ATM 668

RESULTS OF CPLEE ENGINEERING MODEL TESTS

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1.0 ENGINEERING MODEL SUBSYSTEM TESTS

All the engineering model subsystem tests with the CPLEE and the CPLEE experiment test set were successfully completed during February and March. The tests were performed under both ambient pressure and vacuum conditions. When the experiment was operated under vacuum conditions, all the electronic circuits and detectors were operated. Therefore, we obtained with the CPLEE Engineering Model a valid test on operating characteristics such as power profile and turn-on transients in addition to obtaining a complete check-out of all interface circuits. It is also important to note that operation of any or all three of the high voltage power supplies did not affect the performance of the interface circuits.

The CPLEE engineering model was tested in accordance with ATM 630, CPLEE Engineering Model Test Procedure, and the results of these tests are recorded in Tables I through VIII. The tests verified that CPLEE was operating properly and was ready to be integrated with the Central Station.

There were four test discrepancies that occurred during subsystem tests:

1. The Channeltron Power Supply "Increase ON" command was inoperative.

2. The feedback ripple from the low voltage power supply on the +29 volts line exceeded the spec limit.

3. This same feedback ripple from the low voltage power supply was picked up on the analog housekeeping lines, timing lines, and control lines.

4. There were current transients greater than 200 milliamperes per millisecond caused by the switching characteristics of the DC-DC converter in the low voltage power supply.

2.0 SYSTEM INTEGRATION TESTS

The following report on the system integration tests with CPLEE was prepared by the System Engineering Department and published in ATM 643, "March Engineering Model Test Progress Report." This information is repeated in this ATM in order to consolidate all the results from the CPLEE engineering model tests at BxA in a single document.

3.0 CATEGORY #2 TESTS FOR CPLEE

Subsystem tests with the CPLEE operating in vacuum were completed in February and Category #2 tests in vacuum commenced at the beginning of March. At this time the EM System was substantially in the Array A experiments configuration but with the CPLEE connected in place of the LSM, utilizing the LSM commands and data slots, although the CPLEE analog signal outputs were correctly connected to the Central Station multiplexer. This arrangement permitted Category #2 tests of CPLEE to be performed and also allowed the Array A experiments STS software to be checked and debugged.

The Category #2 tests of the CPLEE which were made at the end of January in the arrangement described except that the experiment was operating in air had proceeeded very smoothly, but when the tests in vacuum were started the experiment data stream was meaningless. In consequence a careful investigation was made to determine whether the change in the behavior of the experiment, which had passed its subsystem tests satisfactorily, was due to some spurious condition of the test set up with the Central Station. All the interface signals were proved to be in accordance with the ICS, and the only apparent change from the earlier test in air was the use of a non-standard cable between the Central Station and the CPLEE ETS vacuum chamber. This cable is required as the standard flat cable cannot be used with the vacuum chamber connectors. Measurements made at the chamber connector showed that high frequency noise induced from the experiment power convertor was present between the shields of the digital timing and data lines and the signal return, of about 200 mV peak-to-peak amplitude.

After further investigation it was established that valid experiment data could be obtained either by connecting a .025 μF capacitor between the data line shield and the signal return at the vacuum chamber end of the cable, and/or by making more direct connections between the cable shields and the Central Station ground. Category #2 tests were performed with these revised timing and data line shielding arrangements.

Table IX is a table of functional discrepancies noted during the Category #2 and #3 tests. A brief summary of the Category #2 test results is given below:

Power

The experiment power profile and the turn-on transient were within the limits quoted in the interface specification. Observed values of input current are:

CPLEE Status	Current
1. Normal	98 mA
2. Ripple during analyzer voltage sequence	10 mA p-p
3. Turn on	
1st peak	240 mA
2nd peak	280 mA
4. Heater on increment	90 mA
5. Initial heater on transient	80 mA

The turn-on-current transient, which has a characteristic double peak arising from the operation of the current limiter, is shown in Figure I.

The recorded turn-off transient peak voltages were +65V and -25V. These values are considered to be high but acceptable to the data subsystem. The turn-off voltage transient is shown in Figure II.

The experiment power convertor noise was substantial. Variations in the noise voltage were recorded at the signal breakout box close to the Central Station at different steps in the analyzer sequence and on alternate convertor half cycles. The maximum noise level observed was about 1.0 V p-p. In Figure III typical waveforms for the observed voltage noise and for the transient on the input current to the experiment are illustrated.

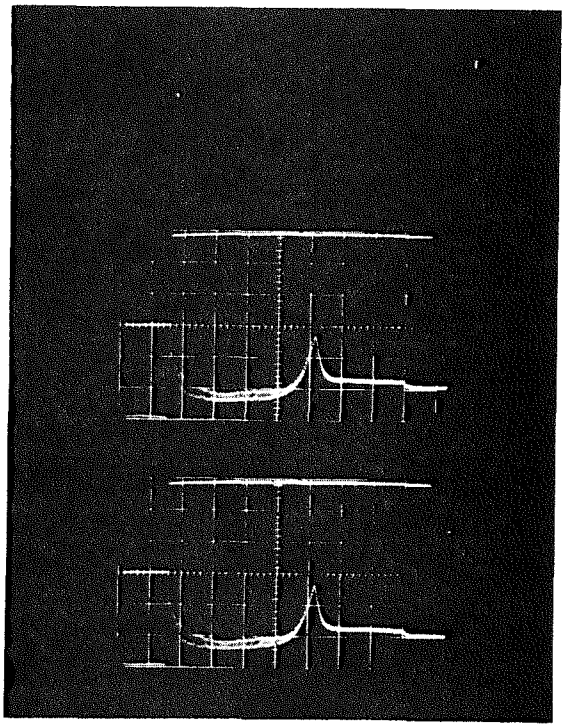
Commands

Command response was normal, the experiment responded correctly to all commands and no spurious interactions were detected.

Examination of the waveform on the experiment to Central Station interface lines showed that substantial loading of the Central Station by the experiment occurred, raising the logical "low" level during the command to a value which depended on the command line being examined, and which was between +150 mV and +300 mV. Also about 250 mV peak-to-peak noise induced from the CPLEE power convertor was present, so that on certain lines the level could rise marginally above the ICS value of +400 mV maximum.

Both records:
Top trace: 29 V to experiment 10 V/cm
Bottom trace: 29 V line input current to experiment 100 mA/cm

Both records: 10 mS/cm

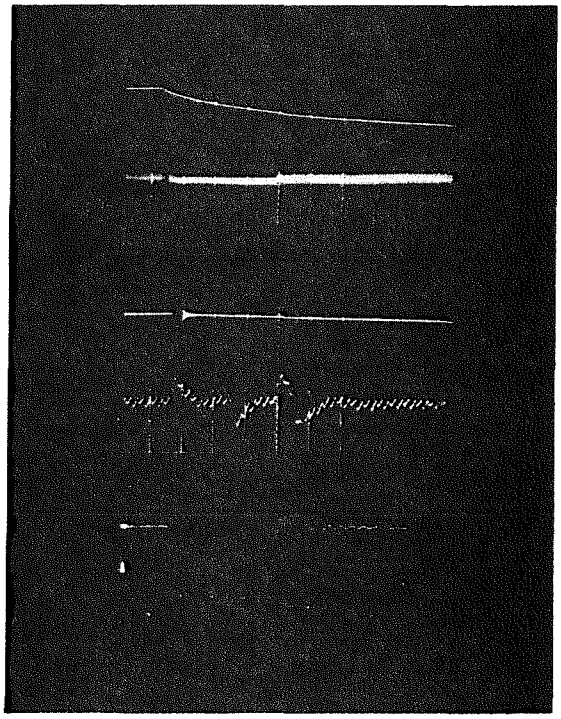


(a) PCU #2

(b) PCU #1

Figure I CPLEE Turn-On Transients

All records:
Top trace: 29 V line to experiment 20 V/cm
Bottom trace: 29 V supply from PCU 200 mV/cm



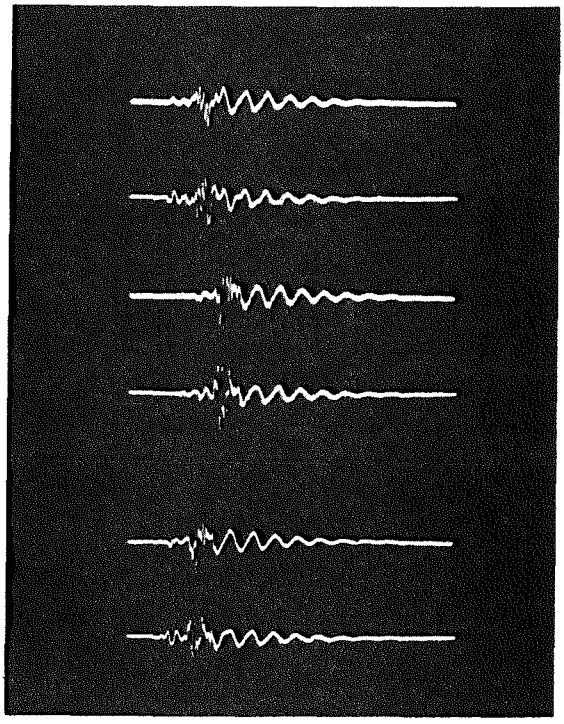
(a) 5 mS/cm

(b) 200 μs/cm

(c) 20 μs/cm

Figure II CPLEE Turn-Off Voltage Transients

All records:
Top trace: 29 V to experiment 0.5 V/cm
Bottom trace: 29 V line input current 100 mA/cm
All records: 2 μs/cm multiple sweep exposures



Note that variations occur:

1. Between each convertor half cycle.

2. At different steps in the analyzer sequence.

Figure III CPLEE 29V Line, Typical Power Convertor Noise

Oscillograph records were obtained and are available at BxA, but the noise frequency is sufficiently high to be at the limit of the speed of the camera and film which was available and the records are not suitable for reproduction.

Timing and Data Signal Waveforms

All the timing and data signal waveforms were normal and were in accordance with the ICS specification values. Typical data words are shown with the corresponding demand pulses in Figure IV.

Detail oscillograph records were taken of all the waveforms, and these are available at BxA. It was observed that the loading of the experiment raises the low level of the even frame mark to +0.15V and the low level of the shift and data demand lines to +0.3V. Furthermore, about 150mV peak-to-peak of power convertor induced noise was superimposed on these levels. However, as explained above for the command lines the records are not suitable for reproduction.

Downlink Performance

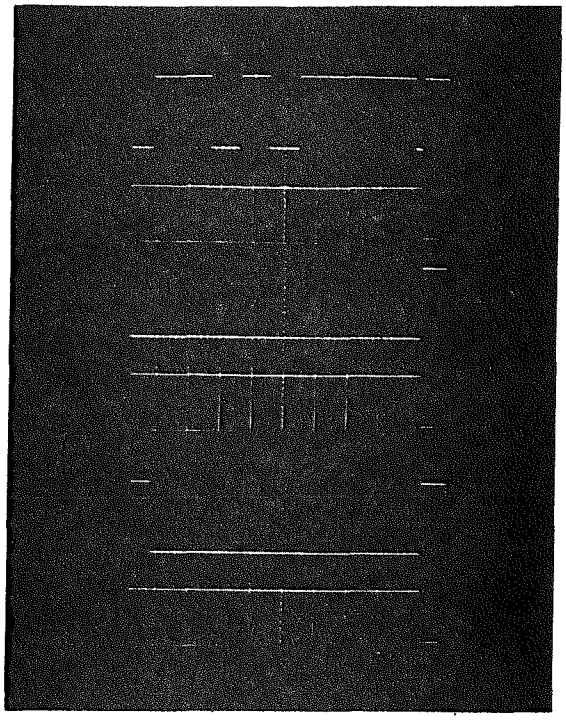
With the revised shield grounding and filtering as described above, the downlink performance appeared to be good, but a detailed verification of the downlink performance was deferred until the Category #3 tests.

4.0 CATEGORY #3 TESTS - - ARRAY A3

Category #3 testing was limited to three days operation of the Array A3 configuration of experiments, the PSE, SWE and CPLEE were operated together, the LSM was not available to complete the array. In this configuration CPLEE replaces the SIDE, and the SIDE data slots are used, i.e., words 15, 31, 47, 56 and 63 in the ALSEP format, together with word 24 which was previously a SP PSE word.

Most of the testing was directed towards checking the CPLEE, as the other experiments had previously been checked during the Array A Category #3 tests as reported in ATM 626. A new problem was encountered, the count data on both the science and calibration steps appeared to be correct, examination of the analog lines indicated that the analyzer voltage was sequencing correctly but a substantial number of errors on the experiment sequence status bits were detected. These errors only occurred on the positive analyzer voltage steps of the sequence, no errors were recorded on the negative voltage steps.

All records:
Top trace: 10 MSB's of CPLEE word #2, 2 V/cm
Bottom trace: Data demand 2 V/cm
All at: 1 mS/cm



(a) Calibration count

(b) All "zeros"

(c) Leading "one" followed by all "zeros"

Figure IV CPLEE Data and Data Demand Signals

Large fluctuations of the error rate were observed during the three day test period. It was established that the interface signals to the CPLEE were in accordance with the ICS values, and also that the error rate at a given time was unaffected by the operation of either or both the PSE and the SWE. Consequently, it was decided to perform the planned Category #3 tests, and to treat the observed errors as a simple experiment malfunction not associated with the rest of the system. During the course of the tests, no correlation between error rate and experiment operating time or temperature could be discerned.

The system command response was checked with all the experiments operating in a similar test to that performed on the Array A experiment configuration. Command sequences for both central station control and for the individual experiments were employed. During this tests, the experiments which were not being directly addressed were set in their reset mode, and the operating mode status of the experiments was verified by the ETS's.

No major interactions which would permanently affect the experiment operating mode were detected, although on two occasions the CPLEE apparently jumped forward in its analizer voltage sequence. This behavior could not be made to recur on repeating the commands. However, as the CPLEE status bits reflect the current state of the experiment, the effect of any jump is restricted to the possible loss of one or two frames of CPLEE data which would appear to be of minor significance.

5.0 CATEGORY #4 TESTS

The CPLEE STS program was run for the first time 3/15/67 and proved to be completely correct, the data decommutation, experiment status tracking, data output formating, data print out and command tracking operations all worked without error.

Table I - ETS Isolation of Lines Check(1), ETS

ETS Selector SW Pos.	Resistance to Chassis Grnd			
	ETS Alone		ETS with CPLEE	
	Specified	Measured	Specified	Measured
A 2	30K Ω ± (*)	∞	1.5K (*)	1.6 K
A 4	1800Ω	1580 Ω	1.3K	1.3 K
A 6	1450 Ω	1490 Ω	1.3K	1.2 K
A 9	1800 Ω	1360 Ω	1.3K	1.3 K
A 19	∞	∞	22K	22 K
A 20	∞	∞	7.3K	7.3K
A 21	∞	∞	6.9K	6.9K
A 22	∞	∞	320 Ω	320 Ω
A 23	∞	∞	5.5K	5.5K
A 24	∞	∞	5.5K	5.6 K
C-11	1700 Ω	3100	1.3K	1.3K
C-12	1700 Ω	3100	↕	1.3K
C-13	1700 Ω	3100		1.3K
C-14	1700 Ω	3100		1.25K
C-15	1700 Ω	3100		1.25K
C-16	1700 Ω	3100		1.25K
C-17	1700 Ω	3100		1.3 K
C-18	1700 Ω	3100	1.3K	1.3 K
A 26	74 Ω	74 Ω	70 Ω	70 Ω
A 27 (4)	~~∞~~ 74 Ω	75 Ω	70 Ω	70 Ω
A 30	∞	∞	380 Ω	380 Ω
A 31	2800 Ω	32 K	1.2K	1.15K
A 32	∞	∞	1.4K	1.4K
A 33	∞	∞	1.0K	0.9 K
A 34	∞	∞	650 Ω	650 Ω
A 35	∞	∞	310 Ω	310 Ω
A 36	∞	∞	24K	24 K
A 37	∞ (*)	∞	300K	300 K

SW. "A" in Pos. "C"

(1) Refer to Fig. 1 for ETS Selector Switch Designation.
(*) All resistances are specified to ± 25%.
(4) Throw switch on Main Power Panel to "Survival Htr Power Line" position for this measurement only.

Table II - CPLEE Cable Isolation Measurements

	No.*	Line	Deutsch P65B	RESISTANCE: Line to Case Grnd (1) Specified	Line to Case Grnd (1) Measured	Line to Signal Grnd (2) Specified	Line to Signal Grnd (2) Measured	Remarks
	1	Shield	j			∞	∞	
	2	Digital Data	V			1.6K (3)	1.6K	
	3	Shield	s			∞	∞	
	4	Shift Pulse (Data Clock)	U			480K	480K	
	5	Shield	i			∞	∞	
	6	Even Frame Mark	T			16K	16K	
	7	Shield	t			∞	∞	
	8	Case Ground Return	S	0Ω		∞	∞	
	9	Demand Pulse	h			1.3K	1.3K	
	10	Signal Return	r			0 Ω	0	
Commands	11	Therm. Cont. Bypass On	R			10 Meg	10 Meg	
Commands	12	Therm. Cont. Bypass Off	g			8.5 Meg	8.5MΩ	
Commands	13	Dust Cover Removal	q			120K	120K	
Commands	14	Auto. Volt Level Seq. On	P			70K	70K	
Commands	15	Step Voltage Level	f			500K	500K	
Commands	16	Auto Volt Level Seq. Off	e			500K	500K	
Commands	17	Chann. P.S. Volt INCR On	N			∞	∞	
Commands	18	Chann. P.S. Volt INCR Off	M			∞	∞	

*These flat cable line numbers are the same as connector J65A-P65 (flight connector) numbers.

(1) Connect one lead of the ohmmeter to line 8 (Deutsch Pin S).

(2) Connect one lead of the ohmmeter to line 10 (Deutsch Pin r).

(3) All resistances are specified to ± 25%.

Table II (continued)

	No.	Line	Deutsch P65B	RESISTANCE: Line to Case Grnd Specified	RESISTANCE: Line to Case Grnd Measured	RESISTANCE: Line to Signal Grnd Specified	RESISTANCE: Line to Signal Grnd Measured	Remarks
Housekeeping	19	Switchable P.S. Volt	L			30K	30K	
	20	Channeltron PS #1 volt	K			7.5K	7.5K	
	21	Channeltron PS #2 volt	J			7.0K	7.0K	
	22	DC-DC Converter volt	d			300 Ω	300 Ω	
	23	Temperature #1	c			5.7K	5.7K	
	24	Temperature #2	H			5.7K	5.7K	
	25	Spare	p			∞	∞	
	26	Operating & Heater Pwr	b			∞	∞	
	27		G			∞	∞	
	28		n			∞	∞	
	29		a			∞	∞	
	30	Power Return Line	F			∞	∞	
	31		m			∞	∞	
	32		k			∞	∞	
	33		Z			∞	∞	
	34	Survival Heater Power	E			∞	∞	
	35		Y			∞	∞	
	36		X			∞	∞	
	37		D			∞	∞	

Not Connected - A, B, C, W

Table III - Experiment Functional Tests

Ambient Pressure

Paragraph Number	Test Parameter	Test Limit	Measured Value	Remarks
5.6.1	Experiment Current (Heater Off)	80 ± 5 ma	80 mA	
5.6.2	Noise & Ripple	≤100 mv p-p	+40 mA -30 mA	current noise
5.6.3	Digital Data Sequence	Fig. 2	Correct ☒ Incorrect ☐	
5.6.3	Test Oscillator Frequency	Fig. 2	381 KC	
5.6.4.1	Experiment Current, Heater Off	80 ± 5 ma	80mA	
5.6.4.1	Command Indicator Lights			
	Thermal Control Bypass On	ON	✓	
	Automatic Voltage Sequence On	ON	✓	
	Channeltron P.S. Voltage Increase Off	ON	✓	
	All other indicator lights	OFF	✓	
5.6.4.1	Experiment Current (Heater On)	142 ± 5 ma	160 mA	
5.6.4.2	Experiment Current (Heater Off)	80 ± 5 ma	80 mA	
5.6.4.2	Command Indicator Lights			
	Thermal Control Bypass Off	ON	✓	
	Automatic Voltage Sequence On	ON	✓	
	Channeltron P.S. Voltage Increase Off	ON	✓	
	All other indicators Off	OFF	✓	

Table III - Experiment Functional Tests

Ambient Pressure (continued)

Paragraph Number	Test Parameter	Test Limit	Measured Value	Remarks
5.6.4.3	Dust Cover Removal Signal (3.19V → ± 0.2V)			
	Amplitude	0→0.2V		
	Duration	18 ± 2 ms		
5.6.4.3	Command Indicator Lights			
	Thermal Control Bypass Off	ON	✓	
	Automatic Voltage Sequence On	ON	✓	
	Channeltron P.S. Voltage Increase Off	ON	✓	
	Dust Cover Removal	ON	✓	
	All other indicators	OFF		
5.6.4.4	Digital Data Sequence, AUTO SEQ. OFF	Fig. 2	ID Bit Check Correct ☒ Incorrect ☐	
	Command Indicator Lights			
	Thermal Control Bypass Off	ON	✓	
	Automatic Voltage Sequence Off	ON	✓	
	Channeltron P.S. Voltage Increase Off	ON	✓	
	All other indicators	OFF	✓	
5.6.4.5	Digital Data Sequence, STEP VOLT. LEVEL	Fig. 2	ID Bit Check 3,4: 11 10 01 00 / 3,4: 11 10 01 00	

Table III - Experiment Functional Tests

Ambient Pressure (continued)

Paragraph Number	Test Parameter	Test Limit	Measured Value	Remarks
			Light Check	
5.6.4.5	Command Indicator Lights			
	Thermal Control Bypass Off	ON	✓	
	Automatic Voltage Sequence Off	ON	✓	
	Channeltron P.S. Voltage Increase Off	ON	✓	
	All other indicators	OFF	✓	
			Correct ☒ Incorrect ☐	
5.6.4.6	Digital Data Sequence, AUTO SEQ. ON	Fig. 2		
	Command Indicator Lights			
	Thermal Control Bypass On	ON	✓	
	Automatic Voltage Sequence On	ON	✓	
	Channeltron P.S. Voltage Increase Off	ON	✓	
	All other indicators	OFF	✓	

Table IV - Analog Housekeeping Data

Ambient Pressure Condition

Voltage Selector Switch	Title	Analog T/M Signals Nominal	Tolerance	Measured
HK-1	Switchable P.S.			
	+3500	0V	± 0.2V	0 V
	350	0V	± 0.2V	0 V
	35	0V	± 0.2V	0 V
	+0	0V	± 0.1V	0 V
	-3500	0V	± 0.2V	0 V
	-350	0V	± 0.2V	0 V
	-35	0V	± 0.2V	0 V
	-0	0V	± 0.1V	0 V
HK-2	Channeltron P.S. #1	0V	± 0.2V	0 V
HK-3	Channeltron P.S. #2	0V	± 0.2 V	0 V
HK-4	DC-DC Converter	3.10V	± 0.2V	3.3 V
HK-5	Temp. of Logic Module Standoff	1.78V (+25°C)	Note 1	1.95 V
HK-6	Temp. of Low Voltage P.S.	1.78V (+24°C)	Note 1	1.90 V

NOTE: Maximum safe operating temperature in vacuum is 45°C.
See attached curves for conversion data.

Table V - CSE Connector Signals
Ambient Pressure Condition

CPLEE GSE Connector (9 Pins)	Position of ETS Selector Switch "A"	SIGNAL Specified	SIGNAL Measured	Remarks
TP1 Test Osc. Output	30	Freq.: 375KC to 385KC	381 KC	
TP2 VFO Input	31	See remarks	—	Should be zero unless external VFO signal is applied.
TP3 Low Voltage 34V	32	+34VDC (± 1.0)	34 V	
TP4 Power 29V	33	+29VDC (± 0.5)	29.5 V	
TP5 Supply 6V	34	+ 8VDC (± 1.0)	8.4 V	
TP6 Dust Cover Removal Signal to Squibs	35 13	3.10 (± 0.2) VDC		See Note 1
TP7 Channeltron P.S. Low Voltage	36	28.8 (± 0.5) volts DC	27.5 V	
TP8 Channeltron P.S. Return	37	0V	0	

Note 1 This point measures the voltage applied to the collector of a transistor. When the dust cover removal command is transmitted, the transistor is turned "ON", and this voltage drops to about +0.5 volts for 20 millisecond.

Table VI - Analog Housekeeping Data

Vacuum Condition

Voltage Selector Switch	Title	Analog T/M Signals Nominal	Tolerance	Measured
HK-1	Switchable P.S.			
	+3500	3.30V	± 0.2V	3.34 V
	350	4.30V	± 0.2V	4.30
	35	4.15V	± 0.2V	4.15
	+0	0.25V	± 0.1V	0.25
	-3500	4.05	± 0.2V	4.05
	-350	4.30V	± 0.2V	4.30
	-35	4.15V	± 0.2V	4.15
	-0	0.25V	± 0.1V	0.25
HK-2	Channeltron P.S.#1	3.75V	± 0.2V	3.75
HK-3	Channeltron P.S.#2	3.38V (no load)	± 0.2V	3.37
HK-4	DC-DC Converter	3.10V	± 0.2V	3.1
HK-5	Temp. of Logic Module	1.78V (=25°C)	Note 1	1.78
HK-6	Temp of Low Voltage P.S.	1.70V(=24°C)	Note 1	1.70

NOTE: Maximum safe operating temperature in vacuum is 45°C.
* See attached curves for conversion data.

Table VII - GSE Connector Signals March 15, 1967

Vacuum Condition Vacuum 2.5×10^{-6} torr

CPLEE GSE Connector (9 Pins)	Position of ETS Selector Switch "A"	SIGNAL Specified	SIGNAL Measured	Remarks
TP1 Test Osc. Output	30	Freq.: 315KC to 385KC	381 KC	
TP2 VFO Input	31	See remarks		Should be zero unless external VFO signal is applied.
TP3 Low Voltage 34V	32	+34VDC (± 1.0)	+34V, noise:	+250 mv P -200 mv P
TP4 Power 29V	33	+29VDC (± 0.5)	29.5 V	
TP5 Supply 6V	34	+ 8VDC (± 1.0)	8.4 V	
TP6 Dust Cover Removal Signal to Squibs	35 13	3.10 (± 0.2) VDC		See Note 1
TP7 Channeltron P.S. Low Voltage	36	28.8 (± 0.5) volts DC	27.5V	+1.0V P -1.0V P
TP8 Channeltron P.S. Return	37	0 VDC	27.5 V	When TP-7 is jumpered to TP-8 on Command Indicator Panel, TP-8 will read 28.8 (± 0.5) volts.

Note 1 This point measures the voltage applied to the collector of a transistor. When the dust cover removal command is transmitted, the transistor is turned "ON" and this voltage drops to about +0.2 volts for 20 milliseconds.

Table VIII - Experiment Functional Tests

March 1st 1967

Vacuum Operation

Vacuum : 2.5×10^{-6} torr

Paragraph Number	Test Parameter	Test Limit	Measured Value	Remarks
5.7.2	a. Experiment Current (Heater Off), HV supplies OFF	80 ± 5ma	a. 80 ma	
	b. Experiment Current (Heater Off, HV P.S. On)	98 ± 5ma	b. 98 ma	
	c. Noise & Ripple		c. +40 ma, -30ma	
	d. Noise & Ripple		d. +40ma, -30 ma	
5.7.5	Digital Data Sequence	Fig. 2	Correct ☒ Incorrect ☐	
5.7.5	Test Oscillator Frequency	Fig. 2	441 424 c/1.147sec	(OK within 10% limits)
5.7.6.1	Experiment Current, Heater Off	98 ± 5 ma	98 ma	
5.7.6.1	Command Indicator Lights			
	Thermal Control Bypass On	ON ✓		
	Automatic Voltage Sequence On	ON ✓		
	Channeltron P.S. Voltage Increase Off	ON ✓		
	All other indicator lights	OFF ✓		
5.7.6.1	Experiment Current (Heater On)	160 ± 5 ma	160 ma	
5.7.6.2	Experiment Current (Heater Off)	98 ± 5 ma	98 ma	
5.7.6.2	Command Indicator Lights			
	Thermal Control Bypass Off	ON ✓		
	Automatic Voltage Sequence On	ON ✓		
	Channeltron P.S. Voltage Increase Off	ON ✓		
	All other indicators Off	OFF ✓		

Table VIII (continued)

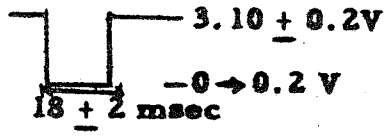
Paragraph Number	Test Parameter	Test Limit	Measured Value	Remarks
5.7.6.3	Dust Cover Removal Signal Amplitude Duration			
5.7.6.3	Command Indicator Lights			
	Thermal Control Bypass Off	ON ✓		
	Automatic Voltage Sequence On	ON ✓		
	Channeltron P.S. Voltage Increase Off	ON ✓		
	Dust Cover Removal	ON ✓		
	All other indicators	OFF ✓		
5.7.6.4	Digital Data Sequence, AUTO SEQ. OFF	Fig. 2	ID Bit Check Correct ☒ Incorrect ☐	
	Command Indicator Lights			
	Thermal Control Bypass Off	ON ✓		
	Automatic Voltage Sequence Off	ON ✓		
	Channeltron P.S. Voltage Increase Off	ON ✓		
	All other indicators	OFF		
5.7.6.5	Digital Data Sequence, STEP VOLT. LEVEL	Fig. 2	ID Bit Check 3,4 1 1 · 3,4 1 0 · 3,4 0 1 · 3,4 0 0 3,4 1 1 · 3,4 1 0 · 3,4 0 1 · 3,4 0 0	

Table VIII continued

Paragraph Number	Test Parameter	Test Limit	Measured Value	Remarks
			Light Check	
5.7.6.5	Command Indicator Lights			
	Thermal Control Bypass Off	ON	✓	
	Automatic Voltage Sequence Off	ON	✓	
	Channeltron P.S. Voltage Increase Off	ON	✓	
	All other indicators	OFF	✓	
			Correct ☒	Incorrect ☐
5.7.6.6	Digital Data Sequence, AUTO SEQ. ON	Fig.2		
5.7.6.6	Command Indicator Lights			
	Thermal Control Bypass On	ON	✓	
	Automatic Voltage Sequence On	ON	✓	
	Channeltron P.S. Voltage Increase Off	ON	✓	
	All other indicators	OFF	✓	
5.7.7	Turn-On Transient			
	Auto Volt. Sequence	ON	✓	
	Channeltron P.S. Increase	OFF	✓	
	Thermal Control Bypass	OFF	✓	
5.7.8	Noise & Ripple on Power Lines	≤100 m V p-p	+40mV, -30mV, all H.V. Supplies - ON	

Table IX

CPLEE DISCREPANCIES NOTED IN EM TESTS

	Discrepancy	ICS Paragraph	ICS Value	Acceptable Value to Bendix	Remarks
1.	Intermittent Digital Data Operation with EM Central Station	NA	NA	NA	Investigation indicates that the experiment logic may have a low noise margin. Category #2 tests completed with revised grounding and filtering of timing lines to reduce noise input to the experiment. Improved shielding incorporated in the prototype.
2.	Power Line Noise	3.2.3.4	100 mV p-p	Dependent on Cat. #3 tests	1 V p-p noise in the 29 V line. Additional shielding incorporated in prototype model.
3.	Power Converter Noise on Analog Lines	3.2.2.2	10 mV p-p	———	Affects data accuracy, refer to 2. Acceptable value depends on accuracy required.
4.	Power Converter Noise on Timing and Command Lines	Not specified.		100 mV p-p	About 150 mV p-p on timing, about 250 mV p-p on command lines. Can carry the logic "low" level marginally above the +0.4 V limit. See Item 1 regarding sensitivity of experiment to this noise.
5.	Errors on Status Bits Transmitted by Experiment	3.2.2.3.4	———	Errors are not acceptable	Observed during Category #3 tests. All other data indicates that experiment is functioning correctly. Errors could not be correlated with operation of the other experiments.