

Technical Handbook

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ALIGNMENT AND CALIBRATION DATA FOR THE ATMOSPHERE EXPLORER C SPACECRAFT

AED R-3973
November 28, 1973

RCA | Government and Commercial Systems
Astro-Electronics Division | Princeton, New Jersey

ALIGNMENT AND CALIBRATION BOOK
ATMOSPHERE EXPLORER "C" MISSION

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APPENDIX A

Analog Telemetry Conversion Coefficients

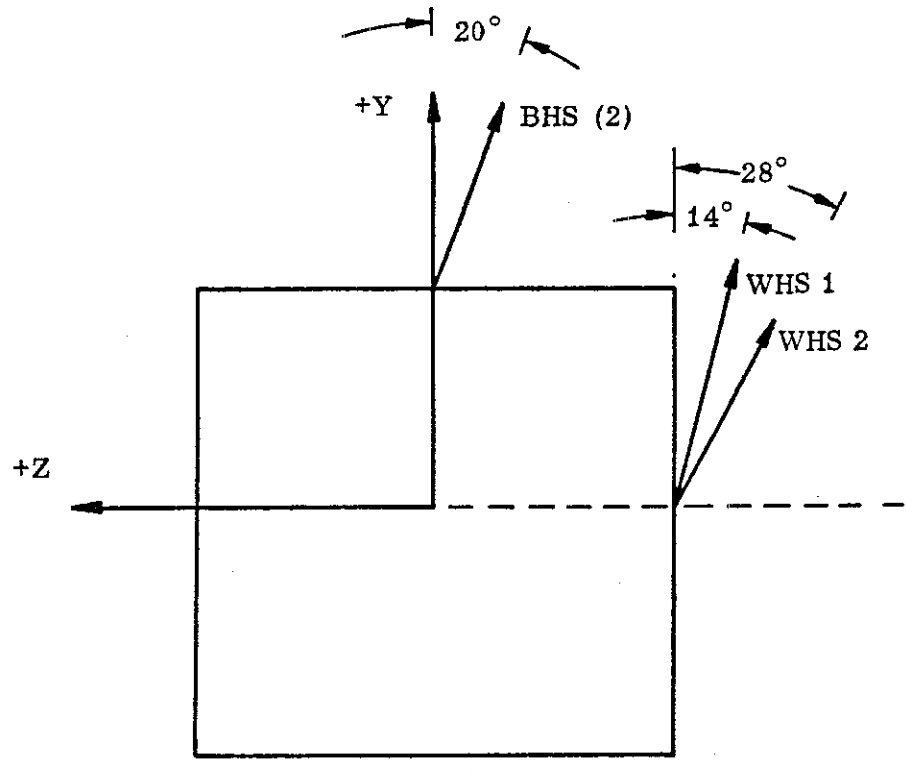
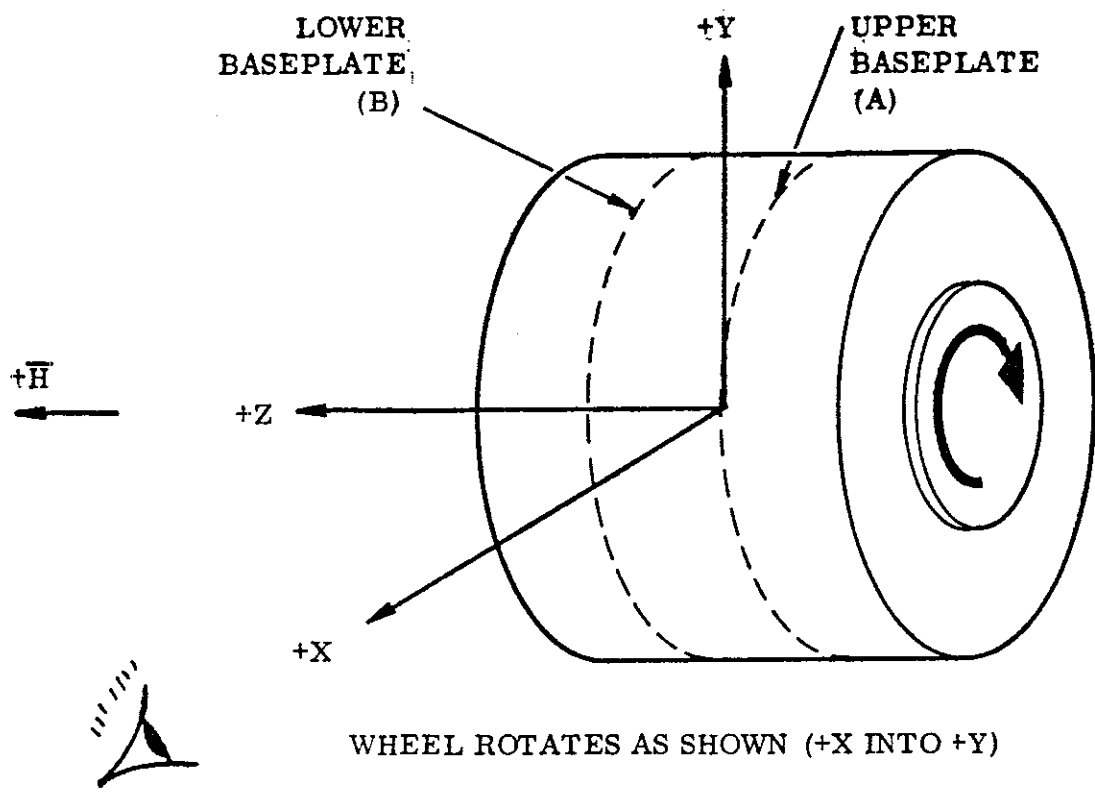
APPENDIX B

Component Serial Numbers

APPENDIX C

History Tape Index

SECTION 1.0



VIEW ALONG +X

Figure 1-1. Spacecraft Axis Definition

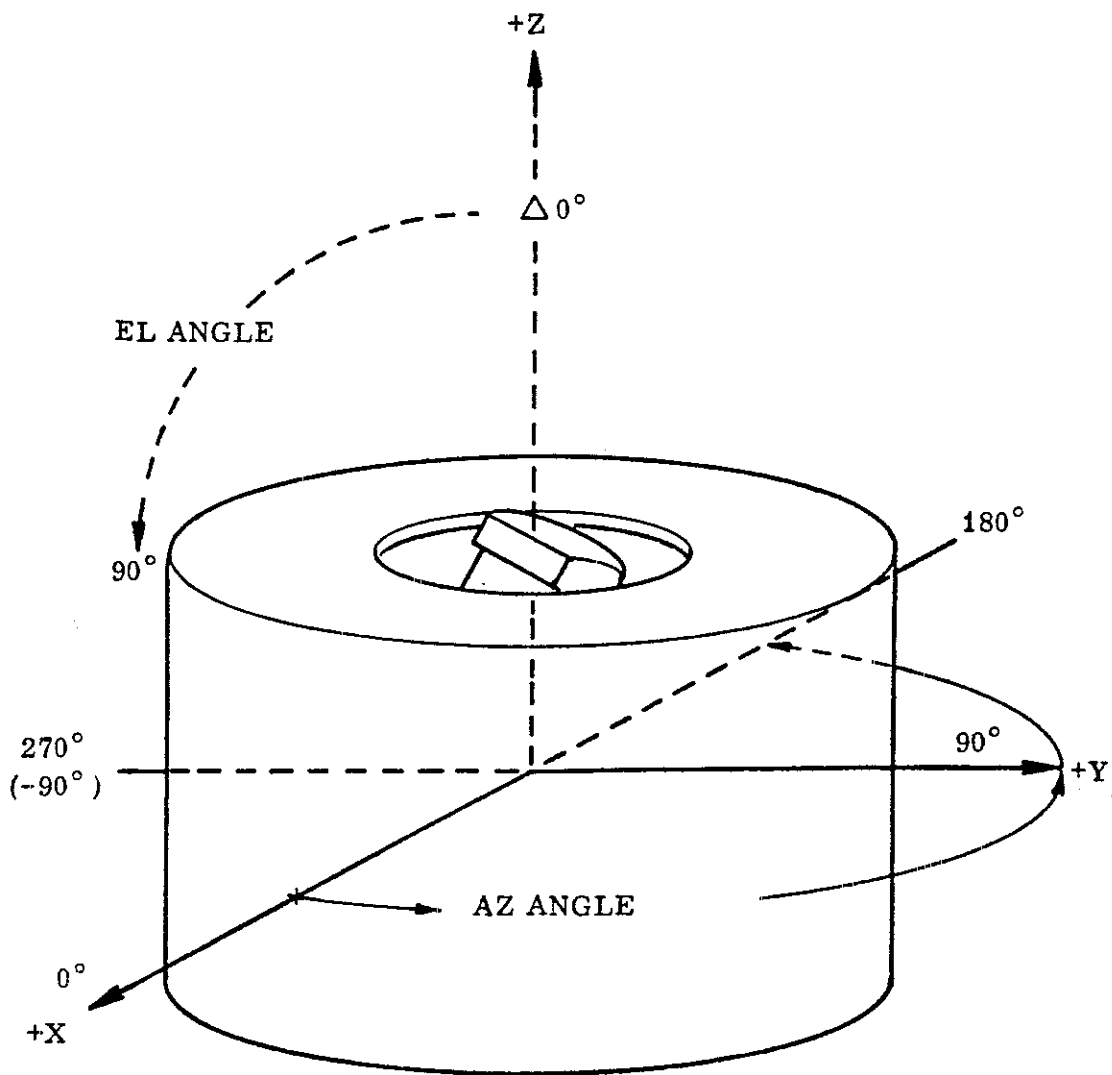
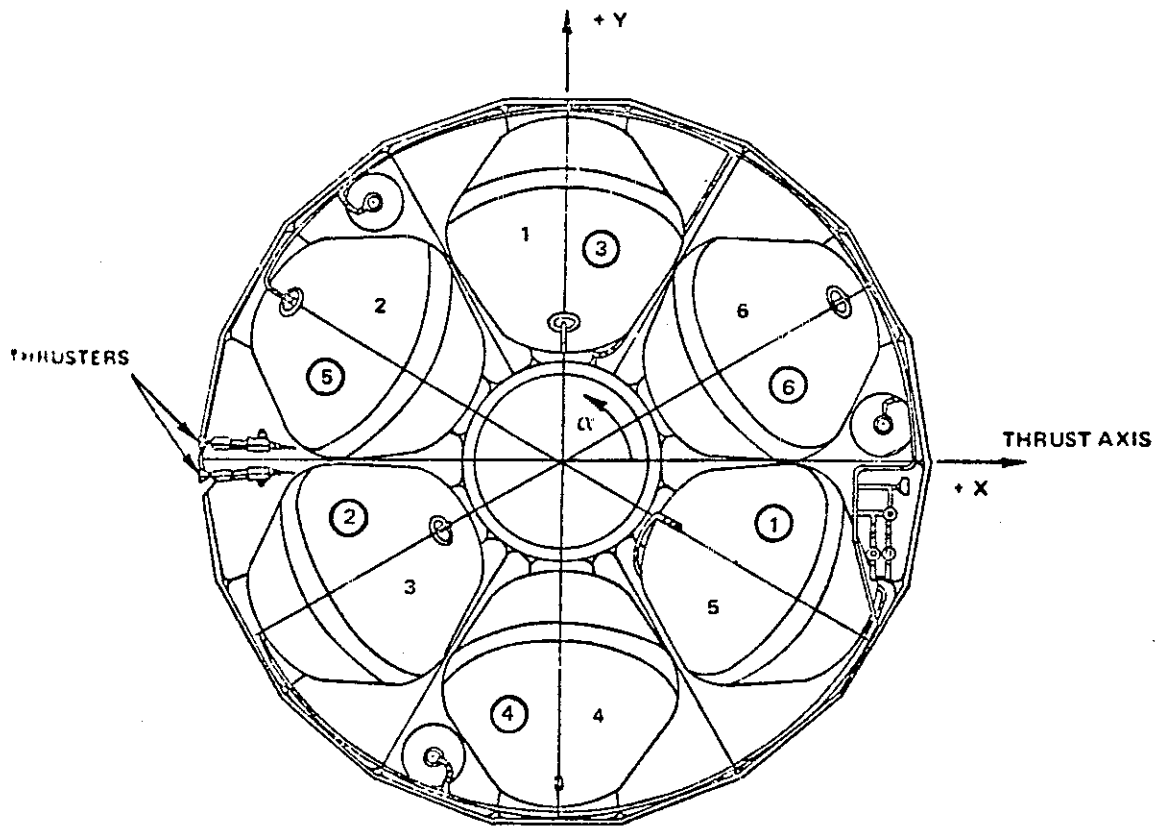


Figure 1-2. SPS Coordinates

○ = TRW and RCA Numbers



Tank Numbering System Used in C of M Control Computer Program
to be used by OCC

Figure 1-3. Propellant Tank Orientation (Top View)

SECTION 2.0

13 February 1974
74-AE-1063

National Aeronautics and
Space Administration
Goddard Space Flight Center
Greenbelt, Maryland 20771



Attention: Mr. R. Weaver, Code 420

Subject: Transmittal of Addendum to AE-C Alignment
and Calibration Data Book

Gentlemen:

Enclosed herewith are 15 copies of the addendum to
the "Alignment and Calibration Data for the Atmosphere
Explorer C Spacecraft" book.

The addendum consists of sections 2.0 and 3.0 dealing
with Optical Alignment and Mass Properties, respectively.

Very truly yours,

A handwritten signature in cursive script that reads 'S Toth'.

S. Toth
Manager
AE Project Operations

dr

Enclosures: Section 2.0, 4 pages
Section 3.0, 2 pages

cc: Mr. J. Findlay, Code 420, w/15 copies ENC

RCA/AED:	R. de Bastos	D. Shipley
	A. Heisman	B. Stewart
	G. Martch	P. Wise
	M. Perchick	File: 15

Addendum

SECTION 2.0

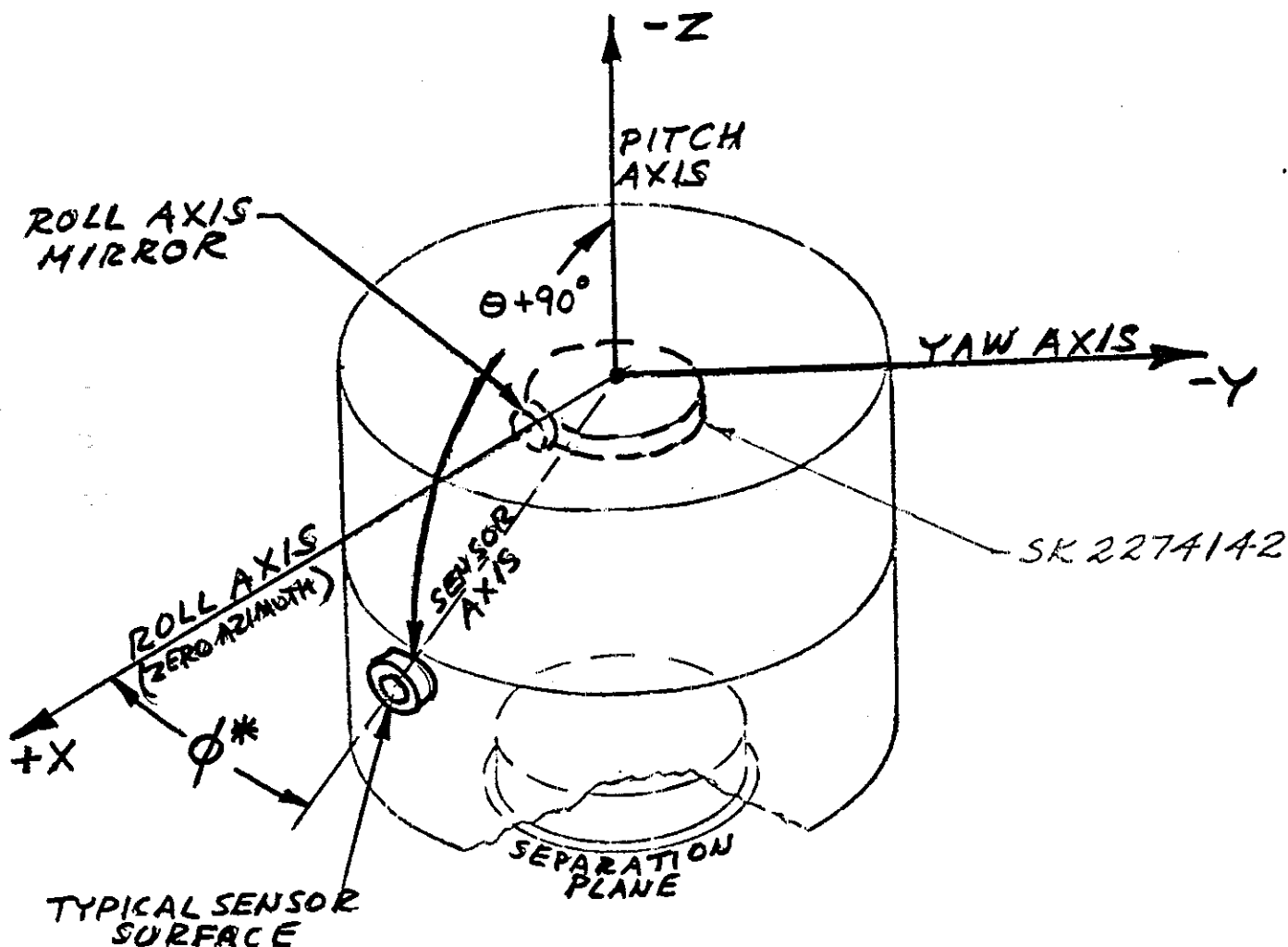
AE SPACECRAFT "C" OPTICAL ALIGNMENT DATA

Tables 2.1 and 2.2 provide the results of optical alignment measurements of the experiment and select black box/system reference surfaces. These measurements were taken in accordance with TP-OA-2271596 at three discrete times in the spacecraft integration and test program as follows:

17 August 1973	Pre-vibration
24 October 1973	Post-vibration
3 November 1973	Post-vibration Retest

The change in the pointing direction of the reference surface normals in the elevation and azimuth planes is provided for each of the two sets of data. The sign convention utilized for the data presentation is given in Figure 2.1.

FIGURE 2.1



ALIGNMENT DATA SIGN CONVENTION

The elevation angle θ is the angle between the MWA mounting plane and the sensor axis. The angle θ is negative when the angle between the sensor axis and the negative pitch axis (-Z) is less than 90 degrees. Conversely, the angle θ is positive when the angle between sensor and pitch axes is greater than 90 degrees.

The azimuth angle ϕ is the angle between roll/pitch plane (+X, -Z) and the plane defined by the pitch axis and sensor axis. The angle ϕ is positive when the plane defined by the pitch axis and the sensor axis is counter-clockwise of the +X, -Z plane as viewed from the -Z axis.

* Angle ϕ shown here is a positive angle.

TABLE 2.1

OPTICAL ALIGN DATA POST VIBR RETEST VS POST VIBR 3 NOV 1973/24 OCT 1973

EQUIPMENT	POST-VIBR		Δ		POST-VIBR RETEST		REQUIRED		REMARKS
	AZIM	ELEV	AZIM	ELEV	AZIM	ELEV	AZIM	ELEV	
BIMS	+8.2'	+4.8'	+0.8'	-1.5'	+9.0'	+3.3'	0° ±1'	±1°	Pre-vibr Az = +9.0'
PES No. 1	+8° 39.7'	+6.3'	-30.6'	+4.5'	+8° 9.1'	+10.8'	+8° ±1°	±1°	Pre-vibr Az = +8° 51.2'
DSAS - Mirror No. 1	-1° 11.5'	0.0'	+1° 13.8'	-1.4'	+2.3'	-1.4'	0° ±6'	±6'	Box repositioned about Azimuth
DSAS - Mirror No. 2	-	-	-	-	-	+11.7'	-	-	-
BHS - Upper (S/N 006)	+269° 46.7'	-20° 14.4'	+8.6'	+17.7'	+269° 55.3'	-19° 56.7'	+270° ±6'	-20° ±6'	Box repositioned about Az. and Elev.
BHS - Lower (S/N 004)	+269° 48.8'	-20° 13.2'	+8.0'	+16.1'	+269° 56.8'	-19° 57.1'	+270° ±6'	-20° ±6'	As BHS Upper.
RPA Drift Hd.	-3.3'	+6.8'	+2.4'	-2.7'	-0.9'	+4.1'	0° ±6'	±6'	New box
RPA No. 1	-10.4'	+6.4'	+14.9'	+1.2'	+4.5'	+6.6'	0° ±1°	±1°	New box
RPA No. 2	+110° 19.9'	+12.6'	-30.3'	-15.6'	+109° 49.6'	-2.9'	+110° ±1°	±1°	New box
RPA No. 3	+229° 54.6'	+7.5'	-3.6'	-5.2'	+229° 51.0'	+2.3'	+230° ±1°	±1°	New box
RPA Drift Hd.	-	-	-	-	Side of Grid Vertical within 0.001" over 1.0"	-	-	-	New box
LEE	+270° 1.2'	-2.0'	-0.9'	-1.9'	+270° 0.3'	-3.9'	+270° ±1°	±1°	Pre-vibr Elev. = -12.2'

POST VIBR RETEST VS POST VIBR 3 NOV 1973 - 24 OCT 1973

EQUIPMENT	POST-VIBR		Δ		POST-VIBR RETEST		REQUIRED		REMARKS	
	AZIM	ELEV	AZIM	ELEV	AZIM	RPO RAD	AZIM	RPO RAD		
OAPS YAW	-	-	-	-	+175° 23.0'	0.010"	-29° 17.1'	-	0.050"	30° Nom
OAPS ΔVA (Lft) (No. Load)	-	-	-	-	+175° 6.2'	0.030"	+5° 54.9'	-	0.050"	+6° ±30'
OAPS ΔVA (Lft) (Load ≅ 5.0 lb)	-	-	-	-	+175° 3.6'	0.033"	+6° 0.7'	-	0.050"	+6° ±30'
OAPS ΔVB (Rt) (No Load)	-	-	-	-	+184° 39.2'	0.087"	+5° 48.1	-	0.050"	+6° ±30'
OAPS ΔVB (Rt) (Load ≅ 5.0 lb)	-	-	-	-	+184° 40.7'	0.050"	+5° 54.3	-	0.050"	+6° ±30'

TABLE 2.2

EXPERIMENT	PRE-VIBRATION (8/17/73)			Δ			POST-VIBRATION (10/24/73)			REQUIREMENT		
	AZ	EL		AZ	EL		AZ	EL		AZ	EL	
BIMS	+ 9.0'	+ 3.1'		- 0.8'	+ 1.7'		+ 8.2'	+ 4.8'		0° ± 1°	± 1°	
RPA DRIFT HEAD	- 3.2'	+ 3.0'		- 0.1'	+ 3.8'		- 3.3'	+ 6.8'		0° ± 6'	± 6'	
RPA #1	-10.6'	0.0'		+ 0.2'	+ 5.4'		-10.4'	+ 5.4'		0° ± 1°	± 1°	
RPA #2	+110° 18.2'	+13.9'		+ 1.7'	- 1.3'		+110° 19.9'	+12.6'		+110° ± 1°	± 1°	
LEE	+270° 1.2'	-12.2'		0.0	+10.2'		+270° 1.2'	- 2.0'		+270° ± 1°	± 1°	
PES #1	+ 9° 51.2'	+ 1.7'		-11.5'	+ 4.6'		+ 9° 39.7'	+ 6.3'		+ 9° ± 1°	± 1°	
PES #2	+189° 11.6'	-15.0'		- 3.8'	+ 4.7'		+189° 7.8'	-10.3'		+189° ± 1°	± 1°	
RPA #3	+229° 51.2'	-10.1'		+ 3.4'	+17.6'		+229° 54.6'	+ 7.5'		+230° ± 1°	± 1°	
OSS	- 5.6'	+ 2.7'		- 0.4'	+ 5.6'		- 6.0'	+ 8.3'		0° ± 1°	± 1°	
MIMS	+16.6'	+ 1.9'		- 3.3'	+ 1.0'		+13.3'	+ 2.9'		0° ± 2°	± 2°	
UVNO	+179° 44.7'	-27.6'		+ 1.2'	- 7.8'		+179° 45.9'	-35.4'		+180° ± 1°	± 1°	
DSAS (Mirror #1)	1° 11.3'	- 1.1'		- 0.2'	+ 1.1'		- 1° 11.5'	0.0		0° ± 6'	± 6'	
CEPR	+ 89° 50.7'	- 6.0'		+23.7'	+ 4.7'		90° 14.4'	- 1.3'		+ 90° ± 2°	± 30'	
ESUM	+ 90° 2.2'	- 6.8'		-	-		-	-		+ 90° ± 1°	± 1°	
NATE	+329° 35.2'	+ 5.6'		+ 6.4'	+ 6.6'		+329° 41.6'	+12.2'		+330° ± 1°	± 1°	
NACE	-29.6'	- 4.6'		+18.8'	+25.1'		-10.8'	+20.5'		0° ± 1°	± 1°	
BHS - UPPER (S/N 006)	+269° 53.7'	-20.0'		- 6.0'	+ 1.3'		+269° 46.7'	-20.0'		+270° ± 6'	-20° ± 6'	
BHS - LOWER (S/N 004)	+269° 55.0'	-20.0'		- 6.2'	+ 3.9'		+269° 48.8'	-20.0'		+270° ± 6'	-20° ± 6'	
UP BPL, +X FLAT	- 0.7'	- 1.2'		+ 0.5'	- 0.2'		- 0.2'	- 1.4'		0° ± 7'	± 8'	
LOW BPL, +X FLAT	+ 2.2'	+ 2.5'		- 0.8'	+ 1.3'		+ 1.4'	+ 3.8'		0° ± 9'	± 8'	
VAE (-X) TO UVNO	-	-		-	-		-	-		-	-	
VAE (WIDE TO NARROW)	-	-		-	-		-	-		-	-	
VAE - WIDE CH. (+Y)	-	-		-	-		-	-		-	-	
VAE - NARROW CH. (-X)	-	-		-	-		-	-		-	-	
VAE - WIDE CH.	+269° 48.7'	+ 1.4'		+10.5'	+ 3.5'		+269° 59.2'	+ 4.9'		+270° ± 1°	± 1°	
VAE - NARROW CH.	+179° 52.3'	- 0.8'		+10.7'	+ 3.0'		+180° 3.0'	+ 2.2'		180° ± 1°	± 1°	

SECTION 3.0

Addendum

Section 3.0 Weight, Moment of Inertia, Center of Gravity and Balance Measurements

Final measured/calculated mass properties for A. E. Spacecraft C are given in Table 3.1. Tabulations for four configurations are as follows:

- 1) OAP's empty
- 2) Launch
- 2) Beginning of Life (B. O. L.) - 373.0 lbs. fuel
- 3) End of Life (E. O. L.) - 18.0 lbs. fuel

Table 3.1

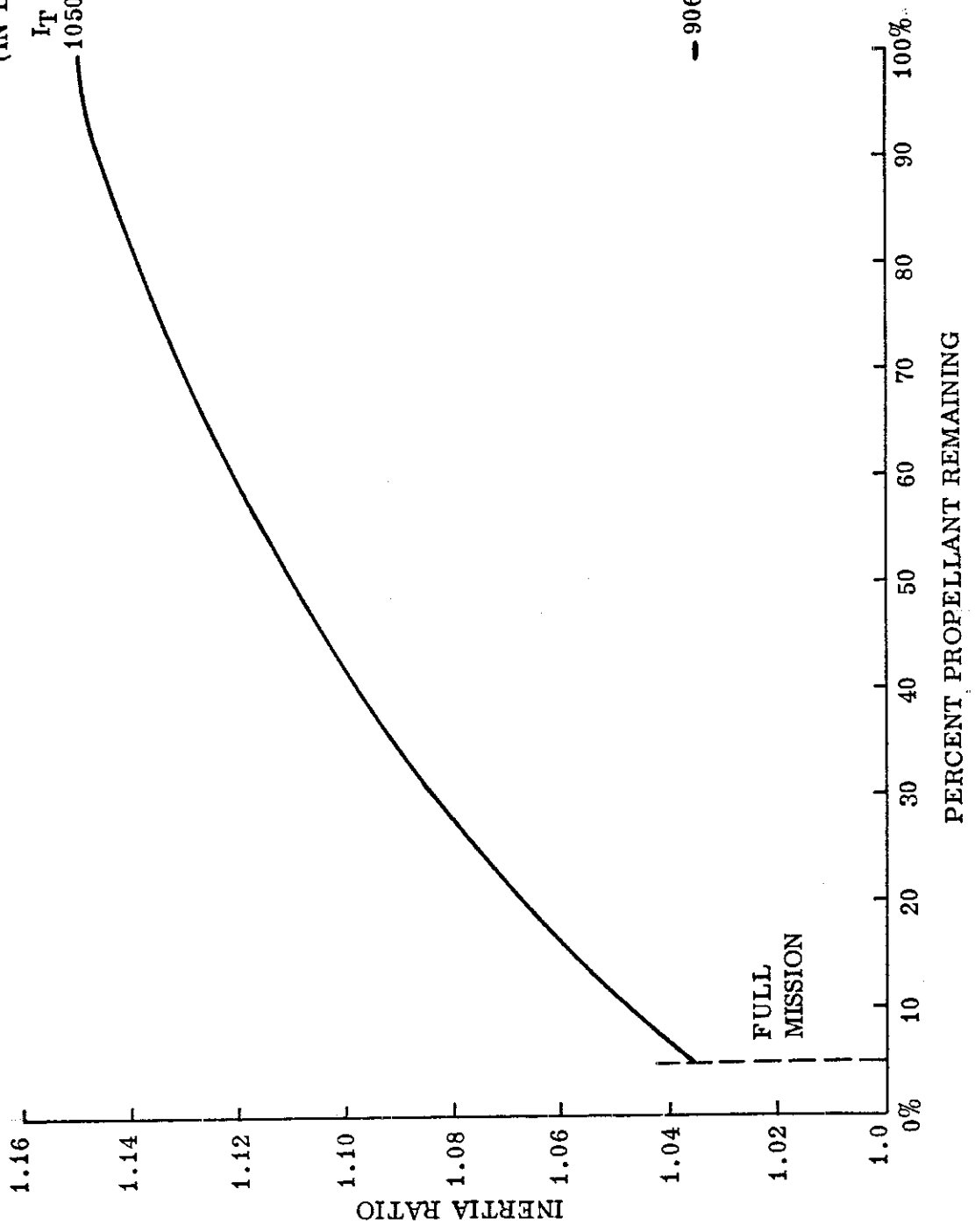
AE-C MASS PROPERTIES

S/C Configuration	Weight (lbs)	(inches $\times 10^3$)		(lb-in ²)		I_S	$I_{LAT-MAX}$	Inertia Ratio
		\bar{X}	\bar{Y}	\bar{Z}	WXX			
1 OAP's Empty	1117.3	47	5	5	-	-	-	-
2 Launch	1493.7	21	-15	4	504 max.	202	-	-
3 B.O.L.	1490.3	-20	-18	6	113 max.	113	455	1.181
4 E.O.L.	1135.3	-26	-24	8	113 max.	113	381	1.048

SECTION 4.0

INERTIAS
(IN LB SEC²)

I_T 1050
I_S 1210 BOL



906 938 EOL

FULL
MISSION

SECTION 5.0

COMMAND LIST

THE COMMAND FORMAT USED FOR THE AE "C" SPACECRAFT IS SHOWN IN FIGURE 5-1. THE SEVEN BIT ADDRESS FOR AE "C" IS GIVEN IN BINARY AS 1101000.

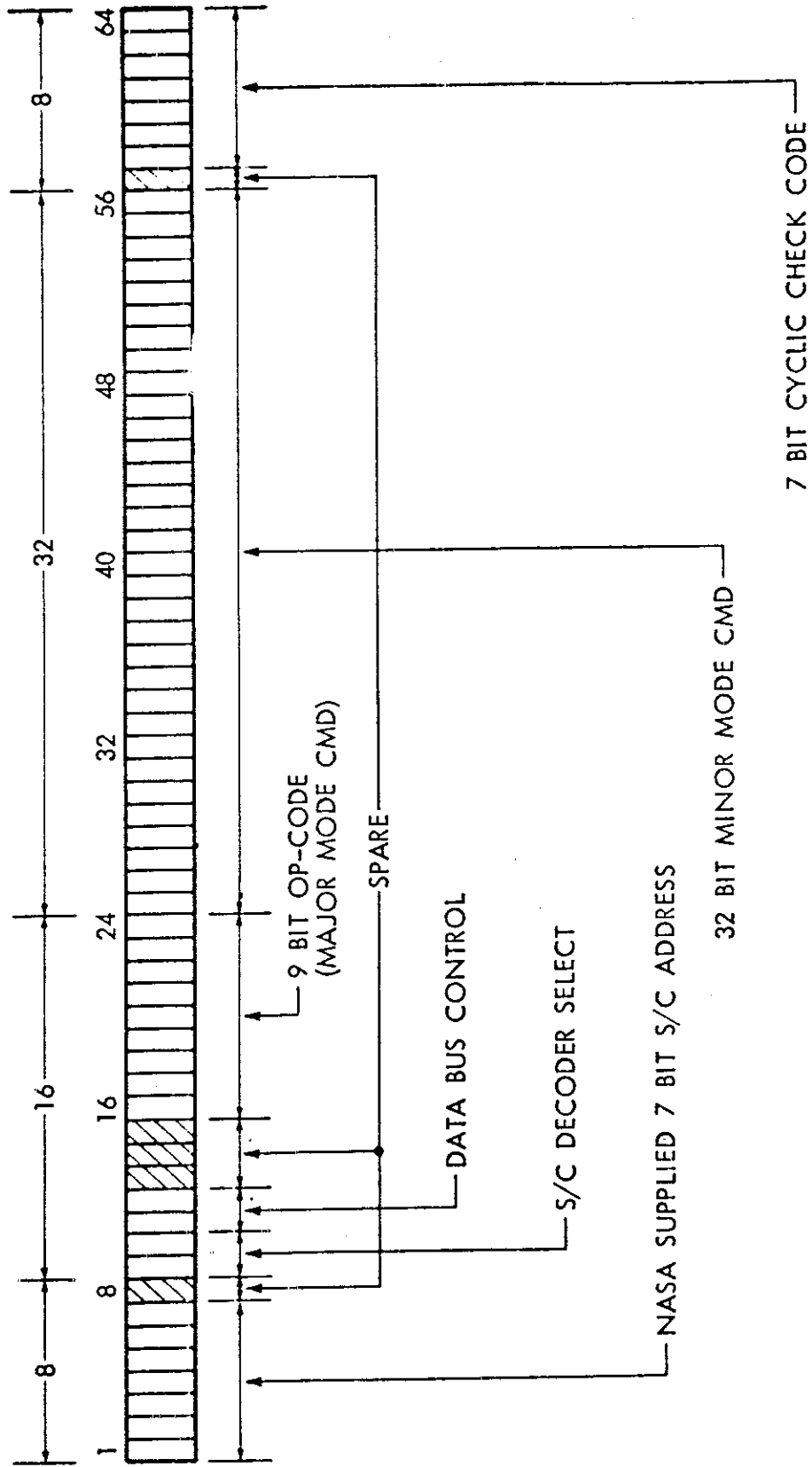


Figure 5-1. Command Word Structure - Real-Time Command

Command Word Format

The actual format of the 64-bit command word is as follows:

- Bits 1-7 - 'XEO' - Satellite address code
- Bit 8 - Spare bit = 0
- Bits 9, 10 - Decoder select code; 01 = decoder 1, 10 = decoder 2 and 00, or 11 signified neither decoder
- Bits 11, 12 - Data bus control code; 00, 01, 10 - no minor mode data, 11 signifies minor mode data is present
- Bit 13 - Spare = 0
- Bit 14 - Spare = 0
- Bit 15 - Spare = 0
- Bits 16-24 - 9 bit OP CODE
- Bits 25-56 - 32 bit MINOR MODE DATA; these bits are all 0's if minor mode data is not included
- Bit 57 - Spare = 0
- Bits 58-64 - Cyclic code check bits

It should be noted that for all command transmissions, whether for individual 64-bit commands, or a group of such commands, the command string is always preceded by a special "frame sync" word containing 63 logic 0 bits followed by a logic 1 bit. (See Figure 5-1 for Command Word Structure.)

ATMOSPHERE EXPLORER
MISSIONS C, D, AND E

Title: AE COMMAND LIST

DN- 832-2.2(AE)

Written by: R. Borlik

Date: 20 July 1972

Approved by: B. Stewart

Date: 24 July 1972

REVISIONS

Ltr.	Description	Date	Author
A	Added the command "FSL LOAD MINOR MODE".	1 Aug 1972	R. Borlik
B	Added op codes; revised command terminology to agree with telemetry list; deleted the Command "Telemetry Power Off"; added the commands "H.K. TLM (A) Power Off" and "H.K. TLM (B) Power Off." Combined the commands to fire the SPS A2 and EL Ordnance. Added commands: "Initialize Shunt Limiter Relays", "Reg. Bus Min. Load OFF", "Enable DSAI Power", "Disable DSAI Power".	27 Oct. 1972	R. Borlik
C	Corrected command name for Op Code 544 (Page 7) to DSAI PWR Disable. Sheet 12 - Change command name typo, last line "Initialize Shunt Limiter Relays". Sheet 17 change 9 bit op code for "LEE H.V. #2 ON" to 627.	31 Oct 1972	R. Borlik
D	DSAI code allocations changed. (Page 7) Code 146 connected to PCMC 2. (Page 13)	27 Nov 72	W. V. Fuldner
E	Corrected DSAI Pwr Disable Op-Code (Page 7)	12 Mar 73	W. V. Fuldner
F	Recorrected DSAI Pwr Disable Op-Code (pg. 7) and Corrected CEP Instr. Pwr off Op-Code (pg. 3)	26 Mar 73	W. V. Fuldner
	CONTINUED...		

ATMOSPHERE EXPLORER
MISSIONS C, D, AND E

TITLE: AE COMMAND LIST

DN-832-2.2(AE)

REVISIONS CONTINUED...

Ltr.	Description	Date	Author
G	Changed "Use Memory 2, Not 1" to 057(p 24); Added PROG 1 Nadir Flip 667(p 25); PROG 2 Nadir Flip 630(p 25); Deleted "Memories OFF"(p 24); Changed "ESUM Motor Power ON" to OP Code 650(p 14); "ESUM BIPH HTR PWR ON" to OP Code 747(p 14); "PES INSTR POWER ON" to Op Code 657(p 5); "PES INSTR POWER OFF" to Op Code 422(p 5); Deleted "DSAI PWR ENABLE" (p 7); "DSAI PWR DISABLE" (p 7); Added "ATC AUX HTRS Commands" (p 21); "ATC REF TEMP Commands" (p 21).	28 Oct 73	W. V. Fuldner
H	Added "Damper Fire 1" Op Code (p 25) "Damper Fire 2" Op Code (p 25)	20 Nov 73	W. V. Fuldner

AE COMMAND LIST

This note lists the commands used for AE spacecraft C, D, and E. The 9-bit op codes are coded in octal with the corresponding 2 of 32 codes also listed. Correspondence between the 9-bit and 2 of 32 codes is defined in DN-716-11.1(AE). Commands are transmitted MSB first. As an example, the first command in the list, "DISABLE OAPS" has the 9-bit op code 036₈, which is transmitted as:

000011110
 ↑
 MSB, first bit transmitted

The remaining columns in the table indicate that the command is decoder eleven times on baseplate A as a relay type command and once on baseplate A and twice on baseplate B as a logic level command and is used in spacecraft C, D, and E. Minor mode commands are indicated by asterisks.

In assigning the op codes, the number of bit lines used for a particular system was kept to a minimum as far as possible to reduce the probability of erroneous responses in the event of a bit line failure in the active state. An additional consideration was keeping the loading of the 32 bit lines approximately equal.

A summary of the command op code utilization is given below.

No. of Codes			Where Used
C	D	E	
157	187	185	CDU A only
16	16	15	LIU A only
149	153	147	CDU B only
40	38	40	LIU B only
5	5	5	CDU A and CDU B
2	2	2	LIU A and LIU B
1	1	1	LIU A & B and CDU A

Command Function			Op Code		Utilization				Spacecraft		
9Bit	2of32	Rly.	R.D.	L.L.	Base-Plate	C	D	E			
036	30,31	1(A)		1(A) 2(B)	A&B	X	X	X			
034	28,29	2			A						
033	27,28	2			A						
031	25,26	1			A						
072	26,28	1			A						
131	25,28	1			A						
130	24,27	1			A						
230	24,29	1			A						
070	24,26	1			A						
032	26,27	3			A						
171	25,29	3			A						
170	24,28	3			A						
132	26,29	1			A						
071	25,27	1			A						
133	27,30	1			A						
232	26,31	1			A						

Command Function	Op Code		Utilization			Spacecraft			
	9Bit	2of32	Rly.	R.D.	L.L.	Base-Plate	C	D	E
CEP, INSTR. PWR. ON	350	8,16	1			A	X	X	X
INSTR. PWR. OFF	362	18,26	1			A			
ENABLE BIPH HTRS	437	8,31	1			A			
DISABLE BIPH HTRS	536	9,30	1			A			
RAD. PROBE HTR. ON	476	8,30	1			A			
AX PROBE HTR. ON	636	11,30	1			A			
RAD. BIPH HTR. ON	634	9,28	1			A			
AX BIPH HTR. ON	754	12,28	1			A			
ALL HTRS. OFF	635	10,29	4			A			
PROBES NORMAL	575	9,29		1		A			
PROBES REVERSED	674	10,28		1		A			
SYSTEM 1 MODE 1	675	11,29		1		A			
SYSTEM 1 MODE 2	676	12,30		1		A			
SYSTEM 2 MODE 1	577	11,31		1		A			
SYSTEM 2 MODE 2	735	12,29		1		A			
SYSTEM 2 MODE 3	637	12,31		1		A			
VA REFERENCE +1	715	13,28		1		A			
VA REFERENCE -1	716	14,29		1		A			
VA REFERENCE 0	576	10,30		1		A			
INTERNAL CLK.	755	13,29		1		A			
EXTERNAL CLK.	656	14,28		1		A			

Command Function	Op Code		Utilization				Spacecraft		
	9Bit	2of32	Rly.	R.D.	L.L.	Base-Plate	C	D	E
CEP, CALIBRATE	560	16,28			1	A	X	X	X
UVNO INSTR. PWR. ON	145	5,9	1			A	X	X	
INSTR. PWR. OFF	252	10,16	1			A	X	X	
LOAD MINOR MODE *	037	0,31			1	A	X	X	
OSS INSTR. PWR. ON	153	11,15	1			A	X	X	X
INSTR. PWR. OFF	446	6,16	1			A			
PUMP PWR. ON	213	11,16	1			A			
PUMP PWR. OFF	347	7,15	1			A			
FIRE CMD. #1	447	7,17	1			A			
FIRE CMD. #2	550	8,20	1			A			
FILAMENT #1 ON	174	0,28			1	A			
FILAMENT #2 ON	175	1,29			1	A			
FILAMENTS OFF	234	1,28			1	A			
LOAD MINOR MODE *	135	0,29			1	A	Y	Y	Y

Command Function	Op Code		Utilization				Spacecraft		
	9Bit	2of32	Rly.	R.D.	L.L.	Base-Plate	C	D	E
NACE INSTR. PWR. ON	511	9,20	1			A	X	X	X
INSTR. PWR. OFF	610	8,21	1			A			
ENABLE COVER PWR.	546	6,18	1			A			
DISABLE COVER PWR.	547	7,19	1			A			
COVER PWR. ON	507	7,18	1			A			
COVER PWR. OFF	606	6,19	1			A			
FIRE CMD #1	646	6,20	1			A			
FIRE CMD #2	647	7,21	1			A			
SEL. MIN. MODE REG. A	607	7,20		1		A			
SEL. MIN. MODE REG. B	706	6,21		1		A			
BYPASS MODE	543	3,15		1		A			
NORMAL MODE	603	3,16		1		A			
LOAD MINOR MODE A	427	0,23			1	A			
LOAD MINOR MODE B	467	1,23			1	A			
PES INSTR. PWR. ON	657	15,29	1			A	X	X	X
INSTR. PWR. OFF	422	18,27	1			A			
HI VOLT 1 ON	351	9,17		1		A			
HI VOLT 1 OFF	151	9,13		1		A			
HI VOLT 2 ON	112	10,13		1		A			

Command Function	Op Code		Utilization				Spacecraft		
	9Bit	2of32	Rly.	R.D.	L.L.	Base-Plate	C	D	E
PES HI VOLT 2 OFF	113	11,14		1		A	X	X	X
CAL. MODE ENABLE	152	10,14		1		A			
CAL. MODE DISABLE	053	11,13		1		A			
CAL. MODE INITIATE	430	1,24			1	A			
LOAD MINOR MODE *	370	0,24			1	A	Y	Y	Y
MAG INSTR. PWR. ON	235	2,29	1			B	X	X	X
INSTR. PWR. OFF	236	3,30	1			B	X	X	X
CALIBRATE	617	15,28			1	B	X	X	X
PSA INSTR. PWR. ON	205	5,10	1			A	X	X	X
INSTR. PWR. OFF	506	6,17	1			A			
FIRE COMD. 1	253	11,17	1			A			
FIRE COMD. 2	537	10,31	1			A	Y	Y	Y
PSB INSTR. PWR. ON	105	5,8	1			A	X	X	X
INSTR. PWR. OFF	212	10,15	1			A			
ENABLE HTR. PWR.	154	12,16	1			A	Y	Y	Y

Command Function		Op Code		Utilization				Spacecraft		
9Bit	2of32	Rly.	R.D.	L.L.	Base-Plate	C	D	E		
	410	8,17	1		A	X	X	X		
PSB DISABLE HTR. PWR.										
	407	7,16	1		A	X	X	X		
HEATER ON										
	545	5,17	1		A	X	X	X		
HEATER OFF										
TAL INSTR. PWR. ON	717	15,30	1		A	X	X	X		
INSTR. PWR. OFF	522	18,29	1		A					
SEL. TC-1/RWT-1	673	9,27		1	A					
SEL. TC-2/RWT-2	267	23,29		1	A					
SEL. AMP A	411	9,18		1	A					
SEL. AMP B	227	23,28		1	A					
DSAI PWR. ON	042	2,4	1		A	X	X	X		
PWR. OFF	207	7,12	1		A	X	X	X		
ENABLE SQUIB BUS. A, NOT B	073	27,29	1		A	X	X	X		
ENABLE SQUIB BUS. B, NOT A	075	29,31	1		A	X	X	X		
DISABLE SQUIB BUSES	074	28,30	2		A	X	X	X		

Command Function		Op Code		Utilization				Spacecraft		
9Bit	2of32	Rly.	R.D.	L.L.	Base-Plate	C	D	E		
USE LIU. XTAL A, NOT B	573	7,27	1(A)		A&B	X	X	X		
USE LIU. XTAL B, NOT A	574	8,28	1(A)		A&B	X	X	X		
USE TIME BASE MASTER A, SLAVE B	633	8,27			A&B	X	X	X		
USE TIME BASE MASTER B, SLAVE A	534	7,28			A&B	X	X	X		
TELEM PWR. ON	012	10,11	2		A&B	X	X	X		
A TELEM. PWR. OFF	240	0,6	1		A	X	X	X		
B TELEM. PWR. OFF	655	13,27	1		B	X	X	X		
PCE 1 H.S. CONVRT. PWR. ON	104	4,7	1		A	X	X	X		
PCE 1 H.S. CONVRT. PWR. OFF	201	1,6	1		A					
PCE 2 H.S. CONVRT. PWR. ON	142	2,6	1		A					
PCE 2 H.S. CONVRT. PWR. OFF	143	3,7	1		A					
BHSION, 2 OFF	102	2,5			A					
BHS2 ON, 1 OFF	045	5,7			A					
BOTH BHS OFF	300	0,7			A	✓	✓	✓		
PCE PITCH SENSE NORMAL	001	1,2			A	X	X	X		
PITCH SENSE CROSSED	100	0,3			A	X	X	X		

Command Function	Op Code		Rly.	Utilization			Spacecraft		
	9Bit	2of32		R.D.	L.L.	Base-Plate	C	D	E
PCE DISCONNECT MOTOR 1	206	6,11		1		A	X	X	X
DISCONNECT MOTOR 2	101	1,4		1		A			
PL CLOSED LOOP MODE	140	0,4		2		A			
PL OPEN LOOP MODE	141	1,5		2		A			
PL GAIN NORMAL	005	5,6		2		A			
PL GAIN COARSE	202	2,7		2		A			
PCE LOAD MINOR MODE *	004	4,5			2	A			
DESPIN ON	003	3,4		2		A			
DESPIN OFF	200	0,5		2		A			
BOTH PITCH LOOPS OFF	040	0,2		2		A			
SELECT PL 1, NOT 2	604	4,17		1		A			
SELECT PL 2, NOT 1	002	2,3		1		A			
SELECTED LOOP ON	041	1,3		2		A	Y	Y	Y

Command Function	Op Code		Utilization				Spacecraft		
	9Bit	2of32	Rly.	R.D.	L.L.	Base-Plate	C	D	E
SELECTED SBT ON	564	0,20	2			A	X	X	X
SELECTED SBT OFF	565	1,21	2			A			
SBT-1 AUTO ACQ. MODE ENABLE	306	6,13	1			A			
SBT-2 AUTO ACQ. MODE ENABLE	525	0,21	1			A			
SBT AUTO ACQ. MODE DISABLE	307	7,14	2			A			
SBT OSC TEST MODE	623	0,19		2		A			
SBT HI PWR. ENABLE	662	0,18		2		A			
SBT LO PWR. ENABLE	721	0,17		2		A			
SELECT SBT 1, NOT 2	247	7,13		1		A			
SELECT SBT 2, NOT 1	346	6,14		1		A			
SBT RANGING ENABLE	740	0,16		2		A			
SBT RANGING DISABLE	700	0,15		2		A			
SBT OSC NORMAL MODE	157	15,19		2		A			
SELECT PMP 1, NOT 2	312	10,17	1			A			
SELECT PMP 2, NOT 1	054	12,14	1			A			
SELECTED PMP ON	250	8,14	2			A			
SELECTED PMP OFF	014	12,13	2			A			
PMP PLBK. MODE	551	9,21		2		A			
PMP R.T. ONLY MODE	450	8,18		2		A			
SELECT VBT 1, NOT 2	517	15,26	1	1		B			
SELECT VBT 2, NOT 1	520	16,27	1	1		B	Y	Y	Y

Command Function		Op Code		Utilization			Spacecraft		
9Bit	2of32	Rly.	R.D.	L.L.	Base-Plate	C	D	E	
SELECTED VBT ON	460	2			A	X	X	X	
SELECTED VBT OFF	557	2			A				
VBT BEACON MODE ENABLE	711		2		A				
VBT TELEM. MODE ENABLE	611		2		A	Y	Y	Y	
POWER SUPPLY ELECTR									
						X	X	X	
BOTH REGULATORS OFF	024		2		A				
REGUL. 1 ON, ONLY	221	1**	1		A				
REGUL. 2 ON, ONLY	222	1**	1		A				
PSE FAILED CONTROL AMP DISCONN.	261		1		A				
CONNECT ALL CHR. CNTRLS.	123		3		A				
CHRG. CONTROL 1 DISCONNECT	026		1		A				
CHRG. CONTROL 2 DISCONNECT	262		1		A				
CHRG. CONTROL 3 DISCONNECT	263		1		A				
3RD ELECTRODE INHIB. CHG. CNTRL. 1	064		1		A				
3RD ELECTRODE ENABLE CHG. CNTRL. 1	163		1		A				
3RD ELECTRODE INHIB. CHG. CNTRL. 2	025		1		A				
3RD ELECTRODE ENABLE CHG. CNTRL. 2	124		1		A				
3RD ELECTRODE INHIB. CHG. CNTRL. 3	065		1		A				
3RD ELECTRODE ENABLE CHG. CNTRL. 3	321		1		A	Y	Y	Y	

**One relay operated by either command.

Command Function	Op Code		Utilization			Spacecraft			
	9Bit	2of32	Rly.	R.D.	L.L.	Base-Plate	C	D	E
PSE CHG. CNTRL. 1 FAIL DET. ENABLE	224	20,25		1		A	X	X	X
CHG. CNTRL. 1 FAIL DET. DISABLE	223	19,24		1		A			
CHG. CNTRL. 2 FAIL DET. ENABLE	125	21,24		1		A			
CHG. CNTRL. 2 FAIL DET. DISABLE	322	18,25		1		A			
CHG. CNTRL. 3 FAIL DET. ENABLE	027	23,24		1		A			
CHG. CNTRL. 3 FAIL DET. DISABLE	126	22,25		1		A			
ATC 1 DISCONNECT	164	20,24		1		A			
ATC 2 DISCONNECT	165	21,25		1		A			
ATC 3 DISCONNECT	066	22,24		1		A			
ATC 4 DISCONNECT	361	17,25		1		A			
CONNECT ALL ATC's	061	17,19		2		A			
REG. BUS. DET ENABLE	022	18,20		1		A			
REG. BUS. DET DISABLE	121	17,20		1		A			
UNREG. BUS. DET ENABLE	062	18,20		1		A			
UNREG. BUS. DET DISABLE	161	17,21		1		A			
REG. BUS. CURR. TLM - FINE SCALE	023	19,20		1		A			
REG. BUS. CURR. TLM - COARSE SCALE	122	18,21		1		A			
UNREG. BUS. CURR. TLM - FINE SCALE	063	19,21		1		A			
UNREG. BUS. CURR. TLM - COARSE SCALE	162	18,22		1		A			
REG. BUS MIN. LOAD OFF	620	16,29	1			A			
INITIALIZE SHUNT LIMITER RELAYS	366	22,30		2		A	Y	Y	Y

Command Function		Op Code		Utilization			Spacecraft		
9Bit	2of32	Rly.	R.D.	L.L.	Base-Plate	C	D	E	
PCM CONTROL									
	013		1		A	X	X	X	
ENABLE PCMC 1									
	146		1		A				
ENABLE PCMC 2									
	047		2		A				
DISABLE PCM									
	007			1	A				
PCM 1 ON									
	106			1	A				
PCM 1 OFF									
	107			1	A				
PCM 2 ON									
	246			1	A				
PCM 2 OFF									
	147			2	A				
ENABLE PCM 1, NOT 2 DATA TO PMP									
	046			2	A				
ENABLE PCM 2, NOT 1 DATA TO PMP									
	111			2	A				
DISABLE PCM DATA TO PMP									
	150			2	A				
ENABLE PCM 1, NOT 2, DATA TO T.R.									
	245			2	A				
ENABLE PCM 2, NOT 1, DATA TO T.R.									
	052			2	A				
ENABLE PCM 1, NOT 2, DATA TO VBT									
	010			2	A				
ENABLE PCM 2, NOT 1, DATA TO VBT									
	050				A				
COMD. PCM 1 TO ROM MODE									
	051				A				
COMD. PCM 1 TO MARC MODE									
	011				A				
COMD. PCM 2 TO ROM MODE									
	110				A	Y	Y	Y	Y
COMD. PCM 2 TO MARC MODE									

Command Function	Op Code		Utilization				Spacecraft		
	9Bit	2of32	Rly.	R.D.	L.L.	Base-Plate	C	D	E
ESUM INSTR. PWR. ON	376	6,30	1			B	X	X	X
MOTOR PWR. ON	650	8,22	1			B			
BIPHENYL. HTR. PWR. ON	747	7,23	1			B			
PWR. OFF	377	7,31	3			B			
ENABLE PL. & UNREG. BUSSES	707	7,22	1			B			
DISABLE PL. & UNREG. BUSSES	710	8,23	1			B			
HI V. ON	746	6,22		1		B			
HI V. OFF	730	7,24		1		B			
LOAD MINOR MODE *	136	1,30			1	B	Y	Y	Y
VAE INSTR. PWR. ON	501	1,12	1			B	X	X	X
INSTR. PWR. OFF	503	3,14	1			B			
ENABLE BIPH. HTR. PWR	403	3,12	1			B			
DISABLE BIPH. HTR. PWR.	601	1,14	1			B			
BIPH. 1 HTR. PWR. ON	442	2,12	1			B			
BIPH 2 HTR. PWR. ON	502	2,13	1			B			
NORMAL/BIPH. HTR. PWR. OFF	643	3,17	2	1		B			
INVERT	644	4,18		1		B			
LOAD MINOR MODE 1 *	731	8,25			1	B			
LOAD MINOR MODE 2 *	672	8,26			1	B	Y	Y	Y

Command Function	Op Code		Utilization				Spacecraft		
	9Bit	2of32	Rly.	R.D.	L.L.	Base-Plate	C	D	E
MIMS INSTR. PWR. ON	325	21,28	1			B	X	X	
INSTR. PWR. OFF	326	22,29	1			B	X	X	
LOAD MINOR MODE *	732	9,26			1	B	X	X	
BIMS INSTR. PWR. ON	365	21,29	1			B	X	X	X
INSTR. PWR. OFF	266	22,28	1			B	X	X	X
VERRIDE MODE	303	3,10			1	B	X	X	X
LOAD MINOR MODE *	343	3,11			1	B	X	X	X
EUVS LOW VOLT PWR. ON	314	12,19	1			B	X	X	X
ENABLE PL & UNREG. PWR.	452	10,20	1			B			
MOTOR PWR. 1 ON	512	10,21	1			B			
MOTOR PWR. 2 ON	414	12,21	1			B			
LV & MOT. PWR. OFF	413	11,20	3			B			
STBY. PWR. ON	354	12,20	1			B			
STBY. PWR. OFF	255	13,19	1			B	Y	Y	Y

Command Function	Op Code		Utilization				Spacecraft		
	9Bit	20f32	Rly.	R.D.	L.L.	Base-Plate	C	D	E
EUVS HV SUPPLY 1 ON	514	12,23		1		B	X	X	X
HV SUPPLY 1 OFF	515	13,24		1		B			
HV SUPPLY 2 ON	455	13,23		1		B			
HV SUPPLY 2 OFF	456	14,24		1		B			
HV SUPPLY PMT ON	416	14,23		1		B			
HV SUPPLY PMT OFF	554	12,24		1		B			
HI RATE OVERRIDE 1	352	10,18			1	B			
APERTURE 1 POSIT. 1	313	11,18			1	B			
APERTURE 1 POSIT. 2	412	10,19			1	B			
GRATING 1 MANUAL UP	353	11,19			1	B			
GRATING 1 MANUAL DWN.	315	13,20			1	B			
HI RATE OVERRIDE 2	256	14,20			1	B			
APERTURE 2 POSIT. 1	355	13,21			1	B			
APERTURE 2 POSIT. 2	316	14,21			1	B			
GRATING 2 MANUAL UP	612	10,23			1	B			
GRATING 2 MANUAL DWN.	553	11,23			1	B			
LOAD MINOR MODE 1	357	15,23			1	B			
LOAD MINOR MODE 2	320	16,23			1	B			
DISABLE PL & UNREG. PWR.	453	11,21	1			B			
HI RATE NORMAL 1	652	10,24			1	B			
HI RATE RESET 1	613	11,24			1	B	Y	V	Y

Command Function	Op Code		Utilization				Spacecraft		
	9Bit	2of32	Rly.	R.D.	L.L.	Base-Plate	C	D	E
EUVS HI RATE NORMAL 2	417	15,24			1	B	X	X	X
HI RATE RESET 2	360	16,24			1	B	X	X	X
LEE INST. PWR. ON	645	5,19	1			B	X	X	
INST. PWR. OFF	625	2,21	1			B	X	X	
H.V. 1 ON	567	3,23		1		B	X	X	
H.V. 1 OFF	570	4,24		1		B	X	X	
SSO ON	627	4,23		1		B	X		
SSO OFF	530	3,24		1		B	X		
H.V. 2 ON	627	4,23		1		B		X	
H.V. 2 OFF	530	3,24		1		B		X	
LOAD MINOR MODE *	751	9,25			1	B	X	X	
NATE INST. PWR. ON	602	2,15	1			B	X	X	X
INST. PWR. OFF	701	1,16	1			B			
ENABLE COVER PWR.	702	2,17	1			B			
DISABLE COVER PWR.	703	3,18	1			B			
COVER PWR. ON	641	1,15	1			B			
COVER PWR. OFF	642	2,16	1			B	Y	Y	Y

Command Function		Op Code		Utilization			Spacecraft		
9Bit	2Of32	Rly.	R.D.	L.L.	Base-Plate	C	D	E	
NATE FIRE COMD. 1	741	1,17	1		B	X	X	X	
FIRE COMD. 2	742	2,18	1		B				
SELECT MINOR MODE REG. A	723	2,19		1	B				
SELECT MINOR MODE REG. B	566	2,22		1	B				
NORMAL MODE	743	3,19		1	B				
BY PASS MODE	626	3,22		1	B				
LOAD MINOR MODE A	744	4,20		1	B				
LOAD MINOR MODE B	725	4,21		1	B	Y	Y	Y	
MESA XY PWR. ON	331	0,25	1		B	X	X	X	
XY PWR. OFF	332	1,26	1		B				
YX PWR. ON	371	1,25	1		B				
YX PWR. OFF	372	2,26	1		B				
Z PWR. ON	471	3,25	1		B				
Z PWR. OFF	472	4,26	1		B				
XY SUSPENSION RANGE A	431	2,25		1	B				
XY SUSPENSION RANGE B	432	3,26		1	B				
XY SUSPENSION RANGE C	531	4,25		1	B				
XY CONSTRAINT RANGE A	233	0,27		1	B				
XY CONSTRAINT RANGE B	571	5,25		1	B	Y	Y	Y	

Command Function	Op Code		Utilization				Spacecraft		
	9Bit	2of32	Rly.	R.D.	L.L.	Base-Plate	C	D	E
MESA XY CONSTRAINT RANGE C	137	2,31		1		B	X	X	X
YX SUSPENSION RANGE A	532	5,26		1		B			
YX SUSPENSION RANGE B	237	4,31		1		B			
YX SUSPENSION RANGE C	375	5,29		1		B			
YX CONSTRAINT RANGE A	433	4,27		1		B			
YX CONSTRAINT RANGE B	336	5,30		1		B			
YX CONSTRAINT RANGE C	177	3,31		1		B			
Z SUSPENSION RANGE A	473	5,27		1		B			
Z SUSPENSION RANGE B	434	5,28		1		B			
Z SUSPENSION RANGE C	273	1,27		1		B			
Z CONSTRAINT RANGE A	373	3,27		1		B			
Z CONSTRAINT RANGE B	526	1,22		1		B			
Z CONSTRAINT RANGE C	466	0,22		1		B	Y	Y	Y
RPA INST. PWR. ON	614	12,25	1			B	X	X	X
INST. PWR. OFF	615	13,26	1			B			
DRIFT HEAD PWR. ON	555	13,25	1			B			
DRIFT HEAD PWR. OFF	556	14,26	1			B			
HI SWEEP LEVEL	552	10,22		1		B			
LO SWEEP LEVEL	753	11,27		1		B	Y	Y	Y

Command Function		Op Code		Utilization				Spacecraft		
9Bit	2of32	Rly.	R.D.	L.L.	Base-Plate	C	D	E		
	714		1		B	X	X	X		
RPA MULTIPLEX SWITCH										
	454		1		B					
ORIENTED MODE										
	752		1		B					
SPIN MODE										
	415		1		B					
NORMAL RESOLUTION										
	616		1		B					
HIGH RESOL.										
	663		1		B					
BIAS HEAD 2										
	624		1		B					
BIAS HEAD 3										
	724			1	B					
LOAD MINOR MODE *										
	513		1		B	Y	Y	Y		
ELECTROMETER SWITCH										
	665			1	B	X	X	X		
SPS LOAD MINOR MODE *										
	203		1		B					
REG. PWR. ON										
	301		1		B					
AZ MTR PWR. ON										
	242		1		B					
EL. MTR. PWR. ON										
	204		3		B					
POWER OFF										
	340		1		B					
ENABLE UNREG. PWR.										
	341		1		B					
DISABLE UNREG. PWR.										
	144		1		B					
FIRE COMD. 1										
	302		1		B	Y	Y	Y		
FIRE COMD. 2										

Command Function		Op Code		Utilization			Spacecraft		
9Bit	2of32	Rly.	R.D.	L.L.	Base-Plate	C	D	E	
474	6,28		1		B	X	X	X	
475	7,29		1		B				
436	7,30		1		B				
435	6,29		1		B				
311	9,16			1	B				
272	0,26	1			B	X	X	X	
333	2,27	1			B	X	X	X	
334	3,28	2			B	X	X	X	
444	4,14	1			B	X	X	X	
345	5,13	1			B	X	X	X	
243	3,9	1			B	X	X	X	
244	4,10	1			B	X	X	X	
445	5,15	1			A	X	X	X	
544	4,16	1			A	X	X	X	
443	3,13	1			A	X	X	X	
722	1,18	1			A	X	X	X	
160	16,20	1			A	X	X	X	
257	15,21	1			A	X	X	X	
217	15,20	1			A	X	X	X	
220	16,21	1			A	X	X	X	

Command Function		Op Code		Utilization			Spacecraft		
9Bit	2of32	Rly.	R.D.	L.L.	Base-Plate	C	D	E	
ENABLE MARC PWR.	653 11,25	1			B		X	X	
DISABLE MARC PWR.	654 12,26	1			B		X	X	
MARC ON	516 14,25		1		B		X	X	
MARC OFF	733 10,27		1		B		X	X	
SEL. PCMC-1 NRZ DATA TO MARC	535 8,29		1		B		X	X	
SEL. PCMC-2 NRZ DATA TO MARC	337 6,31		1		B		X	X	
DISABLE QUOMAC COILS	275 3,29	2			B	X	X	X	
ENABLE QUOMAC COIL 1	374 4,28	1			B	X	X	X	
ENABLE QUOMAC COIL 2	274 2,28	1			B	X	X	X	
ENABLE OAPS HEATERS	327 23,30	1			B	X	X	X	
DISABLE OAPS HEATERS	330 24,31	1			B				
Δ V1 THRUST HTR. ON	367 23,31	1			B				
Δ V1 THRUST HTR. OFF	270 24,30	1			B				
Δ V2 THRUST HTR. ON	172 26,30	1			B				
Δ V2 THRUST HTR. OFF	271 25,31	1			B				
YAW THRUST HTR. ON	231 25,30	1			B				
YAW THRUST HTR. OFF	134 28,31	1			B				
OAPS TANK HTRS. ON	173 27,31	1			B	Y	Y	Y	

Command Function	Op Code		Utilization				Spacecraft		
	9Bit	2of32	Rly.	R.D.	L.L.	Base-Plate	C	D	E
OAPS TANK HTRS. OFF	035	29,30	1			B	X	X	X
BOTH DECODERS NORMAL	632	7,26		2		B	X	X	X
DISABLE DEC 1 STORED COMDS.	727	6,23		1		B	X	X	X
DISABLE DEC 2 STORED COMDS.	750	8,24		1		B	X	X	X
TAPE RCDR. CONTROL									
TR-1 ON	664	2,20	1			B	X	X	X
TR-1 OFF	726	5,22	1			B			
TR-1 SEL RCD, NOT PLBK	323	19,26	1			B			
TR-1 SEL PLBK, NOT RCD	324	20,27	1			B			
TR-1 SEL TRK 1, NOT 2	424	20,29		1		B			
TR-1 SEL TRK 2, NOT 1	423	19,28		1		B			
TR-1 OUTPUT BUFFER ENABLE	264	20,26	1			B			
TR-1 OUTPUT BUFFER DISABLE	363	19,27	1			B			
TR-2 ON	666	4,22	1			B			
TR-2 OFF	745	5,21	1			B			
TR-2 SEL RCD, NOT PLBK	225	21,26	1			B			
TR-2 SEL PLBK, NOT RCD	226	22,27	1			B	Y	Y	Y

Command Function	Op Code		Rly.	Utilization			Spacecraft		
	9Bit	2of32		R.D.	L.L.	Base-Plate	C	D	E
TAPE RCDR CONTROL (Continued)									
TR-2 SEL TRK 1, NOT 2	463	19,29	1		B	X	X	X	
TR-2 SEL TRK 2, NOT 1	364	20,28	1		B				
TR-2 OUTPUT BUFFER ENABLE	166	22,26	1		B				
TR-2 OUTPUT BUFFER DISABLE	265	21,27	1		B	Y	Y	Y	
PROGRAMMER									
SEL PROG. 1, NOT 2	015	13,14	1		B	X	X	X	
SEL PROG. 2, NOT 1	021	17,18	1		B				
SELECTED PROG. ON	017	15,16	2		B				
SELECTED PROG. OFF	116	14,17	2		B				
USE MEMORY 1, NOT 2	117	15,18	2		B				
USE MEMORY 2, NOT 1	057	15,17	2		B				
PROG. NADIR. ZERO REF.	155	13,17	2		B				
SPIN OAPS PLUS	020	16,17	2		B				
SPIN OAPS MINUS	156	14,18	2		B				
PROG. SET LOAD/DUMP	* 757	15,31			B				
PROG. LOAD MEM. - MAJOR	* 720	16,31			B	Y	Y	Y	Y

Command Function	Op Code		Utilization				Spacecraft		
	9Bit	2of32	Rly.	R.D.	L.L.	Base-Plate	C	D	E
PROGRAMMER (Continued)									
PROG. LOAD MEM. - MINOR *	661	17,31			2	B	X	X	X
PROG. LOAD MEM. - DATA *	622	18,31			2	B			
PROG. LOAD OAPS DELTA *	055	13,15			1A 3B	A&B			
PROG. LOAD ATTITUDE DATA *	056	14,16			2	B			
MEM. PROG. ON	016	14,15			2	B			
MEM. PROG. STBY.	115	13,16			2	B			
PROG. THRUST ON CMD.	736	13,30			1A 3B	A&B			
THRUST OFF CMD.	677	13,31			2	B			
AUTO ROLL MEASURE ON	756	14,30			2	B			
AUTO ROLL STBY.	660	16,30			2	B			
NADIR. PROG. ON	621	17,30			2	B			
NADIR. PROG. STBY.	562	18,30			2	B			
PROG 1 NADIR FLIPPED REF	667	5,23			2	B			
PROG 2 NADIR FLIPPED REF	630	5,24			2	B			
DAMPER, FIRE 1	505	5,16	1			A			
DAMPER, FIRE 2	406	6,15	1			A			

The following section is taken from the performance specification for the dual programmer. Included are the bit allocations for the minor mode commands associated with the programmer for :

Memory programmer

Auto roll Programmer

QCMAC/MASC Programmer

CAPS programmer

<u>Field</u>	<u>Bits</u>	<u>Description</u>
Time	1-16	This time is the time as measured by the 16 least significant bits of the S/C time code at which the attached OP Code is to be presented to the DEC for execution. The total programmable time is 72 hours, 49 minutes, 4 seconds in 4 second increments.
Spare	17	At present this bit is not being used.
OP Code	18-26	One of the 9 bit codes specifying any of the commands in the S/C glossary.
DBC	27	The Data Bus Control bit must be a "0" if the OP Code is for a major mode command and a "1" if the OP Code is for a minor mode command.
P	28	A Parity bit chosen such that odd parity is maintained over bits 17-28.
Tag	29-32	Bits 29 & 30 of the Tag field shall be loaded into the CMU as "0's" regardless of what is sent. These bits are used internal to the MP as status indicators (see 3.1.1.1.2.3.3.1). Bits 31 & 32 shall be loaded as sent but are presently unused.

While the MP is in the Load mode, the receipt of a Load Memory Major command shall cause the associated minor mode data to be stored in the CMU. The thirty-two bits of data shall be stored in four consecutive 10 bit words in the CMU. The current Load/Dump address shall be used as the ten MSB of the CMU address with the two LSB being 00, 01, 10, and 11 respectively for the four CMU words.

For the Load Memory Major command, the control field (first 2 bits) of each ten bit CMU word shall be loaded as 01. Figure 3.1.4b shows the format for the data as stored in the CMU.

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3.1.1.1.2.1.3 Load Memory Minor Command

The Load Memory Minor command will be a minor mode command input to the PROG. The thirty-two bits of minor mode data shall have exactly the same format as for the Load Memory Major command except that the DBC bit must be a "1". (See format in Paragraph 3.1.1.1.2.1.2.)

While the MP is in the Load mode, the receipt of a Load Memory Minor command shall cause the associated minor mode data to be stored in the CMU. The thirty-two bits of data shall be stored in four consecutive 10 bit words in the CMU. The current Load/Dump address shall be used as the ten MSB of the CMU address with the two LSB being 00, 01, 10, and 11 respectively for the four CMU words.

For the Load Memory Minor command, the control field (first 2 bits) of each ten bit CMU word shall be loaded as 10. Figure 3.1.4c shows the format for the data as stored in the CMU.

3.1.1.1.2.1.4 Load Memory Data Command

The Load Memory Data command will be a minor mode command input to the PROG. The thirty-two bits of minor mode data will be arbitrary binary data to be sent to the DEC along with an associated minor mode command. See Figure 3.1.4d for the format as sent from the ground.

While the MP is in the Load mode, the receipt of a Load Memory Data command shall cause the associated minor mode data to be stored in the CMU. The thirty-two bits of data shall be stored in four consecutive ten bit words in the CMU. The current Load/Dump address shall be used as the ten MSB of the CMU address with the two LSB being 00, 01, 10, and 11 respectively for the four CMU words.

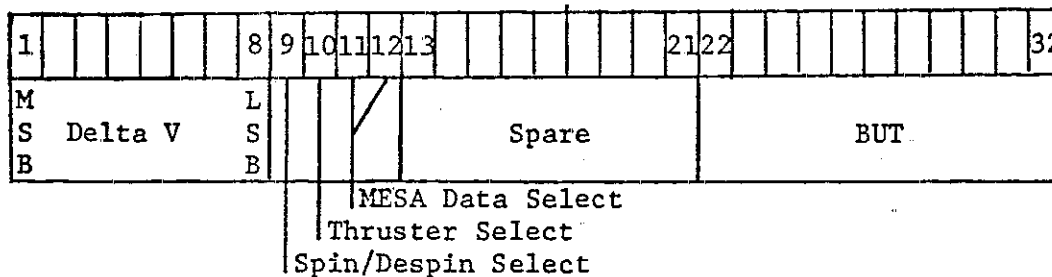
For the Load Memory Data command, the control field (first 2 bits) of each ten bit CMU word shall be loaded as 00. Figure 3.1.4e shows the format for the data as stored in the CMU.

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3.1.1.2.2 Load OAPS Delta Command

The PROG shall accept a Load OAPS Delta minor mode command as input. On receipt of this command, the OP shall enter one of its four active modes. The format for the 32 bits of minor mode data is as follows:



BITS	FIELD	DEFINITION
1-8	Delta V	One of 256 possible binary numbers corresponding to the 256 velocity change increments possible. The programmable range corresponds to Delta V's from zero to 44.11 ft/s.
9	Spin/Despin Select	Code 0 in this bit specifies despun operation of the thruster. Code 1 specifies spinning operation of the thruster.
10	Thruster Select	Code 0 in this bit enables the thrust on/off outputs to the Delta V thruster drivers. Code 1 enables the thrust on/off outputs to the Yaw thruster drivers.
11-12	MESA Data Select	Code 00 selects neither MESA data output. Code 10 selects MESA XY data output. Code 01 selects MESA YX data output. Code 11 is unused but selects neither MESA data output.

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<u>BITS</u>	<u>FIELD</u>	<u>DEFINITION</u>
13-21	Spare	These bits are unused at present.
22-32	BUT	These bits are used by the BUT in the LIU; however, they shall also be accepted as part of a good Load OAPS Delta command by the PROG.

After receipt of a valid Load OAPS Delta command the OP shall examine the Spin/Despin select and Thruster select fields of the loaded word to determine which active mode to enter. While this command sets the active mode, no thruster shall be activated by this command and the integration of the acceleration as measured by the MESA shall not be started. The allowed modes and corresponding codes in the select fields are as follows:

Bits: 9 & 10	<u>Mode</u>
0 0	Delta V Despun
1 0	Delta V Spin
0 1	Yaw Despun
1 1	Yaw Spin

The Thrust On command received after a Load OAPS Delta command shall actually turn on the appropriate thrusters and initiate the Delta V comparison. If a new Load OAPS Delta command is received before a Thrust On command, the OP shall accept it and enter the new mode. Once the Thrust On command has been received, however, receipt of a new Load OAPS Delta command shall cause the OP to return to Standby Mode.

Any of the four active modes shall be terminated by receipt of the Disable OAPS command or the BUT overflow signal. Additionally, the Delta V Despun mode shall be terminated when the measured Delta V from the MESA is greater than or equal to the programmed Delta V loaded via the Load OAPS Delta command.

3.1.1.2.2.1 Delta V Despun Mode

While in this mode, the OP shall accept the first Thrust On command which occurs, turn on the two sets of outputs to the Delta V thruster, and start integrating the output of the accelerometer. The OP shall continually compare this measured Delta V with that loaded via the Load OAPS Delta V command which set the mode. When the measured Delta V is greater than or equal to the programmed one, the OP shall return the Thrus-

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ter On/Off outputs to the inactive level and enter Standby mode. This mode shall also be terminated and the OP returned to Standby mode on receipt of the Disable OAPS command or on receipt of the BUT overflow signal.

Receipt of additional Thrust On/Off commands while the Delta V is being measured shall control the Thruster On/Off outputs but shall not interrupt the measurement or comparison of the Delta V.

The selected input from the Miniature Electro-Static Accelerometer (MESA) will be a frequency proportional to the S/C acceleration (see Paragraph 3.1.1.2.10). After receipt of the first Thrust On command in this mode, the OP shall integrate the MESA data to measure the velocity change (Delta V) of the S/C. The integration shall be done by counting the pulses on the selected MESA Data input. The OP shall provide for Delta V in the range of zero feet per second to 44.11 feet per second corresponding to a range of 2^{13} counts to $2^{20}-2^{13}$ counts.

The OP shall continually compare the eight MSB of this accumulated count against the programmed Delta V from the Load OAPS Delta command. The granularity on the programmable Delta V shall be 0.173 feet per second and there shall be 255 uniform steps in the range. The count shall always start from zero on receipt of the first Thrust On command occurring during the Delta V Despun mode and shall continue until a Delta V match is detected or the mode is terminated. The count shall not be reset nor be inhibited by receipt of further Thrust On/Off commands.

3.1.1.2.2.2 Delta V Spin Mode

While in this mode, the OP shall accept the first Thrust On command which occurs, enable the two sets of outputs to the Delta V Thrusters, enable the OAPS Nadir Commutation, and inhibit the Delta V match.

In this mode the Thrust On command enables the outputs to the Delta V Thrusters but the actual turn on and off of the thrusters shall be under control of the OAPS Delta V Nadir Commutation. (See Paragraphs 3.1.1.5.1.7 and 3.1.1.5.1.8) The OP shall receive the commutation signals from the Nadir Programmer (NP) internal to the PROG. After the Delta V thruster outputs are enabled by the Thrust On command, the receipt of OAPS Delta V Nadir 1 shall turn on the Delta V thrusters and the receipt of OAPS Delta V Nadir 2 shall turn them off. This action shall continue until the Thrust Off command disables the thruster outputs or until the mode is terminated by the Disable OAPS command or the BUT overflow signal. Receipt of additional Thrust On/Off commands while in this mode shall enable/disable the Delta V thrust outputs but shall not terminate the mode.

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USED BY ARP																USED BY QS				USED BY MS																		
1	2							8	9	10						16	17	18	19	20	21	22	23	24									32					
F	M	UPPER THRESHOLD						L	S	P	M	LOWER THRESHOLD						L	F	Q	Q	F	M	M	M	M	MASC NADIR						L					
C	S							S	A	A	S							S	C	+	-	C	+	-	C	+	-	C	+	-	C	+	-	C	+	-	S	B
B	B							B	R	E	B							B	B	O	N	O	N	B	O	N	O	N	B							B		

Programmable MASC Nadir
MASC Commutation On/Off
MASC Minus On/Off
MASC Plus On/Off
Field Control Bit for MASC (Bits 20-32)
QOMAC Minus On/Off
QOMAC Plus On/Off
Field Control Bit for QOMAC (Bits 17-19)
Auto Roll Lower Threshold
Spare
Auto Roll Upper Threshold
Field Control Bit for Auto Roll (Bits 1-16)

For further description of the data in each field and the modes associated with them refer to the paragraphs which specify the appropriate Programmer section.

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Thus a real time or stored QOMAC program shall be executed with the polarity reversed from that received by the QS.

3.1.1.3.1.3 QOMAC Inhibit Mode

The QS shall operate in the Inhibit mode when the ARP indicates a measured roll error which is between the loaded lower threshold and upper threshold. In this mode neither the QOMAC Plus On nor the QOMAC Minus On commands shall activate either the QOMAC Coil Plus outputs nor the QOMAC Coil Minus outputs. Thus a real time or stored QOMAC program received by the QS shall not be executed.

3.1.1.3.2 QOMAC Control Commands

Bits 17, 18, and 19 of the Load Attitude Data minor mode command (see Paragraph 3.1.1.6.1.9) shall be used by the QS to control its state or operation. The codes for these bits and the corresponding commands are listed below:

Bits:	<u>17</u>	<u>18</u>	<u>19</u>	Command
	1	0	0	QOMAC Off
	1	1	0	QOMAC Plus On
	1	0	1	QOMAC Minus On
	1	1	1	This code is not allowed--neither coil drive shall be energized
	0	X	X	No new command - state stays the same

X - Don't Care Condition

The QS shall monitor these bits continuously and shall respond to the corresponding commands as described in Paragraph 3.1.1.3.1, depending on the mode set by the ARP. Bit 17, the QOMAC field control bit, must be a "1" to initiate a new QOMAC command.

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3.1.1.3.6 MASC Control Commands

Bits 20, 21, 22, and 23 of the Load Attitude Data minor mode command (see Paragraph 3.1.1.6.1.9) shall be used by the MS to control its state. The codes for these bits and the corresponding commands are listed below:

Bits:	<u>20</u>	<u>21</u>	<u>22</u>	<u>Command</u>
	1	0	0	MASC Off
	1	1	0	MASC Plus On
	1	0	1	MASC Minus On
	1	1	1	This code is not allowed--neither coil drive shall be energized.
	0	X	X	No new command - state stays the same.

Bits:	<u>20</u>	<u>23</u>	<u>Command</u>
	1	0	MASC Commutation Off
	1	1	MASC Commutation On
	0	X	No new command - State stays the same.

X - Don't Care Condition

The MS shall monitor these bits continuously and shall respond to the corresponding commands as described in Paragraph 3.1.1.3.5. Bit 20, the MASC field control bit, must be a "1" to initiate a new MASC command.

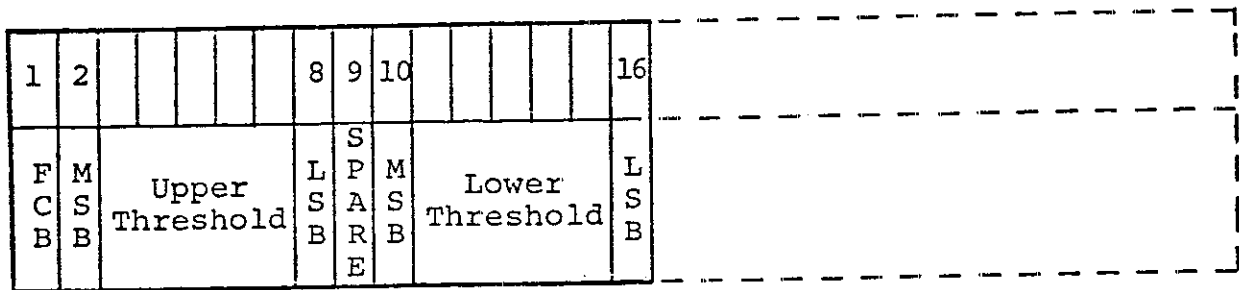
3.1.1.3.7 MASC Coil Plus

The PROG shall provide four identical MASC Coil Plus outputs to the coil drivers in the CDU. These signals shall become active upon receipt of the appropriate MASC Plus On and MASC Minus On commands as described in Paragraph 3.1.1.3.5 depending on the commanded mode. When active, these signals shall cause current to flow in the positive sense in the Enabled MASC Coil(s). These signals shall never be active at the same time that the MASC Coil Minus outputs are active, and shall make all transitions at least 30 milliseconds away

these commands as received by the QMP to provide an automatic turnoff of the ARP active mode.

3.1.1.4.2 Load Auto Roll

Bits 1 through 16 of the Load Attitude Data minor mode command (See Paragraph 3.1.1.6.1.9) shall be used by the ARP to program the upper and lower thresholds. The format for these bits is as follows:



Bits	Field	Definition
1	Auto Roll Field Control Bit	This bit must be a "1" to load new threshold values into the ARP.
2-8	Upper Threshold	A binary number representing the counts of 4096Hz clock corresponding to the desired Earth Time difference for the upper limit of roll error.
9	Spare	This bit is unused at present.
10-16	Lower Threshold	A binary number representing the counts of 4096Hz clock corresponding to the desired Earth Time difference for the lower limit of roll error.

Each time the Load Attitude Data command is received and the AR FCB is a "1", the ARP shall load the new thresholds but shall take no further action. This command shall not turn on the ARP nor shall it change the state of the outputs if the ARP is already on. The thresholds may be changed while the

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The following tables delineate the bit allocations for pitch offset and wheel speed bias for the mino mode command used by the pitch control subsystem.

PITCH OFFSET (COMMAND)

Numbers refer to offset in degrees

BIT #

BIT #	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	2	3	4
00000	0	32	64	96	128	160	192	224	256	288	320	352																		
00001	1	33	65	97	129	161	193	225	257	289	321	353																		
00010	2	34	66	98	130	162	194	226	258	290	322	354																		
00011	3	35	67	99	131	163	195	227	259	291	323	355																		
00100	4	36	68	100	132	164	196	228	260	292	324	356																		
00101	5	37	69	101	133	165	197	229	261	293	325	357																		
00110	6	38	70	102	134	166	198	230	262	294	326	358																		
00111	7	39	71	103	135	167	199	231	263	295	327	359																		
01000	8	40	72	104	136	168	200	232	264	296	328																			
01001	9	41	73	105	137	169	201	233	265	297	329																			
01010	10	42	74	106	138	170	202	234	266	298	330																			
01011	11	43	75	107	139	171	203	235	267	299	331																			
01100	12	44	76	108	140	172	204	236	268	300	332																			
01101	13	45	77	109	141	173	205	237	269	301	333																			
01110	14	46	78	110	142	174	206	238	270	302	334																			
01111	15	47	79	111	143	175	207	239	271	303	335																			
10000	16	48	80	112	144	176	208	240	272	304	336																			
10001	17	49	81	113	145	177	209	241	273	305	337																			
10010	18	50	82	114	146	178	210	242	274	306	338																			
10011	19	51	83	115	147	179	211	243	275	307	339																			
10100	20	52	84	116	148	180	212	244	276	308	340																			
10101	21	53	85	117	149	181	213	245	277	309	341																			
10110	22	54	86	118	150	182	214	246	278	310	342																			
10111	23	55	87	119	151	183	215	247	279	311	343																			
11000	24	56	88	120	152	184	216	248	280	312	344																			
11001	25	57	89	121	153	185	217	249	281	313	345																			
11010	26	58	90	122	154	186	218	250	282	314	346																			
11011	27	59	91	123	155	187	219	251	283	315	347																			
11100	28	60	92	124	156	188	220	252	284	316	348																			
11101	29	61	93	125	157	189	221	253	285	317	349																			
11110	30	62	94	126	158	190	222	254	286	318	350																			
11111	31	63	95	127	159	191	223	255	287	319	351																			

NOT VALID

SPEED BIAS COMMAND

BIT NO.			1	1	0	0
12	11	10	1	0	1	0
1	1	1	10	18	26	34
1	1	0	11	19	27	35
1	0	1	12	20	28	36
1	0	0	13	21	29	37
0	1	1	14	22	30	38
0	1	0	15	23	31	39
0	0	1	16	24	32	40
0	0	0	17	25	33	41

Bit No

14

13

SPEED BIAS IS IN RAD/SEC

The following tables delineate the bit allocations for the minor mode command associated with the SPS and RSL.

SPS MINOR MODE DATA CODES

BIT # (OF MINOR MODE DATA TO SPS)

		67 ---->								
		8 9	00		01		10		11	
SPS DATA CODE	0 0	0.	1	14.	5	28.	9	42.	13	
vs	0 1	3.5	2	17.5	6	31.5	10	45.5	14	
OFFSET ANGLE & OFFSET STEP NUMBER	1 0	7.	3	21.	7	35.	11	49.	15	
FOR EVALUATION OR CROSS-EVALUATION OFFSETS	1 1	10.5	4	24.5	8	38.5	12	52.5	16	

+11% +1.5 ARC
MINUTES DEVIATION FROM NULL

Step Number

		67 ---->								
		8 9	00		01		10		11	
SPS DATA CODE	0 0	7.7	10	28.9	30	50.2	50	71.4	70	
vs	0 1	13.0	15	34.2	35	55.5	55	76.7	75	
ELEVATION ANGLE AND EL COMMAND ANGLE FOR ELEVATION COARSE SETTINGS IN ACQUISITION	1 0	18.3	20	39.5	40	60.8	60	82.0	80	
	1 1	23.6	25	44.8	45	66.1	65	87.3	85	

+2.7° ANGLE FROM
+Z AXIS

COMMAND ANGLE

MINOR MODE COMMAND TYPE	MINOR MODE DATA BIT VALUES (NUMBERED IN TIME ORDER OF APPEARANCE)																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Commands to SPS	Register Select			Data For Selected Reg.				Offset EN/DIS									
1) El Angle	0	1	1	0	0	x ₆	x ₇	x ₈	x ₉	0							
2) El Offset	0	1	0	1	0	x ₆	x ₇	x ₈	x ₉	1							
3) Cross-El Offset	0	1	0	0	1	x ₆	x ₇	x ₈	x ₉	1							

- NOTES: 1) Bit locations above, which are not filled in, are "Don't Care" bits.
 2) El Angle bit values designated x_n to SPS are values x_n of the echo command received by RSL.

RSL DATA CODES

BIT NUMBER (OF RSL TELEMETRY READOUT, WD 119,4 & 120,4)

RSL DATA CODE	1 2 3	NAME	DESCRIPTION
vs RSL MODE (119,4) 1,2,3 ARE STATUS BITS OF LAST COMMAND TO RSL, BITS 17, 16, & 15, RES- PECTIVELY	0 0 0	REST	Do not send any commands to SPS.
	0 0 1	ECHO	Send bits 3 thru 10 of the last RSL input command to the SPS, without modification
	0 1 0	Scan Rstr	Column by Column
	0 1 1	Scan ε	Scan up and down a column-- 2 sec per step
	1 0 0	REST	
	1 0 1	ECHO	
	1 1 0	Scan Rstr	Row by Row--change offset point each 2 sec
	1 1 1	Scan γ	Scan back and forth across a row--2 sec per step
		NAME	DESCRIPTION
RSL 2 SEC SYNC	4		RSL internal status--2 sec square wave; 1 → 0 starts command to SPS from RSL
RSL-TO-SPS DATA BITS TO BE SENT TO SPS AS MINOR MODE DATA	5 - 12		Bits 5 thru 12 of RSL TLM readout convey the same information as that being sent to the SPS in bits 3 thru 10, respectively, of SPS minor mode data. See "SPS Minor Mode Data Codes."
RSL TLM SPARE	13		Spare--arbitrarily set to "0."

RSL DATA CODES Continued...

	NAME		DESCRIPTION
RSL DESTINATION SELECT	<u>14</u>		RSL internal status--in the next command to SPS from RSL, load data into SPS cross-elevation register ("1") or elevation register ("0") if RSL mode bit 2 is "1." If mode bit 2 is "0," bit 14 has no effect on RSL or SPS.
	<u>15</u>	<u>16</u>	<u>DESCRIPTION</u>
RSL COMMAND LOAD- ING STATUS	0	0	Executing latest command to RSL; generating Xfr.
	0	1	Awaiting next command to RSL.
	1	0	Waiting to execute latest command to RSL.
	1	1	Loading a command to RSL.

RSL MINOR MODE DATA CODES

Minor Mode Command Type	Minor Mode Data Bit Values (numbered in time order of appearance)																	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
Commands to RSL															RSL Mode Select <u>m₃ m₂ m₁</u>			
1) Echo	0	1	x ₃	x ₄	x ₅	x ₆	x ₇	x ₈	x ₉	x ₁₀				1	0	0	1	
2) El Scan (scan ε)	0	1					x ₆ x ₇ x ₈ x ₉ el value				1				1	1	0	
3) Cross-El Scan(scan γ)	0	1					x ₆ x ₇ x ₈ x ₉ xel value				1				1	1	1	
4) Raster Scan by rows	0	1					x ₆ x ₇ x ₈ x ₉				1	x ₁₁ x ₁₂ x ₁₃ x ₁₄ 0 ₀				1	1	0
by columns	0	1					xel value				el value							
5) Rest																		

- NOTES: 1) Bit locations above, which are not filled in, are "Don't Care" bits.
 2) El Angel bit values designated x_n to SPS are values x_n of the echo command received "n" by RSL.

SECTION 6.0

ATMOSPHERE EXPLORER
MISSIONS C, D, AND E

Title: AE HAZARDOUS COMMANDS

DN-1070-17.2/17.3(AE)

Written by: W. V. Fuldner

Date: 1/18/73

Approved by: B. Stewart

Date: 1/19/73

REVISIONS

Ltr.	Description	Date	Author
A	Delete NATE LOAD SENSE Commands, Add. SBT Hi Pwr and SPS MTR Pwr CMOS	3/9/73	W.V.Fuldner
B	Delete SBT Hi Pwr Enable	3/26/73	W. V. Fuldner
C	Add PWR System Safety Circuit Enable & Disable Cmds, and ATC Aux Htr Cmds.	10/29/73	W. V. Fuldner
D	Add CEP Probe Heater Commands and Add Mnemonic Table	11/9/73	W. V. Fuldner
E	Add Damper Ordnance Commands	11/20/73	W.V. Fuldner

AE HAZARDOUS COMMANDS

1.0 INTRODUCTION

The following list of commands have been identified as potentially hazardous to the spacecraft and/or experiments if executed at undesirable times. As concerns the spacecraft and experiment equipment, only major mode commands are involved.

2.0 HAZARDOUS COMMAND LIST

```
FIRE OAPS N.O. VALVE COMD 1
" " " " " 2
" " N.C. " " 1
" " " " " 2
```

```
ENABLE OAPS P.L. BUS A, NOT B
" " " " B, NOT A
```

```
CEP ENABLE BIPH HTRS
CEP RAD BIPH HTR ON
CEP AX BIPH HTR ON
CEP RAD PROBE HTR ON
CEP AX PROBE HTR ON
```

```
OSS FIRE COMD #1
" " " #2
NACE FIRE COMD #1
" " " #2
PSA FIRE COMD #1
" " " #2
```

```
ESUM BIPH HTR PWR ON
VAE ENABLE BIPH HTR
VAE BIPH 1 HTR ON
" " 2 " "
```

```
NATE FIRE COMD #1
" " " #2
```

```
SPS FIRE COMD #1
" " " #2
```

-2-

ENABLE SQUIB BUS A, NOT B
 " " " B, NOT A

OAPS TANK VALVE 1 ON
 " " " 2 "
 " " " 3 "
 " " " 4 "
 " " " 5 "
 " " " 6 "

ENABLE $\Delta V1$ THRSTR, NOT $\Delta V2$ OR YAW
 " $\Delta V2$ " " $\Delta V1$ " "
 " YAW " " $\Delta V1$ " $\Delta V2$

ESUM ENABLE PL AND UNREG BUSES

SBT OSC TEST MODE

SPSAZ MTR PWR ON
 SPS EL MTR PWR ON

REG BUS DETECTOR ENABLE
 " " " DISABLE
 UNREG BUS DETECTOR ENABLE
 " " " DISABLE

CHARGE CONTROL #1 FAILURE DETECTOR ENABLE
 " " #1 " " DISABLE
 " " #2 " " ENABLE
 " " #2 " " DISABLE
 " " #3 " " ENABLE
 " " #3 " " DISABLE

ATC AUX HEATER ENABLE
 " " " ON

DAMPER FIRE COMMAND NO. 1
 DAMPER FIRE COMMAND NO. 2

<u>MNEMONIC</u>	<u>OP CODE (OCTAL)</u>
/CEP, HT RENA.	437
/CEP, APBON.	754
/CEP, RPBON.	634
/CEP, RPHON.	476
/CEP, APHON.	636
/OSS, N1FIRE	447
/OSS, N2FIRE	550
/NACE, N1FIRE.	646
/NACE, N2FIRE.	647
/NATE, N1FIRE	741
/NATE, N2FIRE	742
/PSA, N1FIRE	253
/PSA, N2FIRE	537
/ESUM, PLUBENA.	707
/ESUM, HTRON.	747
/VAE, HTRENA	403
/VAE, HTR1ON	442
/VAE, HTR2ON	502
/SPS, N1FIRE.	144
/SPS, N2FIRE	302
/SPS, AZPWRON.	301
/SPS, ELPWRON.	242
/SQUIB, BUSAENA	073
/SQUIB, BUSBENA	075
/OAPS, NO1FIRE	132
/OAPS, NO2FIRE	071
/OAPS, NC1FIRE.	133
/OAPS, NC2FIRE.	232
/OAPS, PLAENA	034
/OAPS, PLBENA.	033
/OAPS, VAL1ON.	031
/OAPS, VAL2ON.	072
/OAPS, VAL3ON	131
/OAPS, VAL4ON	130
/OAPS, VAL5ON	230
/OAPS, VAL6ON	070
/OAPS, DV1ENA.	171
/OAPS, DV2ENA.	170
/OAPS, YAWENA.	032

<u>MNEMONIC</u>	<u>OP CODE (OCTAL)</u>
/SBT, OSCTEST.	623
/PSE, OVCG1ENA.	224
/PSE, OVCG1DIS.	223
/PSE, OVCG2ENA.	125
/PSE, OVCG2DIS.	322
/PSE, OVCG3ENA.	027
/PSE, OVCG3DIS.	126
/ATC, AXHTRENA.	444
/ATC, AXHTRON.	243
/DAMPER, FIRE 1	505
/DAMPER, FIRE 2	406

SECTION 7.0

ATMOSPHERE EXPLORER
MISSIONS C, D, AND E

Title: COMMAND VERIFICATION WORD BIT ASSIGNMENTS DN-918-2.3(AE)

Written by: R. Borlik Date: 22 September 1972

Approved by: B. Stewart Date: 22 September 1972

REVISIONS

Ltr.	Description	Date	Author
A	Revised description of Bits 1 and 11.	11/9/72	W. V. Fuldner

COMMAND VERIFICATION WORD BIT ASSIGNMENTS

I. INTRODUCTION

This design note defines the coding of the command verification and telemetry format identification information contained in word locations 4 and 5 of the telemetry main frame. Bit 1 corresponds to bit 1 of main frame word 4 and is transmitted first in real time. The bit order is reversed on playback of the spacecraft tape recorder.

Bit 1 Load/Dump Error Flag - A logic 1 in this bit will indicate that one of the following errors has occurred in attempting to command the memory and memory programmer.

- I. If the memory programmer is operating in a load mode or in a dump mode, and the memory address counter in the memory programmer overflows, (attempted wrap-around), the error will be flagged. (The memory programmer will not wrap-around.)
- II. If the memory programmer is not in the load mode, and a load memory major, or load memory minor, or load memory data command is received, the error will be flagged. (The command will not be accepted.)
- III. If the memory programmer is in a load mode or in a dump mode and a set load/dump command is received, the error will be flagged. (The command will not be accepted.)

Bit 2 Stored Command Execution - A logic 1 indicates that a stored command is being executed during the main telemetry frame in which the logic 1 occurs. The command may have been stored in either the Programmer memory or in the MARC.

Bits 3,4,5 Decoder 1 Status - Bit 3 will normally be a logic 1 indicating that bits 4 and 5 represent new information since the last telemetry frame. If this bit is a logic 0, it indicates that the Decoder telemetry has not been updated since last sampled by the telemetry subsystem, and bits 4 and 5 do not represent new information. This fact is necessary for proper command verification bookkeeping on the ground. Bits 4 and 5 indicate state of DEC real time command logic as follows:

Bit 4/Bit 5

0	0	Squelch State - Command clock amplitude below threshold or DEC phase locked oscillator not in phase with received clock signal. Neither commands nor frame sync will be accepted by DEC in this state.
1	0	Sync Search - Decoder is in condition to accept the frame sync patten.
1	1	Address Check - Frame sync has been recognized and Decoder will accept a command with valid address. This state always occurs once immediately after frame sync is received.
0	1	Execute - This state indicates that a valid command has been received and will be executed.

Bits 6,7,8 Decoder 2 Status - Bits 6, 7, and 8 are identical in function to bits 3, 4, and 5, respectively.

Bits 9 & 10 PCMC 1 Status - Bits 9 and 10 indicate the mode of the PCMC which formatted the telemetry data.

Bit 9/Bit 10

0	0	Power off.
1	0	MARC Mode - Telemetry format under control of MARC.
0	1	ROM Mode - Telemetry frame in standard format defined by rest-only memories contained in PCMC.
1	1	Memory Dump Mode - Telemetry format is standard as in ROM mode, except that 32 words in the telemetry main frame contain data from the command memory in place of the normal experiment data.

Bit 11 Bad Sequence Flag - If this bit is a logic 1, it indicates that one of two abnormalities was detected by the format checking logic of the memory Programmer.

- I. During memory load, signifies either that
 - (a) a Load Memory Major or Minor command is received when Load Memory Data command is expected following a Load Memory Minor command, or
 - (b) a Load Memory Data command is received when not expected, that is, whenever the previous load command was not Load Memory Minor, or
 - (c) the memory Programmer left the load mode after receiving a Load Memory Minor, but before receiving a Load Memory Data command.

- II. While in PROGRAM mode, signifies that a stored minor mode command op code was transferred to the Decoder, but not executed because the stored control fields read out of memory with the minor mode data were not all correct.

Bits 12-16

Check Bits - These bits are parity check bits which provide a check over all bits except bit 1.

ATMOSPHERE EXPLORER
MISSIONS C, D, AND E

Title: AE-C, D, E SPACECRAFT TELEMETRY DATA FORMATS DN-836-2.3(AE)

Written by: W. V. Fuldner

Date: 25 July 1972

Approved by: B. Stewart

Date: 25 July 1972

REVISIONS

Ltr.	Description	Date	Author
A	Revised format, add analog/digital indication and baseplate locations of source.	22 Aug 72	W. V. Fuldner
B	Revised word order in main frame words 17 & 18, corrected typos and added Appendix B	31 Aug 72	W. V. Fuldner
C	Interchange Main Frame Words 71 and 127 corrected typos, corrected flag bit allocations, re-identified OAPS Temp. TLM. Added Appendices C & D.	17 Oct 72	W. V. Fuldner
D	On Spacecraft 8-sec subcom, deleted use of word 116 to accommodate ROM error. (Read out word 48 of same subcom) Shifted 116 thru 119 data 1 position higher (See Sheet 11)	30 Nov 72	W. V. Fuldner
E	Delete VHF 1 & 2 output stage temps (Channels 67 & 68 now Spare Delete VHF 1 & 2 Conv. Temps (Channels 71 & 72 now Spare) } S/C 8 sec Subcom	16 Jan 73	W. V. Fuldner
F	Changed Array Temp Designations. Deleted DSAI Enable Flag, 65,22 Bit 4. Changed EUVS HV PMT Flag from 68,106 Bit 5 to Bit 6. Added Tables 6,7,8, and 9.	22 Oct 73	W. V. Fuldner
G	Added Memory -10V TLM to Word (66,121) pg. 11	20 Nov 73	W. V. Fuldner

AE-C, D, E SPACECRAFT TELEMETRY DATA FORMAT

1.0 INTRODUCTION

This design note presents the telemetry format for the spacecraft telemetry contained in the following main frame locations:

1. Words 4 & 5; Command Verification and Frame Identification
2. Word 20; SPS/EUVS eight word analog subcom
3. Words 17 & 18; Attitude information four word subcom
4. Word 65; Spacecraft housekeeping sixty-four word subcom
5. Word 66; Spacecraft housekeeping one hundred twenty-eight word subcom
6. Word 81; Body rotation time reference
7. Word 82; Sun angle time reference
8. Words 119 & 120; MESA/RSL four word subcom

Also included in the attached tables are the formats for the experiment flag bits which are assembled by the spacecraft for the experiment 128 word subcom. Attached in Appendix A is the NASA supplied main frame telemetry format and experiment subcom formats which are understood to be the mission requirements for the AE-C spacecraft. Note that in the experiment 64 word subcom, word 21 is now an analog for the C magnetometer and word 23 is a digital spare.

Note that in spacecraft flag word 46 of the 4 sec spacecraft subcom, bits 4 thru 8 originate on the B baseplate while the flag bit multiplexer used is located on the A baseplate. Thus, these spare relay flag bits from CDU-B are taken across the baseplate to baseplate interface when they are used in the system.

The A or B indication in the upper right hand corner indicates the baseplate on which the source circuit is mounted. The notation in the lower right hand corner identifies the Analog (and polarity) or Digital nature of the signal.

Appendix B contains the memory dump format.

Included in Appendix C are the main frame and experiment subcom frames for the AE-D spacecraft. The word locations shown shaded indicate the changes in the formats from the C spacecraft which require modification to the PCMC Read-Only-Memory, and require additional circuitry in the appropriate LIU's to permit the LIU designs to be interchangeable between to either the C, D, or E spacecraft. Appendix D contains the AE-E main frame and subcom frame formats. With the exception of the magnetometer telemetry, these frames are subsets of the corresponding frames for the AE-C spacecraft. As the system design permits either the analog magnetometer (C) or the digital magnetometer (D), either format is hardware available from the LIU. If it is acceptable to utilize the analog version for the E spacecraft word locations, then the Read-only-Memories of the PCMC for the C spacecraft may be used for the E spacecraft. In all conditions, the overwritten locations for the memory dumps are the same and the spacecraft telemetry locations are the same.

The following tables present the spacecraft telemetry for the AE-C, D, E spacecraft.

TABLE 1

4 sec (64 wd)

8 sec (128 wd)

1	Shunt Diss Current	A	Upper Hat Temp 1 Upper Panel 16	TBA42	A	1	
		AN-			AN-		
2	Side Solar Array Current	A	Lower Hat Temp 2 Bottom Array		A	2	
		AN-	+X Outboard	TBA40	AN-		
3	Bottom Solar Array Current	A	Lower Hat Temp 3 Lower Panel 4		A	3	
		AN-		TBA44	AN-		
4	Batt 1 Chg Current	A	Lower Hat Temp 1 +X near adapter		A	4	
		AN+		TBA41	AN-		
5	Batt 2 Chg Current	A	Lower Hat Temp 2 -X midway		A	5	
		AN+		TBA42	AN-		
6	Batt 3 Chg Current	A	Batt 1 3rd Elect V		A	6	
		AN+			AN-		
7	(2 scales) Unreg Bus Current	A	Batt 2 3rd Elect V		A	7	
		AN-			AN-		
8	(2 scales) Reg Bus Current	A	Batt 3 3rd Elect V		A	8	
		AN-			AN-		
9	← S/C TIME CODE →					A	9
					DIG		
10	Batt 1 Dischg Current	A	Batt 1 Temp		A	10	
		AN-			AN-		
11	Batt 2 Dischg Current	A	Batt 2 Temp		A	11	
		AN-			AN-		
12	Batt 3 Dischg Current	A	Batt 3 Temp		A	12	
		AN-			AN-		
13	Solar Array Bus Voltage	A	Lower Hat Temp 1 Panel 9 Center Lower		A	13	
		AN-		A45	AN-		
14	Unreg Bus Voltage	A	Lower Hat Temp 2 Panel 1 Lower		A	14	
		AN-		A43	AN-		

TABLE 1 (Continued)

4 sec (64 wd)

8 sec (128 wd)

15	Batt 1 Voltage	A	Side Array Temp 3 Panel 9 Upper	A	15
		AN-	A44	AN-	
16	Batt 2 Voltage	A	Top Temp 4 -X, +Y Quad 2	A	16
		AN-	A40	AN-	
17	Batt 3 Voltage	A	Top Temp 5 +X, -Y Quad 4	A	17
		AN-	A41	AN-	
18	Pulse Load Bus Voltage	A	Upper BP Temp 1 +X, +Y Quad 1	A	18
		AN-		AN-	
19	Reg Bus Voltage	A	Upper BP Temp 2 -X, +Y Quad 2	A	19
		AN-		AN-	
20	PCE 1 Comp Amp	A	Upper BP Temp 3 +X, -Y Quad 4	A	20
		AN-		AN-	
21	PCE 2 Comp Amp	A	Upper BP Temp 4 -X, -Y Quad 3	A	21
		AN-		AN-	
22	Relay Flags*	A	Lower BP Temp 1 +X, +Y Quad 1	B	22
		DIG		AN-	
23	Relay Flags*	A	Lower BP Temp 2 -X, +Y Quad 2	B	23
		DIG		AN-	
24	Relay Flags*	A	Lower BP Temp 3 -X, -Y Quad 3	B	24
		DIG		AN-	
25	Relay Flags*	B	Lower BP Temp 4 +X, -Y Quad 4	B	25
		DIG		AN-	
26	Relay Flags*	B	ATC 1 Housing Temp	A	26
		DIG		AN-	
27	Relay Flags*	B	ATC 2 Housing Temp	A	27
		DIG		AN-	
28	Relay Flags*	B	ATC 3 Housing Temp	A	28
		DIG		AN-	

*See Table 2

TABLE 1 (Continued)

4 sec (64 wd)		8 sec (128 wd)		
29	Relay Flags*	A DIG	ATC 4 Housing Temp AN-	29
30	Relay Flags*	A DIG	Δ V Thruster 1 Valve Temp AN-	30
31	Relay Flags*	B DIG.	Δ V Thruster 2 Valve Temp AN-	31
32	Relay Flags*	A DIG	Yaw Thruster Valve Temp AN-	32
33	Relay Flags*	B DIG	Bay 2 OAPS Plumbing Temp AN-	33
34	Relay Flags*	A DIG	Bay 5 OAPS Plumbing Temp AN-	34
35	Relay Flags*	A DIG	Bay 6 OAPS Plumbing Temp AN-	35
36	Relay Flags*	A DIG	OAPS Tank 1 Temp AN-	36
37	Relay Flags*	B DIG	OAPS Tank 2 Temp AN-	37
38	Relay Flags*	B DIG	OAPS Tank 5 Temp AN-	38
39	Relay Flags*	A DIG	OAPS Tank 6 Temp AN-	39
40	Relay Flags*	A DIG	OAPS Pressure 1 AN-	40
41	Relay Flags*	A DIG	OAPS Pressure 2 AN-	41

* See Table 2

TABLE 1 (Continued)

4 sec (64 wd)		8 sec (128 wd)		
42	Relay Flags*	A DIG	RCVR 1 Signal Strength AN-	42
43	Relay Flags*	A DIG	RCVR 2 Signal Strength AN-	43
44	Relay Flags*	A DIG	RCVR 1 Phase Offset AN-	44
45	Relay Flags*	B DIG	RCVR 2 Phase Offset AN-	45
46	Relay Flags*	A DIG	RCVR 1 Conv Voltage AN-	46
47	Spare Digital Word	A DIG	RCVR 2 Conv Voltage AN-	47
48	Logic Flags**	B DIG	SBT 1 Output Stage Temp AN-	48
49	Logic Flags**	A DIG	SBT 2 Output Stage Temp AN-	49
50	Logic Flags**	B DIG	Selected SBT RF Out Pwr AN-	50
51	Logic Flags**	B DIG	Selected SBT DC Conv Volt. AN-	51
52	DSAI Data	A DIG	SBT 1 Conv Temp AN-	52
53	Mem Prog Stat(2)***	B DIG	SBT 2 Conv Temp AN-	53
54	OAPS Prog/A.R.Prog/Nadir Prog Stat. See Table 4	B DIG	SBT Pressure AN-	54
55	OAPS Loaded ΔV	B DIG	Top Array +X off Axis 4" A43 AN-	55

* See Table 2
 ** See Table 3
 *** See Table 6

TABLE 1 (Continued)

4 sec (64 wd)		8 sec (128 wd)				
56	OAPS Measured ΔV	B	Lower Hat Panel 9 Near Thruster	B	56	
		DIG		AN-		
57	Auto Roll Meas ΔT	B	DSAI DC/DC Conv	A	57	
		DIG		AN-		
58	Auto Roll Lower Thr (7)	Auto Roll Upper Thr (7)	ARP Stat * (2)	B	58	
				DIG		
59	Attitude Prog Status See Table 5			B	59	
				DIG		
60	Selected B.H.S. Earth Time (16)			B	60	
				DIG		
61	Selected B.H.S. Period (16)			B	61	
				DIG		
62	But 1 Accum Ct (10)	Output Active (1)	But 1 Seq Stat (4)	But 1 Sel	A	62
					DIG	
63	But 2 Accum Ct (10)	Output Active	But 2 Seq Stat (4)	But 2 Sel	B	63
					DIG	
64	Selected Despin (9 Bits)**	Orientation	Wheel Speed Bias (5 Bits)!	Spare (2)	A	64
			***		DIG	
			VHF 1 RF Output Pwr		A	65
					AN+	
			VHF 2 RF Output Pwr		A	66
					AN+	
			SPARE		A	67
					AN+	
			SPARE		A	68
					AN+	
			VHF XMTR 1 Conv Volt		A	69
					AN+	

*See Table 7.
 **See Table 8.
 ***See Table 9.

TABLE 1 (Continued)

4 sec (64 wd)

8 sec (128 wd)

	VHF XMTR 2 Conv Volt	A	70
		AN+	
	SPARE	A	71
		AN+	
	SPARE	A	72
		AN+	
9	S/C Time Code	A	73
		DIG	
	SPS Target Eye En/Dis	B	74
		AN+	
	Az Coarse Sensor	B	75
		AN+	
	El Angle Cmd Status	B	76
		AN+	
	Az Shaft Position	B	77
		AN+	
	El Motor Current	B	78
		AN+	
	Az Motor Current	B	79
		AN+	
	Az Bearing Temp	B	80
		AN+	
	TR 1 Temp	B	81
		AN-	
	TR 2 Temp	B	82
		AN-	
	TR 1 Pressure	B	83
		AN-	

TABLE 1 (Continued)

TR 2 Pressure	B	84
	AN-	
TR 1 Upper Roller Tape Tension	B	85
	AN-	
TR 1 Lower Roller Tape Tension	B	86
	AN-	
TR 2 Upper Roller Tape Tension	B	87
	AN-	
TR 2 Lower Roller Tape Tension	B	88
	AN-	
TR 1 Humidity Monitor	B	89
	AN-	
TR 2 Humidity Monitor	B	90
	AN-	
TR 1 Playback Level	B	91
	AN-	
TR 2 Playback Level	B	92
	AN-	
TR 1 Motor Current	B	93
	AN-	
TR 2 Motor Current	B	94
	AN-	
PMP 1 Conv Voltage	A	95
	AN-	
PMP 2 Conv Voltage	A	96
	AN-	
MWA Bearing Temp	A	97
	AN-	
MWA Motor 1 Current	A	98
	AN-	

TABLE 1 (Continued)

MWA Motor 2 Current	A	99
	AN-	
PCE 1 Motor Conn/Disc	A	100
	AN-	
PCE 2 Motor Conn/Disc	A	101
	AN-	
H.S. DC/DC Conv 1	A	102
	AN-	
H.S. DC/DC Conv 2	A	103
	AN-	
Dec 1 70 kHz Subc Level	B	104
	AN+	
Dec 2 70 kHz Subc Level	B	105
	AN+	
Dec 1 Squelch Level	B	106
	AN+	
Dec 2 Squelch Level	B	107
	AN+	
Dec 1 DC/DC Conv	B	108
	AN+	
Dec 2 DC/DC Conv	B	109
	AN+	
Prog 1 DC/DC Conv	B	110
	AN+	
Prog 2 DC/DC Conv	B	111
	AN+	
PCMC 1 DC/DC Conv	A	112
	AN+	
PCMC 2 DC/DC Conv	A	113
	AN+	

TABLE 1 (Continued)

		A	114
	PCE 1 DC/DC Conv	AN-	
		A	115
	PCE 2 DC/DC Conv	AN-	
		A	116
	Not available for TLM-Data Same as word 48 of this subcom	AN-	
		A	117
	PSE Bias Reg No. 1	AN-	
		A	118
	PSE Bias Reg No. 2	AN-	
		A	119
	PSE Bias Reg No. 3	AN-	
		A	120
	PSE Heat Sink Temp.	AN-	
		B	121
	Memory -10V (Mem 1 thru PCMC 1 & Mem 2 thru PCMC 2)	AN-	
		B	122
58	Auto Roll Thresholds and ARP Status	DIG	
		B	123
59	Attitude Prog Status	DIG	
		B	124
60	Sel BHS Earth Time	DIG	
		B	125
61	Sel BHS Period	DIG	
		A	126
62	B.U.T 1	DIG	
		B	127
63	B.U.T. 2	DIG	
		A	128
64	Wheel Speed Bias and Orientation	DIG	

TABLE 2. 4 SEC SUBCOM - RELAY FLAGS

WORD	BIT	B.P.								
		1	2	3	4	5	6	7	8	
22	/	-24.5V REG 1 ON/OFF	-24.5V REG 2 ON/OFF	PES INST PWR ON/ OFF	SPARE	PSB UNREG PWR EN/ DIS	PSB HTR PWR ON/ OFF	PSB INST PWR ON/ OFF	U VNO INST PWR ON/ OFF	A
		CEP UNREG PWR EN/ DIS	CEP RAD HTR ON/ OFF	CEP AX HTR ON/ OFF	CEP INST PWR ON/ OFF	CEP BIPH RAD PWR ON/OFF	CEP BIPH AX PWR ON/OFF	PSA INST PWR ON/ OFF	DSAI INST PWR ON/ OFF	A
24	/	NACE UN- REG PWR EN/DIS	NACE COVER PWR ON/OFF	NACE INST PWR ON/ OFF	OSS INST PWR ON/ OFF	OSS PUMP PWR ON/ OFF	PCE 1/2 SELECTED	PCE 1 ON/OFF	PCE 2 ON/OFF	A
		NATE UN- REG PWR EN/DIS	NATE COVER PWR ON/OFF	NATE INST PWR ON/ OFF	EUVS UN- REG PWR EN/DIS	EUVS STDBY PWR ON/OFF	EUVS LOW PWR ON/ OFF	EUVS MTR PWR 1 ON/ OFF	EUVS MTR PWR 2 ON/ OFF	B

TABLE 2. (CONTINUED)

	1	2	3	4	5	6	7	8	
26	SPS UNREG PWR EN/ DIS	SPS INST PWR ON/ OFF	SPS AZ MTR PWR ON/ OFF	VAE UNREG PWR EN/ DIS	VAE BIPH.1 PWR ON/ OFF	VAE BIPH.2 PWR ON/ OFF	VAE INST PWR ON/ OFF	SPS EL MTR PWR ON/ OFF	B
27	RPA INST PWR ON/ OFF	RPA DRIFT PWR ON/ OFF	BIMS INST PWR ON/ OFF	MIMS INST PWR ON/ OFF	ESUM UN- REG PWR EN/DIS	ESUM BI PH. PWR ON/OFF	ESUM INST PWR ON/ OFF	PROG 1/2 SELECTED	B
28	MESA X-Y PWR ON/ OFF	MESA Y-X PWR ON/ OFF	MESA Z PWR ON/ OFF	QOMAC 1 EN/DIS	QOMAC 2 EN/DIS	MASC 1 EN/DIS	MASC 2 EN/DIS	LEE INST PWR ON/ OFF	B
29	OAPS BUS A EN/DIS	OAPS BUS B EN/DIS	TANK VALVE 1 ON/OFF	TANK VALVE 2 ON/OFF	TANK VALVE 3 ON/OFF	TANK VALVE 4 ON/OFF	TANK VALVE 5 ON/OFF	TANK VALVE 6 ON/OFF	A

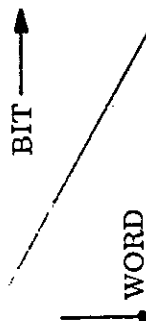


TABLE 2. (CONTINUED)

	1	2	3	4	5	6	7	8
30	Δ V THR 1 EN/DIS	Δ V THR 2 EN/DIS	YAW THR EN/DIS	PITCH LP MTR PWR 1/2 SEL.	PCE 1 H.S. CONV. ON/ OFF	PCE 2 H.S. CONV. ON/ OFF	SBT 1 OSC NORM/TEST	SBT 2 OSC NORM/TEST
31	T.R. 1 PWR ON/OFF	T.R. 1 REC/PB SELECTED	T.R. 1 BUFF PWR EN/DIS	T.R. 2 PWR ON/ OFF	T.R. 2 REC/PB SELECTED	T.R. 2 BUFF PWR EN/DIS	MARC PWR EN/DIS	MARC PWR ON/OFF
32	PCMC 1 EN/DIS	PCMC 2 EN/DIS	PCMC 1 PWR ON/ OFF	PCMC 2 PWR ON/ OFF	PCMC 1 TO SEL. PMP	PCMC 2 TO SEL. PMP	PCMC 1 TO SEL. T.R.	PCMC 2 TO SEL. T.R.
33	DEC 1 STRD CMD EN/ DIS	DEC 2 STRD CMD EN/ DIS	PROG 1 ON/ OFF	PROG 2 ON/ OFF	PROG 1 NADIR FLIP	PROG 2 NADIR FLIP	PROG 1 OAPS SPIN ORIENT.	PROG 2 OAPS SPIN ORIENT.

TABLE 2. (CONTINUED)

WORD	1	2	3	4	5	6	7	8	
34	SBT 1/2 SELECTED	SBT 1 AUTO ACQ EN/ DIS	SBT 2 AUTO ACQ EN/ DIS	SBT 1 PWR ON/OFF	SBT 2 PWR ON/OFF	SBT 1 LO/ HI MODE	SBT 2 LO/ HI MODE	H.K. TLM (A) PWR ON/OFF	A
35	SBT 1 AUTO ACQ ON/ OFF	SBT 2 AUTO ACQ ON/ OFF	PMP 1/2 SELECTED	PMP 1 PWR ON/ OFF	PMP 2 PWR ON/OFF	PMP 1 PB/ RT MODE	PMP 2 PB/ RT MODE	TIME BASE 1/2 (CDU A) SELECTED	A
36	VBT 1/2 SELECTED	VBT 1 PWR ON/OFF	VBT 2 PWR ON/OFF	VBT 1 BEA/ TLM MODE	VBT 2 BEA/ TLM MODE	BHS 1 PWR ON/OFF	BHS 2 PWR ON/OFF	TAL INST PWR ON/ OFF	A
37	PROG 1 CMU PWR SEL.	CMU 1 SELECTED	PROG 2 CMU PWR SEL.	CMU 2 SELECTED	H.K.TLM(B) PWR ON/ OFF	SPARE RELAY CDU B	MARC ON/ OFF (LIU- B)	MARC B. U. CLK ON/OFF (LIU-B)	B

TABLE 2. (CONTINUED)

	1	2	3	4	5	6	7	8	
38	PCMC 1/2 TO MARC (LIU B)	RASTER SCAN ON/ OFF (LIU- B)	RASTER SCAN EN/ DIS	XTAL A/ B SELECT (LIU-B)	TIME BASE 1/2 SEL. (I) (LIU-B)	TIME BASE 1/2 SEL. (II) (LIU-B)	SPARE RELAY CDU B	SPARE RELAY CDU-B	B
39	XTAL A/B SELECT (LIU-A)	TIME BASE 1/2 SEL (I) (LIU-A)	TIME BASE 1/2 SEC (II) (LIU-A)	REG BUS CUR TLM LO/ HI	ATC 1 EN/ DIS	ATC 2 EN/ DIS	ATC 3 EN/ DIS	ATC 4 EN/ DIS	A
40	UNREG BUS CUR TLM LO/ HI	UNREG U. V EN/ DIS	BATT CHGR 1 SAFETY EN/ DIS	BATT CHGR 2 SAFETY EN/ DIS	BATT CHGR 3 SAFETY EN/ DIS	BATT CHGR 1 ON/ OFF	BATT CHGR 2 ON/ OFF	BATT CHGR 3 ON/ OFF	A
41	UNREG U. V ON/ OFF	REG BUS SAFETY EN/ DIS	SH. LLM AMP 1 ON/ OFF	SH. LLM AMP 2 ON/ OFF	WHS NORM/ CROSSED PCE 1	WHS NORM/ CROSSED PCE 2	PCMC 1 TO SEL VBT	PCMC 2 TO SEL VBT	A

TABLE 2. (CONTINUED)

	1	2	3	4	5	6	7	8	
42	PCE 1 COARSE/ NORM SWITCH 3RD EL 1 EN/DIS	PCE 2 COARSE/ NORM SWITCH 3RD EL2 EN/DIS	PCE 1 GAIN SWITCH C/F 3RD EL3 EN/DIS	PCE 2 GAIN SWITCH C/F 3RD EL 1 FIRE	PCE 1 OPEN/ CLOSED 3RD EL 2 FIRE	PCE 2 OPEN/ CLOSED 3RD EL 3 FIRE	PCE 1 SPIN DESPIN SQUIB BUS A EN/DIS	PCE 2 SPIN DESPIN SQUIB BUS B EN/DIS	A
43	3RD EL 1 EN/DIS	3RD EL2 EN/DIS	3RD EL3 EN/DIS	3RD EL 1 FIRE	3RD EL 2 FIRE	3RD EL 3 FIRE	SQUIB BUS A EN/DIS	SQUIB BUS B EN/DIS	A
44	YAW THR VALVE COIL 1 ON/ OFF	YAW THR VALVE COIL 2 ON/ OFF	Δ V THR 1 VALVE COIL 1 ON/ OFF	Δ V THR1 VALVE COIL 2 ON/ OFF	Δ V THR 2 VALVE COIL 1 ON/ OFF	Δ V THR 2 VALVE COIL 2 ON/ OFF	REG BUS MIN. LOAD ON/OFF	SPARE RELAY- CDU-A	A
45	SPARE RELAY CDU-B	ESUM MTR PWR ON/ OFF	OAPS HTR EN/DIS	OAPS TANK HTRS ON/ OFF	Δ V THR 1 HTR ON/ OFF	Δ V THR 2 HTR ON/ OFF	YAW THR HTR ON/ OFF	MAG INST PWR ON/ OFF	B
46	SPARE RELAY CDU-A	SPARE RELAY CDU-A	SPARE RELAY CDU-A	SPARE RELAY CDU-B	SPARE RELAY CDU-B	SPARE RELAY CDU-B	SPARE RELAY CDU-B	SPARE RELAY CDU-B	A

TABLE 3. 4 SEC SUBCOM LOGIC (CONDITIONAL) FLAGS

	1	2	3	4	5	6	7	8	
48	QOMAC 1 + ON/ OFF	QOMAC 1 - ON/ OFF	QOMAC 2+ ON/ OFF	QOMAC 2 - ON/ OFF	MASC 1 + ON/ OFF	MASC 1 - ON/ OFF	MASC 2 + ON/ OFF	MASC 2 - ON/ OFF	B
	LIU-A DEC 1 ON/ OFF	LIU-A DEC 2 ON/ OFF	LIU-A PCMC-1 ON/ OFF	LIU-A PCMC-2 ON/ OFF	RCVR 1 LOCK STATUS	RCVR 2 LOCK STATUS	SBT 1 RANGING EN/ DIS	SBT 2 RANGING EN/ DIS	A
49	LIU-B DEC 1 ON/ OFF	LIU-B DEC 2 ON/ OFF	LIU-B PCRC-1 ON/ OFF	LIU-B PCRC-2 ON/ OFF	SPARE RELAY- CDU-B	TR 1 TRACK 1/2	TR 2 TRACK 1/2	PROG ARP FIELD CONT BIT	B
	TR 1 PRI BOT	TR 1 PRI EOT	TR 1 BUFF ON/ OFF	TR 1 REDUN BOT/ EOT	TR 2 PRI BOT	TR 2 PRI EOT	TR 2 BUFF ON/ OFF	TR 2 REDUN BOT/ EOT	B
50									
51									

TABLE 4. WD 54 BIT ALLOCATIONS (4 SEC SUBCOM)

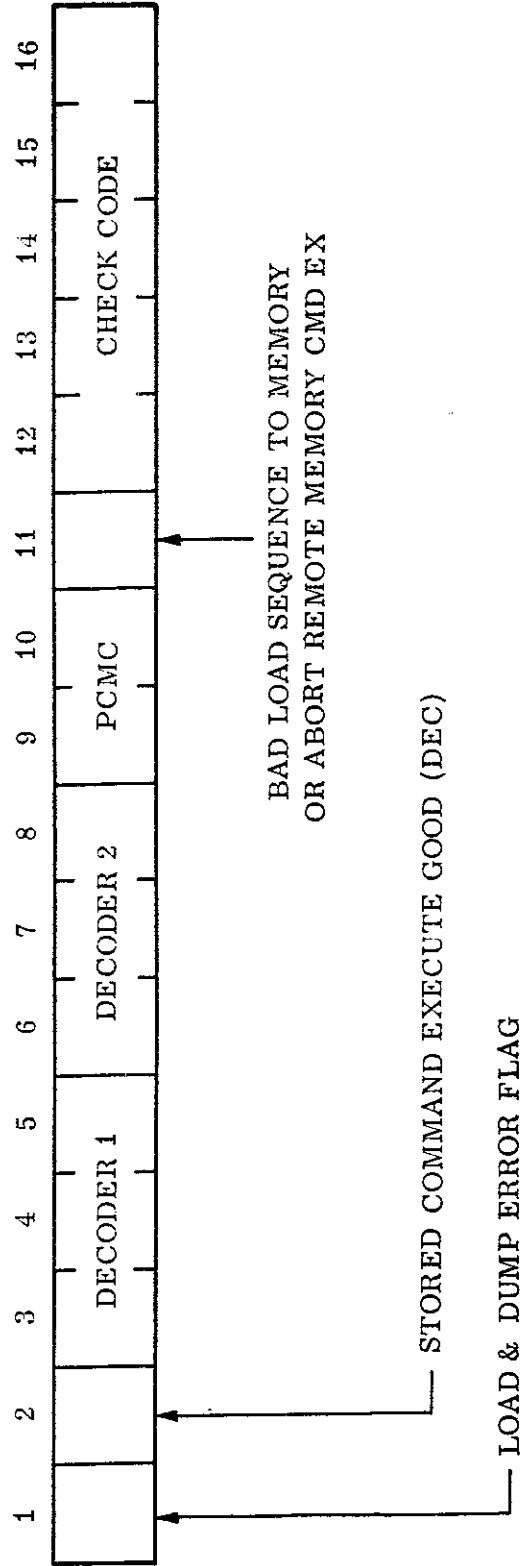
	1	2	3	4	5	6	7	8
	OAPS THRUST ON/OFF	OAPS SPIN/ DESPIN	OAPS Δ V/ YAW	MESA XY SELECT	MESA YX SELECT*	# AUTO ROLL CYCLES REMAINING (See Below)		NADIR PROG ON/OFF

TABLE 5. WD 59 (123) BIT ALLOCATIONS (4 AND 8 SEC SUBCOM)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	QOMAC FIELD CONT BIT	QOMAC + ON/OFF	QOMAC - ON/OFF	MASC FIELD CONT BIT	MASC + ON/OFF	MASC - ON/OFF	MASC COMM ON/OFF				MASC	NADIR				

Cycles Remaining	Bit 6	Bit 7
3	1	1
2	0	1
1	1	0
0 or 4	0	0

MAIN FRAME WORDS 4&5 - CMD VERIFICATION



OTHER S/C TLM

MAIN FRAME, WDS 17, 18

	17	18
1	W.H.S. 1 EARTH TIME	A DIG
2	W.H.S. 2 EARTH TIME	A DIG
3	PCE SPLIT TO INDEX PULSE TIME	A DIG
4	SELECTED W.H.S. PERIOD	A DIG

MAIN FRAME 81: MAIN FRAME SYNC TO SELECTED BHS
SKY/EARTH TRANSITION TIME.

MAIN FRAME 82: MAIN FRAME SYNC TO SOLAR GATE
PULSE TIME.

MAIN FRAME, WDS 119, 120

	119	120
1	MESA XY	B DIG
2	MESA YX	B DIG
3	MESA Z	B DIG
4	RSL SEQ-(4)	RSL LOADED CMD SEQ-(12) B DIG

MAIN FRAME WORD 20

8 WORD SPS ANALOG SUBCOM

1	A _Z (CROSS-EL) OFFSET STATUS	B
		AN+
2	EL OFFSET STATUS	B
		AN+
3	FINE EYE A _Z (CROSS-EL) SIGNAL	B
		AN+
4	FINE EYE EL SIGNAL	B
		AN+
5	ELEVATION POSITION	B
		AN+
6	OFFSET ENABLE/DISABLE	B
		AN+
7	FINE EYE A _Z SIGNAL	B
		AN+
8	FINE EYE EL SIGNAL	B
		AN+

Experiment Relay Flag Bits in 8 Sec. Expt. Subcom (M.F 68)

BIT #	1	2	3	4	5	6	7	8
EXP 8 SEC SUBCUM WORD#								
12 DIG	PES H. V # 1 OFF	PES H.V. # 2 OFF	PES CAL MODE ENABLE/ DISABLE	OSS BREAKOFF CAP STATUS	TAL FLAG BIT #1	TAL FLAG BIT #2	SPARE	SPARE
62 DIG	MESA XY SUSP BIT #1	MESA XY SUSP BIT # 2	MESA YX SUSP BIT #1	MESA YX SUSP BIT #2	MESA Z SUSP BIT #1	MESA Z SUSP BIT #2	MESA XY CONST BIT #1	MESA XY CONST BIT #2
90 DIG	MESA YX CONST BIT #1	MESA YX CONST BIT #2	MESA Z CONST BIT #1	MESA Z CONST BIT #2	RPA HI/ LO SWEEP LEVEL	RPA ELECT MULTIPLY SWITCH	RPA ORIENTED/ SPIN MODE	RPA NORMAL/ HI RESOLU- TION
106 DIG	ESUM H. V. RELAY (RELAY FLAG)	EUVS FLAG H V SIDE 1	EUVS FLAG H V SIDE 2	VAE FLAG	NOT USED	EUVS FLAG HV PMT	LEE H V ON	LEE SUN SENSOR OVERRIDE

TABLE 6. MEMORY PROGRAMMER STATUS
 Word 65,53, Bits 1 & 2

Condition	Bit 1	Bit 2
Standby	0	0
Load	0	1
Dump	1	0
Program	1	1

TABLE 7. AUTO ROLL PROGRAMMER STATUS
 Word 66,58 Bits 7 & 8

Condition	Bit 7	Bit 8
Standby	1	1
Invert	1	0
Inhibit	0	1
Normal	0	0

TABLE 8. DESPIN ORIENTATION
 WORD 65,64 BITS 1-8
 WORD 66,64 BIT 1 (LABELLED 9 BELOW)

BIT #				1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
1	2	3	4	1	1	1	1	0	0	0	0	1	1	1	1	0	0	0	
6	7	8	9	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	
1	1	1	1	0	32	64	96	128	160	192	224	256	288	320	352				
1	1	1	0	1	33	65	97	129	161	193	225	257	289	321	353				
1	1	0	1	2	34	66	98	130	162	194	226	258	290	322	354				
1	1	0	0	3	35	67	99	131	163	195	227	259	291	323	355				
1	0	1	1	4	36	68	100	132	164	196	228	260	292	324	356				
1	0	1	0	5	37	69	101	133	165	197	229	261	293	325	357				
1	0	0	1	6	38	70	102	134	166	198	230	262	294	326	358				
1	0	0	0	7	39	71	103	135	167	199	231	263	295	327	359				
0	1	1	1	8	40	72	104	136	168	200	232	264	296	328					
0	1	1	0	9	41	73	105	137	169	201	233	265	297	329					
0	1	0	1	10	42	74	106	138	170	202	234	266	298	330					
0	1	0	0	11	43	75	107	139	171	203	235	267	299	331					
0	0	1	1	12	44	76	108	140	172	204	236	268	300	332					
0	0	1	0	13	45	77	109	141	173	205	237	269	301	333					
0	0	0	1	14	46	78	110	142	174	206	238	270	302	334					
0	0	0	0	15	47	79	111	143	175	207	239	271	303	335					
1	1	1	1	16	48	80	112	144	176	208	240	272	304	336					
1	1	1	0	17	49	81	113	145	177	209	241	273	305	337					
1	1	0	1	18	50	82	114	146	178	210	242	274	306	338					
1	1	0	0	19	51	83	115	147	179	211	243	275	307	339					
1	0	1	1	20	52	84	116	148	180	212	244	276	308	340					
1	0	1	0	21	53	85	117	149	181	213	245	277	309	341					
1	0	0	1	22	54	86	118	150	182	214	246	278	310	342					
1	0	0	0	23	55	87	119	151	183	215	247	279	311	343					
0	1	1	1	24	56	88	120	152	184	216	248	280	312	344					
0	1	1	0	25	57	89	121	153	185	217	249	281	313	345					
0	1	0	1	26	58	90	122	154	186	218	250	282	314	346					
0	1	0	0	27	59	91	123	155	187	219	251	283	315	347					
0	0	1	1	28	60	92	124	156	188	220	252	284	316	348					
0	0	1	0	29	61	93	125	157	189	221	253	285	317	349					
0	0	0	1	30	62	94	126	158	190	222	254	286	318	350					
0	0	0	0	31	63	95	127	159	191	223	255	287	319	351					

NOT VALID

TABLE 9. WHEEL SPEED BIAS
Word 66, 64 Bits 2 - 6

BIT #	5,6				
2,3,4		00	10	01	11
000		10	18	26	34
100		11	19	27	35
010		12	20	28	36
110		13	21	29	37
001		14	22	30	38
101		15	23	31	39
011		16	24	32	40
111		17	25	33	41

SPEED BIAS IN RADIANS/SEC

APPENDIX A

ATMOSPHERE EXPLORER TELEMETRY

MAIN FRAME FORMAT

AE-C SATELLITE

1	A 2	A 3	A 4	B 5	B 6	B 7	A 8	A
SYNC	SYNC	SYNC	COMMAND STATUS	COMMAND STATUS	RPA	UVNO	UVNO	
D	D	D	D	D	D	D	D	D
9	A 10	B 11	B 12	B 13	B 14	B 15	B 16	B
CEP	BIMS	EUVS	EUVS	EUVS	EUVS	RPA	BIMS	
+A	+A	D	D	D	D	+A	+A	+A
17	A 18	A 19	B 20	B 21	A 22	A 23	B 24	B
S/C	S/C	MIMS	EUVS	NACE	NACE	BIMS	RPA	
D	D	D	+A	+A	D	D	+A	+A
25	A 26	B 27	B 28	B 29	A 30	B 31	B 32	B
CEP	MIMS	NATE	NATE	UVNO	NATE	NATE	RPA	
+A	+A	D	D	D	+A	D	D	+A
33	B 34	B 35	B 36	B 37	A 38	A 39	A 40	A
RPA	ESUM	ESUM	BIMS	SUBCOM COUNTER	PES	PES	PES	
+A	D	D	D	+A	D	D	D	D
41	A 42	B 43	B 44	B 45	B 46	B 47	B 48	B
CEP	RPA	LEE	LEE	LEE	VAE	VAE	VAE	
+A	+A	D	D	D	D	D	D	D
49	B 50	A 51	B 52	B 53	A 54	A 55	B 56	B
BIMS	UVNO	RPA	RPA	NACE	NACE	ESUM	BIMS	
+A	D	+A	+A	D	D	+A	D	D
57	A 58	B 59	B 60	B 61	B 62	B 63	A 64	A
CEP	MIMS	NATE	NATE	RPA	BIMS	OSS	OSS	
+A	+A	D	D	+A	+A	D	D	D
65	A/B 66	A/B 67	A/B 68	A/B 69	A 70	B 71	B 72	A
SUBCOM S/C 64	SUBCOM S/C 128	SUBCOM EXP 64	SUBCOM EXP 128	PSA	RPA	RPA	UVNO	
D	D	D	D	D	+A	D	D	D
73	A 74	B 75	B 76	A 77	A 78	A 79	B 80	B
CEP	MIMS	BIMS	OSS	OSS	OSS	RPA	BIMS	
+A	+A	+A	D	D	D	+A	D	D
81	B 82	A 83	B 84	B 85	A 86	A 87	B 88	B
S/C	S/C	MIMS	MIMS	NACE	NACE	BIMS	RPA	
D	D	+A	+A	D	D	+A	+A	+A
89	A 90	B 91	B 92	B 93	A 94	A 95	A 96	B
CEP	MIMS	NATE	NATE	UVNO	OSS	NACE	RPA	
+A	+A	D	D	D	+A	+A	+A	+A
97	B 98	B 99	B 100	B 101	A 102	A 103	A 104	A
RPA	ESUM	ESUM	BIMS	PSB	PES	PES	PES	
+A	D	D	+A	+A	D	D	D	D
105	A 106	B 107	B 108	B 109	B 110	B 111	B 112	B
CEP	RPA	MAG	MAG	MAG	VAE	VAE	VAE	
+A	+A	+A	+A	+A	D	D	D	D
113	B 114	A 115	B 116	A 117	A 118	A 119	B 120	B
BIMS	UVNO	RPA	NACE	NACE	NACE	MESA	MESA	
+A	D	+A	D	D	D	D	D	D
121	A 122	B 123	B 124	B 125	B 126	B 127	A 128	B
CEP	MIMS	NATE	NATE	RPA	BIMS	TAL	LFE	
+A	+A	D	D	+A	+A	+A	A	A

ATMOSPHERE EXPLORER

4 Second Subcom Format

AE-C Satellite

1	RPA	B 2	CEP	A 3	BIMS	B 4	ESUM	B 5	ESUM	B 6	ESUM	B 7	EUVS	B 8	RPA	B
		D		D		D		D		D		D		D		+A
9	S/C CLOCK	A 10	BIMS	B 11	PSA	A 12	RPA	B 13	PSA	A 14	PSA	A 15	PSA	A 16	RPA	B
		D		+A		+A		D		+A		+A		+A		+A
17	UVNO	A 18	BIMS	B 19	BIMS	B 20	MIMS	B 21	MAG	B 22	RPA	B 23	SPARE	B 24	RPA	B
		D		+A		D		D		A		D		D		+A
25	BIMS	B 26	BIMS	B 27	VAE	B 28	VAE	B 29	MESA	B 30	MESA	B 31	MESA	B 32	RPA	B
		+A		+A		+A		+A		+A		+A		+A		+A
33	RPA	B 34	MIMS	B 35	BIMS	B 36	OSS	A 37	OSS	A 38	OSS	A 39	OSS	A 40	RPA	B
		D		D		D		D		D		D		D		+A
41	PSB	A 42	BIMS	B 43	PSB	A 44	RPA	B 45	MESA	B 46	UVNO	A 47	TAL	A 48	RPA	B
		+A		+A		+A		D		D		+A		+A		+A
49	EUVS	B 50	EUVS	B 51	BIMS	B 52	MIMS	B 53	EUVS	B 54	RPA	B 55	PES	A 56	RPA	B
		D		D		D		D		D		D		D		+A
57	PSB	A 58	BIMS	B 59	PSB	A 60	PSB	A 61	MESA	B 62	MESA	B 63	MESA	B 64	RPA	B
		+A		+A		+A		+A		+A		+A		+A		+A
														July 19, 1972 Revised 17, Aug. 72		

ATMOSPHERE EXPLORER

8 Second Subcom Format

AE-C Satellite

1	A	2	A	3	A	4	A	5	A	6	A	7	A	8	A	
UVNO		UVNO		UVNO		UVNO		UVNO		UVNO		UVNO		UVNO		
	+A		+A		+A		+A		+A		+A		+A		+A	
9	B	10	B	11	B	12	A	13	B	14	B	15	B	16	B	
MESA		MESA		MESA		RELAY STATUS		BIMS		VAE		VAE		VAE		
	+A		+A		+A	D		+A		D		D		D		
17	B	18	B	19	B	20	B	21	B	22	B	23	B	24	B	
VAE		VAE		VAE		VAE		VAE		VAE		VAE		VAE		
	+A		+A		+A		+A		+A		+A		+A		+A	
25	B	26	B	27	B	28	B	29	B	30	B	31	B	32	A	
RPA		RPA		RPA		LEE		LEE		LEE		LEE		NACE		
	+A		+A		+A	D		D		D		D		D	+A	
33	A	34	A	35	A	36	A	37	A	38	A	39	A	40	A	
NACE		NACE		NACE		NACE		NACE		NACE		NACE		NACE		
	+A		+A		+A		+A		+A		+A		+A		+A	
41	A	42	A	43	A	44	A	45	A	46	A	47	A	48	A	
OSS		OSS		OSS		OSS		OSS		OSS		NACE		NACE		
	+A		+A		+A		+A		+A		+A		D		+A	
49	A	50	A	51	A	52	A	53	A	54	A	55	A	56	B	
OSS		OSS		OSS		OSS		OSS		OSS		PES		BIMS		
	+A		+A		+A		+A		+A		+A		D		D	
57	B	58	B	59	B	60	B	61	B	62	RELAY STATUS	B	63	B	64	B
LEE		LEE		LEE		LEE		LEE		LEE		NATE		RPA		
	+A		+A		+A		+A		+A		D		D		D	
65	A	66	A	67	A	68	A	69	A	70	A	71	B	72	B	
CEP		CEP		CEP		CEP		CEP		CEP		NATE		NATE		
	+A		+A		+A		+A		+A		+A		+A		+A	
73	B	74	B	75	B	76	B	77	B	78	B	79	B	80	B	
NATE		NATE		NATE		NATE		NATE		NATE		NATE		NATE		
	+A		+A		+A		+A		+A		+A		+A		+A	
81	B	82	B	83	B	84	B	85	B	86	B	87	B	88	B	
MIMS		MIMS		MIMS		MIMS		MIMS		MIMS		MIMS		MIMS		
	+A		+A		+A		+A		+A		+A		+A		+A	
89	B	90	RELAY STATUS	B	91	A	92	A	93	A	94	A	95	A	96	A
MIMS				PES		PES		PES		PES		PES		PES		
	+A		D		+A		+A		+A		+A		+A		+A	
97	B	98	B	99	B	100	B	101	B	102	B	103	B	104	B	
ESUM		ESUM		ESUM		ESUM		ESUM		ESUM		ESUM		ESUM		
	+A		+A		+A		+A		+A		+A		+A		+A	
105	B	106	RELAY STATUS	B	107	B	108	B	109	A	110	A	111	A	112	A
ESUM				NATE		NATE		NACE		NACE		NACE		NACE		
	+A		D		D		D		D		D		D		D	
113	B	114	B	115	B	116	B	117	B	118	B	119	A	120	B	
EUVS		EUVS		EUVS		EUVS		BIMS		BIMS		PES		BIMS		
	+A		+A		+A		+A		D		D		D		D	
121	B	122	B	123	B	124	B	125	B	126	B	127	B	128	B	
BIMS		BIMS		BIMS		BIMS		BIMS		BIMS		NATE		RPA		
	+A		+A		+A		+A		+A		+A		D		D	

March 8, 1972

Revised 17 Aug. 72

APPENDIX B

ATMOSPHERE EXPLORER TELEMETRY

MAIN FRAME FORMAT

AE-C, D, E SATELLITE
MEMORY DUMP SHOWN SHADED

1	A 2	A 3	A 4	B 5	B 6	B 7	A 8	A 9
SYNC	SYNC	SYNC	COMMAND STATUS	COMMAND STATUS	RPA	UVNO	UVNO	
D	D	D	D	D	D	D	D	D
9	A 10	B 11	B 12	B 13	B 14	B 15	B 16	B 17
CEP	BIMS	EUVS	EUVS	EUVS	EUVS	RPA	BIMS	
+A	+A	D	D	D	D	+A	+A	
17	A 18	A 19	B 20	B 21	A 22	A 23	B 24	B 25
S/C	S/C	MIMS	EUVS	NACE	NACE	BIMS	RPA	
D	D	D	D	D	D	D	D	D
25	A 26	B 27	B 28	B 29	A 30	B 31	B 32	B 33
CEP	MIMS	NATE	NATE	UVNO	NATE	NATE	RPA	
+A	+A	D	D	D	D	D	D	+A
33	B 34	B 35	B 36	B 37	A 38	A 39	A 40	A 41
RPA	ESUM	ESUM	BIMS	SUBCOM COUNTER	PES	PES	PES	
+A	D	D	+A	D	D	D	D	D
41	A 42	B 43	B 44	B 45	B 46	B 47	B 48	B 49
CEP	RPA	LEE	LEE	LEE	VAE	VAE	VAE	
+A	+A	D	D	D	D	D	D	D
49	B 50	A 51	B 52	B 53	A 54	A 55	B 56	B 57
BIMS	UVNO	RPA	RPA	NACE	NACE	ESUM	BIMS	
+A	D	+A	+A	D	D	+A	D	D
57	A 58	B 59	B 60	B 61	B 62	B 63	A 64	A 65
CEP	MIMS	NATE	NATE	RPA	BIMS	OSS	OSS	
+A	+A	D	D	D	+A	+A	D	D
65	A/B 66	A/B 67	A/B 68	A/B 69	A 70	B 71	B 72	A 73
SUBCOM	SUBCOM	SUBCOM	SUBCOM	PSA	RPA	RPA	UVNO	
				D	+A	D	D	D
73	A 74	B 75	B 76	A 77	A 78	A 79	B 80	B 81
CEP	MIMS	BIMS	OSS	OSS	OSS	RPA	BIMS	
+A	+A	+A	D	D	D	+A	D	D
81	B 82	A 83	B 84	B 85	A 86	A 87	B 88	B 89
S/C	S/C	MIMS	MIMS	NACE	NACE	BIMS	RPA	
D	D	D	D	D	D	+A	+A	
89	A 90	B 91	B 92	B 93	A 94	A 95	A 96	B 97
CEP	MIMS	NATE	NATE	UVNO	OSS	NACE	RPA	
+A	+A	D	D	D	+A	+A	+A	
97	B 98	B 99	B 100	B 101	A 102	A 103	A 104	A 105
RPA	ESUM	ESUM	BIMS	PSB	PES	PES	PES	
+A	D	D	+A	+A	D	D	D	D
105	A 106	B 107	B 108	B 109	B 110	B 111	B 112	B 113
CEP	RPA	MAG	MAG	MAG	VAE	VAE	VAE	
+A	+A	+A	+A	+A	D	D	D	D
113	B 114	A 115	B 116	A 117	A 118	A 119	B 120	B 121
BIMS	UVNO	RPA	NACE	NACE	NACE	MESA	MESA	
+A	D	+A	D	D	D	D	D	D
121	A 122	B 123	B 124	B 125	B 126	B 127	A 128	B 129
CEP	MIMS	NATE	NATE	RPA	BIMS	TAL	LFE	
+A	+A	D	D	+A	+A	+A		A

July 19, 1972

Revised 17 Aug. '72

Revised 16 Oct. 1972

APPENDIX C

ATMOSPHERE EXPLORER TELEMETRY

MAIN FRAME FORMAT

AE-D SATELLITE

1 SYNC	2 SYNC	3 SYNC	4 COMD	5 STAT	6 RPA	7 UVNO	8 UVNO
9 CEP	10 LEE	11 EUVS	12 EUVS	13 EUVS	14 EUVS	15 RPA	16 LEE
17 S/C	18 S/C	19 MIMS	20 EUVS	21 NACE	22 NACE	23 LEE	24 RPA
25 CEP	26 MIMS	27 NATE	28 NATE	29 UVNO	30 NATE	31 NATE	32 RPA
33 RPA	34 ESUM	35 ESUM	36 LEE	37 SUBCOM COUNTER	38 PES	39 PES	40 PES
41 CEP	42 RPA	43 LEE	44 LEE	45 LEE	46 VAE	47 VAE	48 VAE
49 LEE	50 UVNO	51 RPA	52 RPA	53 NACE	54 NACE	55 ESUM	56 LEE
57 CEP	58 MIMS	59 NATE	60 NATE	61 RPA	62 LEE	63 OSS	64 OSS
65 SUBCOM	66 SUBCOM	67 SUBCOM	68 SUBCOM	69 PSA	70 RPA	71 RPA	72 UVNO
73 CEP	74 MIMS	75 LEE	76 OSS	77 OSS	78 OSS	79 RPA	80 LEE
81 S/C	82 S/C	83 MIMS	84 MIMS	85 NACE	86 NACE	87 LEE	88 RPA
89 CEP	90 MIMS	91 NATE	92 NATE	93 UVNO	94 LEE	95 NACE	96 RPA
97 RPA	98 ESUM	99 ESUM	100 LEE	101 PSB	102 PES	103 PES	104 PES
105 CEP	106 RPA	107 MAG	108 MAG	109 MAG	110 VAE	111 VAE	112 VAE
113 LEE	114 UVNO	115 RPA	116 NACE	117 NACE	118 NACE	119 MESA	120 MESA
121 CEP	122 MIMS	123 NATE	124 NATE	125 RPA	126 LEE	127 LEE	128 LEE

ATMOSPHERE EXPLORER

8 Second Subcom Format

AE-D Satellite

1	A	2	A	3	A	4	A	5	A	6	A	7	A	8	A
UVNO		UVNO		UVNO		UVNO		UVNO		UVNO		UVNO		UVNO	
	+A		+A		+A		+A		+A		+A		+A		+A
9	B	10	B	11	B	12	A	13	B	14	B	15	B	16	B
MESA		MESA		MESA		RELAY STATUS	D	SPARE		VAE		VAE		VAE	
	+A		+A		+A		D		+A		D		D		D
17	B	18	B	19	B	20	B	21	B	22	B	23	B	24	A
VAE		VAE		VAE		VAE		VAE		VAE		VAE		VAE	
	+A		+A		+A		+A		+A		+A		+A		+A
25	B	26	B	27	B	28	B	29	B	30	B	31	B	32	A
RPA		RPA		RPA		LEE		LEE		LEE		LEE		NACE	
	+A		+A		+A		D		D		D		D		+A
33	A	34	A	35	A	36	A	37	A	38	A	39	A	40	A
NACE		NACE		NACE		NACE		NACE		NACE		NACE		NACE	
	+A		+A		+A		+A		+A		+A		+A		+A
41	A	42	A	43	A	44	A	45	A	46	A	47	A	48	A
OSS		OSS		OSS		OSS		OSS		OSS		NACE		NACE	
	+A		+A		+A		+A		+A		+A		D		+A
49	A	50	A	51	A	52	A	53	A	54	A	55	A	56	B
OSS		OSS		OSS		OSS		OSS		OSS		PES		SPARE	
	+A		+A		+A		+A		+A		+A		D		D
57	B	58	B	59	B	60	B	61	B	62	B	63	B	64	B
LEE		LEE		LEE		LEE		LEE		RELAY STATUS		NATE		RPA	
	+A		+A		+A		+A		+A		D		D		D
65	A	66	A	67	A	68	A	69	A	70	A	71	B	72	B
CEP		CEP		CEP		CEP		CEP		CEP		NATE		NATE	
	+A		+A		+A		+A		+A		+A		+A		+A
73	B	74	B	75	B	76	B	77	B	78	B	79	B	80	B
NATE		NATE		NATE		NATE		NATE		NATE		NATE		NATE	
	+A		+A		+A		+A		+A		+A		+A		+A
81	B	82	B	83	B	84	B	85	B	86	B	87	B	88	B
MIMS		MIMS		MIMS		MIMS		MIMS		MIMS		MIMS		MIMS	
	+A		+A		+A		+A		+A		+A		+A		+A
89	B	90	B	91	A	92	A	93	A	94	A	95	A	96	A
MIMS		RELAY STATUS		PES		PES		PES		PES		PES		PES	
	+A		D		+A		+A		+A		+A		+A		+A
97	B	98	B	99	B	100	B	101	B	102	B	103	B	104	B
ESUM		ESUM		ESUM		ESUM		ESUM		ESUM		ESUM		ESUM	
	+A		+A		+A		+A		+A		+A		+A		+A
105	B	106	B	107	B	108	B	109	A	110	A	111	A	112	A
ESUM		RELAY STATUS		NATE		NATE		NACE		NACE		NACE		NACE	
	+A		D		D		D		D		D		D		D
113	B	114	B	115	B	116	B	117	B	118	B	119	A	120	B
EUVS		EUVS		EUVS		EUVS		SPARE		SPARE		PES		SPARE	
	+A		+A		+A		+A		D		D		D		D
121	B	122	B	123	B	124	B	125	B	126	B	127	B	128	B
SPARE		SPARE		SPARE		SPARE		SPARE		SPARE		NATE		RPA	
	+A		+A		+A		+A		+A		+A		D		D

March 8, 1972

Revised 17 Aug. '72

APPENDIX D

ATMOSPHERE EXPLORER TELEMETRY

MAIN FRAME FORMAT

AE-E SATELLITE

1 SYNC A	2 SYNC A	3 SYNC D	4 COMD	5 STAT	6 RPA A	7 SPARE	8 SPARE
9 CEP A	10 BIMS A	11 EUVS D	12 EUVS D	13 EUVS D	14 EUVS D	15 RPA A	16 BIMS A
17 S/C	18 S/C	19 SPARE	20 EUVS A	21 NACE D	22 NACE D	23 BIMS A	24 RPA A
25 CEP A	26 SPARE	27 NATE D	28 NATE D	29 SPARE	30 NATE D	31 NATE D	32 RPA A
33 RPA A	34 ESUM D	35 ESUM D	36 BIMS A	37 SUBCOM COUNTER	38 PES D	39 PES D	40 PES D
41 CEP A	42 RPA A	43 SPARE	44 SPARE	45 SPARE	46 VAE D	47 VAE D	48 VAE D
49 BIMS A	50 SPARE	51 RPA A	52 RPA A	53 NACE D	54 NACE D	55 ESUM A	56 BIMS D
57 CEP A	58 SPARE	59 NATE D	60 NATE D	61 RPA A	62 BIMS A	63 OSS D	64 OSS D
65 SUBCOM	66 SUBCOM	67 SUBCOM	68 SUBCOM	69 PSA D	70 RPA A	71 RPA D	72 SPARE
73 CEP A	74 SPARE	75 BIMS A	76 OSS D	77 OSS D	78 OSS D	79 RPA A	80 BIMS D
81 S/C	82 S/C	83 SPARE	84 SPARE	85 NACE D	86 NACE D	87 BIMS A	88 RPA A
89 CEP A	90 SPARE	91 NATE D	92 NATE D	93 SPARE	94 SPARE	95 NACE A	96 RPA A
97 RPA A	98 ESUM D	99 ESUM D	100 BIMS A	101 PSB A	102 PES D	103 PES D	104 PES D
105 CEP A	106 RPA A	107 SPARE A	108 SPARE A	109 SPARE A	110 VAE D	111 VAE D	112 VAE D
113 BIMS A	114 SPARE	115 RPA A	116 NACE D	117 NACE D	118 NACE D	119 MESA D	120 MESA D
121 CEP A	122 SPARE	123 NATE D	124 NATE D	125 RPA A	126 BIMS A	127 SPARE A	128 SPARE

ATMOSPHERE EXPLORER

8 Second Subcom Format

AE-E Satellite

1	A	2	A	3	A	4	A	5	A	6	A	7	A	8	A
SPARE		SPARE		SPARE		SPARE		SPARE		SPARE		SPARE		SPARE	
	+A		+A		+A		+A		+A		+A		+A		+A
9	B	10	B	11	B	12	A	13	B	14	B	15	B	16	B
MESA		MESA		MESA		RELAY STATUS	D	BIMS		VAE		VAE		VAE	
	+A		+A		+A		D		+A		D		D		D
17	B	18	B	19	B	20	B	21	B	22	B	23	B	24	B
VAE		VAE		VAE		VAE		VAE		VAE		VAE		VAE	
	+A		+A		+A		+A		+A		+A		+A		+A
25	B	26	B	27	B	28	B	29	B	30	B	31	B	32	A
RPA		RPA		RPA		SPARE		SPARE		SPARE		SPARE		NACE	
	+A		+A		+A		D		D		D		D		+A
33	A	34	A	35	A	36	A	37	A	38	A	39	A	40	A
NACE		NACE		NACE		NACE		NACE		NACE		NACE		NACE	
	+A		+A		+A		+A		+A		+A		+A		+A
41	A	42	A	43	A	44	A	45	A	46	A	47	A	48	A
OSS		OSS		OSS		OSS		OSS		OSS		NACE		NACE	
	+A		+A		+A		+A		+A		+A		D		+A
49	A	50	A	51	A	52	A	53	A	54	A	55	A	56	B
OSS		OSS		OSS		OSS		OSS		OSS		PES		BIMS	
	+A		+A		+A		+A		+A		+A		D		D
57	B	58	B	59	B	60	B	61	B	62	B	63	B	64	B
SPARE		SPARE		SPARE		SPARE		SPARE		RELAY STATUS		NATE		RPA	
	+A		+A		+A		+A		+A		D		D		D
65	A	66	A	67	A	68	A	69	A	70	A	71	B	72	B
CEP		CEP		CEP		CEP		CEP		CEP		NATE		NATE	
	+A		+A		+A		+A		+A		+A		+A		+A
73	B	74	B	75	B	76	B	77	B	78	B	79	B	80	B
NATE		NATE		NATE		NATE		NATE		NATE		NATE		NATE	
	+A		+A		+A		+A		+A		+A		+A		+A
81	B	82	B	83	B	84	B	85	B	86	B	87	B	88	B
SPARE		SPARE		SPARE		SPARE		SPARE		SPARE		SPARE		SPARE	
	+A		+A		+A		+A		+A		+A		+A		+A
89	B	90	B	91	A	92	A	93	A	94	A	95	A	96	A
SPARE		RELAY STATUS		PES		PES		PES		PES		PES		PES	
	+A		D		+A		+A		+A		+A		+A		+A
97	B	98	B	99	B	100	B	101	B	102	B	103	B	104	B
ESUM		ESUM		ESUM		ESUM		ESUM		ESUM		ESUM		ESUM	
	+A		+A		+A		+A		+A		+A		+A		+A
105	B	106	B	107	B	108	B	109	A	110	A	111	A	112	A
ESUM		RELAY STATUS		NATE		NATE		NACE		NACE		NACE		NACE	
	+A		D		D		D		D		D		D		D
113	B	114	B	115	B	116	B	117	B	118	B	119	A	120	B
EUVS		EUVS		EUVS		EUVS		BIMS		BIMS		PES		BIMS	
	+A		+A		+A		+A		D		D		D		D
121	B	122	B	123	B	124	B	125	B	126	B	127	B	128	B
BIMS		BIMS		BIMS		BIMS		BIMS		BIMS		NATE		RPA	
	+A		+A		+A		+A		+A		+A		D		D

W/O #	1	2	3	4	5	6	7	8
22	REG 1 I=ON	REG 2 I=ON	PES POWER I=ON	PSB I=ON	PSB I=ON	PSB I=ON	PSB I=ON	UVMO POWER I=ON
23	CEP I=ON	CEP I=ON	CEP I=ON	CEP I=ON	CEP I=ON	CEP I=ON	CEP I=ON	DIAT POWER I=ON
24	MAGE I=ON	MAGE I=ON	MAGE I=ON	MAGE I=ON	MAGE I=ON	MAGE I=ON	MAGE I=ON	REC-2 I=ON
25	MATE I=ON	MATE I=ON	MATE I=ON	MATE I=ON	MATE I=ON	MATE I=ON	MATE I=ON	EUVS I=ON
26	SAS I=ON	SAS I=ON	SAS I=ON	SAS I=ON	SAS I=ON	SAS I=ON	SAS I=ON	MIR PWR I=ON
27	RPA I=ON	RPA I=ON	RPA I=ON	RPA I=ON	RPA I=ON	RPA I=ON	RPA I=ON	PROG I=ON
28	MESA I=ON	MESA I=ON	MESA I=ON	MESA I=ON	MESA I=ON	MESA I=ON	MESA I=ON	LEE POWER I=ON
29	OPPS I=ON	OPPS I=ON	OPPS I=ON	OPPS I=ON	OPPS I=ON	OPPS I=ON	OPPS I=ON	TANK I=ON
30	TR #1 I=ON	TR #1 I=ON	TR #1 I=ON	TR #1 I=ON	TR #1 I=ON	TR #1 I=ON	TR #1 I=ON	VALVE #6 I=ON
31	TR #1 I=ON	TR #1 I=ON	TR #1 I=ON	TR #1 I=ON	TR #1 I=ON	TR #1 I=ON	TR #1 I=ON	VALVE #5 I=ON
32	TR #1 I=ON	TR #1 I=ON	TR #1 I=ON	TR #1 I=ON	TR #1 I=ON	TR #1 I=ON	TR #1 I=ON	VALVE #4 I=ON
33	TR #1 I=ON	TR #1 I=ON	TR #1 I=ON	TR #1 I=ON	TR #1 I=ON	TR #1 I=ON	TR #1 I=ON	VALVE #3 I=ON
34	TR #1 I=ON	TR #1 I=ON	TR #1 I=ON	TR #1 I=ON	TR #1 I=ON	TR #1 I=ON	TR #1 I=ON	VALVE #2 I=ON
35	TR #1 I=ON	TR #1 I=ON	TR #1 I=ON	TR #1 I=ON	TR #1 I=ON	TR #1 I=ON	TR #1 I=ON	VALVE #1 I=ON
36	TR #1 I=ON	TR #1 I=ON	TR #1 I=ON	TR #1 I=ON	TR #1 I=ON	TR #1 I=ON	TR #1 I=ON	VALVE #0 I=ON

HEX	DEC
A	10
B	11
C	12
D	13
E	14
F	15

AE-C FLAGS

2/1/73

SHEET 1 OF 1

DSAI DATA CODE VS. SUN ANGLE

Bit Number (of read-out)											
234----->											
5	6	7	8	000	001	010	011	100	101	110	111
0	0	0	0	.5	31.5	63.5	32.5			64.5	
0	0	0	1	1.5	30.5	62.5	33.5			65.5	
0	0	1	0	3.5	28.5	60.5	35.5			67.5	
0	0	1	1	2.5	29.5	61.5	34.5			66.5	
0	1	0	0	7.5	24.5	56.5	39.5			71.5	88.5
0	1	0	1	6.5	25.5	57.5	38.5			70.5	89.5
0	1	1	0	4.5	27.5	59.5	36.5			68.5	
0	1	1	1	5.5	26.5	58.5	37.5			69.5	
1	0	0	0	15.5	16.5	48.5	47.5			79.5	80.5
1	0	0	1	14.5	17.5	49.5	46.5			78.5	81.5
1	0	1	0	12.5	19.5	51.5	44.5			76.5	83.5
1	0	1	1	13.5	18.5	50.5	45.5			77.5	82.5
1	1	0	0	8.5	23.5	55.5	40.5			72.5	87.5
1	1	0	1	9.5	22.5	54.5	41.5			73.5	86.5
1	1	1	0	11.5	20.5	52.5	43.5			75.5	84.5
1	1	1	1	10.5	21.5	53.5	42.5			74.5	85.5

↑
 Angle in degrees $\pm .5^\circ$
 from spacecraft X-Y
 plane

For the sun in -Z hemisphere, bit l=1 and angles above as shown.
 For the sun in +Z hemisphere, bit l=0 and angles above negated.
 Post-interrogate pattern: 1 0 1 0 1 0 1 0

SECTION 8.0



TEMPERATURE TELEMETRY

The following table and figures identify the spacecraft temperature telemetry points. Note that the items appearing without an accompanying telemetry word number were used for external instrumentation during the AE-C Thermal Balance Test and are not available in the spacecraft 8 second SUBCOM.

TABLE II
TELEMETRY TEMPERATURE SENSORS

NO.	LOCATION	TELEMETRY WORD NO.	PART NO.
1	ATC Housing QUAD 1	66,26	2274189-501
2	ATC Housing QUAD 2	66,27	2274189-501
3	ATC Housing QUAD 3	66,28	2274189-501
4	ATC Housing QUAD 4	66,29	2274189-501
5	Upper Hat - Top QUAD 1 Ext	66,55	2270700-502
6	Upper Hat - Top QUAD 2 Ext	66,16	2270700-502
7	Upper Hat - Top QUAD 4 Ext	66,17	2270700-502
8	Upper Hat Panel 9 Int	66,15	2270700-502
9	Upper Hat Panel 16 Int	66,1	2270700-501
10	Lower Hat Panel 1 Int	66,14	2270700-501
11	Lower Hat Panel 4 Int	66,3	2270700-501
12	Lower Hat Panel 9 Int	66,13	2270700-502
13	Lower Hat Panel 9 Int	66,56	2270700-503
14	Lower Hat Bottom +X Int	66,2	2270700-501
15	Lower Hat Bottom +X Int	66,4	2270700-501
16	Lower Hat Bottom -X Int	66,5	2270700-502
17	Upper Baseplate QUAD 1	66,18	1964402-501
18	Upper Baseplate QUAD 2	66,19	1964402-501
19	Upper Baseplate QUAD 3	66,21	1964402-501
20	Upper Baseplate QUAD 4	66,20	1964402-501
21	PSA Electronics Box		
22	NACE Electronics Box		

8-2

Size
A

Code Ident No.
49671

TP-TV-2271596

Sheet 62

TABLE II
TELEMETRY TEMPERATURE SENSORS

NO.	LOCATION	TELEMETRY WORD NO.	PART NO.
23	NACE Experiment		
24	OSS Experiment		
25	OSS Experiment Sensor		
26	PES-1 Experiment		
27	Battery 1	66,10	
28	SBT1 Output Stage	66,48	
29	SBT2 Output Stage	66,49	
30	SBT1 Conv	66,52	
31	UVNO Experiment		
32	UVNO Experiment		
33	Battery 2	66,11	
34	PES-2 Experiment		
35	Battery 3	66,12	
36	PSE Heat Sink	66,120	
37	CEP Electronics		
38	Δ V Thruster 1 Valve	66,30	
39	Δ V Thruster 2 Valve	66,31	
40	YAW Thruster Valve	66,32	
41	OAPS Bay 2 Plumbing	66,33	1964402-501
42	OAPS Bay 5 Plumbing	66,34	1964402-501
43	OAPS Bay 6 Plumbing	66,35	1964402-501
44	OAPS Bay Tank 1	66,36	1964402-501

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Size

A

Code Ident No.

49671

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TABLE II

TELEMETRY TEMPERATURE SENSORS

NO.	LOCATION	TELEMETRY WORD NO.	PART NO.
45	OAPS Bay Tank 2	66,37	1964402-501
46	OAPS Bay Tank 5	66,38	1964402-501
47	OAPS Bay Tank 6	66,39	1964402-501
48	Lower Baseplate QUAD 1	66,22	1964402-501
49	Lower Baseplate QUAD 2	66,23	1964402-501
50	Lower Baseplate QUAD 3	66,24	1964402-501
51	Lower Baseplate QUAD 4	66,25	1964402-501
52	NATE Electronics		
53	RPA-1 Experiment		
54	RPA-1 Experiment		
55	BIMS Experiment		
56	NATE Experiment		
57	RPA-3 Experiment		
58	VAE Electronics		
59	VAE Experiment		
60	Tape Recorder #1	66,81	
61	Tape Recorder #2	66,82	
62	RPA-2 Experiment		
63	ESUM Experiment		
64	ESUM Experiment		
65	ESUM Experiment		
66	ESUM Experiment		

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Size A	Code Ident No. 49671	TP-TV-2271596
		Sheet 64



TABLE II
TELEMETRY TEMPERATURE SENSORS

NO.	LOCATION	TELEMETRY WORD NO.	PART NO.
67	MIMS Experiment		
68	MESA Experiment		
69	MESA Experiment		
70	MESA Experiment		
71	MWA Bearing		
72	SPS Azimuth Bearing	66,80	
73	SBT2 Conv	66,53	

8-5

Size

A

Code Ident No.

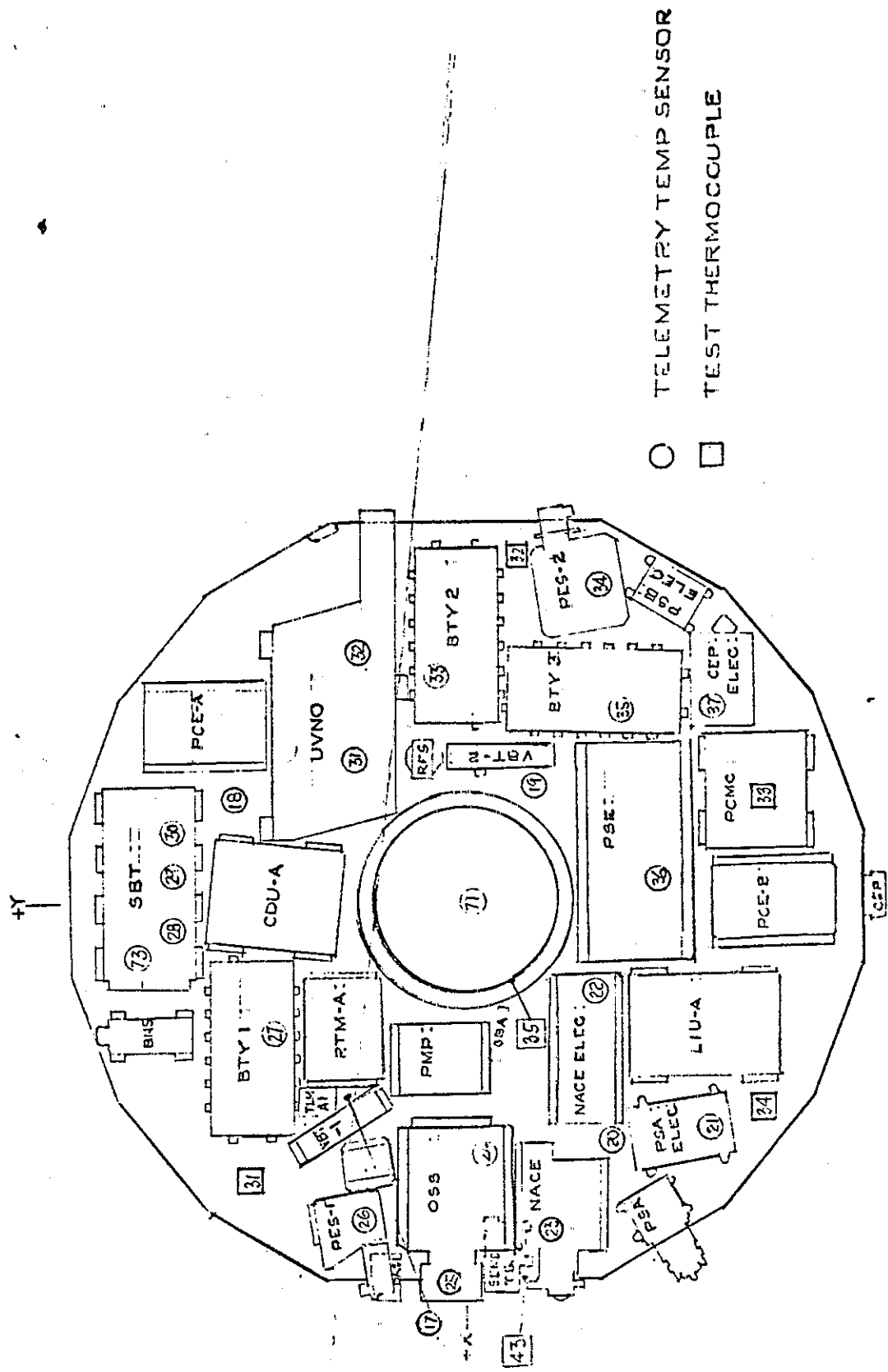
49671

TP-TV-2271596

Sheet 65

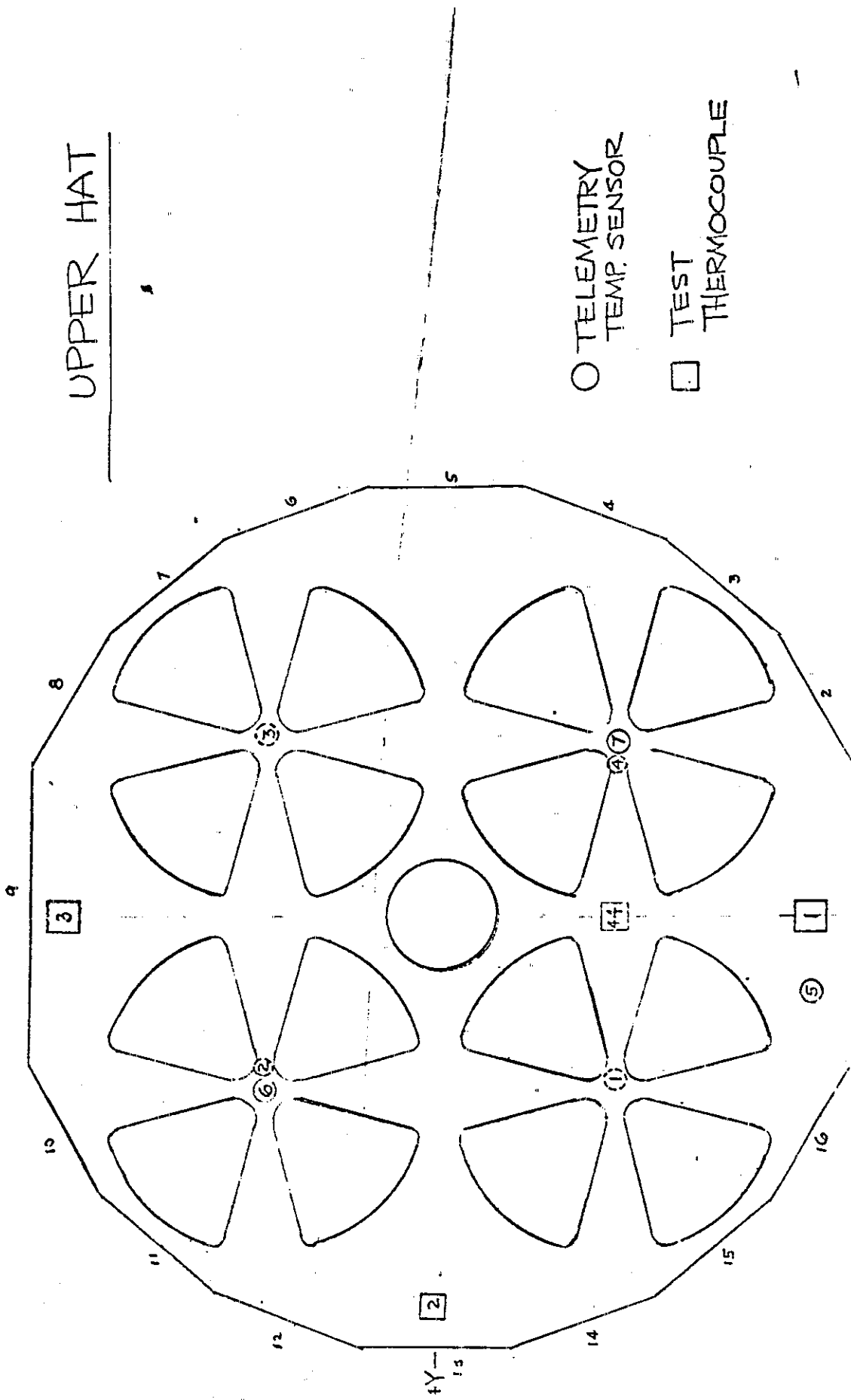
LOCATION OF TELEMETRY TEST SENSORS AND TEST THERMOCOUPLES ON UPPER BASEPLATE

UPPER BASEPLATE



○ TELEMETRY TEMP SENSOR
□ TEST THERMOCOUPLE

LOCATION OF TELEMETRY TEST SENSORS AND TEST
THERMOCOUPLES ON UPPER HAT



UPPER HAT

○ TELEMETRY
TEMP. SENSOR

□ TEST
THERMOCOUPLE

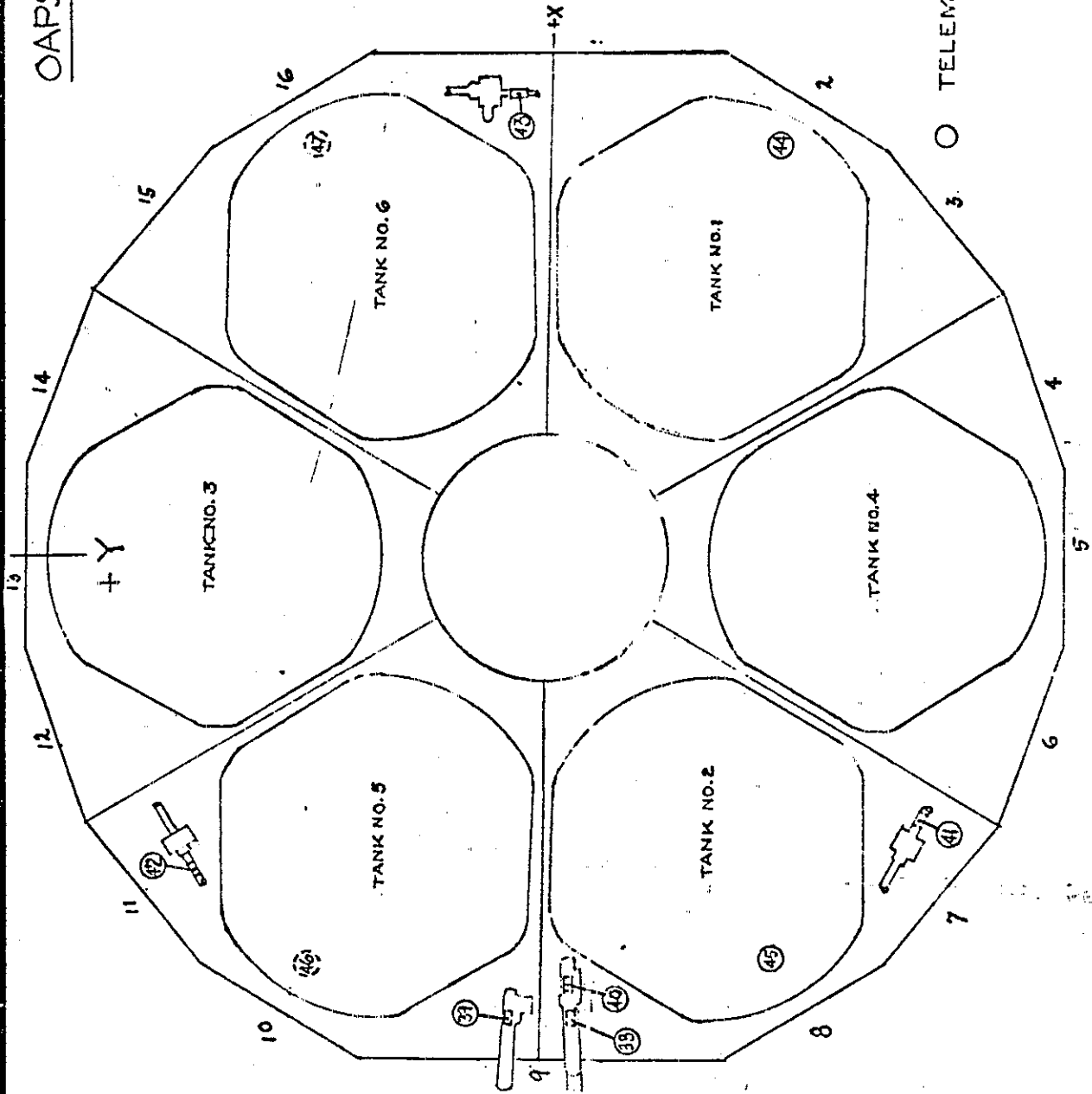
EXTERIOR VIEW



Astro Electronics

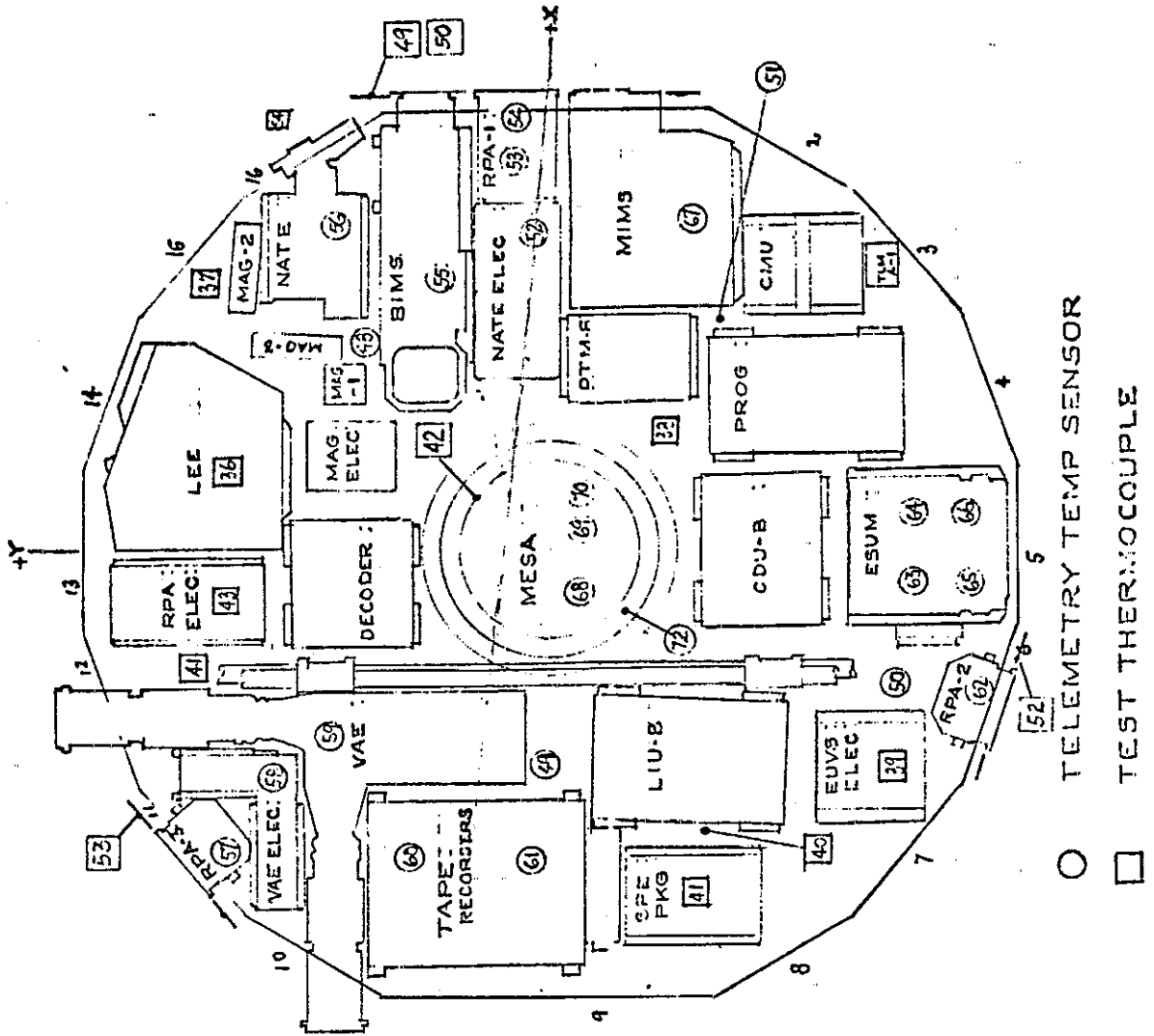
LOCATION OF TELEMETRY TEST SENSORS AND TEST THERMOCOUPLES ON OAPS SECTION

OAPS SECTION

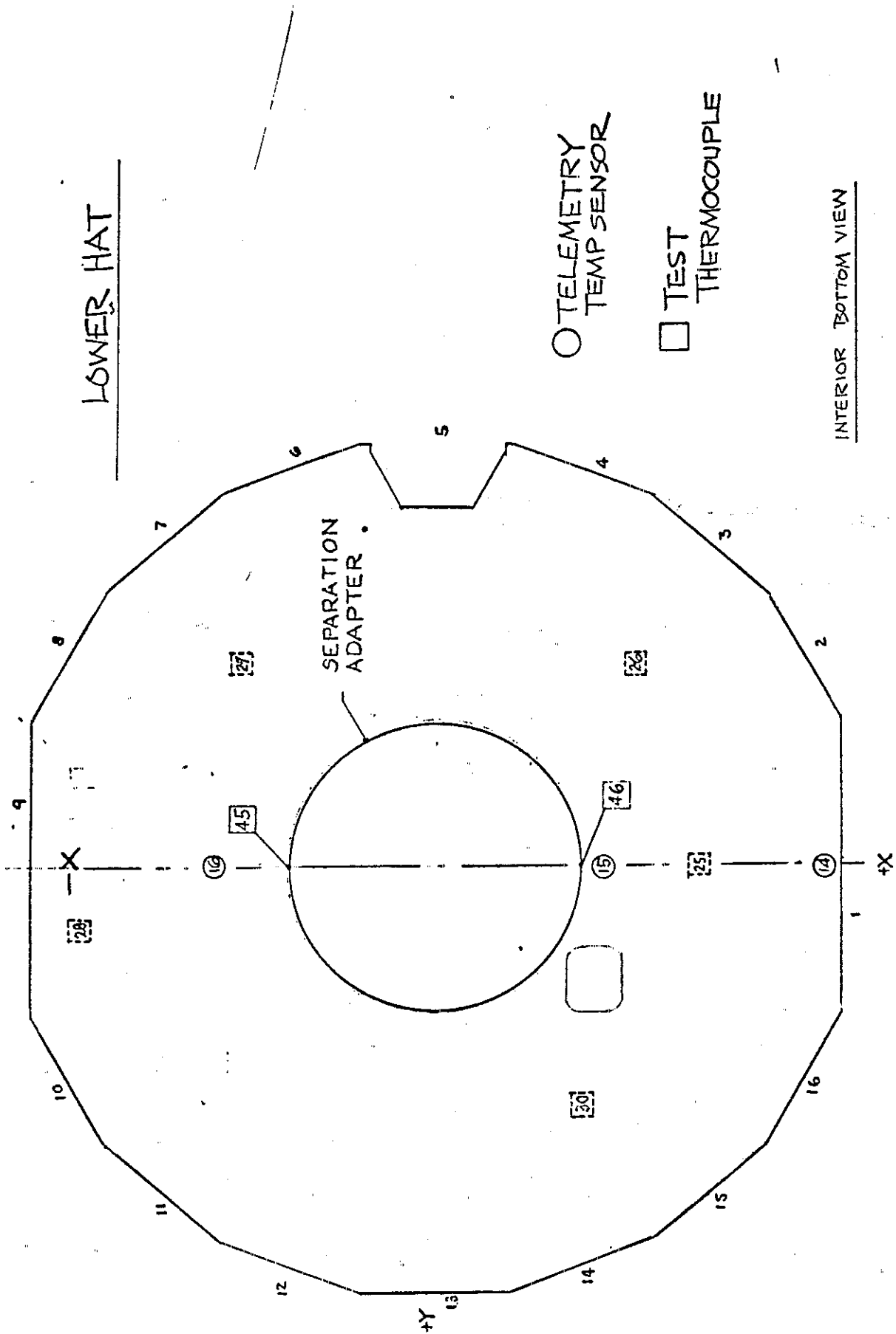


LOCATION OF TELEMETRY TEST SENSORS AND TEST THERMOCOUPLES ON LOWER BASEPLATE

LOWER BASEPLATE



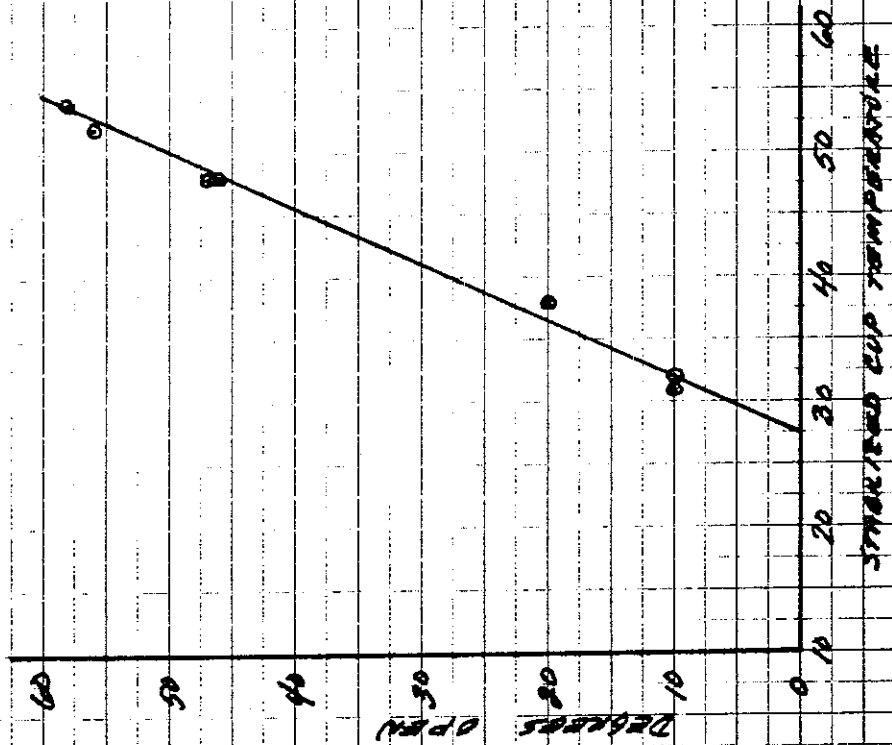
LOCATION OF TELEMETRY TEST SENSORS AND TEST THERMOCOUPLES ON LOWER HAT



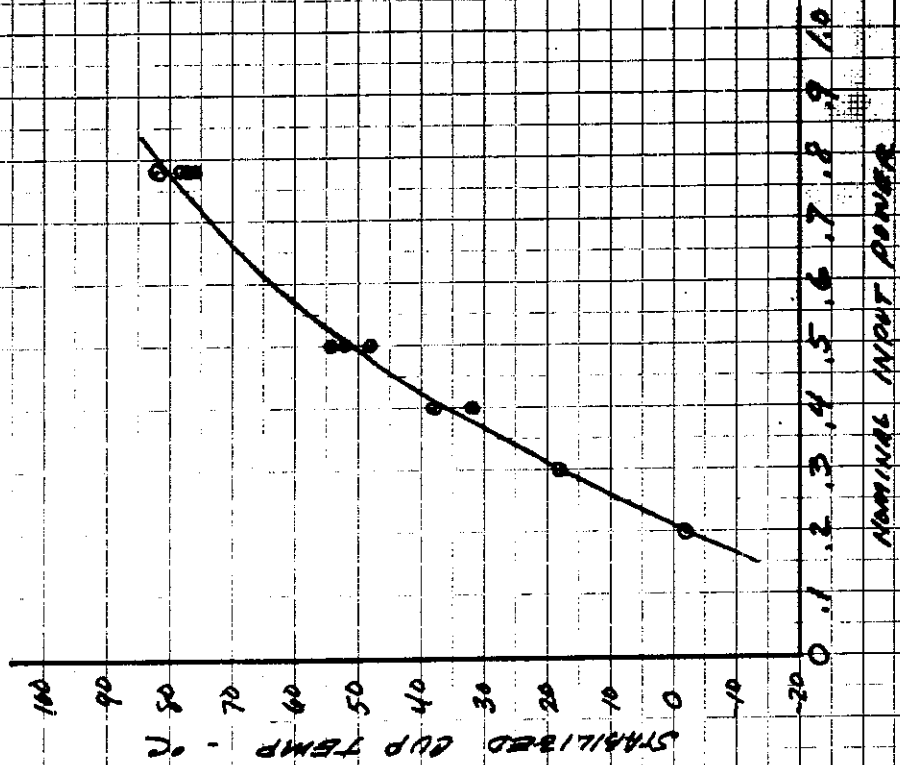
ATC SUMMARY

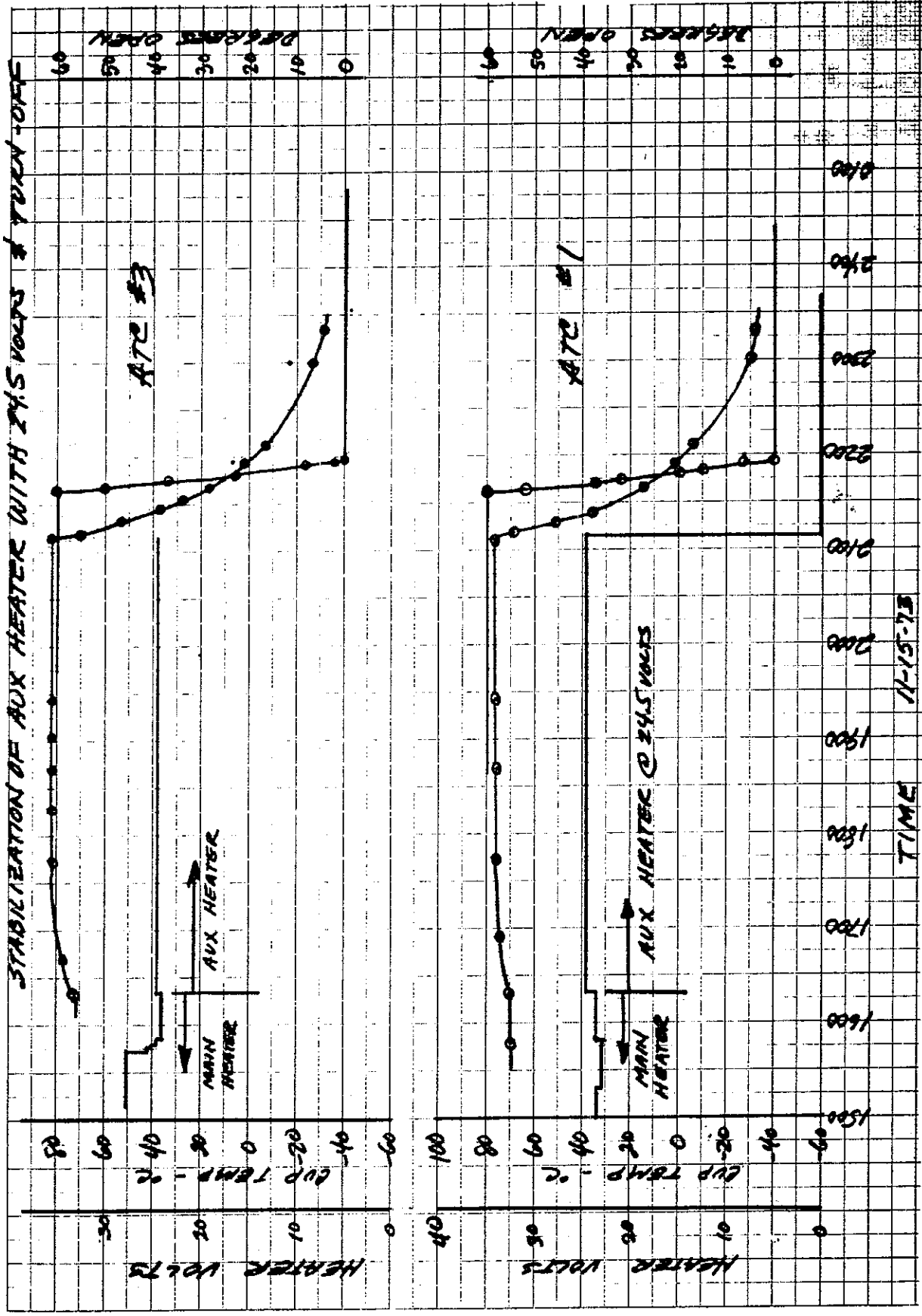
	ATC			
	1	2	3	4
Time to Reach 70 ^o C With 1.0 Watt (From -50 ^o C)	40 Min	42 Min	40	43 Min
Time to Reach 0 ^o From Stabilized 70 ^o No Power		42 Min		44 Min
Time to Reach 70 ^o C With 2.0 Watts (From -40 ^o C)		13 Min		13 Min
Stab Temp With 24.5 Volts on Aux	77 ^o C	76 ^o C	82 ^o C	78 ^o C
Time to Reach 70 ^o With 2.8 Watts (From -50 ^o)		7 Min		7 Min
Time to Reach 100 ^o With 2.8 Watts (From -50 ^o)		11 Min		11 Min
1 Watt at -50 ^o Time for Full Open	52 Min	57 Min	49 Min	55 Min
2 Watt at -40 ^o Time for Full Open		41 Min		36 Min
2.8 Watt at -50 ^o , Time for Full Open		28 Min		28 Min
Stab at 70 ^o , Time for Full Close From Pwr Off		40 Min		46 Min
Stab at 24.5 On Aux, Time for Full Close From Pwr Off	48 Min	43 Min	50 Min	49 Min
Nom Power to Maintain 70 ^o Cup Temp	0.72W	0.75W	0.72W	0.69W
Voltage Req'd to Maintain 70 ^o Cup Temp	23.5 V	24 V	23.5 V	23 V

NOMINAL OPERATION
STABILIZED CUP TEMP
VS POSITION

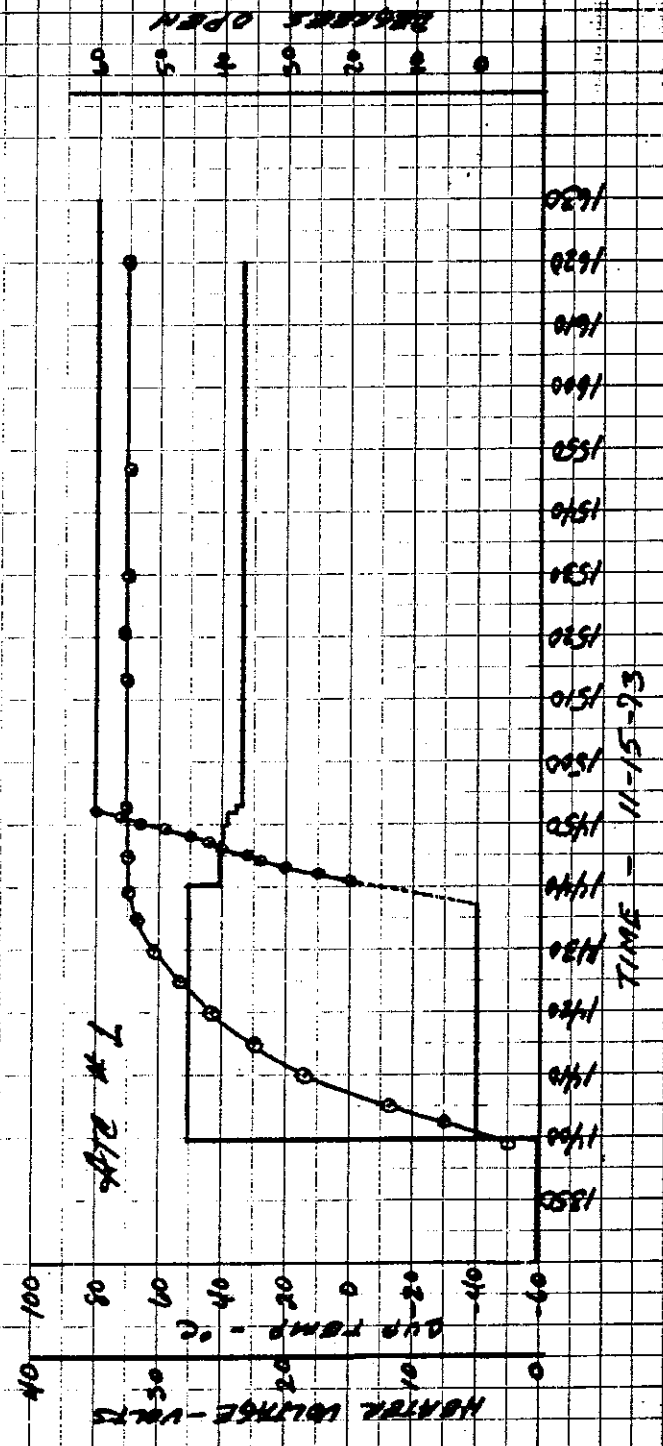
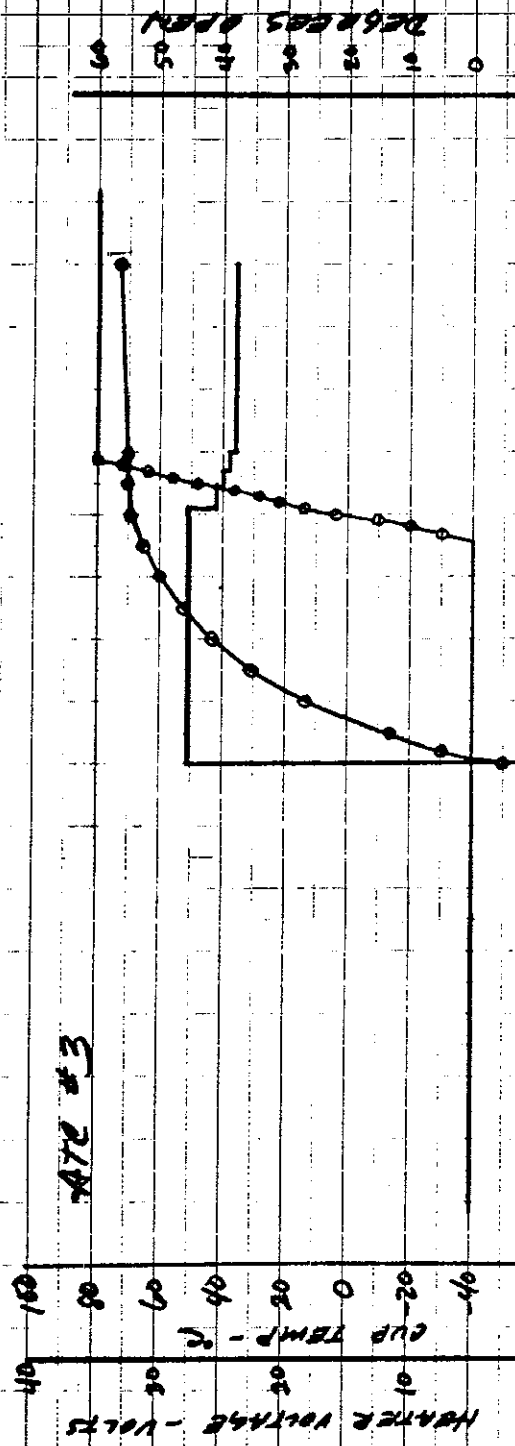


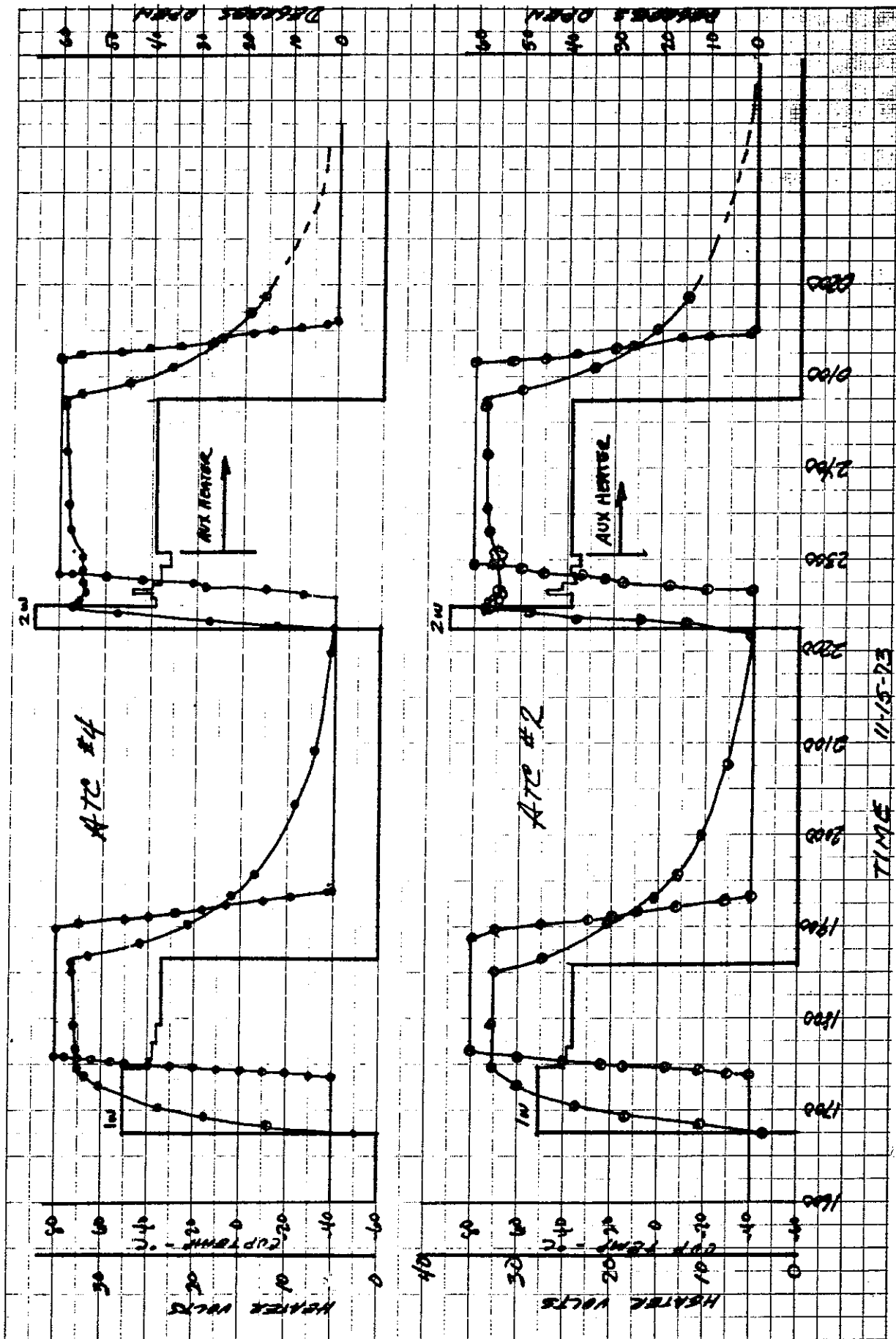
STABILIZED CUP
TEMPERATURE AS A
FUNCTION OF HEATER
POWER



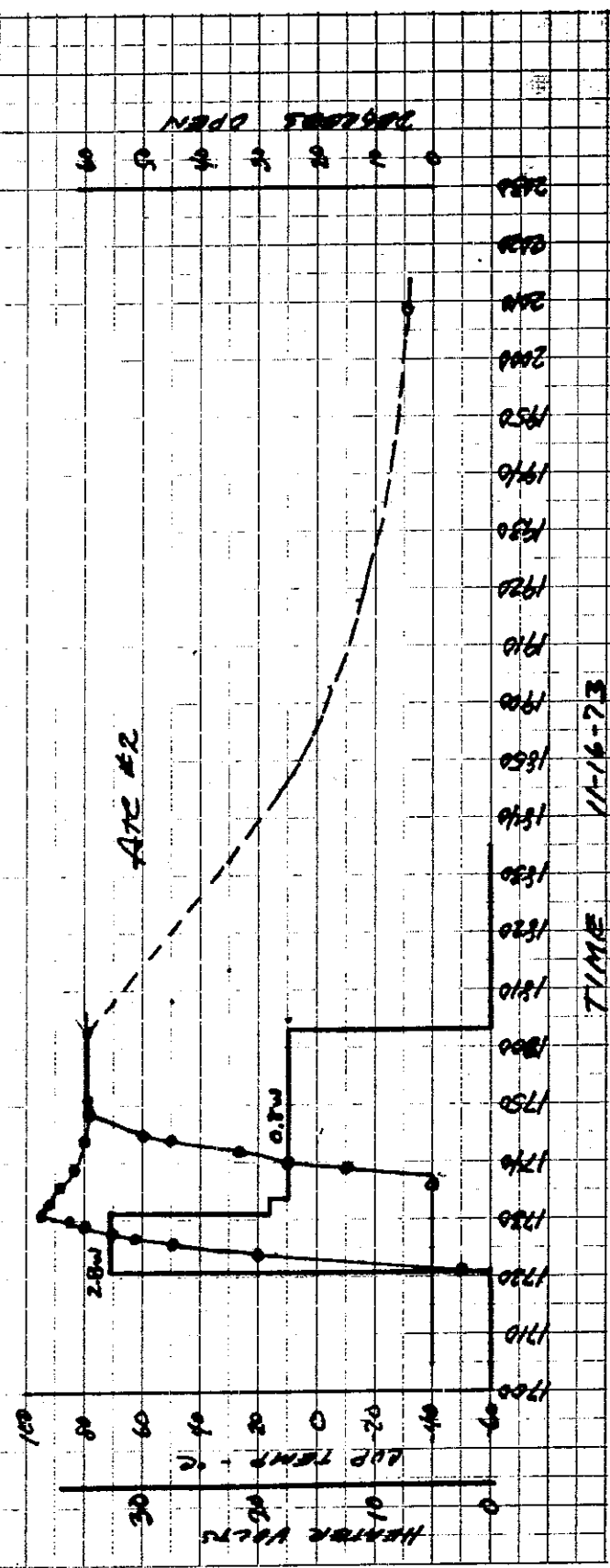
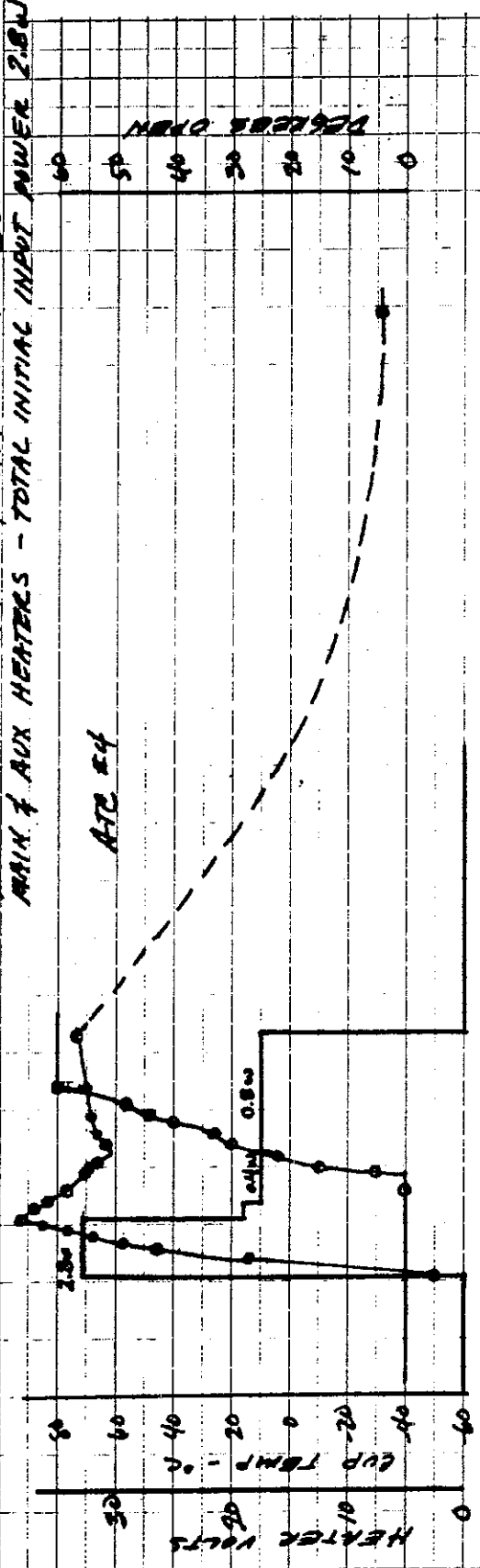


NOMINAL LIMIT
 OF POWER ON WINDING
 LIMITING TEMPER. TO
 70°C CUP TEMPER.



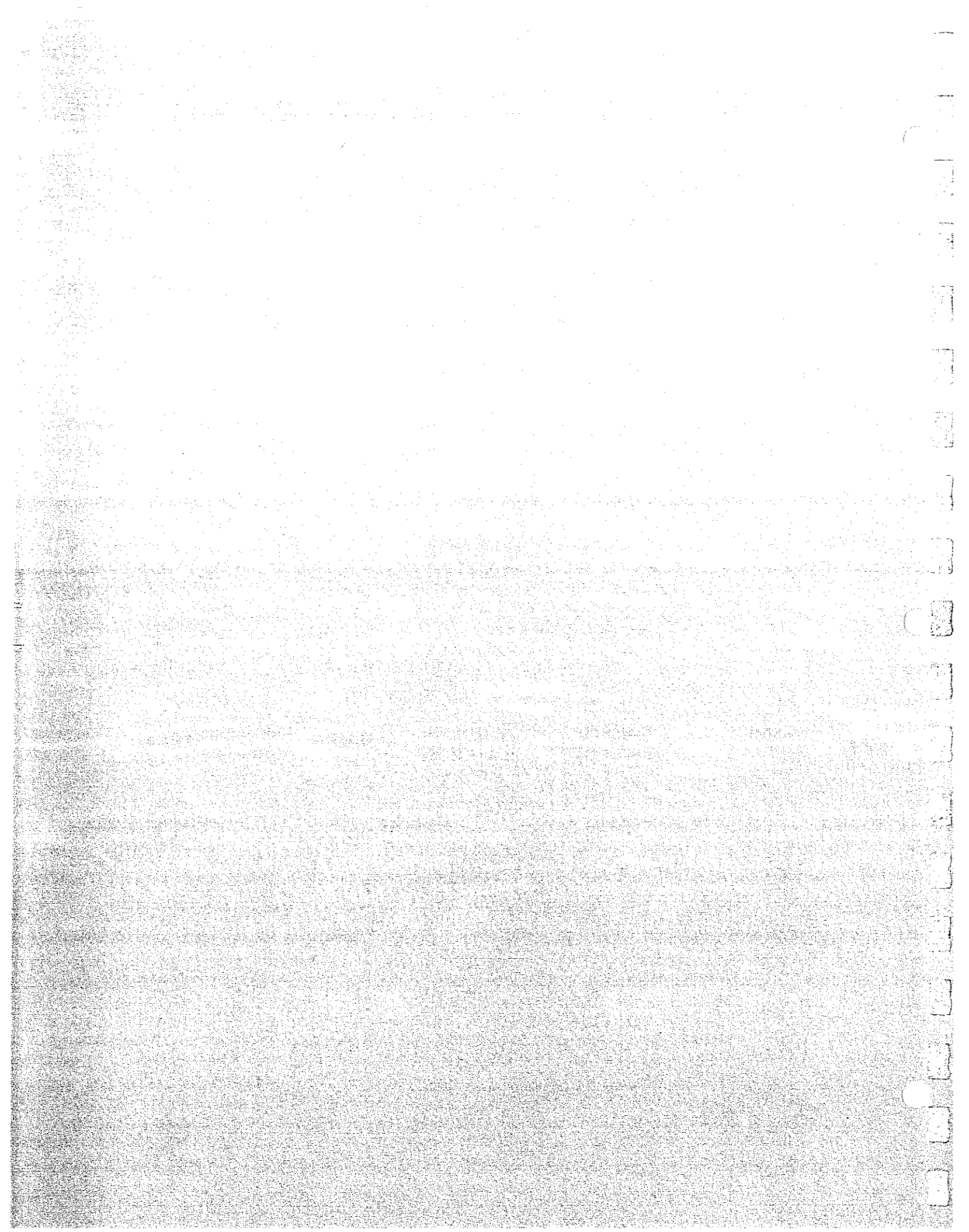


HEATER POWER INITIALLY APPLIED TO BOTH MAIN & AUX HEATERS - TOTAL INITIAL INPUT POWER 2.8W



TIME 11-16-73

SECTION 9.0



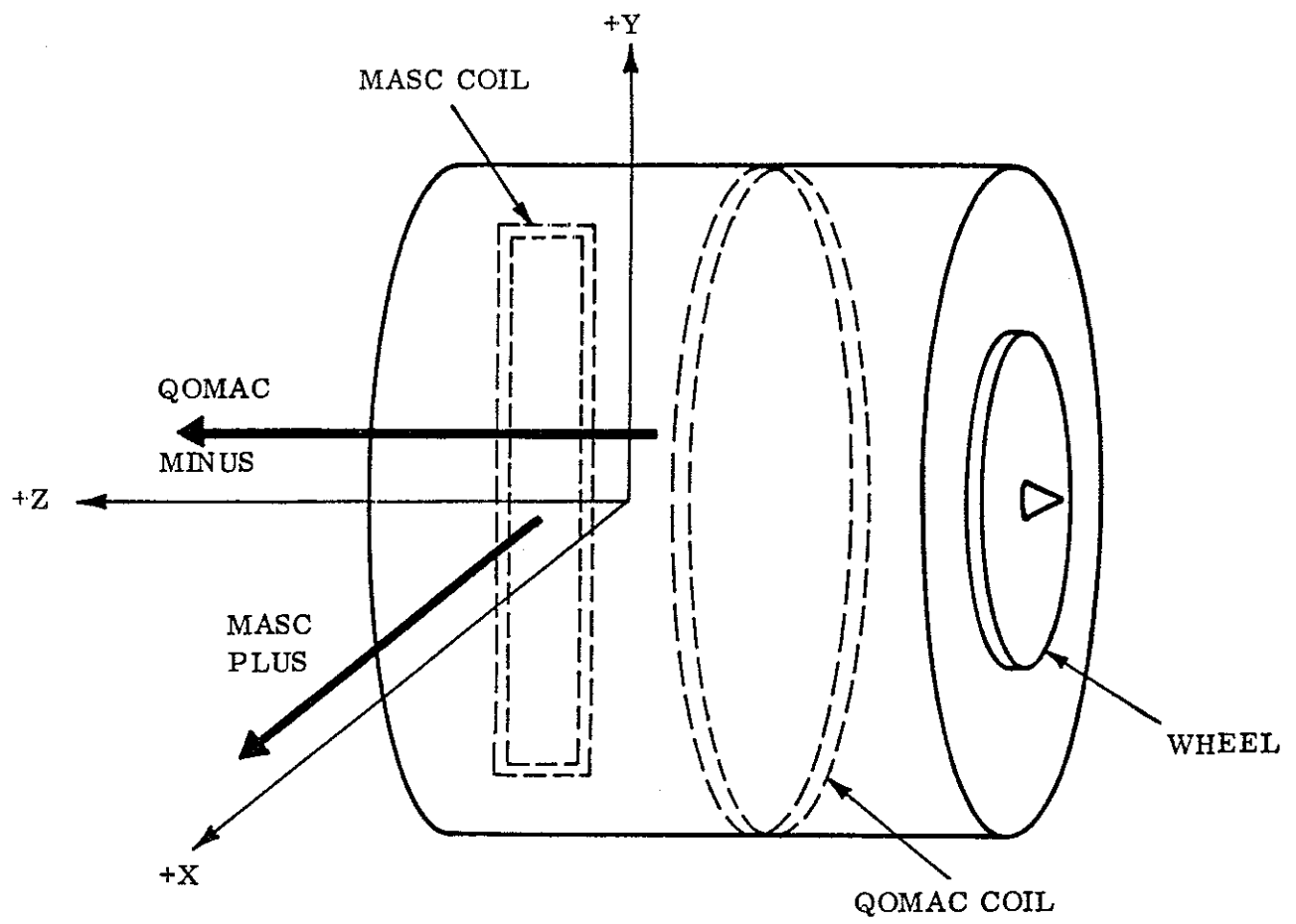


Figure 9-1. Attitude Coil Sense

SECTION 10.0

TABLE 3.1.1(a) - NP NADIRS

C MISSION

Spacecraft Function	Depends after the S/C Nadir that a Functional Nadir is to occur	
	YAW Orientations	
	0° Orientation	180° Orientation
HHMS Experiment	348°	168°
BPA-1 Experiment	357°	177°
UVNO Experiment	180°	180°
ESUM Experiment	360°	360°
CLP Experiment	360°	360°
YAW Experiment	240°	240°
AV 1+ (See Figure 1)	330°	150°
AV 2+ (See Figure 1)	30°	210°
AV 2- (See Figure 1)	210°	30°
AV 1- (See Figure 1)	150°	330°
YAW 3+ (See Figure 2)	60°	60°
YAW 4+ (See Figure 2)	120°	120°
YAW 3- (See Figure 2)	240°	240°
YAW 4- (See Figure 2)	300°	300°
MASC Nadir A	Programmed Value (0° - 360°)	Programmed Value (0° - 360°)
MASC Nadir B	180° After Pro- grammed Value	180° After Pro- grammed Value

FIGURE 3.1.12 (a) - OAPS AV CONFIGURATION

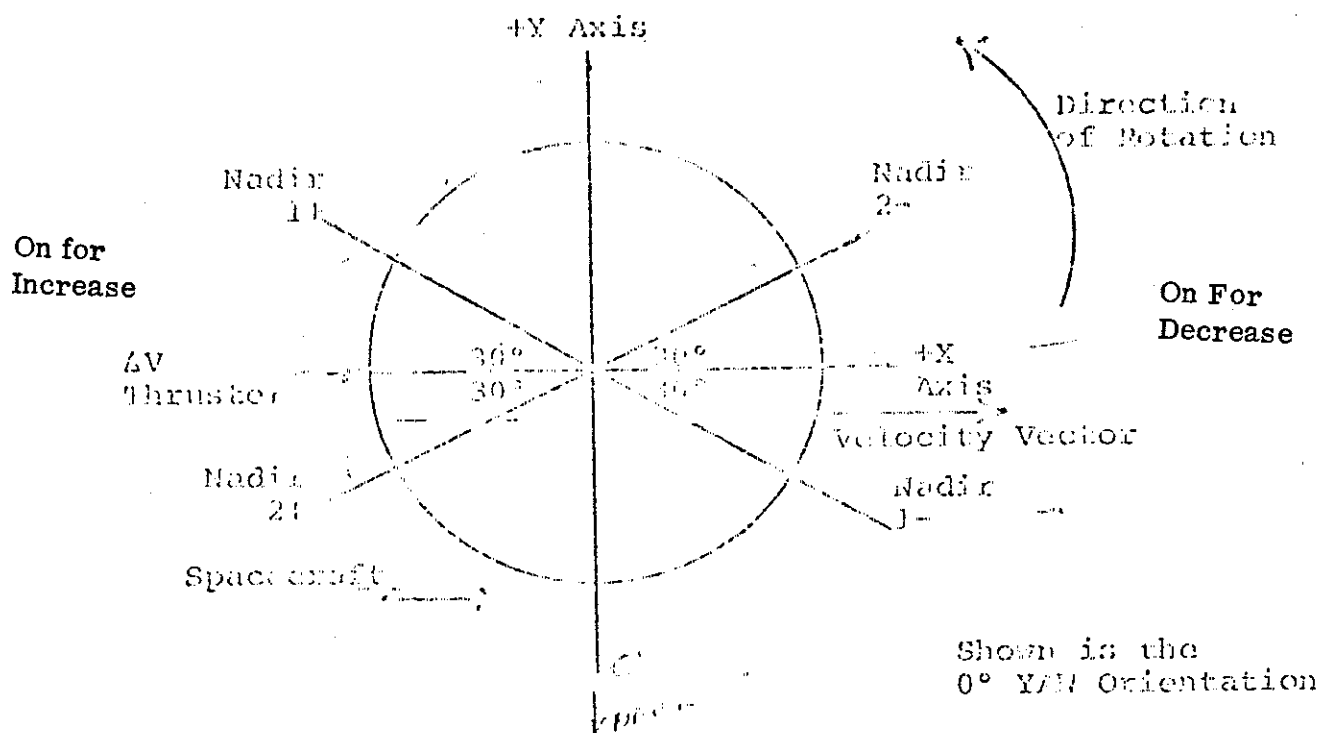
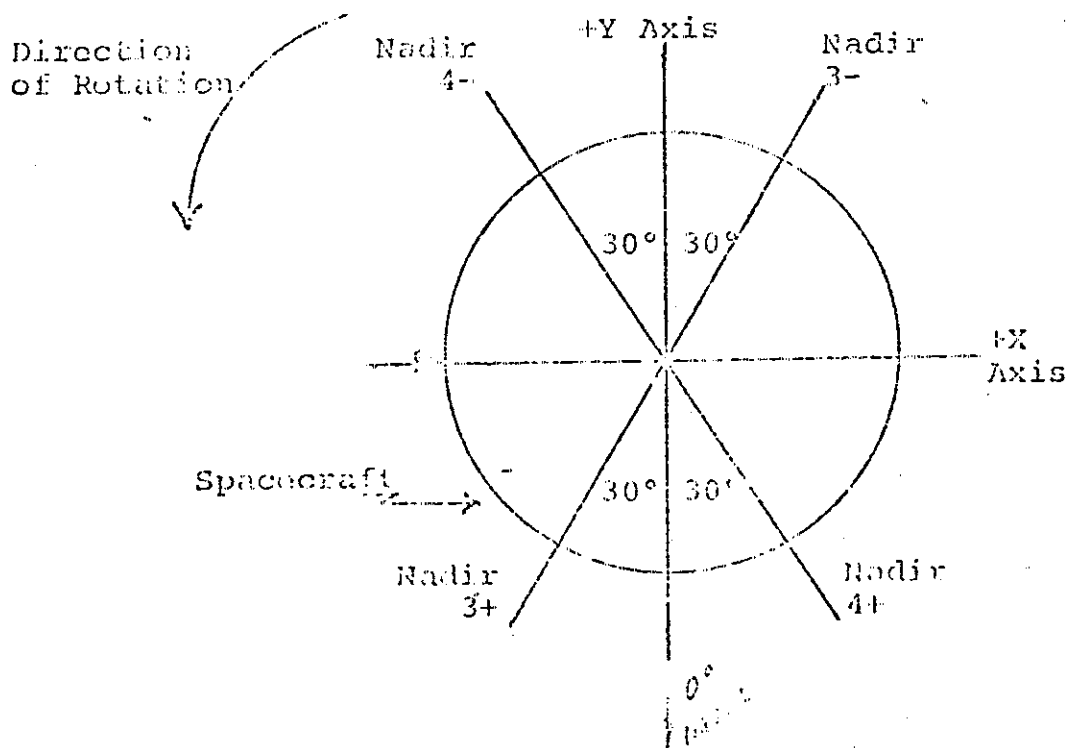


FIGURE 3.1.12 (b) - OAPS YAW CONFIGURATION



10-2

Size	Code Ident No.	
A	49671	
		Sheet

SECTION 11.0

RF SYSTEMS

AE-C has a complement of a Dual S-Band Transponder, two VHF transmitters, an RF switch for VHF, an S-band belt antenna and associated power splitter and a VHF whip antenna and associated cables. The Transponder is modulated by a Dual Premodulation Processor. Manufacturer and serial numbers of these units are given in the following tabulation.

Unit	Serial Number	Manufacturer
Transponder	01P	Motorola
VHF Transmitter #1	01P	RCA/Limited
VHF Transmitter #2	02	RCA/Limited
Belt Antenna		Ball Brothers Research Corp.
Power Splitter		Ball Brothers Research Corp.
RF Switch		RCA/AED
VHF Antenna		RCA/AED
PMP		Vector

A summary of key transponder parameters is presented in the table below.

Parameter	Side 1	Side 2
Receiver Frequency	2108.2479 ^{+0.0021} _{-0.0015} MHz	2108.2471 ^{+0.0019} _{-0.0014} MHz
Receiver Sensitivity	-113.9 ^{+2.7} _{-1.6} dBm	-113.7 ^{+2.9} _{-2.0} dBm
Ranging Delay*	1008.7 ^{+15.3} _{-13.8} ns	998.0 ^{+20.1} _{-20.8} ns
Transmitter Frequency		
AUX OSC	2289.4905 ^{+0.0035} _{-0.0045} MHz	2289.4862 ^{+0.0078} _{-0.0102} MHz
VCXO	2289.502 ^{+0.008} _{-0.012} MHz	2289.496 ^{+0.004} _{-0.006} MHz
Carrier Level		
Low Power Mode	+29.2 ^{+0.5} _{-1.0} dBm	+29.2 ± 1.2 dBm
High Power Mode	+35.8 ^{+0.9} _{-0.5} dBm	+36.2 ± 0.8 dBm
<u>Transmitter Mod Index</u>		
GRARR (Uplink Mod = 1 radian, 70kHz sinusoid)		
Sideband/ Carrier Level	-11.0 ⁺⁰ _{-0.2} dB	-11.4 ± 0.1 dB
PRN (Uplink Mod = 0.38 radian, 496kHz square wave)		
Sideband/ Carrier Level	-18.0 dB	-18.0 dB

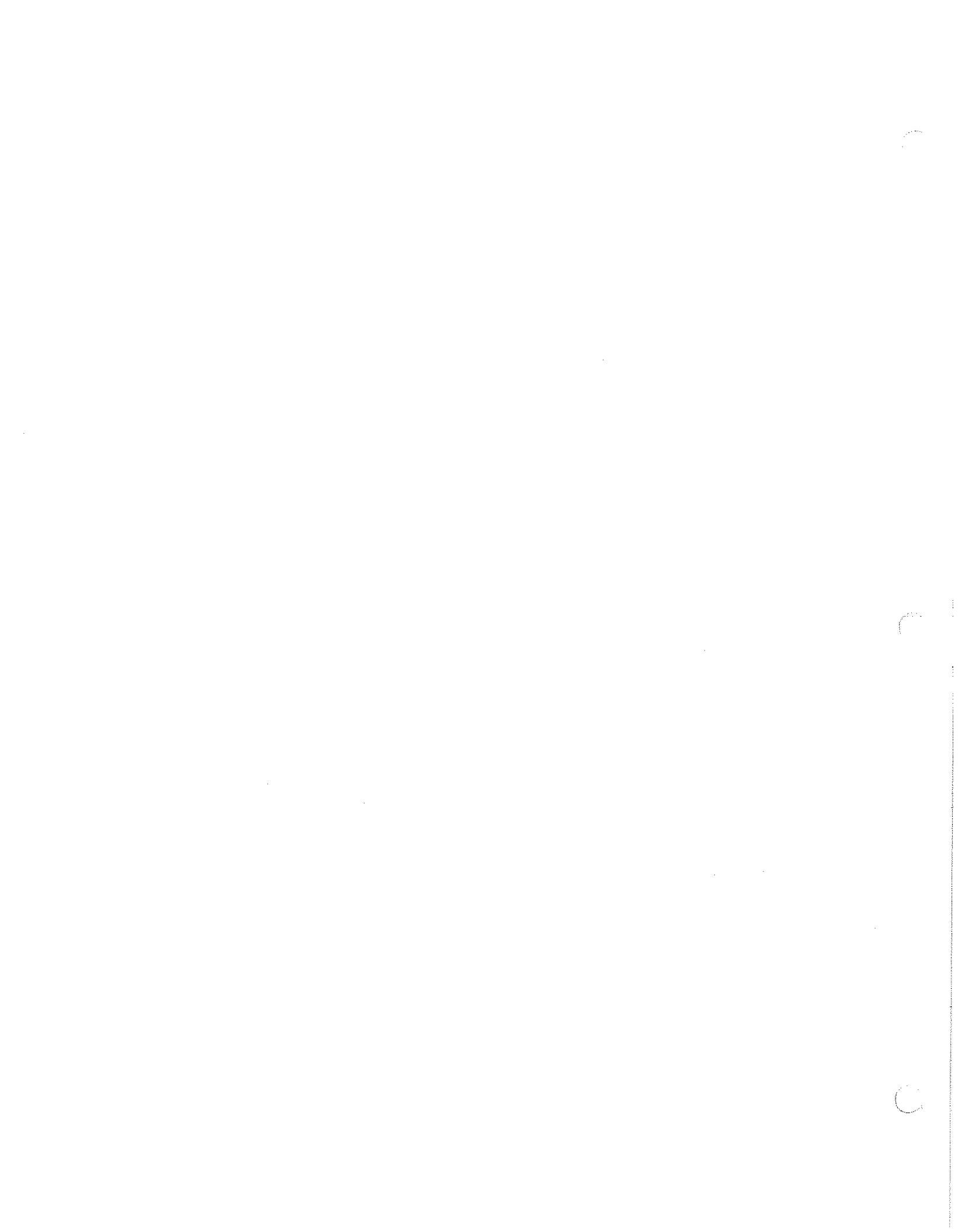
* Variation shown includes effects of +5° to +35° temperature range, + 90kHz doppler and -95dBm to -55dBm signal strength

Parameter	Side 1	Side 2
Transmitter Mod Index (Cont.)		
Real Time		
<u>1024kHz/Carrier</u>		
with PMP 1	$-3.0^{+0.1}_{-0.2}$ dB	-3.1 ± 0.1 dB
with PMP 2	$-3.2^{+0.2}_{-0.4}$	$-2.8^{+0.1}_{-0.2}$ dB
Playback		
<u>1024kHz SB/Carrier</u>		
with PMP 1	-12.1 ± 0.3 dB	$-12.0^{+0.2}_{-0.0}$ dB
with PMP 2	-12.1 ± 0.3 dB	-11.8 ± 0.2 dB
<u>768kHz SB/Carrier</u>		
with PMP 1	$-3.4^{+0.2}_{-0.4}$ dB	$-3.4^{+0}_{-0.1}$ dB
with PMP 2	-3.3 ± 0.3 dB	-3.1 ± 0.1 dB

A summary of key VHF Transmitter parameters is presented below.

Parameter	Side 1	Side 2
Carrier Frequency	137.2295 ^{+0.0015} _{-0.0005} MHz	137.2300 ^{+0.0010} _{-0.0003} MHz
RF Power - Beacon Mode	+26.3 ± 0.3 dBm	+25.8 ^{+0.5} _{-0.4} dBm
RF Power - TLM Mode	+31.3 ^{+0.4} _{-0.2} dBm	+31.5 ^{+0.3} _{-0.2} dBm
<u>Modulation Index</u>		
Carrier Drop with Mod	-2.6 dB	-3.1 dB
16kHz Sideband Below Carrier	-4.4 dB	-3.6 dB

SECTION 12.0



POWER SUBSYSTEM

The AE-C Power Subsystem consists of an upper and lower Solar Array with integral shunt dissipating elements, a Power Supply Electronics Unit containing redundant -24.5V regulators and battery conditioning equipment and three 6 Ampere-hour capacity batteries. Unit serial numbers are listed below.

Upper Solar Array	--	001
Lower Solar Array	--	001
Power Supply Electronics	--	001
Battery #1	--	001
Battery #2	--	002
Battery #3	--	003

POWER SUBSYSTEM OPERATING PARAMETERS

1 OF 2

SHUNT LIMITER THRESHOLD VOLTAGE	=	-38.2V
REG. BUS OVERVOLTAGE TRIP VOLTAGE	=	-26.4V
REG. BUS UNDERVOLTAGE TRIP VOLTAGE	=	-23.1V
UNREG. BUS UNDERVOLTAGE TRIP VOLTAGE	=	-25.9V

THIRD ELECTRODE TRIP VOLTAGES (TELEMETRY VOLTAGE)

BATTERY #1	=	0.415V
BATTERY #2	=	0.625V
BATTERY #3	=	0.625V

POWER SUBSYSTEM OPERATING PARAMETERS

2 OF 2

BATTERY CAPACITY	BATTERY #1	=	6.95AH
	BATTERY #2	=	7.00AH
	BATTERY #3	=	7.05AH
CHARGE CONTROLLER SATURATION CURRENT	BATTERY #1	=	1.59A
	BATTERY #2	=	1.58A
	BATTERY #3	=	1.62A
CHARGE CONTROLLER TRICKLE CHARGE CURRENT	BATTERY #1	=	125 mA
	BATTERY #2	=	125 mA
	BATTERY #3	=	125 mA

AE "C" LOAD PROFILE SUMMARY

COMPONENT	V _{RB}	V _{UB}	CURRENT
NACE	✓		651 mA
NATE	✓		697 mA
OSS	✓		113 mA
MESA XY	✓		228 mA
MESA YX	✓		258 mA
MESA ZZ	✓		231 mA
VAE	✓		232 mA
UVNO	✓		320 mA
LEE	✓		29 mA
RPA	✓		117 mA
RPA DRFON	✓		117 mA
PES	✓		88 mA
MIMS	✓		176 mA
BIMS	✓		30 mA
CEP	✓		147 mA
PSA	✓		35 mA
MAG	✓		89 mA
PSB	✓		59 mA
TAL	✓		10 mA
OSS VIP	✓		59 mA
ESUM	✓		50 mA
EUVS	✓		140 mA
PSB HTR		✓	77 mA

AE "C" LOAD PROFILE SUMMARY

COMPONENT	V _{RB}	V _{UB}	CURRENT
TLM POWER	✓		29.6 mA
TR 1 STDBY	✓		29.5 mA
TR 1 REC	✓		207.1 mA [STDBY TO REC]
TR 1 PB	✓		443.3 mA [STDBY TO PB]
TR 2 STDBY	✓		29.5 mA
TR 2 REC	✓		207.1 mA
TR 2 PB	✓		354.7 mA [STDBY TO PB]
PCMC 2 ON		✓	39.6 mA
PMP 1 ON		✓	69.5 mA
PMP 2 ON		✓	67.8 mA
PROG 2 ON		✓	39.7 mA
DSAI ON		✓	9.6 mA
WHS 1		✓	38.3 mA
BHS 1		✓	19.2 mA
SBT 1 LOW		✓	429 mA
SBT 1 HIGH		✓	950 mA
SBT 2 LOW		✓	446 mA
SBT 2 HIGH		✓	972 mA
PL @ 10 RAD/SEC		✓	198 mA

AE "C" LOAD PROFILE SUMMARY

COMPONENT	V _{RB}	V _{UB}	CURRENT
QOMAC 1 COIL		✓	178 mA
QOMAC 2 COIL		✓	178 mA
MASC 1 COIL		✓	117 mA
MASC 2 COIL		✓	113 mA
OAPS TANK HTR		✓	350 mA
V1 HTR		✓	57 mA
V2 HTR		✓	57 mA
YAW HTR		✓	57 mA
VALVE 1		✓	820 mA
VALVE 2		✓	820 mA
VALVE 3		✓	820 mA
VALVE 4		✓	820 mA
VALVE 5		✓	820 mA
VALVE 6		✓	820 mA
V1 THRUSTER		✓	174 mA
V2 THRUSTER		✓	166 mA
YAW THRUSTER		✓	170 mA
VBT 1 BCN		✓	50 mA
VBT 1 TLM		✓	108 mA
VBT 2 BCN		✓	48 mA
VBT 2 TLM		✓	107 mA

AE "C" LOAD PROFILE SUMMARY

COMPONENT	V _{RB}	V _{UB}	CURRENT
ATC 1		✓	50 mA
ATC 2		✓	50 mA
ATC 3		✓	50 mA
ATC 4		✓	50 mA
ATC AUX. HTR.	✓		200 mA
MIN POWER SBT RECEIVERS & DECODERS		✓	767 mA

APPENDIX A
ANALOG TELEMETRY
CONVERSION COEFFICIENTS

*C0NVC0EF, TM(20,1), D'.6875', D'.0625'.	1 OF 1
*C0NVC0EF, TM(20,2), D'.6875', D'.0625'.	1 OF 1
*C0NVC0EF, TM(20,3), D'37.195', D'-.30019'.	1 OF 1
*C0NVC0EF, TM(20,4), D'36.051', D'-.289855'.	1 OF 1
*C0NVC0EF, TM(20,5), D'95.14574', D'-.381166'.	1 OF 1
*C0NVC0EF, TM(20,6), 0, D'0.02', RAW VOLTS OFFSET EN/DSA	
*C0NVC0EF, TM(20,7), D'37.195', D'-.30019'.	1 OF 1
*C0NVC0EF, TM(20,8), D'36.051', D'-.289855'.	1 OF 1
*C0NVC0EF, TM(37), 0, 1.	
*C0NVC0EF, TM(43), 0, 1.	
*C0NVC0EF, TM(44), 0, 1.	
*C0NVC0EF, TM(45), 0, 1.	
*C0NVC0EF, TM(65,001), D'=-0.1191449E00', D'0.2833101E-01'.	1 OF 2
*C0NVC0EF, TM(65,001), C, D'=-0.1191061E-04'.	2 OF 2
*C0NVC0EF, TM(65,002), D'=-0.1884664E00', D'0.1966319E-01'.	1 OF 2
*C0NVC0EF, TM(65,002), C, D'=-0.5505020E-05'.	2 OF 2
*C0NVC0EF, TM(65,003), D'=-0.1428571E00', D'0.9523810E-02'.	1 OF 1
*C0NVC0EF, TM(65,004), D'=-0.1242785E00', D'0.9030219E-02'.	1 OF 2
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*C0NVC0EF, TM(65,005), D'=-0.1242785E00', D'0.9030219E-02'.	1 OF 2
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*C0NVC0EF, TM(65,006), D'=-0.1242785E00', D'0.9030219E-02'.	1 OF 2
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*C0NVC0EF, TM(65,010), D'=-0.1461748E00', D'0.1852167E-01'.	1 OF 1
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*C0NVC0EF, TM(65,15), 0, D'0.1777777'.	
*C0NVC0EF, TM(65,16), 0, D'0.1777777'.	
*C0NVC0EF, TM(65,17), 0, D'0.1777777'.	
*C0NVC0EF, TM(65,18), 0, D'0.1777777'.	
*C0NVC0EF, TM(65,19), 0, D'0.1777777'.	
*C0NVC0EF, TM(65,20), D'15.', D'-.12'.	
*C0NVC0EF, TM(65,21), D'15.', D'-.12'.	
*C0NVC0EF, TM(65,55), 0, D'0.173'.	
*C0NVC0EF, TM(65,56), 0, D'0.173'.	
*C0NVC0EF, TM(66,01), D'=-0.1463103E02', D'0.1047607E01'.	
*C0NVC0EF, TM(66,01), C, D'=-0.6542340E-02', D'0.2406993E-04'.	
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*C0NVC0EF, TM(66,02), C, D'=-0.6542340E-02', D'0.2406993E-04'.	2 OF 3
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*C0NVC0EF, TM(66,03), D'=-0.1463103E02', D'0.1047607E01'.	1 OF 3
*C0NVC0EF, TM(66,03), C, D'=-0.6542340E-02', D'0.2406993E-04'.	2 OF 3
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*C0NVC0EF, TM(66,04), D'=-0.1463103E02', D'0.1047607E01'.	
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*C0NVC0EF, TM(66,05), D'=-0.8377271E02', D'0.1558943E01'.	1 OF 3
*C0NVC0EF, TM(66,05), C, D'=-0.2359146E-01', D'0.2058943E-03'.	2 OF 3
*C0NVC0EF, TM(66,05), C, D'=-0.8553150E-06', D'0.1364426E-08'.	3 OF 3
*C0NVC0EF, TM(66,006), D'=-0.6905144E-01', D'0.3686159E-02'.	1 OF 1

*C8NVC8EF, TM(66,007), D1=0.6905144E=01', D10.3686159E=02', 1 8F 1
 *C8NVC8EF, TM(66,008), D1=0.6905144E=01', D10.3686159E=02', 1 8F 1
 *C8NVC8EF, TM(66,10), D1=0.2894656E02', D10.6013906E00', 1 8F 2
 *C8NVC8EF, TM(66,10), C, D1=0.2366422E=02', D10.5252951E=05', 2 8F 2
 *C8NVC8EF, TM(66,11), D1=0.2894656E02', D10.6013906E00', 1 8F 2
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 *C8NVC8EF, TM(66,13), C, D1=0.8553150E=06', D10.1364426E=08',
 *C8NVC8EF, TM(66,14), D1=0.1463103E02', D10.1047607E01',
 *C8NVC8EF, TM(66,14), C, D1=0.6542340E=02', D10.2406993E=04',
 *C8NVC8EF, TM(66,14), C, D1=0.2892203E=07',
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 *C8NVC8EF, TM(66,18), C, D1=0.5010382E=06', D10.6713350E=09',
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 *C8NVC8EF, TM(66,20), C, D1=0.5010382E=06', D10.6713350E=09',
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 *C8NVC8EF, TM(66,21), C, D1=0.1925653E=01', D10.1425990E=03',
 *C8NVC8EF, TM(66,21), C, D1=0.5010382E=06', D10.6713350E=09',
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 *C8NVC8EF, TM(66,22), C, D1=0.1925653E=01', D10.1425990E=03',
 *C8NVC8EF, TM(66,22), C, D1=0.5010382E=06', D10.6713350E=09',
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 *C8NVC8EF, TM(66,23), C, D1=0.1925653E=01', D10.1425990E=03',
 *C8NVC8EF, TM(66,23), C, D1=0.5010382E=06', D10.6713350E=09',
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 *C8NVC8EF, TM(66,24), C, D1=0.1925653E=01', D10.1425990E=03',
 *C8NVC8EF, TM(66,24), C, D1=0.5010382E=06', D10.6713350E=09',
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 *C8NVC8EF, TM(66,25), C, D1=0.1925653E=01', D10.1425990E=03',
 *C8NVC8EF, TM(66,25), C, D1=0.5010382E=06', D10.6713350E=09',
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 *C8NVC8EF, TM(66,26), C, D1=0.6210560E=01', D10.5689736E=03',
 *C8NVC8EF, TM(66,26), C, D1=0.2840136E=05', D10.7261843E=08',
 *C8NVC8EF, TM(66,26), C, D1=0.7387759E=11',
 *C8NVC8EF, TM(66,27), D1=0.9090340E02', D10.3885745E01',
 *C8NVC8EF, TM(66,27), C, D1=0.6210560E=01', D10.5689736E=03'.

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 *C0NVCB0EF, TM(66,28), D' = 0.9090340E02', D' 0.3885745E01'.
 *C0NVCB0EF, TM(66,28), C, D' = 0.6210560E-01', D' 0.5689736E-03'.
 *C0NVCB0EF, TM(66,28), C, D' = 0.2840136E-05', D' 0.7261843E-08'.
 *C0NVCB0EF, TM(66,28), C, D' = 0.7387759E-11'.
 *C0NVCB0EF, TM(66,29), D' = 0.9090340E02', D' 0.3885745E01'.
 *C0NVCB0EF, TM(66,29), C, D' = 0.6210560E-01', D' 0.5689736E-03'.
 *C0NVCB0EF, TM(66,29), C, D' = 0.2840136E-05', D' 0.7261843E-08'.
 *C0NVCB0EF, TM(66,29), C, D' = 0.7387759E-11'.
 *C0NVCB0EF, TM(66,30), D' = 0.4073354E02', D' 0.1486012E01'.
 *C0NVCB0EF, TM(66,30), C, D' = 0.1925653E-01', D' 0.1425990E-03'.
 *C0NVCB0EF, TM(66,30), C, D' = 0.5010382E-06', D' 0.6713350E-09'.
 *C0NVCB0EF, TM(66,31), D' = 0.4073354E02', D' 0.1486012E01'.
 *C0NVCB0EF, TM(66,31), C, D' = 0.1925653E-01', D' 0.1425990E-03'.
 *C0NVCB0EF, TM(66,31), C, D' = 0.5010382E-06', D' 0.6713350E-09'.
 *C0NVCB0EF, TM(66,32), D' = 0.4073354E02', D' 0.1486012E01'.
 *C0NVCB0EF, TM(66,32), C, D' = 0.1925653E-01', D' 0.1425990E-03'.
 *C0NVCB0EF, TM(66,32), C, D' = 0.5010382E-06', D' 0.6713350E-09'.
 *C0NVCB0EF, TM(66,33), D' = 0.4073354E02', D' 0.1486012E01'.
 *C0NVCB0EF, TM(66,33), C, D' = 0.1925653E-01', D' 0.1425990E-03'.
 *C0NVCB0EF, TM(66,33), C, D' = 0.5010382E-06', D' 0.6713350E-09'.
 *C0NVCB0EF, TM(66,34), D' = 0.4073354E02', D' 0.1486012E01'.
 *C0NVCB0EF, TM(66,34), C, D' = 0.1925653E-01', D' 0.1425990E-03'.
 *C0NVCB0EF, TM(66,34), C, D' = 0.5010382E-06', D' 0.6713350E-09'.
 *C0NVCB0EF, TM(66,35), D' = 0.4073354E02', D' 0.1486012E01'.
 *C0NVCB0EF, TM(66,35), C, D' = 0.1925653E-01', D' 0.1425990E-03'.
 *C0NVCB0EF, TM(66,35), C, D' = 0.5010382E-06', D' 0.6713350E-09'.
 *C0NVCB0EF, TM(66,36), D' = 0.4073354E02', D' 0.1486012E01'.
 *C0NVCB0EF, TM(66,36), C, D' = 0.1925653E-01', D' 0.1425990E-03'.
 *C0NVCB0EF, TM(66,36), C, D' = 0.5010382E-06', D' 0.6713350E-09'.
 *C0NVCB0EF, TM(66,37), D' = 0.4073354E02', D' 0.1486012E01'.
 *C0NVCB0EF, TM(66,37), C, D' = 0.1925653E-01', D' 0.1425990E-03'.
 *C0NVCB0EF, TM(66,37), C, D' = 0.5010382E-06', D' 0.6713350E-09'.
 *C0NVCB0EF, TM(66,38), D' = 0.4073354E02', D' 0.1486012E01'.
 *C0NVCB0EF, TM(66,38), C, D' = 0.1925653E-01', D' 0.1425990E-03'.
 *C0NVCB0EF, TM(66,38), C, D' = 0.5010382E-06', D' 0.6713350E-09'.
 *C0NVCB0EF, TM(66,39), D' = 0.4073354E02', D' 0.1486012E01'.
 *C0NVCB0EF, TM(66,39), C, D' = 0.1925653E-01', D' 0.1425990E-03'.
 *C0NVCB0EF, TM(66,39), C, D' = 0.5010382E-06', D' 0.6713350E-09'.
 *C0NVCB0EF, TM(66,040), 0, D' 2.4'. 1 0F 1
 *C0NVCB0EF, TM(66,041), 0, D' 2.4'. 1 0F 1
 *C0NVCB0EF, TM(66,42), D' .8098064E02', D' = .4057421E01'.
 *C0NVCB0EF, TM(66,42), D' 0.742834E02', D' = 4.067683'. SBT=1
 *C0NVCB0EF, TM(66,42), C, D' 0.4335085E-01', D' = 0.2380833E-03'. SBT=1
 *C0NVCB0EF, TM(66,42), C, D' 0.4754119E-06'. SBT=1
 *C0NVCB0EF, TM(66,43), D' 0.113664E03', D' = 4.637298'. SBT=2
 *C0NVCB0EF, TM(66,43), C, D' 0.4576475E-01', D' = 0.2291532E-03'. SBT=2
 *C0NVCB0EF, TM(66,43), C, D' 0.4213886E-06'. SBT=2
 *C0NVCB0EF, TM(66,44), D' 0.2062742E03', D' = 1.568281'. SBT=1
 *C0NVCB0EF, TM(66,44), C, D' 0.2216206E-03'. SBT=1
 *C0NVCB0EF, TM(66,45), D' 0.2185566E03', D' = 1.589109'. SBT=2
 *C0NVCB0EF, TM(66,45), C, D' 0.2625564E-03'. SBT=2

*C0NVC0EF, TM(66,46), 0, D'0.08329'.	
*C0NVC0EF, TM(66,47), 0, D'0.08329'.	
*C0NVC0EF, TM(66,48), D'=-0.3595834E02', D'1.297792'.	SBT=1
*C0NVC0EF, TM(66,48), C, D'=-0.1096077E-01', D'0.482827E-04'.	SBT=1
*C0NVC0EF, TM(66,48), C, D'=-0.7369744E-07'.	SBT=1
*C0NVC0EF, TM(66,49), D'=-0.3580249E02', D'1.29888'.	SBT=2
*C0NVC0EF, TM(66,49), C, D'=-0.1094458E-01', D'0.4783706E-04'.	SBT=2
*C0NVC0EF, TM(66,49), C, D'=-0.7238685E-07'.	SBT=2
*C0NVC0EF, TM(66,50), D'0.8013453E-02', D'=-0.1460101E-02'.	SBT
*C0NVC0EF, TM(66,50), C, D'0.8332485E-04'.	SBT
*C0NVC0EF, TM(66,51), 0, D'0.08329'.	
*C0NVC0EF, TM(66,52), D'=-0.3563728E02', D'1.289082'.	SBT=1
*C0NVC0EF, TM(66,52), C, D'=-0.1083165E-01', D'0.4751932E-04'.	SBT=1
*C0NVC0EF, TM(66,52), C, D'=-0.7227311E-07'.	SBT=1
*C0NVC0EF, TM(66,53), D'=-0.3574165E02', D'1.299829'.	SBT=2
*C0NVC0EF, TM(66,53), C, D'=-0.1099943E-01', D'0.485184E-04'.	SBT=2
*C0NVC0EF, TM(66,53), C, D'=-0.7417475E-07'.	SBT=2
*C0NVC0EF, TM(66,54), D'=-0.6805646', D'0.7602352E-01'.	SBT
*C0NVC0EF, TM(66,54), C, D'=-0.1954722E-04'.	SBT
*C0NVC0EF, TM(66,55), D'=-0.8377271E02', D'0.1558943E01'.	
*C0NVC0EF, TM(66,55), C, D'=-0.2359146E-01', D'0.2058943E-03'.	
*C0NVC0EF, TM(66,55), C, D'=-0.8553150E-06', D'0.1364426E-08'.	
*C0NVC0EF, TM(66,56), D'=-39.72', D'4.2128', D'=-.1003937'.	1 BF 4
*C0NVC0EF, TM(66,56), C, D'1.453884E-02', D'=-.1212753E-04'.	2 BF 4
*C0NVC0EF, TM(66,56), C, D'1.5756058E-07', D'=-.1440808E-09'.	3 BF 4
*C0NVC0EF, TM(66,56), C, D'1.475630E-12'.	4 BF 4
*C0NVC0EF, TM(066,057), 0, D'1.040001'.	1BF1
*C0NVC0EF, TM(66,65), D'1.3632903E-01', D'1.9168290E-02'.	VBT 01PAE
*C0NVC0EF, TM(66,65), C, D'1.1937583E-03'.	VBT 01PAE
*C0NVC0EF, TM(66,66), D'0.3142945E-01', D'0.8981928E-02'.	VBT 02AE
*C0NVC0EF, TM(66,66), C, D'0.1846361E-03'.	VBT 02AE
*C0NVC0EF, TM(66,69), 0, D'0.231633'.	VBT
*C0NVC0EF, TM(66,70), 0, D'0.231633'.	VBT
*C0NVC0EF, TM(66,74), D'=-0.2972946E-2', D'0.9581011E-2'.	
*C0NVC0EF, TM(66,74), C, D'=-0.1956267E-5', D'0.2212608E-7'.	
*C0NVC0EF, TM(66,74), C, D'=-0.8491970E-10', D'0.1001661E-12'.	
*C0NVC0EF, TM(66,75), 0, D'0.02'. RAW VOLTS	AZ COARSE
*C0NVC0EF, TM(66,76), D'8.4375', D'1.3125'.	1 BF 1
*C0NVC0EF, TM(66,77), D'276.6', D'1.4865'.	1 BF 1
*C0NVC0EF, TM(66,78), D'1.036156', D'1.00274725'.	1 BF 1
*C0NVC0EF, TM(66,79), D'=-.0583', D'1.006667'.	1 BF 1
*C0NVC0EF, TM(66,80), D'88.83', D'=-2.361343', D'1.03703643'.	1 BF 3
*C0NVC0EF, TM(66,80), C, D'=-.3540826E-03', D'1.1878587E-05'.	2 BF 3
*C0NVC0EF, TM(66,80), C, D'=-.5098887E-08', D'1.5499928E-11'.	3 BF 3
*C0NVC0EF, TM(66,81), D'=-0.4053976E02', D'0.8197756'.	TR
*C0NVC0EF, TM(66,81), C, D'=-0.421029E-02', D'0.1402503E-04'.	TR
*C0NVC0EF, TM(66,82), D'=-0.4053976E02', D'0.8197756'.	TR
*C0NVC0EF, TM(66,82), C, D'=-0.421029E-02', D'0.1402503E-04'.	TR
*C0NVC0EF, TM(66,83), 0, D'0.12'.	TR
*C0NVC0EF, TM(66,84), 0, D'0.12'.	TR
*C0NVC0EF, TM(66,85), D'=-1.878125', D'0.3990635E-01'.	TR1 SN05
*C0NVC0EF, TM(66,86), D'=-0.1149998E02', D'0.9319979E-01'.	TR1 SN05
*C0NVC0EF, TM(66,87), D'=-2.46637', D'0.3363424E-01'.	TR2 SN06

*CONVCDEF, TM(66,88), D'=6.620049', D'0.5160018E=01'.	TR2 SN06
*CONVCDEF, TM(66,89), D'9.622108', D'0.3663051'.	TR
*CONVCDEF, TM(66,89), C, D'=-0.1677747E=02', D'0.3515917E=05'.	TR
*CONVCDEF, TM(66,90), D'9.622108', D'0.3663051'.	TR
*CONVCDEF, TM(66,90), C, D'=-0.1677747E=02', D'0.3515917E=05'.	TR
*CONVCDEF, TM(66,91), D'1.987249', D'0.9739425E=02'.	TR
*CONVCDEF, TM(66,91), C, D'0.2056063E=03', D'=-0.2127275E=06'.	TR
*CONVCDEF, TM(66,92), D'1.987249', D'0.9739425E=02'.	TR
*CONVCDEF, TM(66,92), C, D'0.2056063E=03', D'=-0.2127275E=06'.	TR
*CONVCDEF, TM(66,93), 0, 10.	TR
*CONVCDEF, TM(66,94), 0, 10.	TR
*CONVCDEF, TM(66,95), 0, D'0.04'.	
*CONVCDEF, TM(66,96), 0, D'0.04'.	
*CONVCDEF, TM(66,97), D'=-0.3157637E02', D'0.8654569E00'.	1 BF 3
*CONVCDEF, TM(66,97), C, D'=-0.5782057E=02', D'0.2155696E=04'.	2 BF 3
*CONVCDEF, TM(66,97), C, D'=-0.2690715E=07'.	3 BF 3
*CONVCDEF, TM(66,98), D'=-2.5', D'.56', 0, 0, 0, 0, D'1.E=13', 0.	1 BF 2
*CONVCDEF, TM(66,98), C, 0, 0, 0, 0, 0, 0, D'7.E=33'.	2 BF 2
*CONVCDEF, TM(66,99), D'=-2.5', D'.56', 0, 0, 0, 0, D'1.E=13', 0.	1 BF 2
*CONVCDEF, TM(66,99), C, 0, 0, 0, 0, 0, 0, D'7.E=33'.	2 BF 2
*CONVCDEF, TM(66,100), 0, D'0.02'.	1 BF 1
*CONVCDEF, TM(66,101), 0, D'0.02'.	1 BF 1
*CONVCDEF, TM(66,102), 0, D'0.02'.	1 BF 1
*CONVCDEF, TM(66,103), 0, D'0.02'.	1 BF 1
*CONVCDEF, TM(66,104), D'0.6', D'0.05714'.	
*CONVCDEF, TM(66,105), D'0.6', D'0.05714'.	
*CONVCDEF, TM(66,106), 0, D'0.02'.	
*CONVCDEF, TM(66,107), 0, D'0.02'.	
*CONVCDEF, TM(66,108), 0, D'0.02'.	
*CONVCDEF, TM(66,109), 0, D'0.02'.	
*CONVCDEF, TM(66,110), 0, D'0.02'.	
*CONVCDEF, TM(66,111), 0, D'0.02'.	
*CONVCDEF, TM(66,112), 0, D'0.02'.	
*CONVCDEF, TM(66,113), 0, D'0.02'.	
*CONVCDEF, TM(66,114), 0, D'0.02'.	1 BF 1
*CONVCDEF, TM(66,115), 0, D'0.02'.	1 BF 1
*CONVCDEF, TM(66,117), 0, D'0.1777778'.	1 BF 1
*CONVCDEF, TM(66,118), 0, D'0.1777778'.	1 BF 1
*CONVCDEF, TM(66,119), 0, D'0.1777778'.	1 BF 1
*CONVCDEF, TM(66,120), D'=-0.1386633E03', D'0.5071243E01'.	1 BF 3
*CONVCDEF, TM(66,120), C, D'=-0.7313544E=01', D'0.5781085E=03'.	2 BF 3
*CONVCDEF, TM(66,120), C, D'=-0.2301795E=05', D'0.3662884E=08'.	3 BF 3
*CONVCDEF, TM(67,21), 0, D'0.02'.	
*CONVCDEF, TM(67,41), 0, D'0.02'.	
*CONVCDEF, TM(67,43), 0, D'0.02'.	
*CONVCDEF, TM(67,47), D'=-65.37970', D'255.4002', D'=-654.7483'.	
*CONVCDEF, TM(67,47), C, D'1133.754', D'=-1236.781', D'868.3201'.	
*CONVCDEF, TM(67,47), C, D'=-398.4587', D'119.4403', D'=-22.85947'.	
*CONVCDEF, TM(67,47), C, D'2.635942', D'=-0.1608274'.	
*CONVCDEF, TM(67,47), C, D'0.3673624E=2'.	
*CONVCDEF, TM(67,57), D'=-27.3', D'1.0074', D'=-.00808365'.	1BF2
*CONVCDEF, TM(67,57), C, D'.3263188E=04', D'=-.4796603E=07'.	2BF2
*CONVCDEF, TM(67,59), D'.0045', D'.00064'.	1BF1

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*C8NVC8EF, TM(67,60), C, D'=2141214E=04', D'=.3176575E=07', 28F2
*C8NVC8EF, TM(68,13), D'134.9251', D'=2.666036', D'4.254973E=2',
*C8NVC8EF, TM(68,13), C, D'=5.283102E=4', D'4.356376E=6', D'=2.197680E=8',
*C8NVC8EF, TM(68,13), C, D'6.029328E=11', D'=6.877913E=14',
*C8NVC8EF, TM(68,95), D'120.3493', D'=4.188673', D'9.627414E=2',
*C8NVC8EF, TM(68,95), C, D'=1.390337E=3', D'1.183831E=5',
*C8NVC8EF, TM(68,95), C, D'=5.799742E=8', D'1.506056E=10',
*C8NVC8EF, TM(68,95), C, D'=1.604117E=13',
*C8NVC8EF, TM(68,96), D'120.3493', D'=4.188673', D'9.627414E=2',
*C8NVC8EF, TM(68,96), C, D'=1.390337E=3', D'1.183831E=5',
*C8NVC8EF, TM(68,96), C, D'=5.799742E=8', D'1.506056E=10',
*C8NVC8EF, TM(68,96), C, D'=1.604117E=13',
*C8NVC8EF, TM(101), 0, D'0.02',
*C8NVC8EF, TM(107), 0, D'0.02',
*C8NVC8EF, TM(108), 0, D'0.02',
*C8NVC8EF, TM(109), 0, D'0.02',
*C8NVC8EF, TM(127,1), D'=2.402572', D'9.013122', D'=22.67772',
*C8NVC8EF, TM(127,1), C, D'39.19766', D'=42.75365', D'30.03419',
*C8NVC8EF, TM(127,1), C, D'=13.79851', D'4.143284', D'=0.7947779',
*C8NVC8EF, TM(127,1), C, D'0.9192497E=1', D'=0.5633943E=2',
*C8NVC8EF, TM(127,1), C, D'0.1297912E=3',
*C8NVC8EF, TM(127,2), D'=65.66205', D'147.2664', D'0.9159899',
*C8NVC8EF, TM(127,2), C, D'=1.167493', D'0.4745405', D'=0.08511645',
*C8NVC8EF, TM(127,2), C, D'0.005871594',
*C8NVC8EF, TM(127,3), D'=59.79237', D'149.6019', D'10.56474',
*C8NVC8EF, TM(127,3), C, D'=16.39337', D'11.84696', D'=4.701241',
*C8NVC8EF, TM(127,3), C, D'1.050538', D'=0.1239295', D'0.006007086',
*C8NVC8EF, TM(127,4), D'0.4638650E=1', D'25.55209', D'=0.6198338',
*C8NVC8EF, TM(127,4), C, D'0.9263116E=1', D'0.3000027E=2', D'=0.1956071E=2',
*C8NVC8EF, TM(127,4), C, D'0.2042910E=3', D'=0.1016527E=4', D'0.2516781E=4',
*C8NVC8EF, TM(127,4), C, D'=0.2057158E=8', D'=0.2887134E=10',
*C8NVC8EF, TM(127,4), C, D'0.5031456E=12'.

*C8NVC8EF, TM(68,12), DELETE.

DELETE REQUESTED DOES NOT EXIST IN TABLE

*C8NVC8EF, TM(65,53), DELETE.

DELETE REQUESTED DOES NOT EXIST IN TABLE

*C8NVC8EF, TM(65,54), DELETE.

DELETE REQUESTED DOES NOT EXIST IN TABLE

*C8NVC8EF, TM(68,62), DELETE.

DELETE REQUESTED DOES NOT EXIST IN TABLE

*C8NVC8EF, TM(68,90), DELETE.

DELETE REQUESTED DOES NOT EXIST IN TABLE

*C8NVC8EF, TM(68,106), DELETE.

DELETE REQUESTED DOES NOT EXIST IN TABLE

*PRTC8EFS.

Appendix B
Component Serial Numbers

APPENDIX B
COMPONENT SERIAL NUMBERS

Part Number	Nomenclature	Serial
2271619-501	Battery No. 1	001
2271619-501	Battery No. 2	002
2271619-501	Battery No. 3	003
2271620-501	Power Supply Electronics	001
2271623-501	Pitch Control Electronics No. 1	01
2271623-501	Pitch Control Electronics No. 2	02
2275250-501	Body Horizon Sensor	001
2271630-501	CDU-A	001
2271631-501	LIU-A	001
1972413-1	Dual S-Band Transponder	01P
2270711-1	Beacon Telemetry Transmitter No. 1	01P
2270711-1	Beacon Telemetry Transmitter No. 2	02
2270710-1	Dual PMP	001
196 4670-503	RF Switch	001
2271890-501	RTM-A	001
2271706-501	Dual PCMC	001
1972460-1	DSAI Electronics	101
2271622-501	Momentum Wheel Assembly	001
2276523-501	Nutation Damper & MASC Coil	002
2270716-501	Attitude Control Coil	002
2271621-501	Dual Decoder	001
2271629-501	Dual Programmer	001
2271626-501	CDU-B	001
2271627-501	LIU-B	001
2271632-1	Command Memory Unit No. 1	10003
2271632-1	Command Memory Unit No. 2	10004
2271890-501	RTM-B	002
2260931-1	Tape Recorder No. 1	005
2260931-1	Tape Recorder No. 2	004

Appendix C

History Tape Index

AE HISTORY TAPE LOG

Shelf	Bin	Calendar	GMT		Comment
		Date	Start	Stop	
1	1	4-18-73			NACE S/C Log 1-57
	2	4-18-73			PSA, NACE S/C Log 1 PC 57
	3	4-14-73			OSS S/C Log 1-70
	4	5-14-73			LEE S/C Log 2-1
	5	5-16-73			NATE S/C Log 2-12
	6	5-16-73			RPA S/C Log 2-12
	7	5-16-73			BIMS S/C Log 2-12
	8	5-18-73			MIMS S/C Log 2-27
	9	5-18-73			All Exp, LBP S/C Log 2-27
	10	5-19-73		S/C Log 2-27	PB TR1, All Exp ON
	11	7-18-73			CEP Log 3-1
	12	7-18-73			EUVS S/C Log 5-1
	13	7-17-73			CEP S/C Log 2-94
	14	7-18-73			LIUA S/C Log 3-1
	15	7-17-73			LIUB INTEG S/C Log 2-94
	16	7-17-73			CEP S/C Log 2-94
	17	7-19-73			SPS S/C Log 3-7
	18	7-19-73			SPS S/C Log 3-7
	19	7-19-73			UVNO S/C Log 3-7
		20	7-18-73		S/C Log 3-1
2	1	7-19-73			NATE, SPS S/C Log 3-7
	2	7-19-73			NATE S/C Log 3-7
	3	7-20-73			SPS, PSE S/C Log 3-17
	4	7-21-73			PWR EPUT S/C Log 3-28
	5	7-23-73			PWR EPUT S/C Log 3-30
	6	7-23-73			SPS S/C Log 3-30
	7	7-23			SPS S/C Log 3-30
	8	7-23		S/C Log 3-30	LIUB T/C, CMD VER TEST
	9	7-23		S/C Log 3-30	CMD VER CHECK
	10	7-24			DSDI S/C Log 3-38
	11	7-24			DSAI S/C Log 3-38
	12	7-25			NACE S/C Log 3-44
	13	7-27			EMI S/C Log 3-47
	14	7-27			EMI S/C Log 3-47
	15	7-27			PBK OF EMI S/C Log 3-47
	16	7-17			TR 1 PBK S/C Log 3-47
	17	7-31	213:01: 30:44		S/C Log 3-60
	18			212:19:18:00	CMD MEM S/C Log 3-60
19	8-1			UVNO S/C Log 3-66	
20	8-1		S/C Log 3-66	PROG TURN-ON	

AE HISTORY TAPE LOG (Continued)

Shelf	Bin	Calendar Date	GMT Start	GMT Stop	Comment
3	1	8-1			UVNO S/C Log 3-60
	2	8-1			PROG/NADIR S/C Log 3-66
	3	8-1	214:04:01:55		S/C Log 3-66
	4	8-2	214:09	214:16	PROG TURN-ON S/C Log 3-70
	5	8-2	215:03:08:40		PROG, PSE S/C Log 3-70
	6	8-3			S/C Log 3-81
	7	8-4			C & DN S/C Log 3-82
	8	8-7			PBS, C&DH S/C Log 3-82
	9	8-7			C&DN, PCE S/C Log 3-82
	10	8-8		220:23:14:31	PCE S/C Log 3-89
	11	8-8-73	220:23:14:39		PCE, MWA S/C Log 3-89
	12	8-8	21:03:10:32		PCE, MWA S/C Log 3-89
	13	8-9			PCE DEBUG S/C Log 3-98
	13	8-9			PCE S/C Log 3-98
	15	8-9			EUVS S/C Log 3-98
	16	8-10			NACE S/C Log 4-4
	17	8-10			PCE S/C Log 4-4
	18	8-10		222:21:24:00	S/C Log 4-4
	19	8-11			PROG 2 S/C Log 4-4
	20	8-11			PROG 2 S/C Log 4-9
4	1	8-11			PROG 2 S/C Log 4-9
	2	8-11			PROG 2 S/C Log 4-9
	3	8-12			PROG TURN-ON S/C Log 4-16
	4	8-12			PROG TURN-ON S/C Log 4-16
	5	8-13			MESA Noise S/C Log 4-24
	6	8-13			PCE S/C Log 4-24
	7	8-13			LEE, MIMS S/C Log 4-24
	8	8-13			MESA, CEP S/C Log 4-24
	9	8-13			PES S/C Log 4-24
	10	8-14		16:10:00	VAE S/C Log 4-31
	11	8-14			ESUM S/C Log 4-31
	12	8-14			Prog Delivery S/C Log 4-31
	13	8-14		23:56:00	RPA S/C Log 4-31
	14	8-14			BIMS S/C Log 4-31
	15	8-15			NACE NATE 1 of 2 S/C Log 4-38
	16	8-15		227	OSS WATE 2 of 2 MAG, PSI, PSB
				14:57:50	End at 16:22:13
	16	8-15		227	OSS, NATE End 14:57 S/C Log 4-38
				16:22:30	PSA, PSB, MAG
	17	8-15			PCE, MWA DEGUG S/C Log 4-38
18	8-15		S/C Log 4-38	PCE TLM & MWA OSC 1/2 DEBUG	
19	8-15		S/C Log 4-38	MWA OSCIL DEGUG 2/2 S/C Log 4-38	
20	8-20			SBAWD TURN-ON S/C Log 4-48	

AE HISTORY TAPE LOG (Continued)

Shelf	Bin	Calendar Date	GMT Start	GMT Stop	Comment
5	1	8-20-73			C&DH EPET S/C Log 4-48
	2	8-21	S/C Log 4-54	233:17:00	SBAND XPNDR PES 13:35/15/:19
	3	8-21		233:20:00	S-B XNDR BIMS SPECIAL S/C
	4	8-21	233:19:59	S/C Log 4-34	Log 4-54 TEST BIMS SPECIAL TEST PCE + PCMC/ PROG DEBUG
	5	8-21	234:01:35		COMM EPET S/C Log 4-54
	6	8-21			COMM EPET S/C Log 4-54
	7	8-12	S/C Log 4-61	234:16:54	RANGING DEALY TEST
	8	8-22		S/C Log 4-61	SPS EPET PART 2
	9	8-22			SPS EPET S/C Log 4-61
	10	8-23	235:13:15	235:18:03	COMM EPET 1 of 2 S/C Log 4-69
	11	8-23	235:18:03	235:20:20	COMM EPET 2 of 2 S/C Log 4-69
	12	8-24	236:14:39	236:14:47	4 ft Dish Test HT S/C Log 4-69
	13	8-24	237:00:40	237:03:22	ACS EPET S/C Log 4-68
	14	8-25			SPECIAL PC TEST S/C Log 4-74
	15	8-25			PCE EPET S/C Log 4-74
	16	8-25		S/C Log 4-84	PCE AIR EPET 2 of 2
	17	8-26	238:10:34	238:18:53	PROG TURN ON S/C Log 4-78
	18	8-26	238:18:53	238:21:55	PROG TURN ON 2 of 5 S/C Log 4-78
	19	8-26	238:21:57	S/C Log 4-78	PROG TURN ON 3 of 5
	20	8-26		S/C Log 4-98	PROG TURN ON 4 of 5
6	1	8/26/73		S/C Log 4-78	PROG TURN ON 5 of 5
	2	8/27		S/C Log 4-34	PROG EPET 1 of 3
	3	8/27		S/C Log 4-84	PROG TROUBLE SHOOT 2 of 3
	4	8/27		S/C Log 4-84	PROG TROUBLE SHOOT 3 of 3
	5	8/28	240:13:22	240:15:15	TR TURN ON S/C Log 4-88
	6	8/28	240:16:15	240:19:39	PROG EPET UVNO TLM TR TURN ON PROG DEB S/C 4-89
	7	8/29	241:18:03	S/C Log 4-98	CEP NOISE TEST 1/2
	8	8/29		241:22:41	CEP NOISE TEST 2/2 S/C Log 4-98
	9	8/29		242:01:10	CEP CHK, PCE CHK S/C Log 4-98
	10	8/29	242:01:10	242:02:43	PCS SPECIAL TEST S/C Log 4-98
	11	8/29	242:02:43	242:06:55	POWER EPET 1 of 3 S/C Log 4-98
	12	8/30	242:07:00	242:09:30	POWER EPET 2 of 3 S/C Log 5-5
	13	8/30	242:09:30	242:09:48	POWER EPET 1 of 2 S/C Log 5-5
	14	8/30	242:13:26	242:	POWER EPET 2 of 2 S/C Log 5-5
	15	8/30	242:17:24	242:23:25	PCE SPEC TEST START ORD TEST S/C Log 5-6
	16	8/31	242:23:30		PROG END ORD TEST S/C Log 5-14
	17	8/31	243:0	243:08:42	PROG No. 2 S/C Log 5-14
	18	8/31	243:08:43	243:10:52	PROG No. 3 S/C Log 5-14
	19	8/31	243:10:52	243:14:42	PROG No. 4 GROSS STRAP PROG DEBUG (1) MSM TEST 5-14
	20	8/31	243:14:42		PROG DEBUG (2) S/C Log 5-14

AE HISTORY TAPE LOG (Continued)

Shelf	Bin	Calendar Date	GMT Start	GMT Stop	Comment
7	1	8/31		244:00:05	PROG No. 2 S/C Log 5-26
	2	8/31	244:00:05	244:03:46	PROG No. 3 S/C Log 5-26
	3	9/1	244:03:46	244:04:33	PROG No. 4 S/C Log 5-26
	4	9/4	247:12:15	247:14:30	Recheck Prog S/C Log 5-26
	5	9/4		247:16:13	C&DH EPET ABORT @ 17.30 Log 5-28
	6	9/4		247:20:16	COMM EPET 1/2 Log 5-29
	7	9/4	247:20:16		COMM EPET 2/2 Log 5-29
	8	9/4	248:01:52	248:03:27	EUVS/SPS ADJUST Log 5-29
	9	9/4	248:03:22		PWR EPET 1 of 3 Log 5-29
	10	9/4			PWR EPET 2 of 3 Log 5-29
	11	9/5			PWR EPET 3 of 3 Log 5-34
	12	9/5			UVNO EPET DUMP ON B1 Log 5-34
	13	9/5		248:15:22	PSA, PSB, TAL, MAG, UVNC, BIMS Log 5-34 1/2
	14	9/5	248:15:23		BIM 2/2, OSS Log 5-34
	15	9/5	248:18:28	248:20:28	CEP, ESUM Log 5-34
	16	9/5	248:21:03		EUVS VAE (Part of) Log 5-37
	17	9/5	248:23:18		VAE (Part of and ON) Log 5-38
	18	9/6	248:02:20		RPA and ON Log 5-39
	19	9/6			Exp Real Time Aliveness Log 5-39
	20	9/6			ACS EPET 1 of Log 5-41
8	1	9/6			ACS EPET Log 5-41
	2	9/6		249:18:08	ACS DEBUG Log 5-41
	3	9/6	249:18		EMI (ESUM MTR FLAG 249, 23:05:59)
	4		249:23:51		EMI Log 5-41
	5		249:02:13		EMI Log 5-41
	6	9/7	250:04:43		EMI Log 5-50
	7		250:06:00		EMI Log 5-50
	8	9/7			Ord Test Log 5-56
	9	9/7		250:20:20	ACS Special, OAPS Load UVNO Stat. Log 5-57
	10		250:21:39	251:00:00	SPS ETET Log 5-58
	11	9/7		251:01:07	NATE BAFEL NACE/NATE ORD Log 5-60
	12				Real Time Most Side 1 Pre Vib Log 5-60
	13			251:16:59	Real Time Most Side 1 Pre Vib Log 5-60
	14			251:21:10	Real Time Most Side 1 Pre Vib Log 5-60
	15		251:21:10		Real Time Most Side 1 Pre Vib Log 5-60
	16	9-8-73			VIB Log 5-60

AE HISTORY TAPE LOG (Continued)

Shelf	Bin	Calendar Date	GMT Start	GMT Stop	Comment
8	17		252:04:52		VIB 1st Post Lat RTMO Side 2 XX Log 5-60
	18	9-9-73			VIB Pre YY Log 5-67
	19	9-9			YY Sine Log 5-67
	20	9-9		Log 5-71	Post YY, Most Side 1 & 2
9	1	9-9		252:22:30	PRE, POST THRUST Log 5-71
	2	9-9	252:22:30		Thrust & Most Log 5-71
	3	9-9	253:02:28	253:05:10	Thrust & Most Log 5-71
	4	9-10	253:05:10		Z Z Most Log 5-75
	5	9-10			Prog Test Log 5-75
	6	9-10	253:13:30		Post Shock Log 5-78
	7	9-10	253:16:12		Post Shock Log 5-78
	8	9-10			ATC Test, Ant. Gain Log 5-81
	9	9-10	254:06:35		Prog Test Log 5-84
	10	9-11	254:08:26		Prog Test Log 5-84
	11	9-11			Pyro Test Log 5-89
	12	9-11	255:02:11		AOS & MESA EPET Log 5-96
	13	9-11	255:03:55		ACS & MESA EPET Log 5-96
	14	9-12	255:14:15		MWA Noise Troubleshoot
	15	9-12			
	16	9-14	257:19:06		TR2, OAPS, SBT S/C Log 6-6
	17	7-30			1st C&Dif EPET TR/DATA From S Band Down Link Prob
	18	9-20			Prog Checkout, X Strap ESUM Flag Search S/C Log 6-10
	19	9-20		264:03:44	ESOM Flag Search Prog EPET S/C Log 6-10
	20	9-20	264:03:44		Prog EPET, Comm EPET S/C 6-10
10	1	9-21		264:08:33	Comm, Prog EPET S/C Log 6-18
	2	9-21		264:11:00	Pwr EPET S/C Log 6-18
	3		S/C Log 6-18		
			264:11:00	264:14:10	Pwr EPET Prog Troubleshoot
	4		264:14:17		Troubleshoot S/C Log 6-18
	5			264:22:50	Troubleshoot S/C Log 6-18
	6		264:22:50		Troubleshoot S/C Log 6-18
	7				PSE Turn On S/C Log 6-18
	8	9-22		265:09:20	COMM EPET S/C Log 6-26
	9		265:09:21		COMM EPET S/C Log 6-26
	10		265:12:09	265:14:43	PROG EPET S/C Log 6-26

AE HISTORY TAPE LOG (Continued)

Shelf	Bin	Calendar Date	GMT Start	GMT Stop	Comment
10	11			265:16:02	Prog EPET S/C Log 6-26
	12	9-22	265:17:45	265:20:07	Exp EPET CEP, BIMS NATE Log 6-32
	13	9-22	265:20:07	265:22:28	Exp EPET NATE MESA PSA PSB, TPL, MAG, OSS
	14	9-22	265:22:28	266:01:09	OSS, NACE, VAE, LEE S/C Log 6-34
	15		266:01:09	266:09:46	LEE, Pwr EPET S/C Log 6-35
	16		266:09:46		Pwr EPET S/C Log 6-36
	17		266:13:00		NATE EPET S/C Log 6-38
	18		266:15:34	S/C Log 6-40	Memory Fail Vol VI PS41 VAE, ESUM, EUVS EPET
	19	9-23	266:19:29	266:21:07	MIMs LEE(2) EUVS (2) S/C Log 6-41
	20			267:05:16	MONE S/C Log 6-24
11	1		267:18:26		VAE EPET S/C Log 6-42
	2	9-24			C&DH S/C Log 6-44
	3			268:00:06	RPA S/C Log 6-45
	4		268:08:59		Most S/C Log 6-46
	5		268:16:00		Most With OAPS S/C Log 6-47
	6	9-25			DSAI DEBUG S/C Log 6-47
	7		268:22:42	269:00:50	PUMP DOWN S/C Log 6-48
	8		269:00:50	269:03:11	PUMP DOWN S/C Log 6-49
	9		269:03:11	269:05:29	Pump Task 1 S/C Log 6-54
	10	9-26	269:05:29	269:07:47	S/C Log 6-56
	11	9-26	269:07:47	269:10:05	T.; Log 6-57
	12		269:10:05	269:12:16	Ston Test Log 6-58
	13		269:12:18	269:14:37	Log 6-58
	14		269:14:38	269:16:37	Log 6-58
	15		269:16:57	269:19:09	Log 6-58
	16		269:19:09	269:21:29	SC Look Log 6-59
	17		269:21:29	269:23:51	VBTZ Carrier Stability
	18		269:23:51	270:02:07	S/C Look Log 6-60
	19		270:02:07	270:04:32	Log 6-60
	20		270:04:33	270:07:08	Mone 6-62
12	1		270:07:08	270:09:38	Mone 6-65
	2		270:09:38	270:11:56	Log 6-66
	3		270:12:25	270:14:52	Log 6-70
	4		270:14:52	270:17:13	Log 6-72
	5	9-27	270:17:13	270:19:33	SPS Log 6-73

AE HISTORY TAPE LOG (Continued)

Shelf	Bin	Calendar	GMT		Comment	
		Date	Start	Stop		
12	6	9-27	270:19:33	270:21:54	Log 6-74	
	7	9-27	270:21:54	271:00:17	PCS Log 6-74	
	8	9-27	270:00:17	270:02:38	Log 6-74	
	9	9-27	270:02:38	271:04:56	Log 6-74	
	10	9-28	271:04:56	271:07:16	SPS Log 6-74	
	11		271:07:16	271:09:34	Log 6-32	
	12		271:09:34	271:11:55	Log 6-83	
	13		271:11:55	271:14:19	Log 6-84	
	14		271:14:19	271:16:38	Log 6-84	
	15		271:16:38	271:19:41	Log 6-84	
	16		271:19:41	271:22:03	Task 6 Log 6-84	
	17	9-28	271:22:35	271:23:01	SCE Log 6-86	
	18		271:22:03	272:00:48	Log 6-86	
	19		272:00:48	272:03:07	Task 7 Log 6-88	
	20		272:03:07	272:05:29	Task 8 Log 6-89	
	13	1		272:05:29	272:09:30	Log 6-94
		2		272:09:30	272:11:48	BIMS, OSS ATC Temp Dump Log 6-96
		3		272:11:55		UVNO PLOT EPET Log 6-97
		4		272:11:48	272:14:02	MIMS Log 6-98
		5		272:14:02	272:16:32	NATE Log 6-98
6		9-29	272:16:32	272:18:42	VAE, LEE Log 6-100	
7			272:18:42	272:21:05	EUVS Log 7-1	
8			272:21:05	273:01:	Log 7-2	
9		9-29	273:01:38	273:04:07	Task 9 MOWE Log 7-4	
10			273:04:07	273:06:26	Task 9 Log 7-6	

AE HISTORY TAPE LOG (Continued)

Shelf	Bin	Calendar	GMT		Comment			
		Date	Start	Stop				
13	11	9-30-73	273:06:28	273:08:42	Orbit 2-3 Log 7-10			
	12		273:08:42	273:11:03	Log 7-11			
	13		273:11:03	273:13:15	Orbit 4-5 Log 7-16			
	14		273:13:15	273:16:29	Orbit 5-6 Log 7-16			
	15		273:15:29	273:17:44	Orbit 6 Log 7-18			
	16		273:17:44	273:20:03	Orbit 7 Log 7-19			
	17		273:20:03	273:22:33	Orbit 8 Log 7-20			
	18		273:22:33	274:00:54	Orbit 9 Log 7-21			
	19		274:00:54	274:03:16	Orbit 10-11 Log 7-22			
	20		274:03:16	274:05:32	Log 7-23			
	14		1	10-1-73	274:05:32	274:12:03	Orbit 12 Log 7-24	
			2		274:12:03	274:22:27	Task 10 Log 7-25	
			3		274:22:27	275:15:00	Log 7-25	
			4		10-3-73	275:15:01	276:03:07	Log 7-26
			5			276:03:07	276:05:30	MONE Log 7-30
			6		276:05:30	276:07:42	MONE Log 7-37	
			7		276:07:44	276:09:56	Log 7-38	
			8		10-3-73	276:09:56	276:12:47	Log 7-40
			9			:12:47	:15:09	Orbit 2 Log 7-43
			10		10-3-73	276:15:09	276:17:26	Log 7-44
11		276:17:26	276:19:46			Log 7-44		
12		276:19:46	276:22:07		TV Log 7-44			
13		276:22:07	277:00:25		TV Log 7-44			
14		10-3-73	277:00:25		277:02:24	TV, PES, PSG, PSP, CEP, TAL Log 7-46		
15	277:02:24		277:03:27	MIMS Log 7-47				
16	10-4-73	277:03:27	277:05:52	Log 7-48				
17	10-4-73	277:05:55	277:08:10	COMM 1 Log 7-49 (Cold SEPET)				
18	10-4-73	277:08:11	277:10:27	COMM 2 Log 7-49 (Cold SEPET)				
19	10-4-73	277:10:27	277:12:46	PROG EPET Log 7-50 (Cold SEPET)				
20	10-4-73	277:12:47	277:14:44	Experiments Log 7-53 MIMS				
15	1	10-4-73	277:14:47	277:16:32	Experiments Log 7-54			
	2		277:16:34	277:18:36	Experiments Log 7-55			
	3		277:18:36	277:20:56	Experiments Log 7-55			
	4		10-4-73	277:20:56	277:23:17	TV +5°C ACS Log 7-59		
	5			277:23:17	278:01:37	TV +5°C Log 7-59		
	6		10-5-73	278:01:37	278:04:01	PCE Log 7-60		
	7			278:04:01	278:06:31	SPS Log 7-62		
	8		278:06:31	278:08:47	SPS Log 7-66			
	9		278:08:47	278:11:06	PWR Log 7-68			
	10		10-5-73	278:11:06	278:13:42	PWR & VAE Log 7-71 (Cold)		
	11		10-5-73	278:13:42	278:15:56	VAE Log 7-71		
	12		10-5-73	278:16:08	278:18:25	NACE, OSS, ESUM Log 7-72		
	13		10-5-73	278:18:25	278:20:45	TV +5°C EUVS Log 7-73		

AE HISTORY TAPE LOG (Continued)

Shelf	Bin	Calendar Date	GMT Start	GMT Stop	Comment
15	14		278:20:45	278:23:06	TV +5°C EUVS Log 7-74
	15		278:23:06	279:01:26	TV +5°C EUVS Log 7-75
	16		279:01:26	279:04:00	TV +5°C RTMO Log 7-79
	17	10-6-73	279:04:00	279:06:28	Task 16 Log 7-83
	18		279:06:28	279:09:20	Task 16 Log 7-84
	19		279:09:20	279:11:43	Task 16 Log 7-85
	20		279:11:43	279:14:09	Task 17 +35°C Log 7-87
16	1	10-6-73	279:14:07	279:16:37	+35°C MOST Log 7-87
	2	10-6-73	279:16:37	279:19:11	+35°C MOST VAE Log 7-88
	3	10-6-73	279:19:11	279:21:31	+35°C TV Log 7-89
	4	10-7-73	279:21:31	280:07:18	+35°C → +5°C Log 7-90
	5	10-7-73	280:07:18	280:10:08	ATC Log 7-93
	6	10-7-73	280:10:08	280:12:33	+5 → +35°C Log 7-96
	7	10-7-73	280:12:33	280:15:04	C&DH +5°C Log 7-97
	8	10-7-73	280:15:22	280:17:42	C&DH +5°C Log 8-1
	9	10-7-73	280:17:42	280:19:20	Transition to +35°C Log 8-1
	10	10-7-73	280:19:20	280:22:25	Log 8-2
	11	10-7-73	280:22:27	281:01:02	Log 8-2
	12	10-7-73	281:01:02	281:03:35	Log 8-4
	13	10-8-73	281:03:35	281:06:11	Log 8-4
	14	10-8-73	281:06:11	281:08:40	+35°C EMI Log 8-6
	15	10-8-73	281:08:40	281:10:46	+35°C EMI Log 8-7
	16	10-8-73	281:10:46	281:13:06	Log 8-8
	17		281:14:15	281:19:30	Log 8-9
	18	10-8-73	281:19:30	281:22:16	Attitude Data Log 8-12
	19	10-8-73	281:20:31	282:00:10	Log 8-13
	20	10-8-73	282:00:10	282:02:36	Log 8-17
17	1	10-9-73	282:02:36	282:05:07	+35°C → +5°C Log 8-18
	2	10-9-73	282:05:07	282:07:22	+5°C Log 8-22
	3	10-9-73	282:07:22	282:10:03	+5°C Log 8-24
	4	10-9-73	282:10:03	282:13:09	SPS Log 8-28
	5	10-9-73	282:13:09	282:16:45	AECS Log 8-31
	6	10-9-73	282:16:45	282:19:01	Log 8-32
	7	10-9-73	282:19:01	282:21:19	T VAC EXP Log 8-34
	8		282:21:19	283:00:44	T VAC Prog Log 8-36
	9		283:00:44	283:02:10	RTMO Log 8-39
	10	10-10-73	283:03:02	283:05:15	Log 8-39
	11	10-10-73	283:05:15	283:08:59	JAM SPS Log 8-40
	12	10-10-73	283:09:00	283:11:10	VENT Chamber Log 8-44
	13	10-10-73	283:11:10	283:13:30	PSE, CC3, DIS Log 8-45
	14	10-10-73	283:13:32	283:18:00	Tank Valves Log 8-45
	15	10-10-73	283:15:00	283:17:12	Log 8-45
	16	10-10-73	283:17:12	283:16:28	Task 12 Log 8-47
	17	10-10-73	283:19:28	283:20:26	End of T/V Log 8-47
	18	10-12-73	285:19:33	283:21:23	NACE Test Log 8-52
	19	10-13-73	286:12:45	286:16:11	NACE Test LEE Test Trouble shot Log 8-54
	20	10-13-73	286:20:01	286:20:01	PCM 2 Check PSE I _{RB} Cal

AE HISTORY TAPE LOG (Continued)

Shelf	Bin	Calendar Date	GMT Start	GMT Stop	Comment
18	1	10-26-73	299:12:13:06	300:01:10:00	
	2	10-26-73	300:01:46	300:05:00	TAL, UVNO, NACE, TR2 Turnon
	3	10-27-73	300:05:00		MESA, NATE, MIMS Turnon
	4				
	5	10-27-73	300:19:14	300:21:25	Stabilizing to +35° C
	6	10-27-73	300:21:25	300:23:45	ACS EPET 112
	7	10-27-73	300:23:45	301:02:57	Tenney Test +35 ACS, COMM EPET
	8	10-27-73	301:02:57	301:05:17	Tenney +35 ACS COMM
	9	10-28-73	301:05:19	301:07:52	+35 Tenny COMM EPET & PWR EPET
	10	10-28-73	301:07:53	301:10:05	+35° C Tenney PWR EPET
	11	10-28-73	301:10:05	301:12:37	+35° Tenney C&DH Part 1
	12	10-28-73	301:12:37	301:15:18	+35° C C&DH MIMS
	13	10-28-73	301:15:18	301:19:04	+35° Tenney Exp EPETS RPA
	14	10-28-73	301:19:04	301:21:49	+35° Tenney EXP EPETS
	15	10-28-73	301:21:49	302:00:08	+35° C Tenney Exp EPETS OSS, VAE, NACE 1/2
	16	10-28-73	302:00:08	302:02:10	+35° Tenney Exp EPETS NACE 2/2 NATE,
	17	10-28-73	302:02:10	302:04:57	+35 UVNO, Pyro Test OSS PYRO
	18	10-29	302:07:56	302:09:59	+35 +5° +5° CEP EPET MIMS EPET
	19	10-29	302:09:59	302:11:58	+5° C RPA and MESA EPET
	20	10-29	302:12:35	302:14:34	
19	1	10-29	302:14:34	302:16:50	
	2	10-29	UVNO Plot	302:14:34	
	3	10-29	302:16:50	302:19:08	
	4	10-29	302:19:08	302:23:41	Tenny +5° Start Comm EPET
	5	10-29	302:23:41	303:02:05	+5° Temp Comm EPET
	6	10-30	303:02:05	303:05:18	+5 Tenney ACS EPET
	7	10-30	303:05:19	303:07:52	+5 Tenny ACS EPET
	8	10-30	303:07:52	303:10:08	+5 Tenny ACS EPET
	9	10-30	303:10:08	303:12:00	+5 Tenny ACS EPET
	10	10-30	303:13:50	303:16:41	+5 Tenney Pwr Epet
	11	10-30	303:16:48	303:20:18	+5°
	12	10-31	304:27:48	304:07:43	+5° HT
	13	10-31	304:07:43	304:11:55	MESA NOISE TEST
	14	11-6	310:14:39	310:21:34	PSE Check RPA Turn-on
	15	11-7	311:14:00	311:23:18	SPS Turn ON, SPS EPET 1/2
	16	11-7	311:23:18	312:04:11	2/2 SPS EPET EUVS Turn on 1/2 ESUM Turn on
	17	11-7	312:04:11	312:05:40	2/2 ESUM Turn-on ESUM EPET
	18	11-8	312:14:20	312:16:25	EUVP
	19	11-8	312:16:25	312:21:10	RPA EPET
	20	11-8	312:21:17	313:03:43	OSS Pump Pyro Tests 1/2 MESA EPET

AE HISTORY TAPE LOG (Continued)

Shelf	Bin	Calendar	GMT		Comment
		Date	Start	Stop	
20	1	11-8-73	313:03:43	313:06:30	Pyro Tests
	2	11-9	313:06:37	313:10:24	Tests
	3	11-9	313:10:35	313:13:40	HILH TIME CODE + DSAI
	4	11-9	313:18:	314:00:03	Current Measurements
	5	11-10	314:00:03	314:08:16	Prog Memz
	6	11-10	314:08:16	314:16:39	Prog Turn on 1st Prog Epet (Code Fail Octal 0100)
	7	11-10	314:18:35	314:20:54	Prog EPET
	8	11-10	314:20:59	314:03:43	Prog EPET - Move to Environmental Prog Tests: MEMX MEMO
	9	11-10	314:16:73	314:18:35	Prog Mem
	10	11-10	315:03:43	315:09:15	
	11	11-11	315:09:18	315:15:10	Prog Memo Tests
	12	11-11	315:15:10	315:18:39	Prog Memo Tests
	13	11-11	315:18:30	315:21:55	Prog Memo Tests
	14	11-11	315:21:57	316:01:22	Prog Memo Tests
	15	11-11	316:01:22	316:03:52	Prog Memo Tests
	16	11-11	316:03:52	316:05:47	Prog Memo Tests
	17	11-12	316:09:33	316:11:46	Prog Test
	18	11-12	316:14:26	316:16:46	Prog EPET to st 1387
	19	11-12	316:16:46	316:19:57	Prog EPET to end MEMO tests
	20	11-12	316:19:57	316:22:19	Prog Memo 50° c
21	1	11-12	316:22:19	317:04:17	Prog Trans to -10° C
	2	11-13	317:04:18	317:06:36	Prog MEMO @ 80°
	3	11-13	317:07:25	317:09:46	Prog EPET -10° Aborted
	4	11-13	317:12:36	317:14:54	Prog EPET Aborted
	5	11-13	317:14:54	317:17:12	Prog EPET Abort/Special Memo Tests
	6	11-13	317:17:12	317:20:40	Special Memo Tests
	7	11-13	317:20:40	317:22:52	Memo Tests
	8	11-13	317:22:52	318:01:14	Memo and Prog EPET 1/2
	9	11-13	318:01:14	318:03:26	Prog EPET2/2 Transition to -15° C 1/2
	10	11-13	318:03:26	318:06:15	Memo Transition to -15° C
	11	11-14	318:08:11	318:08:30	Aborted Prog EPET
	12	11-14	318:13:50	318:16:11	Memory Extention Tests
	13	11-14	318:16:11	318:18:29	Memory Extention tests
	14	11-14	318:18:29	318:20:48	Memory Execution Tests
15	11-14	318:20:48	318:23:17	Prog Test +35°	
16	11-14	318:23:17	319:01:14	Prog Test +35° C	
17	11-15	319:04:02	319:06:24	Prog Memo Tests + 50° C	
18	11-15	319:06:24	319:08:39	Prog Memo +50 +25° C	
19	11-15	319:08:39	319:11:10	Prog Memo @ +25	
20	11-15	319:11:10	319:14:46	Special Prog Tests	

AE HISTORY TAPE LOG (Continued)

Shelf	Bin	Calendar	GMT		Comment
		Date	Start	Stop	
22	1	11-15	319:14:46	319:16:18:40	Special Prog Tests
	2	11-15	320:00:48	320:04:32	Special Prog Tests
	3	11-15	320:04:32	320:06:21	Special Prog Tests
	4	11-16	320:06:21	320:10:12	MASC-QUOMAC
	5	11-16	320:11:00	320:21:56	
	6	11-16	320:21:56	321:00:32	Prog Test Sup Time Cov From Prog-1
	7	11-16	321:00:32	321:02:38	Prog Tests OAPS HTR Tests
	8	11-16-17	321:02:38	322:00:36	Prog Test Sup Tme Tests SN
	9	11-17	322:00:36		Before 4 AFTEM Board Romir SAF 103
	10	11-18	322:22:04	323:04:05	Prog Memo Tests
	11	11-19		323:19:55	HICT TCG EXEL Test
	12	11-19-21	323:19:55	325:07:39	High Time Base Exel Test Memo on Prog Mem 1 and 2 CEP EPET PSA EPET OAPS Pressurization (Pro Vib)

