

Measurements List

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OUTDATED

This list contains all items of Telemetry and Commands in Array A. The "Frame", "Column" and "Row" columns on the telemetry list indicate the word location in the TM bit stream as defined in ATM-262. The Command numbers uniquely identify each command in Array A and are the base 10 equivalent of the binary code assigned to each command.

Prepared by


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Approved by


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CENTRAL STATION MEASUREMENTS

Measurement	Range	Accuracy (Required)	Bits Per Sample	Samples/ Second	Data Location		
					Frame	Column	Row
Crystal Temp., Receiver	-50° to 200°F		10	0.018	16	1	5
Pre-Limiting Level, Receiver			10	0.018	17	1	5
Local Oscillator Output Level, Recvr.			10	0.018	18	1	5
Subcarrier Presence, Receiver	Bistable	NA	10	0.018	19	1	5
Crystal Temp., Transmitter "A"	-50° to 200°F	± 10°F	10	0.018	20	1	5
Crystal Temp., Transmitter "B"	-50° to 200°F	± 10°F	10	0.018	21	1	5
Heat Sink Temp., Transmitter "A"	-50° to 200°F	± 10°F	10	0.018	22	1	5
Heat Sink Temp., Transmitter "B"	-50° to 200°F	± 10°F	10	0.018	23	1	5
Base Temp., Data Processor "A"	-50° to 200°F	± 10°F	10	0.018	24	1	5
Base Temp., Data Processor "B"	-50° to 200°F	± 10°F	10	0.018	25	1	5
Internal Temp., Data Processor "A"	-50° to 200°F	± 10°F	10	0.018	26	1	5
Internal Temp., Data Processor "B"	-50° to 200°F	± 10°F	10	0.018	27	1	5
Internal Temp., Command Decoder	-50° to 200°F	± 10°F	10	0.018	28	1	5
Base Temp., Command Decoder	-50° to 200°F	± 10°F	10	0.018	29	1	5
VCO Temp., Command Decoder	-50° to 200°F	± 10°F	10	0.018	30	1	5
Internal Temp., Power Distribution	-50° to 200°F	± 10°F	10	0.018	31	1	5
Base Temp., Power Distribution	-50° to 200°F	± 10°F	10	0.018	32	1	5
Sun Shield Temp., #1	-300° to +300°F	± 15°F	10	0.018	33	1	5

(cont'd)

CENTRAL STATION MEASUREMENTS (cont'd)

Measurement	Range	Accuracy (Required)	Bits per Sample	Samples/ Second	Data Location		
					Frame	Column	Row
Sun Shield Temp., #2	-300° to +300°F	± 15°F	10	0.018	34	1	5
Sun Shield Temp., #3	-300° to +300°F	± 15°F	10	0.018	35	1	5
Sun Shield Temp., #4	-300° to +300°F	± 15°F	10	0.018	36	1	5
Sun Shield Temp., #5	-300° to +300°F	± 15°F	10	0.018	37	1	5
Thermal Plate Temp., #1	-50° to +200°F	± 15°F	10	0.018	38	1	5
Thermal Plate Temp., #2	-50° to +200°F	± 15°F	10	0.018	39	1	5
Thermal Plate Temp., #3	-50° to 200°F	± 10°F	10	0.0183	40	1	5
Thermal Plate Temp., #4	-50° to 200°F	± 10°F	10	0.0183	41	1	5
Thermal Plate Temp., #5	-50° to 200°F	± 10°F	10	0.0183	42	1	5
Thermal Plate Temp., #6	-50° to 200°F	± 10°F	10	0.0183	43	1	5
Thermal Plate Temp., #7	-50° to 200°F	± 10°F	10	0.0183	44	1	5
PCU Output Voltage #1	0 to 35 vdc	± 1%	10	0.018	45	1	5
PCU Output Voltage #2	0 to 18 vdc	± 1%	10	0.018	46	1	5
PCU Output Voltage #3	0 to 15 vdc				47	1	5
PCU Output Voltage #4	0 to 6 vdc	± 1%	10	0.018	48	1	5
PCU Output Voltage #5	0 to -15 vdc				49	1	5
PCU Output Current (29 vdc supply)	0 to 2 amps	± 5%	10	0.018	50	1	5

POWER SUBSYSTEM MEASUREMENTS

Measurement	Range	Accuracy	Bits Per Sample	Samples Second	Data Location		
					Frame	Column	Row
RTG Hot Junction Temp. #1	1000°F to 1400°F	± 20°F	10	0.018	51	1	5
RTG Hot Junction Temp. #2	1000°F to 1400°F	± 20°F	10	0.018	52	1	5
RTG Hot Junction Temp. #3	1000°F to 1400°F	± 20°F	10	0.018	53	1	5
RTG Cold Junction Temp. #1	600° to 1000°F	± 20°F	10	0.018	54	1	5
RTG Cold Junction Temp. #2	600° to 1000°F	± 20°F	10	0.018	55	1	5
RTG Cold Junction Temp. #3	600° to 1000°F	± 20°F	10	0.018	56	1	5
RTG Output Voltage	0 to 30 vdc	± 1%	10	0.018	57	1	5
RTG Output Current	0 to 8 amps	± 5%	10	0.018	58	1	5
PCU Internal Temp. #1	0° -125°F	± 10°F	10	0.018	59	1	5
PCU Internal Temp. #2	0° -125°F	± 10°F	10	0.018	60	1	5
PCU Power Stage #1 On	0 - 3v	± 20%	10	0.018	61	1	5
PCU Power Stage #2 On	0 - 3v	± 20%	10	0.018	62	1	5

PASSIVE SEISMIC MEASUREMENTS

Measurement	Range	Accuracy	Bits Per Sample	Samples / Second	Data Location		
					Frame	Column	Row
LP, N-S Seismic Output	10 to 1×10^5 millimicrons	Resolution: 10 millimicrons	10	6.6	Every	1	2, 4, 6, 8
LP, E-W Seismic Output	10 to 1×10^5 millimicrons	Resolution: 10 millimicrons	10	6.6	Every	3	2, 4, 6, 8
LP, Vert. Seismic Output	10 to 1×10^5 millimicrons	Resolution: 10 millimicrons	10	6.6	Every	5	2, 4, 6, 8
LP, N-S, Tidal Output	$300v/cm/sec^2$	Resolution: 50 microgals	10	0.83	Even	3	5
LP, E-W, Tidal Output	$300v/cm/sec^2$	Resolution: 50 microgals	10	0.83	Even	5	5
LP, Vert. Tidal Output	$300v/cm/sec^2$	Resolution: 50 microgals	10	0.83	Odd	3	5
Temperature	10-40°C	0.1°C	10	0.83	Odd	5	5
SPSeismic Output	1 to 1×10^4 millimicrons	Resolution: 1 millimicron	10	38.1	Every	29 locations as shown in Fig. 1	
LP, Tide Reference Voltage	0-2.5v	0.5%	10	0.018 A	63	1	5
LP, Tide Reference Voltage	0-2.5v	0.5%	10	0.018 A	64	1	5
LP, Tide Reference Voltage	0-2.5v	0.5%	10	0.018 A	65	1	5
Instrument Temperature	-50°F to $\pm 200^\circ F$	0.1°C	10	0.018 A	66	1	5
LP Amplifier Gain Setting	H-3 level	NA	10	0.018 A	67	1	5
LP Amplifier Gain Setting	H-3 level	NA	10	0.018 A	68	1	5
SP Amplifier Gain Setting	3 level	NA	10	0.018 A	69	1	5
LP Amplifier Gain Setting (Vertical)	3 level	NA	10	0.018 A	70	1	5

SUPRATHERMAL ION DETECTOR

Measurement	Range	Accuracy	Bits/ sample	Samples/ Second	Data Location Frame	Column	Row
Step Ident.			10	3	odd	7	2
CCGE			10	3	odd	7	4
High Energy Analyzer Voltage			10	3	odd	7	5
High energy count	)	)	)			8	7
	) 1-2 ²⁰ particles	) 10 ⁻¹⁰	) 20	1.5	odd		
High energy count	)	)	)			7	8
Command & Step Info.			10	3	even	7	2
Velocity Select Voltage			10	3	even	7	4
Low energy analyzer Voltage			10	3	even	7	5
Low energy count	)	)	)			8	7
	) 1-2 ²⁰ particles	) 10 ⁻¹⁰	) 20	1.5	even		
Low energy count	)	)	)			7	8

TABLE 3

MAGNETOMETER MEASUREMENTS

Measurement	Range	Accuracy (Required)	Bits per Sample	Samples/ Second	Data Location Frame	Column	Row
Field Strength, Magnetic X Axis	-200 to +200 gamma	± 0.5 gamma	10	3.3	each	1 1	3 7
Field Strength, Magnetic Y Axis	-200 to +200 gamma	± 0.5 gamma	10	3.3	each	3 3	3 7
Field Strength, Magnetic Z Axis	-200 to +200 gamma	± 0.5 gamma	10	3.3	each	5 5	3 7
Magnetometer Temp. #1	-100 ^o to +250 ^o F	$\pm 7^{\circ}$ F	3 I D 7 Data 0.0183		1 every 16	5	1
Magnetometer Temp. #2	-100 ^o to +250 ^o F	$\pm 7^{\circ}$ F	3 I D 7 Data 0.0183		1 every 16	5	1
Magnetometer Temp. #3	-100 ^o to +250 ^o F	$\pm 7^{\circ}$ F	3 I D 7 Data 0.0183		1 every 16	5	1
Magnetometer Temp. #4	-100 ^o to +250 ^o F	$\pm 7^{\circ}$ F	3 I D 7 Data 0.0183		1 every 16	5	1
Magnetometer Temp. #5	-100 ^o to +250 ^o F	$\pm 7^{\circ}$ F	3 I D 7 Data 0.0183		1 every 16	5	1
Level Sensor			3 I D 7 Data		1 every 16	5	1
Level Sensor			3 I D 7 Data		1 every 16	5	1
Status Flag Grp. 1			3 I D 7 Data		1 every 16	5	1
Status Flag Grp. 2			3 I D 7 Data		1 every 16	5	1
Status Flag Grp. 3			3 I D 7 Data		1 every 16	5	1
Status Flag Grp. 4			3 I D 7 Data		1 every 16	5	1

(cont'd)

MAGNETOMETER MEASUREMENTS

TABLE 3 (cont'd)

Measurement	Range	Accuracy (Required)	Bits per Sample	Samples/ Second	Data Location		Row
					Frame	Column	
All Zeros			10		1 every 16	5	1
All Zeros			10		1 every 16	5	1
All Zeros			10		1 every 16	5	1
All Zeros			10		1 every 16	5	1
All Zeros			10		1 every 16	5	1

SOLAR WIND MEASUREMENTS

Measurement	Range	Accuracy	Bits per Sample	Samples/ Second	Data Location		Row
					Frame	Column	
Proton and electron		$\pm 4\%$	10	6.625	(See Note)	7	1
measurements plus		$\pm 4\%$	10	6.625		7	3
calibration and		$\pm 4\%$	10	6.625		7	5
housekeeping data		$\pm 4\%$	10	6.625		7	7

NOTE: Using these four word positions, a cycle of 186 words is transmitted at four words per frame. Because the 80 calibration and housekeeping words are read 16 per each 186 word sequence, these 186 words must be repeated 5 times to obtain all the housekeeping and calibration data.



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Command
Number

User and Function

Data Subsystem

3	Slow Data Rate
5	Normal Data Rate
6	Initialize
7	Timer Reset
9	Diplexer Transmitter A
10	Diplexer Transmitter B

Power Distribution

15	Passive Seismic on
17	Passive Seismic off
18	Passive Seismic thermal control on
19	Passive Seismic thermal control off
20	Suprathermal Ion Detector on high level
21	Suprathermal Ion Detector on low level
23	Suprathermal Ion Detector off
25	Suprathermal Ion Detector thermal control on
26	Suprathermal Ion Detector thermal control off
27	
42	Solar Wind on high level
43	Solar Wind on low level
44	Solar Wind off
46	Magnetometer on
47	Magnetometer off
48	Magnetometer Thermal Control on
50	Magnetometer Thermal Control off
51	Central Package Thermal Control on
52	Central Package Thermal Control off
53	Central Package Thermal Control on
54	Central Package Thermal Control off
55	Data Processor A-on, B-off
56	Data Processor B-on, A-off
57	Transmitter Master on
58	Transmitter Master off
59	Transmitter A-on, B-off



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Command
Number

User and Function

Power S. S. Control

65 Redundant ckt override

Passive Seismic Experiment

70 Change gain L-P horizontal
71 Change gain L-P horizontal
72 Change gain L-P vertical
73 Calibration on
74 Calibration off
75 Change gain S-P

76 Self leveling on
77 Self leveling off

79 Uncage

80 Tide zero on
81 Tide zero off
82 Thermal control bypass on
83 Thermal control bypass off

Supra-thermal Ion Detector

90 These comprise 4 command
91 lines and 1 line for an execute
92 command. The 16 command
93 functions transmitted on these
94 lines are given below.

Command
FunctionSuprathermal Ion
Detector Functions

1 Dust Cover removal
2 Thermal Control bypass on
3 Thermal control bypass off
4 Break pressure gauge seal
5 Channeltron voltage normal
6 Change Channeltron voltage normal
7 Change velocity selector Program No. 1
8 Change velocity selector Program No. 2
9 Change velocity selector Program No. 3
10 Change retarding pot. progr.
Program No. 1



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Command Function	Suprathermal Ion Detector Functions
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- | | |
|----|---|
| 11 | Change retarding pot. progr.
Program No. 2 |
| 12 | Change retarding pot. progr.
Program No. 2 |
| 13 | Change ground plane bias
Program No. 1 |
| 14 | Change ground plane bias
Program No. 2 |
| 15 | Change ground plane bias
Program No. 3 |
| 16 | Change ground plane bias
Program No. 4 |

Solar Wind

- | | |
|-----|--------------------|
| 100 | Dust cover removal |
|-----|--------------------|

Magnetometer

- | | |
|-----|-----------------------|
| 110 | Range selection |
| 112 | Steady field offset |
| 114 | Steady field hold |
| 115 | Flip/cal inhibit |
| 117 | Filter failure bypass |
| 118 | Site survey |



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FIGURE 1

Array A

Normal Configuration

	1	2	3	4	5	6	7	8
1	X	X	X	x	o	x	S	x
2	-	x	-	x	-	x	I	x
3	o	x	o	x	o	x	S	x
4	-	x	-	x	-	x	I	x
5	H	x	●	x	●	x	S	x
6	-	x	-	x	-	CV	I	x
7	o	x	o	x	o	x	S	I
8	-	x	-	x	-	x	I	x

Legend:

X = Control
x = Passive Seismic - Short period
- = Passive Seismic - Long period seismic
● = Passive Seismic - Long period tidal and one temperature
o = Magnetometer
S = Solar Wind
I = Ionosphere (digital)

HF = Heat Flow
CP = Charged Particle
CV = Command Verification
H = Housekeeping

Each box contains one 10 bit word

Total bits per frame $\approx 10 \times 64 = 640$ bits