

11176-6055-RO-00

LM/AGS FLIGHT PROGRAM 6
LM 5 MISSION CONSTANTS

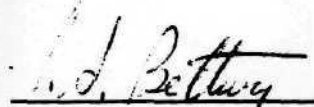
June 1969

Prepared for:


National Aeronautics and Space Administration
Manned Spacecraft Center, Houston, Texas
Under Contract No. NAS 9-8166

Submitted by: C. J. Mabee


Approved by:


T. S. Bettwy, Assistant
Manager, System Design and
Analysis Department

Approved by:


H. B. Grossman, Manager
Data Processing Systems
Department

Approved by:


T. W. Layton, Chairman
LM/AGS Software
Design Review Board

LM 5 MISSION CONSTANTS

Enclosed as Appendix C is the LM AGS FP6 Mission Constants List for LM 5. Appendix A describes the output of the LMDAP program (Appendix C), and Appendix B describes the constants contained in FP6.

These constants were supplied in References 1, 2, and 3.

The accelerometer and gyro bias compensation DEDA readout values prior to the first inflight calibration are given in the following table.

Symbol	DEDA		Decimal Value	Description
	Address	Value		
1K1	544	-00027	-0.27 deg/hr	X } Gyro Bias Y } Compensation Z }
1K6	545	-00003	-0.03 deg/hr	
1K11	546	-00041	-0.41 deg/hr	
1K19	540	+00000	0.000 ft/sec ²	X } Accelerometer Y } Bias Compensation Z }
1K21	541	+00001	0.001 ft/sec ²	
1K23	542	+00002	0.002 ft/sec ²	

REFERENCES

1. 7222.14-804, "ASA 018 Mission Hardware Constants," by R. G. Smith, dated 4 June 1969.
2. MSC Letter, Number EG43-69-195, by R. G. Chilton, dated 27 May 1969.
3. MSC Letter, Number EG43-69-218, (Changes to FP6/"G Mission Constants"), received 17 June 1969.
4. 7224.9-160, "Review of MSC Constants List for Flight Program 6 (G Mission)," dated 16 June 1969.

Appendix A

OUTPUT OF THE LM DICTIONARY ANALYSIS PROGRAM

Output of the LM Dictionary Analysis Program (LMDAP) consists of an absolute deck and a listing which contains up to four parts which are titled:

IM AGS Constants Lists,
Dictionary Analysis,
Checksum Calculations (optional),
AEA Memory Non-Compares.

The output absolute deck is an updated version of the absolute deck of the flight program or EPC which is an input into LMDAP. The two decks differ only where constants have been updated, and the locations which differ are listed in the AEA Memory Non-Compares.

The first page of the listing contains the type of mission, and ASA for which the constants are valid, the date, and a TRW control number.

The Dictionary Analysis part of the listing is described in the following paragraphs:

The NAME column contains the symbolic name used in the computer program to identify each constant.

The LOC. column lists the octal address in the computer where each constant is stored.

The value input to the program for each constant is listed in the INPUT column. If this column is blank, then no new input has been specified for that constant in the latest assembly. The value is given in the engineering units specified by the UNITS column. If the units used by the computer differ from the engineering units for a given constant, the input value is multiplied by a conversion factor, which is defined as that number which, when multiplied by the input, will convert it to its equivalent in the units which are internal to the AEA. The factor is listed in the C.F. column and is unity if no change of units is to be performed. (The AEA units of a constant are found following its definition in Appendix B.) The value of the gravity used in computing the conversion factors is 32.12681 ft/sec/sec which is the value of gravity at KSC.

There are two exceptions to the above: the gyro drift biases (1K1P, 1K6P, 1K11P), the accelerometer biases (1K19P, 1K21P, 1K23P), and the EPC gyro input axis unbalance biases (K40P, K42P, K44P) are converted to AEA compensations (1K1, 1K6, 1K11, 1K19, 1K21, 1K23, K40, K42, K44) by changing their signs.

The LMDAP inputs 1K18P, 1K20P, and 1K22P are deviations from the nominal accelerometer scale factor of 0.003125 fps/pulse. Since the flight program uses a single constant per axis to represent the actual accelerometer scale factor, each input is added to one, and the sum is multiplied by the nominal scale factor to compute the program constants 1K18, 1K20, and 1K22, listed in octal in the AEA OCT. column. Then, the deviations are recomputed from the scale factors and are listed in the AEA VALUE column.

The number in the SCALE column defines the binary scaling of each constant. The binary scaling equals the number of bits in the computer word (excluding the sign bit) to the left of the binary point. A computer word consists of a sign bit and 17 data bits: therefore, a constant with binary scaling of 17 would be an integer (binary point to the right of the last bit). The binary scaling is required to be large enough to permit the maximum possible value of a constant to be contained in a single computer word.

Each constant is stored in two's complement binary form. The actual computer value is listed in the AEA OCT. column (one octal digit is equivalent to three binary digits). If the new AEA value is different from the one previously in the program deck, an asterisk will precede the constant name.

Since the computer word has a finite number of bits, a given input number cannot in general be represented exactly in the computer. The AEA VALUE column contains the result of reconvertng the AEA octal value to decimal in engineering units, using the conversion factor mentioned above.

The Checksum Calculations are an optional set of outputs and are printed only when some checksums are computed. For each checksum computed, the locations checksummed, the locations where the new checksum is stored, the original value of the location which contains the new checksum and the new checksum are printed in the columns labeled RANGE, LOC., ORIG. VALUE, and NEW VALUE, respectively.

The last output from LMDAP is a list which contains the locations, the original octal contents, and the new octal contents for each location which has changed from the input absolute deck.

Appendix B

GROUP 1

PARAMETERS TO BE SPECIFIED DURING THE MISSION

<u>NAME</u>	<u>DESCRIPTION OF LMDAP INPUT</u>	<u>INTERNAL AEA UNITS</u>	<u>LMDAP INPUT UNITS</u>
1J	Desired TPI time for CSI computation	SEC	MIN
4J	Time increment from node to TPF (in TPI mode)	SEC	MIN
17J	Radar range rate	FPS	FPS
18J	Radar range	FT	FT
25J	DEDA altitude update	FT	FT
28J1	Component of External V input in \underline{V}_1 Direction	FPS	FPS
28J2	Component of External V input in \underline{W}_1 Direction	FPS	FPS
28J3	Component of External V input in \underline{U}_1 Direction	FPS	FPS
1J1	LM Update State Vector - X Inertial Position	FT	FT
1J2	Y Inertial Position	FT	FT
1J3	Z Inertial Position	FT	FT
1J4	X Inertial Velocity	FPS	FPS
1J5	Y Inertial Velocity	FPS	FPS
1J6	Z Inertial Velocity	FPS	FPS
1J7	LM Update State Vector Epoch Time	SEC	MIN
2J1	CSM Update State Vector - X Inertial Position	FT	FT
2J2	Y Inertial Position	FT	FT
2J3	Z Inertial Position	FT	FT
2J4	X Inertial Velocity	FPS	FPS
2J5	Y Inertial Velocity	FPS	FPS
2J6	Z Inertial Velocity	FPS	FPS
2J7	CSM Update State Vector Epoch Time	SEC	MIN

GROUP 2

AGS HARDWARE DEPENDENT CONSTANTS

<u>NAME</u>	<u>DESCRIPTION OF LMDAP INPUT</u>	<u>INTERNAL AEA UNITS</u>	<u>LMDAP INPUT UNITS</u>
1K1P*	X axis gyro drift bias	RAD/20MS (Compen.)	DEG/HR (Bias)
1K6P*	Y axis gyro drift bias	RAD/20MS (Compen.)	DEG/HR (Bias)
1K11P*	Z axis gyro drift bias	RAD/20MS (Compen.)	DEG/HR (Bias)
	A positive gyro drift bias causes a gyro output of more than 32 pulses per millisecond (640 pulses per 20 milliseconds) for no ASA rotation. The range of each of the biases is ± 10 deg/hr.		
1K3*	X axis gyro scale factor deviation	NO-UNITS(Deviation)	NO-UNITS (Deviation)
1K8*	Y axis gyro scale factor deviation	NO-UNITS(Deviation)	NO-UNITS (Deviation)
1K13*	Z axis gyro scale factor deviation	NO-UNITS(Deviation)	NO-UNITS (Deviation)
	A positive scale factor deviation exists when a gyro's scale factor is greater than 2^{-16} radians per pulse. The range of each deviation is $\pm .78$ percent.		
1K14*	Compensation constant for X gyro spin axis mass unbalance drift	RAD/FPS	DEG/HR/G
	A positive gyro spin axis mass unbalance exists when a positive ASA acceleration in the direction of the X gyro input axis results in a negative X gyro output (less than 640 pulses per 20 milliseconds) with no rotation. The range of the bias is ± 10 deg/hr/g.		

*These constants are dependent on the hardware to be used during a mission.

<u>NAME</u>	<u>DESCRIPTION OF LMTAP INPUT</u>	<u>INTERNAL AEA UNITS</u>	<u>LMDAP INPUT UNITS</u>
1K18P*	X axis accelerometer scale factor deviation	FPS/PULSE (Scale)	NO-UNITS (Deviation)
1K20P*	Y axis accelerometer scale factor deviation	FPS/PULSE Factors)	NO-UNITS (Deviation)
1K22P*	Z axis accelerometer scale factor deviation	FPS/PULSE	NO-UNITS (Deviation)
	A positive accelerometer scale factor deviation exists when the measured accelerometer's scale factor is greater than the nominal value of + .003125 fps/pulse. The range of this input is ± 24 percent.		
1K19P*	X axis accelerometer bias	FPS/20MS(Compen.)	MICRO G (Bias)
1K21P*	Y axis accelerometer bias	FPS/20MS(Compen.)	MICRO G (Bias)
1K23P*	Z axis accelerometer bias	FPS/20MS(Compen.)	MICRO G (Bias)
	A positive accelerometer bias results in an accelerometer output of more than 32 pulses per millisecond (640 pulses per 20 milliseconds). The range of each of these biases is $\pm 2000 \mu\text{g}$.		
1K26	X axis azimuth alignment gain constant (lunar align)	NO-UNITS	NO-UNITS
1K27	Lunar align leveling alignment constant	RAD/FPS	RAD/FPS
1K28	Lunar align leveling alignment constant	NO-UNITS	NO-UNITS
1K29	Lunar align stop error criterion	RAD	RAD
1K30	Gyro calibrate time	2-SEC	2-SEC
1K33	Gyro calibration gain constant	NO-UNITS	NO-UNITS
1K34	Gyro calibration gain constant	1/20MS	1/20MS
1K35	Navigation sensed velocity threshold	FT/SEC	FT/SEC
1K36	Accelerometer calibration gain constant	NO-UNITS	NO-UNITS

*These constants are dependent on the hardware to be used during a mission.

<u>NAME</u>	<u>DESCRIPTION OF LMDAP INPUT</u>	<u>INTERNAL AEA UNITS</u>	<u>LMDAP INPUT UNITS</u>
1K37	Accelerometer calibration time	2-SEC	2-SEC
6K2	Radar filter initialization value of P_{11} and P_{22}	FT ²	FT ²
6K4	Radar filter initialization value of P_{33} and P_{44}	(FPS) ²	(FPS) ²
6K5	Radar filter factor in r_y update	NO-UNITS	NO-UNITS
6K6	Radar filter factor in V_y update	NO-UNITS	NO-UNITS
6K8	Radar filter term in q_{11}	(FT/SEC) ²	(FT/SEC) ²
6K9	Radar filter factor in q_{11} and q_{22}	(RAD) ²	(RAD) ²
6K10	Radar filter factor in q_{11} and q_{22}	FT ²	FT ²

GROUP 3

VEHICLE DEPENDENT CONSTANTS

<u>NAME</u>	<u>DESCRIPTION OF LMDAP INPUT</u>	<u>INTERNAL AFA UNITS</u>	<u>LMDAP INPUT UNITS</u>
LK9	Ullage counter limit	COUNTS	COUNTS
LK2	Coefficient in T_B computation	SEC/FT	SEC/FT
LK3	Coefficient in T_B computation	(SEC/FT) ²	(SEC/FT) ²
LK7	Cant angle of engine about Y-axis	RAD	RAD
LK8	Cant angle of engine about Z-axis	RAD	RAD
LK21	Limit on body attitude errors	RAD	RAD
LK23	Time to maintain attitude hold momentarily after staging	40-MSEC	40-MSEC
LK25	Ascent engine cutoff impulse compensation	FPS	FPS
LK26	V_G threshold for engine cutoff	FPS	FPS
LK27	Descent stage ΔV capability	FPS	FPS
LK31	Lower limit on a_T	FT/SEC ²	FT/SEC ²
LK35	Ullage threshold	FT/SEC ²	FT/SEC ²

GROUP 4

MISSION DEPENDENT CONSTANTS

<u>NAME</u>	<u>DESCRIPTION OF LMDAP INPUT</u>	<u>INTERNAL AEA UNITS</u>	<u>IMDAP INPUT UNITS</u>
1K4	Altitude/Altitude rate interpolation factor	NO-UNITS	NO-UNITS
2K1	Lunar gravitational constant	FT ³ /SEC ²	FT ³ /SEC ²
2K2	Reciprocal of 2K1	SEC ² /FT ³	SEC ² /FT ³
2K4	-2K1 ΔT (ΔT = 2 sec)	FT ³ /SEC	FT ³ /SEC
3K4	Sine of central angle limit in TPI	NO-UNITS	NO-UNITS
4K4	Coefficient in linear expression for \dot{r}_f	1/SEC	1/SEC
4K5	Quantity in linear expression for \dot{r}_f	FT	FT
4K6	Upper limit on \dot{r}_f	FPS	FPS
4K10	Factor in LM desired semi-major axis α_L (O.I.)	FT/RAD	FT/RAD
4K12	Acceleration check for lower limit of \ddot{r}_d	FT/SEC ²	FT/SEC ²
5K14	Upper limit on \ddot{r}_d	FT/SEC ³	FT/SEC ³
5K16	Upper limit on \ddot{y}_d	FT/SEC ³	FT/SEC ³
5K17	Lower limit on \ddot{y}_d	FT/SEC ³	FT/SEC ³
5K18	Lower limit on \ddot{r}_d	FT/SEC ³	FT/SEC ³
5K20	Lower limit on \ddot{r}_d	FT/SEC ³	FT/SEC ³
5K26	Velocity-to-be-gained threshold	FPS	FPS
K55	Scale factor for \dot{r} display	NO-UNITS	NO-UNITS
WBX	X component of unit vector for guidance steering	NO-UNITS	NO-UNITS
WBY	Y component of unit vector for guidance steering	NO-UNITS	NO-UNITS
WBZ	Z component of unit vector for guidance steering	NO-UNITS	NO-UNITS
2J	Cotangent of desired LOS angle at TPI for CSI computation	NO-UNITS	NO-UNITS

GROUP 4, continued

<u>NAME</u>	<u>DESCRIPTION OF IMDAP INPUT</u>	<u>INTERNAL AEA UNITS</u>	<u>IMDAP INPUT UNITS</u>
3J	Rendezvous offset time for TPI computation	SEC	MIN
5J	Landing site radius	FT	FT
6J	Desired LM transfer time for TPI routine	SEC	MIN
7J	Term in LM desired semi-major axis α_L (O.I.)	FT	FT
8J	Lower limit of α_L (O. I.)	FT	FT
9J	Upper limit of α_L (O. I.)	FT	FT
16J	Orbit insertion targeted injection altitude	FT	FT
21J	Vertical pitch steering altitude threshold	FT	FT
22J	Vertical pitch steering altitude rate threshold	FPS	FPS
23J	Orbit insertion targeted injection radial rate	FPS	FPS
29J	Radar filter update time initialization value	SEC	MIN

GROUP 5

EQUATION DEPENDENT CONSTANTS

<u>NAME</u>	<u>DESCRIPTION OF LMDAP INPUT</u>	<u>INTERNAL AEA UNITS</u>	<u>LMDAP INPUT UNITS</u>
1K2L	FDAI computation singularity region	NO-UNITS	NO-UNITS
1K56	Negative of lunar rotation rate times .02 sec	RAD	RAD
2K3	q value set if overflow occurs in e^2 computation of LM orbit parameters	FT	FT
2K11	Set value of V_T if no valid TPI solution	FPS	FPS
2K1L	Initial p perturbation	FT	FT
2K17	Number of p-iteration minus 3	COUNTS	COUNTS
2K18	Partial derivative protector in p-iterator routine	SEC	SEC
2K19	Δ_p limiter	FT	FT
2K20	p-iterator convergence check	SEC	SEC

Group 6 DEDA Conversion Factors

<u>NAME</u>	<u>DESCRIPTION OF LMDAP INPUT</u>
BACCSF	Convert $.001 \text{ ft/sec}^2$ to $\text{fps}/20 \text{ msec}$ at B1
BM13SF	Convert $.01^\circ/\text{hr}$ to $\text{rad}/20 \text{ msec}$ at B13
B23SF	Convert 100 ft to ft at B23
B18SF	Convert .1 min to sec at B18
B13VSF	Convert .1 fps to fps at B13
B3SF	Convert $.01^\circ$ to rad at B3
B23RSF	Convert .1 nmi to ft at B23
B13SF	Convert .01 min to sec at B13

APPENDIX C

LM AGS CONSTANTS LIST

THIS LISTING IS INTENDED AS DOCUMENTATION OF THE PROGRAM CONSTANTS.
THE MEANINGS OF ALL COLUMNS IN THE LISTING ARE CONTAINED IN APPENDIX A.
CAUTION MUST BE EXERCISED IN ATTEMPTING TO RELATE DATA CONTAINED IN
THIS LIST TO SUCH PURPOSES AS DEDA ENTRIES OR READOUTS.

MISSION LM5 MISSION CONSTANTS

ASA 018

DATE 06/16/69

CONTROL NUMBER 7332.6-062

DICTIONARY ANALYSIS

NAME	LOC.	INPUT	SCALE	C.F.	AEA OCT.	AEA VALUE	UNITS
1J	0275		18	.60000 02	000000	.00000000 00	MIN
4J	0306		13	.60000 02	000000	.00000000 00	MIN
17J	0503		13	.10000 01	000000	.00000000 00	FPS
18J	0316		23	.10000 01	000000	.00000000 00	FT
25J	0223		23	.10000 01	000000	.00000000 00	FT
28J1	0450		13	.10000 01	000000	.00000000 00	FPS
28J2	0451		13	.10000 01	000000	.00000000 00	FPS
28J3	0452		13	.10000 01	000000	.00000000 00	FPS
1J1	0240		23	.10000 01	000000	.00000000 00	FT
1J2	0241		23	.10000 01	000000	.00000000 00	FT
1J3	0242		23	.10000 01	000000	.00000000 00	FT
1J4	0260		13	.10000 01	000000	.00000000 00	FPS
1J5	0261		13	.10000 01	000000	.00000000 00	FPS
1J6	0262		13	.10000 01	000000	.00000000 00	FPS
1J7	0254		18	.60000 02	000000	.00000000 00	MIN
2J1	0244		23	.10000 01	000000	.00000000 00	FT
2J2	0245		23	.10000 01	000000	.00000000 00	FT
2J3	0246		23	.10000 01	000000	.00000000 00	FT

DICTIONARY ANALYSIS

NAME	LOC.	INPUT	SCALE	C.F.	AEA OCT.	AEA VALUE	UNITS
2J4	0264		13	.10000 01	000000	.00000000 00	FPS
2J5	0265		13	.10000 01	000000	.00000000 00	FPS
2J6	0266		13	.10000 01	000000	.00000000 00	FPS
2J7	0272		18	.60000 02	000000	.00000000 00	MIN
* 1K1P	0544	.27000000 00	-13	-.96963-07	777744	.26893870 00	DEG/HR
* 1K6P	0545	.30000000-01	-13	-.96963-07	777775	.28814861-01	DEG/HR
* 1K11P	0546	.41000000 00	-13	-.96963-07	777725	.41301300 00	DEG/HR
* 1K3	0550	-.10480000-02	-7	.10000 01	735521	-.10480285-02	NO-UNITS
* 1K8	0551	-.28500000-03	-7	.10000 01	766522	-.28502941-03	NO-UNITS
* 1K13	0552	.34430000-02	-7	.10000 01	160644	.34430027-02	NO-UNITS
* 1K14	0537	-.65000000 00	-14	.15091-06	777455	-.65108032 00	DEG/HR/G
* 1K18P	0534	-.46300000-03	-8	.31250-02	314551	-.46348572-03	NO-UNITS
* 1K20P	0535	.30300000-03	-8	.31250-02	314671	.29945374-03	NO-UNITS
* 1K22P	0536	.14520000-02	-8	.31250-02	315062	.14533997-02	NO-UNITS
1K19P	0540	.99999999 00	1	-.64254-06	000000	-.00000000 00	MICRO-G
* 1K21P	0541	-.17000000 02	1	-.64254-06	000001	-.23747750 02	MICRO-G
* 1K23P	0542	-.65999999 02	1	-.64254-06	000003	-.71243251 02	MICRO-G
1K26	0626		8	.10000 01	561111	-.14285742 03	NO-UNITS

DICTIONARY ANALYSIS

NAME	LOC.	INPUT	SCALE	C.F.	AEA OCT.	AEA VALUE	UNITS
1K27	0627		-4	.10000 01	262132	.43499947-01	RAD/FPS
* 1K28	0630	.10760600 03	7	.10000 01	327155	.10760645 03	NO-UNITS
1K29	0631		-4	.10000 01	004061	.99992752-03	RAD
1K30	0617		17	.10000 01	000226	.15000000 03	2-SEC
1K33	0632		-3	.10000 01	243656	.79999924-01	NO-UNITS
1K34	0633		-15	.10000 01	247613	.19999919-04	1/20MS
1K35	0634		7	.10000 01	000400	.25000000 00	FT/SEC
1K36	0635		0	.10000 01	777651	-.66375733-03	NO-UNITS
1K37	0621		17	.10000 01	000017	.15000000 02	2-SEC
6K2	0457		30	.10000 01	027657	.99999744 08	FT2
6K4	0456		10	.10000 01	031000	.10000000 03	FT2/SEC2
6K5	0656		0	.10000 01	505075	-.73000336 00	NO-UNITS
6K6	0522		8	.10000 01	777605	-.24023437 00	NO-UNITS
6K8	0304		10	.10000 01	000034	.21875000 00	FT2/SEC2
6K9	0611		-15	.10000 01	376057	.30290103-04	(RAD)2
6K10	0517		28	.10000 01	005754	.62504960 07	FT2
* 1K9	0616	.40000000 01	17	.10000 01	000004	.40000000 01	COUNTS
* 4K2	0654	-.50240000-04	-12	.10000 01	713244	-.50239265-04	SEC/FT

DICTIONARY ANALYSIS

NAME	LOC.	INPUT	SCALE	C.F.	AEA OCT.	AEA VALUE	UNITS
* 4K3	0655	.16830000-08	-25	.10000 01	016352	.16830199-08	SEC2/FT2
* 4K7	0566	.26180000-01	0	.10000 01	006547	.26176453-01	RAD
* 4K8	0602	.00000000 00	0	.10000 01	000000	.00000000 00	RAD
4K21	0666		2	.10000 01	020603	.26181030 00	RAD
* 4K23	0622	.62000000 02	17	.10000 01	000076	.62000000 02	40MSEC
* 4K25	0657	.16700000 01	13	.10000 01	000033	.16875000 01	FPS
* 4K26	0454	.70000000 02	13	.10000 01	002140	.70000000 02	FPS
* 4K27	0473	-.79999900 04	13	.10000 01	406000	-.80000000 04	FPS
4K34	0660		7	.10000 01	002000	.10000000 01	FT/SEC2
4K35	0661		7	.10000 01	000146	.99609375-01	FT/SEC2
1K4	0624		0	.10000 01	031463	.99998474-01	NO-UNITS
2K1	0636		48	.10000 01	235407	.17318811 15	FT3/SEC2
2K2	0637		-47	.10000 01	320020	.57740271-14	SEC2/FT3
2K4	0674		49	.10000 01	542371	-.34637623 15	FT3/SEC
3K4	0613		1	.10000 01	026164	.17364502 00	NO-UNITS
4K4	0565		-7	.10000 01	203045	.40000081-02	1/SEC
4K5	0662		23	.10000 01	257175	.57424000 07	FT
4K6	0527		13	.10000 01	002400	.80000000 02	FPS

DICTIONARY ANALYSIS

NAME	LOC.	INPUT	SCALE	C.F.	AEA OCT.	AEA VALUE	UNITS
* 4K10	0227	-.62538273 06	20	.10000 01	547243	-.62538400 06	FT/RAD
4K12	0506		7	.10000 01	012000	.50000000 01	FT/SEC2
5K14	0560		-2	.10000 01	000000	.00000000 00	FT/SEC3
* 5K16	0561	.99999998-02	-2	.10000 01	012173	.10000229-01	FT/SEC3
* 5K17	0601	-.99999998-02	-2	.10000 01	765605	-.10000229-01	FT/SEC3
5K18	0564		-2	.10000 01	631463	-.10000038 00	FT/SEC3
5K20	0523		-2	.10000 01	000000	.00000000 00	FT/SEC3
5K26	0466		13	.10000 01	000360	.15000000 02	FPS
K55	0607		0	.10000 01	377777	.99999237 00	NO UNITS
WBX	0514		1	.10000 01	000000	.00000000 00	NO-UNITS
WBY	0515		1	.10000 01	000000	.00000000 00	NO-UNITS
WBZ	0516		1	.10000 01	000000	.00000000 00	NO-UNITS
2J	0605		7	.10000 01	003775	.19970703 01	NO-UNITS
3J	0312		13	.60000 02	000000	.00000000 00	MIN
* 5J	0231	.56936290 07	23	.10000 01	255603	.56936320 07	FT
* 6J	0307	.42830000 02	13	.60000 02	120235	.42830208 02	MIN
* 7J	0224	.60267264 07	23	.10000 01	267730	.60267520 07	FT
* 8J	0225	.58148000 07	23	.10000 01	261350	.58147840 07	FT

DICTIONARY ANALYSIS

NAME	LOC.	INPUT	SCALE	C.F.	AEA OCT.	AEA VALUE	UNITS
9J	0226		23	.10000 01	326447	.70312320 07	FT
16J	0232		23	.10000 01	001652	.60032000 05	FT
21J	0233		23	.10000 01	000607	.25024000 05	FT
22J	0464		13	.10000 01	001440	.50000000 02	FPS
* 23J	0465	.19500000 02	13	.10000 01	000470	.19500000 02	FPS
* 29J	0274	-.30000000 03	18	.60000 02	756330	-.30000000 03	MIN
1K24	0625		1	.10000 01	000071	.86975098-03	NO-UNITS
1K56	0673		-14	.10000 01	777616	-.53085387-07	RAD
2K3	0216		23	.10000 01	040000	.10485760 07	FT
2K11	0526		13	.10000 01	273400	.60000000 04	FPS
2K14	0217		23	.10000 01	001415	.49984000 05	FT
2K17	0620		17	.10000 01	000005	.50000000 01	COUNTS
2K18	0447		13	.10000 01	000360	.15000000 02	SEC
2K19	0230		23	.10000 01	017205	.50003200 06	FT
2K20	0453		13	.10000 01	000040	.20000000 01	SEC
BM13SF	0676		0	.10000 01	365706	.96049499 00	
B23SF	0677		0	.10000 01	243656	.63999939 00	
B18SF	0700		0	.10000 01	125253	.33333588 00	

DICTIONARY ANALYSIS

NAME	LOC.	INPUT	SCALE	C.F.	AEA OCT.	AEA VALUE	UNITS
B13VSF	0701		0	.10000 01	240000	.62500000 00	
B3SF	0702		0	.10000 01	131415	.34970856 00	
B23RSF	0703		0	.10000 01	032756	.10533142 00	
B13SF	0704		0	.10000 01	032525	.10416412 00	
BACCSF	0446		0	.10000 01	303240	.76293945 00	

113 CONSTANTS ANALYZED

CHECKSUM CALCULATIONS

RANGE	LOC.	ORIG. VALUE	NEW VALUE
0207 - 1004	0206	126003	106617

AEA MEMORY NON-COMPARE

ORIGINAL DECK IS *
NEW DECK IS *

FLIGHT PROGRAM X--LMAGS FPX S03 0151
FLIGHT PROGRAM 6 -- LM AGS FP6 S03 0160

02/14/69
06/16/69

LOC.	ORIG. VALUE	NEW VALUE	LOC.	ORIG. VALUE	NEW VALUE	LOC.	ORIG. VALUE	NEW VALUE	LOC.	ORIG. VALUE	NEW VALUE
0206	126003	106617	0224	270633	267730	0225	261561	261350	0227	540764	547243
0231	256014	255603	0274	776030	756330	0307	120400	120235	0454	003100	002140
0465	000000	000470	0473	432700	406000	0534	314632	314551	0535	314632	314671
0536	314632	315062	0537	000000	777455	0541	000000	000001	0542	000000	000003
0544	000000	777744	0545	000000	777775	0546	000000	777725	0550	000000	735521
0551	000000	766522	0552	000000	160644	0561	010142	012173	0566	026263	006547
0601	767636	765605	0602	010550	000000	0616	000003	000004	0622	000031	000076
0630	327700	327155	0654	713513	713244	0655	012552	016352	0657	000042	000033

LM PROGRAM HEADER=*
DECK LABEL=0160
CHECKSUM=377372002655

FLIGHT PROGRAM 6 -- LM AGS FP6 S03 0160

C-11

06/16/69