

APPENDIX A

FLIGHT PROGRAM LISTING - LM AGS FP6 S03
(Formerly Flight Program X)

			3.	*		
			4.	*		
		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
		0010	22.	B11	EQU	TS10
		0011	23.	B21	EQU	TS11
		0012	24.	B31	EQU	TS12
		0013	25.	B41	EQU	TS13
		0014	26.	B12	EQU	TS14
		0015	27.	B22	EQU	TS15
		0016	28.	B32	EQU	TS16
		0017	29.	B42	EQU	TS17
00 02	0020	000000	30.	SPEX3	DEC	0
00 03	0021	000000	31.	SPEX2	DEC	0
01 02	0022	000000	32.	SPEX1	DEC	0
01 03	0023	000000	33.	SPEX	DEC	0
02 02	0024	000000	34.	TVARBP	DEC	0
02 03	0025	40 0 6246	35.		TRA	RETURN
			36.	*		
			37.	*		TAPE LOAD STARTUP CHECKSUM
			38.	*		
03 02	0026	66 0 6402	39.	SF	OUT	6402

SCRATCH PAD STORAGE

B3 R13 FOR RATE
 B3 B13 FOR RATE
 B-7 B3 FOR RATE
 B-7 B3 FOR RATE
 B3 ZERO FOR RATE
 B3 ZERO FOR RATE
 B-7 ZERO FOR RATE
 B-7 ZERO FOR RATE

TEMP STORE FOR CK SUM,
 SERV ROUT, STARTUP

DEDA INPUT SCALE FACTOR

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03	03	0027	64	0	2040	40.	OCTF	INP	2040			DEDA OCTAL INPUT
04	02	0030	56	0	0001	41.	U2X	ALS	1	B1		UNIT RADIAL VECTOR TO
04	03	0031	46	0	0033	42.	U2Y	TMI	*+2	B1		TRIAL RENDEZ PT.
05	02	0032	40	0	0027	43.	U2Z	TRA	*-3	B1		
					0030	44.	VFX	EQU	U2X			BRAKING VFL VECTOR AT 13.
					0030	45.	RDOTX	EQU	U2X	0B13		RANGE RATE CSM-LM
					0031	46.	RDOTY	EQU	U2Y			
					0032	47.	RDOTZ	EQU	U2Z			
05	03	0033	70	0	0034	48.	O2	DLY	*+1	B1		RENDEZ ANGLE SINE
06	02	0034	66	0	7012	49.	V1X	OUT	7012	B1		HORIZ UNIT VECTOR
06	03	0035	64	0	6200	50.	V1Y	INP	6200			
07	02	0036	30	0	0137	51.	V1Z	CLZ	SUM			
07	03	0037	20	0	0066	52.	DLSC	CLA	V2Z			DOWNLINK SHIFT COUNTER
00	04	0040	10	0	0024	53.	W1X	STO	TVARBR	B1		U1 X V1
00	05	0041	30	0	0153	54.	W1Y	CLZ	WRDCNT			
01	04	0042	72	0	0024	55.	W1Z	TSQ	TVARBR			
01	05	0043	32	0	0137	56.	SI	ADZ	SUM	B0		F(SIN(EC))
02	04	0044	10	0	0137	57.	A31S	STO	SUM	B1		RADAR NULL DIR COS
02	05	0045	20	0	0024	58.	A32S	CLA	TVARBR			
03	04	0046	24	0	4046	59.	A33S	SUB	CLAFR			
03	05	0047	46	0	0060	60.	SIDFLL	TMI	U1X	B1		SIN DELTA L
04	04	0050	30	0	0137	61.	V6X	CLZ	SUM	B13		TEMP STORAGE FOR TPI QUANT
04	05	0051	46	0	0054	62.	V6Y	TMI	*+3			
05	04	0052	24	0	4006	63.	V6Z	SUB	1B17			
					0050	64.	DQX	EQU	V6X			ACCUM VFL IN XDV
05	05	0053	46	0	1101	65.	CODELL	TMI	EXIT40	B1		COS DELTA L
06	04	0054	20	0	7512	66.	WCX	CLA	10B4	B1		UNIT VECTOR NORMAL
06	05	0055	10	0	0412	67.	WCY	STO	S12			TO CSM ORBIT
07	04	0056	66	0	6410	68.	WCZ	OUT	6410			
07	05	0057	40	0	1052	69.	TMPBR	TRA	SINITC			TEMP BRANCH STORE
00	06	0060	30	0	0153	70.	U1X	CLZ	WRDCNT	B1		LEM UNIT RAD VECTOR
00	07	0061	22	0	4006	71.	U1Y	ADD	1B17			
01	06	0062	10	0	0153	72.	U1Z	STO	WRDCNT			
01	07	0063	24	0	4014	73.	BRANCH	SUB	1B11			GUIDANCE BRANCH
02	06	0064	46	0	0042	74.	V2X	TMI	W1Z	B1		HORIZ UNIT VECTOR AT
02	07	0065	70	0	0041	75.	V2Y	DLY	W1Y			RENDEZ POINT
03	06	0066	20	0	0206	76.	V2Z	CLA	0206			

			77.	*			
			78.	*	END OF TAPE LOAD CHECKSUM PROGRAM		
			79.	*			
		0064	80.	VGX	EQU	V2X	VEL TO GAIN VECTOR AT 13
03 07	0067	000000	81.	AT	DEC	0B7	THRUST ACCELERATION
04 06	0070	000000	82.	FX	DEC	0B2	ATTITUDE ERRORS.
04 07	0071	000000	83.	EY	DEC	0	
05 06	0072	000000	84.	FZ	DEC	0	
05 07	0073	000000	85.	X3	DEC	0B0	XFR ORB PARAM.
		0073	86.	Q11	EQU	X3	B30 B1C FOR RATE
06 06	0074	000000	87.	DVXM1	DEC	0B1	BODY DELTA VS
06 07	0075	000000	88.	DVYM1	DEC	0	PREVIOUS CYCLE.
07 06	0076	000000	89.	DVZM1	DEC	0	
07 07	0077	000000	90.	NI	DEC	0B-9	PREDICTION ANGULAR FREQUENCY
		0077	91.	NF	EQU	NI	CSM PRED. ANGULAR FREQ.
00 10	0100	000000	92.	VD2X	DEC	0B2	DELTA V FXP LS
00 11	0101	000000	93.	VD2Y	DEC	0	
01 10	0102	000000	94.	VD2Z	DEC	0	
01 11	0103	000000	95.	CI	DEC	0B0	E(COS(FC))
02 10	0104	000000	96.	DRX	DEC	0B14	LM POS REMAINDERS
02 11	0105	000000	97.	DRY	DEC	0	
03 10	0106	000000	98.	DRZ	DEC	0	
03 11	0107	000000	99.	THEP	DEC	0	PGNS THETA IN COUNTS.
04 10	0110	000000	100.	DIGX	DEC	0B7	PREDICTED CHANGE IN
04 11	0111	000000	101.	DIGY	DEC	0	INTEGRATED GRAVITY.
05 10	0112	000000	102.	DIGZ	DEC	0	
05 11	0113	000000	103.	PSIP	DEC	0	PGNS PSI IN COUNTS.
06 10	0114	000000	104.	GXDY	DEC	0B7	GRAVITY TIMES MAJOR
06 11	0115	000000	105.	GYDT	DEC	0	CYCLE TIME.
07 10	0116	000000	106.	GZDT	DEC	0	
07 11	0117	000000	107.	PHIP	DEC	0	PGNS PHI IN COUNTS.
00 12	0120	000000	108.	DVSX	DEC	0B7	RESOLVED SENSED DEL V
00 13	0121	000000	109.	DVSY	DEC	0	
01 12	0122	000000	110.	DVSZ	DEC	0	
01 13	0123	000000	111.	SIGA	DEC	0B1	SIN FDAI GAMMA.
02 12	0124	000000	112.	RRX	DEC	0B23	COMPUTED LM-CSM RANGE
02 13	0125	000000	113.	RRY	DEC	0	

03 12	0126	000000	114.	RRZ	DEC	0	
03 13	0127	000000	115.	COGA	DEC	0B1	COS FDAI GAMMA.
04 12	0130	200000	116.	A11	DEC	1.0B1	XB DIRECTION COSINES.
04 13	0131	000000	117.	A12	DEC	0	
05 12	0132	000000	118.	A13	DEC	0	
05 13	0133	000000	119.	TS8	DEC	0	
06 12	0134	000000	120.	A31	DEC	0	ZB DIRECTION COSINES.
06 13	0135	000000	121.	A32	DEC	0	
07 12	0136	200000	122.	A33	DEC	1.0B1	
07 13	0137	000000	123.	SUM	DEC	0	RUNNING MEMORY SUM
00 14	0140	000000	124.	A21	DEC	0	YB DIRECTION COSINES.
00 15	0141	200000	125.	A22	DEC	1.0B1	
01 14	0142	000000	126.	A23	DEC	0	
01 15	0143	000000	127.	X4	DEC	0B0	XFR ORB PARAM.
		0143	128.	VHSQ	EQU	X4 0B26	VH SQUARED
		0143	129.	Q12	EQU	X4	B30
02 14	0144	000000	130.	F1	DEC	0	-6 OR -9 XB NORM ERROR
02 15	0145	000000	131.	F3	DEC	0	ZB NORMALITY ERROR.
03 14	0146	000000	132.	F13	DEC	0	XB,ZB ORTHOG ERROR.
03 15	0147	000000	133.	T1	DEC	0B18	TA1 AT RADAR NULL
04 14	0150	000000	134.	DA11	DEC	0B-5	DIR COSINE REMAINDERS
04 15	0151	000000	135.	DA12	DEC	0	
05 14	0152	000000	136.	DA13	DEC	0	
05 15	0153	000000	137.	WRDCNT	DEC	0	CKSUM WORD COUNT
06 14	0154	000000	138.	DA31	DEC	0	
06 15	0155	000000	139.	DA32	DEC	0	
07 14	0156	000000	140.	DA33	DEC	0	
07 15	0157	000000	141.	TSFX	DEC	0	EXIT FROM NORTON
00 16	0160	000000	142.	A110	DEC	0B1	XD DIRECTION COSINES.
00 17	0161	000000	143.	A120	DEC	0	
01 16	0162	000000	144.	A130	DEC	0	
01 17	0163	000000	145.		DEC	0	**UNUSED-INDEXED BY A110**
02 16	0164	000000	146.	A310	DEC	0B1	ZD DIRECTION COSINES.
02 17	0165	000000	147.	A320	DEC	0	
03 16	0166	000000	148.	A330	DEC	0	
03 17	0167	000000	149.	MU17	DEC	0B3	RADAR FILTER ENTRY COUNTER
04 16	0170	000000	150.	P	DEC	0B23	TRAIL SEMI-PARAMETER

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			0170	151.	Q22	EQU	P	B30
04	17	0171	000000	152.	ALPHA	DEC	0B23	XFR ORBIT SEMI-MAJOR AXIS
05	16	0172	000000	153.	Q1	DEC	0B23	XFR ORBIT PERILUNE
			0172	154.	ESQ	EQU	Q1	XFR ORB E SQ AT -2.
05	17	0173	000000	155.	AI	DEC	0B23	PRED. SEMI-MAJOR AXIS
			0173	156.	AE	EQU	AI	CSM PRED. SEMI-MAJOR AXIS
06	16	0174	000000	157.	R5X	DEC	0B23	LM PRED POS AHEAD TDEL
06	17	0175	000000	158.	R5Y	DEC	0	
07	16	0176	000000	159.	R5Z	DEC	0	
07	17	0177	000000	160.	AL	DEC	0B23	LM PRED. SEMI-MAJOR AXIS
10	00	0200	000000	161.	RFX	DEC	0B23	CSM EPOCH POSITION
10	01	0201	000000	162.	RFY	DEC	0	
11	00	0202	000000	163.	RFZ	DEC	0	
11	01	0203	000000	164.	RT	DEC	0B23	CSM PRED POS. MAG.
12	00	0204	000000	165.	RCX	DEC	0B23	PRED EPOCH POS VECTOR
12	01	0205	000000	166.	RCY	DEC	0	
				167.	*			SEE REAR OF LISTING FOR CHECKSUM
13	00	0206						CHECKSUM
			0206	168.	RCZ	DEFINE	0206	RANGE 0207-1004
13	01	0207	000000	169.	RD	DEC	0B23	PRED EPOCH POS. MAG.
14	00	0210	000000	170.	R	DEC	0B23	LM POS MAGNITUDE
14	01	0211	000000	171.	Y	DEC	0B23	OUT OF PLANE POSITION
15	00	0212	000000	172.	PP	DEC	0B23	P PRIME
			0212	173.	DELTA	EQU	PP	B60 B10 FOR RATE
15	01	0213	002261	174.	POUTFS	DEC	7.684096F4B23	MAX P DISPLAYABLE
16	00	0214	000000	175.	POUT	DEC	0	DISPLAY POSITION.
16	01	0215	000000	176.	DPOUT	DEC	0	DISPLAY POSITION INCREMENT.
17	00	0216	040000	177.	2K3	DEC	1048576.B23	QL SET ON O.F.
17	01	0217	001415	178.	2K14	DEC	5.F4B23	INITIAL P PERTURBATION
10	02	0220	000000	179.	RIX	DEC	0B23	ELLIPSE PRED POS OUTPUT
10	03	0221	000000	180.	RIY	DEC	0	
11	02	0222	000000	181.	RIZ	DEC	0	
			0220	182.	DELRI	EQU	RIX	MEASURED MINUS COMPUTED RANGE
			0221	183.	DFLR3	EQU	RIY	B23
			0222	184.	DFLR2	EQU	RIZ	
11	03	0223	000000	185.	25J	DEC	0B23	DEDA ALTITUDE UPDATE
12	02	0224	270633	186.	7J	DEC	6055605B23	TERM IN AL(O.I.)

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12 03	0225	261561	187.	8J	DEC	5823542B23	AL LOWER LIMIT(O.I.)
13 02	0226	326447	188.	9J	DEC	7031200B23	AL UPPER LIMIT(O.I.)
13 03	0227	540764	189.	4K10	DEC	-651361.1B20	TERM IN AL(O.I.)
14 02	0230	017205	190.	2K19	DEC	5.55B23	DELTA P LIMITER
14 03	0231	256014	191.	5J	DEC	5.7024F6B23	LANDING SITE RADIUS
15 02	0232	001652	192.	16J	DEC	60000B23	ORBIT INSERTION ALTITUDE
15 03	0233	000607	193.	21J	DEC	25000B23	PITCH STEERING ALT THRESHOLD
16 02	0234	000000	194.	RPSX	DEC	0B23	CALCULATED RANGE AT TIME
16 03	0235	000000	195.	RPSY	DEC	0	OF RADAR RANGE MEASUREMENT
17 02	0236	000000	196.	RPSZ	DEC	0	
		0234	197.	L12	EQU	RPSX	B30 ZERO FOR RATE
		0235	198.	L22	EQU	RPSY	B30 ZERO FOR RATE
		0236	199.	L32	EQU	RPSZ	B20 ZERO FOR RATE
17 03	0237	000000	200.	L42	DEC	0	B20 ZERO FOR RATE
			201.	*			
			202.	*		INITIALIZE DATA FROM DOWNLINK ADDRESSES	
			203.	*		LOCATIONS 0240-0257 USED	
10 04	0240	000000	204.	1J1	DEC	0B23	LM EPHEMERIS POS
10 05	0241	000000	205.	1J2	DEC	0	
11 04	0242	000000	206.	1J3	DEC	0	
11 05	0243	000000	207.		DEC	0	
12 04	0244	000000	208.	2J1	DEC	0	CSM EPHEMERIS POS
12 05	0245	000000	209.	2J2	DEC	0	
13 04	0246	000000	210.	2J3	DEC	0	
13 05	0247	000000	211.		DEC	0	
14 04	0250	000000	212.		DEC	0	
14 05	0251	000000	213.		DEC	0	
15 04	0252	000000	214.		DEC	0	
15 05	0253	000000	215.		DEC	0	
16 04	0254	000000	216.	1J7	DEC	0B18	LM EPOCH TIME
16 05	0255	000000	217.	1J7LS	DEC	0B1	
17 04	0256	000000	218.		DEC	0	
17 05	0257	000000	219.		DEC	0	
10 06	0260	000000	220.	1J4	DEC	0B13	LM EPHEMERIS VEL
10 07	0261	000000	221.	1J5	DEC	0	
11 06	0262	000000	222.	1J6	DEC	0	
11 07	0263	000000	223.	VPY	DEC	0B13	OUT-OF-PLANE VELOCITY

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12 06	0264	000000	224.	2J4	DEC	0	CSM EPHEMERIS VEL
12 07	0265	000000	225.	2J5	DEC	0	
13 06	0266	000000	226.	2J6	DEC	0	
13 07	0267	000000	227.	DELVG	DEC	0B13	VEL-TO-BE-GAINED FOR 40 MS
14 06	0270	000000	228.	VY0	DEC	0B13	LM OUT-OF-PLANE VEL
14 07	0271	000000	229.	RB	DEC	0B23	RF SAVED FOR ORBIT INSERT.
15 06	0272	000000	230.	2J7	DEC	0	CSM EPOCH TIME
15 07	0273	000000	231.	2J7LS	DEC	0	
16 06	0274	776030	232.	29J	DEC	-2000.B18	INITIAL FILTER TIME FOR T1
16 07	0275	000000	233.	1J	DEC	0B18	NOMINAL TPI TIME (CSI)
17 06	0276	000000	234.	DELTAT	DEC	0B18	TIME OF LAST RADAR UPDATE
17 07	0277	000000	235.	XI	DEC	0B3	Z-AXIS/LOCAL HORIZ ANGLE
10 10	0300	000000	236.	A31BD	DEC	0B1	UNIT VECTOR (LM-CSM)
10 11	0301	000000	237.	A32BD	DEC	0	
11 10	0302	000000	238.	A33BD	DEC	0	
11 11	0303	000000	239.	TLOS	DEC	0B3	DXFF LOS COMPUTED
		C303	240.	THETA	EQU	TLOS	LM-CSM CENTRAL ANG AT CSI/CDH
12 10	0304	000034	241.	6K8	DEC	.22B10	RANGE RATE ERROR VARIANCE
12 11	0305	000000	242.		DEC	0	**UNUSED**
13 10	0306	000000	243.	4J	DEC	0B13	TIME OF NODE PRIOR TO RENDEZ
13 11	0307	120400	244.	6J	DEC	2576.0B13	DESIPED TRANSFER TIME
14 10	0310	000000	245.	TDFL	DEC	0B13	TIME TILL NEXT MANEUVER
14 11	0311	000000	246.	TR	DEC	0B13	TIME TILL RENDEZVOUS
15 10	0312	000000	247.	3J	DEC	0B13	TARGET OFFSET TIME
15 11	0313	000000	248.	TPFRG	DEC	0B13	LM TIME TO PERIGEE
16 10	0314	000000	249.	DELRP	DEC	0B23	DIFF. ALT. AT TIG(CSI-CDH)
16 11	0315	000000	250.	QA	DEC	0B23	LM APOFOCUS ALTITUDE
17 10	0316	000000	251.	18J	DEC	0B23	MEASURED RADAR RANGE
17 11	0317	000000	252.	RR	DEC	0B23	COMPUTED RANGE
10 12	0320	000000	253.	READP	DEC	0	
10 13	0321	000000	254.	ENTERP	DEC	0	
11 12	0322	000000	255.	HOLDP	DEC	0	
11 13	0323	000000	256.	CLEARP	DEC	0	
12 12	0324	000000	257.	HMF	DEC	0	
			258.	*			START OF TELEMETRY LIST
12 13	0325	000000	259.	RMF	DEC	0	READOUT MODE FLAG
13 12	0326	000000	260.	DD	DEC	0	DEDA DATA

13	13	0327	000000	261.	OMF	DEC	0	CLFAR MODE FLAG
14	12	0330	200000	262.	A11T	DEC	1.81	TM DIR COSINES.
14	13	0331	000000	263.	A12T	DEC	0	
15	12	0332	000000	264.	A13T	DEC	0	
15	13	0333	000000	265.	ADST	DEC	0	DEDA ADDRESS
16	12	0334	000000	266.	A31T	DEC	0	
16	13	0335	000000	267.	A32T	DEC	0	
17	12	0336	200000	268.	A33T	DEC	1.81	
17	13	0337	000000	269.	H	DEC	0B23	ALTITUDE
10	14	0340	000000	270.	RX	DEC	0B23	LM POSITION
10	15	0341	000000	271.	RY	DEC	0	
11	14	0342	000000	272.	RZ	DEC	0	
11	15	0343	000000	273.	QL	DEC	0B23	PRESENT LM PERICYNTHION
			0343	274.	SONS10	EQU	QL	ENG ON+S10 FOR TM
12	14	0344	000000	275.	RCX	DEC	0B23	CSM PRESENT POSITION
12	15	0345	000000	276.	RCY	DEC	0	
13	14	0346	000000	277.	RCZ	DEC	0	
13	15	0347	000000	278.	RF	DEC	0B23	PREDICTED BURNOUT ALT.
14	14	0350	000000	279.	DVX	DEC	0B1	BODY DELTA VS
14	15	0351	000000	280.	DVY	DEC	0	THIS CYCLE.
15	14	0352	000000	281.	DVZ	DEC	0	
15	15	0353	000000	282.	TA2	DEC	0B1	ABS TIME LS.
16	14	0354	000000	283.	DAX	DEC	0B-6	DELTA ALPHAS.
16	15	0355	000000	284.	DAY	DEC	0	
17	14	0356	000000	285.	DAZ	DEC	0	
17	15	0357	000000	286.	TBO	DEC	0B9	TIME TO BURNOUT.
10	16	0360	000000	287.	VX	DEC	0B13	LM VELOCITY
10	17	0361	000000	288.	VY	DEC	0	
11	16	0362	000000	289.	VZ	DEC	0	
11	17	0363	000000	290.	MU8S12	DEC	0	MU8/S12 FOR TELEMETRY
12	16	0364	000000	291.	VCX	DEC	0B13	CSM PRESENT VELOCITY
12	17	0365	000000	292.	VCY	DEC	0	
13	16	0366	000000	293.	VCZ	DEC	0	
13	17	0367	000000	294.	HDQT	DEC	0B13	ALTITUDE RATE
14	16	0370	000000	295.	VG	DEC	0B13	VELOCITY TO GAIN
14	17	0371	000000	296.	VT	DEC	0B13	TOTAL VEL REQ FOR DXFR
			0371	297.	VPO	EQU	VT	VEL. TO-BE-GAINED AT CDH

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15	16	0372	000000	298.	TA0	DEC	0B18	TIME FROM CSI TO CDH
15	17	0373	000000	299.	TIG	DEC	0B18	ABSOLUTE TIME OF MANEUVER
16	16	0374	000000	300.	A11BD	DEC	0B1	CMD XB POINTING DIR.
16	17	0375	000000	301.	A12BD	DEC	0	
17	16	0376	000000	302.	A13BD	DEC	0	
17	17	0377	000000	303.	TA1	DEC	0B18	ABS TIME MS.
20	00	0400	000000	304.	SC	DEC	0	AGS FUNCTION SELECTOR
20	01	0401	000000	305.	DISC1C	DEC	0	DISCRETE WD 1-TRUE STATE
21	00	0402	000000	306.	Q1DEDA	DEC	0B23	TRANS ORBIT PERICYN ALT
			0402	307.	DELH	EQU	Q1DEDA	DIFF. ALT. AFTER CDH(CSI-CDH)
21	01	0403	000000	308.	QLTELE	DEC	0B23 ✓	QL FOR TELE AND DEDA
22	00	0404	000000	309.	VD1X	DEC	0B13	40MS VEL ACCUMULATION
22	01	0405	000000	310.	VD1Y	DEC	0	
23	00	0406	000000	311.	VD1Z	DEC	0	
				312.	*			END OF TELEMETRY LIST
23	01	0407	000000	313.	S7	DEC	0	ENGINE ON FOR EXT DELTA V
24	00	0410	000000	314.	S10	DEC	0	GUIDANCE MODE SELECTOR
24	01	0411	000000	315.	S11	DEC	0	RCS-DPS/APS SWITCH
25	00	0412	000000	316.	S12	DEC	0	TEST STATUS
25	01	0413	000000	317.	S13	DEC	0	STORE LUNAR AZUMUTH
26	00	0414	000000	318.	S14	DEC	0	NAVIGATION INITIALIZE
26	01	0415	000000	319.	S15	DEC	0	RADAR GIMBAL NULL
27	00	0416	000000	320.	S16	DEC	0	CDH APSIDAL SELECTION
27	01	0417	000000	321.	S17	DEC	0	RADAR FILTER INIT. SWITCH
20	02	0420	000000	322.	VFX	DEC	0B13	CSM EPOCH VEL
20	03	0421	000000	323.	VFY	DEC	0	
21	02	0422	000000	324.	VEZ	DEC	0	
21	03	0423	000000	325.	RFDDT	DEC	0B13	DESIRED ALT RATE
22	02	0424	000000	326.	VCX	DEC	0B13	PRED EPOCH VEL VECTOR
22	03	0425	000000	327.	VCY	DEC	0	
23	02	0426	000000	328.	VCZ	DEC	0	
23	03	0427	000000	329.	VH	DEC	0B13	LM HORIZONTAL VEL
24	02	0430	000000	330.	VIX	DEC	0B13	ELLIPSE PRED VEL OUTPUT
24	03	0431	000000	331.	VIY	DEC	0	
25	02	0432	000000	332.	VIZ	DEC	0	
25	03	0433	000000	333.	V	DEC	0B13	LM TOTAL VELOCITY
26	02	0434	000000	334.	TP	DEC	0B13	TRIAL XFR ORB TIME.

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26 03	0435	000000	335.	T	DEC	0B13	TIME TO RENDEZ.
27 02	0436	000000	336.	TB	DEC	0B13	TA-TE.
27 03	0437	000000	337.	PDDTM1	DEC	0B13	DISPLAY POS RATE(-1)
20 04	0440	000000	338.	RRDOT	DEC	0B13	RANGE RATE
20 05	0441	000000	339.	RDOTS	DEC	0B13	R. P. STORED AT RADAR INPUT
21 04	0442	000000	340.	TI	DEC	0B13	PREDICTION TIME
21 05	0443	000000	341.	DPDOUT	DEC	0B13	DISPLAY POS RATE INCREMENT
22 04	0444	000000	342.	PDDOUT	DEC	0B13	DSP POS RATE CONV TO FPS AT 13
22 05	0445	000000	343.	TCSM	DEC	0B13	CSM PERIOD (SEC)
23 04	0446	303240	344.	BACCSF	DEC	0.76293980	.001 FT/SEC2 TO FPS/20MS AT 1
23 05	0447	000360	345.	2K18	DEC	15.B13	PARTIAL DERIV PROTECTOR.
24 04	0450	000000	346.	28J1	DEC	0B13	DELTA V DOWNRANGE
24 05	0451	000000	347.	28J2	DEC	0B13	DELTA V CROSSRANGE
25 04	0452	000000	348.	28J3	DEC	0B13	DELTA V RADIAL
25 05	0453	000040	349.	2K20	DEC	2.B13	CONVERGENCE CHECK.
26 04	0454	003100	350.	4K26	DEC	100.B13	VG THRESHOLD
26 05	0455	000000	351.	DDF	DEC	0	DEDA DATA RECEIVED FLAG
27 04	0456	031000	352.	6K4	DEC	.1F3810	INITIAL VALUE OF P33 AND P44
27 05	0457	027657	353.	6K2	DEC	.1F9830	INIT VALUE OF P11,P22
20 06	0460	000000	354.	V5X	DEC	0B13	TPI-PREDICTED V AT TPI TIME
20 07	0461	000000	355.	V5Y	DEC	0	
21 06	0462	000000	356.	V5Z	DEC	0	
		0460	357.	DVGXX	EQU	V5X	VEL TO GAIN IN EXT DELTA V
21 07	0463	000000	358.	VHA	DEC	0B13	
22 06	0464	001440	359.	22J	DEC	50B13	PITCH STEERING ALT RATE THRESH
22 07	0465	000000	360.	23J	DEC	0B13	RRDOT LOWER LIMIT
23 06	0466	000360	361.	5K26	DEC	15B13	PSEUDO ATT HOLD IN STEER
23 07	0467	000000	362.	PAPT	DEC	0B14	PARTIAL DERIVATIVE
24 06	0470	000000	363.	VDX	DEC	0B13	VD1 AT NAV UPDATE
24 07	0471	000000	364.	VDY	DEC	0	
25 06	0472	000000	365.	VDZ	DEC	0	
25 07	0473	432700	366.	4K27	DEC	-7332.B13	DESCENT ENG CAP
26 06	0474	000000	367.	VSMGX	DEC	0B13	VD1 CUTOFF
26 07	0475	000000	368.	VSMGY	DEC	0	
27 06	0476	000000	369.	VSMGZ	DEC	0	
27 07	0477	000000	370.	RADOT	DEC	0B13	PRED. PDOT AT TIG
20 10	0500	000000	371.	DELVGX	DEC	0B13	THRUST VEL TO GAIN

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20	11	0501	000000	372.	DFLVGY	DEC	0	
21	10	0502	000000	373.	DFLVGZ	DEC	0	
21	11	0503	000000	374.	17J	DEC	0B13	RANGE RATE INPUT
22	10	0504	000000	375.	RD3DOT*	DEC	0B-2	DESIPED RADIAL JERK
22	11	0505	000000	376.	YD3DOT*	DEC	0B-2	DESIPED OUT-OF-PLANE JERK
23	10	0506	012000	377.	4K12	DEC	5B7	ACCEL THRESH IN D.I. STEER
23	11	0507	000000	378.	S507	DEC	0B3	ACQ STEER SEL OF PT DIR
24	10	0510	000000	379.	DAXREM	DEC	0B-13	INCFE. GYRO INPUT REMAINDERS
24	11	0511	000000	380.	DAYREM	DEC	0	
25	10	0512	000000	381.	DAZREM	DEC	0	
25	11	0513	000000	382.	C1	DEC	0B1	RENDEZ ANGLE COSINE.
26	10	0514	000000	383.	WBX	DEC	0B1	UNIT VECTOR FOR
26	11	0515	000000	384.	WBY	DEC	0	GUIDANCE STEERING
27	10	0516	000000	385.	WB7	DEC	0	
27	11	0517	005754	386.	6K10	DEC	.625E7B28	VARIANCE OF RADAR RANGE ERROR
20	12	0520	000000	387.	TE1	DEC	0B18	CSM EPOCH TIME MS.
20	13	0521	000000	388.	TL1	DEC	0B18	LEM EPOCH TIME MS.
21	12	0522	777605	389.	6K6	DEC	-.24B8	Y-VFLOCITY FILTER WEIGHT
21	13	0523	000000	390.	5K20	DEC	0B-2	RD3DOT LOWER LIMIT
22	12	0524	000000	391.	TE2	DEC	0	CSM EPOCH TIME LS.
22	13	0525	000000	392.	TL2	DEC	0	LEM EPOCH TIME LS.
23	12	0526	273400	393.	2K11	DEC	6000B13	VT IF OVERFLOW
23	13	0527	002400	394.	4K6	DEC	80.B13	RFDOT UPPER LIMIT
24	12	0530	000000	395.	DAXA	DEC	0B-6	ALIGN INCREMENTS
24	13	0531	000000	396.	DAYA	DEC	0	
25	12	0532	000000	397.	DAZA	DEC	0	
25	13	0533	000000	398.	DISC1	DEC	0	DISCRETE WORD
26	12	0534	314632	399.	1K18	DEC	.003125B-8	ACCEL SCALE FACTOR
26	13	0535	314632	400.	1K20	DEC	.003125B-8	
27	12	0536	314632	401.	1K22	DEC	.003125B-8	
27	13	0537	000000	402.	1K14	DEC	0B-14	X-AXIS MASS UNBAL COMP
20	14	0540	000000	403.	1K19	DEC	0B1	ACCFL BIAS
20	15	0541	000000	404.	1K21	DEC	0B1	COMPENSATION
21	14	0542	000000	405.	1K23	DEC	0B1	
21	15	0543	000000	406.	DSPSC	DEC	0	DISPLAY SHIFT COUNTER.
22	14	0544	000000	407.	1K1	DEC	0B-13	GYRO BIAS
22	15	0545	000000	408.	1K6	DEC	0	COMPENSATIONS

23	14	0546	000000	409.	1K11	DEC	0	
23	15	0547	000000	410.	DDFL	DEC	0B0	LUNAR ALIGN CORRECTION
24	14	0550	000000	411.	1K3	DEC	0B-7	GYFC SCALE FACTOR
24	15	0551	000000	412.	1K8	DEC	0	COMPENSATIONS
25	14	0552	000000	413.	1K13	DEC	0	
25	15	0553	000000	414.	HRF	DEC	0	HIGH RATE FLAG.
26	14	0554	000000	415.	RD2DOT	*DEC	0B7	DESIRED RADIAL ACCEL
26	15	0555	000000	416.	YD2DOT	*DEC	0B7	DESIRED OUT-OF-PLANE ACCEL
			0554	417.	L11	*EQU	RD2DOT	B30 B20 INTERMEDIATE RESULTS
			0555	418.	L21	*EQU	YD2DOT	B30 B20 USED TO COMPUTE
27	14	0556	000000	419.	L31	*DEC	0	B20 B10 RADAR FILTER
27	15	0557	000000	420.	L41	*DEC	0	B20 B10 WEIGHTS
			0554	421.	L1LA	*EQU	RD2DOT	INTERMEDIATE RESULTS FOR
			0555	422.	L1LE	*EQU	YD2DOT	COVARIANCE MATRIX COMPUTATION
			0556	423.	L1LJ	*EQU	L31	B-15
			0557	424.	L1LC	*EQU	L41	
20	16	0560	000000	425.	5K14	*DEC	0B-2	RD3DOT UPPER LIMIT
20	17	0561	010142	426.	5K16	*DEC	.0088-2	YD3DOT UPPER LIMIT
21	16	0562	000000	427.	DLWN	DEC	0	DOWNLINK WORD COUNTER
21	17	0563	000000	428.	DLIF	DEC	0	DOWNLINK INITIALIZE FLAG
22	16	0564	631463	429.	5K18	DEC	-.1B-2	RD3DOT LOWER LIMIT
22	17	0565	203045	430.	4K4	DEC	.0048-7	FACTOR IN RFDOT(OI)
23	16	0566	026263	431.	4K7	DEC	.0873B0	PITCH CANT ANGLE
23	17	0567	000000	432.	DSPFI	DEC	0	DISPLAY FLAG1.
24	16	0570	000000	433.	ID1F	DEC	0	DOWNLINK ID1 RECEIVED
24	17	0571	000000	434.	IDRF	DEC	0	DOWNLINK INPUT COMPLETE
25	16	0572	000000	435.	FLAGT	DEC	0	MEMORY TEST
25	17	0573	000000	436.	FLAG1	DEC	0	20MS BRANCH CONTROL
26	16	0574	000000	437.	DEL2	OCT	0	STAGED FLAG.
26	17	0575	000000	438.	DEL5	OCT	0	ATTHLD LOCK FLAG.
27	16	0576	000000	439.	DEL6	DEC	0	CALIBRATE I.C. FLAG
27	17	0577	000000	440.	DFL10	DEC	0	TPI LOGIC FLAG
30	00	0600	000000	441.	PD3DTL	*DEC	0B-2	RD3DOT LOWER LIMIT
30	01	0601	767636	442.	5K17	*DEC	-.0088-2	YD3DOT LOWER LIMIT
31	00	0602	010550	443.	4K8	DEC	.03480	ROLL CANT ANGLE
31	01	0603	000000	444.	DEL20	DEC	0	LOGIC FLAG FOR ENG CONTROL
32	00	0604	000000	445.	DFL21	OCT	0	LUNAR SURFACE FLAG.

32 01	0605	003775	446.	2J	DEC	1.9970B7	COTAN OF DESIRED LOS AT TPI
33 00	0606	000000	447.	DEL42	OCT	0	LUNAR ALINE COMPLETE FLAG.
33 01	0607	377777	448.	K55	OCT	377777	S.F. FOR HDOT DISPLAY
34 00	0610	000000	449.	MU3	DEC	0	P-ITER COUNTER.
34 01	0611	376057	450.	6K9	DEC	.3029E-4B-15	VARIANCE OF RADAR ANGULAR ERROR
35 00	0612	000000	451.	MU6	DEC	0	STAGING COUNTER.
35 01	0613	026164	452.	3K4	DEC	.17365B1	CENTRAL ANGLE LIMIT ON TPI
36 00	0614	000000	453.	MU8	DEC	0	ULLAGE COUNTER.
36 01	0615	000000	454.	MU10	DEC	0	MINOR CYCLE COUNTER
37 00	0616	000003	455.	1K9	DEC	3.B17	ULLAGE COUNTER LIMIT.
37 01	0617	000226	456.	1K30	DEC	150.B17	GYRO CALIBRATE DURATION
30 02	0620	000005	457.	2K17	DEC	5.B17	NO OF P-ITERATIONS-3
30 03	0621	000017	458.	1K37	DEC	15.B17	ACCEL CAL DURATION
31 02	0622	000031	459.	4K23	DEC	25.B17	STAGING TIME DELAY
31 03	0623	000000	460.	S623	DEC	0B3	EX SELECTION IN G. S
32 02	0624	031463	461.	1K4	DEC	.1B0	DISPLAY INTERPOLATION
32 03	0625	000071	462.	1K24	DEC	.87E-3B1	SINGULARITY THRESHOLD
33 02	0626	561111	463.	1K26	DEC	-.142857E3B8	NEG INV OF ALIGN GAIN CONSTANT
33 03	0627	262132	464.	1K27	DEC	.435E-1B-4	ALIGN CONSTANT
34 02	0630	327700	465.	1K28	DEC	107.9378B7	ALIGN CONSTANT
34 03	0631	004061	466.	1K29	DEC	.001B-4	LUN ALIGN STOP CRITERION
35 02	0632	243656	467.	1K33	DEC	.08B-3	CALIBRATE GAIN.
35 03	0633	247613	468.	1K34	DEC	.00002B-15	CALIBRATE GAIN
36 02	0634	000400	469.	1K35	DEC	.25B7	ACCEL BIAS THRESHOLD
36 03	0635	777651	470.	1K36	DEC	-.66667E-3B0	ACCEL CAL GAIN
37 02	0636	235407	471.	2K1	DEC	.173189E15B48	GRAVITY CONST (LUNAR)
37 03	0637	320020	472.	2K2	DEC	.57740387E-14B-47	1/2K1
			473.	*			
			474.	*			ELEMENTS OF LM STATE ERROR COVARIANCE MATRIX
			475.	*			
30 04	0640	000000	476.	P11	DEC	0B30	VARIANCE OF X-POS ERROR
30 05	0641	000000	477.	P12	DEC	0B30	COVAR OF X AND Y POS ERROR
31 04	0642	000000	478.	P13	DEC	0B20	COVAR OF X-POS AND X-VEL ERROR
31 05	0643	000000	479.	P14	DEC	0B20	COVAR OF X-POS AND Z-VEL ERROR
32 04	0644	000000	480.	P21	DEC	0B30	COVAR OF X AND Z POS ERROR
32 05	0645	000000	481.	P22	DEC	0B30	VARIANCE OF Z-POS ERROR
33 04	0646	000000	482.	P23	DEC	0B20	COVAR OF Z-POS AND X-VEL ERROR

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33	05	0647	000000	483.	P24	DEC	0B20	COVAR OF Z-POS AND Z-VEL ERROR
34	04	0650	000000	484.	P33	DEC	0B1C	VARIANCE OF X-VEL ERROR
34	05	0651	000000	485.	P34	DEC	0B1C	COVAR OF X-VEL AND Z-VEL ERROR
35	04	0652	000000	486.	P43	DEC	0B1C	COVAR OF X-VEL AND Z-VEL ERROR
35	05	0653	000000	487.	P44	DEC	0B1C	VARIANCE OF Z-VEL ERROR
36	04	0654	713513	488.	4K2	DEC	-.499286E-48-12	FACTOR IN TB COMP
36	05	0655	012552	489.	4K3	DEC	.12464325E-8B-25	FACTOR IN TB COMP
37	04	0656	505075	490.	6K5	DEC	-.73B0	Y-POSITION FILTER WEIGHT
37	05	0657	000042	491.	4K25	DEC	2.1B13	ENG CUTOFF COMP
30	06	0660	002000	492.	4K34	DEC	1.87	AT LOWER LIMIT
30	07	0661	000146	493.	4K35	DEC	.1B7	ULLAGE THRESHOLD
31	06	0662	257175	494.	4K5	DEC	5.742395F6B23	NOMINAL BURNOUT ALTITUDE
31	07	0663	000000	495.	SUMLIM	DEC	0	LAST CELL FOR CHECKSUM
32	06	0664	000034	496.	WORD5	DEC	28	
32	07	0665	006200	497.	VY0FS	DEC	200B13	MAX VY0 DISPLAYABLE
33	06	0666	020603	498.	4K21	DEC	.26179938R2	SC FACTOR FOR ATT ERR OUTPUT
33	07	0667	777716	499.	M25B16	DEC	-25.816	CYCLE COUNT TO SECONDS
34	06	0670	240000	500.	DTB	DEC	1.25B1	1 SEC + DEDA TIME BIAS
34	07	0671	077776	501.	ID1	DEC	077776	DOWNLINK ID1 CODE
35	06	0672	10 0 0257	502.	DLWNL	STD	1J1+15	
35	07	0673	777616	503.	1K56	DEC	-.532333E-78-14	NEG LUNAR RATE-RAD/20MS
36	06	0674	542371	504.	2K4	DEC	-.173189F15B48	(-2.)(2K1) B49
36	07	0675	200000	505.	KDT	DEC	1.81	DELTA T/2 AT 1
				506.	*			
				507.	*			DEDA CONVERSION SCALE FACTORS
				508.	*			
37	06	0676	365706	509.	BM13SF	DEC	.96049535B0	.01 DEG/HR TO RAD/20MS AT -13
37	07	0677	243656	510.	B23SF	DEC	.64B0	100 FT TO FT AT 23
30	10	0700	125253	511.	B18SF	DEC	.333333B0	.1 MIN TO SEC AT 18
30	11	0701	240000	512.	B13VSF	DEC	.625B0	.1 FPS TO FPS AT 13
31	10	0702	131415	513.	B3SF	DEC	.34971155B0	.01 DEG TO RAD AT 3
31	11	0703	032756	514.	B23RSF	DEC	.10533045B0	.1 NMI TO FT AT 23
32	10	0704	032525	515.	B13SF	DEC	.10416666B0	.01 MIN TO SEC AT 13
32	11	0705	50 1 0002	516.	ADDMS	AXT	2,1	
33	10	0706	20 1 0010	517.		CLA	TS10,1	
33	11	0707	62 0 0000	518.		*ABS		
34	10	0710	22 0 4036	519.		*ADD	MS	

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34	11	0711	42 1 0706	520.		TIX	*-3,1	
35	10	0712	40 0 4143	521.		TRA	EX3+1	
35	11	0713	000026	522.	SFL0	OCT	000026	
36	10	0714	000000	523.	SDVX	*DEC	0B3	DV SUM FOR ACCEL. CAL
36	11	0715	000000	524.	SDVY	*DEC	0	(ADDR OF SDVX MUST END IN 4)
37	10	0716	000000	525.	SDVZ	*DEC	0	
37	11	0717	000000	526.	MU7	*DEC	0B17	CALIBRATION COUNTER
30	12	0720	000145	527.	SFL1	OCT	145	
30	13	0721	000024	528.	SFL2	OCT	24	
31	12	0722	000020	529.	SFL3	OCT	20	
31	13	0723	000000	530.	T MID	DEC	0	TELEMETRY ID
32	12	0724	000034	531.	SFL8	OCT	34	
32	13	0725	000062	532.	SFL7	OCT	62	
33	12	0726	000064	533.	SFL4	OCT	64	
33	13	0727	000000	534.	DFDASC	DEC	0	DEDA SHIFT COUNTER
34	12	0730	377363	535.	DIAK1	*OCT	377363	
34	13	0731	377401	536.	DIAK2	*OCT	377401	
35	12	0732	40 0 2614	537.	ORBPRT	TRA	DX10P	RETURN FROM NORTON IN D.I.
35	13	0733	000045	538.	SFL6	OCT	45	
				539.	*			
				540.	*			
36	12	0734	12 0 0577	541.	EX36P	STQ	DEL1C	
				542.	*		SAVE QUANTITIES FOR LATER USE IN	
				543.	*		T/B COMPUTATIONS	
				544.		STO	V6Z	
36	13	0735	10 0 0052	545.		CLA	TS12	
37	12	0736	20 0 0012	546.		STO	V6X	
37	13	0737	10 0 0050	547.		CLA	TS13	
30	14	0740	20 0 0013	548.		STO	V6Y	
30	15	0741	10 0 0051	549.		CLA	TI	
31	14	0742	20 0 0442	550.		SUB	4J	
31	15	0743	24 0 0306	551.		TRA	DXFP14-2	
32	14	0744	40 0 2721	552.	EX34P	CLZ	DEL10	
32	15	0745	30 0 0577	553.		TMI	EX33PP+1	
33	14	0746	46 0 3621	554.		TRA	EX34+1	
33	15	0747	40 0 5615	555.	EX37	ADD	VG	
34	14	0750	22 0 0370	556.		TMI	EX35	
34	15	0751	46 0 3611					

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35	14	0752	40	C	3612	557.		TRA	FX35+1	
35	15	0753	20	C	0347	558.	THFF	CLA	RF	
36	14	0754	54	C	0001	559.		LRS	1	B24
36	15	0755	32	C	0003	560.		ADZ	TS3	
37	14	0756	14	C	0004	561.		LDQ	TS4	
37	15	0757	10	C	0004	562.		STO	TS4	=RF+RX B24
30	16	0760	12	C	0003	563.		STQ	TS3	=RZ BB4
30	17	0761	72	C	7034	564.		TSQ	ARCTAF	
31	16	0762	10	C	0000	565.		STO	TSC	THFTAF B3
31	17	0763	24	C	1066	566.		SUB	PI	
32	16	0764	46	C	0766	567.		TMI	*+2	
32	17	0765	24	C	4021	568.		SUB	2PIB3	
33	16	0766	22	C	1066	569.		ADD	PI	
33	17	0767	10	C	0303	570.		STO	THFTAF	THFTAF B3
34	16	0770	20	C	0000	571.		CLA	TSC	B3
34	17	0771	24	C	4021	572.		SUB	2PIB3	
35	16	0772	06	C	4126	573.		MPY	M1B1	B4
35	17	0773	04	C	0077	574.		DVP	NI	
36	16	0774	22	C	0442	575.		ADD	TI	B13
36	17	0775	40	C	2721	576.		TRA	DXFR14-2	
						577.	*			
						578.	*			
					1000	579.		DRG	1000	
40	00	1000	000000			580.	CLADD	DEC	0	PICKUP DEDA DATA
40	01	1001	40	C	7215	581.		TRA	RDR	
41	00	1002	12	C	0023	582.	RND	STQ	SREX	DIRECTION COSINE ROUND
41	01	1003	22	C	4013	583.		ADD	1B9	
42	00	1004	54	C	0011	584.		LRS	9	
42	01	1005	40	C	0023	585.		TRA	SREX	
43	00	1006	20	C	0324	586.	TMCLA	CLA	0324	CLA FOR TELEM
43	01	1007	20	C	1005	587.	TCLTH	CLA	1005	
44	00	1010	10	C	0237	588.	DLSTO	STO	IJ1-1	
44	01	1011	40	C	5070	589.	IC1BR	TRA	IC1	IC1 TRA.
45	00	1012	40	C	1670	590.	BR1	TRA	NAV1P	
45	01	1013	40	C	1212	591.	DEDABR	TRA	DEDAF	DEDA BRANCH TRA.
46	00	1014	40	C	3371	592.	BR5C	TRA	EXFC2	BRANCH 5C TRA.
						593.	*			

				594.	*	HARDWIRE ESCAPE POINTS		
				595.	*			
46	01	1015	40 0	4073	596.	EXIT1	TRA	FX1+1
47	00	1016	40 0	1153	597.	EXIT2	TRA	UBCOMP
47	01	1017	40 0	0705	598.	EXIT3	TRA	ADDMS
40	02	1020	40 0	4222	599.	EXIT4	TRA	EX4+1
40	03	1021	40 0	7420	600.	EXIT5	TRA	PGNSDF
41	02	1022	40 0	7371	601.	EXIT6	TRA	TMF
41	03	1023	40 0	7455	602.	EXIT7	TRA	PGNSD1+5
42	02	1024	40 0	4326	603.	EXIT8	TRA	EX8+1
42	03	1025	40 0	1422	604.	EXIT9	TRA	TVTG
43	02	1026	72 0	1452	605.	EXIT10	TSQ	SOFT1
43	03	1027	72 0	1452	606.	EXIT11	TSQ	SOFT1
44	02	1030	40 0	4450	607.	EXIT12	TRA	ASCENT ENG ON
44	03	1031	40 0	4476	608.	EXIT13	TRA	ΔHF1
45	02	1032	72 0	1635	609.	EXIT14	TSQ	EROUT+1
45	03	1033	40 0	1661	610.	EXIT15	TRA	SOFT2
46	02	1034	40 0	4645	611.	EXIT16	TRA	LUNAL1
46	03	1035	40 0	3544	612.	EXIT17	TRA	FX16+1
47	02	1036	40 0	4743	613.	EXIT18	TRA	FDA11
47	03	1037	40 0	4047	614.	EXIT19	TRA	NOC
40	04	1040	40 0	1376	615.	EXIT20	TRA	DELAY
40	05	1041	40 0	6254	616.	EXIT21	TRA	DLDC
41	04	1042	40 0	3262	617.	EXIT22	TRA	TIMEA
41	05	1043	000031		617.	EXIT22	TRA	IDLF-1
42	04	1044	30 0	0404	618.	25B17	DEC	25B17
42	05	1045	30 0	0405	619.	EXIT23	CLZ	VD1X
43	04	1046	30 0	0406	620.		CLZ	VD1Y
43	05	1047	40 0	5217	621.		CLZ	VD1Z
44	04	1050	40 0	5205	622.		TRA	NAV3
44	05	1051	40 0	5217	623.	EXIT24	TRA	NAV2
45	04	1052	20 0	0473	624.	EXIT25	TRA	NAV3
45	05	1053	10 0	0404	625.	SINITC	CLA	4K27
46	04	1054	10 0	0470	626.		STD	VD1X
46	05	1055	40 0	6367	627.		STD	VDX
47	04	1056	40 0	1676	628.		TRA	EXEC1+7
47	05	1057	40 0	5413	629.	EXIT26	TRA	XDVS
					630.	EXIT27	TRA	EX27+1

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40	06	1060	40	0	5267	631.	EXIT28	TRA	EX28+1	
40	07	1061	30	0	0612	632.	STGCTR	CLZ	MU6	STAGING DELAY COUNTER
41	06	1062	22	0	4006	633.		ADD	1B17	
41	07	1063	10	0	0612	634.		STO	MU6	
42	06	1064	40	0	4437	635.		TRA	AHE	
42	07	1065	40	0	5305	636.	EXIT29	TRA	EX29+1	
43	06	1066	144420			637.	PI	DEC	3.1415926683	
43	07	1067	40	0	5332	638.	EXIT30	TRA	EX30+1	
44	06	1070	40	0	1710	639.	EXIT31	TRA	ALTUP	
44	07	1071	40	0	2446	640.	EXIT32	TRA	LMOPR2	
45	06	1072	40	0	3577	641.	EXIT33	TRA	EX33P	
45	07	1073	40	0	0745	642.	EXIT34	TRA	EX34P	
46	06	1074	40	0	3611	643.	EXIT35	TRA	EX35	
46	07	1075	72	0	0734	644.	EXIT36	TSQ	EX36P	
47	06	1076	40	0	0750	645.	EXIT37	TRA	EX37	
47	07	1077	40	0	3041	646.	EXIT38	TRA	Q5	
40	10	1100	40	0	3376	647.	EXIT39	TRA	EXECM	
40	11	1101	30	0	0400	648.	EXIT40	CLZ	SO	SOFT INITIALIZE
41	10	1102	30	0	0575	649.		CLZ	DEL5	
41	11	1103	30	0	0572	650.		CLZ	FLAGT	
42	10	1104	50	1	0007	651.		AXT	7,1	ZERO S SWITCHES
42	11	1105	30	1	0410	652.		CLZ	S10,1	
43	10	1106	42	1	1105	653.		TIX	*-1,1	
43	11	1107	40	0	1052	654.		TRA	SINITC	CONTINUE INITIALIZE
44	10	1110	40	0	3345	655.	EXIT41	TRA	DSP1	
44	11	1111	40	0	3356	656.	EXIT42	TRA	DSP2CP	
45	10	1112	24	0	1043	657.	EXIT43	SUB	25B17	CHECK FOR TM RESET
45	11	1113	62	0	0000	658.		ABS		
46	10	1114	60	0	0000	659.		COM		
46	11	1115	46	0	6364	660.		TMI	EXFC1+4	NOT 25TH
47	10	1116	72	0	1132	661.		TSQ	TMIF1	RESET TM AT 25TH CYCLE
47	11	1117	40	0	4047	662.		TRA	DELAY	
40	12	1120	40	0	6470	663.	EXIT44	TRA	EX44+1	
40	13	1121	40	0	6505	664.	EXIT45	TRA	EX45+1	
41	12	1122	40	0	7225	665.	EXIT46	TRA	EX46+1	
41	13	1123	40	0	1222	666.	EXIT47	TRA	DEXIT	
42	12	1124	40	0	1225	667.	EXIT48	TRA	CLEARM+1	

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42	13	1125	40	0	1251	668.	EXIT49	TRA	SFTFST	
43	12	1126	40	0	7343	669.	EXIT50	TRA	EX50+1	
43	13	1127	72	0	1351	670.	EXIT51	TSQ	DIAT	
44	12	1130	40	0	6262	671.	EXIT52	TRA	EXEC+1	
44	13	1131	40	0	6262	672.	EXIT53	TRA	EXEC+1	
45	12	1132	12	0	0023	673.	TMIE1	STQ	SREX	INITIALIZE TELEMETRY
45	13	1133	72	0	7410	674.		TSQ	TMIE2	
46	12	1134	20	0	0412	675.		CLA	S12	
46	13	1135	22	0	0614	676.		ADD	MU8	
47	12	1136	10	0	0363	677.		STO	MU8S12	SAVE MU8/S12 FOR TM
47	13	1137	24	0	7520	678.		SUB	3B3	TEST FOR SELF TEST FAILURE
40	14	1140	46	0	1142	679.		TMI	*+2	
40	15	1141	66	0	6410	680.		OUT	6410	SET FAILURE INDICATOR
41	14	1142	40	0	0023	681.		TRA	SREX	
					682.					
					683.		*			
					684.		*	ORBIT ALIGN COMPUTATIONS		
					685.		*			
41	15	1143	50	1	0006	685.	ORBLIN	AXT	6,1	
42	14	1144	30	1	0130	686.		CLZ	A11,1	
42	15	1145	30	1	0150	687.		CLZ	DA11,1	ZERO REMAINDERS
43	14	1146	42	1	1144	688.		TIX	*-2,1	
43	15	1147	20	0	5033	689.		CLA	1B1	
44	14	1150	10	0	0130	690.		STO	A11	
44	15	1151	10	0	0136	691.		STO	A33	
45	14	1152	40	0	4273	692.		TRA	COA21-2	
					693.					
					694.		*			
					695.		*	MASS UNBALANCE COMPENSATION		
					696.		*			
45	15	1153	26	0	0537	696.	URCOMP	MPR	1K14	1K14(DVX) 3-16--13
46	14	1154	32	0	0510	697.		ADZ	DAXRFM	
46	15	1155	10	0	0510	698.		STO	DAXPEM	
					699.					
					700.		*			
					701.		*		20MS MODE CHECK.	
					702.		*			
47	14	1156	20	0	0400	702.	MODCK	CLA	S0	CHECK FOR ALIGNMENT
47	15	1157	24	0	7520	703.		SUB	3B3	SUBMODES
40	16	1160	46	0	4107	704.		TMI	GYCOM-2	- IS INERT REF

40	17	1161	24	0	7701	705.	SUB	1B3	
41	16	1162	46	0	5056	706.	TMI	ZNOC	IMU ALIGN
41	17	1163	24	0	7701	707.	SUB	1B3	
42	16	1164	46	0	4107	708.	TMI	GYCOM-2	- IS LUNAR ALIGN
42	17	1165	24	0	7701	709.	SUB	1B3	
43	16	1166	46	0	1143	710.	TMI	ORBLIN	ORBIT ALIGN
43	17	1167	20	0	0604	711.	CLA	DFL21	CALIBRATE MODE.
44	16	1170	50	1	0002	712.	AXT	2,1	
44	17	1171	46	0	1177	713.	TMI	*+6	- IS LUNAR SURF
45	16	1172	30	1	0714	714.	CLZ	SDVX,1	
45	17	1173	22	1	0350	715.	ADD	DVX,1	
46	16	1174	10	1	0714	716.	STO	SDVX,1	DV SUM AT 1.
46	17	1175	42	1	1172	717.	TIX	*-3,1	
47	16	1176	40	0	4107	718.	TRA	GYCOM-2	
47	17	1177	20	0	0135	719.	CLA	A32	
50	00	1200	72	0	1204	720.	TSQ	HUGH	
50	01	1201	20	0	0141	721.	CLA	A22	
51	00	1202	72	0	1204	722.	TSQ	HUGH	
51	01	1203	20	0	0131	723.	CLA	A12	
52	00	1204	12	0	0023	724.	HUGH STQ	SREX	
52	01	1205	26	0	0673	725.	MPR	1K56	
53	00	1206	32	1	0510	726.	ADZ	DAXREM,1	
53	01	1207	10	1	0510	727.	STO	DAXREM,1	
54	00	1210	42	1	0023	728.	TIX	SREX,1	
54	01	1211	40	0	4107	729.	TRA	GYCOM-2	
						730.			
						731.	*		
						732.	*		
						733.	*		
55	00	1212	30	0	0323	733.	DEDAE CLZ	CLFAR	
55	01	1213	46	0	1224	734.	TMI	CLFARM	SET CLEAR
56	00	1214	20	0	0327	735.	CLA	CMF	
56	01	1215	46	0	1236	736.	TMI	RPT	CLEAR MODE
57	00	1216	20	0	0325	737.	CLA	RMF	
57	01	1217	46	0	1243	738.	TMI	HET	READOUT IN PROGRESS
50	02	1220	20	0	0324	739.	CLA	HMF	
50	03	1221	46	0	3572	740.	TMI	RRT	HOLD IN PROGRESS
51	02	1222	50	1	0003	741.	DEXIT AXT	3,1	NORMAL EXIT

51	03	1223	40	0	1227	742.	TRA	**4	
52	02	1224	10	0	0327	743.	CLEARM	STG	CMF
52	03	1225	64	0	2200	744.	INP	DEDA	
53	02	1226	50	1	0005	745.	AXT	5,1	CLEAR EXIT
53	03	1227	30	1	0320	746.	CLZ	READP,1	RESET FLAGS
54	02	1230	42	1	1227	747.	TIX	*-1,1	
54	03	1231	30	0	0057	748.	CLZ	TMPBR	SET BRANCH FOR NEXT
55	02	1232	10	0	0063	749.	STG	BRANCH	GUIDANCE CYCLE
55	03	1233	20	0	4014	750.	CLA	1B11	INITIALIZE COUNTER
56	02	1234	10	0	0727	751.	STG	DEDASC	
56	03	1235	40	0	3345	752.	TRA	DSP1	TO DISPLAY
57	02	1236	30	0	0320	753.	RPT	CLZ	READP
57	03	1237	46	0	7257	754.	TMI	RMF	TEST FOR
50	04	1240	30	0	0321	755.	CLZ	ENTERP	READOUT MODE
50	05	1241	46	0	7260	756.	TMI	RME+1	OR ENTER MODE
51	04	1242	40	0	1222	757.	TRA	DEXIT	ENTRY.
51	05	1243	30	0	0322	758.	HFT	CLZ	EXIT
52	04	1244	46	0	1246	759.	TMI	HOLDP	READOUT TEST FOR
52	05	1245	40	0	7202	760.	TRA	**2	HOLD COMMANDED
53	04	1246	10	0	0324	761.	STG	ADOUT	TO OUTPUT ROUTINE
53	05	1247	30	0	0325	762.	CLZ	HMF	SET HOLD MODE
54	04	1250	40	0	1222	763.	TRA	RMF	
					764.			DEXIT	
					765.	*			
					766.	*	DEDA	SCALE FACTOR SELECTION	
					767.	*			
54	05	1251	24	0	0713	767.	SFTST	SUB	SFLO
55	04	1252	46	0	1225	768.	TMI	CLEARM+1	LESS THAN 0026 PROTECTED
55	05	1253	24	0	0720	769.	SUB	SFL1	LESS THAN 173 IS OCTAL
56	04	1254	46	0	7310	770.	TMI	NOTDD	
56	05	1255	24	0	4040	771.	SUB	49B17	173-253 IS 100 FEET
57	04	1256	46	0	1326	772.	TMI	SFP	
57	05	1257	24	0	4003	773.	SUB	4B17	254(255-257) IS .1 MIN
50	06	1260	46	0	1330	774.	TMI	SFT	
50	07	1261	24	0	4041	775.	SUB	10B17	260-266(267-271) IS .1 FPS
51	06	1262	46	0	1332	776.	TMI	SFV	
51	07	1263	24	0	4002	777.	SUB	5B17	272-276 IS .1 MIN
52	06	1264	46	0	1330	778.	TMI	SFT	

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52 07	1265	24 0	4000	779.		SUB	7B17	277(300-302),303(304-305)
				780.	*			IS .01 DEG
53 06	1266	46 0	1334	781.		TMI	SFA	
53 07	1267	24 0	4001	782.		SUB	6B17	306-313 IS .01 MIN
54 06	1270	46 0	1336	783.		TMI	SF*1	
54 07	1271	24 0	0721	784.		SUB	SFL2	314-317,337(320-336) IS .1NMI
55 06	1272	46 0	1340	785.		TMI	SFP	
55 07	1273	24 0	4041	786.		SUB	10B17	340-347(350-351) IS 100 FEET
56 06	1274	46 0	1326	787.		TMI	SFP	
56 07	1275	24 0	0722	788.		SUB	SFL3	(352-357)360-371 IS .1 FPS
57 06	1276	46 0	1332	789.		TMI	SFV	
57 07	1277	24 0	4001	790.		SUB	6B17	(372)373(374-376)377 IS .1 MIN
50 10	1300	46 0	1330	791.		TMI	SFT	
50 11	1301	24 0	4005	792.		SUB	2B17	400-401 IS OCTAL
51 10	1302	46 0	7310	793.		TMI	NOTDD	
51 11	1303	24 0	4003	794.		SUB	4B17	402-403(404-405) IS .1 NMI
52 10	1304	46 0	1340	795.		TMI	SFP	
52 11	1305	24 0	4041	796.		SUB	10B17	406-417 IS OCTAL
53 10	1306	46 0	7310	797.		TMI	NOTDD	
53 11	1307	24 0	0726	798.		SUB	SFL4	420-454,456-463,467-503
				799.	*			(455,464-466) IS .1 FPS
54 10	1310	46 0	1332	800.		TMI	SFV	
54 11	1311	24 0	0724	801.		SUB	SFL8	504-537 IS OCTAL
55 10	1312	46 0	7310	802.		TMI	NOTDD	
55 11	1313	24 0	4003	803.		SUB	4B17	540-542(543) IS .001 FT/SEC2
56 10	1314	46 0	1344	804.		TMI	SFACC	
56 11	1315	24 0	4004	805.		SUB	3B17	544-546 IS .01 DEG/HR
57 10	1316	46 0	1346	806.		TMI	SFG	
57 11	1317	24 0	0733	807.		SUB	SFL6	547-613 IS OCTAL
50 12	1320	46 0	7310	808.		TMI	NOTDD	
50 13	1321	24 0	4000	809.		SUB	7B17	614-622 IS 1 COUNT
51 12	1322	46 0	1342	810.		TMI	SF1	
51 13	1323	24 0	0725	811.		SUB	SFL7	623-704 IS OCTAL
52 12	1324	46 0	7310	812.		TMI	NOTDD	
52 13	1325	40 0	1225	813.		TRA	CLFARM+1	ILLEGAL ADDRESS
53 12	1326	20 0	0677	814.	SFP	CLA	B23SF	PICK UP SCALE FACTOR
53 13	1327	40 0	1347	815.		TRA	SFG+1	TO DECIMAL SET UP

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54	12	1330	20	0	0700	816.	SFT	CLA	B18SF	
54	13	1331	40	0	1347	817.		TRA	SFG+1	
55	12	1332	20	0	0701	818.	SFV	CLA	B13VSF	
55	13	1333	40	0	1347	819.		TRA	SFG+1	
56	12	1334	20	0	0702	820.	SFA	CLA	B3SF	
56	13	1335	40	0	1347	821.		TRA	SFG+1	
57	12	1336	20	0	0704	822.	SFT1	CLA	B13SF	
57	13	1337	40	0	1347	823.		TRA	SFG+1	
50	14	1340	20	0	0703	824.	SFR	CLA	B23PSF	
50	15	1341	40	0	1347	825.		TRA	SFG+1	
51	14	1342	20	0	4030	826.	SF1	CLA	PMAX	
51	15	1343	40	0	1347	827.		TRA	SFG+1	
52	14	1344	20	0	0446	828.	SFACC	CLA	BACCSF	
52	15	1345	40	0	1347	829.		TRA	SFG+1	
53	14	1346	20	0	0676	830.	SFG	CLA	BM13SF	
53	15	1347	10	0	0026	831.		STO	SF	SET SCALE FACTOR
54	14	1350	40	0	7326	832.		TRA	DDIN	TO INPUT ROUTINE
54	15	1351	50	1	0001	833.	DIAT	AXT	1,1	IMMEDIATE ACTION TEST
55	14	1352	20	0	0333	834.		CLA	ADST	IMMED. ACTION IF
55	15	1353	22	1	0730	835.		*ADD	DIAK1,1	ACCUMULATOR = 400000
56	14	1354	62	0	0000	836.		ABS		
56	15	1355	46	0	1361	837.		TMI	*+4	
57	14	1356	42	1	1352	838.		TIX	DIAT+1,1	
57	15	1357	12	0	0455	839.		STQ	DDF	
50	16	1360	40	0	1222	840.		TRA	DEXIT	
50	17	1361	42	1	7357	841.		TIX	ATI,1	
51	16	1362	50	1	0002	842.		AXT	2,1	
51	17	1363	20	1	0134	843.		CLA	A31,1	STORE DIRECTION COSINES
52	16	1364	10	1	0044	844.		STO	A31S,1	
52	17	1365	20	1	0124	845.		CLA	RRX,1	SAVE RANGE FOR FILTER
53	16	1366	10	1	0234	846.		STO	RRSX,1	
53	17	1367	42	1	1363	847.		TIX	*-4,1	
54	16	1370	20	0	0377	848.		CLA	TA1	
54	17	1371	24	0	0147	849.		SUB	T1	
55	16	1372	10	0	0276	850.		STO	DELTA T	DELTA T = TA1 - T1 B18
55	17	1373	20	0	0440	851.		CLA	RPDOT	
56	16	1374	10	0	0441	852.		STO	ROOTS	

56	17	1375	40	0	1222	853.		TRA	DEXIT		
						854.	*				
						855.	*		DOWNLINK DATA FORMATTING		
						856.	*				
57	16	1376	50	1	0002	857.	DLDC	AXT	2,1		
57	17	1377	20	1	0244	858.		CLZ	0244,1		LEM VEL
60	00	1400	10	1	0260	859.		STQ	1J4,1		
60	01	1401	30	1	0250	860.		CLZ	0250,1		CSM POS
61	00	1402	10	1	0244	861.		STQ	2J1,1		
61	01	1403	30	1	0254	862.		CLZ	0254,1		CSM VEL
62	00	1404	10	1	0264	863.		STQ	2J4,1		
62	01	1405	42	1	1377	864.		TIX	DLDC+1,1		
63	00	1406	30	0	0247	865.		CLZ	0247		
63	01	1407	54	0	0016	866.		LRS	14		
64	00	1410	32	0	0243	867.		ADZ	0243		
64	01	1411	10	0	0254	868.		STQ	1J7		
65	00	1412	12	0	0255	869.		STQ	1J7LS		
65	01	1413	30	0	0257	870.		CLZ	0257		
66	00	1414	54	0	0016	871.		LRS	14		
66	01	1415	32	0	0253	872.		ADZ	0253		
67	00	1416	10	0	0272	873.		STQ	2J7		
67	01	1417	12	0	0273	874.		STQ	2J7LS		
60	02	1420	72	0	5145	875.		TSQ	CSMPV		
60	03	1421	40	0	5073	876.		TRA	IC1+3		
						877.	*				
						878.	*		DELTA V ACCUMULATION AND THRUST VEL TO GAIN.		
						879.	*				
61	02	1422	50	1	0002	880.	TVTG	AXT	2,1		
61	03	1423	20	1	0350	881.		CLA	DVX,1		1
62	02	1424	54	0	0001	882.		LRS	1		TO 2
62	03	1425	32	1	0100	883.		ADZ	VD2X,1		
63	02	1426	10	1	0100	884.		STQ	VD2X,1		
63	03	1427	20	1	0074	885.		CLA	DVXMI,1		
64	02	1430	54	0	0001	886.		LRS	1		TO 2
64	03	1431	32	1	0100	887.		ADZ	VD2X,1		
65	02	1432	10	1	0100	888.		STQ	VD2X,1		
65	03	1433	54	0	0013	889.		LRS	11		TO 13

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66 02	1434	10 0	0001	890.	STD	TS1		
66 03	1435	56 0	0013	891.	ALS	11		
67 02	1436	60 0	0000	892.	COM			
67 03	1437	32 1	0100	893.	ADZ	VD2X,1		
60 04	1440	10 1	0100	894.	STD	VD2X,1	REMAINDER AT 2	
60 05	1441	27 1	0404	895.	CLA	VD1X,1	DV EXPENDED MS.	
61 04	1442	32 0	0001	896.	ADZ	TS1		
61 05	1443	10 1	0404	897.	STD	VD1X,1	VD1 AT 13	
62 04	1444	60 0	0000	898.	COM			
62 05	1445	22 1	0474	899.	ADD	VSMGX,1	VSMG-VD1	
63 04	1446	10 1	0500	900.	STD	DELVGX,1	THRUST VFL TO GAIN	
63 05	1447	30 1	0070	901.	CLZ	FX,1		
64 04	1450	42 1	1423	902.	TIX	TVTG+1,1		
64 05	1451	40 0	4355	903.	TRA	EX9+1		
				904.				
				905.	*			
				906.	* SOFT 40MS COMPUTATIONS			
				907.	* SOFT1	CLA	S0	TEST MODE
65 04	1452	20 0	0400	908.	SUB	3B3		
65 05	1453	24 0	0750	909.	STD	TS1	SAVE	
66 04	1454	10 0	0001	910.	TMI	IR	- IS INERT. REF.	
66 05	1455	46 0	1507	911.	ZERR	CLA	ZERO	
67 04	1456	20 0	4007	912.	OUT	6007	ZERO ATTITUDE ERRORS	
67 05	1457	66 0	6007	913.	CLZ	DEL5	RESET ATT HOLD INIT FLAG	
60 06	1460	30 0	0575	914.	CLZ	TS1		
60 07	1461	30 0	0001	915.	TMI	ENCOM1	- IS INERTIAL REF	
61 06	1462	46 0	1475	916.	SUB	1B3		
61 07	1463	24 0	7701	917.	TMI	SOFT3		
62 06	1464	46 0	1467	918.	SUB	1B3		
62 07	1465	24 0	7701	919.	TMI	LUNAL		
63 06	1466	46 0	4534	920.	SOFT3	OUT	RESET ENG ON	
63 07	1467	66 0	7040	921.	OUT	7040	SET ENG OFF	
64 06	1470	66 0	6420	922.	CLA	ZERO	SET ENG TM FLAG PLUS	
64 07	1471	20 0	4007	923.	ADD	S10		
65 06	1472	22 0	0410	924.	STD	FONS10		
65 07	1473	10 0	0343	925.	TRA	FDAI	TO ATTITUDE DISPLAY	
66 06	1474	40 0	4626	926.	ENCOM1	CLA	FOLLOWUP ENG. COMMANDS	
66 07	1475	20 0	0533					

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67	06	1476	52	0	0005	927.	*LLS	5	
67	07	1477	46	0	1503	928.	TMI	**4	- DESCENT ENG ON
60	10	1500	52	0	0001	929.	*LLS	1	
60	11	1501	46	0	1503	930.	TMI	**2	- ASCENT ENG ON
61	10	1502	40	0	1467	931.	TRA	SOFT3	ENG OFF
61	11	1503	66	0	7020	932.	OUT	7020	RESET ENG OFF
62	10	1504	66	0	6440	933.	OUT	6440	SET ENG ON
62	11	1505	20	0	4036	934.	CLA	MS	SET ENG TM FLAG NG
63	10	1506	40	0	1472	935.	TRA	SOFT3+3	
63	11	1507	20	0	0533	936.	IR	CLA	DISC1
64	10	1510	56	0	0003	937.	*ALS	3	
64	11	1511	46	0	1516	938.	TMI	IR1	- IS FOLLOWUP
65	10	1512	56	0	0001	939.	*ALS	1	
65	11	1513	46	0	1562	940.	TMI	IR2	- IS AUTOMATIC
66	10	1514	12	0	0603	941.	STQ	DEL20	
66	11	1515	40	0	4437	942.	TRA	AHF	TO ATT HOLD
67	10	1516	20	0	0401	943.	IR1	CLA	DISC1C
67	11	1517	56	0	0004	944.	*ALS	4	
60	12	1520	46	0	1456	945.	TMI	ZERR	PLUS IS AUTOMATIC
60	13	1521	30	0	0575	946.	CLZ	DEL5	
61	12	1522	12	0	0603	947.	STQ	DEL20	
61	13	1523	40	0	1602	948.	TRA	MODE	
62	12	1524	50	1	0002	949.	RSTF	AXT	2,1
62	13	1525	20	0	0623	950.	CLA	S623	
63	12	1526	56	0	0003	951.	*ALS	3	
63	13	1527	46	0	1532	952.	TMI	**3	
64	12	1530	20	1	0054	953.	CLA	WCX,1	
64	13	1531	40	0	1533	954.	TRA	**2	
65	12	1532	20	1	0514	955.	CLA	WBX,1	
65	13	1533	26	1	0134	956.	MPR	A31,1	
66	12	1534	60	0	0000	957.	COM		
66	13	1535	32	0	0070	958.	ADZ	FX	
67	12	1536	10	0	0070	959.	STQ	FX	
67	13	1537	20	0	0411	960.	CLA	S11	
60	14	1540	56	0	0003	961.	*ALS	3	
60	15	1541	46	0	1545	962.	TMI	**4	
61	14	1542	20	0	0401	963.	CLA	DISC1C	

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61	15	1543	56	0	0006	964.	*ALS	6	
62	14	1544	46	0	1551	965.	TMI	*+5	
62	15	1545	20	1	0130	966.	CLA	A11,1	
63	14	1546	26	1	0374	967.	MPP	A11B0,1	
63	15	1547	32	0	0071	968.	ADZ	EY	
64	14	1550	10	0	0071	969.	STO	EY	
64	15	1551	42	1	1525	970.	TIX	RSTF+1,1	
65	14	1552	20	0	0071	971.	CLA	EY	
65	15	1553	26	0	0602	972.	MPP	4K8	
66	14	1554	60	0	0000	973.	CCM		
66	15	1555	10	0	0072	974.	STC	FZ	
67	14	1556	30	0	0071	975.	CLZ	EY	
67	15	1557	26	0	0566	976.	MPP	4K7	
60	16	1560	10	0	0071	977.	STO	EY	
60	17	1561	40	0	4524	978.	TRA	RST	
61	16	1562	56	0	0004	979.	*ALS	4	
61	17	1563	46	0	1572	980.	TMI	IP3	- IS ABORT STAGE
62	16	1564	20	0	0604	981.	CLA	DEL21	IF ON LUNAR SURFACE
62	17	1565	46	0	1456	982.	TMI	ZERR	OUTPUT ZERO ATT ERRORS
63	16	1566	20	0	0533	983.	CLA	DISC1	
63	17	1567	56	0	0007	984.	*ALS	7	
64	16	1570	46	0	1602	985.	TMI	MODE	- IS ABORT
64	17	1571	72	0	1522	986.	TSG	IP1+4	
65	16	1572	20	0	0604	987.	CLA	DEL21	
65	17	1573	46	0	4437	988.	TMI	AHE	
66	16	1574	20	0	0401	989.	CLA	DISC10	
66	17	1575	56	0	0006	990.	*ALS	6	
67	16	1576	46	0	1602	991.	TMI	MODE	
67	17	1577	20	0	0612	992.	CLA	MU6	
70	00	1600	24	0	0622	993.	SUB	4K23	
70	01	1601	46	0	1061	994.	TMI	STGCTR	STAGING ATT HOLD
71	00	1602	20	0	0400	995.	MODE	SC	TEST STEERING MODE
71	01	1603	24	0	7701	996.	SUB	IP3	
72	00	1604	46	0	4437	997.	TMI	AHE	ATT HOLD
72	01	1605	24	0	7701	998.	SUB	IP3	
73	00	1606	46	0	1524	999.	TMI	RSTF	RENDEZVOUS STEERING
73	01	1607	30	0	0575	1000.	CLZ	DEL5	ACQUISITION STEERING

74 00	1610	50	I	0002	1001.	AXT	2,1	
74 01	1611	20	I	0054	1002.	MODEL CLA	WCX,1	
75 00	1612	25	I	0130	1003.	MPR	A11,1	
75 01	1613	32	O	0072	1004.	ADZ	FZ	
76 00	1614	10	O	0072	1005.	STO	FZ	
76 01	1615	20	O	0507	1006.	CLA	S507	ORIFNT LM Z-BODY AXIS
77 00	1616	24	O	7701	1007.	SUR	1B3	IN DESIRED THRUST DIR.
77 01	1617	46	O	1622	1008.	TMI	*+3	OR ESTIMATED CSM DIR.
70 02	1620	20	I	0374	1009.	CLA	A11B0,1	
70 03	1621	10	I	0300	1010.	STO	A31B0,1	
71 02	1622	20	I	0300	1011.	CLA	A31B0,1	
71 03	1623	26	I	0130	1012.	MPR	A11,1	XB
72 02	1624	32	O	0071	1013.	ADZ	EY	
72 03	1625	10	O	0071	1014.	STO	EY	
73 02	1626	20	I	0300	1015.	CLA	A31B0,1	ZB0
73 03	1627	26	I	0140	1016.	MPR	A21,1	YB
74 02	1630	60	O	0000	1017.	COM		
74 03	1631	32	O	0070	1018.	ADZ	FX	
75 02	1632	10	O	0070	1019.	STO	FX	
75 03	1633	42	I	1611	1020.	TIX	MODEL,1	
76 02	1634	40	O	4475	1021.	TRA	EP0UT	
76 03	1635	30	O	0603	1022.	SOFT2 CLZ	DEL20	FIRST TIME FOLLOW
77 02	1636	46	O	1475	1023.	TMI	ENCOM1	PREVIOUS ENGINE STATE
77 03	1637	20	O	0400	1024.	CLA	S0	IF NOT REND MODE
70 04	1640	24	O	7701	1025.	SUB	1B3	TURN ENGINE OFF
70 05	1641	46	O	1467	1026.	TMI	SOFT3	
71 04	1642	24	O	7701	1027.	SUB	1B3	
71 05	1643	46	O	1645	1028.	TMI	*+2	
72 04	1644	40	O	1467	1029.	TRA	SOFT3	
72 05	1645	20	O	0614	1030.	CLA	MU8	TEST FOR ULLAGE
73 04	1646	24	O	0616	1031.	SUB	1K9	
73 05	1647	46	O	1467	1032.	TMI	SOFT3	
74 04	1650	20	O	0657	1033.	CLA	4K25	TEST CFL TO BE
74 05	1651	24	O	0500	1034.	SUB	DELVGX	GAINED GREATER THAN
75 04	1652	46	O	1503	1035.	TMI	ENCOM1+6	SHUTDOWN THRESHOLD
75 05	1653	20	O	0454	1036.	CLA	4K26	
76 04	1654	24	O	0267	1037.	SUB	DELVG	

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76 05	1655	46 0	1503	1038.		TMI	ENCOM1+6	
77 04	1656	30 0	0400	1039.		CLZ	SC	SET ATT HOLD
77 05	1657	30 0	0411	1040.		CLZ	S11	DPS-RCS/APS
70 06	1660	40 0	1467	1041.		TRA	SOFT3	
70 07	1661	30 0	0531	1042.	LUNALI	CLZ	DAYA	CHANGE GAIN
71 06	1662	54 0	0002	1043.		LRS	2	1/4
71 07	1663	10 0	0531	1044.		STO	DAYA	
72 06	1664	30 0	0532	1045.		CLZ	DAZA	
72 07	1665	54 0	0002	1046.		LRS	2	
73 06	1666	10 0	0532	1047.		STO	DAZA	
73 07	1667	40 0	1467	1048.		TRA	SOFT3	
				1049.	*			
				1050.	*		START OF NAVIGATION	
				1051.	*			
74 06	1670	20 0	0604	1052.	NAV1P	CLA	DEL21	
74 07	1671	46 0	5175	1053.		TMI	NAVI	- IS ON LUNAR SURFACE
75 06	1672	20 0	0404	1054.		CLA	VD1X	COMPUTE THRUST ACCEL
75 07	1673	24 0	0470	1055.		SUB	VDX	13
76 06	1674	56 0	0005	1056.		ALS	5	1/2(VD1-VD) AT 7
76 07	1675	40 0	5166	1057.		TRA	5166	TO HARD NAV
77 06	1676	50 1	0002	1058.	XDVS	AXT	2,1	
77 07	1677	20 1	0120	1059.		CLA	DVSX,1	
70 10	1700	22 0	4015	1060.		ADD	1B12	
70 11	1701	54 0	0006	1061.		LRS	6	
71 10	1702	32 1	0050	1062.		ADZ	DQ SX,1	
71 11	1703	10 1	0050	1063.		STO	DQ SX,1	
72 10	1704	20 1	0404	1064.		CLA	VD1X,1	
72 11	1705	10 1	0470	1065.		STO	VDX,1	
73 10	1706	42 1	1677	1066.		TIX	XDVS+1,1	
73 11	1707	40 0	5223	1067.		TRA	NAV4	
74 10	1710	72 0	6261	1068.	ALTUP	TSQ	FXEC	
				1069.	*			
74 11	1711	50 1	0002	1070.		AXT	2,1	
75 10	1712	20 0	0223	1071.		CLA	25J	ALTITUDE ENTRY TEST
75 11	1713	24 0	4006	1072.		SUB	1B17	
76 10	1714	46 0	1723	1073.		TMI	FLTP	IF NO 25J ENTRY
76 11	1715	20 0	0223	1074.		CLA	25J	

77	10	1716	22	0	0231	1075.	ADD	5J		
77	11	1717	10	0	0210	1076.	STO	R	R=5J+25J	
70	12	1720	06	1	0360	1077.	MPY	U1X,1		
70	13	1721	52	0	0001	1078.	LLS	1		
71	12	1722	10	1	0340	1079.	STO	RX,1	NEW R COMPONENTS	
						1080.				
						1081.	*			
						1082.	*	RANGE AND RANGE RATE COMPUTATIONS		
						1083.	*			
71	13	1723	20	1	0344	1083.	FLTR	CLA	RCX,1	RELATIVE RANGE
72	12	1724	24	1	0340	1084.		*SUB	RX,1	
72	13	1725	10	1	0124	1085.		STO	RPX,1	
73	12	1726	10	1	0004	1086.		STO	TS4,1	
73	13	1727	42	1	1712	1087.		TIX	ALTUP+2,1	
74	12	1730	72	0	6737	1088.		TSQ	DPVMAG	DP COMP OF RR MAG
74	13	1731	10	0	0317	1089.		STO	RR	B23 RANGE VECTOR MAG
75	12	1732	20	0	0636	1090.		CLA	2K1	48
75	13	1733	54	0	0001	1091.		LRS	1	49
76	12	1734	04	0	0210	1092.		DVP	R	26
76	13	1735	04	0	0210	1093.		DVP	R	3
77	12	1736	04	0	0210	1094.		DVP	R	-20
77	13	1737	10	0	0223	1095.		STO	25J	2K1/R**3 R-20
70	14	1740	30	0	0440	1096.		CLZ	RRDOT	ZEROED FOR SUM
70	15	1741	50	1	0002	1097.		AXT	2,1	
71	14	1742	20	1	0124	1098.	FLTRA	CLA	RPX,1	
71	15	1743	06	0	5033	1099.		MPY	1B1	B24
72	14	1744	04	0	0317	1100.		DVP	RR	
72	15	1745	10	1	0300	1101.		STO	A31BD,1	B1 UNIT POINTING VECTOR
73	14	1746	20	1	0364	1102.		CLA	VCX,1	B13
73	15	1747	24	1	0360	1103.		SUB	VX,1	
74	14	1750	10	1	0030	1104.		STO	PDOTX,1	B13
74	15	1751	26	1	0300	1105.		MPP	A31BD,1	
75	14	1752	56	0	0001	1106.		ALS	1	
75	15	1753	32	0	0440	1107.		ADZ	RRDOT	
76	14	1754	10	0	0440	1108.		STO	RRDOT	
76	15	1755	20	1	0060	1109.		CLA	U1X,1	
77	14	1756	26	1	0060	1110.		MPP	U1X,1	B2
77	15	1757	26	0	7520	1111.		MPP	3B3	B5

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70	16	1760	24	0	4011	1112.	SUB	185		
70	17	1761	26	0	0223	1113.	MPP	25J		
71	16	1762	10	1	0554	1114.	STO	LILA,1	B-15	
71	17	1763	42	1	1742	1115.	TIX	FLTRA,1		
72	16	1764	20	0	0060	1116.	CLA	U1X		
72	17	1765	26	0	0062	1117.	MPP	U1Z		
73	16	1766	26	0	7520	1118.	MPP	3B3	B5	
73	17	1767	36	0	0223	1119.	MPZ	25J		
74	16	1770	10	0	0557	1120.	STO	LILC	B-15	
74	17	1771	72	0	6261	1121.	TSQ	EXFC	END OF FIRST BR. OF FILTER	
					1122.		*			
75	16	1772	30	0	0167	1123.	PUPDAT	CLZ	MU17	ZERO MU17 IF FILTER TIME
75	17	1773	22	0	7701	1124.		*ADD	1B3	
76	16	1774	46	0	2001	1125.		TMI	FLTRTM	
76	17	1775	10	0	0167	1126.		STO	MU17	
77	16	1776	72	0	6261	1127.		TSQ	EXFC	
77	17	1777	72	0	6261	1128.	FLTRX	TSQ	EXFC	
00	20	2000	40	0	5444	1129.		TRA	5444	
					1130.		*			
00	21	2001	44	0	2002	1131.	FLTRTM	TOV	*+1	COVARIANCE UPDATE
01	20	2002	50	1	0003	1132.		AXT	3,1	RESET OVERFLOW DISCRETE
01	21	2003	20	1	0640	1133.	FLTRFB	CLA	P11,1	30, 30, 20, 20
02	20	2004	26	0	0554	1134.		MPP	LILA	B-15
02	21	2005	10	0	0004	1135.		STO	TS4	15, 15, 5, 5
03	20	2006	20	1	0644	1136.		CLA	P21,1	30, 30, 20, 20
03	21	2007	26	0	0557	1137.		MPP	LILC	B-15
04	20	2010	32	0	0004	1138.		ADZ	TS4	
04	21	2011	10	1	0010	1139.		STO	TS10,1	TS10 A*P11+C*P21 B15
05	20	2012	20	1	0640	1140.		CLA	P11,1	TS11 A*P12+C*P22 B15
05	21	2013	26	0	0557	1141.		MPP	LILC	TS12 A*P13+C*P23 B5
06	20	2014	10	0	0004	1142.		STO	TS4	TS13 A*P14+C*P24 B5
06	21	2015	20	1	0644	1143.		CLA	P21,1	TS14 C*P11+J*P21 B15
07	20	2016	26	0	0556	1144.		MPP	LILJ	TS15 C*P12+J*P22 B15
07	21	2017	32	0	0004	1145.		ADZ	TS4	TS16 C*P13+J*P23 B5
00	22	2020	10	1	0014	1146.		STO	TS14,1	TS17 C*P14+J*P24 B5
00	23	2021	42	1	2003	1147.		TIX	FLTRFB,1	
01	22	2022	20	0	0642	1148.		CLA	P13	B20 32XB25

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01	23	2023	54	0	0005	1149.	LRS	5	MPY BY 32,SCALE AT B30
02	22	2024	22	0	4006	1150.	ADD	1B17	ADD 2**13
02	23	2025	22	0	0640	1151.	ADD	P11	
03	22	2026	10	0	0640	1152.	STC	P11	B30
03	23	2027	20	0	0643	1153.	CLA	P14	
04	22	2030	22	0	0646	1154.	ADD	P23	B20 16XB24
04	23	2031	54	0	0006	1155.	LRS	6	MPY BY 16,SCALE AT B30
05	22	2032	22	0	0641	1156.	ADD	P12	
05	23	2033	10	0	0641	1157.	STC	P12	B30
06	22	2034	10	0	0644	1158.	STC	P21	
06	23	2035	20	0	0647	1159.	CLA	P24	B20 32XB25
07	22	2036	54	0	0005	1160.	LRS	5	MPY BY 32,SCALE AT B30
07	23	2037	22	0	4006	1161.	ADD	1B17	ADD 2**13
00	24	2040	22	0	0645	1162.	ADD	P22	
00	25	2041	10	0	0645	1163.	STC	P22	B30
01	24	2042	20	0	0011	1164.	CLA	TS11	EXCHANGE TS11,TS14
01	25	2043	14	0	0014	1165.	LDQ	TS14	
02	24	2044	12	0	0011	1166.	STQ	TS11	
02	25	2045	10	0	0014	1167.	STQ	TS14	
03	24	2046	50	1	0001	1168.	AXT	1,1	
03	25	2047	20	1	0650	1169.	FLTRC CLA	P33,1	P34 B10
04	24	2050	54	0	0005	1170.	LRS	5	MPY BY 16,SCALE AT B19
04	25	2051	22	1	0010	1171.	ADD	TS10,1	B15 16XB19
05	24	2052	54	0	0001	1172.	LRS	1	SCALE AT B10
05	25	2053	22	1	0642	1173.	ADD	P13,1	
06	24	2054	10	1	0642	1174.	STC	P13,1	B20
06	25	2055	20	1	0652	1175.	CLA	P43,1	P44 B10
07	24	2056	54	0	0005	1176.	LRS	5	MPY BY 16,SCALE AT B19
07	25	2057	22	1	0014	1177.	ADD	TS14,1	B15 16XB19
00	26	2060	54	0	0001	1178.	LRS	1	SCALE AT B20
00	27	2061	22	1	0646	1179.	ADD	P23,1	
01	26	2062	10	1	0646	1180.	STC	P23,1	B20
01	27	2063	42	1	2047	1181.	TIX	FLTRC,1	
02	26	2064	20	0	0012	1182.	CLA	TS12	B5 32XB10
02	27	2065	22	0	4006	1183.	ADD	1B17	ADD 2**(-7)
03	26	2066	22	0	0650	1184.	ADD	P33	
03	27	2067	10	0	0650	1185.	STC	P33	B10

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04 26	2070	20 0	0013	1186.	CLA	TS13
04 27	2071	22 0	0016	1187.	ADD	TS16
05 26	2072	54 0	0001	1188.	LRS	1
05 27	2073	22 0	0651	1189.	ADD	P34
06 26	2074	10 0	0651	1190.	STO	P34
06 27	2075	10 0	0652	1191.	STO	P43
07 26	2076	20 0	0017	1192.	CLA	TS17
07 27	2077	22 0	4006	1193.	ADD	1B17
00 30	2100	22 0	0653	1194.	ADD	P44
00 31	2101	10 0	0653	1195.	STO	P44
01 30	2102	30 0	0417	1196.	CLZ	S17
01 31	2103	56 0	0003	1197.	*ALS	3
02 30	2104	44 0	2106	1198.	TOV	PINIT
02 31	2105	40 0	2123	1199.	TRA	FLTRD
03 30	2106	50 1	0003	1200.	PINIT AXT	3,1
03 31	2107	30 1	0640	1201.	CLZ	P11,1
04 30	2110	30 1	0644	1202.	CLZ	P21,1
04 31	2111	30 1	0650	1203.	CLZ	P33,1
05 30	2112	42 1	2107	1204.	TIX	*-3,1
05 31	2113	20 0	0457	1205.	CLA	6K2
06 30	2114	10 0	0640	1206.	STO	P11
06 31	2115	10 0	0645	1207.	STO	P22
07 30	2116	20 0	0456	1208.	CLA	6K4
07 31	2117	10 0	0650	1209.	STO	P33
00 32	2120	10 0	0653	1210.	STO	P44
00 33	2121	20 0	0274	1211.	CLA	29J
01 32	2122	10 0	0147	1212.	STO	T1
01 33	2123	20 0	0503	1213.	FLTRD CLA	17J
02 32	2124	62 0	0000	1214.	ABS	
02 33	2125	24 0	4006	1215.	SUB	1B17
03 32	2126	46 0	2226	1216.	TMI	FLTRH
03 33	2127	30 0	0503	1217.	RATE CLZ	17J
04 32	2130	24 0	0441	1218.	SUB	RDOTS
04 33	2131	10 0	0220	1219.	STO	DELRI
			1220.	*		
			1221.	*		
			1222.	*		

B5 16XB9
 SCALE AT B10

B10

B5 32XB10
 ADD 2*(-7)

B10
 IS FILTER INIT. REQUIRED
 FORCE OVERFLOW IF =1B3

INITIALIZE P MATRIX

NO RATE CHECK RANGE

B13
 NOTE, DELR2 IS ALREADY
 ZERO SINCE IT IS TIME
 SHAPED WITH R1Z

05 32	2132	30 0	0143	1223.		CLZ	Q12	
05 33	2133	20 0	4030	1224.		CLA	PMAx	=1BC
06 32	2134	10 0	0170	1225.		STO	Q22	
06 33	2135	50 1	0003	1226.		AXT	3,1	
07 32	2136	20 0	0440	1227.	FLTRF	CLA	RRDOT	B13
07 33	2137	26 1	0300	1228.		MPE	A31BD,1	B14
00 34	2140	56 0	0001	1229.		ALS	1	
00 35	2141	24 1	0030	1230.		SUB	RDOTX,1	B13
01 34	2142	06 0	5033	1231.		MPY	1B1	SCALE AT B14
01 35	2143	04 0	0317	1232.		DVP	RF	B23
02 34	2144	10 1	0000	1233.		STO	TS0,1	B-9
02 35	2145	30 1	0554	1234.		CLZ	L11,1	
03 34	2146	30 1	0234	1235.		CLZ	L12,1	
03 35	2147	42 1	0136	1236.		TIX	FLTRF,1	
04 34	2150	30 0	0002	1237.		CLZ	TS2	
04 35	2151	10 0	0001	1238.		STO	TS1	
05 34	2152	20 0	0300	1239.		CLA	A31BD	
05 35	2153	60 0	0000	1240.		COM		TS0 = M11 B-9
06 34	2154	10 0	0002	1241.		STO	TS2	TS1 = M12 B-9
06 35	2155	20 0	0302	1242.		CLA	A33BD	TS2 = M13 B1
07 34	2156	60 0	0000	1243.		COM		TS3 = M14 B1
07 35	2157	10 0	0003	1244.		STO	TS3	
00 36	2160	50 1	0001	1245.		AXT	1,1	
01 37	2161	20 1	0542	1246.	FLTRF	CLA	P13,1	B20
01 36	2162	26 1	0002	1247.		MPE	TS2,1	B1
01 37	2163	32 0	0554	1248.		ADZ	L11	
02 36	2164	10 0	0554	1249.		STO	L11	L11=P13(M13)+P14(M14) B21
02 37	2165	20 1	0646	1250.		CLA	P23,1	B20
03 36	2166	26 1	0002	1251.		MPE	TS2,1	B1
03 37	2167	32 0	0555	1252.		ADZ	L21	
04 36	2170	10 0	0555	1253.		STO	L21	L21 = P23(M13)+P24(M14) B21
04 37	2171	20 1	0650	1254.		CLA	P33,1	B10
05 36	2172	26 1	0002	1255.		MPE	TS2,1	
05 37	2173	32 0	0556	1256.		ADZ	L31	
06 36	2174	10 0	0556	1257.		STO	L31	L31 = P33(M13)+P34(M14) B11
06 37	2175	20 1	0652	1258.		CLA	P43,1	B10
07 36	2176	26 1	0002	1259.		MPE	TS2,1	

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07	37	2177	32	0	0557	1260.	ADZ	L41	
10	20	2200	10	0	0557	1261.	STO	L41	L41 = P43(M13)+P44(M11) B11
10	21	2201	42	1	2161	1262.	TIX	FLTRF,1	
11	20	2202	30	0	0212	1263.	CLZ	DELTA	
11	21	2203	50	1	0003	1264.	AXT	3,1	
12	20	2204	20	1	0640	1265.	FLTRG CLA	P11,1	B30,30,20,20
12	21	2205	26	0	0000	1266.	MPP	TSC	M11 B-9
13	20	2206	10	0	0010	1267.	STO	TS10	B21
13	21	2207	20	1	0644	1268.	CLA	P21,1	
14	20	2210	26	0	0001	1269.	MPP	TS1	M12 B-9
14	21	2211	32	0	0010	1270.	ADZ	TS10	B21,21,11,11
15	20	2212	32	1	0554	1271.	ADZ	L11,1	
15	21	2213	56	0	0001	1272.	ALS	1	B20,20,10,10
16	20	2214	10	1	0554	1273.	STO	L11,1	L11=P11M11+P21M12+P13M13+P14M14
16	21	2215	26	1	0000	1274.	MPP	TSC,1	
17	20	2216	56	0	0001	1275.	ALS	1	
17	21	2217	32	0	0212	1276.	ADZ	DELTA	DELTA=M1J DOT PJ1 B10
10	22	2220	10	0	0212	1277.	STO	DELTA	
10	23	2221	42	1	2204	1278.	TIX	FLTRG,1	
11	22	2222	22	0	0304	1279.	ADD	6K8	
11	23	2223	10	0	0212	1280.	STO	DELTA	
12	22	2224	10	0	0073	1281.	STO	Q11	
12	23	2225	40	0	2315	1282.	TRA	FLTRJ-1	
						1283.			
						1284.			
							*		
							*		
13	22	2226	20	0	0316	1285.	FLTRH CLA	18J	CHECK RANGE
13	23	2227	24	0	4006	1286.	SUB	1817	
14	22	2230	46	0	1776	1287.	TMI	FLTRX-1	
14	23	2231	50	1	0002	1288.	RANGE AXT	2,1	
15	22	2232	20	1	0044	1289.	FLTRI CLA	A31S,1	ZB B1
15	23	2233	26	0	0316	1290.	MPP	18J	
16	22	2234	56	0	0001	1291.	ALS	1	
16	23	2235	24	1	0234	1292.	SUB	RRSX,1	
17	22	2236	10	1	0220	1293.	STO	DELFI,1	B23
17	23	2237	20	1	0124	1294.	CLA	RRX,1	
10	24	2240	26	0	0611	1295.	MPP	6K9	B8
10	25	2241	56	0	0001	1296.	ALS	1	B7

11	24	2242	10	0	0001	1297.	STC	TS1	TRICKY, YES
11	25	2243	26	1	0124	1298.	MPP	PRX,1	R30
12	24	2244	10	1	0001	1299.	STC	TSC,1	R30
12	25	2245	20	1	0300	1300.	CLA	A31B0,1	R1
13	24	2246	26	1	0300	1301.	MPP	A31B0,1	B2
13	25	2247	26	0	0517	1302.	MPP	6K10	2+28 P30
14	24	2251	10	1	0004	1303.	STC	TS4,1	
14	25	2251	42	1	2232	1304.	TIX	FLTR1,1	
15	24	2252	32	0	0012	1305.	ADZ	TS2	
15	25	2253	22	0	0640	1306.	ADD	P11	
16	24	2254	10	0	0073	1307.	STC	Q11	B30
16	25	2255	20	0	0377	1308.	CLA	T1	
17	24	2256	10	0	0147	1309.	STC	T1	T1 = T1
17	25	2257	20	0	0001	1310.	CLA	TS1	(PRX)(6K9) B7
10	26	2260	26	0	0126	1311.	MPP	RRZ	B30
10	27	2261	60	0	0000	1312.	COM		
11	26	2262	22	0	0641	1313.	ADD	P12	
11	27	2263	10	0	0143	1314.	STC	Q12	B30 Q12=P12-6K9(PRX)(RRZ)
12	26	2264	26	0	0143	1315.	MPP	Q12	
12	27	2265	10	0	0001	1316.	STC	TS1	B60
13	26	2266	30	0	0000	1317.	CLZ	TSC	
13	27	2267	32	0	0006	1318.	ADZ	TS6	
14	26	2270	22	0	0645	1319.	ADD	P22	
14	27	2271	10	0	0170	1320.	STC	Q22	B30
15	26	2272	26	0	0073	1321.	MPP	Q11	B60
15	27	2273	24	0	0001	1322.	SUR	TS1	
16	26	2274	10	0	0212	1323.	STC	DELTA	B60
16	27	2275	50	1	0003	1324.	AXT	3,1	
17	26	2276	20	1	0640	1325.	CLA	P11,1	
17	27	2277	60	0	0000	1326.	COM		
10	30	2300	10	1	0554	1327.	STC	L11,1	
10	31	2301	20	1	0644	1328.	CLA	P21,1	
11	30	2302	10	1	0234	1329.	STC	L12,1	
11	31	2303	42	1	2276	1330.	TIX	*-5,1	
12	30	2304	20	0	0656	1331.	CLA	6K5	B0
12	31	2305	26	0	0221	1332.	MPP	DELTA	B23
13	30	2306	22	0	0341	1333.	ADD	PY	Y=Y+6K5*DELTA B23

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13	31	2307	10	0	0341	1334.	STC	RY	
14	30	2310	20	0	0522	1335.	CLA	6K6	B8
14	31	2311	06	0	0221	1336.	MPY	DELP3	
15	30	2312	04	0	0276	1337.	DVP	DELTAT	TO B13
15	31	2313	22	0	0361	1338.	ADD	VY	VY=VY+6K6*DELR3/DELTAT
16	30	2314	10	0	0361	1339.	STC	VY	UPDATED VY AT B13
16	31	2315	72	0	6261	1340.	TSQ	EXFC	END OF 2ND BR. OF FILTER
					1341.		*		POINT B
					1342.		*		SCALING COMMENTS
					1343.		*		RANGE, RATE
17	30	2316	50	1	0003	1344.	FLTRJ	AXT	3,1
17	31	2317	20	1	0234	1345.	CLA	L12,1	B30,30,20,20
10	32	2320	06	0	0143	1346.	MPY	Q12	AT B30
10	33	2321	54	0	0003	1347.	LRS	3	
11	32	2322	04	0	0212	1348.	DVP	DELTA	AT B60
11	33	2323	10	0	0001	1349.	STC	TS1	B3,3,-7,-7
12	32	2324	20	1	0554	1350.	CLA	L11,1	B30,30,20,20 20,20,10,10
12	33	2325	06	0	0170	1351.	MPY	Q22	AT B30 BC FOR RATE
13	32	2326	54	0	0003	1352.	LRS	3	
13	33	2327	04	0	0212	1353.	DVP	DELTA	AT B60 B10 FOR RATE
14	32	2330	22	0	0001	1354.	ADD	TS1	
14	33	2331	10	1	0010	1355.	STC	B11,1	B3,3,-7,-7 13,13,3,3
15	32	2332	26	0	0220	1356.	MPY	DELP1	B23 B13 FOR RATE
15	33	2333	10	1	0004	1357.	STC	TS4,1	B26,26,16,16 26,26,16,16
16	32	2334	20	1	0554	1358.	CLA	L11,1	B30,30,20,20 B20,20,10,10
16	33	2335	06	0	0143	1359.	MPY	Q12	B30 ZERO
17	32	2336	54	0	0003	1360.	LRS	3	
17	33	2337	04	0	0212	1361.	DVP	DELTA	B60
10	34	2340	10	0	0001	1362.	STC	TS1	B3,3,-7,-7
10	35	2341	20	1	0234	1363.	CLA	L12,1	B30,30,20,20 ZERO
11	34	2342	60	0	0000	1364.	COM		
11	35	2343	06	0	0073	1365.	MPY	Q11	B30
12	34	2344	54	0	0003	1366.	LRS	3	
12	35	2345	04	0	0212	1367.	DVP	DELTA	B60
13	34	2346	24	0	0001	1368.	SUB	TS1	
13	35	2347	10	1	0014	1369.	STC	B12,1	B3,3,-7,-7 ZERO FOR RATE
14	34	2350	06	0	0222	1370.	MPY	DELP2	B23

14	35	2351	22	1	0004	1371.	ADD	TS4,1	DRX,DRZ,DVX,DVZ
15	34	2352	56	0	0003	1372.	ALS	3	
15	35	2353	10	1	0004	1373.	STO	TS4,1	B23,23,13,13
16	34	2354	42	1	2317	1374.	TIX	FLTRPJ+1,1	
16	35	2355	22	0	0340	1375.	ADD	RX	
17	34	2356	10	0	0340	1376.	STO	RX	
17	35	2357	20	0	0005	1377.	CLA	TS5	
10	36	2360	22	0	0342	1378.	ADD	RZ	
10	37	2361	10	0	0342	1379.	STO	RZ	
11	36	2362	20	0	0006	1380.	CLA	TS6	
11	37	2363	22	0	0360	1381.	ADD	VX	
12	36	2364	10	0	0360	1382.	STO	VX	
12	37	2365	20	0	0007	1383.	CLA	TS7	
13	36	2366	22	0	0362	1384.	ADD	VZ	
13	37	2367	10	0	0362	1385.	STO	VZ	
14	36	2370	50	1	0003	1386.	AXT	3,1	
14	37	2371	20	0	0010	1387.	CLA	B11	B3 B13
15	36	2372	26	1	0554	1388.	MPP	L11,1	B30,30,10,10 B20,20,10,10
15	37	2373	10	0	0000	1389.	STO	TSC	
16	36	2374	20	0	0014	1390.	CLA	B12	B3 ZERO FOR RATE
16	37	2375	26	1	0234	1391.	MPP	L12,1	
17	36	2376	34	0	0000	1392.	SUZ	TSC	
17	37	2377	56	0	0003	1393.	ALS	3	
20	20	2400	22	1	0640	1394.	ADD	P11,1	
20	21	2401	10	1	0640	1395.	STO	P11,1	B30,30,20,20 FOR BOTH
21	20	2402	20	0	0011	1396.	CLA	B21	B3 B13 FOR RATE
21	21	2403	26	1	0554	1397.	MPP	L11,1	B30,30,20,20 20,20,10,10
22	20	2404	10	0	0000	1398.	STO	TSC	
22	21	2405	20	0	0015	1399.	CLA	B22	B3 ZERO FOR RATE
23	20	2406	26	1	0234	1400.	MPP	L12,1	B30,30,20,20 ZERO
23	21	2407	34	0	0000	1401.	SUZ	TSC	
24	20	2410	56	0	0003	1402.	ALS	3	
24	21	2411	22	1	0644	1403.	ADD	P21,1	
25	20	2412	10	1	0644	1404.	STO	P21,1	B30,30,20,20 FOR BOTH
25	21	2413	42	1	2371	1405.	TIX	FLTRK,1	
26	20	2414	50	1	0001	1406.	AXT	1,1	
26	21	2415	20	0	0012	1407.	CLA	B31	B-7 3

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27	20	2416	26	1	0556	1408.	MPF	L31,1	B20,20	10,10
27	21	2417	10	0	0000	1409.	STO	TSC		
20	22	2420	20	0	0016	1410.	CLA	B32	B-7	ZERO FOR RATE
20	23	2421	26	1	0236	1411.	MPR	L32,1	B20,B20	ZERO FOR RATE
21	22	2422	34	0	0000	1412.	SUZ	TSC		
21	23	2423	56	0	0003	1413.	ALS	3		
22	22	2424	22	1	0650	1414.	ADD	P33,1	B10,10	FOR BOTH
22	23	2425	10	1	0650	1415.	STO	P33,1		
23	22	2426	42	1	2415	1416.	TIX	FLTPL,1		
23	23	2427	20	0	0013	1417.	CLA	B41	B-7	B3
24	22	2430	26	0	0557	1418.	MPR	L41		
24	23	2431	10	0	0000	1419.	STO	TSC		
25	22	2432	20	0	0017	1420.	CLA	B42	B-7	ZERO
25	23	2433	26	0	0237	1421.	MPR	L42		
26	22	2434	34	0	0000	1422.	SUZ	TSC		
26	23	2435	56	0	0003	1423.	ALS	3		
27	22	2436	22	0	0653	1424.	ADD	P44	B10	FOR BOTH
27	23	2437	10	0	0653	1425.	STO	P44		
20	24	2440	20	0	0651	1426.	CLA	P34		
20	25	2441	10	0	0652	1427.	STO	P43		
21	24	2442	20	0	0641	1428.	CLA	P12		
21	25	2443	10	0	0644	1429.	STO	P21		
22	24	2444	30	0	0316	1430.	CLZ	18J		
22	25	2445	40	0	1777	1431.	TRA	FLTRX		
23	24	2446	24	0	0231	1432.	LMQRR2 SUB	5J	QL-5J	AT B23
23	25	2447	10	0	0403	1433.	STO	QLTELE	PERIC. ALT	
24	24	2450	30	0	0007	1434.	CLZ	TS7	= VH SQ	AT B26
24	25	2451	10	0	0143	1435.	STO	VHSQ	SAVE	FOR ORB INS
25	24	2452	72	0	6261	1436.	TSQ	FXEC		
						1437.				
25	25	2453	50	1	0002	1438.	* ORBLM	AXT	2,1	
26	24	2454	20	1	0340	1439.	CLA	PX,1		
26	25	2455	10	1	0204	1440.	STO	ROX,1		
27	24	2456	20	1	0360	1441.	CLA	VX,1		
27	25	2457	10	1	0424	1442.	STO	VOX,1		
20	26	2460	42	1	2454	1443.	TIX	ORBLM+1,1		
20	27	2461	72	0	6444	1444.	TSC	ORBPM	COMPUTE	LM ORBIT PARAMETERS

				1445.	*			RETURN FROM OFBPM W/ ACC=SI
21	26	2462	10 0 0003	1446.		STD	TS3	BC
21	27	2463	54 0 0003	1447.		LPS	3	TO R3
22	26	2464	10 0 0211	1448.		STD	Y	SAVE FOR TPERG
22	27	2465	20 0 0103	1449.		CLA	CI	
23	26	2466	10 0 0004	1450.		STD	TS4	
23	27	2467	72 0 7034	1451.		TSG	ARCTAR	RTN W/ ACCU=E
24	26	2470	60 0 0000	1452.		COM		
24	27	2471	22 0 4021	1453.		ADD	2PIR3	
25	26	2472	32 0 0211	1454.		ADZ	Y	2*PI-F+SI AT B3, ZERO Y
25	27	2473	06 0 5033	1455.		MPY	1B1	TO E4
26	26	2474	04 0 0077	1456.		DVP	NI	AT R-9
26	27	2475	10 0 0313	1457.		STD	TPEEG	R13
27	26	2476	20 0 0173	1458.		CLA	AI	
27	27	2477	24 0 0231	1459.		SUB	5J	
20	30	2500	56 0 0001	1460.		ALS	1	MPY BY 2
20	31	2501	24 0 0403	1461.		SUB	QLTFLF	
21	30	2502	10 0 0315	1462.		STD	Q4	LM APOFOCUS ALT. AT B23
21	31	2503	72 0 6261	1463.		TSG	EXFC	
				1464.	*			
				1465.	*			Y ZEROED IN PREVIOUS BR
22	30	2504	30 0 0270	1466.		CLZ	VYC	
22	31	2505	50 1 0002	1467.		AXT	2,1	
23	30	2506	20 1 0340	1468.	KINGK	CLA	RX,1	
23	31	2507	10 1 0220	1469.		STD	R1X,1	SAVE R FOR ORBIT INS.
24	30	2510	26 1 0054	1470.		MPE	WCX,1	
24	31	2511	56 0 0001	1471.		ALS	1	
25	30	2512	32 0 0211	1472.		ADZ	Y	
25	31	2513	10 0 0211	1473.		STD	Y	Y=(WCX)DOT(RX)
26	30	2514	20 1 0360	1474.		CLA	VX,1	
26	31	2515	10 1 0430	1475.		STD	V1X,1	SAVE V FOR ORBIT INS.
27	30	2516	26 1 0054	1476.		MPE	WCX,1	
27	31	2517	56 0 0001	1477.		ALS	1	
20	32	2520	32 0 0270	1478.		ADZ	VYC	
20	33	2521	10 0 0270	1479.		STD	VYC	VYC=(WCX)DOT(VX)
21	32	2522	20 1 0054	1480.		CLA	WCX,1	SET UP FOR CROSS
21	33	2523	60 0 0000	1481.		COM		PRODUCT SUBROUTINE

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22	32	2524	10	1	0010	1482.	STO	TS10,1	WC X U1 = U1 X -WC
22	33	2525	20	1	0060	1483.	CLA	U1X,1	
23	32	2526	10	1	0004	1484.	STO	TS4,1	
23	33	2527	42	1	2506	1485.	TIX	KINGK,1	
24	32	2530	72	0	6373	1486.	TSQ	CRSPRD	
24	33	2531	72	0	6422	1487.	TSQ	NORMV	V1 VECTOR TO TSB
25	32	2532	72	0	6373	1488.	TSQ	CRSPRD	
25	33	2533	30	0	0003	1489.	CLZ	TS3	
26	32	2534	30	0	0004	1490.	CLZ	TS4	
26	33	2535	50	1	0002	1491.	AXT	2,1	
27	32	2536	30	1	0010	1492.	CLZ	TS10,1	
27	33	2537	10	1	0034	1493.	STO	V1X,1	V1 AT 1
20	34	2540	26	1	0134	1494.	MPP	A31,1	
20	35	2541	22	0	0004	1495.	ADD	TS4	TS4 = V1 DOT ZB AT B2
21	34	2542	10	0	0004	1496.	STO	TS4	
21	35	2543	30	1	0014	1497.	CLZ	TS14,1	
22	34	2544	56	0	0001	1498.	ALS	1	
22	35	2545	10	1	0040	1499.	STO	W1X,1	
23	34	2546	20	1	0134	1500.	CLA	A31,1	
23	35	2547	26	1	0060	1501.	MPR	U1X,1	
24	34	2550	22	0	0003	1502.	ADD	TS3	
24	35	2551	10	0	0003	1503.	STO	TS3	TS3 = U1 DOT ZB AT B2
25	34	2552	42	1	2536	1504.	TIX	*-12,1	
25	35	2553	72	0	7034	1505.	TSQ	APCTAE	
26	34	2554	10	0	0277	1506.	STO	XI	
26	35	2555	72	0	6261	1507.	TSQ	EXEC	END OF LEM ORB PAR BRANCH
						1508.			
						1509.			
						1510.			
							*		
							*	GUIDANCE MODE CHECK	
							*		
							GM		
27	34	2556	20	0	0410	1511.	CLA	S10	
27	35	2557	22	0	7520	1512.	*ADD	3B3	
20	36	2560	46	0	2773	1513.	TMI	XDV	EXTERNAL DELTA V
20	37	2561	22	0	4065	1514.	*ADD	2B3	
21	36	2562	62	0	0000	1515.	*ABS		
21	37	2563	46	0	2577	1516.	TMI	DXFR1	TPI SFAPCH
22	36	2564	20	0	0410	1517.	CLA	S10	
22	37	2565	60	0	0000	1518.	COM		

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23	36	2566	46	0	2573	1519.	TMI	#+5	
23	37	2567	30	0	0310	1520.	CLZ	TDEL	TDEL=C
24	36	2570	20	0	0732	1521.	CLA	ORBRFT	=TRA DX10P
24	37	2571	10	0	0157	1522.	STO	TSEFX	SET UP RETURN FROM NORTON
25	36	2572	40	0	3562	1523.	TRA	NORTON+5	
						1524.			
							*	CSI,CDH, OR TPI EXECUTE	
25	37	2573	20	0	0373	1525.	CLA	TIG	COMPUTE TDEL FOR
26	36	2574	24	0	0377	1526.	SUB	TA1	CSI, CDH, OR TPI(S10=4)
26	37	2575	56	0	0005	1527.	ALS	5	
27	36	2576	10	0	0310	1528.	STO	TDEL	
27	37	2577	20	0	0310	1529.	DXFR1 CLA	TDEL	
30	20	2600	54	0	0005	1530.	LRS	5	
30	21	2601	22	0	0377	1531.	ADD	TA1	
31	20	2602	10	0	0373	1532.	STO	TIG	
31	21	2603	20	0	0310	1533.	CLA	TDEL	
32	20	2604	22	0	0307	1534.	ADD	6J	
32	21	2605	10	0	0311	1535.	STO	TR	TIME TILL RENDEZ(TPI)
33	20	2606	30	0	0310	1536.	CLZ	TDEL	LIMIT TDEL POSITIVE
33	21	2607	46	0	2611	1537.	TMI	#+2	
34	20	2610	10	0	0310	1538.	STO	TDEL	
34	21	2611	30	0	0407	1539.	CLZ	S7	ZERO S7 WHEN NOT IN XDV
35	20	2612	20	0	0310	1540.	CLA	TDEL	
35	21	2613	72	0	3555	1541.	DXFR10 TSQ	NORTON	
36	20	2614	10	0	0347	1542.	DX10P STO	RF	PRED. BUFNDUT ALTITUDE
36	21	2615	22	0	0217	1543.	ADD	2K14	
37	20	2616	10	0	0170	1544.	STO	P	
37	21	2617	30	0	0477	1545.	CLZ	RADDT	
30	22	2620	30	0	0263	1546.	CLZ	VPY	
30	23	2621	30	1	0220	1547.	DXFR5 CLZ	R1X,1	R5 STORE
31	22	2622	10	1	0174	1548.	STO	R5X,1	
31	23	2623	30	1	0430	1549.	CLZ	V1X,1	
32	22	2624	10	1	0014	1550.	STO	TS14,1	
32	23	2625	10	1	0460	1551.	STO	V5X,1	V5 STORE
33	22	2626	26	1	0054	1552.	MPP	WCX,1	
33	23	2627	56	0	0001	1553.	ALS	1	TO 13
34	22	2630	32	0	0263	1554.	ADZ	VPY	VPY = V5 DOT WC
34	23	2631	10	0	0263	1555.	STO	VPY	

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35	22	2632	30	1	0010	1556.	CLZ	TS10,1	
35	23	2633	10	1	0060	1557.	STC	UIX,1	UI STORE
36	22	2634	26	1	0460	1558.	MPR	V5X,1	RADOT = P5 DOT UI
36	23	2635	56	0	0001	1559.	ALS	1	TO 13
37	22	2636	32	0	0477	1560.	ADZ	RADOT	
37	23	2637	10	0	0477	1561.	STC	RADOT	
30	24	2640	20	1	0200	1562.	CLA	REX,1	CSM POS AND VEL FOR
30	25	2641	10	1	0204	1563.	STC	ROX,1	ELLIPSE PREDICTOR
31	24	2642	20	1	0420	1564.	CLA	VEX,1	AND ORBIT PARAMETERS
31	25	2643	10	1	0424	1565.	STC	VOX,1	
32	24	2644	42	1	2621	1566.	TIX	DXFRP5,1	
32	25	2645	72	0	6422	1567.	TSG	NORMV	
33	24	2646	20	0	0013	1568.	CLA	TS13	
33	25	2647	10	0	0463	1569.	STC	VHA	
34	24	2650	72	0	6261	1570.	TSG	EXFC	
34	25	2651	72	0	6444	1571.	ORBIT TSG	ORBPM	CSM ORBIT PARAMETERS
35	24	2652	20	0	0436	1572.	CLA	TB	
35	25	2653	24	0	0445	1573.	SUB	TCSM	
36	24	2654	22	0	0310	1574.	ADD	TDEL	+TIME INC. TO DXFR
36	25	2655	46	0	2657	1575.	TMI	#+2	
37	24	2656	24	0	0445	1576.	SUB	TCSM	
37	25	2657	72	0	3555	1577.	TSG	NCRTON	
30	26	2660	30	0	0003	1578.	DXFR13 CLZ	TS3	
30	27	2661	20	1	0220	1579.	CLA	RIX,1	
31	26	2662	24	1	0174	1580.	SUB	P5X,1	
31	27	2663	10	1	0430	1581.	STC	VIX,1	RC-R5
32	26	2664	20	1	0054	1582.	CLA	WCX,1	
32	27	2665	10	1	0004	1583.	STC	TS4,1	
33	26	2666	20	1	0060	1584.	CLA	UIX,1	
33	27	2667	10	1	0010	1585.	STC	TS10,1	
34	26	2670	26	1	0430	1586.	MPR	VIX,1	UI DOT (RC-R5)
34	27	2671	32	0	0003	1587.	ADZ	TS3	SCALE BOTH RX AND RZ
35	26	2672	10	0	0003	1588.	STC	TS3	AT 24 FOR ARCTAE
35	27	2673	42	1	2661	1589.	TIX	DXFR13+1,1	
36	26	2674	72	0	6373	1590.	TSG	CRSPRD	
36	27	2675	72	0	6422	1591.	TSG	NORMV	
37	26	2676	30	0	0004	1592.	CLZ	TS4	

37	27	2677	50	1	0002	1593.	VRUP1	AXT	2,1	
30	30	2700	20	1	0010	1594.		CLA	TS10,1	
30	31	2701	26	1	0430	1595.		MPP	VIX,1	
31	30	2702	32	0	0004	1596.		ADZ	TS4	
31	31	2703	10	0	0004	1597.		STO	TS4	RZ AT 24
32	30	2704	42	1	2700	1598.		TIX	VRUP1+1,1	
32	31	2705	20	0	0410	1599.		CLA	S10	
33	30	2706	24	0	7520	1600.		SUB	3B3	
33	31	2707	46	0	0753	1601.		TMI	THFF	S10 = 1 OR 2
34	30	2710	72	0	7034	1602.		TSQ	ARCTAF	TLOS=ARCTAN(RX/RZ)
34	31	2711	10	0	0303	1603.		STO	TLOS	LINE OF SIGHT (DFDA)
35	30	2712	20	0	0311	1604.		CLA	TR	
35	31	2713	24	0	0310	1605.		SUB	TDEL	
36	30	2714	10	0	0435	1606.		STO	T	
36	31	2715	20	0	0436	1607.		CLA	TR	
37	30	2716	24	0	0445	1608.		SUB	TCSM	
37	31	2717	22	0	0311	1609.		ADD	TR	TIME INC. TPI TO REND.
30	32	2720	24	0	0312	1610.		SUB	3J	TARGET OFFSET
30	33	2721	10	0	0442	1611.		STO	TI	
31	32	2722	72	0	6261	1612.		TSQ	FXFC	
31	33	2723	20	0	0410	1613.	DXEP14	CLA	S10	
32	32	2724	60	0	0000	1614.		COM		
32	33	2725	46	0	5520	1615.		TMI	CSMT1	TO ELLIPX
						1616.				
						1617.	*			
						1618.	*		ORBIT INSERTION SECTION	
							*			
33	32	2726	20	0	0270	1619.		CLA	VYC	
33	33	2727	60	0	0000	1620.		COM		
34	32	2730	26	0	0270	1621.		MPP	VYC	
34	33	2731	22	0	0143	1622.		ADD	VHSQ	VH SQ
35	32	2732	72	0	7123	1623.		TSQ	SQRTE	
35	33	2733	10	0	0463	1624.		STO	VHA	B13
36	32	2734	20	0	0662	1625.		CLA	4K5	COMPUTE DESIRED BURNOUT
36	33	2735	24	0	0271	1626.		SUB	RB	ALTITUDE RATE
37	32	2736	06	0	0565	1627.		MPY	4K4	
37	33	2737	52	0	0003	1628.		LLS	3	
30	34	2740	10	0	0423	1629.		STO	RFDDT	

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30	35	2741	24	0	0527	1630.	SUB	4K6	LIMIT RFDOT BETWEEN
31	34	2742	46	0	2745	1631.	TMI	++3	23J AND 4K6
31	35	2743	20	0	0527	1632.	CLA	4K6	
32	34	2744	40	0	2751	1633.	TRA	++5	
32	35	2745	20	0	0465	1634.	CLA	23J	
33	34	2746	24	0	0423	1635.	SUB	RFDOT	
33	35	2747	46	0	2752	1636.	TMI	++3	
34	34	2750	20	0	0465	1637.	CLA	23J	
34	35	2751	10	0	0423	1638.	STD	RFDOT	
35	34	2752	20	0	0271	1639.	CLA	PB	
35	35	2753	10	0	0347	1640.	STD	RF	
36	34	2754	20	0	0227	1641.	CLA	4K10	
36	35	2755	26	0	0303	1642.	MPR	THETA F	
37	34	2756	22	0	0224	1643.	ADD	7J	
37	35	2757	10	0	0177	1644.	STD	AL	
30	36	2760	24	0	0226	1645.	SUB	9J	LIMIT AL BETWEEN
30	37	2761	46	0	2764	1646.	TMI	++3	8J AND 9J
31	36	2762	20	0	0226	1647.	CLA	9J	
31	37	2763	40	0	2770	1648.	TRA	++5	
32	36	2764	20	0	0225	1649.	CLA	8J	
32	37	2765	24	0	0177	1650.	SUB	AL	
33	36	2766	46	0	2771	1651.	TMI	++3	
33	37	2767	20	0	0225	1652.	CLA	8J	
34	36	2770	40	0	3740	1653.	TRA	CDH3	AL IN ACCUM
34	37	2771	20	0	0177	1654.	CLA	AL	
35	36	2772	40	0	3741	1655.	TRA	CDH3+1	
					1656.		*	EXTERNAL DELTA V	
35	37	2773	20	0	0407	1657.	XDV	CLA	S7
36	36	2774	56	0	0003	1658.		*ALS	3
36	37	2775	46	0	3003	1659.	TMI	XDV1	-IS ENGINE ON
37	36	2776	20	0	0614	1660.	CLA	MU8	
37	37	2777	24	0	4006	1661.	SUB	1B17	
40	20	3000	46	0	3014	1662.	TMI	XDV2	
40	21	3001	20	0	7701	1663.	CLA	1B3	ULLAGE DETECTED SET S7
41	20	3002	10	0	0407	1664.	STD	S7	
41	21	3003	50	1	0002	1665.	XDV1	AXT	2,1
42	20	3004	20	1	0460	1666.	CLA	DVGXX,1	INPUT VEL TO GAIN

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42	21	3005	24	1	0050	1667.		SUB	DQSX,1	ACCUM DELTA V
43	20	3006	10	1	0004	1668.		STO	TS4,1	
43	21	3007	10	1	0064	1669.		STO	VGX,1	
44	20	3010	42	1	3004	1670.		TIX	XDV1+1,1	
44	21	3011	72	0	6737	1671.		TSQ	DPVMAG	
45	20	3012	10	0	0370	1672.		STO	VG	VEL TO GAIN MAG
45	21	3013	40	0	3212	1673.		TRA	Q7	TO STEERING
46	20	3014	50	1	0002	1674.	XDV2	AXT	2,1	
46	21	3015	20	0	0450	1675.		CLA	28J1	IF IN TPI, DELV = VG
47	20	3016	24	0	0526	1676.		SUB	2K11	IF IN FXT DELTA V EQUAL
47	21	3017	46	0	3023	1677.		TMI	*+4	FUNCTION OF 28J
40	22	3020	30	1	0050	1678.		CLZ	DQSX,1	ZERO DQS VECTOR
40	23	3021	20	1	0064	1679.		CLA	VGX,1	
41	22	3022	40	0	3036	1680.		TRA	XDV2P	
41	23	3023	20	0	0452	1681.		CLA	28J3	RADIAL COMPONENT
42	22	3024	26	1	0060	1682.		MPR	U1X,1	13+1=14
42	23	3025	10	1	0050	1683.		STO	DQSX,1	
43	22	3026	20	0	0451	1684.		CLA	28J2	CROSSRANGE COMPONENT
43	23	3027	26	1	0040	1685.		MPF	W1X,1	
44	22	3030	32	1	0050	1686.		ADZ	DQSX,1	
44	23	3031	10	1	0050	1687.		STO	DQSX,1	
45	22	3032	20	0	0450	1688.		CLA	28J1	DOWNRANGE COMPONENT
45	23	3033	26	1	0034	1689.		MPP	V1X,1	
46	22	3034	34	1	0050	1690.		SUZ	DQSX,1	
46	23	3035	56	0	0001	1691.		ALS	1	TO 13
47	22	3036	10	1	0460	1692.	XDV2P	STO	DVGXX,1	VELOCITY TO GAIN
47	23	3037	42	1	3015	1693.		TIX	XDV2+1,1	
40	24	3040	40	0	3003	1694.		TRA	XDV1	
						1695.				
40	25	3041	20	0	0423	1696.	* Q5	CLA	RFDOT	GUIDANCE LAW
41	24	3042	10	0	0004	1697.		STO	TS4	SET FOR INDEXING
41	25	3043	30	0	0005	1698.		CLZ	TS5	
42	24	3044	20	0	0477	1699.		CLA	RADOT	
42	25	3045	10	0	0010	1700.		STO	TS10	
43	24	3046	20	0	0270	1701.		CLA	VY0	
43	25	3047	10	0	0011	1702.		STO	TS11	
44	24	3050	50	1	0001	1703.		AXT	1,1	

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44	25	3051	44	0	3052	1704.	TOV	*+1	
45	24	3052	20	1	0504	1705.	CLA	RD3DOT,1	-2
45	25	3053	26	0	0357	1706.	MPR	TBO	9-2=7
46	24	3054	54	0	0001	1707.	LRS	1	TO 8
46	25	3055	10	0	0001	1708.	STO	TS1	1/2 AT 7
47	24	3056	20	1	0004	1709.	CLA	TS4,1	RFDOT OR ZERO
47	25	3057	24	1	0010	1710.	SUB	TS10,1	RDOT OR VYO
40	26	3060	10	0	0002	1711.	STO	TS2	
40	27	3061	06	0	7701	1712.	MPY	1B3	B16
41	26	3062	04	0	0357	1713.	*DVP	TBO	16-9=7
41	27	3063	34	0	0001	1714.	SUZ	TS1	R OR YD2DOT
42	26	3064	10	0	0000	1715.	STO	TS0	TEST FOR OVERFLOW
42	27	3065	30	0	0002	1716.	CLZ	TS2	SIGN IF OVERFLOW
43	26	3066	72	0	3335	1717.	TSQ	OVFLT	
43	27	3067	10	1	0554	1718.	STO	RD2DOT,1	
44	26	3070	20	0	4020	1719.	CLA	SIXTH	-2
44	27	3071	26	1	0504	1720.	MPR	RD3DOT,1	-4
45	26	3072	26	0	0357	1721.	MPP	TBO	5
45	27	3073	54	0	0001	1722.	LRS	1	TO 6
46	26	3074	22	1	0554	1723.	ADD	RD2DOT,1	+1/2 2DOT AT 6
46	27	3075	26	0	0357	1724.	MPR	TBO	15
47	26	3076	56	0	0001	1725.	ALS	1	TO 14
47	27	3077	10	0	0001	1726.	STO	TS1	
40	30	3100	20	1	0010	1727.	CLA	TS10,1	
40	31	3101	54	0	0001	1728.	LRS	1	TO 14
41	30	3102	32	0	0001	1729.	ADZ	TS1	
41	31	3103	26	0	0357	1730.	MPP	TBO	23
42	30	3104	22	1	0210	1731.	ADD	R,1	
42	31	3105	10	1	0014	1732.	STO	TS14,1	RE OR YE
43	30	3106	42	1	3051	1733.	TIX	Q5+8,1	
43	31	3107	10	0	0347	1734.	STO	RF	23
44	30	3110	10	0	0271	1735.	STO	RB	SAVE RF FOR ORBIT INSERT.
44	31	3111	24	0	0231	1736.	SUB	5J	-LUNAR RADIUS
45	30	3112	24	0	0232	1737.	SUB	16J	BURNOUT ALT ERROR
45	31	3113	10	0	0014	1738.	STO	TS14	
46	30	3114	14	0	0523	1739.	LDQ	5K20	
46	31	3115	20	0	0506	1740.	CLA	4K12	

47	30	3116	24	0	0067	1741.	SUR	AT	
47	31	3117	46	0	0122	1742.	TMI	*+3	IF AT GT 4K12
40	32	3120	20	0	0574	1743.	CLA	DEL2	
40	33	3121	46	0	0123	1744.	TMI	*+2	IF AT LE 4K12 AND DEL2=1
41	32	3122	14	0	0564	1745.	LDQ	5K18	
41	33	3123	12	0	0600	1746.	STG	RD3DOT	LOWER LIMIT
42	32	3124	20	0	0357	1747.	CLA	TB0	
42	33	3125	26	0	0357	1748.	MPR	TB0	
43	32	3126	26	0	0357	1749.	MPR	TB0	TB CUBED
43	33	3127	10	0	0001	1750.	STG	TS1	27
44	32	3130	50	1	0001	1751.	AXT	1,1	
44	33	3131	44	0	0132	1752.	GDLAW3 TDV	*+1	
45	32	3132	20	1	0014	1753.	CLA	TS14,1	BURNOUT ERROR
45	33	3133	06	0	5000	1754.	MPY	12B4	27
46	32	3134	52	0	0002	1755.	LLS	2	TO 25
46	33	3135	04	0	0001	1756.	*DVP	TS1	-2
47	32	3136	32	1	0504	1757.	*ADZ	RD3DOT,1	DESIRED ACCEL RATE
47	33	3137	10	0	0000	1758.	STG	TSC	TEST FOR OVERFLOW
40	34	3140	20	1	0014	1759.	CLA	TS14,1	
40	35	3141	72	0	0335	1760.	TSC	OVFLT	
41	34	3142	10	1	0504	1761.	STG	RD3DOT,1	
41	35	3143	46	0	0150	1762.	TMI	*+5	
42	34	3144	24	1	0560	1763.	SUB	5K14,1	UPPER LIMIT TEST
42	35	3145	46	0	0152	1764.	TMI	*+5	
43	34	3146	20	1	0560	1765.	CLA	5K14,1	SET AT UPPER LIMIT
43	35	3147	40	0	0353	1766.	TRA	LL3DOT+1	
44	34	3150	24	1	0600	1767.	SUB	RD3DOTL,1	LOWER LIMIT TEST
44	35	3151	46	0	0352	1768.	TMI	LL3DOT	
45	34	3152	42	1	0131	1769.	GDLAW4 TIX	GDLAW3,1	
45	35	3153	20	0	0636	1770.	CLA	2K1	48
46	34	3154	06	0	5033	1771.	MPY	1B1	849
46	35	3155	04	0	0210	1772.	DVP	R	49-23=26
47	34	3156	34	0	0143	1773.	SUZ	VHSQ	VH SQ
47	35	3157	06	0	4010	1774.	MPY	1B4	B3C
40	36	3160	04	0	0210	1775.	DVP	R	-ORBITAL RAD ACCEL AT 7
40	37	3161	32	0	0554	1776.	ADZ	RD2DOT	
41	36	3162	10	0	0554	1777.	STG	RD2DOT	CMD RAD ACCEL AT 7

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41	37	3163	72	0	6261	1778.	TSQ	EXEC	
						1779.	*		
						1780.	*	STEERING EQUATIONS.	
						1781.	*		
42	36	3164	20	0	0233	1782.	STEER	CLA	21J
42	37	3165	24	0	0337	1783.		SUB	H
43	36	3166	46	0	3176	1784.		TMI	STEER1
43	37	3167	20	0	0464	1785.		CLA	22J
44	36	3170	24	0	0367	1786.		SUB	HDOT
44	37	3171	46	0	3176	1787.		TMI	STEER1
45	36	3172	20	0	7701	1788.		CLA	1B3 =1C24B13
45	37	3173	10	0	0370	1789.		STO	VG
46	36	3174	20	0	4030	1790.		CLA	PMAX
46	37	3175	40	0	3206	1791.		TRA	PSIP=1
47	36	3176	50	1	0001	1792.	STEER1	AXT	1,1
47	37	3177	44	0	3200	1793.		TOV	**1
50	20	3200	20	1	0554	1794.		CLA	RD2DOT,1
50	21	3201	14	0	4007	1795.		LDQ	ZERO
51	20	3202	04	0	0067	1796.		*DVP	AT
51	21	3203	10	0	0000	1797.		STO	TSC
52	20	3204	20	1	0554	1798.		CLA	RD2DOT,1
52	21	3205	72	0	2335	1799.		TSQ	OVFLT
53	20	3206	10	1	0010	1800.		STO	TS10,1
53	21	3207	42	1	3177	1801.		TIX	STEER1+1,1
54	20	3210	26	0	0010	1802.		MPR	TS10
54	21	3211	10	0	0014	1803.		STO	TS14
55	20	3212	20	0	0614	1804.	07	CLA	MU8
55	21	3213	24	0	4006	1805.		SUB	1B17
56	20	3214	46	0	3220	1806.		TMI	**4
56	21	3215	20	0	0370	1807.		CLA	VG
57	20	3216	24	0	0466	1808.		SUB	5K26
57	21	3217	46	0	3231	1809.		TMI	STEER5
50	22	3220	20	0	0410	1810.		CLA	S10
50	23	3221	24	0	4006	1811.		SUB	1B17
51	22	3222	46	0	3264	1812.		TMI	STEER2
51	23	3223	50	1	0002	1813.		AXT	2,1
52	22	3224	20	1	0064	1814.		CLA	VGX,1

COMMAND X-AXIS VERT

PSIP=1

PSIP AND PSIIY COMPS

PSIP OR Y AT ZERO

TEST FOR OVERFLOW

SIGN IF OVERFLOW

PSIP OR PSIIY AT 0

(PSIP)SQ AT 0

TEST IF ENG ON

CONSTANT STEERING IF

XBD FOR EXT DELTA V

52	23	3225	06	0	5033	1815.	MPY	1B1	B14
53	22	3226	04	0	0370	1816.	DVP	VG	RESULT AT B1
53	23	3227	10	1	0374	1817.	STO	A11B0,1	
54	22	3230	42	1	3224	1818.	TIX	*-4,1	
54	23	3231	30	0	0000	1819.	STEEPS CLZ	TSC	
55	22	3232	30	0	0001	1820.	CLZ	TS1	
55	23	3233	30	0	0002	1821.	CLZ	TS2	
56	22	3234	50	1	0002	1822.	AXT	2,1	COMPUTE VELOCITY TO BE
56	23	3235	20	1	0374	1823.	CLA	A11B0,1	GAINED COMPONENTS
57	22	3236	26	1	0130	1824.	MPR	A11,1	
57	23	3237	32	0	0000	1825.	ADZ	TSC	
50	24	3240	10	0	0000	1826.	STO	TSC	
50	25	3241	20	1	0374	1827.	CLA	A11B0,1	
51	24	3242	26	1	0140	1828.	MPP	A21,1	
51	25	3243	32	0	0001	1829.	ADZ	TS1	
52	24	3244	10	0	0001	1830.	STO	TS1	
52	25	3245	20	1	0374	1831.	CLA	A11B0,1	
53	24	3246	26	1	0134	1832.	MPP	A31,1	
53	25	3247	32	0	0002	1833.	ADZ	TS2	
54	24	3250	10	0	0002	1834.	STO	TS2	
54	25	3251	42	1	3235	1835.	TIX	*-12,1	
55	24	3252	50	1	0002	1836.	AXT	2,1	
55	25	3253	20	0	0370	1837.	CLA	VG	
56	24	3254	10	0	0267	1838.	STO	DELVG	
56	25	3255	06	1	0000	1839.	MPY	TSC,1	
57	24	3256	52	0	0002	1840.	LLS	2	TO 13
57	25	3257	22	1	0470	1841.	ADD	V0X,1	
50	26	3260	10	1	0474	1842.	STO	VSMGX,1	13
50	27	3261	42	1	3253	1843.	TIX	*-6,1	
51	26	3262	72	0	0261	1844.	TSQ	EXFC	
51	27	3263	40	0	0472	1845.	IDLE TRA	TEST	
52	26	3264	20	0	4030	1846.	STEEPS2 CLA	RMAX	
52	27	3265	34	0	0014	1847.	SUZ	TS14	
53	26	3266	10	0	0014	1848.	STO	TS14	1-(PSIP)SQ
53	27	3267	72	0	0123	1849.	TSQ	SQRTE	
54	26	3270	10	0	0015	1850.	STO	TS15	
54	27	3271	20	0	0011	1851.	CLA	TS11	

55	26	3272	62	0	0000	1852.	ABS	
55	27	3273	24	0	0015	1853.	SUB	TS15
56	26	3274	46	0	3304	1854.	TMI	STEEP3
56	27	3275	20	0	0011	1855.	CLA	TS11
57	26	3276	46	0	3301	1856.	TMI	#+3
57	27	3277	20	0	0015	1857.	CLA	TS15
50	30	3300	40	0	3303	1858.	TRA	#+3
50	31	3301	20	0	0015	1859.	CLA	TS15
51	30	3302	60	0	0000	1860.	COM	
51	31	3303	10	0	0011	1861.	STO	TS11
52	30	3304	20	0	0011	1862.	STEEP3 CLA	TS11
52	31	3305	26	0	0011	1863.	MPP	TS11
53	30	3306	60	0	0000	1864.	COM	
53	31	3307	32	0	0014	1865.	ADZ	TS14
54	30	3310	72	0	7123	1866.	TSG	SQRTE
54	31	3311	10	0	0012	1867.	STO	TS12
55	30	3312	50	1	0002	1868.	STEEP4 AXT	2,1
55	31	3313	20	0	0010	1869.	CLA	TS10
56	30	3314	26	1	0060	1870.	MPP	U1X,1
56	31	3315	10	0	0001	1871.	STO	TS1
57	30	3316	20	0	0450	1872.	CLA	28J1
57	31	3317	46	0	3332	1873.	OUT1 TMI	OUT
50	32	3320	20	0	0012	1874.	CLA	TS12
50	33	3321	26	1	0034	1875.	MPP	V1X,1
51	32	3322	32	0	0001	1876.	ADZ	TS1
51	33	3323	10	0	0001	1877.	STO	TS1
52	32	3324	20	0	0011	1878.	CLA	TS11
52	33	3325	26	1	0040	1879.	MPP	W1X,1
53	32	3326	32	0	0001	1880.	ADZ	TS1
53	33	3327	10	1	0374	1881.	STO	A11BD,1
54	32	3330	42	1	3313	1882.	TIX	STEEP4+1,1
54	33	3331	40	0	3231	1883.	TRA	STEEP5
55	32	3332	20	0	0012	1884.	OUT CLA	TS12
55	33	3333	60	0	0000	1885.	COM	
56	32	3334	40	0	2321	1886.	TRA	OUT1+2
56	33	3335	44	0	3340	1887.	OVFLT TOV	#+3
57	32	3336	20	0	0000	1888.	CLA	TSC

IF 28J1 NEGATIVE

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55	36	3372	10	C	0063	1926.	STO	BRANCH	
55	37	3373	72	C	1132	1927.	TSQ	TMI#1	RESFT TM
56	36	3374	30	C	0455	1928.	CLZ	DDF	DEDA DATA FLAG.
56	37	3375	46	C	3461	1929.	TMI	NEWDD	
57	36	3376	30	C	0571	1930.	EXFCM	CLZ	TEST IF DOWNLINK DATA
57	37	3377	46	C	3533	1931.	TMI	EXFCM2	HAS BEEN RECEIVED
60	20	3400	20	C	0400	1932.	EXFCM1	CLA	SO
60	21	3401	24	C	7520	1933.	SUB	3B3	
61	20	3402	46	C	3453	1934.	TMI	EXFCA	SC-3(-IS INER. REF)
61	21	3403	24	C	7701	1935.	SUR	1B3	
62	20	3404	46	C	3536	1936.	TMI	EXFCA	SC-4(-IS IMU ALIGN)
62	21	3405	24	C	7701	1937.	SUB	1B3	
63	20	3406	46	C	4047	1938.	TMI	DELAY	SC-5(-IS LUN ALIGN)
63	21	3407	24	C	7701	1939.	SUB	1B3	
64	20	3410	46	C	3453	1940.	TMI	EXFCA	SC-6(-IS ORB ALIGN)
64	21	3411	22	C	5427	1941.	*ADD	7B3	SC+1
65	20	3412	46	C	3432	1942.	TMI	INCMU7	SC=7
65	21	3413	20	C	0604	1943.	CAL	CLA	CALIBRATE MODE
66	20	3414	46	C	3416	1944.	TMI	*+2	
66	21	3415	72	C	4772	1945.	TSQ	FADICS	IMU DIP COSINES
67	20	3416	72	C	4451	1946.	TSQ	ATTEFF	COMPUTE ATTITUDE ERRORS
67	21	3417	50	1	0002	1947.	AXT	2,1	
60	22	3420	20	C	0632	1948.	CLA	1K33	-3
60	23	3421	06	1	0070	1949.	MPY	FX,1	2
61	22	3422	52	C	0014	1950.	LLS	12	-3+2-12=-13
61	23	3423	32	1	0510	1951.	ADZ	DAXREM,1	
62	22	3424	10	1	0510	1952.	STO	DAXREM,1	-13
62	23	3425	20	C	0633	1953.	CLA	1K34	-15
63	22	3426	26	1	0070	1954.	MPP	FX,1	2
63	23	3427	32	1	0544	1955.	ADZ	1K1,1	
64	22	3430	10	1	0544	1956.	STO	1K1,1	GYRO BIAS AT -13
64	23	3431	42	1	3420	1957.	TIX	*-9,1	
65	22	3432	30	C	0717	1958.	INCMU7	CLZ	MU7
65	23	3433	22	C	4006	1959.	ADD	1B17	INCR. COUNTER
66	22	3434	10	C	0717	1960.	STO	MU7	
66	23	3435	24	C	0621	1961.	SUB	1K37	ACCEL. CAL. DURATION
67	22	3436	62	C	0000	1962.	ABS		

67	23	3437	60	0	0000	1963.	COM		
60	24	3440	46	0	3447	1964.	TMI	**7	+ IS TIME FOR ACCEL CAL
60	25	3441	50	1	0002	1965.	AXT	2,1	
61	24	3442	30	1	0714	1966.	CLZ	SDVX,1	
61	25	3443	26	0	0635	1967.	MPR	1K36	
62	24	3444	32	1	0540	1968.	ADZ	1K19,1	
62	25	3445	10	1	0540	1969.	STO	1K19,1	NEW BIAS CORRECTION
63	24	3446	42	1	3442	1970.	TIX	*-4,1	
63	25	3447	20	0	0717	1971.	CLA	MU7	
64	24	3450	24	0	0617	1972.	SUB	1K30	
64	25	3451	46	0	3453	1973.	TMI	EXFCA	
65	24	3452	30	0	0400	1974.	CLZ	SC	CAL COMPLETE, SET ATT HOLD
65	25	3453	30	0	0530	1975.	EXFCA CLZ	DAXA	ZERO ALIGNMENT INCREMENTS
66	24	3454	30	0	0531	1976.	CLZ	DAYA	
66	25	3455	30	0	0532	1977.	CLZ	DAZA	
67	24	3456	40	0	4047	1978.	TRA	DEFLAY	END MAJOR CYCLE
67	25	3457	12	0	0023	1979.	STQ	SREFX	STORE NEW DEDA DATA.
60	26	3460	40	0	0022	1980.	TRA	SREFX1	
60	27	3461	20	0	4065	1981.	NEWDD CLA	STOCUM	EQU TO STORE
61	26	3462	22	0	0333	1982.	ADD	ADST	DEDA ADDRESS.
61	27	3463	10	0	0022	1983.	STO	SREFX1	
62	26	3464	20	0	0326	1984.	CLA	DD	DEDA DATA.
62	27	3465	72	0	3457	1985.	TSC	*-6	
63	26	3466	20	0	1012	1986.	CLA	BP1	PROTECT BRANCH FROM DEDA
63	27	3467	10	0	0063	1987.	STO	BRANCH	
64	26	3470	20	0	0333	1988.	CLA	ADST	
64	27	3471	24	0	4013	1989.	SUB	1B9	SC ADDRESS
65	26	3472	46	0	3376	1990.	TMI	EXFCM	
65	27	3473	24	0	4006	1991.	SUB	1B17	
66	26	3474	46	0	3513	1992.	TMI	EXFC3	NEW WD IS SC
66	27	3475	24	0	4041	1993.	SUB	1QB17	
67	26	3476	46	0	3376	1994.	TMI	EXFCM	NEW WD BTWN SOPS13
67	27	3477	24	0	4006	1995.	SUB	1B17	
60	30	3500	46	0	6154	1996.	TMI	LUNAZ	NEW WD IS S13
60	31	3501	24	0	4006	1997.	SUB	1B17	
61	30	3502	46	0	3504	1998.	TMI	**2	NEW WD IS S14
61	31	3503	40	0	3376	1999.	TRA	EXFCM	

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62	30	3504	20	0	0414	2000.	CLA	S14	NEW WD IS S14.
62	31	3505	24	0	4065	2001.	SUB	2B3	
63	30	3506	46	0	3511	2002.	TMI	*+3	S14-2 (-IS S14=1)
63	31	3507	24	0	7701	2003.	SUB	1B3	
64	30	3510	46	0	3533	2004.	TMI	EXECLM2	S14-3 (-IS S14=2)
64	31	3511	10	0	0563	2005.	STO	DLIF	ENABLE DL IF S14=1
65	30	3512	40	0	3400	2006.	TRA	EXECLM1	
65	31	3513	20	0	0400	2007.	EXEC3 CLA	S0	
66	30	3514	22	0	7701	2008.	*ADD	1B3	NEG IF S0=7
66	31	3515	46	0	3525	2009.	TMI	MABEE	
67	30	3516	24	0	5427	2010.	SUB	7B3	
67	31	3517	46	0	3453	2011.	TMI	EXECA	
60	32	3520	20	0	0604	2012.	CLA	DEL21	CALIBRATE I.C.
60	33	3521	46	0	3525	2013.	TMI	MABEE	
61	32	3522	20	0	7520	2014.	CLA	3B3	IMU ALINE FOR 2SECS.
61	33	3523	10	0	0400	2015.	STO	S0	
62	32	3524	12	0	0576	2016.	STQ	DEL6	
62	33	3525	50	1	0006	2017.	MABEE AXT	6,1	
63	32	3526	30	1	0714	2018.	CLZ	SDVX,1	ZFRD MU7 AND DV SUMS
63	33	3527	20	1	0130	2019.	CLA	A11,1	
64	32	3530	10	1	0160	2020.	STO	A11D,1	
64	33	3531	42	1	3526	2021.	TIX	*-3,1	
65	32	3532	40	0	3453	2022.	TRA	EXECA	
65	33	3533	20	0	1011	2023.	EXECLM2 CLA	IC1BR	SET IC BRANCH
66	32	3534	10	0	0063	2024.	STO	BRANCH	
66	33	3535	40	0	3400	2025.	TRA	EXECLM1	
67	32	3536	30	0	0576	2026.	EXEC6 CLZ	DEL6	IMU ALINE.
67	33	3537	46	0	3541	2027.	TMI	*+2	-IS CALIBRATE.
60	34	3540	40	0	3542	2028.	TRA	*+2	
60	35	3541	20	0	5000	2029.	CLA	6B3	
61	34	3542	10	0	0400	2030.	STO	S0	
61	35	3543	40	0	4047	2031.	TRA	DELAY	
62	34	3544	20	0	0140	2032.	FDA11 CLA	A21	
62	35	3545	26	0	0127	2033.	MPR	COGA	
63	34	3546	10	0	0001	2034.	STO	TS1	
63	35	3547	20	0	0142	2035.	CLA	A23	
64	34	3550	26	0	0123	2036.	MPR	SIGA	

64	35	3551	40	0	4674	2037.	TRA	TX17+6	
65	34	3552	20	1	0600	2038.	LL300T	CLA	RD30T,1
65	35	3553	10	1	0574	2039.	STO	RD300T,1	
66	34	3554	40	0	0152	2040.	TRA	GDLAW4	
66	35	3555	10	0	0442	2041.	NORTON	STO	TI
67	34	3556	12	0	0157	2042.	STQ	TSEX	SURE TO GO TO EXEC,
67	35	3557	72	0	0261	2043.	TSQ	EXEC	
60	36	3560	72	0	0535	2044.	TSG	ELPR0	ELPR AND COMPT
60	37	3561	72	0	0261	2045.	TSQ	EXEC	LENGTH OF VECTOR
61	36	3562	50	1	0002	2046.	AXT	2,1	PIX
61	37	3563	20	1	0220	2047.	CLA	PIX,1	
62	36	3564	10	1	0014	2048.	STO	TS14,1	
62	37	3565	42	1	3563	2049.	TIX	*-2,1	
63	36	3566	72	0	0422	2050.	TSG	NORMV	
63	37	3567	50	1	0002	2051.	AXT	2,1	
64	36	3570	20	0	0013	2052.	CLA	TS13	LENGTH OF PI
64	37	3571	40	0	0157	2053.	TRA	TSEX	
65	36	3572	30	0	0320	2054.	RD7	CLZ	TEST FOR EXIT
65	37	3573	46	0	3575	2055.	TMI	*+2	FROM HOLD
66	36	3574	40	0	1222	2056.	TRA	DEXIT	EXIT
66	37	3575	10	0	0325	2057.	STO	RMF	TO READOUT
67	36	3576	40	0	7202	2058.	TRA	ACOUT	
67	37	3577	20	0	0410	2059.	EX33P	CLA	S10
70	20	3600	24	0	7520	2060.	SUB	3R3	
70	21	3601	46	0	3630	2061.	TMI	CSICDH	
71	20	3602	20	0	0526	2062.	CLA	2K11	
71	21	3603	10	0	0450	2063.	STO	28J1	
72	20	3604	20	0	0613	2064.	CLA	3K4	
72	21	3605	24	0	0033	2065.	SUB	02	
73	20	3606	46	0	5552	2066.	TMI	EX33+1	
73	21	3607	30	0	0577	2067.	CLZ	DEL10	
74	20	3610	46	0	3620	2068.	TMI	EX33PP	
74	21	3611	20	0	0526	2069.	EX35	CLA	2K11
75	20	3612	10	0	0371	2070.	STO	VT	
75	21	3613	30	0	0172	2071.	CLZ	01	
76	20	3614	24	0	0231	2072.	SUB	5J	
76	21	3615	10	0	0402	2073.	STO	Q1DFDA	

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77	20	3616	72	0	6261	2074.		TSQ	EXEC	
77	21	3617	40	0	2773	2075.		TRA	XDV	
70	22	3620	30	0	0306	2076.	FX33PP	CLZ	4J	
						2077.	*		RESTORE SAVED QUANTITIES FOR T/B COMPUTATIONS	
						2078.	*		IN HARD MEMORY	
70	23	3621	30	0	0050	2079.		CLZ	V6X	
71	22	3622	10	0	0012	2080.		STO	TS12	
71	23	3623	30	0	0051	2081.		CLZ	V6Y	
72	22	3624	10	0	0013	2082.		STO	TS13	
72	23	3625	30	0	0052	2083.		CLZ	V6Z	
73	22	3626	10	0	0014	2084.		STO	TS14	
73	23	3627	40	0	6067	2085.		TRA	EX36+1	
74	22	3630	72	0	6261	2086.	CSICDH	TSQ	EXEC	
74	23	3631	20	0	0203	2087.		CLA	RT	
75	22	3632	24	0	0347	2088.		SUB	RF	
75	23	3633	10	0	0402	2089.		STO	DELH	
76	22	3634	10	0	0314	2090.		STO	DELFP	LITTLE DELTA R AT 23
76	23	3635	30	0	0423	2091.		CLZ	RFDOT	
77	22	3636	50	1	0002	2092.		AXT	2,1	
77	23	3637	20	1	0430	2093.		CLA	VIX,1	
70	24	3640	26	1	0030	2094.		MPR	UZX,1	
70	25	3641	56	0	0001	2095.		ALS	1	
71	24	3642	32	0	0423	2096.		ADZ	RFDOT	
71	25	3643	10	0	0423	2097.		STO	RFDOT	RFDOT = U2 DOT VT B13
72	24	3644	42	1	3637	2098.		TIX	*-5,1	
72	25	3645	20	0	0410	2099.		CLA	S10	
73	24	3646	22	0	5000	2100.		*ADD	6B3	
73	25	3647	46	0	3773	2101.		TMI	CDH	S10 = 2
74	24	3650	20	0	0416	2102.	CSI	CLA	S16	
74	25	3651	06	0	4022	2103.		MPY	3PID4	A=3/4(PII(S16)) AT B6
75	24	3652	10	0	0001	2104.		STO	TS1	
75	25	3653	04	0	0173	2105.		DVP	AE	
76	24	3654	26	0	0402	2106.		MPR	DELH	
76	25	3655	10	0	0002	2107.		STO	TS2	A(DELH/AE) B6
77	24	3656	20	0	0001	2108.		CLA	TS1	
77	25	3657	26	0	5033	2109.		MPR	1B1	
70	26	3660	10	0	0005	2110.		STO	TS5	A AT B7

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70	27	3661	20	0	0275	2111.	CLA	1J		
71	26	3662	24	0	0373	2112.	SUB	TIG		
71	27	3663	56	0	0003	2113.	ALS	3		
72	26	3664	26	0	0077	2114.	MPR	NE		NE(1J-TIG) AT B6
72	27	3665	22	0	0002	2115.	ADD	TS2		
73	26	3666	26	0	5000	2116.	MPP	6B3	=1.5B1	3/2(NE)(1J-TIG)+ 3/2(A)(DELH/AE)
						2117.	*			
73	27	3667	24	0	0005	2118.	SUB	TS5		
74	26	3670	22	0	0605	2119.	ADD	2J		
74	27	3671	10	0	0007	2120.	STO	TS7		B AT B7
75	26	3672	20	0	0477	2121.	CLA	RADOT		
75	27	3673	24	0	0423	2122.	SUB	RFDOT		
76	26	3674	10	0	0005	2123.	STO	TS5		VERTICAL COMP. OF VPO
76	27	3675	06	0	4010	2124.	MPY	1B4		
77	26	3676	04	0	0463	2125.	DVP	VHA		4(RADOT-REDOT)/VHA B6
77	27	3677	24	0	0002	2126.	SUB	TS2		
70	30	3700	10	0	0010	2127.	STO	TS10		
70	31	3701	20	0	0303	2128.	CLA	THETA F		
71	30	3702	54	0	0003	2129.	LRS	3		
71	31	3703	22	0	0010	2130.	ADD	TS10		
72	30	3704	06	0	5033	2131.	MPY	1B1		ACC = C AT B7
72	31	3705	04	0	0007	2132.	DVP	TS7		C/B BC
73	30	3706	10	0	0011	2133.	STO	TS11		
73	31	3707	26	0	0173	2134.	MPP	AE		
74	30	3710	10	0	0402	2135.	STO	DELH		DELH B23
74	31	3711	24	0	0314	2136.	SUB	DELHP		LITTLE DELTA R
75	30	3712	26	0	0077	2137.	MPR	NE		TO B14
75	31	3713	54	0	0001	2138.	LRS	1		B13 (DIVIDE BY 4)
76	30	3714	10	0	0004	2139.	STO	TS4		HORIZ COMP. OF VPO
76	31	3715	20	0	0011	2140.	CLA	TS11		C/B = DELH/AE B0
77	30	3716	26	0	0001	2141.	MPR	TS1		A(DELH/AF) B6
77	31	3717	22	0	0002	2142.	ADD	TS2		
70	32	3720	10	0	0001	2143.	STO	TS1		
70	33	3721	20	0	1066	2144.	CLA	PI		
71	32	3722	26	0	0416	2145.	MPP	S16		
71	33	3723	24	0	0001	2146.	SUB	TS1		
72	32	3724	06	0	7701	2147.	MPY	1B3		TO B9

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72	33	3725	04	0	0077	2148.	DVP	NE	
73	32	3726	10	0	0372	2149.	STO	TAO	
73	33	3727	30	0	0006	2150.	CLZ	TS6	
74	32	3730	72	0	6737	2151.	TSQ	DPVMAG	
74	33	3731	10	0	0371	2152.	STO	VPO	
75	32	3732	20	0	0477	2153.	CLA	RADOT	
75	33	3733	10	0	0423	2154.	STO	RFDOT	
76	32	3734	20	0	0314	2155.	CDH2	CLA	DELRP
76	33	3735	22	0	0402	2156.	ADD	DELH	
77	32	3736	26	0	4126	2157.	MPR	M1B1	
77	33	3737	22	0	0173	2158.	ADD	AE	
70	34	3740	10	0	0177	2159.	CDH3	STO	AL
70	35	3741	26	0	0347	2160.	MPP	RF	
71	34	3742	10	0	0007	2161.	STO	TS7	
71	35	3743	20	0	0177	2162.	CLA	AL	
72	34	3744	24	0	0347	2163.	SUB	RF	
72	35	3745	22	0	0177	2164.	ADD	AL	
73	34	3746	06	0	0636	2165.	MPY	2K1	
73	35	3747	54	0	0001	2166.	LRS	1	
74	34	3750	04	0	0007	2167.	DVP	TS7	
74	35	3751	72	0	7123	2168.	TSQ	SQRTE	
75	34	3752	24	0	0463	2169.	SUB	VHA	
75	35	3753	10	0	0450	2170.	STO	28J1	
76	34	3754	72	0	6261	2171.	TSQ	EXFC	
76	35	3755	20	0	0477	2172.	CLA	RADOT	
77	34	3756	24	0	0423	2173.	SUB	RFDOT	
77	35	3757	10	0	0452	2174.	STO	28J3	
70	36	3760	10	0	0005	2175.	STO	TS4+1	
70	37	3761	20	0	0410	2176.	CLA	SIC	
71	36	3762	60	0	0000	2177.	COM		
71	37	3763	46	0	2773	2178.	TMI	XDV	
72	36	3764	20	0	0450	2179.	CLA	28J1	
72	37	3765	10	0	0004	2180.	STO	TS4	
73	36	3766	20	0	0270	2181.	CLA	VYC	
73	37	3767	10	0	0006	2182.	STO	TS4+2	
74	36	3770	72	0	6737	2183.	TSQ	DPVMAG	
74	37	3771	10	0	0370	2184.	STO	VG	

COMPUTE VPO
 VEL-TO-BE-GAINED AT CDH

LITTLE DELTA R

-.5BC = -1B1

28J1 = VHF - VHA

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75 36	3772	40 0	6136	2185.		TRA	GDLAW	
75 37	3773	30 0	0372	2186.	CDH	CLZ	TAO	
76 36	3774	22 0	0373	2187.		ADD	TIG	
76 37	3775	10 0	0373	2188.		STO	TIG	TIG = TIG + TAO
77 36	3776	40 0	3734	2189.		TRA	CDH2	
				2190.	*			SEE REAR OF LISTING FOR CHECKSUM
				2191.	*			START OF HARDWIRED MEMORY
				2192.	*			CONSTANTS
				2193.	*			

77 37	3777					CHECKSUM		RANGE 1005-3776
			4000	2194.		ORG	4000	
00 40	4000	000007		2195.	7B17	DEC	7.B17	CONSTANTS FOR NORMALIZE
00 41	4001	000006		2196.	6B17	DEC	6.B17	
01 40	4002	000005		2197.	5B17	DEC	5.B17	
01 41	4003	000004		2198.	4B17	DEC	4.B17	
02 40	4004	000003		2199.	3B17	DEC	3.B17	
02 41	4005	000002		2200.	2B17	DEC	2.B17	
03 40	4006	000001		2201.	1B17	DEC	1.B17	
03 41	4007	000000		2202.	ZERO	DEC	0	
			4065	2203.	2B3	EQU	1B2	
			7512	2204.	5B3	EQU	10B4	
			5000	2205.	6B3	EQU	12B4	
04 40	4010	020000		2206.	1B4	DEC	1.B4	
04 41	4011	010000		2207.	1B5	DEC	1.B5	
05 40	4012	004000		2208.	1B6	DEC	1.B6	
05 41	4013	000400		2209.	1B9	DEC	1.B9	
06 40	4014	000100		2210.	1B11	DEC	1.B11	
06 41	4015	000040		2211.	1B12	DEC	1.B12	
07 40	4016	000020		2212.	1B13	DEC	1.B13	
07 41	4017	000010		2213.	1B14	DEC	1.B14	
			4017	2214.	8B17	EQU	1B14	
00 42	4020	252525		2215.	SIXTH	OCT	252525	
00 43	4021	311040		2216.	2PIB3	DEC	6.2831853B3	
			4021	2217.	1K25	EQU	2PIB3	
01 42	4022	113314		2218.	3PID4	DEC	2.3561945B3	
01 43	4023	062210		2219.	PID2	DEC	1.57079633B3	
02 42	4024	031104		2220.	PID4	DEC	.78539816B3	

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02 43	4025	774761	2221.	K173	DEC	-.18488F-3B-6	
03 42	4026	042027	2222.	K172	DEC	.83119F-2B-4	
03 43	4027	525261	2223.	K171	DEC	-.16665554B-2	
04 42	4030	377777	2224.	K170	OCT	377777	1B0
		4030	2225.	PMAX	EQU	K170	
04 43	4031	660111	2226.	K183	DEC	-.0389929B-3	
05 42	4032	112712	2227.	K182	DEC	.1462766B-1	
05 43	4033	726707	2228.	K181	DEC	-.3211819B1	
06 42	4034	077746	2229.	K180	DEC	.999215B2	
06 43	4035	54 0 0000	2230.	SHDUM	LRS	0	
07 42	4036	400000	2231.	MS	OCT	400000	
07 43	4037	400001	2232.	NMAX	OCT	400001	
00 44	4040	000061	2233.	49B17	DEC	49.B17	
00 45	4041	000012	2234.	10B17	DEC	10.B17	
01 44	4042	303240	2235.	BC0L	DEC	100000.B17	
01 45	4043	40 0 4475	2236.	TRNSFR	TRA	FRCUT	EXIT FROM ATT ERROR COMPS
02 44	4044	40 0 6246	2237.	BACK	TRA	RETURN	
02 45	4045	66 0 6100	2238.	TMOU	OUT	6100	
03 44	4046	20 0 4000	2239.	CLAFR	CLA	4000	
		7002	2240.	CLATEN	EQU	SIC02	CLA 0,1
		4036	2241.	TRACOM	EQU	MS	LOOKS LIKE TRA 0
		4065	2242.	STOCOM	EQU	1B2	LOOKS LIKE STO 0
		5033	2243.	DUMCLA	EQU	1B1	LOOKS LIKE CLA 0
			2244.	*			
			2245.	***			
			2246.				
			2247.	DELAY	DLY	**1	
03 45	4047	70 0 4050	2247.				
04 44	4050	64 0 2001	2248.		INP	2001	INPUT PGNS ANGLES
04 45	4051	10 0 0107	2249.		STO	THEP	
05 44	4052	64 0 2002	2250.		INP	2002	
05 45	4053	10 0 0117	2251.		STO	PHIP	
06 44	4054	64 0 2004	2252.		INP	2004	
06 45	4055	10 0 0113	2253.		STO	PSIP	
07 44	4056	64 0 6010	2254.		INP	6010	INPUT GYRO DATA
07 45	4057	10 0 0354	2255.		STO	DAX	
00 46	4060	64 0 6002	2256.		INP	6002	
00 47	4061	10 0 0355	2257.		STO	DAY	

01 46	4062	64 0	6004	2258.	INP	6004	
01 47	4063	10 0	0356	2259.	STO	DAZ	
02 46	4064	64 0	6020	2260.	INP	6020	INPUT ACCELEROMETER DATA
02 47	4065	10 0	0000	2261.	1B2 STO	TS0	VALUE USED AS CONSTANT
03 46	4066	64 0	6040	2262.	INP	6040	
03 47	4067	10 0	0001	2263.	STO	TS1	
04 46	4070	64 0	6100	2264.	INP	6100	
04 47	4071	10 0	0002	2265.	STO	TS2	
05 46	4072	40 0	1015	2266.	EX1 TRA	EXIT1	
				2267.	*	PROCESS ACCELEROMETER INPUTS	
05 47	4073	50 1	0002	2268.	AXT	2,1	
06 46	4074	30 1	0350	2269.	DVS CLZ	DVX,1	SAVE PREVIOUS VALUE
06 47	4075	10 1	0074	2270.	STO	DVXM1,1	
07 46	4076	30 1	0000	2271.	CLZ	TS0,1	
07 47	4077	24 0	7507	2272.	SUB	1K7	11
00 50	4100	56 0	0001	2273.	ALS	1	
00 51	4101	26 1	0534	2274.	MPR	1K18,1	SCALE FACTOR
01 50	4102	56 0	0001	2275.	ALS	1	SCALE AT 1
01 51	4103	22 1	0540	2276.	ADD	1K19,1	BIAS COMPENSATION
02 50	4104	10 1	0350	2277.	STO	DVX,1	AT 1
02 51	4105	42 1	4074	2278.	TIX	DVS,1	
03 50	4106	40 0	1016	2279.	TRA	EXIT2	TO MODE CHECK.
				2280.	*	PROCESS GYRO INPUTS	
03 51	4107	50 1	0002	2281.	AXT	2,1	
04 50	4110	44 0	4111	2282.	TOV	*+1	RESET
04 51	4111	30 1	0354	2283.	GYCOM CLZ	DAX,1	
05 50	4112	24 0	7507	2284.	SUB	1K7	
05 51	4113	56 0	0001	2285.	ALS	1	RADIANS AT -6
06 50	4114	10 1	0354	2286.	STO	DAX,1	
06 51	4115	26 1	0550	2287.	MPR	1K3,1	SCALE FACTOR COMP
07 50	4116	22 1	0544	2288.	ADD	1K1,1	AT -13
07 51	4117	32 1	0510	2289.	ADZ	DAXPEM,1	
00 52	4120	10 1	0510	2290.	STO	DAXPEM,1	
00 53	4121	22 0	4010	2291.	ADD	1R4	ROUND
01 52	4122	54 0	0016	2292.	LRS	14	TO +1
01 53	4123	56 0	0007	2293.	ALS	7	TO -6, QUANTIZED AT -16
02 52	4124	10 0	0006	2294.	STO	TS6	

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02 53	4125	56 0 0007	2295.		ALS	7	SAVE REMAINDER
03 52	4126	60 0 0000	2296.	M1B1	COM		INSTRUCTION LOOKS LIKE -1B1
03 53	4127	32 1 0510	2297.		ADZ	DAXPFM,1	
04 52	4130	10 1 0510	2298.		STO	DAXPFM,1	
04 53	4131	30 0 0006	2299.		CLZ	TS6	
05 52	4132	32 1 0354	2300.		ADZ	DAX,1	
05 53	4133	22 1 0530	2301.		ADD	DAXA,1	
06 52	4134	10 1 0354	2302.		STO	DAX,1	-6
06 53	4135	56 0 0003	2303.		*ALS	3	TO -9
07 52	4136	10 1 0010	2304.		STO	TS10,1	
07 53	4137	62 0 0000	2305.		*ABS		
00 54	4140	22 0 4012	2306.		*ADD	1B6	TEST FOR POSSIBLE OVERFL
00 55	4141	42 1 4111	2307.		TIX	GYCOM,1	
01 54	4142	40 0 1017	2308.	FX3	TRA	EXIT3	
01 55	4143	44 0 4405	2309.		TOV	HRC	
02 54	4144	30 0 0553	2310.		CLZ	HFF	
02 55	4145	46 0 4373	2311.		TMI	LRI	
			2312.	*	COMPUTE	DIRECTION COSINE CHANGE	
03 54	4146	20 0 0010	2313.	GDCC	CLA	TS10	DAX AT -6 OR -9
03 55	4147	06 0 0011	2314.		MPY	TS11	DAY
04 54	4150	54 0 0001	2315.		LRS	1	1/2DAX(DAY) AT -12 OR -18
04 55	4151	72 0 1002	2316.		TSQ	RND	
05 54	4152	22 0 0012	2317.		ADD	TS12	DAZ
05 55	4153	10 0 0001	2318.		STO	TS1	
06 54	4154	20 0 0010	2319.		CLA	TS10	
06 55	4155	06 0 0012	2320.		MPY	TS12	
07 54	4156	54 0 0001	2321.		LRS	1	1/2DAX(DAZ) AT -12 OR -18
07 55	4157	72 0 1002	2322.		TSQ	RND	
00 56	4160	34 0 0146	2323.		SUZ	E13	
00 57	4161	10 0 0007	2324.		STO	TS7	
01 56	4162	24 0 0011	2325.		SUB	TS11	
01 57	4163	10 0 0002	2326.		STO	TS2	
02 56	4164	20 0 0011	2327.		CLA	TS11	
02 57	4165	26 0 0011	2328.		MPR	TS11	
03 56	4166	54 0 0001	2329.		LRS	1	
03 57	4167	10 0 0133	2330.		STO	TS8	
04 56	4170	22 0 0012	2331.		CLA	TS12	

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04 57	4171	26	0	0012	2332.	MPP	TS12	
05 56	4172	54	0	0001	2333.	LRS	1	1/2DAZ(DAZ) AT -12 OR -18
05 57	4173	22	0	0133	2334.	ADD	TS8	
06 56	4174	72	0	1002	2335.	TSG	RND	
06 57	4175	60	0	0000	2336.	COM		
07 56	4176	32	0	0144	2337.	ADZ	E1	NORMALITY CONSTRAINT
07 57	4177	10	0	0003	2338.	STO	TS3	
10 40	4200	30	0	0007	2339.	CLZ	TS7	
10 41	4201	22	0	0011	2340.	ADD	TS11	
11 40	4202	10	0	0004	2341.	STO	TS4	
11 41	4203	20	0	0011	2342.	CLA	TS11	
12 40	4204	06	0	0012	2343.	MPY	TS12	
12 41	4205	54	0	0001	2344.	LRS	1	1/2DAY(DAZ) AT -12 OR -18
13 40	4206	72	0	1002	2345.	TSG	RND	
13 41	4207	24	0	0010	2346.	SUB	TS10	
14 40	4210	10	0	0005	2347.	STO	TS5	
14 41	4211	20	0	0010	2348.	CLA	TS10	
15 40	4212	26	0	0010	2349.	MPP	TS10	
15 41	4213	54	0	0001	2350.	LRS	1	1/2DAX(DAX) AT -12 OR -18
16 40	4214	32	0	0133	2351.	ADZ	TS8	
16 41	4215	72	0	1002	2352.	TSG	RND	
17 40	4216	60	0	0000	2353.	COM		
17 41	4217	32	0	0145	2354.	ADZ	E3	
10 42	4220	10	0	0006	2355.	STO	TS6	
10 43	4221	40	0	1020	2356.	EX4 TRA	EXIT4	
11 42	4222	50	1	0002	2357.	AXT	2,1	COMPUTE EQUATIONS
11 43	4223	20	0	0001	2358.	DIC05 CLA	TS1	
12 42	4224	26	1	0140	2359.	MPP	A21,1	1
12 43	4225	32	1	0150	2360.	ADZ	DA11,1	
13 42	4226	10	1	0150	2361.	STO	DA11,1	-5 OR -8
13 43	4227	20	0	0002	2362.	CLA	TS2	
14 42	4230	26	1	0134	2363.	MPP	A31,1	
14 43	4231	32	1	0150	2364.	ADZ	DA11,1	
15 42	4232	10	1	0150	2365.	STO	DA11,1	-5 OR -8
15 43	4233	20	0	0003	2366.	CLA	TS3	
16 42	4234	26	1	0130	2367.	MPP	A11,1	
16 43	4235	32	1	0150	2368.	ADZ	DA11,1	

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17 42	4236	10 1	C150	2369.	STO	DA11,1	-5 OR -8
17 43	4237	20 0	C004	2370.	CLA	TS4	ROW 3
10 44	4240	26 1	C130	2371.	MPR	A11,1	
10 45	4241	32 1	C154	2372.	ADZ	DA31,1	
11 44	4242	10 1	C154	2373.	STO	DA31,1	
11 45	4243	20 0	C005	2374.	CLA	TS5	
12 44	4244	26 1	C140	2375.	MPR	A21,1	
12 45	4245	32 1	C154	2376.	ADZ	DA31,1	
13 44	4246	10 1	C154	2377.	STO	DA31,1	
13 45	4247	20 0	C006	2378.	CLA	TS6	
14 44	4250	26 1	C134	2379.	MPR	A31,1	
14 45	4251	32 1	C154	2380.	ADZ	DA31,1	
15 44	4252	10 1	C154	2381.	STO	DA31,1	
15 45	4253	42 1	4223	2382.	TIX	DICOS,1	
				2383.	* INTEGRATE DIRECTION COSINES		
16 44	4254	50 1	C006	2384.	AXT	6,1	
16 45	4255	20 0	C553	2385.	INTAS CLA	HRF	
17 44	4256	46 0	4431	2386.	TMI	HRINT	-5 OR -8 TEST
17 45	4257	20 1	C150	2387.	CLA	DA11,1	
10 46	4260	22 0	4013	2388.	RND1 ADD	1B9	ROUND
10 47	4261	54 0	C011	2389.	SHFT1 LRS	9	TO 1
11 46	4262	10 0	C001	2390.	STO	TS1	
11 47	4263	56 0	C011	2391.	ALS	9	
12 46	4264	60 0	C000	2392.	COM		
12 47	4265	32 1	C150	2393.	ADZ	DA11,1	
13 46	4266	10 1	C150	2394.	STO	DA11,1	SAVE REMAINDER.
13 47	4267	30 1	C130	2395.	CLZ	A11,1	
14 46	4270	32 0	C001	2396.	ADZ	TS1	
14 47	4271	10 1	C130	2397.	STO	A11,1	
15 46	4272	42 1	4255	2398.	TIX	INTAS,1	
15 47	4273	72 0	1021	2399.	TSQ	EXIT5	DOWNLINK INPUT
16 46	4274	72 0	1022	2400.	TSQ	EXIT6	TELEMETRY OUTPUT
				2401.	* COMPUTE	ROW 2	
16 47	4275	20 0	C131	2402.	COA21 CLA	A12	
17 46	4276	26 0	C136	2403.	MPR	A33	2
17 47	4277	10 0	C001	2404.	STO	TS1	
10 50	4300	20 0	C132	2405.	CLA	A13	

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10	51	4301	26	0	0135	2406.	MPP	A32	
11	50	4302	34	0	0001	2407.	SUZ	TS1	
11	51	4303	56	0	0001	2408.	ALS	1	TO 1
12	50	4304	10	0	0140	2409.	STO	A21	A21
12	51	4305	20	0	0132	2410.	CLA	A13	
13	50	4306	26	0	0134	2411.	MPP	A31	
13	51	4307	10	0	0001	2412.	STO	TS1	
14	50	4310	20	0	0130	2413.	CLA	A11	
14	51	4311	26	0	0136	2414.	MPP	A33	
15	50	4312	34	0	0001	2415.	SUZ	TS1	
15	51	4313	56	0	0001	2416.	ALS	1	
16	50	4314	10	0	0141	2417.	STO	A22	A22
16	51	4315	20	0	0130	2418.	CLA	A11	
17	50	4316	26	0	0135	2419.	MPP	A32	
17	51	4317	10	0	0001	2420.	STO	TS1	
10	52	4320	20	0	0131	2421.	CLA	A12	
10	53	4321	26	0	0134	2422.	MPP	A31	
11	52	4322	34	0	0001	2423.	SUZ	TS1	
11	53	4323	56	0	0001	2424.	ALS	1	
12	52	4324	10	0	0142	2425.	STO	A23	A23, DIR COS UPDATE COMPLETE
12	53	4325	40	0	1024	2426.	EX8 TRA	EXIT8	
						2427.	* DVINT	VELOCITY RESOLUTION	
13	52	4326	50	1	0002	2428.	AXT	2,1	RESOLVE BODY DVS TO
13	53	4327	20	1	0130	2429.	CLA	A11,1	INERTIAL FRAME AND
14	52	4330	26	0	0350	2430.	MPP	DVX	ACCUMULATE.
14	53	4331	10	0	0001	2431.	STO	TS1	2
15	52	4332	20	1	0140	2432.	CLA	A21,1	
15	53	4333	26	0	0351	2433.	MPP	DVY	
16	52	4334	32	0	0001	2434.	ADZ	TS1	
16	53	4335	10	0	0001	2435.	STO	TS1	
17	52	4336	20	1	0134	2436.	CLA	A31,1	
17	53	4337	26	0	0352	2437.	MPP	DVZ	
10	54	4340	32	0	0001	2438.	ADZ	TS1	2
10	55	4341	22	0	4016	2439.	ADD	1813	ROUND
11	54	4342	54	0	0005	2440.	LRS	5	
11	55	4343	32	1	0120	2441.	ADZ	DVSX,1	
12	54	4344	10	1	0120	2442.	STO	DVSX,1	7

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12	55	4345	42	1	4327	2443.	TIX	DVINT+1,1	
13	54	4346	72	0	1021	2444.	TSQ	EXIT5	DOWNLINK INPUT
13	55	4347	72	0	1022	2445.	TSQ	EXIT6	TELEMETRY OUTPUT
					2446.		*		
14	54	4350	30	0	0573	2447.	CLZ	FLAG1	
14	55	4351	46	0	0063	2448.	TMI	BRANCH	- IS GUID/NAV CYCLE.
15	54	4352	20	0	4036	2449.	CLA	MS	
15	55	4353	10	0	0573	2450.	STO	FLAG1	
16	54	4354	40	0	1025	2451.	EX9 TRA	EXIT9	
					2452.		*		
					2453.		*	HARDWIRED 40 MS COMPUTATIONS	
					2454.		*	DISCRETE INPUT AND STAGING RECOGNITION COMPS.	
					2455.		*		
16	55	4355	64	0	2020	2456.	INP	DISC1I	INPUT DISCRETE WD 1
17	54	4356	10	0	0401	2457.	STO	DISC1C	
17	55	4357	22	0	4006	2458.	ADD	1B17	OBTAIN TWOS COMP OF INPUT WD
10	56	4360	60	0	0000	2459.	CCM		
10	57	4361	10	0	0533	2460.	STO	DISC1	
11	56	4362	20	0	0574	2461.	CLA	DFL2	TEST FOR STAGING
11	57	4363	46	0	1026	2462.	TMI	EXIT10	- IS STAGED.
12	56	4364	20	0	0401	2463.	CLA	DISC1C	TEST FOR ASCENT ENG ON
12	57	4365	56	0	0006	2464.	*ALS	6	
13	56	4366	46	0	1026	2465.	TMI	EXIT10	- IS OFF.
13	57	4367	30	0	0604	2466.	CLZ	DEL21	RESET LUNAR SURFACE FLAG
14	56	4370	20	0	4036	2467.	CLA	MS	
14	57	4371	10	0	0574	2468.	STO	DFL2	SET STAGED FLAG
15	56	4372	40	0	1027	2469.	TRA	EXIT11	
					2470.		*		
					2471.		*	DIRECTION COSINE LOGIC	
15	57	4373	50	1	0006	2472.	LRI AXT	6,1	
16	56	4374	20	1	0150	2473.	CLZ	DA11,1	REMAINDERS
16	57	4375	56	0	0003	2474.	ALS	3	TO -8
17	56	4376	10	1	0150	2475.	STO	DA11,1	
17	57	4377	42	1	4374	2476.	TIX	*-3,1	
20	40	4400	20	0	4260	2477.	CLA	RND1	
20	41	4401	10	0	1003	2478.	STO	RND+1	
21	40	4402	20	0	4261	2479.	CLA	SHFT1	

21	41	4403	10	0	1004	2480.	STO	RND+2	
22	40	4404	40	0	4146	2481.	TRA	C000	
						2482.			*
22	41	4405	20	0	0553	2483.	HRC	CLA	HFF
23	40	4406	46	0	4421	2484.	TMI	HRC1	
23	41	4407	20	0	4422	2485.	CLA	RND2	SET UP FOR HIGH RATE
24	40	4410	10	0	1003	2486.	STO	RND+1	
24	41	4411	20	0	4423	2487.	CLA	SHFT2	
25	40	4412	10	0	1004	2488.	STO	RND+2	
25	41	4413	10	0	0553	2489.	STO	HFF	
26	40	4414	50	1	0006	2490.	AXT	6,1	
26	41	4415	30	1	0150	2491.	CLZ	DA11,1	
27	40	4416	54	0	0003	2492.	LRS	3	TO -5
27	41	4417	10	1	0150	2493.	STO	DA11,1	
20	42	4420	42	1	4415	2494.	TIX	*-3,1	
20	43	4421	50	1	0002	2495.	HRC1	AXT	2,1
21	42	4422	20	1	0354	2496.	CLA	DAX,1	
21	43	4423	10	1	0010	2497.	STO	TS10,1	AT -6
22	42	4424	30	1	0144	2498.	CLZ	E1,1	
22	43	4425	54	0	0003	2499.	LRS	3	TO -6
23	42	4426	10	1	0144	2500.	STO	E1,1	
23	43	4427	42	1	4422	2501.	TIX	*-5,1	
24	42	4430	40	0	4146	2502.	TRA	C000	
						2503.			*
24	43	4431	20	1	0150	2504.	HRC1	CLA	DA11,1
25	42	4432	22	0	4015	2505.	RND2	ADD	1812
25	43	4433	54	0	0006	2506.	SHFT2	LRS	6
26	42	4434	10	0	0001	2507.	STO	TS1	ROUND
26	43	4435	56	0	0006	2508.	ALS	6	TO 1
27	42	4436	40	0	4264	2509.	TRA	INTAS+7	
						2510.			*
						2511.			*
27	43	4437	20	0	0575	2512.	AHF	CLA	DEL5
20	44	4440	46	0	4450	2513.	TMI	AHF1	ATTITUDE HOLD ENTRY
20	45	4441	20	0	4036	2514.	CLA	MS	IF MINUS - DRIVE TO REF COSINES
21	44	4442	10	0	0575	2515.	STO	DEL5	FIRST CYCLE IN
21	45	4443	50	1	0006	2516.	AXT	6,1	ATTITUDE HOLD
									SET DESIRED ATTITUDE

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22	44	4444	20	1	0130	2517.	CLA	A11,1	
22	45	4445	10	1	0160	2518.	STO	A110,1	
23	44	4446	42	1	4444	2519.	TIX	*-2,1	
23	45	4447	72	0	1030	2520.	TSQ	EXIT12	TO ACQUISITION RESET.
24	44	4450	14	0	4043	2521.	AHF1 LDQ	TPNSFR	TRA FROUT INTO Q
24	45	4451	12	0	0023	2522.	ATTERR STQ	SPEX	ENTER HERE FROM CALIBRATE
25	44	4452	50	1	0002	2523.	AXT	2,1	COMPUTE EX
25	45	4453	20	1	0164	2524.	CLA	A310,1	
26	44	4454	26	1	0140	2525.	MPR	A21,1	1+1=+2
26	45	4455	60	0	0000	2526.	COM		
27	44	4456	32	0	0070	2527.	ADZ	EX	
27	45	4457	10	0	0070	2528.	STO	EX	+2
20	46	4460	42	1	4453	2529.	TIX	*-5,1	
20	47	4461	50	1	0002	2530.	EYEZ AXT	2,1	COMPUTE EY AND EZ
21	46	4462	20	1	0160	2531.	CLA	A110,1	
21	47	4463	26	1	0140	2532.	MPR	A21,1	1+1=+2
22	46	4464	32	0	0072	2533.	ADZ	EZ	
22	47	4465	10	0	0072	2534.	STO	EZ	
23	46	4466	20	1	0160	2535.	CLA	A110,1	
23	47	4467	26	1	0134	2536.	MPR	A31,1	1+1=+2
24	46	4470	60	0	0000	2537.	COM		
24	47	4471	32	0	0071	2538.	ADZ	EY	
25	46	4472	10	0	0071	2539.	STO	EY	
25	47	4473	42	1	4462	2540.	TIX	*-9,1	
26	46	4474	40	0	0023	2541.	TRA	SPEX	
						2542.			
						2543.	*		
						2544.	* EPROUT	LIMIT AND OUTPUT ATTITUDE ERRORS	
26	47	4475	40	0	1031	2544.	TRA	EXIT13	
27	46	4476	50	1	0002	2545.	AXT	2,1	
27	47	4477	30	1	0070	2546.	CLZ	EX,1	
20	50	4500	14	0	4036	2547.	LDQ	MS	
20	51	4501	46	0	4503	2548.	TMI	**2	
21	50	4502	40	0	4504	2549.	TRA	**2	
21	51	4503	12	1	0070	2550.	STQ	EX,1	
22	50	4504	62	0	0000	2551.	ABS		
22	51	4505	24	0	0666	2552.	SUR	4K21	+2
23	50	4506	46	0	4511	2553.	TMI	**3	LESS THAN MAX

23 51	4507	20 0	4030	2554.	CLA	PMAX	SET MAX OUTPUT
24 50	4510	40 0	4513	2555.	TRA	*+3	
24 51	4511	22 0	0666	2556.	ADD	4K21	
25 50	4512	04 0	0666	2557.	DVP	4K21	SCALE FACTOR
25 51	4513	32 1	0070	2558.	ADZ	EX,1	
26 50	4514	10 1	0070	2559.	STO	EX,1	
26 51	4515	42 1	4477	2560.	TIX	EROUT+2,1	
27 50	4516	66 0	6001	2561.	OUT	FX0	AT C
27 51	4517	20 0	0071	2562.	CLA	FY	
20 52	4520	66 0	6002	2563.	OUT	EY0	AT C
20 53	4521	20 0	0072	2564.	CLA	FZ	
21 52	4522	66 0	6004	2565.	OUT	FZ0	AT C
21 53	4523	40 0	1032	2566.	TRA	EXIT14	
				2567.			
				2568.			
				2569.			
22 52	4524	30 0	0575	2569.	* RST	RENDEZVOUS STEERING CLZ DEL5	CLEAR ATT HLD 1ST CYCLE FLAG
22 53	4525	50 1	0002	2570.		AXT 2,1	
23 52	4526	20 1	0374	2571.		CLA A11B0,1	
23 53	4527	10 1	0160	2572.		STO A11D,1	
24 52	4530	42 1	4526	2573.		TIX *-2,1	
24 53	4531	20 0	4043	2574.		CLA TRNSFP	TRA EROUT INTO SREX
25 52	4532	10 0	0023	2575.		STO SREX	
25 53	4533	40 0	4461	2576.		TRA FYZZ	
				2577.			
				2578.			
26 52	4534	20 0	0134	2579.	* LUNAL	LUNAR ALIGN COMPS CLA A31	
26 53	4535	26 0	0134	2580.		MPR A31	
27 52	4536	60 0	0000	2581.		COM	
27 53	4537	22 0	4065	2582.		ADD 1B2	
20 54	4540	72 0	7123	2583.		TSQ SQRTF	
20 55	4541	10 0	0001	2584.		STO TS1	
21 54	4542	20 0	0047	2585.		CLA SIDELL	COMPUTE COS DEL A
21 55	4543	26 0	0547	2586.		MPR DDEL	
22 54	4544	22 0	0053	2587.		ADD CODELL	
22 55	4545	06 0	0001	2588.		MPY TS1	A320 AT 2
23 54	4546	52 0	0001	2589.		LLS 1	
23 55	4547	26 0	0141	2590.		MPR A22	

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24	54	4550	10	0	0002	2591.	STO	TS2	
24	55	4551	20	0	0053	2592.	CLA	CODELL	COMPUTE SIN DEL A
25	54	4552	26	0	0547	2593.	MPR	DDEL	
25	55	4553	60	0	0000	2594.	COM		
26	54	4554	22	0	0047	2595.	ADD	SIDELL	
26	55	4555	06	0	0001	2596.	MPY	TS1	A330 AT 2
27	54	4556	52	0	0001	2597.	LLS	1	
27	55	4557	26	0	0142	2598.	MPR	A23	
20	56	4560	32	0	0002	2599.	ADZ	TS2	
20	57	4561	10	0	0002	2600.	STO	TS2	
21	56	4562	20	0	0134	2601.	CLA	A31	
21	57	4563	26	0	0140	2602.	MPR	A21	
22	56	4564	32	0	0002	2603.	ADZ	TS2	
22	57	4565	14	0	4007	2604.	LDQ	ZFRQ	
23	56	4566	04	0	0626	2605.	DVP	1K26	
23	57	4567	10	0	0530	2606.	STO	DATA	-6
24	56	4570	20	0	0134	2607.	CLA	A31	
24	57	4571	14	0	4007	2608.	LDQ	ZFRQ	
25	56	4572	04	0	0630	2609.	DVP	1K28	1-7=-6
25	57	4573	10	0	0001	2610.	STO	TS1	
26	56	4574	20	0	0352	2611.	CLA	DVZ	
26	57	4575	22	0	0076	2612.	ADD	DVZM1	
27	56	4576	06	0	0627	2613.	MPY	1K27	1-4=-3
27	57	4577	52	0	0003	2614.	LLS	3	TC -6
30	40	4600	34	0	0001	2615.	SUZ	TS1	
30	41	4601	10	0	0531	2616.	STO	DATA	
31	40	4602	20	0	0351	2617.	CLA	DVY	
31	41	4603	22	0	0075	2618.	ADD	DVYM1	
32	40	4604	06	0	0627	2619.	MPY	1K27	1-4=-3
32	41	4605	52	0	0003	2620.	LLS	3	TC -6
33	40	4606	10	0	0001	2621.	STO	TS1	
33	41	4607	20	0	0140	2622.	CLA	A21	
34	40	4610	14	0	4007	2623.	LDQ	ZFRQ	
34	41	4611	04	0	0630	2624.	DVP	1K28	
35	40	4612	34	0	0001	2625.	SUZ	TS1	
35	41	4613	10	0	0532	2626.	STO	DATA	
36	40	4614	50	1	0002	2627.	AXT	2,1	

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36	41	4615	20	0	0530	2628.	CLA	DAX4,1
37	40	4616	62	0	0000	2629.	ABS	
37	41	4617	54	0	0002	2630.	LRS	2
30	42	4620	32	0	0002	2631.	ADZ	TS2
30	43	4621	10	0	0002	2632.	STO	TS2
31	42	4622	42	1	4615	2633.	TIX	*-5,1
31	43	4623	24	0	0631	2634.	SUB	1K29
32	42	4624	10	0	0606	2635.	STO	DEL42
32	43	4625	40	0	1033	2636.	TRA	EXIT15
						2637.		
						2638.	*	
						2639.	* FDAI	COMPUTATIONS
33	42	4626	20	0	0135	2639.	CLA	A32
33	43	4627	60	0	0000	2640.	CUM	
34	42	4630	72	0	4724	2641.	TSQ	FDAIL
34	43	4631	66	0	2004	2642.	OUT	SIBFO
35	42	4632	20	0	0136	2643.	CLA	A33
35	43	4633	26	0	0136	2644.	MPP	A33
36	42	4634	10	0	0001	2645.	STO	TS1
36	43	4635	20	0	0134	2646.	CLA	A31
37	42	4636	26	0	0134	2647.	MPP	A31
37	43	4637	32	0	0001	2648.	ADZ	TS1
30	44	4640	72	0	7123	2649.	TSQ	SQRTE
30	45	4641	10	0	0002	2650.	STO	TS2
31	44	4642	72	0	4724	2651.	TSQ	FDAIL
31	45	4643	66	0	2010	2652.	OUT	COBEO
32	44	4644	40	0	1034	2653.	TRA	EXIT16
32	45	4645	20	0	0002	2654.	CLA	TS2
33	44	4646	24	0	0625	2655.	SUB	1K24
33	45	4647	46	0	1035	2656.	TMI	EXIT17
34	44	4650	14	0	4007	2657.	LDQ	ZERO
34	45	4651	20	0	0134	2658.	CLA	A31
35	44	4652	54	0	0001	2659.	LRS	1
35	45	4653	04	0	0002	2660.	DVP	TS2
36	44	4654	10	0	0123	2661.	STO	SIGA
36	45	4655	72	0	4724	2662.	TSQ	FDAIL
37	44	4656	66	0	2020	2663.	OUT	SIGA0
37	45	4657	14	0	4007	2664.	LDQ	ZERO

TO -4

TEST FOR LUNAR ALIGN COMPLETE
 DEL42 NEG IS LUNAL COMPLETE

TOTAL ATTITUDE
 -A32
 LIMIT ROUTINE
 SIN BETA AT 0

COS BETA

USE OLD VALUE OF SIGA AND COGA

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30 46 4660 20 0 0136 2665.
 30 47 4661 54 0 0001 2666.
 31 46 4662 04 0 0002 2667.
 31 47 4663 10 0 0127 2668.
 32 46 4664 72 0 4724 2669.
 32 47 4665 66 0 2040 2670.
 33 46 4666 40 0 1035 2671.
 2672.
 2673.
 33 47 4667 20 0 0142 2674.
 34 46 4670 26 0 0123 2675.
 34 47 4671 10 0 0001 2676.
 35 46 4672 20 0 0140 2677.
 35 47 4673 26 0 0127 2678.
 36 46 4674 34 0 0001 2679.
 36 47 4675 56 0 0001 2680.
 37 46 4676 72 0 4724 2681.
 37 47 4677 66 0 2001 2682.
 30 50 4700 20 0 0132 2683.
 30 51 4701 26 0 0123 2684.
 31 50 4702 10 0 0001 2685.
 31 51 4703 20 0 0130 2686.
 32 50 4704 26 0 0127 2687.
 32 51 4705 34 0 0001 2688.
 33 50 4706 56 0 0001 2689.
 33 51 4707 72 0 4724 2690.
 34 50 4710 66 0 2002 2691.
 2692.
 2693.
 2694.
 34 51 4711 64 0 2040 2695.
 35 50 4712 22 0 4006 2696.
 35 51 4713 60 0 0000 2697.
 36 50 4714 56 0 0001 2698.
 36 51 4715 46 0 6214 2699.
 37 50 4716 56 0 0003 2700.
 37 51 4717 50 1 0003 2701.

EX17

*
 *

CLA A33
 LRS 1
 DVP TS2
 STO COGA
 TSQ FDAIL
 OUT COGAD
 TRA EXIT17

THE NEXT 5 CELLS ARE BYPASSED AND
 RE-WRITTEN IN SOFT MEMORY
 GAMMA OUTPUT

CLA A23
 MPP SIGA
 STO TS1
 CLA A21
 MPR COGA
 SUZ TS1
 ALS 1
 TSQ FDAIL
 OUT SIALO
 CLA A13
 MPP SIGA
 STO TS1
 CLA A11
 MPP COGA
 SUZ TS1
 ALS 1
 TSQ FDAIL
 OUT COALO

*
 *
 *

DEDA DISCRETE SAMPLING

INP DISC21
 ADD 1B17
 COM
 *ALS 1
 TMI GSESR
 *ALS 3
 AXT 3,1

IS TAPE LOAD REQUESTED
 IF MINUS - TRANSFER TO GSE SERV

30	52	4720	46	0	4741	2702.	TMI	SPULSE		
30	53	4721	56	0	0001	2703.	*ALS	1		
31	52	4722	42	1	4720	2704.	TIX	*-2,1		
31	53	4723	40	0	4742	2705.	TRA	SPULSF+1		
						2706.				
						2707.	*			
							* FDAIL		FDAI LIMITING SUBROUTINE.	
32	52	4724	12	0	0023	2708.	STQ	SPEX		
32	53	4725	14	0	4036	2709.	LDQ	MS		
33	52	4726	46	0	4730	2710.	TMI	*+2		
33	53	4727	14	0	4007	2711.	LDQ	ZEPD		
34	52	4730	12	0	0001	2712.	STQ	TS1	SET SIGN	
34	53	4731	62	0	0000	2713.	ABS			
35	52	4732	22	0	4014	2714.	ADD	1B11	ROUND	
35	53	4733	56	0	0001	2715.	*ALS	1		
36	52	4734	46	0	4736	2716.	TMI	*+2	- SET MAX VALUE	
36	53	4735	40	0	4737	2717.	TRA	*+2		
37	52	4736	20	0	4030	2718.	CLA	PMAX		
37	53	4737	32	0	0001	2719.	ADZ	TS1		
30	54	4740	40	0	0023	2720.	TRA	SPEX		
						2721.				
30	55	4741	10	1	0320	2722.	SPULSF STQ	READP,1	SET DEDA FLAG	
31	54	4742	40	0	1036	2723.	TRA	EXIT18		
						2724.	*			
						2725.	* NOC		COMPUTE NORMALITY AND ORTHOGONALITY CONSTRAINTS	
31	55	4743	50	1	0002	2726.	AXT	2,1		
32	54	4744	20	1	0130	2727.	CLA	A11,1		
32	55	4745	26	1	0130	2728.	MPR	A11,1		
33	54	4746	32	0	0144	2729.	ADZ	F1		
33	55	4747	10	0	0144	2730.	STQ	F1	AT 2	
34	54	4750	20	1	0134	2731.	CLA	A31,1		
34	55	4751	26	1	0134	2732.	MPR	A31,1		
35	54	4752	32	0	0145	2733.	ADZ	F3	AT 2	
35	55	4753	10	0	0145	2734.	STQ	F3		
36	54	4754	20	1	0130	2735.	CLA	A11,1		
36	55	4755	26	1	0134	2736.	MPR	A31,1		
37	54	4756	32	0	0146	2737.	ADZ	F13		
37	55	4757	10	0	0146	2738.	STQ	F13	AT 2	

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30	56	4760	42	1	4744	2739.	TIX	NOC+1,1	
30	57	4761	56	0	0012	2740.	ALS	10	DIV BY 2, SCALE AT -9
31	56	4762	10	0	0146	2741.	STO	F13	
31	57	4763	50	1	0001	2742.	AXT	1,1	
32	56	4764	20	0	4065	2743.	CLA	1B2	
32	57	4765	34	1	0144	2744.	SUZ	F1,1	1-E
33	56	4766	56	0	0012	2745.	ALS	10	TO -9
33	57	4767	10	1	0144	2746.	STO	F1,1	
34	56	4770	42	1	4764	2747.	TIX	*-4,1	
34	57	4771	40	0	1037	2748.	TRA	EXIT19	
						2749.			
						2750.	*		
							* EULER ANGLE DIRECTION COSINES SUBROUTINE		
35	56	4772	12	0	0022	2751.	EADICS	STQ	SPEX1
35	57	4773	20	0	0107	2752.		CLA	THEP
36	56	4774	26	0	4021	2753.		MPR	2PIB3
36	57	4775	72	0	6767	2754.		TSQ	SICOF
37	56	4776	30	0	0001	2755.		CLZ	TS1
37	57	4777	10	0	0005	2756.		STO	TS5
40	40	5000	30	0	0000	2757.	12B4	CLZ	TS0
40	41	5001	10	0	0006	2758.		STO	TS6
41	40	5002	20	0	0113	2759.		CLA	PSIP
41	41	5003	26	0	4021	2760.		MPR	2PIB3
42	40	5004	72	0	6767	2761.		TSQ	SICOF
42	41	5005	30	0	0001	2762.		CLZ	TS1
43	40	5006	10	0	0161	2763.		STO	A12D
43	41	5007	30	0	0000	2764.		CLZ	TS0
44	40	5010	10	0	0007	2765.		STO	TS7
44	41	5011	20	0	0117	2766.		CLA	PHIP
45	40	5012	26	0	4021	2767.		MPR	2PIB3
45	41	5013	72	0	6767	2768.		TSQ	SICOF
46	40	5014	20	0	0007	2769.		CLA	TS7
46	41	5015	26	0	0006	2770.		MPR	TS6
47	40	5016	56	0	0001	2771.		ALS	1
47	41	5017	10	0	0160	2772.		STO	A11D
40	42	5020	20	0	0007	2773.		CLA	TS7
40	43	5021	26	0	0005	2774.		MPR	TS5
41	42	5022	56	0	0001	2775.		ALS	1

RADIANS AT 3

VALUE USED AS CONSTANT

1

INPUTS COMPLETE

1

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41	43	5023	60	0	0000	2776.	COM				
42	42	5024	10	0	0162	2777.	STO	A130		1	
42	43	5025	20	0	0001	2778.	CLA	TS1			
43	42	5026	26	0	0161	2779.	MPR	A120			
43	43	5027	56	0	0001	2780.	ALS	1			
44	42	5030	10	0	0003	2781.	STO	TS3			
44	43	5031	26	0	0006	2782.	MPR	TS6			
45	42	5032	10	0	0004	2783.	STO	TS4			
45	43	5033	22	0	0000	2784.	CLA	TS0		COSINE PHI	
46	42	5034	26	0	0005	2785.	MPR	TS5			
46	43	5035	32	0	0004	2786.	ADZ	TS4			
47	42	5036	56	0	0001	2787.	ALS	1			
47	43	5037	10	0	0164	2788.	STO	A310		1	
40	44	5040	30	0	0001	2789.	CLZ	TS1			
40	45	5041	36	0	0007	2790.	MPZ	TS7			
41	44	5042	56	0	0001	2791.	ALS	1			
41	45	5043	60	0	0000	2792.	COM				
42	44	5044	10	0	0165	2793.	STO	A320		1	
42	45	5045	30	0	0003	2794.	CLZ	TS3			
43	44	5046	36	0	0005	2795.	MPZ	TS5			
43	45	5047	10	0	0004	2796.	STO	TS4			
44	44	5050	30	0	0000	2797.	CLZ	TS0			
44	45	5051	36	0	0006	2798.	MPZ	TS6			
45	44	5052	34	0	0004	2799.	SUZ	TS4			
45	45	5053	56	0	0001	2800.	ALS	1			
46	44	5054	10	0	0166	2801.	STO	A330		DI-COS COMPLETE	
46	45	5055	40	0	0022	2802.	TRA	SREX1		EXIT	
						2803.	*				
						2804.	*	IMU ALIGN COMPUTATIONS			
47	44	5056	30	0	0144	2805.	ZNOC	CLZ	F1		
47	45	5057	30	0	0145	2806.		CLZ	F3		
40	46	5060	30	0	0146	2807.		CLZ	F13		
40	47	5061	72	0	4772	2808.	IMUCC	TSG	FADICS		
41	46	5062	50	1	0006	2809.		AXT	6,1		
41	47	5063	20	1	0160	2810.		CLA	A110,1	REPLACE DIR COSINES	
42	46	5064	10	1	0130	2811.		STO	A11,1	WITH IMU DIR COSINES.	
42	47	5065	30	1	0150	2812.		CLZ	DA11,1	ZERO REMAINDERS	

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43	46	5066	42	1	5063	2813.	TIX	*-3,1	
43	47	5067	40	0	4273	2814.	TRA	COA21-2	
					2815.	*			
					2816.	*		INITIALIZE BRANCHES.	
					2817.	*			
44	46	5070	30	0	0414	2818.	IC1	CLZ	S14
44	47	5071	24	0	4065	2819.		SUB	2B3
45	46	5072	46	0	1040	2820.		TMI	EXIT20
45	47	5073	50	1	0002	2821.		AXT	2,1
46	46	5074	30	1	0240	2822.		CLZ	1J1,1
46	47	5075	10	1	0204	2823.		STO	ROX,1
47	46	5076	30	1	0260	2824.		CLZ	1J4,1
47	47	5077	10	1	0424	2825.		STO	VOX,1
40	50	5100	42	1	5074	2826.		TIX	*-4,1
40	51	5101	30	0	0254	2827.		CLZ	1J7
41	50	5102	10	0	0521	2828.		STO	TL1
41	51	5103	30	0	0255	2829.		CLZ	1J7LS
42	50	5104	10	0	0525	2830.		STO	TL2
42	51	5105	72	0	6444	2831.		TSQ	ORBPM
43	50	5106	30	0	0543	2832.		CLZ	DSPSC
43	51	5107	72	0	1041	2833.		TSQ	EXIT21
					2834.	*			
44	50	5110	50	1	0001	2835.	IC2	AXT	1,1
44	51	5111	72	0	6746	2836.		TSQ	DPTSB
45	50	5112	20	0	0604	2837.		CLA	DEL21
45	51	5113	46	0	5124	2838.		TMI	RVCOMP
46	50	5114	72	0	6535	2839.		TSQ	ELPPD
46	51	5115	50	1	0002	2840.		AXT	2,1
47	50	5116	30	1	0220	2841.		CLZ	RIX,1
47	51	5117	10	1	0340	2842.		STO	RX,1
40	52	5120	30	1	0430	2843.		CLZ	VIX,1
40	53	5121	10	1	0360	2844.		STO	VX,1
41	52	5122	42	1	5116	2845.		TIX	*-4,1
41	53	5123	40	0	5134	2846.		TRA	*+9
42	52	5124	50	1	0002	2847.	RVCOMP	AXT	2,1
42	53	5125	30	1	0424	2848.		CLZ	VOX,1
43	52	5126	10	1	0360	2849.		STO	VX,1

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43	53	5127	06	0	0442	2850.	MPY	T1	13+13=26	
44	52	5130	52	0	0003	2851.	LLS	3		
44	53	5131	32	1	0204	2852.	ADZ	POX,1		
45	52	5132	10	1	0340	2853.	STO	RX,1	AT 23	
45	53	5133	42	1	5125	2854.	TIX	*-6,1		
46	52	5134	72	0	6261	2855.	TSG	EXFC	IC3 NEXT	
					2856.					
46	53	5135	72	0	5400	2857.	IC3	TSQ	GRAV	TO GRAVITY
47	52	5136	50	1	0002	2858.	AXT	2,1		
47	53	5137	30	1	0120	2859.	CLZ	DVSX,1		
40	54	5140	30	1	0104	2860.	CLZ	DRX,1		
40	55	5141	20	1	0114	2861.	CLA	GXDT,1		
41	54	5142	10	1	0110	2862.	STO	DIGX,1		
41	55	5143	42	1	5137	2863.	TIX	*-4,1		
42	54	5144	40	0	1042	2864.	TRA	EXIT22		
					2865.					
					2866.					
42	55	5145	50	1	0002	2867.	CSMPV	AXT	CSM DL OR DEDA INPUTS TO EPOCH CELLS.	
43	54	5146	30	1	0244	2868.	CLZ	2J1,1	CSM POS	
43	55	5147	10	1	0200	2869.	STO	REF,1		
44	54	5150	30	1	0264	2870.	CLZ	2J4,1	CSM VFL	
44	55	5151	10	1	0420	2871.	STO	VEX,1		
45	54	5152	42	1	5146	2872.	TIX	*-4,1		
45	55	5153	30	0	0272	2873.	CLZ	2J7	CSM EPOCH MS	
46	54	5154	10	0	0520	2874.	STO	TE1		
46	55	5155	30	0	0273	2875.	CLZ	2J7LS	CSM EPOCH LS	
47	54	5156	10	0	0524	2876.	STO	TE2		
47	55	5157	30	0	0436	2877.	CLZ	TR		
40	56	5160	40	0	6764	2878.	TRA	EXIT		
					2879.					
					2880.					
					2881.					
40	57	5161	20	0	0604	2882.	NAV	CLA	DEL21	
41	56	5162	46	0	5175	2883.		TMI	NAV1	-IS ON LUNAR SURFACE.
41	57	5163	20	0	0464	2884.		CLA	0464	
42	56	5164	24	0	0470	2885.		SUB	VDX	
42	57	5165	56	0	0006	2886.		ALS	6	

				2887.	*			
				2888.	*			
				2889.	*			
				2890.				
				2891.				
				2892.				
				2893.				
				2894.				
				2895.				
				2896.				
43	56	5166	10 0	0067		STO	AT	1/2(VD1-VDI) AT 7
43	57	5167	24 0	0661		SUB	4K35	ULLAGE THRESHOLD.
44	56	5170	46 0	5203		TMI	NAV2-2	AT-4K35
44	57	5171	30 0	0614		CLZ	MU8	INCF ULLAGE COUNTER.
45	56	5172	22 0	4006		ADD	1B17	
45	57	5173	10 0	0614		STO	MU8	
46	56	5174	40 0	1050		TRA	EXIT24	
46	57	5175	30 0	0110	NAV1	CLZ	DIGX	LUNAP SURFACE NAV.
47	56	5176	30 0	0111		CLZ	DIGY	
47	57	5177	30 0	0112		CLZ	DIGZ	
50	40	5200	20 0	0616		CLA	1K9	ULLAGE COUNT LIMIT
50	41	5201	10 0	0614		STO	MU8	
51	40	5202	40 0	1044		TRA	EXIT23	
51	41	5203	30 0	0614		CLZ	MU8	RESET ULLAGE COUNTER.
52	40	5204	40 0	1050		TRA	EXIT24	
52	41	5205	30 0	0001	NAV2	CLZ	TS1	ACCEL DRIFT TEST.
53	40	5206	50 1	0002		AXT	2,1	
53	41	5207	20 1	0120		CLA	DVSX,1	
54	40	5210	62 0	0000		ABS		
54	41	5211	32 0	0001		ADZ	TS1	
55	40	5212	10 0	0001		STO	TS1	
55	41	5213	42 1	5207		TIX	*-4,1	
56	40	5214	24 0	0634		SUB	1K35	
56	41	5215	46 0	1051		TMI	EXIT25	COAST PHASE
57	40	5216	40 0	1056		TRA	EXIT26	
57	41	5217	30 0	0120	NAV3	CLZ	DVSX	
50	42	5220	30 0	0121		CLZ	DVSY	
50	43	5221	30 0	0122		CLZ	DVSZ	
51	42	5222	40 0	1056		TRA	EXIT26	
51	43	5223	50 1	0002	NAV4	AXT	2,1	VEL AND POS UPDATE.
52	42	5224	30 1	0120		CLZ	DVSX,1	SENSED VEL AT 7
52	43	5225	32 1	0110		ADZ	DIGX,1	PREDICTED INTG GRAVITY.
53	42	5226	10 1	0110		STO	DIGX,1	7
53	43	5227	22 0	4015		ADD	1B12	ROUND

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54	42	5230	54	0	0006	2924.	LRS	6	
54	43	5231	10	0	0002	2925.	STO	TS2	DV AT 13
55	42	5232	22	1	0360	2926.	ADD	VX,1	
55	43	5233	10	0	0001	2927.	STO	TS1	NEW V AT 13
56	42	5234	26	0	0675	2928.	MPR	KDT	DT/2 AT 1.
56	43	5235	10	0	0004	2929.	STO	TS4	
57	42	5236	30	1	0360	2930.	CLZ	VX,1	V(N-1)
57	43	5237	26	0	0675	2931.	MPR	KDT	
50	44	5240	32	0	0004	2932.	ADZ	TS4	
50	45	5241	32	1	0104	2933.	ADZ	DPX,1	
51	44	5242	10	1	0104	2934.	STO	DPX,1	14
51	45	5243	22	0	4013	2935.	ADD	189	ROUND
52	44	5244	54	0	0011	2936.	LRS	9	
52	45	5245	10	0	0003	2937.	STO	TS3	DR AT 23
53	44	5246	32	1	0340	2938.	ADZ	PX,1	
53	45	5247	10	1	0340	2939.	STO	PX,1	NEW P AT 23
54	44	5250	30	0	0002	2940.	CLZ	TS2	DV AT 13
54	45	5251	56	0	0006	2941.	ALS	6	
55	44	5252	60	0	0000	2942.	COM		
55	45	5253	32	1	0110	2943.	ADZ	DIGX,1	
56	44	5254	10	1	0110	2944.	STO	DIGX,1	VFL REMAINDER AT 7
56	45	5255	30	0	0003	2945.	CLZ	TS3	DR AT 23
57	44	5256	56	0	0011	2946.	ALS	9	
57	45	5257	60	0	0000	2947.	COM		
50	46	5260	32	1	0104	2948.	ADZ	DPX,1	
50	47	5261	10	1	0104	2949.	STO	DPX,1	PUS REMAINDER AT 14
51	46	5262	30	0	0001	2950.	CLZ	TS1	
51	47	5263	10	1	0360	2951.	STO	VX,1	NEW V AT 13
52	46	5264	42	1	5224	2952.	TIX	NAV4+1,1	
52	47	5265	72	0	5400	2953.	TSQ	GRAV	TO GRAVITY COMP.
53	46	5266	40	0	1060	2954.	TRA	EXIT28	LIMIT AT.
53	47	5267	20	0	0660	2955.	CLA	4K34	
54	46	5270	24	0	0067	2956.	SUR	AT	
54	47	5271	46	0	5274	2957.	TMI	*+3	
55	46	5272	20	0	0660	2958.	CLA	4K34	
55	47	5273	10	0	0067	2959.	STO	AT	
56	46	5274	20	0	4036	2960.	CLA	MS	SET IC DISPLAY.

FX28

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56	47	5275	10	0	0567	2961.		STO	DSPF1	
57	46	5276	72	0	6254	2962.		TSQ	TIMEA	TO TA UPDATE
						2963.				
						2964.	*			
						2965.	*		CSM ORBIT PARAMETERS	
						2966.	*			
57	47	5277	20	0	0414	2966.	ORBPAP	CLA	S14	
50	50	5300	24	0	7520	2967.		SUB	3B3	
50	51	5301	46	0	5305	2968.		TMI	**4	
51	50	5302	30	0	0414	2969.		CLZ	S14	
51	51	5303	72	0	5145	2970.		TSQ	CSMPV	
52	50	5304	40	0	1065	2971.	EX29	TRA	EXIT29	
52	51	5305	50	1	0002	2972.		AXT	2,1	
53	50	5306	20	1	0200	2973.		CLA	REF,1	
53	51	5307	10	1	0004	2974.		STO	TS4,1	
54	50	5310	10	1	0204	2975.		STO	ROX,1	
54	51	5311	20	1	0420	2976.		CLA	VFX,1	
55	50	5312	10	1	0010	2977.		STO	TS10,1	
55	51	5313	10	1	0424	2978.		STO	VCX,1	
56	50	5314	42	1	5306	2979.		TIX	*-6,1	
56	51	5315	72	0	6373	2980.		TSQ	CPSPRD	
57	50	5316	72	0	6422	2981.		TSQ	NORMV	
57	51	5317	50	1	0002	2982.		AXT	2,1	
50	52	5320	30	1	0010	2983.		CLZ	TS10,1	
50	53	5321	10	1	0054	2984.		STO	WCX,1	
51	52	5322	42	1	5320	2985.		TIX	*-2,1	
51	53	5323	72	0	6444	2986.		TSQ	ORBPM	COMPUTE CSM ORB PARAMS FROM EPD
52	52	5324	20	0	4021	2987.		CLA	2PIB3	
52	53	5325	14	0	4007	2988.		LDQ	ZERO	
53	52	5326	54	0	0001	2989.		LRS	1	
53	53	5327	04	0	0077	2990.		DVP	NI	4-(-9)=13
54	52	5330	10	0	0445	2991.		STO	TCSM	
54	53	5331	40	0	1067	2992.	EX30	TRA	EXIT30	
55	52	5332	20	0	0436	2993.		CLA	TR	
55	53	5333	24	0	0445	2994.		SUB	TCSM	
56	52	5334	46	0	5355	2995.		TMI	BR2EX	
56	53	5335	20	0	0445	2996.		CLA	TCSM	
57	52	5336	14	0	4007	2997.		LDQ	ZERO	

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57	53	5337	54	0	0005	2998.	LRS	5	TO +18
50	54	5340	12	0	0001	2999.	STQ	TS1	
50	55	5341	32	0	0520	3000.	ADZ	TF1	
51	54	5342	10	0	0520	3001.	STO	TE1	
51	55	5343	30	0	0001	3002.	CLZ	TS1	
52	54	5344	32	0	0524	3003.	ADZ	TE2	
52	55	5345	10	0	0524	3004.	STO	TE2	
53	54	5346	46	0	5350	3005.	TMI	*+2	OVERFLOW
53	55	5347	40	0	5355	3006.	TRA	BR2EX	
54	54	5350	24	0	4036	3007.	SUB	MS	
54	55	5351	10	0	0524	3008.	STO	TF2	
55	54	5352	30	0	0520	3009.	CLZ	TE1	
55	55	5353	22	0	4006	3010.	ADD	1B17	
56	54	5354	10	0	0520	3011.	STO	TE1	
56	55	5355	72	0	6261	3012.	BR2EX	TSQ	EXEC
					3013.		*		
					3014.		*		CSM PRESENT POS AND VEL.
					3015.		*		
57	54	5356	50	1	0000	3016.	AXT	0,1	
57	55	5357	72	0	6746	3017.	TSQ	DPTSB	COMPUTE DBL PREC TA-TE
50	56	5360	10	0	0436	3018.	STO	TR	+13
50	57	5361	72	0	6535	3019.	TSQ	FLPRD	TRANSFER TO ELLIPSE PRED
51	56	5362	50	1	0002	3020.	AXT	2,1	
51	57	5363	30	1	0220	3021.	CLZ	R1X,1	
52	56	5364	10	1	0344	3022.	STO	RCX,1	23
52	57	5365	30	1	0430	3023.	CLZ	V1X,1	
53	56	5366	10	1	0364	3024.	STO	VCX,1	13
53	57	5367	42	1	5363	3025.	TIX	*-4,1	
54	56	5370	72	0	6261	3026.	TSQ	EXEC	
					3027.		*		
54	57	5371	50	1	0002	3028.	AXT	2,1	
55	56	5372	20	1	0360	3029.	CLA	VX,1	COMPUTE MAGNITUDE OF VEL VECTOR
55	57	5373	10	1	0004	3030.	STO	TS4,1	
56	56	5374	42	1	5372	3031.	TIX	*-2,1	
56	57	5375	72	0	6737	3032.	TSQ	DPVMAG	
57	56	5376	10	0	0433	3033.	STO	V	13
57	57	5377	40	0	1070	3034.	TRA	EXIT31	

				3035.	*			
				3036.	*			
				3037.	*			
				3038.		GRAV	STQ	SREX3
60	40	5400	12	0	0020		AXT	2,1
60	41	5401	50	1	0002		CLA	RX,1
61	40	5402	20	1	0340		STO	TS14,1
61	41	5403	10	1	0014		TIX	*-2,1
62	40	5404	42	1	5402		TSQ	NORMV
62	41	5405	72	0	6422		CLZ	TS13
63	40	5406	30	0	0013		STO	R
63	41	5407	10	0	0210		SUB	5J
64	40	5410	24	0	0231		STO	H
64	41	5411	10	0	0337		TRA	EXIT27
65	40	5412	40	0	1057		CLA	2K4
65	41	5413	20	0	0674		LDQ	ZERO
66	40	5414	14	0	4007		LRS	3
66	41	5415	54	0	0003		DVP	TS17
67	40	5416	04	0	0017		STQ	TS7
67	41	5417	10	0	0007		AXT	2,1
60	42	5420	50	1	0002		GRAV1	GXDT,1
60	43	5421	30	1	0114		STQ	TSC
61	42	5422	10	0	0000		CLZ	TS10,1
61	43	5423	30	1	0010		STO	UIX,1
62	42	5424	10	1	0060		MPR	TS7
62	43	5425	26	0	0007		STQ	GXDT,1
63	42	5426	10	1	0114		SUZ	TSC
63	43	5427	24	0	0000		LRS	1
64	42	5430	54	0	0001		ADD	GXDT,1
64	43	5431	22	1	0114		ADZ	DIGX,1
65	42	5432	32	1	0110		STQ	DIGX,1
65	43	5433	10	1	0110		CLA	VX,1
66	42	5434	20	1	0360		MPR	UIX,1
66	43	5435	26	1	0060		ADZ	TS13
67	42	5436	32	0	0013		STO	TS13
67	43	5437	10	0	0013		TIX	GRAV1,1
60	44	5440	42	1	5421		ALS	1
60	45	5441	56	0	0001			

GRAVITY AND H, HOOT COMPUTATIONS.

COMPUTE U1 AND R.

23
 MEAN LUNAR RADIUS
 ALTITUDE AT 23

52
 R SQ AT 46
 -GRAV VECT MAG AT 6

G(N-1)DT
 UNIT VECTOR FR NORMV
 1
 -MU DT/(R SQ) AT 6

7
 G(N-1)DT

PREDICTED INTG GRAV IN A
 VFL REMAINDER
 INTG GRAV+VEL REM AT
 13
 FORM V DOT U1.

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61	44	5442	10	0	0367	3072.	STO	HDOT	ALT RATE AT 13.	
61	45	5443	40	0	0020	3073.	TRA	SREX3		
						3074.				
						3075.				
						3076.				
62	44	5444	20	0	0367	3077.	LMORB	CLA	HDOT	B13
62	45	5445	06	0	0367	3078.		MPY	HDOT	
63	44	5446	10	0	0014	3079.		STO	TS14	
63	45	5447	12	0	0015	3080.		STQ	TS15	
64	44	5450	20	0	0433	3081.		CLA	V	13
64	45	5451	26	0	0433	3082.		MPR	V	
65	44	5452	24	0	0014	3083.		SUB	TS14	
65	45	5453	10	0	0007	3084.		STO	TS7	VH SQ AT 26
66	44	5454	72	0	7123	3085.		TSQ	SQRTF	
66	45	5455	10	0	0427	3086.		STO	VH	13
67	44	5456	44	0	5457	3087.		TOV	*+1	CL. O.F.
67	45	5457	20	0	0210	3088.		CLA	R	23
60	46	5460	26	0	0210	3089.		MPR	R	
60	47	5461	26	0	0637	3090.		MPR	2K2	
61	46	5462	06	0	0007	3091.		MPY	TS7	46-47+26=25
61	47	5463	52	0	0002	3092.		LLS	2	
62	46	5464	10	0	0010	3093.		STO	TS10	PL AT 23
62	47	5465	54	0	0001	3094.		LRS	1	
63	46	5466	10	0	0011	3095.		STO	TS11	SAVE PL AT 24
63	47	5467	12	0	0012	3096.		STQ	TS12	
64	46	5470	04	0	0210	3097.		DVP	R	
64	47	5471	24	0	5033	3098.		SUB	1B1	
65	46	5472	56	0	0004	3099.		ALS	4	-3
65	47	5473	10	0	0000	3100.		STC	TS0	
66	46	5474	36	0	0000	3101.		MPZ	TS0	
66	47	5475	10	0	0013	3102.		STO	TS13	(PL/R-1) SQ AT -6.
67	46	5476	30	0	0014	3103.		CLZ	TS14	HDOT SQ AT 26
67	47	5477	14	0	0015	3104.		LDQ	TS15	
60	50	5500	52	0	0010	3105.		LLS	8	18
60	51	5501	26	0	0637	3106.		MPR	2K2	
61	50	5502	26	0	0010	3107.		MPR	TS10	PL
61	51	5503	32	0	0013	3108.		ADZ	TS13	EL SQ IN A AT -6.

62	50	5504	44	0	5516	3109.	TOV	LMORB1+2	
62	51	5505	72	0	7123	3110.	TSQ	SQPTF	
63	50	5506	54	0	0004	3111.	LRS	4	EL AT 1
63	51	5507	22	0	5033	3112.	ADD	1B1	
64	50	5510	10	0	0001	3113.	STO	TS1	1+FL AT 1.
64	51	5511	30	0	0011	3114.	CLZ	TS11	OL AT 24
65	50	5512	14	0	0012	3115.	LDQ	TS12	
65	51	5513	04	0	0001	3116.	DVP	TS1	
66	50	5514	10	0	0343	3117.	LMORB1 STO	QL	LM PERICYNTHION AT 23
66	51	5515	40	0	1071	3118.	TRA	EXIT32	
67	50	5516	20	0	0216	3119.	CLA	2K3	SET QL=CONST
67	51	5517	40	0	5514	3120.	TRA	LMORB1	
						3121.	*		
						3122.	*	CSM PREDICTION.	
						3123.	*		
60	52	5520	72	0	6535	3124.	CSMT1 TSQ	ELPRD	TO ELLIPSE PREDICTOR.
60	53	5521	72	0	6261	3125.	TSQ	EXEC	
						3126.	*		
						3127.	*	TRANSFER ORBIT VECTORS.	
						3128.	*		
61	52	5522	50	1	0002	3129.	AXT	2,1	
61	53	5523	20	1	0220	3130.	CLA	R1X,1	CSM PRED POS
62	52	5524	10	1	0014	3131.	STO	TS14,1	
62	53	5525	42	1	5523	3132.	TIX	*-2,1	
63	52	5526	72	0	6422	3133.	TSQ	NORMV	NORMALIZE RT
63	53	5527	30	0	0013	3134.	CLZ	TS13	
64	52	5530	10	0	0203	3135.	STO	RT	23
64	53	5531	50	1	0002	3136.	AXT	2,1	
65	52	5532	20	1	0010	3137.	XORBVI CLA	TS10,1	CIX=BX
65	53	5533	10	1	0030	3138.	STO	U2X,1	
66	52	5534	20	1	0060	3139.	CLA	U1X,1	
66	53	5535	10	1	0004	3140.	STO	TS4,1	
67	52	5536	26	1	0030	3141.	MPP	U2X,1	
67	53	5537	32	0	0013	3142.	ADZ	TS13	
60	54	5540	10	0	0013	3143.	STO	TS13	
60	55	5541	42	1	5532	3144.	TIX	XORBVI,1	
61	54	5542	56	0	0001	3145.	ALS	1	

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61	55	5543	10	0	0513	3146.	STO	C1	U1 DOT U2 AT 1,
62	54	5544	26	0	0513	3147.	MPR	C1	
62	55	5545	60	0	0000	3148.	COM		
63	54	5546	22	0	4065	3149.	ADD	1B2	
63	55	5547	72	0	7123	3150.	TSQ	SQRT E	
64	54	5550	10	0	0033	3151.	STO	C2	1
64	55	5551	40	0	1072	3152.	FX33 TRA	EXIT33	
65	54	5552	72	0	6373	3153.	TSQ	CRSPFD	U1XU2 AT 2.
65	55	5553	20	0	0015	3154.	CLA	TS14+1	
66	54	5554	06	0	0055	3155.	MPY	WCY	
66	55	5555	46	0	5557	3156.	TMI	*+2	-IS PEND ANG GREAT 180.
67	54	5556	40	0	5562	3157.	TRA	*+4	
67	55	5557	30	0	0033	3158.	CLZ	C2	
60	56	5560	60	0	0000	3159.	COM		
60	57	5561	10	0	0033	3160.	STO	C2	
61	56	5562	50	1	0002	3161.	AXT	2,1	NORMALIZE W1 AND
61	57	5563	30	1	0014	3162.	XORBV2 CLZ	TS14,1	
62	56	5564	14	0	4007	3163.	LDQ	ZERO	
62	57	5565	04	0	0033	3164.	DVP	C2	
63	56	5566	10	1	0040	3165.	STO	W1X,1	1
63	57	5567	20	1	0060	3166.	CLA	U1X,1	
64	56	5570	26	0	0513	3167.	MPR	C1	
64	57	5571	10	0	0001	3168.	STO	TS1	
65	56	5572	20	1	0030	3169.	CLA	U2X,1	1
65	57	5573	54	0	0001	3170.	LRS	1	
66	56	5574	34	0	0001	3171.	SUZ	TS1	
66	57	5575	14	0	4007	3172.	LDQ	ZERO	
67	56	5576	04	0	0033	3173.	DVP	C2	
67	57	5577	10	1	0034	3174.	STO	V1X,1	1
70	40	5600	20	1	0060	3175.	CLA	U1X,1	1
70	41	5601	54	0	0001	3176.	LRS	1	
71	40	5602	10	0	0001	3177.	STO	TS1	2
71	41	5603	20	1	0030	3178.	CLA	U2X,1	
72	40	5604	26	0	0513	3179.	MPR	C1	
72	41	5605	34	0	0001	3180.	SUZ	TS1	
73	40	5606	14	0	4007	3181.	LDQ	ZERO	
73	41	5607	04	0	0033	3182.	DVP	C2	

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74	40	5610	10	1	0064	3183.	STO	V2X,1	1
74	41	5611	42	1	5563	3184.	TIX	XORBV2,1	
75	40	5612	30	C	0610	3185.	CLZ	MU3	P-ITERATION INDEX.
75	41	5613	72	C	6261	3186.	TSQ	EXFC	
						3187.	*		
						3188.	*	P-ITERATOR	
						3189.	*		
76	40	5614	40	C	1073	3190.	FX34 TRA	EXIT34	
76	41	5615	44	C	5616	3191.	TOV	*+1	CL. D.F.
77	40	5616	20	C	0170	3192.	CLA	P	ITERATION P AT 23
77	41	5617	24	C	0347	3193.	SUB	RF	
70	42	5620	14	C	4007	3194.	LDQ	ZERO	
70	43	5621	04	C	0347	3195.	DVP	RF	
71	42	5622	10	C	0011	3196.	STO	TS11	X1 AT C.
71	43	5623	06	C	0011	3197.	MPY	TS11	
72	42	5624	52	C	0002	3198.	LLS	2	
72	43	5625	10	C	0001	3199.	STO	TS1	X1 SQ. AT -2
73	42	5626	20	C	0170	3200.	CLA	P	
73	43	5627	24	C	0203	3201.	SUB	RT	
74	42	5630	14	C	4007	3202.	LDQ	ZERO	
74	43	5631	04	C	0203	3203.	DVP	RT	
75	42	5632	10	C	0012	3204.	STO	TS12	X2 AT .0
75	43	5633	26	C	0513	3205.	MPR	C1	
76	42	5634	10	C	0002	3206.	STO	TS2	1
76	43	5635	20	C	0011	3207.	CLA	TS11	X1
77	42	5636	54	C	0001	3208.	LRS	1	
77	43	5637	34	C	0002	3209.	SUZ	TS2	
70	44	5640	14	C	4007	3210.	LDQ	ZERO	
70	45	5641	04	C	0033	3211.	DVP	C2	
71	44	5642	10	C	0143	3212.	STO	X4	AT C.
71	45	5643	20	C	0012	3213.	CLA	TS12	X2
72	44	5644	54	C	0001	3214.	LRS	1	
72	45	5645	10	C	0002	3215.	STO	TS2	1
73	44	5646	20	C	0011	3216.	CLA	TS11	X1
73	45	5647	26	C	0513	3217.	MPR	C1	
74	44	5650	34	C	0002	3218.	SUZ	TS2	
74	45	5651	14	C	4007	3219.	LDQ	ZERO	

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75	44	5652	04	0	0033	3220.	DVP	C2	I
75	45	5653	10	0	0073	3221.	STO	X3	AT C.
76	44	5654	06	0	0073	3222.	MPY	X3	
76	45	5655	52	0	0002	3223.	LLS	2	
77	44	5656	32	0	0001	3224.	ADZ	TS1	-2
77	45	5657	44	0	1074	3225.	TOV	EXIT35	D.F. IF F TOO LARGE.
70	46	5660	10	0	0172	3226.	STO	FSQ	F SQ AT -2.
70	47	5661	54	0	0002	3227.	LRS	2	
71	46	5662	10	0	0013	3228.	STO	TS13	F SQ AT C.
71	47	5663	60	0	0000	3229.	CCM		
72	46	5664	22	0	4030	3230.	ADD	PMAX	
72	47	5665	10	0	0014	3231.	STO	TS14	(1-E SQ) AT 0.
73	46	5666	72	0	7123	3232.	TSQ	SQRTF	
73	47	5667	10	0	0015	3233.	STO	TS15	ROOT(1-E SQ) AT C.
74	46	5670	20	0	0143	3234.	CLA	X4	
74	47	5671	24	0	0073	3235.	SUB	X3	
75	46	5672	54	0	0001	3236.	LRS	1	1
75	47	5673	22	0	0033	3237.	ADD	C2	
76	46	5674	26	0	0015	3238.	MPR	TS15	
76	47	5675	10	0	0003	3239.	STO	TS3	SIN(DELTA E) AT 1.
77	46	5676	20	0	0073	3240.	CLA	X3	
77	47	5677	26	0	0143	3241.	MPE	X4	
70	50	5700	60	0	0000	3242.	COM		
70	51	5701	32	0	0013	3243.	ADZ	TS13	
71	50	5702	54	0	0001	3244.	LRS	1	1
71	51	5703	10	0	0013	3245.	STO	TS13	F SQ-X3(X4) AT 1.
72	50	5704	30	0	0011	3246.	CLZ	TS11	
72	51	5705	32	0	0012	3247.	ADZ	TS12	X1+X2
73	50	5706	54	0	0001	3248.	LRS	1	1
73	51	5707	32	0	0013	3249.	ADZ	TS13	
74	50	5710	22	0	0513	3250.	ADD	C1	
74	51	5711	10	0	0004	3251.	STO	TS4	COS(DELTA E) AT 1.
75	50	5712	72	0	7034	3252.	TSQ	ARCTAF	
75	51	5713	10	0	0016	3253.	STO	TS16	DELTA F AT 3.
76	50	5714	20	0	0203	3254.	CLA	RT	
76	51	5715	26	0	0143	3255.	MPE	X4	
77	50	5716	10	0	0001	3256.	STO	TS1	23

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77	51	5717	20	0	0347	3257.	CLA	RF	
70	52	5720	26	0	0073	3258.	MPR	X3	
70	53	5721	34	0	0001	3259.	SUZ	TS1	
71	52	5722	06	0	0015	3260.	MPY	TS15	
71	53	5723	54	0	0003	3261.	LRS	3	26
72	52	5724	04	0	0170	3262.	DVP	P	
72	53	5725	32	0	0016	3263.	ADZ	TS16	
73	52	5726	10	0	0016	3264.	STO	TS16	DELTA E + X7-X8 AT 3.
73	53	5727	20	0	0170	3265.	CLA	P	
74	52	5730	14	0	4007	3266.	LDQ	ZERO	
74	53	5731	04	0	0014	3267.	DVP	TS14	1-F SQ
75	52	5732	10	0	0171	3268.	STO	ALPHA	23
75	53	5733	26	0	0637	3269.	MPR	2K2	1/2K1 AT -47
76	52	5734	72	0	7123	3270.	TSQ	SQFTE	(-47+23)/2=-12
76	53	5735	26	0	0171	3271.	MPR	ALPHA	1/N AT 11 IN A.
77	52	5736	36	0	0016	3272.	MPZ	TS16	11+3=14
77	53	5737	56	0	0001	3273.	ALS	1	NEW TP AT 13.
70	54	5740	24	0	0434	3274.	SUB	TP	
70	55	5741	10	0	0002	3275.	STO	TS2	DELTA TP
71	54	5742	32	0	0434	3276.	ADZ	TP	
71	55	5743	10	0	0434	3277.	STO	TP	13
72	54	5744	20	0	0435	3278.	CLA	T	
72	55	5745	24	0	0434	3279.	SUB	TP	
73	54	5746	10	0	0000	3280.	STO	TS0	T-TP
73	55	5747	30	0	0610	3281.	CLZ	MU3	INCREMENT ITER COUNTER.
74	54	5750	22	0	4006	3282.	ADD	1B17	
74	55	5751	10	0	0610	3283.	STO	MU3	
75	54	5752	24	0	4005	3284.	SUB	2B17	ITERATION SCHEME.
75	55	5753	46	0	6026	3285.	TMI	PITER2	-IS MU3=1.
76	54	5754	24	0	4006	3286.	SUB	1B17	
76	55	5755	46	0	5771	3287.	TMI	PITER1	-IS MU3=2.
77	54	5756	24	0	0620	3288.	SUB	2K17	MU3-NO. ITERATIONS IN A.
77	55	5757	46	0	5765	3289.	TMI	**+6	-IS NOT DONE.
70	56	5760	30	0	0000	3290.	CLZ	TS0	DONE. T-TP
70	57	5761	62	0	0000	3291.	ABS		
71	56	5762	24	0	0453	3292.	SUB	2K20	
71	57	5763	46	0	6040	3293.	TMI	PITER3+5	-IS CONVERGED.

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04 63	6031	60 0	0000	3331.	COM		
05 62	6032	10 0	0003	3332.	STO	TS3	DELTA P
05 63	6033	30 0	0170	3333.	PITFP3 CLZ	P	
06 62	6034	10 0	0212	3334.	STO	PP	
06 63	6035	32 0	0003	3335.	ADZ	TS3	
07 62	6036	10 0	0170	3336.	STO	P	NEW P
07 63	6037	40 0	6262	3337.	TRA	EXEC+1	
00 64	6040	72 0	6261	3338.	TSQ	EXEC	
				3339.			
				3340.			
				3341.			
				3342.	TBRAKE CLA	2K1	48
00 65	6041	20 0	0636	3342.	LDQ	ZERO	
01 64	6042	14 0	4007	3343.	LRS	I	
01 65	6043	54 0	0001	3344.	DVP	P	49-23=26
02 64	6044	04 0	0170	3345.	TSQ	SQRT6	
02 65	6045	72 0	7123	3346.	STO	TS1	ROOT(MU/P) AT 13
03 64	6046	10 0	0001	3347.	MPZ	X3	
03 65	6047	36 0	0073	3348.	STO	RFDDT	13
04 64	6050	10 0	0423	3349.	CLA	TS1	
04 65	6051	20 0	0001	3350.	MPZ	X4	
05 64	6052	36 0	0143	3351.	STO	TS13	13
05 65	6053	10 0	0013	3352.	CLZ	TS1	
06 64	6054	30 0	0001	3353.	MPY	P	
06 65	6055	06 0	0170	3354.	STO	TS1	ROOT(PXMU) AT 36
07 64	6056	10 0	0001	3355.	STQ	TS2	
07 65	6057	12 0	0002	3356.	DVP	RF	
00 66	6060	04 0	0347	3357.	STO	TS12	13
00 67	6061	10 0	0012	3358.	CLZ	TS1	
01 66	6062	30 0	0001	3359.	LDQ	TS2	
01 67	6063	14 0	0002	3360.	DVP	RT	
02 66	6064	04 0	0203	3361.	STO	TS14	13
02 67	6065	10 0	0014	3362.	TRA	EXIT36	
03 66	6066	40 0	1075	3363.	TQV	*+1	CL. O.F.
03 67	6067	44 0	6070	3364.	AXT	2,1	
04 66	6070	50 1	0002	3365.	IMPBK1 CLA	TS13	ROOT(MU/P)X(X4) AT 13
04 67	6071	20 0	0013	3366.	MPZ	U2X,1	1
05 66	6072	36 1	0030	3367.			

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05 67	6073	10 0 0007	3368.	STO	TS7	
06 66	6074	20 0 0014	3369.	CLA	TS14	ROOT(PXMU)/RT AT 13
06 67	6075	36 1 0064	3370.	MPZ	V2X,1	1
07 66	6076	32 0 0007	3371.	ADZ	TS7	
07 67	6077	56 0 0001	3372.	ALS	1	13
00 70	6100	24 1 0430	3373.	SUB	VIX,1	
00 71	6101	10 1 0030	3374.	STO	VFX,1	-BRAKING VEL AT 13
01 70	6102	20 0 0423	3375.	CLA	RFDDT	13
01 71	6103	26 1 0060	3376.	MPP	UIX,1	1
02 70	6104	10 0 0007	3377.	STO	TS7	
02 71	6105	20 0 0012	3378.	CLA	TS12	ROOT(PXMU)/RF AT 13
03 70	6106	26 1 0034	3379.	MPP	VIX,1	1
03 71	6107	32 0 0007	3380.	ADZ	TS7	
04 70	6110	56 0 0001	3381.	ALS	1	13
04 71	6111	24 1 0460	3382.	SUB	V5X,1	
05 70	6112	10 1 0064	3383.	STO	VGX,1	VEL TO GAIN AT 13
05 71	6113	10 1 0004	3384.	STO	TS4,1	
06 70	6114	42 1 6071	3385.	TIX	IMPBK1,1	
06 71	6115	44 0 1074	3386.	TOV	EXIT35	CHECK VG OR VF O.F.
07 70	6116	72 0 6737	3387.	TSQ	DPVMAG	
07 71	6117	10 0 0370	3388.	STO	VG	13
00 72	6120	30 0 0172	3389.	CLZ	FSQ	E SQ FR P ITER AT-2.
00 73	6121	72 0 7123	3390.	TSQ	SQRTE	
01 72	6122	54 0 0001	3391.	LRS	1	E AT C.
01 73	6123	60 0 0000	3392.	COM		
02 72	6124	22 0 4030	3393.	ADD	PMAX	1-E AT C.
02 73	6125	26 0 0171	3394.	MPP	ALPHA	
03 72	6126	10 0 0172	3395.	STO	Q1	Q OF TRANS ORB AT 23
03 73	6127	72 0 6261	3396.	TSQ	EXEC	
			3397.			
				*		COMPLETE VF ON FOLLOWING CYCLE.
04 72	6130	50 1 0002	3398.	AXT	2,1	
04 73	6131	20 1 0030	3399.	CLA	VFX,1	13
05 72	6132	10 1 0004	3400.	STO	TS4,1	
05 73	6133	42 1 6131	3401.	TIX	*-2,1	
06 72	6134	72 0 6737	3402.	TSQ	DPVMAG	
06 73	6135	40 0 1076	3403.	TRA	EXIT37	VF IN A AT B.
			3404.			

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07 76	6176	40 0	1100	3442.		TRA	EXIT39	
				3443.	*			
				3444.	*		POWER ON INITIALIZATION	
				3445.	*			
07 77	6177	66 0	3050	3446.	INIT	OUT	3050	RESET CARRY INHIBIT
10 60	6200	64 0	6200	3447.		INP	6200	
10 61	6201	64 0	2200	3448.		INP	DFDA	
11 60	6202	66 0	7057	3449.		OUT	7057	RESET DISCRETES
11 61	6203	20 0	4044	3450.		CLA	BACK	
12 60	6204	10 0	0025	3451.		STO	TVARBP+1	
12 61	6205	20 0	4046	3452.		CLA	CLAPP	PRIME HARDWIRED CORES
13 60	6206	10 0	0024	3453.		STO	TVARBR	
13 61	6207	72 0	0024	3454.		TSQ	TVARBR	
14 60	6210	20 0	0024	3455.		CLA	TVARBR	
14 61	6211	24 0	7002	3456.		SUB	CLATEN	
15 60	6212	46 0	6207	3457.		TMI	*-3	
15 61	6213	66 0	7010	3458.		OUT	7010	RESET FAILURE INDICATOR
				3459.	*	GSE	SERVICE ROUTINE	
16 60	6214	64 0	2040	3460.	GSESR	INP	2040	
16 61	6215	56 0	0001	3461.		ALS	1	
17 60	6216	46 0	1101	3462.		TMI	EXIT40	INITIALIZE
17 61	6217	64 0	6200	3463.		INP	6200	
10 62	6220	22 0	4011	3464.		ADD	1B5	
10 63	6221	10 0	0007	3465.		STC	TS7	
11 62	6222	22 0	4065	3466.		ADD	STOCOM	SET UP VARIABLE STORE
11 63	6223	10 0	0024	3467.		STO	TVARBR	
12 62	6224	66 0	6402	3468.	WFDLP	OUT	6402	SET GSE 5
12 63	6225	64 0	2040	3469.		INP	2040	
13 62	6226	56 0	0001	3470.		ALS	1	
13 63	6227	46 0	6231	3471.		TMI	*+2	
14 62	6230	40 0	6225	3472.		TRA	*-3	
14 63	6231	66 0	7012	3473.		OUT	7012	RESET GSE 5 AND FAIL INDIC.
15 62	6232	64 0	2040	3474.		INP	2040	
15 63	6233	56 0	0001	3475.		ALS	1	
16 62	6234	46 0	6231	3476.		TMI	*-3	WAIT FOR NEXT WORD
16 63	6235	56 0	0001	3477.		ALS	1	
17 62	6236	46 0	6243	3478.		TMI	*+5	

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17	63	6237	30	0	0007	3479.	CLZ	TS7	END OF BLOCK
10	64	6240	22	0	4036	3480.	ADD	TRACOM	
10	65	6241	10	0	0024	3481.	STO	TVARBP	
11	64	6242	40	0	0024	3482.	TRA	TVARBP	
11	65	6243	64	0	6200	3483.	INP	6200	INPUT WORD AND STORE
12	64	6244	72	0	0024	3484.	TSQ	TVARBP	
12	65	6245	40	0	6224	3485.	TRA	WRDLP	
13	64	6246	10	0	0000	3486.	RETURN STO	TSQ	INCREMENT OF VARIABLE
13	65	6247	30	0	0024	3487.	CLZ	TVARBP	STORE OF BRING
14	64	6250	22	0	4006	3488.	ADD	1B17	
14	65	6251	10	0	0024	3489.	STO	TVARBP	
15	64	6252	30	0	0000	3490.	CLZ	TSQ	
15	65	6253	40	0	6764	3491.	TRA	EXIT	
						3492.			
						3493.			
						3494.			
						3495.			
16	64	6254	30	0	0377	3495.	TIMEA CLZ	TA1	UPDATE ABS TIME.
16	65	6255	22	0	4006	3496.	ADD	1B17	EQU TO 2SFCS.
17	64	6256	10	0	0377	3497.	STO	TA1	
17	65	6257	20	0	4014	3498.	CLA	1B11	I.C. DEDA COUNTER
10	66	6260	10	0	0727	3499.	STO	DEDASC	
10	67	6261	12	0	0063	3500.	EXEC STQ	BRANCH	SET NEXT BRANCH.
11	66	6262	30	0	0727	3501.	CLZ	DEDASC	
11	67	6263	56	0	0001	3502.	*ALS	1	
12	66	6264	46	0	6267	3503.	TMI	*+3	- IS TIME TO DEDA.
12	67	6265	10	0	0727	3504.	STO	DEDASC	
13	66	6266	40	0	1110	3505.	TRA	EXIT41	
13	67	6267	30	0	0063	3506.	CLZ	BRANCH	SAVE BRANCH IN
14	66	6270	10	0	0057	3507.	STO	TMPBF	TEMPORARY BRANCH
14	67	6271	20	0	1013	3508.	CLA	DEDABF	DEDA START
15	66	6272	10	0	0063	3509.	STO	BRANCH	
15	67	6273	40	0	1110	3510.	TRA	EXIT41	TO SOFT DISPLAY
						3511.			
						3512.			
						3513.			
16	66	6274	30	0	0543	3514.	DSPLY CLZ	DSPSC	
16	67	6275	56	0	0001	3515.	*ALS	1	

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11	75	6343	66	0	6010	3553.		OUT	6010	OUTPUT ALT RATE.
12	74	6344	40	0	1111	3554.		TRA	EXIT42	COMPUTE VYO FOR OUTPUT
12	75	6345	66	0	6020	3555.		OUT	6020	OUTPUT SAME.
13	74	6346	20	0	0214	3556.	DSPLY3	CLA	POUT	DISPLAY POSITION.
13	75	6347	46	0	6351	3557.		TMI	*+2	
14	74	6350	40	0	6352	3558.		TRA	*+2	
14	75	6351	20	0	4007	3559.		CLA	ZERO	ALT NEG.
15	74	6352	56	0	0001	3560.		*ALS	1	SIGN BIT USED
15	75	6353	66	0	3040	3561.		OUT	3040	RESET
16	74	6354	66	0	2420	3562.		OUT	2420	SELFCY ALT.
16	75	6355	66	0	6010	3563.		OUT	6010	OUTPUT ALT.
17	74	6356	20	0	4011	3564.		CLA	1B5	
17	75	6357	10	0	0543	3565.	DSPLY4	STO	DSPSC	RESET COUNTER.
					3566.		*			
					3567.		*			
					3568.		*			
					3569.					
10	76	6360	30	0	0615	3569.	EXFC1	CLZ	MU10	UPDATE MINOR CYCLE COUNT.
10	77	6361	22	0	4006	3570.		ADD	1B17	
11	76	6362	10	0	0615	3571.		STO	MU10	
11	77	6363	40	0	1112	3572.		TRA	EXIT43	
12	76	6364	20	0	0615	3573.		CLA	MU10	CHECK FOR END.
12	77	6365	24	0	4040	3574.		SUB	49B17	
13	76	6366	46	0	4047	3575.		TMI	DELAY	-IS NOT END.
13	77	6367	30	0	0615	3576.		CLZ	MU10	
14	76	6370	20	0	1014	3577.		CLA	BR50	BR50 START.
14	77	6371	10	0	0063	3578.		STO	BRANCH	
15	76	6372	40	0	4047	3579.		TRA	DELAY	
					3580.		*			
					3581.		*			
					3582.		*			
					3583.					
15	77	6373	12	0	0023	3583.	CRSPED	STQ	SREX	
16	76	6374	20	0	0006	3584.		CLA	TS4+2	AZ
16	77	6375	26	0	0011	3585.		MPR	TS10+1	BY
17	76	6376	10	0	0007	3586.		STO	TS7	
17	77	6377	20	0	0005	3587.		CLA	TS4+1	AY
20	60	6400	26	0	0012	3588.		MPR	TS10+2	BZ
20	61	6401	34	0	0007	3589.		SUZ	TS7	

21	60	6402	10	0	0014	3590.	STO	TS14	CX
21	61	6403	20	0	0004	3591.	CLA	TS4	AX
22	60	6404	26	0	0012	3592.	MPR	TS10+2	BZ
22	61	6405	10	0	0007	3593.	STO	TS7	
23	60	6406	20	0	0006	3594.	CLA	TS4+2	AZ
23	61	6407	26	0	0010	3595.	MPR	TS10	
24	60	6410	34	0	0007	3596.	SUZ	TS7	
24	61	6411	10	0	0015	3597.	STO	TS14+1	CY
25	60	6412	20	0	0005	3598.	CLA	TS4+1	AY
25	61	6413	26	0	0010	3599.	MPR	TS10	BX
26	60	6414	10	0	0007	3600.	STO	TS7	
26	61	6415	20	0	0004	3601.	CLA	TS4	AX
27	60	6416	26	0	0011	3602.	MPR	TS10+1	BY
27	61	6417	34	0	0007	3603.	SUZ	TS7	
20	62	6420	10	0	0016	3604.	STO	TS14+2	CZ
20	63	6421	40	0	0023	3605.	TRA	SREX	

3606. *
 3607. * NORMALIZE VECTOR SUBROUTINE.
 3608. *

21	62	6422	12	0	0021	3609.	NORMV STQ	SREX2	
21	63	6423	30	0	0017	3610.	CLZ	TS17	
22	62	6424	50	1	0002	3611.	AXT	2,1	
22	63	6425	20	1	0014	3612.	CLA	TS14,1	INPUT VECTOR
23	62	6426	26	1	0014	3613.	MPR	TS14,1	
23	63	6427	32	0	0017	3614.	ADZ	TS17	
24	62	6430	10	0	0017	3615.	STO	TS17	
24	63	6431	42	1	6425	3616.	TIX	*-4,1	
25	62	6432	72	0	7123	3617.	TSQ	SQRTF	
25	63	6433	10	0	0013	3618.	STO	TS13	
26	62	6434	50	1	0002	3619.	AXT	2,1	
26	63	6435	20	1	0014	3620.	CLA	TS14,1	
27	62	6436	14	0	4007	3621.	LDQ	ZFRQ	
27	63	6437	54	0	0001	3622.	LRS	1	
20	64	6440	04	0	0013	3623.	DVP	TS13	
20	65	6441	10	1	0010	3624.	STC	TS10,1	UNIT VECTOR AT 1.
21	64	6442	42	1	6435	3625.	TIX	*-5,1	
21	65	6443	40	0	0021	3626.	TRA	SPEX2	

				3627.	*			
				3628.	*			
				3629.	*			
				3630.	ORBPM	STQ	SREX2	
22	64	6444	12	0	0021	CLZ	TS11	
22	65	6445	30	0	0011	CLZ	TS12	
23	64	6446	30	0	0012	CLZ	TS13	
23	65	6447	30	0	0013	CLZ	TS13	
24	64	6450	44	0	6451	TOV	*+1	
24	65	6451	50	1	0002	AXT	2,1	
25	64	6452	20	1	0204	ORBPM1	ROX,1	23
25	65	6453	26	1	0424	MPR	VOX,1	13
26	64	6454	32	0	0013	ADZ	TS13	
26	65	6455	10	0	0013	STQ	TS13	RO DOT VO AT 36
27	64	6456	20	1	0424	CLA	VOX,1	
27	65	6457	26	1	0424	MPR	VOX,1	
20	66	6460	32	0	0012	ADZ	TS12	
20	67	6461	10	0	0012	STQ	TS12	VO DOT VO AT 26
21	66	6462	20	1	0204	CLA	ROX,1	
21	67	6463	26	1	0204	MPR	ROX,1	
22	66	6464	32	0	0011	ADZ	TS11	
22	67	6465	10	0	0011	STQ	TS11	RO DOT PO AT 46
23	66	6466	42	1	6452	TIX	ORBPM1,1	
23	67	6467	40	0	1120	EX44	EXIT44	
24	66	6470	72	0	7123	TSQ	SQRTE	
24	67	6471	10	0	0207	STQ	RO	23
25	66	6472	06	0	0012	MPY	TS12	23+26=49
25	67	6473	44	0	6474	TOV	*+1	
26	66	6474	04	0	0636	DVP	2K1	48
26	67	6475	60	0	0000	COM		
27	66	6476	22	0	4030	ADD	PMAX	2B1
27	67	6477	10	0	0001	STQ	TS1	
20	70	6500	20	0	0207	CLA	RO	
20	71	6501	14	0	4007	LDQ	ZERO	
21	70	6502	54	0	0001	LRS	1	
21	71	6503	04	0	0001	DVP	TS1	
22	70	6504	40	0	1121	EX45	EXIT45	
22	71	6505	10	0	0173	STQ	AI	ALPHA I AT 23

23	70	6506	20	0	0636	3664.	CLA	2K1	
23	71	6507	14	0	4007	3665.	LDQ	ZERO	
24	70	6510	54	0	0001	3666.	LFS	1	49
24	71	6511	04	0	0173	3667.	DVP	AI	49-23=26
25	70	6512	72	0	7123	3668.	TSQ	SQRTE	
25	71	6513	10	0	0001	3669.	STO	TS1	ROOT(MU/ALPHA) AT 13
26	70	6514	14	0	4007	3670.	LDQ	ZERO	
26	71	6515	54	0	0001	3671.	LRS	1	
27	70	6516	04	0	0173	3672.	DVP	AI	
27	71	6517	10	0	0077	3673.	STO	NI	ANG FREQ AT -9.
20	72	6520	20	0	0173	3674.	CLA	AI	
20	73	6521	24	0	0207	3675.	SUB	RC	
21	72	6522	14	0	4007	3676.	LDQ	ZERO	
21	73	6523	04	0	0173	3677.	DVP	AI	
22	72	6524	10	0	0103	3678.	STO	CI	0
22	73	6525	20	0	0173	3679.	CLA	AI	
23	72	6526	36	0	0001	3680.	MPZ	TS1	
23	73	6527	10	0	0001	3681.	STO	TS1	ROOT(ALPHAXMU) AT 36
24	72	6530	30	0	0013	3682.	CLZ	TS13	36
24	73	6531	14	0	4007	3683.	LDQ	ZERO	
25	72	6532	04	0	0001	3684.	DVP	TS1	
25	73	6533	10	0	0043	3685.	STO	SI	0
26	72	6534	40	0	0021	3686.	TRA	SREX2	
						3687.			
						3688.			
						3689.			
26	73	6535	12	0	0021	3690.	ELPRD	STQ	SREX2
27	72	6536	30	0	0007	3691.	CLZ	TS7	ITERATION COUNTER.
27	73	6537	20	0	0442	3692.	CLA	TI	13
20	74	6540	26	0	0077	3693.	MPR	NI	AT -9.
20	75	6541	56	0	0001	3694.	ALS	1	
21	74	6542	10	0	0010	3695.	STO	TS10	DEL M AT 3.
21	75	6543	10	0	0011	3696.	ELPRD1	STO	TS11
22	74	6544	72	0	6767	3697.	TSQ	SICOF	DEL E AT 3.
22	75	6545	20	0	0000	3698.	CLA	TSQ	
23	74	6546	26	0	0103	3699.	MPR	CI	AT 0.
23	75	6547	10	0	0013	3700.	STO	TS13	1

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ELLIPSE PREDICTOR SUBROUTINE.

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24	74	6550	20	0	0001	3701.	CLA	TS1	1
24	75	6551	26	0	0043	3702.	MPR	SI	0+1=1
25	74	6552	34	0	0013	3703.	SUZ	TS13	
25	75	6553	22	0	5033	3704.	ADD	1B1	
26	74	6554	10	0	0012	3705.	STO	TS12	X12 AT 1.
26	75	6555	30	0	0007	3706.	CLZ	TS7	
27	74	6556	24	0	4005	3707.	SUB	2B17	2ITERATIONS.
27	75	6557	46	0	6642	3708.	TMI	ELPPD3	-IS NOT DONE.
20	76	6560	20	0	0103	3709.	CLA	CI	0
20	77	6561	54	0	0001	3710.	LRS	1	1
21	76	6562	60	0	0000	3711.	COM		
21	77	6563	22	0	0000	3712.	ADD	TS0	
22	76	6564	06	0	0173	3713.	MPY	AI	23+1=24
22	77	6565	04	0	0207	3714.	DVP	RO	23
23	76	6566	10	0	0003	3715.	STO	TS3	F AT 1.
23	77	6567	30	0	0010	3716.	CLZ	TS10	3
24	76	6570	34	0	0011	3717.	SUZ	TS11	
24	77	6571	56	0	0002	3718.	ALS	2	1
25	76	6572	22	0	0001	3719.	ADD	TS1	
25	77	6573	14	0	4007	3720.	LDQ	ZERO	
26	76	6574	54	0	0001	3721.	LRS	1	
26	77	6575	04	0	0077	3722.	DVP	NI	AT -9.
27	76	6576	10	0	0007	3723.	STO	TS7	G AT 11.
27	77	6577	20	0	0207	3724.	CLA	RO	
30	60	6600	26	0	0012	3725.	MPR	TS12	
30	61	6601	10	0	0014	3726.	STO	TS14	24
31	60	6602	20	0	0173	3727.	CLA	AI	
31	61	6603	26	0	0077	3728.	MPR	NI	
32	60	6604	06	0	0001	3729.	MPY	TS1	23-9+1=15
32	61	6605	04	0	0014	3730.	DVP	TS14	
33	60	6606	60	0	0000	3731.	COM		
33	61	6607	10	0	0013	3732.	STO	TS13	F DOT AT -9.
34	60	6610	20	0	0012	3733.	CLA	TS12	X12
34	61	6611	24	0	5033	3734.	SUB	1B1	
35	60	6612	32	0	0000	3735.	ADZ	TS0	
35	61	6613	14	0	4007	3736.	LDQ	ZERO	
36	60	6614	54	0	0001	3737.	LRS	1	2

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36	61	6615	04	0	0012	3738.	DVP	TS12		
37	60	6616	10	0	0017	3739.	STO	TS17		G DOT AT 1.
37	61	6617	50	1	0002	3740.	AXT	2,1		
30	62	6620	20	1	0204	3741.	FLPRD2 CLA	ROX,1		23
30	63	6621	26	0	0003	3742.	MPP	TS3		1
31	62	6622	10	0	0002	3743.	STO	TS2		24
31	63	6623	20	1	0424	3744.	CLA	VOX,1		13
32	62	6624	26	0	0007	3745.	MPP	TS7		11+13=24
32	63	6625	32	0	0002	3746.	ADZ	TS2		
33	62	6626	56	0	0001	3747.	ALS	1		23
33	63	6627	10	1	0220	3748.	STO	RIX,1		PRED POS AT 23
34	62	6630	20	1	0204	3749.	CLA	ROX,1		23
34	63	6631	26	0	0013	3750.	MPP	TS13		-9
35	62	6632	10	0	0002	3751.	STO	TS2		14
35	63	6633	20	1	0424	3752.	CLA	VOX,1		13
36	62	6634	26	0	0017	3753.	MPP	TS17		1
36	63	6635	32	0	0002	3754.	ADZ	TS2		
37	62	6636	56	0	0001	3755.	ALS	1		
37	63	6637	10	1	0430	3756.	STO	VIX,1		PRED VFL AT 13
30	64	6640	42	1	6620	3757.	TIX	ELPRD2,1		
30	65	6641	40	0	0021	3758.	TRA	SREX2		
31	64	6642	22	0	4004	3759.	ELPRD3 ADD	3B17		
31	65	6643	10	0	0007	3760.	STO	TS7		
32	64	6644	20	0	0010	3761.	CLA	TS10		3
32	65	6645	24	0	0011	3762.	SUB	TS11		
33	64	6646	56	0	0002	3763.	ALS	2		
33	65	6647	10	0	0013	3764.	STO	TS13		DEL(M)-DEL(E) AT 1.
34	64	6650	20	0	0000	3765.	CLA	TS0		1
34	65	6651	54	0	0001	3766.	LRS	1		2
35	64	6652	24	0	4065	3767.	SUB	1B2		
35	65	6653	26	0	0043	3768.	MPP	SI		0+2=2
36	64	6654	56	0	0001	3769.	ALS	1		
36	65	6655	10	0	0014	3770.	STO	TS14		1
37	64	6656	20	0	0001	3771.	CLA	TS1		
37	65	6657	26	0	0103	3772.	MPP	CI		0+1=1
30	66	6660	32	0	0014	3773.	ADZ	TS14		
30	67	6661	32	0	0013	3774.	ADZ	TS13		X11 IN A AT 1.

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31	66	6662	14	0	4007	3775.	LDQ	ZERO		
31	67	6663	54	0	0003	3776.	LRS	3	4	
32	66	6664	04	0	0012	3777.	DVP	TS12	DEL E CORRECTION AT 3.	
32	67	6665	32	0	0011	3778.	ADZ	TS11	DEL E	
33	66	6666	40	0	6543	3779.	TRA	ELPRD1		
					3780.					
					3781.	*				
					3782.	*			DOUBLE PRECISION SQUARE SUBROUTINE.	
					3783.	*				
33	67	6667	12	0	0023	3783.	DPSQ	STQ	SREX	
34	66	6670	30	0	0001	3784.		CLZ	TS1	A SQ MS
34	67	6671	30	0	0002	3785.		CLZ	TS2	A SQ LS
35	66	6672	50	1	0002	3786.		AXT	2,1	
35	67	6673	20	1	0004	3787.	DPSQ1	CLA	TS4,1	
36	66	6674	06	1	0004	3788.		MPY	TS4,1	
36	67	6675	32	0	0001	3789.		*ADZ	TS1	
37	66	6676	46	0	6716	3790.		TMI	DPSQ3	CHECK FOR O.F.
37	67	6677	10	0	0001	3791.		STO	TS1	
30	70	6700	12	0	0003	3792.		STQ	TS3	
30	71	6701	30	0	0002	3793.		CLZ	TS2	
31	70	6702	32	0	0003	3794.		*ADZ	TS3	
31	71	6703	10	0	0002	3795.		STO	TS2	
32	70	6704	46	0	6706	3796.		TMI	*+2	CHECK FOR O.F.
32	71	6705	40	0	6714	3797.		TRA	DPSQ2	
33	70	6706	24	0	4036	3798.		*SUB	MS	
33	71	6707	10	0	0002	3799.		STO	TS2	
34	70	6710	30	0	0001	3800.		CLZ	TS1	
34	71	6711	22	0	4006	3801.		*ADD	1B17	
35	70	6712	46	0	6716	3802.		TMI	DPSQ3	CHECK FOR O.F.
35	71	6713	10	0	0001	3803.		STO	TS1	
36	70	6714	42	1	6673	3804.	DPSQ2	TIX	DPSQ1,1	
36	71	6715	40	0	0023	3805.		TRA	SREX	
37	70	6716	20	0	4030	3806.	DPSQ3	CLA	PMAX	O.F. DETECTED.
37	71	6717	10	0	0001	3807.		STO	TS1	
30	72	6720	40	0	0023	3808.		TRA	SREX	
					3809.		*			
					3810.		*			
					3811.		*			NORMALIZE SUBROUTINE.

30	73	6721	12	0	0022	3812.	NORM	STQ	SREX1	
31	72	6722	44	0	6723	3813.		TOV	*+1	CLEAR D.F.
31	73	6723	14	0	0002	3814.		LDQ	TS2	A SQ LS
32	72	6724	50	1	0007	3815.		AXT	7,1	8 SHIFTS(16 PLACES) POSSIBLE
32	73	6725	20	0	0001	3816.		CLA	TS1	A SQ MS
33	72	6726	52	0	0002	3817.		*LLS	2	
33	73	6727	44	0	6735	3818.		TOV	NORM1	
34	72	6730	10	0	0001	3819.		STO	TS1	NORMALIZED A.
34	73	6731	42	1	6725	3820.		TIX	*-4,1	
35	72	6732	20	0	4017	3821.		CLA	8B17	
35	73	6733	22	0	4035	3822.		ADD	SHDUM	LRS 0
36	72	6734	40	0	0022	3823.		TRA	SREX1	
36	73	6735	20	1	4000	3824.	NORM1	CLA	7B17,1	
37	72	6736	40	0	6733	3825.		TRA	*-3	
						3826.	*			
						3827.	*			DOUBLE PRECISION VECTOR MAGNITUDE.
						3828.	*			
37	73	6737	12	0	0021	3829.	DPVMAG	STQ	SREX2	SAVE RET ADDR.
30	74	6740	72	0	6667	3830.		TSQ	DPSQ	TO DOUB PREC SQ.
30	75	6741	72	0	6721	3831.		TSQ	NORM	TO NORMALIZE.
31	74	6742	10	0	0020	3832.		STO	SREX3	LRS(I/2)
31	75	6743	30	0	0001	3833.		CLZ	TS1	NORMALIZED SQ.
32	74	6744	72	0	7123	3834.		TSQ	SQRTE	
32	75	6745	40	0	0020	3835.		TRA	SREX3	RE-NORMALIZE A-REG.
						3836.	*			
						3837.	*			DOUBLE PRECISION TIME SUBTRACT.
						3838.	*			
33	74	6746	12	0	0023	3839.	DPTS8	STQ	SREX	
33	75	6747	20	0	0377	3840.		CLA	TA1	ABS TIME MS AT 18.
34	74	6750	24	1	0520	3841.		SUB	TE1,1	EPOCH TIME MS AT 18.
34	75	6751	56	0	0005	3842.		ALS	5	13
35	74	6752	10	0	0001	3843.		STO	TS1	
35	75	6753	20	1	0524	3844.		CLA	TE2,1	EPOCH TIME LS AT 1.
36	74	6754	54	0	0014	3845.		LRS	12	13
36	75	6755	10	0	0002	3846.		STO	TS2	
37	74	6756	20	0	0353	3847.		CLA	TA2	ABS TIME LS AT 1.
37	75	6757	54	0	0014	3848.		LRS	12	13

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30	76	6760	34	0	0002	3849.	SUZ	TS2	
30	77	6761	32	0	0001	3850.	ADZ	TS1	
31	76	6762	10	0	0442	3851.	STO	TI	TIME DIFF AT 13.
31	77	6763	40	0	0023	3852.	TRA	SREX	
						3853.			
						3854.	* EXIT	STQ	SREX2
32	76	6764	12	0	0021	3854.		TRA	SREX2
32	77	6765	40	0	0021	3855.			
						3856.	*		
						3857.	*		
						3858.	*		SINE-COSINE SUBROUTINE ENTER WITH ANGLE IN
						3859.	*		RADIANS AT B3 IN ACC AND RETURN IN Q
						3860.			
33	76	6766	22	0	4021	3860.	ADD	2PIB3	
33	77	6767	46	0	6766	3861.	SIC0E TMI	*-1	SET PLUS
34	76	6770	12	0	0023	3862.	STQ	SREX	
34	77	6771	10	0	0001	3863.	STO	TS1	
35	76	6772	24	0	4021	3864.	SUB	2PIB3	SET BETWEEN 0-2PI
35	77	6773	46	0	6775	3865.	TMI	*+2	
36	76	6774	10	0	0001	3866.	STO	TS1	
36	77	6775	20	0	4023	3867.	CLA	PID2	PI/2
37	76	6776	24	0	0001	3868.	SUB	TS1	
37	77	6777	10	0	0000	3869.	STO	TS0	PI/2-ALPHA
40	60	7000	46	0	7021	3870.	TMI	SIC01	- IS GREATER THAN 90
40	61	7001	50	1	0001	3871.	AXT	1,1	
41	60	7002	20	1	0000	3872.	SIC02 CLA	TS0,1	
41	61	7003	56	0	0002	3873.	ALS	2	TO 1
42	60	7004	10	1	0000	3874.	STO	TS0,1	
42	61	7005	26	1	0000	3875.	MPR	TS0,1	
43	60	7006	10	0	0002	3876.	STO	TS2	ALPHA SQUARED AT 2
43	61	7007	26	0	4025	3877.	MPR	K173	2-6=-4
44	60	7010	22	0	4026	3878.	ADD	K172	
44	61	7011	26	0	0002	3879.	MPR	TS2	-2
45	60	7012	27	0	4027	3880.	ADD	K171	
45	61	7013	26	0	0002	3881.	MPR	TS2	0
46	60	7014	22	0	4030	3882.	ADD	K170	
46	61	7015	26	1	0000	3883.	MPR	TS0,1	1
47	60	7016	10	1	0000	3884.	STO	TS0,1	
47	61	7017	42	1	7002	3885.	TIX	SIC02,1	

40	62	7020	40	0	0023	3886.		TRA	SPEX	EXIT
40	63	7021	22	0	4023	3887.	SIC01	ADD	PID2	
41	62	7022	10	0	0001	3888.		STO	TS1	PI-ALPHA
41	63	7023	46	0	7025	3889.		TMI	*+2	- IS GREATER THAN 180
42	62	7024	40	0	7001	3890.		TRA	SIC02-1	
42	63	7025	22	0	4023	3891.		ADD	PID2	
43	62	7026	60	0	0000	3892.		COM		
43	63	7027	10	0	0000	3893.		STO	TSC	ALPHA-3PI/2
44	62	7030	46	0	7001	3894.		TMI	SIC02-1	- IS BETWEEN 180 AND 270
44	63	7031	24	0	4023	3895.		SUB	PID2	
45	62	7032	10	0	0001	3896.		STO	TS1	ALPHA-2PI
45	63	7033	40	0	7001	3897.		TRA	SIC02-1	
						3898.	*			
						3899.	*			
						3900.	*			ARCTANGENT SUBROUTINE ENTER WITH SINE AND
						3901.	*			COSINE AT 1 IN TS3 AND TS4
46	62	7034	12	0	0023	3902.	ARCTAN	STO	SPEX	SET EXIT
46	63	7035	20	0	0003	3903.		CLA	TS3	
47	62	7036	62	0	0000	3904.		ABS		
47	63	7037	10	0	0001	3905.		STO	TS1	
48	64	7040	20	0	0004	3906.		CLA	TS4	
48	65	7041	44	0	7042	3907.		TOV	*+1	
41	64	7042	62	0	0000	3908.		ABS		
41	65	7043	22	0	0001	3909.		*ADD	TS1	KCOS+K SIN
42	64	7044	44	0	7047	3910.		TOV	*+3	O.F. CHECK.
42	65	7045	20	0	0004	3911.		CLA	TS4	
43	64	7046	40	0	7055	3912.		TRA	*+7	
43	65	7047	20	0	0001	3913.		CLZ	TS1	O.F. RE-SCALE.
44	64	7050	54	0	0001	3914.		LRS	1	
44	65	7051	10	0	0001	3915.		STO	TS1	ABS SIN.
45	64	7052	30	0	0004	3916.		CLZ	TS4	
45	65	7053	54	0	0001	3917.		LRS	1	
46	64	7054	10	0	0004	3918.		STO	TS4	COS
46	65	7055	44	0	7113	3919.		TMI	ARCTAN	- IS 2ND OR 3RD QUAD
47	64	7056	22	0	0001	3920.		ADD	TS1	
47	65	7057	10	0	0002	3921.		STO	TS2	
48	66	7060	20	0	4024	3922.		CLA	PID4	

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40 67	7061	10 0 0005	3923.	STO	TS5	1/4 PI
41 66	7062	20 0 0001	3924.	CLA	TS1	
41 67	7063	24 0 0004	3925.	SUB	TS4	SIN-COS
42 66	7064	14 0 4007	3926.	ARCTA1 LDQ	ZERO	
42 67	7065	54 0 0001	3927.	LRS	1	
43 66	7066	04 0 0002	3928.	DVP	TS2	
43 67	7067	10 0 0006	3929.	STO	TS6	=X AT 1
44 66	7070	06 0 0006	3930.	MPY	TS6	
44 67	7071	10 0 0007	3931.	STO	TS7	X SQUARED AT 2
45 66	7072	26 0 4031	3932.	MPR	K183	-1
45 67	7073	22 0 4032	3933.	ADD	K182	
46 66	7074	06 0 0007	3934.	MPY	TS7	1
46 67	7075	22 0 4033	3935.	ADD	K181	
47 66	7076	06 0 0007	3936.	MPY	TS7	3
47 67	7077	52 0 0001	3937.	LLS	1	2
40 70	7100	22 0 4034	3938.	ADD	K180	
40 71	7101	26 0 0006	3939.	MPR	TS6	3
41 70	7102	22 0 0005	3940.	ADD	TS5	
41 71	7103	10 0 0001	3941.	STO	TS1	
42 70	7104	20 0 0003	3942.	CLA	TS3	
42 71	7105	46 0 7110	3943.	TMI	*+3	
43 70	7106	20 0 0001	3944.	CLA	TS1	
43 71	7107	40 0 0023	3945.	TRA	SREX	EXIT
44 70	7110	20 0 4021	3946.	CLA	2PIB3	PHI GREATER THAN 180
44 71	7111	24 0 0001	3947.	SUB	TS1	
45 70	7112	40 0 0023	3948.	TRA	SREX	
45 71	7113	20 0 4022	3949.	ARCTA2 CLA	3PID4	
46 70	7114	10 0 0005	3950.	STO	TS5	3/4 PI
46 71	7115	20 0 0004	3951.	CLA	TS4	
47 70	7116	24 0 0001	3952.	SUB	TS1	
47 71	7117	10 0 0007	3953.	STO	TS2	
40 72	7120	20 0 0001	3954.	CLA	TS1	
40 73	7121	22 0 0004	3955.	ADD	TS4	
41 72	7122	40 0 7064	3956.	TRA	ARCTA1	
			3957.	*		
			3958.	*		
			3959.	*		

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

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42	76	7164	54	0	0001	3997.	LRS	1		
42	77	7165	34	0	0002	3998.	SUZ	TS2		
43	76	7166	10	0	0003	3999.	STO	TS3	SIN THETA	
43	77	7167	20	0	0004	4000.	CLA	TS4	AX	
44	76	7170	26	0	0010	4001.	MPR	TS10	BX	
44	77	7171	54	0	0001	4002.	LRS	1		
45	76	7172	10	0	0002	4003.	STO	TS2		
45	77	7173	20	0	0006	4004.	CLA	TS4+2	AZ	
46	76	7174	26	0	0012	4005.	MPR	TS10+2	BZ	
46	77	7175	54	0	0001	4006.	LRS	1		
47	76	7176	32	0	0002	4007.	ADZ	TS2		
47	77	7177	10	0	0004	4008.	STO	TS4	COS THETA	
50	60	7200	72	0	7034	4009.	TSQ	ARCTAE		
50	61	7201	40	0	0022	4010.	TRA	SREX1	THETA IN A AT 3.	
						4011.				
						4012.				
						4013.				
						4014.				
51	60	7202	20	0	0333	4014.	ADOUT	CLA	ADST	OUTPUT ADDRESS
51	61	7203	22	0	5033	4015.		ADD	DUMCLA	
52	60	7204	10	0	1000	4016.		STO	CLADD	SET CLA OF DATA
52	61	7205	54	0	0011	4017.		LRS	9	
53	60	7206	50	1	0002	4018.		AXT	2,1	
53	61	7207	52	0	0003	4019.		LLS	3	3 BITS PER PASS
54	60	7210	66	0	2200	4020.		OUT	DEDA	
54	61	7211	66	0	2600	4021.		OUT	SHOUT	SET SHIFT OUT
55	60	7212	56	0	0022	4022.		*ALS	18	TIME DELAY
55	61	7213	42	1	7207	4023.		TIX	*-4,1	
56	60	7214	40	0	1000	4024.		TRA	CLADD	GET DATA
56	61	7215	10	0	0326	4025.	ROP	STO	DD	
57	60	7216	46	0	7353	4026.		TMI	SNS	TEST SIGN
57	61	7217	20	0	4007	4027.		CLA	ZERO	POSITIVE
50	62	7220	66	0	2200	4028.	SOUT	OUT	DEDA	OUTPUT SIGN
50	63	7221	66	0	2600	4029.		OUT	SHOUT	
51	62	7222	20	0	0027	4030.		CLA	OCTF	OCTAL OR DECIMAL OUTPUT
51	63	7223	46	0	7247	4031.		TMI	OCTO	
52	62	7224	40	0	1122	4032.	EX46	TRA	EXIT46	
52	63	7225	20	0	0326	4033.		CLA	DD	DECIMAL OUTPUT

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53	62	7226	26	0	0026	4034.	MPR	SF	SCALE FACTOR
53	63	7227	62	0	0000	4035.	ABS		MAGNITUDE
54	62	7230	50	1	0004	4036.	AXT	4,1	OUTPUT 5 DIGITS
54	63	7231	44	0	7232	4037.	TOV	*+1	
55	62	7232	14	0	4007	4038.	LDQ	ZERO	
55	63	7233	04	0	4042	4039.	*DVP	BCDL	DIVIDE BY 100K
56	62	7234	12	0	0001	4040.	STQ	TS1	
56	63	7235	30	0	0001	4041.	CLZ	TS1	UNROUNDED QUOTIENT
57	62	7236	22	0	4006	4042.	AID	1817	ROUND UP
57	63	7237	44	0	7355	4043.	TOV	MAX	TEST FOR TOO LARGE
50	64	7240	06	0	4041	4044.	DOU ^T	MPY	10817
50	65	7241	66	0	2200	4045.	OUT	DFDA	EXTRACT DIGIT
51	64	7242	66	0	2600	4046.	OUT	SHOUT	OUTPUT
51	65	7243	12	0	0001	4047.	STQ	TS1	REMAINDER
52	64	7244	30	0	0001	4048.	CLZ	TS1	
52	65	7245	42	1	7240	4049.	TIX	*-5,1	
53	64	7246	40	0	1123	4050.	TRA	EXIT47	
53	65	7247	14	0	0326	4051.	OCTO	DD	OCTAL OUTPUT
54	64	7250	50	1	0004	4052.	AXT	4,1	OUTPUT 5 OCTAL DIGITS
54	65	7251	52	0	0003	4053.	*LLS	3	EXTRACT DIGIT
55	64	7252	66	0	2200	4054.	OUT	DFDA	OUTPUT
55	65	7253	66	0	2600	4055.	OUT	SHOUT	
56	64	7254	56	0	0022	4056.	*ALS	18	TIME DELAY
56	65	7255	42	1	7251	4057.	TIX	*-4,1	
57	64	7256	40	0	1123	4058.	TRA	EXIT47	
57	65	7257	10	0	0325	4059.	RMF	STQ	READOUT ENTRY
50	66	7260	66	0	2500	4060.	OUT	SHIN	ENTER ENTRY SET SHIFT IN
50	67	7261	30	0	0327	4061.	CLZ	CMF	RESET CLEAR MODE
51	66	7262	30	0	0027	4062.	CLZ	OCTF	OCTAL FLAG
51	67	7263	30	0	0326	4063.	CLZ	DD	CLEAR DFDA DATA
52	66	7264	20	0	4007	4064.	CLA	ZERO	
52	67	7265	50	1	0002	4065.	AXT	2,1	INPUT 3 DIGIT ADDRESS
53	66	7266	56	0	0003	4066.	ALS	3	
53	67	7267	10	0	0333	4067.	STQ	ADST	
54	66	7270	64	0	2200	4068.	INP	DFDA	INPUT DIGIT
54	67	7271	66	0	2500	4069.	OUT	SHIN	SET SHIFT IN
55	66	7272	54	0	0015	4070.	LRS	13	

55	67	7273	24	0	4017	4071.	SUB	8817	TEST FOR ERROR
56	66	7274	46	0	7276	4072.	TMI	**2	
56	67	7275	40	0	1124	4073.	TRA	EXIT48	ERROR EXIT
57	66	7276	22	0	4017	4074.	ADD	8817	
57	67	7277	32	0	0333	4075.	ADZ	ADST	ASSEMBLE ADDRESS
50	70	7300	42	1	7266	4076.	TIX	*-10,1	
50	71	7301	10	0	0333	4077.	STO	ADST	
51	70	7302	64	0	2200	4078.	INP	DEDA	
51	71	7303	66	0	2500	4079.	OUT	SHIN	
52	70	7304	56	0	0004	4080.	*ALS	4	
52	71	7305	10	0	0002	4081.	STO	TS2	SIGN
53	70	7306	20	0	0333	4082.	CLA	ADST	
53	71	7307	40	0	1125	4083.	TRA	EXIT49	SCALE FACTOR SELECT
54	70	7310	20	0	4036	4084.	CLA	MS	SET OCTAL FLAG
54	71	7311	10	0	0027	4085.	STO	OCTF	
55	70	7312	20	0	0325	4086.	CLA	RMF	EXIT IF READOUT
55	71	7313	46	0	1123	4087.	TMI	EXIT47	
56	70	7314	50	1	0004	4088.	AXT	4,1	INPUT 5 OCTAL DIGITS
56	71	7315	64	0	2200	4089.	INP	DEDA	
57	70	7316	66	0	2500	4090.	OUT	SHIN	
57	71	7317	54	0	0016	4091.	LRS	14	
50	72	7320	32	0	0326	4092.	ADZ	DD	ASSEMBLE WORD
50	73	7321	52	0	0003	4093.	LLS	3	
51	72	7322	10	0	0326	4094.	STO	DD	
51	73	7323	42	1	7315	4095.	TIX	*-6,1	
52	72	7324	32	0	0002	4096.	ADZ	TS2	ADD SIGN
52	73	7325	40	0	7344	4097.	TRA	STDD	
53	72	7326	20	0	0325	4098.	CLA	RMF	DECIMAL DATA
53	73	7327	46	0	1123	4099.	TMI	EXIT47	EXIT IF READOUT
54	72	7330	50	1	0004	4100.	AXT	4,1	READ 5 DIGITS
54	73	7331	40	0	7336	4101.	TRA	**5	
55	72	7332	66	0	2500	4102.	OUT	SHIN	
55	73	7333	06	0	7512	4103.	MPY	10B4	MULTIPLY BY 10
56	72	7334	52	0	0004	4104.	LLS	4	SCALE
56	73	7335	10	0	0326	4105.	STO	DD	
57	72	7336	64	0	2200	4106.	INP	DEDA	
57	73	7337	54	0	0015	4107.	LRS	13	

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DDIN

50	74	7340	32	0	0326	4108.	ADZ	DD	ASSEMBLE WORD
50	75	7341	42	1	7332	4109.	TIX	*-7,1	
51	74	7342	40	0	1126	4110.	EX50 TRA	EXIT50	
51	75	7343	04	0	1026	4111.	DVP	SF	SCALE FACTOR
52	74	7344	10	0	0326	4112.	STDD STO	DD	
52	75	7345	30	0	0002	4113.	CLZ	TS2	
53	74	7346	46	0	7350	4114.	TMI	*+2	COMPLEMENT IF MINUS
53	75	7347	40	0	1127	4115.	TRA	EXIT51	IMMEDIATE ACTION TEST
54	74	7350	30	0	0326	4116.	CLZ	DD	COMPLEMENT
54	75	7351	60	0	0000	4117.	CCM		
55	74	7352	40	0	7344	4118.	TRA	STDD	
55	75	7353	20	0	4006	4119.	SNS CLA	1B17	PICK UP NEGATIVE SIGN
56	74	7354	40	0	7220	4120.	TRA	SQUT	
56	75	7355	20	0	4030	4121.	MAX CLA	PMAX	GET MAXIMUM NUMBER
57	74	7356	40	0	7240	4122.	TRA	DQUT	
						4123.	*		
						4124.	*	ABSOLUTE TIME INITIALIZE	
						4125.	*		
57	75	7357	20	0	0615	4126.	ATI CLA	MU10	CYCLE COUNT
50	76	7360	14	0	4007	4127.	LDG	ZERO	
50	77	7361	04	0	0667	4128.	DVP	M25B16	MINUS SEC AT 1
51	76	7362	22	0	0670	4129.	ADD	DTB	1+TIME BIAS
51	77	7363	22	0	5033	4130.	ADD	1B1	+1 SEC
52	76	7364	10	0	0353	4131.	STO	TA2	2+BIAS-CYCLE COUNT
52	77	7365	20	0	0326	4132.	CLA	DD	INPUT TIME
53	76	7366	24	0	4006	4133.	SUB	1B17	T-2 SEC
53	77	7367	10	0	0377	4134.	STO	TA1	MOST SIG ABS TIME
54	76	7370	40	0	1123	4135.	TRA	EXIT47	
						4136.	*		
						4137.	*	AGS TELEMETRY OUTPUT	
						4138.	*		
54	77	7371	12	0	0023	4139.	TME STO	SPEX	
55	76	7372	64	0	2020	4140.	INP	DISC11	
55	77	7373	56	0	0002	4141.	*ALS	2	TEST FOR STOP
56	76	7374	46	0	0023	4142.	TMI	SPEX	EXIT IF NOT
56	77	7375	30	0	0723	4143.	CLZ	TMID	
57	76	7376	22	0	4006	4144.	ADD	1B17	INCREMENT IDENT NUMBER

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57	77	7377	10	0	0723	4145.	STO	TMID		
60	60	7400	22	0	1006	4146.	ADD	TMCLA	SET UP TO GET WORD	
60	61	7401	10	0	0021	4147.	STO	SREX-2		
61	60	7402	24	0	1006	4148.	SUB	TMCLA	GET ID	
61	61	7403	56	0	0014	4149.	*ALS	12		
62	60	7404	66	0	6200	4150.	OUT	TMIDO	OUTPUT IDENTIFICATION	
62	61	7405	20	0	4045	4151.	CLA	TMOUT	OUTPUT INSTRUCTION	
63	60	7406	10	0	0022	4152.	STO	SREX-1		
63	61	7407	40	0	0021	4153.	TRA	SREX-2		
						4154.				
						4155.				
						4156.				
						4157.				
64	60	7410	30	0	0723	4157.	TMIF2	CLZ	TMID	RESET TO FIRST WORD
64	61	7411	50	1	0002	4158.		AXT	2,1	
65	60	7412	20	1	0130	4159.		CLA	A11,1	SAVE DIPECTION COSINES
65	61	7413	10	1	0330	4160.		STO	A11T,1	FOR TELEMETRY
66	60	7414	20	1	0134	4161.		CLA	A31,1	
66	61	7415	10	1	0334	4162.		STO	A31T,1	
67	60	7416	42	1	7412	4163.		TIX	*-4,1	
67	61	7417	40	0	6764	4164.		TRA	EXIT	
						4165.				
						4166.				
						4167.				
						4168.				
60	62	7420	12	0	0023	4168.	PGNSDF	STQ	SREX	
60	63	7421	20	0	0563	4169.		CLA	DLIF	DOWNLINK INITIALIZE FLAG
61	62	7422	46	0	7424	4170.		TMI	*+2	
61	63	7423	40	0	0023	4171.		TRA	SREX	EXIT
62	62	7424	64	0	2020	4172.		INP	DISC11	
62	63	7425	56	0	0001	4173.		*ALS	1	TEST FOR STOP
63	62	7426	46	0	0023	4174.		TMI	SREX	PULSE RECEIVED
63	63	7427	64	0	6200	4175.		INP	DLREG	INPUT WORD
64	62	7430	54	0	0002	4176.		LRS	2	DISCARD UNWANTED BITS
64	63	7431	10	0	0012	4177.		STO	TS12	SAVE INPUT
65	62	7432	20	0	0570	4178.		CLA	IDIF	TEST FOR PRIOR ID
65	63	7433	46	0	7450	4179.		TMI	PGNSD1	NUMBER 1 FOUND
66	62	7434	30	0	0012	4180.		CLZ	TS12	TEST IF CURRENT
66	63	7435	46	0	0023	4181.		TMI	SREX	WORD IS AN ID

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67	62	7436	24	0	0671	4182.	SUB	ID1	
67	63	7437	62	0	0000	4183.	ABS		
60	64	7440	60	0	0000	4184.	COM		
60	65	7441	46	0	0023	4185.	TMI	SREX	
61	64	7442	20	0	4025	4186.	CLA	K173	IS ID1
61	65	7443	10	0	0570	4187.	STO	ID1F	SET FLAG
62	64	7444	30	0	0562	4188.	CLZ	DLWN	ZERO WORD NUMBER
62	65	7445	20	0	4011	4189.	PGNSD2	CLA	1B5
63	64	7446	10	0	0037	4190.	STO	DLSC	SET SHIFT COUNT
63	65	7447	40	0	0023	4191.	TRA	SREX	EXIT
64	64	7450	40	0	1023	4192.	PGNSD1	TRA	EXIT7
64	65	7451	30	0	0037	4193.	CLZ	DLSC	
65	64	7452	56	0	0001	4194.	*ALS	1	TEST FOR ID
65	65	7453	46	0	7445	4195.	TMI	PGNSD2	WORD EXPECTED
66	64	7454	10	0	0037	4196.	STO	DLSC	
66	65	7455	30	0	0562	4197.	CLZ	DLWN	
67	64	7456	22	0	4006	4198.	ADD	1B17	INCREMENT WORD NUMBER
67	65	7457	10	0	0562	4199.	STO	DLWN	
60	66	7460	22	0	1010	4200.	ADD	DLSTO	FORM STORE COMMAND
60	67	7461	10	0	0022	4201.	STO	SREX-1	
61	66	7462	24	0	0672	4202.	SUB	DLWNL	TEST FOR LAST WORD
61	67	7463	46	0	7467	4203.	TMI	**4	
62	66	7464	30	0	0570	4204.	CLZ	ID1F	RESET ID1 FLAG
62	67	7465	30	0	0563	4205.	CLZ	DLIF	RESET INITIALIZE FLAG
63	66	7466	10	0	0571	4206.	STO	IDRF	SET DATA RECEIVED FLAG
63	67	7467	30	0	0012	4207.	CLZ	TS12	
64	66	7470	56	0	0003	4208.	*ALS	3	
64	67	7471	40	0	0022	4209.	TRA	SREX-1	
						4210.			
						4211.	*		
						4212.	* TEST	SELF-TEST ROUTINE	
65	66	7472	20	0	0572	4212.	CLA	FLAG	
65	67	7473	46	0	7722	4213.	TMI	CKSUM	
66	66	7474	20	0	0412	4214.	CLA	S12	
66	67	7475	24	0	7701	4215.	SUB	1B3	
67	66	7476	46	0	7502	4216.	TMI	**4	
67	67	7477	24	0	4065	4217.	SUB	1B2	
60	70	7500	46	0	7503	4218.	TMI	**3	-IS LESS THAN 3

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62	75	7545	44	0	7772	4256.	TOV	ERROR				
63	74	7546	60	0	0000	4257.	COM		000000			
63	75	7547	72	0	7767	4258.	TSQ	ACCUM	777777			
64	74	7550	60	0	0000	4259.	COM		000001			
64	75	7551	62	0	0000	4260.	ABS		000001			
65	74	7552	50	1	0007	4261.	AXT	7,1				
65	75	7553	10	1	0000	4262.	STO	TS0,1				
66	74	7554	24	0	4006	4263.	SUB	1B17				
66	75	7555	42	1	7553	4264.	TIX	*-2,1				
67	74	7556	20	0	4006	4265.	CLA	1B17	000001		000001	
67	75	7557	30	0	0004	4266.	CLZ	TS4	777776		777776	
60	76	7560	56	0	0017	4267.	ALS	15	600000			
60	77	7561	44	0	7772	4268.	TOV	ERROR				
61	76	7562	36	0	0005	4269.	MPZ	TS5	000001	200000	777777	
61	77	7563	34	0	0007	4270.	SUZ	TS7	000000	200000	000001	
62	76	7564	52	0	0003	4271.	LLS	3	000004	000000		
62	77	7565	32	0	0002	4272.	ADZ	TS2	000000	000000	777774	
63	76	7566	50	1	0003	4273.	AXT	3,1				
63	77	7567	22	1	0004	4274.	ADD	TS4,1				
64	76	7570	42	1	7567	4275.	TIX	*-1,1				
64	77	7571	50	1	0007	4276.	AXT	7,1				
65	76	7572	50	1	0000	4277.	AXT	0,1				
65	77	7573	34	1	0003	4278.	SUZ	TS3,1	000003	000000	777775	
66	76	7574	42	1	7772	4279.	TIX	ERROR,1				
66	77	7575	50	1	0002	4280.	AXT	2,1				
67	76	7576	32	0	0001	4281.	ADZ	TS1	777776	000000	777773	
67	77	7577	42	1	7600	4282.	TIX	*+1,1				
70	60	7600	42	1	7601	4283.	TIX	*+1,1				
70	61	7601	34	1	0000	4284.	SUZ	TS0,1	000004	000000	777772	
71	60	7602	50	1	0003	4285.	AXT	3,1				
71	61	7603	32	1	0000	4286.	ADZ	TS0,1				
72	60	7604	42	1	7603	4287.	TIX	*-1,1				
72	61	7605	22	0	4036	4288.	ADD	MS	400004		400000	
73	60	7606	62	0	0000	4289.	ABS		377774			
73	61	7607	22	0	4030	4290.	*ADD	K170	777773		377777	
74	60	7610	72	0	7775	4291.	TSQ	DVFLW				
74	61	7611	62	0	0000	4292.	ABS		000005			

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75	60	7612	52	0	0000	4293.	LLS	0				
75	61	7613	24	0	4002	4294.	SUB	5B17	000000		000005	
76	60	7614	72	0	7767	4295.	TSQ	ACCUM	777777			
76	61	7615	20	0	0000	4296.	CLA	TSC	000000		000000	
77	60	7616	40	0	7621	4297.	TRA	*+3				
77	61	7617	72	0	7767	4298.	TSQ	ACCUM	777777			
70	62	7620	40	0	7622	4299.	TRA	*+2				
70	63	7621	40	0	7617	4300.	TRA	*-2				
71	62	7622	10	0	0000	4301.	STO	TSC				
71	63	7623	22	0	4006	4302.	ADD	1B17	000000		000001	
72	62	7624	20	0	0000	4303.	CLA	TSC	777777		777777	
72	63	7625	24	0	0000	4304.	SUB	TSC	000000		777777	
73	62	7626	72	0	7767	4305.	TSQ	ACCUM	777777			
73	63	7627	56	0	0020	4306.	ALS	16	600000			
74	62	7630	06	0	0000	4307.	MPY	TSC	000000	200000	777777	
74	63	7631	12	0	0001	4308.	STQ	TS1				
75	62	7632	22	0	0001	4309.	ADD	TS1	200000	200000	200000	
75	63	7633	24	0	5033	4310.	SUB	1B1	000000	200000	200000	
76	62	7634	22	0	4020	4311.	ADD	SIXTH	252525	200000	252525	
76	63	7635	26	0	4004	4312.	MPR	3B17	000002	377777	000003	
77	62	7636	22	0	0000	4313.	ADD	TSC	000001	377777	777777	
77	63	7637	04	0	4005	4314.	DVP	2B17	377777	377777	000002	
70	64	7640	44	0	7772	4315.	TOV	FRPOP				
70	65	7641	12	0	0002	4316.	STQ	TS2				
71	64	7642	24	0	4030	4317.	SUB	K170	000000	377777	377777	
71	65	7643	24	0	4030	4318.	SUB	K170	400001	377777	377777	
72	64	7644	22	0	0002	4319.	ADD	TS2	000000	377777	377777	
72	65	7645	22	0	4020	4320.	ADD	SIXTH	252525	377777	252525	
73	64	7646	24	0	4002	4321.	SUB	5B17	252520	377777	000005	
73	65	7647	26	0	4020	4322.	MPR	SIXTH	161612	161620	252525	
74	64	7650	12	0	0002	4323.	STQ	TS2				
74	65	7651	24	0	0002	4324.	SUB	TS2	777772	161620	161620	
75	64	7652	54	0	0021	4325.	LRS	17	777777	777772		
75	65	7653	04	0	4003	4326.	DVP	4B17	777777	777776	000004	
76	64	7654	12	0	0002	4327.	STQ	TS2				
76	65	7655	22	0	0002	4328.	ADD	TS2	777775	777776	777776	
77	64	7656	22	0	4004	4329.	ADD	3B17	000000	777776	000003	

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77	65	7657	24	0	4020	4330.	SUB	SIXTH	525253	777776	252525
70	66	7660	10	0	0003	4331.	STO	TS3			
70	67	7661	26	0	0003	4332.	MPR	TS3	161616	307071	525253
71	66	7662	04	0	0003	4333.	DVP	TS3	525251	525251	525253
71	67	7663	06	0	4020	4334.	MPY	SIXTH	616160	743435	252525
72	66	7664	04	0	4020	4335.	DVP	SIXTH	525251	525251	252525
72	67	7665	22	0	4005	4336.	ADD	2B17	525253	525251	000002
73	66	7666	22	0	0003	4337.	*ADD	TS3	252526		525253
73	67	7667	72	0	7775	4338.	TSQ	OVFLW			
74	66	7670	24	0	0003	4339.	*SUB	TS3	525253		525253
74	67	7671	72	0	7775	4340.	TSQ	OVFLW			
75	66	7672	24	0	4020	4341.	*SUB	SIXTH	252526		252525
75	67	7673	72	0	7775	4342.	TSQ	OVFLW			
76	66	7674	60	0	0000	4343.	COM				
76	67	7675	22	0	4020	4344.	ADD	SIXTH	777777		252525
77	66	7676	14	0	0006	4345.	LDQ	TS6	777777	000000	000000
77	67	7677	22	0	0000	4346.	ADD	TS0	777776	000000	777777
70	70	7700	54	0	0002	4347.	LRS	2	777777	600000	
70	71	7701	04	0	0000	4348.	1B3 *DVP	TS0	200000	177777	777777
71	70	7702	12	0	0000	4349.	STQ	TSC			
71	71	7703	72	0	7775	4350.	TSQ	OVFLW			
72	70	7704	24	0	0000	4351.	SUB	TS0	000001		177777
72	71	7705	24	0	4006	4352.	SUB	1B17	000000		000001
73	70	7706	72	0	7767	4353.	TSQ	ACCUM	777777		
73	71	7707	20	0	4004	4354.	CLA	3B17			
74	70	7710	04	0	4005	4355.	*DVP	2B17			
74	71	7711	72	0	7775	4356.	TSQ	OVFLW			
75	70	7712	20	0	4036	4357.	SETFG CLA	MS			END OF LOGIC TEST
75	71	7713	10	0	0572	4358.	STO	FLAGT			SET TEST FLAG
76	70	7714	30	0	0137	4359.	CLZ	SUM			INITIALIZF MEMORY
76	71	7715	20	0	1007	4360.	CLA	TCLTH			TEST
77	70	7716	10	0	0024	4361.	STO	TVARBR			
77	71	7717	20	0	7002	4362.	CLA	CLATEN			
70	72	7720	10	0	0663	4363.	STO	SUMLIM			
70	73	7721	40	0	1130	4364.	TRA	EXIT52			
						4365.	* MEMORY CHECKSUM ROUTINE				
71	72	7722	72	0	7750	4366.	CKSUM TSQ	MEMSUM			PERFORM SUMMATION

71	73	7723	30	0	0137	4367.	CLZ	SUM	TEST SUM
72	72	7724	46	0	7727	4368.	TMI	*+3	
72	73	7725	24	0	4006	4369.	SUB	1B17	
73	72	7726	46	0	7742	4370.	TMI	COPEX	
73	73	7727	20	0	0412	4371.	CLA	S12	INCORRECT SUM
74	72	7730	24	0	7520	4372.	SUB	3B3	SET TEST WORD BITS
74	73	7731	46	0	7735	4373.	TMI	*+4	AND TEST MODE FAILURE
75	72	7732	20	0	5427	4374.	CLA	7B3	INDICATOR
75	73	7733	10	0	0412	4375.	STO	S12	
76	72	7734	40	0	7737	4376.	TRA	*+3	
76	73	7735	20	0	5033	4377.	CLA	1B1	
77	72	7736	66	0	6410	4378.	OUT	6410	
77	73	7737	10	0	0412	4379.	STO	S12	
70	74	7740	30	0	0572	4380.	CLZ	FLAGT	RESET FLAG
70	75	7741	40	0	1130	4381.	TRA	EXIT52	
71	74	7742	20	0	0412	4382.	COPEX CLA	S12	CORRECT SUM
71	75	7743	24	0	4006	4383.	SUB	1B17	
72	74	7744	46	0	7746	4384.	TMI	*+2	
72	75	7745	40	0	7740	4385.	TRA	*-5	
73	74	7746	20	0	7701	4386.	CLA	1B3	
73	75	7747	40	0	7737	4387.	TRA	COPEX-3	
74	74	7750	12	0	0023	4388.	MEMSUM STQ	SREX	MEMORY SUMMATION SUBRT.
74	75	7751	30	0	0153	4389.	CLZ	WRDCNT	
75	74	7752	72	0	0024	4390.	TSQ	TVARBR	
75	75	7753	32	0	0137	4391.	*ADZ	SUM	FORM SUM
76	74	7754	10	0	0137	4392.	STO	SUM	
76	75	7755	20	0	0024	4393.	CLA	TVARBR	
77	74	7756	24	0	0663	4394.	SUB	SUMLIM	TEST FOR LIMIT
77	75	7757	46	0	7761	4395.	TMI	*+2	
70	76	7760	40	0	0023	4396.	TRA	SPEX	
70	77	7761	30	0	0153	4397.	CLZ	WRDCNT	
71	76	7762	22	0	4006	4398.	ADD	1B17	
71	77	7763	10	0	0153	4399.	STO	WRDCNT	INCREMENT WORD COUNTER.
72	76	7764	24	0	0664	4400.	SUB	WORDS	
72	77	7765	46	0	7752	4401.	TMI	MEMSUM+2	
73	76	7766	40	0	1131	4402.	TRA	EXIT53	
73	77	7767	46	0	7772	4403.	ACCUM TMI	ERROR	SUBROUTINE TO TEST FOR

74	76	7770	24	0	4006	4404.		SUB	1B17	ZERO ACCUMULATOR
74	77	7771	46	0	6764	4405.		TMI	EXIT	
75	76	7772	20	0	7520	4406.	ERROR	CLA	3B3	
75	77	7773	10	0	0412	4407.		STC	S12	
76	76	7774	40	0	7712	4408.		TPA	SETEG	
76	77	7775	44	0	6764	4409.	OVFLW	TOV	EXIT	OVERFLOW TEST
77	76	7776	40	0	7772	4410.		TRA	ERROR	
						4411.	*			
						4412.	*			INPUT-OUTPUT ADDRESSES
						4413.	*			
77	77	7777						CHECKSUM		RANGE 4000-7776
			6200			4414.	DLREG	DEFINE	6200	
			2020			4415.	DISC1I	DEFINE	2020	DISCRETE INPUT WORD 1
			2040			4416.	DISC2I	DEFINE	2040	DISCRETE INPUT WORD 2
			2200			4417.	DFDA	DEFINE	2200	
			2001			4418.	SIALD	DEFINE	2001	DEFINE OUTPUT REGISTERS
			2002			4419.	COALD	DEFINE	2002	FOR FDAI ANGLES
			2004			4420.	SIBED	DEFINE	2004	
			2010			4421.	COBED	DEFINE	2010	
			2020			4422.	SIGAD	DEFINE	2020	
			2040			4423.	COGAD	DEFINE	2040	
			6001			4424.	EXD	DEFINE	6001	DEFINE THE ATT ERROR
			6002			4425.	FYD	DEFINE	6002	OUTPUT REGISTERS
			6004			4426.	EZD	DEFINE	6004	
			6200			4427.	TMIDD	DEFINE	6200	
			2600			4428.	SHOUT	DEFINE	2600	
			2500			4429.	SHIN	DEFINE	2500	
			0000			4430.	END			

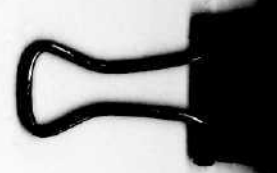
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CHECKSUM CALCULATIONS

RANGE	LOC.	VALUE
0207 - 1004	0206	126003
1005 - 3776	3777	306163
4000 - 7776	7777	225333



SYMBOL DICTIONARY TABLE

10B17	2234	10B4	4229	12B4	2757	16J	192	17J	37
18J	251	1B1	2784	1B11	2210	1B12	2211	1B13	2212
1B14	2213	1B17	2201	1B2	2261	1B3	4348	1B4	2206
1B5	2207	1B6	2208	1B9	2209	1J	233	1J1	204
1J2	X 205	1J3	X 206	1J4	220	1J5	X 221	1J6	X 222
1J7	216	1J7LS	217	1K1	407	1K11	X 409	1K13	X 413
1K14	402	1K18	399	1K19	403	1K20	X 400	1K21	X 404
1K22	X 401	1K23	X 405	1K24	462	1K25	X 2217	1K26	463
1K27	464	1K28	465	1K29	466	1K3	411	1K30	456
1K33	467	1K34	468	1K35	469	1K36	470	1K37	458
1K4	461	1K56	503	1K6	X 408	1K7	4226	1K8	X 412
1K9	455	21J	193	22J	359	23J	360	25B17	618
25J	185	28J1	346	28J2	347	28J3	348	29J	232
2B17	2200	2B3	2203	2J	446	2J1	208	2J2	X 209
2J3	X 210	2J4	224	2J5	X 225	2J6	X 226	2J7	230
2J7LS	231	2K1	471	2K11	393	2K14	178	2K17	457
2K18	345	2K19	190	2K2	472	2K20	349	2K3	177
2K4	504	2PIB3	2216	3B17	2199	3B3	4235	3J	247
3K4	452	3PID4	2218	49B17	2233	4B17	2198	4J	243
4K10	189	4K12	377	4K2	488	4K21	498	4K23	459
4K25	491	4K26	350	4K27	366	4K3	489	4K34	492
4K35	493	4K4	430	4K5	494	4K6	394	4K7	431
4K8	443	5B17	2197	5B3	X 2204	5J	191	5K14	425
5K16	X 426	5K17	X 442	5K18	429	5K20	390	5K26	361
6B17	2196	6B3	2205	6J	244	6K10	386	6K2	353
6K4	352	6K5	490	6K6	389	6K8	241	6K9	450
7B17	2195	7B3	3061	7J	186	8B17	2214	8J	187
9J	188	A11	116	A11BD	300	A11D	142	A11T	262
A12	117	A12BD	X 301	A12D	143	A12T	X 263	A13	118
A13BD	X 302	A13D	144	A13T	X 264	A21	124	A22	125
A23	126	A31	120	A31BD	236	A31D	146	A31S	57
A31T	266	A32	121	A32BD	X 237	A32D	147	A32S	X 58
A32T	X 267	A33	122	A33BD	238	A33D	148	A33S	X 59
A33T	X 268	ABVFC	X 3990	ACCUM	4403	ADDMS	516	ADOUT	4014

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ADST	265	AF	156	AHE	2512	AHE1	2521	AI	155
AL	160	ALPHA	152	ALTUP	1068	ARCTA1	3926	ARCTA2	3949
ARCTAE	3902	AT	81	ATI	4126	ATTERP	2522	B11	22
B12	26	B13SF	515	B13VSF	512	B18SF	511	B21	23
B22	27	B23RSF	514	B23SF	510	B31	24	B32	28
B3SF	513	B41	25	B42	29	BACCSF	344	BACK	2237
BCDL	2235	BM13SF	509	BR1	590	BR2EX	3012	BR50	592
BRANCH	73	C1	382	C2	48	CAL	X 1943	CDCC	2313
CDH	2186	CDH2	2155	CDH3	2159	CI	95	CKSUM	4366
CLADD	580	CLAFR	2239	CLATEN	2240	CLEARM	743	CLEARP	256
CMF	261	COA21	2402	COALO	4419	COBED	4421	CODELL	65
COGA	115	COGAD	4423	COREX	4382	CRSPRD	3583	CSI	X 2102
CSICDH	2086	CSMPV	2867	CSMT1	3124	DA11	134	DA12	X 135
DA13	X 136	DA31	138	DA32	X 139	DA33	X 140	DAX	283
DAXA	395	DAXREM	379	DAY	284	DAYA	396	DAYREM	X 380
DAZ	285	DAZA	397	DAZREM	X 381	DD	260	DDEL	410
DDF	351	DDIN	4098	DEDA	4417	DEDABR	591	DEDAE	733
DEDASC	534	DEL10	440	DEL2	437	DEL20	444	DEL21	445
DEL42	447	DEL5	438	DEL6	439	DELAY	2247	DELH	307
DELP	3317	DELR1	182	DELR2	184	DELR3	183	DELRP	249
DELTA	173	DELTAT	234	DELVG	227	DELVGX	371	DELVGY	X 372
DELVGZ	X 373	DEXIT	741	DIAK1	535	DIAK2	X 536	DIAT	833
DICOS	2358	DIGX	100	DIGY	101	DIGZ	102	DISC1	398
DISC1C	305	DISC1I	4415	DISC2I	4416	DLDC	857	DLIF	428
DLREG	4414	DLSC	52	DLSTQ	588	DLWN	427	DLWNL	502
DOOT	4044	DPDOOT	341	DPOUT	176	DPSQ	3783	DPSQ1	3787
DPSQ2	3804	DPSQ3	3806	DPTSB	3839	DPVMAG	3829	DQSX	64
DRX	96	DRY	X 97	DRZ	X 98	DSP1	1898	DSP2CP	1911
DSPF1	432	DSPLY	3514	DSPLY1	3524	DSPLY2	3542	DSPLY3	3556
DSPLY4	3565	DSPSC	406	DTB	500	DUMCLA	2243	DVGXX	357
DVINT	2428	DVS	2269	DVSX	108	DVSY	109	DVSZ	110
DVX	279	DVXM1	87	DVY	280	DVYM1	88	DVZ	281
DVZM1	89	DXICP	1542	DXFR1	1529	DXFR10	X 1541	DXFR13	1578
DXFR14	1613	DXFRS	1547	F1	130	E13	132	E3	131
EADICS	2751	FLPRD	3690	FLPRD1	3696	ELPRD2	3741	ELPRD3	3759
ENCOM1	926	ENTERP	254	FCNS10	274	EROUT	2544	ERROR	4406

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ESQ	154	FX	82	FX1	2266	EX16	2653	EX17	2671
FX27	3048	FX2R	2954	FX29	2971	EX3	2308	EX30	2992
FX33	3152	FX33P	2059	FX33PP	2076	EX34	3190	EX34P	552
FX35	2069	FX36	3363	FX36P	541	EX37	555	EX4	2356
FX44	3649	FX45	3662	FX46	4032	EX50	4110	EX8	2426
EX9	2451	EXFC	3500	FXEC1	3569	EXEC2	1925	EXEC3	2007
FXEC6	2026	EXFOA	1975	FXECM	1930	EXECM1	1932	EXECM2	2023
EXIT	3854	EXIT1	596	EXIT1C	605	EXIT11	606	EXIT12	607
EXIT13	608	EXIT14	609	EXIT15	610	EXIT16	611	EXIT17	612
EXIT18	613	EXIT19	614	EXIT2	597	EXIT20	615	EXIT21	616
EXIT22	617	EXIT23	619	EXIT24	623	EXIT25	624	EXIT26	629
EXIT27	630	EXIT28	631	EXIT29	636	EXIT3	598	EXIT30	638
EXIT31	639	EXIT32	640	EXIT33	641	EXIT34	642	EXIT35	643
EXIT36	644	EXIT37	645	EXIT38	646	EXIT39	647	EXIT4	599
EXIT40	648	EXIT41	655	EXIT42	656	EXIT43	657	EXIT44	663
EXIT45	664	EXIT46	665	EXIT47	666	EXIT48	667	EXIT49	668
EXIT5	600	EXIT50	669	EXIT51	670	EXIT52	671	EXIT53	672
EXIT6	601	EXIT7	602	EXIT8	603	EXIT9	604	EXO	4424
EY	83	EYEZ	2530	EYD	4425	EZ	84	EZO	4426
FDAI	2639	FDAI1	2032	FDAIL	2708	FLAG1	436	FLAGT	435
FLTR	1083	FLTRA	1098	FLTRB	1133	FLTRC	1169	FLTRD	1213
FLTRF	1227	FLTRF	1246	FLTRG	1265	FLTRH	1285	FLTRI	1289
FLTRJ	1344	FLTRK	1387	FLTRL	1407	FLTRTM	1131	FLTRX	1128
GDLAW	3407	GDLAW3	1752	GDLAW4	1769	GM	X 1511	GRAV	3038
GRAV1	3055	GSESR	3460	GXDT	104	GYCOM	2283	GYDT	X 105
GZDT	X 106	H	269	HDOT	294	HET	758	HMF	257
HOLDP	255	HRC	2483	HRC1	2495	HRF	414	HRINT	2504
HUGH	724	IC1	2818	IC1BR	589	IC2	X 2835	IC3	X 2857
ID1	501	ID1F	433	IDLE	1845	IDRF	434	IMPBK1	3366
IMUDC	X 2808	INCMU7	1958	INIT	3446	INTAS	2385	IR	936
IR1	943	IP2	979	IR3	987	K170	2224	K171	2223
K172	2222	K173	2221	K180	2229	K181	2228	K182	2227
K183	2226	K55	448	KDT	505	KINGK	1468	KSR	3981
L11	417	L12	197	L21	418	L22	X 198	L31	419
L32	199	L41	420	L42	200	LILA	421	LILC	424
LILE	X 422	LILJ	423	LL3DOT	2038	LMORB	X 3077	LMORBI	3117

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LMORB2	1432	LFI	2472	LUNAL	2579	LUNAL1	1042	LUNAZ	3424
M1B1	2296	M25B16	499	MABEE	2017	MAX	4121	MEMSUM	4388
MODCK	X 702	MODF	995	MODE1	1002	MS	2231	MU10	454
MU17	149	MU3	449	MU6	451	MU7	526	MU8	453
MU8S12	290	NAV	X 2882	NAV1	2897	NAVIP	1052	NAV2	2905
NAV3	2915	NAV4	2919	NE	91	NEWDD	1981	NI	90
NMAX	2232	NJC	2726	NCRM	3812	NORM1	3824	NORMV	3609
NORTON	2041	NOTDD	4684	OCTF	40	OCTO	4051	ORBIT3	X 1571
ORBLIN	685	OPBLM	1438	ORBPAP	X 2966	ORBPAP	3630	ORBPAP	3636
ORBRET	537	OUT	1884	OUT1	1873	OVFLT	1887	OVFLW	4409
P	150	P11	476	P12	477	P13	478	P14	479
P21	480	P22	481	P23	482	P24	483	P33	484
P34	485	P43	486	P44	487	PART	362	PDOTM1	337
PDOOT	342	PGNSD1	4192	PGNSD2	4189	PGNSDF	4168	PHIP	107
PI	637	PID2	2219	PID4	2220	PINIT	1200	PITER1	3299
PITER2	3328	PITER3	3333	PMAX	2225	POUT	175	POUTFS	174
PP	172	PSIP	103	PUPDAT	X 1123	Q1	153	Q11	86
Q12	129	QIDFDA	306	Q22	151	Q5	1696	Q7	1804
QA	250	QL	273	QLTELE	308	R	170	RO	169
ROX	165	ROY	X 166	ROZ	X 168	R5X	157	R5Y	X 158
R5Z	X 159	RADOT	370	RANGE	X 1288	RATE	X 1217	RB	229
RCX	275	RCY	X 276	RCZ	X 277	RD2DOT	415	RD3DOT	375
RD3DTL	441	RDOTS	339	RDOTX	45	RDOTY	X 46	RDOTZ	X 47
READP	253	RETURN	3486	REX	161	REY	X 162	REZ	X 163
RF	278	RFDOT	325	RIX	179	RIY	180	RIZ	181
RME	4059	PMF	259	PND	582	RND1	2388	RND2	2505
ROR	4025	RPT	753	FR	252	RRDOT	338	RRSX	194
RRSY	195	RRSZ	196	PRT	2054	RRX	112	RRY	X 113
RRZ	114	RST	2569	RST1	X 978	RSTE	949	RT	164
RVCOMP	2847	PX	270	PY	271	RZ	272	SO	304
S10	314	S11	315	S12	316	S13	X 317	S14	318
S15	X 319	S16	320	S17	321	S507	378	S623	460
S7	313	SDVX	523	SDVY	X 524	SDVZ	X 525	SETFG	4357
SF	39	SF1	826	SFA	820	SFACC	828	SFG	830
SFLO	522	SFL1	527	SFL2	528	SFL3	529	SFL4	533
SFL6	538	SFL7	532	SFL8	531	SFP	814	SFR	824

SFT	816	SFT1	822	SFTEST	767	SFV	818	SHDUM	2230
SHFT1	2389	SHFT2	2506	SHIN	4429	SHOUT	4428	SI	56
SIALO	4418	SIBFO	4420	SICO1	3887	SICO2	3872	SICOF	3861
SIDELL	60	SIGA	111	SIGAO	4422	SINITC	625	SIXTH	2215
SNS	4119	SOFT1	907	SOFT2	1022	SOFT3	920	SOUT	4028
SPULSF	2722	SQRT1	3978	SQRTE	3961	SREFX	33	SREX1	32
SREX2	31	SREFX3	30	STDD	4112	STEER X	1782	STEER1	1792
STEER2	1846	STEER3	1862	STEER4	1868	STEER5	1819	STGCTR	632
STOCOM	2242	SUM	123	SUMLIM	495	T	335	T1	133
TAC	298	TA1	303	TA2	282	TB	336	TBO	286
TBRAKE X	3342	TCLTH	587	TCSM	343	TDEL	245	TE1	387
TE2	391	TFST	4212	THEF	558	THEP	99	THETAF	240
TI	340	TIG	299	TIMEA	3495	TL1	388	TL2	392
TLOS	239	TMCLA	586	TME	4139	TMID	530	TMIDO	4427
TMIE1	673	TMIF2	4157	TMCUT	2238	TMPBR	69	TP	334
TPERG	248	TR	246	TRACOM	2241	TRNSFR	2236	TSO	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	119	TSEFX	141	TVARBR	34	TVTGT	880	UIX	70
U1Y X	71	U1Z	72	U2X	41	U2Y	42	U2Z	43
UBCOMP	696	V	333	VCX	326	VOY X	327	VOZ X	328
V1X	49	V1Y X	50	V1Z X	51	V2X	74	V2Y X	75
V2Z	76	V5X	354	V5Y X	355	V5Z X	356	V6X	61
V6Y	62	V6Z	63	VCX	291	VCY X	292	VCZ X	293
VD1X	309	VD1Y	310	VD1Z	311	VD2X	92	VD2Y X	93
VD2Z X	94	VDX	363	VDY X	364	VDZ X	365	VEX	322
VEY X	323	VEZ X	324	VFX	44	VG	295	VGX	80
VH	329	VHA	358	VHSQ	128	VIX	330	VIY X	331
VIZ X	332	VPO	297	VPY	223	VRUP1	1593	VSMGX	367
VSMGY X	368	VSMGZ X	369	VT	296	VX	287	VY	288
VYO	228	VYDFS	497	VZ	289	W1X	53	W1Y	54
W1Z	55	WRX	383	WBY X	384	WBZ X	385	WCX	66
WCY	67	WCZ X	68	WORDS	496	WRDCNT	137	WRDLP	3468
X3	85	X4	127	XDV	1657	XDV1	1665	XDV2	1674
XDV2P	1692	XDVS	1058	XI	235	XORBV1	3137	XORBV2	3162

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SYMBOL REFERENCE TABLE

6 TSC	565 STO	571 CLA	1233 STO *	1266 MPR	1274 MPR *	1299 STO *	1317 CLZ
	1389 STO	1392 SUZ	1398 STO	1401 SUZ	1409 STO	1412 SUZ	1419 STO
	1422 SUZ	1715 STO	1758 STO	1797 STO	1819 CLZ	1825 ADZ	1826 STO
	1839 MPY *	1888 CLA	2261 STO	2271 CLZ *	2757 CLZ	2764 CLZ	2784 CLA
	2797 CLZ	3056 STO	3061 SUZ	3100 STO	3101 MPZ	3280 STO	3290 CLZ
	3317 CLZ	3486 STO	3490 CLZ	3698 CLA	3712 ADD	3735 ADZ	3765 CLA
	3869 STO	3872 CLA *	3874 STO *	3875 MPR *	3883 MPR *	3884 STO *	3893 STO
	3980 STO	3984 ADZ	4226 STQ	4229 SUB	4230 STQ	4235 LDQ	4240 SUB
	4262 STO *	4284 SUZ *	4286 ADZ *	4296 CLA	4301 STO	4303 CLA	4304 SUB
	4307 MPY	4313 ADD	4346 ADD	4348 DVP	4349 STQ	4351 SUB	
	7 TS1	890 STO	896 ADZ	909 STO	914 CLZ	1238 STO	1269 MPR
1310 CLA		1316 STO	1322 SUB	1349 STO	1354 ADD	1362 STO	1368 SUB
1708 STO		1714 SUZ	1726 STO	1729 ADZ	1750 STO	1756 DVP	1820 CLZ
1829 ADZ		1830 STO	1871 STO	1876 ADZ	1877 STO	1880 ADZ	2034 STO
2104 STO		2108 CLA	2141 MPR	2143 STO	2146 SUB	2263 STO	2318 STO
2358 CLA		2390 STO	2396 ADZ	2404 STO	2407 SUZ	2412 STO	2415 SUZ
2420 STO		2423 SUZ	2431 STO	2434 ADZ	2435 STO	2438 ADZ	2507 STO
2584 STO		2588 MPY	2596 MPY	2610 STO	2615 SUZ	2621 STO	2625 SUZ
2645 STO		2648 ADZ	2676 STO	2679 SUZ	2685 STO	2688 SUZ	2712 STQ
2719 ADZ		2755 CLZ	2762 CLZ	2778 CLA	2789 CLZ	2905 CLZ	2909 ADZ
2910 STO		2927 STO	2950 CLZ	2999 STQ	3002 CLZ	3113 STO	3116 DVP
3168 STO		3171 SUZ	3177 STO	3180 SUZ	3199 STO	3224 ADZ	3256 STO
3259 SUZ		3301 STO	3310 CLZ	3347 STO	3350 CLA	3353 CLZ	3355 STO
3359 CLZ		3429 STO	3433 DVP	3438 DVP	3657 STO	3661 DVP	3669 STO
3680 MPZ		3681 STO	3684 DVP	3701 CLA	3719 ADD	3729 MPY	3771 CLA
3784 CLZ		3789 ADZ	3791 STO	3800 CLZ	3803 STO	3807 STO	3816 CLA
3819 STO		3833 CLZ	3843 STO	3850 ADZ	3863 STO	3866 STO	3868 SUB
3888 STO		3896 STO	3905 STO	3909 ADD	3913 CLZ	3915 STO	3920 ADD
3924 CLA		3941 STO	3944 CLA	3947 SUB	3952 SUB	3954 CLA	3962 STO
3970 CLA		3973 STQ	3981 LDQ	4040 STQ	4041 CLZ	4047 STQ	4048 CLZ
4237 STQ	4239 SUB	4247 STQ	4249 ADD	4281 ADZ	4308 STQ	4309 ADD	
8 TS2	1237 CLZ	1241 STO	1247 MPR *	1251 MPR *	1255 MPR *	1259 MPR *	1305 ADZ

	1711 STO	1716 CLZ	1821 CLZ	1833 ADZ	1834 STO	2107 STO	2115 ADD
	2126 SUB	2142 ADD	2265 STO	2326 STO	2362 CLA	2591 STO	2599 ADZ
	2600 STO	2603 ADZ	2631 ADZ	2632 STO	2650 STO	2654 CLA	2660 DVP
	2667 DVP	2925 STO	2940 CLZ	3206 STO	3209 SUZ	3215 STO	3218 SUZ
	3275 STO	3295 CLA	3307 DVP	3311 MPY	3356 STQ	3360 LDQ	3743 STO
	3746 ADZ	3751 STO	3754 ADZ	3785 CLZ	3793 CLZ	3795 STO	3799 STO
	3814 LDQ	3846 STO	3849 SUZ	3876 STO	3879 MPR	3881 MPR	3921 STO
	3928 DVP	3953 STO	3967 CLZ	3978 STO	3983 DVP	3994 STO	3998 SUZ
	4003 STO	4007 ADZ	4081 STO	4096 ADZ	4113 CLZ	4250 STQ	4251 ADD
	4272 ADZ	4316 STQ	4319 ADD	4323 STQ	4324 SUB	4327 STQ	4328 ADD
9 TS3	560 ADZ	563 STQ	1244 STO	1446 STO	1489 CLZ	1502 ADD	1503 STO
	1578 CLZ	1587 ADZ	1588 STO	2338 STO	2366 CLA	2781 STO	2794 CLZ
	2937 STO	2945 CLZ	3239 STO	3320 STO	3324 CLZ	3332 STO	3335 ADZ
	3715 STO	3742 MPR	3792 STQ	3794 ADZ	3903 CLA	3942 CLA	3999 STO
	4278 SUZ *	4331 STO	4332 MPR	4333 DVP	4337 ADD	4339 SUB	
10 TS4	561 LDQ	562 STO	1086 STO *	1135 STO	1138 ADZ	1142 STO	1145 ADZ
	1303 STO *	1357 STO *	1371 ADD *	1373 STO *	1450 STO	1484 STO *	1490 CLZ
	1495 ADD	1496 STO	1583 STO *	1592 CLZ	1596 ADZ	1597 STO	1668 STO *
	1697 STO	1709 CLA *	2139 STO	2175 STQ\$	2180 STO	2182 STQ\$	2341 STO
	2370 CLA	2783 STO	2786 ADZ	2796 STO	2799 SUZ	2929 STO	2932 ADZ
	2974 STO *	3030 STO *	3140 STO *	3251 STO	3384 STO *	3400 STO *	3584 CLA\$
	3587 CLA\$	3591 CLA	3594 CLA\$	3598 CLA\$	3601 CLA	3787 CLA *	3788 MPY *
	3906 CLA	3911 CLA	3916 CLZ	3918 STO	3925 SUB	3951 CLA	3955 ADD
	3992 MPR\$	3995 CLA	4000 CLA	4004 CLA\$	4008 STO	4266 CLZ	4274 ADD *
11 TS5	1377 CLA	1698 CLZ	2110 STO	2118 SUB	2123 STO	2175 STO	2347 STO
	2374 CLA	2756 STO	2774 MPR	2785 MPR	2795 MPZ	3587 CLA	3598 CLA
	3923 STO	3940 ADD	3950 STO	4269 MPZ			
12 TS6	1318 ADZ	1380 CLA	2150 CLZ	2182 STO	2294 STO	2299 CLZ	2355 STO
	2378 CLA	2758 STO	2770 MPR	2782 MPR	2798 MPZ	3584 CLA	3594 CLA
	3929 STO	3930 MPY	3939 MPR	3992 MPR	4004 CLA	4345 LDQ	
13 TS7	1383 CLA	1434 CLZ	2120 STO	2132 DVP	2161 STO	2167 DVP	2324 STO

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2339	CLZ	2765	STO	2769	CLA	2773	CLA	2790	MPZ	3053	STO	3059	MPR
3084	STO	3091	MPY	3368	STO	3371	ADZ	3377	STO	3380	ADZ	3465	STO
3479	CLZ	3586	STO	3589	SUZ	3593	STO	3596	SUZ	3600	STO	3603	SUZ
3691	CLZ	3706	CLZ	3723	STO	3745	MPR	3760	STO	3931	STO	3934	MPY
3936	MPY	4270	SUZ										

14 TS10

22	FQU	517	CLA *	1139	STO *	1171	ADD *	1267	STO	1270	ADZ	1482	STO *
1492	CLZ *	1556	CLZ *	1585	STO *	1594	CLA *	1700	STO	1710	SUB *	1727	CLA *
1800	STO *	1802	MPR	1869	CLA	1914	STQ	1920	ADZ	2127	STO	2130	ADD
2304	STO *	2313	CLA	2319	CLA	2346	SUB	2348	CLA	2349	MPR	2497	STO *
2977	STO *	2983	CLZ *	3057	CLZ *	3093	STO	3107	MPR	3137	CLA *	3544	STO
3550	ADZ	3585	MPR\$	3588	MPR\$	3592	MPR\$	3595	MPR	3599	MPR	3602	MPR\$
3624	STO *	3695	STO	3716	CLZ	3761	CLA	3991	CLA	3996	MPR\$	4001	MPR
4005	MPR\$												

15 TS11

23	FQU	1164	CLA	1166	STQ	1702	STO	1851	CLA	1855	CLA	1861	STO
1862	CLA	1863	MPR	1878	CLA	2133	STO	2140	CLA	2314	MPY	2325	SUB
2327	CLA	2328	MPR	2340	ADD	2342	CLA	3095	STO	3114	CLZ	3196	STO
3197	MPY	3207	CLA	3216	CLA	3246	CLZ	3585	MPR	3602	MPR	3631	CLZ
3646	ADZ	3647	STO	3696	STO	3717	SUZ	3762	SUB	3778	ADZ		

16 TS12

24	FQU	545	CLA	1182	CLA	1867	STO	1874	CLA	1884	CLA	2080	STO
2317	ADD	2320	MPY	2331	CLA	2332	MPR	2343	MPY	3096	STQ	3115	LDQ
3204	STO	3213	CLA	3247	ADZ	3358	STO	3378	CLA	3588	MPR	3592	MPR
3632	CLZ	3642	ADZ	3643	STO	3652	MPY	3705	STO	3725	MPR	3733	CLA
3738	DVP	3777	DVP	3996	MPR	4005	MPR	4177	STO	4180	CLZ	4207	CLZ

17 TS13

25	FQU	547	CLA	1186	CLA	1568	CLA	2052	CLA	2082	STO	3044	CLZ
3068	ADZ	3069	STO	3102	STO	3108	ADZ	3134	CLZ	3142	ADZ	3143	STO
3228	STO	3243	ADZ	3245	STO	3249	ADZ	3352	STO	3366	CLA	3618	STO
3623	DVP	3633	CLZ	3638	ADZ	3639	STO	3682	CLZ	3700	STO	3703	SUZ
3732	STO	3750	MPR	3764	STO	3774	ADZ						

18 TS14

26	FQU	1146	STO *	1165	LDQ	1167	STO	1177	ADD *	1497	CLZ *	1550	STO *
1732	STO *	1738	STO	1753	CLA *	1759	CLA *	1803	STO	1847	SUZ	1848	STO
1865	ADZ	2048	STO *	2084	STO	3041	STO *	3079	STO	3083	SUB	3103	CLZ

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	3131 STO *	3154 CLAS	3162 CLZ *	3231 STO	3267 DVP	3362 STO	3369 CLA
	3590 STO	3597 STOS	3604 STOS	3612 CLA *	3613 MPR *	3620 CLA *	3726 STO
	3730 DVP	3770 STO	3773 ADZ				
19 TS15	27 FQU	1850 STO	1853 SUB	1857 CLA	1859 CLA	3080 STQ	3104 LDQ
	3154 CLA	3233 STO	3238 MPR	3260 MPY	3597 STO		
20 TS16	28 FQU	1187 ADD	3253 STO	3263 ADZ	3264 STO	3272 MPZ	3604 STO
21 TS17	29 FQU	1192 CLA	3052 DVP	3610 CLZ	3614 ADZ	3615 STO	3739 STO
	3753 MPR						
22 B11	1355 STO *	1387 CLA					
23 B21	1396 CLA						
24 B31	1407 CLA						
25 B41	1417 CLA						
26 B12	1369 STO *	1390 CLA					
27 B22	1399 CLA						
28 B32	1410 CLA						
29 B42	1420 CLA						
30 SREX3	3038 STQ	3073 TRA	3832 STO	3835 TRA			
31 SREX2	3609 STQ	3626 TRA	3630 STQ	3686 TRA	3690 STQ	3758 TRA	3829 STQ
	3854 STQ	3855 TRA	4147 STO	4153 TRA			
32 SREX1	1980 TRA	1983 STO	2751 STQ	2802 TRA	3812 STQ	3823 TRA	3969 STO
	3986 TRA	3990 STQ	4010 TRA	4152 STO	4201 STO	4209 TRA	
33 SREX	582 STQ	585 TRA	673 STQ	681 TRA	724 STQ	728 TIX *	1979 STQ

	2522 STQ	2541 TRA	2575 STO	2708 STQ	2720 TRA	3583 STQ	3605 TRA
	3783 STQ	3805 TRA	3808 TRA	3839 STQ	3852 TRA	3862 STQ	3886 TRA
	3902 STQ	3945 TRA	3948 TRA	3961 STQ	3966 TRA	4139 STQ	4142 TMI
	4147 STQ\$	4152 STQ\$	4153 TRA\$	4168 STQ	4171 TRA	4174 TMI	4181 TMI
	4185 TMI	4191 TRA	4201 STQ\$	4209 TRA\$	4388 STQ	4396 TRA	
34 TVARRR	53 STQ	55 TSQ	58 CLA	3451 STQ\$	3453 STQ	3454 TSQ	3455 CLA
	3467 STQ	3481 STQ	3482 TRA	3484 TSQ	3487 CLZ	3489 STQ	4361 STQ
	4390 TSQ	4393 CLA					
39 SF	831 STQ	4034 MPR	4111 DVP				
40 OCTF	4030 CLA	4062 CLZ	4085 STQ				
41 U2X	44 EQU	45 EQU	2094 MPR *	3138 STQ *	3141 MPR *	3169 CLA *	3178 CLA *
	3367 MPZ *						
42 U2Y	46 EQU						
43 U2Z	47 EQU						
44 VFX	3374 STQ *	3399 CLA *					
45 RDOTX	1104 STQ *	1230 SUB *					
46 RDOTY	NOT USED						
47 RDOTZ	NOT USED						
48 C2	2065 SUB	3151 STQ	3158 CLZ	3160 STQ	3164 DVP	3173 DVP	3182 DVP
	3211 DVP	3220 DVP	3237 ADD				
49 V1X	1493 STQ *	1689 MPR *	1875 MPR *	3174 STQ *	3379 MPR *		
50 V1Y	NOT USED						
51 V1Z	NOT USED						

69	TMPBR	748 CLZ	3507 STO						
70	UIX	60 TMI	1077 MPY *	1109 CLA *	1110 MPR *	1116 CLA	1483 CLA *	1501 MPR *	
		1557 STO *	1584 CLA *	1682 MPR *	1870 MPR *	3058 STO *	3067 MPR *	3139 CLA *	
		3166 CLA *	3175 CLA *	3376 MPR *					
71	UIY	NOT USED							
72	UIZ	1117 MPR							
73	BRANCH	749 STO	1926 STO	1987 STO	2024 STO	2448 TMI	3500 STO	3506 CLZ	
		3509 STO	3578 STO						
74	V2X	80 EQU	3183 STO *	3370 MPZ *					
75	V2Y	NOT USED							
76	V2Z	52 CLA							
80	VGX	1669 STO *	1679 CLA *	1814 CLA *	3383 STO *				
81	AT	1741 SUB	1796 DVP	2890 STO	2956 SUB	2959 STO	3415 DVP		
82	EX	901 CLZ *	958 ADZ	959 STO	1018 ADZ	1019 STO	1949 MPY *	1954 MPR *	
		2527 ADZ	2528 STO	2546 CLZ *	2550 STO *	2558 ADZ *	2559 STO *		
83	EY	968 ADZ	969 STO	971 CLA	975 CLZ	977 STO	1013 ADZ	1014 STO	
		2538 ADZ	2539 STO	2562 CLA					
84	EZ	974 STO	1004 ADZ	1005 STO	2533 ADZ	2534 STO	2564 CLA		
85	X3	86 EQU	3221 STO	3222 MPY	3235 SUB	3240 CLA	3258 MPR	3348 MPZ	
86	Q11	1281 STO	1307 STO	1321 MPR	1365 MPY				
87	DVXM1	885 CLA *	2270 STO *						

88 DVYM1		2618 ADD						
89 DVZM1		2612 ADD						
90 NI		91 EQU 3728 MPR	574 DVP	1456 DVP	2990 DVP	3673 STO	3693 MPR	3722 DVP
91 NE		2114 MPR	2137 MPR	2148 DVP				
92 VD2X		883 ADZ *	884 STO *	887 ADZ *	888 STO *	893 ADZ *	894 STO *	
93 VD2Y	NOT USED							
94 VD2Z	NOT USED							
95 CI		1449 CLA	3678 STO	3699 MPR	3709 CLA	3772 MPR		
96 DRX		2860 CLZ *	2933 ADZ *	2934 STO *	2948 ADZ *	2949 STO *		
97 DRY	NOT USED							
98 DRZ	NOT USED							
99 THEP		2249 STO	2752 CLA					
100 DIGX		2862 STO * 3065 STO *	2897 CLZ	2921 ADZ *	2922 STO *	2943 ADZ *	2944 STO *	3064 ADZ *
101 DIGY		2898 CLZ						
102 DIGZ		2899 CLZ						
103 PSIP		2253 STO	2759 CLA					
104 GXDT		2861 CLA *	3055 CLZ *	3060 STO *	3063 ADD *			

105 GYDT	NOT USED								
106 GZDT	NOT USED								
107 PHIP		2251 STO	2766 CLA						
108 DVSX		1059 CLA *	2441 ADZ *	2442 STO *	2859 CLZ *	2907 CLA *	2915 CLZ	2920 CLZ *	
109 DVSY		2916 CLZ							
110 DVSZ		2917 CLZ							
111 SIGA		2036 MPR	2661 STO	2675 MPR	2684 MPR				
112 RPX		845 CLA *	1085 STO *	1098 CLA *	1294 CLA *	1298 MPR *			
113 RRY	NOT USED								
114 PRZ		1311 MPR							
115 COGA		2033 MPR	2668 STO	2678 MPR	2687 MPR				
116 A11		686 CLZ *	690 STO	966 CLA *	1003 MPR *	1012 MPR *	1824 MPR *	2019 CLA *	
		2367 MPR *	2371 MPR *	2395 CLZ *	2397 STO *	2413 CLA	2418 CLA	2429 CLA *	
		2517 CLA *	2686 CLA	2727 CLA *	2728 MPR *	2735 CLA *	2811 STO *	4159 CLA *	
117 A12		723 CLA	2402 CLA	2421 CLA					
118 A13		2405 CLA	2410 CLA	2683 CLA					
119 TSB		2330 STO	2334 ADD	2351 ADZ	3972 STO	3975 ADD	3982 CLA		
120 A31		843 CLA *	956 MPR *	1494 MPR *	1500 CLA *	1832 MPR *	2363 MPR *	2379 MPR *	
		2411 MPR	2422 MPR	2436 CLA *	2536 MPR *	2579 CLA	2580 MPR	2601 CLA	
		2607 CLA	2646 CLA	2647 MPR	2658 CLA	2731 CLA *	2732 MPR *	2736 MPR *	

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	3424 CLA	3425 MPR	4161 CLA *					
121 A32	719 CLA	2406 MPR	2419 MPR	2639 CLA	3431 CLA			
122 A33	691 STO	2403 MPR	2414 MPR	2643 CLA	2644 MPR	2665 CLA	3436 CLA	
123 SUM	51 CLZ 4392 STO	56 ADZ	57 STO	61 CLZ	4359 CLZ	4367 CLZ	4391 ADZ	
124 A21	1016 MPR * 2525 MPR *	1828 MPR * 2532 MPR *	2032 CLA 2602 MPR	2359 MPR * 2622 CLA	2375 MPR * 2677 CLA	2409 STO	2432 CLA *	
125 A22	721 CLA	2417 STO	2590 MPR					
126 A23	2035 CLA	2425 STO	2598 MPR	2674 CLA				
127 X4	128 EQU	129 EQU	3212 STO	3234 CLA	3241 MPR	3255 MPR	3351 MPZ	
128 VHSQ	1435 STO	1622 ADD	1773 SUZ					
129 Q12	1223 CLZ	1314 STO	1315 MPR	1346 MPY	1359 MPY			
130 F1	2337 ADZ 2805 CLZ	2498 CLZ *	2500 STO *	2729 ADZ	2730 STO	2744 SUZ *	2746 STO *	
131 F3	2354 ADZ	2733 ADZ	2734 STO	2806 CLZ				
132 F13	2323 SUZ	2737 ADZ	2738 STO	2741 STO	2807 CLZ			
133 T1	849 SUB	1212 STO	1309 STO					
134 DA11	687 CLZ * 2387 CLA * 2504 CLA *	2360 ADZ * 2393 ADZ * 2812 CLZ *	2361 STO * 2394 STO *	2364 ADZ * 2473 CLZ *	2365 STO * 2475 STO *	2368 ADZ * 2491 CLZ *	2369 STO * 2493 STO *	
135 DA12	NOT USED							

136 DA13	NOT USED							
137 WRDCNT		54 CLZ	70 CLZ	72 STO	4389 CLZ	4397 CLZ	4399 STO	
138 DA31		2372 ADZ *	2373 STO *	2376 ADZ *	2377 STO *	2380 ADZ *	2381 STO *	
139 DA32	NOT USED							
140 DA33	NOT USED							
141 TSEX		1522 STO	2042 STO	2053 TRA				
142 A11D		2020 STO *	2518 STO *	2531 CLA *	2535 CLA *	2572 STO *	2772 STO	2810 CLA *
143 A12D		2763 STO	2779 MPR					
144 A13D		2777 STO						
146 A31D		2524 CLA *	2788 STO					
147 A32D		2793 STO						
148 A33D		2801 STO						
149 MU17		1123 CLZ	1126 STO					
150 P		151 FQU 3333 CLZ	1544 STO 3336 STO	3192 CLA 3345 DVP	3200 CLA 3354 MPY	3262 DVP	3265 CLA	3299 CLA
151 Q22		1225 STO	1320 STO	1351 MPY				
152 ALPHA		3268 STO	3271 MPR	3394 MPR				
153 Q1		154 FQU	2071 CLZ	3395 STO				
154 FSQ		3226 STO	3389 CLZ					

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155 AI		156 EQU 3679 CLA	1458 CLA 3713 MPY	3663 STO 3727 CLA	3667 DVP	3672 DVP	3674 CLA	3677 DVP
156 AE		2105 DVP	2134 MPR	2158 ADD				
157 R5X		1548 STO *	1580 SUB *					
158 R5Y	NOT USED							
159 P5Z	NOT USED							
160 AL		1644 STO	1650 SUB	1654 CLA	2159 STO	2162 CLA	2164 ADD	
161 REX		1562 CLA *	2869 STO *	2973 CLA *				
162 REY	NOT USED							
163 REZ	NOT USED							
164 RT		2087 CLA	3135 STO	3201 SUB	3203 DVP	3254 CLA	3361 DVP	
165 ROX		1440 STO * 3645 MPR *	1563 STO * 3741 CLA *	2823 STO * 3749 CLA *	2852 ADZ *	2975 STO *	3636 CLA *	3644 CLA *
166 ROY	NOT USED							
168 ROZ	NOT USED							
169 RO		3651 STO	3658 CLA	3675 SUB	3714 DVP	3724 CLA		
170 R		1076 STO 3045 STO	1092 DVP 3088 CLA	1093 DVP 3089 MPR	1094 DVP 3097 DVP	1731 ADD *	1772 DVP	1775 DVP
171 Y		1448 STO	1454 ADZ	1472 ADZ	1473 STO			
172 PP		173 EQU	3300 SUZ	3334 STO				

173 DELTA	1263 CLZ 1361 DVP	1276 ADZ 1367 DVP	1277 STO	1280 STO	1323 STO	1348 DVP	1353 DVP
174 POUTFS	3532 DVP	3536 DVP					
175 POUT	1903 STO	3521 CLZ	3534 CLA	3541 STO	3556 CLA		
176 DPOUT	3522 ADD	3533 STO	3539 CLZ				
177 2K3	3119 CLA						
178 2K14	1543 ADD	3328 CLA					
179 PIX	182 EQU 3130 CLA *	1469 STO * 3748 STO *	1547 CLZ *	1579 CLA *	2047 CLA *	2841 CLZ *	3021 CLZ *
180 PIY	183 EQU						
181 PIZ	184 EQU						
182 DELR1	1219 STO	1293 STO *	1356 MPR				
183 DELR3	1332 MPR	1336 MPY					
184 DELR2	1370 MPY						
185 25J	1071 CLA	1074 CLA	1095 STO	1113 MPR	1119 MPZ		
186 7J	1643 ADD						
187 8J	1649 CLA	1652 CLA					
188 9J	1645 SUB	1647 CLA					
189 4K10	1641 CLA						

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190 2K19		3322 SUB	3326 CLA	3330 CLA			
191 5J		1075 ADD	1432 SUB	1459 SUB	1736 SUB	2072 SUB	3046 SUB
192 16J		1737 SUB					
193 21J		1782 CLA					
194 RRSX		197 EQU	846 STO *	1292 SUB *			
195 RRSY		198 EQU					
196 RRSZ		199 EQU					
197 L12		1235 CLZ *	1329 STO *	1345 CLA *	1363 CLA *	1391 MPR *	1400 MPR *
198 L22	NOT USED						
199 L32		1411 MPR *					
200 L42		588 STO	1421 MPR				
204 1J1		502 STO\$	588 STO\$	2822 CLZ *			
205 1J2	NOT USED						
206 1J3	NOT USED						
208 2J1		861 STO *	2868 CLZ *				
209 2J2	NOT USED						
210 2J3	NOT USED						
216 1J7		868 STO	2827 CLZ				

217	1J7LS	869 STQ	2829 CLZ						
220	1J4	859 STQ *	2824 CLZ *						
221	1J5	NOT USED							
222	1J6	NOT USED							
223	VPY	1546 CLZ	1554 ADZ	1555 STQ					
224	2J4	863 STQ *	2870 CLZ *						
225	2J5	NOT USED							
226	2J6	NOT USED							
227	DELVG	1037 SUB	1838 STQ						
228	VY0	1466 CLZ 2181 CLA	1478 ADZ	1479 STQ	1619 CLA	1621 MPR	1701 CLA	1911 CLA	
229	RB	1626 SUB	1639 CLA	1735 STQ					
230	2J7	873 STQ	2873 CLZ						
231	2J7LS	874 STQ	2875 CLZ						
232	29J	1211 CLA							
233	1J	2111 CLA							
234	DELTAT	850 STQ	1337 DVP						
235	XI	1506 STQ							
236	A318D	1010 STQ *	1011 CLA *	1015 CLA *	1101 STQ *	1105 MPR *	1228 MPR *	1239 CLA	

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1300 CLA * 1301 MPR *

237 A32BD	NOT USED							
238 A33BD		1242 CLA						
239 TLOS		240 FQU	1603 STO					
240 THETA F		570 STO	1642 MPR	2128 CLA				
241 6K8		1279 ADD						
243 4J		550 SUB	2076 CLZ					
244 6J		1534 ADD						
245 TDEL		1520 CLZ 1574 ADD	1528 STO 1605 SUB	1529 CLA	1533 CLA	1536 CLZ	1538 STO	1540 CLA
246 TR		1535 STO	1604 CLA	1609 ADD				
247 3J		1610 SUB						
248 TPERG		1457 STO						
249 DELRP		2090 STO	2136 SUB	2155 CLA				
250 QA		1462 STO						
251 18J		1285 CLA	1290 MPR	1430 CLZ				
252 RR		1089 STO	1100 DVP	1232 DVP				
253 READP		746 CLZ *	753 CLZ	2054 CLZ	2722 STO *			
254 ENTERP		755 CLZ						

255	HOLDP	758	CLZ						
256	CLEARP	733	CLZ						
257	HMF	739	CLA	761	STO				
259	RMF	737	CLA	762	CLZ	2057	STO	4059	STO
260	DD	1984	CLA	4025	STO	4033	CLA	4051	LDQ
		4105	STO	4108	ADZ	4112	STO	4116	CLZ
261	CMF	735	CLA	743	STO	4061	CLZ	4086	CLA
								4098	CLA
262	A11T	4160	STO	*				4092	ADZ
									4094
263	A12T	NOT USED							
264	A13T	NOT USED							
265	ADST	834	CLA	1982	ADD	1988	CLA	4014	CLA
		4082	CLA					4067	STO
								4075	ADZ
266	A31T	4162	STO	*					4077
267	A32T	NOT USED							
268	A33T	NOT USED							
269	H	1783	SUB	1902	CLA	3047	STO		
270	RX	1079	STO	*	1084	SUB	*	1375	ADD
		2853	STO	*	2938	ADZ	*	2939	STO
								1376	STO
								3040	CLA
								1439	CLA
								1468	CLA
									2842
271	RY	1333	ADD	1334	STO				
272	RZ	1378	ADD	1379	STO				

273 QL	274 FQU	3117 STO					
274 EONSIO	924 STO						
275 RCX	1083 CLA *	3022 STO *					
276 RCY	NOT USED						
277 RCZ	NOT USED						
278 RF	558 CLA 3193 SUB	1542 STO 3195 DVP	1640 STO 3257 CLA	1734 STO 3357 DVP	2088 SUB	2160 MPR	2163 SUB
279 DVX	715 ADD *	881 CLA *	2269 CLZ *	2277 STO *	2430 MPR		
280 DVY	2433 MPR	2617 CLA					
281 DVZ	2437 MPR	2611 CLA					
282 TA2	3847 CLA	4131 STO					
283 DAX	2255 STO	2283 CLZ *	2286 STO *	2300 ADZ *	2302 STO *	2496 CLA *	
284 DAY	2257 STO						
285 DAZ	2259 STO						
286 TBD	1706 MPR 1749 MPR	1713 DVP 3419 STO	1721 MPR	1724 MPR	1730 MPR	1747 CLA	1748 MPR
287 VX	1103 SUB * 2926 ADD *	1381 ADD 2930 CLZ *	1382 STO 2951 STO *	1441 CLA * 3029 CLA *	1474 CLA * 3066 CLA *	2844 STO *	2849 STO *
288 VY	1338 ADD	1339 STO					
289 VZ	1384 ADD	1385 STO					

290 MU8S12		677 STO						
291 VCX		1102 CLA *	3024 STO *					
292 VCY	NOT USED							
293 VCZ	NOT USED							
294 HDOT		1786 SUB	1904 CLA	3072 STO	3077 CLA	3078 MPY		
295 VG		555 ADD 3388 STO	1672 STO 3408 CLA	1789 STO 3411 MPR	1807 CLA 3413 MPY	1816 DVP	1837 CLA	2184 STO
296 VT		297 EQU	2070 STO					
297 VP0		2152 STO						
298 TAC		2149 STO	2186 CLZ					
299 TIG		1525 CLA	1532 STO	2112 SUB	2187 ADD	2188 STO		
300 A11BD		967 MPR * 2571 CLA *	1009 CLA *	1817 STO *	1823 CLA *	1827 CLA *	1831 CLA *	1881 STO *
301 A12BD	NOT USED							
302 A13BD	NOT USED							
303 TAI		848 CLA 4134 STO	1308 CLA	1526 SUB	1531 ADD	3495 CLZ	3497 STO	3840 CLA
304 SO		648 CLZ 1974 CLZ	702 CLA 2007 CLA	907 CLA 2015 STO	995 CLA 2030 STO	1024 CLA	1039 CLZ	1932 CLA
305 DISC10		943 CLA	963 CLA	989 CLA	2457 STO	2463 CLA		

324 VEZ	NOT USED							
325 RFDOT		1629 STO 2122 SUB	1635 SUB 2154 STO	1638 STO 2173 SUB	1696 CLA 3349 STO	2091 CLZ 3375 CLA	2096 ADZ	2097 STO
326 VCX		1442 STO * 3641 MPR *	1565 STO * 3744 CLA *	2825 STO * 3752 CLA *	2848 CLZ *	2978 STO *	3637 MPR *	3640 CLA *
327 VCY	NOT USED							
328 VOZ	NOT USED							
329 VH		3086 STO						
330 VIX		1475 STO * 3023 CLZ *	1549 CLZ * 3373 SUB *	1581 STO * 3756 STO *	1586 MPR *	1595 MPR *	2093 CLA *	2843 CLZ *
331 VIY	NOT USED							
332 VIZ	NOT USED							
333 V		3033 STO	3081 CLA	3082 MPR				
334 TP		3274 SUB	3276 ADZ	3277 STO	3279 SUB			
335 T		1606 STO	3278 CLA					
336 TB		1572 CLA	1607 CLA	2877 CLZ	2993 CLA	3018 STO		
337 PDOTM1		3525 SUZ	3529 STO					
338 RRDOT		851 CLA	1096 CLZ	1107 ADZ	1108 STO	1227 CLA		
339 RDOTS		852 STO	1218 SUB					
340 TI		549 CLA	575 ADD	1611 STO	2041 STO	2850 MPY	3692 CLA	3851 STO

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341	DPDOUT	3519	ADD	3527	STO								
342	PDDOUT	3518	CLZ	3520	STO	3524	STO	3528	CLA	3542	CLA	3545	CLA
343	TCSM	1573	SUB	1576	SUB	1608	SUB	2991	STO	2994	SUB	2996	CLA
344	BACCSF	828	CLA										
345	2K18	3297	SUB										
346	28J1	1675	CLA	1688	CLA	1872	CLA	2063	STO	2170	STO	2179	CLA
347	28J2	1684	CLA										
348	28J3	1681	CLA	2174	STO								
349	2K20	3292	SUB										
350	4K26	1036	CLA										
351	DDF	839	STO	1928	CLZ								
352	6K4	1208	CLA										
353	6K2	1205	CLA										
354	V5X	357	EQU	1551	STO *	1558	MPR *	3382	SUB *				
355	V5Y	NOT USED											
356	V5Z	NOT USED											
357	DVGXX	1666	CLA *	1692	STO *								
358	VHA	1569	STO	1624	STO	2125	DVP	2169	SUB				

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359 22J		1785 CLA						
360 23J		1634 CLA	1637 CLA					
361 5K26		1808 SUB						
362 PART		3316 STO	3318 MPY					
363 VDX		627 STO	1055 SUB	1065 STO *	1841 ADD *	2885 SUB		
364 VDY	NOT USED							
365 VDZ	NOT USED							
366 4K27		625 CLA						
367 VSMGX		899 ADD *	1842 STO *					
368 VSMGY	NOT USED							
369 VSMGZ	NOT USED							
370 RADOT		1545 CLZ	1560 ADZ	1561 STO	1699 CLA	2121 CLA	2153 CLA	2172 CLA
371 DELVGX		900 STO *	1034 SUB					
372 DELVGY	NOT USED							
373 DELVGZ	NOT USED							
374 17J		1213 CLA	1217 CLZ					
375 RD3DOT		1705 CLA *	1720 MPR *	1757 ADZ *	1761 STO *	2039 STO *		
376 YD3DOT	NOT USED							

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377 4K12	1740 CLA							
378 S507	1006 CLA							
379 DAXREM	697 ADZ 2290 STO *	698 STO 2297 ADZ *	726 ADZ * 2298 STO *	727 STO *	1951 ADZ *	1952 STO *	2289 ADZ *	
380 DAYREM	NOT USED							
381 DAZREM	NOT USED							
382 C1	3146 STO	3147 MPR	3167 MPR	3179 MPR	3205 MPR	3217 MPR	3250 ADD	
383 WBX	955 CLA *							
384 WBY	NOT USED							
385 WBZ	NOT USED							
386 6K10	1302 MPR							
387 TE1	2874 STO	3000 ADZ	3001 STO	3009 CLZ	3011 STO	3841 SUB *		
388 TL1	2828 STO							
389 6K6	1335 CLA							
390 5K20	1739 LDQ							
391 TE2	2876 STO	3003 ADZ	3004 STO	3008 STO	3844 CLA *			
392 TL2	2830 STO							
393 2K11	1676 SUB	2062 CLA	2069 CLA					
394 4K6	1630 SUB	1632 CLA						

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395 DAXA		1975 CLZ	2301 ADD *	2606 STO	2628 CLA *
396 DAYA		1042 CLZ	1044 STO	1976 CLZ	2616 STO
397 DAZA		1045 CLZ	1047 STO	1977 CLZ	2626 STO
398 DISC1		926 CLA	936 CLA	983 CLA	2460 STO
399 1K18		2274 MPR *			
400 1K20	NOT USED				
401 1K22	NOT USED				
402 1K14		696 MPP			
403 1K19		1968 ADZ *	1969 STO *	2276 ADD *	
404 1K21	NOT USED				
405 1K23	NOT USED				
406 DSPSC		2832 CLZ	3514 CLZ	3565 STO	
407 1K1		1955 ADZ *	1956 STO *	2288 ADD *	
408 1K6	NOT USED				
409 1K11	NOT USED				
410 DDEL		2586 MPR	2593 MPR		
411 1K3		2287 MPR *			
412 1K8	NOT USED				

413 1K13	NOT USED							
414 HPF		2310 CLZ	2385 CLA	2483 CLA	2489 STO			
415 RD2DOT		417 EQU 1798 CLA *	421 EQU	1718 STO *	1723 ADD *	1776 ADZ	1777 STO	1794 CLA *
416 YD2DOT		418 EQU	422 EQU					
417 L11		1234 CLZ * 1358 CLA *	1248 ADZ 1388 MPR *	1249 STO 1397 MPR *	1271 ADZ *	1273 STO *	1327 STO *	1350 CLA *
418 L21		1252 ADZ	1253 STO					
419 L31		423 EQU	1256 ADZ	1257 STO	1408 MPR *			
420 L41		424 EQU	1260 ADZ	1261 STO	1418 MPR			
421 L1LA		1114 STO *	1134 MPR					
422 L1LE	NOT USED							
423 L1LJ		1144 MPR						
424 L1LC		1120 STO	1137 MPR	1141 MPR				
425 5K14		1763 SUB *	1765 CLA *					
426 5K16	NOT USED							
427 DLWN		4188 CLZ	4197 CLZ	4199 STO				
428 DLIF		2005 STO	4169 CLA	4205 CLZ				
429 5K18		1745 LDQ						

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448 K55	1909 DVP						
449 MU3	3185 CLZ	3281 CLZ	3283 STO				
450 6K9	1295 MPR						
451 MU6	632 CLZ	634 STO	992 CLA				
452 3K4	2064 CLA						
453 MU8	676 ADD 2903 CLZ	1030 CLA	1660 CLA	1804 CLA	2893 CLZ	2895 STO	2901 STO
454 MU10	3569 CLZ	3571 STO	3573 CLA	3576 CLZ	4126 CLA		
455 1K9	1031 SUB	2900 CLA					
456 1K30	1972 SUB						
457 2K17	3288 SUB						
458 1K37	1961 SUB						
459 4K23	993 SUB						
460 S623	950 CLA						
461 1K4	3526 MPR	3530 MPY					
462 1K24	2655 SUB						
463 1K26	2605 DVP						
464 1K27	2613 MPY	2619 MPY					
465 1K28	2609 DVP	2624 DVP					

466 1K29	2634 SUB							
467 1K33	1948 CLA							
468 1K34	1953 CLA							
469 1K35	2912 SUB							
470 1K36	1967 MPR							
471 2K1	1090 CLA	1770 CLA	2165 MPY	3342 CLA	3654 DVP	3664 CLA		
472 2K2	3090 MPR	3106 MPR	3269 MPR					
476 P11	1133 CLA *	1140 CLA *	1151 ADD	1152 STO	1201 CLZ *	1206 STO	1265 CLA *	
	1306 ADD	1325 CLA *	1394 ADD *	1395 STO *				
477 P12	1156 ADD	1157 STO	1313 ADD	1428 CLA				
478 P13	1148 CLA	1173 ADD *	1174 STO *	1246 CLA *				
479 P14	1153 CLA							
480 P21	1136 CLA *	1143 CLA *	1158 STO	1202 CLZ *	1268 CLA *	1328 CLA *	1403 ADD *	
	1404 STO *	1429 STO						
481 P22	1162 ADD	1163 STO	1207 STO	1319 ADD				
482 P23	1154 ADD	1179 ADD *	1180 STO *	1250 CLA *				
483 P24	1159 CLA							
484 P33	1169 CLA *	1184 ADD	1185 STO	1203 CLZ *	1209 STO	1254 CLA *	1414 ADD *	
	1415 STO *							
485 P34	1189 ADD	1190 STO	1426 CLA					

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486 P43	1175 CLA *	1191 STO	1258 CLA *	1427 STO	
487 P44	1194 ADD	1195 STO	1210 STO	1424 ADD	1425 STO
488 4K2	3410 ADD				
489 4K3	3409 MPR				
490 6K5	1331 CLA				
491 4K25	1033 CLA				
492 4K34	2955 CLA	2958 CLA			
493 4K35	2891 SUB				
494 4K5	1625 CLA				
495 SUMLIM	4363 STO	4394 SUB			
496 WORDS	4400 SUB				
497 VY0FS	1916 DVP				
498 4K21	2552 SUB	2556 ADD	2557 DVP		
499 M25B16	4128 DVP				
500 DTB	4129 ADD				
501 ID1	4182 SUB				
502 DLWNL	4202 SUB				
503 1K56	725 MPR				

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504 2K4	3049 CLA			
505 KDT	2928 MPR	2931 MPR		
509 BM13SF	830 CLA			
510 B23SF	814 CLA			
511 B18SF	816 CLA			
512 B13VSF	818 CLA			
513 B3SF	820 CLA			
514 B23RSF	824 CLA			
515 B13SF	822 CLA			
516 ADDMS	598 TRA			
522 SFLO	767 SUB			
523 SDVX	714 CLZ *	716 STO *	1966 CLZ *	2018 CLZ *
524 SDVY	NOT USED			
525 SDVZ	NOT USED			
526 MU7	1958 CLZ	1960 STO	1971 CLA	
527 SFL1	769 SUB			
528 SFL2	784 SUB			
529 SFL3	788 SUB			

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589 IC18F	2023 CLA	
590 BP1	1925 CLA	1986 CLA
591 DEDABF	3508 CLA	
592 BR50	3577 CLA	
596 EXIT1	2266 TRA	
597 EXIT2	2279 TRA	
598 EXIT3	2308 TRA	
599 EXIT4	2356 TRA	
600 EXIT5	2399 TSQ	2444 TSQ
601 EXIT6	2400 TSQ	2445 TSQ
602 EXIT7	4192 TRA	
603 EXIT8	2426 TRA	
604 EXIT9	2451 TRA	
605 EXIT10	2462 TMI	2465 TMI
606 EXIT11	2469 TRA	
607 EXIT12	2520 TSQ	
608 EXIT13	2544 TRA	
609 EXIT14	2566 TRA	

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610	EXIT15	2636	TRA	
611	EXIT16	2653	TRA	
612	EXIT17	2656	TMI	2671 TRA
613	EXIT18	2723	TRA	
614	EXIT19	2748	TRA	
615	EXIT20	2820	TMI	
616	EXIT21	2833	TSQ	
617	EXIT22	2864	TRA	
618	25B17	657	SUB	
619	EXIT23	2902	TRA	
623	EXIT24	2896	TRA	2904 TRA
624	EXIT25	2913	TMI	
625	SINITC	69	TRA	654 TRA
629	EXIT26	2914	TRA	2918 TRA
630	EXIT27	3048	TRA	
631	EXIT28	2954	TRA	
632	STGCTR	994	TMI	
636	EXIT29	2971	TRA	

637 PI	566 SUB	569 ADD	2144 CLA
638 EXIT30	2992 TRA		
639 EXIT31	3034 TRA		
640 EXIT32	3118 TRA		
641 EXIT33	3152 TRA		
642 EXIT34	3190 TRA		
643 EXIT35	3225 TOV	3294 TRA	3386 TOV
644 EXIT36	3363 TRA		
645 EXIT37	3403 TRA		
646 EXIT38	3420 TRA		
647 EXIT39	3442 TRA		
648 EXIT40	65 TMI	3462 TMI	
655 EXIT41	3505 TRA	3510 TRA	
656 EXIT42	3554 TRA		
657 EXIT43	3572 TRA		
663 EXIT44	3649 TRA		
664 EXIT45	3662 TRA		
665 EXIT46	4032 TRA		

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666 EXIT47	4050 TRA	4058 TRA	4087 TMI	4099 TMI	4135 TRA		
667 EXIT48	4073 TRA						
668 EXIT49	4083 TRA						
669 EXIT50	4110 TRA						
670 EXIT51	4115 TRA						
671 EXIT52	4219 TRA	4364 TRA	4381 TRA				
672 EXIT53	4402 TRA						
673 TMIF1	661 TSQ	1927 TSQ					
685 DRBLIN	710 TMI						
696 UBCOMP	597 TRA						
702 MODCK	NOT USED						
724 HUGH	720 TSQ	722 TSQ					
733 DEDAF	591 TRA						
741 DEXIT	666 TRA	757 TRA	763 TRA	840 TRA	853 TRA	2056 TRA	
743 CLEARM	667 TRAS	734 TMI	768 TMI\$	813 TRAS			
753 RPT	736 TMI						
758 HFT	738 TMI						
767 SFTEST	668 TRA						

814 SFP	772 TMI	787 TMI					
816 SFT	774 TMI	778 TMI	791 TMI				
818 SFV	776 TMI	789 TMI	800 TMI				
820 SFA	781 TMI						
822 SFT1	783 TMI						
824 SFR	785 TMI	795 TMI					
826 SF1	810 TMI						
828 SFACC	804 TMI						
830 SFG	806 TMI 827 TRAS	815 TRAS 829 TRAS	817 TRAS	819 TRAS	821 TRAS	823 TRAS	825 TRAS
833 DIAT	670 TSQ	838 TIX\$*					
857 DLDC	615 TFA	864 TIX\$*					
880 TVTG	604 TFA	902 TIX\$*					
907 SOFT1	605 TSQ	606 TSQ					
911 ZERR	945 TMI	982 TMI					
920 SOFT3	917 TMI 1048 TRA	931 TRA	935 TRAS	1026 TMI	1029 TRA	1032 TMI	1041 TRA
926 ENCOM1	915 TMI	1023 TMI	1035 TMI\$	1038 TMI\$			
936 IR	910 TMI						

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943	IR1	938	TMI	986	TSQ\$
949	RSTE	970	TIX\$*	999	TMI
978	RST1	NOT USED			
979	IR2	940	TMI		
987	IP3	980	TMI		
995	MODE	948	TRA	985	TMI
				991	TMI
1002	MODE1	1020	TIX *		
1022	SOFT2	609	TSQ		
1042	LUNAL1	610	TRA		
1052	NAV1P	590	TRA		
1058	XDVS	629	TRA	1066	TIX\$*
1068	ALTUP	639	TRA	1087	TIX\$*
1083	FLTR	1073	TMI		
1098	FLTRA	1115	TIX *		
1123	PUPDAT	NOT USED			
1128	FLTRX	1287	TMI\$	1431	TRA
1131	FLTRTM	1125	TMI		
1133	FLTRB	1147	TIX *		

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1169 FLTRC		1181 TIX *
1200 PINIT		1198 TOV
1213 FLTRD		1199 TRA
1217 RATE	NOT USED	
1227 FLTRF		1236 TIX *
1246 FLTRF		1262 TIX *
1265 FLTRG		1278 TIX *
1285 FLTPH		1216 TMT
1288 RANGE	NOT USED	
1289 FLTRI		1304 TIX *
1344 FLTRJ		1282 TRAF\$ 1374 TIX\$*
1387 FLTRK		1405 TIX *
1407 FLTRL		1416 TIX *
1432 LMORB2		640 TRA
1438 ORBLM		1443 TIX\$*
1468 KINGK		1485 TIX *
1511 GM	NOT USED	
1529 DXFR1		1516 TMT

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1541 DXFR10	NOT USED			
1542 DX10P		537 TRA		
1547 DXFRR5		1566 TIX *		
1571 ORBIT3	NOT USED			
1578 DXFR13		1589 TIX\$*		
1593 VRUP1		1598 TIX\$*		
1613 DXFR14		551 TRAS	576 TRAS	
1657 XDV		1513 TMI	2075 TRA	2178 TMI
1665 XDV1		1659 TMI	1670 TIX\$*	1694 TRA
1674 XDV2		1662 TMI	1693 TIX\$*	
1692 XDV2P		1680 TRA		
1696 Q5		646 TRA	1733 TIX\$*	
1752 GDLOW3		1769 TIX *		
1769 GDLOW4		2040 TRA		
1782 STEEP	NOT USED			
1792 STEEP1		1784 TMI	1787 TMI	1801 TIX\$*
1804 Q7		1673 TRA		
1819 STEERS		1809 TMI	1883 TRA	

1845 IDLF	617 TRAF				
1846 STEFR2	1812 TMI				
1862 STEFR3	1854 TMI				
1868 STEFR4	1882 TIXS*				
1873 OUT1	1886 TRAF				
1884 OUT	1873 TMI				
1887 OVFLT	1717 TSO	1760 TSO	1799 TSO		
1898 DSP1	655 TRA	752 TRA			
1911 DSP2CP	656 TRA				
1925 EXEC2	592 TRA				
1930 EXECM	647 TRA	1990 TMI	1994 TMI	1999 TRA	
1932 EXFCM1	2006 TRA	2025 TRA			
1943 CAL	NOT USED				
1958 INCMU7	1942 TMI				
1975 EXECA	1934 TMI	1940 TMI	1973 TMI	2011 TMI	2022 TRA
1981 NEWDD	1929 TMI				
2007 EXFC3	1992 TMI				
2017 MABEE	2009 TMI	2013 TMI			

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2023 EXFCM2	1931 TMI	2004 TMI			
2026 EXEC6	1936 TMI				
2032 FDAI1	612 TPA				
2038 LL3DOT	1766 TRAS	1768 TMI			
2041 NORTON	1523 TRAS	1541 TSQ	1577 TSQ		
2054 RRT	740 TMI				
2059 EX33P	641 TRA				
2069 EX35	556 TMI	557 TRAS	643 TRA		
2076 EX33PP	553 TMIS	2068 TMI			
2086 CSICDH	2061 TMI				
2102 CSI	NOT USED				
2155 CDH2	2189 TRA				
2159 CDH3	1653 TRA	1655 TRAS			
2186 CDH	2101 TMI				
2195 7B17	779 SUB	809 SUB	3824 CLA *		
2196 6B17	782 SUB	790 SUB			
2197 5B17	777 SUB	4294 SUB	4321 SUB		
2198 4B17	773 SUB	794 SUB	803 SUB	4243 LDQ	4326 DVP

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2199 3B17	805 SUB	3759 ADD	4312 MPR	4329 ADD	4354 CLA			
2200 2B17	792 SUB	3284 SUB	3707 SUB	4314 DVP	4336 ADD	4355 DVP		
2201 1B17	63 SUB	71 ADD	633 ADD	1072 SUB	1150 ADD	1161 ADD	1183 ADD	
	1193 ADD	1215 SUB	1286 SUB	1661 SUB	1805 SUB	1811 SUB	1959 ADD	
	1991 SUB	1995 SUB	1997 SUB	2458 ADD	2696 ADD	2894 ADD	3010 ADD	
	3282 ADD	3286 SUB	3488 ADD	3496 ADD	3570 ADD	3801 ADD	4042 ADD	
	4119 CLA	4133 SUB	4144 ADD	4198 ADD	4263 SUB	4265 CLA	4302 ADD	
	4352 SUB	4369 SUB	4383 SUB	4398 ADD	4404 SUB			
2202 ZERO	911 CLA	922 CLA	1795 LDQ	2604 LDQ	2608 LDQ	2623 LDQ	2657 LDQ	
	2664 LDQ	2711 LDQ	2988 LDQ	2997 LDQ	3050 LDQ	3163 LDQ	3172 LDQ	
	3181 LDQ	3194 LDQ	3202 LDQ	3210 LDQ	3219 LDQ	3266 LDQ	3302 LDQ	
	3343 LDQ	3430 LDQ	3435 LDQ	3535 LDQ	3549 CLA	3559 CLA	3621 LDQ	
	3659 LDQ	3665 LDQ	3670 LDQ	3676 LDQ	3683 LDQ	3720 LDQ	3736 LDQ	
	3775 LDQ	3926 LDQ	3965 CLA	4027 CLA	4038 LDQ	4064 CLA	4127 LDQ	
2203 2B3	1514 ADD	2001 SUB	2819 SUB					
2204 5B3	NOT USED							
2205 6B3	2029 CLA	2100 ADD	2116 MPR					
2206 1B4	1774 MPY	2124 MPY	2291 ADD					
2207 1B5	1112 SUB	3464 ADD	3564 CLA	4189 CLA				
2208 1B6	2306 ADD							
2209 1B9	583 ADD	1989 SUB	2388 ADD	2935 ADD				
2210 1B11	73 SUB	750 CLA	2714 ADD	3498 CLA				
2211 1B12	1060 ADD	2505 ADD	2923 ADD					

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2212 1B13	2439 ADD							
2213 1B14	2214 EQU							
2214 8B17	3821 CLA	4071 SUB	4074 ADD					
2215 SIXTH	1719 CLA	4224 CLA	4311 ADD	4320 ADD	4322 MPR	4330 SUB	4334 MPY	
	4335 DVP	4341 SUB	4344 ADD					
2216 2PIB3	568 SUB	572 SUB	1453 ADD	2217 EQU	2753 MPR	2760 MPR	2767 MPR	
	2987 CLA	3860 ADD	3864 SUB	3946 CLA				
2217 1K25	NOT USED							
2218 3PID4	2103 MPY	3949 CLA						
2219 PID2	3867 CLA	3887 ADD	3891 ADD	3895 SUB				
2220 PID4	3922 CLA							
2221 K173	3877 MPR	4186 CLA						
2222 K172	3878 ADD							
2223 K171	3880 ADD							
2224 K170	2225 EQU	3882 ADD	4223 LDO	4254 ADD	4290 ADD	4317 SUB	4318 SUB	
2225 PMAX	826 CLA	1224 CLA	1790 CLA	1846 CLA	1891 CLA	1919 CLA	2554 CLA	
	2718 CLA	3230 ADD	3313 CLA	3393 ADD	3418 CLA	3540 CLA	3656 ADD	
	3806 CLA	4121 CLA						
2226 K183	3932 MPR							
2227 K182	3933 ADD							

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2228 K181	3935 ADD						
2229 K180	3938 ADD						
2230 SHDUM	3822 ADD						
2231 MS	519 ADD	934 CLA	2241 EQU	2449 CLA	2467 CLA	2514 CLA	2547 LDQ
	2709 LDQ	2960 CLA	3007 SUB	3440 CLA	3547 CLA	3798 SUB	4084 CLA
	4246 LDQ	4288 ADD	4357 CLA				
2232 NMAX	1893 CLA	3315 CLA					
2233 49B17	771 SUB	3574 SUB					
2234 10B17	775 SUB	786 SUB	796 SUB	1993 SUB	4044 MPY		
2235 BCDL	4039 DVP						
2236 TRNSFR	2521 LDQ	2574 CLA					
2237 BACK	3450 CLA						
2238 TMOU	4151 CLA						
2239 CLAFR	59 SUB	3452 CLA					
2240 CLATEN	3456 SUB	4362 CLA					
2241 TRACOM	3480 ADD						
2242 STOCOM	1981 CLA	3466 ADD					
2243 DUMCLA	4015 ADD						
2247 DELAY	614 TRA	662 TRA	1938 TMI	1978 TRA	2031 TRA	3575 TMI	3579 TRA

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2261 1B2	2203 EQU 4217 SUB	2242 EQU	2582 ADD	2743 CLA	3149 ADD	3427 ADD	3767 SUB
2266 EX1	596 TRAS						
2269 DVS	2278 TIX *						
2283 GYCOM	704 TMI\$	708 TMI\$	718 TRAS	729 TRAS	2307 TIX *		
2296 M1B1	573 MPY	2157 MPR					
2308 EX3	521 TRAS						
2313 CDCC	2481 TRA	2502 TPA					
2356 EX4	599 TRAS						
2358 DICOS	2382 TIX *						
2385 INTAS	2398 TIX *	2509 TRAS					
2388 RND1	2477 CLA						
2389 SHFT1	2479 CLA						
2402 COA21	692 TRAS	2814 TRAS					
2426 EX8	603 TRAS						
2428 DVINT	603 TRA	2443 TIX\$*					
2451 EX9	903 TRAS						
2472 LRI	2311 TMI						
2483 HRC	2309 TOV						

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2495 HRC1	2484 TMI					
2504 HRINT	2386 TMI					
2505 RND2	2485 CLA					
2506 SHFT2	2487 CLA					
2512 AHE	635 TRA	942 TRA	988 TMI	997 TMI		
2521 AHE1	607 TRA	2513 TMI				
2522 ATTERR	1946 TSQ					
2530 EYEZ	2576 TPA					
2544 EROUT	608 TPA\$	1021 TRA	2236 TRA	2560 TIX\$*		
2569 RST	978 TPA					
2579 LUNAL	919 TMI					
2639 FDAI	925 TRA					
2653 EX16	611 TPA\$					
2671 EX17	2037 TPA\$					
2708 FDAIL	2641 TSQ	2651 TSQ	2662 TSQ	2669 TSQ	2681 TSQ	2690 TSQ
2722 SPULS ^F	2702 TMI	2705 TRA\$				
2726 NDC	613 TRA	2739 TIX\$*				
2751 EADICS	1945 TSQ	2808 TSQ				

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2757 1284		1754 MPY	2205 EQU				
2784 1B1		689 CLA	1099 MPY	1231 MPY	1455 MPY	1771 MPY	1815 MPY
		2131 MPY	2243 EQU	3098 SUB	3112 ADD	3412 ADD	3704 ADD
		4130 ADD	4310 SUB	4377 CLA			2109 MPR
							3734 SUB
2805 ZNOC		706 TMI					
2808 IMUDC	NOT USED						
2818 IC1		589 TRA	876 TRAS				
2835 IC2	NOT USED						
2847 RVCOMP		2838 TMI					
2857 IC3	NOT USED						
2867 CSMPV		875 TSQ	2970 TSQ				
2882 NAV	NOT USED						
2897 NAV1		1053 TMI	2883 TMI				
2905 NAV2		623 TRA	2892 TMI\$				
2915 NAV3		622 TRA	624 TRA				
2919 NAV4		1067 TRA	2952 TIX\$*				
2954 EX28		631 TRAS					
2966 ORBPAR	NOT USED						
2971 EX29		636 TRAS					

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2992 EX3C	638 TRAS		
3012 BR2FX	2995 TMI	3006 TRA	
3038 GRAV	2857 TSQ	2953 TSQ	
3048 EX27	630 TRAS		
3055 GRAV1	3070 TIX *		
3061 7B3	1941 ADD	2010 SUB	4374 CLA
3077 LMORB	NOT USED		
3117 LMORB1	3109 TOVS	3120 TRA	
3124 CSMT1	1615 TMI		
3137 XORBV1	3144 TIX *		
3152 EX33	2066 TMI\$		
3162 XORBV2	3184 TIX *		
3190 EX34	554 TRAS		
3299 PITER1	3287 TMI		
3317 DELP	3298 TMI		
3328 PITER2	3285 TMI		
3333 PITER3	3293 TMI\$	3323 TMI	
3342 TBRAKE	NOT USED		

3363 EX36	2085 TRAS						
3366 IMPRK1	3385 TIX *						
3407 GDLAW	2185 TRA						
3424 LUNAZ	1996 TMI						
3446 INIT	3306 DLY						
3460 GSESR	2699 TMI						
3468 WRDLP	3485 TRA						
3486 RETURN	35 TRA	2237 TRA					
3495 TIMEA	616 TRA	2962 TSQ					
3500 EXEC	671 TRAS	672 TRAS	1068 TSQ	1121 TSQ	1127 TSQ	1128 TSQ	1340 TSQ
	1436 TSQ	1463 TSQ	1507 TSQ	1570 TSQ	1612 TSQ	1778 TSQ	1844 TSQ
	2043 TSQ	2045 TSQ	2074 TSQ	2086 TSQ	2171 TSQ	2855 TSQ	3012 TSQ
	3026 TSQ	3125 TSQ	3186 TSQ	3337 TRAS	3338 TSQ	3396 TSQ	
3514 DSPLY	1901 TRA						
3524 DSPLY1	1910 TRA						
3542 DSPLY2	3523 TRAS						
3556 DSPLY3	1921 TRAS						
3565 DSPLY4	3517 TRA						
3569 EXEC1	628 TRAS	660 TMI\$					
3583 CRSPRD	1486 TSQ	1488 TSQ	1590 TSQ	2980 TSQ	3153 TSQ		

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3609	NORMV	1487	TSQ	1567	TSQ	1591	TSQ	2050	TSQ	2981	TSQ	3043	TSQ	3133	TSQ
3630	DRBPM	1444	TSQ	1571	TSQ	2831	TSQ	2986	TSQ						
3636	DRBPM1	3648	TIX *												
3649	EX44	663	TRA\$												
3662	EX45	664	TRA\$												
3690	ELPRD	2044	TSQ	2839	TSQ	3019	TSQ	3124	TSQ						
3696	ELPRD1	3779	TPA												
3741	ELPRD2	3757	TIX *												
3759	ELPRD3	3708	TMI												
3783	DPSQ	3830	TSQ												
3787	DPSQ1	3804	TIX *												
3804	DPSQ2	3797	TPA												
3806	DPSQ3	3790	TMI	3802	TMI										
3812	NORM	3831	TSQ	3968	TSQ										
3824	NORM1	3818	TOV												
3829	DPVMAG	1088	TSQ	1671	TSQ	2151	TSQ	2183	TSQ	3032	TSQ	3387	TSQ	3402	TSQ
3839	DPTSB	2836	TSQ	3017	TSQ										
3854	EXIT	1889	TRA	1894	TRA	2878	TRA	3491	TRA	4164	TRA	4405	TMI	4409	TOV

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3861 SIC0E	2754 TSQ	2761 TSQ	2768 TSQ	3697 TSQ			
3872 SIC02	2240 EQU	3885 TIX *	3890 TRA\$	3894 TMI\$	3897 TRA\$		
3887 SIC01	3870 TMI						
3902 ARCTAE	564 TSQ	1451 TSQ	1505 TSQ	1602 TSQ	3252 TSQ	4009 TSQ	
3926 ARCTA1	3956 TRA						
3949 ARCTA2	3919 TMI						
3961 SORTF	1623 TSQ	1849 TSQ	1866 TSQ	2168 TSQ	2583 TSQ	2649 TSQ	3085 TSQ
	3110 TSQ	3150 TSQ	3232 TSQ	3270 TSQ	3346 TSQ	3390 TSQ	3428 TSQ
	3617 TSQ	3650 TSQ	3668 TSQ	3834 TSQ			
3978 SORT1	3985 TIX *						
3981 KSR	3976 ADD						
3990 ABVEC	NOT USED						
4014 ADOUT	760 TRA	2058 TRA					
4025 ROP	581 TRA						
4028 SOUT	4120 TRA						
4032 EX46	665 TRAS\$						
4044 DOUT	4122 TRA						
4051 OCTO	4031 TMI						
4059 RME	754 TMI	756 TMI\$					

4084 NOTDD	770 TMI	793 TMI	797 TMI	802 TMI	808 TMI	812 TMI	
4098 DDIN	832 TPA						
4110 EX50	669 TRAS						
4112 STDD	4097 TPA	4118 TPA					
4119 SNS	4026 TMI						
4121 MAX	4043 TOV						
4126 ATI	841 TIX *						
4139 TME	601 TPA						
4157 TMIF2	674 TSQ						
4168 PGNSDE	600 TPA						
4189 PGNSD2	4195 TMI						
4192 PGNSD1	602 TRAS	4179 TMI					
4212 TEST	1845 TPA						
4226 1K7	2272 SUB	2284 SUB					
4229 10B4	66 CLA	2204 EQU	4103 MPY				
4235 3B3	678 SUB 1933 SUB	703 SUB 2014 CLA	908 SUB 2060 SUB	1111 MPR 2967 SUB	1118 MPR 4372 SUB	1512 ADD 4406 CLA	1600 SUB
4348 1B3	705 SUB 1007 SUB	707 SUB 1025 SUB	709 SUB 1027 SUB	916 SUB 1124 ADD	918 SUB 1663 CLA	996 SUB 1712 MPY	998 SUB 1788 CLA

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	1935 SUB 4386 CLA	1937 SUB	1939 SUB	2003 SUB	2008 ADD	2147 MPY	4215 SUB
4357 SETFG	4408 TRA						
4366 CKSUM	4213 TMI						
4382 COREX	4370 TMI	4887 TRA\$					
4388 MEMSUM	4366 TSQ	4401 TMI\$					
4403 ACCUM	4258 TSQ	4295 TSQ	4298 TSQ	4305 TSQ	4353 TSQ		
4406 ERROR	4231 TOV 4279 TIX *	4234 TRA 4315 TOV	4245 TOV 4403 TMI	4253 TRA 4410 TRA	4255 TMI	4256 TOV	4268 TOV
4409 OVFLW	4227 TSQ 4350 TSQ	4238 TSQ 4356 TSQ	4242 TSQ	4291 TSQ	4338 TSQ	4340 TSQ	4342 TSQ
4414 DLREG	4175 INP						
4415 DISC1I	2456 INP	4140 INP	4172 INP				
4416 DISC2I	2695 INP						
4417 DEDA	744 INP 4078 INP	3448 INP 4089 INP	4020 OUT 4106 INP	4028 OUT	4045 OUT	4054 OUT	4068 INP
4418 SIALO	2682 OUT						
4419 COALO	2691 OUT						
4420 SIBEO	2642 OUT						
4421 COBEO	2652 OUT						
4422 SIGAO	2663 OUT						

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4423	COGAD	2670	OUT								
4424	EXD	2561	OUT								
4425	EYD	2563	OUT								
4426	EZD	2565	OUT								
4427	TMIDD	4150	OUT								
4428	SHOUT	4021	OUT	4029	OUT	4046	OUT	4055	OUT		
4429	SHIN	4060	OUT	4069	OUT	4079	OUT	4090	OUT	4102	OUT

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NO BAD CONSTANTS OR ILLEGAL ALARM CONDITIONS

LM PROGRAM HEADER=* FLIGHT PROGRAM X--LMAGS FPX S03 0151
DECK LABEL=0151
CHECKSUM=377372002647

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NO GO CARD FOUND