQUESTING LOAD OF ERROR ANGLES
LOAD DESIRED ERROR ANGLES
EXIT
#80
#90
#100
#110
#120
#130



CHANGE CONTROL NOTES

LOGIC REV 03 PCR MIT 66
          04 EDITORIAL

SET SURFACE FLAG EXTENDED VERB 44 LOGIC REV 01 11/27/68

PURPOSE: (1) TO SET THE SURFACE FLAG

ASSUMPTIONS: (1) THE PROCESS IS CREW SELECTED BY DSKY ENTRY.

PROG CONT	CMC	GROUND	CREW	CHECKLIST	TIME	TOTAL TIME
	START CREW INITIATED SET SURFACE FLAG PROCESS		KEY IN V44E			
	SET SURFACE FLAG					#10
	EXIT					

CHANGE CONTROL NOTES

LOGIC REV 01 PCN 515

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RESET SURFACE FLAG EXTENDED VERB 45 LOGIC REV 01 11/27/68

PURPOSE: (1) TO RESET THE SURFACE FLAG

ASSUMPTIONS: (1) THE PROCESS IS CREW SELECTED BY DSKY ENTRY.

PROG CONT	CMC	GROUND	CREW	CHECKLIST	TIME	TOTAL TIME
	START CREW INITIATED RESET SURFACE FLAG PROCESS		KEY IN V45E			
	RESET SURFACE FLAG					#10
	EXIT					

CHANGE CONTROL NOTES

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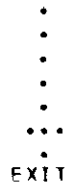
ESTABLISH G+C CONTROL EXTENDED VERB 46 LOGIC REV 01 11/27/68

PURPOSE: (1) TO ACTIVATE THE DAP.

ASSUMPTIONS: (1) THE PROCESS IS CREW SELECTED BY V46E.



CHANGE CONTROL NOTES

LOGIC REV 01 PCN 515

MOVE OTHER VEHICLE STATE VECTOR TO THIS VEHICLE STATE VECTOR (V47) LOGIC REV 01 11/27/68

PURPOSE: (1) TO TRANSFER THE LM STATE VECTOR INFORMATION TO THE CSM STATE VECTOR.

ASSUMPTIONS: (1) THIS TRANSFER OF THE STATE VECTOR INFORMATION MAY BE ACCOMPLISHED AT ANY TIME.

(2) THE PROCESS IS CREW SELECTED BY DSKY ENTRY.

PROG CONT	CMC	GROUND	CREW	CHECKLIST	TIME	TOTAL TIME
	START CREW INITIATED STATE VECTOR TRANSFER. (LM TO CM)		KEY IN V47E			
	IS INTEGRATION IN PROCESS?					#10
	Y: COMPLETE INTEGRATION					#20
	N: TRANSFER OTHER VEHICLE STATE VECTOR TO THIS VEHICLE STATE VECTOR.					#30

```
        .
        .
        .
        .
        .
      EXIT
```

#40

CHANGE CONTROL NOTES

LOGIC REV 01 PCN 515

NOTE: THIS EXTENDED VERB IS USED TO CALL ROUTINE R03. SEE R03 FOR SPECIFICATION LOGIC FLOW FOR LOADING DAP DATA.

CHANGE CONTROL NOTES

LOGIC REV 01 PCN 515

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START CREW DEFINED MANEUVER LOGIC REV 01 11/27/68
EXTENDED VERB 49

NOTE: THIS EXTENDED VERB IS USED TO CALL ROUTINE R62. SEE R62 FOR THE SPECIFICATION LOGIC FLOW FOR A CREW DEFINED MANEUVER.

CHANGE CONTROL NOTES

LOGIC REV 01 PCN 515

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PLEASE PERFORM EXTENDED VERB 50 LOGIC REV 01 11/27/68

PURPOSE: (1) TO INTERRUPT A PROGRAM OR ROUTINE TO ALLOW THE ASTRONAUT TO MANUALLY ACCEPT OR REJECT THE INFORMATION DISPLAYED ON THE DSKY.

ASSUMPTIONS (1) PRESSING PROCEED ON DSKY INDICATES REQUESTED ACTION HAS BEEN PERFORMED.

(2) EXECUTION OF ENTER INDICATES THE REQUESTED ACTION IS NOT DESIRED.

(3) THIS VERB ALWAYS APPEARS FLASHING ON THE DSKY.

(4) THIS VERB IS INTERNALLY INITIATED BY THE PROGRAM AND SHOULD NOT BE SELECTED BY THE CREW.

NOTE: THIS VERB IS COMPLETELY DESCRIBED IN SECTION 4.2.2.7

CHANGE CONTROL NOTES

LOGIC REV 01 PCN 515

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PLEASE MARK V51 LOGIC REV 01 11/27/68

PURPOSE: (1) TO ALLOW THE ASTRONAUT TO OBTAIN OPTICAL SIGHTING DATA BY USE OF THE SXT, SCT, AND THE MARK BUTTON.

ASSUMPTIONS: (1) OPTICS IS ON AND OPERATIONAL.

(2) THIS VERB IS USED IN P03, R21, AND R53. REFER TO THOSE PURPOSES AND ASSUMPTIONS FOR ADDITIONAL RESTRICTIONS.

(3) THIS VERB IS INTERNALLY INITIATED BY THE PROGRAM AND SHOULD NOT BE SELECTED BY THE CREW.

NOTE: THIS VERB IS COMPLETELY DESCRIBED IN SECTION 4.2.2.8.

CHANGE CONTROL NOTES

LOGIC REV 01 PCN 515

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MARKED ON OFFSET LANDING SITE V52 LOGIC REV 01 11/27/68

PURPOSE: (1) TO SET THE INDEX OF THE OFFSET DESIGNATOR EQUAL TO THE VALUE OF THE MARK COUNTER.

ASSUMPTIONS: (1) V52E MUST BE KEYED IN BY THE ASTRONAUT AFTER MARKING ON THE OFFSET LANDING SITE.

(2) THIS VERB IS ONLY MEANINGFUL IN PROGRAM P22 THEREFORE REFER TO THE ASSUMPTIONS, PURPOSES, AND LOGIC FLOW OF P22 FOR FURTHER INSTRUCTIONS.

CHANGE CONTROL NOTES

LOGIC REV 01 PCN 515

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PLEASE MARK ALTERNATE LCS V53 LCGIC REV 01 11/27/68

PURPOSE: (1) TO ALLOW THE ASTRONAUT TO OBTAIN OPTICAL SIGHTING DATA BY USE OF ANY DESIGNATED ALTERNATE LINE OF SIGHT.

ASSUMPTIONS: (1) THIS VERB IS USED IN R23 AND R56 ONLY.
REFER TO THE PURPOSES AND ASSUMPTIONS OF THESE ROUTINES FOR ADDITIONAL RESTRUCTIONS.

(2) THIS VERB IS INTERNALLY GENERATED BY THE PROGRAM AND SHOULD NOT BE SELECTED BY THE CREW.

NOTE: THIS VERB IS COMPLETELY DESCRIBED IN SECTION 4.2.2.8.

CHANGE CONTROL NOTES

LOGIC REV 01 PCN 515

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START RENDEZVOUS BACKUP SIGHTING MARK
EXTENDED VERB 54

LOGIC REV 01 11/27/68

NOTE: THIS EXTENDED VERB IS USED TO CALL ROUTINE R23. SEE R23 FOR THE SPECIFICATION LOGIC FLOW FOR RENDEZVOUS BACKUP SIGHTING MARK PROCESS.

CHANGE CONTROL NOTES

LOGIC REV 01 PCN 515

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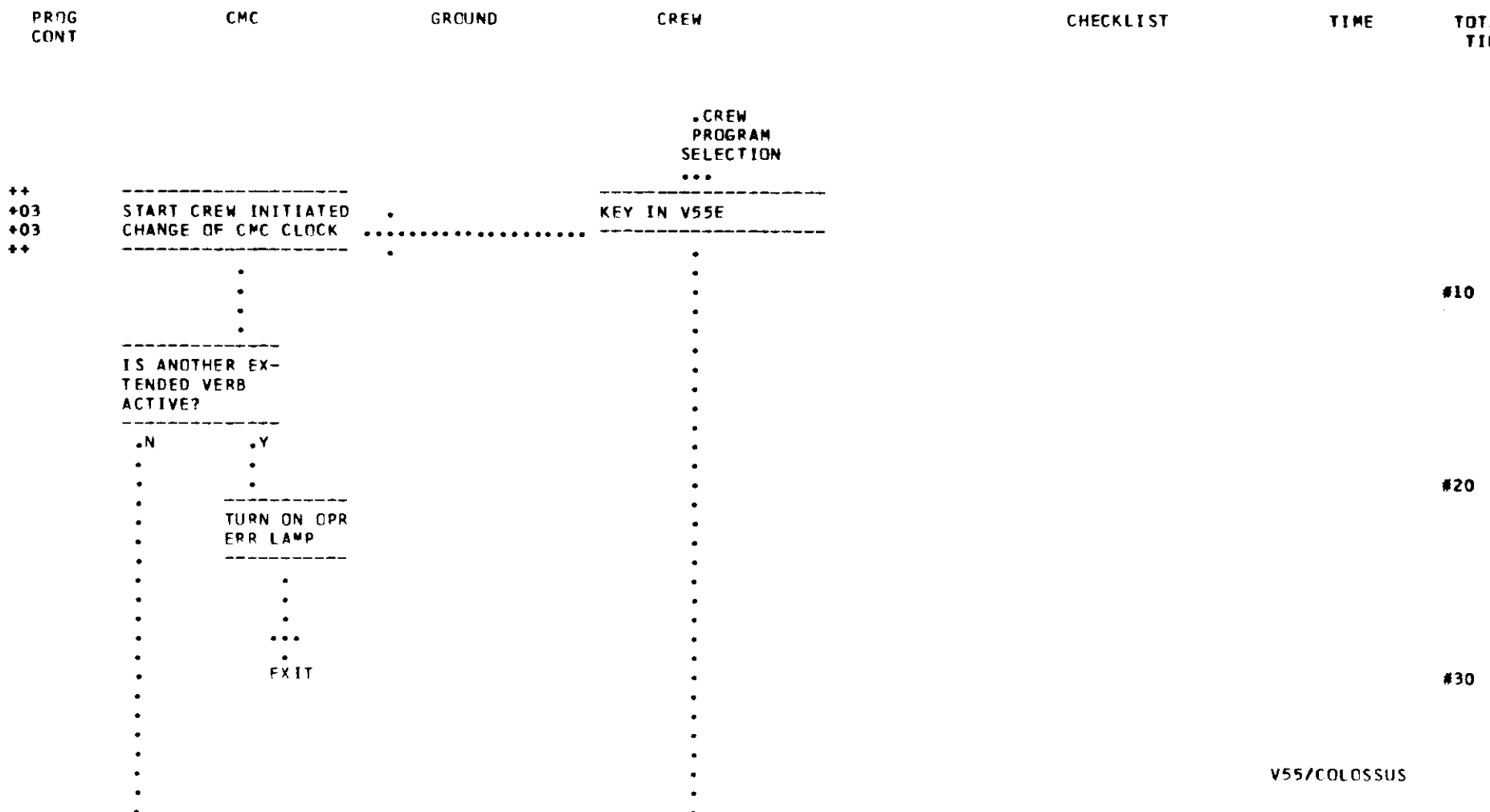
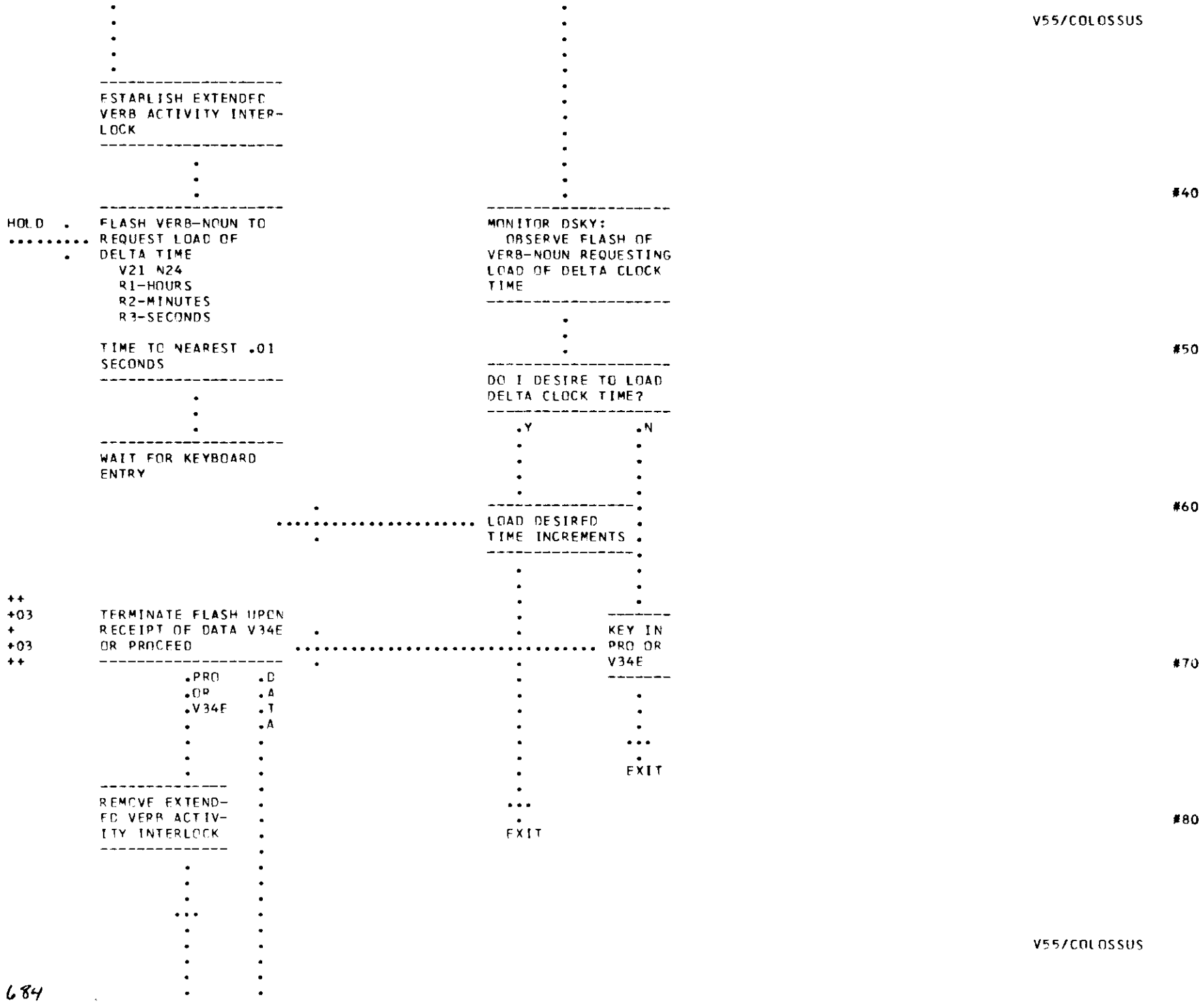
INCREMENT CMC TIME EXTENDED VERB (V55) LOGIC REV 03 03/05/68

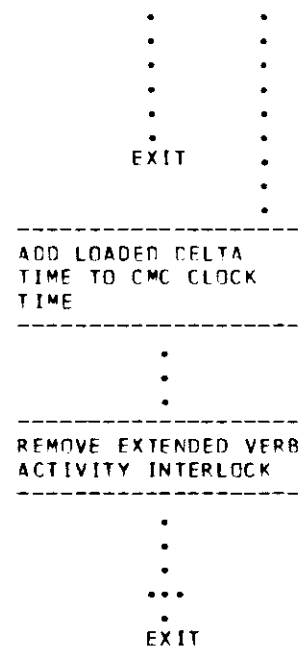
PURPOSE (1) TO CHANGE THE CMC CLOCK TIME USING INCREMENTS (OR DECREMENTS) LOADED BY THE ASTRONAUT.

ASSUMPTIONS: (1) THE PROCESS MAY BE SELECTED ONLY WHEN NO OTHER EXTENDED VERB IS ACTIVE.

(2) THE PROCESS IS CREW SELECTED BY V55E.




ESTABLISH EXTENDED VERB ACTIVITY INTER-LOCK
#40
HOLD
FLASH VERB-NOUN TO REQUEST LOAD OF DELTA TIME
V21 N24
R1-HOURS
R2-MINUTES
R3-SECONDS
TIME TO NEAREST .01 SECONDS
MONITOR DSKY:
OBSERVE FLASH OF VERB-NOUN REQUESTING LOAD OF DELTA CLOCK TIME
#50
DO I DESIRE TO LOAD DELTA CLOCK TIME?
.Y
.N
WAIT FOR KEYBOARD ENTRY
#60
LOAD DESIRED TIME INCREMENTS
KEY IN PRO OR V34E
#70
TERMINATE FLASH UPON RECEIPT OF DATA V34E OR PROCEED
.PRO
.OR
.V34E
.D
.A
.T
.A
EXIT
REMOVE EXTEND-ED VERB ACTIV-ITY INTERLOCK
EXIT
#80



#90

#100

#110

CHANGE CONTROL NOTES

LOGIC REV 03 PCR MIT 66

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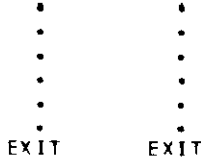
TERMINATE TRACKING EXTENDED VERB 56 LOGIC REV 01 11/27/68

PURPOSE: (1) CLEAR RENDEZVOUS, UPDATE AND TRACK FLAGS.

(2) TERMINATE PROGRAM P20.

ASSUMPTIONS: (1) PROCESS IS CREW SELECTED BY DSKY ENTRY.

PROG CONT	CMC	GROUND	CREW	CHECKLIST	TIME	TOTAL TIME
	START CREW INITIATED TERMINATE TRACKING PROCESS		KEY IN V56E			
	CLEAR RNDVZFLG, UPDATFLG, AND TRACKFLG					#10
	IS P20 THE PRESENT MAJOR MODE?					
	Y. DO ROUTINE R00					#20
	N. CONTINUE IN PRESENT MAJOR MODE					#30



CHANGE CONTROL NOTES

LOGIC REV 01 PCN 515

START RENDEZVOUS SIGHTING MARK
EXTENDED VERB 57

LOGIC REV 01 11/27/68

NOTE: THIS EXTENDED VERB IS USED TO CALL ROUTINE R21. SEE R21 FOR THE SPECIFICATION LOGIC FLOW FOR STARTING THE RENDEZVOUS SIGHTING MARK PROCESS.

CHANGE CONTROL NOTES

LOGIC REV 01 PCN 515

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691

RESET STICK FLAG EXTENDED VERB 58 LOGIC REV 01 11/27/68

PURPOSE: (1) RESET THE STICK FLAG

(2) ENABLE AUTOMATIC MANEUVERING

ASSUMPTIONS: (1) PROCESS IS CREW INITIATED BY OSKY ENTRY

PROG CONT	CMC	GROUND	CREW	CHECKLIST	TIME	TOTAL TIME
	START CREW INITIATED STICK FLAG RESET PROCESS		KEY IN V58E			
	RESET STICK FLAG					#10
	EXIT					

CHANGE CONTROL NOTES

LOGIC REV 01 PCN 515

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PLEASE MARK (OPTICS CALIBRATION) V59 LOGIC REV 01 11/27/68

PURPOSE: (1) TO ALLOW THE ASTRONAUT TO OBTAIN OPTICAL SIGHTING DATA BY USE OF THE SXT AND THE MARK BUTTON.

ASSUMPTIONS: (1) THE OPTICS IS ON AND OPERATIONAL.

(2) THIS VERB IS USED IN ROUTINE R57 ONLY.

REFER TO R57 PURPOSE AND ASSUMPTIONS FOR ADDITIONAL RESTRICTIONS.

(3) THIS VERB IS INTERNALLY INITIATED BY THE PROGRAM AND SHOULD NOT BE SELECTED BY THE CREW.

CHANGE CONTROL NOTES

LOGIC REV 01 PCN 515

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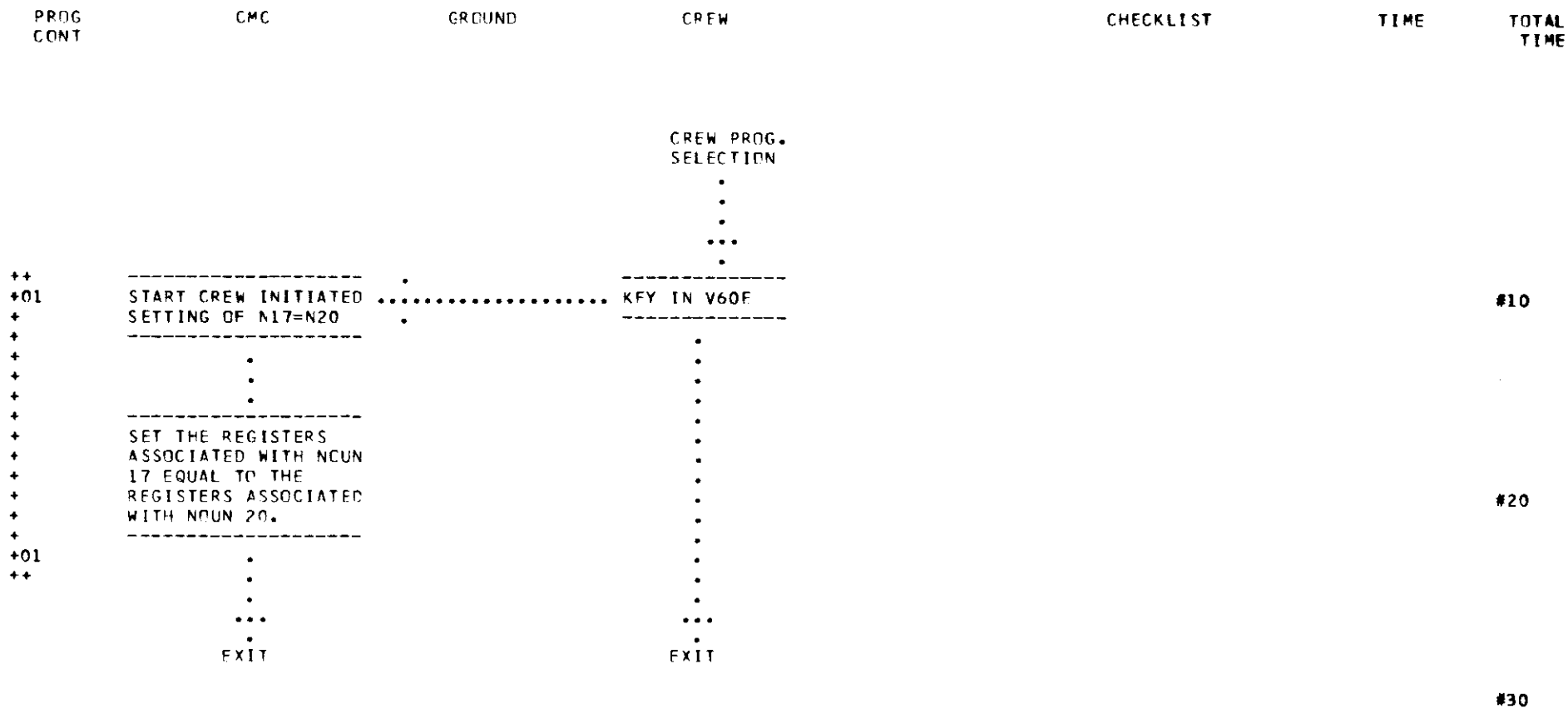
SET N17=N20 EXTENDED VERB (V60) LOGIC REV 01 04/02/68

+>
+01
PURPOSE: (1) TO SET THE ASTRONAUT TOTAL ATTITUDE REGISTERS (N17) EQUAL TO THE PRESENT ATTITUDE (N20) (PROVIDE AN "ATTITUDE SET
++ FOR MODE III).

ASSUMPTIONS: (1) THE PROCESS IS CREW SELECTED BY V60E.



CHANGE CONTROL NOTES

REV 01 PCR MIT 35 00053000

SELECT MODE 1 EXTENDED VERB (V61) LOGIC REV 02 12/20/67

PURPOSE: (1) TO DISPLAY ON THE FDAI ERROR NEEDLES THE DIFFERENCE BETWEEN THE CURRENT CDU ANGLES AND THE DAP COMMANDED ANGLES.

ASSUMPTIONS: (1) THE PROCESS IS CREW SELECTED BY DSKY ENTRY.

(2) THIS PROCESS MAY BE SELECTED AT ANY TIME.

PROG CONT	CMC	GROUND	CREW	CHECKLIST	TIME	TOTAL TIME
			CREW PROG. SELECTION			
	START CREW INITIATED MODE 1 ERROR DISPLAY		KEY IN V61E			#10
	RESET NEEDLEFLG					
	EXIT		EXIT			#20

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SELECT MODE 2 EXTENDED VERB (V62) LOGIC REV 01 12/20/67

PURPOSE: (1) TO DISPLAY THE TOTAL ATTITUDE ERROR (N22-N20) ON THE FDAI ERROR NEEDLES.

ASSUMPTIONS: (1) THE PROCESS IS CREW SELECTED BY DSKY ENTRY.

(2) THIS PROCESS MAY BE SELECTED AT ANY TIME.

PROG CONT	CMC	GROUND	CREW	CHECKLIST	TIME	TOTAL TIME
			CREW PROG. SELECTION			
	START CREW INITIATED MODE 2 ERROR DISPLAY		KEY IN V62E			#10
	SET NEEDLEFLG					
	SET BIT 6 IN FLAG WORD 9					#20
	EXIT		EXIT			#30

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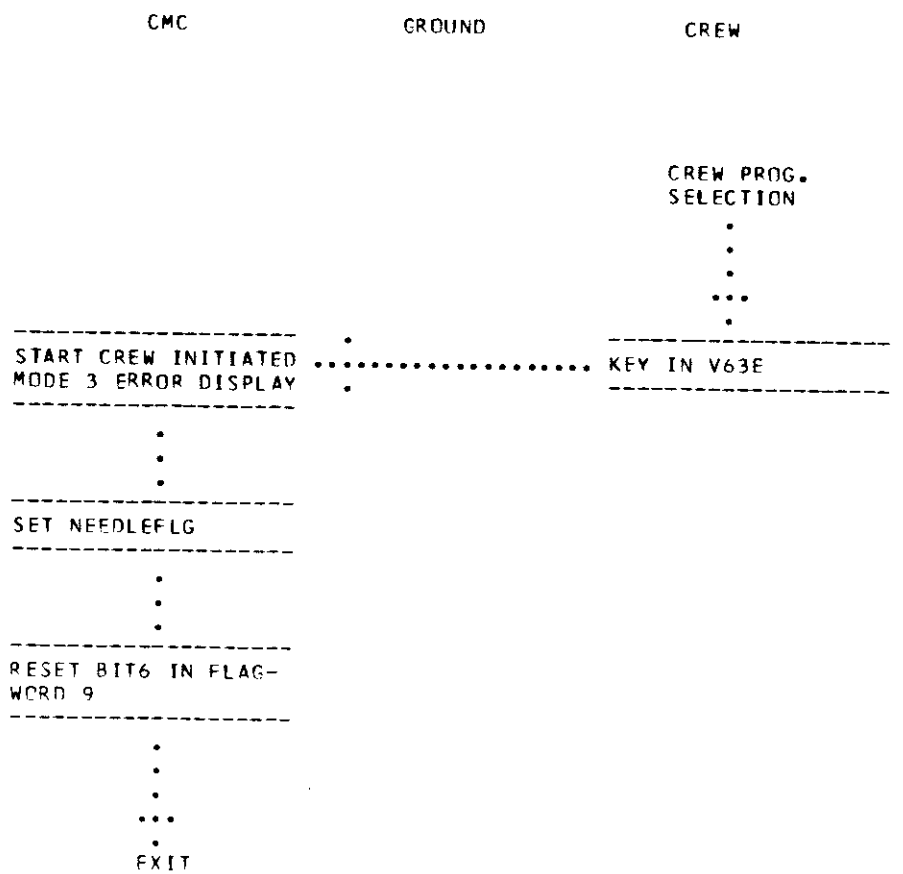
SELECT MODE 3 EXTENDED VERB (V63) LOGIC REV 02 12/20/67

PURPOSE: (1) TO DISPLAY TOTAL ASTRONAUT ATTITUDE ERROR (N17-N20) ON THE FDAI ERROR NEEDLES.

ASSUMPTIONS: (1) THE PROCESS IS CREW SELECTED BY DSKY ENTRY.

(2) THIS PROCESS MAY BE SELECTED AT ANY TIME.



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START S-BAND ANTENNA CALCULATIONS
EXTENDED VERB 64

LOGIC REV 01 11/27/68

NOTE: THIS EXTENDED VERB IS USED TO CALL ROUTINE R05. SEE R05 FOR THE SPECIFICATION LOGIC FLOW FOR STARTING THE S-BAND ANTENNA CALCULATIONS.

CHANGE CONTROL NOTES

LOGIC REV 01 PCN 515

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START OPTICAL VERIFICATION OF PRELAUNCH ALIGNMENT EXTENDED VERB 65

LOGIC REV 01 11/27/68

NOTE: THIS EXTENDED VERB IS USED TO CALL PROGRAM P03. SEE PROGRAM P03 FOR THE SPECIFICATION LOGIC FLOW FOR STARTING THE PRELAUNCH ALIGNMENT OPTICAL VERIFICATION.

CHANGE CONTROL NOTES

LOGIC REV 01 PCN 515

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MOVE THIS VEHICLE STATE VECTOR
TO OTHER VEHICLE STATE VECTOR (V66)

LOGIC REV 01 11/27/68

PURPOSE: (1) TO TRANSFER THE CSM STATE VECTOR INFORMATION TO THE LM STATE VECTOR

ASSUMPTIONS: (1) THE TRANSFER OF THE STATE VECTOR INFORMATION MAY BE ACCOMPLISHED AT ANY TIME SUBJECT TO THE NORMAL PROGRAM RESTRICTIONS

(2) THE PROCESS IS CREW SELECTED BY DSKY ENTRY.

PROG CONT	CMC	GROUND	CREW	CHECKLIST	TIME	TOTAL TIME
	START CREW INITIATED STATE VECTOR TRANS-FER (CM TO LM)		KEY IN V66E			
	IS INTEGRATION IN PROCESS					#10
	COMPLETE INTEGRATION (Y)					#20
	TRANSFER THIS VEHIC-LE STATE VECTOR TO OTHER VEHICLE STATE VECTOR (N)					#30

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     ...
      .
    EXIT
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CHANGE CONTROL NOTES

LOGIC REV 01 PCN 515

W-MATRIX RMS ERROR DISPLAY (V67) LOGIC REV 02 11/29/68

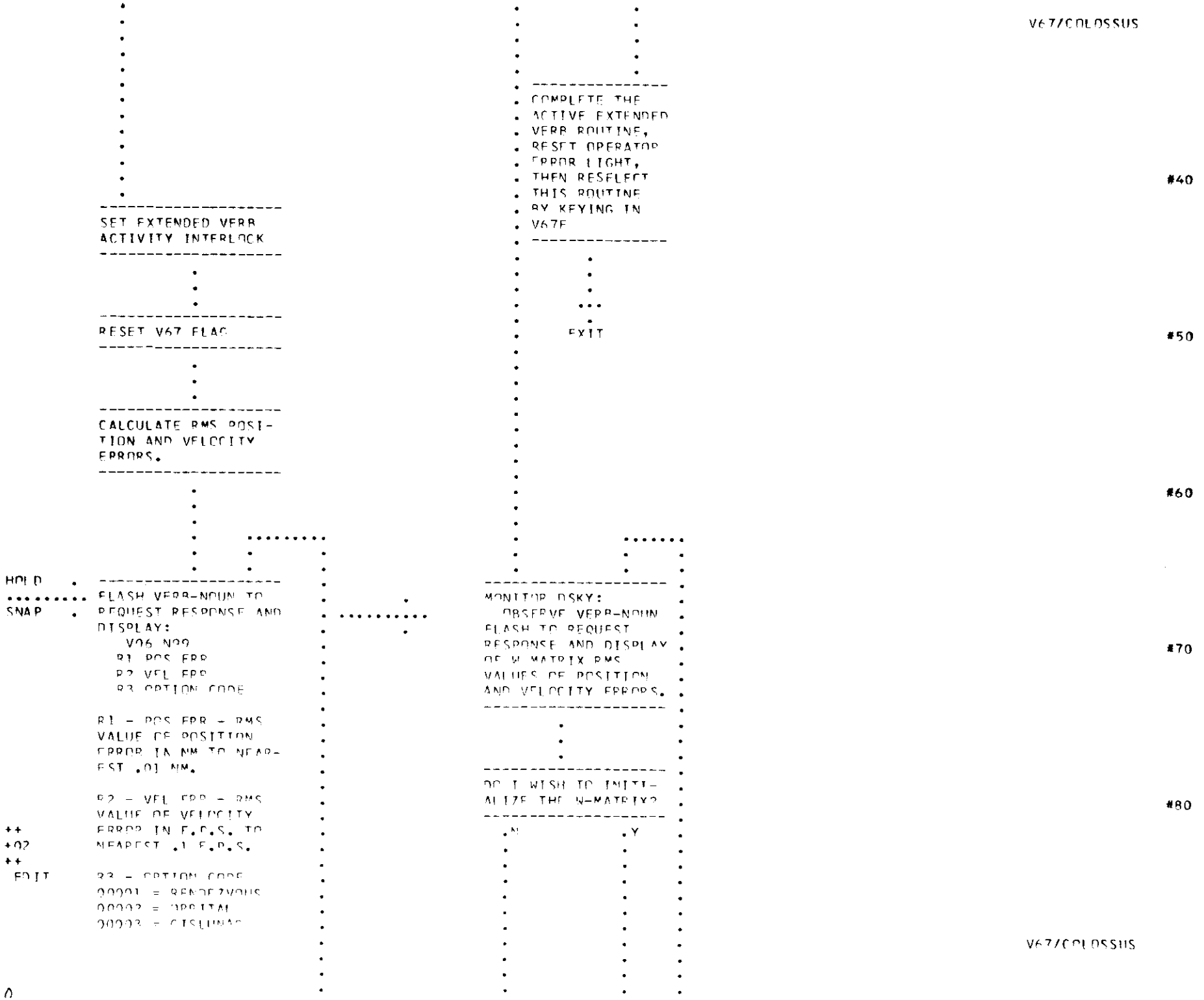
PURPOSE: (1) TO PROVIDE A MEANS OF DISPLAYING W MATRIX INFORMATION AND REINITIALIZING THE W MATRIX IF DESIRED.

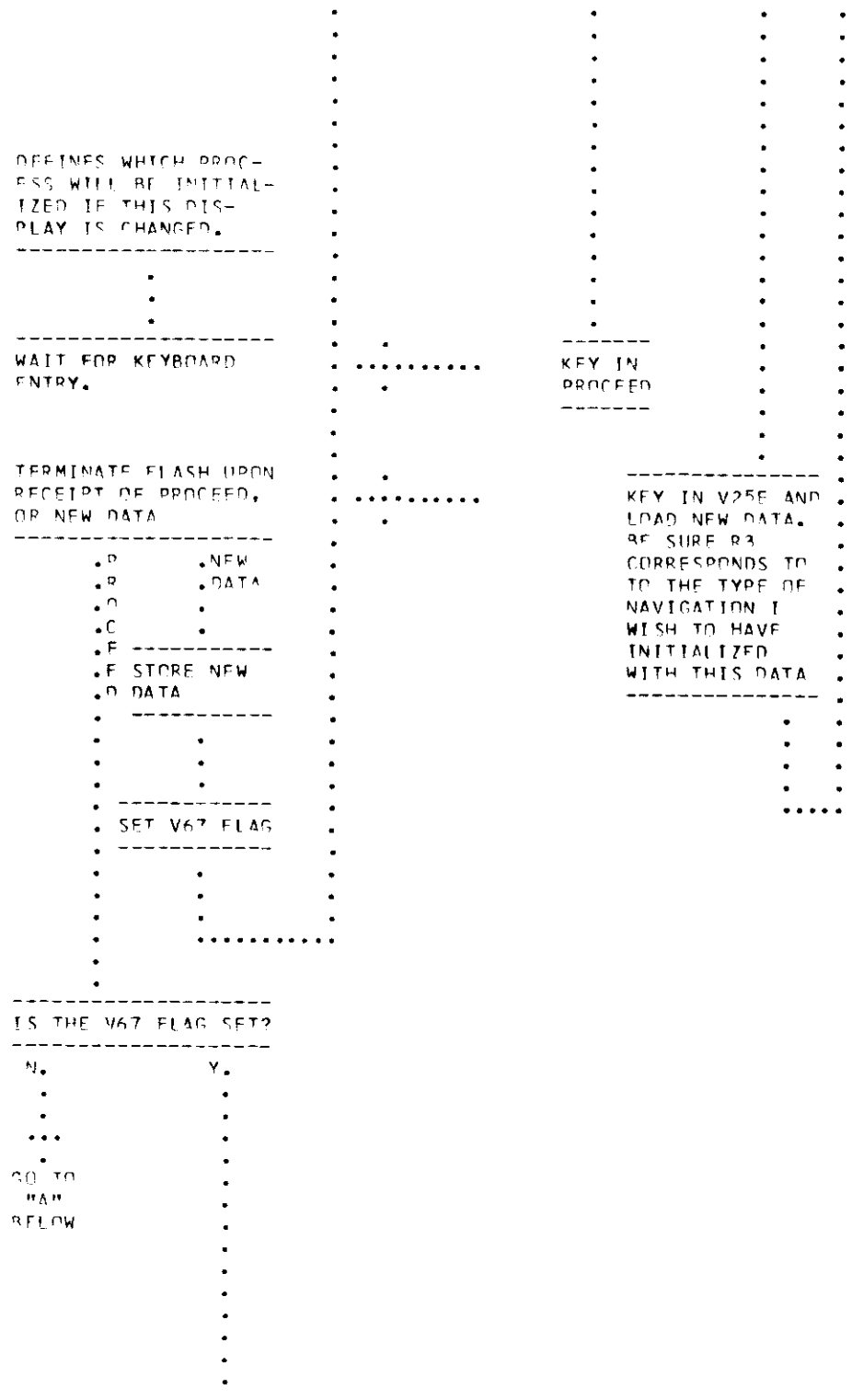
ASSUMPTIONS: (1) NO OTHER EXTENDED VERBS ARE ACTIVE.

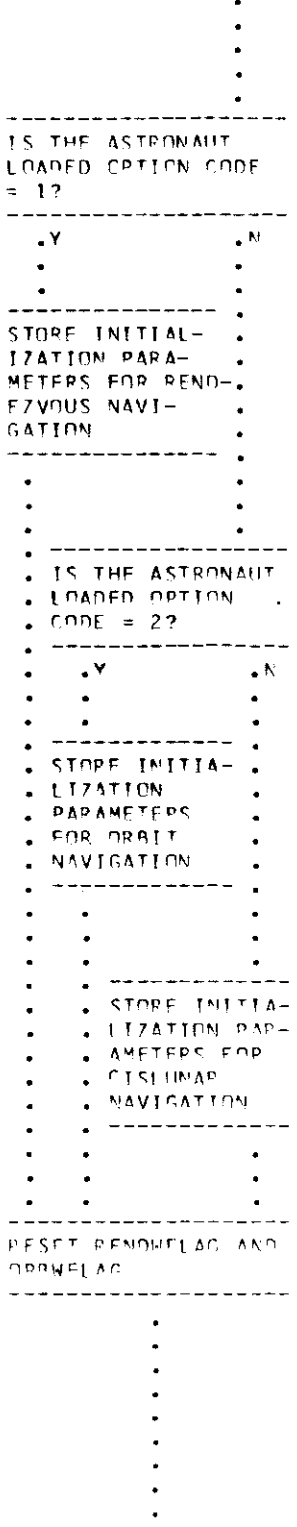
(2) THIS PROCESS IS CREW SELECTED BY DSKY ENTRY.

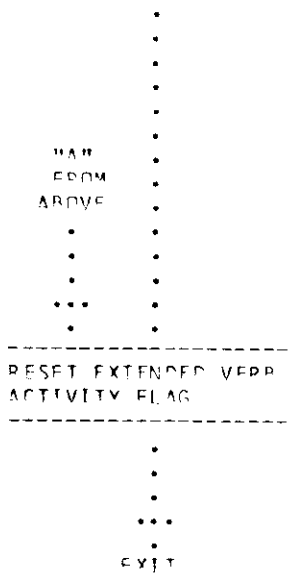
(3) IF NEW VALUES OF RMS POSITION AND VELOCITY ERRORS ARE LOADED IN THIS ROUTINE, W MATRIX INITIALIZATION OCCURS THE NEXT TIME A MEASUREMENT IS MADE.

PROG CONT	CMC	GROUND	CREW	CHECKLIST	TIME	TOTAL TIME
			CREW EXTENDED VERB SELECTION			
	START EXTENDED VERB 67 ROUTINE		KEY IN V67E			#10
	IS EXTENDED VERB ACTIVITY FLAG SET?					
	N: EXIT					#20
	Y: TURN ON OPERATOR ERROR LIGHT		MONITOR DSKY: DOES OPERATOR ERROR LIGHT COME ON INDICATING ANOTHER EXTENDED VERB IS IN PROCESS?			#30
			N:			
			Y:			


SET EXTENDED VERB ACTIVITY INTERLOCK
RESET V67 FLAG
CALCULATE RMS POSITION AND VELOCITY ERRORS.
FLASH VERB-NOUN TO REQUEST RESPONSE AND DISPLAY:
V06 N99
R1 POS ERR
R2 VEL ERR
R3 OPTION CODE
R1 = POS ERR = RMS VALUE OF POSITION ERROR IN NM TO NEAREST .01 NM.
R2 = VEL ERR = RMS VALUE OF VELOCITY ERROR IN F.P.S. TO NEAREST .1 F.P.S.
R3 = OPTION CODE
00001 = RENDEZVOUS
00002 = ORBITAL
00003 = CISLUNAR
HOLD
SNAP
++
+02
++
EDIT
COMPLETE THE ACTIVE EXTENDED VERB ROUTINE, RESET OPERATOR ERROR LIGHT, THEN RESELECT THIS ROUTINE BY KEYING IN V67E
EXIT
MONITOR DSKY:
OBSERVE VERB-NOUN FLASH TO REQUEST RESPONSE AND DISPLAY OF W MATRIX RMS VALUES OF POSITION AND VELOCITY ERRORS.
DO I WISH TO INITIALIZE THE W-MATRIX?
N
Y
#40
#50
#60
#70
#80


DEFINES WHICH PROC-
ESS WILL BE INITIAL-
IZED IF THIS DIS-
PLAY IS CHANGED.
WAIT FOR KEYBOARD
ENTRY.
KEY IN
PROCEED
KEY IN V25E AND
LOAD NEW DATA.
BE SURE R3
CORRESPONDS TO
TO THE TYPE OF
NAVIGATION I
WISH TO HAVE
INITIALIZED
WITH THIS DATA
TERMINATE FLASH UPON
RECEIPT OF PROCEED,
OR NEW DATA
PROCEED
NEW DATA
STORE NEW DATA
SET V67 FLAG
IS THE V67 FLAG SET?
N.
Y.
GO TO "A" BELOW
#90
#100
#110
#120
#130
#140


IS THE ASTRONAUT LOADED OPTION CODE = 1?
Y
N
STORE INITIAL-IZATION PARA-METERS FOR REND-EZVOUS NAVI-GATION
#150
IS THE ASTRONAUT LOADED OPTION CODE = 2?
#160
Y
N
STORE INITIA-LIZATION PARAMETERS FOR ORBIT NAVIGATION
#170
STORE INITIA-LIZATION PAR-AMETERS FOR CISLUNAR NAVIGATION
#180
RESET RENDWFLAG AND ORBWFLAG
#190



#200

#210

CHANGE CONTROL NOTES

LOGIC DEV 01 PCR-MET-193
02 [illegible]

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CSM STROKE TEST ON EXTENDED VERB (V68) — LOGIC — REV 01 — 11/27/68

PURPOSE: (1) TO GENERATE A WAVEFORM IN THE PITCH AXIS DESIGNED TO EXCITE BENDING.

ASSUMPTIONS: (1) THE PROCESS IS CREW SELECTED BY DSKY ENTRY.

(2) SECTION 3.3.9 OF R577 IS THE CONTROLLING SPECIFICATION. EXCERPTS FROM THAT SECTION ARE WRITTEN INTO THIS ASSUMPTION FOR INFORMATION ONLY.

IF THE PROCESS IS SELECTED PRIOR TO IGNITION PLUS 6 SECONDS, THE STROKE TEST WILL BE DELAYED UNTIL IGNITION PLUS 10 SECONDS.

THE WAVE FORM WILL CONSIST OF 4 SETS OF BURSTS WITH EACH SET BEING DEFINED BY THE NUMBER OF REVERSALS IN THAT SET, THE AMPLITUDE OF THE WAVE IN THE SET IN TERMS OF THE NUMBER OF BURSTS IN EACH HALF AMPLITUDE, AND THE PULSE BURST SIZE (A PAD LOADED PARAMETER). THE BURST SIZE IS THE SAME IN ALL SETS AND IS DEFINED IN TERMS OF BIT LENGTH WHERE EACH BIT IS SCALED AT 85.41 ARCSEC.

THE 4 SETS ARE DEFINED AS FOLLOWS:

SET 1 .... 10 BURSTS PER HALF AMPLITUDE WITH 4 REVERSALS
SET 2 .... 6 BURSTS PER HALF AMPLITUDE WITH 6 REVERSALS
SET 3 .... 5 BURSTS PER HALF AMPLITUDE WITH 10 REVERSALS
SET 4 .... 4 BURSTS PER HALF AMPLITUDE WITH 10 REVERSALS

PROG CONT	CMC	GROUND	CREW	CHECKLIST	TIME	TOTAL TIME
			CREW SELECTION			
	START CREW INITIATED STROKE TEST		KEY V68E			#10
	IS TVC DAP ON?					
	Y: TURN ON CPR ERR LIGHT					#20

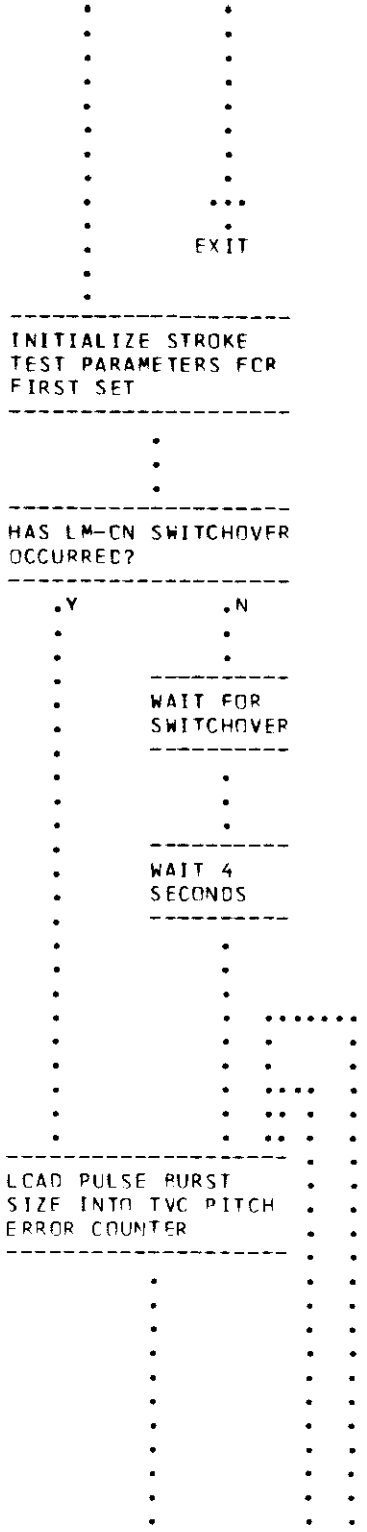
#30

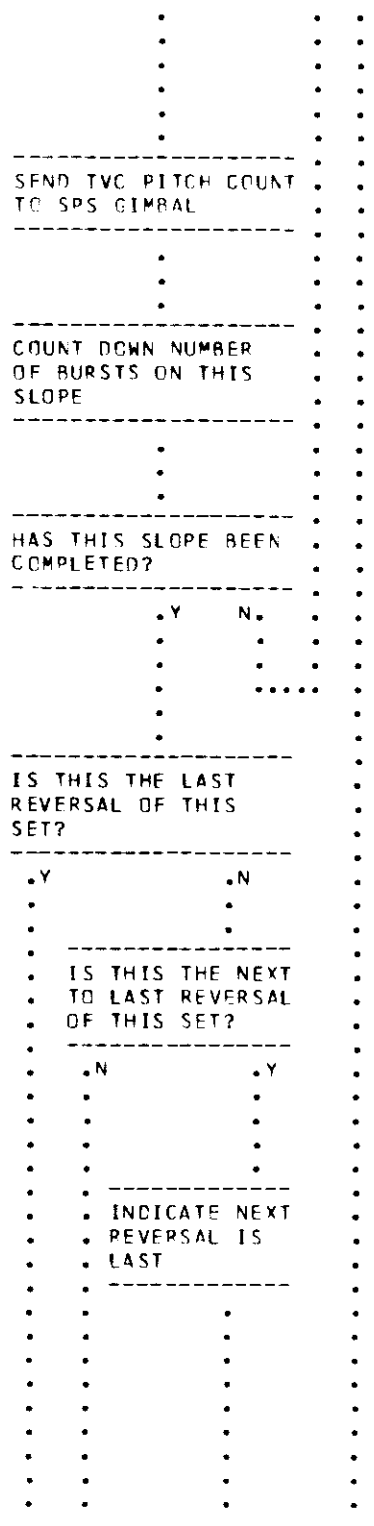
#40

#50

#60

#70


EXIT
INITIALIZE STROKE TEST PARAMETERS FOR FIRST SET
HAS LM-CN SWITCHOVER OCCURRED?
.Y
.N
WAIT FOR SWITCHOVER
WAIT 4 SECONDS
LOAD PULSE BURST SIZE INTO TVC PITCH ERROR COUNTER



#80

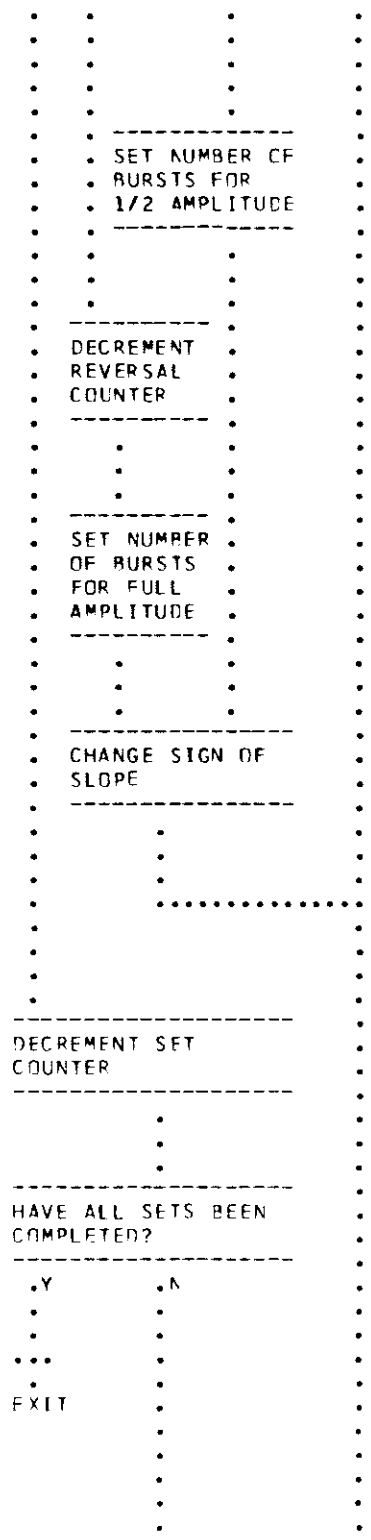
#90

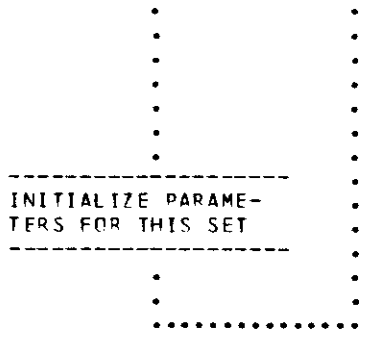
#100

#110

#120

#130


SET NUMBER OF BURSTS FOR 1/2 AMPLITUDE
#140
DECREMENT REVERSAL COUNTER
SET NUMBER OF BURSTS FOR FULL AMPLITUDE
#150
CHANGE SIGN OF SLOPE
#160
DECREMENT SET COUNTER
#170
HAVE ALL SETS BEEN COMPLETED?
Y
N
#180
EXIT



CHANGE CONTROL NOTES

LOGIC REV 01 PCN 515

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RESTART EXTENDED VERB (V69) LOGIC REV 05 07/09/68

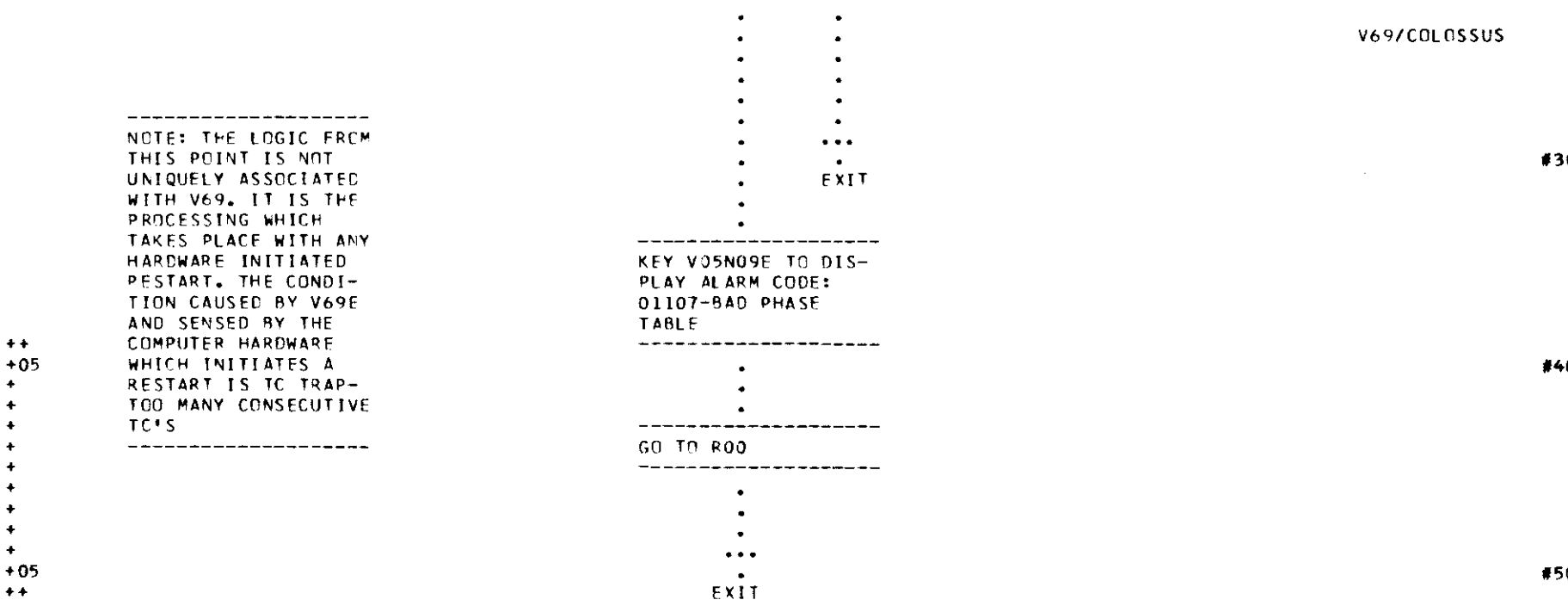
PURPOSE: (1) TO CAUSE A COMPUTER RESTART.

ASSUMPTIONS: (1) THE RESTART IS CREW INITIATED BY DSKY ENTRY.

(2) V69E DOES NOT DIRECTLY SELECT RESTART PROCESSING. IT CAUSES A SITUATION WHICH SATISFIES ONE OF THE CONDITIONS FOR AN AUTOMATIC RESTART, I.E. TOO MANY CONSECUTIVE TC INSTRUCTIONS.

(3) THIS PROCESS MAY BE SELECTED AT ANY TIME.

PROG CONT	CMC	GROUND	CREW	CHECKLIST	TIME	TOTAL TIME
			CREW PROG SELECTION			
	START CREW INITATED COMPUTER RESTART		KEY IN V69E			#10
	BRANCH (TC) TO SELF		MONITOR DSKY: DOES PROGRAM ALARM LIGHT COME ON INDICATING COMPUTATIONAL DIFFICULTIES?			#20
++ +35 ++			.Y .N			



#30 #40 #50 #60 #70 #80

```
                    .
                    .
                    .
                    .
                    .
                    .
                    .
                    .
--------------------
ZERO OUTBIT CHANNELS
11 (EXCEPT ENGINE
ON, OFF AND ISS
WARNING); 12 (EXCEPT
COARSE ALIGN ENABLE,
ZERO IMU CDU'S AND
ENABLE IMU ERROR
COUNTER); 13 (EXCEPT
TELEMETRY BITS, RESET
TRAP BITS AND T6RUPT
BIT); AND 14 (EXCEPT
GYRO ENABLE)
--------------------
                    .
                    .
                    .
--------------------
TERMINATE WAITLISTED
TASKS
--------------------
                    .
                    .
                    .
--------------------
CLEAR ALL EXECUTIVE
REGISTER SETS
--------------------
                    .
                    .
                    .
--------------------
INDICATE NO ACTIVE
JOBS
--------------------
                    .
                    .
                    .
--------------------
MAKE ALL VAC AREAS
AVAILABLE
--------------------
                    .
                    .
                    .
--------------------
BLANK DSKY REGISTERS
(PROGRAM, VERB,
NOUN, R1, R2, R3)
--------------------
                    .
                    .
                    .
                    .
                    .
                    .
```

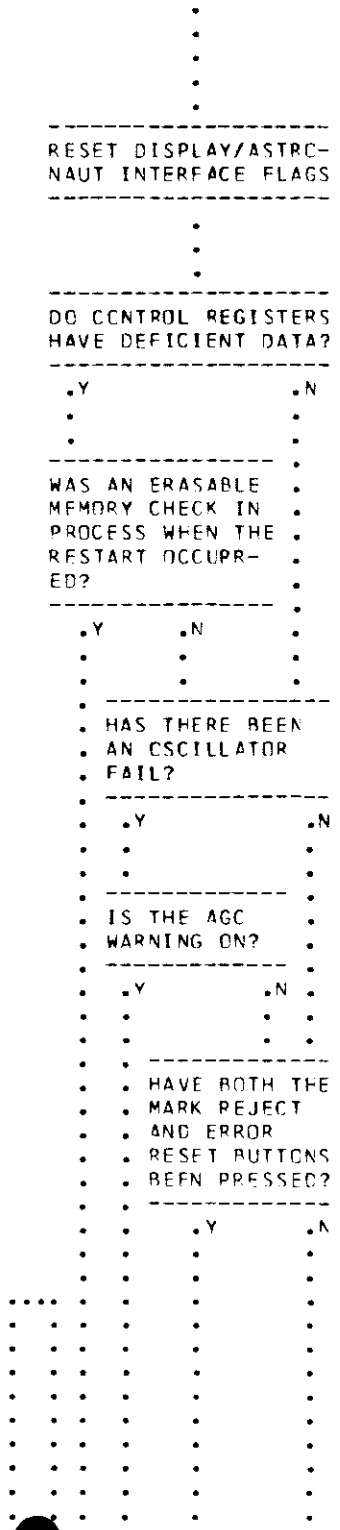
#90

#100

#110

#120

#130


RESET DISPLAY/ASTRO-
NAUT INTERFACE FLAGS
#140
DO CONTROL REGISTERS
HAVE DEFICIENT DATA?
.Y
.N
#150
WAS AN ERASABLE
MEMORY CHECK IN
PROCESS WHEN THE
RESTART OCCUPR-
ED?
.Y
.N
#160
HAS THERE BEEN
AN OSCILLATOR
FAIL?
.Y
.N
#170
IS THE AGC
WARNING ON?
.Y
.N
HAVE BOTH THE
MARK REJECT
AND ERROR
RESET BUTTONS
BEEN PRESSED?
#180
.Y
.N
#190

++
+05
++

CLEAR SELF CHECK ERROR REGISTERS, AND MODE REGISTER

ZERO OUTBIT CHANNELS: 11 ("A" RELAYS); 12 (GNC); 13 (AGC); AND 14 (ISS) #200

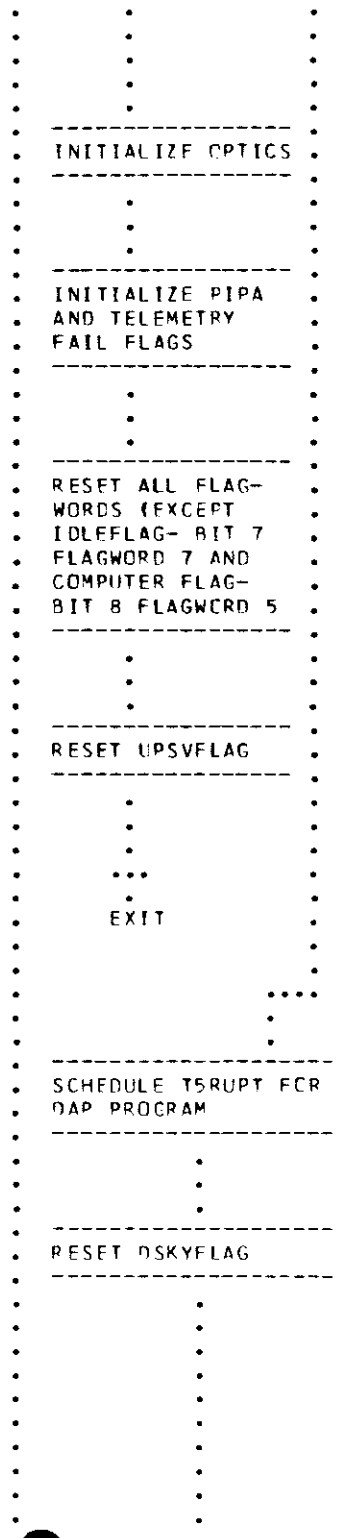
INITIALIZE DOWN-LINK WITH POO DOWNLIST #210

CLEAR PHASE TABLE #220

INITIALIZE IMU (INHIBIT IMU FAIL FOR 5 SECONDS) #230

TURN OFF NO ATT LIGHT

TERMINATE OPTICS COARSE ALIGN #240



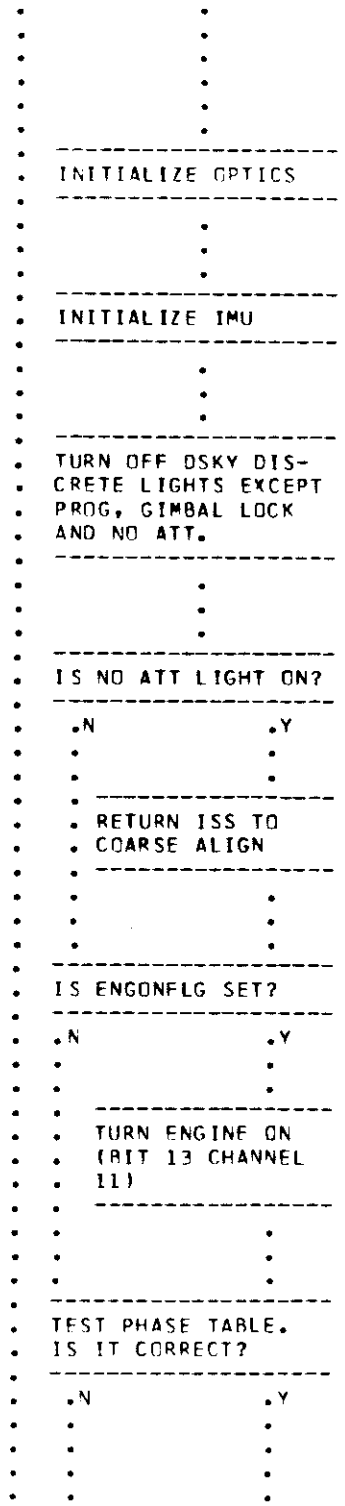
#250

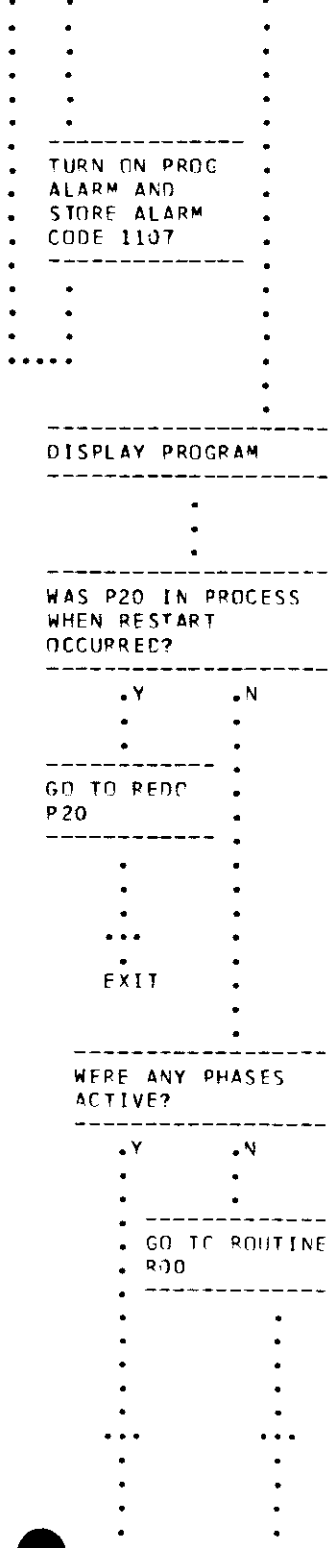
#260

#270

#280

#290


INITIALIZE OPTICS
#300
INITIALIZE IMU
TURN OFF DSKY DIS-
CRETE LIGHTS EXCEPT
PROG, GIMBAL LOCK
AND NO ATT.
#310
IS NO ATT LIGHT ON?
#320
N
Y
RETURN ISS TO
COARSE ALIGN
#330
IS ENGONFLG SET?
N
Y
TURN ENGINE ON
(BIT 13 CHANNEL
11)
#340
TEST PHASE TABLE.
IS IT CORRECT?
#350
N
Y



#360

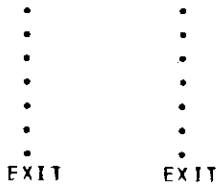
#370

#380

#390

#400

++
+05
++



CHANGE CONTROL NOTES

REV 04 PCR MIT 66
REV 05 PCR 206

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UPDATE LIFT OFF TIME EXTENDED VERB 70 LOGIC REV 01 11/27/68

NOTE: THIS EXTENDED VERB IS USED BY UPDATE PROGRAM P27 ONLY. SEE P27 FOR THE SPECIFICATION LOGIC FLOW FOR UPDATING THE LIFT OFF TIME.

CHANGE CONTROL NOTES

LOGIC REV 01 PCN 515

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UNIVERSAL UPDATE - BLOCK ADR
EXTENDED VERB 71

LOGIC REV 01 11/27/68

NOTE: THIS EXTENDED VERB IS USED BY UPDATE PROGRAM P27 ONLY. SEE P27 FOR THE SPECIFICATION LOGIC FLOW FOR A BLOCK ADDRESS UNIVERSAL UPDATE.

CHANGE CONTROL NOTES

LOGIC REV 01 PCN 515

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UNIVERSAL UPDATE - SINGLE ADDRESS
EXTENDED VERB 72

LOGIC REV 01 11/27/68

NOTE: THIS EXTENDED VERB IS USED WITH UPDATE PROGRAM P27 ONLY. SEE P27 FOR THE SPECIFICATION LOGIC FLOW SINGLE ADDRESS UNIVERSAL UPDATE.

CHANGE CONTROL NOTES

LOGIC REV 01 PCN 515

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UPDATE CMC TIME (OCTAL)
EXTENDED VERB 73

LOGIC REV 01 11/27/68

NOTE: THIS EXTENDED VERB IS USED BY THE UPDATE PROGRAM P27 ONLY. SEE P27 FOR THE SPECIFICATION LOGIC FLOW FOR THE OCTAL UPDATE OF CMC TIME.

CHANGE CONTROL NOTES

LOGIC REV 01 PCN 515

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INITIALIZE ERASABLE DUMP VIA DOWNLINK EXTENDED VERB (V74)

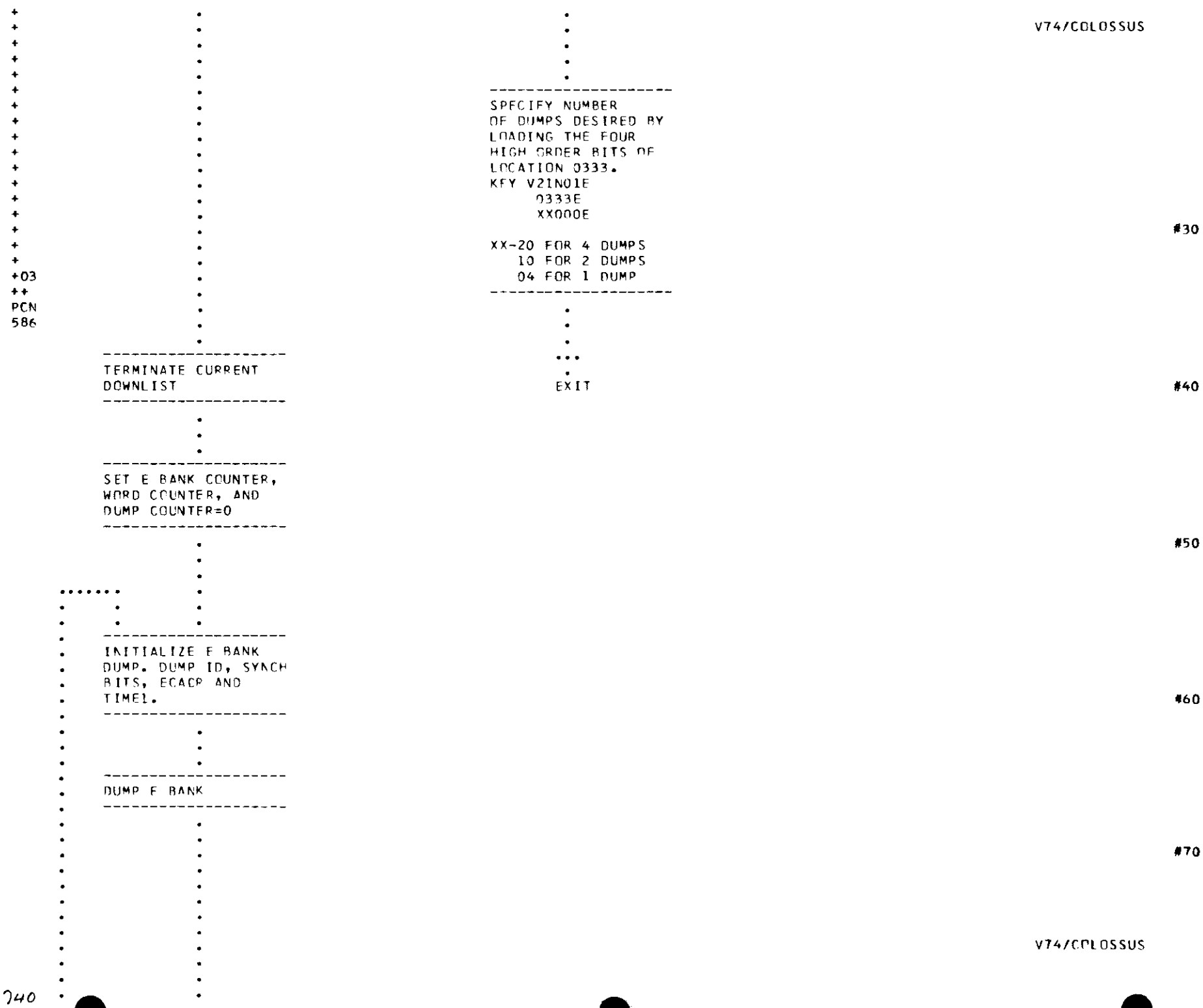
LOGIC REV 03 11/27/68

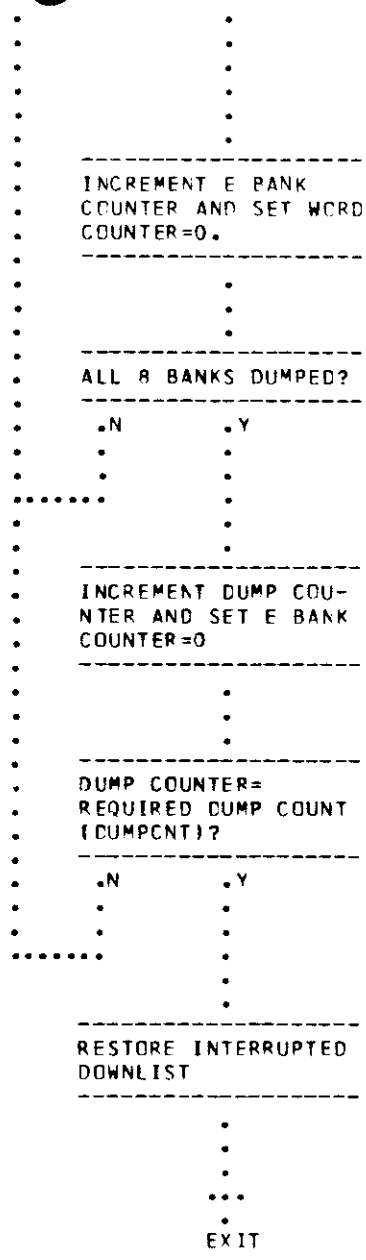
PURPOSE: (1) TO DUMP ALL EIGHT BANKS OF ERASABLE MEMORY VIA DOWNLINK.

ASSUMPTIONS: (1) THE PROCESS IS CREW SELECTED BY DSKY ENTRY.

++ (2) 4, 2, OR 1 COMPLETE DUMPS MAY BE CALLED BY THE ASTRONAUT BY LOADING 20000, 10000, OR 04000
+03 RESPECTIVELY IN LOCATION 0333(DUMPCNT). THIS MAY BE DONE BEFORE OR AFTER KEYING V74E.
+
+ (3) THE DUMP OF EACH BANK IS PRECEDED BY AN ID WORD, SYNCH BITS, ECADR AND TIME.
+
+ (4) THE E BANKS ARE DUMPED IN ORDER, STARTING WITH E BANK ZERO.
+03
++ (5) THE TIME REQUIRED FOR 4 COMPLETE DUMPS IS 83.2 SECONDS (100 WORDS PER SEC BIT RATE).
EDIT

PROG CONT	CMC	GROUND	CREW	CHECKLIST	TIME	TOTAL TIME
			CREW PROG. SELECTION			
	START CREW INITIATED DOWNLINK ERASABLE DUMP		KEY IN V74E			#10
++ +03 + + + + + + + + + + + + + + +						#20


+03
++
PCN
586
TERMINATE CURRENT DOWNLIST
SET E BANK COUNTER, WORD COUNTER, AND DUMP COUNTER=0
INITIALIZE E BANK DUMP, DUMP ID, SYNCH BITS, ECADR AND TIME1.
DUMP E BANK
SPECIFY NUMBER OF DUMPS DESIRED BY LOADING THE FOUR HIGH ORDER BITS OF LOCATION 0333.
KEY V21N01E
0333E
XX000E
XX-20 FOR 4 DUMPS
10 FOR 2 DUMPS
04 FOR 1 DUMP
EXIT
#30
#40
#50
#60
#70


INCREMENT E BANK COUNTER AND SET WORD COUNTER=0.
ALL 8 BANKS DUMPED?
N
Y
INCREMENT DUMP COUNTER AND SET E BANK COUNTER=0
DUMP COUNTER= REQUIRED DUMP COUNT (DUMPCNT)?
N
Y
RESTORE INTERRUPTED DOWNLIST
EXIT

#80

#90

#100

#110

CHANGE CONTROL NOTES

```
LOGIC REV 02  PCR MIT 66                                    00165000
LOGIC REV 03  PCN 586                                       00165001
```

SET LIFTOFF FLAG EXTENDED VERB 75 LOGIC REV 01 11/27/68

PURPOSE: (1) SET LIFTOFF BACK-UP FLAG.

ASSUMPTION: (1) THE PROCESS IS CREW SELECTED BY V75E

PROG CONT	CMC	GROUND	CREW	CHECKLIST	TIME	TOTAL TIME
	START CREW INITIATED SET LIFTOFF FLAG PROCESS		KEY IN V75E			
	SET LIFTOFF BACK-UP FLAG					#10
	EXIT					#20

CHANGE CONTROL NOTES

LOGIC REV 01 PCN 515

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SET PREFERRED ATTITUDE FLAG EXTENDED VERB 76 LOGIC REV 01 11/27/68

PURPOSE: (1) TO SET PREFERRED ATTITUDE FLAG

ASSUMPTION: (1) PROCESS IS CREW SELECTED BY DSKY ENTRY.

PROG CONT	CMC	GROUND	CREW	CHECKLIST	TIME	TOTAL TIME
	INITIATE PREFERRED ATTITUDE FLAG SET PROCESS		KEY IN V76E			
	SET PREFERRED ATTITUDE FLAG					#10
	EXIT					#20

CHANGE CONTROL NOTES

LOGIC REV 01 PCN 515

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RESET PREFERRED ATTITUDE FLAG EXTENDED VERB 77 LOGIC REV 01 11/27/68

PURPOSE: (1) TO RESET PREFERRED ATTITUDE FLAG

ASSUMPTION: (1) PROCESS IS CREW SELECTED BY DSKY ENTRY.

PROG CONT	CMC	GROUND	CREW	CHECKLIST	TIME	TOTAL TIME
	INITIATE PREFERRED ATTITUDE FLAG RESET PROCESS		KEY IN V77E			
	RESET PREFERRED ATTITUDE FLAG					#10
	EXIT					#20

CHANGE CONTROL NOTES

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CHANGE GYRO COMPASS LAUNCH AZIMUTH
VERB 78

LOGIC REV 01 11/27/68

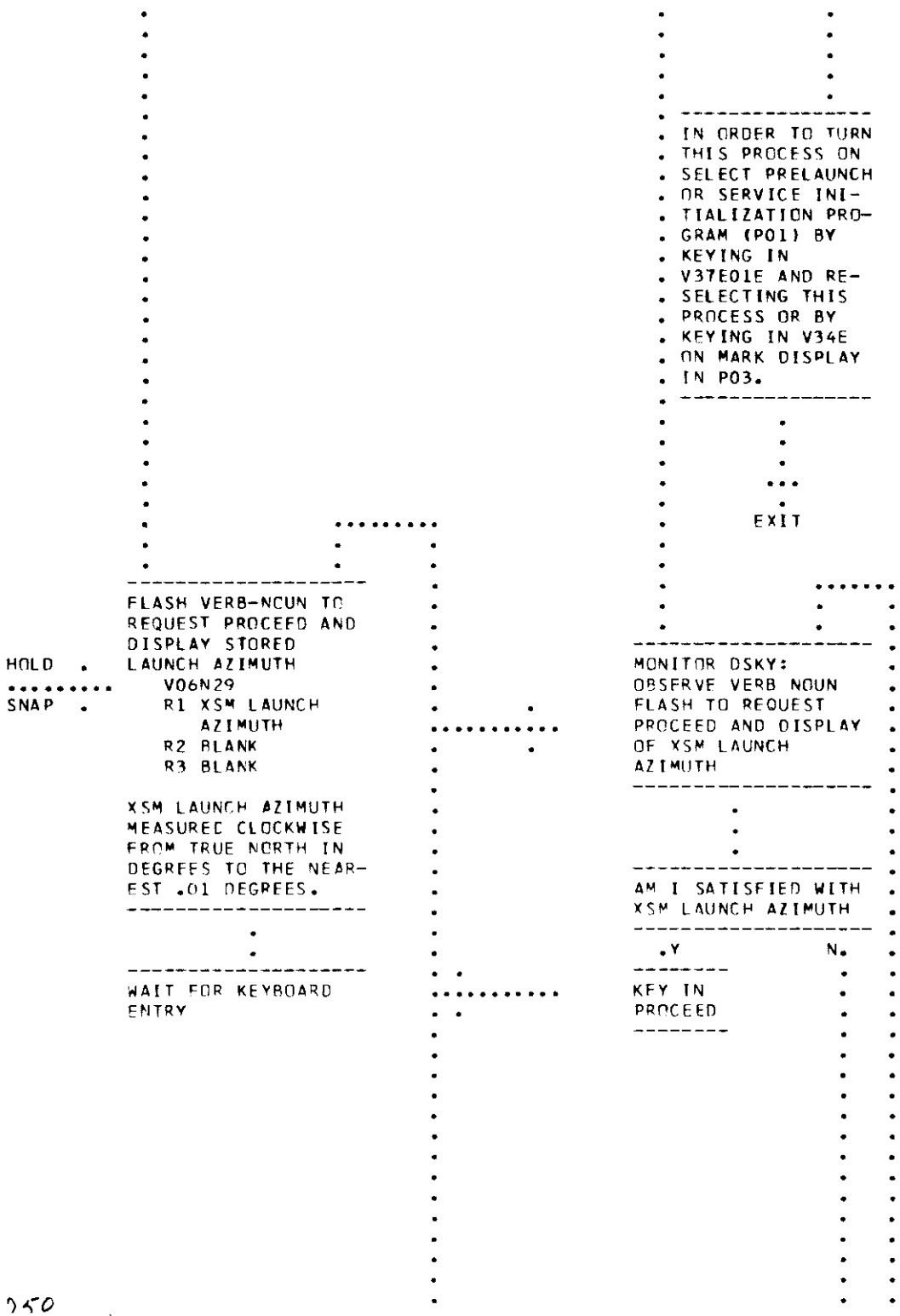
PURPOSE: (1) TO PROVIDE THE PROPER STABLE MEMBER ORIENTATION FOR LAUNCH.

ASSUMPTIONS: (1) THE PROCESS HAS THE CAPABILITY TO CHANGE THE LAUNCH AZIMUTH OF THE STABLE MEMBER WHILE GYRO COMPASSING (P02)

(2) PROCESS IS CREW SELECTED BY KEYBOARD ENTRY V78F

(3) THE PROCESS MAY BE SELECTED ONLY DURING PRELAUNCH OR SERVICE-GYRO COMPASSING PROGRAM (P02)

PROG CONT	CMC	GROUND	CREW	CHECKLIST	TIME	TOTAL TIME
	START GYRO COMPASS LAUNCH AZIMUTH CHANGE		KEY IN V78E			
	IS THE CURRENT PROGRAM P02?					#10
	TURN ON OPERATOR ERROR LIGHT		MONITOR DSKY: DOES OPERATOR ERROR LIGHT COME ON INDICATING THAT THIS ROUTINE CAN NOT BE SELECTED AT THIS TIME?			#20
	EXIT					


IN ORDER TO TURN THIS PROCESS ON SELECT PRELAUNCH OR SERVICE INITIALIZATION PROGRAM (P01) BY KEYING IN V37E01E AND RESELECTING THIS PROCESS OR BY KEYING IN V34E ON MARK DISPLAY IN P03.
EXIT
FLASH VERB-NOUN TO REQUEST PROCEED AND DISPLAY STORED LAUNCH AZIMUTH
V06N29
R1 XSM LAUNCH AZIMUTH
R2 BLANK
R3 BLANK
XSM LAUNCH AZIMUTH MEASURED CLOCKWISE FROM TRUE NORTH IN DEGREES TO THE NEAREST .01 DEGREES.
WAIT FOR KEYBOARD ENTRY
HOLD
SNAP
MONITOR DSKY: OBSERVE VERB NOUN FLASH TO REQUEST PROCEED AND DISPLAY OF XSM LAUNCH AZIMUTH
AM I SATISFIED WITH XSM LAUNCH AZIMUTH
Y
N
KEY IN PROCEED

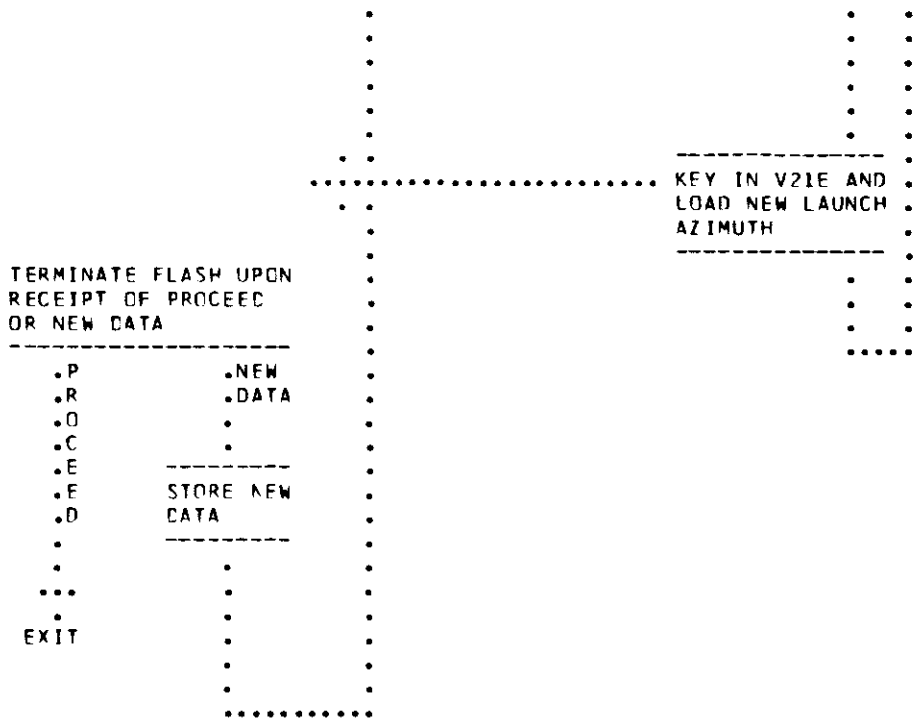
#30

#40

#50

#60

#70



#80

#90

CHANGE CONTROL NOTES

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START LUNAR LANDMARK SELECTION
EXTENDED VERB 79

LOGIC REV 01 11/27/68

NOTE: THIS EXTENDED VERB CALLS ROUTINE 35. SEE R35 FOR THE SPECIFICATION LOGIC FLOW FOR STARTING THE LUNAR LANDMARK SELECTION.

CHANGE CONTROL NOTES

LOGIC REV 01 PCN 515

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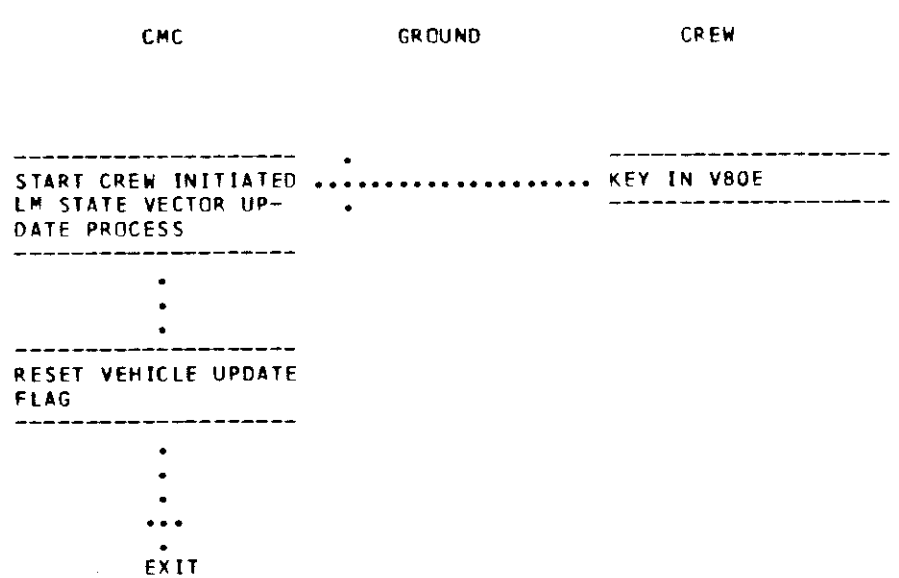
UPDATE LM STATE VECTOR EXTENDED VERB 80 LOGIC REV 01 11/27/68

PURPOSE: (1) TO CAUSE THE RENDEZVOUS DATA PROCESSING RESULTS TO UPDATE THE LM STATE VECTOR

ASSUMPTION: (1) PROCESS IS CREW SELECTED BY V80E



CHANGE CONTROL NOTES

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UPDATE CSM STATE VECTOR EXTENDED VERB 81 LOGIC REV 01 11/27/68

PURPOSE: (1) TO CAUSE THE RENDEZVOUS DATA PROCESSING RESULTS TO UPDATE THE CSM STATE VECTOR.

ASSUMPTION: (1) PROCESS IS CREW SELECTED BY V81E.

PROG CONT	CMC	GROUND	CREW	CHECKLIST	TIME	TOTAL TIME
	START CREW INITIATED CSM STATE VECTOR UPDATE PROCESS		KEY IN V81E			
	SET VEHICLE UPDATE FLAG					#10
	EXIT					#20

CHANGE CONTROL NOTES

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REQUEST ORBIT PARAMETER DISPLAY ROUTINE LOGIC REV 01 11/27/68
EXTENDED VERB 82

NOTE: THIS EXTENDED VERB CALLS ROUTINE 30. SEE R30 FOR THE SPECIFICATION LOGIC FLOW FOR REQUESTING ORBIT PARAMETER DISPLAY.

CHANGE CONTROL NOTES

LOGIC REV 01 PCN 515

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REQUEST RENDEZVOUS PARAMETER
DISPLAY #1 EXTENDED VERB 83

LOGIC REV 01 11/27/68

NOTE: THIS EXTENDED VERB CALLS ROUTINE 31. SEE
R31 FOR THE SPECIFICATION LOGIC FLOW FOR
REQUESTING RENDEZVOUS PARAMETER DISPLAY #1

CHANGE CONTROL NOTES

LOGIC REV 01 PCN 515

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REQUEST RENDEZVOUS PARAMETER
DISPLAY #2 EXTENDED VERB 85

LOGIC REV 01 11/27/68

NOTE: THIS EXTENDED VERB CALLS ROUTINE 34. SEE
R34 FOR THE SPECIFICATION LOGIC FLOW FOR
REQUESTING RENDEZVOUS PARAMETER DISPLAY #2.

CHANGE CONTROL NOTES

LOGIC REV 01 PCN 515

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REJECT RENDEZVOUS BACK-UP SIGHTING MARK V86 — LOGIC — REV 01 — 11/27/68

PURPOSE: (1) IN THE EVENT OF AN UNSATISFACTORY SIGHTING MARK TAKEN DURING THE RENDEZVOUS BACK-UP SIGHTING MARK ROUTINE, V86E MAY BE USED TO ERASE THE MARK DATA (IF ANY) IN POSITION 1.

ASSUMPTIONS: (1) PROCESS IS CREW SELECTED BY V86E

PROG CONT	CMC	GROUND	CREW	CHECKLIST	TIME	TOTAL TIME
	START CREW INITIATED REJECT OF RENDEZVOUS BACK-UP SIGHTING MARK PROCESS.		KEY IN V86E			
	ERASE MARK DATA (IF ANY) IN POSITION #1					#10
	RECYCLE TO PERFORM ALTERNATE LOS SIGHTING MARK					#20
	EXIT					#30

CHANGE CONTROL NOTES

LOGIC REV C1 — PCN 515

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SET VHF RANGE FLAG EXTENDED VERB 87 LOGIC REV 01 11/27/68

PURPOSE: (1) TO SET THE VHF RANGE FLAG

ASSUMPTION: (1) PROCESS IS CREW SELECTED BY DSKY ENTRY

PROG CONT	CMC	GROUND	CREW	CHECKLIST	TIME	TOTAL TIME
	INITIATE VHF RANGE FLAG SET PROCESS		KEY IN V87E			
	SET VHF RANGE FLAG					#10
	EXIT					#20

CHANGE CONTROL NOTES

LOGIC REV 01 PCN 515

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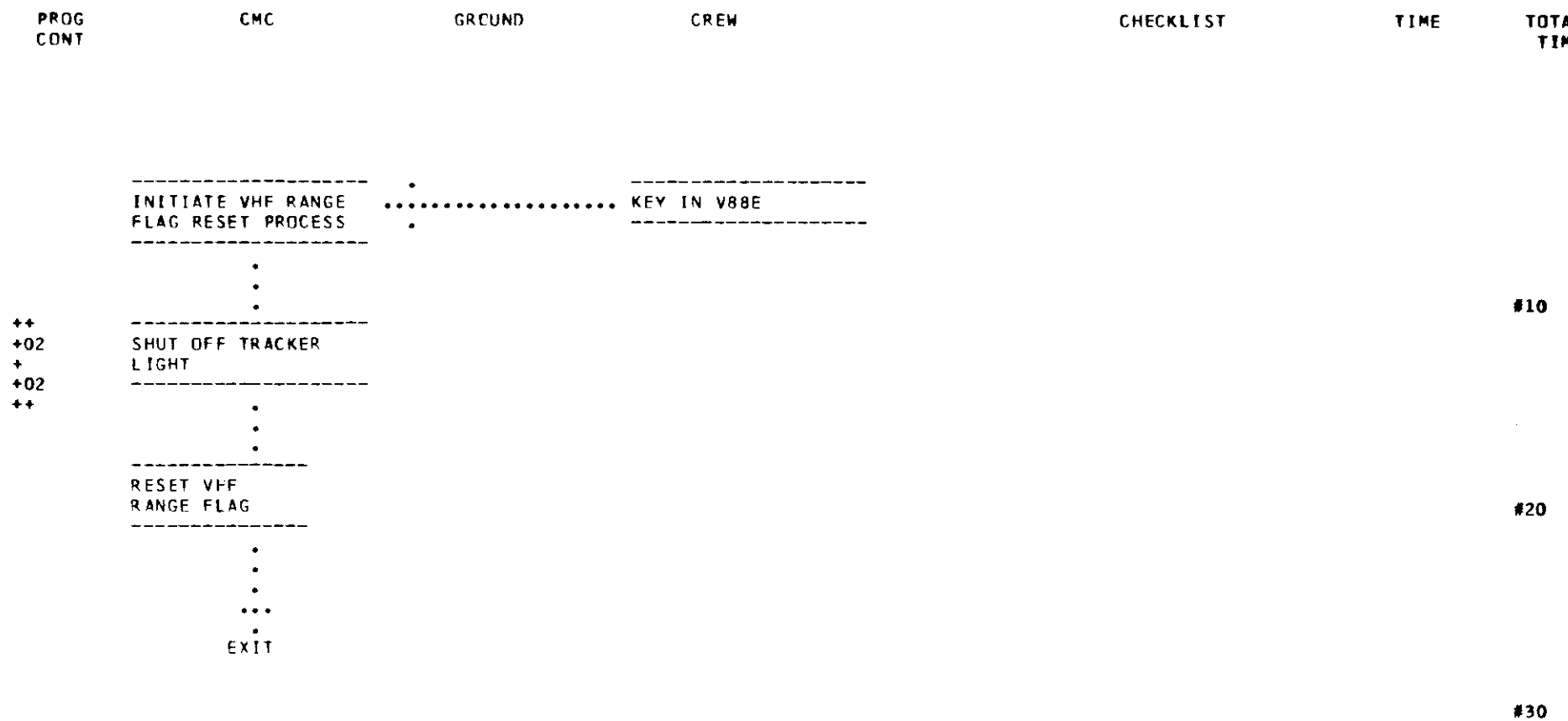
RESET VHF RANGE FLAG EXTENDED VERB 88 LOGIC REV 02 11/27/68

PURPOSE: (1) TO RESET THE VHF RANGE FLAG.

ASSUMPTION: (1) PROCESS IS CREW SELECTED BY DSKY ENTRY.



CHANGE CONTROL NOTES

REV 01 PCR 515
REV 02 PCR 225

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START RENDEZVOUS FINAL ATTITUDE MANEUVER ROUTINE EXTENDED VERB 89

LOGIC REV 01 11/27/68

NOTE: THIS EXTENDED VERB CALLS ROUTINE 63. SEE R63 FOR THE SPECIFICATION LOGIC FLOW TO START RENDEZVOUS FINAL ATTITUDE MANEUVER.

CHANGE CONTROL NOTES

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REQUEST RENDEZVOUS OUT OF PLANE DISPLAY ROUTINE LOGIC REV 01 11/27/68
EXTENDED VERB 90

NOTE: THIS EXTENDED VERB CALLS ROUTINE 36. SEE R36 FOR THE SPECIFICATION LOGIC FLOW OF THE REQUEST FOR RENDEZVOUS OUT OF PLANE DISPLAY.

CHANGE CONTROL NOTES

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DISPLAY ON DSKY THE SUM OF EACH BANK
EXTENDED VERB 91

LOGIC REV 01 11/27/68

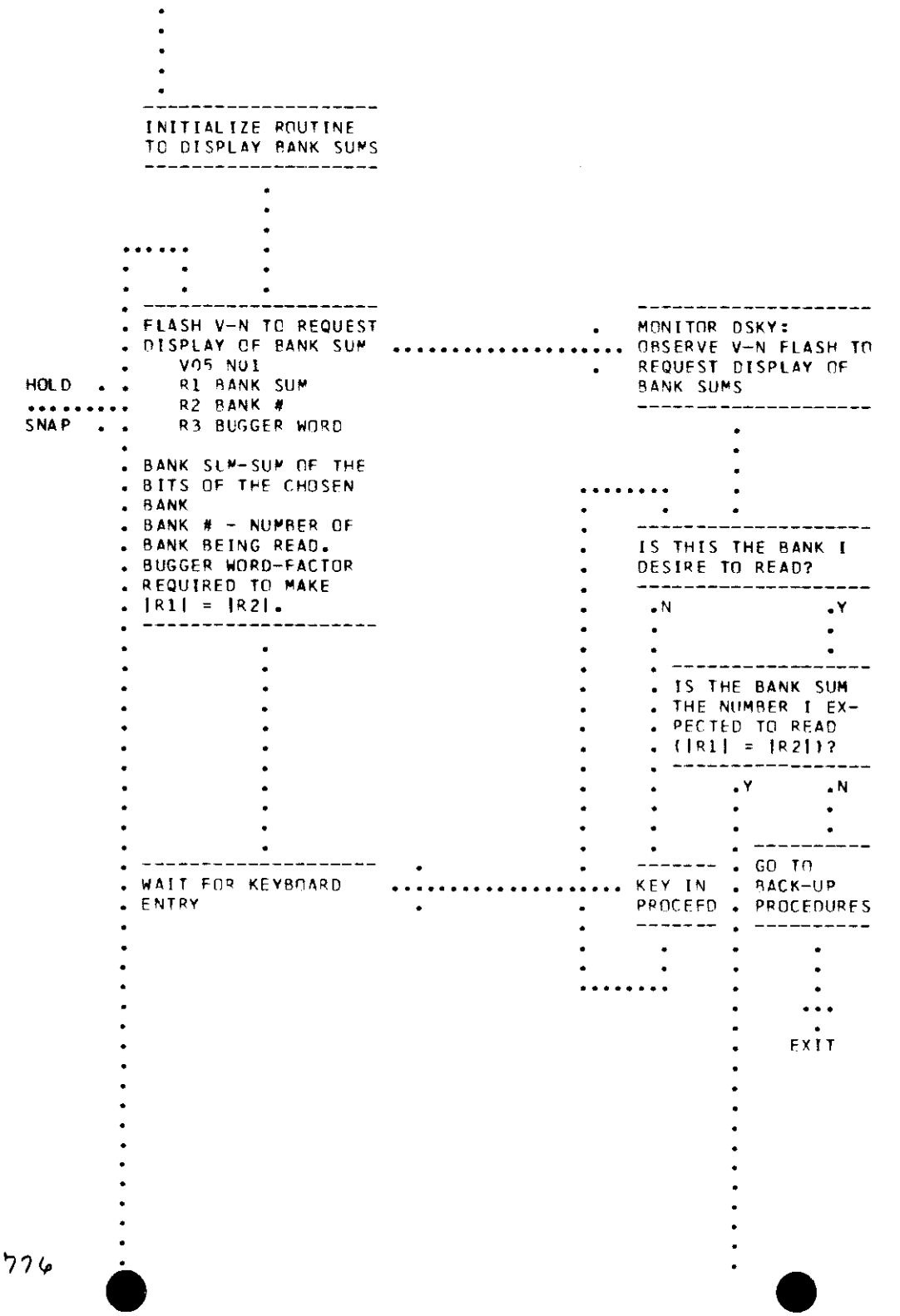
PURPOSE: (1) DISPLAY THE SUM OF EACH BANK FOR COMPARISON.

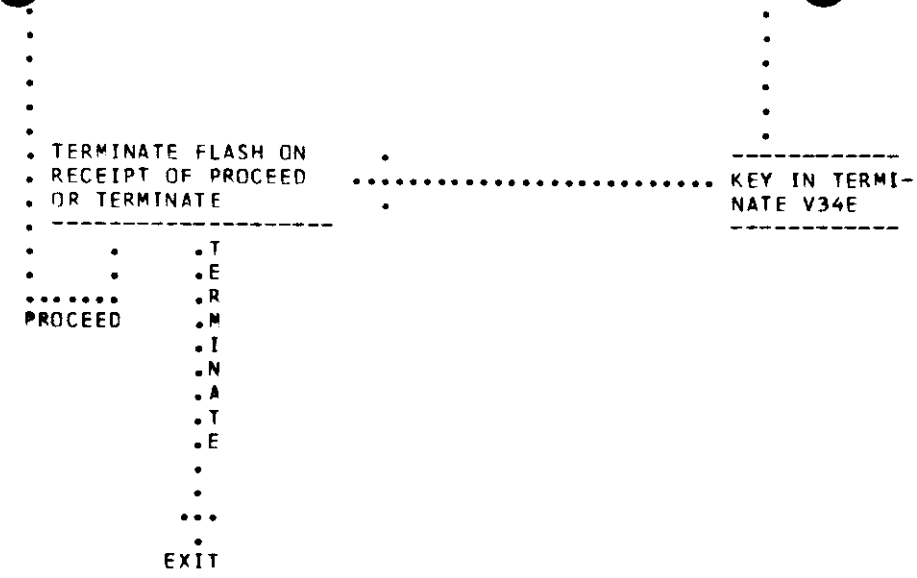
ASSUMPTION: (1) POO IS OPERATING.

(2) NO OTHER EXTENDED VERB IS ACTIVE.

(3) PROCESS IS CREW SELECTED BY DSKY ENTRY

PROG CONT	CMC	GROUND	CREW	CHECKLIST	TIME	TOTAL TIME
	START CREW INITIATED DISPLAY OF THE SUM OF EACH BANK		KEY IN V91E			
	IS PROGRAM POO OPERATING?					#10
	IS ANOTHER EXTENDED VERB ACTIVE					#20
	TURN ON OPR ERR LIGHT					#30
	EXIT					


INITIALIZE ROUTINE
TO DISPLAY BANK SUMS
#40
FLASH V-N TO REQUEST
DISPLAY OF BANK SUM
V05 N01
R1 BANK SUM
R2 BANK #
R3 BUGGER WORD
HOLD
SNAP
BANK SUM-SUM OF THE
BITS OF THE CHOSEN
BANK
BANK # - NUMBER OF
BANK BEING READ.
BUGGER WORD-FACTOR
REQUIRED TO MAKE
|R1| = |R2|.
WAIT FOR KEYBOARD
ENTRY
MONITOR DSKY:
OBSERVE V-N FLASH TO
REQUEST DISPLAY OF
BANK SUMS
#50
IS THIS THE BANK I
DESIRE TO READ?
#60
.N
.Y
IS THE BANK SUM
THE NUMBER I EX-
PECTED TO READ
(|R1| = |R2|)?
#70
.Y
.N
KEY IN
PROCEED
GO TO
BACK-UP
PROCEDURES
#80
EXIT



#90

#100

CHANGE CONTROL NOTES

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START IMU PERFORMANCE TEST EXTENDED VERB 92 LOGIC REV 01 11/27/68

NOTE: EXTENDED VERB 92 IS USED TO START THE IMU PERFORMANCE TESTS. PROGRAM P07. A DESCRIPTION OF THIS PROGRAM MAY BE FOUND IN SECTION 1 OF R577.

CHANGE CONTROL NOTES

LOGIC REV 01 PCN 515

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ENABLE W MATRIX INITIALIZATION EXTENDED VERB (V93) LOGIC REV 04 11/27/68

PURPOSE: (1) TO REQUEST REINITIALIZATION OF THE W MATRIX.

ASSUMPTIONS: (1) THE PROCESS IS CREW SELECTED BY DSKY ENTRY.

(2) THIS PROCESS RESETS THE RENDWFLG AND THE ORBWFLG INDICATING THAT THE W MATRIX IS NOT VALID AND MUST BE REINITIALIZED BEFORE BEING USED. THE RENDWFLG AND THE ORBWFLAG ARE AUTOMATICALLY SET FOLLOWING W MATRIX INITIALIZATION OR REINITIALIZATION.

(3) THIS PROCESS MAY BE SELECTED AT ANY TIME.

PROG CONT	CMC	GROUND	CREW	CHECKLIST	TIME	TOTAL TIME
			CREW PROGRAM SELECTION			
++	START CREW INITIATED		KEY IN V93E			#10
+04	W MATRIX INITIALIZATION					
++	RESET RENDWFLG AND ORBWFLG					#20
	EXIT					

CHANGE CONTROL NOTES

LOGIC REV 03 PCR MIT 66 00058000
LOGIC REV 04 PCR 206 EDIT 00058000

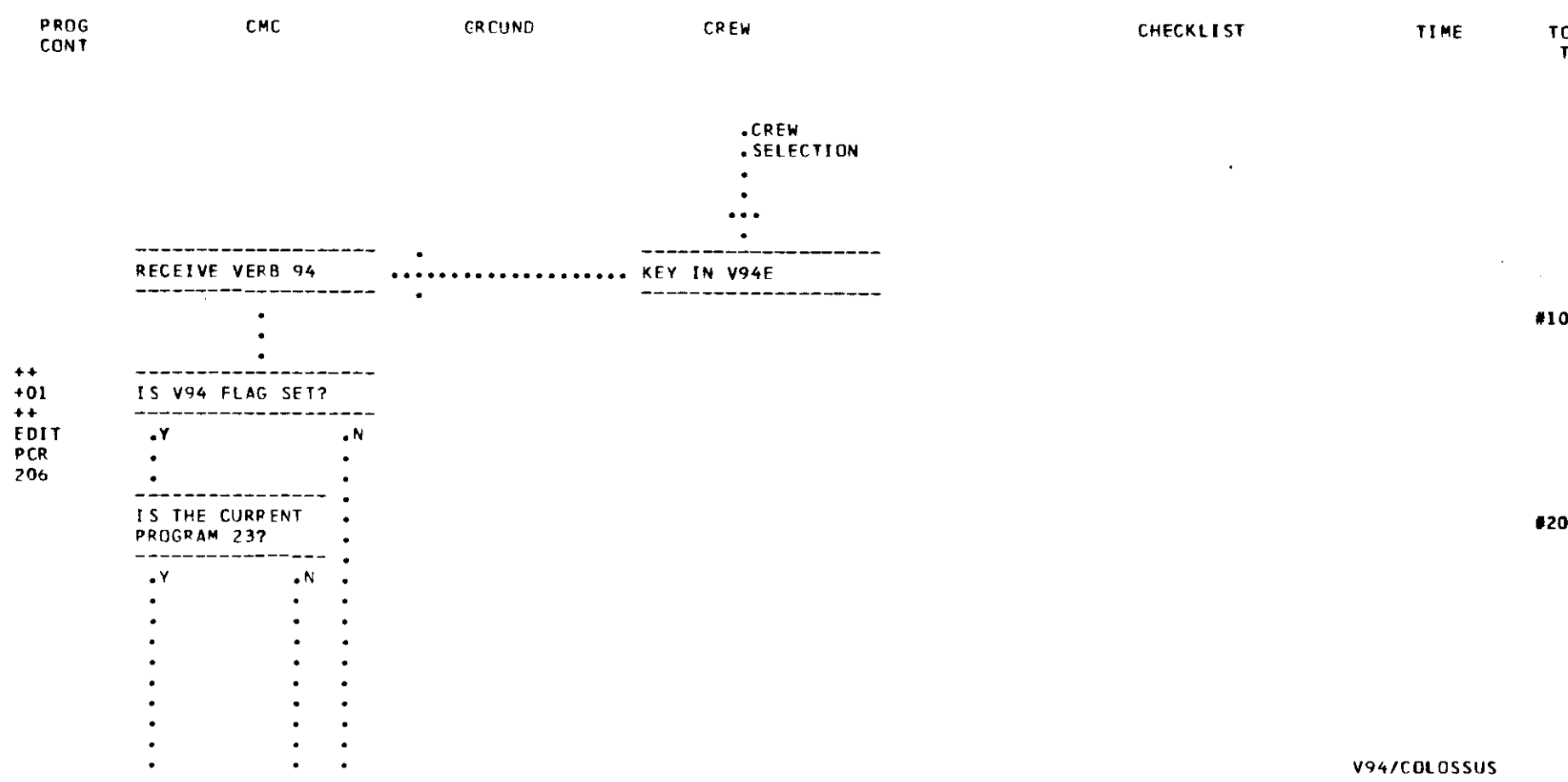
CISLUNAR TRACKING EXTENDED VERB 94 LOGIC REV 01 11/27/68

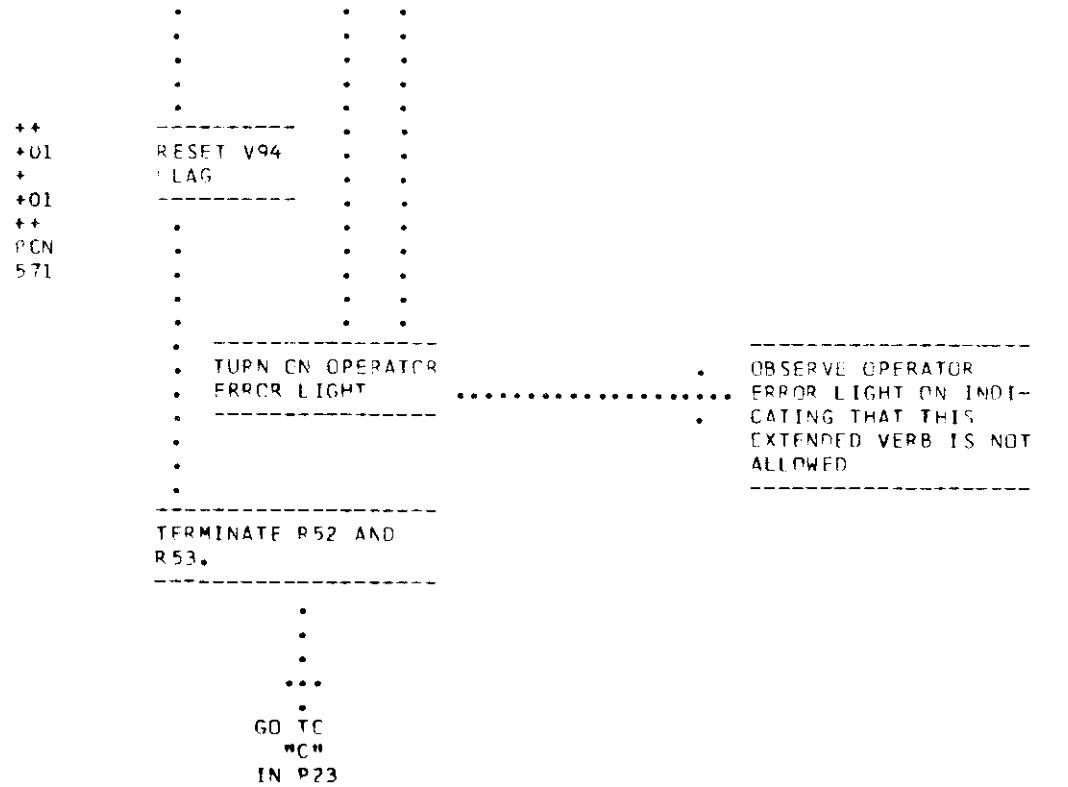
PURPOSE: (1) USED DURING THE CISLUNAR NAVIGATION PROGRAM (P23) TO ALLOW THE ASTRONAUT TO RECYCLE THE PROGRAM BACK TO THE CALCULATIONS OF OR POINTING THE LLOS AT THE DESIGNATED LANDMARK/HORIZON.

ASSUMPTIONS: (1) THIS EXTENDED VERB IS USABLE ONLY DURING THE PERIOD IN P23 FOLLOWING THE TURN ON OF THE AUTOMATIC OPTICS POSITIONING ROUTINE (R52) AND PRIOR TO THE ACCEPTANCE OF THE MARK.

(2) THE SELECTION OF THIS EXTENDED VERB WILL TERMINATE THE AUTOMATIC OPTICS POSITIONING ROUTINE AND THE SIGHTING MARK ROUTINE.

(3) IF THE ASTRONAUT SELECTS THIS EXTENDED VERB AFTER MAKING A MARK BUT PRIOR TO ACCEPTING IT THE MARK DATA WILL BE LOST.





#30

#40

#50

CHANGE CONTROL NOTES

LOGIC REV 00 PCP MIT 33
LOGIC REV 01 PCN 571

TERMINATE INTEGRATION
EXTENDED VERB 96

LOGIC REV 03 11/26/68

PURPOSE: (1) TO PROVIDE A MEANS OF SUSPENDING STATE VECTOR INTEGRATION.

ASSUMPTIONS: (1) IF THE COASTING INTEGRATION ROUTINE IS IN OPERATION, IT IS TERMINATED AT THE END OF THE CURRENT TIME STEP.

(2) THE CURRENT PROGRAM IS TERMINATED

(3) THE CMC IDLING PROGRAM IS ACTIVATED.

++
+02
+
+
+AND
+
+03
++
EDIT

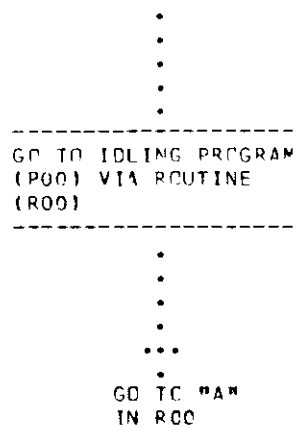
(4) NO STATE VECTOR INTEGRATION OCCURS UNTIL THE RESELECTTION OF ANY PROGRAM OR EXTENDED VERB. NO P00 INTEGRATION OCCURS UNTIL THE RESELECTION OF P00.

(5) THIS ROUTINE DOES NOT MAINTAIN STATE VECTOR OR W-MATRIX SYNCHRONIZATION.

(6) RESELECTION OF A NEW PROGRAM WILL REINITIALIZE THE NORMAL TIMING OF STATE VECTOR INTEGRATION.

PROG CONT	CMC	GROUND	CREW	CHECKLIST	TIME	TOTAL TIME
			.CREW .EXTENDED .VERB .SELECTION			
	START STATE VECTOR TERMINATION ROUTINE.		KEY IN V96E			#10
	SET QUIT FLAG					#20

V96/COLOSSUS
V96/SUNDANCE



CHANGE CONTROL NOTES

LOGIC REV 01 PCR MIT 15
LOGIC REV 02 PCR 507

THRUST FAIL DISPLAY ROUTINE EXTENDED VERB 97 LOGIC REV 01 11/27/68

NOTE: EXTENDED VERB 97 IS USED IN THE SPS THRUST FAIL ROUTINE R40. SEE R40 FOR THE SPECIFICATION LOGIC FLOW FOR DISPLAY OF THRUST FAIL.

THIS VERB IS INTERNALLY INITIATED BY THE PROGRAM AND SHOULD NOT BE SELECTED BY THE CREW.

CHANGE CONTROL NOTES

LOGIC REV 01 PCN 515

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ENABLE ENGINE IGNITICN EXTENDED
VERB 99

LOGIC REV 01 11/27/68

NOTE: EXTENDED VERB 99 IS USED IN THE SPS PROGRAM P40. SEE P40 FOR THE SPECIFICATION LOGIC FLOW TO ENABLE ENGINE IGNITION.

THIS VERB IS INTERNALLY INITIATED BY THE PROGRAM AND SHOULD NOT BE SELECTED BY THE CREW.

CHANGE CONTROL NOTES

LOGIC REV 01 PCN 515

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4.5 THIS LIST REPRESENTS THE VERBS USED IN PROGRAM COLOSSUS REV 01 11/05/68

4.5.1 REGULAR VERBS

00 NOT IN USE

01 DISPLAY OCTAL COMP 1 IN R1

02 DISPLAY OCTAL COMP 2 IN R1

03 DISPLAY OCTAL COMP 3 IN R1

04 DISPLAY OCTAL COMP 1,2 IN R1,R2

05 DISPLAY OCTAL COMP 1,2,3 IN R1,R2,R3

06 DISPLAY DECIMAL IN R1 OR R1,R2 OR R1,R2,R3

07 DISPLAY DP DECIMAL IN R1,R2

08 SPARE

09 SPARE

10 SPARE

11 MONITOR OCTAL COMP 1 IN R1

12 MONITOR OCTAL COMP 2 IN R1

13 MONITOR OCTAL COMP 3 IN R1

14 MONITOR OCTAL COMP 1,2 IN R1,R2

15 MONITOR OCTAL COMP 1,2,3 IN R1,R2,R3

16 MONITOR DECIMAL IN R1 OR R1,R2 OR R1,R2,R3

17 MONITOR DP DECIMAL IN R1,R2

18 SPARE

19 SPARE

20 SPARE

21 LOAD COMPONENT 1 INTO R1

22 LOAD COMPONENT 2 INTO R2

23 LOAD COMPONENT 3 INTO R3

24 LOAD COMPONENT 1,2 INTO R1,R2

25 LOAD COMPONENT 1,2,3 INTO R1,R2,R3

26 SPARE

27 DISPLAY FIXED MEMORY

28 SPARE

29 SPARE

30 REQUEST EXECUTIVE

31 REQUEST WAITLIST

32 RECYCLE

33 PROCEED

34 TERMINATE

35 TEST LIGHTS

36 REQUEST FRESH START

37 CHANGE PROGRAM

38 SPARE

39 SPARE

4.5.2 EXTENDED VERBS

40 ZERO CDU (W N20)

41 COARSE ALIGN CDU (W N20,N91)

42 PULSE TORQUE GYRO

43 LOAD FDAI ATT ERROR NEEDLES (TEST ONLY)

44 SET SURFACE FLAG

45 RESET SURFACE FLAG

46 ACTIVATE DAP

47 SET LM STATE VECTOR INTO CSM STATE VECTOR

48 LOAD DAP DATA (R03)

49 START CREW DEFINED MANEUVER (R62)

50 PLEASE PERFORM

51 PLEASE MARK

52 MARKED ON OFFSET LANDING SITE

53 PLEASE MARK ALTERNATE LOS

54 START REND BACK UP SIGHTING MARK (R23)

55 INCREMENT CMC TIME (DECIMAL)

56 TERMINATE TRACKING

57 START REND SIGHTING MARK (R21)

58 RESET STICK FLAG

59 PLEASE MARK (OPTICS CALIBRATION)

60 SET ATTITUDE ERROR REFERENCE TO PRESENT ATTITUDE.

61 SELECT MODE 1 (DISPLAY DAP ATTITUDE ERROR)

62 SELECT MODE 2 (DISPLAY TOTAL ATTITUDE ERROR (N22-N20))

63 SELECT MODE 3 (DISPLAY TOTAL ASTRONAUT ATTITUDE ERROR (N17-N20))

64 START S-BAND ANT CALC (R05)

65 START OPTICAL VERIFICATION OF PRELAUNCH ALIGNMENT (P03)

66 SET CSM STATE VECTOR INTO LM STATE VECTOR

67 START W-MATRIX RMS ERROR DISPLAY

68 CSM STROKE TEST ON

69 RESTART

70 UPDATE LIFTOFF TIME (P27)

71 UNIVERSAL UPDATE-BLOCK ADR (P27)

72 UNIVERSAL UPDATE-SINGLE ADR (P27)

73 UPDATE CMC TIME (OCTAL) (P27)

74 INITIALIZE ERASABLE DUMP VIA DOWNLINK

75 BACKUP LIFTOFF

76 SET PREFERRED ATTITUDE FLAG

77 RESET PREFERRED ATTITUDE FLAG

78 UPDATE PRELAUNCH AZIMUTH

79 START LUNAR LANDMARK SELECTION (R35)

80 UPDATE LM STATE VECTOR

81 UPDATE CSM STATE VECTOR

82 REQUEST ORBIT PARAM DISPLAY (R30)

83 REQUEST REND PARAM DISPLAY #1 (R31)

84 SPARE

85 REQUEST REND PARAM DISPLAY #2 (R34)

86 REJECT REND BACK UP SIGHTING MARK

87 SET VHF RANGE FLAG

88 RESET VHF RANGE FLAG

89 START REND FINAL ATTITUDE MANEUVER (R63)

90 REQUEST REND CUT OF PLANE DISPLAY (R36)

91 BANKSUM

92 START IMU PERFORMANCE TEST (P07)

93 ENABLE W MATRIX INITIALIZATION

94 ENABLE CISLUNAR TRACKING RECYCLE

95 SPARE

96 TERMINATE INTEGRATION AND GO TO P00

97 THRUST FAIL DISPLAY

98 SPARE

99 ENABLE ENGINE IGNITION

4.6 THIS LIST REPRESENTS THE NOUNS USED IN PROGRAM COLOSSUS.

00	NOT IN USE		
01	SPECIFY ADDRESS (FRAC)	(L)	.XXXXX FRAC .XXXXX FRAC .XXXXX FRAC
02	SPECIFY ADDRESS (WHOLE)	(L)	XXXXX. INTEG XXXXX. INTEG XXXXX. INTEG
03	SPECIFY ADDRESS (DEGREE)	(L)	XXX.XX DEG XXX.XX DEG XXX.XX DEG
04	SPARE		
05	ANGULAR ERROR/DIFFERENCE		XXX.XX DEG
06	OPTION CODE	(L)	OCT OCT
07	FLAGWORD OPERATOR		OCT OCT OCT
08	ALARM DATA		OCT OCT OCT
09	ALARM CODES		OCT OCT OCT

10	CHANNEL TO BE SPECIFIED (L-EXCEPT CHAN 7)		OCT
11	SPARE		
12	OPTION CODE		OCT OCT
13	SPARE		
14	SPARE		
15	INCREMENT ADDRESS (L-W NO1,NO2,NO3,N10)		OCT
16	TIME OF EVENT (USED BY EXT VERB ONLY)	(L)	00XXX. HRS 00XX. MIN 0XX.XX SEC
17	ASTRONAUT TOTAL ATTITUDE (USED IN MODE 3 NEEDLES (V63))	(L)	XXX.XX DEG XXX.XX DEG XXX.XX DEG
18	BALL ANGLES AUTO MANEUVER		R XXX.XX DEG P XXX.XX DEG Y XXX.XX DEG
19	SPARE		
20	PRESENT ICDU ANGLES		R XXX.XX DEG P XXX.XX DEG Y XXX.XX DEG
21	PIPAS		X XXXXX. PULSES Y XXXXX. PULSES Z XXXXX. PULSES
22	NEW ICDU ANGLES	(L)	R XXX.XX DEG P XXX.XX DEG Y XXX.XX DEG
23	SPARE		
24	DELTA TIME FOR CMC CLOCK	(L)	00XXX. HRS 00XX. MIN 0XX.XX SEC
25	CHECKLIST (USED WITH V50)		XXXXX.
26	PRIO/DELAY,ADRES,PRCON (L-W V30,V31)		OCT OCT OCT
27	SELF TEST ON/OFF SWITCH	(L)	XXXXX.
28	SPARE		

29	XSM LAUNCH AZ			XXX.XX DEG
30	TARGET CODE (GYROCOMPASSING VERIFICATION)			XXXXX. XXXXX. XXXXX.
31	TIME OF LANDING SITE			00XXX. HRS 000XX. MIN 0XX.XX SEC
32	TIME FROM PERIGEE			00XXX. HRS 000XX. MIN 0XX.XX SEC
33	GETI		(L)	00XXX. HRS 000XX. MIN 0XX.XX SEC
34	TIME OF EVENT	(L)		00XXX. HRS 000XX. MIN 0XX.XX SEC
35	TIME FROM EVENT			00XXX. HRS 000XX. MIN 0XX.XX SEC
36	TIME OF CMC CLOCK	(L)		00XXX. HRS 000XX. MIN 0XX.XX SEC
37	GETI(TPI)		(L)	00XXX. HRS 000XX. MIN 0XX.XX SEC
38	TIME OF STATE VECTOR			00XXX. HRS 000XX. MIN 0XX.XX SEC
39	DELTA TIME FOR TRANSFER			00XXX. HRS 000XX. MIN 0XX.XX SEC
40	TFI/TFC VG DELTA V (ACCUMULATED)			XXBXX M-S XXXX.X FPS XXXX.X FPS
41	TARGET AZIMUTH TARGET ELEVATION TARGET IDENTIFIER (PASTE FROM N30)	(L)		XXX.XX DEG XX.XXX DEG 0000X
42	APO ALT PER ALT DELTA V (REQUIRED)			XXXX.X NM XXXX.X NM XXXX.X FPS

43	LATITUDE (+ NORTH)		XXX.XX DEG
	LONGITUDE (+ EAST)		XXX.XX DEG
	ALTITUDE		XXXX.X NM
44	APO ALT		XXXX.X NM
	PER ALT		XXXX.X NM
	TFF		XXBXX M-S
45	MARKS (VHF-OPTICS)		XXBXX
	TFI (NEXT BURN)		XXBXX M-S
	MGA		XXX.XX DEG
46	DAP CONFIG	(L)	OCT
			OCT
47	THIS VEHICLE WEIGHT	(L)	XXXXX. LBS
	OTHER VEHICLE WEIGHT		XXXXX. LBS
48	GIMBAL PITCH TRIM	(L)	XXX.XX DEG
	GIMBAL YAW TRIM		XXX.XX DEG
49	DELTA R		XXXX.X NM
	DELTA V		XXXX.X FPS
	SOURCE CODE		0000X.
50	SPLERROR		XXXX.X NM
	PERIGEE		XXXX.X NM
	TFF		XXBXX M-S
51	RHO		XXX.XX DEG
	GAMMA		XXX.XX DEG
52	CENTRAL ANGLE OF ACTIVE VEHICLE		XXX.XX DEG
53	RANGE		XXX.XX NM
	RANGE RATE		XXXX.X FPS
	PHI		XXX.XX DEG
54	RANGE		XXX.XX NM
	RANGE RATE		XXXX.X FPS
	THETA		XXX.XX DEG
55	PER CODE	(L)	XXXXX.
	ELEVATION ANGLE (E)		XXX.XX DEG
	CENTRAL ANGLE OF PASSIVE VEHICLE		XXX.XX DEG
56	REENTRY ANGLE		XXX.XX DEG
	DELTA V		XXXXX. FPS
57	DELTA R (SOR) (+ PASS VEH LEADS)	(L)	XXXX.X NM
58	PER ALT (POST TPI OR SOF)		XXXX.X NM
	DELTA V (TPI OR SOF)		XXXX.X FPS
	DELTA V (TPF OR SOR FINAL)		XXXX.X FPS

59	DELTA V LOS 1		XXXX.X FPS
	DELTA V LOS 2		XXXX.X FPS
	DELTA V LOS 3		XXXX.X FPS
60	G MAX		XXX.XX G
	V PRED		XXXXX. FPS
	GAMMA EI (+ UP)		XXX.XX DEG
61	IMPACT LATITUDE	(L)	XXX.XX DEG
	IMPACT LONGITUDE		XXX.XX DEG
	HEADS UP/DOWN (+ UP)		00001.
62	VI ,INERTIAL VEL MAG		XXXXX. FPS
	HDOT ,ALT RATE		XXXXX. FPS
	H ,ALT ABOVE PAD RADIUS		XXXX.X NM
63	RTGO ,RNG FROM E.I. TO SPLASH		XXXX.X NM
	VIO ,PREDICTED INERT VEL		XXXXX. FPS
	TFE ,TIME FROM FROM E.I.		XXBXX M-S
64	DRAG ACCELERATION		XXX.XX G
	VI ,INERTIAL VELOCITY		XXXXX. FPS
	R TO TARG (+ OVSHT)		XXXX.X NM
65	SAMPLED CMC TIME		00XXX. HRS
	(FETCHED IN INTERRUPT)		000XX. MIN
			0XX.XX SEC
66	BETA, CMD BANK ANGLE		XXX.XX DEG
	CROSS RANGE ERROR (+ TGT RT)		XXXX.X NM
	DOWN RANGE ERROR (+ OVSHT)		XXXX.X NM
67	R TO TARG (+ OVSHT)		XXXX.X NM
	LAT ,PRESENT POSITION (+ NORTH)		XXX.XX DEG
	LONG ,PRESENT POSITION (+ EAST)		XXX.XX DEG
68	BETA, CMD BANK ANGLE		XXX.XX DEG
	VI ,INERTIAL VELOCITY		XXXXX. FPS
	HDOT ,ALT RATE		XXXXX. FPS
69	BETA		XXX.XX DEG
	DL		XXX.XX G
	VL		XXXXX. FPS
70	CELESTIAL BODY CODE (BEFORE MARK)	(L)	OCT
	LANDMARK DATA		OCT
	HORIZON DATA		OCT
71	CELESTIAL BODY CODE (AFTER MARK)	(L)	OCT
	LANDMARK DATA		OCT
	HORIZON DATA		OCT

72	DELT ANG (+ ACT VEH LEADS)	(L)	XXX.XX DEG
	DELT ALT (+ PASS VEH ABOVE)		XXXX.X NM
	SEARCH OPTION		XXXXX.
73	SPARE		
74	SPARE		
75	SPARE		
76	SPARE		
77	SPARE		
78	SPARE		
79	SPARE		
80	TIME TO IGNITION/CUT OFF		XXBXX M-S
	VG		XXXXX. FPS
	DELTA V (ACCUMULATED)		XXXXX. FPS
81	DELTA VX (LV)	(L)	XXXX.X FPS
	DELTA VY (LV)		XXXX.X FPS
	DELTA VZ (LV)		XXXX.X FPS
82	SPARE		
83	DELTA VX(CONT)		XXXX.X FPS
	DELTA VY(CONT)		XXXX.X FPS
	DELTA VZ(CONT)		XXXX.X FPS
84	DELTA VX(O VEH)	(L)	XXXX.X FPS
	DELTA VY(O VEH)		XXXX.X FPS
	DELTA VZ(O VEH)		XXXX.X FPS
85	VGX (CONT)		XXXX.X FPS
	VGY (CONT)		XXXX.X FPS
	VGZ (CONT)		XXXX.X FPS
86	DELTA VX		XXXXX. FPS
	DELTA VY		XXXXX. FPS
	DELTA VZ		XXXXX. FPS
87	MARK DATA: OPTICS SHAFT ANGLE		XXX.XX DEG
	OPTICS TRUNNION ANGLE		XX.XXX DEG
88	PLANET 1/2 UNIT POSITION VECTOR X	(L)	.XXXXX
	Y		.XXXXX
	Z		.XXXXX
89	LANDMARK LATITUDE (+ NORTH)	(L)	XX.XXX DEG
	LANDMARK LONGITUDE/2 (+ EAST)		XX.XXX DEG
	LANDMARK ALTITUDE		XXX.XX NM

90	REND OUT OF PLANE PARAMETERS	Y		XXX.XX NM
		Y DOT		XXXX.X FPS
		PSI		XXX.XX DEG
91	PRESENT OCDU ANGLES - SHAFT			XXX.XX DEG
	- TRUN			XX.XXX DEG
92	NEW OCDU ANGLES- SHAFT		(L)	XXX.XX DEG
	TRUN			XX.XXX DEG
93	DELTA GYRO ANGLES		(L)	X XX.XXX DEG
				Y XX.XXX DEG
				Z XX.XXX DEG
94	ALTERNATE LOS - SHAFT		(L)	XXX.XX DEG
	TRUN			XX.XXX DEG
95	PREF ATT FDAI ANGLES			R XXX.XX DEG
				P XXX.XX DEG
				Y XXX.XX DEG
96	+X AXIS ATT FDAI ANGLES			R XXX.XX DEG
				P XXX.XX DEG
				Y XXX.XX DEG
97	SYSTEM TEST INPUTS		(L)	XXXXX.
				XXXXX.
				XXXXX.
98	SYSTEM TEST RESULTS		(L)	XXXXX.
	AND INPUTS			.XXXXX
				XXXXX.
99	RMS VALUE OF POSITION ERROR		(L)	XXX.XX NM
	RMS VALUE OF VELOCITY ERROR			XXXX.X NM
	OPTION CODE			XXXXX

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THIS LIST REPRESENTS THE CHECKLIST REFERENCE CODES USED WITH V50N25 FOR PROGRAM COLOSSUS.

R1 CODE	ACTION TO BE EFFECTED
00014	PERFORM FINE ALIGNMENT
00015	PERFORM CELESTIAL BODY ACQUISITION
00016	TERMINATE MARK SEQUENCE
00041	SWITCH CM/SM SEPARATION TO UP
00062	KEY CMC TO STANDBY
00202	PERFORM GNCS AUTOMATIC MANEUVER
00203	SWITCH TO CMC-AUTO
00204	PERFORM SPS GIMBAL TRIM

SWITCH-DENOTES CHANGE POSITION OF A CONSOLE SWITCH

PERFORM-DENOTES START OR END OF A TASK

KEY IN-DENOTES KEY IN OF DATA THRU THE DSKY

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4.8 THIS LIST REPRESENTS THE OPTION CODES USED WITH V04N06 FOR PROGRAM COLOSSUS. REV 01 11/14/68

THE SPECIFIED OPTION CODES WILL BE DISPLAYED IN R1
IN CONJUNCTION WITH EL V04 N06 TO REQUEST THE ASTRONAUT
TO LOAD INTO R2 THE OPTION HE DESIRES.

R1 OPTION CODE	PURPOSE	INPUT FOR R2
00001	SPECIFY IMU ORIENTATION	1=PREF 2= NOMINAL 3=REFSMMAT 4=LANDING SITE
00002	SPECIFY VEHICLE	1=THIS VEHICLE 2=OTHER VEHICLE
00003	SPECIFY TRACKING ATTITUDE	1=PREFERRED 2=+X-AXIS
00005	SPECIFY SOR PHASE	1=FIRST 2=SECOND
00007	SPECIFY PROPULSION SYSTEM	1=SPS 2=RCS

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4.9 THIS LIST REPRESENTS THE ALARM CODES USED WITH V05N09 FOR PROGRAM COLOSSUS.

R1

CODE	PURPOSE	SET BY
00110	NO MARK SINCE LAST MARK REJECT	SXTMARK
00112	MARK NOT BEING ACCEPTED	SXTMARK
00113	NO INRITS	SXTMARK
00114	MARK MADE BUT NOT DESIRED	SXTMARK
00115	OPTICS TORQUE REQUEST WITH SWITCH NOT AT CMC	EXT VERB OPTICS CDU
00116	OPTICS SWITCH ALTERED BEFORE 15 SEC ZERO TIME ELAPSED	T4RUPT
00117	OPTICS TORQUE REQUEST WITH OPTICS NOT AVAILABLE (OPTIND=-0)	EXT VERB OPTICS CDU
00120	OPTICS TORQUE REQUEST WITH OPTICS NOT ZEROED	T4RUPT
00121	CDU'S NOT GOOD AT TIME OF MARK	SXTMARK
00122	MARKING NOT CALLED FOR	SXTMARK
00124	P17 TPI SEARCH-NO SAFE PERICTR HERE	TPI SEARCH
00205	BAD PIPA READING	SERVICER
00206	ZERO ENCODE NOT ALLOWED WITH COARSE ALIGN + GIMBAL LOCK	IMU MODE SWITCH IMU 2
00207	ISS TURNON REQUEST NOT PRESENT FOR 90 SEC	T4RUPT
00210	IMU NOT OPERATING	IMU MODE SWITCH, IMU 2, R02, P51,
00211	COARSE ALIGN ERROR-DRIVE >2 DEGREES	IMU MODE SWITCH
00212	PIPA FAIL BUT PIPA IS NOT BEING USED	IMU MODE SWITCH, T4RUPT
00213	IMU NOT OPERATING WITH TURN-ON REQUEST	T4RUPT
00214	PROGRAM USING IMU WHEN TURNED OFF	T4RUPT
00215	PREFERRED ORIENTATION SELECTED BUT NOT SPECIFIED	P52, P54
00217	BAD RETURN FROM STALL ROUTINES	CURTAINS

1A

00220		IMU NOT ALIGNED (RAC REESMMAT)	P02, P51
00401		DESIRED GIMBAL ANGLES YIELD GIMBAL LOCK	INF ALIGN, IMU2
00404		TARGET OUT OF VIEW (TRUN. ANGLE > 90 DEG)	P52
00405		TWO STARS NOT AVAILABLE	P52,P54
00406		REND NAVIGATION NOT OPERATING	P21, P23
00407		TARGET OUT OF VIEW (TRUN. ANGLE > 50 DEG)	P52
00421		W-MATRIX OVER FLOW	INTEGRV
00605		NUMBER OF ITERATIONS EXCEEDS LOOP MAXIMUM	P32, P72
00611		NO TIG FOR GIVEN FLEV ANGLE	P34,P74
00612		STATE VECTOR IN WRONG SPHERE OF INFLUENCE	P37
00613		REENTRY ANGLE OUT OF LIMITS	P37
01102		CMC SELF TEST ERROR	SELF CHECK
01103	P *	UNUSED CCS BRANCH EXECUTED	ABORT
01104	P *	DELAY ROUTINE BUSY	EXEC
01105		DOWNLINK TOO FAST	T4RUPT
01106		UPLINK TOO FAST	T4RUPT
01107		PHASE TABLE FAILURE, ASSUME ERASABLE MEMORY IS DESTROYED	RESTART
01201	P *	EXECUTIVE OVERFLOW-NO VAC AREAS	EXEC
01202	P *	EXECUTIVE OVERFLOW-NO CORE SETS	EXEC
01203	P *	WAITLIST OVERFLOW-TOO MANY TASKS	WAITLIST
01206	P *	SECOND JOB ATTEMPTS TO GO TO SLEEP VIA KEYBOARD AND DISPLAY PROGRAM	PINBALL
01207	P *	NO VAC AREA FOR MARKS	SXT MARK
01210	P *	TWO PROGRAMS USING DEVICE AT SAME TIME	IMU MODE SWITCH
01211	P *	ILLEGAL INTERRUPT OF EXTENDED VERB	SXTMARK

01301	PCN 588	ARCSIN-ARCCOS INPUT ANGLE TOO LARGE	INTERPRETER
01302	P *	SQRT CALLED WITH NEGATIVE ARGUMENT	INTERPRETER
01407		VG INCREASING	S40.8
01426		IMU UNSATISFACTORY	P61,P62
01427		IMU REVERSED	P61, P62
01501	P *	KEYBOARD AND DISPLAY ALARM DURING INTERNAL USE (NVSUB)	PINBALL
01502	P *	ILLEGAL FLASHING DISPLAY	GOPLAY
01520		V37 REQUEST NOT PERMITTED AT THIS TIME	V37
01600		OVERFLOW IN DRIFT TEST	OPT PRE ALIGN CALIB
01601	P *	BAD IMU TORQUE	OPT PRE ALIGN CALIB
01703		INSUFFICIENT TIME FOR INTEG., TIG WAS SLIPPED.	P41
01706		STAGE VERIFY DISCRETE DOES NOT AGREE	R03
01707		CHECKLIST 203 NOT PERFORMED	R61
03777		ICDU FAIL CAUSED THE ISS WARNING	T4RUPT
04777		ICDU, PIPA FAILS CAUSED THE ISS WARNING	T4RUPT
07777		IMU FAIL CAUSED THE ISS WARNING	T4RUPT
10777		IMU, PIPA FAILS CAUSED THE ISS WARNING	T4RUPT
13777		IMU, ICDU FAILS CAUSED THE ISS WARNING	T4RUPT
14777		IMU, ICDU, PIPA FAILS CAUSED THE ISS WARNING	T4RUPT

* INDICATES ABORT TYPE, ALL OTHERS ARE NON-ABORTIVE.
P * INDICATES A GO TO PROGRAM 00 TYPE ABORT
B * INDICATES A BAIL OUT TYPE ABORT

(Unless AVERAGE G is on, then P* becomes B*)

1A

NOTE: FOR VOS N09 DISPLAYS:
R1-XXXXX (FIRST ALARM TO OCCUR AFTER LAST RESET).
R2-XXXXX (SECOND ALARM TO OCCUR AFTER LAST RESET).
R3-XXXXX (ALARM WHICH OCCURRED LAST)

CHANGE CONTROL NOTES

LOGIC REV 02 PCN 620
REV 03 PCN 588

Internal:

Adler, P. (2)
Bairnsfather, R.
Battin, R.
Beals, C.
Blanchard, E.
Cooper, W.
Copps, E.
Copps, S.
Cox, G.
Davis, S.
Day, W.
DeCain, F.
Denniston, E.
Deutsch, S.
DeWolf, D.
Dimock, G.
Drake, L.
Drane, L.
Dunbar, J.
Dunbar, V.
Edmonds, G.
Eliassen, S.
Engel, A. (2)
Felleman, P.
Fleming, J.
Gediman, L. (20)
Glendenning, J.
Glick, K.
Goldberger, S.
Goodwin, K.
Grace, E.
Greene, K.
Griggs, K.
Hamilton, M.
Haslam, R.
Heinemann, P.
Henize, J.
Hoag, D.
Hsiung, D.
Hughes, E.
Ireland, B.
Issacs, T.
Johnson, I.
Johnson, L. B.
Johnson, M.
Johnston, M.
Keene, D.
Kernan, J.
Kiburz, R.
Kido, K.
*Kingston, J.
Klumpp, A.
Kosmala, A.
Kossuth, G.
Kupfer, W.
Laats, A.
Larson, L.
Larson, R.
Lawrence, J.
Leone, F.
Levine, G.
Lickly, D. (3)
Lones, R.
Marscher, W.
Martin, F.
McOuat, H.
Megna, V.
Metzinger, R.
Millard, D.
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Miller, J.S.
Mimno, P.
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Morth, R.
Muller, E.
Nevins, J.
O'Connor, J.
Ostanek, W.
Parr, T.
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Plender, P. (6)
Pope, G.
Pu, C.
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Robertson, W.
Rye, P. (3)
Sapanaro, J. (4)
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Sprague, D.
Stameris, W.
Stubbs, G.
Suomala, J.
Sutherland, J.
Tanner, W.
Tinkham, R.
Turnbull, J.
Vincent, K.
Vittek, J.
Volante, P.
Weatherbee, R.
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Werner, R.
White, P.
White, R.
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