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FLIGHT PROGRAM 8--LM AGS FP8 S03 4039
LM ABORT ELECTRONICS ASSEMBLY

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				3.	*						
				4.	*					SCRATCH PAD STORAGE	
			0000	5.		ORG				0000	
00	00	0000	000000	6.	TS0	DEC				0	
00	01	0001	000000	7.	TS1	DEC				0	
01	00	0002	000000	8.	TS2	DEC				0	
01	01	0003	000000	9.	TS3	DEC				0	
02	00	0004	000000	10.	TS4	DEC				0	
02	01	0005	000000	11.	TS5	DEC				0	
03	00	0006	000000	12.	TS6	DEC				0	
03	01	0007	000000	13.	TS7	DEC				0	
04	00	0010	000000	14.	TS10	DEC				0	
04	01	0011	000000	15.	TS11	DEC				0	
05	00	0012	000000	16.	TS12	DEC				0	
05	01	0013	000000	17.	TS13	DEC				0	
06	00	0014	000000	18.	TS14	DEC				0	
06	01	0015	000000	19.	TS15	DEC				0	
07	00	0016	000000	20.	TS16	DEC				0	
07	01	0017	000000	21.	TS17	DEC				0	
00	02	0020	000000	22.	SREX3	DEC				0	
00	03	0021	000000	23.	SREX2	DEC				0	
01	02	0022	000000	24.	SREX1	DEC				0	
01	03	0023	000000	25.	SREX	DEC				0	
02	02	0024	000000	26.	TVARBR	DEC				0	TEMP STORE FOR CK SUM, SERV ROUT, STARTUP
02	03	0025	40 0 6246	27.	TRA	TRA				RETURN	
				28.	*						
				29.	*					TAPE LOAD STARTUP CHECKSUM	
				30.	*						
03	02	0026	66 0 6402	31.	SF	OUT				6402	DEDA INPUT SCALE FACTOR
03	03	0027	64 0 2040	32.	OCTF	INP				2040	DEDA OCTAL INPUT
				33.	*						
				34.	*					THE NEXT 16 LOCATIONS ARE SHARED	
				35.	*					WITH A RR FILTER TEMPORY MATRIX	
				36.	*						
04	02	0030	56 0 0001	37.	U2X	ALS				1	B1 UNIT RADIAL VECTOR TO
04	03	0031	46 0 0033	38.	U2Y	TMI				*+2	B1 TRIAL RENDEZ PT.
05	02	0032	40 0 0027	39.	U2Z	TRA				*-3	B1

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			0030	40.	D11	EQU	U2X			RADAR TEMP. MATRIX (16 LOC)
			0030	41.	VFX	EQU	U2X			BRAKING VEL VECTOR AT 13.
05	03	0033	70 0 0034	42.	C2	DLY	*+1	B1		RENDEZ ANGLE SINE
06	02	0034	66 0 7012	43.	V1X	OUT	7012	B1		HORIZ UNIT VECTOR
06	03	0035	64 0 6200	44.	V1Y	INP	6200			
07	02	0035	30 0 0137	45.	V1Z	CLZ	SUM			
07	03	0037	20 0 0066	46.	DLSC	CLA	V2Z			DOWNLINK SHIFT COUNTER
00	04	0040	10 0 0024	47.	W1X	STO	TVARBR	B1		U1 X V1
			0040	48.	D31	EQU	W1X			
00	05	0041	30 0 0153	49.	W1Y	CLZ	WRDCNT			
01	04	0042	72 0 0024	50.	W1Z	TSQ	TVARBR			
01	05	0043	32 0 0137	51.	SI	ADZ	SUM	B0		E(SIN(E0))
02	04	0044	10 0 0137	52.	RD2DOT*STO		SUM	B7		DESIRED RADIAL ACCEL
02	05	0045	20 0 0024	53.	YD2DOT*CLA		TVARBR	B7		DESIRED OUT-OF-PLANE ACCEL
03	04	0046	24 0 4046	54.	TSEX	SUB	CLAFR			EXIT FROM NORTON
03	05	0047	46 0 0060	55.	SIDELL	TMI	U1X	B1		SIN DELTA L
04	04	0050	30 0 0137	56.	V6X	CLZ	SUM	B13		TEMP STORAGE FOR TPI QUANT
04	05	0051	46 0 0054	57.	V6Y	TMI	*+3			
05	04	0052	24 0 4006	58.	V6Z	SUB	1B17			
			0050	59.	DQX	EQU	V6X			ACCUM VEL IN XDV
05	05	0053	46 0 1101	60.	CODELL	TMI	EXIT40	B1		COS DELTA L
06	04	0054	20 0 7512	61.	WCX	CLA	10B4	B1		UNIT VECTOR NORMAL
06	05	0055	10 0 0412	62.	WCY	STO	S12			TO CSM ORBIT
07	04	0056	66 0 6410	63.	WCZ	OUT	6410			
07	05	0057	40 0 1052	64.	TMPBR	TRA	SINITC			TEMP BRANCH STORE
00	06	0060	30 0 0153	65.	U1X	CLZ	WRDCNT	B1		LEM UNIT RAD VECTOR
00	07	0061	22 0 4006	66.	U1Y	ADD	1B17			
01	06	0062	10 0 0153	67.	U1Z	STO	WRDCNT			
01	07	0063	24 0 4014	68.	BRANCH	SUB	1B11			GUIDANCE BRANCH
02	06	0064	46 0 0042	69.	V2X	TMI	W1Z	B1		HORZ UNIT VECTOR AT
02	07	0065	70 0 0041	70.	V2Y	DLY	W1Y			RENDEZ POINT
03	06	0066	20 0 0206	71.	V2Z	CLA	0206			
			0064	72.	VGX	EQU	V2X			VEL TO GAIN VECTOR AT 13
				73.	*					
				74.	*		END OF TAPE LOAD CHECKSUM PROGRAM			
				75.	*					
03	07	0067	000000	76.	AT	DEC	0B7			THRUST ACCELERATION

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04	06	0070	000000	77.	EX	DEC	0B2	ATTITUDE ERRORS.
04	07	0071	000000	78.	EY	DEC	0	
05	06	0072	000000	79.	EZ	DEC	0	
05	07	0073	000000	80.	X3	DEC	0B0	XFR ORB PARAM.
			0073	81.	TR3	EQU	X3	ADDRESS OF RESULT FOR MXM
06	06	0074	000000	82.	DVXM1	DEC	0B1	BODY DELTA VS
06	07	0075	000000	83.	DVYM1	DEC	0	PREVIOUS CYCLE.
07	06	0076	000000	84.	DVZM1	DEC	0	
07	07	0077	000000	85.	NI	DEC	0B-9	PREDICTION ANGULAR FREQUENCY
			0077	86.	NE	EQU	NI	CSM PRED. ANGULAR FREQ.
			0077	87.	TR8	EQU	NI	RADAR TEMP
00	10	0100	000000	88.	VD2X	DEC	0B2	DELTA V EXP LS
00	11	0101	000000	89.	VD2Y	DEC	0	
01	10	0102	000000	90.	VD2Z	DEC	0	
01	11	0103	000000	91.	CI	DEC	0B0	E(COS(E0))
			0103	92.	TR1	EQU	CI	ADDR. OF 1ST MATRIX FOR MXM
02	10	0104	000000	93.	DRX	DEC	0B14	LM POS REMAINDERS
02	11	0105	000000	94.	DRY	DEC	0	
03	10	0106	000000	95.	DRZ	DEC	0	
03	11	0107	000000	96.	THEP	DEC	0	PGNS THETA IN COUNTS.
04	10	0110	000000	97.	DIGX	DEC	0B7	PREDICTED CHANGE IN
04	11	0111	000000	98.	DIGY	DEC	0	INTEGRATED GRAVITY.
05	10	0112	000000	99.	DIGZ	DEC	0	
05	11	0113	000000	100.	PSIP	DEC	0	PGNS PSI IN COUNTS.
06	10	0114	000000	101.	GXDT	DEC	0B7	GRAVITY TIMES MAJOR
06	11	0115	000000	102.	GYDT	DEC	0	CYCLE TIME.
07	10	0116	000000	103.	GZDT	DEC	0	
07	11	0117	000000	104.	PHIP	DEC	0	PGNS PHI IN COUNTS.
00	12	0120	000000	105.	DVSX	DEC	0B7	RESOLVED SENSED DEL V
00	13	0121	000000	106.	DVSY	DEC	0	
01	12	0122	000000	107.	DVSZ	DEC	0	
01	13	0123	000000	108.	SIGA	DEC	0B1	SIN FDAI GAMMA.
02	12	0124	000000	109.	RRX	DEC	0B23	COMPUTED LM-CSM RANGE
02	13	0125	000000	110.	RRY	DEC	0	
03	12	0126	000000	111.	RRZ	DEC	0	
03	13	0127	000000	112.	COGA	DEC	0B1	COS FDAI GAMMA.
04	12	0130	200000	113.	A11	DEC	1.0B1	XB DIRECTION COSINES.

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04	13	0131	000000	114.	A12	DEC	0	
05	12	0132	000000	115.	A13	DEC	0	
05	13	0133	000000	116.	TS8	DEC	0	
06	12	0134	000000	117.	A31	DEC	0	ZB DIRECTION COSINES.
06	13	0135	000000	118.	A32	DEC	0	
07	12	0136	200000	119.	A33	DEC	1.0B1	
07	13	0137	000000	120.	SUM	DEC	0	RUNNING MEMORY SUM
00	14	0140	000000	121.	A21	DEC	0	YB DIRECTION COSINES.
00	15	0141	200000	122.	A22	DEC	1.0B1	
01	14	0142	000000	123.	A23	DEC	0	
01	15	0143	000000	124.	X4	DEC	0B0	XFR ORB PARAM.
			0143	125.	VHSQ	EQU	X4 0B26	VH SQUARED
			0143	126.	TR2	EQU	X4	ADDR. OF 2ND MATRIX FOR MXM
02	14	0144	000000	127.	E1	DEC	0	-6 OR -9 XB NORM ERROR
02	15	0145	000000	128.	E3	DEC	0	ZB NORMALITY ERROR.
03	14	0146	000000	129.	E13	DEC	0	XB,ZB ORTHOG ERROR.
03	15	0147	000000	130.	DEL10	DEC	0	TPI LOGIC FLAG
04	14	0150	000000	131.	DA11	DEC	0B-5	DIR COSINE REMAINDERS
04	15	0151	000000	132.	DA12	DEC	0	
05	14	0152	000000	133.	DA13	DEC	0	
05	15	0153	000000	134.	WRDCNT	DEC	0	CKSUM WORD COUNT
06	14	0154	000000	135.	DA31	DEC	0	
06	15	0155	000000	136.	DA32	DEC	0	
07	14	0156	000000	137.	DA33	DEC	0	
07	15	0157	000000	138.	DEL44	DEC	0	RADAR CODE WORD RESET FLAG
00	16	0160	000000	139.	A11D	DEC	0B1	XD DIRECTION COSINES.
00	17	0161	000000	140.	A12D	DEC	0	
01	16	0162	000000	141.	A13D	DEC	0	
01	17	0163	000000	142.		DEC	0	**UNUSED-INDEXED BY A11D**
02	16	0164	000000	143.	A31D	DEC	0B1	ZD DIRECTION COSINES.
02	17	0165	000000	144.	A32D	DEC	0	
03	16	0166	000000	145.	A33D	DEC	0	
03	17	0167	000000	146.	MU17	DEC	0B3	RADAR FILTER ENTRY COUNTER
04	16	0170	000000	147.	P	DEC	0B23	TRIAL SEMI-PARAMETER
04	17	0171	000000	148.	ALPHA	DEC	0B23	XFR ORBIT SEMI-MAJOR AXIS
05	16	0172	000000	149.	Q1	DEC	0B23	XFR ORBIT PERILUNE
			0172	150.	ESQ	EQU	Q1	XFR ORB E SQ AT -2.

05 17	0173	000000	151.	AI	DEC	0B23	PRED. SEMI-MAJOR AXIS
		0173	152.	AE	EQU	AI	CSM PRED. SEMI-MAJOR AXIS
06 16	0174	000000	153.	R5X	DEC	0B23	LM PRED POS AHEAD TDEL
06 17	0175	000000	154.	R5Y	DEC	0	
07 16	0176	000000	155.	R5Z	DEC	0	
07 17	0177	000000	156.	AL	DEC	0B23	LM PRED. SEMI-MAJOR AXIS
10 00	0200	000000	157.	REX	DEC	0B23	CSM EPOCH POSITION
10 01	0201	000000	158.	REY	DEC	0	
11 00	0202	000000	159.	REZ	DEC	0	
11 01	0203	000000	160.	RT	DEC	0B23	CSM PRED POS. MAG.
12 00	0204	000000	161.	ROX	DEC	0B23	PRED EPOCH POS VECTOR
12 01	0205	000000	162.	ROY	DEC	0	
			163.	*	SEE REAR OF LISTING FOR CHECKSUM		
13 00	0206				CHECKSUM		RANGE 0207-1004
		0206	164.	ROZ	DEFINE	0206	
13 01	0207	000000	165.	RO	DEC	0B23	PRED EPOCH POS. MAG.
		0170	166.	C11	EQU	P	RADAR TEMP. MATRIX
		0171	167.	C12	EQU	ALPHA	
		0172	168.	C13	EQU	Q1	
		0173	169.	C14	EQU	AI	
		0174	170.	C21	EQU	R5X	
		0175	171.	C22	EQU	R5Y	
		0176	172.	C23	EQU	R5Z	
		0177	173.	C24	EQU	AL	
		0200	174.	C31	EQU	REX	
		0201	175.	C32	EQU	REY	
		0202	176.	C33	EQU	REZ	
		0203	177.	C34	EQU	RT	
		0204	178.	C41	EQU	ROX	
		0205	179.	C42	EQU	ROY	
		0206	180.	C43	EQU	ROZ	
		0207	181.	C44	EQU	RO	
14 00	0210	000000	182.	R	DEC	0B23	LM POS MAGNITUDE
14 01	0211	000000	183.	Y	DEC	0B23	OUT OF PLANE POSITION
15 00	0212	000000	184.	PP	DEC	0B23	P PRIME/EXIT FOR MXM
15 01	0213	002261	185.	POUTFS	DEC	7.684096E4B23	MAX P DISPLAYABLE
16 00	0214	000000	186.	POUT	DEC	0	DISPLAY POSITION.

16 01	0215	000000	187.	DPOUT	DEC	0	DISPLAY POSITION INCREMENT.
17 00	0216	040000	188.	2K3	DEC	1048576.823	QL SET ON D.F.
17 01	0217	001415	189.	2K14	DEC	5.E4823	INITIAL P PERTURBATION
10 02	0220	000000	190.	RIX	DEC	0B23	ELLIPSE PRED POS OUTPJT
10 03	0221	000000	191.	RIY	DEC	0	
11 02	0222	000000	192.	RIZ	DEC	0	
		0220	193.	DELR1	EQU	RIX	MEASURED MINUS COMPUTED RANGE
		0221	194.	DELR3	EQU	RIY	B23
		0222	195.	DELR2	EQU	RIZ	
11 03	0223	000000	196.	25J	DEC	0B23	DEDA ALTITUDE UPDATE
12 02	0224	270322	197.	7J	DEC	6042736823	TERM IN AL(O.I.)
12 03	0225	131565	198.	8J	DEC	2940243823	TERM IN AL(O.I) LOWER LIMIT
13 02	0226	270423	199.	10J	DEC	6046910823	RETARGET VALUE FOR 7J
13 03	0227	257015	200.	4K5	DEC	5735200823	NOMINAL BURNOUT ALTITUDE
14 02	0230	017205	201.	2K19	DEC	5.E5823	DELTA P LIMITER
14 03	0231	255704	202.	5J	DEC	5.697785E6823	LANDING SITE RADIUS
15 02	0232	001652	203.	16J	DEC	60000823	ORBIT INSERTION ALTITUDE
15 03	0233	000607	204.	21J	DEC	25000823	PITCH STEERING ALT THRESHOLD
16 02	0234	000000	205.	RRSX	DEC	0B23	CALCULATED RANGE AT TIME
16 03	0235	000000	206.	RRSY	DEC	0	OF RADAR RANGE MEASUREMENT
17 02	0236	000000	207.	RRSZ	DEC	0	
17 03	0237	121372	208.	6K11	DEC	0.31831080	1/PI
			209.	*			
			210.	*			INITIALIZE DATA FROM DOWNLINK ADDRESSES
			211.	*			LOCATIONS 0240-0257 USED
10 04	0240	000000	212.	1J1	DEC	0B23	LM EPHEMERIS POS
10 05	0241	000000	213.	1J2	DEC	0	
11 04	0242	000000	214.	1J3	DEC	0	
11 05	0243	000000	215.		DEC	0	
12 04	0244	000000	216.	2J1	DEC	0	CSM EPHEMERIS POS
12 05	0245	000000	217.	2J2	DEC	0	
13 04	0246	000000	218.	2J3	DEC	0	
13 05	0247	000000	219.		DEC	0	
14 04	0250	000000	220.		DEC	0	
14 05	0251	000000	221.		DEC	0	
15 04	0252	000000	222.		DEC	0	
15 05	0253	000000	223.		DEC	0	

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16 04	0254	000000	224.	1J7	DEC	0B18	LM EPOCH TIME
16 05	0255	000000	225.	1J7LS	DEC	0B1	
17 04	0256	000000	226.		DEC	0	
17 05	0257	000000	227.		DEC	0	
		0252	228.	THETAR	EQU	2J3+4	RADAR ANTENNA TRUNNION ANGLE
		0253	229.	BETAR	EQU	2J3+5	RADAR ANTENNA SHAFT ANGLE
		0254	230.	RM	EQU	1J7	RADAR RAW RANGE INPUT
		0255	231.	RMDOT	EQU	1J7+1	RADAR RAW RANGE RATE INPUT
		0256	232.	DEL46	EQU	1J7+2	RADAR COMPOSITE WORD
10 06	0260	000000	233.	1J4	DEC	0B13	LM EPHEREMIS VEL
10 07	0261	000000	234.	1J5	DEC	0	
11 06	0262	000000	235.	1J6	DEC	0	
11 07	0263	000000	236.	VPY	DEC	0B13	OUT-OF-PLANE VELOCITY
12 06	0264	000000	237.	2J4	DEC	0	CSM EPHEMERIS VEL
12 07	0265	000000	238.	2J5	DEC	0	
13 06	0266	000000	239.	2J6	DEC	0	
13 07	0267	631463	240.	5K18	DEC	-.1B-2	RD3DOT LOWER LIMIT
14 06	0270	000000	241.	VY0	DEC	0B13	LM OUT-OF-PLANE VEL
14 07	0271	006200	242.	VY0FS	DEC	200B13	MAX VY0 DISPLAYABLE
15 06	0272	000000	243.	2J7	DEC	0	CSM EPOCH TIME
15 07	0273	000000	244.	2J7LS	DEC	0	
16 06	0274	000017	245.	7K1	DEC	30B18	TIG TIME BIAS
16 07	0275	000000	246.	1J	DEC	0B18	NOMINAL TPI TIME (CSI)
17 06	0276	505075	247.	6K5	DEC	-.73B0	Y-POSITION FILTER WEIGHT
17 07	0277	000000	248.	XI	DEC	0B3	Z-AXIS/LOCAL HORIZ ANGLE
10 10	0300	000000	249.	A31BD	DEC	0B1	UNIT VECTOR (LM-CSM)
10 11	0301	000000	250.	A32BD	DEC	0	
11 10	0302	000000	251.	A33BD	DEC	0	
11 11	0303	000000	252.	TLDS	DEC	0B3	DXFR LOS COMPUTED
		0303	253.	THETAF	EQU	TLDS	LM-CSM CENTRAL ANG AT CSI/CDH
12 10	0304	026164	254.	3K4	DEC	.1736531	CENTRAL ANGLE LIMIT ON TPI
12 11	0305	766316	255.	12J	DEC	-.29990483	PHASE ANGLE LIMIT FOR RETARGET
13 10	0306	000000	256.	4J	DEC	0B13	TIME OF NODE PRIOR TO RENDEZ
13 11	0307	120500	257.	6J	DEC	2580.0B13	DESIRED TRANSFER TIME
14 10	0310	000000	258.	TDEL	DEC	0B13	TIME TILL NEXT MANEUVER
14 11	0311	000000	259.	TR	DEC	0B13	TIME TILL RENDEZVOUS
15 10	0312	000000	260.	3J	DEC	0B13	TARGET OFFSET TIME

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15	11	0313	226051	261.	6K12	DEC	9.3884	RAW RADAR AT 18 TO FT. AT 22
16	10	0314	000000	262.	DELRP	DEC	0B23	DIFF. ALT. AT TIG(CSI-CDH)
16	11	0315	000000	263.	QA	DEC	0B23	LM APOFOCUS ALTITUDE
17	10	0316	000000	264.	18J	DEC	0B22	MEASURED RADAR RANGE
17	11	0317	000000	265.	RR	DEC	0B22	COMPUTED RANGE
10	12	0320	000000	266.	READP	DEC	0	
10	13	0321	000000	267.	ENTERP	DEC	0	
11	12	0322	000000	268.	HOLDP	DEC	0	
11	13	0323	000000	269.	CLEARP	DEC	0	
12	12	0324	000000	270.	HMF	DEC	0	
				271.	*			START OF TELEMETRY LIST
12	13	0325	000000	272.	RMF	DEC	0	READOUT MODE FLAG
13	12	0326	000000	273.	DD	DEC	0	DEDA DATA
13	13	0327	000000	274.	CMF	DEC	0	CLEAR MODE FLAG
14	12	0330	200000	275.	A11T	DEC	1.81	TM DIR COSINES.
14	13	0331	000000	276.	A12T	DEC	0	
15	12	0332	000000	277.	A13T	DEC	0	
15	13	0333	000000	278.	ADST	DEC	0	DEDA ADDRESS
16	12	0334	000000	279.	A31T	DEC	0	
16	13	0335	000000	280.	A32T	DEC	0	
17	12	0336	200000	281.	A33T	DEC	1.81	
17	13	0337	000000	282.	H	DEC	0B23	ALTITUDE
10	14	0340	000000	283.	RX	DEC	0B23	LM POSITION
10	15	0341	000000	284.	RY	DEC	0	
11	14	0342	000000	285.	RZ	DEC	0	
11	15	0343	000000	286.	QL	DEC	0B23	PRESENT LM PERICYNTHION
			0343	287.	EONS10	EQU	QL	ENG ON+S10 FOR TM
12	14	0344	000000	288.	RCX	DEC	0B23	CSM PRESENT POSITION
12	15	0345	000000	289.	RCY	DEC	0	
13	14	0346	000000	290.	RCZ	DEC	0	
13	15	0347	000000	291.	RF	DEC	0B23	PREDICTED BURNOUT ALT.
14	14	0350	000000	292.	DVX	DEC	0B1	BODY DELTA VS
14	15	0351	000000	293.	DVY	DEC	0	THIS CYCLE.
15	14	0352	000000	294.	DVZ	DEC	0	
15	15	0353	000000	295.	TA2	DEC	0B1	ABS TIME LS.
16	14	0354	000000	296.	DAX	DEC	0B-6	DELTA ALPHAS.
16	15	0355	000000	297.	DAY	DEC	0	

17	14	0356	000000	298.	DAZ	DEC	0	
17	15	0357	000000	299.	TBO	DEC	0B9	TIME TO BURNOUT.
10	16	0360	000000	300.	VX	DEC	0B13	LM VELOCITY
10	17	0361	000000	301.	VY	DEC	0	
11	16	0362	000000	302.	VZ	DEC	0	
11	17	0363	000000	303.	MU8S12	DEC	0	MU8/S12 FOR TELEMETRY
12	16	0364	000000	304.	VCX	DEC	0B13	C5M PRESENT VELOCITY
12	17	0365	000000	305.	VCY	DEC	0	
13	16	0366	000000	306.	VCZ	DEC	0	
13	17	0367	000000	307.	H00T	DEC	0B13	ALTITUDE RATE
14	16	0370	000000	308.	VG	DEC	0B13	VELOCITY TO GAIN
14	17	0371	000000	309.	VF	DEC	0B13	TRANSFER BRAKING VELOCITY
15	16	0372	000000	310.	TA0	DEC	0B18	TIME FROM CSI TO CDH
15	17	0373	000000	311.	TIG	DEC	0B18	ABSOLUTE TIME OF MANEJVER
16	16	0374	000000	312.	A11BD	DEC	0B1	CMD XB POINTING DIR.
16	17	0375	000000	313.	A12BD	DEC	0	
17	16	0376	000000	314.	A13BD	DEC	0	
17	17	0377	000000	315.	TA1	DEC	0B18	ABS TIME MS.
20	00	0400	000000	316.	S0	DEC	0	AGS FUNCTION SELECTOR
20	01	0401	000000	317.	DISC1C	DEC	0	DISCRETE WD 1-TRUE STATE
21	00	0402	377776	318.	Q1DEDA	DEC	8388500B23	TRANS ORBIT PERICYN ALT
			0402	319.	DELH	EQU	Q1DEDA	DIFF. ALT. AFTER CDH(CSI-CDH)
21	01	0403	000000	320.	QLTELE	DEC	0B23	QL FOR TELE AND DEDA
22	00	0404	000000	321.	VD1X	DEC	0B13	40MS VEL ACCUMULATION
22	01	0405	000000	322.	VD1Y	DEC	0	
23	00	0406	000000	323.	VD1Z	DEC	0	
				324.	*			END OF TELEMETRY LIST
23	01	0407	000000	325.	DEL6	DEC	0	CALIBRATE I.C. FLAG
24	00	0410	000000	326.	S10	DEC	0	GUIDANCE MODE SELECTOR
24	01	0411	000000	327.	S11	DEC	0	AUTO RADAR SWITCH
25	00	0412	000000	328.	S12	DEC	0	TEST STATUS
25	01	0413	000000	329.	S13	DEC	0	STORE LUNAR AZUMUTH
26	00	0414	000000	330.	S14	DEC	0	NAVIGATION INITIALIZE
26	01	0415	000000	331.	S15	DEC	0	RADAR GIMBAL NULL
			0415	332.	RDDTS	EQU	S15	R. R. STORED AT RADAR INPUT
27	00	0416	000000	333.	S16	DEC	0	CDH APSIDAL SELECTION
27	01	0417	000000	334.	S17	DEC	0	RADAR FILTER INIT. SWITCH

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20	02	0420	000000	335.	VEX	DEC	0B13	CSM EPOCH VEL
20	03	0421	000000	336.	VEY	DEC	0	
21	02	0422	000000	337.	VEZ	DEC	0	
21	03	0423	000000	338.	RFDOT	DEC	0B13	DESIRED ALT RATE
22	02	0424	000000	339.	VOX	DEC	0B13	PRED EPOCH VEL VECTOR
22	03	0425	000000	340.	VOY	DEC	0	
23	02	0426	000000	341.	VOZ	DEC	0	
			0424	342.	I	EQU	VOX	MXM INDEX
			0425	343.	J	EQU	VOY	MXM INDEX
			0426	344.	K	EQU	VOZ	MXM INDEX
23	03	0427	000000	345.	VH	DEC	0B13	LM HORIZONTAL VEL
				346.	*			VIX,VIY,VIZ ARE SHARED WITH RR FILTER
24	02	0430	000000	347.	VIX	DEC	0B13	ELLIPSE PRED VEL OUTPUT
24	03	0431	000000	348.	VIY	DEC	0	
25	02	0432	000000	349.	VIZ	DEC	0	
25	03	0433	000000	350.	V	DEC	0B13	LM TOTAL VELOCITY
26	02	0434	000000	351.	TP	DEC	0B13	TRIAL XFR ORB TIME.
26	03	0435	000000	352.	T	DEC	0B13	TIME TO RENDEZ.
			0435	353.	RB	EQU	T	RF SAVED FOR ORBIT INSERT.
27	02	0436	000000	354.	TB	DEC	0B13	TA-TE.
27	03	0437	000000	355.	PDDTM1	DEC	0B13	DISPLAY POS RATE(-1)
20	04	0440	000000	356.	RRDOT	DEC	0B13	RANGE RATE
20	05	0441	001750	357.	1000D	DEC	1000B17	RANGE MARK COUNTER INCREMENT
21	04	0442	000000	358.	TI	DEC	0B13	PREDICTION TIME/RR FILTER TEMP
21	05	0443	000000	359.	DPDDUT	DEC	0B13	DISPLAY POS RATE INCREMENT
22	04	0444	000000	360.	PDDUT	DEC	0B13	DSP POS RATE CONV TO FPS AT 13
22	05	0445	000000	361.	TCSM	DEC	0B13	CSM PERIOD (SEC)
23	04	0446	000066	362.	4K25	DEC	3.402B13	ENG CUTOFF COMP
23	05	0447	000360	363.	2K18	DEC	15.813	PARITIAL DERIV PROTECTOR.
24	04	0450	000000	364.	28J1	DEC	0B13	DELTA V DOWNRANGE
24	05	0451	000000	365.	28J2	DEC	0B13	DELTA V CROSSRANGE
25	04	0452	000000	366.	28J3	DEC	0B13	DELTA V RADIAL
25	05	0453	000040	367.	2K20	DEC	2.813	CONVERGENCE CHECK.
26	04	0454	002140	368.	4K26	DEC	70.0B13	VG THRESHOLD
26	05	0455	000000	369.	DDF	DEC	0	DEDA DATA RECEIVED FLAG
27	04	0456	031000	370.	6K4	DEC	.1E3B10	INITIAL VALUE OF P33 AND P44
27	05	0457	027657	371.	6K2	DEC	.1E9B30	INIT VALUE OF P11,P22

20	06	0460	000000	372.	V5X	DEC	0B13	TPI-PREDICTED V AT TPI TIME
20	07	0461	000000	373.	V5Y	DEC	0	
21	06	0462	000000	374.	V5Z	DEC	0	
			0460	375.	TR4	EQU	V5X	NO. OF COL IN MATRIX A
			0461	376.	TR6	EQU	V5Y	NO. OF ROWS IN MATRIX B
			0462	377.	TR5	EQU	V5Z	NO. OF ROWS IN MATRIX A
21	07	0463	000000	378.	VHA	DEC	0B13	
22	06	0464	001440	379.	22J	DEC	50B13	PITCH STEERING ALT RATE THRESH
22	07	0465	000470	380.	23J	DEC	19.5B13	RFDOT LOWER LIMIT
23	06	0466	000360	381.	5K26	DEC	15B13	PSEUDO ATT HOLD IN STEER
23	07	0467	000000	382.	PART	DEC	0B14	PARTIAL DERIVATIVE
24	06	0470	000000	383.	VDX	DEC	0B13	VDI AT NAV UPDATE
24	07	0471	000000	384.	VDY	DEC	0	
25	06	0472	000000	385.	VDZ	DEC	0	
25	07	0473	406000	386.	4K27	DEC	-8000.0B13	OVERFLOW PROTECTION FOR VDI X
26	06	0474	000000	387.	VSMGX	DEC	0B13	VDI CUTOFF
26	07	0475	000000	388.	VSMGY	DEC	0	
27	06	0476	000000	389.	VSMGZ	DEC	0	
27	07	0477	000000	390.	RADOT	DEC	0B13	PRED. RDOT AT TIG
20	10	0500	000000	391.	DELVGX	DEC	0B13	THRUST VEL TO GAIN
20	11	0501	000000	392.	DELVGY	DEC	0	
21	10	0502	000000	393.	DELVGZ	DEC	0	
21	11	0503	000000	394.	17J	DEC	0B13	RANGE RATE INPJT
22	10	0504	000000	395.	RD3DOT*	DEC	0B-2	DESIRED RADIAL JERK
22	11	0505	000000	396.	YD3DOT*	DEC	0B-2	DESIRED OUT-OF-PLANE JERK
23	10	0506	012000	397.	4K12	DEC	5B7	ACCEL THRESH IN O.I. STEER
23	11	0507	000000	398.	S507	DEC	0B3	ACC STEER SEL OF PT DIR
24	10	0510	000000	399.	DAXREM	DEC	0B-13	INCRE. GYRO INPUT REMAINDERS
24	11	0511	000000	400.	DAYREM	DEC	0	
25	10	0512	000000	401.	DAZREM	DEC	0	
25	11	0513	000000	402.	C1	DEC	0B1	RENDEZ ANGLE COSINE.
26	10	0514	000000	403.	WBX	DEC	0B1	UNIT VECTOR FOR
26	11	0515	000000	404.	WBY	DEC	0	GUIDANCE STEERING
27	10	0516	000000	405.	WBZ	DEC	0	
27	11	0517	411500	406.	6K14	DEC	-15768814	RADAR RANGE RATE NULL
20	12	0520	000000	407.	TE1	DEC	0B18	CSM EPOCH TIME MS.
20	13	0521	000000	408.	TL1	DEC	0B18	LEM EPOCH TIME MS.

21	12	0522	676356	409.	6K6	DEC	-.0018-8	Y-VELOCITY FILTER WEIGHT
21	13	0523	000000	410.	5K20	DEC	08-2	RD3DOT LOWER LIMIT
22	12	0524	000000	411.	TE2	DEC	0	CSM EPOCH TIME LS.
22	13	0525	000000	412.	TL2	DEC	0	LEM EPOCH TIME LS.
23	12	0526	273400	413.	2K11	DEC	6000813	VF IF OVERFLOW
23	13	0527	002400	414.	4K6	DEC	80.813	RFDOT UPPER LIMIT
24	12	0530	000000	415.	DAXA	DEC	08-6	ALIGN INCREMENTS
24	13	0531	000000	416.	DAYA	DEC	0	
25	12	0532	000000	417.	DAZA	DEC	0	
25	13	0533	000000	418.	DISC1	DEC	0	DISCRETE WORD
26	12	0534	314632	419.	1K18	DEC	.0031258-8	ACCEL SCALE FACTOR
26	13	0535	314632	420.	1K20	DEC	.0031258-8	
27	12	0536	314632	421.	1K22	DEC	.0031258-8	
27	13	0537	000000	422.	1K14	DEC	08-14	X-AXIS MASS UNBAL COMP
20	14	0540	000000	423.	1K19	DEC	081	ACCEL BIAS
20	15	0541	000000	424.	1K21	DEC	081	COMPENSATION
21	14	0542	000000	425.	1K23	DEC	081	
21	15	0543	000000	426.	DSPSC	DEC	0	DISPLAY SHIFT COUNTER.
22	14	0544	000000	427.	1K1	DEC	08-13	GYRO BIAS
22	15	0545	000000	428.	1K6	DEC	0	COMPENSATIONS
23	14	0546	000000	429.	1K11	DEC	0	
23	15	0547	000000	430.	DDEL	DEC	080	LUNAR ALIGN CORRECTION
24	14	0550	000000	431.	1K3	DEC	08-7	GYRO SCALE FACTOR
24	15	0551	000000	432.	1K8	DEC	0	COMPENSATIONS
25	14	0552	000000	433.	1K13	DEC	0	
25	15	0553	000000	434.	HRF	DEC	0	HIGH RATE FLAG.
26	14	0554	000000	435.	A31S	DEC	081	RADAR NULL DIR COS
26	15	0555	000000	436.	A32S	DEC	0	
27	14	0556	000000	437.	A33S	DEC	0	
27	15	0557	203045	438.	4K4	DEC	.0048-7	FACTOR IN RFDOT(01)
20	16	0560	000000	439.	5K14	*DEC	08-2	RD3DOT UPPER LIMIT
20	17	0561	012173	440.	5K16	*DEC	.018-2	YD3DOT UPPER LIMIT
21	16	0562	000000	441.	DLWN	DEC	0	DOWNLINK WORD COUNTER
21	17	0563	000000	442.	DEL32	DEC	0	DOWNLINK INITIALIZE FLAG
22	16	0564	000034	443.	6K8	DEC	.22810	RANGE RATE ERROR VARIANCE
				444.	*			{ADDR OF 6K8 MUST END IN 4}
22	17	0565	000100	445.	6K9	DEC	.3029E-48-4	VARIANCE OF RADAR ANGULAR ERROR

23	16	0566	005754	446.	6K10	DEC	.625E7B28	RANGE ERROR VARIANCE
23	17	0567	000000	447.	DSPF1	DEC	0	DISPLAY FLAG1.
24	16	0570	000000	448.	ID1F	DEC	0	DOWNLINK ID RECEIVED
24	17	0571	000000	449.	DEL31	DEC	0	DOWNLINK INPUT COMPLETE
25	16	0572	000000	450.	FLAGT	DEC	0	MEMORY TEST
25	17	0573	000000	451.	FLAG1	DEC	0	20MS BRANCH CONTROL
26	16	0574	000000	452.	DEL2	OCT	0	STAGED FLAG.
26	17	0575	000000	453.	DEL5	OCT	0	ATTHLD LOCK FLAG.
27	16	0576	144420	454.	PI	DEC	3.1415926683	
27	17	0577	464072	455.	6K13	DEC	-1.5928681	RADAR RANGE RATE TO FPS AT 13
30	00	0600	000000	456.	DVGXX	DEC	0B13	VEL TO GAIN IN EXT DELTA V
30	01	0601	000000	457.	DVGXY	DEC	0	
31	00	0602	000000	458.	DVGXZ	DEC	0	
31	01	0603	000000	459.	DEL20	DEC	0	LOGIC FLAG FOR ENG CONTROL
32	00	0604	000000	460.	DEL21	OCT	0	LUNAR SURFACE FLAG.
32	01	0605	003775	461.	2J	DEC	1.997087	COTAN OF DESIRED LOS AT TPI
33	00	0606	000000	462.	DEL42	OCT	0	LUNAR ALINE COMPLETE FLAG.
			0606	463.	DEL45	EQU	DEL42	RR RANGE/RANGE RT. UPDATE FLAG
33	01	0607	377777	464.	K55	OCT	377777	S.F. FOR HDOT DISPLAY
34	00	0610	000000	465.	MU3	DEC	0	P-ITER COUNTER.
			0610	466.	RD3DTL*EQU		MU3	RD3DOT LOWER LIMIT
34	01	0611	765605	467.	5K17	*DEC	-.018-2	YD3DOT LOWER LIMIT
35	00	0612	000000	468.	MU6	DEC	0	STAGING COUNTER.
35	01	0613	000017	469.	1K37	DEC	15.B17	ACCEL CAL DURATION
36	00	0614	000000	470.	MU8	DEC	0	ULLAGE COUNTER.
36	01	0615	000000	471.	MU10	DEC	0	MINOR CYCLE COUNTER
37	00	0616	000005	472.	1K9	OFC	5.0B17	ULLAGE COUNTER LIMIT
37	01	0617	000226	473.	1K30	DEC	150.B17	GYRO CALIBRATE DURATION
30	02	0620	000005	474.	2K17	DEC	5.B17	NO OF P-ITERATIONS-3
30	03	0621	000000	475.	MU19	DEC	0	MARK COUNTER
31	02	0622	000076	476.	4K23	DEC	62.0B17	STAGING TIME DELAY
31	03	0623	000000	477.	S623	DEC	0B3	EX SELECTION IN G. S
32	02	0624	031463	478.	1K4	DEC	.1B0	DISPLAY INTERPOLATION
32	03	0625	000071	479.	1K24	DEC	.87E-3B1	SINGULARITY THRESHOLD
33	02	0626	561111	480.	1K26	DEC	-.142857E3B8	NEG INV OF ALIGN GAIN CONSTANT
33	03	0627	262132	481.	1K27	DEC	.435E-1B-4	ALIGN CONSTANT
34	02	0630	327443	482.	1K28	DEC	107.78396B7	ALIGN CONSTANT

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34	03	0631	004061	483.	1K29	DEC	.001B-4	LUN ALIGN STOP CRITERION
35	02	0632	243656	484.	1K33	DEC	.08B-3	CALIBRATE GAIN.
35	03	0633	247613	485.	1K34	DEC	.00002B-15	CALIBRATE GAIN
36	02	0634	000400	486.	1K35	DEC	.25B7	ACCEL BIAS THRESHOLD
36	03	0635	777651	487.	1K36	DEC	-.66667E-3B0	ACCEL CAL GAIN
37	02	0636	235407	488.	2K1	DEC	.173189E15B48	GRAVITY CONST (LUNAR)
37	03	0637	320020	489.	2K2	DEC	.57740387E-14B-47	1/2K1
30	04	0640	000007	490.	6J1	DEC	.3358E-8B-14	LUNAR ROT RATE ABOUT X-REF
30	05	0641	777616	491.	6J2	DEC	-.53039E-7B-14	LUNAR ROT RATE ABOUT Y-REF
31	04	0642	000007	492.	6J3	DEC	.3052E-8B-14	LUNAR ROT RATE ABOUT Z-REF
31	05	0643	032525	493.	B13SF	DEC	.10416666B0	.01 MIN TO SEC AT 13
32	04	0644	000000	494.	SDVX	*DEC	0B1	DV SUM FOR ACCEL CAL
32	05	0645	000000	495.	SDVY	*DEC	0	(ADDR OF SDVX MUST END IN 4)
33	04	0646	000000	496.	SDVZ	*DEC	0	
33	05	0647	000000	497.	MU7	*DEC	0B17	CALIBRATION COUNTER
34	04	0650	000002	498.	7K2	DEC	2B17	NOISE IN P-MATRIX DIAGONALS
34	05	0651	240000	499.	B13VSF	DEC	.625B0	.1 FPS TO FPS AT 13
35	04	0652	131415	500.	B3SF	DEC	.34971155B0	.01 DEG TO RAD AT 3
35	05	0653	032756	501.	B23RSF	DEC	.10533045B0	.1 NMI TO FT AT 23
36	04	0654	713267	502.	4K2	DEC	-.50204E-4B-12	FACTOR IN TB COMP
36	05	0655	016336	503.	4K3	DEC	.16803E-8B-25	FACTOR IN TB COMP
37	04	0656	206645	504.	B22RSF	DEC	.5266522B0	.01 NMI TO FT AT 22
37	05	0657	303240	505.	BACCSF	DEC	0.762939B0	.001 FT/SEC2 TO FPS/20MS AT 1
30	06	0660	002000	506.	4K34	DEC	1.87	AT LOWER LIMIT
30	07	0661	000146	507.	4K35	DEC	.187	ULLAGE THRESHOLD
31	06	0662	662400	508.	4K10	DEC	-317433.91B20	TERM IN AL(O.I.)
31	07	0663	000000	509.	SUMLIM	DEC	0	LAST CELL FOR CHECKSUM
32	06	0664	000034	510.	WORDS	DEC	28	
32	07	0665	125253	511.	B18SF	DEC	.333333B0	.1 MIN TO SEC AT 18
33	06	0666	020603	512.	4K21	DEC	.26179938B2	SC FACTOR FOR ATT ERR OUTPUT
33	07	0667	777716	513.	M25B16	DEC	-25.B16	CYCLE COUNT TO SECONDS
34	06	0670	240000	514.	DTB	DEC	1.25B1	1 SEC + DEDA TIME BIAS
34	07	0671	000000	515.	ID	DEC	0	CURRENT DOWNLIST ID CODE
35	06	0672	10 0 0257	516.	DLWNL	STO	1J1+15	END OF DOWNLINK BUFFER
35	07	0673	547405	517.	11J	DEC	-624599.84B20	RETARGET VALUE FOR 4K10
36	06	0674	542371	518.	2K4	DEC	-.173189E15B48	(-2.)(2K1) B49
36	07	0675	200000	519.	KDT	DEC	1.B1	DELTA T/2 AT 1

37 06	0676	365706	520.	BM13SF	DEC	.96049535B0	.01 DEG/HR TO RAD/20MS AT -13
37 07	0677	243656	521.	B23SF	DEC	.64B0	100 FT TO FT AT 23
			522.	*			THE FOLLOWING 15 PARAMETERS HAVE
			523.	*			VARIABLE SCALING. INITIAL SCALING IS INDICATED
30 10	0700	027657	524.	P11	DEC	.1E9B30	VARIANCE OF X-POS ERROR
30 11	0701	000000	525.	P12	DEC	0B30	COVARIANCE OF X AND Y POS ERROR
31 10	0702	000000	526.	P13	DEC	0B20	COVAR OF X-POS AND X-VEL ERROR
31 11	0703	000000	527.	P14	DEC	0B20	COVAR OF X-POS AND Z-VEL ERROR
32 10	0704	000000	528.	P21	DEC	0B30	COVAR OF X AND Z POS ERROR
32 11	0705	027657	529.	P22	DEC	.1E9B30	VARIANCE OF Z-POS ERROR
33 10	0706	000000	530.	P23	DEC	0B20	COVAR OF Z-POS AND X-VEL ERROR
33 11	0707	000000	531.	P24	DEC	0B20	COVAR OF Z-POS AND Z-VEL ERROR
34 10	0710	000000	532.	P31	DEC	0B20	COVAR OF X-POS AND X-VEL ERROR
34 11	0711	000000	533.	P32	DEC	0B20	COVAR OF Z-POS AND X-VEL ERROR
35 10	0712	031000	534.	P33	DEC	.1E3B10	VARIANCE OF X-VEL ERROR
35 11	0713	000000	535.	P34	DEC	0B10	COVAR OF X-VEL AND Z-VEL ERROR
36 10	0714	000000	536.	P41	DEC	0B20	COVAR OF X-POS AND Z-VEL ERROR
36 11	0715	000000	537.	P42	DEC	0B20	COVAR OF Z-POS AND Z-VEL ERROR
37 10	0716	000000	538.	P43	DEC	0B10	COVAR OF X-VEL AND Z-VEL ERROR
37 11	0717	031000	539.	P44	DEC	.1E3B10	VARIANCE OF Z-VEL ERROR
30 12	0720	12 0 0021	540.	VRSH	STQ	SREX2	
30 13	0721	54 0 0000	541.		LRS	0	
31 12	0722	40 0 0021	542.		TRA	SREX2	
31 13	0723	000000	543.	TMID	DEC	0	TELEMETRY ID
32 12	0724	000026	544.	SFLO	OCT	000026	
32 13	0725	377777	545.	PMAXP	OCT	377777	COUNTS AT 17
33 12	0726	40 0 2606	546.	ORBRET	TRA	DX10P	RETURN FROM NORTON IN O.I.
33 13	0727	000000	547.	DEDASC	DEC	0	DEDA SHIFT COUNTER
			548.	*			
			549.	*			
34 12	0730	12 0 0147	550.	EX36P	STQ	DEL10	
			551.	*			SAVE QUANTITIES FOR LATER USE IN
			552.	*			T/B COMPUTATIONS
34 13	0731	10 0 0052	553.		STQ	V6Z	
35 12	0732	20 0 0012	554.		CLA	TS12	
35 13	0733	10 0 0050	555.		STQ	V6X	
36 12	0734	20 0 0013	556.		CLA	TS13	

36	13	0735	10 0 0051	557.		STO	V6Y	
37	12	0736	20 0 0442	558.		CLA	TI	
37	13	0737	24 0 0306	559.		SUB	4J	
30	14	0740	40 0 2742	560.		TRA	DXFR14-2	
30	15	0741	20 0 0000	561.	RREX	CLA	TSO	VARIABLE ADDRESS LOAD, MULTIPLY
31	14	0742	06 0 0000	562.	RREX1	MPY	TSO	AND STORE FOR MATRIX MULTIPLY
31	15	0743	04 0 7701	563.		DVP	1B3	ROUTINE (MXM) - PERFORMS
32	14	0744	32 0 0077	564.		ADZ	TR8	$C(I,J)=C(I,J)+A(K,I)*B(J,K)$
32	15	0745	10 0 0000	565.	RREX2	STO	TSO	
33	14	0746	10 0 0077	566.		STO	TR8	$C(I,J)=C(I,J)+A(K,I)*B(J,K)$
33	15	0747	20 0 0741	567.		CLA	RREX	
34	14	0750	22 0 0460	568.		ADD	TR4	INCREMENT CLA
34	15	0751	10 0 0741	569.		STO	RREX	
35	14	0752	20 0 0742	570.		CLA	RREX1	
35	15	0753	22 0 4006	571.		ADD	1B17	INCREMENT MPY
36	14	0754	10 0 0742	572.		STO	RREX1	
36	15	0755	50 1 0002	573.		AXT	2,1	INCREMENT AND TEST INDEXES
37	14	0756	20 1 0424	574.		CLA	I,1	
37	15	0757	22 0 4006	575.		ADD	1B17	
30	16	0760	10 1 0424	576.		STO	I,1	
30	17	0761	24 1 0460	577.		SUB	TR4,1	
31	16	0762	46 0 2434	578.		TMI	R1+1	
31	17	0763	42 1 0756	579.		TIX	*-5,1	
32	16	0764	20 0 0461	580.		CLA	TR6	REARRANGE DIMENSIONS AND
32	17	0765	10 0 0460	581.		STO	TR4	ADDRESSES ON EXIT TO SAVE
33	16	0766	20 0 0073	582.		CLA	TR3	STEPS IN FILTER
33	17	0767	10 0 0103	583.		STO	TR1	
34	16	0770	50 1 0007	584.		AXT	7,1	
34	17	0771	40 0 0212	585.		TRA	PP	EXIT MXM
35	16	0772	377363	586.	DIAK1	*OCT	377363	TEST FOR DEDA ENTRY INTO 415
35	17	0773	377401	587.	DIAK2	*OCT	377401	TEST FOR DEDA ENTRY INTO 377
36	16	0774	000034	588.	6K8S	DEC	.22B10	WORKING VALUE OF 6K8
				589.	*			(ADDR OF 6K8S MUST END IN 4)
36	17	0775	000100	590.	6K9S	DEC	.3029E-4B-4	WORKING VALUE OF 6K9
37	16	0776	005754	591.	6K10S	DEC	.625E7828	WORKING VALUE OF 6K10
37	17	0777	000000	592.	6K6S	DEC	0	WORKING VALUE OF 6K6
				593.	*			

*
*

FLIGHT PROGRAM 8--LM AGS FP8 S03 4039
LM ABORT ELECTRONICS ASSEMBLY

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			594.	*			
		1000	595.		ORG	1000	
40 00	1000	000000	596.	CLADD	DEC	0	PICKUP DEDA DATA
40 01	1001	40 0 7215	597.		TRA	ROR	
41 00	1002	12 0 0023	598.	RND	STQ	SREX	DIRECTION COSINE ROUND
41 01	1003	22 0 4013	599.		ADD	1B9	
42 00	1004	54 0 0011	600.		LRS	9	
42 01	1005	40 0 0023	601.		TRA	SREX	
43 00	1006	20 0 0324	602.	TMCLA	CLA	0324	CLA FOR TELEM
43 01	1007	20 0 1005	603.	TCLTH	CLA	1005	
44 00	1010	10 0 0237	604.	DLSTO	STQ	1J1-1	
44 01	1011	40 0 5070	605.	IC1BR	TRA	IC1	IC1 TRA.
45 00	1012	40 0 1742	606.	BR1	TRA	NAV1P	
45 01	1013	40 0 1277	607.	DEDABR	TRA	DEDAE	DEDA BRANCH TRA.
46 00	1014	40 0 3405	608.	BR50	TRA	EXEC2	BRANCH 50 TRA.
			609.	*			
			610.	*		HARDWARE ESCAPE POINTS	
			611.	*			
46 01	1015	40 0 4073	612.	EXIT1	TRA	EX1+1	
47 00	1016	40 0 1236	613.	EXIT2	TRA	UBCOMP	
47 01	1017	40 0 1133	614.	EXIT3	TRA	ADDMS	
40 02	1020	40 0 4222	615.	EXIT4	TRA	EX4+1	
40 03	1021	40 0 7420	616.	EXIT5	TRA	PGNSDE	
41 02	1022	40 0 7371	617.	EXIT6	TRA	TME	
41 03	1023	40 0 7455	618.	EXIT7	TRA	PGNSD1+5	
42 02	1024	40 0 4326	619.	EXIT8	TRA	EX8+1	
42 03	1025	40 0 1426	620.	EXIT9	TRA	TVTG	
43 02	1026	72 0 1456	621.	EXIT10	TSQ	SOFT1	
43 03	1027	72 0 1456	622.	EXIT11	TSQ	SOFT1	ASCENT ENG ON
44 02	1030	40 0 4450	623.	EXIT12	TRA	A4E1	
44 03	1031	40 0 4476	624.	EXIT13	TRA	EROUT+1	
45 02	1032	72 0 1623	625.	EXIT14	TSQ	SOFT2	
45 03	1033	40 0 1733	626.	EXIT15	TRA	LUNAL1	GAIN CHANGE
46 02	1034	40 0 4645	627.	EXIT16	TRA	EX16+1	
46 03	1035	40 0 3560	628.	EXIT17	TRA	FDAIL	
47 02	1036	40 0 4743	629.	EXIT18	TRA	NDC	
47 03	1037	40 0 4047	630.	EXIT19	TRA	DELAY	

40	04	1040	40	0	1405	631.	EXIT20	TRA	DLDC	
40	05	1041	40	0	6254	632.	EXIT21	TRA	TIMEA	
41	04	1042	40	0	3341	633.	EXIT22	TRA	IDLE-1	
41	05	1043	377747			634.	025C	OCT	377747	TEST FOR TM RESET
42	04	1044	30	0	0404	635.	EXIT23	CLZ	VD1X	
42	05	1045	30	0	0405	636.		CLZ	VD1Y	
43	04	1046	30	0	0406	637.		CLZ	VD1Z	
43	05	1047	40	0	5217	638.		TRA	NAV3	
44	04	1050	40	0	5205	639.	EXIT24	TRA	NAV2	
44	05	1051	40	0	5217	640.	EXIT25	TRA	NAV3	
45	04	1052	20	0	0473	641.	SINITC	CLA	4K27	
45	05	1053	10	0	0404	642.		STD	VD1X	
46	04	1054	10	0	0470	643.		STD	VDX	
46	05	1055	40	0	6367	644.		TRA	EXEC1+7	
47	04	1056	40	0	1750	645.	EXIT26	TRA	XDVS	
47	05	1057	40	0	5413	646.	EXIT27	TRA	EX27+1	
40	06	1060	40	0	5267	647.	EXIT28	TRA	EX28+1	
40	07	1061	30	0	0612	648.	STGCTR	CLZ	MU6	STAGING DELAY COUNTER
41	06	1062	22	0	4006	649.		ADD	1B17	
41	07	1063	10	0	0612	650.		STD	MU6	
42	06	1064	40	0	4437	651.		TRA	A4E	
42	07	1065	40	0	5305	652.	EXIT29	TRA	EX29+1	
43	06	1066	20	0	1176	653.	CLATAB	CLA	SFTAB-1	CLA FOR DEDA SF TABLE
43	07	1067	40	0	5332	654.	EXIT30	TRA	EX30+1	
44	06	1070	40	0	1762	655.	EXIT31	TRA	ALTUP	
44	07	1071	40	0	2456	656.	EXIT32	TRA	LMORB2	
45	06	1072	40	0	3612	657.	EXIT33	TRA	EX33P	
45	07	1073	40	0	1141	658.	EXIT34	TRA	EX34P	
46	06	1074	40	0	3622	659.	EXIT35	TRA	EX35	
46	07	1075	72	0	0730	660.	EXIT36	TSQ	EX36P	
47	06	1076	40	0	3623	661.	EXIT37	TRA	EX35+1	
47	07	1077	40	0	3063	662.	EXIT38	TRA	Q5	
40	10	1100	40	0	3411	663.	EXIT39	TRA	EXECM	
40	11	1101	30	0	0400	664.	EXIT40	CLZ	S0	SOFT INITIALIZE
41	10	1102	30	0	0575	665.		CLZ	DEL5	
41	11	1103	30	0	0572	666.		CLZ	FLAGT	
42	10	1104	50	1	0007	667.		AXT	7.1	ZERO S SWITCHES

42	11	1105	30	1	0410	668.	CLZ	S10,1	
43	10	1106	42	1	1105	669.	TIX	*-1,1	
43	11	1107	40	0	1052	670.	TRA	SINITC	CONTINUE INITIALIZE
44	10	1110	40	0	3356	671.	EXIT41 TRA	DSP1	
44	11	1111	40	0	3367	672.	EXIT42 TRA	DSP2CP	
45	10	1112	22	0	1043	673.	EXIT43*ADD	025C	CHECK FOR TM RESET
45	11	1113	62	0	0000	674.	*ABS		
46	10	1114	46	0	1167	675.	TMI	TMIE1	- RESET TM AT 25 CYCLE
46	11	1115	40	0	6364	676.	TRA	EXEC1+4	NOT 25TH CYCLE
47	10	1116	077776			677.	IDAI OCT	077776	AGS INITIALIZE DOWNLIST ID
47	11	1117	077775			678.	IDRP OCT	077775	REND./PRETHRUST DOWNLIST ID
40	12	1120	40	0	6470	679.	EXIT44 TRA	EX44+1	
40	13	1121	40	0	6505	680.	EXIT45 TRA	EX45+1	
41	12	1122	40	0	7225	681.	EXIT46 TRA	EX46+1	
41	13	1123	40	0	1307	682.	EXIT47 TRA	DEXIT	
42	12	1124	40	0	1312	683.	EXIT48 TRA	CLEARM+1	
42	13	1125	40	0	1336	684.	EXIT49 TRA	SFTEST	
43	12	1126	40	0	7343	685.	EXIT50 TRA	EX50+1	
43	13	1127	72	0	1362	686.	EXIT51 TSQ	DIAT	
44	12	1130	40	0	6262	687.	EXIT52 TRA	EXEC+1	
44	13	1131	40	0	6262	688.	EXIT53 TRA	EXEC+1	
45	12	1132	10	0	0257	689.	DLWNLC STO	1J1+15	DLWNL PROTECTION
45	13	1133	50	1	0002	690.	ADDMS AXT	2,1	
46	12	1134	20	1	0010	691.	CLA	TS10,1	
46	13	1135	62	0	0000	692.	*ABS		
47	12	1136	22	0	4036	693.	*ADD	MS	
47	13	1137	42	1	1134	694.	TIX	*-3,1	
40	14	1140	40	0	4143	695.	TRA	EX3+1	
40	15	1141	30	0	0147	696.	EX34P CLZ	DEL10	
41	14	1142	46	0	3631	697.	TMI	EX33PP+1	
41	15	1143	40	0	5615	698.	TRA	EX34+1	
42	14	1144	20	0	0347	699.	THEF CLA	RF	
42	15	1145	54	0	0001	700.	LRS	1	B24
43	14	1146	32	0	0003	701.	ADZ	TS3	
43	15	1147	14	0	0004	702.	LDQ	TS4	
44	14	1150	10	0	0004	703.	STO	TS4	=RF+RX B24
44	15	1151	12	0	0003	704.	STQ	TS3	=RZ B24

45	14	1152	72	0	7034	705.	TSQ	ARCTAE	
45	15	1153	10	0	0000	706.	STO	TSO	THETA F B3
46	14	1154	24	0	0576	707.	SUB	PI	
46	15	1155	46	0	1157	708.	TMI	*+2	
47	14	1156	24	0	4021	709.	SUB	2PIB3	
47	15	1157	22	0	0576	710.	ADD	PI	
40	16	1160	10	0	0303	711.	STO	THETA F	THETA F B3
40	17	1161	20	0	0000	712.	CLA	TSO	B3
41	16	1162	24	0	4021	713.	SUB	2PIB3	
41	17	1163	06	0	4126	714.	MPY	M1B1	B4
42	16	1164	04	0	0077	715.	DVP	VI	
42	17	1165	22	0	0442	716.	ADD	TI	B13
43	16	1166	40	0	2742	717.	TRA	DXFR14-2	
43	17	1167	72	0	7410	718.	TSQ	TMIE2	INITIALIZE TELEMETRY
44	16	1170	20	0	0412	719.	CLA	S12	
44	17	1171	22	0	0614	720.	ADD	MU8	
45	16	1172	10	0	0363	721.	STO	MU8S12	SAVE MU8/S12 FOR TM
45	17	1173	24	0	7520	722.	SUB	333	TEST FOR SELF TEST FAILURE
46	16	1174	46	0	1176	723.	TMI	*+2	
46	17	1175	66	0	6410	724.	OUT	6410	SET FAILURE INDICATOR
47	16	1176	40	0	4047	725.	TRA	DELAY	END MAJOR CYCLE
					726.		*		
					727.		*	DEDA SCALE FACTOR LOCATOR TABLE	
					728.		*	SCALE FACTORS MUST REMAIN AT LOCS IN COMMENTS	
					729.		*	FORMAT OF TABLE IS, BIT 0=1 TABLE EXCEEDED,	
					730.		*	BITS 1-9 LAST ADDRESS OF DEDA SCALE FACTOR REGION,	
					731.		*	BIT 10=1 FOR OCTAL REGION, BITS 11-17 ADDRESS OF	
					732.		*	SCALE FACTOR RELATIVE TO LOCATION 636	
47	17	1177	075200		733.	SFTAB	OCT	075200	OCT LOC 026-172, OCT
50	00	1200	125441		734.		OCT	125441	OCT LOC 173-253, DEC, SF AT 677
50	01	1201	127427		735.		OCT	127427	OCT LOC 254-257, DEC, SF AT 665
51	00	1202	134413		736.		OCT	134413	OCT LOC 260-271, DEC, SF AT 651
51	01	1203	137027		737.		OCT	137027	OCT LOC 272-276, DEC, SF AT 665
52	00	1204	142414		738.		OCT	142414	OCT LOC 277-305, DEC, SF AT 652
52	01	1205	145405		739.		OCT	145405	OCT LOC 306-313, DEC, SF AT 643
53	00	1206	146415		740.		OCT	146415	OCT LOC 314-315, DEC, SF AT 653
53	01	1207	147420		741.		OCT	147420	OCT LOC 316-317 DEC, SF AT 656

54 00	1210	157415	742.	OCT	157415	OCT LOC 320-337,DEC,SF AT 653
54 01	1211	164441	743.	OCT	164441	OCT LOC 340-351,DEC,SF AT 677
55 00	1212	174413	744.	OCT	174413	OCT LOC 352-371,DEC,SF AT 651
55 01	1213	177427	745.	OCT	177427	OCT LOC 372-377,DEC,SF AT 665
56 00	1214	200600	746.	OCT	200600	OCT LOC 400-401,OCT
56 01	1215	202415	747.	OCT	202415	OCT LOC 402-405,DEC,SF AT 653
57 00	1216	207600	748.	OCT	207600	OCT LOC 406-417,OCT
57 01	1217	241413	749.	OCT	241413	OCT LOC 420-503,DEC,SF AT 651
50 02	1220	257600	750.	OCT	257600	OCT LOC 504-537,OCT
50 03	1221	261421	751.	OCT	261421	OCT LOC 540-543,DEC,SF AT 657
51 02	1222	263040	752.	OCT	263040	OCT LOC 544-546,DEC,SF AT 676
51 03	1223	305600	753.	OCT	305600	OCT LOC 547-613,OCT
52 02	1224	311067	754.	OCT	311067	OCT LOC 614-622,DEC,SF AT 725
52 03	1225	342200	755.	OCT	342200	OCT LOC 623-704,OCT

756. * THE ABOVE 23 PLACE TABLE MUST BE FOLLOWED
 757. * BY A WORD WITH BIT 0 SET

758. *
 759. * ORBIT ALIGN COMPUTATIONS

53 02	1226	50 1 0006	761.	ORBLIN AXT	6,1	
53 03	1227	30 1 0130	762.	CLZ	A11,1	
54 02	1230	30 1 0150	763.	CLZ	DA11,1	ZERO REMAINDERS
54 03	1231	42 1 1227	764.	TIX	*-2,1	
55 02	1232	20 0 5033	765.	CLA	1B1	
55 03	1233	10 0 0130	766.	STO	A11	
56 02	1234	10 0 0136	767.	STO	A33	
56 03	1235	40 0 4273	768.	TRA	COA21-2	

769. *
 770. * MASS UNBALANCE COMPENSATION

57 02	1236	26 0 0537	772.	UBCOMP MPR	1K14	(DVX){1K14} 1+(-14)=-13
57 03	1237	32 0 0510	773.	ADZ	DAXREM	
50 04	1240	10 0 0510	774.	STO	DAXREM	

775. *
 776. * 20MS MODE CHECK.

50 05	1241	20 0 0400	778.	MODCK CLA	S0	CHECK FOR ALIGNMENT
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51 04	1242	24 0	7520	779.		SUB	3B3	SUBMODES
51 05	1243	46 0	4107	780.		TMI	GYCOM-2	- IS INERT REF
52 04	1244	24 0	7701	781.		SUB	1B3	
52 05	1245	46 0	5056	782.		TMI	ZNDC	IMU ALIGN
53 04	1246	24 0	7701	783.		SUB	1B3	
53 05	1247	46 0	4107	784.		TMI	GYCOM-2	- IS LUNAR ALIGN
54 04	1250	24 0	7701	785.		SUB	1B3	
54 05	1251	46 0	1226	786.		TMI	ORBLIN	ORBIT ALIGN
55 04	1252	50 1	0002	787.		AXT	2,1	CALIBRATE MODE
55 05	1253	20 0	0604	788.	CALIB1	CLA	DEL21	
56 04	1254	46 0	1261	789.		TMI	*+5	- LM IS ON LUNAR SURFACE
56 05	1255	30 1	0644	790.		CLZ	SDVX,1	SUM BODY AXIS VEL
57 04	1256	22 1	0350	791.		ADD	DVX,1	INCREMENTS SINCE START OF ACC.
57 05	1257	10 1	0644	792.		STO	SDVX,1	BIAS CALCULATIONS
50 06	1260	40 0	1275	793.		TRA	CALIB2	
50 07	1261	20 1	0130	794.		CLA	A11,1	LUNAR CAL., COMPENSATE COMP.
51 06	1262	26 1	0640	795.		MPR	6J1,1	OF VEH ROT FOR LUNAR ROTATION
51 07	1263	32 0	0510	796.		ADZ	DAXREM	1+(-14)=-13
52 06	1264	10 0	0510	797.		STO	DAXREM	A11 DOT 6J1
52 07	1265	20 1	0140	798.		CLA	A21,1	
53 06	1266	26 1	0640	799.		MPR	6J1,1	
53 07	1267	32 0	0511	800.		ADZ	DAYREM	
54 06	1270	10 0	0511	801.		STO	DAYREM	A21 DOT 6J1
54 07	1271	20 1	0134	802.		CLA	A31,1	
55 06	1272	26 1	0640	803.		MPR	6J1,1	
55 07	1273	32 0	0512	804.		ADZ	DAZREM	
56 06	1274	10 0	0512	805.		STO	DAZREM	A31 DOT 6J1
56 07	1275	42 1	1253	806.	CALIB2	TIX	CALIB1,1	
57 06	1276	40 0	4107	807.		TRA	GYCOM-2	
				808.	*			
				809.	*			DEDA MODE SELECTION
				810.	*			
57 07	1277	30 0	0323	811.	DEDAE	CLZ	CLEARP	
50 10	1300	46 0	1311	812.		TMI	CLEARM	SET CLEAR
50 11	1301	20 0	0327	813.		CLA	CMF	
51 10	1302	46 0	1323	814.		TMI	RPT	CLEAR MODE
51 11	1303	20 0	0325	815.		CLA	RMF	

52	10	1304	46	0	1330	816.	TMI	HET	READOUT IN PROGRESS
52	11	1305	20	0	0324	817.	CLA	HMF	
53	10	1306	46	0	3606	818.	TMI	RRT	HOLD IN PROGRESS
53	11	1307	50	1	0003	819.	DEXIT	AXT	NORMAL EXIT
54	10	1310	40	0	1314	820.	TRA	*+4	
54	11	1311	10	0	0327	821.	CLEARM	STO	
55	10	1312	64	0	2200	822.	INP	DEDA	
55	11	1313	50	1	0005	823.	AXT	5,1	CLEAR EXIT
56	10	1314	30	1	0320	824.	CLZ	READP,1	RESET FLAGS
56	11	1315	42	1	1314	825.	TIX	*-1,1	
57	10	1316	30	0	0057	826.	CLZ	TMPBR	SET BRANCH FOR NEXT
57	11	1317	10	0	0063	827.	STO	BRANCH	GUIDANCE CYCLE
50	12	1320	20	0	4014	828.	CLA	1B11	INITIALIZE COUNTER
50	13	1321	10	0	0727	829.	STO	DEDASC	
51	12	1322	40	0	3356	830.	TRA	DSP1	TO DISPLAY
51	13	1323	30	0	0320	831.	RPT	CLZ	TEST FOR
52	12	1324	46	0	7257	832.	TMI	RME	READOUT MODE
52	13	1325	30	0	0321	833.	CLZ	ENTERP	OR ENTER MODE
53	12	1326	46	0	7260	834.	TMI	RME+1	ENTRY.
53	13	1327	40	0	1307	835.	TRA	DEXIT	EXIT
54	12	1330	30	0	0322	836.	HET	CLZ	READOUT TEST FOR
54	13	1331	46	0	1333	837.	TMI	*+2	HOLD COMMANDED
55	12	1332	40	0	7202	838.	TRA	ADOUT	TO OUTPUT ROUTINE
55	13	1333	10	0	0324	839.	STO	HMF	SET HOLD MODE
56	12	1334	30	0	0325	840.	CLZ	RMF	
56	13	1335	40	0	1307	841.	TRA	DEXIT	
					842.		*		
					843.		*	DEDA SCALE FACTOR SELECTION	
					844.		*		
57	12	1336	24	0	0724	845.	SFTEST	SUB	SFLO
57	13	1337	46	0	1312	846.	TMI	CLEARM+1	- IF OCT LOC BELOW 0026
50	14	1340	20	0	1066	847.	CLA	CLATAB	INITIALIZE FIRST TABLE VALUE
50	15	1341	10	0	0721	848.	STO	VRSH+1	STORE CLA INSTRUCTION
51	14	1342	20	0	0721	849.	CLA	VRSH+1	INCREMENT CLA INSTRUCTION
51	15	1343	22	0	4006	850.	ADD	1B17	ADDRESS
52	14	1344	10	0	0721	851.	STO	VRSH+1	
52	15	1345	72	0	0720	852.	TSQ	VRSH	

53	14	1346	46	0	1312	853.	TMI	CLEARM+1	- IF OCT LOC ABOVE 704
53	15	1347	54	0	0010	854.	LRS	8	EXAMINE BITS 1-9 OF VALUE
54	14	1350	24	0	0333	855.	SUB	ADST	-IF OCT LOC ABOVE VALUE,
54	15	1351	46	0	1342	856.	TMI	*-7	CHECK NEXT VALUE IN TABLE
55	14	1352	52	0	0022	857.	*LLS	18	RECOVER BITS 10-17 OF THIS VAL
55	15	1353	46	0	7310	858.	TMI	NOTDD	-IF OCT REGION, NO SF REQ
56	14	1354	54	0	0012	859.	LRS	10	SCALE BITS 11-17 OF VAL
56	15	1355	22	0	6041	860.	ADD	TBRAKE	CONSTRUCT INSTRUCTION TO OBTAIN
57	14	1356	10	0	0721	861.	STD	VRSH+1	SCALE FACTOR FOR THIS REGION
57	15	1357	72	0	0720	862.	TSQ	VRSH	OBTAIN SF FOR THIS REGION
50	16	1360	10	0	0026	863.	STD	SF	SET SCALE FACTOR
50	17	1361	40	0	7326	864.	TRA	DDIN	TO INPUT ROUTINE
51	16	1362	50	1	0001	865.	DIAT AXT	1,1	IMMEDIATE ACTION TEST
51	17	1363	20	0	0333	866.	CLA	ADST	IMMED. ACTION IF
52	16	1364	22	1	0772	867.	*ADD	DIAK1,1	ACCUMULATOR = 400000
52	17	1365	62	0	0000	868.	ABS		
53	16	1366	46	0	1372	869.	TMI	*+4	
53	17	1367	42	1	1363	870.	TIX	DIAT+1,1	
54	16	1370	12	0	0455	871.	STD	DDF	
54	17	1371	40	0	1307	872.	TRA	DEXIT	
55	16	1372	42	1	7357	873.	TIX	ATI,1	
55	17	1373	14	0	1371	874.	LDQ	*-2	SET RETURN TO DEXIT
56	16	1374	50	1	0002	875.	AXT	2,1	
56	17	1375	20	1	0124	876.	CLA	RRX,1	SAVE RANGE FOR FILTER
57	16	1376	10	1	0234	877.	STD	RRSX,1	
57	17	1377	20	1	0134	878.	CLA	A31,1	STORE DIRECTION COSINES
60	00	1400	10	1	0554	879.	STD	A31S,1	
60	01	1401	42	1	1375	880.	TIX	*-4,1	
61	00	1402	20	0	0440	881.	CLA	RRDOT	
61	01	1403	10	0	0415	882.	STD	RDOTS	
62	00	1404	40	0	6764	883.	TRA	EXIT	
					884.	*			
					885.	*		DOWNLINK DATA FORMATTING	
					886.	*			
62	01	1405	50	1	0002	887.	DLDC AXT	2,1	
63	00	1406	30	1	0244	888.	CLZ	0244,1	LEM VEL
63	01	1407	10	1	0260	889.	STD	1J4,1	

64 00	1410	30 1	0250	890.	CLZ	0250,1	CSM POS
64 01	1411	10 1	0244	891.	STO	2J1,1	
65 00	1412	30 1	0254	892.	CLZ	0254,1	CSM VEL
65 01	1413	10 1	0264	893.	STO	2J4,1	
66 00	1414	42 1	1406	894.	TIX	DLDC+1,1	
66 01	1415	30 0	0247	895.	CLZ	0247	
67 00	1416	54 0	0016	896.	LRS	14	
67 01	1417	32 0	0243	897.	ADZ	0243	
60 02	1420	10 0	0254	898.	STO	1J7	
60 03	1421	12 0	0255	899.	STO	1J7LS	
61 02	1422	10 0	0272	900.	STO	2J7	
61 03	1423	12 0	0273	901.	STO	2J7LS	
62 02	1424	72 0	5145	902.	TSO	CSMPV	
62 03	1425	40 0	5073	903.	TRA	IC1+3	
			904.		*		
			905.		*		
			906.		*		
			907.		TVTG	AXT	2,1
63 02	1426	50 1	0002	908.	CLA	DVX,1	1
63 03	1427	20 1	0350	909.	LRS	1	TO 2
64 02	1430	54 0	0001	910.	ADZ	VD2X,1	
64 03	1431	32 1	0100	911.	STO	VD2X,1	
65 02	1432	10 1	0100	912.	CLA	DVXM1,1	
66 02	1434	54 0	0001	913.	LRS	1	TO 2
66 03	1435	32 1	0100	914.	ADZ	VD2X,1	
67 02	1436	10 1	0100	915.	STO	VD2X,1	
67 03	1437	54 0	0013	916.	LRS	11	TO 13
60 04	1440	10 0	0001	917.	STO	TS1	
60 05	1441	56 0	0013	918.	ALS	11	
61 04	1442	60 0	0000	919.	COM		
61 05	1443	32 1	0100	920.	ADZ	VD2X,1	
62 04	1444	10 1	0100	921.	STO	VD2X,1	REMAINDER AT 2
62 05	1445	20 1	0404	922.	CLA	VD1X,1	DV EXPENDED MS.
63 04	1446	32 0	0001	923.	ADZ	TS1	
63 05	1447	10 1	0404	924.	STO	VD1X,1	VD1 AT 13
64 04	1450	60 0	0000	925.	COM		
64 05	1451	22 1	0474	926.	ADD	VSMGX,1	VSMG-VD1

65 04	1452	10 1	0500	927.		STO	DELVGX,1	THRUST VEL TO GAIN
65 05	1453	30 1	0070	928.		CLZ	EX,1	
66 04	1454	42 1	1427	929.		TIX	TVTG+1,1	
66 05	1455	40 0	4355	930.		TRA	EX9+1	
				931.	*			
				932.	*		SOFT 40MS COMPUTATIONS	
				933.	*			
67 04	1456	20 0	0400	934.	SOFT1	CLA	S0	TEST MODE
67 05	1457	24 0	7520	935.		SUB	3B3	
60 06	1460	10 0	0001	936.		STO	TS1	SAVE
60 07	1461	46 0	1513	937.		TMI	IR	- IS INERT. REF.
61 06	1462	20 0	4007	938.	ZERR	CLA	ZERO	
61 07	1463	66 0	6007	939.		OUT	6007	ZERO ATTITUDE ERRORS
62 06	1464	30 0	0575	940.		CLZ	DEL5	RESET ATT HOLD INIT FLAG
62 07	1465	30 0	0001	941.		CLZ	TS1	
63 06	1466	46 0	1501	942.		TMI	ENCOM1	- IS INERTIAL REF
63 07	1467	24 0	7701	943.		SUB	1B3	
64 06	1470	46 0	1473	944.		TMI	SOFT3	
64 07	1471	24 0	7701	945.		SUB	1B3	
65 06	1472	46 0	4534	946.		TMI	LUNAL	
65 07	1473	66 0	7040	947.	SOFT3	OUT	7040	RESET ENG ON
66 06	1474	66 0	6420	948.		OUT	6420	SET ENG OFF
66 07	1475	20 0	4007	949.		CLA	ZERO	SET ENG TM FLAG PLUS
67 06	1476	22 0	0410	950.		ADD	S10	
67 07	1477	10 0	0343	951.		STO	EONS10	
60 10	1500	40 0	4626	952.		TRA	FJAI	TO ATTITUDE DISPLAY
60 11	1501	20 0	0533	953.	ENCOM1	CLA	DISC1	FOLLOWUP ENG. COMMANDS
61 10	1502	52 0	0005	954.		*LLS	5	
61 11	1503	46 0	1507	955.		TMI	**4	- DESCENT ENG ON
62 10	1504	52 0	0001	956.		*LLS	1	
62 11	1505	46 0	1507	957.		TMI	**2	- ASCENT ENG ON
63 10	1506	40 0	1473	958.		TRA	SOFT3	ENG OFF
63 11	1507	66 0	7020	959.		OUT	7020	RESET ENG OFF
64 10	1510	66 0	6440	960.		OUT	6440	SET ENG ON
64 11	1511	20 0	4036	961.		CLA	MS	SET ENG TM FLAG NG
65 10	1512	40 0	1476	962.		TRA	SOFT3+3	
65 11	1513	20 0	0411	963.	IR	CLA	S11	TEST FOR AUTO RADAR DATA

66	10	1514	56	0	0003	964.		*ALS	3	
66	11	1515	46	0	1644	965.		TMI	RADCK	
67	10	1516	10	0	0157	966.		STQ	DEL44	SET/RESET CODE WORD FLAG
67	11	1517	20	0	0533	967.	IR4	CLA	DISC1	
60	12	1520	56	0	0003	968.		*ALS	3	
60	13	1521	46	0	1526	969.		TMI	IR1	- IS FOLLOWUP
61	12	1522	56	0	0001	970.		*ALS	1	
61	13	1523	46	0	1550	971.		TMI	IR2	- IS AUTOMATIC
62	12	1524	12	0	0603	972.		STQ	DEL20	
62	13	1525	40	0	4437	973.		TRA	A4E	TO ATT HOLD
63	12	1526	20	0	0401	974.	IR1	CLA	DISC1C	
63	13	1527	56	0	0004	975.		*ALS	4	
64	12	1530	46	0	1462	976.		TMI	ZERR	PLUS IS AUTOMATIC
64	13	1531	30	0	0575	977.		CLZ	DEL5	
65	12	1532	12	0	0603	978.		STQ	DEL20	
65	13	1533	40	0	1570	979.		TRA	MODE	
66	12	1534	20	0	0623	980.	RSTE	CLA	S623	
66	13	1535	56	0	0003	981.		*ALS	3	
67	12	1536	46	0	1541	982.		TMI	*+3	
67	13	1537	20	1	0054	983.		CLA	WCX,1	
60	14	1540	40	0	1542	984.		TRA	*+2	
60	15	1541	20	1	0514	985.		CLA	WBX,1	
61	14	1542	26	1	0134	986.		MPR	A31,1	
61	15	1543	60	0	0000	987.		COM		
62	14	1544	32	0	0070	988.		ADZ	EX	
62	15	1545	10	0	0070	989.		STQ	EX	
63	14	1546	42	1	1534	990.		TIX	RSTE,1	
63	15	1547	40	0	4524	991.	RST1	TRA	RST	
64	14	1550	56	0	0004	992.	IR2	*ALS	4	
64	15	1551	46	0	1560	993.		TMI	IR3	- IS ABORT STAGE
65	14	1552	20	0	0604	994.		CLA	DEL21	IF ON LUNAR SURFACE
65	15	1553	46	0	1462	995.		TMI	ZERR	OUTPUT ZERO ATT ERRORS
66	14	1554	20	0	0533	996.		CLA	DISC1	
66	15	1555	56	0	0007	997.		*ALS	7	
67	14	1556	46	0	1570	998.		TMI	MODE	- IS ABORT
67	15	1557	72	0	1532	999.		TSQ	IR1+4	
60	16	1560	20	0	0604	1000.	IR3	CLA	DEL21	

60	17	1561	46	0	4437	1001.	TMI	A4E	
61	16	1562	20	0	0401	1002.	CLA	DISC1C	
61	17	1563	56	0	0006	1003.	*ALS	6	
62	16	1564	46	0	1570	1004.	TMI	MODE	
62	17	1565	20	0	0612	1005.	CLA	MU6	
63	16	1566	24	0	0622	1006.	SUB	4K23	
63	17	1567	46	0	1061	1007.	TMI	STGCTR	STAGING ATT HOLD
64	16	1570	20	0	0400	1008.	MODE	SO	TEST STEERING MODE
64	17	1571	24	0	7701	1009.	SUB	1B3	
65	16	1572	46	0	4437	1010.	TMI	A4E	ATT HOLD
65	17	1573	50	1	0002	1011.	AXT	2,1	
66	16	1574	24	0	7701	1012.	SUB	1B3	
66	17	1575	46	0	1534	1013.	TMI	RSTE	RENDEZVOUS STEERING
67	16	1576	30	0	0575	1014.	CLZ	DEL5	ACQUISITION STEERING
67	17	1577	20	1	0054	1015.	MODE1	WCX,1	
70	00	1600	26	1	0130	1016.	MPR	A11,1	
70	01	1601	32	0	0072	1017.	ADZ	EZ	
71	00	1602	10	0	0072	1018.	STO	EZ	
71	01	1603	20	0	0507	1019.	CLA	S507	ORIENT LM Z-BODY AXIS
72	00	1604	24	0	7701	1020.	SUB	1B3	IN DESIRED THRUST DIR.
72	01	1605	46	0	1610	1021.	TMI	*+3	OR ESTIMATED CSM DIR.
73	00	1606	20	1	0374	1022.	CLA	A11BD,1	
73	01	1607	10	1	0300	1023.	STO	A31BD,1	
74	00	1610	20	1	0300	1024.	CLA	A31BD,1	
74	01	1611	26	1	0130	1025.	MPR	A11,1	XB
75	00	1612	32	0	0071	1026.	ADZ	EY	
75	01	1613	10	0	0071	1027.	STO	EY	
76	00	1614	20	1	0300	1028.	CLA	A31BD,1	ZBD
76	01	1615	26	1	0140	1029.	MPR	A21,1	YB
77	00	1616	60	0	0000	1030.	COM		
77	01	1617	32	0	0070	1031.	ADZ	EX	
70	02	1620	10	0	0070	1032.	STO	EX	
70	03	1621	42	1	1577	1033.	TIX	MODE1,1	
71	02	1622	40	0	4475	1034.	TRA	EROUT	
71	03	1623	30	0	0603	1035.	SOFT2	CLZ	FIRST TIME FOLLOW
72	02	1624	46	0	1501	1036.	TMI	ENCOM1	PREVIOUS ENGINE STATE
72	03	1625	20	0	0400	1037.	CLA	SO	IF NOT GUIDANCE STEERING

73 02	1626	56 0 0003	1038.		*ALS	3	TURN ENGINE OFF
73 03	1627	46 0 1631	1039.		TMI	*+2	
74 02	1630	40 0 1473	1040.		TRA	SOFT3	
74 03	1631	20 0 0614	1041.		CLA	MU8	TEST FOR ULLAGE
75 02	1632	24 0 0616	1042.		SUB	1K9	
75 03	1633	46 0 1473	1043.		TMI	SOFT3	
76 02	1634	20 0 0446	1044.		CLA	4K25	TEST CEL TO BE
76 03	1635	24 0 0500	1045.		SUB	DELV GX	GAINED GREATER THAN
77 02	1636	46 0 1507	1046.		TMI	ENCOM1+6	SHUTDOWN THRESHOLD
77 03	1637	20 0 0454	1047.		CLA	4K26	
70 04	1640	24 0 0370	1048.		SUB	VG	
70 05	1641	46 0 1507	1049.		TMI	ENCOM1+6	
71 04	1642	30 0 0400	1050.		CLZ	S0	SET ATT HOLD
71 05	1643	40 0 1473	1051.		TRA	SOFT3	
72 04	1644	12 0 0563	1052.	RADCK	STQ	DEL32	REINITIALIZE DOWNLINK
72 05	1645	20 0 1117	1053.		CLA	IDRP	SET DOWNLIST ID TO REND/PRETHRJ
73 04	1646	10 0 0671	1054.		STQ	ID	
73 05	1647	20 0 0256	1055.		CLA	DEL46	IS CODE WORD RESET
74 04	1650	56 0 0001	1056.		*ALS	1	
74 05	1651	62 0 0000	1057.		*ABS		
75 04	1652	46 0 1516	1058.		TMI	IR+3	
75 05	1653	22 0 4015	1059.		*ADD	1B12	IS CODE WORD SET
76 04	1654	62 0 0000	1060.		ABS		
76 05	1655	46 0 1657	1061.		TMI	*+2	YES IF NEGATIVE
77 04	1656	40 0 1517	1062.		TRA	IR4	
77 05	1657	30 0 0157	1063.		CLZ	DEL44	HAS CODE WORD BEEN RESET
70 06	1660	46 0 1662	1064.		TMI	*+2	PRIOR TO BEING SET
70 07	1661	40 0 1517	1065.		TRA	IR4	NO
71 06	1662	44 0 1663	1066.		TOV	*+1	
71 07	1663	50 1 0001	1067.		AXT	1,1	IF SHAFT OR TRUNNION
72 06	1664	20 1 0252	1068.		CLA	THETA R,1	ANGLE IS GREATER
72 07	1665	56 0 0004	1069.		*ALS	4	THAN 11.2 DEG, THEN
73 06	1666	44 0 1517	1070.		TOV	IR4	DO NOT PROCESS
73 07	1667	42 1 1664	1071.		TIX	*-3,1	
74 06	1670	30 0 0606	1072.		CLZ	DEL45	ALTERNATE RANGE, RATE
74 07	1671	46 0 1704	1073.		TMI	IR6	
75 06	1672	12 0 0606	1074.		STQ	DEL45	

75	07	1673	30	0	0254	1075.	CLZ	RM	RANGE ENTRY
76	06	1674	54	0	0022	1076.	LRS	18	
76	07	1675	30	0	0256	1077.	CLZ	DEL46	TEST FOR HIGH SCALING
77	06	1676	46	0	1700	1078.	TMI	*+2	
77	07	1677	54	0	0003	1079.	LRS	3	LOW SCALE
70	10	1700	52	0	0021	1080.	LLS	17	
70	11	1701	26	0	0313	1081.	MPR	6K12	COUNTS TO FEET AT 22
71	10	1702	10	0	0316	1082.	STO	18J	
71	11	1703	40	0	1710	1083.	TRA	*+5	
72	10	1704	30	0	0255	1084.	IR6 CLZ	RMDOT	RANGE RATE ENTRY
72	11	1705	24	0	0517	1085.	SUB	6K14	NULL AT 17000
73	10	1706	04	0	0577	1086.	DVP	6K13	COUNTS TO FT/SEC AT B13
73	11	1707	10	0	0503	1087.	STO	17J	
74	10	1710	72	0	1374	1088.	TSQ	DIAT+10	SAVE REL RNG VECT, REL VEL
74	11	1711	50	1	0002	1089.	AXT	2,1	
75	10	1712	20	1	0140	1090.	IR5 CLA	A21,1	B1, ADJUST Z BODY FOR SHAFT
75	11	1713	26	0	0252	1091.	MPR	THETAR	B1+B0=B1, AND TRUNNION ANGLES
76	10	1714	04	0	0237	1092.	DVP	6K11	B1-B0=B1
76	11	1715	10	1	0554	1093.	STO	A31S,1	B1
77	10	1716	20	1	0130	1094.	CLA	A11,1	B1
77	11	1717	26	0	0253	1095.	MPR	BETAR	B1+B0=B1
70	12	1720	04	0	0237	1096.	DVP	6K11	B1-B0=B1
70	13	1721	34	1	0554	1097.	SUZ	A31S,1	B1
71	12	1722	22	1	0134	1098.	ADD	A31,1	
71	13	1723	10	1	0014	1099.	STO	TS14,1	XB*BETAR/6K11-YB*THETAR/6K11+73
72	12	1724	42	1	1712	1100.	TIX	IR5,1	
72	13	1725	72	0	6422	1101.	TSQ	NORMV	
73	12	1726	50	1	0002	1102.	AXT	2,1	
73	13	1727	30	1	0010	1103.	CLZ	TS10,1	MOVE NORMALIZED DIRECTION
74	12	1730	10	1	0554	1104.	STO	A31S,1	INTO ZB*
74	13	1731	42	1	1727	1105.	TIX	*-2,1	
75	12	1732	40	0	4711	1106.	TRA	4711	EXIT TO DEDA DISCRETE SAMPLING
75	13	1733	30	0	0531	1107.	LUNAL1 CLZ	DAYA	CHANGE GAIN
76	12	1734	54	0	0002	1108.	LRS	2	1/4
76	13	1735	10	0	0531	1109.	STO	DAYA	
77	12	1736	30	0	0532	1110.	CLZ	DAZA	
77	13	1737	54	0	0002	1111.	LRS	2	

70	14	1740	10	0	0532	1112.	STO	DAZA		
70	15	1741	40	0	1473	1113.	TRA	SOFT3		
						1114.	*			
						1115.	*	START OF NAVIGATION		
						1116.	*			
71	14	1742	20	0	0604	1117.	NAV1P	CLA	DEL21	
71	15	1743	46	0	5175	1118.		TMI	NAV1	- IS ON LUNAR SURFACE
72	14	1744	20	0	0404	1119.		CLA	VD1X	COMPUTE THRUST ACCEL
72	15	1745	24	0	0470	1120.		SUB	VDX	13
73	14	1746	56	0	0005	1121.		ALS	5	1/2(VD1-VD) AT 7
73	15	1747	40	0	5166	1122.		TRA	5166	TO HARD NAV
74	14	1750	50	1	0002	1123.	XDVS	AXT	2,1	
74	15	1751	20	1	0120	1124.		CLA	DVSX,1	
75	14	1752	22	0	4015	1125.		ADD	1B12	
75	15	1753	54	0	0006	1126.		LRS	6	
76	14	1754	32	1	0050	1127.		ADZ	DQSX,1	
76	15	1755	10	1	0050	1128.		STO	DQSX,1	
77	14	1756	20	1	0404	1129.		CLA	VD1X,1	
77	15	1757	10	1	0470	1130.		STO	VDX,1	
70	16	1760	42	1	1751	1131.		TIX	XDVS+1,1	
70	17	1761	40	0	5223	1132.		TRA	NAV4	
71	16	1762	72	0	6261	1133.	ALTUP	TSO	EXEC	
						1134.	*			
71	17	1763	50	1	0002	1135.		AXT	2,1	
72	16	1764	20	1	0200	1136.		CLA	REX,1	SAVE REX FROM FILTER
72	17	1765	10	1	0430	1137.		STO	VIX,1	SCRATCH MATRIX C AREA
73	16	1766	20	0	0223	1138.		CLA	25J	ALTITUDE ENTRY TEST
73	17	1767	24	0	4006	1139.		SUB	1B17	
74	16	1770	46	0	1777	1140.		TMI	FLTR	IF NO 25J ENTRY
74	17	1771	20	0	0223	1141.		CLA	25J	
75	16	1772	22	0	0231	1142.		ADD	5J	
75	17	1773	10	0	0210	1143.		STO	R	R=5J+25J
76	16	1774	06	1	0060	1144.		MPY	UIX,1	
76	17	1775	52	0	0001	1145.		LLS	1	
77	16	1776	10	1	0340	1146.		STO	RX,1	NEW R COMPONENTS
						1147.	*			
						1148.	*	RANGE AND RANGE RATE COMPUTATIONS		

77	17	1777	20	1	0344	1149.	*				
00	20	2000	24	1	0340	1150.	FLTR	CLA	RCX,1		RELATIVE RANGE
00	21	2001	10	1	0124	1151.		*SUB	RX,1		
01	20	2002	10	1	0004	1152.		STO	RRX,1		
01	21	2003	42	1	1764	1153.		STO	TS4,1		
02	20	2004	30	0	0223	1154.		TIX	ALTUP+2,1		
02	21	2005	72	0	6737	1155.		CLZ	25J		
03	20	2006	56	0	0001	1156.		TSQ	DPVMAG		DP COMP OF RR MAG
03	21	2007	10	0	0317	1157.		ALS	1		
04	20	2010	20	0	0636	1158.		STO	RR		B22 RANGE VECTOR MAG
04	21	2011	54	0	0005	1159.		CLA	2K1		48
05	20	2012	04	0	0210	1160.		LRS	5		53
05	21	2013	04	0	0210	1161.		DVP	R		30
06	20	2014	04	0	0210	1162.		DVP	R		7
06	21	2015	10	0	0030	1163.		DVP	R		-16
07	20	2016	50	1	0007	1164.	DAD	STO	D11		2K1/R**3 B-16
07	21	2017	30	1	0170	1165.		AXT	7,1		
00	22	2020	30	1	0200	1166.		CLZ	C11,1		ZERO PHI,M
00	23	2021	42	1	2017	1167.		CLZ	C31,1		
01	22	2022	30	0	0440	1168.		TIX	*-2,1		
01	23	2023	50	1	0002	1169.		CLZ	RRDOT		ZEROED FOR SUM
02	22	2024	20	1	0124	1170.		AXT	2,1		
02	23	2025	04	0	0317	1171.	FLTRA	CLA	RRX,1		
03	22	2026	10	1	0300	1172.		DVP	RP		
03	23	2027	20	1	0364	1173.		STO	A31BD,1		B1 UNIT POINTING VECTOR
04	22	2030	24	1	0360	1174.		CLA	VCX,1		B13
04	23	2031	10	1	0004	1175.		SUB	VX,1		
05	22	2032	26	1	0300	1176.		STO	TS4,1		B13 RANGE RATE CSM-LM
05	23	2033	56	0	0001	1177.		MPR	A31BD,1		
06	22	2034	32	0	0440	1178.		ALS	1		
06	23	2035	10	0	0440	1179.		ADZ	RRDOT		
07	22	2036	20	1	0060	1180.		STO	RRDOT		
07	23	2037	26	1	0060	1181.		CLA	U1X,1		
00	24	2040	26	0	7520	1182.		MPR	U1X,1		B2
00	25	2041	24	0	4011	1183.		MPR	3B3		B5
01	24	2042	26	0	0030	1184.		SUB	1B5		
						1185.		MPR	D11		

01 25	2043	10 1	0200	1186.	STO	C31,1	ADT,JDT AT B-7
02 24	2044	20 0	4003	1187.	CLA	4B17	
02 25	2045	10 1	0460	1188.	STO	TR4,1	SET UP DIMENSION FOR MXM
03 24	2046	42 1	2024	1189.	TIX	FLTRA,1	
03 25	2047	14 0	7701	1190.	LDQ	1B3	COMMON SETUP OF PHI AND M
04 24	2050	12 0	0170	1191.	STQ	C11	
04 25	2051	12 0	0175	1192.	STQ	C22	
05 24	2052	12 0	0207	1193.	STQ	C44	
05 25	2053	20 0	2373	1194.	CLA	PAD	COMMON ADDR SETUP FOR
06 24	2054	10 0	0103	1195.	STO	TR1	PHI*P*PHI(T) AND M*P*M(T)
06 25	2055	20 0	2220	1196.	CLA	CAD	
07 24	2056	10 0	0143	1197.	STO	TR2	
07 25	2057	20 0	0604	1198.	CLA	DEL21	BYPASS FILTER IF ON SURFACE TO
00 26	2060	46 0	2402	1199.	TMI	FLTRX	AVOID CONFLICT WITH D44, SIDELL
				1200.			
00 27	2061	30 0	0167	1201.	* PUPDAT CLZ	MU17	ZERO MU17 IF FILTER TIME
01 26	2062	22 0	7701	1202.	*ADD	1B3	
01 27	2063	46 0	2274	1203.	TMI	FLTRTM	
02 26	2064	10 0	0167	1204.	STO	MU17	
02 27	2065	20 0	0503	1205.	FLTRD CLA	17J	
03 26	2066	62 0	0000	1206.	ABS		
03 27	2067	24 0	4006	1207.	SUB	1B17	
04 26	2070	46 0	2121	1208.	TMI	FLTRH	NO RATE CHECK RANGE
04 27	2071	30 0	0503	1209.	RATE CLZ	17J	
05 26	2072	24 0	0415	1210.	SUB	RDOTS	
05 27	2073	10 0	0220	1211.	STO	DELRI	B13
06 26	2074	50 1	0002	1212.	AXT	2,1	
06 27	2075	20 0	0440	1213.	FLTRE CLA	RRDOT	B13
07 26	2076	26 1	0300	1214.	MPR	A31BD,1	B14
07 27	2077	04 0	4126	1215.	DVP	M1B1	
00 30	2100	22 1	0004	1216.	ADD	TS4,1	B13
00 31	2101	06 0	4065	1217.	MPY	1B2	SCALE AT B15
01 30	2102	04 0	0317	1218.	DVP	RR	B22
01 31	2103	10 1	0170	1219.	STO	C11,1	M11 AT B-7
02 30	2104	20 1	0300	1220.	CLA	A31BD,1	B1
02 31	2105	54 0	0002	1221.	LRS	2	
03 30	2106	10 1	0171	1222.	STO	C12,1	M14 AT B3

03 31	2107	42 1	2075	1223.	TIX	FLTRE,1	
04 30	2110	14 0	0172	1224.	LDQ	C13	
04 31	2111	20 0	0171	1225.	CLA	C12	
05 30	2112	12 0	0171	1226.	STO	C12	M12 AT B-7
05 31	2113	10 0	0172	1227.	STO	C13	M13 AT B3
06 30	2114	30 0	0175	1228.	CLZ	C22	M22 (M21,M23,M24 ALREADY ZERO)
06 31	2115	20 0	0774	1229.	CLA	6K8S	B10
07 30	2115	10 0	0316	1230.	STO	18J	N11, (N12=C42=0, N22=C44=1B3)
07 31	2117	20 0	4006	1231.	CLA	1B17	
00 32	2120	40 0	2167	1232.	TRA	FLTRJ	
				1233.	*		
				1234.	*		
00 33	2121	22 0	0316	1235.	FLTRH	ADD	18J
01 32	2122	46 0	2402	1236.		TMI	FLTRX
01 33	2123	50 1	0002	1237.	RANGE	AXT	2,1
02 32	2124	20 1	0554	1238.	FLTRI	CLA	A31S,1
02 33	2125	26 0	0316	1239.		MPR	18J
03 32	2126	24 1	0234	1240.		SUB	RRSX,1
03 33	2127	10 1	0220	1241.		STO	DELRI,1
04 32	2130	20 1	0124	1242.		CLA	RRX,1
04 33	2131	26 1	0124	1243.		MPR	RRX,1
05 32	2132	06 0	0775	1244.		MPY	6K9S
05 33	2133	52 0	0014	1245.		LLS	12
06 32	2134	10 1	0000	1246.		STO	TS0,1
06 33	2135	20 1	0300	1247.		CLA	A31BD,1
07 32	2136	26 1	0300	1248.		MPR	A31BD,1
07 33	2137	26 0	0776	1249.		MPR	6K10S
00 34	2140	10 1	0004	1250.		STO	TS4,1
00 35	2141	42 1	2124	1251.		TIX	FLTRI,1
01 34	2142	32 0	0002	1252.		ADZ	TS2
01 35	2143	10 0	0316	1253.		STO	18J
02 34	2144	20 0	0126	1254.		CLA	RRZ
02 35	2145	06 0	0000	1255.		MPY	TS0
03 34	2146	04 0	0124	1256.		DVP	RRX
03 35	2147	10 0	0205	1257.		STO	C42
04 34	2150	30 0	0000	1258.		CLZ	TS0
04 35	2151	32 0	0006	1259.		ADZ	TS6

CHECK RANGE

ZB B1

B22

B23

B46

B42

B30

B30

B1

B2

N11 AT B30

B30

-N12

05 34	2152	10 0	0207	1260.		STO	C44	N22
				1261.	*			M IS ALREADY SET UP IN C11-C24
05 35	2153	20 0	0276	1262.		CLA	6K5	B0
06 34	2154	26 0	0221	1263.		MPR	DELR3	B23
06 35	2155	22 0	0341	1264.		ADD	PY	Y=Y+6K5*DELR3 B23
07 34	2156	10 0	0341	1265.		STO	RY	
07 35	2157	20 0	0777	1266.		CLA	6K6S	B-8
00 36	2160	06 0	0221	1267.		MPY	DELR3	B15
00 37	2161	52 0	0002	1268.		LLS	2	B13
01 36	2162	22 0	0361	1269.		ADD	VY	
01 37	2163	10 0	0361	1270.		STO	VY	VY=VY+6K6*DELR3
02 36	2164	20 0	0522	1271.		CLA	6K6	
02 37	2165	10 0	0777	1272.		STO	6K6S	RESTORE GAIN AFTER 1ST PASS
03 36	2166	20 0	0441	1273.		CLA	1000D	
03 37	2167	32 0	0621	1274.	FLTRJ	ADZ	MU19	INCREMENT MARK COUNTER
04 36	2170	10 0	0621	1275.		STO	MU19	
04 37	2171	20 0	4005	1276.		CLA	2B17	DIMENSION FOR MXM (OTHER DIM. AND ADDR. ALREADY SET UP)
05 36	2172	10 0	0461	1277.		STO	TR6	
05 37	2173	20 0	2015	1278.		CLA	DAD	
06 36	2174	72 0	2404	1279.		TSQ	MXM	RETURN WITH D=P(T)*M(T)
06 37	2175	20 0	2213	1280.		CLA	C31AD	
07 36	2176	72 0	2404	1281.		TSQ	MXM	RETURN WITH Q IN C31-C34
07 37	2177	30 0	0205	1282.		CLZ	C42	
10 20	2200	24 0	0201	1283.		SUB	C32	
10 21	2201	10 0	0201	1284.		STO	C32	QP12=QP21= -(Q12+N12)
11 20	2202	10 0	0202	1285.		STO	C33	
11 21	2203	06 0	0201	1286.		MPY	C32	
12 20	2204	52 0	0003	1287.		LLS	3	(QP12)**2 AT B57(ZERO FOR RATE)
12 21	2205	10 0	0040	1288.	D31AD	STO	D31	
13 20	2206	20 0	0200	1289.		CLA	C31	
13 21	2207	32 0	0316	1290.		ADZ	18J	
14 20	2210	54 0	0021	1291.		LRS	17	
14 21	2211	20 0	0203	1292.		CLA	C34	
15 20	2212	32 0	0207	1293.		ADZ	C44	
15 21	2213	10 0	0200	1294.	C31AD	STO	C31	QP11=Q22+N22
16 20	2214	12 0	0203	1295.		STQ	C34	QP22=Q11+N11
16 21	2215	06 0	0203	1296.		MPY	C34	

17	20	2216	52	0	0003	1297.	LLS	3	QP11*QP22 AT B57(B10 FOR RATE)	
17	21	2217	24	0	0040	1298.	SUB	D31		
10	22	2220	10	0	0170	1299.	CAD	STO	C11	DETERMINANT OF (Q+N) MATRIX
10	23	2221	20	0	2015	1300.		CLA	DAD	
11	22	2222	10	0	0143	1301.		STO	TR2	
11	23	2223	20	0	4005	1302.		CLA	2B17	
12	22	2224	10	0	0462	1303.		STO	TR5	
12	23	2225	20	0	4003	1304.		CLA	4B17	
13	22	2226	10	0	0461	1305.		STO	TR6	
13	23	2227	20	0	2205	1306.		CLA	D31AD	
14	22	2230	72	0	2404	1307.		TSQ	MXM	RETURN WITH B(T)*C11 IN D31-D44 SETUP FOR TRICKY INDEXING
14	23	2231	20	0	0220	1308.		CLA	DELR1	
15	22	2232	10	0	0173	1309.		STO	C14	
15	23	2233	20	0	0222	1310.		CLA	DELR2	
16	22	2234	10	0	0177	1311.		STO	C24	
						1312.	*			INDEX IS LOADED IN MXM
16	23	2235	20	1	0040	1313.		CLA	D31,1	AT B57,B47 (B20,B10 FOR RATE)
17	22	2236	06	0	7701	1314.		MPY	1B3	
17	23	2237	04	0	0170	1315.		DVP	C11	
10	24	2240	10	1	0040	1316.		STO	D31,1	B(T) AT B3,B-7(B13,B3 FOR RATE)
10	25	2241	06	1	0173	1317.		MPY	C14,1	B(I,1)*DELR1 OR B(I,2)*DELR2 TO B23 OR B13
11	24	2242	52	0	0003	1318.		LLS	3	LAST 4 TIMES THRU WILL ADD TO VALUES COMPUTED 1ST 4 TIMES
11	25	2243	32	1	0204	1319.		ADZ	C41,1	
12	24	2244	10	1	0204	1320.		STO	C41,1	
12	25	2245	42	1	2235	1321.		TIX	*-8,1	
13	24	2246	20	0	0340	1322.		CLA	RX	
13	25	2247	34	0	0204	1323.		SUZ	C41	B(1,1)*DELR1+B(1,2)*DELR2
14	24	2250	10	0	0340	1324.		STO	RX	
14	25	2251	20	0	0342	1325.		CLA	RZ	
15	24	2252	34	0	0205	1326.		SUZ	C42	B(2,1)(DELR1+B(2,2)*DELR2
15	25	2253	10	0	0342	1327.		STO	RZ	
16	24	2254	20	0	0360	1328.		CLA	VX	
16	25	2255	34	0	0206	1329.		SUZ	C43	B(3,1)*DELR1+B(3,2)*DELR2
17	24	2256	10	0	0360	1330.		STO	VX	
17	25	2257	20	0	0362	1331.		CLA	VZ	
10	26	2260	34	0	0207	1332.		SUZ	C44	B(4,1)*DELR1+B(4,2)*DELR2
10	27	2261	10	0	0362	1333.		STO	VZ	

11 26	2262	20 0	2220	1334.	CLA	CAD	
11 27	2263	72 0	2404	1335.	TSQ	MXM	RETURN WITH B*M*P IN C11-C44
				1336.	*	INDEX IS LOADED IN MXM	
12 26	2264	20 1	0700	1337.	CLA	P11,1	P=P-B*M*P
12 27	2265	34 1	0170	1338.	SUZ	C11,1	
13 26	2266	10 1	0700	1339.	STO	P11,1	
13 27	2267	20 1	0710	1340.	CLA	P31,1	
14 26	2270	34 1	0200	1341.	SUZ	C31,1	
14 27	2271	10 1	0710	1342.	STO	P31,1	
15 26	2272	42 1	2264	1343.	TIX	*-6,1	
15 27	2273	40 0	2402	1344.	TRA	FLTRX	
16 26	2274	20 0	0202	1345.	FLTRTM CLA	C33	FINISH SETUP OF PHI
16 27	2275	10 0	0205	1346.	STO	C42	JDT
17 26	2276	12 0	0202	1347.	STQ	C33	1B3
17 27	2277	20 0	0060	1348.	CLA	U1X	
10 30	2300	26 0	0062	1349.	MPR	U1Z	
10 31	2301	26 0	7520	1350.	MPR	3B3	B5
11 30	2302	36 0	0030	1351.	MPZ	D11	
11 31	2303	10 0	0201	1352.	STO	C32	CDT AT B-7
12 30	2304	10 0	0204	1353.	STO	C41	
12 31	2305	20 0	4013	1354.	CLA	1B9	DT AT B13
13 30	2306	10 0	0172	1355.	STO	C13	
13 31	2307	10 0	0177	1356.	STO	C24	NOW HAVE PHI IN C11-C44
14 30	2310	20 0	2015	1357.	CLA	DAD	
14 31	2311	72 0	2404	1358.	TSQ	MXM	RETURN WITH D = P(T)*PHI(T)
15 30	2312	20 0	2373	1359.	CLA	PAD	
15 31	2313	72 0	2404	1360.	TSQ	MXM	RETURN WITH P=D(T)*PHI(T), OR
				1361.	*	P(NEW) = PHI*P(OLD)*PHI(T)	
16 30	2314	20 0	0700	1362.	CLA	P11	ADD STATE NOISE TO DIAGONALS
16 31	2315	22 0	0650	1363.	ADD	7K2	
17 30	2316	10 0	0700	1364.	STO	P11	
17 31	2317	20 0	0705	1365.	CLA	P22	
10 32	2320	22 0	0650	1366.	ADD	7K2	
10 33	2321	10 0	0705	1367.	STO	P22	
11 32	2322	20 0	0712	1368.	CLA	P33	
11 33	2323	22 0	0650	1369.	ADD	7K2	
12 32	2324	10 0	0712	1370.	STO	P33	

12	33	2325	20	0	0717	1371.	CLA	P44	
13	32	2326	22	0	0650	1372.	ADD	7K2	
13	33	2327	10	0	0717	1373.	STO	P44	
14	32	2330	72	0	6261	1374.	TSQ	EXEC	
14	33	2331	44	0	2332	1375.	TOV	**1	RESET OVERFLOW
15	32	2332	20	0	7003	1376.	CLA	SIC02+1	ALS 2
15	33	2333	72	0	2440	1377.	TSQ	STEST	TEST FOR SCALING TOO LOW
16	32	2334	20	0	4150	1378.	*CLA	COCC+2	LRS 1
16	33	2335	44	0	2341	1379.	TOV	RSHFT	NEED RIGHT SHIFT IF OVERFLOW
17	32	2336	20	0	4375	1380.	CLA	LRI+2	ALS 3
17	33	2337	72	0	2440	1381.	TSQ	STEST	SEE IF SCALING DOWN IS POSSIBLE
10	34	2340	20	0	4113	1382.	CLA	GYCOM+2	ALS 1
10	35	2341	10	0	0721	1383.	RSHFT STO	VRSH+1	
11	34	2342	50	1	0002	1384.	AXT	2,1	
11	35	2343	20	1	0774	1385.	CLA	6K8S,1	
12	34	2344	72	0	0720	1386.	TSQ	VRSH	
12	35	2345	44	0	2360	1387.	TOV	RVSAR	BYPASS RESCALING IF OVERFLOW IN
					1388.	*			EITHER 2ND STEST OR ALS 1 6K10,
13	34	2346	10	1	0774	1389.	STO	5K8S,1	OTHERWISE SHIFT LEFT OR RIGHT 1
13	35	2347	42	1	2343	1390.	TIX	*-4,1	6K8,6K9,6K10 AND P MATRIX
14	34	2350	50	1	0007	1391.	AXT	7,1	
14	35	2351	20	1	0700	1392.	CLA	P11,1	
15	34	2352	72	0	0720	1393.	TSQ	VRSH	
15	35	2353	10	1	0700	1394.	STO	P11,1	
16	34	2354	20	1	0710	1395.	CLA	P31,1	
16	35	2355	72	0	0720	1396.	TSQ	VRSH	
17	34	2356	10	1	0710	1397.	STO	P31,1	
17	35	2357	42	1	2351	1398.	TIX	*-6,1	
10	36	2360	30	0	0417	1399.	RVSAR CLZ	S17	IS FILTER INIT. REQUESTED
10	37	2361	56	0	0003	1400.	*ALS	3	
11	36	2362	46	0	2364	1401.	TMT	PINIT	
11	37	2363	40	0	2402	1402.	TRA	FLTRX	
12	36	2364	50	1	0007	1403.	PINIT AXT	7,1	INITIALIZE P MATRIX AND FILTER
12	37	2365	30	1	0700	1404.	CLZ	P11,1	CONSTANTS
13	36	2366	30	1	0710	1405.	CLZ	P31,1	
13	37	2367	20	1	0564	1406.	CLA	6K8,1	
14	36	2370	10	1	0774	1407.	STO	6K8S,1	THIS ALSO ZEROES 6K6S

14	37	2371	42	1	2365	1408.		TIX	PINIT+1,1	
15	36	2372	20	0	0457	1409.		CLA	5K2	
15	37	2373	10	0	0700	1410.	PAD	STO	P11	
16	36	2374	10	0	0705	1411.		STO	P22	
16	37	2375	20	0	0456	1412.		CLA	6K4	
17	36	2376	10	0	0712	1413.		STO	P33	
17	37	2377	10	0	0717	1414.		STO	P44	
20	20	2400	30	0	0621	1415.		CLZ	MU19	CLEAR MARK COUNTER
20	21	2401	30	0	0606	1416.		CLZ	DEL45	MAKE RANGE THE FIRST UPDATE
21	20	2402	72	0	6261	1417.	FLTRX	TSQ	EXEC	
21	21	2403	40	0	5444	1418.		TRA	LMORB	
						1419.	*			
						1420.	*			
						1421.	*			MATRIX MULTIPLY SUBROUTINE
						1422.	*			PERFORMS C = A(T)*B(T) WHERE (T) INDICATES THE
						1423.	*			TRANSPOSE OPERATION , ENTER WITH TR1 = STO A11
						1424.	*			WHERE A11=ADDRESS OF 1ST ELEMENT OF A, TR2 = STO
						1425.	*			B11, A = STO C11 , TR4 = NO. OF COLUMNS IN A,
						1426.	*			TR5 = NO. OF ROWS IN A, TR6 = NO. OF ROWS IN B,
						1427.	*			THE RESULT MATRIX C WILL HAVE TR4 ROWS AND TR6
						1428.	*			COLUMNS, ALL MATRICES ARE ASSUMED TO BE STORED
						1429.	*			BY ROWS IN SEQUENTIAL LOCATIONS BEGINNING WITH
							*			A11, A12, . . . , A21, A22, . . . , ETC.
22	20	2404	12	0	0212	1430.	MXM	STO	PP	SAVE RETURN ADDRESS
22	21	2405	10	0	0073	1431.		STO	TR3	STORE STO C11 IN TR3
23	20	2406	24	0	4006	1432.		SUB	1B17	
23	21	2407	10	0	0745	1433.		STO	RREX2	VARIABLE MATRIX ELEMENT STORE
24	20	2410	30	0	0424	1434.		CLZ	I	
24	21	2411	20	0	0143	1435.	R3	CLA	TR2	
25	20	2412	24	0	4010	1436.		SUB	1B4	FORM MPY FROM STO
25	21	2413	10	0	0742	1437.		STO	RREX1	VARIABLE MULTIPLY
26	20	2414	30	0	0425	1438.		CLZ	J	
26	21	2415	20	0	0037	1439.		CLA	DLSC	(D24)
27	20	2416	10	0	0442	1440.		STO	TI	TEMP. STORAGE TO SAVE D24
27	21	2417	72	0	6261	1441.		TSQ	EXEC	
20	22	2420	20	0	0442	1442.		CLA	TI	
20	23	2421	10	0	0037	1443.		STO	DLSC	RESTORE D24
21	22	2422	20	0	0103	1444.	R2	CLA	TR1	

21	23	2423	22	0	0424	1445.	ADD	I		
22	22	2424	22	0	4065	1446.	ADD	STOCOM		FORM CLA FROM STO
22	23	2425	10	0	0741	1447.	STO	RREX		VARIABLE CLA
23	22	2426	20	0	0745	1448.	CLA	RREX2		
23	23	2427	22	0	4006	1449.	ADD	1B17		INCREMENT STO INSTRUCTION
24	22	2430	10	0	0745	1450.	STO	RREX2		
24	23	2431	30	0	0426	1451.	CLZ	<		
25	22	2432	30	0	0077	1452.	CLZ	TR8		TEMP. SUM
25	23	2433	40	0	0741	1453.	R1 TRA	RREX		
26	22	2434	42	1	2436	1454.	TIX	*+2,1		
26	23	2435	40	0	2411	1455.	TRA	R3		
27	22	2436	42	1	2433	1456.	TIX	R1,1		
27	23	2437	40	0	2422	1457.	TRA	R2		
						1458.	*			TEST FOR VARIABLE SCALING OF FILTER
20	24	2440	10	0	0721	1459.	STEST STO	VRSH+1		
20	25	2441	12	0	0020	1460.	STO	SREX3		
21	24	2442	20	0	0317	1461.	CLA	RR		B22
21	25	2443	26	0	0317	1462.	MPR	RR		22+22=44
22	24	2444	06	0	0775	1463.	MPY	6K9S		
22	25	2445	52	0	0012	1464.	LLS	10		
23	24	2446	72	0	0720	1465.	TSQ	VRSH		
23	25	2447	50	1	0007	1466.	AXT	7,1		
24	24	2450	20	1	0700	1467.	CLA	P11,1		
24	25	2451	72	0	0720	1468.	TSQ	VRSH		
25	24	2452	20	1	0710	1469.	CLA	P31,1		
25	25	2453	72	0	0720	1470.	TSQ	VRSH		
26	24	2454	42	1	2450	1471.	TIX	*-4,1		
26	25	2455	40	0	0020	1472.	TRA	SREX3		
27	24	2456	24	0	0231	1473.	LMORB2 SUB	5J		QL-5J AT B23
27	25	2457	10	0	0403	1474.	STO	QLTELE		PERIC. ALT
20	26	2460	30	0	0007	1475.	CLZ	TS7		= VH SQ AT B26
20	27	2461	10	0	0143	1476.	STO	VHSQ		SAVE FOR ORB INS
21	26	2462	72	0	6261	1477.	TSQ	EXEC		
						1478.	*			
21	27	2463	50	1	0002	1479.	ORBLM AXT	2,1		
22	26	2464	20	1	0430	1480.	CLA	VIX,1		RESTORE REX INTO FILTER
22	27	2465	10	1	0200	1481.	STO	REX,1		SCRATCH MATRIX C AREA

23	26	2466	20	1	0340	1482.	CLA	RX,1	
23	27	2467	10	1	0204	1483.	STO	ROX,1	
24	26	2470	20	1	0360	1484.	CLA	VX,1	
24	27	2471	10	1	0424	1485.	STO	VOX,1	
25	26	2472	42	1	2464	1486.	TIX	ORBLM+1,1	
25	27	2473	72	0	6444	1487.	TSQ	ORBPM	COMPUTE LM ORBIT PARAMETERS
26	26	2474	20	0	0173	1488.	CLA	AI	
26	27	2475	24	0	0231	1489.	SUB	5J	
27	26	2476	56	0	0001	1490.	ALS	1	MPY BY 2
27	27	2477	24	0	0403	1491.	SUB	OLTELE	
20	30	2500	10	0	0315	1492.	STO	QA	LM APOFOCUS ALT. AT B23
20	31	2501	72	0	6261	1493.	TSQ	EXEC	
						1494.			
						1495.			
						1496.			
21	30	2502	30	0	0211	1496.	CLZ	Y	
21	31	2503	30	0	0270	1497.	CLZ	VY0	
22	30	2504	50	1	0002	1498.	AXT	2,1	
22	31	2505	20	1	0340	1499.	CLA	RX,1	
23	30	2506	10	1	0220	1500.	STO	RIX,1	SAVE R FOR ORBIT INS.
23	31	2507	26	1	0054	1501.	MPR	WCX,1	
24	30	2510	56	0	0001	1502.	ALS	1	
24	31	2511	32	0	0211	1503.	ADZ	Y	
25	30	2512	10	0	0211	1504.	STO	Y	Y=(WCX)DOT(RX)
25	31	2513	20	1	0360	1505.	CLA	VX,1	
26	30	2514	10	1	0430	1506.	STO	VIX,1	SAVE V FOR ORBIT INS.
26	31	2515	26	1	0054	1507.	MPR	WCX,1	
27	30	2516	56	0	0001	1508.	ALS	1	
27	31	2517	32	0	0270	1509.	ADZ	VY0	
20	32	2520	10	0	0270	1510.	STO	VY0	VY0=(WCX)DOT(VX)
20	33	2521	20	1	0054	1511.	CLA	WCX,1	SET UP FOR CROSS
21	32	2522	60	0	0000	1512.	COM		PRODUCT SUBROUTINE
21	33	2523	10	1	0010	1513.	STO	TS10,1	WC X U1 = U1 X -WC
22	32	2524	20	1	0060	1514.	CLA	U1X,1	
22	33	2525	10	1	0004	1515.	STO	TS4,1	
23	32	2526	42	1	2505	1516.	TIX	KINGK,1	
23	33	2527	72	0	6373	1517.	TSQ	CRSPRD	
24	32	2530	72	0	6422	1518.	TSQ	NORMV	V1 VECTOR TO TSB

24	33	2531	72	0	6373	1519.	TSQ	CRSPRD	
25	32	2532	30	0	0003	1520.	CLZ	TS3	
25	33	2533	30	0	0004	1521.	CLZ	TS4	
26	32	2534	50	1	0002	1522.	AXT	2,1	
26	33	2535	30	1	0010	1523.	CLZ	TS10,1	
27	32	2536	10	1	0034	1524.	STO	VIX,1	VI AT 1
27	33	2537	26	1	0134	1525.	MPR	A31,1	
20	34	2540	22	0	0004	1526.	ADD	TS4	TS4 = V1 DOT ZB AT B2
20	35	2541	10	0	0004	1527.	STO	TS4	
21	34	2542	30	1	0014	1528.	CLZ	TS14,1	
21	35	2543	56	0	0001	1529.	ALS	1	
22	34	2544	10	1	0040	1530.	STO	WIX,1	
22	35	2545	20	1	0134	1531.	CLA	A31,1	
23	34	2546	26	1	0060	1532.	MPR	U1X,1	
23	35	2547	22	0	0003	1533.	ADD	TS3	
24	34	2550	10	0	0003	1534.	STO	TS3	TS3 = U1 DOT ZB AT B2
24	35	2551	42	1	2535	1535.	TIX	*-12,1	
25	34	2552	72	0	7034	1536.	TSQ	ARCTAE	
25	35	2553	10	0	0277	1537.	STO	XI	
26	34	2554	72	0	6261	1538.	TSQ	EXEC	END OF LEM ORB PAR BRANCH
						1539.			
						1540.	*		
						1541.	*	GUIDANCE MODE CHECK	
						1542.	*		
26	35	2555	20	0	0410	1542.	GM	CLA	S10
27	34	2556	22	0	7512	1543.		*ADD	5B3
27	35	2557	62	0	0000	1544.		*ABS	
20	36	2560	46	0	2573	1545.		TMI	DXFR1
20	37	2561	22	0	4065	1546.		*ADD	1B2
21	36	2562	46	0	2567	1547.		TMI	**5
21	37	2563	30	0	0310	1548.		CLZ	TDEL
22	36	2564	20	0	0726	1549.		CLA	ORBRET
22	37	2565	10	0	0046	1550.		STO	TSEX
23	36	2566	40	0	3576	1551.		TRA	NORTON+5
						1552.	*		CSI,CDH,TPI EXECUTE, OR EXT DV
23	37	2567	20	0	0373	1553.		CLA	TIG
24	36	2570	24	0	0377	1554.		SUB	TAL
24	37	2571	56	0	0005	1555.		ALS	5

25	36	2572	10	0	0310	1556.		STO	TDEL	
25	37	2573	20	0	0310	1557.	DXFR1	CLA	TDEL	
26	36	2574	54	0	0005	1558.		LRS	5	
26	37	2575	22	0	0377	1559.		ADD	TA1	
27	36	2576	10	0	0373	1560.		STO	TIG	
27	37	2577	30	0	0310	1561.		CLZ	TDEL	TDEL=OR GTR 0 AFTER TR CALC
30	20	2600	46	0	2602	1562.		TMI	*+2	
30	21	2601	10	0	0310	1563.		STO	TDEL	
31	20	2602	22	0	0307	1564.		ADD	6J	
31	21	2603	10	0	0311	1565.		STO	TR	TIME UNTIL RENDEZVOUS (TPI)
32	20	2604	20	0	0310	1566.		CLA	TDEL	
32	21	2605	72	0	3571	1567.	DXFR10	TSQ	NORTON	
33	20	2606	10	0	0347	1568.	DX10P	STO	RF	PRED. BURNOUT ALTITUDE
33	21	2607	22	0	0217	1569.		ADD	2K14	
34	20	2610	10	0	0170	1570.		STO	P	
34	21	2611	30	0	0477	1571.		CLZ	RADOT	
35	20	2612	30	0	0263	1572.		CLZ	VPY	
35	21	2613	30	1	0220	1573.	DXFRR5	CLZ	RIX,1	R5 STORE
36	20	2614	10	1	0174	1574.		STO	R5X,1	
36	21	2615	30	1	0430	1575.		CLZ	VIX,1	
37	20	2616	10	1	0014	1576.		STO	TS14,1	
37	21	2617	10	1	0460	1577.		STO	V5X,1	V5 STORE
30	22	2620	26	1	0054	1578.		MPR	WCX,1	
30	23	2621	56	0	0001	1579.		ALS	1	TO 13
31	22	2622	32	0	0263	1580.		ADZ	VPY	VPY = V5 DOT WC
31	23	2623	10	0	0263	1581.		STO	VPY	
32	22	2624	30	1	0010	1582.		CLZ	TS10,1	
32	23	2625	10	1	0060	1583.		STO	U1X,1	U1 STORE
33	22	2626	26	1	0460	1584.		MPR	V5X,1	RADOT = R5 DOT U1
33	23	2627	56	0	0001	1585.		ALS	1	TO 13
34	22	2630	32	0	0477	1586.		ADZ	RADOT	
34	23	2631	10	0	0477	1587.		STO	RADOT	
35	22	2632	20	1	0200	1588.		CLA	REX,1	CSM POS AND VEL FOR
35	23	2633	10	1	0204	1589.		STO	ROX,1	ELLIPSE PREDICTOR
36	22	2634	20	1	0420	1590.		CLA	VEX,1	AND ORBIT PARAMETERS
36	23	2635	10	1	0424	1591.		STO	VOX,1	
37	22	2636	42	1	2613	1592.		TIX	DXFRR5,1	

37	23	2637	72	0	6422	1593.	TSQ	NORMV	
30	24	2640	20	0	0013	1594.	CLA	TS13	
30	25	2641	10	0	0463	1595.	STO	VHA	
31	24	2642	72	0	6261	1596.	TSQ	EXEC	
31	25	2643	72	0	6444	1597.	ORBIT3 TSQ	ORBPM	CSM ORBIT PARAMETERS
32	24	2644	20	0	0436	1598.	CLA	TB	
32	25	2645	24	0	0445	1599.	SUB	TCSM	
33	24	2646	22	0	0310	1600.	ADD	TDEL	+TIME INC. TO DXFR
33	25	2647	46	0	2651	1601.	TMI	*+2	
34	24	2650	24	0	0445	1602.	SUB	TCSM	
34	25	2651	72	0	3571	1603.	TSQ	NORTON	
35	24	2652	30	0	0003	1604.	DXFR13 CLZ	TS3	
35	25	2653	20	1	0220	1605.	CLA	R1X,1	
36	24	2654	24	1	0174	1606.	SUB	R5X,1	
36	25	2655	10	1	0430	1607.	STO	V1X,1	RC-R5
37	24	2656	20	1	0054	1608.	CLA	WCX,1	
37	25	2657	10	1	0004	1609.	STO	TS4,1	
30	26	2660	20	1	0060	1610.	CLA	U1X,1	
30	27	2661	10	1	0010	1611.	STO	TS10,1	
31	26	2662	26	1	0430	1612.	MPR	V1X,1	U1 DOT (RC-R5)
31	27	2663	32	0	0003	1613.	ADZ	TS3	SCALE BOTH RX AND RZ
32	26	2664	10	0	0003	1614.	STO	TS3	AT 24 FOR ARCTAE
32	27	2665	42	1	2653	1615.	TIX	DXFR13+1,1	
33	26	2666	72	0	6373	1616.	TSQ	CRSPRD	
33	27	2667	72	0	6422	1617.	TSQ	NORMV	
34	26	2670	30	0	0004	1618.	CLZ	TS4	
34	27	2671	50	1	0002	1619.	VRUP1 AXT	2,1	
35	26	2672	20	1	0010	1620.	CLA	TS10,1	
35	27	2673	10	1	0034	1621.	STO	V1X,1	V1,NORM XPROD OF WC AND U1
36	26	2674	26	1	0430	1622.	MPR	V1X,1	
36	27	2675	32	0	0004	1623.	ADZ	TS4	
37	26	2676	10	0	0004	1624.	STO	TS4	RZ AT 24
37	27	2677	42	1	2672	1625.	TIX	VRUP1+1,1	
30	30	2700	20	0	5033	1626.	CLA	1B1	
30	31	2701	24	0	0410	1627.	SUB	S10	
31	30	2702	46	0	3024	1628.	TMI	XDV-1	EXT DELTA V
31	31	2703	22	0	5000	1629.	*ADD	5B3	

32	30	2704	46	0	1144	1630.	TMI	THEF	O.I., CSI, CDH
32	31	2705	30	0	0450	1631.	CLZ	28J1	COMPUTE TPI VELOCITY
33	30	2706	30	0	0451	1632.	CLZ	28J2	IN LOCAL VERTICAL COORD.
33	31	2707	30	0	0452	1633.	CLZ	28J3	
34	30	2710	50	1	0002	1634.	AXT	2,1	
34	31	2711	20	1	0034	1635.	DXFRA CLA	VIX,1	B1
35	30	2712	26	1	0064	1636.	MPR	VGX,1	B1+B13=B14
35	31	2713	56	0	0001	1637.	ALS	1	B13
36	30	2714	32	0	0450	1638.	ADZ	28J1	
36	31	2715	10	0	0450	1639.	STO	28J1	
37	30	2716	20	1	0040	1640.	CLA	WIX,1	B1
37	31	2717	06	1	0064	1641.	MPY	VGX,1	B1+B13=B14
30	32	2720	04	0	4126	1642.	DVP	M1B1	B13
30	33	2721	32	0	0451	1643.	ADZ	28J2	
31	32	2722	10	0	0451	1644.	STO	28J2	
31	33	2723	20	1	0060	1645.	CLA	UIX,1	B1
32	32	2724	06	1	0064	1646.	MPY	VGX,1	B1+B13=B14
32	33	2725	04	0	4126	1647.	JVP	M1B1	B13
33	32	2726	32	0	0452	1648.	ADZ	28J3	
33	33	2727	10	0	0452	1649.	STO	28J3	
34	32	2730	42	1	2711	1650.	TIX	DXFRA,1	
34	33	2731	72	0	7034	1651.	TSQ	ARCTAE	TLOS=ARCTAN(RX/RZ)
35	32	2732	10	0	0303	1652.	STO	TLOS	LINE OF SIGHT (DEDA)
35	33	2733	20	0	0311	1653.	CLA	TR	
36	32	2734	24	0	0310	1654.	SUB	TDEL	
36	33	2735	10	0	0435	1655.	STO	T	
37	32	2736	20	0	0436	1656.	CLA	TB	
37	33	2737	24	0	0445	1657.	SUB	TCSM	
30	34	2740	22	0	0311	1658.	ADD	TR	TIME INC. TPI TO REND.
30	35	2741	24	0	0312	1659.	SUB	3J	TARGET OFFSET
31	34	2742	10	0	0442	1660.	STO	TI	
31	35	2743	72	0	6261	1661.	TSQ	EXEC	
32	34	2744	20	0	0410	1662.	DXFR14 CLA	S10	
32	35	2745	60	0	0000	1663.	COM		
33	34	2746	46	0	5520	1664.	TMI	CSMT1	TO ELLIPX
						1665.	*		
						1666.	*		ORBIT INSERTION SECTION

				1667.	*				
33	35	2747	24	0	0270	1668.	SUB	VY0	S10 EQUALS 0, ORBIT INSERTION
34	34	2750	26	0	0270	1669.	MPR	VY0	
34	35	2751	22	0	0143	1670.	ADD	VHSQ	VH SQ
35	34	2752	72	0	7123	1671.	TSQ	SQRTE	
35	35	2753	10	0	0463	1672.	STO	VHA	B13
36	34	2754	20	0	0227	1673.	CLA	4K5	COMPUTE DESIPEB BURNDOUT
36	35	2755	24	0	0435	1674.	SUB	RB	ALTITUDE RATE
37	34	2756	06	0	0557	1675.	MPY	4K4	
37	35	2757	52	0	0003	1676.	LLS	3	
30	36	2760	10	0	0423	1677.	STO	RFDOT	
30	37	2761	24	0	0527	1678.	SUB	4K6	LIMIT RFDOT BETWEEN
31	36	2762	46	0	2765	1679.	TMI	*+3	23J AND 4K6
31	37	2763	20	0	0527	1680.	CLA	4K6	
32	36	2764	40	0	2771	1681.	TRA	*+5	
32	37	2765	20	0	0465	1682.	CLA	23J	
33	36	2766	24	0	0423	1683.	SUB	RFDOT	
33	37	2767	46	0	2772	1684.	TMI	*+3	
34	36	2770	20	0	0465	1685.	CLA	23J	
34	37	2771	10	0	0423	1686.	STO	RFDOT	
35	36	2772	20	0	0533	1687.	CLA	DISC1	IS ABORT OR ABORT STAGE YES
35	37	2773	56	0	0007	1688.	*ALS	7	
36	36	2774	46	0	2777	1689.	TMI	*+3	- ABORT YES
36	37	2775	22	0	4126	1690.	*ADD	M1B1	
37	36	2776	46	0	3010	1691.	TMI	ORBI2	- ABORT STAGE NO
37	37	2777	20	0	0303	1692.	CLA	THETAF	
40	20	3000	24	0	0305	1693.	SUB	12J	
40	21	3001	46	0	3006	1694.	TMI	*+5	- CENTRAL ANGLE LESS THAN LIMIT
41	20	3002	20	0	0226	1695.	CLA	10J	SET NEW SLOPE AND OFFSET
41	21	3003	10	0	0224	1696.	STO	7J	VALUES FOR AL WHEN ABORT OR
42	20	3004	20	0	0673	1697.	CLA	11J	ABORT STAGE YES AND THE
42	21	3005	10	0	0662	1698.	STO	4K10	CENTRAL ANGLE LARGE
43	20	3006	20	0	5033	1699.	CLA	1B1	STOP PASSES OF NEW SLOPE/OFFSET
43	21	3007	10	0	0305	1700.	STO	12J	EQUALS 4 RAD AT B3
44	20	3010	20	0	0303	1701.	ORBI2 CLA	THETAF	CALCULATE AL
44	21	3011	06	0	0662	1702.	MPY	4K10	
45	20	3012	22	0	0224	1703.	ADD	7J	

45	21	3013	10	0	0177	1704.	STO	AL		
46	20	3014	20	0	0435	1705.	CLA	R3		
46	21	3015	10	0	0347	1706.	STO	RF		
47	20	3016	54	0	0001	1707.	LRS	1	CHECK FOR LOW LIMIT OF AL	
47	21	3017	22	0	0225	1708.	ADD	8J		
40	22	3020	24	0	0177	1709.	SUB	AL		
40	23	3021	46	0	3741	1710.	TMI	CDH3+1		
41	22	3022	22	0	0177	1711.	ADD	AL		
41	23	3023	40	0	3740	1712.	TRA	CDH3	AL LOW LIMIT 8J+RB/2	
						1713.				
						1714.	*			
							*		TERMINAL FOR CSI, CDH, EXT DV	
42	22	3024	72	0	6261	1715.	TSQ	EXEC		
42	23	3025	20	0	0373	1716.	XDV	CLA	TIG	TEST FOR ULLAGE TIME
43	22	3026	24	0	0274	1717.	SUB	7K1		
43	23	3027	24	0	0377	1718.	SUB	TA1	IF TIME FOR ULLAGE, THEN	
44	22	3030	46	0	3047	1719.	TMI	XDV2	FREEZE COORDINATE FRAME	
44	23	3031	50	1	0002	1720.	XDV1	2,1		
45	22	3032	20	0	0452	1721.	CLA	28J3	RADIAL COMPONENT	
45	23	3033	26	1	0060	1722.	MPR	U1X,1	13+1=14	
46	22	3034	10	1	0050	1723.	STO	DQSX,1		
46	23	3035	20	0	0451	1724.	CLA	28J2	CROSSRANGE COMPONENT	
47	22	3036	26	1	0040	1725.	MPR	W1X,1		
47	23	3037	32	1	0050	1726.	ADZ	DQSX,1		
40	24	3040	10	1	0050	1727.	STO	DQSX,1		
40	25	3041	20	0	0450	1728.	CLA	28J1	DOWNRANGE COMPONENT	
41	24	3042	26	1	0034	1729.	MPR	V1X,1		
41	25	3043	34	1	0050	1730.	SUZ	DQSX,1		
42	24	3044	56	0	0001	1731.	ALS	1	TO 13	
42	25	3045	10	1	0600	1732.	STO	DVGXX,1	VELOCITY TO GAIN	
43	24	3046	42	1	3032	1733.	TIX	XDV1+1,1		
43	25	3047	50	1	0002	1734.	XDV2	2,1	LOAD NDX FOR STEER/XDV	
44	24	3050	20	0	0410	1735.	CLA	S10	O.I. EXIT TO STEERING	
44	25	3051	24	0	7701	1736.	SUB	1B3		
45	24	3052	46	0	3262	1737.	TMI	STEER4+1	GO TO STEERING	
45	25	3053	20	1	0600	1738.	XDV3	DVGXX,1	INITIAL VG	
46	24	3054	24	1	0050	1739.	SUB	DQSX,1	ACCUMULATED DELTA V	
46	25	3055	10	1	0004	1740.	STO	TS4,1		

47	24	3056	10	1	0064	1741.	STO	VGX,1	B13
47	25	3057	42	1	3053	1742.	TIX	XDV3,1	
40	26	3060	72	0	6737	1743.	TSQ	DPVMAG	
40	27	3061	10	0	0370	1744.	STO	VG	VEL TO GAIN MAGNITUDE
41	26	3062	40	0	3302	1745.	TRA	Q7	GO TO STEERING
						1746.			
41	27	3063	20	0	0423	1747.	CLA	RFDOT	GUIDANCE LAW
42	26	3064	10	0	0004	1748.	STJ	TS4	SET FOR INDEXING
42	27	3065	30	0	0005	1749.	CLZ	TS5	
43	26	3066	20	0	0477	1750.	CLA	RADOT	
43	27	3067	10	0	0010	1751.	STO	TS10	
44	26	3070	20	0	0270	1752.	CLA	VY0	
44	27	3071	10	0	0011	1753.	STO	TS11	
45	26	3072	50	1	0001	1754.	AXT	1,1	
45	27	3073	44	0	3074	1755.	TOV	*+1	
46	26	3074	20	1	0504	1756.	CLA	RD3DOT,1	-2
46	27	3075	26	0	0357	1757.	MPR	TB0	9-2=7
47	26	3076	54	0	0001	1758.	LRS	1	TO 8
47	27	3077	10	0	0001	1759.	STO	TS1	1/2 AT 7
40	30	3100	20	1	0004	1760.	CLA	TS4,1	RFDOT OR ZERO
40	31	3101	24	1	0010	1761.	SUB	TS10,1	RDOT OR VY0
41	30	3102	10	0	0002	1762.	STO	TS2	
41	31	3103	06	0	7701	1763.	MPY	1B3	B16
42	30	3104	04	0	0357	1764.	*OVP	TB0	15-9=7
42	31	3105	34	0	0001	1765.	SUZ	TS1	R OR YD2DOT
43	30	3106	10	0	0000	1766.	STO	TS0	TEST FOR OVERFLOW
43	31	3107	30	0	0002	1767.	CLZ	TS2	SIGN IF OVERFLOW
44	30	3110	72	0	3346	1768.	TSQ	OVFLT	
44	31	3111	10	1	0044	1769.	STO	RD2DOT,1	
45	30	3112	20	0	4020	1770.	CLA	SIXTH	-2
45	31	3113	26	1	0504	1771.	MPR	RD3DOT,1	-4
46	30	3114	26	0	0357	1772.	MPR	TB0	5
46	31	3115	54	0	0001	1773.	LRS	1	TO 6
47	30	3116	22	1	0044	1774.	ADD	RD2DOT,1	+1/2 2DOT AT 6
47	31	3117	26	0	0357	1775.	MPR	TB0	15
40	32	3120	56	0	0001	1776.	ALS	1	TO 14
40	33	3121	10	0	0001	1777.	STO	TS1	

41	32	3122	20	1	0010	1778.	CLA	TS10,1	
41	33	3123	54	0	0001	1779.	LRS	1	TO 14
42	32	3124	32	0	0001	1780.	ADZ	TS1	
42	33	3125	26	0	0357	1781.	MPR	TB0	23
43	32	3126	22	1	0210	1782.	ADD	R,1	
43	33	3127	10	1	0014	1783.	STD	TS14,1	RF OR YF
44	32	3130	42	1	3073	1784.	TIX	Q5+8,1	
44	33	3131	10	0	0347	1785.	STD	RF	23
45	32	3132	10	0	0435	1786.	STD	R3	SAVE RF FOR ORBIT INSERT.
45	33	3133	24	0	0231	1787.	SUB	5J	-LUNAR RADIUS
46	32	3134	24	0	0232	1788.	SUB	16J	BURNOUT ALT ERROR
46	33	3135	10	0	0014	1789.	STD	TS14	
47	32	3136	14	0	0523	1790.	LDQ	5K20	
47	33	3137	20	0	0506	1791.	CLA	4K12	
40	34	3140	24	0	0067	1792.	SUB	AT	
40	35	3141	46	0	3144	1793.	TMI	*+3	IF AT GT 4K12
41	34	3142	20	0	0574	1794.	CLA	DEL2	
41	35	3143	46	0	3145	1795.	TMI	*+2	IF AT LE 4K12 AND DEL2=1
42	34	3144	14	0	0267	1796.	LDQ	5K18	
42	35	3145	12	0	0610	1797.	STD	RD3DTL	RD3DOT LOWER LIMIT
43	34	3146	20	0	0357	1798.	CLA	TB0	
43	35	3147	26	0	0357	1799.	MPR	TB0	
44	34	3150	26	0	0357	1800.	MPR	TB0	TB CUBED
44	35	3151	10	0	0001	1801.	STD	TS1	27
45	34	3152	50	1	0001	1802.	AXT	1,1	
45	35	3153	44	0	3154	1803.	GDLAW3 TOV	*+1	
46	34	3154	20	1	0014	1804.	CLA	TS14,1	BURNOUT ERROR
46	35	3155	06	0	5000	1805.	MPY	12B4	27
47	34	3156	52	0	0002	1806.	LLS	2	TO 25
47	35	3157	04	0	0001	1807.	*DVP	TS1	-2
40	36	3160	32	1	0504	1808.	*ADZ	RD3DOT,1	DESIRED ACCEL RATE
40	37	3161	10	0	0000	1809.	STD	TS0	TEST FOR OVERFLOW
41	36	3162	20	1	0014	1810.	CLA	TS14,1	
41	37	3163	72	0	3346	1811.	TSQ	OVFLT	
42	36	3164	10	1	0504	1812.	STD	RD3DOT,1	
42	37	3165	46	0	3172	1813.	TMI	*+5	
43	36	3166	24	1	0560	1814.	SUB	5K14,1	UPPER LIMIT TEST

43	37	3167	46	0	3174	1815.	TMI	*+5		
44	36	3170	20	1	0560	1816.	CLA	5K14,1	SET AT UPPER LIMIT	
44	37	3171	40	0	3567	1817.	TRA	LL3DOT+1		
45	36	3172	24	1	0610	1818.	SUB	RD3DTL,1	LOWER LIMIT TEST	
45	37	3173	46	0	3566	1819.	TMI	LL3DOT		
46	36	3174	42	1	3153	1820.	GDLAW4 TIX	GDLAW3,1		
46	37	3175	20	0	0636	1821.	CLA	2K1	48	
47	36	3176	06	0	5033	1822.	MPY	1B1	B49	
47	37	3177	04	0	0210	1823.	DVP	R	49-23=26	
50	20	3200	34	0	0143	1824.	SUZ	VHSQ	VH SQ	
50	21	3201	06	0	4010	1825.	MPY	1B4	B30	
51	20	3202	04	0	0210	1826.	DVP	R	-ORBITAL RAD ACCEL AT 7	
51	21	3203	32	0	0044	1827.	ADZ	RD2DOT		
52	20	3204	10	0	0044	1828.	STO	RD2DOT	CMD RAD ACCEL AT 7	
52	21	3205	72	0	6261	1829.	TSQ	EXEC		
						1830.				
						1831.	*			
						1832.	*	STEERING EQUATIONS.		
						1833.	*			
53	20	3206	20	0	0233	1833.	STEER CLA	21J		
53	21	3207	24	0	0337	1834.	SUB	H		
54	20	3210	46	0	3220	1835.	TMI	STEER1		
54	21	3211	20	0	0464	1836.	CLA	22J		
55	20	3212	24	0	0367	1837.	SUB	HDOT		
55	21	3213	46	0	3220	1838.	TMI	STEER1		
56	20	3214	20	0	7701	1839.	CLA	1B3 =1024B13	COMMAND X-AXIS VERT	
56	21	3215	10	0	0370	1840.	STO	VG		
57	20	3216	20	0	4030	1841.	CLA	PMAX	PSIP=1	
57	21	3217	40	0	3230	1842.	TRA	*+9		
50	22	3220	50	1	0001	1843.	STEER1 AXT	1,1		
50	23	3221	44	0	3222	1844.	TOV	*+1		
51	22	3222	20	1	0044	1845.	CLA	RD2DOT,1	PSIP AND PS1Y COMPS	
51	23	3223	14	0	4007	1846.	LDQ	ZERO		
52	22	3224	04	0	0067	1847.	*DVP	AT	PSIP OR Y AT ZERO	
52	23	3225	10	0	0000	1848.	STO	TSO	TEST FOR OVERFLOW	
53	22	3226	20	1	0044	1849.	CLA	RD2DOT,1	SIGN IF OVERFLOW	
53	23	3227	72	0	3346	1850.	TSQ	OVFLT		
54	22	3230	10	1	0010	1851.	STO	TS10,1	PSIP OR PS1Y AT 0	

54	23	3231	42	1	3221	1852.	TIX	STEER1+1,1	
55	22	3232	26	0	0010	1853.	MPR	TS10	
55	23	3233	60	0	0000	1854.	COM		
56	22	3234	22	0	4030	1855.	ADD	PMAX	
56	23	3235	10	0	0014	1856.	STO	TS14	1-(PSIP)SQ
57	22	3236	72	0	7123	1857.	TSQ	SQRTE	
57	23	3237	10	0	0015	1858.	STO	TS15	
50	24	3240	20	0	0011	1859.	CLA	TS11	
50	25	3241	62	0	0000	1860.	ABS		
51	24	3242	24	0	0015	1861.	SUB	TS15	
51	25	3243	46	0	3253	1862.	TMI	STEER3	
52	24	3244	20	0	0011	1863.	CLA	TS11	
52	25	3245	46	0	3250	1864.	TMI	*+3	
53	24	3246	20	0	0015	1865.	CLA	TS15	
53	25	3247	40	0	3252	1866.	TRA	*+3	
54	24	3250	20	0	0015	1867.	CLA	TS15	
54	25	3251	60	0	0000	1868.	COM		
55	24	3252	10	0	0011	1869.	STO	TS11	
55	25	3253	20	0	0011	1870.	STEER3 CLA	TS11	
56	24	3254	26	0	0011	1871.	MPR	TS11	
56	25	3255	60	0	0000	1872.	COM		
57	24	3256	32	0	0014	1873.	ADZ	TS14	
57	25	3257	72	0	7123	1874.	TSQ	SQRTE	
50	26	3260	10	0	0012	1875.	STO	TS12	
50	27	3261	40	0	3031	1876.	STEER4 TRA	XDV1	COMPUTE DELTA V IN LOCAL VERT.
51	26	3262	20	0	0010	1877.	CLA	TS10	
51	27	3263	26	1	0060	1878.	MPR	UIX,1	
52	26	3264	10	0	0001	1879.	STO	TS1	
52	27	3265	20	0	0450	1880.	CLA	28J1	
53	26	3266	46	0	3343	1881.	OUT1 TMI	OUT	IF 28J1 NEGATIVE
53	27	3267	20	0	0012	1882.	CLA	TS12	
54	26	3270	26	1	0034	1883.	MPR	VIX,1	
54	27	3271	32	0	0001	1884.	ADZ	TS1	
55	26	3272	10	0	0001	1885.	STO	TS1	
55	27	3273	20	0	0011	1886.	CLA	TS11	
56	26	3274	26	1	0040	1887.	MPR	WIX,1	
56	27	3275	32	0	0001	1888.	ADZ	TS1	

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57	26	3276	06	0	0370	1889.	MPY	VG	
57	27	3277	52	0	0001	1890.	LLS	1	TO 13
50	30	3300	10	1	0064	1891.	STD	VGX,1	VELOCITY YET TO BE GAINED
50	31	3301	42	1	3262	1892.	TIX	STEER4+1,1	
51	30	3302	50	1	0002	1893.	AXT	2,1	COMPUTE VELOCITY TO BE
51	31	3303	20	1	0470	1894.	CLA	VDX,1	GAINED COMPONENTS
52	30	3304	10	1	0474	1895.	STD	VSMGX,1	
52	31	3305	42	1	3303	1896.	TIX	*-2,1	
53	30	3306	50	1	0002	1897.	AXT	2,1	
53	31	3307	20	1	0064	1898.	CLA	VGX,1	
54	30	3310	06	1	0130	1899.	MPY	A11,1	
54	31	3311	52	0	0001	1900.	LLS	1	TO 13
55	30	3312	32	0	0474	1901.	ADZ	VSMGX	X-COMP OF TOTAL V TO BE GAINED
55	31	3313	10	0	0474	1902.	STD	VSMGX	
56	30	3314	20	1	0064	1903.	CLA	VGX,1	
56	31	3315	06	1	0140	1904.	MPY	A21,1	
57	30	3316	52	0	0001	1905.	LLS	1	TO 13
57	31	3317	32	0	0475	1906.	ADZ	VSMGY	
50	32	3320	10	0	0475	1907.	STD	VSMGY	Y-COMP OF TOTAL V TO BE GAINED
50	33	3321	20	1	0064	1908.	CLA	VGX,1	
51	32	3322	06	1	0134	1909.	MPY	A31,1	
51	33	3323	52	0	0001	1910.	LLS	1	TO 13
52	32	3324	32	0	0476	1911.	ADZ	VSMGZ	
52	33	3325	10	0	0476	1912.	STD	VSMGZ	Z-COMP OF TOTAL V TO BE GAINED
53	32	3326	20	0	0614	1913.	CLA	MU8	TEST IF ENG ON
53	33	3327	24	0	4006	1914.	SUB	1B17	
54	32	3330	46	0	3334	1915.	TMI	**4	- ENG OFF
54	33	3331	20	0	0370	1916.	CLA	VG	
55	32	3332	24	0	0466	1917.	SUB	5K26	
55	33	3333	46	0	3340	1918.	TMI	**5	
56	32	3334	20	1	0064	1919.	CLA	VGX,1	
56	33	3335	06	0	5033	1920.	MPY	1B1	B14
57	32	3336	04	0	0370	1921.	DVP	VG	RESULT AT B1
57	33	3337	10	1	0374	1922.	STD	A11BD,1	
50	34	3340	42	1	3307	1923.	TIX	Q7+5,1	
50	35	3341	72	0	6261	1924.	TSQ	EXEC	
51	34	3342	40	0	7472	1925.	IDLE	TRA	TEST

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51	35	3343	20	0	0012	1926.	OUT	CLA	TS12	
52	34	3344	60	0	0000	1927.		COM		
52	35	3345	40	0	3270	1928.		TRA	JUT1+2	
53	34	3346	44	0	3351	1929.	OVFLT	TOV	*+3	
53	35	3347	20	0	0000	1930.		CLA	TS0	
54	34	3350	40	0	6764	1931.		TRA	EXIT	EXIT WITH COMPUTED VALUE
54	35	3351	46	0	3354	1932.		TMI	*+3	
55	34	3352	20	0	4030	1933.		CLA	PMAX	POSITIVE LIMIT
55	35	3353	40	0	3355	1934.		TRA	*+2	
56	34	3354	20	0	4037	1935.		CLA	NMAX	
56	35	3355	40	0	6764	1936.		TRA	EXIT	
						1937.		*		
						1938.		*	DISPLAY ROUTINE SOFT PORTION.	
						1939.		*		
57	34	3356	44	0	3357	1940.	DSP1	TOV	*+1	CL. O.F.
57	35	3357	30	0	0567	1941.		CLZ	DSPF1	H, HDOT MODE.
50	36	3360	46	0	3362	1942.		TMI	*+2	-IS INITIALIZE.
50	37	3361	40	0	6274	1943.		TRA	DSPLY	TO COUNTER CHECK.(HARD)
51	36	3362	20	0	0337	1944.		CLA	H	
51	37	3363	10	0	0214	1945.		STO	POUT	
52	36	3364	20	0	0367	1946.		CLA	HDOT	
						1947.		*	Q REGISTER DOES NOT NEED TO BE ZERO	
						1948.		*	SINCE DVP K55 IS AT WORST A LEFT	
						1949.		*	SHIFT OF 2 AND THE ALT RATE REGISTER	
						1950.		*	IS ONLY 15 BITS LONG	
52	37	3365	04	0	0607	1951.		DVP	K55	
53	36	3366	40	0	6306	1952.		TRA	DSPLY1	
53	37	3367	20	0	0270	1953.	DSP2CP	CLA	VY0	OUT-OF-CSM PLANE VEL.
54	36	3370	54	0	0021	1954.		LRS	17	SET SIGN OF Q AND USE
54	37	3371	52	0	0021	1955.		LLS	17	UP TIME
55	36	3372	12	0	0010	1956.		STQ	TS10	SAVE SIGN
55	37	3373	62	0	0000	1957.		ABS		
56	36	3374	04	0	0271	1958.		*DVP	VY0FS	=FULL-SCALE VALUE(200 FPS)
56	37	3375	44	0	3377	1959.		TOV	*+2	
57	36	3376	40	0	3400	1960.		TRA	*+2	
57	37	3377	20	0	4030	1961.		CLA	PMAX	
60	20	3400	32	0	0010	1962.		ADZ	TS10	VY0 IN SIGN-MAGNITUDE

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60	21	3401	40	0	6345	1963.	TRA	DSPLY3-1	TO OUTPUT.(HARD)
						1964.	*		
						1965.	*	EXECUTIVE PART 2.	(BRANCH 50)
						1966.	*	START AT EXEC2	
						1967.	*		
61	20	3402	20	0	1117	1968.	EXEC7	CLA	IDRP
61	21	3403	24	0	0671	1969.		SUB	ID
62	20	3404	46	0	3525	1970.		TMI	EXECP2
62	21	3405	20	0	1012	1971.	EXEC2	CLA	BRI
63	20	3406	10	0	0063	1972.		STO	BRANCH
63	21	3407	30	0	0455	1973.		CLZ	DDF
64	20	3410	46	0	3472	1974.		TMI	NEWDD
64	21	3411	30	0	0571	1975.	EXECPM	CLZ	DEL31
65	20	3412	46	0	3402	1976.		TMI	EXEC7
65	21	3413	20	0	0400	1977.	EXECPM1	CLA	S0
66	20	3414	24	0	7520	1978.		SUB	3B3
66	21	3415	46	0	3466	1979.		TMI	EXECA
67	20	3416	24	0	7701	1980.		SUB	1B3
67	21	3417	46	0	3552	1981.		TMI	EXEC6
60	22	3420	24	0	7701	1982.		SUB	1B3
60	23	3421	46	0	1167	1983.		TMI	TMIE1
61	22	3422	24	0	7701	1984.		SUB	1B3
61	23	3423	46	0	3466	1985.		TMI	EXECA
62	22	3424	22	0	5427	1986.		*ADD	7B3
62	23	3425	46	0	3445	1987.		TMI	INCMU7
63	22	3426	20	0	0604	1988.	CAL	CLA	DEL21
63	23	3427	46	0	3431	1989.		TMI	*+2
64	22	3430	72	0	4772	1990.		TSQ	EADICS
64	23	3431	72	0	4451	1991.		TSQ	ATTERR
65	22	3432	50	1	0002	1992.		AXT	2,1
65	23	3433	20	0	0632	1993.		CLA	1K33
66	22	3434	06	1	0070	1994.		MPY	EX,1
66	23	3435	52	0	0014	1995.		LLS	12
67	22	3436	32	1	0510	1996.		ADZ	DAXREM,1
67	23	3437	10	1	0510	1997.		STO	DAXREM,1
60	24	3440	20	0	0633	1998.		CLA	1K34
60	25	3441	26	1	0070	1999.		MPR	EX,1

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61	24	3442	32	1	0544	2000.	ADZ	1K1,1	
61	25	3443	10	1	0544	2001.	STO	1K1,1	GYRO BIAS AT -13
62	24	3444	42	1	3433	2002.	TIX	*-9,1	
62	25	3445	30	0	0647	2003.	INCMU7 CLZ	MU7	INCR. COUNTER
63	24	3446	22	0	4006	2004.	ADD	1B17	
63	25	3447	10	0	0647	2005.	STO	MU7	
64	24	3450	24	0	0613	2006.	SU3	1K37	ACCEL. CAL. DURATION
64	25	3451	62	0	0000	2007.	ABS		
65	24	3452	60	0	0000	2008.	COM		
65	25	3453	46	0	3462	2009.	TMI	*+7	+ IS TIME FOR ACCEL CAL
66	24	3454	50	1	0002	2010.	AXT	2,1	
66	25	3455	30	1	0644	2011.	CLZ	SDVX,1	
67	24	3456	26	0	0635	2012.	MPR	1K36	
67	25	3457	32	1	0540	2013.	ADZ	1K19,1	
60	26	3460	10	1	0540	2014.	STO	1K19,1	NEW BIAS CORRECTION
60	27	3461	42	1	3455	2015.	TIX	*-4,1	
61	26	3462	20	0	0647	2016.	CLA	MU7	
61	27	3463	24	0	0617	2017.	SUB	1K30	
62	26	3464	46	0	3466	2018.	TMI	EXECA	
62	27	3465	30	0	0400	2019.	CLZ	SO	CAL COMPLETE, SET ATT HOLD
63	26	3466	30	0	0530	2020.	EXECA CLZ	DAXA	ZERO ALIGNMENT INCREMENTS
63	27	3467	30	0	0531	2021.	CLZ	DAYA	
64	26	3470	30	0	0532	2022.	CLZ	DAZA	
64	27	3471	40	0	1167	2023.	TRA	TMIE1	RESET TM
65	26	3472	20	0	4065	2024.	NEWDD CLA	STDCOM	EQU TO STORE
65	27	3473	22	0	0333	2025.	ADD	ADST	DEDA ADDRESS.
66	26	3474	10	0	0721	2026.	STO	VRSH+1	SET UP STORE INSTRUCTION
66	27	3475	20	0	0326	2027.	CLA	DD	DEDA DATA.
67	26	3476	72	0	0720	2028.	TSQ	VRSH	STORE DATA
67	27	3477	20	0	1012	2029.	CLA	BRI	PROTECT BRANCH FROM DEDA
60	30	3500	10	0	0063	2030.	STO	BRANCH	
60	31	3501	20	0	1132	2031.	CLA	DLWNLC	PROTECT DLWNL
61	30	3502	10	0	0672	2032.	STO	DLWNL	FROM DEDA ENTRY
61	31	3503	20	0	0333	2033.	CLA	ADST	
62	30	3504	24	0	4013	2034.	SUB	1B9	SO ADDRESS
62	31	3505	46	0	3411	2035.	TMI	EXECM	
63	30	3506	24	0	4006	2036.	SUB	1B17	

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63	31	3507	46	0	3532	2037.	TMI	EXEC3	NEW WD IS S0
64	30	3510	24	0	4041	2038.	SUB	10B17	
64	31	3511	46	0	3411	2039.	TMI	EXECCM	NEW WD BTWN SOPS13
65	30	3512	24	0	4006	2040.	SUB	1B17	
65	31	3513	46	0	6154	2041.	TMI	LUNAZ	NEW WD IS S13
65	30	3514	24	0	4006	2042.	SUB	1B17	
66	31	3515	46	0	3517	2043.	TMI	*+2	NEW WD IS S14
67	30	3516	40	0	3411	2044.	TRA	EXECCM	
67	31	3517	20	0	0414	2045.	CLA	S14	NEW WD IS S14.
60	32	3520	24	0	4065	2046.	SUB	2B3	
60	33	3521	10	0	0563	2047.	STO	DEL32	ENABLE DL IF S14=1
61	32	3522	46	0	3527	2048.	TMI	EXECCM2+2	
61	33	3523	60	0	0000	2049.	COM		
62	32	3524	46	0	3413	2050.	TMI	EXECCM1	- S14=3
62	33	3525	20	0	1011	2051.	EXECCM2 CLA	IC1BR	SET IC1 BRANCH
63	32	3526	10	0	0063	2052.	STO	BRANCH	
63	33	3527	20	0	1116	2053.	CLA	IDAI	AGS INITIALIZE ID
64	32	3530	10	0	0671	2054.	STO	ID	
64	33	3531	40	0	3413	2055.	TRA	EXECCM1	
65	32	3532	20	0	0400	2056.	EXECC3 CLA	S0	
65	33	3533	22	0	7701	2057.	*ADD	1B3	NEG IF S0=7
66	32	3534	46	0	3544	2058.	TMI	MABEE	
66	33	3535	24	0	5427	2059.	SUB	7B3	
67	32	3536	46	0	3466	2060.	TMI	EXECA	
67	33	3537	20	0	0604	2061.	CLA	DEL21	CALIBRATE I.C.
60	34	3540	46	0	3544	2062.	TMI	MABEE	
60	35	3541	20	0	7520	2063.	CLA	3B3	IMU ALINE FOR 2SECS.
61	34	3542	10	0	0400	2064.	STO	S0	
61	35	3543	12	0	0407	2065.	STO	DEL6	
62	34	3544	50	1	0006	2066.	MABEE AXT	6,1	
62	35	3545	30	1	0644	2067.	CLZ	SDVX,1	ZERO MUT AND DV SJMS
63	34	3546	20	1	0130	2068.	CLA	A11,1	
63	35	3547	10	1	0160	2069.	STO	A11D,1	
64	34	3550	42	1	3545	2070.	TIX	*-3,1	
64	35	3551	40	0	3466	2071.	TRA	EXECA	
65	34	3552	30	0	0407	2072.	EXECC6 CLZ	DEL6	IMU ALINE.
65	35	3553	46	0	3555	2073.	TMI	*+2	-IS CALIBRATE.

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66	34	3554	40	0	3556	2074.	TRA	*+2	
66	35	3555	20	0	5000	2075.	CLA	6B3	
67	34	3556	10	0	0400	2076.	STO	S0	
67	35	3557	40	0	1167	2077.	TRA	TMIE1	RESET TM
60	36	3560	20	0	0140	2078.	FDAIL CLA	A21	
60	37	3561	26	0	0127	2079.	MPR	COGA	
61	36	3562	10	0	0001	2080.	STO	TS1	
61	37	3563	20	0	0142	2081.	CLA	A23	
62	36	3564	26	0	0123	2082.	MPR	SIGA	
62	37	3565	40	0	4674	2083.	TRA	EX17+6	
63	36	3566	20	1	0610	2084.	LL3DOT CLA	RD3DTL,1	
63	37	3567	10	1	0504	2085.	STO	RD3DOT,1	
64	36	3570	40	0	3174	2086.	TRA	GDRAW4	
64	37	3571	10	0	0442	2087.	NORTON STO	TI	
65	36	3572	12	0	0046	2088.	STQ	TSEX	SUBR TO GO TO EXEC,
65	37	3573	72	0	6261	2089.	TSQ	EXEC	
66	36	3574	72	0	6535	2090.	TSQ	ELPRD	ELPR AND COMPT
66	37	3575	72	0	6261	2091.	TSQ	EXEC	LENGTH OF VECTOR
67	36	3576	50	1	0002	2092.	AXT	2,1	RIX
67	37	3577	20	1	0220	2093.	CLA	RIX,1	
70	20	3600	10	1	0014	2094.	STO	TS14,1	
70	21	3601	42	1	3577	2095.	TIX	*-2,1	
71	20	3602	72	0	6422	2096.	TSQ	NORMV	
71	21	3603	50	1	0002	2097.	AXT	2,1	
72	20	3604	20	0	0013	2098.	CLA	TS13	LENGTH OF RI
72	21	3605	40	0	0046	2099.	TRA	TSEFX	
73	20	3606	30	0	0320	2100.	RRT CLZ	READP	TEST FOR EXIT
73	21	3607	10	0	0325	2101.	STO	RMF	FROM HOLD
74	20	3610	46	0	7202	2102.	TMI	ADOUT	TO READ OUT
74	21	3611	40	0	1307	2103.	TRA	DEXIT	EXIT
75	20	3612	20	0	0410	2104.	EX33P CLA	S10	
75	21	3613	24	0	7520	2105.	SUB	3B3	
76	20	3614	46	0	3640	2106.	TMI	CSICDH	
76	21	3615	20	0	0304	2107.	CLA	3K4	
77	20	3616	24	0	0033	2108.	SUB	C2	
77	21	3617	46	0	5552	2109.	TMI	EX33+1	
70	22	3620	30	0	0147	2110.	CLZ	DEL10	

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70	23	3621	46	0	3630	2111.		TMI	EX33PP	
71	22	3622	20	0	0526	2112.	EX35	CLA	2K11	
71	23	3623	10	0	0371	2113.		STO	VF	
72	22	3624	30	0	0172	2114.		CLZ	Q1	
72	23	3625	24	0	0231	2115.		SUB	5J	
73	22	3626	10	0	0402	2116.		STO	Q1DEDA	
73	23	3627	40	0	3302	2117.		TRA	Q7	GO TO STEERING
74	22	3630	30	0	0306	2118.	EX33PP	CLZ	4J	
						2119.	*			RESTORE SAVED QUANTITIES FOR T/B COMPUTATIONS
						2120.	*			IN HARD MEMORY
74	23	3631	30	0	0050	2121.		CLZ	V6X	
75	22	3632	10	0	0012	2122.		STO	TS12	
75	23	3633	30	0	0051	2123.		CLZ	V6Y	
76	22	3634	10	0	0013	2124.		STO	TS13	
76	23	3635	30	0	0052	2125.		CLZ	V6Z	
77	22	3636	10	0	0014	2126.		STO	TS14	
77	23	3637	40	0	6067	2127.		TRA	EX36+1	
70	24	3640	72	0	6261	2128.	CSICDH	TSO	EXEC	
70	25	3641	20	0	0203	2129.		CLA	RT	
71	24	3642	24	0	0347	2130.		SUB	RF	
71	25	3643	10	0	0402	2131.		STO	DELH	
72	24	3644	10	0	0314	2132.		STO	DELRP	LITTLE DELTA R AT 23
72	25	3645	30	0	0423	2133.		CLZ	RFDOT	
73	24	3646	50	1	0002	2134.		AXT	2,1	
73	25	3647	20	1	0430	2135.		CLA	VIX,1	
74	24	3650	26	1	0030	2136.		MPR	U2X,1	
74	25	3651	56	0	0001	2137.		ALS	1	
75	24	3652	32	0	0423	2138.		ADZ	RFDOT	
75	25	3653	10	0	0423	2139.		STO	RFDOT	RFDOT = U2 DOT VT B13
76	24	3654	42	1	3647	2140.		TIX	*-5,1	
76	25	3655	20	0	0410	2141.		CLA	S10	
77	24	3656	22	0	5000	2142.		*ADD	5B3	
77	25	3657	46	0	3773	2143.		TMI	COH	S10 = 2
70	26	3660	20	0	0416	2144.	CSI	CLA	S16	
70	27	3661	06	0	4022	2145.		MPY	3PID4	A=3/4(PI)(S16) AT B6
71	26	3662	10	0	0001	2146.		STO	TS1	
71	27	3663	04	0	0173	2147.		DVP	AE	

72	26	3664	26	0	0402	2148.	MPR	DELH	
72	27	3665	10	0	0002	2149.	STO	TS2	A(DELH/AE) B6
73	26	3666	20	0	0001	2150.	CLA	TS1	
73	27	3667	26	0	5033	2151.	MPR	1B1	
74	26	3670	10	0	0005	2152.	STO	TS5	A AT B7
74	27	3671	20	0	0275	2153.	CLA	1J	
75	26	3672	24	0	0373	2154.	SUB	TIG	
75	27	3673	56	0	0003	2155.	ALS	3	
76	26	3674	26	0	0077	2156.	MPR	NE	NE(1J-TIG) AT B6
76	27	3675	22	0	0002	2157.	ADD	TS2	
77	26	3676	26	0	5000	2158.	MPR	6B3 =1.5B1	3/2(NE)(1J-TIG)+
						2159.			3/2(A)(DELH/AE)
							*		
77	27	3677	24	0	0005	2160.	SUB	TS5	
70	30	3700	22	0	0605	2161.	ADD	2J	
70	31	3701	10	0	0007	2162.	STO	TS7	B AT B7
71	30	3702	20	0	0477	2163.	CLA	RADOT	
71	31	3703	24	0	0423	2164.	SUB	RFDOT	
72	30	3704	06	0	4010	2165.	MPY	1B4	
72	31	3705	04	0	0463	2166.	DVP	V4A	4(RADOT-REDOT)/V4A B6
73	30	3706	24	0	0002	2167.	SUB	TS2	
73	31	3707	10	0	0010	2168.	STO	TS10	
74	30	3710	20	0	0303	2169.	CLA	THETA F	
74	31	3711	54	0	0003	2170.	LRS	3	
75	30	3712	22	0	0010	2171.	ADD	TS10	
75	31	3713	06	0	5033	2172.	MPY	1B1	ACC = C AT B7
76	30	3714	04	0	0007	2173.	DVP	TS7	C/B B0
76	31	3715	10	0	0011	2174.	STO	TS11	
77	30	3716	26	0	0173	2175.	MPR	AE	
77	31	3717	10	0	0402	2176.	STO	DELH	DELH B23
70	32	3720	20	0	0011	2177.	CLA	TS11	C/B = DELH/AE B0
70	33	3721	26	0	0001	2178.	MPR	TS1	A(DELH/AE) B6
71	32	3722	22	0	0002	2179.	ADD	TS2	
71	33	3723	10	0	0001	2180.	STO	TS1	
72	32	3724	20	0	0576	2181.	CLA	PI	
72	33	3725	26	0	0416	2182.	MPR	S16	
73	32	3726	24	0	0001	2183.	SUB	TS1	
73	33	3727	06	0	7701	2184.	MPY	1B3	TD B9

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74	32	3730	04	0	0077	2185.	DVP	NE	
74	33	3731	10	0	0372	2186.	STO	TAO	
75	32	3732	20	0	0477	2187.	CLA	RADOT	
75	33	3733	10	0	0423	2188.	STO	RFDOT	
76	32	3734	20	0	0314	2189.	CDH2	CLA	DELRP
76	33	3735	22	0	0402	2190.	ADD	DELH	LITTLE DELTA R
77	32	3736	26	0	4126	2191.	MPR	M1B1	-.580 = -1B1
77	33	3737	22	0	0173	2192.	ADD	AE	
70	34	3740	10	0	0177	2193.	CDH3	STO	AL
70	35	3741	20	0	0177	2194.	CLA	AL	CALCULATE 28J1
71	34	3742	24	0	0347	2195.	SUB	RF	
71	35	3743	22	0	0177	2196.	ADD	AL	
72	34	3744	06	0	0636	2197.	MPY	2K1	
72	35	3745	54	0	0001	2198.	LRS	1	
73	34	3746	04	0	0347	2199.	DVP	RF	
73	35	3747	14	0	4007	2200.	LDQ	ZERO	
74	34	3750	04	0	0177	2201.	DVP	AL	
74	35	3751	72	0	7123	2202.	TSQ	SORTE	
75	34	3752	24	0	0463	2203.	SUB	VHA	
75	35	3753	10	0	0450	2204.	STO	28J1	28J1 = VHF - VHA
76	34	3754	72	0	6261	2205.	TSQ	EXEC	
76	35	3755	20	0	0477	2206.	CLA	RADOT	
77	34	3756	24	0	0423	2207.	SUB	RFDOT	
77	35	3757	10	0	0452	2208.	STO	28J3	
70	36	3760	10	0	0005	2209.	STO	TS4+1	
70	37	3761	20	0	0410	2210.	CLA	S10	
71	36	3762	60	0	0000	2211.	COM		
71	37	3763	46	0	3025	2212.	TMI	XDV	
72	36	3764	20	0	0450	2213.	CLA	28J1	
72	37	3765	10	0	0004	2214.	STO	TS4	
73	36	3766	20	0	0270	2215.	CLA	VY0	
73	37	3767	10	0	0006	2216.	STO	TS4+2	
74	36	3770	72	0	6737	2217.	TSQ	DPVMAG	
74	37	3771	10	0	0370	2218.	STO	VS	
75	36	3772	40	0	6136	2219.	TRA	GDRAW	
75	37	3773	30	0	0372	2220.	CDH	CLZ	TAO
76	36	3774	22	0	0373	2221.	ADD	TIS	

76	37	3775	10 0 0373	2222.	STO	TIG	TIG = TIG + TAO
77	36	3776	40 0 3734	2223.	TRA	CDH2	
				2224.	*	SEE REAR OF LISTING FOR CHECKSUM	
				2225.	*	START OF HARDWIRED MEMORY	
				2226.	*	CONSTANTS	
				2227.	*		
77	37	3777			CHECKSUM		RANGE 1005-3776
			4000	2228.	JRG	4000	
00	40	4000	000007	2229.	7B17	DEC	7.B17
00	41	4001	000006	2230.	6B17	DEC	6.B17
01	40	4002	000005	2231.	5B17	DEC	5.B17
01	41	4003	000004	2232.	4B17	DEC	4.B17
02	40	4004	000003	2233.	3B17	DEC	3.B17
02	41	4005	000002	2234.	2B17	DEC	2.B17
03	40	4006	000001	2235.	1B17	DEC	1.B17
03	41	4007	000000	2236.	ZERO	DEC	0
			4065	2237.	2B3	EQU	1B2
			7512	2238.	5B3	EQU	10B4
			5000	2239.	6B3	EQU	12B4
04	40	4010	020000	2240.	1B4	DEC	1.B4
04	41	4011	010000	2241.	1B5	DEC	1.B5
05	40	4012	004000	2242.	1B6	DEC	1.B6
05	41	4013	000400	2243.	1B9	DEC	1.B9
06	40	4014	000100	2244.	1B11	DEC	1.B11
06	41	4015	000040	2245.	1B12	DEC	1.B12
07	40	4016	000020	2246.	1B13	DEC	1.B13
07	41	4017	000010	2247.	1B14	DEC	1.B14
			4017	2248.	8B17	EQU	1B14
00	42	4020	252525	2249.	SIXTH	OCT	252525
00	43	4021	311040	2250.	2PIB3	DEC	6.2831853B3
			4021	2251.	1K25	EQU	2PIB3
01	42	4022	113314	2252.	3PID4	DEC	2.3561945B3
01	43	4023	062210	2253.	PID2	DEC	1.57079633B3
02	42	4024	031104	2254.	PID4	DEC	.78539816B3
02	43	4025	774761	2255.	K173	DEC	-.18488E-3B-6
03	42	4026	042027	2256.	K172	DEC	.83119E-2B-4
03	43	4027	525261	2257.	K171	DEC	-.16665554B-2

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04	42	4030	377777	2258.	K170	DCT	377777	180
			4030	2259.	PMAX	EQU	K170	
04	43	4031	660111	2260.	K183	DEC	-.03899298-3	
05	42	4032	112712	2261.	K182	DEC	.14627668-1	
05	43	4033	726707	2262.	K181	DEC	-.321181981	
06	42	4034	077746	2263.	K180	DEC	.99921582	
06	43	4035	54 0 0000	2264.	SHDUM	LRS	0	
07	42	4036	400000	2265.	MS	DCT	400000	
07	43	4037	400001	2266.	NMAX	DCT	400001	
00	44	4040	000061	2267.	49B17	DEC	49.B17	
00	45	4041	000012	2268.	10B17	DEC	10.B17	
01	44	4042	303240	2269.	BCDL	DEC	100000.B17	
01	45	4043	40 0 4475	2270.	TRNSFR	TRA	EROUT	EXIT FROM ATT ERROR COMPS
02	44	4044	40 0 6246	2271.	BACK	TRA	RETURN	
02	45	4045	66 0 6100	2272.	TMOU	OUT	6100	
03	44	4046	20 0 4000	2273.	CLAFR	CLA	4000	
			7002	2274.	CLATEN	EQU	SIC02	CLA 0,1
			4036	2275.	TRACOM	EQU	MS	LOOKS LIKE TRA 0
			4065	2276.	STOCOM	EQU	182	LOOKS LIKE STO 0
			5033	2277.	DUMCLA	EQU	181	LOOKS LIKE CLA 0
				2278.	*			
				2279.	***		20 MILLISECOND COMPUTATIONS	
				2280.	*			
03	45	4047	70 0 4050	2281.	DELAY	DLY	*+1	
04	44	4050	64 0 2001	2282.		INP	2001	INPUT PGNS ANGLES
04	45	4051	10 0 0107	2283.		STO	THEP	
05	44	4052	64 0 2002	2284.		INP	2002	
05	45	4053	10 0 0117	2285.		STO	PHIP	
06	44	4054	64 0 2004	2286.		INP	2004	
06	45	4055	10 0 0113	2287.		STO	PSIP	
07	44	4056	64 0 6010	2288.		INP	6010	INPUT GYRO DATA
07	45	4057	10 0 0354	2289.		STO	DAX	
00	46	4060	64 0 6002	2290.		INP	6002	
00	47	4061	10 0 0355	2291.		STO	DAY	
01	46	4062	64 0 6004	2292.		INP	6004	
01	47	4063	10 0 0356	2293.		STO	DAZ	
02	46	4064	64 0 6020	2294.		INP	6020	INPUT ACCELEROMETER DATA

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02 47	4065	10 0 0000	2295.	1B2	STO	TS0	VALUE USED AS CONSTANT
03 46	4066	64 0 6040	2296.		INP	6040	
03 47	4067	10 0 0001	2297.		STO	TS1	
04 46	4070	64 0 6100	2298.		INP	6100	
04 47	4071	10 0 0002	2299.		STO	TS2	
05 46	4072	40 0 1015	2300.	EX1	TRA	EXIT1	
			2301.	*	PROCESS	ACCELEROMETER INPUTS	
05 47	4073	50 1 0002	2302.		AXT	2,1	
06 46	4074	30 1 0350	2303.	DVS	CLZ	DVX,1	SAVE PREVIOUS VALUE
06 47	4075	10 1 0074	2304.		STO	DVXM1,1	
07 46	4076	30 1 0000	2305.		CLZ	TS0,1	
07 47	4077	24 0 7507	2306.		SUB	1K7	11
00 50	4100	56 0 0001	2307.		ALS	1	
00 51	4101	26 1 0534	2308.		MPR	1K18,1	SCALE FACTOR
01 50	4102	56 0 0001	2309.		ALS	1	SCALE AT 1
01 51	4103	22 1 0540	2310.		ADD	1K19,1	BIAS COMPENSATION
02 50	4104	10 1 0350	2311.		STO	DVX,1	AT 1
02 51	4105	42 1 4074	2312.		TIX	DVS,1	
03 50	4106	40 0 1016	2313.		TRA	EXIT2	TO MODE CHECK.
			2314.	*	PROCESS	GYRO INPUTS	
03 51	4107	50 1 0002	2315.		AXT	2,1	
04 50	4110	44 0 4111	2316.		TOV	*+1	RESET
04 51	4111	30 1 0354	2317.	GYCOM	CLZ	DAX,1	
05 50	4112	24 0 7507	2318.		SUB	1K7	
05 51	4113	56 0 0001	2319.		ALS	1	RADIANS AT -6
06 50	4114	10 1 0354	2320.		STO	DAX,1	
06 51	4115	26 1 0550	2321.		MPR	1K3,1	SCALE FACTOR COMP
07 50	4116	22 1 0544	2322.		ADD	1K1,1	AT -13
07 51	4117	32 1 0510	2323.		ADD	DAXREM,1	
00 52	4120	10 1 0510	2324.		STO	DAXREM,1	
00 53	4121	22 0 4010	2325.		ADD	1B4	ROUND
01 52	4122	54 0 0016	2326.		LRS	14	TO +1
01 53	4123	56 0 0007	2327.		ALS	7	TO -6, QUANTIZED AT -16
02 52	4124	10 0 0006	2328.		STO	TS6	
02 53	4125	56 0 0007	2329.		ALS	7	SAVE REMAINDER
03 52	4126	60 0 0000	2330.	M1B1	COM		INSTRUCTION LOOKS LIKE -1B1
03 53	4127	32 1 0510	2331.		ADZ	DAXREM,1	

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04 52	4130	10 1 0510	2332.	STO	DAXREM,1	
04 53	4131	30 0 0006	2333.	CLZ	TS6	
05 52	4132	32 1 0354	2334.	ADZ	DAX,1	
05 53	4133	22 1 0530	2335.	ADD	DAXA,1	
06 52	4134	10 1 0354	2336.	STO	DAX,1	-6
06 53	4135	56 0 0003	2337.	*ALS	3	TO -9
07 52	4136	10 1 0010	2338.	STO	TS10,1	
07 53	4137	62 0 0000	2339.	*ABS		
00 54	4140	22 0 4012	2340.	*ADD	1B6	TEST FOR POSSIBLE OVERFL
00 55	4141	42 1 4111	2341.	TIX	GYCOM,1	
01 54	4142	40 0 1017	2342.	EX3 TRA	EXIT3	
01 55	4143	44 0 4405	2343.	TOV	HRC	
02 54	4144	30 0 0553	2344.	CLZ	HRC	
02 55	4145	46 0 4373	2345.	TMI	LRI	
			2346.	* COMPUTE	DIRECTION COSINE CHANGE	
03 54	4146	20 0 0010	2347.	CDCC CLA	TS10	DAX AT -6 OR -9
03 55	4147	06 0 0011	2348.	MPY	TS11	DAY
04 54	4150	54 0 0001	2349.	LRS	1	1/2DAX(DAY) AT -12 OR -18
04 55	4151	72 0 1002	2350.	TSQ	RND	
05 54	4152	22 0 0012	2351.	ADD	TS12	DAZ
05 55	4153	10 0 0001	2352.	STO	TS1	
06 54	4154	20 0 0010	2353.	CLA	TS10	
06 55	4155	06 0 0012	2354.	MPY	TS12	
07 54	4156	54 0 0001	2355.	LRS	1	1/2DAX(DAZ) AT -12 OR -18
07 55	4157	72 0 1002	2356.	TSQ	RND	
00 56	4160	34 0 0146	2357.	SUZ	E13	
00 57	4161	10 0 0007	2358.	STO	TS7	
01 56	4162	24 0 0011	2359.	SUB	TS11	
01 57	4163	10 0 0002	2360.	STO	TS2	
02 56	4164	20 0 0011	2361.	CLA	TS11	
02 57	4165	26 0 0011	2362.	MPR	TS11	
03 56	4166	54 0 0001	2363.	LRS	1	
03 57	4167	10 0 0133	2364.	STO	TS8	
04 56	4170	20 0 0012	2365.	CLA	TS12	
04 57	4171	26 0 0012	2366.	MPR	TS12	
05 56	4172	54 0 0001	2367.	LRS	1	1/2DAZ(DAZ) AT -12 OR -18
05 57	4173	22 0 0133	2368.	ADD	TS8	

06	56	4174	72	0	1002	2369.	TSQ	RND	
06	57	4175	60	0	0000	2370.	COM		
07	56	4176	32	0	0144	2371.	ADZ	E1	NORMALITY CONSTRAINT
07	57	4177	10	0	0003	2372.	STD	TS3	
10	40	4200	30	0	0007	2373.	CLZ	TS7	
10	41	4201	22	0	0011	2374.	ADD	TS11	
11	40	4202	10	0	0004	2375.	STD	TS4	
11	41	4203	20	0	0011	2376.	CLA	TS11	
12	40	4204	06	0	0012	2377.	MPY	TS12	
12	41	4205	54	0	0001	2378.	LRS	1	1/2DAY(DAZ) AT -12 OR -18
13	40	4206	72	0	1002	2379.	TSQ	RND	
13	41	4207	24	0	0010	2380.	SUB	TS10	
14	40	4210	10	0	0005	2381.	STD	TS5	
14	41	4211	20	0	0010	2382.	CLA	TS10	
15	40	4212	26	0	0010	2383.	MPR	TS10	
15	41	4213	54	0	0001	2384.	LRS	1	1/2DAX(DAX) AT -12 OR -18
16	40	4214	32	0	0133	2385.	ADZ	TS8	
16	41	4215	72	0	1002	2386.	TSQ	RND	
17	40	4216	60	0	0000	2387.	COM		
17	41	4217	32	0	0145	2388.	ADZ	E3	
10	42	4220	10	0	0006	2389.	STD	TS6	
10	43	4221	40	0	1020	2390.	EX4 TRA	EXIT4	
11	42	4222	50	1	0002	2391.	AXT	2,1	COMPUTE EQUATIONS
11	43	4223	20	0	0001	2392.	DICDS CLA	TS1	
12	42	4224	26	1	0140	2393.	MPR	A21,1	1
12	43	4225	32	1	0150	2394.	ADZ	DA11,1	
13	42	4226	10	1	0150	2395.	STD	DA11,1	-5 OR -8
13	43	4227	20	0	0002	2396.	CLA	TS2	
14	42	4230	26	1	0134	2397.	MPR	A31,1	
14	43	4231	32	1	0150	2398.	ADZ	DA11,1	
15	42	4232	10	1	0150	2399.	STD	DA11,1	-5 OR -8
15	43	4233	20	0	0003	2400.	CLA	TS3	
16	42	4234	26	1	0130	2401.	MPR	A11,1	
16	43	4235	32	1	0150	2402.	ADZ	DA11,1	
17	42	4236	10	1	0150	2403.	STD	DA11,1	-5 OR -8
17	43	4237	20	0	0004	2404.	CLA	TS4	ROW 3
10	44	4240	26	1	0130	2405.	MPR	A11,1	

10	45	4241	32	1	0154	2406.	ADZ	DA31,1	
11	44	4242	10	1	0154	2407.	STO	DA31,1	
11	45	4243	20	0	0005	2408.	CLA	TS5	
12	44	4244	26	1	0140	2409.	MPR	A21,1	
12	45	4245	32	1	0154	2410.	ADZ	DA31,1	
13	44	4246	10	1	0154	2411.	STO	DA31,1	
13	45	4247	20	0	0006	2412.	CLA	TS6	
14	44	4250	26	1	0134	2413.	MPR	A31,1	
14	45	4251	32	1	0154	2414.	ADZ	DA31,1	
15	44	4252	10	1	0154	2415.	STO	DA31,1	
15	45	4253	42	1	4223	2416.	TIX	DIC05,1	
					2417.		*	INTEGRATE DIRECTION COSINES	
16	44	4254	50	1	0006	2418.	AXT	6,1	
16	45	4255	20	0	0553	2419.	INTAS	CLA	HRF
17	44	4256	46	0	4431	2420.	TMI	HRINT	-5 OR -8 TEST
17	45	4257	20	1	0150	2421.	CLA	DA11,1	
10	46	4260	22	0	4013	2422.	RND1	ADD	ROUND
10	47	4261	54	0	0011	2423.	SHFT1	LRS	TO 1
11	46	4262	10	0	0001	2424.	STO	TS1	
11	47	4263	56	0	0011	2425.	ALS	9	
12	46	4264	60	0	0000	2426.	COM		
12	47	4265	32	1	0150	2427.	ADZ	DA11,1	
13	46	4266	10	1	0150	2428.	STO	DA11,1	SAVE REMAINDER.
13	47	4267	30	1	0130	2429.	CLZ	A11,1	
14	46	4270	32	0	0001	2430.	ADZ	TS1	
14	47	4271	10	1	0130	2431.	STO	A11,1	
15	46	4272	42	1	4255	2432.	TIX	INTAS,1	
15	47	4273	72	0	1021	2433.	TSQ	EXIT5	DOWNLINK INPUT
16	46	4274	72	0	1022	2434.	TSQ	EXIT6	TELEMETRY OUTPUT
					2435.		*	COMPUTE ROW 2	
16	47	4275	20	0	0131	2436.	COA21	CLA	A12
17	46	4276	26	0	0136	2437.	MPR	A33	2
17	47	4277	10	0	0001	2438.	STO	TS1	
10	50	4300	20	0	0132	2439.	CLA	A13	
10	51	4301	26	0	0135	2440.	MPR	A32	
11	50	4302	34	0	0001	2441.	SUZ	TS1	
11	51	4303	56	0	0001	2442.	ALS	1	TO 1

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12	50	4304	10	0	0140	2443.	STO	A21	A21
12	51	4305	20	0	0132	2444.	CLA	A13	
13	50	4306	26	0	0134	2445.	MPR	A31	
13	51	4307	10	0	0001	2446.	STO	TS1	
14	50	4310	20	0	0130	2447.	CLA	A11	
14	51	4311	26	0	0136	2448.	MPR	A33	
15	50	4312	34	0	0001	2449.	SUZ	TS1	
15	51	4313	56	0	0001	2450.	ALS	1	
16	50	4314	10	0	0141	2451.	STO	A22	A22
16	51	4315	20	0	0130	2452.	CLA	A11	
17	50	4316	26	0	0135	2453.	MPR	A32	
17	51	4317	10	0	0001	2454.	STO	TS1	
10	52	4320	20	0	0131	2455.	CLA	A12	
10	53	4321	26	0	0134	2456.	MPR	A31	
11	52	4322	34	0	0001	2457.	SUZ	TS1	
11	53	4323	56	0	0001	2458.	ALS	1	
12	52	4324	10	0	0142	2459.	STO	A23	A23,DIR COS UPDATE COMPLETE
12	53	4325	40	0	1024	2460.	EX8 TRA	EXIT8	
						2461.	* DVINT	VELOCITY RESOLUTION	
13	52	4326	50	1	0002	2462.	AXT	2,1	RESOLVE BODY DVS TO
13	53	4327	20	1	0130	2463.	CLA	A11,1	INERTIAL FRAME AND
14	52	4330	26	0	0350	2464.	MPR	DVX	ACCUMULATE.
14	53	4331	10	0	0001	2465.	STO	TS1	2
15	52	4332	20	1	0140	2466.	CLA	A21,1	
15	53	4333	26	0	0351	2467.	MPR	DVY	
16	52	4334	32	0	0001	2468.	ADZ	TS1	
16	53	4335	10	0	0001	2469.	STO	TS1	
17	52	4336	20	1	0134	2470.	CLA	A31,1	
17	53	4337	26	0	0352	2471.	MPR	DVZ	
10	54	4340	32	0	0001	2472.	ADZ	TS1	2
10	55	4341	22	0	4016	2473.	ADD	1B13	ROUND
11	54	4342	54	0	0005	2474.	LRS	5	
11	55	4343	32	1	0120	2475.	ADZ	DVSX,1	
12	54	4344	10	1	0120	2476.	STO	DVSX,1	7
12	55	4345	42	1	4327	2477.	TIX	DVINT+1,1	
13	54	4346	72	0	1021	2478.	TSQ	EXIT5	DOWNLINK INPUT
13	55	4347	72	0	1022	2479.	TSQ	EXIT6	TELEMETRY OUTPUT

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14 54	4350	30 0	0573	2480.	*			
14 54	4350	30 0	0573	2481.		CLZ	FLAG1	
14 55	4351	46 0	0063	2482.		TMI	BRANCH	- IS GUID/NAV CYCLE.
15 54	4352	20 0	4036	2483.		CLA	MS	
15 55	4353	10 0	0573	2484.		STO	FLAG1	
16 54	4354	40 0	1025	2485.	EX9	TRA	EXIT9	
				2486.	*			
				2487.	*			
				2488.	*			
				2489.	*			
16 55	4355	64 0	2020	2490.		INP	DISC11	INPUT DISCRETE WD 1
17 54	4356	10 0	0401	2491.		STO	DISC1C	
17 55	4357	22 0	4006	2492.		ADD	1B17	OBTAIN TWOS COMP OF INPUT WD
10 56	4360	60 0	0000	2493.		COM		
10 57	4361	10 0	0533	2494.		STO	DISC1	
11 56	4362	20 0	0574	2495.		CLA	DEL2	TEST FOR STAGING
11 57	4363	46 0	1026	2496.		TMI	EXIT10	- IS STAGED.
12 56	4364	20 0	0401	2497.		CLA	DISC1C	TEST FOR ASCENT ENG ON
12 57	4365	56 0	0006	2498.		*ALS	6	
13 56	4366	46 0	1026	2499.		TMI	EXIT10	- IS OFF.
13 57	4367	30 0	0604	2500.		CLZ	DEL21	RESET LUNAR SURFACE FLAG
14 56	4370	20 0	4036	2501.		CLA	MS	
14 57	4371	10 0	0574	2502.		STO	DEL2	SET STAGED FLAG
15 56	4372	40 0	1027	2503.		TRA	EXIT11	
				2504.	*			
				2505.	*			
15 57	4373	50 1	0006	2506.	LRI	AXT	6,1	
16 56	4374	30 1	0150	2507.		CLZ	DA11,1	REMAINDERS
16 57	4375	56 0	0003	2508.		ALS	3	TO -8
17 56	4376	10 1	0150	2509.		STO	DA11,1	
17 57	4377	42 1	4374	2510.		TIX	*-3,1	
20 40	4400	20 0	4260	2511.		CLA	RND1	
20 41	4401	10 0	1003	2512.		STO	RND+1	
21 40	4402	20 0	4261	2513.		CLA	S4FT1	
21 41	4403	10 0	1004	2514.		STO	RND+2	
22 40	4404	40 0	4146	2515.		TRA	CDCC	
				2516.	*			

22	41	4405	20	0	0553	2517.	HRC	CLA	HRF	
23	40	4406	46	0	4421	2518.		TMI	HRC1	
23	41	4407	20	0	4432	2519.		CLA	RND2	SET UP FOR HIGH RATE
24	40	4410	10	0	1003	2520.		STO	RND+1	
24	41	4411	20	0	4433	2521.		CLA	SHFT2	
25	40	4412	10	0	1004	2522.		STO	RND+2	
25	41	4413	10	0	0553	2523.		STO	HRC	
26	40	4414	50	1	0006	2524.		AXT	6,1	
26	41	4415	30	1	0150	2525.		CLZ	DA11,1	
27	40	4416	54	0	0003	2526.		LRS	3	TO -5
27	41	4417	10	1	0150	2527.		STO	DA11,1	
20	42	4420	42	1	4415	2528.		TIX	*-3,1	
20	43	4421	50	1	0002	2529.	HRC1	AXT	2,1	
21	42	4422	20	1	0354	2530.		CLA	DAX,1	
21	43	4423	10	1	0010	2531.		STO	TS10,1	AT -6
22	42	4424	30	1	0144	2532.		CLZ	E1,1	
22	43	4425	54	0	0003	2533.		LRS	3	TO -6
23	42	4426	10	1	0144	2534.		STO	E1,1	
23	43	4427	42	1	4422	2535.		TIX	*-5,1	
24	42	4430	40	0	4146	2536.		TRA	CDCC	
						2537.	*			
24	43	4431	20	1	0150	2538.	HRINT	CLA	DA11,1	
25	42	4432	22	0	4015	2539.	RND2	ADD	1B12	ROUND
25	43	4433	54	0	0006	2540.	SHFT2	LRS	6	TO 1
26	42	4434	10	0	0001	2541.		STO	TS1	
26	43	4435	56	0	0006	2542.		ALS	6	
27	42	4436	40	0	4264	2543.		TRA	INTAS+7	
						2544.	*			
						2545.	*			
27	43	4437	20	0	0575	2546.	AHE	CLA	DEL5	ATTITUDE HOLD.(40 MS)
20	44	4440	46	0	4450	2547.		TMI	A4E1	ATTITUDE HOLD ENTRY
20	45	4441	20	0	4036	2548.		CLA	MS	IF MINUS - DRIVE TO REF COSINES
21	44	4442	10	0	0575	2549.		STO	DEL5	FIRST CYCLE IN
21	45	4443	50	1	0006	2550.		AXT	6,1	ATTITUDE HOLD
22	44	4444	20	1	0130	2551.		CLA	A11,1	SET DESIRED ATTITUDE
22	45	4445	10	1	0160	2552.		STO	A110,1	
23	44	4446	42	1	4444	2553.		TIX	*-2,1	

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23	45	4447	72	0	1030	2554.		TSQ	EXIT12	TO ACQUISITION RESET.
24	44	4450	14	0	4043	2555.	AHE1	LDO	TRNSFR	TRA EROUT INTO 0
24	45	4451	12	0	0023	2556.	ATTERR	STQ	SREX	ENTER HERE FROM CALIBRATE
25	44	4452	50	1	0002	2557.		AXT	2,1	COMPUTE EX
25	45	4453	20	1	0164	2558.		CLA	A31D,1	
26	44	4454	26	1	0140	2559.		MPR	A21,1	1+1=+2
26	45	4455	60	0	0000	2560.		COM		
27	44	4456	32	0	0070	2561.		ADZ	EX	
27	45	4457	10	0	0070	2562.		STQ	EX	+2
20	46	4460	42	1	4453	2563.		TIX	*-5,1	
20	47	4461	50	1	0002	2564.	EYEZ	AXT	2,1	COMPUTE EY AND EZ
21	46	4462	20	1	0160	2565.		CLA	A11D,1	
21	47	4463	26	1	0140	2566.		MPR	A21,1	1+1=+2
22	46	4464	32	0	0072	2567.		ADZ	EZ	
22	47	4465	10	0	0072	2568.		STQ	EZ	
23	46	4466	20	1	0160	2569.		CLA	A11D,1	
23	47	4467	26	1	0134	2570.		MPR	A31,1	1+1=+2
24	46	4470	60	0	0000	2571.		COM		
24	47	4471	32	0	0071	2572.		ADZ	EY	
25	46	4472	10	0	0071	2573.		STQ	EY	
25	47	4473	42	1	4462	2574.		TIX	*-9,1	
26	46	4474	40	0	0023	2575.		TRA	SREX	
						2576.	*			
						2577.	*			
26	47	4475	40	0	1031	2578.	EROUT	TRA	EXIT13	
27	46	4476	50	1	0002	2579.		AXT	2,1	
27	47	4477	30	1	0070	2580.		CLZ	FX,1	
20	50	4500	14	0	4036	2581.		LDO	MS	
20	51	4501	46	0	4503	2582.		TMI	*+2	
21	50	4502	40	0	4504	2583.		TRA	*+2	
21	51	4503	12	1	0070	2584.		STQ	EX,1	
22	50	4504	62	0	0000	2585.		ABS		
22	51	4505	24	0	0666	2586.		SUB	4K21	+2
23	50	4506	46	0	4511	2587.		TMI	*+3	LESS THAN MAX
23	51	4507	20	0	4030	2588.		CLA	PMAX	SET MAX OUTPUT
24	50	4510	40	0	4513	2589.		TRA	*+3	
24	51	4511	22	0	0666	2590.		ADD	4K21	

25 50	4512	04 0	0666	2591.	DVP	4K21	SCALE FACTOR
25 51	4513	32 1	0070	2592.	ADZ	EX,1	
26 50	4514	10 1	0070	2593.	STD	EX,1	
26 51	4515	42 1	4477	2594.	TIX	EROUT+2,1	
27 50	4516	66 0	6001	2595.	OUT	EX0	AT 0
27 51	4517	20 0	0071	2596.	CLA	EY	
20 52	4520	66 0	6002	2597.	OUT	EY0	AT 0
20 53	4521	20 0	0072	2598.	CLA	EZ	
21 52	4522	66 0	6004	2599.	OUT	EZ0	AT 0
21 53	4523	40 0	1032	2600.	TRA	EXIT14	
				2601.			
				2602.	*		
				2603.	* RENDEZVOUS STEERING		
22 52	4524	30 0	0575	2603.	RST CLZ	DEL5	CLEAR ATT HLD 1ST CYCLE FLAG
22 53	4525	50 1	0002	2604.	AXT	2,1	
23 52	4526	20 1	0374	2605.	CLA	A118D,1	
23 53	4527	10 1	0160	2606.	STD	A11D,1	
24 52	4530	42 1	4526	2607.	TIX	*-2,1	
24 53	4531	20 0	4043	2608.	CLA	TRNSFR	TRA ERDUT INTO SREX
25 52	4532	10 0	0023	2609.	STD	SREX	
25 53	4533	40 0	4461	2610.	TRA	EYEZ	
				2611.	*		
				2612.	* LUNAR ALIGN COMPS		
26 52	4534	20 0	0134	2613.	LUNAL CLA	A31	
26 53	4535	26 0	0134	2614.	MPR	A31	
27 52	4536	60 0	0000	2615.	COM		
27 53	4537	22 0	4065	2616.	ADD	1B2	
20 54	4540	72 0	7123	2617.	TSQ	SQRT	
20 55	4541	10 0	0001	2618.	STD	TS1	
21 54	4542	20 0	0047	2619.	CLA	SIDELL	COMPUTE COS DEL A
21 55	4543	26 0	0547	2620.	MPR	DDEL	
22 54	4544	22 0	0053	2621.	ADD	CODELL	
22 55	4545	06 0	0001	2622.	MPY	TS1	A32D AT 2
23 54	4546	52 0	0001	2623.	LLS	1	
23 55	4547	26 0	0141	2624.	MPR	A22	
24 54	4550	10 0	0002	2625.	STD	TS2	
24 55	4551	20 0	0053	2626.	CLA	CODELL	COMPUTE SIN DEL A
25 54	4552	26 0	0547	2627.	MPR	DDEL	

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25	55	4553	60	0	0000	2628.	COM		
26	54	4554	22	0	0047	2629.	ADD	SIDELL	
26	55	4555	06	0	0001	2630.	MPY	TS1	A33D AT 2
27	54	4556	52	0	0001	2631.	LLS	1	
27	55	4557	26	0	0142	2632.	MPR	A23	
20	56	4560	32	0	0002	2633.	AD7	TS2	
20	57	4561	10	0	0002	2634.	STO	TS2	
21	56	4562	20	0	0134	2635.	CLA	A31	
21	57	4563	26	0	0140	2636.	MPR	A21	
22	56	4564	32	0	0002	2637.	ADZ	TS2	
22	57	4565	14	0	4007	2638.	LDQ	ZERO	
23	56	4566	04	0	0626	2639.	DVP	1K26	
23	57	4567	10	0	0530	2640.	STO	DAXA	-6
24	56	4570	20	0	0134	2641.	CLA	A31	
24	57	4571	14	0	4007	2642.	LDQ	ZERO	
25	56	4572	04	0	0630	2643.	DVP	1K28	1-7=-6
25	57	4573	10	0	0001	2644.	STO	TS1	
26	56	4574	20	0	0352	2645.	CLA	DVZ	
26	57	4575	22	0	0076	2646.	ADD	DVZM1	
27	56	4576	06	0	0627	2647.	MPY	1K27	1-4=-3
27	57	4577	52	0	0003	2648.	LLS	3	TO -6
30	40	4600	34	0	0001	2649.	SUZ	TS1	
30	41	4601	10	0	0531	2650.	STO	DAYA	
31	40	4602	20	0	0351	2651.	CLA	DVY	
31	41	4603	22	0	0075	2652.	ADD	DVYM1	
32	40	4604	06	0	0627	2653.	MPY	1K27	1-4=-3
32	41	4605	52	0	0003	2654.	LLS	3	TO -6
33	40	4606	10	0	0001	2655.	STO	TS1	
33	41	4607	20	0	0140	2656.	CLA	A21	
34	40	4610	14	0	4007	2657.	LDQ	ZERO	
34	41	4611	04	0	0630	2658.	DVP	1K28	
35	40	4612	34	0	0001	2659.	SUZ	TS1	
35	41	4613	10	0	0532	2660.	STO	DAZA	
36	40	4614	50	1	0002	2661.	AXT	2,1	
36	41	4615	20	1	0530	2662.	CLA	DAXA,1	
37	40	4616	62	0	0000	2663.	ABS		
37	41	4617	54	0	0002	2664.	LRS	2	TO -4

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30	42	4620	32	0	0002	2665.	ADZ	TS2	
30	43	4621	10	0	0002	2666.	STO	TS2	
31	42	4622	42	1	4615	2667.	TIX	*-5,1	
31	43	4623	24	0	0631	2668.	SUB	1K29	TEST FOR LUNAR ALIGN COMPLETE
32	42	4624	10	0	0606	2669.	STO	DEL42	DEL42 NEG IS LUNAL COMPLETE
32	43	4625	40	0	1033	2670.	TRA	EXIT15	
						2671.			
						2672.	*		
						2673.	* FDAI	COMPUTATIONS	
33	42	4626	20	0	0135	2673.	FDAI	CLA	TOTAL ATTITUDE
33	43	4627	60	0	0000	2674.	CLA	A32	-A32
34	42	4630	72	0	4724	2675.	COM		LIMIT ROUTINE
34	43	4631	66	0	2004	2676.	TSQ	FDAIL	SIN BETA AT 0
35	42	4632	20	0	0136	2677.	DUT	SIBEO	
35	43	4633	26	0	0136	2678.	CLA	A33	
36	42	4634	10	0	0001	2679.	MPR	A33	
36	43	4635	20	0	0134	2680.	STO	TS1	
37	42	4636	26	0	0134	2681.	CLA	A31	
37	43	4637	32	0	0001	2682.	MPR	A31	
30	44	4640	72	0	7123	2683.	ADZ	TS1	
30	45	4641	10	0	0002	2684.	TSQ	SQRTE	
31	44	4642	72	0	4724	2685.	STO	TS2	COS BETA
31	45	4643	66	0	2010	2686.	TSQ	FDAIL	
32	44	4644	40	0	1034	2687.	DUT	COBEO	
32	45	4645	20	0	0002	2688.	EX16 TRA	EXIT16	
33	44	4646	24	0	0625	2689.	CLA	TS2	
33	45	4647	46	0	1035	2690.	SUB	1K24	
34	44	4650	14	0	4007	2691.	TMI	EXIT17	USE OLD VALUE OF SIGA AND COGA
34	45	4651	20	0	0134	2692.	LDQ	ZERO	
35	44	4652	54	0	0001	2693.	CLA	A31	
35	45	4653	04	0	0002	2694.	LRS	1	
36	44	4654	10	0	0123	2695.	DVP	TS2	
36	45	4655	72	0	4724	2696.	STO	SIGA	
37	44	4656	66	0	2020	2697.	TSQ	FDAIL	
37	45	4657	14	0	4007	2698.	DUT	SIGAO	
30	46	4660	20	0	0136	2699.	LDQ	ZERO	
30	47	4661	54	0	0001	2700.	CLA	A33	
31	46	4662	04	0	0002	2701.	LRS	1	
							DVP	TS2	

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31	47	4663	10	0	0127	2702.	STO	COGA		
32	46	4664	72	0	4724	2703.	TSQ	FDAIL		
32	47	4665	66	0	2040	2704.	OUT	COGAD		
33	46	4666	40	0	1035	2705.	EX17	TRA	EXIT17	
						2706.	*		THE NEXT 5 CELLS ARE BYPASSED AND	
						2707.	*		RE-WRITTEN IN SOFT MEMORY	
33	47	4667	20	0	0142	2708.	CLA	A23	GAMMA OUTPUT	
34	46	4670	26	0	0123	2709.	MPR	SIGA		
34	47	4671	10	0	0001	2710.	STO	TS1		
35	46	4672	20	0	0140	2711.	CLA	A21		
35	47	4673	26	0	0127	2712.	MPR	COGA		
36	46	4674	34	0	0001	2713.	SUZ	TS1		
36	47	4675	56	0	0001	2714.	ALS	1		
37	46	4676	72	0	4724	2715.	TSQ	FDAIL		
37	47	4677	66	0	2001	2716.	OUT	SIALD		
30	50	4700	20	0	0132	2717.	CLA	A13		
30	51	4701	26	0	0123	2718.	MPR	SIGA		
31	50	4702	10	0	0001	2719.	STO	TS1		
31	51	4703	20	0	0130	2720.	CLA	A11		
32	50	4704	26	0	0127	2721.	MPR	COGA		
32	51	4705	34	0	0001	2722.	SUZ	TS1		
33	50	4706	56	0	0001	2723.	ALS	1		
33	51	4707	72	0	4724	2724.	TSQ	FDAIL		
34	50	4710	66	0	2002	2725.	OUT	COALD		
						2726.	*			
						2727.	*	DEDA DISCRETE SAMPLING		
						2728.	*			
34	51	4711	64	0	2040	2729.	INP	DISC2I		
35	50	4712	22	0	4006	2730.	ADD	1B17		
35	51	4713	60	0	0000	2731.	COM			
36	50	4714	56	0	0001	2732.	*ALS	1	IS TAPE LOAD REQUESTED	
36	51	4715	46	0	6214	2733.	TMI	GSEFR	IF MINUS - TRANSFER TO GSE SERV	
37	50	4716	56	0	0003	2734.	*ALS	3		
37	51	4717	50	1	0003	2735.	AXT	3,1		
30	52	4720	46	0	4741	2736.	TMI	SPULSE		
30	53	4721	56	0	0001	2737.	*ALS	1		
31	52	4722	42	1	4720	2738.	TIX	*-2,1		

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31 57 4763 50 1 0001 2776.
 32 56 4764 20 0 4065 2777.
 32 57 4765 34 1 0144 2778.
 33 56 4766 56 0 0012 2779.
 33 57 4767 10 1 0144 2780.
 34 56 4770 42 1 4764 2781.
 34 57 4771 40 0 1037 2782.
 2783.
 2784.
 35 56 4772 12 0 0022 2785.
 35 57 4773 20 0 0107 2786.
 36 56 4774 26 0 4021 2787.
 36 57 4775 72 0 6767 2788.
 37 56 4776 30 0 0001 2789.
 37 57 4777 10 0 0005 2790.
 40 40 5000 30 0 0000 2791.
 40 41 5001 10 0 0006 2792.
 41 40 5002 20 0 0113 2793.
 41 41 5003 26 0 4021 2794.
 42 40 5004 72 0 6767 2795.
 42 41 5005 30 0 0001 2796.
 43 40 5006 10 0 0161 2797.
 43 41 5007 30 0 0000 2798.
 44 40 5010 10 0 0007 2799.
 44 41 5011 20 0 0117 2800.
 45 40 5012 26 0 4021 2801.
 45 41 5013 72 0 6767 2802.
 46 40 5014 20 0 0007 2803.
 46 41 5015 26 0 0006 2804.
 47 40 5016 56 0 0001 2805.
 47 41 5017 10 0 0160 2806.
 40 42 5020 20 0 0007 2807.
 40 43 5021 26 0 0005 2808.
 41 42 5022 56 0 0001 2809.
 41 43 5023 60 0 0000 2810.
 42 42 5024 10 0 0162 2811.
 42 43 5025 20 0 0001 2812.

AXT 1,1
 CLA 1B2
 SUZ E1,1
 ALS 10
 STD F1,1
 TIX *-4,1
 TRA EXIT19

1-E
TO -9

*
* EULER ANGLE DIRECTION COSINES SUBROUTINE

EADICS STQ SREX1
 CLA THEP
 MPR 2PIB3
 TSQ SICOE
 CLZ TS1
 STD TS5
 12B4 CLZ TS0
 STD TS6
 CLA PSIP
 MPR 2PIB3
 TSQ SICOE
 CLZ TS1
 STD A12D
 CLZ TS0
 STD TS7
 CLA PHIP
 MPR 2PIB3
 TSQ SICOE
 CLA TS7
 MPR TS6
 ALS 1
 STD A11D
 CLA TS7
 MPR TS5
 ALS 1
 COM
 STD A13D
 CLA TS1

RADIANS AT 3

VALUE USED AS CONSTANT

1

INPUTS COMPLETE

1

1

43	42	5026	26	0	0161	2813.	MPR	A12D		
43	43	5027	56	0	0001	2814.	ALS	1		
44	42	5030	10	0	0003	2815.	STO	TS3		
44	43	5031	26	0	0006	2816.	MPR	TS6		
45	42	5032	10	0	0004	2817.	STO	TS4		
45	43	5033	20	0	0000	2818.	1B1	CLA	TS0	COSINE PHI
46	42	5034	26	0	0005	2819.	MPR	TS5		
46	43	5035	32	0	0004	2820.	ADZ	TS4		
47	42	5036	56	0	0001	2821.	ALS	1		
47	43	5037	10	0	0164	2822.	STO	A31D	1	
40	44	5040	30	0	0001	2823.	CLZ	TS1		
40	45	5041	36	0	0007	2824.	MPZ	TS7		
41	44	5042	56	0	0001	2825.	ALS	1		
41	45	5043	60	0	0000	2826.	COM			
42	44	5044	10	0	0165	2827.	STO	A32D	1	
42	45	5045	30	0	0003	2828.	CLZ	TS3		
43	44	5046	36	0	0005	2829.	MPZ	TS5		
43	45	5047	10	0	0004	2830.	STO	TS4		
44	44	5050	30	0	0000	2831.	CLZ	TS0		
44	45	5051	36	0	0006	2832.	MPZ	TS6		
45	44	5052	34	0	0004	2833.	SUZ	TS4		
45	45	5053	56	0	0001	2834.	ALS	1		
46	44	5054	10	0	0166	2835.	STO	A33D	DI-COS COMPLETE	
46	45	5055	40	0	0022	2836.	TRA	SREX1	EXIT	
						2837.	*			
						2838.	*			
						2839.	ZNOC	IMU ALIGN COMPUTATIONS		
47	44	5056	30	0	0144	2839.	CLZ	E1		
47	45	5057	30	0	0145	2840.	CLZ	E3		
40	46	5060	30	0	0146	2841.	CLZ	E13		
40	47	5061	72	0	4772	2842.	IMUDC	TSQ	EADICS	
41	46	5062	50	1	0006	2843.	AXT	6,1		
41	47	5063	20	1	0160	2844.	CLA	A110,1	REPLACE DIR COSINES	
42	46	5064	10	1	0130	2845.	STO	A11,1	WITH IMU DIR COSINES.	
42	47	5065	30	1	0150	2846.	CLZ	DA11,1	ZERO REMAINDERS	
43	46	5066	42	1	5063	2847.	TIX	*-3,1		
43	47	5067	40	0	4273	2848.	TRA	COA21-2		
						2849.	*			

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				2850.	*		INITIALIZE BRANCHES.	
				2851.	*			
44	46	5070	30 0 0414	2852.	IC1	CLZ	S14	
44	47	5071	24 0 4065	2853.		SUB	2B3	
45	46	5072	46 0 1040	2854.		TMI	EXIT20	TO DL FORMATTING
45	47	5073	50 1 0002	2855.		AXT	2,1	LEM POS AND VEL DATA
46	46	5074	30 1 0240	2856.		CLZ	1J1,1	LEM POS
46	47	5075	10 1 0204	2857.		STD	ROX,1	
47	46	5076	30 1 0260	2858.		CLZ	1J4,1	LEM VEL
47	47	5077	10 1 0424	2859.		STD	VOX,1	
40	50	5100	42 1 5074	2860.		TIX	*-4,1	
40	51	5101	30 0 0254	2861.		CLZ	1J7	EPOCH TIME MS
41	50	5102	10 0 0521	2862.		STD	TL1	
41	51	5103	30 0 0255	2863.		CLZ	1J7LS	EPOCH TIME LS
42	50	5104	10 0 0525	2864.		STD	TL2	
42	51	5105	72 0 6444	2865.		TSQ	DRBPM	
43	50	5106	30 0 0543	2866.		CLZ	DSPSC	CLEAR DISPLAY COUNTER
43	51	5107	72 0 1041	2867.		TSQ	EXIT21	
				2868.	*			
44	50	5110	50 1 0001	2869.	IC2	AXT	1,1	
44	51	5111	72 0 6746	2870.		TSQ	DPTS8	COMPUTE DBL PREC TA - TL
45	50	5112	20 0 0604	2871.		CLA	DEL21	
45	51	5113	46 0 5124	2872.		TMI	RVCOMP	
46	50	5114	72 0 6535	2873.		TSQ	ELPRD	TRNSFR TO ELLIPSE PRED
46	51	5115	50 1 0002	2874.		AXT	2,1	
47	50	5116	30 1 0220	2875.		CLZ	RIX,1	
47	51	5117	10 1 0340	2876.		STD	RX,1	
40	52	5120	30 1 0430	2877.		CLZ	VIX,1	
40	53	5121	10 1 0360	2878.		STD	VX,1	
41	52	5122	42 1 5116	2879.		TIX	*-4,1	
41	53	5123	40 0 5134	2880.		TRA	*+9	
42	52	5124	50 1 0002	2881.	RVCOMP	AXT	2,1	
42	53	5125	30 1 0424	2882.		CLZ	VOX,1	
43	52	5126	10 1 0360	2883.		STD	VX,1	
43	53	5127	06 0 0442	2884.		MPY	TI	13+13=26
44	52	5130	52 0 0003	2885.		LLS	3	
44	53	5131	32 1 0204	2886.		ADZ	ROX,1	

45	52	5132	10	1	0340	2887.	STD	RX,1	AT 23
45	53	5133	42	1	5125	2888.	TIX	*-6,1	
46	52	5134	72	0	6261	2889.	TSQ	EXEC	IC3 NEXT
					2890.		*		
46	53	5135	72	0	5400	2891.	IC3 TSQ	GRAV	TO GRAVITY
47	52	5136	50	1	0002	2892.	AXT	2,1	
47	53	5137	30	1	0120	2893.	CLZ	DVSX,1	
40	54	5140	30	1	0104	2894.	CLZ	DRX,1	
40	55	5141	20	1	0114	2895.	CLA	GXDT,1	
41	54	5142	10	1	0110	2896.	STD	DIGX,1	
41	55	5143	42	1	5137	2897.	TIX	*-4,1	
42	54	5144	40	0	1042	2898.	TRA	EXIT22	
					2899.		*		
					2900.		*		
									CSM DL OR DEDA INPUTS TO EPOCH CELLS.
42	55	5145	50	1	0002	2901.	CSMPV AXT	2,1	
43	54	5146	30	1	0244	2902.	CLZ	2J1,1	CSM POS
43	55	5147	10	1	0200	2903.	STD	REX,1	
44	54	5150	30	1	0264	2904.	CLZ	2J4,1	CSM VEL
44	55	5151	10	1	0420	2905.	STD	VEX,1	
45	54	5152	42	1	5146	2906.	TIX	*-4,1	
45	55	5153	30	0	0272	2907.	CLZ	2J7	CSM EPOCH MS
46	54	5154	10	0	0520	2908.	STD	TE1	
46	55	5155	30	0	0273	2909.	CLZ	2J7LS	CSM EPOCH LS
47	54	5156	10	0	0524	2910.	STD	TF2	
47	55	5157	30	0	0436	2911.	CLZ	TB	
40	56	5160	40	0	6764	2912.	TRA	EXIT	
					2913.		*		
					2914.		*		
					2915.		*		
									NEXT 5 INSTRUCTIONS BYPASSED
40	57	5161	20	0	0604	2916.	NAV CLA	DEL21	
41	56	5162	46	0	5175	2917.	TMI	NAV1	-IS ON LUNAR SURFACE.
41	57	5163	20	0	0464	2918.	CLA	0464	
42	56	5164	24	0	0470	2919.	SUB	VDX	
42	57	5165	56	0	0006	2920.	ALS	6	
					2921.		*		
					2922.		*		
					2923.		*		
									HARDWIRED NAVIGATION

43	56	5166	10	0	0067	2924.	STD	AT	1/2(VD1-VD) AT 7	
43	57	5167	24	0	0661	2925.	SUB	4K35	ULLAGE THRESHOLD.	
44	56	5170	46	0	5203	2926.	TMI	NAV2-2	AT-4K35	
44	57	5171	30	0	0614	2927.	CLZ	MU8	INCR ULLAGE COUNTER.	
45	56	5172	22	0	4006	2928.	ADD	1B17		
45	57	5173	10	0	0614	2929.	STD	MU8		
46	56	5174	40	0	1050	2930.	TRA	EXIT24		
46	57	5175	30	0	0110	2931.	NAV1	CLZ	DIGX	LUNAR SURFACE NAV.
47	56	5176	30	0	0111	2932.		CLZ	DIGY	
47	57	5177	30	0	0112	2933.		CLZ	DIGZ	
50	40	5200	20	0	0616	2934.		CLA	1K9	ULLAGE COUNT LIMIT
50	41	5201	10	0	0614	2935.		STD	MU8	
51	40	5202	40	0	1044	2936.		TRA	EXIT23	
51	41	5203	30	0	0614	2937.		CLZ	MU8	RESET ULLAGE COUNTER.
52	40	5204	40	0	1050	2938.		TRA	EXIT24	
52	41	5205	30	0	0001	2939.	NAV2	CLZ	TS1	ACCEL DRIFT TEST.
53	40	5206	50	1	0002	2940.		AXT	2,1	
53	41	5207	20	1	0120	2941.		CLA	DVSX,1	
54	40	5210	62	0	0000	2942.		ABS		
54	41	5211	32	0	0001	2943.		ADZ	TS1	
55	40	5212	10	0	0001	2944.		STD	TS1	
55	41	5213	42	1	5207	2945.		TIX	*-4,1	
56	40	5214	24	0	0634	2946.		SUB	1K35	
56	41	5215	46	0	1051	2947.		TMI	EXIT25	COAST PHASE
57	40	5216	40	0	1056	2948.		TRA	EXIT26	
57	41	5217	30	0	0120	2949.	NAV3	CLZ	DVSX	
50	42	5220	30	0	0121	2950.		CLZ	DVSY	
50	43	5221	30	0	0122	2951.		CLZ	DVSZ	
51	42	5222	40	0	1056	2952.		TRA	EXIT26	
51	43	5223	50	1	0002	2953.	NAV4	AXT	2,1	VEL AND POS UPDATE.
52	42	5224	30	1	0120	2954.		CLZ	DVSX,1	SENSED VEL AT 7
52	43	5225	32	1	0110	2955.		ADZ	DIGX,1	PREDICTED INTG GRAVITY.
53	42	5226	10	1	0110	2956.		STD	DIGX,1	7
53	43	5227	22	0	4015	2957.		ADD	1B12	ROUND
54	42	5230	54	0	0006	2958.		LRS	6	
54	43	5231	10	0	0002	2959.		STD	TS2	DV AT 13
55	42	5232	22	1	0360	2960.		ADD	VX,1	

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55	43	5233	10	0	0001	2961.	STO	TS1	NEW V AT 13
56	42	5234	26	0	0675	2962.	MPR	KJT	DT/2 AT 1.
56	43	5235	10	0	0004	2963.	STO	TS4	
57	42	5236	30	1	0360	2964.	CLZ	VX,1	V(N-1)
57	43	5237	26	0	0675	2965.	MPR	KDT	
50	44	5240	32	0	0004	2966.	ADZ	TS4	
50	45	5241	32	1	0104	2967.	ADZ	DRX,1	
51	44	5242	10	1	0104	2968.	STO	DRX,1	14
51	45	5243	22	0	4013	2969.	ADD	1B9	ROUND
52	44	5244	54	0	0011	2970.	LRS	9	
52	45	5245	10	0	0003	2971.	STO	TS3	DR AT 23
53	44	5246	32	1	0340	2972.	ADZ	RX,1	
53	45	5247	10	1	0340	2973.	STO	RX,1	NEW R AT 23
54	44	5250	30	0	0002	2974.	CLZ	TS2	DV AT 13
54	45	5251	56	0	0006	2975.	ALS	6	
55	44	5252	60	0	0000	2976.	COM		
55	45	5253	32	1	0110	2977.	ADZ	DIGX,1	
56	44	5254	10	1	0110	2978.	STO	DIGX,1	VEL REMAINDER AT 7
56	45	5255	30	0	0003	2979.	CLZ	TS3	DR AT 23
57	44	5256	56	0	0011	2980.	ALS	9	
57	45	5257	60	0	0000	2981.	COM		
50	46	5260	32	1	0104	2982.	ADZ	DRX,1	
50	47	5261	10	1	0104	2983.	STO	DRX,1	POS REMAINDER AT 14
51	46	5262	30	0	0001	2984.	CLZ	TS1	
51	47	5263	10	1	0360	2985.	STO	VX,1	NEW V AT 13
52	46	5264	42	1	5224	2986.	TIX	VAV4+1,1	
52	47	5265	72	0	5400	2987.	TSQ	GRAV	TO GRAVITY COMP.
53	46	5266	40	0	1060	2988.	EX28 TRA	EXIT28	
53	47	5267	20	0	0660	2989.	CLA	4K34	LIMIT AT.
54	46	5270	24	0	0067	2990.	SUB	AT	
54	47	5271	46	0	5274	2991.	TMI	*+3	
55	46	5272	20	0	0660	2992.	CLA	4K34	
55	47	5273	10	0	0067	2993.	STO	AT	
56	46	5274	20	0	4036	2994.	CLA	MS	SET IC DISPLAY.
56	47	5275	10	0	0567	2995.	STO	DSPF1	
57	46	5276	72	0	6254	2996.	TSQ	TIMEA	TO TA UPDATE
						2997.	*		

				2998.	*		CSM ORBIT PARAMETERS	
				2999.	*			
57	47	5277	20 0	0414	3000.	ORBPAR	CLA	S14
50	50	5300	24 0	7520	3001.		SUB	3B3
50	51	5301	46 0	5305	3002.		TMI	*+4
51	50	5302	30 0	0414	3003.		CLZ	S14
51	51	5303	72 0	5145	3004.		TSQ	CSMPV
52	50	5304	40 0	1065	3005.	EX29	TRA	EXIT29
52	51	5305	50 1	0002	3006.		AXT	2,1
53	50	5306	20 1	0200	3007.		CLA	REX,1
53	51	5307	10 1	0004	3008.		STD	TS4,1
54	50	5310	10 1	0204	3009.		STD	ROX,1
54	51	5311	20 1	0420	3010.		CLA	VEX,1
55	50	5312	10 1	0010	3011.		STD	TS10,1
55	51	5313	10 1	0424	3012.		STD	VOX,1
56	50	5314	42 1	5306	3013.		TIX	*-6,1
56	51	5315	72 0	6373	3014.		TSQ	CRSPRD
57	50	5316	72 0	6422	3015.		TSQ	NORMV
57	51	5317	50 1	0002	3016.		AXT	2,1
50	52	5320	30 1	0010	3017.		CLZ	TS10,1
50	53	5321	10 1	0054	3018.		STD	WCX,1
51	52	5322	42 1	5320	3019.		TIX	*-2,1
51	53	5323	72 0	6444	3020.		TSQ	ORBPM
52	52	5324	20 0	4021	3021.		CLA	2PIB3
52	53	5325	14 0	4007	3022.		LDQ	ZERO
53	52	5326	54 0	0001	3023.		LRS	1
53	53	5327	04 0	0077	3024.		DVP	NI
54	52	5330	10 0	0445	3025.		STD	TCSM
54	53	5331	40 0	1067	3026.	EX30	TRA	EXIT30
55	52	5332	20 0	0436	3027.		CLA	TB
55	53	5333	24 0	0445	3028.		SUB	TCSM
56	52	5334	46 0	5355	3029.		TMI	BR2EX
56	53	5335	20 0	0445	3030.		CLA	TCSM
57	52	5336	14 0	4007	3031.		LDQ	ZERO
57	53	5337	54 0	0005	3032.		LRS	5
50	54	5340	12 0	0001	3033.		STD	TS1
50	55	5341	32 0	0520	3034.		ADZ	TE1

COMPUTE CSM ORB PARAMS FROM EPJ

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TD +18

51	54	5342	10	0	0520	3035.	STO	TE1	
51	55	5343	30	0	0001	3036.	CLZ	TS1	
52	54	5344	32	0	0524	3037.	ADZ	TE2	
52	55	5345	10	0	0524	3038.	STO	TE2	
53	54	5346	46	0	5350	3039.	TMI	**2	OVERFLOW
53	55	5347	40	0	5355	3040.	TRA	BR2EX	
54	54	5350	24	0	4036	3041.	SUB	MS	
54	55	5351	10	0	0524	3042.	STO	TE2	
55	54	5352	30	0	0520	3043.	CLZ	TE1	
55	55	5353	22	0	4006	3044.	ADD	1B17	
56	54	5354	10	0	0520	3045.	STO	TE1	
56	55	5355	72	0	6261	3046.	BR2EX	TSQ	EXEC
						3047.	*		
						3048.	*		CSM PRESENT POS AND VEL.
						3049.	*		
57	54	5356	50	1	0000	3050.	AXT	0,1	
57	55	5357	72	0	6746	3051.	TSQ	DPTSB	COMPUTE DBL PREC TA-TE
50	56	5360	10	0	0436	3052.	STO	TB	+13
50	57	5361	72	0	6535	3053.	TSQ	ELPRD	TRANSFER TO ELLIPSE PRED
51	56	5362	50	1	0002	3054.	AXT	2,1	
51	57	5363	30	1	0220	3055.	CLZ	RIX,1	
52	56	5364	10	1	0344	3056.	STO	RCX,1	23
52	57	5365	30	1	0430	3057.	CLZ	VIX,1	
53	56	5366	10	1	0364	3058.	STO	VCX,1	13
53	57	5367	42	1	5363	3059.	TIX	*-4,1	
54	56	5370	72	0	6261	3060.	TSQ	EXEC	
						3061.	*		
54	57	5371	50	1	0002	3062.	AXT	2,1	
55	56	5372	20	1	0360	3063.	CLA	VX,1	COMPUTE MAGNITUDE OF VEL VECTOR
55	57	5373	10	1	0004	3064.	STO	TS4,1	
56	56	5374	42	1	5372	3065.	TIX	*-2,1	
56	57	5375	72	0	6737	3066.	TSQ	DPVMAG	
57	56	5376	10	0	0433	3067.	STO	V	13
57	57	5377	40	0	1070	3068.	TRA	EXIT31	
						3069.	*		
						3070.	*		GRAVITY AND H, HDOT COMPUTATIONS.
						3071.	*		

60	40	5400	12	0	0020	3072.	GRAV	STO	SREX3	
60	41	5401	50	1	0002	3073.		AXT	2,1	
61	40	5402	20	1	0340	3074.		CLA	RX,1	
61	41	5403	10	1	0014	3075.		STO	TS14,1	
62	40	5404	42	1	5402	3076.		TIX	*-2,1	
62	41	5405	72	0	6422	3077.		TSQ	NORMV	COMPUTE U1 AND R.
63	40	5406	30	0	0013	3078.		CLZ	TS13	
63	41	5407	10	0	0210	3079.		STO	R	23
64	40	5410	24	0	0231	3080.		SUB	5J	MEAN LUNAR RADIUS
64	41	5411	10	0	0337	3081.		STO	4	ALTITUDE AT 23
65	40	5412	40	0	1057	3082.	EX27	TRA	EXIT27	
65	41	5413	20	0	0674	3083.		CLA	2K4	
66	40	5414	14	0	4007	3084.		LDQ	ZERO	
66	41	5415	54	0	0003	3085.		LRS	3	52
67	40	5416	04	0	0017	3086.		DVP	TS17	R SQ AT 46
67	41	5417	10	0	0007	3087.		STO	TS7	-GRAV VECT MAG AT 6
60	42	5420	50	1	0002	3088.		AXT	2,1	
60	43	5421	30	1	0114	3089.	GRAV1	CLZ	GXDT,1	
61	42	5422	10	0	0000	3090.		STO	TS0	G(N-1)DT
61	43	5423	30	1	0010	3091.		CLZ	TS10,1	UNIT VECTOR FR NORMV
62	42	5424	10	1	0060	3092.		STO	UIX,1	1
62	43	5425	26	0	0007	3093.		MPR	TS7	-MU DT/(R SQ) AT 6
63	42	5426	10	1	0114	3094.		STO	GXDT,1	7
63	43	5427	34	0	0000	3095.	7B3	SUZ	TS0	G(N-1)DT
64	42	5430	54	0	0001	3096.		LRS	1	
64	43	5431	22	1	0114	3097.		ADD	GXDT,1	PREDICTED INTG GRAV IN A
65	42	5432	32	1	0110	3098.		ADZ	DIGX,1	VEL REMAINDER
65	43	5433	10	1	0110	3099.		STO	DIGX,1	INTG GRAV+VEL REM AT
66	42	5434	20	1	0360	3100.		CLA	VX,1	13
66	43	5435	26	1	0060	3101.		MPR	UIX,1	FORM V DOT U1.
67	42	5436	32	0	0013	3102.		ADZ	TS13	
67	43	5437	10	0	0013	3103.		STO	TS13	
60	44	5440	42	1	5421	3104.		TIX	GRAV1,1	
60	45	5441	56	0	0001	3105.		ALS	1	
61	44	5442	10	0	0367	3106.		STO	HDDT	ALT RATE AT 13.
61	45	5443	40	0	0020	3107.		TRA	SREX3	
						3108.	*			

				3109.	*	LEM ORBIT PARAMETERS.		
				3110.	*			
62	44	5444	20 0 0367	3111.	LMORB	CLA	HDOT	B13
62	45	5445	06 0 0367	3112.		MPY	HDOT	
63	44	5446	10 0 0014	3113.		STO	TS14	
63	45	5447	12 0 0015	3114.		STQ	TS15	
64	44	5450	20 0 0433	3115.		CLA	V	13
64	45	5451	26 0 0433	3116.		MPR	V	
65	44	5452	24 0 0014	3117.		SUB	TS14	
65	45	5453	10 0 0007	3118.		STO	TS7	VH SQ AT 26
66	44	5454	72 0 7123	3119.		TSQ	SQRTE	
66	45	5455	10 0 0427	3120.		STO	VH	13
67	44	5456	44 0 5457	3121.		TOV	*+1	CL. O.F.
67	45	5457	20 0 0210	3122.		CLA	R	23
60	46	5460	26 0 0210	3123.		MPR	R	
60	47	5461	26 0 0637	3124.		MPR	2K2	
61	46	5462	06 0 0007	3125.		MPY	TS7	46-47+26=25
61	47	5463	52 0 0002	3126.		LLS	2	
62	46	5464	10 0 0010	3127.		STO	TS10	PL AT 23
62	47	5465	54 0 0001	3128.		LRS	1	
63	46	5466	10 0 0011	3129.		STO	TS11	SAVE PL AT 24
63	47	5467	12 0 0012	3130.		STQ	TS12	
64	46	5470	04 0 0210	3131.		DVP	R	
64	47	5471	24 0 5033	3132.		SUB	1B1	
65	46	5472	56 0 0004	3133.		ALS	4	-3
65	47	5473	10 0 0000	3134.		STO	TS0	
66	46	5474	36 0 0000	3135.		MPZ	TS0	
66	47	5475	10 0 0013	3136.		STO	TS13	(PL/R-1) SQ AT -6.
67	46	5476	30 0 0014	3137.		CLZ	TS14	HDOT SQ AT 26
67	47	5477	14 0 0015	3138.		LDQ	TS15	
60	50	5500	52 0 0010	3139.		LLS	8	18
60	51	5501	26 0 0637	3140.		MPR	2K2	
61	50	5502	26 0 0010	3141.		MPR	TS10	PL
61	51	5503	32 0 0013	3142.		ADZ	TS13	EL SQ IN A AT -6.
62	50	5504	44 0 5516	3143.		TOV	LMORB1+2	
62	51	5505	72 0 7123	3144.		TSQ	SQRTE	
63	50	5506	54 0 0004	3145.		LRS	4	FL AT 1

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63	51	5507	22	0	5033	3146.	ADD	1B1	
64	50	5510	10	0	0001	3147.	STO	TS1	1+EL AT 1.
64	51	5511	30	0	0011	3148.	CLZ	TS11	OL AT 24
65	50	5512	14	0	0012	3149.	LDQ	TS12	
65	51	5513	04	0	0001	3150.	DVP	TS1	
66	50	5514	10	0	0343	3151.	LMORB1 STO	QL	LM PERICYNTHION AT 23
66	51	5515	40	0	1071	3152.	TRA	EXIT32	
67	50	5516	20	0	0216	3153.	CLA	2K3	SET QL=CONST
67	51	5517	40	0	5514	3154.	TRA	LMORB1	
						3155.	*		
						3156.	*		CSM PREDICTION.
						3157.	*		
60	52	5520	72	0	6535	3158.	CSMT1 TSQ	ELPRD	TO ELLIPSE PREDICTOR.
60	53	5521	72	0	6261	3159.	TSQ	EXEC	
						3160.	*		
						3161.	*		TRANSFER ORBIT VECTORS.
						3162.	*		
61	52	5522	50	1	0002	3163.	AXT	2,1	
61	53	5523	20	1	0220	3164.	CLA	RIX,1	CSM PRED POS
62	52	5524	10	1	0014	3165.	STO	TS14,1	
62	53	5525	42	1	5523	3166.	TIX	*-2,1	
63	52	5526	72	0	6422	3167.	TSQ	NORMV	NORMALIZE RT
63	53	5527	30	0	0013	3168.	CLZ	TS13	
64	52	5530	10	0	0203	3169.	STO	RT	23
64	53	5531	50	1	0002	3170.	AXT	2,1	
65	52	5532	20	1	0010	3171.	XORBV1 CLA	TS10,1	C1X=BX
65	53	5533	10	1	0030	3172.	STO	U2X,1	
66	52	5534	20	1	0060	3173.	CLA	U1X,1	
66	53	5535	10	1	0004	3174.	STO	TS4,1	
67	52	5536	26	1	0030	3175.	MPR	U2X,1	
67	53	5537	32	0	0013	3176.	ADZ	TS13	
60	54	5540	10	0	0013	3177.	STO	TS13	
60	55	5541	42	1	5532	3178.	TIX	XORBV1,1	
61	54	5542	56	0	0001	3179.	ALS	1	
61	55	5543	10	0	0513	3180.	STO	C1	U1 DOT U2 AT 1,
62	54	5544	26	0	0513	3181.	MPR	C1	
62	55	5545	60	0	0000	3182.	COM		

63	54	5546	22	0	4065	3183.	ADD	1B2		
63	55	5547	72	0	7123	3184.	TSQ	SQRTE		
64	54	5550	10	0	0033	3185.	STO	C2	1	
64	55	5551	40	0	1072	3186.	EX33 TRA	EXIT33		
65	54	5552	72	0	6373	3187.	TSQ	CRSPRD	U1XU2 AT 2.	
65	55	5553	20	0	0015	3188.	CLA	TS14+1		
66	54	5554	06	0	0055	3189.	MPY	WCY		
66	55	5555	46	0	5557	3190.	TMI	**2	-IS REND ANG GREAT 180.	
67	54	5556	40	0	5562	3191.	TRA	**4		
67	55	5557	30	0	0033	3192.	CLZ	C2		
60	56	5560	60	0	0000	3193.	COM			
60	57	5561	10	0	0033	3194.	STO	C2		
61	56	5562	50	1	0002	3195.	AXT	2,1	NORMALIZE W1 AND	
61	57	5563	30	1	0014	3196.	XORBV2 CLZ	TS14,1		
62	56	5564	14	0	4007	3197.	LDQ	ZERO		
62	57	5565	04	0	0033	3198.	DVP	C2		
63	56	5566	10	1	0040	3199.	STO	W1X,1	1	
63	57	5567	20	1	0060	3200.	CLA	U1X,1		
64	56	5570	26	0	0513	3201.	MPR	C1		
64	57	5571	10	0	0001	3202.	STO	TS1		
65	56	5572	20	1	0030	3203.	CLA	U2X,1	1	
65	57	5573	54	0	0001	3204.	LRS	1		
66	56	5574	34	0	0001	3205.	SUZ	TS1		
66	57	5575	14	0	4007	3206.	LDQ	ZERO		
67	56	5576	04	0	0033	3207.	DVP	C2		
67	57	5577	10	1	0034	3208.	STO	V1X,1	1	
70	40	5600	20	1	0060	3209.	CLA	U1X,1	1	
70	41	5601	54	0	0001	3210.	LRS	1		
71	40	5602	10	0	0001	3211.	STO	TS1	2	
71	41	5603	20	1	0030	3212.	CLA	U2X,1		
72	40	5604	26	0	0513	3213.	MPR	C1		
72	41	5605	34	0	0001	3214.	SUZ	TS1		
73	40	5606	14	0	4007	3215.	LDQ	ZERO		
73	41	5607	04	0	0033	3216.	DVP	C2		
74	40	5610	10	1	0064	3217.	STO	V2X,1	1	
74	41	5611	42	1	5563	3218.	TIX	XORBV2,1		
75	40	5612	30	0	0610	3219.	CLZ	MU3	P-ITERATION INDEX.	

75	41	5613	72	0	6261	3220.	TSQ	EXEC		
						3221.	*			
						3222.	*	P-ITERATOR		
						3223.	*			
76	40	5614	40	0	1073	3224.	EX34	TRA	EXIT34	
76	41	5615	44	0	5616	3225.		TOV	**1	CL. O.F.
77	40	5616	20	0	0170	3226.		CLA	P	ITERATION P AT 23
77	41	5617	24	0	0347	3227.		SUB	RF	
70	42	5620	14	0	4007	3228.		LDQ	ZERO	
70	43	5621	04	0	0347	3229.		DVP	RF	
71	42	5622	10	0	0011	3230.		STO	TS11	X1 AT 0.
71	43	5623	06	0	0011	3231.		MPY	TS11	
72	42	5624	52	0	0002	3232.		LLS	2	
72	43	5625	10	0	0001	3233.		STO	TS1	X1 SQ. AT -2
73	42	5626	20	0	0170	3234.		CLA	P	
73	43	5627	24	0	0203	3235.		SUB	RT	
74	42	5630	14	0	4007	3236.		LDQ	ZERO	
74	43	5631	04	0	0203	3237.		DVP	RT	
75	42	5632	10	0	0012	3238.		STO	TS12	X2 AT .0
75	43	5633	26	0	0513	3239.		MPR	C1	
76	42	5634	10	0	0002	3240.		STO	TS2	1
76	43	5635	20	0	0011	3241.		CLA	TS11	X1
77	42	5636	54	0	0001	3242.		LRS	1	
77	43	5637	34	0	0002	3243.		SUZ	TS2	
70	44	5640	14	0	4007	3244.		LDQ	ZERO	
70	45	5641	04	0	0033	3245.		DVP	C2	
71	44	5642	10	0	0143	3246.		STO	X4	AT 0.
71	45	5643	20	0	0012	3247.		CLA	TS12	X2
72	44	5644	54	0	0001	3248.		LRS	1	
72	45	5645	10	0	0002	3249.		STO	TS2	1
73	44	5646	20	0	0011	3250.		CLA	TS11	X1
73	45	5647	26	0	0513	3251.		MPR	C1	
74	44	5650	34	0	0002	3252.		SUZ	TS2	
74	45	5651	14	0	4007	3253.		LDQ	ZERO	
75	44	5652	04	0	0033	3254.		DVP	C2	1
75	45	5653	10	0	0073	3255.		STO	X3	AT 0.
76	44	5654	06	0	0073	3256.		MPY	X3	

76	45	5655	52	0	0002	3257.	LLS	2	
77	44	5656	32	0	0001	3258.	ADZ	TS1	-2
77	45	5657	44	0	1074	3259.	TOV	EXIT35	D.F. IF E TOO LARGE.
70	46	5660	10	0	0172	3260.	STO	ESQ	E SQ AT -2.
70	47	5661	54	0	0002	3261.	LRS	2	
71	46	5662	10	0	0013	3262.	STO	TS13	E SQ AT 0.
71	47	5663	60	0	0000	3263.	COM		
72	46	5664	22	0	4030	3264.	ADD	PMAX	
72	47	5665	10	0	0014	3265.	STO	TS14	(1-E SQ) AT 0.
73	46	5666	72	0	7123	3266.	TSQ	SORTE	
73	47	5667	10	0	0015	3267.	STO	TS15	ROOT(1-E SQ) AT 0.
74	46	5670	20	0	0143	3268.	CLA	X4	
74	47	5671	24	0	0073	3269.	SUB	X3	
75	46	5672	54	0	0001	3270.	LRS	1	1
75	47	5673	22	0	0033	3271.	ADD	C2	
76	46	5674	26	0	0015	3272.	MPR	TS15	
76	47	5675	10	0	0003	3273.	STO	TS3	SIN(DELTA E) AT 1.
77	46	5676	20	0	0073	3274.	CLA	X3	
77	47	5677	26	0	0143	3275.	MPR	X4	
70	50	5700	60	0	0000	3276.	COM		
70	51	5701	32	0	0013	3277.	ADZ	TS13	
71	50	5702	54	0	0001	3278.	LRS	1	1
71	51	5703	10	0	0013	3279.	STO	TS13	E SQ-X3(X4) AT 1.
72	50	5704	30	0	0011	3280.	CLZ	TS11	
72	51	5705	32	0	0012	3281.	ADZ	TS12	X1+X2
73	50	5706	54	0	0001	3282.	LRS	1	1
73	51	5707	32	0	0013	3283.	ADZ	TS13	
74	50	5710	22	0	0513	3284.	ADD	C1	
74	51	5711	10	0	0004	3285.	STO	TS4	COS(DELTA E) AT 1.
75	50	5712	72	0	7034	3286.	TSQ	ARCTAE	
75	51	5713	10	0	0016	3287.	STO	TS16	DELTA E AT 3.
76	50	5714	20	0	0203	3288.	CLA	RT	
76	51	5715	26	0	0143	3289.	MPR	X4	
77	50	5716	10	0	0001	3290.	STO	TS1	23
77	51	5717	20	0	0347	3291.	CLA	RF	
70	52	5720	26	0	0073	3292.	MPR	X3	
70	53	5721	34	0	0001	3293.	SUZ	TS1	

71	52	5722	06	0	0015	3294.	MPY	TS15	
71	53	5723	54	0	0003	3295.	LRS	3	26
72	52	5724	04	0	0170	3296.	JVP	P	
72	53	5725	32	0	0016	3297.	ADZ	TS16	
73	52	5726	10	0	0016	3298.	STJ	TS16	DELTA E + X7-X8 AT 3.
73	53	5727	20	0	0170	3299.	CLA	P	
74	52	5730	14	0	4007	3300.	LDQ	ZERO	
74	53	5731	04	0	0014	3301.	DVP	TS14	1-E SQ
75	52	5732	10	0	0171	3302.	STO	ALPHA	23
75	53	5733	26	0	0637	3303.	MPR	2K2	1/2K1 AT -47
76	52	5734	72	0	7123	3304.	TSQ	SQRT E	(-47+23)/2=-12
76	53	5735	26	0	0171	3305.	MPR	ALPHA	1/N AT 11 IN A.
77	52	5736	36	0	0016	3306.	MPZ	TS16	11+3=14
77	53	5737	56	0	0001	3307.	ALS	1	NEW TP AT 13.
70	54	5740	24	0	0434	3308.	SUB	TP	
70	55	5741	10	0	0002	3309.	STO	TS2	DELTA TP
71	54	5742	32	0	0434	3310.	ADZ	TP	
71	55	5743	10	0	0434	3311.	STO	TP	13
72	54	5744	20	0	0435	3312.	CLA	T	
72	55	5745	24	0	0434	3313.	SUB	TP	
73	54	5746	10	0	0000	3314.	STO	TS0	T-TP
73	55	5747	30	0	0610	3315.	CLZ	MU3	INCREMENT ITER COUNTER.
74	54	5750	22	0	4006	3316.	ADD	1B17	
74	55	5751	10	0	0610	3317.	STO	MU3	
75	54	5752	24	0	4005	3318.	SUB	2B17	ITERATION SCHEME.
75	55	5753	46	0	6026	3319.	TMI	PITER2	-IS MU3=1.
76	54	5754	24	0	4006	3320.	SUB	1B17	
76	55	5755	46	0	5771	3321.	TMI	PITER1	-IS MU3=2.
77	54	5756	24	0	0620	3322.	SUB	2K17	MU3-NO. ITERATIONS IN A.
77	55	5757	46	0	5765	3323.	TMI	**6	-IS NOT DONE.
70	56	5760	30	0	0000	3324.	CLZ	TS0	DONE. T-TP
70	57	5761	62	0	0000	3325.	ABS		
71	56	5762	24	0	0453	3326.	SUB	2K20	
71	57	5763	46	0	6040	3327.	TMI	PITER3+5	-IS CONVERGED.
72	56	5764	40	0	1074	3328.	TRA	EXIT35	
72	57	5765	20	0	0002	3329.	CLA	TS2	DELTA TP.
73	56	5766	62	0	0000	3330.	ABS		

73	57	5767	24	0	0447	3331.	SUB	2K18	
74	56	5770	46	0	6013	3332.	TMI	DELP	-IS SKIP PARTIAL
74	57	5771	20	0	0170	3333.	PITER1	CLA	P
75	56	5772	34	0	0212	3334.	SUZ	PP	COMPUTE PARITAL T.
75	57	5773	10	0	0001	3335.	STD	TS1	23
76	56	5774	14	0	4007	3336.	LDQ	ZERO	
76	57	5775	54	0	0004	3337.	LRS	4	27
77	56	5776	44	0	5777	3338.	TOV	**1	CL. D.F.
77	57	5777	40	0	6001	3339.	TRA	**2	
00	60	6000	70	0	6177	3340.	DLY	INIT	TO TURN ON SEQUENCE
00	61	6001	04	0	0002	3341.	DVP	TS2	27-13=14
01	60	6002	44	0	6004	3342.	TOV	**2	
01	61	6003	40	0	6012	3343.	TRA	**7	
02	60	6004	30	0	0001	3344.	CLZ	TS1	DET SIGN OF PART
02	61	6005	06	0	0002	3345.	MPY	TS2	NUM X DENOM
03	60	6006	46	0	6011	3346.	TMI	**3	
03	61	6007	20	0	4030	3347.	CLA	PMAX	
04	60	6010	40	0	6012	3348.	TRA	**2	
04	61	6011	20	0	4037	3349.	CLA	NMAX	
05	60	6012	10	0	0467	3350.	STD	PART	PARTIAL T AT 14
05	61	6013	30	0	0000	3351.	DELP	CLZ	T-TP
06	60	6014	06	0	0467	3352.	MPY	PART	
06	61	6015	52	0	0004	3353.	LLS	4	13+14-4=23
07	60	6016	10	0	0003	3354.	STD	TS3	DELTA P
07	61	6017	62	0	0000	3355.	ABS		
00	62	6020	24	0	0230	3356.	SUB	2K19	
00	63	6021	46	0	6033	3357.	TMI	PITER3	
01	62	6022	30	0	0003	3358.	CLZ	TS3	
01	63	6023	46	0	6030	3359.	TMI	**5	
02	62	6024	20	0	0230	3360.	CLA	2K19	
02	63	6025	40	0	6032	3361.	TRA	**5	
03	62	6026	20	0	0217	3362.	PITER2	CLA	2K14
03	63	6027	40	0	6031	3363.	TRA	**2	
04	62	6030	20	0	0230	3364.	CLA	2K19	
04	63	6031	60	0	0000	3365.	COM		
05	62	6032	10	0	0003	3366.	STD	TS3	DELTA P
05	63	6033	30	0	0170	3367.	PITER3	CLZ	P

06	62	6034	10	0	0212	3368.	STO	PP	
06	63	6035	32	0	0003	3369.	ADZ	TS3	
07	62	6036	10	0	0170	3370.	STO	P	NEW P
07	63	6037	40	0	6262	3371.	TRA	EXEC+1	
00	64	6040	72	0	6261	3372.	TSQ	EXEC	
						3373.			
						3374.			
						3375.			
							*		
							*	IMPULSE AND BRAKING VELOCITIES.	
							*		
00	65	6041	20	0	0636	3376.	TBRAKE	CLA	2K1 48
01	64	6042	14	0	4007	3377.	LDQ	ZERO	
01	65	6043	54	0	0001	3378.	LRS	1	
02	64	6044	04	0	0170	3379.	DVP	P	49-23=26
02	65	6045	72	0	7123	3380.	TSQ	SORTE	
03	64	6046	10	0	0001	3381.	STO	TS1	ROOT(MU/P) AT 13
03	65	6047	36	0	0073	3382.	MPZ	X3	
04	64	6050	10	0	0423	3383.	STO	RFDOT	13
04	65	6051	20	0	0001	3384.	CLA	TS1	
05	64	6052	36	0	0143	3385.	MPZ	X4	
05	65	6053	10	0	0013	3386.	STO	TS13	13
06	64	6054	30	0	0001	3387.	CLZ	TS1	
06	65	6055	06	0	0170	3388.	MPY	P	
07	64	6056	10	0	0001	3389.	STO	TS1	ROOT(PXMU) AT 36
07	65	6057	12	0	0002	3390.	STQ	TS2	
00	66	6060	04	0	0347	3391.	DVP	RF	
00	67	6061	10	0	0012	3392.	STO	TS12	13
01	66	6062	30	0	0001	3393.	CLZ	TS1	
01	67	6063	14	0	0002	3394.	LDQ	TS2	
02	66	6064	04	0	0203	3395.	DVP	RT	
02	67	6065	10	0	0014	3396.	STO	TS14	13
03	66	6066	40	0	1075	3397.	EX36	TRA	EXIT36
03	67	6067	44	0	6070	3398.		TQV	**1 CL. O.F.
04	66	6070	50	1	0002	3399.		AXT	2,1
04	67	6071	20	0	0013	3400.	IMPBK1	CLA	TS13 ROOT(MU/P)X(X4) AT 13
05	66	6072	36	1	0030	3401.		MPZ	U2X,1 1
05	67	6073	10	0	0007	3402.		STO	TS7
06	66	6074	20	0	0014	3403.		CLA	TS14 ROOT(PXMU)/RT AT 13
06	67	6075	36	1	0064	3404.		MPZ	V2X,1 1

07 66	6076	32 0	0007	3405.	ADZ	TS7	
07 67	6077	56 0	0001	3406.	ALS	1	13
00 70	6100	24 1	0430	3407.	SUB	VIX,1	
00 71	6101	10 1	0030	3408.	STD	VFX,1	-BRAKING VEL AT 13
01 70	6102	20 0	0423	3409.	CLA	RFDOT	13
01 71	6103	26 1	0060	3410.	MPR	UIX,1	1
02 70	6104	10 0	0007	3411.	STD	TS7	
02 71	6105	20 0	0012	3412.	CLA	TS12	ROOT(PXMU)/RF AT 13
03 70	6106	26 1	0034	3413.	MPR	VIX,1	1
03 71	6107	32 0	0007	3414.	ADZ	TS7	
04 70	6110	56 0	0001	3415.	ALS	1	13
04 71	6111	24 1	0460	3416.	SUB	V5X,1	
05 70	6112	10 1	0064	3417.	STD	VGX,1	VEL TO GAIN AT 13
05 71	6113	10 1	0004	3418.	STD	TS4,1	
06 70	6114	42 1	6071	3419.	TIX	IMPBK1,1	
06 71	6115	44 0	1074	3420.	TOV	EXIT35	CHECK VG OR VF D.F.
07 70	6116	72 0	6737	3421.	TSQ	DPVMAG	
07 71	6117	10 0	0370	3422.	STD	VG	13
00 72	6120	30 0	0172	3423.	CLZ	ESQ	F SQ FR P ITER AT-2.
00 73	6121	72 0	7123	3424.	TSQ	SQRTE	
01 72	6122	54 0	0001	3425.	LRS	1	E AT 0.
01 73	6123	60 0	0000	3426.	COM		
02 72	6124	22 0	4030	3427.	ADD	PMAX	1-E AT 0.
02 73	6125	26 0	0171	3428.	MPR	ALPHA	
03 72	6126	10 0	0172	3429.	STD	Q1	Q OF TRANS ORB AT 23
03 73	6127	72 0	6261	3430.	TSQ	EXEC	
				3431.	*		COMPLETE VF DN FOLLOWING CYCLE.
04 72	6130	50 1	0002	3432.	AXT	2,1	
04 73	6131	20 1	0030	3433.	CLA	VFX,1	13
05 72	6132	10 1	0004	3434.	STD	TS4,1	
05 73	6133	42 1	6131	3435.	TIX	*-2,1	
06 72	6134	72 0	6737	3436.	TSQ	DPVMAG	
06 73	6135	40 0	1076	3437.	TRA	EXIT37	VF IN A AT B.
				3438.	*		
				3439.	*		GUIDANCE LAW COMPUTATIONS.
				3440.	*		
07 72	6136	44 0	6137	3441.	GDLOW	TOV	**1
							TIME TO BURN COMP.

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07 73	6137	20 0	0370	3442.	CLA	VG	13
00 74	6140	26 0	0655	3443.	MPR	4K3	AT -25
00 75	6141	22 0	0654	3444.	ADD	4K2	AT -12
01 74	6142	26 0	0370	3445.	MPR	VG	
01 75	6143	22 0	5033	3446.	ADD	1B1	
02 74	6144	06 0	0370	3447.	MPY	VG	
02 75	6145	54 0	0002	3448.	LRS	2	16
03 74	6146	04 0	0067	3449.	* DVP	AT	16-7=9
03 75	6147	44 0	6151	3450.	TOV	**2	
04 74	6150	40 0	6152	3451.	TRA	**2	
04 75	6151	20 0	4030	3452.	CLA	PMAX	
05 74	6152	10 0	0357	3453.	STO	TBD	TIME TO BURN AT 9.
05 75	6153	40 0	1077	3454.	TRA	EXIT38	

3455. *
 3456. * COMPUTE LUNAR AZIMUTH
 3457. *

06 74	6154	20 0	0134	3458.	LUNAZ CLA	A31	
06 75	6155	26 0	0134	3459.	MPR	A31	+2
07 74	6156	60 0	0000	3460.	COM		
07 75	6157	22 0	4065	3461.	ADD	1B2	
00 76	6160	72 0	7123	3462.	TSQ	SORTE	
00 77	6161	10 0	0001	3463.	STO	TS1	+1
01 76	6162	14 0	4007	3464.	LDQ	ZERO	
01 77	6163	20 0	0135	3465.	CLA	A32	
02 76	6164	54 0	0001	3466.	LRS	1	TO 2
02 77	6165	04 0	0001	3467.	DVP	TS1	
03 76	6166	10 0	0053	3468.	STO	CODELL	
03 77	6167	14 0	4007	3469.	LDQ	ZERO	
04 76	6170	20 0	0136	3470.	CLA	A33	
04 77	6171	54 0	0001	3471.	LRS	1	TO 2
05 76	6172	04 0	0001	3472.	DVP	TS1	
05 77	6173	10 0	0047	3473.	STO	SIDELL	AT 1
06 76	6174	20 0	4036	3474.	CLA	MS	
06 77	6175	10 0	0604	3475.	STO	DEL21	
07 76	6176	40 0	1100	3476.	TRA	EXIT39	

3477. *
 3478. * POWER ON INITIALIZATION

				3479.	*				
07	77	6177	66 0	3050	3480.	INIT	OUT	3050	RESET CARRY INHIBIT
10	60	6200	64 0	6200	3481.		INP	6200	
10	61	6201	64 0	2200	3482.		INP	DEDA	
11	60	6202	66 0	7057	3483.		OUT	7057	RESET DISCRETES
11	61	6203	20 0	4044	3484.		CLA	BACK	
12	60	6204	10 0	0025	3485.		STO	TVARBR+1	
12	61	6205	20 0	4046	3486.		CLA	CLAFR	PRIME HARDWIRED CORES
13	60	6206	10 0	0024	3487.		STO	TVARBR	
13	61	6207	72 0	0024	3488.		TSQ	TVARBR	
14	60	6210	20 0	0024	3489.		CLA	TVARBR	
14	61	6211	24 0	7002	3490.		SUB	CLATEN	
15	60	6212	46 0	6207	3491.		TMI	*-3	
15	61	6213	66 0	7010	3492.		OUT	7010	RESET FAILURE INDICATOR
				3493.	*		GSE	SERVICE ROUTINE	
16	60	6214	64 0	2040	3494.	GSESR	INP	2040	
16	61	6215	56 0	0001	3495.		ALS	1	
17	60	6216	46 0	1101	3496.		TMI	EXIT40	INITIALIZE
17	61	6217	64 0	6200	3497.		INP	6200	
10	62	6220	22 0	4011	3498.		ADD	1B5	
10	63	6221	10 0	0007	3499.		STO	TS7	
11	62	6222	22 0	4065	3500.		ADD	STDCOM	SET UP VARIABLE STORE
11	63	6223	10 0	0024	3501.		STO	TVARBR	
12	62	6224	66 0	6402	3502.	WRDLP	OUT	6402	SET GSE 5
12	63	6225	64 0	2040	3503.		INP	2040	
13	62	6226	56 0	0001	3504.		ALS	1	
13	63	6227	46 0	6231	3505.		TMI	*+2	
14	62	6230	40 0	6225	3506.		TRA	*-3	
14	63	6231	66 0	7012	3507.		OUT	7012	RESET GSE 5 AND FAIL INDIC.
15	62	6232	64 0	2040	3508.		INP	2040	
15	63	6233	56 0	0001	3509.		ALS	1	
16	62	6234	46 0	6231	3510.		TMI	*-3	WAIT FOR NEXT WORD
16	63	6235	56 0	0001	3511.		ALS	1	
17	62	6236	46 0	6243	3512.		TMI	*+5	
17	63	6237	30 0	0007	3513.		CLZ	TS7	END OF BLOCK
10	64	6240	22 0	4036	3514.		ADD	TRACOM	
10	65	6241	10 0	0024	3515.		STO	TVARBR	

11	64	6242	40	0	0024	3516.	TRA	TVARBR		
11	65	6243	64	0	6200	3517.	INP	6200	INPUT WORD AND STORE	
12	64	6244	72	0	0024	3518.	TSQ	TVARBR		
12	65	6245	40	0	6224	3519.	TRA	WRDLP		
13	64	6246	10	0	0000	3520.	RETURN	STO	TSO	INCREMENT OF VARIABLE
13	65	6247	30	0	0024	3521.	CLZ	TVARBR	STORE OR BRING	
14	64	6250	22	0	4006	3522.	ADD	1B17		
14	65	6251	10	0	0024	3523.	STO	TVARBR		
15	64	6252	30	0	0000	3524.	CLZ	TSO		
15	65	6253	40	0	6764	3525.	TRA	EXIT		
						3526.	*			
						3527.	*		TIME UPDATE AND EXECUTIVE PART 1.	
						3528.	*			
16	64	6254	30	0	0377	3529.	TIMEA	CLZ	TA1	UPDATE ABS TIME.
16	65	6255	22	0	4006	3530.	ADD	1B17	EQU TO 2SECS.	
17	64	6256	10	0	0377	3531.	STO	TA1		
17	65	6257	20	0	4014	3532.	CLA	1B11	I.C. DEDA COUNTER	
10	66	6260	10	0	0727	3533.	STO	DEDASC		
10	67	6261	12	0	0063	3534.	EXEC	STO	BRANCH	SET NEXT BRANCH.
11	66	6262	30	0	0727	3535.	CLZ	DEDASC		
11	67	6263	56	0	0001	3536.	*ALS	1		
12	66	6264	46	0	6267	3537.	TMI	++3	- IS TIME TO DEDA.	
12	67	6265	10	0	0727	3538.	STO	DEDASC		
13	66	6266	40	0	1110	3539.	TRA	EXIT41		
13	67	6267	30	0	0063	3540.	CLZ	BRANCH	SAVE BRANCH IN	
14	66	6270	10	0	0057	3541.	STO	TMPBR	TEMPORARY BRANCH	
14	67	6271	20	0	1013	3542.	CLA	DEDABR	DEDA START	
15	66	6272	10	0	0063	3543.	STO	BRANCH		
15	67	6273	40	0	1110	3544.	TRA	EXIT41	TO SOFT DISPLAY	
						3545.	*			
						3546.	*		DISPLAY SUBROUTINE.	
						3547.	*			
16	66	6274	30	0	0543	3548.	DSPLY	CLZ	DSPSC	
16	67	6275	56	0	0001	3549.	*ALS	1		
17	66	6276	44	0	6300	3550.	TOV	++2	O.F. IS TIME TO DISPLAY	
17	67	6277	40	0	6357	3551.	TRA	DSPLY4		
10	70	6300	30	0	0444	3552.	CLZ	PDOUT	INCREMENT DISPLAY VARIABLES.	

10	71	6301	22	0	0443	3553.	ADD	DPDOUT		
11	70	6302	10	0	0444	3554.	STO	PDDOUT	13	
11	71	6303	30	0	0214	3555.	CLZ	POUT		
12	70	6304	22	0	0215	3556.	ADD	DPOUT		
12	71	6305	40	0	6323	3557.	TRA	DSPLY2-5		
13	70	6306	10	0	0444	3558.	DSPLY1 STO	PDDOUT		I.C. DISPLAY COMPS.
13	71	6307	34	0	0437	3559.	SUZ	PDDTMI		
14	70	6310	26	0	0624	3560.	MPR	1K4	.1	
14	71	6311	10	0	0443	3561.	STO	DPDOUT		DELTA PDDT AT 13.
15	70	6312	20	0	0444	3562.	CLA	PDDOUT	13	
15	71	6313	10	0	0437	3563.	STO	PDDTMI		
16	70	6314	06	0	0624	3564.	MPY	1K4	.1	
16	71	6315	54	0	0011	3565.	LRS	9		0.2 PDDT AT 23.
17	70	6316	04	0	0213	3566.	DVP	PDDTFS		=76840 FT B23
17	71	6317	10	0	0215	3567.	STO	DPOUT		DELTA P AT DISPLAY SCALE.
10	72	6320	20	0	0214	3568.	CLA	PDDOUT	23	
10	73	6321	14	0	4007	3569.	LDQ	ZERO		
11	72	6322	04	0	0213	3570.	*DVP	PDDTFS		=76840 FT B23
11	73	6323	44	0	6325	3571.	TOV	**2		
12	72	6324	40	0	6327	3572.	TRA	**3		
12	73	6325	30	0	0215	3573.	CLZ	DPOUT		
13	72	6326	20	0	4030	3574.	CLA	PMAX		
13	73	6327	10	0	0214	3575.	STO	PDDOUT		OUTPUT P AT DISPLAY SCALE.
14	72	6330	20	0	0444	3576.	DSPLY2 CLA	PDDOUT		DISPLAY POSITION RATE.
14	73	6331	62	0	0000	3577.	ABS			
15	72	6332	10	0	0010	3578.	STO	TS10		
15	73	6333	20	0	0444	3579.	CLA	PDDOUT		
16	72	6334	46	0	6337	3580.	TMI	**3		
16	73	6335	20	0	4036	3581.	CLA	MS	1 IS +	
17	72	6336	40	0	6340	3582.	TRA	**2		
17	73	6337	20	0	4007	3583.	CLA	ZERO	0 IS -	
10	74	6340	32	0	0010	3584.	ADZ	TS10		SIGN MAGNITUDE.
10	75	6341	66	0	3040	3585.	DUT	3040		RESET
11	74	6342	66	0	2440	3586.	DUT	2440		SELECT ALT RATE.
11	75	6343	66	0	6010	3587.	DUT	6010		OUTPUT ALT RATE.
12	74	6344	40	0	1111	3588.	TRA	EXIT42		COMPUTE VYO FOR DUTPUT
12	75	6345	66	0	6020	3589.	DUT	6020		OUTPUT SAME.

13	74	6346	20	0	0214	3590.	DSPLY3	CLA	POUT	DISPLAY POSITION.
13	75	6347	46	0	6351	3591.		TMI	**2	
14	74	6350	40	0	6352	3592.		TRA	**2	
14	75	6351	20	0	4007	3593.		CLA	ZERO	ALT NEG.
15	74	6352	56	0	0001	3594.		*ALS	1	SIGN BIT USED
15	75	6353	66	0	3040	3595.		OUT	3040	RESET
16	74	6354	66	0	2420	3596.		OUT	2420	SELECT ALT.
16	75	6355	66	0	6010	3597.		OUT	6010	OUTPUT ALT.
17	74	6356	20	0	4011	3598.		CLA	185	
17	75	6357	10	0	0543	3599.	DSPLY4	STO	DSPSC	RESET COUNTER.
						3600.		*		
						3601.		*	CYCLE COUNTING	
						3602.		*		
10	76	6360	30	0	0615	3603.	EXEC1	CLZ	MU10	UPDATE MINOR CYCLE COUNT.
10	77	6361	22	0	4006	3604.		ADD	1817	
11	76	6362	10	0	0615	3605.		STO	MU10	
11	77	6363	40	0	1112	3606.		TRA	EXIT43	
12	76	6364	20	0	0615	3607.		CLA	MU10	CHECK FOR END.
12	77	6365	24	0	4040	3608.		SUB	49B17	
13	76	6366	46	0	4047	3609.		TMI	DELAY	-IS NOT END.
13	77	6367	30	0	0615	3610.		CLZ	MU10	
14	76	6370	20	0	1014	3611.		CLA	BR50	BR50 START.
14	77	6371	10	0	0063	3612.		STO	BRANCH	
15	76	6372	40	0	4047	3613.		TRA	DELAY	
						3614.		*		
						3615.		*	CROSS PRODUCT SUBROUTINE. AXB=C.	
						3616.		*		
15	77	6373	12	0	0023	3617.	CRSPRD	STQ	SREX	
16	76	6374	20	0	0006	3618.		CLA	TS4+2	AZ
16	77	6375	26	0	0011	3619.		MPR	TS10+1	BY
17	76	6376	10	0	0007	3620.		STO	TS7	
17	77	6377	20	0	0005	3621.		CLA	TS4+1	AY
20	60	6400	26	0	0012	3622.		MPR	TS10+2	BZ
20	61	6401	34	0	0007	3623.		SUZ	TS7	
21	60	6402	10	0	0014	3624.		STO	TS14	CX
21	61	6403	20	0	0004	3625.		CLA	TS4	AX
22	60	6404	26	0	0012	3626.		MPR	TS10+2	BZ

22	61	6405	10	0	0007	3627.	STO	TS7	
23	60	6406	20	0	0006	3628.	CLA	TS4+2	AZ
23	61	6407	26	0	0010	3629.	MPR	TS10	
24	60	6410	34	0	0007	3630.	SUZ	TS7	
24	61	6411	10	0	0015	3631.	STO	TS14+1	CY
25	60	6412	20	0	0005	3632.	CLA	TS4+1	AY
25	61	6413	26	0	0010	3633.	MPR	TS10	BX
26	60	6414	10	0	0007	3634.	STO	TS7	
26	61	6415	20	0	0004	3635.	CLA	TS4	AX
27	60	6416	26	0	0011	3636.	MPR	TS10+1	BY
27	61	6417	34	0	0007	3637.	SUZ	TS7	
20	62	6420	10	0	0016	3638.	STO	TS14+2	CZ
20	63	6421	40	0	0023	3639.	TRA	SREX	
						3640.			*
						3641.			*
						3642.			*
21	62	6422	12	0	0021	3643.	NORMV STQ	SREX2	
21	63	6423	30	0	0017	3644.	CLZ	TS17	
22	62	6424	50	1	0002	3645.	AXT	2,1	
22	63	6425	20	1	0014	3646.	CLA	TS14,1	INPUT VECTOR
23	62	6426	26	1	0014	3647.	MPR	TS14,1	
23	63	6427	32	0	0017	3648.	ADZ	TS17	
24	62	6430	10	0	0017	3649.	STO	TS17	
24	63	6431	42	1	6425	3650.	TIX	*-4,1	
25	62	6432	72	0	7123	3651.	TSQ	SQRTE	
25	63	6433	10	0	0013	3652.	STO	TS13	
26	62	6434	50	1	0002	3653.	AXT	2,1	
26	63	6435	20	1	0014	3654.	CLA	TS14,1	
27	62	6436	14	0	4007	3655.	LDQ	ZERO	
27	63	6437	54	0	0001	3656.	LRS	1	
20	64	6440	04	0	0013	3657.	DVP	TS13	
20	65	6441	10	1	0010	3658.	STO	TS10,1	UNIT VECTOR AT 1.
21	64	6442	42	1	6435	3659.	TIX	*-5,1	
21	65	6443	40	0	0021	3660.	TRA	SREX2	
						3661.			*
						3662.			*
						3663.			*

NORMALIZE VECTOR SUBROUTINE.

INPUT VECTOR

UNIT VECTOR AT 1.

ORBIT PARAMETERS FROM EPOCH SUBROUTINE.

22	64	6444	12	0	0021	3664.	ORBPM	STQ	SREX2	
22	65	6445	30	0	0011	3665.		CLZ	TS11	
23	64	6446	30	0	0012	3666.		CLZ	TS12	
23	65	6447	30	0	0013	3667.		CLZ	TS13	
24	64	6450	44	0	6451	3668.		TOV	*+1	
24	65	6451	50	1	0002	3669.		AXT	2,1	
25	64	6452	20	1	0204	3670.	ORBPM1	CLA	ROX,1	23
25	65	6453	26	1	0424	3671.		MPR	VOX,1	13
26	64	6454	32	0	0013	3672.		ADZ	TS13	
26	65	6455	10	0	0013	3673.		STO	TS13	RO DOT VO AT 36
27	64	6456	20	1	0424	3674.		CLA	VOX,1	
27	65	6457	26	1	0424	3675.		MPR	VOX,1	
20	66	6460	32	0	0012	3676.		ADZ	TS12	
20	67	6461	10	0	0012	3677.		STO	TS12	VO DOT VO AT 26
21	66	6462	20	1	0204	3678.		CLA	ROX,1	
21	67	6463	26	1	0204	3679.		MPR	ROX,1	
22	66	6464	32	0	0011	3680.		ADZ	TS11	
22	67	6465	10	0	0011	3681.		STO	TS11	RO DOT RO AT 46
23	66	6466	42	1	6452	3682.		TIX	ORBPM1,1	
23	67	6467	40	0	1120	3683.	EX44	TRA	EXIT44	
24	66	6470	72	0	7123	3684.		TSQ	SORTE	
24	67	6471	10	0	0207	3685.		STQ	RO	23
25	66	6472	06	0	0012	3686.		MPY	TS12	23+26=49
25	67	6473	44	0	6474	3687.		TOV	*+1	
26	66	6474	04	0	0636	3688.		DVP	2K1	48
26	67	6475	60	0	0000	3689.		COM		
27	66	6476	22	0	4030	3690.		ADD	PMAX	281
27	67	6477	10	0	0001	3691.		STO	TS1	
20	70	6500	20	0	0207	3692.		CLA	RO	
20	71	6501	14	0	4007	3693.		LDQ	ZERO	
21	70	6502	54	0	0001	3694.		LRS	1	
21	71	6503	04	0	0001	3695.		DVP	TS1	
22	70	6504	40	0	1121	3696.	EX45	TRA	EXIT45	
22	71	6505	10	0	0173	3697.		STO	AI	ALPHA I AT 23
23	70	6506	20	0	0636	3698.		CLA	2K1	
23	71	6507	14	0	4007	3699.		LDQ	ZERO	
24	70	6510	54	0	0001	3700.		LRS	1	49

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24	71	6511	04	0	0173	3701.	DVP	AI	49-23=26	
25	70	6512	72	0	7123	3702.	TSQ	SQRTE		
25	71	6513	10	0	0001	3703.	STD	TS1	ROOT(MU/ALPHA) AT 13	
26	70	6514	14	0	4007	3704.	LDQ	ZERO		
26	71	6515	54	0	0001	3705.	LRS	I		
27	70	6516	04	0	0173	3706.	DVP	AI		
27	71	6517	10	0	0077	3707.	STD	NI	ANG FREQ AT -9.	
20	72	6520	20	0	0173	3708.	CLA	AI		
20	73	6521	24	0	0207	3709.	SUB	RO		
21	72	6522	14	0	4007	3710.	LDQ	ZERO		
21	73	6523	04	0	0173	3711.	DVP	AI		
22	72	6524	10	0	0103	3712.	STD	CI	0	
22	73	6525	20	0	0173	3713.	CLA	AI		
23	72	6526	36	0	0001	3714.	MPZ	TS1		
23	73	6527	10	0	0001	3715.	STD	TS1	ROOT(ALPHAXMU) AT 36	
24	72	6530	30	0	0013	3716.	CLZ	TS13	36	
24	73	6531	14	0	4007	3717.	LDQ	ZERO		
25	72	6532	04	0	0001	3718.	DVP	TS1		
25	73	6533	10	0	0043	3719.	STD	SI	0	
26	72	6534	40	0	0021	3720.	TRA	SREX2		
					3721.					
					3722.	*				
					3723.	*	ELLIPSE PREDICTOR	SUBROUTINE.		
					3724.	*				
26	73	6535	12	0	0021	3724.	ELPRD	STQ	SREX2	
27	72	6536	30	0	0007	3725.		CLZ	TS7	ITERATION COUNTER.
27	73	6537	20	0	0442	3726.		CLA	TI	13
20	74	6540	26	0	0077	3727.		MPR	NI	AT -9.
20	75	6541	56	0	0001	3728.		ALS	I	
21	74	6542	10	0	0010	3729.		STD	TS10	DEL M AT 3.
21	75	6543	10	0	0011	3730.	ELPRD1	STD	TS11	DEL E AT 3.
22	74	6544	72	0	6767	3731.		TSQ	SICOE	
22	75	6545	20	0	0000	3732.		CLA	TS0	
23	74	6546	26	0	0103	3733.		MPR	CI	AT 0.
23	75	6547	10	0	0013	3734.		STD	TS13	1
24	74	6550	20	0	0001	3735.		CLA	TS1	1
24	75	6551	26	0	0043	3736.		MPR	SI	0+1=1
25	74	6552	34	0	0013	3737.		SUZ	TS13	

25	75	6553	22	0	5033	3738.	ADD	1B1	
26	74	6554	10	0	0012	3739.	STJ	TS12	X12 AT 1.
26	75	6555	30	0	0007	3740.	CLZ	TS7	
27	74	6556	24	0	4005	3741.	SUB	2B17	2 ITERATIONS.
27	75	6557	46	0	6642	3742.	TMI	ELPRD3	-IS NOT DONE.
20	76	6560	20	0	0103	3743.	CLA	CI	0
20	77	6561	54	0	0001	3744.	LRS	1	1
21	76	6562	60	0	0000	3745.	COM		
21	77	6563	22	0	0000	3746.	ADD	TS0	
22	76	6564	06	0	0173	3747.	MPY	AI	23+1=24
22	77	6565	04	0	0207	3748.	DVP	RO	23
23	76	6566	10	0	0003	3749.	STO	TS3	F AT 1.
23	77	6567	30	0	0010	3750.	CLZ	TS10	3
24	76	6570	34	0	0011	3751.	SUZ	TS11	
24	77	6571	56	0	0002	3752.	ALS	2	1
25	76	6572	22	0	0001	3753.	ADD	TS1	
25	77	6573	14	0	4007	3754.	LDQ	ZERO	
26	76	6574	54	0	0001	3755.	LRS	1	
26	77	6575	04	0	0077	3756.	DVP	NI	AT -9.
27	76	6576	10	0	0007	3757.	STO	TS7	G AT 11.
27	77	6577	20	0	0207	3758.	CLA	RO	
30	60	6600	26	0	0012	3759.	MPR	TS12	
30	61	6601	10	0	0014	3760.	STO	TS14	24
31	60	6602	20	0	0173	3761.	CLA	AI	
31	61	6603	26	0	0077	3762.	MPR	NI	
32	60	6604	06	0	0001	3763.	MPY	TS1	23-9+1=15
32	61	6605	04	0	0014	3764.	DVP	TS14	
33	60	6606	60	0	0000	3765.	COM		
33	61	6607	10	0	0013	3766.	STO	TS13	F DOT AT -9.
34	60	6610	20	0	0012	3767.	CLA	TS12	X12
34	61	6611	24	0	5033	3768.	SUB	1B1	
35	60	6612	32	0	0000	3769.	ADZ	TS0	
35	61	6613	14	0	4007	3770.	LDQ	ZERO	
36	60	6614	54	0	0001	3771.	LRS	1	2
36	61	6615	04	0	0012	3772.	DVP	TS12	
37	60	6616	10	0	0017	3773.	STO	TS17	G DOT AT 1.
37	61	6617	50	1	0002	3774.	AXT	2,1	

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30	62	6620	20	1	0204	3775.	ELPRD2	CLA	ROX,1	23
30	63	6621	26	0	0003	3776.		MPR	TS3	1
31	62	6622	10	0	0002	3777.		STD	TS2	24
31	63	6623	20	1	0424	3778.		CLA	VOX,1	13
32	62	6624	26	0	0007	3779.		MPR	TS7	11+13=24
32	63	6625	32	0	0002	3780.		ADZ	TS2	
33	62	6626	56	0	0001	3781.		ALS	1	23
33	63	6627	10	1	0220	3782.		STD	RIX,1	PRED POS AT 23
34	62	6630	20	1	0204	3783.		CLA	ROX,1	23
34	63	6631	26	0	0013	3784.		MPR	TS13	-9
35	62	6632	10	0	0002	3785.		STD	TS2	14
35	63	6633	20	1	0424	3786.		CLA	VOX,1	13
36	62	6634	26	0	0017	3787.		MPR	TS17	1
36	63	6635	32	0	0002	3788.		ADZ	TS2	
37	62	6636	56	0	0001	3789.		ALS	1	
37	63	6637	10	1	0430	3790.		STD	VIX,1	PRED VEL AT 13
30	64	6640	42	1	6620	3791.		TIX	ELPRD2,1	
30	65	6641	40	0	0021	3792.		TRA	SREX2	
31	64	6642	22	0	4004	3793.	ELPRD3	ADD	3B17	
31	65	6643	10	0	0007	3794.		STD	TS7	
32	64	6644	20	0	0010	3795.		CLA	TS10	3
32	65	6645	24	0	0011	3796.		SUB	TS11	
33	64	6646	56	0	0002	3797.		ALS	2	
33	65	6647	10	0	0013	3798.		STD	TS13	DEL(M)-DEL(E) AT 1.
34	64	6650	20	0	0000	3799.		CLA	TS0	1
34	65	6651	54	0	0001	3800.		LRS	1	2
35	64	6652	24	0	4065	3801.		SUB	1B2	
35	65	6653	26	0	0043	3802.		MPR	SI	0+2=2
36	64	6654	56	0	0001	3803.		ALS	1	
36	65	6655	10	0	0014	3804.		STD	TS14	1
37	64	6656	20	0	0001	3805.		CLA	TS1	
37	65	6657	26	0	0103	3806.		MPR	CI	0+1=1
30	66	6660	32	0	0014	3807.		ADZ	TS14	
30	67	6661	32	0	0013	3808.		ADZ	TS13	X11 IN A AT 1.
31	66	6662	14	0	4007	3809.		LDQ	ZERO	
31	67	6663	54	0	0003	3810.		LRS	3	4
32	66	6664	04	0	0012	3811.		DVP	TS12	DEL E CORRECTION AT 3.

32	67	6665	32 0 0011	3812.		ADZ	TS11	DEL E
33	66	6666	40 0 6543	3813.		TRA	ELPRD1	
				3814.	*			
				3815.	*			DOUBLE PRECISION SQUARE SUBROUTINE.
				3816.	*			
33	67	6667	12 0 0023	3817.	DPSQ	STQ	SREX	
34	66	6670	30 0 0001	3818.		CLZ	TS1	A SQ MS
34	67	6671	30 0 0002	3819.		CLZ	TS2	A SQ LS
35	66	6672	50 1 0002	3820.		AXT	2,1	
35	67	6673	20 1 0004	3821.	DPSQ1	CLA	TS4,1	
36	66	6674	06 1 0004	3822.		MPY	TS4,1	
36	67	6675	32 0 0001	3823.		*ADZ	TS1	
37	66	6676	46 0 6716	3824.		TMI	DPSQ3	CHECK FOR D.F.
37	67	6677	10 0 0001	3825.		STQ	TS1	
30	70	6700	12 0 0003	3826.		STQ	TS3	
30	71	6701	30 0 0002	3827.		CLZ	TS2	
31	70	6702	32 0 0003	3828.		*ADZ	TS3	
31	71	6703	10 0 0002	3829.		STQ	TS2	
32	70	6704	46 0 6706	3830.		TMI	*+2	CHECK FOR D.F.
32	71	6705	40 0 6714	3831.		TRA	DPSQ2	
33	70	6706	24 0 4036	3832.		*SUB	MS	
33	71	6707	10 0 0002	3833.		STQ	TS2	
34	70	6710	30 0 0001	3834.		CLZ	TS1	
34	71	6711	22 0 4006	3835.		*ADD	1B17	
35	70	6712	46 0 6716	3836.		TMI	DPSQ3	CHECK FOR D.F.
35	71	6713	10 0 0001	3837.		STQ	TS1	
36	70	6714	42 1 6673	3838.	DPSQ2	TIX	DPSQ1,1	
36	71	6715	40 0 0023	3839.		TRA	SREX	
37	70	6716	20 0 4030	3840.	DPSQ3	CLA	PMAX	D.F. DETECTED.
37	71	6717	10 0 0001	3841.		STQ	TS1	
30	72	6720	40 0 0023	3842.		TRA	SREX	
				3843.	*			
				3844.	*			NORMALIZE SUBROUTINE.
				3845.	*			
30	73	6721	12 0 0022	3846.	NORM	STQ	SREX1	
31	72	6722	44 0 6723	3847.		TQV	*+1	CLEAR D.F.
31	73	6723	14 0 0002	3848.		LQD	TS2	A SQ LS

32	72	6724	50	1	0007	3849.	AXT	7,1	8 SHIFTS(16 PLACES) POSSIBLE
32	73	6725	20	0	0001	3850.	CLA	TS1	A SQ MS
33	72	6726	52	0	0002	3851.	*LLS	2	
33	73	6727	44	0	6735	3852.	TOV	NORM1	
34	72	6730	10	0	0001	3853.	STO	TS1	NORMALIZED A.
34	73	6731	42	1	6725	3854.	TIX	*-4,1	
35	72	6732	20	0	4017	3855.	CLA	8B17	
35	73	6733	22	0	4035	3856.	ADD	S4DUM	LRS 0
36	72	6734	40	0	0022	3857.	TRA	SREX1	
36	73	6735	20	1	4000	3858.	NORM1 CLA	7B17,1	
37	72	6736	40	0	6733	3859.	TRA	*-3	
						3860.	*		
						3861.	*		DOUBLE PRECISION VECTOR MAGNITUDE.
						3862.	*		
37	73	6737	12	0	0021	3863.	DPVMAG STQ	SREX2	SAVE RET ADDRS.
30	74	6740	72	0	6667	3864.	TSQ	DPSQ	TO DOUB PREC SQ.
30	75	6741	72	0	6721	3865.	TSQ	NORM	TO NORMALIZE.
31	74	6742	10	0	0020	3866.	STO	SREX3	LRS(I/2)
31	75	6743	30	0	0001	3867.	CLZ	TS1	NORMALIZED SQ.
32	74	6744	72	0	7123	3868.	TSQ	SQRTE	
32	75	6745	40	0	0020	3869.	TRA	SREX3	RE-NORMALIZE A-REG.
						3870.	*		
						3871.	*		DOUBLE PRECISION TIME SUBTRACT.
						3872.	*		
33	74	6746	12	0	0023	3873.	DPTSB STQ	SREX	
33	75	6747	20	0	0377	3874.	CLA	TA1	ABS TIME MS AT 18.
34	74	6750	24	1	0520	3875.	SUB	TE1,1	EPOCH TIME MS AT 18.
34	75	6751	56	0	0005	3876.	ALS	5	13
35	74	6752	10	0	0001	3877.	STO	TS1	
35	75	6753	20	1	0524	3878.	CLA	TF2,1	EPOCH TIME LS AT 1.
36	74	6754	54	0	0014	3879.	LRS	12	13
36	75	6755	10	0	0002	3880.	STO	TS2	
37	74	6756	20	0	0353	3881.	CLA	TA2	ABS TIME LS AT 1.
37	75	6757	54	0	0014	3882.	LRS	12	13
30	76	6760	34	0	0002	3883.	SUZ	TS2	
30	77	6761	32	0	0001	3884.	ADZ	TS1	
31	76	6762	10	0	0442	3885.	STO	TI	TIME DIFF AT 13.

31	77	6763	40	0	0023	3886.		TRA	SREX	
						3887.	*			
32	76	6764	12	0	0021	3888.	EXIT	STQ	SREX2	
32	77	6765	40	0	0021	3889.		TRA	SREX2	
						3890.	*			
						3891.	*			
						3892.	*			
						3893.	*			
									SINE-COSINE SUBROUTINE ENTER WITH ANGLE IN RADIANS AT B3 IN ACC AND RETURN IN Q	
33	76	6766	22	0	4021	3894.		ADD	2PIB3	
33	77	6767	46	0	6766	3895.	SIC0E	TMI	*-1	SET PLUS
34	76	6770	12	0	0023	3896.		STQ	SREX	
34	77	6771	10	0	0001	3897.		STQ	TS1	
35	76	6772	24	0	4021	3898.		SUB	2PIB3	SET BETWEEN 0-2PI
35	77	6773	46	0	6775	3899.		TMI	*+2	
36	76	6774	10	0	0001	3900.		STQ	TS1	
36	77	6775	20	0	4023	3901.		CLA	PI/2	
37	76	6776	24	0	0001	3902.		SUB	TS1	
37	77	6777	10	0	0000	3903.		STQ	TS0	PI/2-ALPHA
40	60	7000	46	0	7021	3904.		TMI	SIC01	- IS GREATER THAN 90
40	61	7001	50	1	0001	3905.		AXT	1,1	
41	60	7002	20	1	0000	3906.	SIC02	CLA	TS0,1	
41	61	7003	56	0	0002	3907.		ALS	2	TO 1
42	60	7004	10	1	0000	3908.		STQ	TS0,1	
42	61	7005	26	1	0000	3909.		MPR	TS0,1	
43	60	7006	10	0	0002	3910.		STQ	TS2	ALPHA SQUARED AT 2
43	61	7007	26	0	4025	3911.		MPR	K173	2-6=-4
44	60	7010	22	0	4026	3912.		ADD	K172	
44	61	7011	26	0	0002	3913.		MPR	TS2	-2
45	60	7012	22	0	4027	3914.		ADD	K171	
45	61	7013	26	0	0002	3915.		MPR	TS2	0
46	60	7014	22	0	4030	3916.		ADD	K170	
46	61	7015	26	1	0000	3917.		MPR	TS0,1	1
47	60	7016	10	1	0000	3918.		STQ	TS0,1	
47	61	7017	42	1	7002	3919.		TIX	SIC02,1	
40	62	7020	40	0	0023	3920.		TRA	SREX	EXIT
40	63	7021	22	0	4023	3921.	SIC01	ADD	PI/2	
41	62	7022	10	0	0001	3922.		STQ	TS1	PI-ALPHA

41	63	7023	46	0	7025	3923.	TMI	*+2	- IS GREATER THAN 180
42	62	7024	40	0	7001	3924.	TRA	SIC02-1	
42	63	7025	22	0	4023	3925.	ADD	PID2	
43	62	7026	60	0	0000	3926.	COM		
43	63	7027	10	0	0000	3927.	STO	TS0	ALPHA-3PI/2
44	62	7030	46	0	7001	3928.	TMI	SIC02-1	- IS BETWEEN 180 AND 270
44	63	7031	24	0	4023	3929.	SUB	PID2	
45	62	7032	10	0	0001	3930.	STO	TS1	ALPHA-2PI
45	63	7033	40	0	7001	3931.	TRA	SIC02-1	
					3932.		*		
					3933.		*		
					3934.		*		ARCTANGENT SUBROUTINE ENTER WITH SINE AND
					3935.		*		COSINE AT 1 IN TS3 AND TS4
46	62	7034	12	0	0023	3936.	ARCTAE STO	SREX	SET EXIT
46	63	7035	20	0	0003	3937.	CLA	TS3	
47	62	7036	62	0	0000	3938.	ABS		
47	63	7037	10	0	0001	3939.	STO	TS1	
40	64	7040	20	0	0004	3940.	CLA	TS4	
40	65	7041	44	0	7042	3941.	TOV	*+1	
41	64	7042	62	0	0000	3942.	ABS		
41	65	7043	22	0	0001	3943.	*ADD	TS1	KCOS+KSIN
42	64	7044	44	0	7047	3944.	TOV	*+3	D.F. CHECK.
42	65	7045	20	0	0004	3945.	CLA	TS4	
43	64	7046	40	0	7055	3946.	TRA	*+7	
43	65	7047	30	0	0001	3947.	CLZ	TS1	D.F. RE-SCALE.
44	64	7050	54	0	0001	3948.	LRS	1	
44	65	7051	10	0	0001	3949.	STO	TS1	ABS SIN.
45	64	7052	30	0	0004	3950.	CLZ	TS4	
45	65	7053	54	0	0001	3951.	LRS	1	
46	64	7054	10	0	0004	3952.	STO	TS4	COS
46	65	7055	46	0	7113	3953.	TMI	ARCTA2	- IS 2ND OR 3RD QUAD
47	64	7056	22	0	0001	3954.	ADD	TS1	
47	65	7057	10	0	0002	3955.	STO	TS2	
40	66	7060	20	0	4024	3956.	CLA	PID4	
40	67	7061	10	0	0005	3957.	STO	TS5	1/4 PI
41	66	7062	20	0	0001	3958.	CLA	TS1	
41	67	7063	24	0	0004	3959.	SUB	TS4	SIN-COS

42	66	7064	14	0	4007	3960.	ARCTA1	LDQ	ZERO	
42	67	7065	54	0	0001	3961.		LRS	1	
43	66	7066	04	0	0002	3962.		DVP	TS2	
43	67	7067	10	0	0006	3963.		STO	TS6	=X AT 1
44	66	7070	06	0	0006	3964.		MPY	TS6	
44	67	7071	10	0	0007	3965.		STO	TS7	X SQUARED AT 2
45	66	7072	26	0	4031	3966.		MPR	K183	-1
45	67	7073	22	0	4032	3967.		ADD	K182	
46	66	7074	06	0	0007	3968.		MPY	TS7	1
46	67	7075	22	0	4033	3969.		ADD	K181	
47	66	7076	06	0	0007	3970.		MPY	TS7	3
47	67	7077	52	0	0001	3971.		LLS	1	2
40	70	7100	22	0	4034	3972.		ADD	K180	
40	71	7101	26	0	0006	3973.		MPR	TS6	3
41	70	7102	22	0	0005	3974.		ADD	TS5	
41	71	7103	10	0	0001	3975.		STO	TS1	
42	70	7104	20	0	0003	3976.		CLA	TS3	
42	71	7105	46	0	7110	3977.		TMI	*+3	
43	70	7106	20	0	0001	3978.		CLA	TS1	
43	71	7107	40	0	0023	3979.		TRA	SREX	EXIT
44	70	7110	20	0	4021	3980.		CLA	2PIB3	PHI GREATER THAN 180
44	71	7111	24	0	0001	3981.		SUB	TS1	
45	70	7112	40	0	0023	3982.		TRA	SREX	
45	71	7113	20	0	4022	3983.	ARCTA2	CLA	3PID4	
46	70	7114	10	0	0005	3984.		STO	TS5	3/4 PI
46	71	7115	20	0	0004	3985.		CLA	TS4	
47	70	7116	24	0	0001	3986.		SUB	TS1	
47	71	7117	10	0	0002	3987.		STO	TS2	
40	72	7120	20	0	0001	3988.		CLA	TS1	
40	73	7121	22	0	0004	3989.		ADD	TS4	
41	72	7122	40	0	7064	3990.		TRA	ARCTA1	
						3991.	*			
						3992.	*			
						3993.	*			
						3994.	*			
						3995.				
41	73	7123	12	0	0023	3995.	SQRTE	STQ	SREX	
42	72	7124	10	0	0001	3996.		STQ	TS1	

SQUARE ROOT SUBROUTINE ENTER WITH
 SQUARE IN ACC AND RETURN IN Q

42	73	7125	60	0	0000	3997.	COM		TEST FOR ZERO OR NEG
43	72	7126	46	0	7131	3998.	TMI	*+3	
43	73	7127	20	0	4007	3999.	CLA	ZERO	SET ROOT EQUAL ZERO
44	72	7130	40	0	0023	4000.	TRA	SREX	
44	73	7131	30	0	0002	4001.	CLZ	TS2	SET TS2=0
45	72	7132	72	0	6721	4002.	TSQ	NORM	TO NORMALIZE
45	73	7133	10	0	0022	4003.	STO	SREX1	SAVE SHIFT
46	72	7134	20	0	0001	4004.	CLA	TS1	
46	73	7135	54	0	0001	4005.	LRS	1	.5SQ
47	72	7136	10	0	0133	4006.	STO	TS8	
47	73	7137	12	0	0001	4007.	STQ	TS1	
40	74	7140	54	0	0002	4008.	LRS	2	.125SQ
40	75	7141	22	0	0133	4009.	ADD	TS8	.625SQ
41	74	7142	22	0	7147	4010.	ADD	KSR	.375+.625SQ=RN-1
41	75	7143	50	1	0001	4011.	AXT	1,1	2 ITERATIONS
42	74	7144	10	0	0002	4012.	SQRT1 STO	TS2	
42	75	7145	54	0	0001	4013.	LRS	1	.5 RN-1
43	74	7146	10	0	0000	4014.	STO	TS0	
43	75	7147	14	0	0001	4015.	KSR LDQ	TS1	KSR=.375+DELTA
44	74	7150	20	0	0133	4016.	CLA	TS8	
44	75	7151	04	0	0002	4017.	DVP	TS2	
45	74	7152	32	0	0000	4018.	ADZ	TS0	.5SQ/RN-1+.5RN-1=RN
45	75	7153	42	1	7144	4019.	TIX	SQRT1,1	
46	74	7154	40	0	0022	4020.	TRA	SREX1	TO SHIFT
						4021.	*		
						4022.	*	ANGLE BETWEEN VECTORS SUBROUTINE.	
						4023.	*		
46	75	7155	12	0	0022	4024.	ABVEC STO	SREX1	
47	74	7156	20	0	0010	4025.	CLA	TS10	BX
47	75	7157	26	0	0006	4026.	MPR	TS4+2	AZ
40	76	7160	54	0	0001	4027.	LRS	1	
40	77	7161	10	0	0002	4028.	STO	TS2	
41	76	7162	20	0	0004	4029.	CLA	TS4	AX
41	77	7163	26	0	0012	4030.	MPR	TS10+2	BZ
42	76	7164	54	0	0001	4031.	LRS	1	
42	77	7165	34	0	0002	4032.	SUZ	TS2	
43	76	7166	10	0	0003	4033.	STO	TS3	SIN THETA

43	77	7167	20	0	0004	4034.	CLA	TS4	AX	
44	76	7170	26	0	0010	4035.	MPR	TS10	BX	
44	77	7171	54	0	0001	4036.	LRS	1		
45	76	7172	10	0	0002	4037.	STO	TS2		
45	77	7173	20	0	0006	4038.	CLA	TS4+2	AZ	
46	76	7174	26	0	0012	4039.	MPR	TS10+2	BZ	
46	77	7175	54	0	0001	4040.	LRS	1		
47	76	7176	32	0	0002	4041.	ADZ	TS2		
47	77	7177	10	0	0004	4042.	STO	TS4	COS THETA	
50	60	7200	72	0	7034	4043.	TSQ	ARCTAE		
50	61	7201	40	0	0022	4044.	TRA	SREX1	THETA IN A AT 3.	
						4045.	*			
						4046.	*	DEDA PROCESSING ENTRY		
						4047.	*			
51	60	7202	20	0	0333	4048.	ADDOUT	CLA	ADST	OUTPUT ADDRESS
51	61	7203	22	0	5033	4049.		ADD	DUMCLA	
52	60	7204	10	0	1000	4050.		STO	CLADD	SET CLA OF DATA
52	61	7205	54	0	0011	4051.		LRS	9	
53	60	7206	50	1	0002	4052.		AXT	2,1	
53	61	7207	52	0	0003	4053.		LLS	3	3 BITS PER PASS
54	60	7210	66	0	2200	4054.		OUT	DEDA	
54	61	7211	66	0	2600	4055.		OUT	S4OUT	SET SHIFT OUT
55	60	7212	56	0	0022	4056.		*ALS	18	TIME DELAY
55	61	7213	42	1	7207	4057.		TIX	*-4,1	
56	60	7214	40	0	1000	4058.		TRA	CLADD	GET DATA
56	61	7215	10	0	0326	4059.	ROR	STO	DD	
57	60	7216	46	0	7353	4060.		TMI	SNS	TEST SIGN
57	61	7217	20	0	4007	4061.		CLA	ZERO	POSITIVE
50	62	7220	66	0	2200	4062.	SOUT	OUT	DEDA	OUTPUT SIGN
50	63	7221	66	0	2600	4063.		OUT	S4OUT	
51	62	7222	20	0	0027	4064.		CLA	OCTF	OCTAL OR DECIMAL OUTPUT
51	63	7223	46	0	7247	4065.		TMI	OCTO	
52	62	7224	40	0	1122	4066.	EX46	TRA	EXIT46	
52	63	7225	20	0	0326	4067.		CLA	DD	DECIMAL OUTPUT
53	62	7226	26	0	0026	4068.		MPR	SF	SCALE FACTOR
53	63	7227	62	0	0000	4069.		ABS		MAGNITUDE
54	62	7230	50	1	0004	4070.	*	AXT	4,1	OUTPUT 5 DIGITS

54	63	7231	44	0	7232	4071.	TOV	*+1	
55	62	7232	14	0	4007	4072.	LDQ	ZERO	
55	63	7233	04	0	4042	4073.	*DVP	BCDL	DIVIDE BY 100K
56	62	7234	12	0	0001	4074.	STQ	TS1	
56	63	7235	30	0	0001	4075.	CLZ	TS1	UNROUNDED QUOTIENT
57	62	7236	22	0	4006	4076.	ADD	1B17	ROUND UP
57	63	7237	44	0	7355	4077.	TOV	MAX	TEST FOR TOO LARGE
50	64	7240	06	0	4041	4078.	DOUT MPY	10B17	EXTRACT DIGIT
50	65	7241	66	0	2200	4079.	DUT	DEDA	OUTPUT
51	64	7242	66	0	2600	4080.	DUT	SHOUT	
51	65	7243	12	0	0001	4081.	STQ	TS1	REMAINDER
52	64	7244	30	0	0001	4082.	CLZ	TS1	
52	65	7245	42	1	7240	4083.	TIX	*-5,1	
53	64	7246	40	0	1123	4084.	TRA	EXIT47	
53	65	7247	14	0	0326	4085.	OCTD LDQ	DD	OCTAL OUTPUT
54	64	7250	50	1	0004	4086.	AXT	4,1	OUTPUT 5 OCTAL DIGITS
54	65	7251	52	0	0003	4087.	*LLS	3	EXTRACT DIGIT
55	64	7252	66	0	2200	4088.	DUT	DEDA	OUTPUT
55	65	7253	66	0	2600	4089.	DUT	SHOUT	
56	64	7254	56	0	0022	4090.	*ALS	18	TIME DELAY
56	65	7255	42	1	7251	4091.	TIX	*-4,1	
57	64	7256	40	0	1123	4092.	TRA	EXIT47	
57	65	7257	10	0	0325	4093.	RME STD	RMF	READOUT ENTRY
50	66	7260	66	0	2500	4094.	DUT	SHIN	ENTER ENTRY SET SHIFT IN
50	67	7261	30	0	0327	4095.	CLZ	CMF	RESET CLEAR MODE
51	66	7262	30	0	0027	4096.	CLZ	OCTF	OCTAL FLAG
51	67	7263	30	0	0326	4097.	CLZ	DD	CLEAR DEDA DATA
52	66	7264	20	0	4007	4098.	CLA	ZERO	
52	67	7265	50	1	0002	4099.	AXT	2,1	INPUT 3 DIGIT ADDRESS
53	66	7266	56	0	0003	4100.	ALS	3	
53	67	7267	10	0	0333	4101.	STD	ADST	
54	66	7270	64	0	2200	4102.	INP	DEDA	INPUT DIGIT
54	67	7271	66	0	2500	4103.	DUT	SHIN	SET SHIFT IN
55	66	7272	54	0	0015	4104.	LRS	13	
55	67	7273	24	0	4017	4105.	SUB	8B17	TEST FOR ERROR
56	66	7274	46	0	7276	4106.	TMI	*+2	
56	67	7275	40	0	1124	4107.	TRA	EXIT48	ERROR EXIT

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57	66	7276	22	0	4017	4108.	ADD	8B17	
57	67	7277	32	0	0333	4109.	ADZ	ADST	ASSEMBLE ADDRESS
50	70	7300	42	1	7266	4110.	TIX	*-10,1	
50	71	7301	10	0	0333	4111.	STO	ADST	
51	70	7302	64	0	2200	4112.	INP	DEDA	
51	71	7303	66	0	2500	4113.	OUT	SHIN	
52	70	7304	56	0	0004	4114.	*ALS	4	
52	71	7305	10	0	0002	4115.	STO	TS2	SIGN
53	70	7306	20	0	0333	4116.	CLA	ADST	
53	71	7307	40	0	1125	4117.	TRA	EXIT49	SCALE FACTOR SELECT
54	70	7310	20	0	4036	4118.	NOTDD	CLA	MS
54	71	7311	10	0	0027	4119.	STO	DCTF	SET OCTAL FLAG
55	70	7312	20	0	0325	4120.	CLA	RMF	EXIT IF READOUT
55	71	7313	46	0	1123	4121.	TMI	EXIT47	
56	70	7314	50	1	0004	4122.	AXT	4,1	INPUT 5 OCTAL DIGITS
56	71	7315	64	0	2200	4123.	INP	DEDA	
57	70	7316	66	0	2500	4124.	OUT	SHIN	
57	71	7317	54	0	0016	4125.	LRS	14	
50	72	7320	32	0	0326	4126.	ADZ	DD	ASSEMBLE WORD
50	73	7321	52	0	0003	4127.	LLS	3	
51	72	7322	10	0	0326	4128.	STO	DD	
51	73	7323	42	1	7315	4129.	TIX	*-6,1	
52	72	7324	32	0	0002	4130.	ADZ	TS2	ADD SIGN
52	73	7325	40	0	7344	4131.	TRA	STDD	
53	72	7326	20	0	0325	4132.	DDIN	CLA	RMF
53	73	7327	46	0	1123	4133.	TMI	EXIT47	DECIMAL DATA
54	72	7330	50	1	0004	4134.	AXT	4,1	EXIT IF READOUT
54	73	7331	40	0	7336	4135.	TRA	**5	READ 5 DIGITS
55	72	7332	66	0	2500	4136.	OUT	SHIN	
55	73	7333	06	0	7512	4137.	MPY	10B4	MULTIPLY BY 10
56	72	7334	52	0	0004	4138.	LLS	4	SCALE
56	73	7335	10	0	0326	4139.	STO	DD	
57	72	7336	64	0	2200	4140.	INP	DEDA	
57	73	7337	54	0	0015	4141.	LRS	13	
50	74	7340	32	0	0326	4142.	ADZ	DD	ASSEMBLE WORD
50	75	7341	42	1	7332	4143.	TIX	*-7,1	
51	74	7342	40	0	1126	4144.	EX50	TRA	EXIT50

51	75	7343	04	0	0026	4145.		DVP	SF	SCALE FACTOR
52	74	7344	10	0	0326	4146.	STDD	STO	DD	
52	75	7345	30	0	0002	4147.		CLZ	TS2	
53	74	7346	46	0	7350	4148.		TMI	*+2	COMPLEMENT IF MINUS
53	75	7347	40	0	1127	4149.		TRA	EXIT51	IMMEDIATE ACTION TEST
54	74	7350	30	0	0326	4150.		CLZ	DD	COMPLEMENT
54	75	7351	60	0	0000	4151.		COM		
55	74	7352	40	0	7344	4152.		TRA	STDD	
55	75	7353	20	0	4006	4153.	SNS	CLA	1B17	PICK UP NEGATIVE SIGN
56	74	7354	40	0	7220	4154.		TRA	SOUT	
56	75	7355	20	0	4030	4155.	MAX	CLA	PMAX	GET MAXIMUM NUMBER
57	74	7356	40	0	7240	4156.		TRA	DOUT	
						4157.	*			
						4158.	*			
						4159.	*			
						4160.	ATI	CLA	MU10	CYCLE COUNT
57	75	7357	20	0	0615	4160.		LDQ	ZERO	
50	76	7360	14	0	4007	4161.		DVP	M25B16	MINUS SEC AT 1
50	77	7361	04	0	0667	4162.		ADD	DTB	1+TIME BIAS
51	76	7362	22	0	0670	4163.		ADD	1B1	+1 SEC
51	77	7363	22	0	5033	4164.		STO	TA2	2+BIAS-CYCLE COUNT
52	76	7364	10	0	0353	4165.		CLA	DD	INPUT TIME
52	77	7365	20	0	0326	4166.		SUB	1B17	T-2 SEC
53	76	7366	24	0	4006	4167.		STO	TA1	MOST SIG ABS TIME
53	77	7367	10	0	0377	4168.		TRA	EXIT47	
54	76	7370	40	0	1123	4169.				
						4170.	*			
						4171.	*			
						4172.	*			
						4173.	TME	STQ	SREX	
54	77	7371	12	0	0023	4173.		INP	DISC11	
55	76	7372	64	0	2020	4174.		*ALS	2	TEST FOR STOP
55	77	7373	56	0	0002	4175.		TMI	SREX	EXIT IF NOT
56	76	7374	46	0	0023	4176.		CLZ	TMID	
56	77	7375	30	0	0723	4177.		ADD	1B17	INCREMENT IDENT NUMBER
57	76	7376	22	0	4006	4178.		STQ	TMID	
57	77	7377	10	0	0723	4179.		ADD	TMCLA	SET UP TO GET WORD
60	60	7400	22	0	1006	4180.		STO	SREX-2	
60	61	7401	10	0	0021	4181.				

61	60	7402	24	0	1006	4182.	SUB	TMCLA	GET ID
61	61	7403	56	0	0014	4183.	*ALS	12	
62	60	7404	66	0	6200	4184.	OUT	TMIDO	OUTPUT IDENTIFICATION
62	61	7405	20	0	4045	4185.	CLA	TMOUT	OUTPUT INSTRUCTION
63	60	7406	10	0	0022	4186.	STD	SREX-1	
63	61	7407	40	0	0021	4187.	TRA	SREX-2	
						4188.	*		
						4189.	*	TELEMETRY INITIALIZE	
						4190.	*		
64	60	7410	30	0	0723	4191.	TMIE2	CLZ	RESET TO FIRST WORD
64	61	7411	50	1	0002	4192.	AXT	2,1	
65	60	7412	20	1	0130	4193.	CLA	A11,1	SAVE DIRECTION COSINES
65	61	7413	10	1	0330	4194.	STD	A11T,1	FOR TELEMETRY
66	60	7414	20	1	0134	4195.	CLA	A31,1	
66	61	7415	10	1	0334	4196.	STD	A31T,1	
67	60	7416	42	1	7412	4197.	TIX	*-4,1	
67	61	7417	40	0	6764	4198.	TRA	EXIT	
						4199.	*		
						4200.	*	PGNS DOWNLINK INPUT	
						4201.	*		
60	62	7420	12	0	0023	4202.	PGNSDE	STQ	SREX
60	63	7421	20	0	0563	4203.	CLA	DEL32	DOWNLINK INITIALIZE FLAG
61	62	7422	46	0	7424	4204.	TMI	*+2	
61	63	7423	40	0	0023	4205.	TRA	SREX	EXIT
62	62	7424	64	0	2020	4206.	INP	DISC11	
62	63	7425	56	0	0001	4207.	*ALS	1	TEST FOR STOP
63	62	7426	46	0	0023	4208.	TMI	SREX	PULSE RECEIVED
63	63	7427	64	0	6200	4209.	INP	DLREG	INPUT WORD
64	62	7430	54	0	0002	4210.	LRS	2	DISCARD UNWANTED BITS
64	63	7431	10	0	0012	4211.	STD	TS12	SAVE INPUT
65	62	7432	20	0	0570	4212.	CLA	ID1F	TEST FOR PRIOR ID
65	63	7433	46	0	7450	4213.	TMI	PGNSD1	NUMBER 1 FOUND
66	62	7434	30	0	0012	4214.	CLZ	TS12	TEST IF CURRENT
66	63	7435	46	0	0023	4215.	TMI	SREX	WORD IS AN ID
67	62	7436	24	0	0671	4216.	SUB	ID	TEST FOR PROPER ID
67	63	7437	62	0	0000	4217.	ABS		
60	64	7440	60	0	0000	4218.	COM		

60	65	7441	46	0	0023	4219.	TMI	SREX	
61	64	7442	20	0	4025	4220.	CLA	K173	IS IDAI OR IDRP
61	65	7443	10	0	0570	4221.	STO	ID1F	SET FLAG
62	64	7444	30	0	0562	4222.	CLZ	DLWN	ZERO WORD NUMBER
62	65	7445	20	0	4011	4223.	PGNSD2 CLA	1B5	
63	64	7446	10	0	0037	4224.	STO	DLSC	SET SHIFT COUNT
63	65	7447	40	0	0023	4225.	TRA	SREX	EXIT
64	64	7450	40	0	1023	4226.	PGNSD1 TRA	EXIT7	
64	65	7451	30	0	0037	4227.	CLZ	DLSC	
65	64	7452	56	0	0001	4228.	*ALS	1	TEST FOR ID
65	65	7453	46	0	7445	4229.	TMI	PGNSD2	WORD EXPECTED
66	64	7454	10	0	0037	4230.	STO	DLSC	
66	65	7455	30	0	0562	4231.	CLZ	DLWN	
67	64	7456	22	0	4006	4232.	ADD	1B17	INCREMENT WORD NUMBER
67	65	7457	10	0	0562	4233.	STO	DLWN	
60	66	7460	22	0	1010	4234.	ADD	DLSTO	FORM STORE COMMAND
60	67	7461	10	0	0022	4235.	STO	SREX-1	
61	66	7462	24	0	0672	4236.	SUB	DLWNL	TEST FOR LAST WORD
61	67	7463	46	0	7467	4237.	TMI	**4	
62	66	7464	30	0	0570	4238.	CLZ	ID1F	RESET ID1 FLAG
62	67	7465	30	0	0563	4239.	CLZ	DEL32	RESET INITIALIZE FLAG
63	66	7466	10	0	0571	4240.	STO	DEL31	SET DATA RECEIVED FLAG
63	67	7467	30	0	0012	4241.	CLZ	TS12	
64	66	7470	56	0	0003	4242.	*ALS	3	
64	67	7471	40	0	0022	4243.	TRA	SREX-1	
						4244.	*		
						4245.	*	SELF-TEST ROUTINE	
65	66	7472	20	0	0572	4246.	TEST CLA	FLAGT	
65	67	7473	46	0	7722	4247.	TMI	CKSUM	
66	66	7474	20	0	0412	4248.	CLA	S12	
66	67	7475	24	0	7701	4249.	SUB	1B3	
67	66	7476	46	0	7502	4250.	TMI	**4	
67	67	7477	24	0	4065	4251.	SUB	1B2	
60	70	7500	46	0	7503	4252.	TMI	**3	-IS LESS THAN 3
60	71	7501	40	0	1130	4253.	TRA	EXIT52	
61	70	7502	66	0	7010	4254.	OUT	7010	
						4255.	*	LOGIC TEST	

									ACCUM.	Q REG.	OPER.
61	71	7503	44 0	7504	4256.		TOV	*+1			
62	70	7504	14 0	4030	4257.		LDQ	K170		377777	377777
62	71	7505	20 0	4020	4258.		CLA	SIXTH	252525	377777	252525
63	70	7506	56 0	0001	4259.		*ALS	1	525252		
63	71	7507	12 0	0000	4260.	1K7	STQ	TS0			
64	70	7510	72 0	7775	4261.		TSQ	OVFLW		TEST FOR OVERFLOW	
64	71	7511	54 0	0021	4262.		LRS	17	777777	525252	
65	70	7512	24 0	0000	4263.	10B4	SUB	TS0	400000	525252	377777
65	71	7513	12 0	0000	4264.		STQ	TS0			
66	70	7514	44 0	7772	4265.		TOV	ERROR		TEST RESET OF OVERFLOW	
66	71	7515	60 0	0000	4266.		*COM		400000		
67	70	7516	46 0	7520	4267.		TMI	*+2			
67	71	7517	40 0	7772	4268.		TRA	ERROR			
60	72	7520	14 0	0000	4269.	3B3	LDQ	TS0	400000	525252	525252
60	73	7521	52 0	0021	4270.		*LLS	17	125252	000000	
61	72	7522	12 0	0001	4271.		STQ	TS1			
61	73	7523	72 0	7775	4272.		TSQ	OVFLW			
62	72	7524	24 0	0001	4273.		SUB	TS1	125252		000000
62	73	7525	24 0	0000	4274.		*SUB	TS0	400000		525252
63	72	7526	56 0	0001	4275.		*ALS	1	000000		
63	73	7527	72 0	7775	4276.		TSQ	OVFLW			
64	72	7530	14 0	4003	4277.		LDQ	4B17	000000	000004	00004
64	73	7531	52 0	0037	4278.		LLS	31	200000	000000	
65	72	7532	44 0	7772	4279.		TOV	ERROR		NO OVERFLOW	
65	73	7533	14 0	4036	4280.		LDQ	MS	200000	400000	400000
66	72	7534	12 0	0001	4281.		STQ	TS1			
66	73	7535	54 0	0020	4282.		LRS	15	000001	000000	
67	72	7536	22 0	0001	4283.		ADD	TS1	400001	000000	400000
67	73	7537	12 0	0002	4284.		STQ	TS2			
60	74	7540	22 0	0002	4285.		ADD	TS2			
60	75	7541	46 0	7543	4286.		TMI	*+2			
61	74	7542	40 0	7772	4287.		TRA	ERROR			
61	75	7543	22 0	4030	4288.		ADD	K170	000000	000000	377777
62	74	7544	46 0	7772	4289.		TMI	ERROR			
62	75	7545	44 0	7772	4290.		TOV	ERROR			
63	74	7546	60 0	0000	4291.		COM		000000		
63	75	7547	72 0	7767	4292.		TSQ	ACCUM	777777		

64	74	7550	60	0	0000	4293.	COM		000001			
64	75	7551	62	0	0000	4294.	ABS		000001			
65	74	7552	50	1	0007	4295.	AXT	7,1				
55	75	7553	10	1	0000	4296.	STO	TS0,1				
65	74	7554	24	0	4006	4297.	SUB	1B17				
66	75	7555	42	1	7553	4298.	TIX	*-2,1				
67	74	7556	20	0	4006	4299.	CLA	1B17	000001		000001	
67	75	7557	30	0	0004	4300.	CLZ	TS4	777776		777776	
60	76	7560	56	0	0017	4301.	ALS	15	600000			
60	77	7561	44	0	7772	4302.	TOV	ERROR				
61	76	7562	36	0	0005	4303.	MPZ	TS5	000001	200000	777777	
61	77	7563	34	0	0007	4304.	SUZ	TS7	000000	200000	000001	
62	76	7564	52	0	0003	4305.	LLS	3	000004	000000		
62	77	7565	32	0	0002	4306.	ADZ	TS2	000000	000000	777774	
63	76	7566	50	1	0003	4307.	AXT	3,1				
63	77	7567	22	1	0004	4308.	ADD	TS4,1				
64	76	7570	42	1	7567	4309.	TIX	*-1,1				
64	77	7571	50	1	0007	4310.	AXT	7,1				
65	76	7572	50	1	0000	4311.	AXT	0,1				
65	77	7573	34	1	0003	4312.	SUZ	TS3,1	000003	000000	777775	
66	76	7574	42	1	7772	4313.	TIX	ERROR,1				
66	77	7575	50	1	0002	4314.	AXT	2,1				
67	76	7576	32	0	0001	4315.	ADZ	TS1	777776	000000	777773	
67	77	7577	42	1	7600	4316.	TIX	*+1,1				
70	60	7600	42	1	7601	4317.	TIX	*+1,1				
70	61	7601	34	1	0000	4318.	SUZ	TS0,1	000004	000000	777772	
71	60	7602	50	1	0003	4319.	AXT	3,1				
71	61	7603	32	1	0000	4320.	ADZ	TS0,1				
72	60	7604	42	1	7603	4321.	TIX	*-1,1				
72	61	7605	22	0	4036	4322.	ADD	MS	400004		400000	
73	60	7606	62	0	0000	4323.	ABS		377774			
73	61	7607	22	0	4030	4324.	*ADD	K170	777773		377777	
74	60	7610	72	0	7775	4325.	TSQ	OVFLW				
74	61	7611	62	0	0000	4326.	ABS		000005			
75	60	7612	52	0	0000	4327.	LLS	0				
75	61	7613	24	0	4002	4328.	SUB	5B17	000000		000005	
76	60	7614	72	0	7767	4329.	TSQ	ACCUM	777777			

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76	61	7615	20	0	0000	4330.	CLA	TS0	000000		000000
77	60	7616	40	0	7621	4331.	TRA	*+3			
77	61	7617	72	0	7767	4332.	TSQ	ACCUM	777777		
70	62	7620	40	0	7622	4333.	TRA	*+2			
70	63	7621	40	0	7617	4334.	TRA	*-2			
71	62	7622	10	0	0000	4335.	STQ	TS0			
71	63	7623	22	0	4006	4336.	ADD	1B17	000000		000001
72	62	7624	20	0	0000	4337.	CLA	TS0	777777		777777
72	63	7625	24	0	0000	4338.	SUB	TS0	000000		777777
73	62	7626	72	0	7767	4339.	TSQ	ACCUM	777777		
73	63	7627	56	0	0020	4340.	ALS	15	600000		
74	62	7630	06	0	0000	4341.	MPY	TS0	000000	200000	777777
74	63	7631	12	0	0001	4342.	STQ	TS1			
75	62	7632	22	0	0001	4343.	ADD	TS1	200000	200000	200000
75	63	7633	24	0	5033	4344.	SUB	1B1	000000	200000	200000
76	62	7634	22	0	4020	4345.	ADD	SIXTH	252525	200000	252525
76	63	7635	26	0	4004	4346.	MPR	3B17	000002	377777	000003
77	62	7636	22	0	0000	4347.	ADD	TS0	000001	377777	777777
77	63	7637	04	0	4005	4348.	DVP	2B17	377777	377777	000002
70	64	7640	44	0	7772	4349.	TOV	ERROR			
70	65	7641	12	0	0002	4350.	STQ	TS2			
71	64	7642	24	0	4030	4351.	SUB	K170	000000	377777	377777
71	65	7643	24	0	4030	4352.	SUB	K170	400001	377777	377777
72	64	7644	22	0	0002	4353.	ADD	TS2	000000	377777	377777
72	65	7645	22	0	4020	4354.	ADD	SIXTH	252525	377777	252525
73	64	7646	24	0	4002	4355.	SUB	5B17	252520	377777	000005
73	65	7647	26	0	4020	4356.	MPR	SIXTH	161612	161620	252525
74	64	7650	12	0	0002	4357.	STQ	TS2			
74	65	7651	24	0	0002	4358.	SUB	TS2	777772	161620	161620
75	64	7652	54	0	0021	4359.	LRS	17	777777	777772	
75	65	7653	04	0	4003	4360.	DVP	4B17	777777	777776	000004
76	64	7654	12	0	0002	4361.	STQ	TS2			
76	65	7655	22	0	0002	4362.	ADD	TS2	777775	777776	777776
77	64	7656	22	0	4004	4363.	ADD	3B17	000000	777776	000003
77	65	7657	24	0	4020	4364.	SUB	SIXTH	525253	777776	252525
70	66	7660	10	0	0003	4365.	STQ	TS3			
70	67	7661	26	0	0003	4366.	MPR	TS3	161616	307071	525253

71	66	7662	04	0	0003	4367.	DVP	TS3	525251	525251	525253
71	67	7663	06	0	4020	4368.	MPY	SIXTH	616160	743435	252525
72	66	7664	04	0	4020	4369.	DVP	SIXTH	525251	525251	252525
72	67	7665	22	0	4005	4370.	ADD	2B17	525253	525251	000002
73	66	7666	22	0	0003	4371.	*ADD	TS3	252526		525253
73	67	7667	72	0	7775	4372.	TSQ	OVFLW			
74	66	7670	24	0	0003	4373.	*SUB	TS3	525253		525253
74	67	7671	72	0	7775	4374.	TSQ	OVFLW			
75	66	7672	24	0	4020	4375.	*SUB	SIXTH	252526		252525
75	67	7673	72	0	7775	4376.	TSQ	OVFLW			
76	66	7674	60	0	0000	4377.	COM				
76	67	7675	22	0	4020	4378.	ADD	SIXTH	777777		252525
77	66	7676	14	0	0006	4379.	LDQ	TS6	777777	000000	000000
77	67	7677	22	0	0000	4380.	ADD	TS0	777776	000000	777777
70	70	7700	54	0	0002	4381.	LRS	2	777777	600000	
70	71	7701	04	0	0000	4382.	IB3 *DVP	TS0	200000	177777	777777
71	70	7702	12	0	0000	4383.	STQ	TS0			
71	71	7703	72	0	7775	4384.	TSQ	OVFLW			
72	70	7704	24	0	0000	4385.	SUB	TS0	000001		177777
72	71	7705	24	0	4006	4386.	SUB	1B17	000000		000001
73	70	7706	72	0	7767	4387.	TSQ	ACCUM	777777		
73	71	7707	20	0	4004	4388.	CLA	3B17			
74	70	7710	04	0	4005	4389.	*DVP	2B17			
74	71	7711	72	0	7775	4390.	TSQ	OVFLW			END OF LOGIC TEST
75	70	7712	20	0	4036	4391.	SETFG CLA	MS			
75	71	7713	10	0	0572	4392.	STQ	FLAGT			SET TEST FLAG
76	70	7714	30	0	0137	4393.	CLZ	SUM			
76	71	7715	20	0	1007	4394.	CLA	TCLTH			INITIALIZE MEMORY
77	70	7716	10	0	0024	4395.	STQ	TVARBR			TEST
77	71	7717	20	0	7002	4396.	CLA	CLATEN			
70	72	7720	10	0	0663	4397.	STQ	SUMLIM			
70	73	7721	40	0	1130	4398.	TRA	EXIT52			
						4399.	* CKSUM	MEMORY CHECKSUM ROUTINE			
71	72	7722	72	0	7750	4400.	TSQ	MEMSUM			PERFORM SUMMATION
71	73	7723	30	0	0137	4401.	CLZ	SUM			TEST SUM
72	72	7724	46	0	7727	4402.	TMI	*+3			
72	73	7725	24	0	4006	4403.	SUB	1B17			

73	72	7726	46	0	7742	4404.	TMI	COREX	
73	73	7727	20	0	0412	4405.	CLA	S12	INCORRECT SUM
74	72	7730	24	0	7520	4406.	SUB	3B3	SET TEST WORD BITS
74	73	7731	46	0	7735	4407.	TMI	*+4	AND TEST MODE FAILURE
75	72	7732	20	0	5427	4408.	CLA	7B3	INDICATOR
75	73	7733	10	0	0412	4409.	STD	S12	
76	72	7734	40	0	7737	4410.	TRA	*+3	
76	73	7735	20	0	5033	4411.	CLA	1B1	
77	72	7736	66	0	6410	4412.	OUT	6410	
77	73	7737	10	0	0412	4413.	STD	S12	
70	74	7740	30	0	0572	4414.	CLZ	FLAGT	RESET FLAG
70	75	7741	40	0	1130	4415.	TRA	EXIT52	
71	74	7742	20	0	0412	4416.	COREX CLA	S12	CORRECT SUM
71	75	7743	24	0	4006	4417.	SUB	1B17	
72	74	7744	46	0	7746	4418.	TMI	*+2	
72	75	7745	40	0	7740	4419.	TRA	*-5	
73	74	7746	20	0	7701	4420.	CLA	1B3	
73	75	7747	40	0	7737	4421.	TRA	COREX-3	
74	74	7750	12	0	0023	4422.	MEMSUM STD	SREX	MEMORY SUMMATION SUBRT.
74	75	7751	30	0	0153	4423.	CLZ	WRDCNT	
75	74	7752	72	0	0024	4424.	TSQ	TVARBR	
75	75	7753	32	0	0137	4425.	*ADZ	SUM	FORM SUM
76	74	7754	10	0	0137	4426.	STD	SUM	
76	75	7755	20	0	0024	4427.	CLA	TVARBR	
77	74	7756	24	0	0663	4428.	SUB	SUMLIM	TEST FOR LIMIT
77	75	7757	46	0	7761	4429.	TMI	*+2	
70	76	7760	40	0	0023	4430.	TRA	SREX	
70	77	7761	30	0	0153	4431.	CLZ	WRDCNT	
71	76	7762	22	0	4006	4432.	ADD	1B17	
71	77	7763	10	0	0153	4433.	STD	WRDCNT	INCREMENT WORD COUNTER
72	76	7764	24	0	0664	4434.	SUB	WORDS	
72	77	7765	46	0	7752	4435.	TMI	MEMSUM+2	
73	76	7766	40	0	1131	4436.	TRA	EXIT53	
73	77	7767	46	0	7772	4437.	ACCUM TMI	ERROR	SUBROUTINE TO TEST FOR
74	76	7770	24	0	4006	4438.	SUB	1317	ZERO ACCUMULATOR
74	77	7771	46	0	6764	4439.	TMI	EXIT	
75	76	7772	20	0	7520	4440.	ERROR CLA	3B3	

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75	77	7773	10	0	0412	4441.		STD	S12	
76	76	7774	40	0	7712	4442.		TRA	SETFG	
76	77	7775	44	0	6764	4443.	OVFLW	TOV	EXIT	OVERFLOW TEST
77	76	7776	40	0	7772	4444.		TRA	ERROR	
						4445.	*			
						4446.	*			
						4447.	*			
									INPUT-OUTPUT ADDRESSES	
77	77	7777						CHECKSUM		RANGE 4000-7776
			6200			4448.	DLREG	DEFINE	6200	
			2020			4449.	DISC1I	DEFINE	2020	DISCRETE INPUT WORD 1
			2040			4450.	DISC2I	DEFINE	2040	DISCRETE INPUT WORD 2
			2200			4451.	DEDA	DEFINE	2200	
			2001			4452.	SIALO	DEFINE	2001	DEFINE OUTPUT REGISTERS
			2002			4453.	COALO	DEFINE	2002	FOR FDAI ANGLES
			2004			4454.	SIBEO	DEFINE	2004	
			2010			4455.	COBEO	DEFINE	2010	
			2020			4456.	SIGAO	DEFINE	2020	
			2040			4457.	COGAO	DEFINE	2040	
			6001			4458.	EXO	DEFINE	6001	DEFINE THE ATT ERROR
			6002			4459.	EYO	DEFINE	6002	OUTPUT REGISTERS
			6004			4460.	EZO	DEFINE	6004	
			6200			4461.	TMIDO	DEFINE	6200	
			2600			4462.	SHOUT	DEFINE	2600	
			2500			4463.	SHIN	DEFINE	2500	
			0000			4464.		END		

TRW

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CHECKSUM CALCULATIONS

RANGE	LOC.	VALUE
0207 - 1004	0206	505072
1005 - 3776	3777	023521
4000 - 7776	7777	225333

SYMBOL DICTIONARY TABLE

1000D	357	10B17	2268	10B4	4263	10J	199	11J	517
12B4	2791	12J	255	16J	203	17J	394	18J	264
1B1	2818	1B11	2244	1B12	2245	1B13	2246	1B14	2247
1B17	2235	1B2	2295	1B3	4382	1B4	2240	1B5	2241
1B6	2242	1B9	2243	1J	246	1J1	212	1J2	X 213
1J3	X 214	1J4	233	1J5	X 234	1J6	X 235	1J7	224
1J7LS	225	1K1	427	1K11	X 429	1K13	X 433	1K14	422
1K18	419	1K19	423	1K20	X 420	1K21	X 424	1K22	X 421
1K23	X 425	1K24	479	1K25	X 2251	1K26	480	1K27	481
1K28	482	1K29	483	1K3	431	1K30	473	1K33	484
1K34	485	1K35	486	1K36	487	1K37	469	1K4	478
1K6	X 428	1K7	4260	1K8	X 432	1K9	472	21J	204
22J	379	23J	380	25J	196	28J1	364	28J2	365
28J3	366	2B17	2234	2B3	2237	2J	461	2J1	216
2J2	X 217	2J3	218	2J4	237	2J5	X 238	2J6	X 239
2J7	243	2J7LS	244	2K1	488	2K11	413	2K14	189
2K17	474	2K18	363	2K19	201	2K2	489	2K20	367
2K3	188	2K4	518	2PIB3	2250	3B17	2233	3B3	4269
3J	260	3K4	254	3PID4	2252	49B17	2267	4B17	2232
4J	256	4K10	508	4K12	397	4K2	502	4K21	512
4K23	476	4K25	362	4K26	368	4K27	386	4K3	503
4K34	506	4K35	507	4K4	438	4K5	200	4K6	414
5B17	2231	5B3	2238	5J	202	5K14	439	5K16	X 440
5K17	X 467	5K18	240	5K20	410	5K26	381	6B17	X 2230
6B3	2239	6J	257	6J1	490	5J2	X 491	6J3	X 492
6K10	X 446	6K10S	591	6K11	208	6K12	261	6K13	455
6K14	406	6K2	371	6K4	370	6K5	247	6K6	409
6K6S	592	6K8	443	6K8S	588	6K9	X 445	6K9S	590
7B17	2229	7B3	3095	7J	197	7K1	245	7K2	498
8B17	2248	8J	198	A11	113	A11BD	312	A11D	139
A11T	275	A12	114	A12BD	X 313	A12D	140	A12T	X 276
A13	115	A13BD	X 314	A13D	141	A13T	X 277	A21	121
A22	122	A23	123	A31	117	A31BD	249	A31D	143
A31S	435	A31T	279	A32	118	A32BD	X 250	A32D	144

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A32S	X	436	A32T	X	280	A33		119	A33BD	X	251	A33D		145
A33S	X	437	A33T	X	281	ABVEC	X	4024	ACCUM		4437	ADDMS		690
ADOUT		4048	ADST		278	AE		152	AHE		2546	AHE1		2555
AI		151	AL		156	ALPHA		148	ALTUP		1133	ARCTA1		3960
ARCTA2		3983	ARCTAE		3936	AT		76	ATI		4160	ATTERR		2556
B13SF	X	493	B13VSF	X	499	B18SF	X	511	B22RSF	X	504	B23RSF	X	501
B23SF	X	521	B3SF	X	500	BACCSF	X	505	BACK		2271	BCDL		2269
BETAR		229	BM13SF	X	520	BR1		606	BR2EX		3046	BR50		608
BRANCH		68	C1		402	C11		166	C12		167	C13		168
C14		169	C2		42	C21	X	170	C22		171	C23	X	172
C24		173	C31		174	C31AD		1294	C32		175	C33		176
C34		177	C41		178	C42		179	C43		180	C44		181
CAD		1299	CAL	X	1988	CALIB1		788	CALIB2		806	CDCC		2347
CDH		2220	CDH2		2189	CDH3		2193	CI		91	CKSUM		4400
CLADD		596	CLAFR		2273	CLATAB		653	CLATEN		2274	CLEARM		821
CLEARP		269	CMF		274	COA21		2436	COALD		4453	COBEO		4455
CODELL		60	COGA		112	COGAD		4457	COREX		4416	CRSPRD		3617
CSI	X	2144	CSICDH		2128	CMPV		2901	CSMT1		3158	D11		40
D31		48	D31AD		1288	DA11		131	DA12	X	132	DA13	X	133
DA31		135	DA32	X	136	DA33	X	137	DAD		1164	DAX		296
DAXA		415	DAXREM		399	DAY		297	DAYA		416	DAYREM		400
DAZ		298	DAZA		417	DAZREM		401	DD		273	DDEL		430
DDF		369	DDIN		4132	DEDA		4451	DEDA3R		607	DEDAE		811
DEDASC		547	DEL10		130	DEL2		452	DEL20		459	DEL21		460
DEL31		449	DEL32		442	DEL42		462	DEL44		138	DEL45		463
DEL46		232	DEL5		453	DEL6		325	DELAY		2281	DELH		319
DELP		3351	DELR1		193	DELR2		195	DEL33		194	DELRP		262
DELVGX		391	DELVGY	X	392	DELVGZ	X	393	DEXIT		819	DIAK1		586
DIAK2	X	587	DIAT		865	DICOS		2392	DIGX		97	DIGY		98
DIGZ		99	DISC1		418	DISC1C		317	DISC1I		4449	DISC2I		4450
DLDC		887	DLREG		4448	DLSC		46	DLSTO		604	DLWN		441
DLWNL		516	DLWNL		689	DOUT		4078	DPDOUT		359	DPOUT		187
DPSQ		3817	DPSQ1		3821	DPSQ2		3838	DPSQ3		3840	DPTSB		3873
DPVMAG		3863	DQSX		59	DRX		93	DRY	X	94	DRZ	X	95
DSP1		1940	DSP2CP		1953	DSPF1		447	DSPLY		3548	DSPLY1		3558
DSPLY2		3576	DSPLY3		3590	DSPLY4		3599	DSPSC		426	DTR		514

DUMCLA	2277	DVGXX	456	DVGXY	X 457	DVGXZ	X 458	DVINT	2462
DVS	2303	DVSX	105	DVSY	105	DVSZ	107	DVX	292
DVXMI	82	DVY	293	DVYM1	83	DVZ	294	DVZM1	84
DX10P	1568	DXFR1	1557	DXFR10	X 1567	DXFR13	1604	DXFR14	1662
DXFRA	1635	DXFRR5	1573	E1	127	E13	129	E3	128
EADICS	2785	ELPRD	3724	ELPRD1	3730	ELPRD2	3775	ELPRD3	3793
ENCOM1	953	ENTERP	267	EONS10	287	EROUT	2578	ERROR	4440
ESQ	150	EX	77	EX1	2300	EX15	2687	EX17	2705
EX27	3082	EX28	2988	EX29	3005	EX3	2342	EX30	3026
EX33	3186	EX33P	2104	EX33PP	2118	EX34	3224	EX34P	696
EX35	2112	EX36	3397	EX36P	550	EX4	2390	EX44	3683
EX45	3696	EX46	4066	EX50	4144	EX8	2460	EX9	2485
EXFC	3534	EXEC1	3603	EXEC2	1971	EXEC3	2056	EXEC6	2072
EXEC7	1968	EXECA	2020	EXECM	1975	EXECM1	1977	EXECM2	2051
EXIT	3888	EXIT1	612	EXIT10	621	EXIT11	622	EXIT12	623
EXIT13	624	EXIT14	625	EXIT15	626	EXIT16	627	EXIT17	628
EXIT18	629	EXIT19	630	EXIT2	613	EXIT20	631	EXIT21	632
EXIT22	633	EXIT23	635	EXIT24	639	EXIT25	640	EXIT26	645
EXIT27	646	EXIT28	647	EXIT29	652	EXIT3	614	EXIT30	654
EXIT31	655	EXIT32	656	EXIT33	657	EXIT34	658	EXIT35	659
EXIT36	660	EXIT37	661	EXIT38	662	EXIT39	663	EXIT4	615
EXIT40	664	EXIT41	671	EXIT42	672	EXIT43	673	EXIT44	679
EXIT45	680	EXIT46	681	EXIT47	682	EXIT48	683	EXIT49	684
EXIT5	616	EXIT50	685	EXIT51	686	EXIT52	687	EXIT53	688
EXIT6	617	EXIT7	618	EXIT8	619	EXIT9	620	FXD	4458
EY	78	EYEZ	2564	EYD	4459	EZ	79	EZD	4460
FDAI	2673	FDAI1	2078	FDAIL	2742	FLAG1	451	FLAGT	450
FLTR	1150	FLTRA	1171	FLTRJ	X 1205	FLTRE	1213	FLTRH	1235
FLTRI	1238	FLTRJ	1274	FLTRTM	1345	FLTRX	1417	GDRAW	3441
GDRAW3	1803	GDRAW4	1820	GM	X 1542	GRAV	3072	GRAV1	3089
GSESR	3494	GXDT	101	GYCOM	2317	GYDT	X 102	GZDT	X 103
H	282	HDDT	307	HET	835	HMF	270	HOLDP	268
HRC	2517	HRC1	2529	HRF	434	HRINT	2538	I	342
IC1	2852	IC1BR	605	IC2	X 2369	IC3	X 2891	ID	515
ID1F	448	IDAI	677	IDLE	1925	IDRP	678	IMPBK1	3400
IMUDC	X 2842	INCMU7	2003	INIT	3480	INTAS	2419	IR	963

IR1	974	IR2	992	IR3	1000	IR4	967	IR5	1090
IR6	1084	J	343	K	344	K170	2258	K171	2257
K172	2256	K173	2255	K180	2263	K181	2262	K182	2261
K183	2260	K55	464	KDT	519	KINGK	1499	KSR	4015
LL3DOT	2084	LMORB	3111	LMORB1	3151	LMORB2	1473	LRI	2506
LUNAL	2613	LUNAL1	1107	LUNAZ	3458	M1B1	2330	M25B15	513
MABEE	2066	MAX	4155	MEMSUM	4422	MODCK X	778	MODE	1008
MODE1	1015	MS	2265	MU10	471	MU17	146	MU19	475
MU3	465	MU6	468	MU7	497	MU8	470	MU8S12	303
MXM	1430	NAV X	2916	NAV1	2931	NAV1P	1117	NAV2	2939
NAV3	2949	NAV4	2953	NE	86	NEWDD	2024	NI	85
NMAX	2266	NOC	2760	NORM	3846	NORM1	3858	NORMV	3643
NORTON	2087	NOTDD	4118	O25C	634	OCTF	32	OCTO	4085
ORBI2	1701	ORBIT3 X	1597	OR3LIN	761	ORBLM	1479	ORBPARG X	3000
ORBPM	3664	ORBPM1	3670	ORBRET	546	OUT	1926	OUT1	1881
OVFLT	1929	OVFLW	4443	P	147	P11	524	P12 X	525
P13 X	526	P14 X	527	P21 X	528	P22	529	P23 X	530
P24 X	531	P31	532	P32 X	533	P33	534	P34 X	535
P41 X	536	P42 X	537	P43 X	538	P44	539	PAD	1410
PART	382	PDDTM1	355	PDDUT	360	PGNSD1	4226	PGNSD2	4223
PGNSDE	4202	PHIP	104	PI	454	PID2	2253	PID4	2254
PINIT	1403	PITER1	3333	PITER2	3362	PITER3	3367	PMAX	2259
PMAXP X	545	POUT	186	POUTFS	185	PP	184	PSIP	100
PUPDAT X	1201	Q1	149	Q1DEDA	318	Q5	1747	Q7	1893
QA	263	QL	286	QLTELE	320	R	182	RO	165
ROX	161	ROY	162	ROZ	154	R1	1453	R2	1444
R3	1435	R5X	153	R5Y	154	R5Z	155	RADCK	1052
RADOT	390	RANGE X	1237	RATE X	1209	RB	353	RCX	288
RCY X	289	RCZ X	290	RD2DOT	52	RD3DOT	395	RD3DTL	466
RDOTS	332	READP	266	RETURN	3520	REX	157	REY	158
REFZ	159	RF	291	RFDOT	338	RIX	190	RIV	191
RIZ	192	RM	230	RMDOT	231	RME	4093	RMF	272
RND	598	RND1	2422	RND2	2539	ROR	4059	RPT	831
RR	265	RRDOT	356	RREX	561	RREX1	562	RREX2	565
RRSX	205	RRSY X	206	RRSZ X	207	RRT	2100	RRX	109
RRY X	110	RRZ	111	RSHFT	1383	RST	2603	RST1 X	991

RSTF	980	RT	160	RVCOMP	2881	RVSAR	1399	PX	283
RY	284	RZ	285	S0	315	S10	326	S11	327
S12	328	S13	X 329	S14	330	S15	331	S16	333
S17	334	S507	398	S623	477	SDVX	494	SDVY	X 495
SDVZ	X 496	SETFG	4391	SF	31	SFLD	544	SFTAB	733
SFTEST	845	SHDUM	2264	SHFT1	2423	SHFT2	2540	SHIN	4463
SHOUT	4462	SI	51	SIALD	4452	SIBED	4454	SIC01	3921
SIC02	3906	SIC0E	3895	SIDELL	55	SIGA	108	SIGAO	4456
SINITC	641	SIXTH	2249	SNS	4153	SOFT1	934	SOFT2	1035
SOFT3	947	SOUT	4062	SPULSE	2756	SQRT1	4012	SQRTE	3995
SREX	25	SREX1	24	SREX2	23	SREX3	22	STDD	4146
STEER	X 1833	STEER1	1843	STEER3	1870	STEER4	1876	STEST	1459
STGCTR	648	STOCOM	2276	SUM	120	SUMLIM	509	T	352
TA0	310	TA1	315	TA2	295	TB	354	TBO	299
TBRAKE	3376	TCLTH	603	TCSM	361	TDEL	258	TE1	407
TE2	411	TEST	4246	THEF	699	THEP	96	THETAF	253
THETAR	228	TI	358	TIG	311	TIMEA	3529	TL1	408
TL2	412	TLDS	252	TMCLA	602	TME	4173	TMID	543
TMIDD	4461	TMIE1	718	TMIE2	4191	TMOJT	2272	TMPBR	64
TP	351	TR	259	TR1	92	TR2	126	TR3	81
TR4	375	TR5	377	TR6	376	TR8	87	TRACOM	2275
TRNSFR	2270	TS0	6	TS1	7	TS10	14	TS11	15
TS12	16	TS13	17	TS14	18	TS15	19	TS16	20
TS17	21	TS2	8	TS3	9	TS4	10	TS5	11
TS6	12	TS7	13	TS8	116	TSEX	54	TVARBR	26
TVTGT	907	UIX	65	UIY	X 66	UIZ	67	U2X	37
U2Y	X 38	U2Z	X 39	UBCOMP	772	V	350	VOX	339
VOY	340	V07	341	V1X	43	V1Y	X 44	V1Z	X 45
V2X	69	V2Y	X 70	V2Z	71	V5X	372	V5Y	373
V5Z	374	V6X	56	V6Y	57	V6Z	58	VCX	304
VCY	X 305	VCZ	X 306	VD1X	321	VD1Y	322	VD1Z	323
VD2X	88	VD2Y	X 89	VD2Z	X 90	VDX	383	VDY	X 384
VDZ	X 385	VEX	335	VEY	X 336	VEZ	X 337	VF	309
VFX	41	VG	308	VGX	72	VH	345	VHA	378
VHSQ	125	VIX	347	VIY	X 348	VIZ	X 349	VPY	236
VRSH	540	VRUP1	1619	VSMGX	387	VSMGY	388	VSMGZ	389

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VX	300	VY	301	VY0	241	VYDFS	242	VZ	302
WIX	47	W1Y	49	W1Z	50	WBX	403	WBY	X 404
WBZ	X 405	WCX	61	WCY	62	WCZ	X 63	WORDS	510
WRDCNT	134	WRDLP	3502	X3	80	X4	124	XDV	1716
XDV1	1720	XDV2	1734	XDV3	1738	XDVS	1123	XI	248
XORBV1	3171	XORBV2	3196	Y	183	YD2DOT	X 53	YD3DOT	X 396
ZERO	2236	ZERR	938	ZNOC	2839				

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SYMBOL REFERENCE TABLE

6 TS0	561	CLA	562	MPY	565	STO	706	STO	712	CLA	1246	STO *	1255	MPY
	1258	CLZ	1766	STO	1809	STO	1848	STO	1930	CLA	2295	STO	2305	CLZ *
	2791	CLZ	2798	CLZ	2818	CLA	2831	CLZ	3090	STO	3095	SUZ	3134	STO
	3135	MPZ	3314	STO	3324	CLZ	3351	CLZ	3520	STO	3524	CLZ	3732	CLA
	3746	ADD	3769	ADZ	3799	CLA	3903	STO	3906	CLA *	3908	STO *	3909	MPR *
	3917	MPR *	3918	STO *	3927	STO	4014	STO	4018	ADZ	4260	STO	4263	SJB
	4264	STO	4269	LDQ	4274	SUB	4296	STO *	4318	SUZ *	4320	ADZ *	4330	CLA
	4335	STO	4337	CLA	4338	SUB	4341	MPY	4347	ADD	4380	ADD	4382	DVP
	4383	STO	4385	SUB										
7 TS1	917	STO	923	ADZ	936	STO	941	CLZ	1759	STO	1765	SUZ	1777	STO
	1780	ADZ	1801	STO	1807	DVP	1879	STO	1884	ADZ	1885	STO	1888	ADZ
	2080	STO	2146	STO	2150	CLA	2178	MPR	2180	STO	2183	SUB	2297	STO
	2352	STO	2392	CLA	2424	STO	2430	ADZ	2438	STO	2441	SUZ	2446	STO
	2449	SUZ	2454	STO	2457	SUZ	2465	STO	2468	ADZ	2469	STO	2472	ADZ
	2541	STO	2618	STO	2622	MPY	2630	MPY	2644	STO	2649	SUZ	2655	STO
	2659	SUZ	2679	STO	2682	ADZ	2710	STO	2713	SUZ	2719	STO	2722	SUZ
	2746	STO	2753	ADZ	2789	CLZ	2796	CLZ	2812	CLA	2823	CLZ	2939	CLZ
	2943	ADZ	2944	STO	2961	STO	2984	CLZ	3033	STO	3036	CLZ	3147	STO
	3150	DVP	3202	STO	3205	SUZ	3211	STO	3214	SUZ	3233	STO	3258	ADZ
	3290	STO	3293	SUZ	3335	STO	3344	CLZ	3381	STO	3384	CLA	3387	CLZ
	3389	STO	3393	CLZ	3463	STO	3467	DVP	3472	DVP	3691	STO	3695	DVP
	3703	STO	3714	MPZ	3715	STO	3718	DVP	3735	CLA	3753	ADD	3763	MPY
	3805	CLA	3818	CLZ	3823	ADZ	3825	STO	3834	CLZ	3837	STO	3841	STO
	3850	CLA	3853	STO	3867	CLZ	3877	STO	3884	ADZ	3897	STO	3900	STO
	3902	SUB	3922	STO	3930	STO	3939	STO	3943	ADD	3947	CLZ	3949	STO
	3954	ADD	3958	CLA	3975	STO	3978	CLA	3981	SUB	3986	SUB	3988	CLA
	3996	STO	4004	CLA	4007	STO	4015	LDQ	4074	STO	4075	CLZ	4081	STO
	4082	CLZ	4271	STO	4273	SUB	4281	STO	4283	ADD	4315	ADZ	4342	STO
	4343	ADD												
8 TS2	1252	ADZ	1762	STO	1767	CLZ	2149	STO	2157	ADD	2167	SUB	2179	ADD
	2299	STO	2360	STO	2396	CLA	2625	STO	2633	ADZ	2634	STO	2637	ADZ

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2665 ADZ	2666 STO	2684 STO	2688 CLA	2694 DVP	2701 DVP	2959 STO
2974 CLZ	3240 STO	3243 SUZ	3249 STO	3252 SUZ	3309 STO	3329 CLA
3341 DVP	3345 MPY	3390 STQ	3394 LDQ	3777 STO	3780 ADZ	3785 STO
3788 ADZ	3819 CLZ	3827 CLZ	3829 STO	3833 STO	3848 LDQ	3880 STQ
3883 SUZ	3910 STO	3913 MPR	3915 MPR	3955 STO	3962 DVP	3987 STO
4001 CLZ	4012 STO	4017 DVP	4028 STO	4032 SUZ	4037 STO	4041 ADZ
4115 STO	4130 ADZ	4147 CLZ	4284 STQ	4285 ADD	4306 ADZ	4350 STQ
4353 ADD	4357 STQ	4358 SUB	4361 STQ	4362 ADD		

9 TS3

701 ADZ	704 STQ	1520 CLZ	1533 ADD	1534 STO	1604 CLZ	1613 ADZ
1614 STO	2372 STO	2400 CLA	2815 STO	2828 CLZ	2971 STO	2979 CLZ
3273 STO	3354 STO	3358 CLZ	3366 STO	3369 ADZ	3749 STO	3776 MPR
3826 STO	3828 ADZ	3937 CLA	3976 CLA	4033 STO	4312 SUZ *	4365 STQ
4366 MPR	4367 DVP	4371 ADD	4373 SUB			

10 TS4

702 LDQ	703 STO	1153 STO *	1176 STO *	1216 ADD *	1250 STO *	1515 STO *
1521 CLZ	1526 ADD	1527 STO	1609 STO *	1618 CLZ	1623 ADZ	1524 STQ
1740 STO *	1748 STO	1760 CLA *	2209 STQ\$	2214 STO	2216 STQ\$	2375 STO
2404 CLA	2817 STO	2820 ADZ	2830 STO	2833 SUZ	2963 STO	2966 ADZ
3008 STO *	3064 STO *	3174 STO *	3285 STO	3418 STO *	3434 STO *	3618 CLA\$
3621 CLA\$	3625 CLA	3628 CLA\$	3632 CLA\$	3635 CLA	3821 CLA *	3822 MPY *
3940 CLA	3945 CLA	3950 CLZ	3952 STO	3959 SUB	3985 CLA	3989 ADD
4026 MPR\$	4029 CLA	4034 CLA	4038 CLA\$	4042 STO	4300 CLZ	4308 ADD *

11 TS5

1749 CLZ	2152 STO	2160 SUB	2209 STO	2381 STO	2408 CLA	2790 STO
2808 MPR	2819 MPR	2829 MPZ	3621 CLA	3632 CLA	3957 STO	3974 ADD
3984 STO	4303 MPZ					

12 TS6

1259 ADZ	2216 STO	2328 STO	2333 CLZ	2389 STO	2412 CLA	2792 STO
2804 MPR	2816 MPR	2832 MPZ	3618 CLA	3628 CLA	3963 STO	3964 MPY
3973 MPR	4026 MPR	4038 CLA	4379 LDQ			

13 TS7

1475 CLZ	2162 STO	2173 DVP	2358 STO	2373 CLZ	2799 STO	2803 CLA
2807 CLA	2824 MPZ	3087 STO	3093 MPR	3118 STO	3125 MPY	3402 STO
3405 ADZ	3411 STO	3414 ADZ	3499 STO	3513 CLZ	3620 STO	3623 SJZ
3627 STO	3630 SUZ	3634 STO	3637 SUZ	3725 CLZ	3740 CLZ	3757 STO

	3779 MPR	3794 STO	3965 STO	3968 MPY	3970 MPY	4304 SUZ		
14 TS10	691 CLA *	1103 CLZ *	1513 STO *	1523 CLZ *	1582 CLZ *	1611 STO *	1620 CLA *	
	1751 STO	1761 SUB *	1778 CLA *	1851 STO *	1853 MPR	1877 CLA	1956 STO	
	1962 ADZ	2168 STO	2171 ADD	2338 STO *	2347 CLA	2353 CLA	2380 SUB	
	2382 CLA	2383 MPR	2531 STO *	3011 STO *	3017 CLZ *	3091 CLZ *	3127 STO	
	3141 MPR	3171 CLA *	3578 STO	3584 ADZ	3619 MPR\$	3622 MPR\$	3626 MPR\$	
	3629 MPR	3633 MPR	3636 MPR\$	3658 STO *	3729 STO	3750 CLZ	3795 CLA	
	4025 CLA	4030 MPR\$	4035 MPR	4039 MPR\$				
15 TS11	1753 STO	1859 CLA	1863 CLA	1869 STO	1870 CLA	1871 MPR	1886 CLA	
	2174 STO	2177 CLA	2348 MPY	2359 SUB	2361 CLA	2362 MPR	2374 ADD	
	2376 CLA	3129 STO	3148 CLZ	3230 STO	3231 MPY	3241 CLA	3250 CLA	
	3280 CLZ	3619 MPR	3636 MPR	3665 CLZ	3680 ADZ	3681 STO	3730 STO	
	3751 SUZ	3796 SUB	3812 ADZ					
16 TS12	554 CLA	1875 STO	1882 CLA	1926 CLA	2122 STO	2351 ADD	2354 MPY	
	2365 CLA	2366 MPR	2377 MPY	3130 STO	3149 LDQ	3238 STO	3247 CLA	
	3281 ADZ	3392 STO	3412 CLA	3622 MPR	3626 MPR	3666 CLZ	3676 ADZ	
	3677 STO	3686 MPY	3739 STO	3759 MPR	3767 CLA	3772 DVP	3811 DVP	
	4030 MPR	4039 MPR	4211 STO	4214 CLZ	4241 CLZ			
17 TS13	556 CLA	1594 CLA	2098 CLA	2124 STO	3078 CLZ	3102 ADZ	3103 STO	
	3136 STO	3142 ADZ	3158 CLZ	3176 ADZ	3177 STO	3262 STO	3277 ADZ	
	3279 STO	3283 ADZ	3386 STO	3400 CLA	3652 STO	3657 DVP	3667 CLZ	
	3672 ADZ	3673 STO	3716 CLZ	3734 STO	3737 SUZ	3766 STO	3784 MPR	
	3798 STO	3808 ADZ						
18 TS14	1099 STO *	1528 CLZ *	1576 STO *	1783 STO *	1789 STO	1804 CLA *	1810 CLA *	
	1856 STO	1873 ADZ	2094 STO *	2126 STO	3075 STO *	3113 STO	3117 SUB	
	3137 CLZ	3165 STO *	3188 CLA\$	3196 CLZ *	3265 STO	3301 DVP	3396 STO	
	3403 CLA	3624 STO	3631 STO\$	3638 STO\$	3646 CLA *	3647 MPR *	3654 CLA *	
	3760 STO	3764 DVP	3804 STO	3807 ADZ				
19 TS15	1858 STO	1861 SUB	1865 CLA	1867 CLA	3114 STO	3138 LDQ	3188 CLA	
	3267 STO	3272 MPR	3294 MPY	3631 STO				

20	TS16	3287 STO	3297 ADZ	3298 STO	3306 MPZ	3638 STO		
21	TS17	3086 DVP	3644 CLZ	3648 ADZ	3649 STO	3773 STO	3787 MPR	
22	SREX3	1460 STQ	1472 TRA	3072 STQ	3107 TRA	3866 STO	3869 TRA	
23	SREX2	540 STO 3792 TRA	542 TRA 3863 STQ	3643 STQ 3888 STQ	3660 TRA 3889 TRA	3664 STQ 4181 STO	3720 TRA 4187 TRA	3724 STQ
24	SREX1	2785 STQ 4044 TRA	2836 TRA 4186 STO	3846 STQ 4235 STQ	3857 TRA 4243 TRA	4003 STO	4020 TRA	4024 STQ
25	SREX	598 STO 3617 STQ 3896 STQ 4173 STQ 4208 TMI 4430 TRA	601 TRA 3639 TRA 3920 TRA 4176 TMI 4215 TMI	2556 STQ 3817 STQ 3936 STQ 4181 STQ\$ 4219 TMI	2575 TRA 3839 TRA 3979 TRA 4186 STO\$ 4225 TRA	2609 STO 3842 TRA 3982 TRA 4187 TRA\$ 4235 STO\$	2742 STQ 3873 STO 3995 STQ 4202 STQ 4243 TRA\$	2754 TRA 3886 TRA 4000 TRA 4205 TRA 4422 STQ
26	TVARBR	47 STO 3501 STO 4424 TSQ	50 TSQ 3515 STO 4427 CLA	53 CLA 3516 TRA	3485 STO\$ 3518 TSQ	3487 STO 3521 CLZ	3488 TSQ 3523 STO	3489 CLA 4395 STQ
31	SF	863 STO	4068 MPR	4145 DVP				
32	OCTF	4064 CLA	4096 CLZ	4119 STO				
37	U2X	40 EQU 3401 MPZ *	41 EQU	2136 MPR *	3172 STO *	3175 MPR *	3203 CLA *	3212 CLA *
38	U2Y	NOT USED						
39	U2Z	NOT USED						
40	D11	1164 STO	1185 MPR	1351 MPZ				

41 VFX		3408 STO *	3433 CLA *					
42 C2		2108 SUB 3245 DVP	3185 STO 3254 DVP	3192 CLZ 3271 ADD	3194 STO	3198 DVP	3207 DVP	3216 DVP
43 V1X		1524 STO *	1621 STO *	1635 CLA *	1729 MPR *	1883 MPR *	3208 STO *	3413 MPR *
44 V1Y	NOT USED							
45 V1Z	NOT USED							
46 DLSC		1439 CLA	1443 STO	4224 STO	4227 CLZ	4230 STO		
47 W1X		48 EQU	1530 STO *	1640 CLA *	1725 MPR *	1887 MPR *	3199 STO *	
48 D31		1288 STO	1298 SUB	1313 CLA *	1316 STO *			
49 W1Y		70 DLY						
50 W1Z		69 TMI						
51 SI		3719 STO	3736 MPR	3802 MPR				
52 RD2DOT		1769 STO *	1774 ADD *	1827 ADZ	1828 STO	1845 CLA *	1849 CLA *	
53 YD2DOT	NOT USED							
54 TSEX		1550 STO	2088 STQ	2099 TRA				
55 SIDELL		2619 CLA	2629 ADD	3473 STO				
56 V6X		59 EQU	555 STO	2121 CLZ				
57 V6Y		557 STO	2123 CLZ					
58 V6Z		553 STO	2125 CLZ					

59	DOSX	1127 ADZ *	1128 STO *	1723 STO *	1726 ADZ *	1727 STO *	1730 SUZ *	1739 SUB *
60	CODELL	2621 ADD	2626 CLA	3468 STO				
61	WCX	983 CLA * 3018 STO *	1015 CLA *	1501 MPR *	1507 MPR *	1511 CLA *	1578 MPR *	1608 CLA *
62	WCY	3189 MPY						
63	WCZ	NOT USED						
64	TMPBR	826 CLZ	3541 STO					
65	UIX	55 TMI 1583 STO * 3173 CLA *	1144 MPY * 1610 CLA * 3200 CLA *	1181 CLA * 1645 CLA * 3209 CLA *	1182 MPR * 1722 MPR * 3410 MPR *	1348 CLA 1878 MPR *	1514 CLA * 3092 STO *	1532 MPR * 3101 MPR *
66	UIY	NOT USED						
67	UIZ	1349 MPR						
68	BRANCH	827 STO 3543 STO	1972 STO 3612 STO	2030 STO	2052 STO	2482 TMI	3534 STO	3540 CLZ
69	V2X	72 EQU	3217 STO *	3404 MPZ *				
70	V2Y	NOT USED						
71	V2Z	46 CLA						
72	VGX	1636 MPR * 1908 CLA *	1641 MPY * 1919 CLA *	1646 MPY * 3417 STO *	1741 STO *	1891 STO *	1898 CLA *	1903 CLA *
76	AT	1792 SUB	1847 DVP	2924 STO	2990 SUB	2993 STO	3449 DVP	
77	FX	928 CLZ *	988 ADZ	989 STO	1031 ADZ	1032 STO	1994 MPY *	1999 MPR *

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	2561 ADZ	2562 STO	2580 CLZ *	2584 STO *	2592 ADZ *	2593 STO *		
78 EY	1026 ADZ	1027 STO	2572 ADZ	2573 STO	2596 CLA			
79 EZ	1017 ADZ	1018 STO	2567 ADZ	2568 STO	2598 CLA			
80 X3	81 EQU	3255 STO	3256 MPY	3269 SUB	3274 CLA	3292 MPR	3382 MPZ	
81 TR3	582 CLA	1431 STO						
82 DVXM1	912 CLA *	2304 STO *						
83 DVYM1	2652 ADD							
84 DVZM1	2646 ADD							
85 NI	86 EQU 3762 MPR	87 EQU	715 DVP	3024 DVP	3707 STO	3727 MPR	3756 DVP	
86 NE	2156 MPR	2185 DVP						
87 TR8	564 ADZ	566 STO	1452 CLZ					
88 VD2X	910 ADZ *	911 STO *	914 ADZ *	915 STO *	920 ADZ *	921 STO *		
89 VD2Y	NOT USED							
90 VD2Z	NOT USED							
91 CI	92 EQU	3712 STO	3733 MPR	3743 CLA	3806 MPR			
92 TR1	583 STO	1195 STO	1444 CLA					
93 DRX	2894 CLZ *	2967 ADZ *	2968 STO *	2982 ADZ *	2983 STO *			
94 DRY	NOT USED							

95 DRZ	NOT USED								
96 THEP		2283 STO	2786 CLA						
97 DIGX		2896 STO * 3099 STO *	2931 CLZ	2955 ADZ *	2956 STO *	2977 ADZ *	2978 STO *	3098 ADZ *	
98 DIGY		2932 CLZ							
99 DIGZ		2933 CLZ							
100 PSIP		2287 STO	2793 CLA						
101 GXDT		2895 CLA *	3089 CLZ *	3094 STO *	3097 ADD *				
102 GYDT	NOT USED								
103 GZDT	NOT USED								
104 PHIP		2285 STO	2800 CLA						
105 DVSX		1124 CLA *	2475 ADZ *	2476 STO *	2893 CLZ *	2941 CLA *	2949 CLZ	2954 CLZ *	
106 DVSY		2950 CLZ							
107 DVSZ		2951 CLZ							
108 SIGA		2082 MPR	2695 STO	2709 MPR	2718 MPR				
109 RRX		876 CLA *	1152 STO *	1171 CLA *	1242 CLA *	1243 MPR *	1256 DVP		
110 RRY	NOT USED								
111 RRZ		1254 CLA							
112 COGA		2079 MPR	2702 STO	2712 MPR	2721 MPR				

113	A11	762 CLZ *	766 STD	794 CLA *	1016 MPR *	1025 MPR *	1094 CLA *	1899 MPY *
		2068 CLA *	2401 MPR *	2405 MPR *	2429 CLZ *	2431 STD *	2447 CLA	2452 CLA
		2463 CLA *	2551 CLA *	2720 CLA	2761 CLA *	2762 MPR *	2769 CLA *	2845 STD *
		4193 CLA *						
114	A12	2436 CLA	2455 CLA					
115	A13	2439 CLA	2444 CLA	2717 CLA				
116	TS8	2364 STD	2368 ADD	2385 ADZ	4006 STD	4009 ADD	4016 CLA	
117	A31	802 CLA *	878 CLA *	986 MPR *	1098 ADD *	1525 MPR *	1531 CLA *	1909 MPY *
		2397 MPR *	2413 MPR *	2445 MPR	2456 MPR	2470 CLA *	2570 MPR *	2613 CLA
		2614 MPR	2635 CLA	2641 CLA	2680 CLA	2681 MPR	2692 CLA	2765 CLA *
		2766 MPR *	2770 MPR *	3458 CLA	3459 MPR	4195 CLA *		
118	A32	2440 MPR	2453 MPR	2673 CLA	3465 CLA			
119	A33	767 STD	2437 MPR	2448 MPR	2677 CLA	2678 MPR	2699 CLA	3470 CLA
120	SUM	45 CLZ	51 ADZ	52 STD	56 CLZ	4393 CLZ	4401 CLZ	4425 ADZ
		4426 STD						
121	A21	798 CLA *	1029 MPR *	1090 CLA *	1904 MPY *	2078 CLA	2393 MPR *	2409 MPR *
		2443 STD	2466 CLA *	2559 MPR *	2566 MPR *	2636 MPR	2656 CLA	2711 CLA
122	A22	2451 STD	2624 MPR					
123	A23	2081 CLA	2459 STD	2632 MPR	2708 CLA			
124	X4	125 EQU	126 EQU	3246 STD	3268 CLA	3275 MPR	3289 MPR	3385 MPZ
125	VHSQ	1476 STD	1670 ADD	1824 SUZ				
126	TR2	1197 STD	1301 STD	1435 CLA				

127 E1	2371 ADZ 2839 CLZ	2532 CLZ *	2534 STO *	2763 ADZ	2764 STO	2778 SUZ *	2780 STO *
128 E3	2388 ADZ	2767 ADZ	2768 STO	2840 CLZ			
129 E13	2357 SUZ	2771 ADZ	2772 STO	2775 STO	2841 CLZ		
130 DEL10	550 STQ	696 CLZ	2110 CLZ				
131 DA11	763 CLZ * 2421 CLA * 2538 CLA *	2394 ADZ * 2427 ADZ * 2846 CLZ *	2395 STO * 2428 STO *	2398 ADZ * 2507 CLZ *	2399 STO * 2509 STO *	2402 ADZ * 2525 CLZ *	2403 STO * 2527 STO *
132 DA12	NOT USED						
133 DA13	NOT USED						
134 WRDCNT	49 CLZ	65 CLZ	67 STO	4423 CLZ	4431 CLZ	4433 STO	
135 DA31	2406 ADZ *	2407 STO *	2410 ADZ *	2411 STO *	2414 ADZ *	2415 STO *	
136 DA32	NOT USED						
137 DA33	NOT USED						
138 DEL44	966 STO	1063 CLZ					
139 A11D	2069 STO *	2552 STO *	2565 CLA *	2569 CLA *	2606 STO *	2806 STO	2844 CLA *
140 A12D	2797 STO	2813 MPR					
141 A13D	2811 STO						
143 A31D	2558 CLA *	2822 STO					
144 A32D	2827 STO						

145 A33D	2835 STO						
146 MU17	1201 CLZ	1204 STO					
147 P	166 EQU 3367 CLZ	1570 STO 3370 STO	3226 CLA 3379 DVP	3234 CLA 3388 MPY	3296 DVP	3299 CLA	3333 CLA
148 ALPHA	167 EQU	3302 STO	3305 MPR	3428 MPR			
149 Q1	150 EQU	168 EQU	2114 CLZ	3429 STO			
150 ESQ	3260 STO	3423 CLZ					
151 AI	152 EQU 3711 DVP	169 EQU 3713 CLA	1488 CLA 3747 MPY	3697 STO 3761 CLA	3701 DVP	3706 DVP	3708 CLA
152 AE	2147 DVP	2175 MPR	2192 ADD				
153 R5X	170 EQU	1574 STO *	1606 SUB *				
154 R5Y	171 EQU						
155 R5Z	172 EQU						
156 AL	173 EQU 2201 DVP	1704 STO	1709 SUB	1711 ADD	2193 STO	2194 CLA	2196 ADD
157 REX	174 EQU	1136 CLA *	1481 STO *	1588 CLA *	2903 STO *	3007 CLA *	
158 REY	175 EQU						
159 REZ	176 EQU						
160 RT	177 EQU	2129 CLA	3169 STO	3235 SUB	3237 DVP	3288 CLA	3395 DVP
161 POX	178 EQU	1483 STO *	1589 STO *	2857 STO *	2886 ADZ *	3009 STO *	3570 CLA *

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	3678 CLA *	3679 MPR *	3775 CLA *	3783 CLA *		
162 ROY	179 EQU					
164 ROZ	180 EQU					
165 RO	181 EQU	3685 STD	3692 CLA	3709 SUB	3748 DVP	3758 CLA
166 C11	1166 CLZ *	1191 STQ	1219 STD *	1299 STD	1315 DVP	1338 SUZ *
167 C12	1222 STD *	1225 CLA	1226 STQ			
168 C13	1224 LDQ	1227 STD	1355 STD			
169 C14	1309 STD	1317 MPY *				
170 C21	NOT USED					
171 C22	1192 STD	1228 CLZ				
172 C23	NOT USED					
173 C24	1311 STD	1356 STD				
174 C31	1167 CLZ *	1186 STD *	1289 CLA	1294 STD	1341 SUZ *	
175 C32	1283 SUB	1284 STD	1286 MPY	1352 STD		
176 C33	1285 STD	1345 CLA	1347 STQ			
177 C34	1292 CLA	1295 STQ	1296 MPY			
178 C41	1319 ADZ *	1320 STD *	1323 SUZ	1353 STD		
179 C42	1257 STD	1282 CLZ	1326 SUZ	1346 STD		
180 C43	1329 SUZ					

181 C44	1193 STO	1260 STO	1293 ADZ	1332 SUZ				
182 R	1143 STO 3079 STO	1161 DVP 3122 CLA	1162 DVP 3123 MPR	1163 DVP 3131 DVP	1782 ADD *	1823 DVP	1826 DVP	
183 Y	1496 CLZ	1503 ADZ	1504 STO					
184 PP	585 TRA	1430 STO	3334 SUZ	3368 STO				
185 POUTFS	3566 DVP	3570 DVP						
186 POUT	1945 STO	3555 CLZ	3568 CLA	3575 STO	3590 CLA			
187 DPOUT	3556 ADD	3567 STO	3573 CLZ					
188 2K3	3153 CLA							
189 2K14	1569 ADD	3362 CLA						
190 RIX	193 EQU 3164 CLA *	1500 STO * 3782 STO *	1573 CLZ *	1605 CLA *	2093 CLA *	2875 CLZ *	3055 CLZ *	
191 RIY	194 EQU							
192 RIZ	195 EQU							
193 DELR1	1211 STO	1241 STO *	1308 CLA					
194 DELR3	1263 MPR	1267 MPY						
195 DELR2	1310 CLA							
196 25J	1138 CLA	1141 CLA	1155 CLZ					
197 7J	1696 STO	1703 ADD						

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198 8J		1708 ADD					
199 10J		1695 CLA					
200 4K5		1673 CLA					
201 2K19		3356 SUB	3360 CLA	3364 CLA			
202 5J		1142 ADD	1473 SUB	1489 SUB	1787 SUB	2115 SUB	3080 SUB
203 16J		1788 SUB					
204 21J		1833 CLA					
205 RRSX		877 STO *	1240 SUB *				
206 PRSY	NOT USED						
207 RRSZ	NOT USED						
208 6K11		604 STO	1092 DVP	1096 DVP			
212 1J1		516 STO\$	604 STO\$	689 STO\$	2856 CLZ *		
213 1J2	NOT USED						
214 1J3	NOT USED						
216 2J1		891 STO *	2902 CLZ *				
217 2J2	NOT USED						
218 2J3		228 EQU\$	229 EQU\$				
224 1J7		230 EQU	231 EQU\$	232 EQU\$	898 STO	2861 CLZ	

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225 1J7LS	231 EQU	899 STQ	2863 CLZ				
228 THETAR	228 EQU	1068 CLA *	1091 MPR				
229 BETAR	229 EQU	1095 MPR					
230 RM	1075 CLZ						
231 RMDOT	1084 CLZ						
232 DEL46	232 EQU	1055 CLA	1077 CLZ				
233 1J4	889 STQ *	2858 CLZ *					
234 1J5	NOT USED						
235 1J6	NOT USED						
236 VPY	1572 CLZ	1580 ADZ	1581 STQ				
237 2J4	893 STQ *	2904 CLZ *					
238 2J5	NOT USED						
239 2J6	NOT USED						
240 5K18	1796 LDQ						
241 VY0	1497 CLZ 2215 CLA	1509 ADZ	1510 STQ	1668 SUB	1669 MPR	1752 CLA	1953 CLA
242 VY0FS	1958 DVP						
243 2J7	900 STQ	2907 CLZ					
244 2J7LS	901 STQ	2909 CLZ					

245 7K1	1717 SUB							
246 1J	2153 CLA							
247 6K5	1262 CLA							
248 XI	1537 STO							
249 A31BD	1023 STO *	1024 CLA *	1028 CLA *	1173 STO *	1177 MPR *	1214 MPR *	1220 CLA *	
	1247 CLA *	1248 MPR *						
250 A32BD	NOT USED							
251 A33BD	NOT USED							
252 TLOS	253 EQU	1652 STO						
253 THETA F	711 STO	1692 CLA	1701 CLA	2169 CLA				
254 3K4	2107 CLA							
255 12J	1693 SUB	1700 STO						
256 4J	559 SUB	2118 CLZ						
257 6J	1564 ADD							
258 TDEL	1548 CLZ	1556 STO	1557 CLA	1561 CLZ	1563 STO	1566 CLA	1600 ADD	
	1654 SUB							
259 TR	1565 STO	1653 CLA	1658 ADD					
260 3J	1659 SUB							
261 6K12	1081 MPR							

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262 DELRP	2132 STO	2189 CLA						
263 OA	1492 STO							
264 18J	1082 STO	1230 STO	1235 ADD	1239 MPR	1253 STO	1290 ADZ		
265 RR	1158 STO	1172 DVP	1218 DVP	1461 CLA	1462 MPR			
266 READP	824 CLZ *	831 CLZ	2100 CLZ	2756 STO *				
267 ENTERP	833 CLZ							
268 HOLDP	836 CLZ							
269 CLEARP	811 CLZ							
270 HMF	817 CLA	839 STO						
272 RMF	815 CLA	840 CLZ	2101 STO	4093 STO	4120 CLA	4132 CLA		
273 DD	2027 CLA 4139 STO	4059 STO 4142 ADZ	4067 CLA 4146 STO	4085 LDQ 4150 CLZ	4097 CLZ 4156 CLA	4126 ADZ	4128 STO	
274 CMF	813 CLA	821 STO	4095 CLZ					
275 A11T	4194 STO *							
276 A12T	NOT USED							
277 A13T	NOT USED							
278 ADST	855 SUB 4111 STO	866 CLA 4116 CLA	2025 ADD	2033 CLA	4048 CLA	4101 STO	4109 ADZ	
279 A31T	4196 STO *							

297 DAY	2291 STO							
298 DAZ	2293 STO							
299 TBD	1757 MPR 1800 MPR	1764 DVP 3453 STO	1772 MPR	1775 MPR	1781 MPR	1798 CLA	1799 MPR	
300 VX	1175 SUB * 2960 ADD *	1328 CLA 2964 CLZ *	1330 STO 2985 STO *	1484 CLA * 3063 CLA *	1505 CLA * 3100 CLA *	2878 STO *	2883 STO *	
301 VY	1269 ADD	1270 STO						
302 VZ	1331 CLA	1333 STO						
303 MU8S12	721 STO							
304 VCX	1174 CLA *	3058 STO *						
305 VCY	NOT USED							
306 VCZ	NOT USED							
307 H00T	1837 SUB	1946 CLA	3106 STO	3111 CLA	3112 MPY			
308 VG	1048 SUB 3422 STO	1744 STO 3442 CLA	1840 STO 3445 MPR	1889 MPY 3447 MPY	1916 CLA	1921 DVP	2218 STO	
309 VF	2113 STO							
310 TAO	2186 STO	2220 CLZ						
311 TIG	1553 CLA	1560 STO	1716 CLA	2154 SUB	2221 ADD	2222 STO		
312 A11BD	1022 CLA *	1922 STO *	2605 CLA *					
313 A12BD	NOT USED							

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314	A13B0	NOT USED							
315	TA1	1554 SUB	1559 ADD	1718 SUB	3529 CLZ	3531 STO	3874 CLA	4168 STO	
316	S0	664 CLZ 2019 CLZ	778 CLA 2056 CLA	934 CLA 2064 STO	1008 CLA 2076 STO	1037 CLA	1050 CLZ	1977 CLA	
317	DISC1C	974 CLA	1002 CLA	2491 STO	2497 CLA				
318	Q1DEDA	319 EQU	2116 STO						
319	DELH	2131 STO	2148 MPR	2176 STO	2190 ADD				
320	QLTELE	1474 STO	1491 SUB						
321	VD1X	635 CLZ	642 STO	922 CLA *	924 STO *	1119 CLA	1129 CLA *		
322	VD1Y	636 CLZ							
323	VD1Z	637 CLZ							
325	DEL6	2065 STO	2072 CLZ						
326	S10	668 CLZ * 2141 CLA	950 ADD 2210 CLA	1542 CLA	1627 SUB	1662 CLA	1735 CLA	2104 CLA	
327	S11	963 CLA							
328	S12	62 STO 4441 STO	719 CLA	4248 CLA	4405 CLA	4409 STO	4413 STO	4416 CLA	
329	S13	NOT USED							
330	S14	2045 CLA	2852 CLZ	3000 CLA	3003 CLZ				
331	S15	332 EQU							

350 V	3067 STO	3115 CLA	3116 MPR				
351 TP	3308 SUB	3310 ADZ	3311 STO	3313 SUB			
352 T	353 EQU	1655 STO	3312 CLA				
353 RB	1674 SUB	1705 CLA	1786 STO				
354 TB	1598 CLA	1656 CLA	2911 CLZ	3027 CLA	3052 STO		
355 PDOTMI	3559 SUZ	3563 STO					
356 RRDOT	881 CLA	1169 CLZ	1179 ADZ	1180 STO	1213 CLA		
357 1000D	1273 CLA						
358 TI	558 CLA 3726 CLA	716 ADD 3885 STO	1440 STO	1442 CLA	1660 STO	2087 STO	2884 MPY
359 DPDOU	3553 ADD	3561 STO					
360 PDOUT	3552 CLZ	3554 STO	3558 STO	3562 CLA	3576 CLA	3579 CLA	
361 TCSM	1599 SUB	1602 SUB	1657 SUB	3025 STO	3028 SUB	3030 CLA	
362 4K25	1044 CLA						
363 2K18	3331 SUB						
364 28J1	1631 CLZ	1638 ADZ	1639 STO	1728 CLA	1880 CLA	2204 STO	2213 CLA
365 28J2	1632 CLZ	1643 ADZ	1644 STO	1724 CLA			
366 28J3	1633 CLZ	1648 ADZ	1649 STO	1721 CLA	2208 STO		
367 2K20	3326 SUB						

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368 4K26	1047 CLA				
369 DDF	871 STO	1973 CLZ			
370 6K4	1412 CLA				
371 6K2	1409 CLA				
372 V5X	375 EQU	1577 STO *	1584 MPR *	3416 SUB *	
373 V5Y	376 EQU				
374 V5Z	377 EQU				
375 TR4	568 ADD	577 SUB *	581 STO	1188 STO *	
376 TR6	580 CLA	1277 STO	1305 STO		
377 TR5	1303 STO				
378 VHA	1595 STO	1672 STO	2166 DVP	2203 SUB	
379 22J	1836 CLA				
380 23J	1682 CLA	1685 CLA			
381 5K26	1917 SUB				
382 PART	3350 STO	3352 MPY			
383 VDX	643 STO	1120 SUB	1130 STO *	1894 CLA *	2919 SUB
384 VDY	NOT USED				
385 VDZ	NOT USED				

404	WBY	NOT USED						
405	WBZ	NOT USED						
406	6K14	1085	SUB					
407	TE1	2908	STO	3034	ADZ	3035	STO	3043 CLZ 3045 STO 3875 SUB *
408	TL1	2862	STO					
409	6K6	1271	CLA					
410	5K20	1790	LDQ					
411	TE2	2910	STO	3037	ADZ	3038	STO	3042 STO 3878 CLA *
412	TL2	2864	STO					
413	2K11	2112	CLA					
414	4K6	1678	SUB	1680	CLA			
415	DAXA	2020	CLZ	2335	ADD *	2640	STO	2662 CLA *
416	DAYA	1107	CLZ	1109	STO	2021	CLZ	2650 STO
417	DAZA	1110	CLZ	1112	STO	2022	CLZ	2660 STO
418	DISC1	953	CLA	967	CLA	996	CLA	1687 CLA 2494 STO
419	1K18	2308	MPR *					
420	1K20	NOT USED						
421	1K22	NOT USED						

422	1K14		772	MPR								
423	1K19		2013	ADZ *	2014	STO *	2310	ADD *				
424	1K21	NOT USED										
425	1K23	NOT USED										
426	DSPSC		2866	CLZ	3548	CLZ	3599	STO				
427	1K1		2000	ADZ *	2001	STO *	2322	ADD *				
428	1K6	NOT USED										
429	1K11	NOT USED										
430	DDEL		2620	MPR	2627	MPR						
431	1K3		2321	MPR *								
432	1K8	NOT USED										
433	1K13	NOT USED										
434	HRF		2344	CLZ	2419	CLA	2517	CLA	2523	STO		
435	A31S		879	STO *	1093	STO *	1097	SUZ *	1104	STO *	1238	CLA *
436	A32S	NOT USED										
437	A33S	NOT USED										
438	4K4		1675	MPY								
439	5K14		1814	SUB *	1816	CLA *						

459 DEL20	972 STQ	978 STQ	1035 CLZ				
460 DEL21	788 CLA 2500 CLZ	994 CLA 2871 CLA	1000 CLA 2916 CLA	1117 CLA 3475 STQ	1198 CLA	1988 CLA	2061 CLA
461 2J	2161 ADD						
462 DEL42	463 EQU	2669 STQ					
463 DEL45	1072 CLZ	1074 STQ	1416 CLZ				
464 K55	1951 DVP						
465 MU3	466 EQU	3219 CLZ	3315 CLZ	3317 STQ			
466 RD3DTL	1797 STQ	1818 SUB *	2084 CLA *				
467 5K17	NOT USED						
468 MU6	648 CLZ	650 STQ	1005 CLA				
469 1K37	2006 SUB						
470 MU8	720 ADD	1041 CLA	1913 CLA	2927 CLZ	2929 STQ	2935 STQ	2937 CLZ
471 MU10	3603 CLZ	3605 STQ	3607 CLA	3610 CLZ	4160 CLA		
472 1K9	1042 SUB	2934 CLA					
473 1K30	2017 SUB						
474 2K17	3322 SUB						
475 MU19	1274 ADZ	1275 STQ	1415 CLZ				
476 4K23	1006 SUB						

477	S623	980	CLA										
478	1K4	3560	MPR	3564	MPY								
479	1K24	2689	SUB										
480	1K26	2639	DVP										
481	1K27	2647	MPY	2653	MPY								
482	1K28	2643	DVP	2658	DVP								
483	1K29	2668	SUB										
484	1K33	1993	CLA										
485	1K34	1998	CLA										
486	1K35	2946	SUB										
487	1K36	2012	MPR										
488	2K1	1159	CLA	1821	CLA	2197	MPY	3376	CLA	3688	DVP	3698	CLA
489	2K2	3124	MPR	3140	MPR	3303	MPR						
490	6J1	795	MPR *	799	MPR *	803	MPR *						
491	6J2	NOT USED											
492	6J3	NOT USED											
493	B13SF	NOT USED											
494	SDVX	790	CLZ *	792	STO *	2011	CLZ *	2067	CLZ *				

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495	SDVY	NOT USED			
496	SDVZ	NOT USED			
497	MU7		2003 CLZ	2005 STO	2016 CLA
498	7K2		1363 ADD	1366 ADD	1369 ADD 1372 ADD
499	B13VSF	NOT USED			
500	B3SF	NOT USED			
501	B23RSF	NOT USED			
502	4K2		3444 ADD		
503	4K3		3443 MPR		
504	B22RSF	NOT USED			
505	BACCSF	NOT USED			
506	4K34		2989 CLA	2992 CLA	
507	4K35		2925 SUB		
508	4K10		1698 STO	1702 MPY	
509	SUMLIM		4397 STO	4428 SUB	
510	WORDS		4434 SUB		
511	B18SF	NOT USED			
512	4K21		2586 SUB	2590 ADD	2591 DVP

513	M25B16	4162	DVP																	
514	DTB	4163	ADD																	
515	ID	1054	STO	1969	SUB	2054	STO	4216	SUB											
516	DLWNL	2032	STO	4236	SUB															
517	11J	1697	CLA																	
518	2K4	3083	CLA																	
519	KDT	2962	MPR	2965	MPR															
520	BM13SF	NOT	USED																	
521	B23SF	NOT	USED																	
524	P11	1337	CLA *	1339	STO *	1362	CLA	1364	STO	1392	CLA *	1394	STO *	1404	CLZ *					
		1410	STO	1467	CLA *															
525	P12	NOT	USED																	
526	P13	NOT	USED																	
527	P14	NOT	USED																	
528	P21	NOT	USED																	
529	P22	1365	CLA	1367	STO	1411	STO													
530	P23	NOT	USED																	
531	P24	NOT	USED																	
532	P31	1340	CLA *	1342	STO *	1395	CLA *	1397	STO *	1405	CLZ *	1469	CLA *							

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533 P32	NOT USED							
534 P33		1368 CLA	1370 STO	1413 STO				
535 P34	NOT USED							
536 P41	NOT USED							
537 P42	NOT USED							
538 P43	NOT USED							
539 P44		1371 CLA	1373 STO	1414 STO				
540 VRSH		848 STO\$ 1386 TSQ 2026 STO\$	849 CLA\$ 1393 TSQ 2028 TSQ	851 STO\$ 1396 TSQ	852 TSQ 1459 STO\$	861 STO\$ 1465 TSQ	862 TSQ 1468 TSQ	1383 STO\$ 1470 TSQ
543 TMID		4177 CLZ	4179 STO	4191 CLZ				
544 SFLO		845 SUB						
545 PMAXP	NOT USED							
546 ORBRET		1549 CLA						
547 DEDASC		829 STO	3533 STO	3535 CLZ	3538 STO			
550 EX36P		660 TSQ						
561 RREX		567 CLA	569 STO	1447 STO	1453 TRA			
562 RREX1		570 CLA	572 STO	1437 STO				
565 RREX2		1433 STO	1448 CLA	1450 STO				

586	DI AK1	867	ADD *						
587	DI AK2	NOT USED							
588	6K8S	1229	CLA	1385	CLA *	1389	STO *	1407	STO *
590	6K9S	1244	MPY	1463	MPY				
591	6K10S	1249	MPR						
592	6K6S	1266	CLA	1272	STO				
596	CLADD	4050	STO	4058	TRA				
598	RND	2350	TSQ	2356	TSQ	2369	TSQ	2379	TSQ
		2520	STO\$	2522	STO\$	2386	TSQ	2512	STO\$
								2514	STO\$
602	TMCLA	4180	ADD	4182	SUB				
603	TCLTH	4394	CLA						
604	DLSTO	4234	ADD						
605	IC1BR	2051	CLA						
606	BR1	1971	CLA	2029	CLA				
607	DEDABR	3542	CLA						
608	BR50	3611	CLA						
612	EXIT1	2300	TRA						
613	EXIT2	2313	TRA						
614	EXIT3	2342	TRA						

615	EXIT4	2390	TRA	
616	EXIT5	2433	TSQ	2478 TSQ
617	EXIT6	2434	TSQ	2479 TSQ
618	EXIT7	4226	TRA	
619	EXIT8	2460	TRA	
620	EXIT9	2485	TRA	
621	EXIT10	2496	TMI	2499 TMI
622	EXIT11	2503	TRA	
623	EXIT12	2554	TSQ	
624	EXIT13	2578	TRA	
625	EXIT14	2600	TRA	
626	EXIT15	2670	TRA	
627	EXIT16	2687	TRA	
628	EXIT17	2690	TMI	2705 TRA
629	EXIT18	2757	TRA	
630	EXIT19	2782	TRA	
631	EXIT20	2854	TMI	
632	EXIT21	2867	TSQ	

633	EXIT22	2898	TRA		
634	025C	673	ADD		
635	EXIT23	2936	TRA		
639	EXIT24	2930	TRA	2938	TRA
640	EXIT25	2947	TMI		
641	SINITC	64	TRA	670	TRA
645	EXIT26	2948	TRA	2952	TRA
646	EXIT27	3082	TRA		
647	EXIT28	2988	TRA		
648	STGCTR	1007	TMI		
652	EXIT29	3005	TRA		
653	CLATAB	847	CLA		
654	EXIT30	3026	TRA		
655	EXIT31	3068	TRA		
656	EXIT32	3152	TRA		
657	EXIT33	3186	TRA		
658	EXIT34	3224	TRA		
659	EXIT35	3259	TOV	3328	TRA 3420 TOV

660	EXIT36	3397	TRA					
661	EXIT37	3437	TRA					
662	EXIT38	3454	TRA					
663	EXIT39	3476	TRA					
664	EXIT40	60	TMI	3496	TMI			
671	EXIT41	3539	TRA	3544	TRA			
672	EXIT42	3588	TRA					
673	EXIT43	3606	TRA					
677	IDAI	2053	CLA					
678	IDRP	1053	CLA	1968	CLA			
679	EXIT44	3683	TRA					
680	EXIT45	3696	TRA					
681	EXIT46	4066	TRA					
682	EXIT47	4084	TRA	4092	TRA	4121	TMI	4133 TMI 4169 TRA
683	EXIT48	4107	TRA					
684	EXIT49	4117	TRA					
685	EXIT50	4144	TRA					
686	EXIT51	4149	TRA					

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687	EXIT52	4253	TRA	4398	TRA	4415	TRA
688	EXIT53	4436	TRA				
689	DLWNLC	2031	CLA				
690	ADDMS	614	TRA				
696	EX34P	658	TRA				
699	THEF	1630	TMI				
718	TMIE1	675	TMI	1983	TMI	2023	TRA
						2077	TRA
733	SFTAB	653	CLAS				
761	ORBLIN	786	TMI				
772	UBCOMP	613	TRA				
778	MODCK	NOT USED					
788	CALIB1	806	TIX *				
806	CALIB2	793	TRA				
811	DEDAE	607	TRA				
819	DEXIT	682	TRA	835	TRA	841	TRA
						872	TRA
						2103	TRA
821	CLEARM	683	TRAS	812	TMI	846	TMI\$
						853	TMI\$
831	RPT	814	TMI				
836	HET	816	TMI				

845 SFTEST	684 TRA						
865 DIAT	686 TSQ	870 TIX\$*	1088 TSQ\$				
887 DLDC	631 TRA	894 TIX\$*					
907 TVTG	620 TRA	929 TIX\$*					
934 SOFT1	621 TSQ	622 TSQ					
938 ZERR	976 TMI	995 TMI					
947 SOFT3	944 TMI	958 TRA	962 TRA\$	1040 TRA	1043 TMI	1051 TRA	1113 TRA
953 ENCOM1	942 TMI	1036 TMI	1046 TMI\$	1049 TMI\$			
963 IR	937 TMI	1058 TMI\$					
967 IR4	1062 TRA	1065 TRA	1070 TOV				
974 IR1	969 TMI	999 TSQ\$					
980 RSTE	990 TIX *	1013 TMI					
991 RST1	NOT USED						
992 IR2	971 TMI						
1000 IR3	993 TMI						
1008 MODE	979 TRA	998 TMI	1004 TMI				
1015 MODEL	1033 TIX *						
1035 SOFT2	625 TSQ						

1052	RADCK		965	TMI				
1084	IR6		1073	TMI				
1090	IR5		1100	TIX *				
1107	LUNAL1		626	TRA				
1117	NAV1P		606	TRA				
1123	XDVS		645	TRA	1131	TIX\$*		
1133	ALTUP		655	TRA	1154	TIX\$*		
1150	FLTR		1140	TMI				
1164	DAD		1278	CLA	1300	CLA	1357	CLA
1171	FLTRA		1189	TIX *				
1201	PUPDAT	NOT USED						
1205	FLTRD	NOT USED						
1209	RATE	NOT USED						
1213	FLTRE		1223	TIX *				
1235	FLTRH		1208	TMI				
1237	RANGE	NOT USED						
1238	FLTRI		1251	TIX *				
1274	FLTRJ		1232	TRA				

1288 D31AD	1306 CLA					
1294 C31AD	1280 CLA					
1299 CAD	1196 CLA	1334 CLA				
1345 FLTRTM	1203 TMI					
1383 RSHFT	1379 TOV					
1399 RVSAR	1387 TOV					
1403 PINIT	1401 TMI	1408 TIX\$*				
1410 PAD	1194 CLA	1359 CLA				
1417 FLTRX	1199 TMI	1236 TMI	1344 TRA	1402 TRA		
1430 MXM	1279 TSQ	1281 TSQ	1307 TSQ	1335 TSQ	1358 TSQ	1360 TSQ
1435 R3	1455 TRA					
1444 R2	1457 TRA					
1453 R1	578 TMI\$	1456 TIX *				
1459 STEST	1377 TSQ	1381 TSQ				
1473 LMORB2	656 TRA					
1479 ORBLM	1486 TIX\$*					
1499 KINGK	1516 TIX *					
1542 GM	NOT USED					

1557 DXFR1	1545 TMI		
1567 DXFR10	NOT USED		
1568 DX10P	546 TRA		
1573 DXFRR5	1592 TIX *		
1597 ORBIT3	NOT USED		
1604 DXFR13	1615 TIX\$*		
1619 VRUP1	1625 TIX\$*		
1635 DXFRA	1650 TIX *		
1662 DXFR14	560 TRAS	717 TRAS	
1701 ORBI2	1691 TMI		
1716 XDV	1628 TMI\$	2212 TMI	
1720 XDV1	1733 TIX\$*	1876 TRA	
1734 XDV2	1719 TMI		
1738 XDV3	1742 TIX *		
1747 Q5	662 TRA	1784 TIX\$*	
1803 GDRAW3	1820 TIX *		
1820 GDRAW4	2086 TRA		
1833 STEER	NOT USED		

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1843 STEER1	1835 TMI	1838 TMI	1852 TIX\$*
1870 STEER3	1862 TMI		
1876 STEER4	1737 TMI\$	1892 TIX\$*	
1881 OUT1	1928 TRA\$		
1893 Q7	1745 TRA	1923 TIX\$*	2117 TRA
1925 IDLE	633 TRA\$		
1926 OUT	1881 TMI		
1929 OVFLT	1768 TSQ	1811 TSQ	1850 TSQ
1940 DSP1	671 TRA	830 TRA	
1953 DSP2CP	672 TRA		
1968 EXEC7	1976 TMI		
1971 EXEC2	608 TRA		
1975 EXECM	663 TRA	2035 TMI	2039 TMI 2044 TRA
1977 EXECM1	2050 TMI	2055 TRA	
1988 CAL	NOT USED		
2003 INCMU7	1987 TMI		
2020 EXECA	1979 TMI	1985 TMI	2018 TMI 2060 TMI 2071 TRA
2024 NEWDD	1974 TMI		

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2051 EXECM2	1970 TMI	2048 TMI\$	
2056 EXEC3	2037 TMI		
2066 MABEE	2058 TMI	2062 TMI	
2072 EXEC6	1981 TMI		
2078 FDAI1	628 TRA		
2084 LL3DOT	1817 TRA\$	1819 TMI	
2087 NORTON	1551 TRA\$	1567 TSQ	1603 TSQ
2100 RRT	818 TMI		
2104 EX33P	657 TRA		
2112 EX35	659 TRA	661 TRA\$	
2118 EX33PP	697 TMI\$	2111 TMI	
2128 CSICDH	2106 TMI		
2144 CSI	NOT USED		
2189 CDH2	2223 TRA		
2193 CDH3	1710 TMI\$	1712 TRA	
2220 CDH	2143 TMI		
2229 7817	3858 CLA *		
2230 6817	NOT USED		

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2231 5B17	4328 SUB	4355 SUB						
2232 4B17	1187 CLA	1304 CLA	4277 LDQ	4360 DVP				
2233 3B17	3793 ADD	4346 MPR	4363 ADD	4388 CLA				
2234 2B17	1276 CLA	1302 CLA	3318 SUB	3741 SUB	4348 DVP	4370 ADD	4389 DVP	
2235 1B17	58 SUB	66 ADD	571 ADD	575 ADD	649 ADD	850 ADD	1139 SJB	
	1207 SUB	1231 CLA	1432 SUB	1449 ADD	1914 SUB	2004 ADD	2036 SUB	
	2040 SUB	2042 SUB	2492 ADD	2730 ADD	2928 ADD	3044 ADD	3316 ADD	
	3320 SUB	3522 ADD	3530 ADD	3604 ADD	3835 ADD	4076 ADD	4153 CLA	
	4167 SUB	4178 ADD	4232 ADD	4297 SUB	4299 CLA	4336 ADD	4386 SUB	
	4403 SUB	4417 SUB	4432 ADD	4438 SUB				
2236 ZERO	938 CLA	949 CLA	1846 LDQ	2200 LDQ	2638 LDQ	2642 LDQ	2657 LDQ	
	2691 LDQ	2698 LDQ	2745 LDQ	3022 LDQ	3031 LDQ	3084 LDQ	3197 LDQ	
	3206 LDQ	3215 LDQ	3228 LDQ	3236 LDQ	3244 LDQ	3253 LDQ	3300 LDQ	
	3336 LDQ	3377 LDQ	3464 LDQ	3469 LDQ	3569 LDQ	3583 CLA	3593 CLA	
	3655 LDQ	3693 LDQ	3699 LDQ	3704 LDQ	3710 LDQ	3717 LDQ	3754 LDQ	
	3770 LDQ	3809 LDQ	3960 LDQ	3999 CLA	4061 CLA	4072 LDQ	4098 CLA	
	4161 LDQ							
2237 2B3	2046 SUB	2853 SUB						
2238 5B3	1543 ADD							
2239 6B3	1629 ADD	2075 CLA	2142 ADD	2158 MPR				
2240 1B4	1436 SUB	1825 MPY	2165 MPY	2325 ADD				
2241 1B5	1184 SUB	3498 ADD	3598 CLA	4223 CLA				
2242 1B6	2340 ADD							
2243 1B9	599 ADD	1354 CLA	2034 SUB	2422 ADD	2969 ADD			

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2244 1B11	68 SUB	828 CLA	2748 ADD	3532 CLA				
2245 1B12	1059 ADD	1125 ADD	2539 ADD	2957 ADD				
2246 1B13	2473 ADD							
2247 1B14	2248 EQU							
2248 8B17	3855 CLA	4105 SUB	4108 ADD					
2249 SIXTH	1770 CLA 4369 DVP	4258 CLA 4375 SUB	4345 ADD 4378 ADD	4354 ADD	4356 MPR	4364 SUB	4368 MPY	
2250 2PIB3	709 SUB 3894 ADD	713 SUB 3898 SUB	2251 EQU 3980 CLA	2787 MPR	2794 MPR	2801 MPR	3021 CLA	
2251 1K25	NOT USED							
2252 3PID4	2145 MPY	3983 CLA						
2253 PID2	3901 CLA	3921 ADD	3925 ADD	3929 SUB				
2254 PID4	3956 CLA							
2255 K173	3911 MPR	4220 CLA						
2256 K172	3912 ADD							
2257 K171	3914 ADD							
2258 K170	2259 EQU	3916 ADD	4257 LQJ	4288 ADD	4324 ADD	4351 SUB	4352 SUB	
2259 PMAX	1841 CLA 3347 CLA	1855 ADD 3427 ADD	1933 CLA 3452 CLA	1961 CLA 3574 CLA	2588 CLA 3690 ADD	2752 CLA 3840 CLA	3264 ADD 4155 CLA	
2260 K183	3966 MPR							

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2281 DELAY	630 TRA	725 TRA	3609 TMI	3613 TRA			
2295 1B2	1217 MPY 3461 ADD	1546 ADD 3801 SUB	2237 EQU 4251 SUB	2276 EQU	2616 ADD	2777 CLA	3183 ADD
2300 EX1	612 TRA\$						
2303 DVS	2312 TIX *						
2317 GYCOM	780 TMI\$	784 TMI\$	807 TRA\$	1382 CLA\$	2341 TIX *		
2330 M1B1	714 MPY	1215 DVP	1642 DVP	1647 DVP	1690 ADD	2191 MPR	
2342 EX3	695 TRA\$						
2347 CDCC	1378 CLA\$	2515 TRA	2536 TRA				
2390 EX4	615 TRA\$						
2392 DICOS	2416 TIX *						
2419 INTAS	2432 TIX *	2543 TRA\$					
2422 RND1	2511 CLA						
2423 SHFT1	2513 CLA						
2436 COA21	768 TRA\$	2848 TRA\$					
2460 EX8	619 TRA\$						
2462 DVINT	619 TRA	2477 TIX\$*					
2485 EX9	930 TRA\$						
2506 LRI	1380 CLA\$	2345 TMI					

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2517 HRC	2343 TOV					
2529 HRC1	2518 TMI					
2538 HRINT	2420 TMI					
2539 RND2	2519 CLA					
2540 SHFT2	2521 CLA					
2546 AHE	651 TRA	973 TRA	1001 TMI	1010 TMI		
2555 AHE1	623 TRA	2547 TMI				
2556 ATTERR	1991 TSQ					
2564 EYEZ	2610 TRA					
2578 EROUT	624 TRA\$	1034 TRA	2270 TRA	2594 TIX\$*		
2603 RST	991 TRA					
2613 LUNAL	946 TMI					
2673 FDAI	952 TRA					
2687 EX16	627 TRA\$					
2705 EX17	2083 TRA\$					
2742 FDAIL	2675 TSQ	2685 TSQ	2696 TSQ	2703 TSQ	2715 TSQ	2724 TSQ
2756 SPULSE	2736 TMI	2739 TRA\$				
2760 NOC	629 TRA	2773 TIX\$*				

TRW

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3005 EX29	652 TRA\$		
3026 EX30	654 TRA\$		
3046 BR2EX	3029 TMI	3040 TRA	
3072 GRAV	2891 TSQ	2987 TSQ	
3082 EX27	646 TRA\$		
3089 GRAV1	3104 TIX *		
3095 7B3	1986 ADD	2059 SUB	4408 CLA
3111 LMORB	1418 TRA		
3151 LMORB1	3143 TOV\$	3154 TRA	
3158 CSMT1	1664 TMI		
3171 XORBV1	3178 TIX *		
3186 EX33	2109 TMI\$		
3196 XORBV2	3218 TIX *		
3224 EX34	698 TRA\$		
3333 PITER1	3321 TMI		
3351 DELP	3332 TMI		
3362 PITER2	3319 TMI		
3367 PITER3	3327 TMI\$	3357 TMI	

3376 TBRAKE	860 ADD							
3397 EX36	2127 TRA\$							
3400 IMPBK1	3419 TIX *							
3441 GDRAW	2219 TRA							
3458 LUNAZ	2041 TMI							
3480 INIT	3340 DLY							
3494 GSESR	2733 TMI							
3502 WRDLP	3519 TRA							
3520 RETURN	27 TRA	2271 TRA						
3529 TIMEA	632 TRA	2996 TSQ						
3534 EXEC	687 TRA\$	688 TRA\$	1133 TSQ	1374 TSQ	1417 TSQ	1441 TSQ	1477 TSQ	
	1493 TSQ	1538 TSQ	1596 TSQ	1661 TSQ	1715 TSQ	1829 TSQ	1924 TSQ	
	2089 TSQ	2091 TSQ	2128 TSQ	2205 TSQ	2889 TSQ	3046 TSQ	3060 TSQ	
	3159 TSQ	3220 TSQ	3371 TRA\$	3372 TSQ	3430 TSQ			
3548 DSPLY	1943 TRA							
3558 DSPLY1	1952 TRA							
3576 DSPLY2	3557 TRA\$							
3590 DSPLY3	1963 TRA\$							
3599 DSPLY4	3551 TRA							
3603 EXEC1	644 TRA\$	676 TRA\$						

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3617 CRSPRD	1517 TSQ	1519 TSQ	1616 TSQ	3014 TSQ	3187 TSQ		
3643 NORMV	1101 TSQ 3167 TSQ	1518 TSQ	1593 TSQ	1617 TSQ	2096 TSQ	3015 TSQ	3077 TSQ
3664 ORBPM	1487 TSQ	1597 TSQ	2865 TSQ	3020 TSQ			
3670 ORBPM1	3682 TIX *						
3683 EX44	679 TRAF						
3696 EX45	680 TRAF						
3724 ELPRD	2090 TSQ	2873 TSQ	3053 TSQ	3158 TSQ			
3730 ELPRD1	3813 TRA						
3775 ELPRD2	3791 TIX *						
3793 ELPRD3	3742 TMI						
3817 DPSQ	3864 TSQ						
3821 DPSQ1	3838 TIX *						
3838 DPSQ2	3831 TRA						
3840 DPSQ3	3824 TMI	3836 TMI					
3846 NORM	3865 TSQ	4002 TSQ					
3858 NORM1	3852 TOV						
3863 DPVMAG	1156 TSQ	1743 TSQ	2217 TSQ	3066 TSQ	3421 TSQ	3436 TSQ	
3873 DPTSB	2870 TSQ	3051 TSQ					

3888 EXIT	883 TRA 4443 TOV	1931 TRA	1936 TRA	2912 TRA	3525 TRA	4198 TRA	4439 TMI
3895 SIC0E	2788 TSQ	2795 TSQ	2802 TSQ	3731 TSQ			
3906 SIC02	1376 CLA\$	2274 EQU	3919 TIX *	3924 TRA\$	3928 TMI\$	3931 TRA\$	
3921 SIC01	3904 TMI						
3936 ARCTAE	705 TSQ	1536 TSQ	1651 TSQ	3286 TSQ	4043 TSQ		
3960 ARCTA1	3990 TRA						
3983 ARCTA2	3953 TMI						
3995 SQ RTE	1671 TSQ 3144 TSQ 3651 TSQ	1857 TSQ 3184 TSQ 3684 TSQ	1874 TSQ 3266 TSQ 3702 TSQ	2202 TSQ 3304 TSQ 3868 TSQ	2617 TSQ 3380 TSQ	2683 TSQ 3424 TSQ	3119 TSQ 3462 TSQ
4012 SQRT1	4019 TIX *						
4015 KSR	4010 ADD						
4024 ABVEC	NOT USED						
4048 ADOUT	838 TRA	2102 TMI					
4059 ROR	597 TRA						
4062 SOUT	4154 TRA						
4066 EX46	681 TRA\$						
4078 DOUT	4156 TRA						
4085 OCTO	4065 TMI						

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4093 RME	832 TMI	834 TMI\$					
4118 NOTDD	858 TMI						
4132 DDIN	864 TRA						
4144 EX50	685 TRA\$						
4146 STDD	4131 TRA	4152 TRA					
4153 SNS	4060 TMI						
4155 MAX	4077 TOV						
4160 ATI	873 TIX *						
4173 TME	617 TRA						
4191 TMIE2	718 TSQ						
4202 PGNSDE	616 TRA						
4223 PGNSD2	4229 TMI						
4226 PGNSD1	618 TRA\$	4213 TMI					
4246 TEST	1925 TRA						
4260 1K7	2306 SUB	2318 SUB					
4263 10B4	61 CLA	2238 EQU	4137 MPY				
4269 3B3	722 SUB 2105 SUB	779 SUB 3001 SUB	935 SUB 4406 SUB	1183 MPR 4440 CLA	1350 MPR	1978 SUB	2063 CLA
4382 1B3	563 DVP	781 SUB	783 SUB	785 SUB	943 SUB	945 SUB	1009 SUB

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1012 SUB 1020 SUB 1190 LJO 1202 ADD 1314 MPY 1736 SUB 1763 MPY
1839 CLA 1980 SUB 1982 SUB 1984 SUB 2057 ADD 2184 MPY 4249 SUB
4420 CLA

4391 SETFG 4442 TRA
4400 CKSUM 4247 TMI
4416 COREX 4404 TMI 4421 TRA\$
4422 MEMSUM 4400 TSQ 4435 TMI\$
4437 ACCUM 4292 TSQ 4329 TSQ 4332 TSQ 4339 TSQ 4387 TSQ
4440 ERROR 4265 TOV 4268 TRA 4279 TOV 4287 TRA 4289 TMI 4290 TOV 4302 TOV
4313 TIX * 4349 TOV 4437 TMI 4444 TRA
4443 OVFLW 4261 TSQ 4272 TSQ 4276 TSQ 4325 TSQ 4372 TSQ 4374 TSQ 4376 TSQ
4384 TSQ 4390 TSQ
4448 DLREG 4209 INP
4449 DISC1I 2490 INP 4174 INP 4206 INP
4450 DISC2I 2729 INP
4451 DEDA 822 INP 3482 INP 4054 OUT 4062 OUT 4079 OUT 4088 OUT 4102 INP
4112 INP 4123 INP 4140 INP
4452 SIALO 2716 OUT
4453 COALO 2725 OUT
4454 SIBEO 2676 OUT
4455 COBEO 2686 OUT

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4456 SIGAO	2697 OUT				
4457 COGAO	2704 OUT				
4458 EXO	2595 OUT				
4459 EYO	2597 OUT				
4460 EZO	2599 OUT				
4461 TMIDO	4184 OUT				
4462 SHOUT	4055 OUT	4063 OUT	4080 OUT	4089 OUT	
4463 SHIN	4094 OUT	4103 OUT	4113 OUT	4124 OUT	4136 OUT

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NO BAD CONSTANTS OR ILLEGAL ALARM CONDITIONS

LM PROGRAM HEADER=*
DECK LABEL=
CHECKSUM=377372002641

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NO GO CARD FOUND

TRW
RETURN TO SYSTEM FROM 22745(8)

6325 LINES OF EXEC OUTPUT.

END OF JOB. ELAPSED JOB TIME= .00 MINUTES.

00.000

007462 LINES PRINTED.

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