

INTERNATIONAL SUN - EARTH EXPLORER - C
(ISEE-C)

Telemetry Formats
and
Telemetry Lists

Revision C

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ISEE-C
Telemetry Formats and Telemetry List

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List of Effective Pages

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Cover	C
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Revision Page

Revision	Date	By	Description
Original	8/16/76	B. Cain	Initial Release
A	12/7/76	B. Cain	Telemetry Formats and Individual Telemetry List's updated to include latest available information.
B	4/20/77	B. Cain	Include latest available information
C	9/8/77	B. Cain	Include latest available information

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I. PURPOSE

The purpose of this document is to present the system used to identify the ISEE-C Spacecraft Telemetry Channels and to present a detailed telemetry list for the ISEE-C Spacecraft.

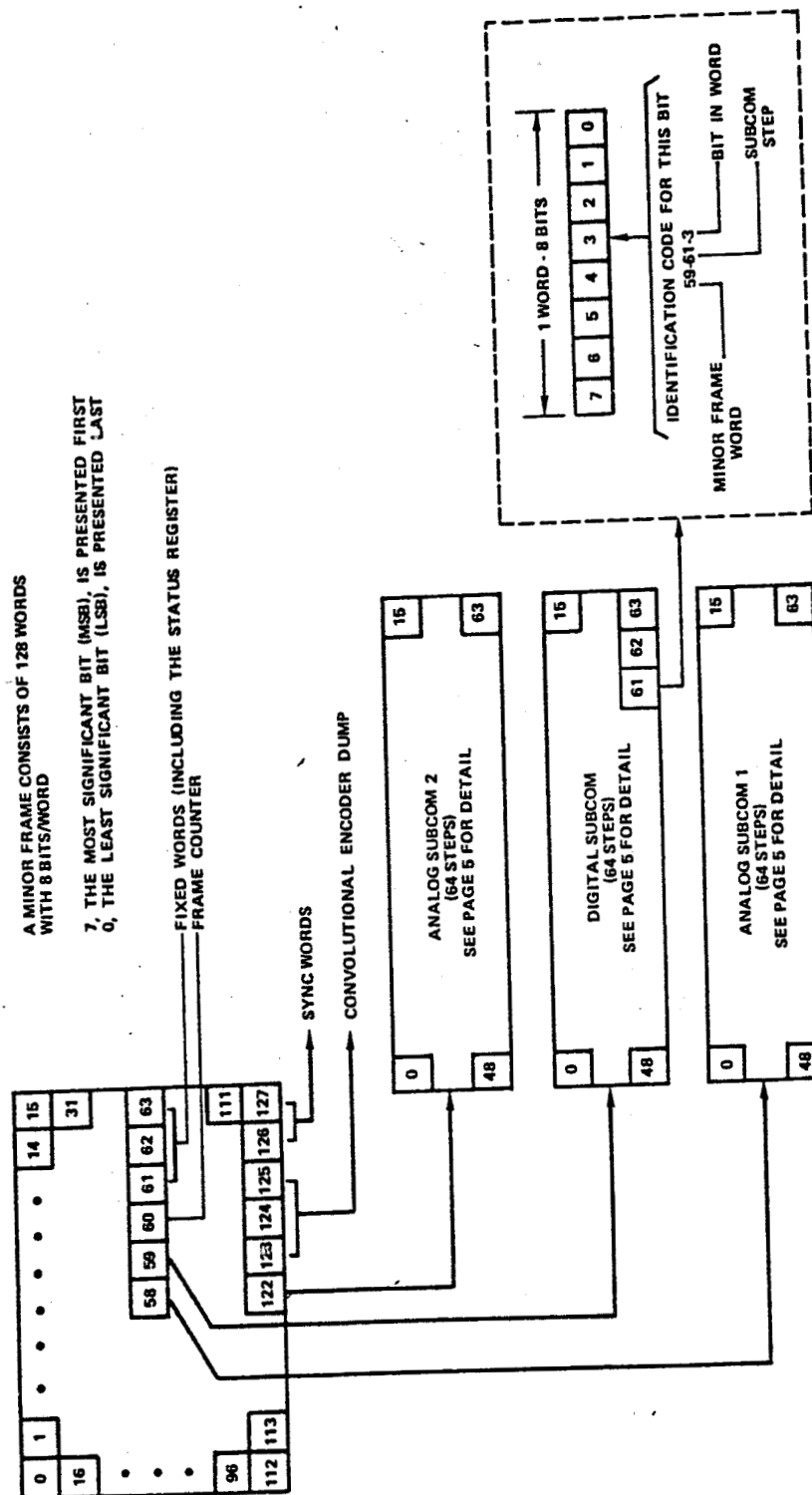
II. SCOPE

The telemetry system identification is presented in graphic form to provide a rapid assessment of the system. A detailed telemetry list for the scientific format, with the telemetry assignments listed in numerical order, is presented in Appendix A. Appendix B lists the assignments by subsystem/experiment. The telemetry list for the engineering format is presented in Appendix C.

III. REFERENCES

Detailed information pertinent to the ISEE-C telemetry system can be found in GSFC Document ISEE-733-74-001, Revision C, dated 28 June 1976 and entitled "International Sun-Earth Explorer - A/C, Electrical Interface Specification.

IV. ISEE-C Telemetry Bit Identification



NOTE: 256 Minor frames/major frame

V. ISEE-C Telemetry Timing Table

Bit Rate Time (sec)	Major Frame	Minor Frame	Analog Subcoms (word)	Digital Subcom (word)	Fixed Words
0	0	0	0	0	0
0.5		1	1	1	1
1.0		2	2	2	2
1.5		3	3	3	3
2.0		4	4	4	0
2.5		5	5	5	1
.		.	.	.	.
.		.	.	.	.
.		.	.	.	.
30.5		61	61	61	1
31.0		62	62	62	2
31.5		63	63	63	3
32.0		64	0	0	0
		65	1	1	1
		.	.	.	.
		.	.	.	.
		.	.	.	.
		125	61	61	1
		126	62	62	2
		127	63	63	3
64.0		128	0	0	0
		129	1	1	1
		.	.	.	.
		.	.	.	.
		.	.	.	.
		189	61	61	1
		190	62	62	2
		191	63	63	3
96.0		192	0	0	0
		193	1	1	1
		.	.	.	.
		.	.	.	.
		.	.	.	.
		253	61	61	1
		254	62	62	2
		255	63	63	3
128.0	1	0	0	0	0

122	Analog Subcom (ASI)2 (See Page 5)
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VII ISEE-C Subcom Formats

Word 58
Analog
Subcom
(ASI) 1

Revision B

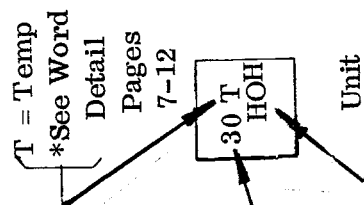
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
16 T	17 T	18 T	19 T	20 T	21 T	22 T	23 T	24 T	25 T	26 T	27 T	28 T	29 T	30 T	31 T
BAH	AT	BAH	ANH	CM	HKH	MEH	MEH	MEH	HOH	HOH	SCH	SCH	STH	DFH	DFH
32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47
48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63
SBH	SBH	Spare	TYH	CM	MEH	Spare	SCH	STH	AM	Spare	Spare	DFH	OGH	OGH	OGH

Subcom Word No.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
AM	CM	CM	19 T	20 T	21 T	22 T	23 T	24 T	25 T	26 T	27 T	28 T	29 T	30 T	31 T
16 T	17 T	18 T	TYH	CM	AM	CM	CM	CM	PW	CM	AM	HOH	HOH	AT	AT
TL	TYH	SBH	TYH	CM	AM	CM	CM	CM	PW	CM	AM	HOH	HOH	SD	SD
32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47
48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63
PW	CM	CM	SD	TL	SD	SD	AT	AT	CM	CM	AM	PW	AM	AM	AM

Word 122
Analog
Subcom
(ASI) 2

5



Word 59
Digital
Subcom
(DSI)

0	1	2	3	4	5	6	7	8	9	10*	11*	12*	13*	14*	15*
16*	17*	18*	19*	20*	21*	22*	23*	24	25	26	27	28	29	30	31
32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47
48*	49*	50*	51*	52*	53*	54*	55*	56	57	58	59	60	61	62	63
PW	SD	SD	AT	CM	CM	AT	AT	SPARE	SPARE	SPARE	TL	Spare	MEH	MEH	SMH

4/20/77

VIII Status Register ISEE-C Words 61, 62, 63
in Minor Frame

Word 61 Unit: TL AT, SE	7 = MSB							0 = LSB		
	0	1	2	3	4	5	6	7	8	9
	TL Parity Correct	Third Stage Separated	HPS-A Latch Valve 1 Position	HPS-B Latch Valve 2 Position	HPS-A Latch Valve 3 Position	HPS-B Latch Valve 4 Position	Spare	Third Stage Separation Switch Bypass	Disabled	Enabled
0			Closed	Closed	Closed	Closed				
1	Wrong	Attached	Open	Open	Open	Open				

Word 62 Unit: SE, CM-03, SD	7 = MSB							0 = LSB		
	0	1	2	3	4	5	6	7	8	9
	Spare	Spare	+Y Inertia Boom	-Y Inertia Boom	Transponder A	Transponder B	+ X Boom	- X Boom	Folded	Deployed
0			Folded	Folded	Unlock	Unlock	Folded	Folded		
1			Deployed	Deployed	Lock	Lock	Deployed	Deployed		

Word 63 Unit: CM-01	7 = MSB							0 = LSB		
	0	1	2	3	4	5	6	7	8	9
	Command Drivers A	Command Drivers B	Data Present Decoder A	Data Present Decoder B	Parity Decoder A	Parity Decoder B	Address Decoder A	Address Decoder B	OK	False
0	Disable	Disable	No	No	OK	OK	OK	OK		
1	Enable	Enable	Yes	Yes	False	False	False	False		

IX. ISEE-C Digital Subcom Word Detail (Sheet 1 of 6)

Word 10	7 -MSB							0-LSB		
	Thruster No. 1 Select	Thruster No. 2 Select	Thruster No. 3 Select	Thruster No. 4 Select	Thruster No. 5 Select	Thruster No. 6 Select	Thruster No. 7 Select	Thruster No. 8 Select		
Unit: AT	Not-Selected	Not-Selected	Not-Selected	Not-Selected	Not-Selected	Not-Selected	Not-Selected	Not-Selected		
0	Selected	Selected	Selected	Selected	Selected	Selected	Selected	Selected		
1										

Word 11	Thruster No. 11 Select	Thruster No. 12 Select	Thruster No. 9 Select	Thruster No. 10 Select	Sector Initiate	Sector Initiate	Sector Initiate
	Not-Selected	Not-Selected	Not-Selected	Not-Selected	2 ⁹	2 ⁸	2 ⁷
Unit: AT	Not-Selected	Not-Selected	Not-Selected	Not-Selected			
0	Selected	Selected	Selected	Selected			
1							

Word 12	Sector	Sector	Sector	Sector	Sector Width Select	Sector Width Select
	Initiate	Initiate	Initiate	Initiate	2 ⁵	2 ⁴
Unit: AT	Initiate	Initiate	Initiate	Initiate		
0						
1						

Word 13	No. Firing Pulses or Spin Revolutions	No. Firing Pulses or Spin Revolutions	No. Firing Pulses or Spin Revolutions	No. Firing Pulses or Spin Revolutions	No. Firing Pulses or Spin Revolutions	No. Firing Pulses or Spin Revolutions	Thruster Firing Ratio
	2 ¹⁰	2 ⁵	2 ⁴	2 ³	2 ²	2 ¹	2 ⁰
Unit: AT							
0							
1							

Word 14	Thruster Firing Ratio	Thruster Firing Ratio	Thruster Firing Ratio	Thruster Ratio Firing Disabled Enabled	Logic Power Off On	Maneuver Initiate/ Terminate Initiate	Maneuver Complete Incomplete Complete	+28 V On/Off Off On
	C = 2 ²	B = 2 ¹	A = 2 ⁰					
Unit: AT								
0								
1								

IX ISEE-C Digital Subcom Word Detail (Sheet 2 of 6)

	7 -MSB	6	5	4	3	2	1	0 -LSB
Word 15	Thruster No. 1 Select	Thruster No. 2 Select	Thruster No. 3 Select	Thruster No. 4 Select	Thruster No. 5 Select	Thruster No. 6 Select	Thruster No. 7 Select	Thruster No. 8 Select
Unit: AT	Not-Selected Selected	Not-Selected Selected	Not-Selected Selected	Not-Selected Selected	Not-Selected Selected	Not-Selected Selected	Not-Selected Selected	Not-Selected Selected
0								
1								

Word 16	Thruster No. 11 Select	Thruster No. 12 Select	Thruster No. 9 Select	Thruster No. 10 Select	Sector Initiate	Sector Initiate	Sector Initiate	Sector Initiate
Unit: AT	Not-Selected Selected	Not-Selected Selected	Not-Selected Selected	Not-Selected Selected				
0								
1								

Word 17	Sector Initiate	Sector Initiate	Sector Initiate	Sector Initiate	Sector Initiate	Sector Initiate	Sector Width Select	Sector Width Select
Unit: AT								
0								
1								

Word 18	No. Firing Pulses or Spin Revolutions	No. Firing Pulses or Spin Revolutions	No. Firing Pulses or Spin Revolutions	No. Firing Pulses or Spin Revolutions	No. Firing Pulses or Spin Revolutions	No. Firing Pulses or Spin Revolutions	No. Firing Pulses or Spin Revolutions	Thruster Firing Ratio
Unit: AT								
0								
1								

Word 19	Thruster Firing Ratio	Thruster Firing Ratio	Thruster Firing Ratio	Thruster Ratio Firing	Logic Power	Maneuver Initiate / Terminate	Maneuver Complete	+28V On/Off
Unit: AT								
0								
1								

IX ISEE-C Digital Subcom Word Detail (Sheet 3 of 6)

Words 20 & 52 Unit: CM	7-MSB							0-LSB		
	Command Counter B	Command Counter B	Command Counter B	Command Counter B	Command Counter B	Command Counter B	Command Counter B	Command Counter B	Command Counter B	Command Counter B
	7 2	6 2	5 2	4 2	3 2	2 2	1 2	0 2	0 2	0 2
0										
1										

Words 21 & 53 Unit: CM	Command Counter A	Command Counter A	Command Counter A	Command Counter A	Command Counter A	Command Counter A	Command Counter A	Command Counter A	Command Counter A	Command Counter A
	7 2	6 2	5 2	4 2	3 2	2 2	1 2	0 2	0 2	0 2
	7 2	6 2	5 2	4 2	3 2	2 2	1 2	0 2	0 2	0 2
0										
1										

Word 22 Unit: CM- 03	Exp. Wire Antenna Motor	Exp. Wire Antenna Mode	+U Antenna	-U Antenna	+V Antenna	-V Antenna	+Z Antenna	-Z Antenna
	Off	Retract	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled
	On	Deploy	Enabled	Enabled	Enabled	Enabled	Enabled	Enabled
0								
1								

IX ISEE-C Digital Subcom Detail (Sheet 4 of 6)

Word 23 Unit: CM- 03	7-MSB		6		5		4		3		2		1		0-LSB	
	+U Antenna Limit Flag	-U Antenna Limit Flag	+V Antenna Limit Flag	-V Antenna Limit Flag	+Z Antenna Limit Flag	-Z Antenna Limit Flag	Battery Present									
	Mid-length Sto/Full Dep	Mid-length Sto/Full Dep	Mid-length Sto/Full Dep	Mid-length Sto/Full Dep	Mid-length Sto/Full Dep	Mid-length Sto/Full Dep	Off	On								
0																
1																

IX ISEE-C Digital Subcom Word Detail (Sheet 5 of 6)

7-MSB		6		5		4		3		2		1		0-LSB	
Word 48	Battery	Main Bus		Main Bus		Battery UV		Auto Load		Auto Load		Battery		Boost	
Unit: PW	Heater	UV Detector		OC		Detector		Remove		Remove		Status		Regulator	
0	Off	On		Enable		Enable		Output		Enable		Enable		On	
1	On	Off		Disable		Disable		No Output		Disable		Disable		Off	

Word 49	MGA Beam	Medium Gain		Medium Gain		Transponder		Transponder		Transponder		Transponder		Transponder	
Unit: SD	Control	Antenna		Antenna		B Modulation		B Antenna		B Ranging		B Digital			
0	Converter	Position		Position		Index		IGA		Off		Off			
1	Off	2 ¹		2 ⁰		M2		MGA		On		On			
	On					M1									

Word 50	Transponder	Transponder		Transponder		Transponder		Transponder		Transponder		Transponder		Opposite	
Unit: SD	B Mode	A Modulation		A Antenna		A Ranging		A Digital		A Mode		Non-Coherent		DHU +7.75	
0	Non-Coherent	Index		QFHA		Off		Off		On		Coherent		Off	
1	Coherent	M2		MGA		On		On						On	
		M1													

Word 51 Unit: CM	7 = MSB					0 = LSB				
	Accel. Pulse Counter	Accel. Pulse Counter	Accel. Pulse Counter	Accel. Pulse Counter	Accel. Pulse Counter	Accel. Pulse Counter	Accel. Pulse Counter	Accel. Pulse Counter	Accel. Pulse Counter	
0	2^7							2^2	2^0	
1		2^6						2^1	2^1	

Word 54 Unit: CM- 03	HPS-A PRM TK HTRS	HPS-A SEC TK HTRS	HPS B PRM TK HTRS	HPS B SEC TK HTRS	HPS A/B PRM LN HTRS	HPS A/B SEC LN HTRS
	0					
1						

See Note Below

Word 55 Unit: CM- 03	HPS A PRM TK HTRS	HPS A SEC TK HTRS	HPS B PRM TK HTRS	HPS B SEC TK HTRS	HPS A/B PRM LN HTRS	HPS A/B SEC LN HTRS
	0					
1						

NOTE:

Heater command states can be determined from truth table shown at right, for Bit i of subcom words 54 and 55, where i = 7 thru 2.

Truth Table

	54	55
Off	0	0
HI	1	1
LO	0	1
MED	1	0

0 AT (ACC)	1	2	3	4	5	6	7	8 AT (ACC)	9	10	11	12	13	14	15
				Indirect No. 1 (I ₁)							Indirect No. 2 (I ₂)				
16	17	18	19	20	21	22	23	24	25	26	27 SD	28	29	30	31
	ASI 1	I ₁	ASI 2		DSI				ASI 2	I ₂	Static Phase A		SMH		
32	33	34	35	36	37	38	39	40	41	42	43 SD	44	45	46	47
				ASI 1	I ₁	ASI 2	I ₂				Static Phase B		DSI		
48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63
				ASI 1	I ₁	ASI 2	I ₂				DSI	Frame Counter	Fixed Words		
64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79
					DSI						ASI 1		SMH		
80	81	82	83	84	85 Non ESS I	86 28 V Bus	87	88	89	90	91	92	93	94	95
				ASI 1	ESS I		ESS I						DSI		
96	97	98	99	100	101 Solar Array Re-main-der	102	103 SCH	104	105	106	107	108	109	110	111
													SMH		
112	113	114	115	116	117 SMH	118 SMH	119 SMH	120	121	122	123	124 ENC	125	126	127
					(X)	(Y)	(Z)					Dump		SYNC	

Words	
IF	THEN
Word 60 LSB	61 S/C 62 Clock 63
00	
Word 60 LSB	61 VM I/A 62 E/A 63 R/O
01	
Word 60 LSB	61 Status Reg 62 (See Page 6) 63
10	
Word 60 LSB	61 VM R/O 62 CMD REG 63
11	

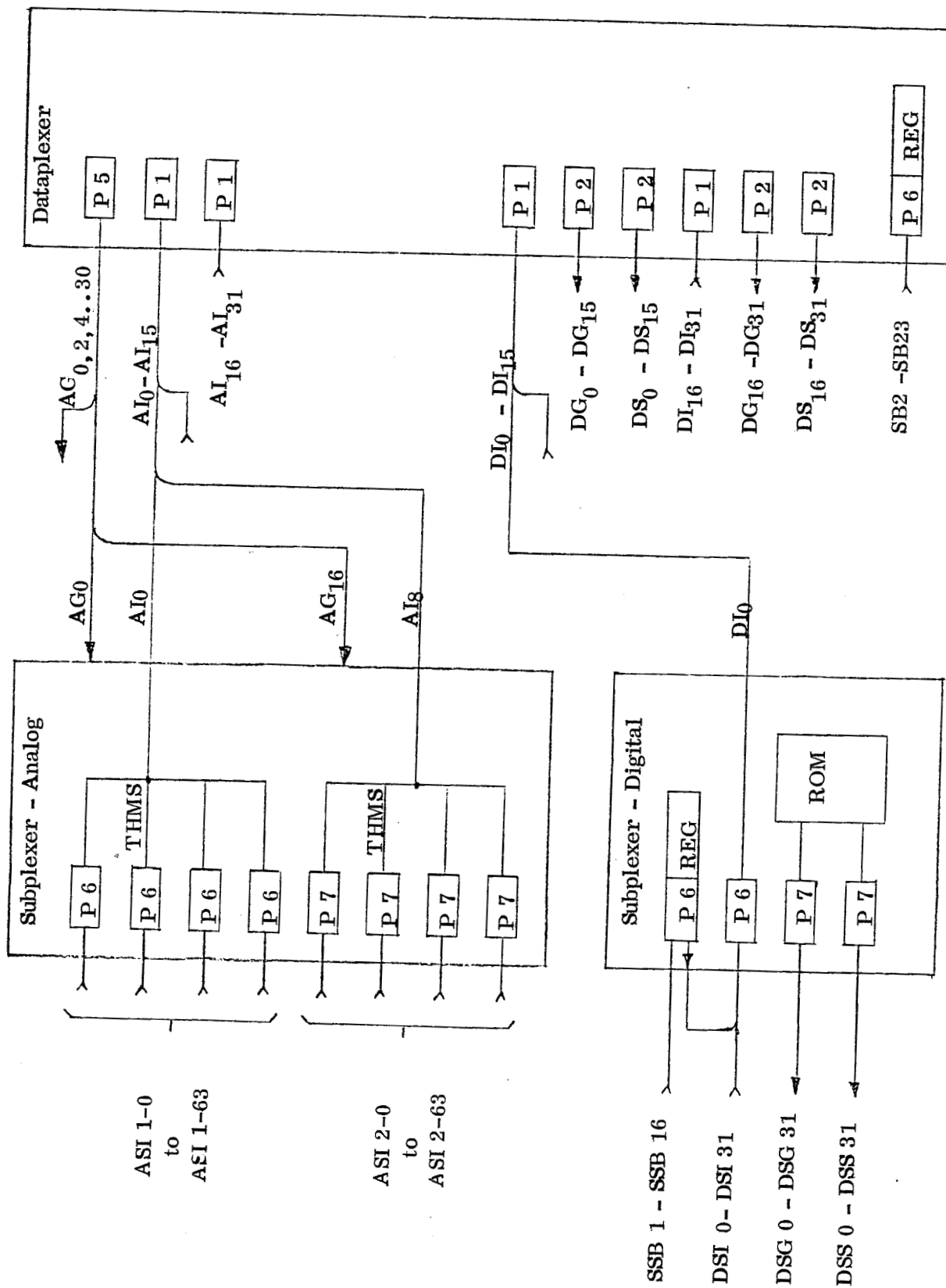
First Bit from Decoder

X ISEE-C Minor Telemetry Frame Engineering
Format (Sheet 2 of 2)

Indirect Address No. 1 (I_1) and No. 2 (I_2) - Independently select any of these 16 parameters.

<u>Address</u>	<u>Unit</u>	<u>Measurement</u>
AI ₁₆	SCH	16 Chanf ₁₆ (100 KHz) Data
AI ₁₇	SCH	16 Chanf ₁₅ (56 KHz) Data
AI ₁₈	SCH	16 Chanf ₁₄ (31 KHz) Data
AI ₁₉	SCH	16 Chanf ₁₃ (17 KHz) Data
AI ₂₀	SCH	16 Chanf ₁₂ (10 KHz) Data
AI ₂₁	SD	Static Phase A
AI ₂₂	SD	Static Phase B
AI ₂₃	AT	Accelerometer Output
AI ₂₄	SMH	X-Axis Magnetic Field Data
AI ₂₅	SMH	Y-Axis Magnetic Field Data
AI ₂₆	SMH	Z-Axis Magnetic Field Data
AI ₂₇	PW	Non-Essential Bus Current
AI ₂₈	PW	Main Bus Voltage
AI ₂₉	PW	Essential Bus Current
AI ₃₀	PW	Solar Array Current
AI ₃₁	TL	Remainder

XI DHU Simplified Interconnect Diagram



XII-ISEE-C Minor Telemetry Frame Scientific (Normal) Addressing Format

See Notes

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
DI ₁₃	DI ₁₃	DI ₁₆	DI ₁₆	AI ₂	DI ₁₁	DI ₁₁	DI ₁₀	DI ₈	DI ₉	DI ₉	DI ₉	DI ₄	DI ₄	DI ₁₂	DI ₁₂
32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47
DI ₃	DI ₃	DI ₂	DI ₂	DI ₆	DI ₆	DI ₁₅	DI ₆	DI ₆	DI ₆	DI ₆	DI ₁₇	DI ₁₇	DI ₁₇	DI ₁₇	DI ₃
48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63
DI ₆	DI ₆	DI ₂	DI ₂	DI ₂	DI ₂	DI ₂	DI ₆	AI ₄	DI ₆	AI ₀	DI ₀	Frame Count	Fixed Word	Fixed Word	Fixed Word
64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79
DI ₆	DI ₆	DI ₂	DI ₂	DI ₆	DI ₆	DI ₆	DI ₇	DI ₇	DI ₇	DI ₇	DI ₁₇	DI ₁₇	DI ₁₇	DI ₁₇	DI ₁₇
80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95
DI ₆	DI ₆	DI ₂	DI ₂	DI ₂	AI ₁₆	AI ₁₇	AI ₁₈	AI ₁₉	AI ₂₀	AI ₁	AI ₃	AI ₅	AI ₇	AI ₉	AI ₁₀
96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111
AI ₁₁	AI ₁₂	AI ₁₃	AI ₁₄	AI ₁₅	AI ₁₆	AI ₆	DI ₂	DI ₂	DI ₂	DI ₂	DI ₁₄	DI ₁₄	DI ₁₄	DI ₁₄	DI ₁₄
112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127
DI ₇	DI ₇	DI ₇	DI ₇	DI ₇	DI ₇	DI ₇	DI ₁	DI ₁	DI ₁	AI ₈	Encoder Dump	Encoder Dump	Encoder Dump	Encoder Dump	Sync

- Notes:
1. Dark triangle indicates word gate is generated and used.
 2. Light triangle indicates word gate is generated but not used.

XII-ISEE-C Telemetry Digital Subcom Addressing Format

See Notes

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
				DSI ₀								DSI ₄			DSI ₁₂
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
				DSI ₅	DSI ₁₅	DSI ₆	DSI ₉	DSI ₂₃	DSI ₂₄	Spare DSI ₂₅	DSI ₇	DSI ₇	DSI ₁₁	DSI ₈	DSI ₈
32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47
				DSI ₁₄							DSI ₂₆	DSI ₂₇	DSI ₁₉	DSI ₁₉	Spare DSI ₁₇
48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63
DSI ₂	DSI ₂₀	DSI ₂₀	DSI ₁₃	DSI ₅	DSI ₁₅	DSI ₁₆	DSI ₂₁	Spare DSI ₂₈	Spare DSI ₂₉	Spare DSI ₃₀	DSI ₃₁	Spare DSI ₁₈	DSI ₁₀	DSI ₁₀	DSI ₃

- Notes: 1. Dark triangle indicates word gate is generated and used.
2. Light triangle indicates word gate is generated but not used.

XIV ISEE-C Minor Telemetry Frame Engineering Addressing Format

See Notes

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
AI ₂₃	AI ₀	AI ₁₆₋₃₁	AI ₈	AI ₁₆₋₃₁	DI ₀	AI ₂₃	AI ₁₆₋₃₁	AI ₈	AI ₁₆₋₃₁	AI ₁₆₋₃₁	AI ₁₆₋₃₁				
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
AI ₀	AI ₀	AI ₁₆₋₃₁	AI ₈	AI ₁₆₋₃₁	DI ₀	AI ₈	AI ₁₆₋₃₁	AI ₁₆₋₃₁	AI ₈	AI ₁₆₋₃₁	AI ₂₁	AI ₂₁	DI ₇		
32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47
				AI ₀	AI ₁₆₋₃₁	AI ₈	AI ₁₆₋₃₁	AI ₁₆₋₃₁			AI ₂₂	DI ₀	DI ₀		
48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63
				AI ₀	AI ₁₆₋₃₁	AI ₈	AI ₁₆₋₃₁	AI ₁₆₋₃₁			DI ₀	Frame Count	Fixed Words		
64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79
					DI ₀						AI ₀	AI ₀	DI ₇		
80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95
				AI ₀	AI ₂₇	AI ₂₈	AI ₂₉						DI ₀		
96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111
				AI ₀	AI ₃₀	AI ₃₁	AI ₁₇						DI ₇		
112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127
				AI ₀	AI ₂₄	AI ₂₅	AI ₂₆				Encoder Dump	Encoder Dump	Encoder Dump	SYNC	

- Notes: 1. Dark triangle indicates word gate is generated and used.
2. Light triangle indicates word gate is generated but not used.

XV GLOSSARY

A	Analog
ACCEL	Accelerometer
A/D	Analog to Digital
AG	Analog Gate
AI	Analog Input
ALT	Alternate
AM	Amplitude
ANH	Anderson Experiment
ANT	Antenna
APP	Appendix
ASI	Analog Subcom Input
AT	Attitude and Orbit Control Subsystem
AUTO	Automatic

BAH	Bame Experiment
BTRY	Battery
BU	Backup

CAL	Calibrate
CHAMB	Chamber
CHAN	Channel
CHG	Charge
CM	Command Subsystem
CMD	Command
CMPT	Component
CONN	Connect
CONS	Consecutive
CONV	Converter
CTR	Counter
CUR	Current

D	Digital
DCDR	Decoder
DEFL	Deflector
DEP	Deploy

XV Glossary (Cont'd.)

DET	Detector
DFH	DeFeiter
DG	Digital Gate
DHU	Data Handling Unit
DI	Digital Input
DIG	Digital
DISCH	Discharge
DMU	Data Multiplexer Unit
DS	Digital Subplexer
DSG	Digital Subplexer Gate
DSI	Digital Subplexer Input
DSS	Digital Subplexer Shift

E/A	Execute Address
EED	Electro Explosive Device
ELEC	Electronics
ENC	Encoder
ESS	Essential
EXEC	Executed
EXP	Experiment

FLD	Field
FRC	Frame Counter
FSS	Fine Sun Sensor

GRB	Gamma Ray Burst
-----	-----------------

XV Glossary (Cont'd.)

HETS	High Energy Telescope Telescope
HKH	Heckman Experiment
HOH	Hovestadt
HPS	Hydrazine Propulsion System
HSKG	Housekeeping
HTRS	Heaters
HV	High Voltage
HZ	Hertz

I 1	Indirect No. 1
I 2	Indirect No. 2
I/A	Indirect Address
ID	Independent
IGA	Intermediate Gain Antenna
INST	Instrument

KHZ	Kilohertz
KV	Kilovolt

Li	Lithium
LSB	Least Significant Bit
LV	Low Voltage

M	Mega
MAG	Magnetic
MAJ	Major
MAM	Mission Adaptor Module
MEH	Meyer Experiment
MEM	Memory

XV Glossary (Cont'd.)

MGA	Medium Gain Antenna
MON	Monitor
MPI	Max Planck Institute
MSB	Most Significant Bit
NG	Noise Generator
No.	Number
OC	Over Current
OGH	Ogilvie
OPN	Operating
P	
PAS	Panaramic Attitude Scanner
PAU	Preamplifier, U Antenna
PAV	Preamplifier, V Antenna
PAZ	Preamplifier, Z Antenna
PC	
PH	Phase
PHA	Pulse Height Analyzer
PKG	Package
PM	Photo Multiplier
PMT	Photo Multiplier Tube
POS	Position
PREAMP	Preamplifier
PRM	Prime
PRESS	Pressure
PS	Power Supply
PW	Power Subsystem
QFHA	Quadra Filar Helix Antenna

XV Glossary (Cont'd.)

RCVR	Receiver
REF	Reference
REG	Register
RF	Radio Frequency
R/O	Readout
RO	Readout
ROM	Read Only Memory
RSVR	Reservoir

SA	Spectral Analyzer
SB	Status Bit
SBH	Steinberg Experiment
S/C	Spacecraft
SCH	Scharf Experiment
SCINT	Scintalator
SD	S-Band Communication Subsystem
SE	Structures
SEC	Second
SI	Silicon
SIG	Signal
SMH	Smith Experiment
S/N	Serial Number
SSB	Subplexer Status Bit
SSC	Spin Sync Clock
SST	Solid State Telescope
STH	Stone
STO	Stowed
STR	Strength
SUBCOM	Subcommutated
SUP	Supply
SYS	System

T	Temperature
TC	Thermocouple
TEL	Telescope
TEMP	Temperature
THMS	Thermistor
TK	Tank
TL	Telemetry and Data Processing Subsystem
TLM	Telemetry
TSTR	Transistor
TYH	von Rosenvinge Experiment

XV Glossary (Cont'd.)

UH	
UL	
UOM	University of Maryland
UV	Undervoltage
UW	
V	Volt
VERIF	Verification
VLETS	Very Low Energy Telescope System
VM	Variable Memory
VOLT	Voltage
WB	Wideband
XMTR	Transmitter
XPNDR	Transponder
XTAL	Crystal

APPENDIX A

ISEE-C Scientific Format Telemetry List -
Listed Numerically

Minor Frame Word	Subcom Word	Bit	Unit ID	Telemetry Descriptor	Analog or Digital	Analog Range or Digital States	Remarks
0			MEH	Cosmic Ray Rlectron Data	D		
1			MEH	Cosmic Ray Electron Data	D		
2			MEH	Cosmic Ray Electron Data	D		See B-XIII App B
3			MEH	Cosmic Ray Rlectron Data	D		
4			SBH	Am Exp. Data	A		See B-XV, App B
5			TYH	VLET PHA Data	D		
6			TYH	VLET PHA Data	D		
7			TYH	VLET Rates and PHA Status	D		See B-XX, App B
8			TYH	HET Rates	D		
9			TYH	HET PHA Data	D		
10			TYH	HET PHA Data	D		
11			TYH	HET PHA Data	D		
12			DFH	Tel 1 Exp Data	D		
13			DFH	Tel 1 Exp Data	D		See B-X, App B
14			DFH	Tel 2 Exp Data	D		
15			DFH	Tel 2 Exp Data	D		
16			DFH	Tel 3 Exp Data	D		
17			DFH	Tel 3 Exp Data	D		
18			HOH	Exp Data	D		See B-XII, App B
19			HOH	Exp Data	D		See B-XV, App B
20			SBH	Am Exp Data	A		
21			HOH	Exp Data	D		See B-XII, App B
22			HOH	Exp Data	D		
23			HOH	Exp Data	D		

Minor Frame Word	Subcom Word	Bit	Unit ID	Telemetry Descriptor	Analog or Digital	Analog Range or Digital States	Remarks
24			HOH	Exp Data	D		
25			HOH	Exp Data	D		
26			HOH	Exp Data	D		See B-XII, App B
27			SMH	Triaxial Mag Fld Data	D		
28			↓	Triaxial Mag Fld Data	D		See B-XVII, App B
29			↓	Triaxial Mag Fld Data	D		
30			SMH	Triaxial Mag Fld Data	D		
31			HKH	Cosmic Ray Event Data	D		
32			HKH	Cosmic Ray Event Data	D		See B-XI, App B
33			BAH	Solar Wind Ions Data	D		
34			BAH	Solar Wind Ions Data	D		See B-IX, App B
35			BAH	Solar Wind Ions Data	D		
36			SBH	Am Exp Data	A		See B-XV, App B
37			STH	Exp Data	D		See B-XVIII, App B
38			OGH	Exp Data	D		See B-XIV, App B
39			STH	Exp Data	D		See B-XVIII, App B
40			ANH	X-Ray Experiment Data	D		
41			↓	X-Ray Experiment Data	D		
42			↓	X-Ray Experiment Data	D		
43			↓	X-Ray Experiment Data	D		See B-VIII, App B
44			↓	X-Ray Experiment Data	D		
45			↓	X-Ray Experiment Data	D		
46			↓	X-Ray Experiment Data	D		
47			ANH	X-Ray Experiment Data	D		
48			STH	Exp Data	D		See B-XVIII, App B

Minor Frame Word	Subcom Word	Bit	Unit ID	Telemetry Descriptor	Analog or Digital	Analog Range or Digital States	Remarks
49			BAH	Solar Wind Ions Data	D		See B-IX, App B
50			BAH	Solar Wind Ions Data	D		
51			BAH	Solar Wind Ions Data	D		
52			SBH	Am Exp Data	A		See B-XV, App B
53			BAH	Solar Wind Ions Data	D		
54			BAH	Solar Wind Ions Data	D		See B-IX, App B
55			STH	Exp Data	D		See B-XVIII, App B
56			SBH	Exp Ph/Status Data	A		See B-XV, App B
57			STH	Exp Data	D		See B-XVIII, App B
58	0		BAH	+5 Volt Pwr Monitor	A		
	1		BAH	High Voltage A	A		
	2		BAH	High Voltage B	A		See B-IX, App B
	3		BAH	Sweep A Mon	A		
	4		BAH	Sweep B Mon	A		
	5		ANH	X-Ray Mem Logic Volt	A		
	6		ANH	SST Hskg Data	A		See B-VIII, App B
	7		ANH	SST Hskg Data	A		
	8		HOH	Hskg Data	A		
	9		HOH	Hskg Data	A		
	10		HOH	Hskg Data	A		See B-X, App B
	11		HOH	Hskg Data	A		
	12		HOH	GRB PM Volt Mon	A		
	13		ANH	X-Ray Hskg Data	A		
	14		ANH	X-Ray Hskg Data	A		See B-VIII, App B
	15		CM	Wire Ant Deploy (+)	A		
	16		BAH	Exp Temp	A		

Minor Frame Word	Subcom Word	Bit	Unit ID	Telemetry Descriptor	Analog or Digital	Analog Range or Digital States	Remarks
58	17		AT	Accel Temp	A		
	18		ANH	X-Ray Mem Temp	A		
	19		ANH	X-Ray Temp	A		
	20		ANH	SST Temp	A		
	21		HKH	Drift Chamb Temp	A		
	22		HKH	Silicon Det Temp	A		
	23		MEH	Elec Temp	A		
	24		MEH	CsI Xal Temp	A		
	25		HOH	UOM Pkg Temp	A		
	26		HOH	MPI Pkg Temp	A		
	27		SCH	Short Ant. Preamp Temp	A		
	28		SCH	B Ant Preamp Temp	A		
	29		STH	Exp Temp	A		
	30		DFH	Cold Plate Temp	A		
	31		DFH	Conv Temp	A		
	32		HKH	Pwr Mon	A		
	33		IHK	Exp Status	A		
	34		HKH	Hskg Data	A		
	35		HKH	Hskg Data	A		
	36		CM	Wire Ant Deploy (-)	A		
	37		MEH	Exp Pwr ON Mon	A		
	38			Spare	A		
	39		SCH	Pwr Mon	A		
	40		STH	Det Temp	A		

-See B-XI, App B

See B-XIII, App B

See B-XVI, App B

See B-XVIII, App B

Minor Frame Word	Subcom Word	Bit	Unit ID	Telemetry Descriptor	Analog or Digital	Analog Range or Digital States	Remarks
58	41		DFH	Prm Pwr Conv Mon	A		
	42		DFH	BU Pwr Conv Mon	A		
	43		DFH	Tel 1 Kskg Data	A		-See B-X, App B
	44		DFH	Tel 2 Hskg Data	A		
	45		DFH	Tel 3 Hskg Data			
	46		OGH	+ Volt Mon	A		
	47		OGH	High Volt Mon	A		-See B-XIV, App B
	48		SBH	B Pwr Mon	A		
	49		SBH	B * Pwr Mon	A		-See B-XV, App B
	50			Spare			
	51		TYH	VLETS Hskg Data	A		
	52		TYH	HEIS Pwr Mon	A		-See B-XX, App B
	53		TYH	VLETS Pwr Mon	A		
	54		AM	FSS-A Coarse (V01)	A		
	55			FSS-A Coarse (V02)	A		
	56			FSS-A Coarse (V03)	A		
	57			FSS-A Fine (VS)	A		
	58		AM	FSS-A Fine (VC)	A		
	59		-	Spare	A		
	60		SMH	Hskg Data	A		
	61		SMH	SA A or X Fld Data	A		
	62		SMH	SA B or Y Fld Data	A		-See B-XVII, App B
	63		SMH	SA C or Z Fld Data	A		

Minor Frame Word	Subcom Word	Bit	Unit ID	Telemetry Descriptor	Analog or Digital	Analog Range or Digital States	Remarks
59	0		AM	PAS Attitude	D		
	1			PAS Attitude			
	2			PAS Attitude			
	3			PAS Attitude			
	4			PAS Attitude			
	5			PAS Attitude			
	6			PAS Attitude			
	7			PAS Attitude			
	8			PAS Attitude			
	9		AM	PAS Attitude			
	10		AT	HPS Elec A CMD Status	D		
	11			HPS Elec A CMD Status			
	12			HPS Elec A CMD Status			
	13			HPS Elec A CMD Status			
	14			HPS Elec A CMD Status			
	15			HPS Elec B CMD Status			
	16			HPS Elec B CMD Status			
	17			HPS Elec B CMD Status			
	18			HPS Elec B CMD Status			
	19		AT	HPS Elec B CMD Status			
	20		CM-01	CMD Dcdr B CMD Ctr	D		
	21		CM-01	CMD Dcdr A CMD Ctr	D		
	22		CM-03	Wire Ant CMD Flags			
	23		CM-03	Wire Ant Deploy Flags			

-See B-I, App B

-See B-II, App B

-See B-III, App B

Minor Frame Word	Subcom Word	Bit	Unit ID	Telemetry Descriptor	Analog or Digital	Analog Range or Digital States	Remarks
59	24		BAH	EED No. 1 Arm Status	D		See B-IX, App B
	25		BAH	EED No. 2 Arm Status	D		See B-IX, App B
	26			Spare			
	27		SBH	CMD State/Status	D		See B-XV, App B
	28		SBH	CMD State/Status	D		
	29		SCH	Inst Status	D		See B-XVI, App B
	30		OGH	Exp Status Data	D		
	31		OGH	Exp Status Data	D		See B-XIV, App B
	32		TL	Sun Time (8 MSB)	D		
	33			Sun Time (8 LSB)	D		
	34			Sun Period (8 MSB)	D		
	35			Sun Period (8 LSB)	D		
	36			Mag Time (8 MSB)	D		
	37			Mag Time (8 LSB)	D		See B-VII, App B
	38			Mag Period (8 MSB)	D		
	39			Mag Period (8 LSB)	D		
	40			SSC Cmd Reg Status R. O	D		
	41			SSC Cmd Reg Status R. O.	D		
	42		TL	SSC Cmd Reg Status R. O.	D		
	43		TYH	HET Cmd Status	D		
	44			HET Cmd Status	D		See B-XX, App B
	45			HET Cmd Status	D		
	46		TYH	HET Cmd Status	D		

Minor Frame Word	Subcom Word	Bit	Unit ID	Telemetry Descriptor	Analog or Digital	Analog Range or Digital States	Remarks
59	47			Spare	D		See B-IV, App B
	48		PW	Configuration Status	D		
	49		SD	Configuration Status	D		See B-V, App B
	50		SD	Configuration Status	D		
	51		AT	Accel Pulse Ctr	D		See B-11, App B
	52		CM	CMD Dcd B Cmd Ctr	D		
	53		CM	Cmd Dcd A CMD Ctr	D		See B-III, App B
	54		AT	HPS Htrs Cmd Status	D		See B-11, App B
	55		AT	HPS Htrs Cmd Status	D		
	56			Spare	D		
	57			Spare	D		
	58			Spare	D		
	59		TL	Data System ID	D		See B-VII, App B
	60			Spare	D		
	61		MEH	Inst Status	D		
	62		MEH	Inst Status	D		See B-XIII, App B
	63		SMH	Inst Status	D		See B-XVII, App B
59	0	1,0	TL	Word 61, 62, 63 Subcom ID	D	Bit 0 = 0 bit 1 = 0	
60	1	1,0		Word 61, 62, 63 Subcom ID	D	Bit 0 = 1 bit 1 = 0	
	2	1,0		Word 61, 62, 63 Subcom ID	D	Bit 0 = 0 bit 1 = 1	
60	3	1,0		Word 61, 62, 63 Subcom ID	D	Bit 0 = 1 bit 1 = 1	
61	0	7-0		S/C Clock	D	8 MSB's	
	1	7-0		Variable Mem R/O	D	8 bit's	
	2	7-0	TL	Status Reg	D		See VIII, of Text

Minor Frame Word	Subcom Word	Bit	Unit ID	Telemetry Descriptor	Analog or Digital	Analog Range or Digital States	Remarks
61	3	7-0	TL	Variable Mem R/O	D	8 bits	See VIII of Text
62	0	7-0		S/C Clock	D	Bits 9-16	
62	1	7-0		Indirect Add Reg	D	8 bits	
62	2	7-0		Status Reg	D		
62	3	7-0		CMD Reg	D	Bits 1-8	See VIII of Text
63	0	7-0		S/C Clock	D	8 LSB's	
	1	7-0		Execute Add R/O	D	8 bits	
	2	7-0		Status Reg	D		
63	3	7-0	TL	CMD Reg	D	Bits 9-16	See B-XVIII, App B
64			STH	Exp Data	D		
65			BAH	Solar Wind Ions Data	D		
66			BAH	Solar Wind Ions Data	D		
67			BAH	Solar Wind Ions Data	D		See B-IX, App B
68			SBH	Am Exp Data	A		
69			STH	Exp Data	D		See B-XV, App B
70			SMH	Triaxial Mag Fld Data	D		
71				Triaxial Mag Fld Data	D		See B-XVIII, App B
72				Triaxial Mag Fld Data	D		
73			SMH	Triaxial Mag Fld Data	D		See B-XVII, App B
74			ANH	X-Ray Exp Data	D		
75				X-Ray Exp Data	D		See B-VIII, App B
76				X-Ray Exp Data	D		
77				X-Ray Exp Data	D		
78				X-Ray Exp Data	D		
79			ANH	X-Ray Exp Data	D		

Minor Frame Word	Subcom Word	Bit	Unit ID	Telemetry Descriptor	Analog or Digital	Analog Range or Digital States	Remarks
80			STH	Exp Data	D		See B-XIII, App B
81			BAH	Solar Wind Ions Data	D		
82			BAH	Solar Wind Ions Data	D		See B-IX, App B
83			BAH	Solar Wind Ions Data	D		
84			SBH	Am Exp Data	A		See B-XV, App B
85			SCH	16 Chan f ₁₆ (100 KHz) Data	A		
86				16 Chan f ₁₅ (56 KHz) Data	A		
87				16 Chan f ₁₄ (31 KHz) Data	A		
88				16 Chan f ₁₃ (17 KHz) Data	A		
89				16 Chan f ₁₂ (10 KHz) Data	A		
90				16 Chan f ₁₁ (5.6 KHz) Data	A		
91				16 Chan f ₁₀ (3.1 KHz) Data	A		See B-XVI, App B
92				16 Chan f ₉ (1.7 KHz) Data	A		
93				16 Chan f ₈ (1 KHz) Data	A		
94				16 Chan f ₇ (560 Hz) Data	A		
95				16 Chan f ₆ (310 Hz) Data	A		
96				16 Chan f ₅ (170 Hz) Data	A		
97				16 Chan f ₄ (100 Hz) Data	A		
98				16 Chan f ₃ (56 Hz) Data	A		
99			SCH	16 Chan f ₂ (31 Hz) Data	A		
100			SBH	Am Exp Data	A		See B-XV, App B
101			SCH	16 Chan f ₁ (17 Hz) Data	A		
102			SCH	8 Chan Data	A		See B-XVI, App B
103			BAH	Solar Wind Ions Data	D		
104			BAH	Solar Wind Electrons Data	D		See B-IX, App B

Minor Frame Word	Subcom Word	Bit	Unit ID	Telemetry Descriptor	Analog or Digital	Analog Range or Digital States	Remarks
105			BAH	Solar Wind Electrons Data	D		
106				Solar Wind Electrons Data	D		
107				Solar Wind Electrons Data	D		
108				Solar Wind Electrons Data	D		
109				Solar Wind Electrons Data	D		-See B-IX, App B
110				Solar Wind Electrons Data	D		
111			BAH	Solar Wind Electrons Data	D		
112			SMH	Triaxial Mag Fld Data	D		
113				Triaxial Mag Fld Data	D		
114				Triaxial Mag Fld Data	D		-See B-XVII, App B
115			SMH	Triaxial Mag Fld Data	D		
116			SBH	Am Exp Data	A		See B-XV, App B
117			ANH	SST Exp Data	D		
118				SST Exp Data	D		
119				SST Exp Data	D		
120				SST Exp Data	D		
121			ANH	SST Exp Data	D		-See B-VIII, App B
122	0		AM	PAS Pwr Mon	A		
	1		CM	Cmd Dcdr A -10V Mon	A		
	2		CM	Cmd Dcdr B -10V Mon	A		
	3		AT	Accel Pwr Mon	A		
	4		AT	HPS-A TC	A		
	5		AT	HPS-B TC	A		
	6		AM	FSS-A Pwr Mon	A		
122	7		AM	FSS-A Bias Volt	A		

Minor Frame Word	Subcom Word	Bit	Unit ID	Telemetry Descriptor	Analog or Digital	Analog Range or Digital States	Remarks
122	8		AM	FSS-B Bias Volt	A		
	9		CM	Cmd Dcdr A +10V Mon	A		
	10		CM	Cmd Dcdr B +10V Mon	A		
	11		AM	FSS-B Pwr Mon	A		
	12		HOH	Low Volt Conv	A		-See B-XII, App B
	13		HOH	Stepped Defl Volt (UL)	A		
	14		AT	HPS-A Tk Press	A		
	15		AT	HPS-B Tk Press	A		
	16		TL	DMU Temp	A		
	17		TYH	HETS Temp	A		
	18		SBH	Θ B or Θ B* Temp	A		See B-XV, App B
	19		TYH	VLETS Temp	A		
	20		AM	FSS Elec Temp	A		
	21		AM	PAS Elec Temp	A		
	22		AM	PAS Sensor Temp	A		
	23		CM	Cmd Dcdr A Temp	A		
	24		PW	Btry Temp	A		
	25		PW	Pwr Module Temp	A		
	26		PW	MAM Temp	A		
	27		PW	Solar Array Temps	A		See B-IV, App B
	28		SD	Xpndr A WB Fil Temp	A		
	29		SD	Xpndr B WB Fil Temp	A		
	30		SD	Xpndr A RF Tstr Temp	A		
	31		SD	Xpndr B RF Tstr Temp	A		
	32		TL	+3.2V Cal	A		

Minor Frame Word	Subcom Word	Bit	Unit ID	Telemetry Descriptor	Analog or Digital	Analog Range or Digital States	Remarks
122	33		TL	+0.1V Cal	A		
122	34		TL	+5.0V Cal	A		
122	35		TL	+2.5V Cal	A		
122	36		TL	Radiation Mon	A		
122	37		TL	A/D Ramp	A		
122	38		TL	2.5V @ 2 M	A		

Minor Frame Word	Subcom Word	Bit	Unit ID	Telemetry Descriptor	Analog or Digital	Analog Range or Digital States	Remarks
122	39	0-23	AT	HPS Elec A Temp (s)	A		See B-II, App B See B-XIX, App B
	39	24, 25, 26	TEH	Exp Temps	A		
	40		AT	HPS Elec B Temp(s)	A		
	41		PW	Btry Disch Cur	A		
	42		PW	Btry Volt	A		
	43		PW	Main Bus Volt	A		
	44		PW	Non-Ess Bus Cur	A		
	45		PW	Ess Bus Cur	A		
	46		PW	Solar Array Cur	A		
	47		PW	Shunt Dump Cur	A		
	48		PW	Btry Chg Cur	A		
	49		SD	Xpndr B Sig Str	A		
	50		SD	Xpndr A Static Ph	A		
	51		SD	Xpndr B Static Ph	A		
	52		SD	Xpndr A Revr Conv Volt	A		
	53		SD	Xpndr A Xmtr Conv Volt	A		
	54		SD	Xpndr B Revr Conv Volt	A		
	55		SD	Xpndr B Xmtr Conv Volt	A		
	56		SD	Xpndr A RF Pwr	A		
	57		SD	Xpndr B RF Pwr	A		
	58		SD	Xpndr A Sig Str	A		
	59		AM	FSS-B Coarse (V01)	A		
	60		AM	FSS-B Coarse (V02)	A		

Minor Frame Word	Subcom Word	Bit	Unit ID	Telemetry Descriptor	Analog or Digital	Analog Range or Digital States	Remarks
122	61		AM	FSS-B Coarse (VO3)	A		
122	62		AM	FSS-B Fine (VS)	A		
122	63		AM	FSS-B Fine (VC)	A		
123			TL	Encoder Dump	D		
124			TL	Encoder Dump	D		
125			TL	Encoder Dump	D		
126			TL	Sync	D		
127			TL	Sync	D		

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APPENDIX B

ISEE-C Scientific Format Telemetry List -

Listed by Subsystem/Experiment

Minor Frame Word	Subcom Word	Bit	Unit ID	Telemetry Descriptor	Analog or Digital	Analog Range or Digital States	Remarks
58	54	-	AM	FSS-A Coarse (VO1)	A		
58	55	-		FSS-A Coarse (VO2)	A		
58	56	-		FSS-A Coarse (VO3)	A		
58	57	-		FSS-A Fine (VS)	A		
58	58	-		FSS-A Fine (VC)	A		
59	0	-		PAS Attitude	D		Word 1 of 10
59	1	-		PAS Attitude	D		Word 2 of 10
59	2	-		PAS Attitude	D		Word 3 of 10
59	3	-		PAS Attitude	D		Word 4 of 10
59	4	-		PAS Attitude	D		Word 5 of 10
59	5	-		PAS Attitude	D		Word 6 of 10
59	6	-		PAS Attitude	D		Word 7 of 10
59	7	-		PAS Attitude	D		Word 8 of 10
59	8	-		PAS Attitude	D		Word 9 of 10
59	9	-		PAS Attitude	D		Word 10 of 10
122	0	-		PAS Pwr Mon	A	> 2.5 V = ON	
122	6	-		FSS-A Pwr Mon	A		
122	7	-		FSS-A Bias Volt	A		
122	8	-		FSS-B Bias Volt	A		
122	11	-		FSS-B Pwr Mon	A		
122	20	-		FSS Elec Temp	A		
122	21	-		PAS Elec Temp	A		

Minor Frame Word	Subcom Word	Bit	Unit ID	Telemetry Descriptor	Analog or Digital	Analog Range or Digital States	Remarks
122	22	-	AM	PAŞ Sensor Temp.	A		
122	59	-		FSS-B Coarse (VO1)	A		
122	60	-		FSS-B Coarse (VO2)	A		
122	61	-		FSS-B Coarse (VO3)	A		
122	62	-		FSS-B Fine (VS)	A		
122	63	-		FSS-B Fine (VC)	A		

B-II Attitude and Orbit Control (AT) Subsystem Telemetry List

Minor Frame Word	Subcom Word	Bit	Unit ID	Telemetry Descriptor	Analog or Digital	Analog Range or Digital States	Remarks
58	17	-	AT	Accel Temp	A	See IX of Text	
59	10	-		AOCs Elec A CMD Status	D	See IX of Text	
59	11	-		AOCs Elec A CMD Status	D	See IX of Text	40 Bit Word
59	12	-		AOCs Elec A CMD Status	D	See IX of Text	
59	13	-		AOCs Elec A CMD Status	D	See IX of Text	
59	14	-		AOCs Elec A CMD Status	D	See IX of Text	
59	15	-		AOCs Elec B CMD Status	D	See IX of Text	
59	16	-		AOCs Elec B CMD Status	D	See IX of Text	
59	17	-		AOCs Elec B CMD Status	D	See IX of Text	40 Bit Word
59	18	-		AOCs Elec B CMD Status	D	See IX of Text	
59	19	-		AOCs Elec B CMD Status	D	See IX of Text	
59	51	-		Accel Pulse Ctr	D	See IX of Text	
59	54	-		HPS Htrs CMD Status	D	See IX of Text	Also listed in B-III as CM-03 Outputs
59	55	-		HPS Htrs CMD Status	D	See IX of Text	
61	2	5		HPS A LV 1 POS	D	0/1 = Closed/Open	
61	2	3		HPS A LV 3 POS	D	0/1 = Closed/Open	Fixed Word Status Bits See VIII of Text
61	2	4		HPS B LV 2 POS	D	0/1 = Closed/Open	
61	2	2		HPS B LV 4 POS	D	0/1 = Closed/Open	
122	3	-		Accel Pwr Mon	A	> 0.5 V = On	
122	4	-		HPS-A TC 5	A		
122	5	-		HPS-B TC 6	A		
122	14	-		HPS-A Tk Press	A		
122	15	-		HPS-B Tk Press	A		

B-II Attitude and Orbit Control (AT) Subsystem Telemetry List

Minor Frame Word	Subcom Word	Bit	Unit ID	Telemetry Descriptor	Analog or Digital	Analog Range or Digital States	Remarks
122	39	0 - 23	AT	HPS -A Elec A Temp (s)	A		Word 39 is supercommutated 32 times. 0 thru 23 contain AT data. 24, 25 and 26 contain TEH data. Remaining are used for sync.
122	40	0-23	AT	HPS-B Elec B Temp (s)	A		Word 40 is supercommutated 32 times. 0 thru 23 contain AT data. The remaining are used for sync.

B-III Command (CM) Subsystem Telemetry List

Minor Frame Word	Subcom Word	Bit	Unit ID	Telemetry Descriptor	Analog or Digital	Analog Range or Digital States	Remarks
58	15	-	CM-03	Wire Ant Deploy (+)	A		
58	36	-	CM-03	Wire Ant Deploy (-)	A		
59	20	-	CM-01	Cmd Dcdr B Cmd Ctr	D		
59	21	-	CM-01	Cmd Dcdr A Cmd Ctr	D		
59	22	-	CM-03	Wire Ant CMD Flags	D		
59	23	7-2	CM-03	Wire Ant Deploy Flags	D		
59	23	1	CM-03	Btry Present	D	0/1 = OFF/ON	
59	51	-	CM-03	Accel Pulse Ctr	D		-See IX of Text
59	52	-	CM-01	Cmd Dcdr B CMD Ctr	D		
59	53	-	CM-01	Cmd Dcdr A CMD Ctr	D		
59	54	-	CM-03	HPS Htrs CMD Status	D		
59	55	-	CM-03	HPS Htrs CMD Status	D		
61	2	0	CM-03	3D SSS Bypass	D	See Remarks	0/1 = Disabled/Enabled
62	2	7	CM-03	Timer A	D	"	0/1 = Disabled/Enabled
62	2	6	CM-03	Timer B	D	"	0/1 = Disabled/Enabled
122	1	-	CM-01	CMD Dcdr A -10V Mon	A		
122	2	-	CM-01	CMD Dcdr B -10V Mon	A		
122	9	-	CM-01	CMD Dcdr A +10V Mon	A		
122	10	-	CM-01	CMD Dcdr B +10V Mon	A		
122	23	-	CM-01	CMD Dcdr A Temp	A		

B-IV. Power (PW) Subsystem Telemetry List

Minor Frame Word	Subcom Word	Bit	Unit ID	Telemetry Descriptor	Analog or Digital	Analog Range or Digital States	Remarks
59	48	-	PW	Configuration Status	D		See IX of Text
122	24	-		Btry Temp	A		
122	25	-		Pwr Module Temp	A		
122	26	-		MAM Temp	A		
122	27	-		Solar Array Temp(s)	A		8 Parameters Commutated
122	41	-		Btry Disch Cur	A		
122	42	-		Btry Volt	A		
122	43	-		Main Bus Volt	A		
122	44	-		Non-Ess Bus Cur	A		
122	45	-		Ess Bus Cur	A		
122	46	-		Solar Array Cur	A		
122	47	-		Shunt Dump Cur	A		
122	48	-		Btry Chg Cur	A		

B-V. S-Band Communication (SD) Subsystem Telemetry List

Minor Frame Word	Subcom Word	Bit	Unit ID	Telemetry Descriptor	Analog or Digital	Analog Range or Digital States	Remarks
59	49	-	SD	Configuration Status	D		-See IX of Text
59	50	-		Configuration Status	D		
62	2	3,2		Configuration Status	D		
122	28	-		Xpndr A WB Fil Temp	A		-See VIII of Text
122	29	-		Xpndr B WB Fil Temp	A		
122	30	-		Xpndr A RF Tstr Temp	A		
122	31	-		Xpndr B RF Tstr Temp	A		
122	49	-		Xpndr B Sig Str	A		
122	50	-		Xpndr A Static Ph	A		
122	51	-		Xpndr B Static Ph	A		
122	52	-		Xpndr A Revr Conv Volt	A	> 0.5V = On	
122	53	-		Xpndr A Xmtr Conv Volt	A	> 0.5V = On	
122	54	-		Xpndr B Revr Conv Volt	A	> 0.5V = On	
122	55	-		Xpndr B Xmtr Conv Volt	A	> 0.5V = On	
122	56	-		Xpndr A RF Pwr	A		
122	57	-		Xpndr B RF Pwr	A		
122	58	-		Xpndr A Sig Str	A		

B-VI. Structures (SE) Telemetry List

Minor Frame Word	Subcom Word	Bit	Unit ID	Telemetry Descriptor	Analog or Digital	Analog Range or Digital States	Remarks
	NOTE: The following Telemetry parameters are all associated with separation and deployment.						
59	23	1	CM-03	Battery Present	D	See Remarks	0/1 = OFF/ON
61	2	6	SE	Third Stage	D	"	0/1 = Separated/ Attached
61	2	0	CM-03	3D SSS Bypass	D	"	0/1 = Disabled/ Enabled
62	2	7	CM-03	Timers A	D	"	0/1 = Disabled/ Enabled
62	2	6	CM-03	Timers B	D	"	0/1 = Disabled/ Enabled
62	2	5	CM-03	+Y Boom	D	"	0/1 = Folded/ Deployed
62	2	4	CM-03	-Y Boom	D	"	0/1 = Folded/ Deployed
62	2	1	CM-03	+X Boom	D	"	0/1 = Folded/ Deployed
62	2	0	CM-03	-X Boom	D	"	0/1 = Folded/ Deployed

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Minor Frame Word	Subcom Word	Bit	Unit ID	Telemetry Descriptor	Analog or Digital	Analog Range or Digital States	Remarks
59	32	-	TL	Sun Time (8 MSB)	D		
59	33	-		Sun Time (8 LSB)	D		
59	34	-		Sun Period (8 MSB)	D		
59	35	-		Sun Period (8 LSB)	D		
59	36	-		Mag Time (8 MSB)	D		
59	37	-		Mag Time (8 LSB)	D		
59	38	-		Mag Period (8 MSB)	D		
59	39	-		Mag Period (8 LSB)	D		
59	40	See below		SSC CMD Reg Status	D		
59	40	7-0		CMD C4 thru C11 Verif	D		
59	41	See below		SSC CMD Reg Status	D		
59	41	7-0		CMD C12 thru C19 Verif	D		
59	42	See below		SSC CMD Reg Status	D		
59	42	7, 6, 5, 4		CMD C20 thru C23 Verif	D		
59	42	3		OA Complete	D		
59	42	2		Mag Complete	D		
59	42	1		Sun Control	D	See Remarks	1 = Sun Time and Sun Period Complete
59	42	0		MTOS	D	See Remarks	1 = Mag Time and Mag Period Complete
59	42				D	See Remarks	1/0 = Sun Sensor/Generated Pulse
59	42				D	See Remarks	1 = Sun Period increased more than 2 times or disappeared totally.
59	59	7-0		Data System ID	D	All 1's = DHUB All 0's = DHUA	

Minor Frame Word	Subcom Word	Bit	Unit ID	Telemetry Descriptor	Analog or Digital	Analog Range or Digital States	Remarks
60		1, 0	TL	Word 61, 62, 63 Subcom ID	D	See Remarks	00 = Subcom Word 0 01 = Subcom Word 1 10 = Subcom Word 2 11 = Subcom Word 3
61	0	7-0		S/C Clock	D	8 MSB's	
61	1	7-0		Variable Mem RO	D		
61	2	7		TLM Parity	D	See Remarks	0/1 = Correct/Wrong
61	3	7-0		Variable Mem RO	D		
62	0	7-0		S/C Clock	D	Bits 9-16	
62	1	7-0		Indirect Add Reg	D		
62	3	7-0		Cmd Reg	D	Bits 1-8	
63	0	7-0		S/C Clock	D	8 LSB's	
63	1	7-0		Execute Add R0	D	8 Bits	
63	3	7-0		Cmd Reg	D	Bits 9-16	
122	16	7-0		DMU Temp	A		
122	32	7-0		+3.2V Cal	A		
122	33	7-0		+0.1V Cal	A		
122	34	7-0		+5.0V Cal	A		
122	35	7-0		+2.5V Cal	A		
122	36	7-0		Radiation Mon	A		
122	37	7-0		A/D Ramp	A		
122	38	7-0		2.5V at 2M	A		

B-VII Telemetry and Data Processing (TL) Subsystem Telemetry List (Sheet 3 of 3)

Minor Frame Word	Subcom Word	Bit	Unit ID	Telemetry Descriptor	Analog or Digital	Analog Range or Digital States	Remarks
123	-	-	TL	Encoder Dump	D		
124	-	-		Encoder Dump	D		
125	-	-		Encoder Dump	D		
126	-	-		Sync	D		
127	-	-		Sync	D		

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B III. Anderson (ANH) Experiment Telemetry List (She 1 of 2)

Minor Frame Word	Subcom Word	Bit	Unit ID	Telemetry Descriptor	Analog or Digital	Analog Range or Digital States	Remarks
40	-	-	ANH	X-Ray Exp Data	D		word 1 of 14
41	-	-		X-Ray Exp Data	D		word 2 of 14
42	-	-		X-Ray Exp Data	D		word 3 of 14
43	-	-		X-Ray Exp Data	D		word 4 of 14
44	-	-		X-Ray Exp Data	D		word 5 of 14
45	-	-		X-Ray Exp Data	D		word 6 of 14
46	-	-		X-Ray Exp Data	D		word 7 of 14
47	-	-		X-Ray Exp Data	D		word 8 of 14
58	5	-		X-Ray Mem Logic Volt	A	>2.5 VDC = ON	V ₁ , V ₂ , V ₃ , CPT ₁ Commutated
58	6	-		SST Hskg Data	A		V ₄ , V ₅ , V ₆ , CPT 2 Commutated
58	7	-		SST Hskg Data	A		V ₁ , V ₂ , V ₃ , V ₄ Commutated
58	13	-		X-Ray Hskg Data	A		V ₅ , V ₆ , V ₇ , V ₈ Commutated
58	14	-		X-Ray Hskg Data	A		
58	18	-		X-Ray Mem Temp	A		
58	19	-		X-Ray Temp	A		
58	20	-		SST Temp	A		
74	-	-		X-Ray Exp Data	D		word 9 of 14
75	-	-		X-Ray Exp Data	D		word 10 of 14
76	-	-		X-Ray Exp Data	D		word 11 of 14
77	-	-		X-Ray Exp Data	D		word 12 of 14
78	-	-		X-Ray Exp Data	D		word 13 of 14
79	-	-		X-Ray Exp Data	D		word 14 of 14

B- II. Anderson (ANH) Experiment Telemetry List (Sheet 2 of 2)

Minor Frame Word	Subcom Word	Bit	Unit ID	Telemetry Descriptor	Analog or Digital	Analog Range or Digital States	Remarks
117	-	-	ANH 	SST Exp Data	D		Word 1 of 5
118	-	-		SST Exp Data	D		Word 2 of 5
119	-	-		SST Exp Data	D		Word 3 of 5
120	-	-		SST Exp Data	D		Word 4 of 5
121	-	-		SST Exp Data	D		Word 5 of 5

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-IX Bame (BAH) Experiment Telemetry List (Sheet 1 2)

Minor Frame Word	Subcom Word	Bit	Unit ID	Telemetry Descriptor	Analog or Digital	Analog Range or Digital States	Remarks
33	-	-	BAH	Solar Wind Ion Data	D		word 1 of 15
34	-	-		Solar Wind Ion Data	D		word 2 of 15
35	-	-		Solar Wind Ion Data	D		word 3 of 15
49	-	-		Solar Wind Ion Data	D		word 4 of 15
50	-	-		Solar Wind Ion Data	D		word 5 of 15
51	-	-		Solar Wind Ion Data	D		word 6 of 15
53	-	-		Solar Wind Ion Data	D		word 7 of 15
54	-	-		Solar Wind Ion Data	D		word 8 of 15
58	0	-		+ 5 Volt PWR Mon	A		
58	1	-		High Volt A	A		
58	2	-		High Volt B	A		
58	3	-		Sweep A Mon	A		
58	4	-		Sweep B Mon	A		
58	16	-		Exp Temp	A		
59	24	-		EED's No. 1 Arm Status	D	All 1's = Arm	
59	25	-		EED No. 2 Arm Status	D	All 1's = Arm	
65	-	-		Solar Wind Ion Data	D		word 9 of 15
66	-	-		Solar Wind Ion Data	D		word 10 of 15
67	-	-		Solar Wind Ion Data	D		word 11 of 15
81	-	-		Solar Wind Ion Data	D		word 12 of 15
82	-	-		Solar Wind Ion Data	D		word 13 of 15
83	-	-		Solar Wind Ion Data	D		word 14 of 15
103	-	-		Solar Wind Ion Data	D		word 15 of 15
104	-	-		Solar Wind Electron Data	D		word 1 of 8
105	-	-		Solar Wind Electron Data	D		word 2 of 8

B-IX Bame (BAH) Experiment Telemetry List (Sheet 2 of 2)

Minor Frame Word	Subcom Word	Bit	Unit ID	Telemetry Descriptor	Analog or Digital	Analog Range or Digital States	Remarks
106	-	-	BAH	Solar Wind Electron Data	D		word 3 of 8
107	-	-		Solar Wind Electron Data	D		word 4 of 8
108	-	-		Solar Wind Electron Data	D		word 5 of 8
109	-	-		Solar Wind Electron Data	D		word 6 of 8
110	-	-		Solar Wind Electron Data	D		word 7 of 8
111	-	-		Solar Wind Electron Data	D		word 8 of 8

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B-X Defeater (DFH) Experiment Telemetry List

Minor Frame Word	Subcom Word	Bit	Unit ID	Telemetry Descriptor	Analog or Digital	Analog Range or Digital States	Remarks
12	-	-	DFH	Tel 1 Exp Data	D		
13	-	-		Tel 1 Exp Data	D		
14	-	-		Tel 2 Exp Data	D		
15	-	-		Tel 2 Exp Data	D		512 bits (commutated) per Tel
16	-	-		Tel 3 Exp Data	D		16 bits per minor frame
17	-	-		Tel 3 Exp Data	D		32 consecutive minor frames
58	30	-		Cold Plate Temp	A		Contain 1 set of data.
58	31	-		Conv Temp	A		
58	41	-		Prm Pwr Conv Mon	A	> 0.5 VDC = ON	
58	42	-		Bu PWR Conv Mon	A	> 0.5 VDC = ON	
58	43	-		Tel 1 Hskg Data	A		4 Parameters Commutated
							1. Tel 1 Det A Cur
							2. Tel 1 Det B Cur
							3. Tel 1 Temp
							4. +25 V Mon
58	44	-		Tel 2 Hskg Data	A		4 Parameters Commutated
							1. Tel 2 Det A Cur
							2. Tel 2 Det B Cur
							3. Tel 2 Temp
							4. + 10 V Mon
58	45	-		Tel 3 Hskg Data	A		4 Parameters Commutated
							1. Tel 3 Det A Cur
							2. Tel 3 Det B Cur
							3. Tel 3 Temp
							4. -6V Mon

B-XI Heckman (HKH) Telemetry List (Sheet 1 of 2)

Minor Frame Word	Subcom Word	Bit	Unit ID	Telemetry Descriptor	Analog or Digital	Analog Range or Digital States	Remarks
31	-	-	HKH	Cosmic Ray Event Data	D		256 bits commutated 16 consecutive minor frames contain 256 bits corresponding to one cosmic ray event.
32	-	-		Cosmic Ray Event Data	D		
58	21	-		Drift Chamb Temp	A		
58	22	-		Silicon Det Temp	A		
58	32	-		Pwr Mon	A	> 0.5V if LV Pwr ON, and > 2.5V if Gas Valves ENABLED	
58	33	-	HKH	Exp Status	A		16 parameters commutated 1. 8192 Hz S/C Clock 2. Si/Li Det No. 1 3. Si/Li Det No. 2 4. Si/Li Det No. 3 5. Si/Li Det No. 4 6. Si/Li Det No. 5 7. Si/Li Det No. 6 8. Si/Li Det No. 7 9. Si/Li Det No. 8 10. Si/Li Det No. 9 11. Si/Li Det No. 10 12. Plastic Scint. 13. Drift Chamb No. 6 14. Drift Chamb No. 5 15. Drift Chamb No. 2 16. Drift Chamb No. 1 4 parameters commutated 1. Si/Li HV Sup Mon 2. PMT HV Sup Mon 3. Drift Chamb HV Sup Mon 4. Dig. Sys. 1 LV Mon
58	34	-		Hskg Data	A		

Minor Frame Word	Subcom Word	Bit	Unit ID	Telemetry Descriptor	Analog or Digital	Analog Range or Digital States	Remarks
58	35	-	HKH	Hskg Data	A	>2.5 V = Enabled	4 Parameters Commutated 1. Dig Sys 2 LV Mon 2. Gas Sys Intermed. Press 3. Drift Chamb Press 4. Gas Sys Rsvr Press

Minor Frame Word	Subcom Word	Bit	Unit ID	Telemetry Descriptor	Analog or Digital	Analog Range or Digital States	Remarks
18	-	-	HOH	Exp Data	D		Each minor frame contains data transmitted in 1 of 5 "formats" (A thru E). The sequence in which the 5 formats are transmitted repeats itself every 16 minor frames. The "normal" sequence is selected by the instrument DPU, but can be altered by command.
19	-	-		Exp Data	D		
21	-	-		Exp Data	D		
22	-	-		Exp Data	D		
23	-	-		Exp Data	D		
24	-	-		Exp Data	D		
25	-	-		Exp Data	D		
26	-	-		Exp Data	D		
58	8	-		Hskg Data	A		4 parameters commutated MX ADDR* parameter 0 +20 KV Mon 1 Test Ref 2 +20 KV Mon 3 Test Ref
58	9	-		Hskg Data	A		4 parameters commutated MX ADDR * Parameter 0 +2.8 KV Mon 1 -11.9 KV Mon 2 Cold plate temp 3 Det Bias

* Indicated by last 2 bits of Experiment Data Format D

Minor Frame Word	Subcom Word	Bit	Unit ID	Telemetry Descriptor	Analog or Digital	Analog Range or Digital States	Remarks
58	10	-	HOH	Hskg Data	A		4 parameters commutated MX ADDR*: Parameter 0 Gas Press 1 (UW) 1 Valve Temp 1 2 Gas Press 1 3 PC - Bias 1 (UW)
58	11	-		Hskg Data	A		4 parameters commutated MX ADDR* Parameter 0 Gas Press 2 (UH) 1 Valve Temp 2 2 Gas Press 2 3 PC - Bias 2 (UH)
58	12	-		GRB PM Volt Mon	A	> 3 VDC = ON	
58	25	-		UOM Pkg Temp	A		
58	26	-		MPI Pkg Temp	A		
122	12	-		Low Volt Conv	A	>3 VDC = ON	
122	13	-		Stepped Defl Volt (UL)	A		

* Indicated by last 2 bits of Experiment Data Format D

- XIII . Meyer (MEH) Experiment Telemetry List

Minor Frame Word	Subcom Word	Bit	Unit ID	Telemetry Descriptor	Analog or Digital	Analog Range or Digital States	Remarks
0	-	-	MEH	Cosmic Ray Electron Data	D		3 types of data-selected internally. 1. Event Readout-96 bits(3cons. minor frames) per event. 2. Rate Readout-occurs every 32 spins. 224 bits(7cons. minor frames). 3. Null Readout-No data available
1	-	-		Cosmic Ray Electron Data	D		
2	-	-		Cosmic Ray Electron Data	D		
3	-	-		Cosmic Ray Electron Data	D		
58	23	-		Elec Temp	A		
58	24	-		CsI Xtal Temp	A		
58	37	-		Exp Pwr On Mon	A	> 2.5 V= ON	
59	61	-		Inst Status	D		
59	62	-		Inst Status	D		
							64 bits commutated bits 1-32, command verification bits 33-40, general status bits 41-52, GH rate bits 53-64, GB rate

XIV. Ogilive (OGH) Experiment Telemetry List

Minor Frame Word	Subcom Word	Bit	Unit ID	Telemetry Descriptor	Analog or Digital	Analog Range or Digital States	Remarks
38	-	-	OGH	Exp Data	D		6 minor frames/data set
58	46	-		+Volt Mon.	A		Super commutated with sliding
58	47	-		High Volt Mon	A		supply 1 & 2 data
59	30	-		Exp Status Data	D		
59	31	-		Exp Status Data	D		2 major frames/data set

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Minor Frame Word	Subcom Word	Bit	Unit ID	Telemetry Descriptor	Analog or Digital	Analog Range or Digital States	Remarks
4	-	-	SBH	Am Exp Data	A		
20	-	-		Am Exp Data	A		
36	-	-		Am Exp Data	A		
52	-	-		Am Exp Data	A		
56	-	-		Exp Ph/Status Data	A		
58	48	-		B Pwr Mon	A	>1.0 VDC = On	
58	49	-		B* Pwr Mon	A	> 1.0 VDC = On	
59	27	See below		CMD State/Status	D		
59	27	7 (MSB)		Inhibit	D	See Remarks	0/1 = Norm Rcvr Opn/Sync Sig to Rcvr Inhibited
59	27	6		Status Sel	D	See Remarks	0/1=Status B/Status B *
59	27	5		Cal Mode	D	See Remarks	0/1 = No Cal on Previous Cmd Exec/Cal on previous Cmd Exec or Pwr ON
59	27	4(MSB), 3		Maj Frame Type	D	See Remarks	00 = Type 3 01 = Type 1 10 = Type 2
59	27	2(MSB), 1		Mode ID (from Last CMD exec)	D	See Remarks	00 = Mode 1 (B:B*) 01 = Mode 2 (B only) 10 = Mode 3 (B* only)
59	27	0		CM1 Cmd Verif	D	See Remarks	0/1 = PAV + Pwr ON/PAV + PWR OFF

Minor Frame Word	Subcom Word	Bit	Unit ID	Telemetry Descriptor	Analog or Digital	Analog Range or Digital States	Remarks
59	28	See below	SBH	CMD State/Status	D		
59	28	7(MSB)		CM2 CMD Verif	D	See Remarks	0/1 = PAV - PWR ON/PAV - PWR OFF
59	28	6		CM3 CMD Verif	D	See Remarks	0/1 = PAU + PWR ON/PAU + PWR OFF
59	28	5		CM4 CMD Verif	D	"	0/1 = PAU - PWR ON/PAU - PWR OFF
59	28	4		CM5 CMD Verif	D	"	0/1 = PAZ + PWR ON/PAZ + PWR OFF
59	28	3		CM6 CMD Verif	D	"	0/1 = PAZ - PWR ON/PAZ - PWR OFF
59	28	2		CM7 CMD Verif	D	"	0/1 = NG PWR ON/NG PWR OFF
59	28	1		CM8 CMD Verif	D	"	0/1 = Dipole U/Dipole V
59	28	0 (LSB)		Status B*	D	"	0 = Normal seq of Status B and Status B* 1 = Only Status B* is Mon

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B-XV. Steinberg (SB) Experiment Telemetry List (Sheet 3 of 3)

Minor Frame Word	Subcom Word	Bit	Unit ID	Telemetry Descriptor	Analog or Digital	Analog Range or Digital States	Remarks
68	-	-	SBH	Am Exp Data	A		
84	-	-		Am Exp Data	A		
100	-	-		Am Exp Data	A		
116	-	-		Am Exp Data	A		
122	18	-		θB or θB* Temp	A		θB thermistor connected to primary DHU. θB* is connected to the backup DHU.

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Minor Frame Word	Subcom Word	Bit	Unit ID	Telemetry Descriptor	Analog or Digital	Analog Range or Digital States	Remarks
58	27	-	SCH	Short Ant Preamp Temp	A		
58	28	-		B Ant Preamp Temp	A		
58	39	-		Pwr Mon	A	> 2.5 VDC = ON	
59	29	See below		Inst Status	D		
59	29	7(MSB), 6, 5		8 Chan MX ID	D	Octal 0 = 1000 Hz 1 = 560 Hz 2 = 310 Hz 3 = 170 Hz 4 = 100 Hz 5 = 56 Hz 6 = 31 Hz 7 = 17 Hz	
59	29	4		Not Used			
59	29	3		Lg Ant Cmpt Active	D	0/1 = U/V	
59	29	2		Ant Conn to 16 Chan	D	0/1 = B/Lg (If Bit 1 = 1)	
59	29	1		Ant Conn to 16 Chan	D	0/1 = Short/Lg or B	
59	29	0		Ant Conn to 8 Chan	D	0/1 = B/Short	

B-XVI. Scarf (SCH) Experiment Telemetry List (Set 2 of 3)

Minor Frame Word	Subcom Word	Bit	Unit ID	Telemetry Descriptor	Analog or Digital	Analog Range or Digital States	Remarks
85	-		SCH	16 Chan f ₁₆ (100 KHz) Data	A		
86	-			16 Chan f ₁₅ (56 KHz) Data	A		
87	-			16 Chan f ₁₄ (31 KHz) Data	A		
88	-			16 Chan f ₁₃ (17 KHz) Data	A		
89	-			16 Chan f ₁₂ (10 KHz) Data	A		
90	-			16 Chan F ₁₁ (5.6 KHz) Data	A		
91	-			16 Chan f ₁₀ (3.1 KHz) Data	A		
92	-			16 Chan f ₉ (1.7 KHz) Data	A		
93	-			16 Chan f ₈ (1 KHz) Data	A		
94	-			16 Chan f ₇ (560 Hz) Data	A		
95	-			16 Chan f ₆ (310 Hz) Data	A		
96	-			16 Chan f ₅ (170 Hz) Data	A		
97	-			16 Chan f ₄ (100 Hz) Data	A		
98	-			16 Chan f ₃ (56 Hz) Data	A		
99	-			16 Chan f ₂ (31 Hz) Data	A		
101	-			16 Chan f ₁ (17 Hz) Data	A		

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B-XVI. Scarf (SCH) Experiment Telemetry List (Set 3 of 3)

Minor Frame Word	Subcom Word	Bit	Unit ID	Telemetry Descriptor	Analog or Digital	Analog Range or Digital States	Remarks
102	-	-	SCH	8 Chan Data	A		<u>8 Parameters Commutated</u> 8. f_1 (17 Hz) Data 7. f_2 (31 Hz) Data 6. f_3 (56 Hz) Data 5. f_4 (100 Hz) Data 4. f_5 (170 Hz) Data 3. f_6 (310 Hz) Data 2. f_7 (560 Hz) Data 1. f_8 (1 KHz) Data

B- XVII. Smith (SMH) Experiment Telemetry List, sheet 1 of 2)

Minor Frame Word	Subcom Word	Bit	Unit ID	Telemetry Descriptor	Analog or Digital	Analog Range or Digital States	Remarks
27	-	-	SMH	Triaxial Mag Fld Data	D		32 bit word
28	-	-		Triaxial Mag Fld Data	D		bits 0-2, Inst. Opn. Range ID
29	-	-		Triaxial Mag Fld Data	D		bits 3-11, X-Axis Mag Fld
30	-	-		Triaxial Mag Fld Data	D		bits 12-20, Y-Axis Mag Fld
							bits 21-29, Z-Axis Mag Fld
							bits 30, 31, Not Used
58	60	-		Hskg Data	A		8 Parameters Commutated
							1. First Pos ID (OV)
							2. PA Out V RMS
							3. Elec Temp
							4. Sensor Temp
							5. +12 VDC Supply Mon
							6. A/D Conv. Ref Volt
							7. Range ID
							8. +24 VDC RF PS Volt
58	61	-		SA A or X Fld Data	A		The type of data received (SA or Fld) is selected by command (P68).
58	62	-		SA B or Y Fld Data	A		
58	63	-		SA C or Z Fld Data	A		
59	63	See below		Inst Status	D		
59	63	7 (MSE)		Cal Status	D	0/1 = OFF/ON	
59	63	6		Ranging Mode	D	0/1 = Man/Auto	
59	63	5		Analog Data Mode	D	0/1 = Normal/Alt.	
59	63	4, 3, 2		Cal Step ID	D	BCD 0 = Step 1 1 = Step 2 2 = Step 3 3 = Step 4 4 = Step 5 5 = Step 6 6 = Step 7 7 = Step 8	Data is valid to identify steps only when Bit 7 = 1.
59	63						
59	63	1, 0 (LSB)		Not Used			

B-XVII. Smith (SMH) Experiment Telemetry List (Sheet 2 of 2)

Minor Frame Word	Subcom Word	Bit	Unit ID	Telemetry Descriptor	Analog or Digital	Analog Range or Digital States	Remarks
70 Rev. A	-	-	SMH	Triaxial Mag Fld Data	D		<u>32 bit word</u> bits 0-2, Inst. Opn. Range ID
71	-	-		Triaxial Mag Fld Data	D		bits 3-11, X-Axis Mag Fld
72	-	-		Triaxial Mag Fld Data	D		bits 12-20, Y-Axis Mag Fld
73	-	-		Triaxial Mag Fld Data	D		bits 21-29, Z-Axis Mag Fld
112	-	-		Triaxial Mag Fld Data	D		bits 30, 31, Not Used
113	-	-		Triaxial Mag Fld Data	D		<u>32 bit word</u> bits 0-2, Inst. Opn. Range ID
114	-	-		Triaxial Mag Fld Data	D		bits 3-11, X-Axis Mag Fld
115	-	-		Triaxial Mag Fld Data	D		bits 12-20, Y-Axis Mag Fld
							bits 21-29, Z-Axis Mag Fld
							bits 30, 31, Not Used

B-XVIII. . Stone (STH) Experiment Telemetry List

Minor Frame Word	Subcom Word	Bit	Unit ID	Telemetry Descriptor	Analog or Digital	Analog Range or Digital States	Remarks
37	-	-	STH	Exp Data	D		word 1 of 8
39	-	-		Exp Data	D		word 2 of 8
48	-	-		Exp Data	D		word 3 of 8
55	-	-		Exp Data	D		word 4 of 8
57	-	-		Exp Data	D		word 5 of 8
58	29	-		Exp Temp	A		This parameter is also used to indicate experiment power ON. > 0.5 VDC = ON.
58	40	-		Det Temp	A		
64	-	-		Exp Data	D		word 6 of 8
69	-	-		Exp Data	D		word 7 of 8
80	-	-		Exp Data	D		word 8 of 8

B-XIX Teegarden (TEH) Experiment Telemetry

Minor Frame Word	Subcom Word	Bit	Unit ID	Telemetry Descriptor	Analog or Digital	Analog Range or Digital States	Remarks
122	39	24	TEH	Temp 1	A		
122	39	25	TEH	Temp 2	A		
122	39	26	TEH	Temp 3	A		

Minor Frame Word	Subcom Word	Bit	Unit ID	Telemetry Descriptor	Analog or Digital	Analog Range or Digital States	Remarks
5	-	-	TYH	VLET PHA Data	D		128 bits commutated
6	-	-		VLET PHA Data	D		
7	-	-		VLET Rates and PHA Status	D		392 bits commutated
8	-	-		HET Rates	D		512 bits commutated
9	-	-		HET PHA Data	D		
10	-	-		HET PHA Data	D		
11	-	-		HET PHA Data	D		48 bits commutated
58	51	See below		VLET Hskg Data	A		
58	51	7		+12 Volt Mon	A		
58	51	6		+6 Volt Mon	A		
58	51	5		Preamp Temp	A		
58	51	4		Pwr Conv Temp	A		
58	51	3, 2		Spare	A		
58	51	1		-6 V Mon	A		
58	51	0		-12V Mon	A		
58	52	-		HETS Pwr Mon	A		
58	53	-		VLET Pwr Mon	A		
59	43	-		HET Cmd Status	D		word 1 of 4
59	44	-		" " "	D		word 2 of 4
59	45	-		" " "	D		word 3 of 4
56	46	-		" " "	D		word 4 of 4
122	17	-		HETS Temp	A		
122	19	-		HETS Temp	A		

APPENDIX C

ISEE-C ENGINEERING FORMAT TELEMETRY LIST -
LISTED NUMERICALLY

ISSE-C Engineering Format Telemetry List

Minor Frame Word	Subcom Word	Bit	Unit ID	Telemetry Descriptor	Analog or Digital	Analog Range or Digital States	Remarks
0			AT	Accel Output	A		
1				Indirect No. 1 (See Note 4)			
2				Indirect No. 1			
3				Indirect No. 1			
4				Indirect No. 1			
5				Indirect No. 1			
6				Indirect No. 1			
7				Indirect No. 1			
8			AT	Accel Output	A		
9				Indirect No. 2 (See Note 4)			
10				Indirect No. 2			
11				Indirect No. 2			
12				Indirect No. 2			
13				Indirect No. 2			
14				Indirect No. 2			
15				Indirect No. 2			
16			AT	Accel Output	A		
17			TL	ASI 1 (See Note 1)	A		
18				Indirect No. 1			
19			TL	ASI 2 (See Note 2)	A		
20			TL	DSI (See Note 3)	D		
21			TL	DSI	D		
22			TL	DSI	D		

ISSE-C Engineering Format Telemetry List

Minor Frame Word	Subcom Word	Bit	Unit ID	Telemetry Descriptor	Analog or Digital	Analog Range or Digital States	Remarks
23			TL	DSI	D		
24			AT	Accel Output	A		
25			TL	ASI 2	A		
26				Indirect 2			
27			SD	Static Ph A	A		
28			SMH	Triaxial Mag Fld Data	D		
29			SMH	Triaxial Mag Fld Data	D		
30			SMH	Triaxial Mag Fld Data	D		
31			SMH	Triaxial Mag Fld Data	D		
32			AT	Accel Output	A		
33			TL	ASI 1	A		
34				Indirect No. 1			
35			TL	ASI 2	A		
36			TL	ASI 1	A		
37				Indirect No. 1			
38			TL	ASI 2	A		
39				Indirect No. 2			
40			AT	Accel Output	A		
41			TL	ASI 2	A		
42				Indirect No. 2			
43			SD	Static Phase B	A		
44			TL	DSI	D		
45			TL	DSI	D		

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ISSE-C Engineering Format Telemetry List

Minor Frame Word	Subcom Word	Bit	Unit ID	Telemetry Descriptor	Analog or Digital	Analog Range or Digital States	Remarks
46			TL	DSI 4	D		
47			TL	DSI	D		
48			AT	Accel Output	A		
49			TL	ASI 1	A		
50				Indirect No. 1			
51			TL	ASI 2	A		
52			TL	ASI 1	A		
53				Indirect No. 1			
54			TL	ASI 2	A		
55				Indirect No. 2			
56			AT	Accel Output	A		
57			TL	ASI 2 AS 2	A		
58				Indirect No. 2			
59			TL	DSI	A		
60			TL	Fixed Words	D		
61			TL	Fixed Words	D		
62			TL	Fixed Words	D		
63			TL	Fixed Words	D		
64			AT	Accel Output	A		
65			TL	ASI 1	A		
66				Indirect No. 1			
67			TL	ASI 2	A		
68			TL	DSI	D		

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ISSE-C Engineering Format Telemetry List

Minor Frame Word	Subcom Word	Bit	Unit ID	Telemetry Descriptor	Analog or Digital	Analog Range or Digital States	Remarks
69			TL	DSI	D		
70			TL	DSI	D		
71			TL	DSI	D		
72			AT	Accel. Output	A		
73			TL	ASI 2	A		
74				Indirect No. 2			
75			TL	ASI 1	A		
76			SMH	Triaxial Mag Fld Data	D		
77			SMH	Triaxial Mag Fld Data	D		
78			SMH	Triaxial Mag Fld Data	D		
79			SMH	Triaxial Mag Fld Data	D		
80			AT	Accel Output	A		
81			TL	ASI 1	A		
82				Indirect No. 1	A		
83			TL	ASI 2	A		
84			TL	ASI 1	A		
85			PW	Non-Ess. Bus Cur	A		
86			PW	Main Bus Volts	A		
87			PW	Ess Bus Cur	A		
88			AT	Accel Output			
89			TL	ASI 2	A		
90				Indirect No. 2			
91			TL	ASI 1	A		

See B-XVII App B

ISSE-C Engineering Format Telemetry List

Minor Frame Word	Subcom Word	Bit	Unit ID	Telemetry Descriptor	Analog or Digital	Analog Range or Digital States	Remarks
92			TL	DSI	D		
93			TL	DSI	D		
94			TL	DSI	D		
95			TL	DSI	D		
96			AT	Accel Output			
97			TL	ASI 1	A		
98				Indirect No. 1			
99			TL	ASI 2	A		
100			TL	ASI 1	A		
101			PW	Solar Array Cur	A		
102			TL	Remainder			
103			TL	Remainder			
104			AT	Accel Output	A		
105			TL	ASI 2	A		
106				Indirect No. 2			
107			TL	ASI 1	A		
108			SMH	Triaxial Mag Fld Data	D		
109			SMH	Triaxial Mag Fld Data	D		
110			SMH	Triaxial Mag Fld Data	D		
111			SMH	Triaxial Mag Fld Data	D		
112			AT	Accel Output	A		
113			TL	ASI 1	A		
114				Indirect No. 1			

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ISSE-C Engineering Format Telemetry List

Minor Frame Word	Subcom Word	Bit	Unit ID	Telemetry Descriptor	Analog or Digital	Analog Range or Digital States	Remarks
115			TL	ASI 2	A		
116			TL	ASI 1	A		
117			SMH	X-Axis Mag Fld Data	A		
118			SMH	Y-Axis Mag Fld Data	A		
119			SMH	Z-Axis Mag Fld Data	A		
120			AT	Accel Output	A		
121			TL	ASI 2	A		
122				Indirect No. 2			
123			TL	Encoder Dump			
124			TL	Encoder Dump			
125			TL	Encoder Dump			
126			TL	Sync			
127			TL	Sync			

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NOTES

1. ASI 1 - See Appendix A, word 58, for telemetry listing.
2. ASI 2 - See Appendix A, word 122, for telemetry listing.
3. DSI - See Appendix A, word 59, for telemetry listing.
4. Indirect No. 1 (I₁) and No. 2 (I₂) - See page 14 of text for definition.

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