

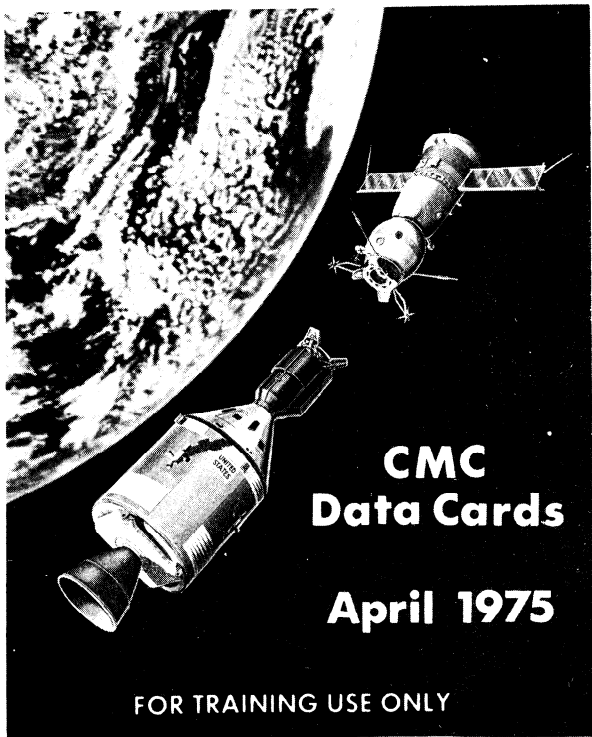
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**GUIDANCE
AND
NAVIGATION**

F. DIGENOVA

CONSOLE 256

SSR



**CMC
Data Cards**

April 1975

FOR TRAINING USE ONLY



Delco Electronics

General Motors Corporation

Goleta, California 93017

BLOCK II BASIC INSTRUCTIONS

INSTRUC-TION	ORDER CODE	DESCRIPTION	INSTRUC-TION	ORDER CODE	DESCRIPTION
AD K	06.	ADD K	LXCH E	02.2	EXCHANGE L AND E
ADS E	02.6	ADD TO STORAGE E	MASK K	07.	MASK WITH K
AUG E	12.4	AUGMENT E	MP K	17.	MULTIPLY K
BZF F	11.2 11.4 11.6	BRANCH ON ZERO TO FIXED F	MSK K	07.	MASK K
BZMF F	16.2 16.4 16.6	BRANCH ON ZERO OR MINUS TO FIXED F	MSU E	12.0	MODULAR SUBTRACT E
CA K CAE E CAF F	03. 03. 03.	CLEAR AND ADD K CLEAR AND ADD E CLEAR AND ADD F	NDX E	05.0	INDEX E
CCS E	01.0	COUNT, COMPARE, AND SKIP ON E	NDX K	15.	INDEX F
COM	04.0000	COMPLEMENT A	NOOP	03.0000	NO OPERATION (E)
CS K	04.	CLEAR AND SUBTRACT K	NOOP	TCF I+1	NO OPERATION (F)
CYL	.0022	CYCLE LEFT	OVSF	05.4000	OVERFLOW SKIP; TS A
CYR	.0020	CYCLE RIGHT	QXCH E	12.2	EXCHANGE Q AND E
DAS E	02.0	DOUBLE ADD TO STORAGE E	RAND H	10.2	READ AND "AND" H
DCA K	13.	DOUBLE CLEAR AND ADD K	READ H	10.0	READ H
DCS K	14.	DOUBLE CLEAR AND SUBTRACT K	RELINT	00.0003	RELEASE INHIBIT INTERRUPT
DCOM	14.0000	DP COMPLEMENT	RESUME	05.0017	RESUME INTERRUPTED PROGRAM
DDOUBL	02.0000	DP DOUBLE	RETURN	00.0002	RETURN; TCCQ
DIM E	12.6	DIMINISH E	ROR H	10.4	READ AND "OR" H
DOUBLE	06.0000	DOUBLE A	RXOR H	10.0	READ AND EXCLUSIVE "OR" H
DTCB	05.2005	DP TRANSFER CONTROL BOTH BANKS	SR	.0021	SHIFT RIGHT
DV E	11.0	DIVIDE BY E	SU E	16.0	SUBTRACT E
DXCH E	05.2	DOUBLE EXCHANGE A AND E	TCAA	05.4005	TRANSFER CONTROL TO ADDRESS IN A; TS Z
EDOP	.0023	EDIT OPERATOR	TC K	00.	TRANSFER CONTROL TO K
EXTEND	0.0006	EXTEND	TCF F	01.2 01.4 01.6	TRANSFER CONTROL TO FIXED F
INCR E	02.4	INCREMENT E	TCR K	00.	TC K
INDEX E	05.0	INDEX NEXT BASIC INSTRUCTION WITH E	TS E	05.4	TRANSFER TO STORAGE E
INDEX K	15.	INDEX NEXT EXTRA- CODE INSTRUCTION WITH K	WAND H	10.3	WRITE AND "AND" H
INHINT	00.0004	INHIBIT INTERRUPT	WOR H	10.5	WRITE AND "OR" H
			WRITE H	10.1	WRITE H
			XCH E	05.6	EXCHANGE A AND E
			ZL	02.2007	ZERO L; LXCH ZERO
			ZQ	12.2007	ZERO Q; QXCH ZERO

VERB CODES

00	NOT IN USE	51	PLEASE MARK
01	DISPLAY OCTAL COMP 1 IN R1	52	SPARE
02	DISPLAY OCTAL COMP 2 IN R1	53	PLEASE PERFORM ALTERNATE LOS MARK
03	DISPLAY OCTAL COMP 3 IN R1	54	REQUEST RENDEZVOUS BACKUP SIGHTING
04	DISPLAY OCTAL COMP 1,2 IN R1, R2	55	MARK ROUTINE (R23)
05	DISPLAY OCTAL COMP 1,2,3 IN R1, R2, R3	56	INCREMENT AGC TIME (DECIMAL)
06	DISPLAY DECIMAL IN R1 OR R1, R2 OR R1, R2, R3	57	TERMINATE TRACKING (P20)
07	DISPLAY DOUBLE PREC DECIMAL IN R1, R2 (TEST ONLY)	58	DISPLAY UPDAT STATE OF FULTKFLG
08		59	ENABLE AUTO MANEUVER IN P20
09		60	ENABLE JETS DISABLED IN R04 DOCKED DATA LOAD ROUTINE
10		61	SET ASTRONAUT TOTAL ATTITUDE (N17) TO PRESENT ATTITUDE
11	MONITOR OCTAL COMP 1 IN R1	62	DISPLAY DAP ATTITUDE ERROR
12	MONITOR OCTAL COMP 2 IN R1	63	DISPLAY TOTAL ATTITUDE ERROR WRT N22
13	MONITOR OCTAL COMP 3 IN R1	64	DISPLAY TOTAL ASTRONAUT ATTITUDE ERROR WRT N17
14	MONITOR OCTAL COMP 1,2 IN R1, R2	65	TRANSFORM OPTICS ANGLES TO TRACKING ANGLES
15	MONITOR OCTAL COMP 1,2,3 IN R1, R2, R3	66	OPTICAL VERIFICATION OF PRELAUNCH ALIGNMENT
16	MONITOR DECIMAL IN R1 OR R1, R2 OR R1, R2, R3	67	VEHICLES ATTACHED. MOVE THIS VEHICLE STATE VECTOR TO OTHER VEHICLE STATE VECTOR
17	MONITOR DOUBLE PREC DECIMAL IN R1, R2 (TEST ONLY)	68	DISPLAY W MATRIX
18		69	SPARE
19		70	CAUSE RESTART
20		71	UPDATE LIFTOFF TIME
21	LOAD COMPONENT 1 INTO R1	72	UNIVERSAL UPDATE - BLOCK ADR
22	LOAD COMPONENT 2 INTO R2	73	UNIVERSAL UPDATE - SINGLE ADR
23	LOAD COMPONENT 3 INTO R3	74	UPDATE AGC TIME (OCTAL)
24	LOAD COMPONENT 1,2 INTO R1, R2	75	INITIALIZE ERASABLE DUMP VIA DOWNLINK
25	LOAD COMPONENT 1,2,3 INTO R1, R2, R3	76	BACKUP LIFTOFF
26		77	START R27 in P20
27	DISPLAY FIXED MEMORY	78	KILL R27
28		79	UPDATE PRELAUNCH AZIMUTH
29		80	SPARE
30	REQUEST EXECUTIVE	81	UPDATE OWS STATE VECTOR
31	REQUEST WAITLIST	82	UPDATE CSM STATE VECTOR
32	RECYCLE PROGRAM	83	REQUEST ORBITAL PARAMETER DISPLAY (R30)
33	PROCEED WITHOUT DSKY INPUTS	84	REQUEST RENDEZVOUS PARAMETER DISPLAY (R31)
34	TERMINATE FUNCTION	85	SPARE
35	TEST LIGHTS	86	REQUEST RENDEZVOUS PARAMETER DISPLAY NO. 2 (R34)
36	REQUEST FRESH START	87	REJECT RENDEZVOUS BACKUP SIGHTING MARK
37	CHANGE PROGRAM (MAJOR MODE)	88	SET VHF RANGE FLAG
38		89	RESET VHF RANGE FLAG
39		90	REQUEST RENDEZVOUS FINAL ATTITUDE (R63)
40	ZERO CDU'S	91	REQUEST RENDEZVOUS OUT OF PLANE DISPLAY (R36)
41	COARSE ALIGN CDU'S	92	DISPLAY BANK SUM
42	FINE ALIGN IMU	93	SPARE
43	LOAD IMU ATT ERROR METERS	94	ENABLE W MATRIX INITIALIZATION
44	REQUEST DOCKED DAP DATA LOAD ROUTINE (R04)	95	SPARE
45	DOCKED DAP TURN ON	96	SPARE
46	ESTABLISH G & C CONTROL	97	TERMINATE INTEGRATION AND GO TO P00
47	MOVE OWS STATE VECTOR INTO CM STATE VECTOR	98	PERFORM ENGINE FAIL PROCEDURE
48	REQUEST DAP DATA LOAD (R03)	99	SPARE
49	REQUEST CREW DEFINED MANEUVER (R62)		PLEASE ENABLE ENGINE
50	PLEASE PERFORM		

NOUN CODES

NORMAL NOUNS	COMPONENTS & SCALING	
00 NOT IN USE		
01 SPECIFY MACHINE ADDRESS (FRACTIONAL)	3 COMP	.XXXXX FOR EACH
02 SPECIFY MACHINE ADDRESS (WHOLE)	3 COMP	XXXXX. FOR EACH
03 SPECIFY MACHINE ADDRESS (DEGREES)	3 COMP	XXX.XX DEG FOR EACH
04 ATTITUDE ERRORS	3 COMP	XXX.XX DEG FOR EACH
05 ANGULAR ERROR/DIFFERENCE CELESTIAL ANGLE	2 COMP	XXX.XX DEG FOR EACH
06 OPTION CODE	2 COMP	OCTAL ONLY FOR EACH
LOADING NOUN 07 WILL SET OR RESET SELECTED BITS IN ANY ERASABLE LOCATION		
07 ECADR OF WORD TO BE MODIFIED ONES FOR BITS TO BE MODIFIED 1 TO SET OR 0 TO RESET SELECTED BITS	3 COMP	OCTAL ONLY FOR EACH
08 ALARM DATA	3 COMP	OCTAL ONLY FOR EACH
09 ALARM CODES	3 COMP	OCTAL ONLY FOR EACH
10 CHANNEL TO BE SPECIFIED	1 COMP	OCTAL ONLY
11 TIG OF NCC	3 COMP	00XXX. HRS 000XX. MIN 0XX.XX SEC
12 OPTION CODE (USED BY EXTENDED VERBS ONLY)	2 COMP	OCTAL ONLY FOR EACH
13 TIG OF NSR	3 COMP	00XXX. HRS 000XX. MIN 0XX.XX SEC
14 STAR TRACKER AZIMUTH ELEVATION	2 COMP	XXXXX. MIN XXXXX. MIN
15 INCREMENT MACHINE ADDRESS	1 COMP	OCTAL ONLY
16 TIME OF EVENT (USED BY EXTENDED VERBS ONLY)	3 COMP	00XXX. HRS 000XX. MIN 0XX.XX SEC
17 ASTRONAUT TOTAL ATTITUDE	3 COMP	XXX.XX DEG FOR EACH
18 AUTO MANEUVER BALL ANGLES	3 COMP	XXX.XX DEG FOR EACH
19 STAR TRACKER AZIMUTH IN 2-WORD OCTAL FORMAT (USE VERB 04 TO DISPLAY)		OCTAL ONLY
20 ICDU ANGLES	3 COMP	XXX.XX DEG FOR EACH
21 PIPAS	3 COMP	XXXXX. PULSES FOR EACH
22 NEW ICDU ANGLES	3 COMP	XXX.XX DEG FOR EACH
23 NAV BASE TO ATM EULER ANGLES	3 COMP	XXX.XX DEG FOR EACH
24 DELTA TIME FOR AGC CLOCK	3 COMP	00XXX. HRS 000XX. MIN 0XX.XX SEC
25 CHECKLIST (USED WITH PLEASE PERFORM ONLY)	3 COMP	XXXXX. FOR EACH
26 PRIORITY/DELAY, ADRES, BBCON	3 COMP	OCTAL ONLY FOR EACH
27 SELF TEST ON/OFF SWITCH	1 COMP	XXXXX.
28 TIG OF NC2	3 COMP	00XXX. HRS 000XX. MIN 0XX.XX SEC
29 XSM LAUNCH AZIMUTH	1 COMP	XXX.XX DEG
30 TARGET CODES	3 COMP	XXXXX. FOR EACH
31 TIME OF W INITIALIZATION	3 COMP	00XXX. HRS 000XX. MIN 0XX.XX SEC
32 TIME FROM PERIGEE	3 COMP	00XXX. HRS 000XX. MIN 0XX.XX SEC
33 TIME OF IGNITION	3 COMP	00XXX. HRS 000XX. MIN 0XX.XX SEC
34 TIME OF EVENT	3 COMP	00XXX. HRS 000XX. MIN 0XX.XX SEC
35 TIME FROM EVENT	3 COMP	00XXX. HRS 000XX. MIN 0XX.XX SEC
36 TIME OF AGC CLOCK	3 COMP	00XXX. HRS 000XX. MIN 0XX.XX SEC
37 TIG OF TPI	3 COMP	00XXX. HRS 000XX. MIN 0XX.XX SEC
38 TIME OF STATE VECTOR	3 COMP	00XXX. HRS 000XX. MIN 0XX.XX SEC
39 TIG OF LAST MANEUVER	3 COMP	00XXX. HRS 000XX. MIN 0XX.XX SEC

NOUN CODES(CONT.)

MIXED NOUNS		COMPONENTS & SCALING		
40	TIME FROM IGNITION/CUTOFF VG, DELTA V (ACCUMULATED)	3 COMP	XXBXX XXXX. X XXXX. X	MIN/SEC FT/SEC FT/SEC
41	TARGET AZIMUTH, TARGET ELEVATION	2 COMP	XXX. XX XX. XXXX	DEG DEG
42	APOGEE, PERIGEE, DELTA V (REQUIRED)	3 COMP	XXXX. X XXXX. X XXXX. X	NAUT MI NAUT MI FT/SEC
43	LATITUDE, LONGITUDE, ALTITUDE	3 COMP	XXX. XX XXX. XX XXXX. X	DEG DEG NAUT MI
44	APOGEE, PERIGEE, TFF	3 COMP	XXXX. X XXXX. X XXBXX	NAUT MI NAUT MI MIN/SEC
45	MARKS (VHF - OPTICS) TFI OF NEXT BURN MGA	3 COMP	+XXBXX XXBXX XXX. XX	MIN/SEC DEG
46	AUTOPILOT CONFIGURATION	2 COMP		OCTAL ONLY FOR EACH
47	THIS VEHICLE WEIGHT	2 COMP	XXXXX.	LBS
48	OTHER VEHICLE WEIGHT PITCH TRIM	2 COMP	XXXXX. XXX. XX	LBS DEG
49	YAW TRIM, DELTA R DELTA V	3 COMP	XXX. XX XXX. XX XXXX. X	DEG DEG FT/SEC
50	VHF OR OPTICS CODE SPLASH ERROR, PERIGEE, TFF	3 COMP	XXXX. X XXXX. X XXBXX	NAUT MI NAUT MI MIN/SEC
51	SPARE	2 COMP	XXX. XX	DEG
52	CENTRAL ANGLE OF ACTIVE VEHICLE	1 COMP	XXX. XX	DEG
53	RANGE, RANGE RATE, PHI	3 COMP	XXX. XX XXXX. X XXX. XX	NAUT MI FT/SEC DEG
54	RANGE, RANGE RATE, THETA	3 COMP	XXX. XX XXXX. X XXX. XX	NAUT MI FT/SEC DEG
55	PERIGEE CODE ELEVATION ANGLE	2 COMP	XXXXX. XXX. XX	DEG DEG
56	VEHICLE RATE	3 COMP	N. XXXX	DEG/SEC FOR EACH
57	NO. OF HALF REVS DELTA ALT NCC DELTA ALT NSR	3 COMP	XXXXX. XXXX. X XXXX. X	NAUT MI NAUT MI
58	DELTA V TPI DELTA V TPF DELTA TIME (TPI - NOMTPI)	3 COMP	XXXX. X XXXX. X XXBXX	FT/SEC FT/SEC MIN/SEC
59	DELTA VELOCITY LOS	3 COMP	XXXX. X	FT/SEC FOR EA.
60	GMAX, VPRED, GAMMA E1	3 COMP	XXX. XX XXXXX. XXX. XX	G FT/SEC DEG
61	IMPACT LATITUDE, IMPACT LONGITUDE, HEADS UP/DOWN	3 COMP	XXX. XX XXX. XX XXX. XX	DEG DEG DEG
62	INERTIAL VEL MAG (VI), ALT RATE CHANGE (HDOT), ALT ABOVE PAD RADIUS (H)	3 COMP	+/-00001 XXXXX. XXXXX. XXXX. X	FT/SEC FT/SEC NAUT MI
63	RANGE 297, 431 TO SPLASH (RTGO) PREDICTED INERT VEL (VIO), TIME FROM 297, 431 (TFE)	3 COMP	XXXX. X XXXXX. XXBXX	NAUT MI FT/SEC MIN/SEC
64	DRAG ACCELERATION, INERTIAL VELOCITY (VI), RANGE TO SPLASH	3 COMP	XXX. XX XXXXX. XXXX. X	G FT/SEC NAUT MI
65	SAMPLED AGC TIME (FETCHED IN INTERRUPT)	3 COMP	00XXX. 000XX. 0XX. XX	HRS MIN SEC
66	COMMAND BANK ANGLE (BETA), CROSS RANGE ERROR, DOWN RANGE ERROR	3 COMP	XXX. XX XXXX. X XXXX. X	DEG NAUT MI NAUT MI
67	RANGE TO TARGET, PRESENT LATITUDE, PRESENT LONGITUDE	3 COMP	XXXX. X XXX. XX XXX. XX	NAUT MI DEG DEG
68	COMMAND BANK ANGLE (BETA), INERTIAL VELOCITY (VI), ALT RATE CHANGE (RDOT)	3 COMP	XXX. XX XXXXX. XXXXX.	DEG FT/SEC FT/SEC
69	BETA DL VL	3 COMP	XXX. XX XXX. XX XXXXX.	DEG G FT/SEC

NOUN CODES(CONT.)

MIXED NOUNS (CONT)		COMPONENTS & SCALING	
70	STAR CODE,	3 COMP	OCTAL ONLY
71	STAR CODE	3 COMP	OCTAL ONLY
72	TIME OF R27 OPTIMIZATION	3 COMP	00XXX, 000XX, 0XX.XX HRS MIN SEC
73	ALTITUDE VELOCITY FLIGHT PATH ANGLE	3 COMP	XXXXXXB, XXXXX, XXX.XX NAUT MI FT/SEC DEG
74	COMMAND BANK ANGLE (BETA) INERTIAL VELOCITY (VI) DRAG ACCELERATION	3 COMP	XXX.XX XXXXX, XXX.XX DEG FT/SEC G
75	DELTA ALTITUDE CDH DELTA TIME (CDH-CSI OR TPI-CDH) DELTA TIME (TPI-CDH or TPI-NOMTPI)	3 COMP	XXXX.X XXBXX XXBXX NAUT MI MIN/SEC MIN/SEC
76	CURRENT R27 RANGE CURRENT R27 RANGE - RATE TIME FROM R27 OPTIMIZATION	3 COMP	XXX.XX XXXX.X XXBXX NAUT MI FT/SEC MIN/SEC
77	OPTIMIZED R27 RANGE OPTIMIZED R27 RANGE RATE R27 THETA/PHI	3 COMP	XX.XX XXXX.X XXXXX NAUT MI FT/SEC DEG
78	YAW ANGLE FOR P20 PITCH ANGLE FOR P20 AZIMUTH CONSTRAINT FOR P20		XXX.XX XXX.XX XXX.XX DEG DEG DEG
79	P20 ROTATION RATE P20 ROTATION DEADBAND	2 COMP	X.XXXX XXX.XX DEG/SEC DFG
80	TIME FROM IGNITION/CUTOFF VG	3 COMP	XXBXX XXXXX, XXXXX, MIN/SEC FT/SEC FT/SEC
81	DELTA V (ACCUMULATED)		
82	DELTA V (LV)	3 COMP	XXXX.X FT/SEC FOR EACH
83	NSR DELTA V (LV)	3 COMP	XXXX.X FT/SEC FOR EACH
84	DELTA V (BODY)	3 COMP	XXXX.X FT/SEC FOR EACH
85	DELTA V NEXT MANEUVER DELTA ALT - NEXT MANEUVER DELTA V THIRD MANEUVER	3 COMP	XXXX.X XXXX.X XXXX.X FT/SEC NAUT MI FT/SEC
86	VG (BODY)	3 COMP	XXXX.X FT/SEC FOR EACH
87	DELTA V (LV)	3 COMP	XXXXX, FT/SEC FOR EACH
88	DOCKED DAP FLAG SPECIFICATION CHANNEL 5 JETS INHIBITED BY DOCKED DAP CHANNEL 6 JETS INHIBITED BY DOCKED DAP	3 COMP	OCTAL ONLY FOR EACH
89	UNIT SUN OR PLANET VECTOR MANUAL/AUTO DOCKED DAP MANEUVER RATES DEAD BAND FOR DOCKED DAP	3 COMP 2 COMP	.XXXXX X.XXXX DEG FOR EACH DEG/SEC
90	Y ACTIVE VEHICLE Y DOT ACTIVE VEHICLE Y DOT PASSIVE VEHICLE	3 COMP	XXX.XX XXX.XX XXXX.X DEG FPS FPS
91	OCDU ANGLE SHAFT OCDU ANGLE TRUNNION	2 COMP	XXX.XX XX.XXX DEG DEG
92	NEW OPTICS ANGLE SHAFT NEW OPTICS ANGLE TRUNNION	2 COMP	XXX.XX XX.XXX DEG DEG
93	DELTA GYRO ANGLES	3 COMP	XX.XXX DEG FOR EACH
94	NEW OPTICS ANGLE SHAFT NEW OPTICS ANGLE TRUNNION	2 COMP	XXX.XX XX.XXX DEG DEG
95	TIG of NC 1	3 COMP	00XXX, 000XX, 0XX.XX HRS MIN SEC
96	Y CM Y DOT CM Y DOT LM	3 COMP	XXX.XX XXXX.X XXXX.X NAUT MI FT/SEC FT/SEC
97	SYSTEM TEST INPUTS	3 COMP	XXXXX, FOREACH
98	SYSTEM TEST RESULTS AND INPUTS	3 COMP	XXXXX, XXXXX XXXXX XXXXX XXXXX, XXXXX, XXXXX.X XXXXX, FT FT/SEC
99	RMS IN POSITION RMS IN VELOCITY RMS OPTION	3 COMP	XXXXX, XXXXX, XXXXX.X XXXXX, FT FT/SEC

NOUN STORAGE REGISTER NAMES

CODE	REGISTER(S)	CODE	REGISTER(S)	CODE	REGISTER(S)
00		52	ACTCENT	80	TTOGO
01	(SPECIFY ADDRESS)	53	RANGE		VGDISP
02	(SPECIFY ADDRESS)		RRATE		DVTOTAL
03	(SPECIFY ADDRESS)		RTHETA	81	DELVLVC, +2, +4
04	AK	54	RANGE	82	VGNSR, +2, +4
	AK1		RRATE	83	DELVIMU, +2, +4
	AK2		RTHETA	84	DVDSP1
05	DSPTM1	55	NN1		DHDS
06	OPTION1, +1		ELEV		DVDSP2
07	XREG		CENTANG	85	VGBODY, +2, +4
	YREG	56	ADOT	86	DELVLVC, +2, +4
	ZREG		ADOT2	87	MRKBUF1+3, +5
08	ALMCADR, +1, +2		ADOT2	88	DAPDATR3
09	FAILREG, +1, +2	57	HALFREVS		CH5FAIL
10	(SPECIFY CHANNEL)		DHNCC		CH6FAIL
11	TCSI, +1		DELH1	89	DKRATE
12	OPTIONX, +1	58	DELVTPI		DKDB
13	TCDH, +1		DELVTPF		
14	TRKAZ		T2TOT3	90	YCSM
	TRKEL	59	DVLOS, +2, +4		YDOTC
15	(INCREMENT ADDRESS)	60	GMAX		YDOTL
16	DSPTMX, +1		VPRED	91	CDUS
17	CPHX, +1, +2		GAMMAEI		CDUT
18	THETAD, +1, +2	61	LAT(SPL)	92	SAC
19	TRKAZOCT, +1		LNG(SPL)		PAC
20	CDUX, Y, Z		HEADSUP	93	OGC, +2, +4
21	PIPAX, Y, Z	62	VMAGI	94	MRKBUF1+3, +5
22	THETAD, +1, +2		IIDOT	95	NC1TIG, +1
23	THETAD, +1, +2		ALT I	96	RANGE
24	DSPTM2, +1	63	RTGO		RRATE
25	DSPTM1, +1, +2		VIO		RRATE2
26	N26/PRI, +1, +2		TTE	97	DSPTM1, +1, +2
27	SMODE	64	D	98	DSPTM2, +1, +2
28	NC2TIG, +1		VMAGI	99	WWPOS
29	DSPTM1		RTGON64		WWVEL
30	DSPTM1, +1, +2	65	SAMPTIME, +1		WWOPT
31	AGEOFW, +1	66	ROLLC		
32	-TPER, +1		XRNGERR		
33	TIG, +1		DNRNGERR		
34	DSPTM1, +1	67	RTGON67		
35	TTOGO, +1		LAT		
36	TIME2, +1		LONG		
37	TP1, +1	68	ROLLC		
38	TET, +1		VMAGI		
39	T3T0T4, +1		RDOT		
40	TTOGO	69	ROLLC		
	VGDISP		Q7		
	DVTOTAL		VL		
41	DSPTM1, +1	70	STARCODE		
42	HAPO	71	STARCODE		
	HPER	72	HORIZON		
	VGDISP	73	FIXTIME, +1		
43	LAT		P21ALT		
	LONG		P21VEL		
	ALT	74	P21GAM		
44	HAPOX		ROLLC		
	HPERX		VMAGI		
	TFF	75	D		
45	VHFCNT		DIFFALT		
	TTOGO		T1TOT2		
	+MGA	76	SVEC		
46	DAPDATR1		SVEC+2		
	DAPDATR2		TFO		
47	CSMMASS	77	OPVEC		
	LEMMASS		OPVEC+2		
48	PACTOFF		PHETA		
	YACTOFF	78	UTAW		
49	N49DISP, +2, +4		U'FPIT		
50	RSP-RREC		AZIMANG1		
	HPERX	79	RATEPTC		
	TFF		DBPTC		
51	SPARE				

CHECK LIST CODES

RI CODE	ACTION TO BE EFFECTED	
00013	KEY IN	COARSE ALIGN OPTION
00014	KEY IN	FINE ALIGNMENT OPTION
00015	PERFORM	CELESTIAL BODY ACQUISITION
00016	KEY IN	TERMINATE MARK SEQUENCE
00017	PERFORM	MINKEY RENDEZVOUS
00020	PERFORM	MINKEY PLANE CHANGE PULSE TORQUING
00041	SWITCH	CM/SM SEPARATION TO UP
00062	SWITCH	AGC POWER DOWN
00204	PERFORM	SPS GIMBAL TRIM

NOTE: SWITCH DENOTES: CHANGE POSITION
OF A CONSOLE SWITCH
PERFORM DENOTES: START OR END OF
A TASK
KEY IN: DENOTES KEY IN OR DATA THRU
THE DSKY

OPTION CODES

THE SPECIFIED OPTION CODES WILL BE FLASHED IN COMPONENT R1 IN CONJUNCTION WITH VERB 04 NOUN 06 TO REQUEST THE ASTRO-NAUT TO LOAD INTO COMPONENT R2 THE OPTION HE DESIRES.

OPTION CODE	PURPOSE	INPUT FOR COMPONENT 2
00001	SPECIFY IMU ORIENTATION	1 = PERF, 2 = NOM 3 = REFSMMAT
00002	SPECIFY VEHICLE	1 = THIS, 2 = OTHER
00004	SPECIFY STATE OF TRACKING = FULTKFLAG	0 = VHF AND OPTICS 1 = PARTIAL VHF OR OPTICS
00012	SPECIFY P50 OPTION	1 = SUN ONLY 2 = SUN AND STAR 3 = INDEPENDENT SOURCE
00013	SPECIFY P55 OPTION	1 = REFSMMAT 2 = MARK
00024	SPECIFY TRACKING OPTION	0 = RENDEZVOUS, VEC POINT 1 = CELESTIAL BODY, VEC POINT 2 = ROTATION 4 = RENDEZVOUS, 3-AXIS 5 = CELESTIAL BODY, 3-AXIS

| | | | |

NOTES

ALARM CODES

CODE	TYPE	SET BY
00107	STAR TRACKER ANGLES OUT OF LIMITS	P55
00110	NO MARK SINCE LAST MARK REJECT	SXTMARK
00113	NO INBITS	SXTMARK
00114	MARK MADE BUT NOT DESIRED	SXTMARK
00115	OPTICS TORQUE REQUEST WITH SWITCH NOT AT CMC	EXT VERB OPT CDU
00116	OPTICS SWITCH ALTERED BEFORE 15 SEC ZERO TIME ELAPSED	T4RUPT
00117	OPTICS TORQUE REQUEST WITH OPTICS NOT AVAILABLE (OPTIND = -0)	EXT VERB OPT CDU
00120	OPTICS TORQUE REQUEST WITH OPTICS NOT ZEROED	T4RUPT
00121	CDUS NO GOOD AT TIME OF MARK	SXTMARK
00205	BAD PIPA READING	SERVICER
00206	ICDU ZERO NOT ALLOWED WITH COARSE ALIGN + GIMBAL LOCK	IMU MODE SWITCHING
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 > 2 DEGREES	IMU MODE SWITCH
00212	PIPA FAIL BUT PIPA IS NOT BEING USED	IMU MODE SWITCH, T4RPT
00213	IMU NOT OPERATING WITH TURN-ON REQUEST	T4RUPT
00214	PROGRAM USING IMU WHEN TURNED OFF	T4RUPT
00217	BAD RETURN FROM STALL ROUTINES	CURTAINS
00220	IMU NOT ALIGNED - NO REFSMMAT	R02, P51
00401	DESIRED GIMBAL ANGLES YIELD GIMBAL LOCK	IMF ALIGN, IMU-2
00402	CREW MUST HONOR 2ND MINKEY TORQUE REQUEST	P52
00404	TARGET OUT OF VIEW - TRUN ANGLE > 90 DEG	R52
00405	TWO STARS NOT AVAILABLE	P52, P54
00406	REND NAVIGATION NOT OPERATING	R21, R23
00421	W-MATRIX OVERFLOW	INTEGRV
00500	NOT ENOUGH PITCH OR YAW JETS	DOCKED DAP
00501	NOT ENOUGH ROLL JETS	DOCKED DAP
00600	10 ITERATIONS OR PHASE MATCH LOOP	P31, P32
00601	15 ITERATIONS OF AN INNER LOOP	P31, P32
00602	15 ITERATIONS OF OUTER LOOP	P31, P32
00603	15 ITERATIONS OF QRDTP1 SUBROUTINE	P31, P32, P33
00611	NO TIG FOR GIVEN ELEVATION ANGLE	P34,
00777	PIPA FAIL CAUSED ISS WARNING	T4RUPT
01102	AGC SELF TEST ERROR	SELF CHECK

ALARM CODES(CONT.)

CODE	TYPE	SET BY
01105	DOWNLINK TOO FAST	T4RUPT
01106	UPLINK TOO FAST	T4RUPT
01107	PHASE TABLE FAILURE. ASSUME ERASABLE MEMORY IS DESTROYED	RESTART
01301	ARCSIN-ARCCOS ARGUMENT TOO LARGE	INTERPRETER
01407	VG INCREASING	S40. 8
01426	IMU UNSATISFACTORY	P61, P62
01427	IMU REVERSED	P61, P62
01520	V37 REQUEST NOT PERMITTED AT THIS TIME	V37
01600	OVERFLOW IN DRIFT TEST	OPT PRE ALIGN CALIB
01601	BAD IMU TORQUE	OPT PRE ALIGN CALIB
01703	INSUF. TIME FOR INTEG., TIG WAS SLIPPED	R41
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
20430	*INTEG. ABORT DUE TO SUB-SURFACE STATE VECTOR	ALL CALLS TO INTEG.
20607	*NO SOLUTION FROM TIME-THETA OR TIME-RADIUS	TIMETHET, TIMERAD
21204	*NEGATIVE OR ZERO WAITLIST CALL	WAITLIST
21206	*SECOND JOB ATTEMPTS TO GO TO SLEEP VIA KEYBOARD AND DISPLAY PROGRAM	PINBALL
21210	*TWO PROGRAMS USING DEVICE AT SAME TIME	IMU MODE SWITCH
21302	*SQRT CALLED WITH NEGATIVE ARGUMENT. ABORT	INTERPRETER
21501	*KEYBOARD AND DISPLAY ALARM DURING INTERNAL USE (NVSUB). ABORT	PINBALL
21502	*ILLEGAL FLASHING DISPLAY	GOPLAY
21521	*P01 OR P07 ILLEGALLY SELECTED	P01, P07
31104	**DELAY ROUTINE BUSY	SERVICE ROUTINES
31201	**EXECUTIVE OVERFLOW - NO VAC AREAS	EXECUTIVE
31202	**EXECUTIVE OVERFLOW - NO CORE SETS	EXECUTIVE
31203	**WAITLIST OVERFLOW - TOO MANY TASKS	WAITLIST
31211	**ILLEGAL INTERRUPT OF EXTENDED VERB	SXTMARK
32000	**JASK INTERRUPTING THE PRECEDING JASK	DKJSLECT

*POODOO ABORT. DOES SOFTWARE
RESTART (ENEMA) AND "GO TO POOH"
(FLASHING VERB 37) UNLESS "AVERAGE
G" IS RUNNING THEN ONLY SOFTWARE
RESTART

**BAILOUT ABORT. DOES SOFTWARE
RESTART (ENEMA)

