

Command List	ATM-369	J
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	DATE 4/11/69	

This command list, applicable to Flight Models 1, 3 and 4 of ALSEP, supersedes previous editions. Flight Model #2 has been allocated for use in the EASEP program, commands for which are defined in EATM-4 (Rev. A) dated 1 February 1969.

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TABLE 1

<u>Symbol</u>	<u>Flight Systems</u>	<u>Command Nomenclature</u>	<u>Octal Command</u>	<u>Decimal Command</u>	<u>Termination Point</u>
CD-31	4	ASE High Bit Rate ON ³	003	3	Data Processor
CD-32	4	ASE High Bit Rate OFF ¹	005	5	" "
CD-33	All	Normal Bit Rate ^{1, 3}	006	6	" "
CD-34	"	Slow Bit Rate	007	7	" "
CD-35	"	Normal Bit Rate Reset ⁴	011	9	" "
CD-1		Transmitter "A" Select ²	012	10	Power Dist. Unit
CD-2	"	Transmitter ON	013	11	" " "
CD-3	"	Transmitter OFF ²	014	12	" " "
CD-4	"	Transmitter "B" Select	015	13	" " "
CD-5	"	PDR #1 ON	017	15	" " "
CD-6	"	PDR #1 OFF	021	17	" " "
CD-7	"	PDR #2 ON	022	18	" " "
CD-8	"	PDR #2 OFF	023	19	" " "
CD-9	"	DSS HTR 3 ON ²	024	20	" " "
CD-10	"	DSS HTR 3 OFF	025	21	" " "
CD-11	"	Data Processor "X" Select ²	034	28	" " "
CD-12	"	Data Processor "Y" Select	035	29	" " "
CD-13	"	Experiment 1 Operational Power ON	036	30	" " "
CD-14	"	Experiment 1 Standby Power ²	037	31	" " "
CD-15	"	Experiment 1 Standby OFF	041	33	" " "
CD-16	"	Experiment 2 Operational Power ON	042	34	" " "
CD-17	"	Experiment 2 Standby Power ^{2, 5}	043	35	" " "

¹ Preset turn-on operating mode.

² Lunar surface initial conditions programmed in during final system checkout.

³ Changes bit rate at end of ALSEP frame during which command executed.

⁴ Changes bit rate upon command execution.

⁵ For Flight system 1, Experiment 2 is effectively OFF in this mode.

TABLE 1 (CONT.)

<u>Symbol</u>	<u>Flight Systems</u>	<u>Command Nomenclature</u>	<u>Octal Command</u>	<u>Decimal Command</u>	<u>Termination Point</u>
CD-18	All	Experiment 2 Standby OFF	044	36	Power Dist. Unit.
CD-19	"	Experiment 3 Operational Power ON	045	37	" " "
CD-20	"	Experiment 3 Standby Power ²	046	38	" " "
CD-21	"	Experiment 3 Standby OFF	050	40	" " "
CD-22	"	Experiment 4 Operational Power ON	052	42	" " "
CD-23	"	Experiment 4 Standby Power ²	053	43	" " "
CD-24	"	Experiment 4 Standby OFF	054	44	" " "
CD-25	"	DSS HTR 1 Select (10w)	055	45	" " "
CD-26	"	DSS HTR 2 Select (5w)	056	46	" " "
CD-27	"	DSS HTR 2 OFF ^{2, 3}	057	47	" " "
CD-36	"	Timer Output Accept ¹	032	26	Command Decoder
CD-37	"	Timer Output Inhibit	033	27	" "
CU-1	"	PCU #1 Select ¹	060	48	Power Cond. Unit
CU-2	"	PCU #2 Select	062	50	" " "
CL-1	"	Gain Change LPX, LPY (Steps through following sequence one step per command) -30db1 0db -10db -20db	063	51	Passive Seismic Exp.
CL-2	"	Gain Change LPZ (Steps through same sequence as CL-1)	064	52	" " "
CL-3	"	Calibration SP ON/OFF ¹	065	53	" " "
CL-4	"	Calibration LP ON/OFF ¹	066	54	" " "

¹Preset turn-on operating mode.

²Lunar surface initial conditions programmed in during final system check out.

³Command CD-27 must be preceded by CD-26.



TABLE 1 (CONT.)

<u>Sys</u>	<u>Flight System</u>	<u>Command Nomenclature</u>	<u>Octal Command</u>	<u>Decimal Command</u>	<u>Termination Point</u>
CL-5	All	Gain Change SPZ (Steps through same sequence as CL-1)	067	55	Passive Seismic Exp.
CL-6	"	Leveling Power X Motor ² ON/OFF ¹	070	56	" " "
CL-7	"	Leveling Power Y Motor ² ON/OFF ¹	071	57	" " "
CL-8	"	Leveling Power Z Motor ² ON/OFF ¹	072	58	" " "
CL-9	"	Uncage Arm/Fire	073	59	" " "
CL-10	"	Leveling Direction ² Plus ¹ /Minus	074	60	" " "
CL-11	"	Leveling Speed ² Low ¹ /High	075	61	" " "
CL-12	"	Thermal Control Mode Auto ¹ /Manual ⁴	076	62	" " "
CL-13	"	Feedback Filter IN/OUT ¹	101	65	" " "
CL-14	"	Coarse Level Sensor IN/OUT ¹	102	66	" " "
CL-15	"	Leveling Mode ² Auto ¹ /Manual	103	67	" " "
CT-1	1, 4	SIDE Load Cmd #1 Command	104	68	Suprathermal Ion Det.
CT-2	"	SIDE Load Cmd #2 Functions	105	69	" " "
CT-3	"	SIDE Load Cmd #3 As shown	106	70	" " "
CT-4	"	SIDE Load Cmd #4 in Note 1	107	71	" " "
CT-5	"	SIDE Execute Command on Page 15	110	72	" " "
CC-1	3, 4	CPLLE Operational Heater ON ^{1,5}	111	73	Charged Particle Exp.
CC-2	"	CPLLE Operational Heater OFF	112	74	" " "
CC-3	"	CPLLE Dust Cover Removal	113	75	" " "
CC-4	"	CPLLE Automatic Voltage Sequence - ON ¹	114	76	" " "
CC-5	"	CPLLE Step Voltage Level ³ (Steps voltage through following steps one step per command) 3500 350 35 0 -35 -350 -3500 0 and repeat	115	77	" " "

¹ Preset turn-on operating mode.

² Manual leveling sequence is as follows: Send CL-15 to change from auto to manual leveling mode, change direction, and speed by CL-10 and CL-11 as necessary, and then execute leveling operation by sending appropriate leveling motor commands, CL-6, CL-7, or CL-8. Leveling operation is terminated by retransmission of CL-6, CL-7, or CL-8.

³ Command sequence is to send CC-6 and then send CC-5 to step voltage levels. CPLLE stops at level it is on at time of command execution.

⁴ Sequence of command is auto on¹/auto off/manual on/manual off.

⁵ There are three CPLLE heater modes. On initial turn on the CPLLE thermostat controls the heaters. CC-1 overrides thermostat and turns heaters on, CC-2 turns heaters off. CPLLE is placed back on thermostat by experiment power turn off and back on.

TABLE 1 (CONT.)

Symbol	Flight System	Command Nomenclature	Octal Command	Decimal Command	Termination Point
CC-6	3,4	CPL E Automatic Voltage Sequence - OFF ¹	117	79	Charged Particle Exp.
CC-7	"	CPL E Channeltron Voltage Increase - ON (One step increase in voltage)	120	80	" " "
CC-8	"	CPL E Channeltron Voltage Increase - OFF ²	121	81	" " "
CW-1	1	SWS Dust Cover Removal ^{5, 7}	122	82	Solar Wind Experiment
CM-1	"	LSM Range Select (Steps through three ranges, one step per command) 400 gammas full scale ² 100 " " " 200 " " " repeat	123	83	LSM Experiment
CM-2	"	Steady Field Offset ³ (Step through seven values, one step per command) 0 percent of full scale ² +25 percent of full scale +50 percent of full scale +75 percent of full scale -75 percent of full scale -50 percent of full scale -25 percent of full scale 0 percent of full scale and repeat	124	84	" "
CM-3	"	Steady Field Address (Steps through following step X axis to Y axis to Z axis to neutral ²)	125	85	" "
CM-4	"	Flip/Cal Inhibit In ² /Out	127	87	" "
CM-5	"	Flip/Cal ⁴ Initiate Science mode after (Returns to Science mode after Flip/Cal sequence)	131	89	" "

¹ CPLE remains in voltage level activated at time of CC-6 command execution and then can be stepped to the next step in sequence by CC-5 or returned to automatic mode by CC-4.

² Preset turn-on operating mode.

³ Field offset sequence is as follows: select proper axis with CM-3, then execute CM-2 the proper number of times to step from present value to desired value.

⁴ Also activated every 12 hours after hour 108 by delayed command sequencer.

⁵ Also executed at hour 96 by delayed command sequencer.

⁶ For 0° flip position; reverse for 180° flip position.

⁷ Repetition of CW-1 three times within ten seconds results in High Voltage Gain Change.

TABLE 1 (CONT.)

<u>Symbol</u>	<u>Flight System</u>	<u>Command Nomenclature</u>	<u>Octal</u>	<u>Decimal</u>	<u>Termination Point</u>
CM-6	1	LSM Filter Failure (In ¹ /Out) Bypass	132	90	LSM Experiment
CM-7	"	Site Survey ²	133	91	" "
CM-8	"	Temperature Control x ¹ /Y/OFF Repeat (Changes from X-axis sensor ¹ to Y-axis sensor to OFF)	134	92	" "
CH-1	3	Normal (Gradient) Mode Select ¹	135	93	Heat Flow Experiment
CH-2	"	Low Conductivity Mode Select (Ring Source)	136	94	" " "
CH-3	"	High Conductivity Mode Select (Heat Pulse)	140	96	" " "
CH-4	"	HF Full Sequence Select ¹	141	97	" " "
CH-5	"	HF Probe #1 Sequence Select	142	98	" " "
CH-6	"	HF Probe #2 Sequence Select	143	99	" " "
CH-7	"	HF Subsequence #1	144	100	" " "
CH-8	"	HF Subsequence #2	145	101	" " "
CH-9	"	HF Subsequence #3	146	102	" " "
CH-10	"	HF Heater Advance (Steps through following 16 step-sequence one step per command) All heaters off Probe #1 heater #2 ON All heaters off Probe #1 heater #4 ON All heaters off Probe #1 heater #1 ON All heaters off Probe #1 heater #3 ON All heaters off Probe #2 heater #2 ON All heaters off Probe #2 heater #4 ON All heaters off Probe #2 heater #1 ON All heaters off Probe #2 heater #3 ON repeat	152	106	" " "

¹Preset turn-on operating mode.²First execution of CM-7 performs X-axis survey, second execution Y-axis survey, and third execution Z-axis survey.

TABLE 1 (CONT.)

<u>Symbol</u>	<u>Flight System</u>	<u>Command Nomenclature</u>	<u>Octal Command</u>	<u>Decimal Command</u>	<u>Termination Point</u>
CS-1	4	Geophone Calibrate	156	110	Active Seismic Expt.
CS-3	4	ASE Grenade Sequential Single Fire (Fires single grenades in sequence 2, 4, 3, 1. Previous grenade must fire before next grenade will fire. Four executions required.)	162	114	" " "
CS-4	4	ASE Grenade #1 Fire	163	115	" " "
CS-5	4	ASE Grenade #2 Fire	164	116	" " "
CS-6	4	ASE Grenade #3 Fire	165	117	" " "
CS-7	4	ASE Grenade #4 Fire	166	118	" " "
CS-8	4	Arm Grenades	170	120	" " "
CX-1	All	Dust Detector - ON ⁴	027	023	Power Dist. Unit
CX-2	All	Dust Detector - OFF	031	025	" " "
CG-1	3	Cal Mode Set	104	068	Cold Cathode Gauge Expt.
CG-2	3	Uprange ¹	105	069	" " " "
CG-3	3	Manual Ranging Mode (Steps through seven ranges)	106	070	" " " "
CG-4	3	Downrange ^{1,2}	107	071	" " " "
CG-5	3	Automatic Ranging Mode ³	110	072	" " " "

¹Command sequence for manually changing range is CG-3 after either CG-2 or CG-4 to set up or downrange respectively.

²Command CG-4 breaks CCGE seal on first execution, may require prior execution of CG-2 to set.

³Preset turn-on operating mode.

⁴Lunar surface initial conditions programmed in during final system checkout.

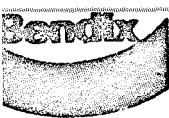


TABLE 2
COMMAND SUMMARY

Termination Point	Number of Commands		
	Flight System #1	Flight System #3	Flight System #4
Data Processor	3	3	5
Power Distribution Unit (Power Switching)	29	29	29
Power Conditioning Unit	2	2	2
Command Decoder	2	2	2
Passive Seismic	15	15	15
Suprathermal Ion Detector/CCGE	5	-	5
Charged Particle	-	8	8
Solar Wind	1	-	-
Magnetometer	8	-	-
Heat Flow	-	10	-
Active Seismic	-	-	7
CCGE (MSC)	-	5	-
Total	65	74	73

Special Commands - Not Assignable

<u>Function</u>	<u>Octal Code</u>	<u>Number</u>
Test Commands	1, 2, 4, 10, 20, 40, 100, 77, 137, 157, 167, 173, 175, 176	14
Address	130, 30, 116, 16, 151, 51 *	6
Address Complement	47, 147, 61, 161, 26, 126 **	6
No Command	0, 177	2
		<u>28</u>
Commands Assigned		92
Commands Not Assignable		28
Commands Not Presently Assigned (150, 153, 154, 155, 160, 171, 172, 174)		8
Total Commands		128

Addresses for Flight System #4 are 25, 65.

**Address complements for Flight System #4 are 152, 112; dual usage is indicated in Table 3 by X in parentheses (X).

TABLE 3

CROSS REFERENCE OF COMMAND NUMBER TO COMMAND FUNCTION

Decimal Command	Octal Command	Command Symbol	Usage			Test Cmds.	Address	Address Complement	No Command	Not Presently Assigned
			Flt. Sys. 1	Flt. Sys. 3	Flt. Sys. 4					
1	1					X				
2	2					X				
3	3	CD-31			X					
4	4					X				
5	5	CD-32			X					
6	6	CD-33	X	X	X					
7	7	CD-34	X	X	X					
8	10					X				
9	11	CD-35	X	X	X					
10	12	CD-1	X	X	X					
11	13	CD-2	X	X	X					
12	14	CD-3	X	X	X					
13	15	CD-4	X	X	X					
14	16						X			
15	17	CD-5	X	X	X					
16	20					X				
17	21	CD-6	X	X	X					
18	22	CD-7	X	X	X					
19	23	CD-8	X	X	X					
20	24	CD-9	X	X	X					
21	25	CD-10	X	X	X(X)		(X)			
22	26							X		



TABLE 3 (CONT.)

Decimal Command	Octal Command	Command Symbol	Flt. Sys. 1	Usage			Test Cmds.	Address	Address Complement	No Command	Not Presently Assigned
				Flt. Sys. 3	Flt. Sys. 4						
23	27	CX-1	X	X	X						
24	30						X				
25	31	CX-2	X	X	X						
26	32	CD-36	X	X	X						
27	33	CD-37	X	X	X						
28	34	CD-11	X	X	X						
29	35	CD-12	X	X	X						
30	36	CD-13	X	X	X						
31	37	CD-14	X	X	X						
32	40					X					
33	41	CD-15	X	X	X						
34	42	CD-16	X	X	X						
35	43	CD-17	X	X	X						
36	44	CD-18	X	X	X						
37	45	CD-19	X	X	X						
38	46	CD-20	X	X	X						
39	47							X			
40	50	CD-21	X	X	X						
41	51						X				
42	52	CD-22	X	X	X						
43	53	CD-23	X	X	X						
44	54	CD-24	X	X	X						
45	55	CD-25	X	X	X						
46	56	CD-26	X	X	X						



TABLE 3 (CONT.)

Decimal Command	Octal Command	Command Symbol	Flt. Sys. 1	Usage		Test Cmds.	Address	Address Complement	No Command	Not Presently Assigned
				Flt. Sys. 3	Flt. Sys. 4					
47	57	CD-27	X	X	X					
48	60	CU-1	X	X	X					
49	61							X		
50	62	CU-2	X	X	X					
51	63	CL-1	X	X	X					
52	64	CL-2	X	X	X					
53	65	CL-3	X	X	X (X)		(X)			
54	66	CL-4	X	X	X					
55	67	CL-5	X	X	X					
56	70	CL-6	X	X	X					
57	71	CL-7	X	X	X					
58	72	CL-8	X	X	X					
59	73	CL-9	X	X	X					
60	74	CL-10	X	X	X					
61	75	CL-11	X	X	X					
62	76	CL-12	X	X	X					
63	77					X				
64	100					X				
65	101	CL-13	X	X	X					
66	102	CL-14	X	X	X					
67	103	CL-15	X	X	X					
68	104	CT-1	X	CG-1 X	X					



TABLE 3 (CONT.)

Decimal Command	Octal Command	Command Symbol	Flt. Sys. 1	Usage			Test Cmds.	Address	Address Complement	No Command	Not Presently Assigned
				Flt. Sys. 3	Flt. Sys. 4						
69	105	CT-2	X	CG-2 X	X						
70	106	CT-3	X	CG-3 X	X						
71	107	CT-4	X	CG-4 X	X						
72	110	CT-5	X	CG-5 X	X						
73	111	CC-1		X	X						
74	112	CC-2		X	X (X)			(X)			
75	113	CC-3		X	X						
76	114	CC-4		X	X						
77	115	CC-5		X	X						
78	116						X				
79	117	CC-6		X	X						
80	120	CC-7		X	X						
81	121	CC-8		X	X						
82	122	CW-1	X								
83	123	CM-1	X								
84	124	CM-2	X								
85	125	CM-3	X								
86	126							X			
87	127	CM-4	X								
88	130						X				
89	131	CM-5	X								
90	132	CM-6	X								



TABLE 3 (CONT.)

Decimal Command	Octal Command	Command Symbol	Usage			Test Cmds.	Address	Address Complement	No Command	Not Presently Assigned
			Flt. Sys. 1	Flt. Sys. 3	Flt. Sys. 4					
113	161							X		
114	162	CS-3			X					
115	163	CS-4			X					
116	164	CS-5			X					
117	165	CS-6			X					
118	166	CS-7			X					
119	167					X				
120	170	CS-8			X					
121	171									X
122	172									X
123	173					X				
124	174									X
125	175					X				
126	176					X				
127	177								X	
0	000								X	
Totals			65	74	73	14	6	6	2	8

Note 2

Heat Flow Command Structure

Octal commands 144 through 146 are used to select subsets of the full heat flow measurement sequence as follows:

Command 144 selects a subset consisting of the four high sensitivity gradient measurements only.

Command 144 followed by command 145 selects a subset consisting of the four low sensitivity gradient measurements only.

Command 144 followed by command 146 selects a subset consisting of probe ambient temperature measurements only.

Command 145 followed by command 146 selects a subset consisting of thermocouple measurements only.

Note 3

Experiment Designations by Flight System

<u>Experiment No.</u>	<u>Flight 1</u>	<u>Flight 3</u>	<u>Flight 4</u>
1	PSE	HFE	PSE
2	ME	PSE	ASE
3	SWE	CCGE	SIDE/CCGE
4	SIDE/CCGE	CPLEE	CPLFE