SEPT 1982

THEMATIC MAPPER

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Prepared for
GODDARD SPACE FLIGHT CENTER
Greenbelt, Maryland 20771
CONTRACT NAS 5-24200

FLIGHT MODEL
PRESHIPMENT REVIEW
DATA PACKAGE
VOLUME IV - APPENDIX
PART E - ELECTRONICS MODULE DATA

Article IV - 3A

HUGHES
HUGHES AIRCRAFT COMPANY
SPACE AND COMMUNICATIONS GROUP

HS 236-0019-1679

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Article IV - 3A

HUGHES

SPACE AND COMMUNICATIONS GROUP

Hughes Ref No. 34598-

Appendix E

Electronics Module Performance Data

Part 1

Pre-Integration Test Data

MODEL EFFECTIVITY	REVISIONS			
	SYM	DESCRIPTION	DATE	APPROVED
	A	[illegible]	[illegible]	
FIRST USE	B	Incorporated EO 1497A, Inc ECR TM2121/01.	EO 2 2 8	
FIRST USE	C	Incorporated EO's 2408A,2681A,2803A,2804A, 2878A,& 3105A	81-6-3	

See EO 3987A
See EO 4059A
See EO 4159A
EO 4089A
EO 4180A
EO 4199A
See EO

CONTRACT NO
NAS 5-24200

PREPARED	12/15/79
CHECKED	3/4/80
APPROVED	3/6/80
APPROVED	3/14/80
	4/2/80
	4/11/80

SANTA BARBARA RESEARCH CENTER
A Subsidiary of Hughes Aircraft Company
GOLETA, CALIFORNIA

TITLE
ELECTRONICS MODULE UNIT,
ACCEPTANCE TEST, PROCEDURE FOR

SIZE	CODE IDENT NO	NUMBER
A	11323	16704

SCALE | SHEET 1 OF 231

FORM NO 3122 8-75 691

PROJECT PL 1162

ELEC

SBRC ENGINEERING ORDER / ~~REVISION NOTICE~~ NO. 4199A

CODE IDENT 11323

SHEET 1 OF 1

DRAWING TITLE	DRAWING NUMBER
ELEC MODULE UNIT TEST PROCEDURE	16704 (C)

PROJECT NUMBER	ITEM DISPOSITION	CLASS CHANGE	DRAWING TYPE
PL 1162	REWORK ☐ ITEMS CONFORM ☒	I ☐ II ☒ A	A ☐ B ☒
EFFECTIVITY S1065 S/N 003 & SUBSQ	NO ITEMS MADE ☐ REJECT ☐ USE ☐ NOT APPLICABLE ☐ REF FR 8343	AUTHORIZING ECR NUMBER TM2658/01	

DESCRIPTION OF CHANGE

SHEET 229, PARA 4.23.9.25

WAS:

CDVU +8V	1-14	1-15	8(±.8) VDC
RADIOMETER +8V	1-5	1-4	8.5(±.85) VDC

IS:

RADIOMETER +8V	1-14	1-15	8.5(±.85) VDC
CDVU +8V	1-5	1-4	8(±.8) VDC

SHEET 230, PARA 4.23.9.26

WAS:

CDVU +8V	1-14	1-15	8(±.8) VDC
RADIOMETER +8V	1-5	1-4	8.5(±.85) VDC

IS:

RADIOMETER +8V	1-14	1-15	8.5(±.85) VDC
CDVU +8V	1-5	1-4	8(±.8) VDC

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CHECKED BY	DATE 9 MAR 92	MANUFACTURING APPROVAL	DATE	INCORPORATED BY	DATE
REA/RSA APPROVAL	DATE 9 MAR 1992	PROJECT APPROVAL	DATE 3/9/92	DRAWING REV LETTER	

FLEX

SBRC ENGINEERING ORDER / ~~REVISION NOTICE~~ NO. 4180A

CODE IDENT 11323

SHEET 1 OF 1

NG TITLE	DRAWING NUMBER
ELECTRONICS MODULE UNIT ACCEPTANCE TEST	16704-C

PROJECT NUMBER	ITEM DISPOSITION	CLASS CHANGE	DRAWING TYPE
PL1162	REWORK ☐ ITEMS CONFORM ☒	I ☐ II ☒A	A ☐ B ☒
EFFECTIVITY 51065 S/N 003 AND SUBQ	NO ITEMS MADE ☐ REJECT ☐ USE ☐ NOT APPLICABLE ☐	AUTHORIZING ECR NUMBER TM2654/01	

DESCRIPTION OF CHANGE

SHEET 230 PARA 4.23.9.26

WAS: SET + S/C SIMULATED LINE VOLTAGE TO 21 (+0.5, -0) VDC

IS: SET + S/C SIMULATE LINE VOLTAGE TO 23 (+.5, -0) VDC

also correct typographical error at same subparagraph -

WAS: Measure Power Supply Output Voltages during HI LINE ...

IS: Measure Power Supply Output Voltages during LO LINE ...

"*" NOTE AND/OR ITEM NUMBER TO BE ASSIGNED AT TIME OF INCORPORATION

ED BY	DATE	QUALITY APPROVAL	DATE	RELEASED BY	DATE
[illegible]	3 MAR 92	[signature]	3 MAR 92	[signature]	3-3-92
CHECKED BY	DATE	MANUFACTURING APPROVAL	DATE	INCORPORATED BY	DATE
[signature]	3MAR 92				
REA/RSA APPROVAL	DATE	PROJECT APPROVAL	DATE	DRAWING REV LETTER	
[signature]	3 MAR 92	[signature]	3/3/92		

AC FORM NO. 351 [illegible]

ELEC

SSRC ENGINEERING ORDER / ~~REVISION NOTICE~~ NO. 4059A

ODE IDENT 11323

SHEET 1 OF 1

DRAWING TITLE	DRAWING NUMBER
ELECTRONICS MODULE UNIT ACCEPTANCE TEST PROCEDURE	16704-C

PROJECT NUMBER	ITEM DISPOSITION	CLASS CHANGE	DRAWING TYPE
PL1162	REWORK ☐ ITEMS CONFORM ☒	I ☐ II ☒ A	A ☐ B ☒
EFFECTIVITY 51065 S/N 002 & SUBSQ	NO ITEMS MADE ☐ REJECT ☐ USE ☐ NOT APPLICABLE ☐	AUTHORIZING ECR NUMBER TM2618/01	

DESCRIPTION OF CHANGE

DATA SHEET 4 OF 22 PARA 4.19.1

BAND 1 SPEC LIMIT (mVp-p) IS 225≤V≤814 WAS 270≤V≤570

DATA SHEET 7 OF 22 PARA 4.19.2

BAND 2 SPEC LIMIT (mVp-p) IS 740≤V≤2670 WAS 909≤V≤1990

DATA SHEET 10 OF 22 PARA 4.19.3

BAND 3 SPEC LIMIT (mVp-p) IS 740≤V≤2670 WAS 760≤V≤1660

DATA SHEET 13 OF 22 PARA 4.19.4

BAND 4 SPEC LIMIT (mVp-p) IS 912≤V≤3630 WAS 1660≤V≤3630

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D. Smith	11/22/82	[signature]	1-3-83	[signature]	83-1-27
CHECKED BY	DATE	MANUFACTURING APPROVAL	DATE	INCORPORATED BY	DATE
[signature]	12/22/82				
REA/RSA APPROVAL	DATE	PROJECT APPROVAL	DATE	DRAWING REV LETTER	
[signature]	[illegible]	[signature]	1/27/83		

[illegible]

E.O. No.

[EDITC] ENGINEERING ORDER / ~~REVISION NOTICE~~ NO. 4159.1

SHEET 1 OF 2

DESCRIPTIVE TITLE	DRAWING NUMBER
[illegible] UNIT ACCEPTANCE TEST PROCEDURE	1670-4-C

PROJECT NUMBER	ITEM DISPOSITION	CLASS CHANGE	DRAWING TYPE
PL1162	REWORK ☐ ITEMS CONFORM ☒ NO ITEMS MADE ☐ REJECT ☐ USE ☐ NOT APPLICABLE ☐	I ☐ A ☒	A ☐ B ☒

EFFECTIVITY	AUTHORIZING ECR NUMBER
S1065 [illegible]	TM2646/01

DESCRIPTION OF CHANGE

SHEET 215, PAR 4.23.9.2

WAS : SMA +28V 240, ½W 1-1, 1-2 1-5
SMA -28V 240, ½W 1-11, 1-12 1-6

IS : SMA +28V 240, 5W 1-1, 1-2 1-6
SMA -28V 240, 5W 1-11, 1-12 1-7

SHEET 217, PAR 4.23.9.6

WAS : MEASURE STEADY STATE SMA +28V 28<V<30.5 VDC

IS : MEASURE STEADY STATE SMA +28V 28<V<31 VDC

SHEET 218, PAR 4.23.9.9

WAS : MEASURE STEADY STATE SMA -28V -28<V<-30.5 VDC

IS : MEASURE STEADY STATE SMA -28V -28<V<-31 VDC

* NOTE AND/OR ITEM NUMBER TO BE ASSIGNED AT TIME OF INCORPORATION

[illegible] BY	DATE	QUALITY APPROVAL	DATE	RELEASED BY	DATE
CHECKED BY	DATE	MANUFACTURING APPROVAL	DATE	INCORPORATED BY	DATE
SEA RSA APPROVAL	DATE	PROJECT APPROVAL	DATE	DRAWING REV LETTER	

SPDS ENGINEERING ORDER / ~~REVISION NOTICE~~ NO. ...

CODE IDENT 11323

SHEET 2

DRAWING TITLE	DRAWING NUMBER
ELECTRICAL MODULE UNIT ACCEPTANCE	1070+

DESCRIPTION OF CHANGE

SHEET 219, PAR 4.23.9.11

WAS: REMOVE JUMPERS AND CURRENT PROBE AND CLOSE SWITCHES 1-14 AND 1-19.

JUMPER ACROSS RADIOMETRIC -8V INPUT BREAK-OUT BOX JACKS 1-5, 1-10.

IS: REMOVE JUMPERS AND CURRENT PROBE AND CLOSE SWITCHES 1-5 AND 1-10.

JUMPER ACROSS RADIOMETRIC +8V INPUT BREAK-OUT BOX JACKS 1-14, 1-19.

SHEET 219, PAR 4.23.9.20

WAS: MEASURE STEADY STATE BAND 3 +19V AT 3-22

IS: MEASURE STEADY STATE BAND 3 +19V AT 3-21

SHEET 220, PARA 4.23.9.26

	WAS	IS
S.M.A +28V	28VDC < V < 30.5VDC	28 VDC < V < 31 VDC
S.M.A -28V	-28VDC > V > -30.5VDC	-28VDC < V < -31VDC

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ELEC

SBRC ENGINEERING ORDER / ~~REVISION NOTICE~~ NO. 4089A

CODE IDENT 11323

SHEET 1 OF 1

DRAWING TITLE		DRAWING NUMBER	
ELECTRONICS MODULE UNIT ACCEPTANCE		16704-C	
PROJECT NUMBER: PL 1162	ITEM DISPOSITION: REWORK ☐ ITEMS CONFORM ☒ NO ITEMS MADE ☐ REJECT ☐ USE ☐ NOT APPLICABLE ☐	CLASS CHANGE: ☐ I ☒ IIA	DRAWING TYPE: ☐ A ☒ B
EFFECTIVITY: 51065 S/N002 & SUBSQ.		AUTHORIZING ECR NUMBER: TM2623/01	

DESCRIPTION OF CHANGE

1) PARA 4.21.10.2.5 SYS CHECK DC RESTORE ON/CAL SHUTTER NORMAL

	PROCEDURE STEP	SPEC
IS	Verify that the DVM is measuring ≥ 1.45 volts (Note P13 must be disconnected from multiplexer and connected to Function Test Panel for this check)	≥ 1.45 volts
WAS	Verify that the DVM is measuring ≥ 1.8 volts	≥ 1.8 volts

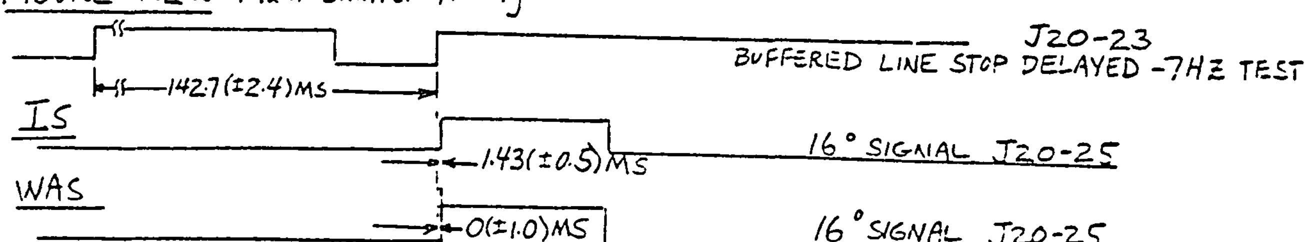
2) PARA 4.21.10.3.5 SYS CHECK DC RESTORE ON / CAL SHUTTER BACKUP SELECT

	PROCEDURE STEP	SPEC
IS	Verify that the DVM is measuring ≥ 1.45 volts (Note P13 must be disconnected from multiplexer and connected to Function Test Panel for this check)	≥ 1.45 volts
WAS	Verify that the DVM is measuring ≥ 1.8 volts	≥ 1.8 volts

3) PARA 4.21.14.4.6 SYS CHECK/FRAME DC RESTORE SELECTED

	PROCEDURE STEP	SPEC
IS	Verify that the DVM is measuring ≥ 1.50 volts (Note P13 must be disconnected from multiplexer and connected to Function Test Panel for this check)	≥ 1.50 volts
WAS	Verify that the DVM is measuring ≥ 1.8 volts	≥ 1.8 volts

4) FIGURE 4.12a Main Shutter Timing



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[signature]	82-2-02		2 1982		
REA/RSA APPROVAL	DATE	PROJECT APPROVAL	DATE	DRAWING REV LETTER	
[signature]	82-02-02	[signature]	2/2/82		

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[signature] 2/2/82 T. P. [signature] 2/2/82

FILE

SBRC CODE IDENT 11323

ENGINEERING ORDER / ~~REVISION NOTICE~~

NO. 3987A

SHEET 1 OF 1

ING TITLE ELECTRONICS MODULE, UNIT ACCEPTANCE TEST PROCEDURE		DRAWING NUMBER 16704-C	
PROJECT NUMBER PL 1162	ITEM DISPOSITION: REWORK ☐ ITEMS CONFORM ☐ NO ITEMS MADE ☐ REJECT ☐ USE ☐ NOT APPLICABLE ☑	CLASS CHANGE ☐ I ☒ II A	DRAWING TYPE ☐ A ☒ B
EFFECTIVITY 51065 S/N 003 & SUBSQ		AUTHORIZING ECR NUMBER TM2595/01	

DESCRIPTION OF CHANGE

PARA 4.8.4.8 DC RESTORE/CAL SHUTTER SENSOR NORMAL MODE TEST

PROCEDURE STEP	SPEC
IS Verify that the DVM is measuring ≥ 1.45 volts	≥ 1.45 volts
WAS Verify that the DVM is measuring ≥ 1.8 volts	≥ 1.8 volts

PARA 4.8.5.5 DC RESTORE/CAL SHUTTER SENSOR BACKUP MODE TEST

PROCEDURE STEP	SPEC
IS Verify that the DVM is measuring ≥ 1.45 volts	≥ 1.45 volts
WAS Verify that the DVM is measuring ≥ 1.8 volts	≥ 1.8 volts

PARA 4.13.7.6 TELEMETRY SCALING/FRAME DC RESTORE SELECTED TEST

PROCEDURE STEP	SPEC
IS Verify that the DVM is measuring ≥ 1.50 volts	≥ 1.50 volts
WAS Verify that the DVM is measuring ≥ 1.8 volts	≥ 1.8 volts

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CHECKED BY	DATE	MANUFACTURING APPROVAL	DATE	INCORPORATED BY	DATE
REA/RSA APPROVAL	DATE	PROJECT APPROVAL	DATE	DRAWING REV LETTER	
[signature]	81-12-17	[signature]	12/17/81		

SBRC FORM NO. 255

[signatures] 12/18/81 ... 12/...

TABLE OF CONTENTS

SIZE	CODE IDENT NO	NUMBER
A	11323	16704
SCALE	REV C	SHEET

1.0 SCOPE

This test verifies the as designed performance of all circuits within the Electronics Module Unit. It is to be conducted prior to mating with the Aft Optics Base Assembly, the Radiative Cooler Unit, the remote sensors and RC door actuator, and the Scan Mirror Assembly. Successful completion of this test will constitute an acceptance of the Electronics Module.

The completely assembled Electronics Module is cabled to the Electronics Module Test Set which provides input power, command inputs, clock and drive sync signal inputs, and simulated Video Sensor preamp inputs. The test set also provides loads for all remote telemetry sensor inputs to the electronics module, motor loads, and all other loads including heaters, RC door actuator and fusible links. A test program will be performed semiautomatically by the module test set under microprocessor control to verify the telemetry and command functions. The electronics module test data are printed out by the test set printer and displayed on the test set monitor. The data must be scanned manually against specifications listed for each test performed.

The following electronics module circuit functions will be performed:

1) The power supply voltages and currents will be recorded for each board connector at several stages of turn-on and the data compared with specification limits or expected values as appropriate.

2) All commands (except multiplexer) will be executed and verified where internal to the Electronics Module; where commands are external to the Module, command lines will be verified.

3) All telemetry will be checked for correct command status, correct temperature voltage and status where telemetry is wholly within the Electronics Module.

4) All temperature Controllers will be exercised against equivalent heater loads and sensors with response and temperature stability verified.

5) The shutter motor drive circuits will be exercised with motor simulation circuits and resonant shutter simulation circuits. The circuits' closed loop performance will be observed along with the drive pulses, and error signals.

6) The Scan Line Corrector drive circuit will be interfaced to an SLC Simulation circuit: both SLC and drive wave form will be observed.

7) The RC door actuator wave form will be checked against a resistive load.

8) All 100 video channels will have simulated preamp signals injected at the several band post amplifier inputs. Gains, offset voltages and noise voltage levels will be recorded for each channel and compared with specification performance requirements.

SIZE	CODE IDENT NO	NUMBER
A	11323	16704
SCALE	REV C	SHEET

2.0 APPLICABLE DOCUMENTS

2.1 Government Documents - None

2.2 SBRC/HAC Documents

TP32015 - 500		System Test Plan
356938		Mapper System Electrical Interface Definition
52347		Electronics Module Assy Thematic Mapper
52348		Assy, Cable Routing Thematic Mapper
75572		Cable Diagram - Thematic Mapper
50901	- 50900	A10-Serial Magnitude Command
50905	- 50904	A18-A21-Post Amps Bands 1-4
50909	- 50908	A15, A17-Post Amp Band 5 and 7
50913	- 50912	A16-Post Amp Band 6 and Relay
50917	- 50916	A6-Cal Shutter Main
50921	- 50920	A5-Temp Control/DC Restore Control
50927	- 50926	A3-Cal Lamp and Inchworm
53878	- 53877	A9-Motor Drive
50943	- 50942	A4-Temp Controller
50949	- 50948	A11-Verification Register
51399	- 51398	A7-Cal Shutter Backup
51403	- 51402	A8-Telemetry Scaling/Baffle Htr
51796	- 51795	A12-A13-Macro Discrete Cmd Gen No. 1
51814	- 51813	A14-Macro Discrete Cmd Gen No. 2
52251	- 52250	A1, A2-Scan Line Corrector
52798	- 52797	A22-Auxiliary Circuit Board
52923		A25-Terminal Board
52930		A23-Capacitor and Relay Board
53160		A24-Terminal Board

3.0 TEST REQUIREMENTS

3.1 General

All tests will be performed in a clean room environment under ambient temperature and pressure.

3.1.1 Test Description and Configuration

All 22 PWBs will be tested by plugging the PWBs into the Electronics Module PWB connectors provided. The Test Set will provide power, signal and command inputs, and will also provide any output loads. The microprocessor program will send commands where required, inject preset signal levels and printout response data and telemetry where applicable. By function these separate tests are:

1) Scan Line Corrector Driver - Apply input power; check regulated buses; apply SLC sync signal. Turn-on; check sync vs Motor Drive and Tachometer feedback signals for proper phasing.

2) Shutter Drivers Function Test:

   a) Cal/Restore Shutter: A simulated shutter load will provide response, supply 7 Hz and 102 kHz sync signals; check for response phase lock and jitter; check for output drive signal parameters.

   b) Back-up Shutter: same as a).

3) Cal Lamp Controller Function Test - Use lamp loads; check lamp current, lamp stability, and sequencer for 7 separate lamp radiance levels. Check all telemetry outputs.

4) Post Amplifier Function Test - Each band PWB post amplifier board will be checked separately with a standard input signal for gain, D.C. offset, noise and bandwidth.

5) Command Decoder Verification Unit (CDVU) - A special subassembly test setup will simulate the Spacecraft Remote Interface Unit (RIU). Under microprocessor control, all valid bit patterns will be applied to the three functional entities of the CDVU, namely the "Command Receiver/Decoder," the "Verification Unit," and the "Macro-Discrete Command Generator." In this test all discrete (relay), macro-discrete, and digital commands will be exercised, and execution verified

where valid command relays are energized. In addition, proper command line state at power turn-on will be verified.

6) Temperature Controllers Function Test - The controlled heaters tested include the telescope baffle heaters, calibration black body heater, RC intermediate and Cold Stage Heaters, Scan Mirror Assembly Heaters, and the Vernier Focal Plane Heater. All heaters will be energized one by one, the temperature and telemetry will be verified for error, and the heater currents measured. In the case of the calibrator black body, both temperature levels will be checked. Heater controller back-up modes will be tested.

7) Actuator Controller Function Test:

a) Inchworm Logic will be tested for direction of travel, step command execution, and verification telemetry.

b) Linear Variable Differential Translator (LVDT) Test will simulate load and drive output, and check output voltage.

c) Radiative Cooler Door Motor Test will command direction OPEN/CLOSE; command MOVE; check output waveforms, check time-out delay (time to open or close).

d) Cooler Door and Main Shutter Fusible Links Test will include command ARM 1, ARM 2, and ACTUATE; output.

e) D.C. Restore - Shutter D.C. Restore input signal will be simulated; output response voltage will be checked; telemetry will be checked; the test will also be repeated for back-up mode.

3.1.2 Data Acquisition and Reduction

Test Set Microprocessor will print out and/or display command and telemetry. All the other data will be taken either from displays or by measuring equipment connected to the Function Test Panel. Data will be compared with specification limits established for each test.

3.2 Test Equipment (or equivalent):

Electronics Module Test Set with (NAS 5-VOIII-C):

1) Command and telemetry generator including Texas Instruments Silent 700 Printer and Sony Video monitor.

2) Power Source and Functional Load Simulator.

3) Required electronics Module and equipment mating cables.

4) Extender cards, Assy. 76400.

5) Module Cable breakout boxes, Assy. 335499-2

6) PWB Extractor, Assy. 76447

3.2.1 Commercial Test Equipment

1) Storage Oscilloscope, Tektronix 7633 with following Tektronix plug-ins:

7A22 preamplifier (differential)
7A26 preamplifier (dual trace) - qty. 2
7B53A time base

2 Voltage Reference, Power Design 2005 - qty. 2

3) True RMS Meter, HP3400A

4) Digital Multimeter, Fluke 8030A

5) Temperature Sensor, Fluke 80T-150°C

6) Pulse Generator, Datapulse 110B

7) Function Generator, HP 3310A

8) Current Probe, Tektronix P6042

9) Decade Resistor Box

Cornell-Dubilier RDA 1-110 ohms
Cornell-Dublier RDC 10K-1100K ohms
Ohmite 9401 100-999,900 ohms

3.3 TEST CONDITIONS

3.3.1 Static Sensitive

The subassemblies shall be handled in accordance with SBRC SP80113 to protect the static sensitive assemblies and components. A wrist stat shall be worn when installing and removing any subassemblies from the module and when handling the Electronic Module Assembly.

3.3.2 Cleanliness

Clean conditions apply to all Protoflight and Flight sub-assemblies. In addition, a dust cover shall be placed over the Electronics Module Assembly whenever it is not on a flow bench.

3.3.3 Visual Inspection

All subassemblies shall be inspected for missing select components and jumper wires; that each board has been tested per its AHRS; and that the connector pins are straight and clean. The mating connector in the module shall be checked for alignment and lack of damaged pins prior to each insertion of the correct PWB assembly.

3.3.4 Extender Cards

Only extender cards Assy 76400 shall be used on the Electronics Module assembly.

Prior to use, each connector on the PWB, Extender Card and Electronics Module shall be visually inspected for lack of damaged pins and that sockets/pins are free of debris.

3.3.5 Installing PWB Assy A1A01 through A1A22

1) Verify that power is off and that wrist stat is worn.

2) Verify connector pins for alignment and cleanliness.

3) Verify correct PWB orientation and verify that PWB is being installed in the correct slot. Each slot has special keying to prevent incorrect PWB insertion.

4) Insert board until connector pins are engaged. Verify that both sides of the connector are properly mating.

5) Apply even pressure on the edge of the board to engage connectors. If board does not begin to engage easily, recheck connector alignment. Do not force the PWB into its connector!

3.3.6 Removing PWB Assy A1A01 through A1A22

1) Verify power is off and wrist stat is worn.

2) Connect flight PWB card extractor tool Assy. 76447 to PWB.

3) Using tool handle, evenly pull board from module connector.

4) Visually inspect the PWB, extender and module connectors to verify that each pin was not damaged.

5) Place PWB in clean storage bag and remove extractor tool. Place PWB in carrying box and return it to its flight storage location.

3.3.7 Module Test Set

The Electronics Module Test Set is to be used to insure proper operation of the TM Electronics Module as a complete unit and as an aid in troubleshooting. The EM test set provides four main functions:

1) Issue and verify commands to the TM Electronics Module.

2) Read telemetry status from the TM Electronics Module.

3) Provide dummy loads and mechanism simulation of thermistors and radiometer hardware.

4) Provide a secondary power source for the voltages needed by the TM Electronics Module in place of its own power supply.

3.3.7.1 Major Components

The Test Set is comprised of seven major modules or units:

1) A Motorola 6800 micromodule μP system consisting of a 6800 CPU board, 3K of RAM, up to 20K of EPROM, and 2 each, 64-channel A/D converter boards for reading analog telemetry. The 6800 CPU is the control center for operations and functions of the test set.

2) A TI Silent 700 teletype terminal. This terminal provides the only communication between the operator and the test set except for the power switches on the different units. The terminal can provide a hardcopy printout of the various functions and operations of the test set.

3) The Augat Interface Box allows the microprocessor to communicate with the TM Electronics Module. It provides all the various clocking and timing signals used by the Test Set to communicate to the Electronics Module. It provides all the circuitry for changing the microprocessor data into the correct format for talking to the Electronics Module and vice versa. It looks like an RIU to the Electronics Module.

4) The two Power Supply Modules provide all of the voltages needed by the TM Electronics Module. Each of these P.S. modules is comprised of several open frame power supply units that have overvoltage protection and foldback current limiting. Each of the P.S. modules has test points for monitoring their output voltages on their front panels.

5) The color CRT display provides a visual indication of system status for the operator.

6) The Telemetry/Command Interconnection Box provides the wiring links between the Augat Interface Box and the Electronics Module, including zener diode protection on all analog telemetry lines.

7) The Function Test Panel contains dummy radiometer loads and simulators. It has two built-in decade counters for thermistor simulation, and test points for monitoring or simulating functions of interest.

3.3.7.2 Turn On/Off Procedure

All power switches on the E.M. Test Set should be at the "OFF" or down position before proceeding further with the turn on procedure. If the harness/module unit under test has not been mated with the Module Test Set previously, carry out the prepower tests in 3.4 before proceeding further.

1) Verify that all interconnecting cables are connected per drawing 76813.

2) Connect the Test Set main power receptacle on the lower left side of the Cabinet to 60HZ, 115 VAC.

3) Connect the cable harnesses between the E.M. Test Set and the TM Electronics Module.

4) Turn on the main power switch on the EM Test Set. CRT power will come on. The video enable switch is on the CRT panel.

5) Turn on the T.I. Silent 700 terminal by pushing the switch on the right rear deck of the terminal toward the rear.

6) Turn on the Augat Interface Box with the switch located on the back connector panel.

7) Turn on the circuit breaker switch on the 6800 Microprocessor front panel. The terminal should print the word "MONITOR".

NOTE: The pushbutton switch on the front panel of the microprocessor is the "RESET" switch. Pushing this switch at any time will return the microprocessor to "MONITOR" mode. The MONITOR mode is the main executive (or operating) program in the computer. All modes of operation are called from this program. Also pushing the "ESC" (escape) key or the "RETURN" key will

usually return the computer to the MONITOR mode.

8) To turn off the EM Test Set follow the reverse order of the preceding steps.

9) For further information on operating E.M. Test set hardware see Procedure 16927.

3.3.8 Module Test Set/Software Operation

There are three basic modes of operating the E.M. Test Set:

1) Issuing Commands

2) Reading Telemetry

3) Specialized Test Programs, which are usually a combination of the first two.

3.3.8.1 Issuing Commands

Issuing any one of the three types of commands is accomplished in the same basic manner.

The HEX Cmd. No. (corresponding to command operation) is keyed into the terminal, then the return key is pushed.

There are two modes for issuing a single command:

"C" Mode

A "C" is keyed in, then the terminal responds with "CMD=", then the operator keys in the HEX Cmd. No. After an approximate one second delay, the terminal will respond with "CMD=". The terminal is now ready for the next command number.

If the terminal responds immediately after pressing the return key with "CMD=" (no one second delay) an invalid command number was used. Also, certain commands are considered critical commands and the computer will prompt the operator with a message asking if he is sure of the command number.

"V" Mode

The "V" mode is identical to the "C" mode except that in addition this mode verifies that the command was actually accomplished by reading back the telemetry. If it does not verify the terminal will print "VERIFY FAILS" then "CMD=" and wait for the next command.

3.3.9.2 Reading Telemetry

Of the three types of telemetry signals, only the serial telemetry and the analog telemetry signals are monitored by the E.M. Test Set.

1) Serial telemetry corresponds to words A through M. Words I and J echo command telemetry for the Serial Magnitude Commands. Word K is associated with the SMA. The telemetry words are received as 8 bit words and are printed out as two HEX digits. If the video is enabled serial telemetry words A-L are displayed on the CRT in a matrix format. The video display is updated every time a "C" command is issued.

   To check the telemetry status before any commands are issued or when the video is disabled, key an "S" on the terminal. The computer will respond with "WORD, BYTE=?". Then key in the word letter and data byte of interest, followed by "RETURN". The computer will print out the data byte read from the TM Electronics Module.

2) Analog telemetry signals are a voltage level between 0V and 5.12V. These signals are processed by an 8 bit A to D converter and the value displayed or stored for later use. The analog telemetry mode is entered by keying a "T15" then "RETURN" on the operator's console. The display is cleared and initialized for analog mode and the following prompt will appear (note that all prompts will be sent to the printer and not to the display CRT):

   a) Select Display Position

      The operator will position cursor on the left margin of display to the desired line (one of seven) using CRTLN for cursor up and CRTLV for cursor down. Once the desired line is selected, enter "RUBOUT".

   b) >CH#, FUNCTION, UL, LL

      The operator now enters a two digit decimal channel number, a functional description of the channel (up to 16 digits), and - if desired - upper and lower allowable readings. If upper and lower limits are not desired, enter "RETURN" immediately following the description.

Example of entry with limits:

>23, CFPA TLMY, 4.123, 1.00 (RETURN)

This will activate channel 23 and flag limit violations for any value above 4.123 volts and below 1.000 volts.

Example of entry without limits:

>23,CFPA (RETURN)

This will activate channel 23 and will not flag limit violations.

In either case, once "RETURN" is entered, the channel number is checked for validity. If determined valid, the channel number and description is displayed on the CRT on the line selected in step a.

c. > ANOTHER LINE?

At this point the operator has the option of adding another display line to the CRT display. If so desired, enter "Y" and control will be returned to step a. Enter "N" and control will be transferred to step d.

d. At this point nothing is printed on the terminal, and the analog read loop begins. All channels selected above will now be read and their values displayed on the CRT. Upper limit violations (if enabled in step B) will be shown as an inverted (reverse color) space immediately to the left of the most significant digit of the reading, and lower limit violations will appear as an inverted space immediately to the right of the least significant digit of the reading. The processor will remain in this mode, reading the requested analog channels and updating the display, until one of two things happen:

1) An "ESCAPE" is entered, at which point control is transferred to step E.

2) A "SPACE" is entered, at which point control is returned to step A.

e. > HARDCOPY?

The operator now has the option of

having a hardcopy of the CRT display. This is accomplished by entering a "Y". If any other key is pressed, control is transferred to "MONITOR".

3.3.9.3 Test Programs

There is a maximum of 13 test programs which can be made available. The test programs are called by keying in "TXX" where XX is the two digit test program number, and then the "RETURN" key. Test Program #1 prints out a description of each test program that is stored in memory.

DATA SHEET NO. 1 OF 3 PARAGRAPH NO. 4.20

DETAILED FUNCTIONAL TESTS

LOGAHR OPER 1500

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
	Multiplexer Initial Check and Handshake			
1.0	Shut off Multiplexer Interface Power at Auxiliary Panel of Test Set.		✓	(✓)
	Shutdown all Module simulated powerforms at the Power Distribution and Bus Power panels of test set.		✓	(✓)
	Remove connection between Multiplexer simulator and mating connector to multiplexer J9 connector.		✓	(✓)
	Install multiplexer into module and mate all interfacing connectors.		✓	(✓)
	Mate breakout boxes to multiplexer J2, J3, and J4 connectors and mate Scan Mirror Electronics simulated signals from test set to multiplexer J13 connector.		✓	(✓)
	Enable all module simulated powerforms at the Power Supply panels and apply power to Multiplexer Interface at Auxiliary Panel of Test Set. Set SME select to position 1.		✓	(✓)
	Execute command: MULTIPLEXER ON (POWER SUPPLY 1).	5	✓	(✓)
2.0	Multiplexer Internal Telemetry Check.			
2.1	With signal return at J4 pin 60 connected to DVM return, verify the following telemetry points when the DVM (+) input is connected to the specified points.		✓	(✓)
	Band 1 Reference J4-1	1.94<V<2.06	1.993	VDC

TEST ENGINEER [signature] DATE 1/20/82 QA [signature] 1/21/82

E.M. MODULE UNIT TEST

SIZE	CODE IDENT NO	NUMBER
A	11323	16704

SCALE | REV 2 | SHEET -

DATA SHEET NO. 2 OF 3 PARAGRAPH NO. 4.20

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1500

PARA OR STEP NO.	PROCEDURE STEP		SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(2.1)	Band 2 Reference	J4-3	1.94<V<2.06	1.999	VDC
	Band 3 Reference	J4-5	1.94<V<2.06	1.997	VDC
	Band 4 Reference	J4-7	1.94<V<2.06	1.998	VDC
	Band 5 Reference	J4-9	1.94<V<2.06	1.994	VDC
	Band 7 Reference	J4-11	1.94<V<2.06	1.997	VDC
	+18.8V Power Status	J4-17	4.05<V<4.75	4.30	VDC
	+5.2V Power Status	J4-18	4.05<V<4.75	4.34	VDC
	-2.3V Power Status	J4-19	3.80<V<4.20	3.97	VDC
	-5.2V Power Status	J4-20	4.05<V<4.75	4.98	VDC
	-13.0 V Power Status	J4-21	4.05<V<4.75	4.40	VDC
2.2	With DVM (+) and return inputs connected to specified inputs record the following telemetry points:				
		DVM(+) / DVM Return			
	Power Supply Temperature	J4-51 J4-52		1.16KΩ	~~VDC~~ °C
	Electronics Temperature	J4-46 J4-47 (Conversion)		1.14KΩ	~~VDC~~ °C
	Power Supply Input Current	J4-55 J4-56 (Conversion)		4.06	1 Amp/ Volt
2.3	Midscan Pulse Telemetry Check.				
	Execute command:				
	MIDSCAN PULSE DISABLE A		82	✓	(✓)
	MIDSCAN PULSE DISABLE B		84	✓	(✓)

TEST ENGINEER Gerrish DATE 1/23/82 QA 2/2/82

E.M. MODULE UNIT TEST

SIZE	CODE IDENT NO	NUMBER
A	11323	16704

SCALE | REV 2 | SHEET 3

DATA SHEET NO. 3 OF 3 PARAGRAPH NO. 4.20

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1ST

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
	Verify on the CRT that digital			
	Word F bit 6 = 1 - check		✓	(✓)
	bit 7 = 0.		✓	(✓)
2.4	Execute command:			
	MIDSCAN PULSE ENABLE A	81	✓	(✓)
	MIDSCAN PULSE ENABLE B	83	✓	(✓)
	Verify on the CRT that digital			
	Word F bit 6 = 1		✓	(✓)
	7 = 1.		✓	(✓)

TEST ENGINEER Smith DATE 2/3/82 QA 2/3/82

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO 11323	NUMBER 16704
	SCALE	REV E	SHEET 3

DATA SHEET NO. 1 OF 56 PARAGRAPH NO. 4.21

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1500

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
4.21	SYSTEM CONFIGURATION FUNCTIONAL RECHECK			
1.	Confirm that test cables 40, 43, 44, 45, 46, and 28 are properly connected between the Electronics Module and the Function Test Panel.		✓	(✓)
2.	Connect test cable 20 and its breakout box to J20 on the Electronics Module.		✓	(✓)
3.	Connect test cables 2 and 3 and their breakout boxes to A5J2 and A5J3, the Electronics Module multiplexer video test access connectors.		✓	(✓)
4.	Initial Simulated Sensor Resistances			
	30KΩ resistor on Function Test Panel (FTP) across Blackbody Heater Input TP's (COLD).		✓	(✓)
	18KΩ resistor on FTP across CFPA Heater control TP's (HOT).		✓	(✓)
	18KΩ resistor on FTP across CFPA Monitor TP's (HOT).		✓	(✓)
	160Ω resistor on FTP across Cold Stage Heater Input TP's (<100°K).		✓	(✓)
	5KΩ resistor on FTP across TP's 1 and 7 (Main Shutter Sensor-HOT).		✓	(✓)
	30KΩ resistor on FTP across TP's 2 and 8 (Backup Shutter Sensor-COLD).		✓	(✓)
	8KΩ resistor on FTP across SMA + Z Heater Input TP's (HOT).		✓	(✓)
	8KΩ resistor on FTP across SMA - Z Heater Input TP's (HOT).		✓	(✓)

TEST ENGINEER [signature] DATE 26 JAN 82 QA 2/3/82

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO 11323	NUMBER 16704
	SCALE	REV	SHEET 50

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DATA SHEET NO. 2 OF 56 PARAGRAPH NO. 4.21

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1500

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(4.)	400Ω resistor on FTP across Intermediate Stage Heater Input TP's (COLD).		✓	(✓)
	5KΩ resistor on FTP across Blackbody (Frame) Sensor TP's 3 and 9 (HOT).		✓	(✓)
	5KΩ resistor on FTP across Blackbody Sensor TP's 5 and 11 (HOT).		✓	(✓)
	3KΩ resistor on FTP across Silicon FPA Sensor TP's 6 and 12 (HOT).		✓	(✓)
	5KΩ resistor on FTP across Baffle Heater Input TP's (HOT).		✓	(✓)
	5KΩ resistor on FTP across Baffle Temp Sensor TP's 4 and 10 (COLD).		✓	(✓)
5.	Execute the following commands to enable all concurrently functional circuitry:			
	COOLER DOOR MOTOR OFF	53	✓	(✓)
	COOLER DOOR MOVE INHIBIT	88	✓	(✓)
	INCHWORM POWER OFF	50	✓	(✓)
	LVDT OFF	5E	✓	(✓)
	SMA + Z HEATER CONTROLLER ON	41	✓	(✓)
	SMA - Z HEATER CONTROLLER ON	43	✓	(✓)
	BLACKBODY HEATER CONTROL ON, T1 SELECT	20	✓	(✓)
	CFPA HEATER CONTROL ON/T1 SELECT/ CFPA TELEMETRY ON	19	✓	(✓)
	COLD STAGE OUTGAS HEATER ENABLE	57	✓	(✓)
	MIDSCAN PULSE A B DISABLED	92 84	✓	(✓)

TEST ENGINEER [signature] DATE 26 JAN 82 QA 2/1/82

E.M. MODULE UNIT TEST | SIZE A | CODE IDENT NO 11323 | NUMBER 16704 | SCALE | REV | SHEET

DATA SHEET NO. 3 OF 56 PARAGRAPH NO. 4.21

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1500

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(5.)	COLD STAGE HEATER CONTROLLER ON/TELEMETRY ON.	58	✓	(✓)
	DC RESTORE ON.	3E	✓	(✓)
	TELEMETRY SCALING ON.	7	✓	(✓)
	COOLER INTERMEDIATE STAGE HEATER CONTROLLER ON.	46	✓	(✓)
	COOLER INTERMEDIATE STAGE OUTGAS HEATER ENABLED.	45	✓	(✓)
	BAFFLE HEATER CONTROL ON.	54	✓	(✓)
	FUSIBLE LINK SWITCHES OPEN.	60	✓	(✓)
	BLACKBODY BACKUP ON.	23	✓	(✓)
	COOLER DOOR ELECTROMAGNET OFF/ FRAME DC RESTORE SELECT.	1F	✓	(✓)
	MULTIPLEXER ON(POWER SUPPLY 1).	5	✓	(✓)
	CALIBRATION LAMP 1 ON.	10	✓	(✓)
	CALIBRATION LAMP 2 ON.	11	✓	(✓)
	CALIBRATION LAMP 3 ON.	12	✓	(✓)
	CALIBRATION LAMP SEQUENCE ON.	4D	✓	(✓)
	CALIBRATION SHUTTER ON/BACKUP SHUTTER OFF/ DC RESTORE NORMAL SELECT.	D	✓	(✓)
	SCAN LINE CORRECTOR 1 ON/ 2 OFF.	4A	✓	(✓)
	(POST AMPLIFIER POWER) BAND 1 ON.	25	✓	(✓)
	BAND 2 ON.	27	✓	(✓)

TEST ENGINEER [signature] DATE 26 JAN 87 QA

E.M. MODULE UNIT TEST

SIZE	CODE IDENT NO	NUMBER
A	11323	16704

SCALE | REV | SHEET

DATA SHEET NO. 4 OF 56 PARAGRAPH NO. 4.21

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1500

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(5.)	BAND 3 ON.	29	✓	(✓)
	BAND 4 ON.	2B	✓	(✓)
	BAND 5 ON.	2D	✓	(✓)
	BAND 6 ON.	2F	✓	(✓)
	BAND 7 ON.	31	✓	(✓)
6.	Calibration Lamp Driver/Sequence Check			
6.1	Verify via the CRT that digital			
	Word D bit 0 = 1		✓	(✓)
	bit 1 = 1		✓	(✓)
	bit 2 = 1		✓	(✓)
	Word F bit 6 = 1		✓	(✓)
	bit 7 = 0.		✓	(✓)
6.2	Execute command:			
	CALIBRATION LAMP 1 OFF/OVERRIDE OFF.	16	✓	(✓)
6.2.1	Verify via the CRT that digital			
	Word D bit 0 = 0.		✓	(✓)
6.3	Connect the Cal Lamp Housing containing the lamp and photodiode assembly to the Cal Lamp #1 (sensor) anode and cathode, and (lamp) "+" and "-" points on the Function Test Panel (FTP).		✓	(✓)
	Note: If Cal Lamp Housing contains three lamps is used, all connections can be made initially and Para 4.2.1.6.4 and 4.2.1.6.5 reconnections can be ignored.			

TEST ENGINEER [signature] DATE 26 JAN 84 QA

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO 11323	NUMBER 16704
	SCALE	REV L	SHEET 58

FORM NO 3132 A 3 80 DIETERICH POST CLEARPRINT 200M

DATA SHEET NO. 5 OF 56 PARAGRAPH NO. 4.21

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1500

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
6.3.1	Execute command:			
	CALIBRATION LAMP 1 ON.	10	✓	(✓)
			✓	(✓)
6.3.2	Verify that analog telemetry			
	Channel 50 "Calibration Lamp 1 Current" = 3.1(±0.6)V.	3.1(±0.6)	3.16	volts
6.3.3	Using a DVM, verify that J20-7 "Lamp #1 Radiance Error" with respect to J20-51 = 7.0(±1.5)V.	7.0(±1.5)	6.28	volts
6.3.3.1	Execute Command: CALIBRATION LAMP 1 OVERRIDE ON	13	✓	( )
6.3.4	Verify via the CRT that digital Word D bit 3=1.		✓	( )
6.3.4	Execute command:			
	CALIBRATION LAMP 1 OFF/OVERRIDE OFF.	16	✓	(✓)
	CALIBRATION LAMP 2 OFF/OVERRIDE OFF.	17	✓	(✓)
6.3.6	Verify via the CRT that digital Word D bit 1 = 0.		✓	(✓)
6.4	Disconnect the Cal Lamp Housing from FTP; connect Cal Lamp Housing to Cal Lamp #2 (sensor) anode and cathode and (lamp) "+" and "-" points to FTP.		✓	(✓)
6.4.1	Execute:			
	CALIBRATION LAMP 1 ON.	10	✓	(✓)
	CALIBRATION LAMP 2 ON.	11	✓	(✓)

TEST ENGINEER [signature] DATE 26 JAN 82 QA [signature]

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO 11323	NUMBER 16704
	SCALE	REV 1	SHEET 5

DATA SHEET NO. 6 OF 50 PARAGRAPH NO. 4.2.2

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1500

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
6.4.2	Verify that analog telemetry			
	Channel 51 "Calibration Lamp 2 Current" = 3.1(±0.6)V.	3.1(±0.6)	3.24	volts
6.4.3	Using a DVM, verify that J20-8 "Lamp 2 Radiance Error" = 7.0(±1.5)V.	7.0(±1.5)	6.48	volts
6.4.3.1	Execute Command: CALIBRATION LAMP 2 OVERRIDE ON	14	✓	( )
6.4.4	Verify via the CRT that digital Word D bit 4 = 1.		✓	( )
6.4.5	Execute command:			
	CALIBRATION LAMP 2 OFF/OVERRIDE OFF.	17	✓	(✓)
	CALIBRATION LAMP 3 OFF/OVERRIDE OFF.	18	✓	(✓)
6.4.6	Verify via the CRT that digital Word D bit 2 = 0.		✓	(✓)
6.5	Disconnect the Cal Lamp Housing from FTP; connect Cal Lamp Housing to Cal Lamp #3 (sensor) anode and cathode and (lamp) "+" and "-" points to FTP.		✓	(✓)
6.5.1	Execute:			
	CALIBRATION LAMP 2 ON.	11	✓	(✓)
	CALIBRATION LAMP 3 ON.	12	✓	(✓)
6.5.2	Verify that analog telemetry			
	Channel 52 "Calibration Lamp 3 Current" = 3.1(±0.6)V.	3.1(±0.6)	3.32	volts

TEST ENGINEER [signature] DATE 26 JAN 82 QA

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO 11323	NUMBER 16704
	SCALE	REV	SHEET

DATA SHEET NO. 7 OF 56 PARAGRAPH NO. 4.21

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1500

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
6.5.3	Using a DVM, verify that J20-9 "Lamp 3 Radiance Error" = 7.0(±1.5)V.	7.0(±1.5)	6.59	volts
6.5.3.1	Execute Command: CALIBRATION LAMP 3 OVERRIDE ON	15	✓	( )
6.5.4	Verify via the CRT that digital Word D bit 5 = 1.		✓	(✓)
6.5.5	Execute commands:			
	CALIBRATION LAMP 3 OFF/OVERRIDE OFF.	18	✓	(✓)
	CALIBRATION LAMP 3 ON.	12	✓	(✓)
6.6	Confirm that the three Cal Lamp LED indicators (1,2,3) on the FTP sequence through the following steps:			
	Step	FTP Indicators Lit		
	1	None	✓	(✓)
	2	1	✓	(✓)
	3	1,2	✓	(✓)
	4	2	✓	(✓)
	5	2.3	✓	(✓)
	6	1,2,3	✓	(✓)
	7	1,3	✓	(✓)
	8	3	✓	(✓)
7.	Blackbody Control Check			
	Verify via the CRT that digital Word E bit 2 = 1		✓	(✓)

TEST ENGINEER [signature] DATE 26 JAN 84 QA

E.M. MODULE UNIT TEST

SIZE	CODE IDENT NO	NUMBER
A	11323	16704

SCALE | REV | SHEET 56

DATA SHEET NO. 8 OF 56 PARAGRAPH NO. 4.21

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1500

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(7.)	bit 5 = 1.		✓	(✓)
	Verify via the CRT that analog telemetry			
	Channel 53 "Blackbody Current" ≥2.5V.	≥2.5	3.72	volts
7.1	Normal T1 On.			
	Execute commands:			
	BLACKBODY HEATER CONTROL OFF/BACKUP OFF.	24	✓	(✓)
	BLACKBODY HEATER CONTROL ON/T1 SELECT.	20	✓	(✓)
	Verify via the CRT that digital			
	Word E bit 2 = 1		✓	(✓)
	bit 3 = 0		✓	(✓)
	bit 4 = 0		✓	(✓)
	bit 5 = 0.		✓	(✓)
7.2	Normal T2 On.			
	Execute commands:			
	BLACKBODY HEATER CONTROL OFF/BACKUP OFF.	24	✓	(✓)
	BLACKBODY HEATER CONTROL ON/T1 SELECT.	20	✓	(✓)
	BLACKBODY T2 SELECT.	21	✓	(✓)
	Verify via the CRT that digital			
	Word E bit 2 = 1		✓	(✓)
	bit 3 = 1		✓	(✓)

TEST ENGINEER [signature] DATE 26 JAN 92 QA

E.M. MODULE UNIT TEST

SIZE	CODE IDENT NO	NUMBER
A	11323	16704

SCALE | REV | SHEET

DATA SHEET NO. 9 OF 56 PARAGRAPH NO. 4.21

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1500

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(7.2)	bit 4 = 0		✓	(✓)
	bit 5 = 0.		✓	(✓)
7.3	Normal T3 On.			
	Execute commands:			
	BLACKBODY HEATER CONTROL OFF/BACKUP OFF.	24	✓	(✓)
	BLACKBODY HEATER CONTROL ON/T1 SELECT.	20	✓	(✓)
	BLACKBODY T3 SELECT.	22	✓	(✓)
	Verify via the CRT that digital			
	Word E bit 2 = 1		✓	(✓)
	bit 3 = 0		✓	(✓)
	bit 4 = 1		✓	(✓)
	bit 5 = 0.		✓	(✓)
7.4	Thermistor Test.			
	Replace Blackbody Heater Input Resistor at FTP with 5000 ohms.		✓	(✓)
	Verify via the CRT that analog telemetry			
	Channel 53 is ≤1.0V.	≤1.0	0.000	volts
	Replace Blackbody Heater Input Resistor at FTP with 30000 ohms.		✓	(✓)
	Verify via the CRT that analog telemetry			
	Channel 53 is ≥2.5 volts.	≥2.5	3.72	volts

TEST ENGINEER [signature] DATE 26 JAN 94 QA _____

DATA SHEET NO. 10 OF 56 PARAGRAPH NO. 4.21

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1500

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
7.5	Reset Relays.			
	Execute command:			
	BLACKBODY HEATER CONTROL OFF/BACKUP OFF.	24	✓	(✓)
	Verify via the CRT that digital			
	Word E bit 2 = 0		✓	(✓)
	bit 5 = 0.		✓	(✓)
7.6	Set Blackbody Heater Relay.			
	Execute command:			
	BLACKBODY HEATER ON, T1 ON.	20	✓	(✓)
8.	CFPA Heater Control Check.			
8.1	CFPA Heater Monitor and Controller Off.			
8.1.1	Execute commands:			
	CFPA TELEMETRY OFF.	1C	✓	(✓)
	CFPA HEATER CONTROL OFF.	1D	✓	(✓)
8.1.2	Verify via the CRT that digital			
	Word H bit 4 = 0		✓	(✓)
	bit 5 = 0		✓	(✓)
	bit 6 = 0		✓	(✓)
	bit 7 = 0.		✓	(✓)

TEST ENGINEER [signature] DATE 26 Jan 87 QA _____

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO 11323	NUMBER 16704
	SCALE	REV -	SHEET 50

FORM NO 3152 A 3 69 DIETRICH-POST CLEARPRINT CCOM

DATA SHEET NO. 11 OF 56 PARAGRAPH NO. 4.21

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1500

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
8.1.3	Verify via the CRT that analog telemetry			
	Channel 68 "CFPA Heater Current" is ≤1.0V.	≤1.0	0.00	volts
	Channel 70 "CFPA Monitor Temperature" is ≤1.0V.	≤1.0	0.00	volts
	Channel 67 CFPA Control Temperature" is ≤1.0V	≤1.0	0.00	volts
8.2	CFPA Heater Controller Off.			
8.2.1	Execute commands:			
	CFPA HEATER CONTROL ON/T1 SELECT/ CFPA TELEMETRY ON.	19	✓	(✓)
	CFPA HEATER CONTROL OFF.	1D	✓	(✓)
8.2.2	Verify via the CRT that digital			
	Word H bit 4 = 0		✓	(✓)
	bit 5 = 0		✓	(✓)
	bit 6 = 0		✓	(✓)
	bit 7 = 1.		✓	(✓)
8.2.3	Verify via the CRT that analog telemetry			
	Channel 68 is ≤1.0V.	≤1.0	0.00	volts
8.3	Heater Controller Off/T2 On.			
8.3.1	Execute commands:			
	CFPA HEATER CONTROL ON/T1 SELECT/ CFPA TELEMETRY ON.	19	✓	(✓)

TEST ENGINEER [signature] DATE 26 JAN 88 QA [signature]

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO 11323	NUMBER 16704
	SCALE	REV C	SHEET 23

FORM NO 3122 [illegible] DIETERICH-POST CLEARPRINT 000M

DATA SHEET NO. 12 CF 50 PARAGRAPH NO. 4.21

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1500

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(8.3.1)	CFPA HEATER CONTROL OFF.	1D	✓	(✓)
	CFPA T2 SELECT.	1A	✓	(✓)
8.3.2	Verify via the CRT that digital			
	Word H bit 4 = 0		✓	(✓)
	bit 5 = 1		✓	(✓)
	bit 6 = 0		✓	(✓)
	bit 7 = 1.		✓	(✓)
8.3.3	Verify via the CRT that analog telemetry			
	Channel 68 is ≤1.0V.	≤1.0	0.00	volts
8.4	Heater Controller Off/T3 On.			
8.4.1	Execute commands:			
	CFPA HEATER CONTROL ON/T1 SELECT/ CFPA TELEMETRY ON.	19	✓	(✓)
	CFPA HEATER CONTROL OFF.	1D	✓	(✓)
	CFPA T3 SELECT.	1B	✓	(✓)
8.4.2	Verify via the CRT that digital			
	Word H bit 4 = 0		✓	(✓)
	bit 5 = 0		✓	(✓)
	bit 6 = 1		✓	(✓)
	bit 7 = 1.		✓	(✓)

EST ENGINEER [signature] DATE 26 Nov 82 QA [signature]

E.M. MODULE UNIT TEST | SIZE A | CODE IDENT NO 11323 | NUMBER 16704 | SCALE | REV | SHEET

DATA SHEET NO. 13 OF 56 PARAGRAPH NO. 4.21

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1500

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
8.4.3	Verify via the CRT that analog telemetry			
	Channel 68 is ≤1.0V.	≤1.0	0.00	volts
8.5	Heater Controller On/T1 On			
8.5.1	Execute Command:			
	CFPA HEATER CONTROL ON/T1 SELECT/ CFPA TELEMETRY ON.	19	✓	(✓)
8.5.2	Verify via the CRT that digital			
	Word H bit 4 = 1		✓	(✓)
	bit 5 = 0		✓	(✓)
	bit 6 = 0		✓	(✓)
	bit 7 = 1.		✓	(✓)
8.6	Test Control Diode			
8.6.1	Verify via the CRT that analog telemetry			
	Channel 67 is ≤1.0V.	≤1.0	0.00	volts
	Channel 68 is ≤1.0V.	≤1.0	0.00	volts
8.6.2	Replace CFPA Heater Control resistor at FTP with 19000 ohms. Record the level of analog telemetry			
	Channel 67,		1.40	volts
	Channel 68.		0.00	volts
8.6.3	Replace CFPA Heater Control resistor at FTP with 20000 ohms ("cold")			

TEST ENGINEER [signature] DATE 26 Nov 84 QA _____

E.M. MODULE UNIT TEST

SIZE	CODE IDENT NO	NUMBER
A	11323	16704

SCALE | REV | SHEET

DATA SHEET NO. 14 OF 56 PARAGRAPH NO. 4.21

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1500

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(8.6.3)	Verify that analog telemetry			
	Channel 67 is ≥2.5 volts,	≥2.5	5.0	volts
	Channel 68 is ≥2.5 volts.	≥2.5	4.9	volts
8.7	Test Monitor Diode.			
8.7.1	Verify that analog telemetry			
	Channel 70 is ≤1.0 volts.	≤1.0	.94	volts
8.7.2	Replace resistor across the CFPA Monitor TP's at FTP with 19000 ohms and observe the level of analog telemetry channel 70.		1.440	volts
	Replace resistor across the CFPA Monitor TP's at FTP with 20000 ohms ("cold"), and verify that analog telemetry			
	Channel 70 is ≥2.5V.	≥2.5	4.96	volts
9.	Cold Stage Outgas Heater Control			
9.1	Heater Disabled/Controller Off/ Temp Monitor On.			
9.1.1	Execute commands:			
	COLD STAGE HEATER CONTROLLER ON/ TELEMETRY ON.	58	✓	(✓)
	COLD STAGE HEATER CONTROLLER OFF/ COLD STAGE OUTGAS HEATER DISABLED.	59	✓	(✓)
9.1.2	Verify via the CRT that digital Word 3 bit 7 = 1		✓	(✓)

TEST ENGINEER [signature] DATE 26 JAN 89 QA _____

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO 11323	NUMBER 16704
	SCALE	REV C	SHEET 3

DATA SHEET NO. 15 OF 56 PARAGRAPH NO. 4.21

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1500

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(9.1.2)	Word H bit 0 = 0		✓	(✓)
	bit 1 = 0.		✓	(✓)
9.1.3	Verify via the CRT that analog telemetry			
	Channel 55 is ≤1.0V.	≤1.0	0.00	volts
9.2	Heater Disabled/Controller and Temp Monitor On.			
9.2.1	Execute command:			
	COLD STAGE HEATER CONTROLLER ON/ TELEMETRY ON.	58	✓	(✓)
9.2.2	Verify via the CRT that digital			
	Word B bit 7 = 1		✓	(✓)
	Word H bit 0 = 1		✓	(✓)
	bit 1 = 0.		✓	(✓)
9.2.3	Using a DVM, verify that test point			
	J20-17 is in the range .1 < V < .5V.	.1 < V < .5	.1 ~~0.00~~	volts
9.2.4	Display and note the values of analog telemetry			
	Channel 55		.54 ~~0.00~~	volts
	Channel 63		5.1 ~~0.00~~	volts
	Channel 64.		4.7 ~~4.62~~	volts

TEST ENGINEER [signature] DATE 26 JAN 87 QA _____

E.M. MODULE UNIT TEST

SIZE	CODE IDENT NO	NUMBER
A	11323	16704

SCALE | REV | SHEET

DATA SHEET NO. 16 OF 50 PARAGRAPH NO. 4.21

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1500

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
9.2.5	Replace resistor on FTP across Cold Stage Heater Input TP's from its minimum value of 00160 ohms to 00400 ohms ("125°K").		✓	(✓)
	Verify that analog telemetry			
	Channel 55 approaches zero volts.		0.0	(✓)
	Channel 63 changes to ≤1.0V.		0.0	(✓)
	Channel 64 decreases from its initial value by 1.0 ± 0.5V.		3.6	(✓)
9.3	Heater Enabled/Controller and Temp Monitor On			
9.3.1	Execute commands:			
	COLD STAGE HEATER CONTROLLER ON/ TELEMETRY ON.	58	✓	(✓)
	COLD STAGE OUTGAS HEATER ENABLE.	57	✓	(✓)
9.3.2	Verify via the CRT that digital			
	Word B bit 7 = 1		✓	(✓)
	Word H bit 0 = 1		✓	(✓)
	bit 1 = 1.		✓	(✓)
9.3.3	Display and note the values of analog telemetry			
	Channel 55		3.7	volts
	Channel 64.		3.6	volts

TEST ENGINEER [signature] DATE 26 OCT 87 QA [signature]

DATA SHEET NO. 17 OF 56 PARAGRAPH NO. 4.21

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1500

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
9.3.4	Replace resistor on FTP across Cold Stage Heater Input TP's with 01200 ohms ("hot").		✓	(✓)
	Verify that analog telemetry			
	Channel 55 approaches zero volts.		✓	(✓)
	Channel 64 approaches zero volts.		✓	(✓)
10.	DC RESTORE/CAL SHUTTER SENSORS/CAL SHUTTER CONTROL CHECK			
	Connect a DVM set on its 20V scale between the DC Restore TP and signal ground at FTP.		✓	(✓)
10.1	DC Restore OFF.			
10.1.1	Execute command:			
	DC RESTORE OFF/TELEMETRY SCALING OFF.	6	✓	(✓)
10.1.2	Verify via the CRT that digital			
	Word L bit 0 = 0.		✓	(✓)
10.1.3	Verify via the CRT that analog telemetry			
	Channel 61 "Calibration Shutter Temperature" is zero.	≤0.01	✓0.00	volts
	Channel 62 "Backup Shutter Temperature" is zero.	≤0.01	✓0.00	volts
	Verify that the DVM is measuring zero voltage.	≤0.01	✓0.00	volts

TEST ENGINEER Lutton DATE 29 Jan '82 QA

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO. 11323	NUMBER 16704
	SCALE	REV	SHEET

DATA SHEET NO. 18 OF 56 PARAGRAPH NO. 4.21

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1500

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
10.2	DC Restore On/Normal Mode Select			
10.2.1	Execute commands: DC RESTORE	3E	✓	(✓)
	SHUTTERS OFF.	F	✓	(✓)
	CAL SHUTTER ON/BACKUP SHUTTER OFF/DC RESTORE NORMAL SELECT.	D	✓	(✓)
10.2.2	Verify via the CRT that digital			
	Word G bit 2 = 1		✓	(✓)
	bit 5 = 0.		✓	(✓)
	Wait one minute,			
	then verify that digital			
	Word G bit 3 = 1		✓	(✓)
	bit 4 = 1.		✓	(✓)
10.2.3	Verify via the CRT that digital			
	Word L bit 0 = 1.		✓	(✓)
10.2.4	Verify via the CRT that analog telemetry			
	Channel 61 is ≤1.0V.	≤1.0	0.0	volts
	Channel 62 is ≥2.5V.	≥2.5	4.6	volts
	Verify that the DVM is measuring ≤1.0V.	≤1.0	.01	volts
10.2.5	Remove resistor across TP's 1 to 7 on FTP and replace with 30000 ohms ("cold").		✓	(✓)

TEST ENGINEER [illegible] DATE 29 Oct 92 QA _____

DATA SHEET NO. 10 OF 56 PARAGRAPH NO. 4.21

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1500

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(10.2.5)	Remove resistor across TP's 2 to 8 on FTP and replace with 05000 ohms ("hot").		✓	(✓)
	Verify via the CRT that analog telemetry			
	Channel 61 is ≥2.5V	≥2.5	4.8	volts
	Channel 62 is ≤1.0V	≤1.0	0.0	volts
	Verify that the DVM is measuring ≥1.8 volts.	~~≥1.8~~ 1.45	1.6	volts
10.3	DC Restore On/Backup mode Select	see EO.4089		
10.3.1	Remove resistor across TP's 1 to 7 on FTP and replace with 5000 ohms		✓	(✓)
	Remove resistor across TP's 2 to 8 on FTP and replace with 30000 ohms		✓	(✓)
10.3.2	Execute commands:			
	DC RESTORE OFF/TELEMETRY SCALING OFF.	6	✓	(✓)
	DC RESTORE ON.	3E	✓	(✓)
	BACKUP SHUTTER ON/CALIBRATION SHUTTER OFF/DC RESTORE BACKUP SELECT.	E	✓	(✓)
10.3.3	Verify via the CRT that digital			
	Word G bit 2 = 0		✓	(✓)
	bit 5 = 1.		✓	(✓)
	Wait one minute,			
	then verify that digital			
	Word G bit 6 = 1		✓	(✓)

TEST ENGINEER [signature] DATE 29 Jan '86 QA

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO 11323	NUMBER 16704
	SCALE	REV —	SHEET 10

FORM NO 3122 A 3 69 DIETZGEN MOST CLEARPRINT 2004

DATA SHEET NO. 20 OF 56 PARAGRAPH NO. 4.21

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1500

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(10.3.3)	bit 7 = 1.		✓	(✓)
10.3.4	Verify via the CRT that digital			
	Word L bit 0 = 0.		✓	(✓)
10.3.5	Verify via the CRT that analog telemetry			
	Channel 61 is ≤1.0V.	≤1.0	0.0	volts
	Channel 62 is ≥2.5V.	≥2.5	4.6	volts
	Verify that the DVM is measuring ≥1.8V.	≥~~1.8~~ 1.45 see C.O. 4089A	1.6	volts
10.3.6	Remove resistor across TP's 1 to 7 on FTP and replace with 30000 ohms.		✓	(✓)
	Remove resistor across TP's 2 to 8 on FTP and replace with 5000 ohms.		✓	(✓)
	Verify via the CRT that analog telemetry			
	Channel 61 is ≥2.5V.	≥2.5	4.7	volts
	Channel 62 is ≤1.0V.	≤1.0	0.0	volts
	Verify that the DVM is measuring ≤1.0 volts.	≤1.0	.5	volts
11.	Scan Mirror Assembly ± Z Recheck			
	Connect a DVM across the SMA - Z Heater Output TP's at FTP.		✓	(✓)
11.1	± Z Heaters Off.			
11.1.1	Execute command:			
	SMA + Z Heater Controller Off.	42	✓	(✓)

TEST ENGINEER [signature] DATE 29 JAN '92 QA _____

E.M. MODULE UNIT TEST | SIZE A | CODE IDENT NO 11323 | NUMBER 16704 | SCALE | REV 2 | SHEET 37

DATA SHEET NO. 21 OF 56 PARAGRAPH NO. 4.21

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1500

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(11.1.1)	SMA - Z Heater Controller Off.	44	✓	(✓)
11.1.2	Verify via the CRT that digital			
	Word A bit 2 = 0		✓	(✓)
	bit 3 = 0.		✓	(✓)
	Verify that the DVM is measuring ≤10mV.	≤10	0	mvolts
11.1.3	Reconnect a DVM across the SMA + Z Heater Output TP's at FTP.		✓	(✓)
	Verify that the DVM is measuring ≤10mV.	≤10	0	mvolts
11.2	SMA + Z Heater On/- Z Heater Off.			
11.2.1	Execute Command:			
	SMA + Z Heater Controller On	41	✓	(✓)
11.2.2	Verify via the CRT that digital			
	Word A bit 2 = 1		✓	(✓)
	3 = 0.		✓	(✓)
11.2.3	Verify that DVM is measuring ≤10mV	≤10	0	mvolts
11.2.4	Remove resistor on FTP across SMA + Z Heater Input TP's and replace with 12000 ohms (cold).		✓	(✓)
	Verify that DVM is measuring ≥500mV.	≥500	886	mvolts
11.3	SMA + Z Heater OFF/- Z Heater ON			

TEST ENGINEER [signature] DATE 27 JAN '84 QA [signature]

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO 11323	NUMBER 16704
	SCALE	REV	SHEET

DATA SHEET NO. 22 OF 56 PARAGRAPH NO. 4.21

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1500

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
11.3.1	Execute Command:			
	SMA + Z Heater Controller OFF.	42	✓	(✓)
	SMA - Z Heater Controller ON.	43	✓	(✓)
11.3.2	Verify via the CRT that digital			
	Word A bit 2 = 0		✓	(✓)
	bit 3 = 1.		✓	(✓)
11.3.4	Reconnect a DVM across the SMA - Z Heater Output TP's at FTP.		✓	(✓)
	Verify that DVM is measuring ≤10mV.	≤10	0	mvolts
.3.5	Remove resistor on FTP across SMA - Z Heater Input TP's and replace with 12000 ohms ("cold").		✓	(✓)
	Verify that DVM is measuring ≥500mV.	≥500	887	mvolts
11.3.6	Execute Command:			
	SMA - Z Heater Controller OFF	44	✓	(✓)
12.	Intermediate Stage Outgas Heater Control			
	Connect a DVM across the Intermediate Stage Heater TP's at FTP.		✓	(✓)
12.1	Intermediate Stage Heater Controller Off/ Heater Disabled.			
12.1.1	Execute command:			
	COOLER INTERMEDIATE STAGE HEATER CONTROLLER OFF/HEATER DISABLED.	47	✓	(✓)

TEST ENGINEER [signature] DATE 27 JAN 92 QA _____

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO 11323	NUMBER 16704
	SCALE	REV	SHEET

DATA SHEET NO. 23 OF 56 PARAGRAPH NO. 4.21

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 500

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
12.1.2	Verify via the CRT that digital			
	Word H bit 2 = 0		✓	( )
	bit 3 = 0.		✓	( )
12.1.3	Verify via the CRT that analog telemetry			
	Channel 65 "Intermediate Stage Temperature A (cold)" is ≤1.0V.	≤1.0	0.0	volts
	Channel 66 "Intermediate Stage Temperature B (hot)" is ≤1.0V.	≤1.0	0.0	volts
	Verify that the current monitoring DVM is measuring ≤10mV.	≤10	0	mvolts
?.2	Intermediate Stage Heater Controller On/ Heater Disabled.			
12.2.1	Execute command:			
	COOLER INTERMEDIATE STAGE HEATER CONTROLLER ON.	46	✓	(✓)
12.2.2	Verify via the CRT that digital			
	Word H bit 2 = 1		✓	(✓)
	bit 3 = 0.		✓	(✓)
	Verify that the DVM is measuring ≤10mV.	≤10	0	mvolts
12.2.3	Display analog telemetry channels 65 and 66 on the CRT.			
	Record the values of			
	Channel 65,	(>2.5)	3.82	volts
	Channel 66.	(>2.5)	~~2.96~~ 4.0	volts

TEST ENGINEER Hinton DATE 27 JAN 82 QA

E.M. MODULE UNIT TEST

SIZE	CODE IDENT NO	NUMBER
A	11323	16704

SCALE | REV 2 | SHEET 23

DATA SHEET NO. 24 OF 56 PARAGRAPH NO. 4.21

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 500

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
12.2.4	Remove resistor on FTP across Intermediate Stage Heater Input TP's and replace with 600 ohms.		✓	(✓)
	Verify that Channel 65 goes to ≤1.0V.	≤1.0	0.0	volts
	Record the value of Channel 66.		3.12	volts
12.2.5	Remove resistor on FTP across Intermediate Stage Heater Input TP's and replace with 1200 ohms.		✓	(✓)
	Verify that Channel 66 goes to ≤1.0V.	≤1.0	.1	volts
	Verify that Channel 65 remains ≤1.0V.	≤1.0	0.0	volts
12.2.6	Remove resistor on FTP across Intermediate Stage Heater Input TP's and replace with 400 ohms.		✓	(✓)
12.3	Intermediate Stage Heater Controller On/ Heater Enabled.			
12.3.1	Execute Commands:			
	COOLER INTERMEDIATE STAGE HEATER CONTROLLER ON.	46	✓	(✓)
	COOLER INTERMEDIATE STAGE OUTGAS HEATER ENABLED.	45	✓	(✓)
12.3.2	Verify via the CRT that digital			
	Word H bit 2 = 1		✓	(✓)
	bit 3 = 1.		✓	(✓)
12.3.3	Verify that the current monitoring DVM is measuring ≥300 mV.	≥300	439	mvolts

TEST ENGINEER [signature] DATE 27 JAN 82 QA [signature]

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO 11323	NUMBER 16704
	SCALE	REV 2	SHEET 73

DATA SHEET NO. 25 OF 56 PARAGRAPH NO. 4.21

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1500

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(12.3.3)	Using a DVM verify that test point J20-22 "Intermediate Outgas On/Off Test" is in the range .1 < V < 1.0 volts.	.1 < V < 1.0	.21	volts
	Using a DVM verify that J20-60 "Outgas Control Test" is ≥3.0 volts.	≥3.0	4.4	volts
12.3.4	Remove resistor on FTP across Intermediate Stage Heater Input TP's and replace with 1200 ohms.		✓	volts
	Verify that the current monitoring DVM is measuring ≤10mV.	≤10	0	mvolts
	Verify that J20-22 is in the range 1 < V < 95 V.	1 < V < 95	90	volts
	Verify that J20-60 is ≤1.0 volts.	≤1.0	0.50	volts
13.	Scan Line Corrector Test			
13.1	SLC #1 On/SLC #2 Off.			
13.1.1	Execute commands:			
	SCAN LINE CORRECTORS OFF	4C	✓	(✓)
	SCAN LINE CORRECTOR 1 ON/2 OFF	4A	✓	(✓)
13.1.2	Verify via the CRT that digital			
	Word G bit 0 = 1		✓	(✓)
	bit 1 = 0.		✓	(✓)
13.1.3	Verify via the CRT that analog telemetry			
	Channel 44 "SLC 1 Drive Current" is 2.5 ± 2.5V. *	2.5 ± 2.5 *	2.2 - 2.8	volts
	* Waveform is a sawtooth			

TEST ENGINEER [signature] DATE 27 JAN 82 QA

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO 11323	NUMBER 16704
	SCALE	REV	SHEET

DATA SHEET NO. 26 OF 56 PARAGRAPH NO. 4.21

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1500

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
13.1.3)	Channel 46 "SLC 1 ± 15V" is 2.5 ± 0.3V.	2.5 ± 0.3	2.52	volts
	Channel 47 "SLC 1 + 5V" is 2.5 ± 0.1V.	2.5 ± 0.1	2.52	volts
13 1.4	Using an oscilloscope confirm that the output of test point J20-1 "SLC 1 Integrator" corresponds to Figure 4.11A	Fig. 4.11A	✓	(✓)
13.1.5	Using an oscilloscope confirm that the output of J20-2 "SLC 1 Torquer Current" corresponds to Figure 4.11B.	Fig. 4.11B	✓	(✓)
13.1.6	Using an oscilloscope confirm that the output of J20-3 "SLC 1 Switch Tach" corresponds to Figure 4.11C.	Fig. 4.11C	✓	(✓)
13.2	SLC #1 Off/SLC #2 On.			
.2.1	Execute command:			
	SCAN LINE CORRECTOR 2 ON/1 OFF.	4B	✓	(✓)
13.2.2	Verify via the CRT that digital			
	Word G bit 0 = 0		✓	(✓)
	bit 1 = 1.		✓	(✓)
13.2.3	Verify via the CRT that analog telemetry			
	Channel 45 "SLC 2 Drive Current" is 2.5 ± 2.5V. *	2.5 ± 2.5 *	2.5 -3.3	volts
	Channel 48 "SLC 2 ± 15V" is 2.5 ± 0.3V.	2.5 ± 0.3	2.44	volts
	Channel 49 "SLC 2 + 5V" is 2.5 ± 0.1V.	2.5 ± 0.1	2.46	volts
13.2.4	Using an oscilloscope confirm that the output of J20-4 "SLC 2 Integrator" corresponds to Figure 4.11A.	Fig. 4.11A	✓	(✓)

* Waveform is a sawtooth

TEST ENGINEER _____ DATE _____ QA _____

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO 11323	NUMBER 16704
	SCALE	REV	SHEET

DATA SHEET NO. 27 OF 56 PARAGRAPH NO. 4.21

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1500

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
13.2.5	Using an oscilloscope confirm that the output of J20-5 "SLC 2 Torquer Current" corresponds to Figure 4.11B.	Fig. 4.11B	✓	(✓)
13.2.6	Using an oscilloscope confirm that the output of J20-6 "SLC 2 Switch Tach" corresponds to Figure 4.11C.	Fig 4.11C	✓	(✓)
14.	Telemetry Scaling.			
	To measure the DC Restore Signal to the MUX connect a DVM set on its 20V scale across the DC Restore TP and signal ground on the FTP.		✓	(✓)
14.1	DC Restore - Telemetry Scaling Off			
14.1.1	Execute commands:			
	COOLER DOOR ELECTROMAGNET OFF/FRAME DC RESTORE SELECT.	1F	✓	(✓)
	Verify via CRT that digital Word L bit 1=1		✓	(✓)
14.1.2	Execute Command:			
	DC RESTORE OFF/ TELEMETRY SCALING OFF	6	✓	(✓)
	Verify via CRT that digital Word L.bit 2=0		✓	(✓)
14.1.3	Verify via the CRT that analog telemetry			
	Channel 59 "Blackbody Temperature" is is ≤1.0V.	≤1.0	0.0	volts
	Channel 60 "SiFPA Temperature is ≤1.0V.	≤1.0	0.0	volts
14.2	Telemetry Scaling On/Backup DC Restore Selected.			

TEST ENGINEER [signature] DATE 27 JAN 95 QA

E.M. MODULE UNIT TEST

SIZE	CODE IDENT NO	NUMBER
A	11323	16704

SCALE | REV | SHEET

DATA SHEET NO. 28 OF 56 PARAGRAPH NO. 4.21

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 150

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
14.2.1	Execute commands:			
	TELEMETRY SCALING ON.	7	✓	(✓)
	COOLER DOOR ELECTROMAGNET OFF/ FRAME DC RESTORE SELECT.	1F	✓	(✓)
	BACKUP SHUTTER ON/CALIBRATION SHUTTER OFF/DC RESTORE BACKUP SELECT.	E	✓	(✓)
14.2.2	Verify via the CRT that digital			
	Word L bit 1 = 0		✓	(✓)
	bit 2 = 1.		✓	(✓)
14.2.3	Verify via the CRT that analog telemetry			
	Channel 59 is ≥2.5V	≥2.5	3.6	volts
	Channel 60 is ≥2.5V.	≥2.5	4.6	volts
14.3	Telemetry Scaling On/Normal DC Restore Selected			
14.3.1	Execute commands:			
	TELEMETRY SCALING ON.	7	✓	(✓)
	COOLER DOOR ELECTROMAGNET OFF/ FRAME DC RESTORE SELECT.	1F	✓	(✓)
	CALIBRATION SHUTTER ON/BACKUP SHUTTER OFF/DC RESTORE NORMAL SELECT.	D	✓	(✓)
14.3.2	Verify via the CRT that digital			
	Word L bit 1 = 0		✓	(✓)
	bit 2 = 1.		✓	(✓)

TEST ENGINEER [signature] DATE 27 JAN 82 QA _____

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO. 11323	NUMBER 16704
	SCALE	REV 2	SHEET 27

DATA SHEET NO. 29 OF 56 PARAGRAPH NO. 4.21

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1500

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
14.3.3	Verify via the CRT that analog telemetry			
	Channel 59 is ≥2.5V	≥2.5	3.6	volts
	Channel 60 is ≥2.5V.	≥2.5	4.7	volts
14.3.4	Verify that the DVM is measuring zero volts.	<10	0.0	mvolts
14.4	Telemetry Scaling on/Frame DC Restore Selected			
14.4.1	Execute commands:			
	TELEMETRY SCALING ON.	7	✓	(✓)
	COOLER DOOR ELECTROMAGNET OFF/ FRAME DC RESTORE SELECT.	1F	✓	(✓)
14.4.2	Verify via the CRT that digital			
	Word L bit 1 = 1		✓	(✓)
	bit 2 = 1.		✓	(✓)
14.4.3	Verify that the DVM is measuring ≤1.0 volts.	≤1.0	0.54	volts
14.4.4	Remove resistor on FTP across TP's 3 to 9 and replace with 30000 ohms.		✓	(✓)
	Remove resistor on FTP across TP's 5 to 11 and replace with 30000 ohms.		✓	(✓)
	Remove resistor on FTP across TP's 6 to 12 and replace with 20000 ohms.		✓	(✓)
14.4.5	Verify via the CRT that analog telemetry			
	Channel 59 is ≤1.0 volts	≤1.0	0.0 ✓	volts

TEST ENGINEER Hutton DATE 27 JAN '82 QA

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO. 11323	NUMBER 16704
	SCALE	REV 2	SHEET 29

DATA SHEET NO. 30 OF 56 PARAGRAPH NO. 4.21

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1500

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(14.4.5)	Channel 60 is ≤1.0 volts.	≤1.0	0.0	volts
14.4.6	Verify that the DVM is now measuring ≥1.8 volts.	1.90 ~~≥1.8~~ see EO 4089A	1.62	volts
15.	Fusible Link Check			
	Connect a DVM across the Cooler Door Fusible Link test points at the FTP			
15.1	All Fusible Link Switches Open			
15.1.1	Execute command:			
	FUSIBLE LINK SWITCHES OPEN.	60	✓	(✓)
15.1.2	Verify via the CRT that digital			
	Word A bit 5 = 0		✓	(✓)
	bit 6 = 0		✓	(✓)
	bit 7 = 0		✓	(✓)
	Word C bit 5 = 0		✓	(✓)
	bit 6 = 0		✓	(✓)
	bit 7 = 0.		✓	(✓)
15.1.3	Verify that the voltage across the Cooler Door Fusible Link TP's is ≤10 mV.	≤10	0.0	mvolts
15.2	All Cooler Door Switches Closed/Cooler Door Fusible Link Activated.			
15.2.1	Execute Commands:			
	COOLER DOOR FUSIBLE LINK SWITCH A CLOSE.	5A	✓	(✓)

TEST ENGINEER [signature] DATE 27 OCT 82 QA _____

E.M. MODULE UNIT TEST

SIZE	CODE IDENT NO	NUMBER
A	11323	16704

SCALE | REV | SHEET

DATA SHEET NO. 31 OF 56 PARAGRAPH NO. 4.21

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1500

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(15.2.1)	COOLER DOOR FUSIBLE LINK SWITCH B CLOSE.	48	✓	(✓)
	COOLER DOOR FUSIBLE LINK SWITCH C CLOSE.	5C	✓	(✓)
15.2.2	Verify via the CRT that digital			
	Word C bit 5 = 1		✓	(✓)
	bit 6 = 1		✓	(✓)
	bit 7 = 1		✓	(✓)
	Word A bit 5 = 0		✓	(✓)
	bit 6 = 0		✓	(✓)
	bit 7 = 0.		✓	(✓)
15.2.3	Verify that the Cooler Door Fusible Link Sonalert is switched to the Alarm position and is sounding (it may be turned off after verification). Verify that the indicator LED is lit.		✓	(✓)
15.2.4	Verify that there is ≥1.0V across the Cooler Door Fusible Link TP's with DVM.	≥1.0	1.5	volts
15.2.5	Verify that there is ≤10 mV across the Main Shutter Fusible Link TP's with DVM.	≤10	0.0	mvolts
15.2.6	Execute command			
	FUSIBLE LINK SWITCHES OPEN	60	✓	(✓)
15.3	All Shutter Switches Closed/Shutter Fusible Link Activated.			

TEST ENGINEER [illegible] DATE 27 JAN 87 QA

DATA SHEET NO. 12 OF 56 PARAGRAPH NO. 4.21

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1500

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
15.3.1	Execute Commands:			
	SHUTTER FUSIBLE LINK SWITCH A CLOSE.	5D	✓	(✓)
	SHUTTER FUSIBLE LINK SWITCH B CLOSE.	49	✓	(✓)
	SHUTTER FUSIBLE LINK SWITCH C CLOSE.	5F	✓	(✓)
15.3.2	Verify via the CRT that digital			
	Word A bit 5 = 1		✓	(✓)
	bit 6 = 1		✓	(✓)
	bit 7 = 1		✓	(✓)
	Word C bit 5 = 0		✓	(✓)
	bit 6 = 0		✓	(✓)
	bit 7 = 0.		✓	(✓)
15.3.3	Verify that the Shutter Fusible Link Sonalert is switched to the Alarm position and is sounding. Verify that the indicator LED is lit.		✓	(✓)
15.3.4	Using a DVM, verify that there is ≥1.0V across the Shutter Fusible Link TP's on FTP.	≥1.0	1.51	volts
	Verify that there is ≤10mV across the Cooler Door Fusible Link TP's on FTP.	≤10	0.001	mvolts
15.3.5	Execute command:			
	FUSIBLE LINK SWITCHES OPEN.	60	✓	(✓)

TEST ENGINEER [signature] DATE 8/7 QA

E.M. MODULE UNIT TEST

SIZE	CODE IDENT NO	NUMBER
A	11323	16704

SCALE | REV | SHEET

DATA SHEET NO. 33 OF 56 PARAGRAPH NO. 4.21

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1500

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
16.	Baffle Heater Test			
	Connect a DVM across the Baffle Heater current TP's on the FTP. (1 volt equals 1 amp current flow).		✓	(✓)
16.1	Heater and Backup Off.			
16.1.1	Execute command:			
	BAFFLE HEATER CONTROLLER OFF/BACKUP OFF.	56	✓	(✓)
16.1.2	Verify via the CRT that digital			
	Word F bit 0 = 0		✓	(✓)
	bit 1 = 0.		✓	(✓)
16.1.3	Verify that the baffle heater current is ≤1 mA (≤1 mV reading on the DVM).	≤1	0	mvolts
16.1.4	Verify that analog telemetry			
	Channel 54 "Baffle Heater Current" is ≤1.0V.	≤1.0	0.0	volts
16.2	Baffle Heater Controller On.			
16.2.1	Execute commands:			
	BAFFLE HEATER CONTROLLER OFF/BACKUP OFF.	56	✓	(✓)
	BAFFLE HEATER CONTROL ON.	54	✓	(✓)
16.2.2	Verify via the CRT that digital			
	Word F bit 0 = 1		✓	(✓)
	bit 1 = 0.		✓	(✓)

TEST ENGINEER [signature] DATE 22-JAN'92 QA [signature]

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO 11323	NUMBER 16704
	SCALE	REV	SHEET 12

DATA SHEET NO. 34 OF 56 PARAGRAPH NO. 4.21

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1500

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
16.2.3	Verify that the baffle heater current DVM is measuring ≤1 mV.	≤1	0	mvolts
16.2.4	Using a DVM verify that test point J20-41 "Baffle Temp Error Test" is in the range 0 < V < 1V.	0 < V < 1	.22	volts
	Using a DVM verify that test point J20-42 "Baffle Heater Current Test" is in the range 0 < V < .1V.	0 < V < .1	.02	volts
16.2.5	Remove resistor on FTP across Baffle Heater Input TP's and replace with 30000 ohms ("cold").		✓	(✓)
	Verify that the baffle heater current DVM is reading ≥300 mV.	≥300	620	mvolts
	Verify that analog telemetry Channel 54 is ≥2.5V.	≥2.5V	5.0	volts
	Using a DVM verify that test point J20-41 is in the range 2 < V < 15V.	2 < V < 15	4.6	volts
	Verify that test point J20-42 is in the range 0.2 < V < 1V.	.2 < V < 1	.62	volts
16.3	Heater and Backup On.			
16.3.1	Execute commands:			
	BAFFLE HEATER CONTROLLER OFF/BACKUP OFF.	56	✓	(✓)
	BAFFLE HEATER CONTROL ON.	54	✓	(✓)
	BAFFLE HEATER BACKUP ON.	55	✓	(✓)
16.3.2	Verify via the CRT that digital Word F bit 0 = 1		✓	(✓)

TEST ENGINEER [signature] DATE 22 JAN 82 QA [signature]

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO 11323	NUMBER 16704
	SCALE	REV 2	SHEET 13

FORM NO 3123 • A-3 69' DIETERICH POST CLEARPRINT 3000M

DATA SHEET NO. 35 OF 56 PARAGRAPH NO. 4.31

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1500

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(16.3.2)	bit 1 = 1.		✓	(✓)
16.3.3	Verify that the baffle current DVM is measuring ≥300 mV.	≥300	330	mvolts
16.3.4	Verify that analog telemetry			
	Channel 54 is ≥2.5V.	≥2.5	3.74	volts
16.4	Baffle Temperature Telemetry.			
16.4.1	Execute command:			
	DC RESTORE OFF/TELEMETRY SCALING OFF.	6	✓	(✓)
16.4.2	Verify via the CRT that analog telemetry			
	Channel 69 "Baffle Temperature" is ≤1.0V	≤1.0	0	volts
16.4.3	Execute command:			
	TELEMETRY SCALING ON.	7	✓	(✓)
	Verify that analog telemetry			
	Channel 69 is ≥2.5V.	≥2.5	5.0	volts
16.4.4	Remove resistor on FTP across TP's 4 and 10 and replace with 30000 ohms.		✓	(✓)
	Verify that analog telemetry			
	Channel 69 is ≤1.0V.	≤1.0	0.0	volts
17.	Post Amplifier Tests			
17.1	Band 1			
17.1.1	Connect cables between Electronic Module connectors J30 and breakout boxes and between J35 and breakout boxes. Verify		✓	(✓)

TEST ENGINEER [signature] DATE 27 JAN 82 QA _____

E.M. MODULE UNIT TEST | SIZE A | CODE IDENT NO 11323 | NUMBER 16704 | SCALE | REV A | SHEET 3

DATA SHEET NO. 36 OF 56 PARAGRAPH NO. 4.21

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1500

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(17.1.1)	that test cable 45 is connected between the EM and the FTP.		✓	(✓)
	Connect cable between Multiplexer output connector J2 and breakout box.			
	Short all unused signal inputs of Band 1 to their respective signal returns [(15 of 16 channels x(2 inputs (HI/L))) = 30 shorts]. Short all signal returns to power return.		✓	(✓)
	Verify via the CRT that digital			
	Word G bit 2 = 1.		✓	(✓)
	B bit 0 = 1.		✓	(✓)
17.1.2	Connect P11 and P12 (from the EM) and J11 and J12 Extender cables (from the MUX) into the MUX Channel Selector box. Select the output channel via the MUX Channel Selector keyboard.		✓	(✓)
	Connect breakout box between EM connector P13 and MUX connector J13. Using the test Equipment configuration shown in Figure 4.19, connect the DC Restore Sync signal on P13-H3/H4 (breakout box PINS 38 and 39) to the "inhibit" input of the phase splitter and to the triggers of both oscilloscopes.		✓	(✓)
17.1.3	Set the function generator at 1KHz.			
	Adjust the sinewave so that it is all positive relative to the DC Restore level and it has an amplitude of 4Vp-p out of the postamps.			

TEST ENGINEER [signature] DATE 27 Jan 84 QA

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO 11323	NUMBER 16704
	SCALE	REV	SHEET 55

FORM NO. 3122 1 A 3 691 DIETZGEN-POST CLEARPRINT 3004

DATA SHEET NO. 37 OF 56 PARAGRAPH NO. 4.21

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1500

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
			✓	
17.4	Connect function generator to consecutive input connector pins as defined on the following Band 1 1000 Hz table. Record related multiplexer output amplitude levels in Actual Data column of the Band 1 1000 Hz table for all 16 channels.		✓	(✓

TEST ENGINEER [illegible] DATE 22 JAN 92 QA

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO 11323	NUMBER 16704
	SCALE	REV	SHEET

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DATA SHEET NO. 38 of 56 PARAGRAPH NO. 4.21.17.1

AND	PARAMETER			Multi-plexer Output	Max Input Reference Spec Limit	Max Output Spec Limit	Actual Data	Units
1	Input Sinewave Freq = 1000 Hz	Input	Signal Ret					
	Channel 1 HI	J30-C3	J30-C4	J2-10	4(±3%)Vpp	3.4<V<4.2 Vp-p	2.0	Vp-p
	LO	J30-C5	J30-C4					
	2 HI	J35-K3	J35-K4	11			2.0	
	LO	J35-K5	J35-K4					
	3 HI	J30-D3	J30-D4	12			2.0	
	LO	J30-D5	J30-D4					
	4 HI	J35-J3	J35-J4	13			2.0	
	LO	J35-J5	J35-J4					
	5 HI	J30-E3	J30-E4	14			2.0	
	LO	J30-E5	J30-E4					
	6 HI	J35-H3	J35-H4	15			2.0	
	LO	J35-H5	J35-H4					
	7 HI	J30-F3	J30-F4	16			2.0	
	LO	J30-F5	J30-F4					
	8 HI	J35-G3	J35-G4	17			2.0	
	LO	J35-G5	J35-G4					
	9 HI	J30-G3	J30-G4	18			2.0	
	LO	J30-G5	J30-G4					
	10 HI	J35-F3	J35-F4	19			2.0	
	LO	J35-F5	J35-F4					
	11 HI	J30-H3	J30-H4	20			2.0	
	LO	J30-H5	J30-H4					
	12 HI	J35-E3	J35-E4	21			2.0	
	LO	J35-E5	J35-E4					
	13 HI	J30-J3	J30-J4	22			2.0	
	LO	J30-J5	J30-J4					
	14 HI	J35-D3	J35-D4	23			2.0	
	LO	J35-D5	J35-D4					
	15 HI	J30-K3	J30-K4	24			2.0	
	LO	J30-K5	J30-K4					
	16 HI	J35-C3	J35-C4	J2-25	4(±3%)Vpp	3.4<V<4.2 Vp-p	2.0	Vp-p
	LO	J35-C5	J35-C4					

Output Return
J2-61

SIZE	CODE IDENT NO	NUMBER
A	11323	16704

SCALE	REV	SHEET
	2	

3/3/82

FORM NO 3132 * A 3-69 DIETERICH POST CLEARPRINT 200M

DATA SHEET NO. 39 OF 56 PARAGRAPH NO. 4.21

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1500

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
17.2	Band 2			
17.2.1	Connect cables between Electronics Module connector J31 and breakout boxes and between J36 and breakout boxes. Verify that test cable 45 is connected between the EM and the FTP.		✓	(✓)
	Short all unused signal inputs of Band 2 to their respective signal returns [15 of 16 channels x(2 inputs (HI/LO)) = 30 shorts]. Short all signal returns to power return.		✓	(✓)
	Verify via the CRT that digital Word B bit 1 = 1.		✓	(✓)
	G bit 2 = 1.		✓	(✓)
17.2.2	Connect P11 and P12 (from the EM) and J11 and J12 Extender cables (from the MUX) into the MUX Channel Selector box. Select the output channel via the MUX Channel Selector Keyboard.		✓	(✓)
	Connect breakout box between EM connector P13 and MUX connector J13. Using the test Equipment configuration shown in Figure 4.19, connect the DC Restore Sync. signal on P13-H3/H4 (breakout box pins 38 and 39) to the "inhibit" input of the phase splitter and to the triggers of both oscilloscopes.		✓	(✓)
17.2.3	Set the function generator at 1 KHz.			
	Adjust the sinewave so that it is all positive relative to the DC Restore level and it has			

TEST ENGINEER [signature] DATE 28 Jan 82 QA

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO 11323	NUMBER 16704
	SCALE	REV	SHEET

DATA SHEET NO. 42 OF 58 PARAGRAPH NO. 4.21

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1500

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(17.2.3)	an amplitude of 4Vp-p out of the postamps.		✓	(✓)
17.2.4	Connect function generator to consecutive input connector pins as defined on the following Band 2 1000 Hz table. Record related multiplexer amplitude levels in Actual Data column of the Band 2 1000 Hz table for all 16 channels.		✓	(✓)

TEST ENGINEER Kuron DATE 23 JAN 92 QA 3/16/92

E.M. MODULE UNIT TEST

SIZE	CODE IDENT NO	NUMBER
A	11323	16704

SCALE | REV | SHEET 42

DATA SHEET NO. 41 of 56 PARAGRAPH NO. 4.21

AND	PARAMETER		Input	Signal Ret	Multiplexer Output	Mux Input Reference Spec Limit	Mux Output Spec Limit	Actual Data	Units
2	Input Sinewave Freq = 1000 Hz								
	Channel 1	HI	J31-C3	J31-C4	J2-27	4 (±3%) Vpp	1.8<V<2.2 Vp-p	2.0	Vp-p
		LO	J31-C5	J31-C4					
	2	HI	J36-K3	J36-K4	28			2.1	
		LO	J36-K5	J36-K4					
	3	HI	J31-D3	J31-D4	29			2.0	
		LO	J31-D5	J31-D4					
	4	HI	J36-J3	J36-J4	30			2.0	
		LO	J36-J5	J36-J4					
	5	HI	J31-E3	J31-E4	31			2.0	
		LO	J31-E5	J31-E4					
	6	HI	J36-H3	J36-H4	32			2.0	
		LO	J36-H5	J36-H4					
	7	HI	J31-F3	J31-F4	33			2.0	
		LO	J31-F5	J31-F4					
	8	HI	J36-G3	J36-G4	34			2.0	
		LO	J36-G5	J36-G4					
	9	HI	J31-G3	J31-G4	35			2.0	
		LO	J31-G5	J31-G4					
	10	HI	J36-F3	J36-F4	36			2.0	
		LO	J36-F5	J36-F4					
	11	HI	J31-H3	J31-H4	37			2.0	
		LO	J31-H5	J31-H4					
	12	HI	J36-E3	J36-E4	38			2.0	
		LO	J36-E5	J36-E4					
	13	HI	J31-J3	J31-J4	39			2.0	
		LO	J31-J5	J31-J4					
	14	HI	J36-D3	J36-D4	40			2.0	
		LO	J36-D5	J36-D4					
	15	HI	J31-K3	J31-K4	41			2.0	
		LO	J31-K5	J31-K4					
	16	HI	J36-C3	J36-C4	J2-42	2 (±3%) Vpp	1.8<V<2.2 Vp-p	2.0	Vp-p
		LO	J36-C5	J36-C4					

Output Return J2-61

SIZE	CODE IDENT NO.	NUMBER
A	11323	16704

SCALE | REV | SHEET

FORM NO 3122-1 A 3 69 DIETERICH-POST CLEARPRINT 000M

DATA SHEET NO. 42 OF 56 PARAGRAPH NO. 4.21

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1500

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
17.3	Band 3			
17.3.1	Connect cables between Electronics Module connectors J32 and breakout boxes and between J37 and breakout boxes. Verify that test cable 45 is connected between the EM and the FTP.		✓	(✓)
	Short all unused signal inputs of Band 3 to their respective signal returns [15 of 16 channels x(2 inputs (HI/LO)) = 30 shorts]. Short all signal returns to power return.		✓	(✓)
	Verify via the CRT that digital Word B bit 2 = 1.		✓	(✓)
	G bit 2 = 1.		✓	(✓)
7.3.2	Connect P11 and P12 (from the EM) and J11 and J12 Extender cables (from the MUX) into the MUX Channel Selector box. Select the output channel via the MUX Channel Selector Keyboard.		✓	(✓)
	Connect breakout box between EM connector P13 and MUX connector J13. Using the test Equipment configuration shown in Figure 4.19, connect the DC Restore Sync. signal on P13-H3/H4 (breakout box pins 38 and 39) to the "inhibit" input of the phase splitter and to the triggers of both oscilloscopes.		✓	(✓)
17.3.3	Set the function generator at 1 KHz.			
	Adjust the sinewave so that it is all positive relative to the DC Restore level and it has			

TEST ENGINEER J Kinton DATE 2K Jan'87 QA

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO. 11323	NUMBER 16704
	SCALE	REV	SHEET

FORM NO. 3132 - A 3-69 DIETERICH-POST CLEARPRINT 2004

DATA SHEET NO. 43 OF 56 PARAGRAPH NO. 4.21

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1500

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(17.3.3)	an amplitude of 4Vp-p out of the postamps.		✓	(✓)
17.3.4	Connect function generator to consecutive input connector pins as defined on the following Band 3 1000 Hz table. Record related multiplexer amplitude levels in Actual Data column of the Band 3 1000 Hz table for all 16 channels.		✓	(✓)

TEST ENGINEER [signature] DATE 28 Jan 88 QA

E.M. MODULE UNIT TEST

SIZE	CODE IDENT NO.	NUMBER
A	11323	16704

SCALE | REV | SHEET

DATA SHEET 44 of 56

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PARAGRAPH NO. 4.21

BAND	PARAMETER		Input	Signal Ret	Multiplexer Output	Mux Input Reference Spec Limit	Mux Output Spec Limit	Actual Data	Units
3	Input Sinewave Freq = 1000 Hz								
	Channel 1	HI	J32-C3	J32-C4	J2-44	4(±3%)VP-P	1.8 < V < 2.2 Vp-p	2.0	Vp-p
		LO	J32-C5	J32-C4					
	2	HI	J37-K3	J37-K4	45			2.0	
		LO	J37-K5	J37-K4					
	3	HI	J32-D3	J32-D4	46			2.0	
		LO	J32-D5	J32-D4					
	4	HI	J37-J3	J37-J4	47			2.0	
		LO	J37-J5	J37-J4					
	5	HI	J32-E3	J32-E4	48			2.0	
		LO	J32-E5	J32-E4					
	6	HI	J37-H3	J37-H4	49			2.0	
		LO	J37-H5	J37-H4					
	7	HI	J32-F3	J32-F4	50			2.0	
		LO	J32-F5	J32-F4					
	8	HI	J37-G3	J37-G4	51			2.0	
		LO	J37-G5	J37-G4					
	9	HI	J32-G3	J32-G4	52			2.0	
		LO	J32-G5	J32-G4					
	10	HI	J37-F3	J37-F4	53			2.0	
		LO	J37-F5	J37-F4					
	11	HI	J32-H3	J32-H4	54			2.0	
		LO	J32-H5	J32-H4					
	12	HI	J37-E3	J37-E4	55			2.0	
		LO	J37-E5	J37-E4					
	13	HI	J32-J3	J32-J4	56			2.0	
		LO	J32-J5	J32-J4					
	14	HI	J37-D3	J37-D4	57			2.0	
		LO	J37-D5	J37-D4					
	15	HI	J32-K3	J32-K4	58			2.1	
		LO	J32-K5	J32-K4					
	16	HI	J37-C3	J37-C4	J2-59	4(±3%)VP-P	1.8 < V < 2.2 Vp-p	2.0	Vp-p
		LO	J37-C5	J37-C4					

Output Return
J2-61

SIZE	CODE IDENT NO.	NUMBER
A	11323	16704

SCALE | REV | SHEET 93

FORM NO 3122 A S 681 DIETERICH-POST CLEARPRINT 200M

DATA SHEET NO. 45 OF 56 PARAGRAPH NO. 4.21

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1500

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
17.4	Band 4			
17.4.1	Connect cables between Electronics Module connectors J33 and breakout boxes and between J38 and breakout boxes. Verify that test cable 45 is connected between the EM and the FTP.		✓	(✓)
	Short all unused signal inputs of Band 4 to their respective signal returns [15 of 16 channels x(2 inputs (HI/LO)) = 30 shorts]. Short all signal returns to power return.		✓	(✓)
	Verify via the CRT that digital Word B bit 3 = 1. G bit 2 = 1.		✓ ✓	(✓) (✓)
7.4.2	Connect P11 and P12 (from the EM) and J11 and J12 Extender cables (from the MUX) into the MUX Channel Selector box. Select the output channel via the MUX Channel Selector Keyboard.		✓	(✓)
	Connect breakout box between EM connector P13 and MUX connector J13. Using the test Equipment configuration shown in Figure 4.19, connect the DC Restore Sync. signal on P13-H3/H4 (breakout box pins 38 and 39) to the "inhibit" input of the phase splitter and to the triggers of both oscilloscopes.		✓	(✓)
17.4.3	Set the function generator at 1 KHz.			
	Adjust the sinewave so that it is all positive relative to the DC Restore level and it has			

TEST ENGINEER [signature] DATE 28 JAN '86 QA

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO 11323	NUMBER 16704
	SCALE	REV C	SHEET 4

FORM NO. 3122 [illegible] DIETZGEN MOST CLEARPRINT CODE

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DATA SHEET NO. 46 OF 56 PARAGRAPH NO. 4.21

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1500

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(17.4.3)	an amplitude of 4Vp-p out of the postamps.		✓	(✓)
17.4.4	Connect function generator to consecutive input connector pins as defined on the following Band 4 1000 Hz table. Record related multiplexer amplitude levels in Actual Data column of the Band 4 1000 Hz table for all 16 channels.		✓	(✓)

TEST ENGINEER Nguyen DATE 28 JAN '82 QA

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO. 11323	NUMBER 16704
	SCALE	REV C	SHEET 5

FORM NO. 3123

DATA SHEET 47 of 56

PARAGRAPH NO. 4.21

BAND	PARAMETER Input Sinewave Freq = 100 Hz		Input	Signal Ret	Multiplexer Output	Mux Input Reference Spec Limit	Mux Output Spec Limit	Actual Data	Units
4	Channel 1	HI	J33-C3	J33-C4	J3-12	4(±3%)VPP	1.8<V<2.2 Vp-p	2.0	Vp-p
		LO	J33-C5	J33-C4					
	2	HI	J38-K3	J38-K4	13			2.0	
		LO	J38-K5	J38-K4					
	3	HI	J33-D3	J33-D4	14			2.0	
		LO	J33-D5	J33-D4					
	4	HI	J38-J3	J38-J4	15			2.0	
		LO	J38-J5	J38-J4					
	5	HI	J33-E3	J33-E4	16			2.0	
		LO	J33-E5	J33-E4					
	6	HI	J38-H3	J38-H4	17			2.0	
		LO	J38-H5	J38-H4					
	7	HI	J33-F3	J33-F4	18			2.0	
		LO	J33-F5	J33-F4					
	8	HI	J38-G3	J38-G4	19			2.0	
		LO	J38-G5	J38-G4					
	9	HI	J33-G3	J33-G4	20			2.0	
		LO	J33-G5	J33-G4					
	10	HI	J38-F3	J38-F4	21			2.0	
		LO	J38-F5	J38-F4					
	11	HI	J33-H3	J33-H4	22			2.0	
		LO	J33-H5	J33-H4					
	12	HI	J38-E3	J38-E4	23			2.0	
		LO	J38-E5	J38-E4					
	13	HI	J33-J3	J33-J4	24			2.0	
		LO	J33-J5	J33-J4					
	14	HI	J38-D3	J38-D4	25			2.0	
		LO	J38-D5	J38-D4					
	15	HI	J33-K3	J33-K4	26			2.0	
		LO	J33-K5	J33-K4					
	16	HI	J38-C3	J38-C4	J3-27	4(±3%)VPP	1.8<V<2.2 Vp-p	2.0	Vp-p
		LO	J38-C5	J38-C4					

Output Return
J3-11

SIZE	CODE IDENT NO	NUMBER
A	11323	16704

SCALE	REV	SHEET
	2	

FORM NO 3122 · 6-75-091 DIETERICH-MOST CLEARPRINT 000M

DATA SHEET NO. 42 OF 56 PARAGRAPH NO. 4.21

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1500

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
17.5	Band 5			
17.5.1	Connect cables between Electronics Module connectors J41 and breakout boxes. Verify that test cable 45 is connected between the EM and the FTP.		✓	(✓)
	Short all unused signal inputs of Band 5 to their respective signal returns [15 of 16 channels x(2 inputs (HI/LO)) = 30 shorts]. Short all signal returns to power return.		✓	(✓)
	Verify via the CRT that digital Word 3 bit 4 = 1. G bit 2 = 1.		✓ ✓	(✓) (✓)
17.5.2	Connect P11 and P12 (from the EM) and J11 and J12 Extender cables (from the MUX) into the MUX Channel Selector box. Select the output channel via the MUX Channel Selector Keyboard.		✓	(✓)
	Connect breakout box between EM connector P13 and MUX connector J13. Using the test Equipment configuration shown in Figure 4.19, connect the DC Restore Sync. signal on P13-H3/H4 (breakout box pins 38 and 39) to the "inhibit" input of the phase splitter and to the triggers of both oscilloscopes.		✓	(✓)
17.5.3	Set the function generator at 1 KHz.			
	Adjust the sinewave so that it is all positive relative to the DC Restore level and it has			

TEST ENGINEER Loutzo DATE 29 JAN 82 QA

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO. 11323	NUMBER 16704
	SCALE	REV C	SHEET 27

DATA SHEET NO. 49 OF 56 PARAGRAPH NO. 4.21

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1500

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(17.5.3)	an amplitude of 4Vp-p out of the postamps.		✓	(✓)
17.5.4	Connect function generator to consecutive input connector pins as defined on the following Band 5 1000Hz table. Record related multiplexer amplitude levels in Actual Data column of the Band 5 1000Hz table for all 16 channels.		✓	(✓)

TEST ENGINEER [signature] DATE 29 JAN 1992 QA _____

E.M. MODULE UNIT TEST

SIZE	CODE IDENT NO.	NUMBER
A	11323	16704

SCALE | REV | SHEET

DATA SHEET 50 of 56

PARAGRAPH NO. 4.21

BAND 5 PARAMETER Input Sinewave Freq = 1000 Hz		Input	Signal Ret	Multiplexer Output	Mux Input Reference Spec Limit	Mux Output Spec Limit	Actual Data	Units
Channel 1	HI	J41-W1	J41-P4	J3-29	4(±3%) ipp	1.3<V<2.2 Vp-p	2.0	Vp-p
	LO	W2						
2	HI	W4		30			2.0	
	LO	W5						
3	HI	V3		31			2.0	
	LO	W3						
4	HI	U4		32			2.0	
	LO	U5						
5	HI	T1		33			2.0	
	LO	T2						
6	HI	R4		34			2.0	
	LO	R5						
7	HI	T3		35			2.0	
	LO	U3						
8	HI	T4		36			2.0	
	LO	T5						
9	HI	S1		37			2.0	
	LO	S2						
10	HI	S3		38			2.0	
	LO	R3						
11	HI	R1		39			2.0	
	LO	P1						
12	HI	N1		40			2.0	
	LO	N2						
13	HI	M1		41			2.0	
	LO	L1						
14	HI	M4		42			2.0	
	LO	N4						
15	HI	L3		43			2.0	
	LO	M3						
16	HI	L4		J3-44	4(±3%) vpp	1.3<V<2.2 Vp-p	2.0	Vp-p
	LO	J41-L5	J41-P4					

Output Return J3-11

SIZE	CODE IDENT NO	NUMBER
A	11323	16704

SCALE | REV | SHEET

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DATA SHEET NO. 51 OF 56 PARAGRAPH NO. 4.21

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1500

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
17.6	Band 6			
17.6.1	Connect cables between Electronics Module connectors J40 and breakout boxes. Verify that test cable 45 is connected between the EM and the FTP.		✓	(✓)
	Short all unused signal inputs of Band 6 to their respective signal returns [3 of 4 channels x(2 inputs (HI/LO)) = 6 shorts]. Short all signal returns to power return.		✓	(✓)
	Verify via the CRT that digital Word B bit 5 = 1.		✓	(✓)
	G bit 2 = 1.		✓	(✓)
	L bit 0 = 1.		✓	(✓)
7.6.2	Connect P11 and P12 (from the EM) and J11 and J12 Extender cables (from the MUX) into the MUX Channel Selector box. Select the output channel via the MUX Channel Selector Keyboard.		✓	(✓)
	Connect breakout box between EM connector P13 and MUX connector J13. Using the test Equipment configuration shown in Figure 4.19, connect the DC Restore Sync. signal on P13-H3/H4 (breakout box pins 38 and 39) to the "inhibit" input of the phase splitter and to the triggers of both oscilloscopes.		✓	(✓)
17.6.3	Set the function generator at 1 KHz.			
	Adjust the sinewave so that it is all positive relative to the DC Restore level and it has			

TEST ENGINEER Clinton DATE 24-Jan-'84 QA

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO. 11323	NUMBER 16704
	SCALE	REV A	SHEET 300

FORM NO. 3132 - A 3-69 DIETZGEN-HOSE BLUEPRINT DOOM

DATA SHEET NO. 52 OF 56 PARAGRAPH NO. 4.21

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1500

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(17.6.3)	an amplitude of 4Vp-p out of the postamps.		✓	(✓)
17.6.4	Connect function generator to consecutive input connector pins as defined on the following Band 6 1000Hz table. Record related multiplexer amplitude levels in Actual Data column of the Band 6 1000Hz table for all 16 channels.		✓	(✓)

EST ENGINEER [signature] DATE 11 Jan 82 QA _____

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO. 11323	NUMBER 16704
	SCALE	REV A	SHEET 52

DATA SHEET 53 of 56 PARAGRAPH NO. 4.21

AND	PARAMETER			Signal	Multi-plexer	Mux Input Reference	Mux Output Spec	Actual	
6	Input Sinewave Freq = 1000 Hz		Input	Ret	Output	Spec Limit	Limit	Data	Units
	Channel 1	HI	J40-M1	J40-J1	J2-5	4 (±3%) VPP	1.8 < V < 2.2 Vp-p	2.0	Vp-p
		LO	N1						
	2	HI	M2		6			2.0	
		LO	N2						
	3	HI	M3		7			2.0	
		LO	N3						
	4	HI	M4		J2-8		1.8 < V < 2.2 Vp-p	2.0	Vp-p
		LO	J40-N4	J40-J1		4 (±3%) VPP			

Output Return
J2-61

SIZE	CODE IDENT NO	NUMBER
A	11323	16704
SCALE	REV	SHEET

FORM NO C 22 A S 681 DIETZGEN-POST CLEARPRINT CORP

DATA SHEET NO. 54 OF 56 PARAGRAPH NO. 4.21

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1500

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
17.7	Band 7			
17.7.1	Connect cables between Electronics Module connector J42 and breakout boxes. Verify that test cable 45 is connected between the EM and the FTP.		✓	(✓)
	Short all unused signal inputs of Band 7 to their respective signal returns [15 of 16 channels x(2 inputs (HI/LO)) = 30 shorts]. Short all signal returns to power return.		✓	(✓)
	Verify via the CRT that digital Word 3 bit 6 = 1. G bit 2 = 1.		✓ ✓	(✓) (✓)
17.7.2	Connect P11 and P12 (from the EM) and J11 and J12 Extender cables (from the MUX) into the MUX Channel Selector box. Select the output channel via the MUX Channel Selector Keyboard.		✓	(✓)
	Connect breakout box between EM connector P13 and MUX connector J13. Using the test Equipment configuration shown in Figure 4.19, connect the DC Restore Sync. signal on P13-H3/H4 (breakout box pins 38 and 39) to the "inhibit" input of the phase splitter and to the triggers of both oscilloscopes.		✓	(✓)
17.7.3	Set the function generator at 1 KHz.			
	Adjust the sinewave so that it is all positive relative to the DC Restore level and it has			

TEST ENGINEER [signature] DATE 2-JAN-92 QA

	SIZE	CODE IDENT NO.	NUMBER
E.M. MODULE UNIT TEST	A	11323	16704
	SCALE	REV	SHEET

DATA SHEET NO. 55 OF 56 PARAGRAPH NO. 4.21

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1500

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(17.7.3)	an amplitude of 4Vp-p out of the postamps.		✓	(✓)
17.7.4	Connect function generator to consecutive input connector pins as defined on the following Band 7 1000 Hz table. Record related multiplexer amplitude levels in Actual Data column of the Band 7 1000 Hz table for all 16 channels.		✓	(✓)

TEST ENGINEER [signature] DATE 29 JAN '92 QA

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO. 11323	NUMBER 16704
	SCALE	REV -	SHEET 20 of

FORM NO. 3122 A 5-69 DIETERICH-POST CLEARPRINT CORP.

DATA SHEET 56 of 56 PARAGRAPH NO. 4.21

AND 7

PARAMETER Input Sinewave Freq = 10 kHz		Input	Signal Ret	Multiplexer Output	Mux Input Reference Spec Limit	Mux Output Spec Limit	Actual Data	Units
Channel 1	HI	J42-W1	J42-P4	J3-45	4/=3%)VPP	1.8<V<2.2 Vp-p	2.0	Vp-p
	LO	W2						
2	HI	W4		46			2.0	
	LO	W5						
3	HI	V3		47			2.0	
	LO	W3						
4	HI	U4		48			2.0	
	LO	U5						
5	HI	T1		49			2.0	
	LO	T2						
6	HI	R4		50			2.0	
	LO	R5						
7	HI	T3		51			2.0	
	LO	U3						
8	HI	T4		52			2.0	
	LO	T5						
9	HI	S1		53			2.0	
	LO	S2						
10	HI	S3		54			2.0	
	LO	R3						
11	HI	R1		55			2.0	
	LO	P1						
12	HI	N1		56			2.0	
	LO	N2						
13	HI	M1		57			2.0	
	LO	L1						
14	HI	M4		58			2.0	
	LO	N4						
15	HI	L3		59			2.0	
	LO	M3						
16	HI	L4		J3-60		1.8<V<2.2 Vp-p	2.0	Vp-p
	LO	J42-L5	J42-P4		4/=3%)VPP			
Output Return J3-11								

GUYTON 29 JAN 87

SIZE	CODE IDENT NO	NUMBER
A	11323	16704

SCALE | REV D | SHEET 225

FORM NO 3122 * A E 8PI DIETERICH POST CLEARPRINT 0008

DATA SHEET NO. 1 OF 4 PARAGRAPH NO. 4.22

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1500

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(4.22)	Ambient Board Temperature Checks			
1.	For the 23 boards listed below use a Fluke 80T-150°C Temperature Sensor connected into a Fluke 8030A Digital Multimeter to measure temperature at top portion of each board heat sink. One measurement shall be made at left side of board heat sink, while another measurement shall be made at right side of board heat sink.			
	Left A1 Scan Line Corrector 52250-1	<50	24.7	°C
	Right A1 Scan Line Corrector 52250-1	<50	24.8	°C
	Left A2 Scan Line Corrector 52250-2	<50	23.6	°C
	Right A2 Scan Line Corrector 52250-2	<50	23.7	°C
	Left A3 Cal Lamp/Inchworm Driver 50926	<50	23.5	°C
	Right A3 Cal Lamp/Inchworm Driver 50926	<50	23.5	°C
	Left A4 Temperature Controller 50942	<50	23.3	°C
	Right A4 Temperature Controller 50942	<50	23.3	°C
	Left A5 Temp Control/DC Restore 50920	<50	23.6	°C
	Right A5 Temp Control/DC Restore 50920	<50	23.6	°C
	Left A6 Main Cal Shutter 50916	<50	23.9	°C
	Right A6 Main Cal Shutter 50916	<50	24.0	°C
	Left A7 Backup Cal Shutter 51398	<50	23.7	°C
	Right A7 Backup Cal Shutter 51398	<50	23.7	°C
	Left A8 Telemetry Scaling/Baffle Heater 51402	<50	25.1	°C
	Right A8 Telemetry Scaling/Baffle Heater 51402	<50	25.3	°C
	Left A9 Motor Drive 50932	<50	23.2	°C
	Right A9 Motor Drive 50932	<50	23.2	°C

TEST ENGINEER Banach DATE 1/29/82 QA

E.M. MODULE UNIT TEST

SIZE	CODE IDENT NO	NUMBER
A	11323	16704

SCALE | REV C | SHEET 16

DATA SHEET NO. 2 OF 4 PARAGRAPH NO. 4.22

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1500

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(1.)	Left A10 Serial Magnitude Command 50900	<50	24.3	°C
	Right A10 Serial Magnitude Command 50900	<50	24.3	°C
	Left A11 Verification Register 50948	<50	24.4	°C
	Right A11 Verification Register 50948	<50	24.3	°C
	Left A12 Macro Discrete Command Generator 1A 51795	<50	23.6	°C
	Right A12 Macro Discrete Command Generator 1A 51795	<50	23.4	°C
	Left A13 Macro Discrete Command Generator 1B 51795	<50	23.4	°C
	Right A13 Macro Discrete Command Generator 1B 51795	<50	23.4	°C
	Left A14 Macro Discrete Command Generator 2 51813	<50	23.6	°C
	Right A14 Macro Discrete Command Generator 2 51813	<50	23.7	°C
	Left A15 Post Amplifier Band 7 50908	<50	24.2	°C
	Right A15 Post Amplifier Band 7 50908	<50	24.2	°C
	Left A16 Post Amplifier Band 6 50912	<50	23.5	°C
	Right A16 Post Amplifier Band 6 50912	<50	23.5	°C
	Left A17 Post Amplifier Band 5 50908	<50	26.8	°C
	Right A17 Post Amplifier Band 5 50908	<50	26.8	°C
	Left A18 Post Amplifier Band 4 50904	<50	27.7	°C
	Right A18 Post Amplifier Band 4 50904	<50	28.6	°C
	Left A19 Post Amplifier Band 3 50904	<50	29.3	°C
	Right A19 Post Amplifier Band 3 50904	<50	29.2	°C
	Left A20 Post Amplifier Band 2 50904	<50	30.0	°C
	Right A20 Post Amplifier Band 2 50904	<50	29.6	°C

TEST ENGINEER Barnes DATE 1/29/82 QA

E.M. MODULE UNIT TEST

SIZE	CODE IDENT NO	NUMBER
A	11323	16704

SCALE REV SHEET 207

DATA SHEET NO. 3 OF 4 PARAGRAPH NO. 4.22

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1500

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(1.)	Left A21 Post Amplifier Band 1 50904	<50	29.6	°C
	Right A21 Post Amplifier Band 1 50904	<50	29.4	°C
	Left A22 Auxiliary Circuits 52797	<50	25.2	°C
	Right A22 Auxiliary Circuits 52797	<50	25.0	°C
	Left* A23 Capacitor/Relays 52930	<50	22.9	°C
	Right* A23 Capacitor/Relays 52930	<50	22.9	°C
2.	Svstem Shutdown.			
	Execute commands:			
	COOLER INTERMEDIATE STAGE HEATER CONTROLLER OFF/HEATER DISABLED.	47	✓	(✓)
	SMA + Z HEATER CONTROLLER OFF.	42	✓	(✓)
	SMA - Z HEATER CONTROLLER OFF.	44	✓	(✓)
	BLACKBODY HEATER CONTROL OFF/BACKUP OFF.	24	✓	(✓)
	CFPA TELEMETRY OFF.	1C	✓	(✓)
	CFPA HEATER CONTROL OFF.	1D	✓	(✓)
	COLD STAGE HEATER CONTROLLER OFF/ COLD STAGE OUTGAS HEATER DISABLED.	59	✓	(✓)
	MULTIPLEXER OFF (POWER SUPPLY 2).	3D	✓	(✓)
	DC RESTORE OFF/TELEMETRY SCALING OFF.	6	✓	(✓)
	BAFFLE HEATER CONTROLLER OFF/BACKUP OFF.	56	✓	(✓)
	MULTIPLEXER OFF (POWER SUPPLY 1).	8	✓	(✓)
	CALIBRATION LAMP 1 OFF/OVERRIDE OFF.	16	✓	(✓)
	*A23 does not have a heat sink per se. Take measurement on right and left side of board.			

TEST ENGINEER Branch DATE 1/29/82 QA

E.M. MODULE UNIT TEST

SIZE	CODE IDENT NO	NUMBER
A	11323	16704

SCALE | REV | SHEET

DATA SHEET NO. 4 OF 4 PARAGRAPH NO. 4.22

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1500

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(2.)	CALIBRATION LAMP 2 OFF/OVERRIDE OFF.	17	✓	(✓)
	CALIBRATION LAMP 3 OFF/OVERRIDE OFF.	18	✓	(✓)
	SHUTTERS OFF.	F	✓	(✓)
	SCAN LINE CORRECTORS OFF.	4C	✓	(✓)
	BAND 1 OFF.	26	✓	(✓)
	BAND 2 OFF.	28	✓	(✓)
	BAND 3 OFF.	2A	✓	(✓)
	BAND 4 OFF.	2C	✓	(✓)
	BAND 5 OFF.	2E	✓	(✓)
	BAND 6 OFF.	30	✓	(✓)
	BAND 7 OFF.	32	✓	(✓)

TEST ENGINEER Brash DATE 1/29/82 QA

E.M. MODULE UNIT TEST

SIZE	CODE IDENT NO.	NUMBER
A	11323	16704

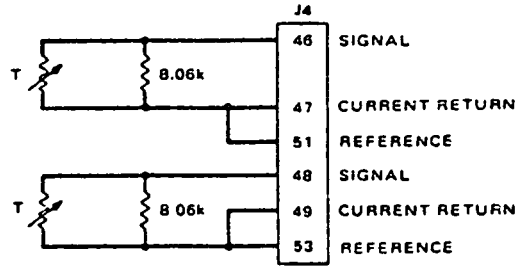
SCALE | REV - | SHEET 2

MULTIPLEXER ELECTRONICS TEMPERATURE

IS-76
WORD 92
PARAMETER 051
CONDITIONED

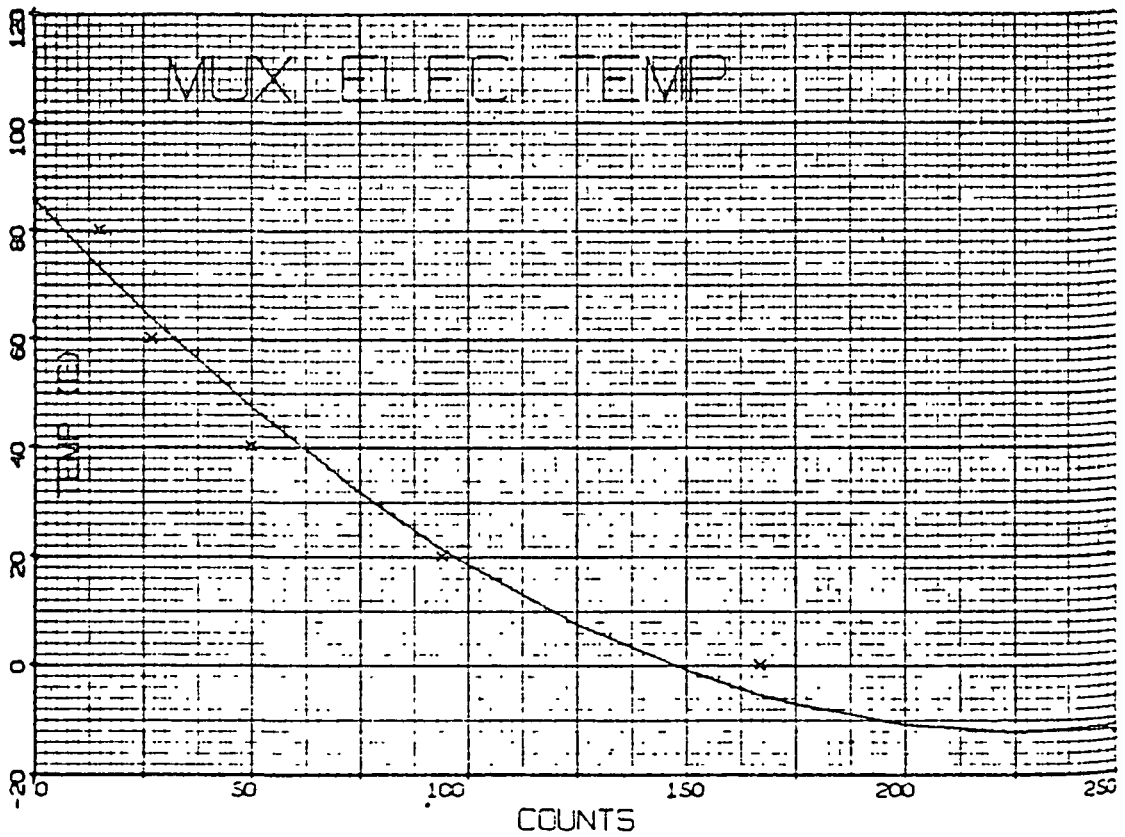
CHANNEL MONITORS TEMPERATURE OF NRZ-L DATA OUTPUT BOARD OF MULTIPLEXER
TWO SENSORS ARE THERMISTORS.

003266-148



TEMPERATURE, °C	OHMS	COUNTS
80 0000	318 7000	15
60 0000	583 1000	27
40 0000	1146.0002	50
20 0000	2437.2002	94
0.0000	5700.0009	167
-13 3700	13169.9316	250

BEST LEAST – SQUARES FIT
TEMPERATURE, °C = 0 85585E 02 + (-0.86264E 00) *COUNTS + (0.18992E -02)*COUNTS **2

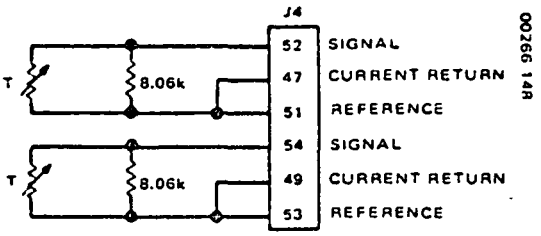


EO 4237A Δ& SHEET 148 → K.n's

MULTIPLEXER POWER SUPPLY TEMPERATURE

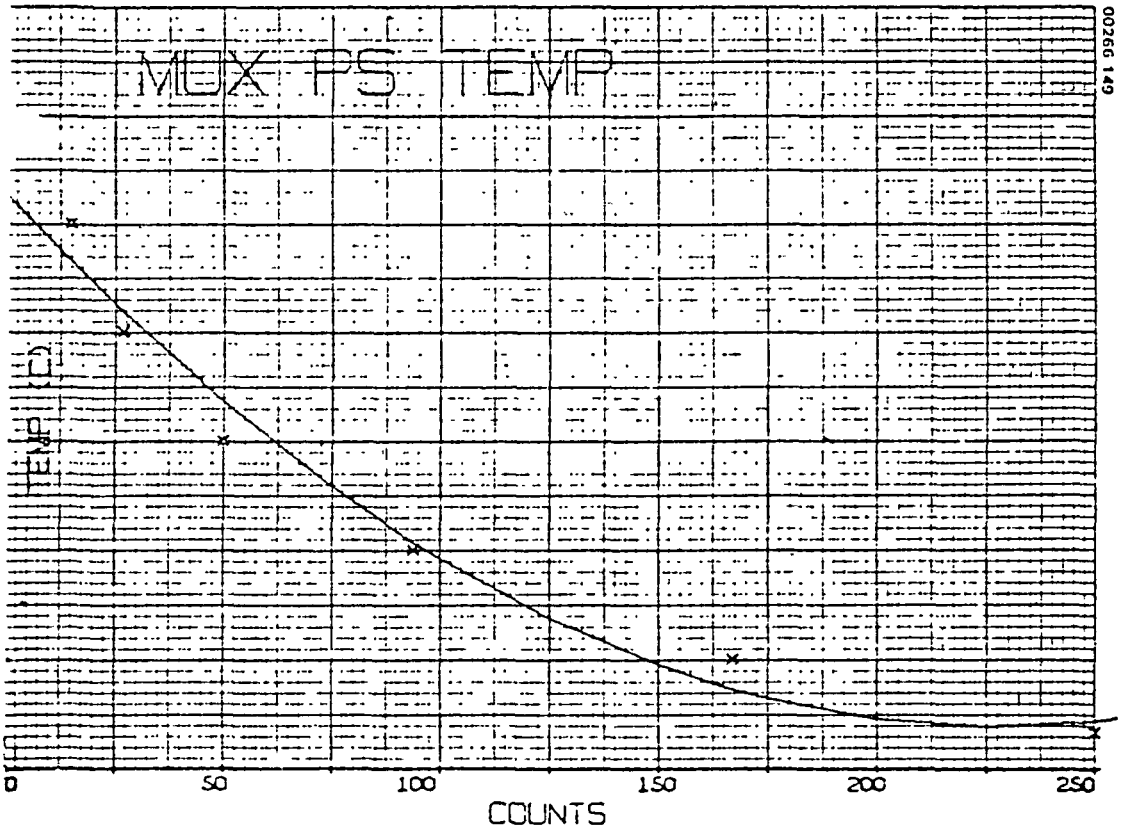
METER 055
DITIONED

CHANNEL MONITORS TEMPERATURE OF MULTIPLEXER POWER SUPPLY.
TWO SENSORS ARE THERMISTORS.



TEMPERATURE °C	OHMS	COUNTS
80.0000	318.7000	15
60.0000	583.1000	27
40 0000	1146.0002	50
20.0000	2437.2002	94
0 0000	5700.0009	167
-13 3700	13169.9316	250

BEST LEAST– SQUARES FIT
TEMPERATURE, °C = 0.35585E 02 + (-0.86264E 00) *COUNTS + (0.18992E -02) *COUNTS **2



Appendix E

Electronics Module Performance Test

Part 2

Pre-Vibration Test Data

DATA SHEET NO. 1 OF 6 PARAGRAPH NO. 3.4

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 600

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(3.4)	CONNECTOR/PWB CONNECTOR CHECKOUT			
1.	Ground Continuity			
1.1	Test for continuity between all chassis grounds appearing at connectors J09 through J28; P09-P13 (MUX connectors), P46 and P47 (Power Supply connectors); and XA01 through XA22 PWB connectors.	Table 3.4A	✓	(✓)
1.2	Repeat for each of the following grounds:			
	Power ground	Table 3.4A	✓	(✓)
	Signal ground	Table 3.4A	✓	(✓)
	Digital ground	Table 3.4A	✓	(✓)
	Spacecraft Power ground	Table 3.4A	✓	(✓)
	28V Return	Table 3.4A	✓	(✓)
	80V Return	Table 3.4A	✓	(✓)
	8V Return	Table 3.4A	✓	(✓)
	Table 3.4A lists all connectors and identifies the ground pins of each type on each connector. Use extender cards to verify plug-in board connectors.			
2.	Ground Isolation			
2.1	Connect the Power Distribution Panel and the Bus Power Supply to P46, P47, J24 and J28 on the Electronics Module. Remove any shorting wires or equipment used in 3.4.1. (Be sure all AC cords are disconnected).		✓	(✓)

TEST ENGINEER JGT DATE 13 DEC 91 QA AR (I) 172 12/91

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO 11323	NUMBER 16704
	SCALE	REV C	SHEET 5

FORM NO 3122 A 3-91 DIETZGEN 1051 CLEARPRINT 1000H

Table 3.4A

GROUND PINS

*Jumper terminals A25-E24/E74/E141 to use as Rtn

Connector	Chassis Gnd	Power Gnd A26E01	Signal Gnd A26E02/E03	Digital Gnd A26E04	Spacecraft Rtn *	33V Rtn A26E29	80V Rtn A26E81	8V Rtn A26E58
P46		G4,G5		A4,B4		J5,K5	C3,D3	C5,D5
P09			K1					
P10								
P13								
XA01	5,84	1,2,91,92	89,90,179,180					
XA02	5,84	1,2,91,92	89,90,179,180					
XA03	31,109,172		1,2					
XA04	50,82,126,150		1,2,91,92				15,16	
XA05			179,180		1,2,91,92 105,106,107,		171,172	
XA06	4,90		1,2,91,92,93,94			161,162		
XA07	4,90		1,2,91,92,93,94			161,162		
XA08	2,180		91,92		83,84			
XA09	92,180	89,90	93,94,121,122					
XA10	12,88			1,2,91,92				
XA11				1,91				
XA12	14,70			179,180				
XA13	14,70			179,180				
XA14	93,164					1,2, 91,92		
XA16				85,86	89,90			
XA18				127				
XA19				127				
XA20				127				
XA21				127				
XA22				1,2,136,137				
J09	59		14	3,4,91,92,93,97				
J10	54		3	28				
J11	1		2,50,69	21				
J12	1		14					
J13	54		65,3	28				
J15	1		2,69,50	21				
J16	3		1,28,49					
J17	3		1,28,49					
J20	53		51,52,57					
J24	21,22,23,24	5,6			37,38,39,40 45,46,47,48			
J25	34							
J26	60,61	13,14						
J27	7							
J28					5,6,7,8			

SIZE A | CODE IDENT NO 11323 | NUMBER 16704 | SCALE | REV C | SHEET

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CONNECTOR	+8V	+8V CDVU	(+21V SLC)	+28V S/C	+80V	-21V	+33V
XA01	61,62		21,22			23,24	
XA02	61,62		21,22			23,24	
XA03			177,178			175,176	
XA04			87,88,177,178		93,94	85,86 175,176	
XA05			63,64* (iso);177,178	113,114, 133,134	155,156	175,176; 65,66 (iso)*	
XA06	81,171 82,172		87,177 88,178			85,175 86,176	73,163 74,164
XA07	81,171 82,172		87,177 88,178			85,175 86,176	73,163 74,164
XA08	13,14		47,48,177,178	89,90, 167,168		43,44 175,176	
XA09	13,14		87,88			85,86	15,105 16,106
XA10		81,82					
XA11		81,82					
XA12							
XA13							
XA14		81,82					161,162 171,172
XA15			135,136 45,46 (Rtn:138)			47,137 **	
XA16			113,114 23,24 (Rtn:117)	77,78		115,116 25,26**	
XA17			135,136 45,46 (Rtn:138)			47,137 **	
XA18			131,132 (Rtn:129)			133,134 **	
XA19			131,132 (Rtn:129)			133,134 **	
XA20			131,132 (Rtn:129)			133,134 **	
XA21			131,132 (Rtn:129)			133,134 **	
XA22		5,6, 95,96					

POWER PINS

Table 3.4B

* Use S/C Rtn. - A5 pins 106,107

** Rtns same as +21V

Dec 1/81

TITLE	SIZE	CODE IDENT NO	NUMBER
	A	11323	16704
	SCALE	REV C	SHEET

DATA SHEET NO. 2 OF 6 PARAGRAPH NO. 3.4

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 600

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
2.2	With all power supply switches on the Power Distribution Panel set to "ON", verify continuity within <2K ohms between the 30V MUX, 8V CDVU, 8V Radiometer, 33V Electro-mechanical, ±21V S/C Returns, +80V Rtns, and SMA Rtns.		✓	(✓)
2.3	Verify that the Isolation Resistance of the following Power Distribution Panel Returns is greater than 10 megohms with respect to the Unipoint ground:			
	28V Bus (HP 62743 unit) Rtn.		✓	(✓)
	+19V Band 1 Rtn.		✓	(✓)
	+19V Band 2 Rtn.		✓	(✓)
	+19V Band 3 Rtn.		✓	(✓)
	+19V Band 4 Rtn.		✓	(✓)
	+19V Band 5/7 Rtn.		✓	(✓)
	+19V Band 6 Rtn.		✓	(✓)
2.4	Connect the Telemetry/Command Interconnection Unit (Module Test Set) to the Electronics Module via the proper cables (Primary inputs). Be sure all AC cords are disconnected.		✓	(✓)

TEST ENGINEER J Gray DATE 2 OCT 81 QA (I) 172 10/2/81

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO. 11323	NUMBER 16704
	SCALE	REV C	SHEET

FORM NO 3132 A 3 80 DIETZGEN HOST CLEARPRINT 5004

DATA SHEET NO. 3 OF 6 PARAGRAPH NO. 3.4

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 602

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
2.5	Reverify that the isolation resistance of the following Power Distribution Panel returns is greater than 10 megohms with respect to the Unipoint ground:			
	28V Bus Rtn.		✓	(✓)
	+19V Band 1 Rtn.		✓	(✓)
	+19V Band 2 Rtn.		✓	(✓)
	+19V Band 3 Rtn.		✓	(✓)
	+19V Band 4 Rtn.		✓	(✓)
	+19V Band 5/7 Rtn.		✓	(✓)
	+19V Band 6 Rtn.		✓	(✓)
2.6	Connect the Function Test Panel to the Electronics Module using the proper cables. Be sure all test points are disconnected and all switches are in the OFF position.		✓	(✓)
2.7	Reverify that the isolation resistance of the following Power Distribution Panel returns is greater than 10 megohms with respect to the Unipoint ground:			
	28V Bus Rtn.		✓	(✓)
	+19V Band 1 Rtn.		✓	(✓)

TEST ENGINEER Guy D DATE 2 DEC '81 QA I (172) 12/10/81

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO 11323	NUMBER 16704
	SCALE	REV C	SHEET 1

DATA SHEET NO. 4 OF 6 PARAGRAPH NO. 3.4

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 608

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM/ VERIFY	UNITS
(2.7)	+19V Band 2 Rtn.		✓	(✓)
	+19V Band 3 Rtn.		✓	(✓)
	+19V Band 4 Rtn.		✓	(✓)
	+19V Band 5/7 Rtn.		✓	(✓)
	+19V Band 6 Rtn.		✓	(✓)
3.	Power to Ground Anti-continuity			
3.1	Turn off all power supply switches. Disconnect all cables from the Electronics Module.		✓	(✓)
	Unipoint the following ground points on A1A26 in the Electronics Module: E01, E81.		✓	(✓)
	Connect unipoint ground to the LO side of a Weston 666 Meter Set to the LO OHMS scale.			
3.2	Module Verify that the following points have isolation greater than 1 megohm with respect to unipoint ground.			
	E08 8 vdc		✓	(✓)
	E19 +21 vdc		✓	(✓)
	E28 +33 vdc		✓	(✓)
	E80 +80 vdc		✓	(✓)
	E20 -21 vdc		✓	(✓)
3.2.1.	GROUND SYSTEM ISOLATION. Verify that the following points have isolation greater than 1MΩ with respect to each other.			
	A26E01 Power Ground (Module Unipoint Ground)		✓	(✓)
	Module Housing Chassis Ground		✓	(✓)
	A25T81-027 Spacecraft 28 V Rtn		✓	(✓)

TEST ENGINEER [signature] DATE 2 Dec '81 QA [signature] 172 81

TITLE	SIZE	CODE IDENT NO	NUMBER
E.M. MODULE UNIT TEST	A	11323	16704
	SCALE	REV	SHEET

DATA SHEET NO. 5 OF 6 PARAGRAPH NO. 3.4

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 6.02

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
3.3	Function Test Panel. Install all cables between the Function Test Panel and the Electronics Module (Be sure all AC cords are disconnected).		✓	(✓)
			✓	(✓)
3.4	Module Test Set. Install cables between the Module Test Set and the Electronics Module. (Be sure all AC cords are disconnected.)		✓	(✓)
	Repeat 3.4.3.2.		✓	(✓)
3.5	Optional PWB Insertion. Carefully insert as many PWB Assemblies, A01 through A22, as are available at this point in the testing of the Electronics Module, and verify that no short circuits are present between the unipoints after each PWB is inserted. Wear a wriststat and observe Static Sensitive procedures when handling PWB assemblies.		✓	(✓)
3.6	Power Supplies. Connect the Power Distribution Panel and the Bus Power Supply to the Electronics Module. Verify that no short circuits exist between the unipoints. DO NOT TURN ON ANY POWER.	P46, P47, J24 mated	✓	(✓)
3.7	Remove any and all PWB's inserted at Para 3.4.3.7 per Para 3.3.6. Disconnect connectors between the Function Test Panel and the Electronics Module.		✓	(✓)
4.	Power Distribution.			
4.1	Verify that the Module Test Set, Power Distribution Panel and Bus Power Supply are properly connected to the Electronics Module.		✓	(✓)

TEST ENGINEER _____ DATE 3 Dec '81 QA _____

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO 11323	NUMBER 16704
	SCALE	REV C	SHEET

DATA SHEET NO. 6 OF 6 PARAGRAPH NO. 3.4

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 600

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
	Insert Extender Cards 76447 in the PWB connectors.		✓	(✓)
	Plug the test set and power supply AC cords into AC outlets.		✓	(✓)
4.2	Complete the Module Test Set turn on procedure 3.3.7.2.		✓	(✓)
4.3	Turn on primary power for the Power Distribution Panel/Bus Power Supply.		✓	(✓)
	Turn on the individual power supplies via their front panel switches.		✓	(✓)
4.4	Verify that power is present at all power pins listed in Table 3.4B.	Table 3.4B	✓	(✓)

TEST ENGINEER [signature] DATE 3 Dec '81 QA [signature] 12/1/81

E.M. MODULE UNIT TEST

SIZE	CODE IDENT NO	NUMBER
A	11323	16704

SCALE | REV C | SHEET

4.0 DETAIL PROCEDURE

4.1 TEST OBJECTIVE

To verify the function of the TM Electronics Module unit to commands. To verify that the digital telemetry corresponds to the commands given. To measure the analog voltage levels.

DATA SHEET NO. 1 OF 9 PARAGRAPH NO. 4.3

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 800

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
	Note: To Perform This Test Board A03-50927 must be installed.			
(4.3)	INCHWORM DRIVE			
1.	Confirm that test cable 46 is properly connected between the Electronics Module and the Function Test Panel.		✓	(✓)
	Connect a DVM between the "Inchworm +5 VDC" test point and signal ground on the Function Test Panel.		✓	(✓)
2.	All Inchworms Off/Mux Off.			
2.1	Execute commands:			
	INCHWORM POWER OFF.	50	✓	(✓)
	INCHWORM 1 DISABLE.	8A	✓	(✓)
	INCHWORM 2 DISABLE.	8C	✓	(✓)
	INCHWORM 3 DISABLE.	8E	✓	(✓)
	INCHWORM EXTEND.	90	✓	(✓)
	INCHWORM MOVEMENT INHIBIT.	94	✓	(✓)
	INCHWORM CONTRACT.	92	✓	(✓)
	(See Table 4.3 for a summary of Inchworm commands)			
2.2	Using the CRT, verify the following digital telemetry: Word F bit 6 = 0		✓	(✓)
	Word D bit 7 = 0		✓	(✓)

TEST ENGINEER J Guyton DATE 11 JAN '82 QA 3/3/82 RH Brandt

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO 11323	NUMBER 16704
	SCALE	REV 2	SHEET 2

FORM NO 3122 1 A 3 69 DIETERICH POST CLEARPRINT 000M

DATA SHEET NO. 2 OF 9 PARAGRAPH NO. 4.3

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 800

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(2.2)	Word E bit 0 = 0.		✓	(✓)
	Word I bit 3 = 0.		✓	(✓)
	bit 2 = 0.		✓	(✓)
	bit 1 = 0.		✓	(✓)
	bit 0 = 0.		✓	(✓)
	Word J bit 6 = 0.		✓	(✓)
	bit 7 = 0.	<1.5v	✓	(✓)
2.3	Verify that the DVM is measuring <1.0 volts.	<1.0	.48	volts
3.	+5 VDC Regulator Check			
3.1	Execute command: INCHWORM POWER ON.	4F	✓	(✓)
3.2	Verify via the CRT that digital			
	Word E bit 0 = 1.		✓	(✓)
3.3	Verify that the DVM is measuring +5.0 ± 0.2 VDC.	+5.0 ± 0.2	5.05	volts
3.4	Execute command: INCHWORM POWER OFF	50	✓	(✓)
3.5	Verify via the CRT that digital			
	Word E bit 0 = 0.		✓	(✓)
3.6	Verify that the DVM is measuring <1.0 volts	<1.0	.48	volts
3.7	Execute Command: INCHWORM MOVE	93	✓	( )
3.8	Verify via that digital Word J bit 6=1		✓ ✓	( )
3.9	Execute command: INCHWORM MOVEMENT INHIBIT	94		

TEST ENGINEER LEUYTON DATE 11 JAN '82 QA [illegible]

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO 11323	NUMBER 16704
	SCALE	REV 2	SHEET 2

DATA SHEET NO. 3 OF 9 PARAGRAPH NO. 4.3

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 900

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
4.	Inchworm #1			
4.1	Connect the four channels of a Tektronix 7633 oscilloscope with 7A26 plug-ins (or equivalent) to the 1 clamp A, 1 clamp B, 1 brake and 1 strerch test points on the Function Test Panel. Trigger on the brake.		✓	(✓)
4.1.5	Alternatively, use an HP 1615A Logic Analyzer, connected to the Function Test Panel as follows:			
	Connector pod 1/bit 0 to 1 Stretch bit 1 to 1 Brake bit 2 to 1 Clamp A bit 3 to 1 Clamp B bit 4 to 2 Stretch bit 5 to 2 Brake bit 6 to 2 Clamp A bit 7 to 2 Clamp B pod1/GND to Signal gnd TP		ORIGINAL PAGE IS OF POOR QUALITY	
	(To set up for Inchworm 3 move pod 1/bits 0,1,2, and 3 to analogous Inchworm 3 positions).			
	Set the Logic Analyzer for a) 8-bit mode, b) internal clock, and c) 100 ms. clocks. Trigger the Logic Analyer approximately one second before the Inchworm Move Command is given.			
4.2	Extend			
	Execute commands:			
	INCHWORM POWER ON.	4F	✓	(✓)
	INCHWORM 1 ENABLE.	89	✓	(✓)

TEST ENGINEER Guyton DATE 11 JAN 82 QA SHA

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO 11323	NUMBER 16704
	SCALE	REV C	SHEET

FORM NO 3132 A 3 69 DIETERICH POST CLEARPRINT 000M

DATA SHEET NO. 4 OF 9 PARAGRAPH NO. 4.3

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 500

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
	INCHWORM EXTEND.	8F	✓	(✓)
	INCHWORM MOVE	93	✓	(✓)
	INCHWORM MOVE INHIBIT	94	✓	(✓)
4.3	Using the CRT, verify the following digital telemetry:			
	Word E bit 0 = 1		✓	(✓)
	Word I bit 3 = 1		✓	(✓)
	bit 2 = 0		✓	(✓)
	bit 1 = 0		✓	(✓)
	bit 0 = 1		✓	(✓)
	Word J bit 6 = 0		✓	(✓)
	bit 7 = 0		✓	(✓)
4.4	Verify the scope pattern in Figure 4.3A, issuing hex command 93 (INCHWORM MOVE), then command 94 (INCHWORM MOVE INHIBIT).		✓	(✓)
4.5	Contract			
	Execute commands:			
	INCHWORM POWER ON.	4F	✓	(✓)
	INCHWORM 1 ENABLE.	89	✓	(✓)
	INCHWORM EXTEND.	90	✓	(✓)
	INCHWORM CONTRACT.	91	✓	(✓)

TEST ENGINEER J GUYTON DATE 11 JAN 82 QA 1/12/82 [illegible]

E.M. MODULE UNIT TEST

SIZE	CODE IDENT NO.	NUMBER
A	11323	16704

SCALE | REV C | SHEET 45

FORM NO 3122 A 3-69 DIETERICH-MOST CLEARPRINT 000M

DATA SHEET NO. 5 OF 9 PARAGRAPH NO. 4.3

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 803

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
	INCHWORM MOVE.	93	✓	(✓)
	INCHWORM MOVE INHIBIT.	94	✓	(✓)
4.6	Using the CRT, verify the following digital telemetry:			
	Word E bit 0 = 1		✓	(✓)
	Word I bit 3 = 1		✓	(✓)
	bit 2 = 0		✓	(✓)
	bit 1 = 0		✓	(✓)
	bit 0 = 0		✓	(✓)
	Word J bit 6 = 0		✓	(✓)
	bit 7 = 1.		✓	(✓)
4.7	Verify the scope pattern in Figure 4.3B, issuing hex commands 93 and 94 as needed.		✓	(✓)
5.	Reset. Repeat 4.3.2.		✓	(✓)
6.	Inchworm #2			
6.1	Connect the four oscilloscope channels to the 2 clamp A, 2 clamp B, 2 brake, and 2 stretch test points on the Function Test			

TEST ENGINEER J Gunton DATE 11 JAN 82 QA 3/1/82 BH Brands

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO. 11323	NUMBER 16704
	SCALE	REV C	SHEET

DATA SHEET NO. 6 OF 9 PARAGRAPH NO. 4.3

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 800

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(6.1)	Panel. Trigger on the brake. (Or use step 4.1.5)		✓	(✓)
6.2	Extend.			
	Execute commands: INCHWORM POWER ON.	4F	✓	(✓)
	INCHWORM 2 ENABLE.	8B	✓	(✓)
	INCHWORM EXTEND.	8F	✓	(✓)
	INCHWORM MOVE.	93	✓	(✓)
	INCHWORM MOVE INHIBIT.	94	✓	(✓)
6.3	Using the CRT, verify the following digital telemetry:			
	Word E bit 0 = 1		✓	(✓)
	Word I bit 3 = 0		✓	(✓)
	bit 2 = 1		✓	(✓)
	bit 1 = 0		✓	(✓)
	bit 0 = 1		✓	(✓)
	Word J bit 6 = 0		✓	(✓)
	bit 7 = 0		✓	(✓)
6.4	Verify the scope pattern in Figure 4.3A, issuing hex commands 93 and 94 as needed.		✓	(✓)
6.5	Contract.			
	Execute commands:			
	INCHWORM POWER ON.	4F	✓	(✓)
	INCHWORM 2 ENABLE.	8B	✓	(✓)

TEST ENGINEER [illegible] DATE 11/14/87 QA [illegible] 11/18/87

E.M. MODULE UNIT TEST

SIZE	CODE IDENT NO	NUMBER
A	11323	16704

SCALE | REV 2 | SHEET 47

DATA SHEET NO. 7 OF 9 PARAGRAPH NO. 4.3

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 800

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(6.5)	INCHWORM EXTEND	90	✓	(✓)
	INCHWORM CONTRACT.	91	✓	(✓)
	INCHWORM MOVE	93	✓	(✓)
	INCHWORM MOVE INHIBIT.	94	✓	(✓)
6.6	Using the CRT, verify the following digital telemetry:			
	Word E bit 0 = 1		✓	(✓)
	Word I bit 3 = 0		✓	(✓)
	bit 2 = 1		✓	(✓)
	bit 1 = 0		✓	(✓)
	bit 0 = 0		✓	(✓)
	Word J bit 6 = 0		✓	(✓)
	bit 7 = 1.		✓	(✓)
6.7	Verify the scope pattern in Figure 4.3B, issuing hex commands 93 and 94 as needed.		✓	(✓)
7.	Reset. Repeat 4.3.2.		✓	(✓)
8.	Inchworm #3			
8.1	Connect the four oscilloscope channels to the 3 clamp A, 3 clamp B, 3 brake, and 3 stretch test points on the Function Test Panel. Trigger on the brake. (or see step 4.1.5)		✓	(✓)
8.2	Extend.			

TEST ENGINEER ✓ GUYTON DATE 11 JAN 82 QA 1/13/82

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO 11323	NUMBER 16704
	SCALE	REV 2	SHEET

DATA SHEET NO. 4 OF 9 PARAGRAPH NO. 4.3

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 800

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(8.2)	Execute commands:			
	INCHWORM POWER ON.	4F	✓	(✓)
	INCHWORM 3 ENABLE.	8D	✓	(✓)
	INCHWORM EXTEND.	8F	✓	(✓)
	INCHWORM MOVE	93	✓	(✓)
	INCHWORM MOVE INHIBIT	94	✓	(✓)
8.3	Using the CRT, verify the following digital telemetry:			
	Word E bit 0 = 1		✓	(✓)
	Word I bit 3 = 0		✓	(✓)
	bit 2 = 0		✓	(✓)
	bit 1 = 1		✓	(✓)
	bit 0 = 1		✓	(✓)
	Word J bit 6 = 0		✓	(✓)
	bit 7 = 0.		✓	(✓)
8.4	Verify the scope pattern in Figure 4.3A, issuing hex commands 93 and 94 as needed.		✓	(✓)
8.5	Contract			
	Execute commands:			
	INCHWORM POWER ON.	4F	✓	( )
	INCHWORM 3 ENABLE.	8D	✓	( )
	INCHWORM EXTEND.	90	✓	( )

TEST ENGINEER Guyton DATE 11-JAN'82 QA 1107

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO 11323	NUMBER 16704
	SCALE	REV C	SHEET 1

DATA SHEET NO. 4 OF 9 PARAGRAPH NO. 4.3

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 900

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(8.5)	INCHWORM CONTRACT.	91	✓	(✓)
	INCHWORM MOVE.	93	✓	(✓)
	INCHWORM MOVE INHIBIT.	94	✓	(✓)
8.6	Using the CRT verify the following digital telemetry:			
	Word E bit 0 = 1		✓	(✓)
	Word I bit 3 = 0		✓	(✓)
	bit 2 = 0		✓	(✓)
	bit 1 = 1		✓	(✓)
	bit 0 = 0		✓	(✓)
	Word J bit 6 = 0		✓	(✓)
	bit 7 = 1.		✓	(✓)
8.7	Verify the scope pattern in Figure 4.3B, issuing hex commands 93 and 94 as needed.		✓	(✓)
8.8	Reset. Repeat 4.3.2.		✓	(✓)

TST ENGINEER [signature] DATE 11 JAN '84 QA [signature]

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO 11323	NUMBER 16704
	SCALE	REV C	SHEET 5 0

Word/Bit	Function	On	Off
I/0	Inchworm Extend	8F	90
I/1	IW3 Enable	8D	8E
I/2	IW2 Enable	8B	8C
I/3	IW1 Enable	89	8A
J/6	IW move	93	94
J/7	IW Contract	91	92
E/0	Power On	4F	50

TABLE 4.3

ORIGINAL PAGE IS
OF POOR QUALITY

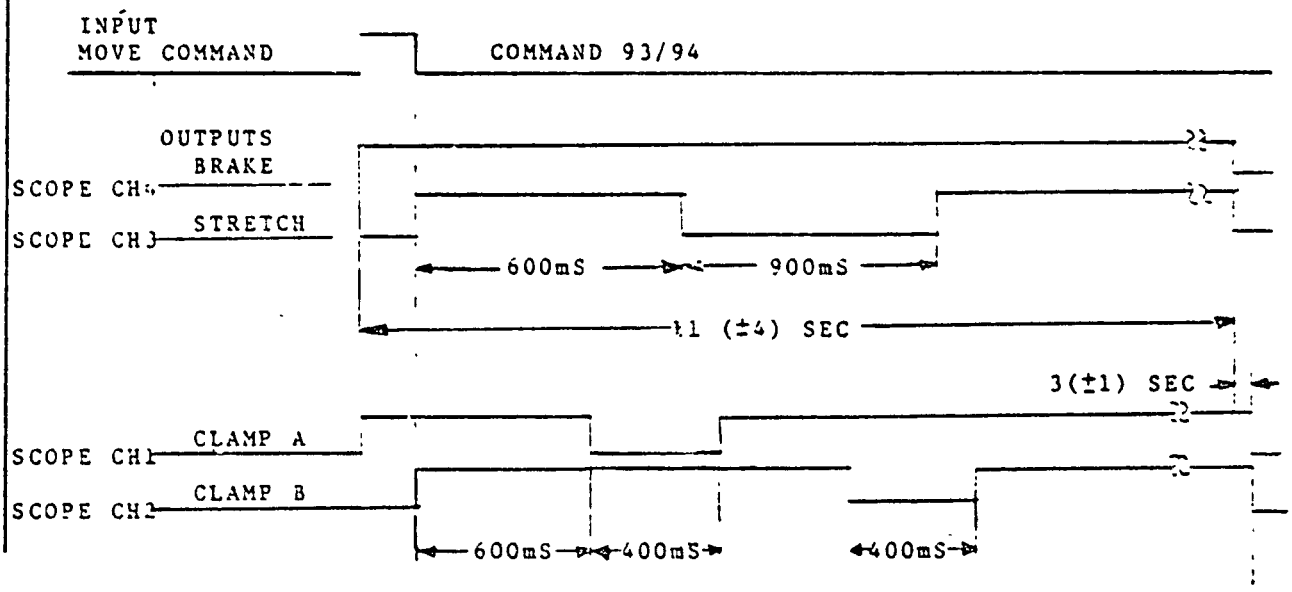

FIGURE 4.3A
EXTEND

TITLE	SIZE	CODE IDENT NO	NUMBER
	A	11323	16704
	SCALE	REV	SHEET

ORIGINAL PAGE IS
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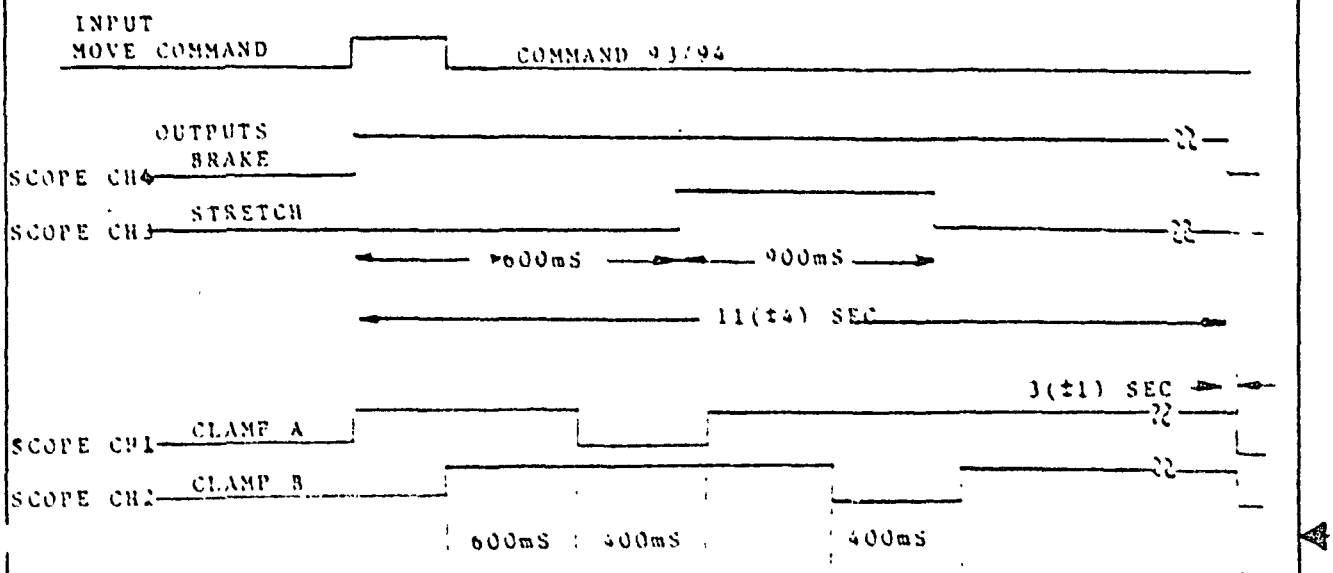

FIGURE 4.3B
CONTRACT

TITLE	SIZE	CODE IDENT NO	NUMBER
	A	11323	
	SCALE	REV C	SHEET

DATA SHEET NO. 2 OF 7 PARAGRAPH NO. 4.4

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 800

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
	Note: To Perform this test board A03-50927 must be installed.			
(4.4)	CALIBRATION LAMP DRIVER TEST			
1.	Confirm that test cable 44 is properly connected between the Electronics Module and the Function Test Panel.		✓	(✓)
2.	Connect the Cal Lamp Housing containing the lamp and photodiode assembly to the Cal Lamp #1 [sensor] anode and cathode, and [lamp] "+" and "-" points on the Function Test Panel.		✓	(✓)
3.	Connect test cable 20 and its breakout box to J20 on the Electronics Module.		✓	(✓)
4.	Cal Lamp #1 On/Normal.			
4.1	Execute commands:			
	CALIBRATION LAMP 2 OFF/OVERRIDE OFF	17	✓	( )
	CALIBRATION LAMP 1 OFF/ OVERRIDE OFF.	16	✓	(✓)
	CALIBRATION LAMP 3 OFF/OVERRIDE OFF	18	✓	( )
	CALIBRATION LAMP 1 ON.	10	✓	(✓)
	Verify that the lamp comes on.		✓	(✓)
4.2	Verify via the CRT that digital			
	Word D bit 0 = 1		✓	(✓)
	bit 1 = 0		✓	(✓)
	bit 2 = 0		✓	(✓)
	bit 3 = 0		✓	(✓)
	bit 4 = 0		✓	(✓)
	bit 5 = 0.		✓	(✓)

TEST ENGINEER J GUYTON DATE 11 JAN '82 QA

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO 11323	NUMBER 16704
	SCALE	REV C	SHEET 2

FORM NO 3122 A 3 80 DIETERICH POST CLEARPRINT 000M

DATA SHEET NO. 2 OF 7 PARAGRAPH NO. 4.4

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 800

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
4.3	Verify that analog telemetry			
	Channel 50 "Calibration Lamp 1 Current" is 3.1 ± 0.6V.	3.1 ± 0.6	3.100	volts
4.4	Using a DVM, observe then record test point J20-7 "Lamp #1 Radiance Error."	7.0 ± 1.5	6.2	volts
5.	Cal Lamp #1 On/Override.			
5.1	Execute command:			
	CALIBRATION LAMP 1 OVERRIDE ON.	13	✓	(✓)
5.2	Verify via the CRT that digital			
	Word D bit 0 = 1		✓	(✓)
	bit 1 = 0		✓	(✓)
	bit 2 = 0		✓	(✓)
	bit 3 = 1		✓	(✓)
	bit 4 = 0		✓	(✓)
	bit 5 = 0.		✓	(✓)
5.3	Verify that analog telemetry			
	Channel 50 is 3.1 ± 0.6V.	3.1 ± 0.6	3.200	volts
6.	Cal Lamp #1 Off/Override Off.			
6.1	Execute command:			
	CALIBRATION LAMP 1 OFF/OVERRIDE OFF.	16	✓	(✓)

TEST ENGINEER J. GUYTON DATE 11 JAN 85 QA 1/17 1/18

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO 11323	NUMBER 16704
	SCALE	REV 2	SHEET 22

FORM NO 3132 A 3 M' DIETRICH-POST CLEARPRINT 0004

DATA SHEET NO. 3 OF 7 PARAGRAPH NO. 4.4

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 600

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
6.2	Verify via the CRT that digital			
	Word D bit 0 = 0		✓	(✓)
	bit 1 = 0		✓	(✓)
	bit 2 = 0		✓	(✓)
	bit 3 = 0		✓	(✓)
	bit 4 = 0		✓	(✓)
	bit 5 = 0.		✓	(✓)
6.3	Verify that analog telemetry			
	Channel 50 is zero volts.	0.0	0.000	volts
7.	Repeat 4.4.2, connecting the Cal Lamp Housing to the Cal Lamp #2 test points on the Function Test Panel.		✓	(✓)
8.	Cal Lamp #2 On/Normal.			
8.1	Execute commands:			
	CALIBRATION LAMP 2 OFF/OVERRIDE OFF.	17	✓	(✓)
	CALIBRATION LAMP 2 ON.	11	✓	(✓)
	Verify that the lamp comes on.		✓	(✓)
8.2	Verify via the CRT that digital			
	Word D bit 0 = 0		✓	(✓)
	bit 1 = 1		✓	(✓)
	bit 2 = 0		✓	(✓)

TEST ENGINEER J GUYTON DATE 11 JAN '82 QA 1/11/82

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO 11323	NUMBER 16704
	SCALE	REV C	SHEET

DATA SHEET NO. 4 OF 7. PARAGRAPH NO. 4.4

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 800

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(8.2)	bit 3 = 0		✓	(✓)
	bit 4 = 0		✓	(✓)
	bit 5 = 0.		✓	(✓)
8.3	Verify that analog telemetry			
	Channel 51 "Calibration Lamp 2 Current" is 3.1 ± 0.6V.	3.1 ± 0.6	3.24	volts
8.4	Using a DVM, observe, then record test point J2C-8 "Lamp #2 Radiance Error."	7.0 ± 1.5	6.47	volts
9.	Cal Lamp #2 On/Override.			
9.1	Execute command:			
	CALIBRATION LAMP 2 OVERRIDE ON	14	✓	(✓)
9.2	Verify via the CRT that digital			
	Word D bit 0 = 0		✓	(✓)
	bit 1 = 1		✓	(✓)
	bit 2 = 0		✓	(✓)
	bit 3 = 0		✓	(✓)
	bit 4 = 1		✓	(✓)
	bit 5 = 0.		✓	(✓)
9.3	Verify that analog telemetry			
	Channel 51 is 3.1 ± 0.6V.	3.1 ± 0.6	3.26	volts

TEST ENGINEER J Gurtin DATE 11 Jan '82 QA 1/13/82

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO 11323	NUMBER 16704
	SCALE	REV C	SHEET 1

DATA SHEET NO. 5 OF 7 PARAGRAPH NO. 4.4

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 800

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
10.	Cal Lamp #2 Off/Override Off.			
10.1	Execute command:			
	CALIBRATION LAMP 2 OFF/OVERRIDE OFF	17	✓	(✓)
10.2	Verify via the CRT that digital			
	Word D bit 0 = 0		✓	(✓)
	bit 1 = 0		✓	(✓)
	bit 2 = 0		✓	(✓)
	bit 3 = 0		✓	(✓)
	bit 4 = 0		✓	(✓)
	bit 5 = 0.		✓	(✓)
10.3	Verify that analog telemetry			
	Channel 51 is zero volts.	0.0	0.00	volts
11.	Repeat 4.4.2, connecting the Cal Lamp Housing to the Cal Lamp #3 test points on the Function Test Panel.		✓	(✓)
12.	Cal Lamp #3 On/Normal.			
12.1	Execute commands:			
	CALIBRATION LAMP 3 OFF/OVERRIDE OFF.	18	✓	(✓)
	CALIBRATION LAMP 3 ON.	12	✓	(✓)
	Verify that the lamp comes on.		✓	(✓)

TEST ENGINEER [illegible] DATE 11 JAN 84 QA 2/3/84

E.M. MODULE UNIT TEST | SIZE A | CODE IDENT NO 11323 | NUMBER 16704 | SCALE | REV C | SHEET 3

DATA SHEET NO. 6 OF 7 PARAGRAPH NO. 4.4

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 800

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
12.2	Verify via the CRT that digital			
	Word D bit 0 = 0		✓	(✓)
	bit 1 = 0		✓	(✓)
	bit 2 = 1		✓	(✓)
	bit 3 = 0		✓	(✓)
	bit 4 = 0		✓	(✓)
	bit 5 = 0.		✓	(✓)
12.3	Verify that analog telemetry			
	Channel 52 "Calibration Lamp 3 Current" is 3.1 ± 0.6V.	3.1 ± 0.6	3.32	volts
12.4	Using a DVM, observe, then record test point J20-9 "Lamp #3 Radiance Error."	7.0 ± 1.5	6.59	volts
13.	Cal Lamp #3 On/Override.			
13.1	Execute command:			
	CALIBRATION LAMP 3 OVERRIDE ON.	15	✓	(✓)
13.2	Verify via the CRT that digital			
	Word D bit 0 = 0		✓	(✓)
	bit 1 = 0		✓	(✓)
	bit 2 = 1		✓	(✓)
	bit 3 = 0		✓	(✓)
	bit 4 = 0		✓	(✓)

TEST ENGINEER [signature] DATE 11 JAN 82 QA 2/3/81

E.M. MODULE UNIT TEST | SIZE A | CODE IDENT NO 11323 | NUMBER 16704 | SCALE | REV C | SHEET 33

DATA SHEET NO. 7 OF 7 PARAGRAPH NO. 4.4

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 800

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(13.2)	bit 5 = 1.		✓	(✓)
13.3	Verify that analog telemetry			
	Channel 52 is 3.1 ± .6V.	3.1 ± 0.6	3.28	volts
14.	Cal Lamp #3 Off/Override Off.			
14.1	Execute command:			
	CALIBRATION LAMP 3 OFF/OVERRIDE OFF.	18	✓	(✓)
14.2	Verify via the CRT that digital			
	Word D bit 0 = 0		✓	(✓)
	bit 1 = 0		✓	(✓)
	bit 2 = 0		✓	(✓)
	bit 3 = 0		✓	(✓)
	bit 4 = 0		✓	(✓)
	bit 5 = 0.		✓	(✓)
14.3	Verify that analog telemetry			
	Channel 52 is zero volts.	0.0	0.00	volts

TEST ENGINEER [illegible] DATE 11 JAN 82 QA 1/11/82

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO 11323	NUMBER 16704
	SCALE	REV C	SHEET 7

DATA SHEET NO. 1 OF 4 PARAGRAPH NO. 4.5

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 800

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
	Note: To Perform This Test Board A04-50942 must be installed.			
(4.5)	BLACKBODY CONTROL TEST			
1.	Confirm that test cable 45 is connected properly between the Electronics Module and the Function Test Panel.		✓	(✓)
	Connect test cable 20 and its breakout box to J20 on the Electronics Module.		✓	(✓)
2.	To simulate the blackbody sensor, connect Decade Resistor #1 to the Blackbody Heater Input TP's on the Function Test Panel. Set DR #1 at 30000 ohms ("cold") to start.		✓	(✓)
3.	Backup On.			
3.1	Execute commands:			
	BLACKBODY HEATER CONTROL OFF/ BACKUP OFF.	24	✓	(✓)
	BLACKBODY HEATER CONTROL ON/ T1 SELECT	20	✓	(✓)
	BLACKBODY BACKUP ON.	23	✓	(✓)
3.2	Verify via the CRT that digital			
	Word E bit 2 = 1		✓	(✓)
	bit 3 = 0		✓	(✓)
	bit 4 = 0		✓	(✓)
	bit 5 = 1.		✓	(✓)

TEST ENGINEER [signature] DATE 8 DEC '81 QA [signature]

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO 11323	NUMBER 16704
	SCALE	REV C	SHEET 2

FORM NO 3132 A 3 80 DIETERICH-POST CLEARPRINT 300M

DATA SHEET NO. 2 OF 4 PARAGRAPH NO. 4.5

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 800

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
3.3	Verify via the CRT that analog telemetry			
	Channel 53 "Blackbody Current" is .5≤V≤1.5 volts.	.5≤V≤1.5	1.14	volts
3.4	Using a DVM verify that test point J20-12 is in the range -12 < V < 0 volts.	-12 <V <0	-3.4	volts
	Using a DVM verify that test point J20-11 is in the range .5 < V < 1 volt.	.5 <V <1	.77	volts
4.	Normal T1 On.			
4.1	Execute commands:			
	BLACKBODY HEATER CONTROL OFF/ BACKUP OFF.	24	✓	(✓)
	BLACKBODY HEATER CONTROL ON/ T1 SELECT.	20	✓	(✓)
4.2	Verify via the CRT that digital			
	Word E bit 2 = 1		✓	(✓)
	bit 3 = 0		✓	(✓)
	bit 4 = 0		✓	(✓)
	bit 5 = 0.		✓	(✓)
5.	Normal T2 On.			
5.1	Execute commands:			
	BLACKBODY HEATER CONTROL OFF/ BACKUP OFF.	24	✓	(✓)
	BLACKBODY HEATER CONTROL ON/ T1 SELECT.	20	✓	(✓)

TEST ENGINEER [signature] DATE Dec '81 QA [signature]

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO 11323	NUMBER 16704
	SCALE	REV 2	SHEET

DATA SHEET NO. 3 OF 4 PARAGRAPH NO. 4.5

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 200

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(5.1)	BLACKBODY T2 SELECT.	21	✓	(✓)
5.2	Verify via the CRT that digital			
	Word E bit 2 = 1		✓	(✓)
	bit 3 = 1		✓	(✓)
	bit 4 = 0		✓	(✓)
	bit 5 = 0.		✓	(✓)
6.	Normal T3 On.			
6.1	Execute commands:			
	BLACKBODY HEATER CONTROL OFF/ BACKUP OFF.	24	✓	(✓)
	BLACKBODY HEATER CONTROL ON/ T1 SELECT.	20	✓	(✓)
	BLACKBODY T3 SELECT.	22	✓	(✓)
6.2	Verify via the CRT that digital			
	Word E bit 2 = 1		✓	(✓)
	bit 3 = 0		✓	(✓)
	bit 4 = 1		✓	(✓)
	bit 5 = 0.		✓	(✓)
7.	Thermistor Test.			
7.1	Set DR #1 at 05000 ohms ("hot").		0.0 ✓	(✓)
	Verify via the CRT that analog telemetry Channel 53 is ≤1.0V.	≤1.0	0.0	volts

TEST ENGINEER [signature] DATE 8 Dec 81 QA

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO 11323	NUMBER 16704
	SCALE	REV	SHEET

DATA SHEET NO. 4 OF 4 PARAGRAPH NO. 4.5

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 100

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
7.2	Using a DVM verify that test point J20-12 is in the range 0 < V < 12 volts.	0 < V < 12	1.31	volts
	Using a DVM verify that test point J20-11 is in the range -.5<V<.5	-.5<V<.5	0.0	volts
7.3	Change DR #1 to 30000 ohms ("cold").		✓	(✓)
	Verify via the CRT that analog telemetry			
	Channel 53 is ≥2.5 volts.	≥2.5	3.7	volts
8.	Re-set Relays.			
8.1	Execute command:			
	BLACKBODY HEATER CONTROL OFF/ BACKUP OFF.	24	✓	(✓)
8.2	Verify via the CRT that digital			
	Word E bit 2 = 0		✓	(✓)
	bit 5 = 0.		✓	(✓)

TEST ENGINEER [signature] DATE 8 Dec 81 QA

E.M. MODULE UNIT TEST

SIZE	CODE IDENT NO	NUMBER
A	11323	16704

SCALE | REV C | SHEET 3

DATA SHEET NO. 3 OF 5 PARAGRAPH NO. 4.6

DETAILED FUNCTIONAL TESTS

LOG AHR OPER SSD

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(4.6)	Note: To Perform This Test Board A04(50942) Must Be Installed.			
	CFPA TESTING			
1.	Confirm that test cable 40 is properly connected between the Electronics Module and the Function Test Panel.		✓	(✓)
	Connect test cable 20 and its breakout box to J20 on the Electronics Module. Connect DVM's set to their 20V scales to points J20-13 and J20-14 on the breakout box.		✓	(✓)
2.	To simulate the control diode connect Decade Resistor #1 across the CFPA Heater Control TP's on the Function Test Panel. Set DR #1 at 18000 ohms ("hot").		✓	(✓)
	To simulate the monitor diode connect Decade Resistor #2 across the CFPA Monitor TP's on the Function Test Panel. Set DR #2 at 18000 ohms ("hot").		✓	(✓)
3.	CFPA Heater Monitor and Controller Off			
3.1	Execute commands:			
	CFFA HEATER CONTROL ON/T1 SELECT/ CFPA TELEMETRY ON.	19	✓	(✓)
	CFPA TELEMETRY OFF.	1C	✓	(✓)
	CFPA HEATER CONTROL OFF.	1D	✓	(✓)
3.2	Verify via the CRT that digital			
	Word H bit 4 = 0		✓	(✓)
	bit 5 = 0		✓	(✓)

EST ENGINEER [signature] DATE 8 Dec 81 QA _____

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO 11323	NUMBER 16704
	SCALE	REV 2	SHEET 1

DATA SHEET NO. 2 OF 5 PARAGRAPH NO. 4.6

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 800

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(3.2)	bit 6 = 0		✓	(✓)
	bit 7 = 0.		✓	(✓)
3.3	Verify via the CRT that analog telemetry			
	Channel 68 "CFPA Heater Current" is ≤1.0V.	≤1.0	0.0	volts
	Channel 70 "CFPA Monitor Temperature" is ≤1.0V.	≤1.0	0.0	volts
	Channel 67 "CFPA Control Temperature" is ≤1.0V.	≤1.0	0.0	volts
3.4	Verify that the DVM monitoring J20-13 "Control Diode Output Test" is measuring in the range 0 ≤ V < .1 volts.	0 ≤V <.1	0.0	volts
3.5	Verify that the DVM monitoring J20-14 "CFPA Temp Error Test" is measuring in the range 0 ≤ V < .1 volts.	0 ≤V <.1	0.0	volts
4.	CFPA Heater Controller Off			
4.1	Execute commands:			
	CFPA HEATER CONTROL ON/T1 SELECT/ CFPA TELEMETRY ON.	19	✓	(✓)
	CFPA HEATER CONTROL OFF.	1D	✓	(✓)
4.2	Verify via the CRT that digital			
	Word H bit 4 = 0		✓	(✓)
	bit 5 = 0		✓	(✓)
	bit 6 = 0		✓	(✓)
	bit 7 = 1.		✓	(✓)

TEST ENGINEER [signature] DATE 8 Dec 81 QA

E.M. MODULE UNIT TEST

SIZE	CODE IDENT NO	NUMBER
A	11323	16704

SCALE | REV C | SHEET 2

DATA SHEET NO. 3 OF 5 PARAGRAPH NO. 4.6

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 800

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
4.3	Verify via the CRT that analog telemetry			
	Channel 68 is ≤1.0V.	≤1.0	0.08	volts
5.	Heater Controller Off/T2 On			
5.1	Execute commands:			
	CFPA HEATER CONTROL ON/T1 SELECT/ CFPA TELEMETRY ON.	19	✓	(✓)
	CFPA HEATER CONTROL OFF.	1D	✓	(✓)
	CFPA T2 SELECT.	1A	✓	(✓)
5.2	Verify via the CRT that digital			
	Word H bit 4 = 0		✓	(✓)
	bit 5 = 1		✓	(✓)
	bit 6 = 0		✓	(✓)
	bit 7 = 1.		✓	(✓)
5.3	Verify via the CRT that analog telemetry			
	Channel 68 is ≤1.0V.	≤1.0	.06	volts
6.	Heater Controller Off/T3 On			
6.1	Execute commands:			
	CFPA HEATER CONTROL ON/T1 SELECT/ CFPA TELEMETRY ON.	19	✓	(✓)
	CFPA HEATER CONTROL OFF.	1D	✓	(✓)
	CFPA T3 SELECT.	1B	✓	(✓)

TEST ENGINEER [signature] DATE 8 Dec 1981 QA

E.M. MODULE UNIT TEST | SIZE A | CODE IDENT NO 11323 | NUMBER 16704 | SCALE | REV 2 | SHEET

DATA SHEET NO. 4 OF 5 PARAGRAPH NO. 4.6

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 800

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
6.2	Verify via the CRT that digital			
	Word H bit 4 = 0		✓	(✓)
	bit 5 = 0		✓	(✓)
	bit 6 = 1		✓	(✓)
	bit 7 = 1.		✓	(✓)
6.3	Verify via the CRT that analog telemetry			
	Channel 68 is ≤1.0V.	≤1.0	.01	volts
7.	Heater Controller On/T1 On			
7.1	Execute Command:			
	CFPA HEATER CONTROL ON/T1 SELECT/ CFPA TELEMETRY ON.	19	✓	(✓)
7.2	Verify via the CRT that digital			
	Word H bit 4 = 1		✓	(✓)
	bit 5 = 0		✓	(✓)
	bit 6 = 0		✓	(✓)
	bit 7 = 1.		✓	(✓)
8.	Test Control Diode			
8.1	With DR #1 set at 18000 ohms verify via the CRT that analog telemetry			
	Channel 67 is ≤1.0V.	≤1.0	0.0	volts
	Channel 68 is ≤1.0V.	≤1.0	0.0	volts

TEST ENGINEER [signature] DATE 8 Dec 81 QA _____

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO 11323	NUMBER 16704
	SCALE	REV 2	SHEET

FORM NO 3122 A 3 80 DIETZGEN MOST CLEARPRINT 2004

DATA SHEET NO. 5 OF 5 PARAGRAPH NO. 4.6

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 80

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(8.1)	Verify that J20-13 is in the range .5 < V < 1.5 volts.	.5 < V <1.5	1.0	volts
	Verify that J20-14 is in the range 0 < V < 15 volts.	0 < V <15	2.57	volts
8.2	Reset DR #1 to 19000 ohms. Record the level of analog telemetry channel 67		1.7	volts
	channel 68		0.0	volts
8.3	Reset DR #1 to 20000 ohms ("cold").			
	Verify that analog telemetry			
	Channel 67 is ≥2.5 volts	≥2.5	4.8	volts
	Channel 68 is ≥2.5 volts	≥2.5	4.8	volts
8.4	Verify that J20-13 is in the range .5 < V < 1.5 volts.	.5 <V <1.5	1.1	volts
	Verify that J20-14 is in the range -15 < V < 0 volts.	-15 <V < 0	-.5	volts
9.	Test Monitor Diode			
9.1	With DR #2 set at 18000 ohms verify that analog telemetry channel 70 is ≤1.0 volts.	≤1.0	2.0	volts
9.2	Reset DR #2 to 19000 ohms and observe the level of analog telemetry channel 70.		1.7	volts
9.3	Reset DR #2 to 20000 ohms ("cold"), and verify that analog telemetry channel 70 is ≥2.5V.	≥2.5	5.1	volts volts
10.	Reset. Repeat 4.6.3.		✓	(✓)

TEST ENGINEER [signature] DATE 12/21/81 QA _____

E.M. MODULE UNIT TEST

SIZE	CODE IDENT NO	NUMBER
A	11323	16704

SCALE | REV 2 | SHEET 5

DATA SHEET NO. 1 OF 5 PARAGRAPH NO. 4.7

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 500

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
	Note: To Perform This Test Boards A04 (50942) & A16(50912) must be installed.			
(4.7)	COLD STAGE OUTGAS HEATER CONTROL			
1.	Confirm that test cable 40 is connected properly between the Electronics Module and the Function Test Panel.		✓	(✓)
	Connect Decade Resistor #1 across the Cold Stage Heater Input TP's to simulate the Cold Stage Platinum Resistance Thermometer. Set DR #1 at 00160 ohms ("<100°K").		✓	(✓)
	Attach test cable 20 and its breakout box to J20 on the Electronics Module.		✓	(✓)
2.	Heater Disabled/Controller and Temp Monitor Off.			
2.1	Execute commands:			
	COLD STAGE HEATER CONTROLLER ON/TELEMETRY ON.	58	✓	(✓)
	COLD STAGE HEATER CONTROLLER OFF/COLD STAGE OUTGAS HEATER DISABLED.	59	✓	(✓)
	COLD STAGE TELEMETRY OFF.	51	✓	(✓)
2.2	Verify via the CRT that digital			
	Word B bit 7 = 0		✓	(✓)
	Word H bit 0 = 0		✓	(✓)
	bit 1 = 0.		✓	(✓)

TEST ENGINEER [signature] DATE 8 Dec 11 QA

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO 11323	NUMBER 16704
	SCALE	REV 2	SHEET

DATA SHEET NO. 2 OF 5 PARAGRAPH NO. 4.7

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 800

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
2.3	Verify via the CRT that analog telemetry			
	Channel 55 "Cold Stage Heater Current" is ≤1.0VDC.	≤1.0	0.0	volts
	Channel 64 "Cold Stage Temperature B (hot)" is ≤1.0VDC.	≤1.0	0.0	volts
	Channel 63 "Cold Stage Temperature A (cold)" is ≤1.0 VDC.	≤1.0	0.0	volts
2.4	Using a DVM, verify that test point			
	J20-15"outgas Control Test" is in the range V < 1.	V < 1.	0.0	volts
	J20-16 "Cold Stage Temp Error Test" is in the range V < 1.	V < 1.	0.0	volts
	J20-18 "Heater Current Test" is in the range V < 1.	V < 1.	0.0	volts
			✓	
3.	Heater Disabled/Controller Off/Temp Monitor On.			
3.1	Execute commands:			
	COLD STAGE HEATER CONTROLLER ON/TELEMETRY ON.	58	✓	( )
	COLD STAGE HEATER CONTROLLER OFF/COLD STAGE OUTGAS HEATER DISABLED.	59	✓	( )

TEST ENGINEER [signature] DATE 4 Dec 81 QA _____

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO 11323	NUMBER 16704
	SCALE	REV 2	SHEET 2

DATA SHEET NO. 3 OF 5 PARAGRAPH NO. 4.7

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 800

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
3.2	Verify via the CRT that digital			
	Word B bit 7 = 1		✓	(✓)
	Word H bit 0 = 0		✓	(✓)
	bit 1 = 0.		✓	(✓)
3.3	Verify via the CRT that analog telemetry			
	Channel 55 is ≤1.0 V.	≤1.0	0.0	volts
3.4	Using a DVM, verify that test point			
	J20-15 is in the range V < 1V.	V < 1.	0.0	volts
	J20-16 is in the range V < 1V.	V < 1.	0.1	volts
	J20-18 is in the range V < 1V.	V < 1.	0.0	volts
			✓	
4.	Heater Disabled/Controller and Temp Monitor On.			
4.1	Execute command:			
	COLD STAGE HEATER CONTROLLER ON/ TELEMETRY ON.	58	✓	(✓)
4.2	Verify via the CRT that digital			
	Word B bit 7 = 1		✓	(✓)
	Word H bit 0 = 1		✓	(✓)
	bit 1 = 0.		✓	(✓)

TEST ENGINEER [signature] DATE 8 Dec '81 QA _____

E.M. MODULE UNIT TEST

SIZE	CODE IDENT NO	NUMBER
A	11323	16704

SCALE | REV C | SHEET —

DATA SHEET NO. 4 OF 5 PARAGRAPH NO. 4.7

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 500

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
4.3	Using a DVM, verify that test point			
	J20-15 is in the range V < 1V.	V < 1	.43	volts
	J20-16 is in the range -15 < V < 0V.	-15 < V < 0	-.88	volts
	J20-17 is in the range .1 < V < 1.0V	.1 < V < 1.0	.01 .1	volts
	J20-18 is in the range V < .1V.	V < .1	.01	volts
4.4	Display and note the values of analog telemetry			
	Channel 55		0.0	volts
	Channel 63		5.1	volts
	Channel 64.		4.7	volts
4.5	Change DR #1 from its minimum value of 00160 ohms to 00400 ohms ("125°K").		✓	(✓)
	Verify that analog telemetry			
	Channel 55 approaches zero volts.		0.0 ✓	(✓)
	Channel 63 changes from ≥ 2.5V to ≤1.0V.		00 ✓	(✓)
	Channel 64 decreases from its initial value by 1.0 ± 0.5V.		3.6 ✓	(✓)
5.	Heater Enabled/Controller and Temp Monitor On.			
5.1	Execute commands:			
	COLD STAGE HEATER CONTROLLER ON/TELEMETRY ON.	58	✓	(✓)
	COLD STAGE OUTGAS HEATER ENABLE.	57	✓	(✓)

TEST ENGINEER [signature] DATE 8 Dec 11 QA

E.M. MODULE UNIT TEST

SIZE	CODE IDENT NO	NUMBER
A	11323	16704

SCALE | REV 2 | SHEET

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DATA SHEET NO. 5 OF 5 PARAGRAPH NO. 4.7

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 600

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
5.2	Verify via the CRT that digital			
	Word B bit 7 = 1		✓	(✓)
	Word H bit 0 = 1		✓	(✓)
	bit 1 = 1.		✓	(✓)
5.3	Display and note the values of analog telemetry			
	Channel 55		.2	volts
	Channel 64.		3.6	volts
5.4	Change DR #1 from 00400 ohms to 01200 ohms ("hot").		✓	(✓)
	Verify that analog telemetry			
	Channel 55 approaches zero volts.		0.0 ✓	(✓)
	Channel 64 approaches zero volts.		0.0 ✓	(✓)
5.5	Using a DVM, verify that test point			
	J20-15 is ≤ .5.volts.	≤.5	.42	volts
	J20-16 is in the range ≥ 0	≥0	4.0	volts
	J20-17 is in the range V >15V	V>15V	~~4.7~~ 90.2 246	volts
	J20-18 is in the range 0≤V <.5	0≤V <.5	0.0	volts
6.	Reset. Repeat step 4.7.2.		✓	(✓)

TEST ENGINEER [signature] DATE 8 Dec 11 QA [signature]

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO 11323	NUMBER 16704
	SCALE	REV	SHEET

FORM NO 3120 1 A 5 69 DIETZGEN POST CLEARPRINT CORP

DATA SHEET NO. 1 OF 3 PARAGRAPH NO. 4.8

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 800

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(4.5)	NOTE: In Order To Perform This Test Boards A05(50920) & A08(51402) Must Be Installed.			
	DC RESTORE/CAL SHUTTER SENSORS			
1.	Confirm that test cables 45, 46 and P13 are connected properly between the Electronics Module and the Function Test Panel Connect a DVM set on its 20V scale between the DC Restore TP and signal ground. If the Mux is already connected to the harness, then use a breakout box and monitor connector P13, PINS M1 and M2.		✓	(✓)
2.	To simulate the Main Shutter Sensor, connect Decade Resistor #1 across TP's 1 and 7 on the FTP.		✓	(✓)
	To simulate the Backup Shutter Sensor connect Decade Resistor #2 across TP's 2 and 8 on the FTP.		✓	(✓)
3.	DC Restore Off			
3.1	Execute commands: SHUTTERS OFF.	F	✓	( )
	DC RESTORE OFF/TELEMETRY SCALING OFF.	6	✓	(✓)
3.2	Verify via the CRT that digital Word L bit 0=0.		✓	(✓)
3.3	Verify via the CRT that analog telemetry			
	Channel 61 "Calibration Shutter Temperature" is zero.	<0.1	.04	volts
	Channel 62 "Backup Shutter Temperature" is zero	<0.1	.04	volts
3.4	Verify that the DVM is measuring zero voltage.	<0.1	0.00	volts

TEST ENGINEER [signature] DATE 15 Dec '81 QA

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO. 11323	NUMBER 16704
	SCALE	REV	SHEET

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DATA SHEET NO. 2 OF 3 PARAGRAPH NO. 4.8

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 800

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
4.	DC Restore On/Normal Mode Select			
4.1	Set DR #1 at 05000 ohms("hot").		✓	(✓)
	Set Dr #2 at 30000 ohms ("cold").		✓	(✓)
4.2	Execute commands:			
	DC RESTORE ON.	3E	✓	(✓)
	CALIBRATION SHUTTER ON/BACKUP SHUTTER OFF/DC RESTORE NORMAL SELECT.	D	✓	(✓)
4.3	Verify via the CRT that digital Word L bit 0=1.		✓	(✓)
4.4	Verify via the CRT that analog telemetry			
	Channel 61 is ≤1.0V.	≤1.0	0.00	volts
	Channel 62 is ≥2.5V.	≥2.5	4.60	volts
4.5	Verify that the DVM is measuring ≤1.0V.	≤1.0	.50	volts
4.6	Set DR #1 to 30000 ohms ("cold").		✓	(✓)
	Set DR #2 to 05000 ohms ("hot").		✓	(✓)
4.7	Verify via the CRT that analog telemetry			
	Channel 61 is ≥2.5V.	≥2.5	4.60	volts
	Channel 62 is ≤1.0V.	≤1.0	0.0	volts
4.8	Verify that the DVM is measuring ≥1.8 volts.	≥ ~~1.8~~ 1.45 See EO.3987A	1.59	volts
5.	DC Restore On/Backup Mode Select			
5.1	Set DR #1 at 05000 ohms		✓	(✓)
	Set DR #2 at 30000 ohms.		✓	(✓)

TEST ENGINEER [signature] DATE 15 Dec '81 QA

	SIZE	CODE IDENT NO	NUMBER
E.M. MODULE UNIT TEST	A	11323	16704
	SCALE	REV	SHEET

DATA SHEET NO. 3 OF 3 PARAGRAPH NO. 4.8

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 800

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
5.2	Execute commands:			
	DC RESTORE OFF/TELEMETRY SCALING OFF.	6	✓	(✓)
	DC RESTORE ON.	3E	✓	(✓)
	BACKUP SHUTTER ON/CALIBRATION SHUTTER OFF/DC RESTORE BACKUP SELECT.	E	✓	(✓)
5.3	Verify via the CRT that digital Word L bit 0=0.		✓	(✓)
5.4	Verify via the CRT that analog telemetry			
	Channel 61 is ≤1.0V.	≤1.0	0.00	volts
	Channel 62 is ≥2.5V.	≥2.5	4.60	volts
5.5	Verify that the DVM is measuring ≥1.8V.	≥1.8 See CO 3987A	1.59	volts
5.6	Set DR #1 to 30000 ohms.		✓	(✓)
	Set DR #2 to 05000 ohms.		✓	(✓)
5.7	Verify via the CRT that analog telemetry			
	Channel 61 is ≥2.5V.	≥2.5	4.60	volts
	Channel 62 is ≤1.0V.	≤1.0	0.00	volts
5.8	Verify that the DVM is measuring ≤1.0 volts.	≤1.0	.49	lts
6.	Reset. Repeat 4.8.3.		✓	(✓)

TEST ENGINEER [signature] DATE 15 Dec 71 QA [signature]

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO 11323	NUMBER 16704
	SCALE	REV C	SHEET

DATA SHEET NO. 1 OF 3 PARAGRAPH NO. 4.9

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 800

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(4.9)	Note: In Order To Perform This Test Boards A05(50920) & A16(50912) Must Be Installed.			
1.0	SMA +/- HEATER CONTROL			
	Verify that test cable 28 is properly connected between the Electronics Module and the Function Test Panel.		✓	(✓)
	Connect test cable 20 and its breakout box to the Electronics Module.		✓	(✓)
2.0	To simulate the heater thermistors connect Decade Resistor #1 across the SMA +Z heater input TP's and connect Decade Resistor #2 across the SMA -Z heater input TP's. Set both DR #1 and DR #2 at 08000 ohms ("hot").		✓	(✓)
3.0	To monitor heater current connect a DVM across the SMA +Z heater output TP's, observing the proper polarities. Connect another DVM across the SMA -Z heater output TP's.		✓	(✓)
	For DVM J20 test access connector meter readings use A5(50920) test point 1 (S/C 28 VRTN) during Para 4.9 as meter return. Set the DVM's on the 0-2VDC scale (1V on the DVM=1 A current in the circuit under test.)		✓	(✓)
4.0	BOTH HEATERS OFF			
4.1	Execute commands: SMA +Z HEATER CONTROLLER OFF.	42	✓	(✓)
	SMA -Z HEATER CONTROLLER OFF.	44	✓	(✓)
4.2	Verify via the CRT that digital Word A bit 2=0		✓	(✓)
	bit 3=0		✓	(✓)
	Word L bit 3=0		✓	(✓)
	bit 4=0.		✓	(✓)
4.3	Verify that each DVM is measuring ± 10 mV.	± 10	✓1.2mV ✓1.2mV	mvolts
5.0	SMA -Z Heater On/-Z Heater Off.			

TEST ENGINEER [signature] DATE 10 Dec '81 QA

	SIZE	CODE IDENT NO	NUMBER
E.M. MODULE UNIT TEST	A	11323	16704
	SCALE	REV C	SHEET

DATA SHEET NO. 2 OF 3 PARAGRAPH NO. 4.9

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 800

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
5.1	Execute commands: SMA +Z HEATER CONTROLLER ON.	41	✓	(✓)
	SMA -Z HEATER CONTROLLER OFF.	44	✓	(✓)
5.2	Verify via the CRT that digital Word A bit 2=1		✓	(✓)
	bit 3=0		✓	(✓)
	Word L bit 3=1		✓	(✓)
	bit 4=0.		✓	(✓)
5.3	Verify that both the +Z and -Z DVM'S are measuring ≤10mV.	≤ 10	1.1mV (+Z) 1.2mV (-Z)	mvolts
5.4	Change DR #1 from 08000 to 12000 ohms ("cold").		Sm. .857 Wire	
	Verify that the +Z DVM measures ≥500 mV, and the -Z DVM measures ≤10 mV	≥500 ≤10	1225 0	mvolts mvolts
5.5	Using a DVM, verify that test point J20-19 "+Z Collector Voltage Test" is in the range .1<V< 1V.	.1<V<1	.135	volts
	Using a DVM, verify that test point J20-20 "+Z Heater On/Off Test" is specified ≥ 1.8 volts	≥1.8	2.23	volts
6.0	SMA +Z HEATER OFF/-Z HEATER ON.			
6.1	Execute commands: SMA +Z HEATER CONTROLLER OFF.	42	✓	(✓)
	SMA -Z HEATER CONTROLLER ON.	43	✓	(✓)
6.2	Verify via the CRT that digital Word A bit 2=0		✓	(✓)
	bit 3=1		✓	(✓)
	Word L bit 3=0		✓	(✓)
	bit 4=1.		✓	(✓)
6.3	Verify that both the +Z and -Z DVM'S are measuring ≤10 mV.	≤ 10	0.0 mV 0.0mV	mvolts
6.4	Change DR #2 from 08000 to 12000 ohms ("cold").		✓	(✓)

TEST ENGINEER [signature] DATE 10 Dec '81 QA

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO 11323	NUMBER 16704
	SCALE	REV C	SHEET 2

DATA SHEET NO. 3 OF 3 PARAGRAPH NO. 4.9

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 800

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(6.4)	Verify -Z DVM measures ≥ 500mV +Z DVM measures ≤ 10mV		.859V 0.0mV	(✓)
6.5	Using a DVM, verify that test point J20-21 is in the range .1<V<1.	0.1 < V < 1	.130	volts
	Verify that test point J20-20 is less than 1 volt.	< 1	.025	volt
				volts
7.0	Reset. Repeat 4.9.4.		✓	(✓)

TEST ENGINEER [signature] DATE 10 Dec '81 QA _____

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO 11323	NUMBER 16704
	SCALE	REV C	SHEET 23

FORM NO 3123 A 3 691 DIETERICH-POST CLEARPRINT 0004

DATA SHEET NO. 1 OF 3 PARAGRAPH NO. 4.10

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 500

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(4.10)	Note: In Order To Perform This Test Boards A05(50920) & A16(50912) Must Be Installed. INTERMEDIATE STAGE OUTGAS HEATER CONTROL			
1.	Confirm that test cable 40 is properly connected between the Electronics Module and the Function Test Panel.		✓	(✓)
1.1	To simulate the Intermediate Stage PRT connect Decade Resistor #1 across the Intermediate Stage Heater Input TP's on the test panel. Set DR #1 at a minimum "temperature" of 00400 ohms.		✓	(✓)
1.2	To monitor heater current connect a DVM across the Intermediate Stage Heater Current TP's, observing the proper polarities. One volt on the DVM equals 1 amp of current in the circuit under test.		✓	(✓)
1.3	Connect test cable 20 and its breakout Box to J20 on the Electronics Module.		✓	(✓)
2.	Intermediate Stage Heater Controller Off/ Heater Disabled.			
2.1	Execute command:			
	COOLER INTERMEDIATE STAGE HEATER CONTROLLER OFF/HEATER DISABLED.	47	✓	(✓)
2.2	Verify via the CRT that digital			
	Word H bit 2 = 0		✓	(✓)
	bit 3 = 0		✓	(✓)
2.3	Verify via the CRT that analog telemetry			
	Channel 65 "Intermediate Stage Temperature A (cold)" is ≤1.0V.	≤1.0	0.00	volts

TEST ENGINEER [signature] DATE 10 Dec 81 QA

E.M. MODULE UNIT TEST | SIZE A | CODE IDENT NO 11323 | NUMBER 16704 | SCALE | REV C | SHEET 5

DATA SHEET NO. 2 OF 3 PARAGRAPH NO. 4.10

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 600

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(2.3)	Channel 66 "Intermediate Stage Temperature B (hot)" is ≤1.0V.	≤1.0	0.0	volts
2.4	Verify that the current monitoring DVM is measuring ≤10 mV.	≤10	0.0	mvolts
3.	Intermediate Stage Heater Controller On/ Heater Disabled.			
3.1	Execute command:			
	COOLER INTERMEDIATE STAGE HEATER CONTROLLER ON.	46	✓	(✓)
3.2	Verify via the CRT that digital			
	Word H bit 2 = 1		✓	(✓)
	bit 3 = 0.		✓	(✓)
3.3	Verify that the DVM is measuring ≤10 mV.	≤10	0	mvolts
3.4	Display analog telemetry channels 65 and 66 on the CRT. With DR #1 set at 00400 ohms record the values of			
	Channel 65	(>2.5)	4.82	volts
	Channel 66.	(>2.5)	4.24	volts
	Both channels should be greater than 2.5V.			
3.5	Change DR #1 to 00600 ohms ("170°K"). Verify that Channel 65 goes to ≤1.0V.	≤1.0	0.0	volts
	Record the value of Channel 66.		3.120	volts
3.6	Change DR #1 to 01200.		✓	(✓)
	Verify that Channel 66 goes to ≤1.0V.	≤1.0	.100	volts

TEST ENGINEER [signature] DATE 10 Dec '81 QA [signature] 12/11/81

E.M. MODULE UNIT TEST

SIZE	CODE IDENT NO	NUMBER
A	11323	16704

SCALE | REV C | SHEET 2

DATA SHEET NO. 3 OF 3 PARAGRAPH NO. 4.10

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 602

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(3.6)	Verify that Channel 65 remains ≤1.0V.	≤1.0	0.00	volts
3.7	Reset DR #1 to 00400 ohms		✓	(✓)
4.	Intermediate Stage Heater Controller On/ Heater Enabled.			
4.1	Execute commands:			
	COOLER INTERMEDIATE STAGE HEATER CONTROLLER ON.	46	✓	(✓)
	COOLER INTERMEDIATE STAGE OUTGAS HEATER ENABLED.	45	✓	(✓)
4.2	Verify via the CRT that digital			
	Word H bit 2 = 1		✓	(✓)
	bit 3 = 1.		✓	(✓)
4.3	With DR #1 set at 00400 ohms, verify that the current monitoring DVM is measuring ≥300 mV.	≥300	439	mvolts
	Using a DVM verify that test point J20-22 "Intermediate Outgas On/Off Test" is in the range .1 < V < 1.0 volts.	.1 < V < 1.0	.330	volts
	Using a DVM verify that J20-60 "outgas Control Test" is ≥3.0 volts.	≥3.0	4.39	volts
4.4	Set DR #1 at 01200 ohms. Verify that the current monitoring DVM is measuring ≤10mV.	≤10	0.0	mvolts
	Verify that J20-22 is in the range 1<V<5 V	1 <V <5	4.5	volts
	Verify that J20-60 is ≤1.0 volts.	≤1.0	.2	volts
5.	Reset. Repeat 4.10.2.		✓	(✓)

TEST ENGINEER [signature] DATE 10 Dec 81 QA [signature]

E.M. MODULE UNIT TEST | SIZE A | CODE IDENT NO 11323 | NUMBER 16704 | SCALE | REV 2 | SHEET

DATA SHEET NO. 1 OF 4 PARAGRAPH NO. 4.13

DETAILED FUNCTIONAL TESTS LOG AHR OFER 600

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM/ VERIFY	UNITS
(4.13)	Note: In Order To Perform ' s Test Boards A05(50920), A08(51402, & A16 (50912) Must Be Installed.			
1.	TELEMETRY SCALING			
	Confirm that test cables 37, 44, & 45 are properly connected between the Electronics Module & the Function Test Panel.		✓	(✓)
	Confirm that Test Cable P13 is connected to Function Test Panel.		✓	( )
2.	To simulate the Bulkhead (Frame) Sensor connect Decade Resistor #1 to TP's 3 and 9 on the FTP. To Simulate the Blackbody Sensor attach Decade Resistor #2 across TP's 5 and 11 on the FTP. To simulate the Silicon FPA sensor attach an External decade box across TP's 6 and 12. As an initial condition, set the Bulkhead, and Blackbody simulators at 05000 ohms, and silicon FPA simulator at 03000 ohms (i.e., all simulators "hot").		✓	(✓)
3.	To measure the DC Restore signal to the MUX connect a DVM set on its 20V scale across the DC Restore TP and signal ground on the FTP.		✓	(✓)

16 Dec '81

TITLE

SIZE	CODE IDENT NO	NUMBER
A	11323	16704
SCALE	REV	SHEET

FORM NO 3122 A 3-69 DIETERICH-POST CLEARPRINT OCOM

DATA SHEET NO. 2 OF 4 PARAGRAPH NO. 4.13

DETAILED FUNCTIONAL TESTS **LOG AHR OPER** 500

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM/ VERIFY	UNITS
4.	DC Restore - Telemetry Scaling Off			
4.1	Execute commands:			
	COOLER DOOR ELECTROMAGNET OFF/FRAME DC RESTORE SELECT	1F	✓	(✓)
	DC RESTORE OFF/TELEMETRY SCALING OFF	6	✓	(✓)
4.2	Verify via the CRT that digital Word L bit 1=0		✓	(✓)
	bit 2=0		/	( )
4.3	Verify via the CRT that analog telemetry			
	Channel 59 "Blackbody Temperature" is ≤ 1.0V.	≤ 1.0	0.0	volts
	Channel 60 "SIFPA Temperature" is ≤ 1.0V.	≤ 1.0	0.0	volts
4.4	Verify that the DVM is measuring zero volts	<0.1	0.0	volts
5.0	Telemetry Scaling On/Backup DC Restore Selected			
5.1	Execute commands:			
	TELEMETRY SCALING ON.	7	✓	(✓)
	COOLER DOOR ELECTROMAGNET OFF/FRAME DC RESTORE SELECT.	1F	✓	(✓)
	BACKUP SHUTTER ON/CALIBRATION SHUTTER OFF/DC RESTORE BACKUP.	E	✓	(✓)

16 Dec 91

TITLE

SIZE	CODE IDENT NO	NUMBER
A	11323	16704

SCALE | REV | SHEET

FORM NO 3132 * A 3 691 DIETERICH-MOST CLEARPRINT 000M

DATA SHEET NO. 3 OF 4 PARAGRAPH NO. 4.13

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 800

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
5.2	Verify via the CRT that digital Word L bit 1=0 bit 2=1.		✓ ✓	(✓) (✓)
5.3	Verify via the CRT that analog telemetry			
	Channel 59 is ≥ 2.5V Channel 60 is ≥ 2.5V.	≥ 2.5 ≥ 2.5	3.7 4.7	volts volts
5.4	Verify that the DVM is measuring zero volts.	<0.1	0.0	volts
6.0	TELEMETRY SCALING ON/NORMAL DC RESTORE SELECTED			
6.1	Execute Commands: TELEMETRY SCALING ON.	7	✓	(✓)
	COOLER DOOR ELECTROMAGNET OFF/ FRAME DC RESTORE SELECT.	1F	✓	(✓)
	CALIBRATION SHUTTER ON/BACKUP SHUTTER OFF/DC RESTORE NORMAL SELECT.	D	✓	(✓)
6.2	Verify via the CRT that digital Word L bit 1=0 bit 2=1.		✓ ✓	(✓) (✓)
6.3	Verify via the CRT that analog telemetry			
	Channel 59 is ≥ 2.5V Channel 60 is ≥ 2.5V.	≥ 2.5 ≥ 2.5	3.7 4.7	volts volts
6.4	Verify that the DVM is measuring zero volts.	<0.1	0.0	volts
7.	TELEMETRY SCALING ON/FRAME DC RESTORE SELECTED			
7.1	Execute Commands; TELEMETRY SCALING ON	7	✓	(✓)
	COOLER DOOR ELECTROMAGNET OFF/ FRAME DC RESTORE SELECT	1F	✓	(✓)
7.2	Verify via the CRT that digital Word L bit 1=1 bit 2=1.		✓	(✓)
7.3	Verify that the DVM is measuring ≤ 1.0 volts.	≤ 1.0	.52	volts

TEST ENGINEER [signature] DATE 16 Dec '71 QA _____

E.M. MODULE UNIT TEST | SIZE A | CODE IDENT NO 11323 | NUMBER 16704 | SCALE | REV 2 | SHEET 55

DATA SHEET NO. ___ OF ___ PARAGRAPH NO. 4.13

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 500

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
7.4	Reset the Blackbody and Bulkhead simulators to 30000 ohms ("cold"). Reset the SIFPA simulator to 20000 ohms ("cold").		✓	(✓)
7.5	Verify via the CRT that analog telemetry			
	Channel 59 is ≤ 1.0 volts	≤ 1.0	0.0	volts
	Channel 60 is ≤ 1.0 volts	≤ 1.0	0.0	volts
7.6	Verify that the DVM is now measuring ≥ 1.8 volts DC restore to the MUX.	≥ 1.8	1.62	volts
8.0	Reset. Repeat 4.13.4.	see ED 39787A	✓	(✓)

TEST ENGINEER [signature] DATE 16 Dec '81 QA [signature]

E.M. MODULE UNIT TEST

SIZE	CODE IDENT NO	NUMBER
A	11323	16704

SCALE | REV | SHEET

DATA SHEET NO. 1 OF 3 PARAGRAPH NO. 4.16

DETAILED FUNCTIONAL TESTS

LOGAHR OPER 800

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(4.16)	Note: In Order To Perform This Test Boards A03(50926) & A08(51402) Must Be Installed. LAMP SEQUENCER TEST			
1.	Confirm that test cable 44 is properly connected between the Electronics Module and the Function Test Panel.		✓	(✓)
	Connect test cable 20 and its breakout box to J20 on the Electronics Module.		✓	(✓)
2.	Calibration Lamp Sequencer On.			
2.1	Execute commands:			
	CALIBRATION LAMP 1 ON.	10	✓	(✓)
	CALIBRATION LAMP 2 ON.	11	✓	(✓)
	CALIBRATION LAMP 3 ON.	12	✓	(✓)
2.2	Verify via the CRT that digital			
	Word D bit 0 = 1		✓	(✓)
	bit 1 = 1		✓	(✓)
	bit 2 = 1.		✓	(✓)
2.3	Confirm that the three Cal Lamp LED indicators on the Function Test Panel are lit.			
2.4	Execute command :			
	CALIBRATION LAMP SEQUENCER OFF.	4E	✓	(✓)

TEST ENGINEER [signature] DATE 11-JAN-82 QA 2/3/82

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO. 11323	NUMBER 16704
	SCALE	REV 2	SHEET 7

DATA SHEET NO. 2 OF 3 PARAGRAPH NO. 4.16

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 800

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(2.4)	CALIBRATION LAMP SEQUENCE ON.	4D	✓	(✓)
2.5	Verify via the CRT that digital			
			✓	(✓)
	Word D bit 6 = 1		✓	(✓)
			✓	(✓)
2.6	Display analog telemetry Channel 8 "All Cal Lamps On" on the CRT.		✓	(✓)
	Verify that the Channel 8 telemetry switches from low (≤1.0V) to high (≥2.5V) every 23 ± 3 seconds, remaining high for 2 ± 1 seconds.	23±3/2±1	24 ✓	seconds
..7	Observing the Cal Lamp LED indicators, verify visually that the lamps sequence in the pattern specified in Table 4.16A, with all lamps being lit when analog Channel 8 is high.		✓	(✓)
2.8	Using a DVM confirm that test point J20-43 "Cal Lamp Sequencer Clock" cycles high and low (TTL logic).		✓	(✓)
3.	Calibration Lamp Secuencer Off.			
3.1	Execute command:			
	CALIBRATION LAMP SEQUENCER OFF.	4E	✓	(✓)
3.2	Verify via the CRT that digital			
	Word D bit 6 = 0		✓	(✓)
			✓	(✓)
			✓	(✓)

TEST ENGINEER Kenton DATE 11 JAN '84 QA 1/13/84

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO 11323	NUMBER 16704
	SCALE	REV C	SHEET 3

DATA SHEET NO. 3 OF 3 PARAGRAPH NO. 4.16

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 800

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
3.3	Verify that analog telemetry Channel 8 is ≤1.0V for >40 sec.	≤1.0/≥40	0.000/ 120	volts/ sec.
4.	Reset.			
4.1	Execute commands:			
	CALIBRATION LAMP 1 OFF/ OVERRIDE OFF.	16	✓	(✓)
	CALIBRATION LAMP 2 OFF/ OVERRIDE OFF.	17	✓	(✓)
	CALIBRATION LAMP 3 OFF/ OVERRIDE OFF.	18	✓	(✓)
4.2	Verify via the CRT that digital			
	Word D bit 0 = 0		✓	(✓)
	bit 1 = 0		✓	(✓)
	bit 2 = 0.		✓	(✓)
4.3	Verify that the Cal Lamp LED indicators are not lit.		✓	(✓)

TEST ENGINEER Clayton DATE 11 JAN '82 QA 2/3/82

E.M. MODULE UNIT TEST

SIZE	CODE IDENT NO	NUMBER
A	11323	16704

SCALE | REV C | SHEET 29

STEP	LAMPS ON (50926)
1	NONE
2	1
3	1,2
4	2
5	2,3
6	1,2,3 (ALL)
7	1,3
8	3

Verify that step 8 occurs every 24 ± 3 sec.

Table 4.16A

DATA SHEET NO. ___ OF __ PARAGRAPH NO. 4.17

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1000

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
	Note: In Order To Perform This Test Boards A09 (~~50932~~) & A10(50912) Must Be Installed. ✓			
(4.17)	COOLER DOOR TEST			
1.	Confirm that test cable 43 is properly connected between the Electronics Module and the Function Test Panel.		✓	(✓)
	Attach test cable 20 and its breakout box to J20 on the Electronics Module		✓	(✓)
1.1	Set all cooler door switches on the Function Test Panel (ungrounded).			
	Execute command: COOLER DOOR ELECTROMAGNET OFF/ FRAME DC RESTORE SELECT.	1F	✓	(✓)
	COOLER DOOR MOVE INHIBIT.	88	✓	(✓)
	COOLER DOOR MOTOR OFF.	53	✓	(✓)
2.	Electromagnet off.			
2.1	Execute command: COOLER DOOR ELECTROMAGNET ON.	1E	✓	(✓)
2.2	Verify via the CRT that digital Word C bit 3 = 1.			
2.3	Execute command: COOLER DOOR ELECTROMAGNET OFF/ FRAME DC RESTORE SELECT.	1F	✓	(✓)
2.4	Verify via the CTT that digital Word C bit 3 = 0		✓	(✓)
3.	Break Release.			
	Execute command: COOLER DOOR MOTOR OFF.	53	✓	(✓)
3.1	Verify via the CRT that digital			

TEST ENGINEER [signature] DATE 7 Dec '91 QA ___

E.M. MODULE UNIT TEST

SIZE	CODE IDENT NO	NUMBER
A	11323	16704

SCALE | REV C | SHEET 1

DATA SHEET NO. 2 OF 11 PARAGRAPH NO. 4.17

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1000

PARA OR STEP NO.	PROCEDURE STEP	SPEC - OR COMMAND	RECORD DATUM / VERIFY	UNITS
3.1 -	Word c bit 4 = 0.		✓	( )
3.2	Connect a DVM across the Cooler Door Brake TP's on the Function Test Panel, observing the proper polarities.		✓	(✓)
3.3	Execute commands:			
	COOLER DOOR MOTOR ON.	52	✓	(✓)
	COOLER DOOR MOVE INHIBIT.	88	✓	(✓)
	COOLER DOOR MOVE.	87	✓	(✓)
3.4	Verify via the CRT that digital Word I bit 4 = 1.		✓	(✓)
	c bit 4 = 1.		✓	
	Verify that the DVM is measuring 33(±30) VDC.	33(±30)	31.9 ✓	volts
3.5	Execute command:			
	COOLER DOOR MOTOR OFF.	53	✓	(✓)
	COOLER DOOR MOVE INHIBIT.	88	✓	(✓)
4.	Cooler Door Switches			
4.1	Door Closed. Set the cooler door switches on the Function Test Panel as follows:			
	"open" - down.	down	✓	(✓)
	"closed" - up (grounded).	up	✓	(✓)
	"outgas" - down.	down	✓	(✓)
4.2	Execute command:			
	COOLER DOOR MOTOR ON.	52	✓	(✓)
4.3	Verify via the CRT that digital			
	Word c bit 0 = 1		✓	(✓)
	bit 1 = 0		✓	(✓)

TEST ENGINEER [signature] DATE 7 Dec '81 QA

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO 11323	NUMBER 16704
	SCALE	REV	SHEET

DATA SHEET NO. 3 OF 11 PARAGRAPH NO. 4.17

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1000

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(4.3)	bit 2 = 0		✓	(✓)
	bit 4 = 1.		✓	(✓)
4.4	Outgas position. Set the cooler door switches on the Function Test Panel as follows:			
	"open" - down.		✓	(✓)
	"closed" - down.		✓	(✓)
	"outgas" - up (grounded).		✓	(✓)
	Execute command: COOLER DOOR MOTOR ON.	52	✓	(✓)
4.5	Verify via the CRT that digital			
	Word C bit 0 = 0		✓	(✓)
	bit 1 = 1		✓	(✓)
	bit 2 = 0		✓	(✓)
	bit 4 = 1.		✓	(✓)
4.6	Full open. Set the cooler door switches on the Function Test Panel as follows:			
	"open" - up (grounded).		✓	(✓)
	"closed" - down.		✓	(✓)
	"outgas" - down.		✓	(✓)
	Execute command: COOLER DOOR MOTOR ON.	52	✓	(✓)
4.7	Verify via the CRT that digital			
	Word C bit 0 = 0		✓	(✓)
	bit 1 = 0		✓	(✓)
	bit 2 = 1		✓	(✓)

TEST ENGINEER [signature] DATE 7 Dec 71 QA

	SIZE	CODE IDENT NO.	NUMBER
C.M. MODULE UNIT TEST	A	11323	16704
	SCALE	REV 2	SHEET 3

DATA SHEET NO. 4 OF 11 PARAGRAPH NO. 4.17

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1000

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(4.7)	bit 4 = 1.		✓	(✓)
4.8	Reset. Set all switches down.			
	Execute command:			
	COOLER DOOR MOTOR OFF.	53	✓	(✓)
	Verify via the CRT that digital			
	Word C bit 0 = 0		✓	(✓)
	bit 1 = 0		✓	(✓)
	bit 2 = 0		✓	(✓)
	bit 4 = 0.		✓	(✓)
	Motor Test			
	Connect an oscilloscope to Door Motor Phase 1, No. 1 (+) TP and Door Motor Phase 2, No. 1 (+) TP on the Function Test Panel.		✓	(✓)
5.1	Door Opening.			
	Execute commands:			
	COOLER DOOR MOTOR ON.	52	✓	(✓)
	COOLER DOOR OPEN.	85	✓	(✓)
	COOLER DOOR MOVE INHIBIT.	88	✓	(✓)
	COOLER DOOR MOVE	87	✓	(✓)

TEST ENGINEER [signature] DATE 7 Dec 81 QA

E.M. MODULE UNIT TEST

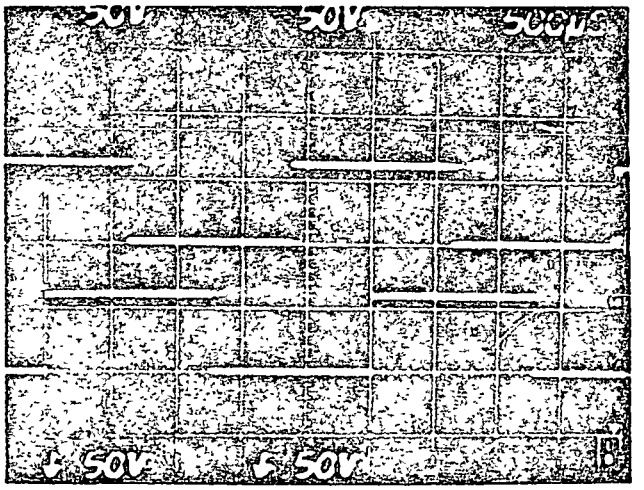
SIZE	CODE IDENT NO	NUMBER
A	11323	16704

SCALE | REV C | SHEET

DATA SHEET NO. 5 OF 11 PARAGRAPH NO. 4.17

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1000

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(5.1)	Observe the phase 2 test point shifted 90° with respect to the phase 1 test point. Photograph the waveform and attach it below:		✓	(✓)
				
5.2	Verify via the CRT that digital Word C bit 4 = 1 Word I bit 4 = 1 bit 5 = 1.		✓ ✓ ✓	(✓) (✓) (✓)

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TEST ENGINEER [signature] DATE 7 Dec 4/11 QA _____

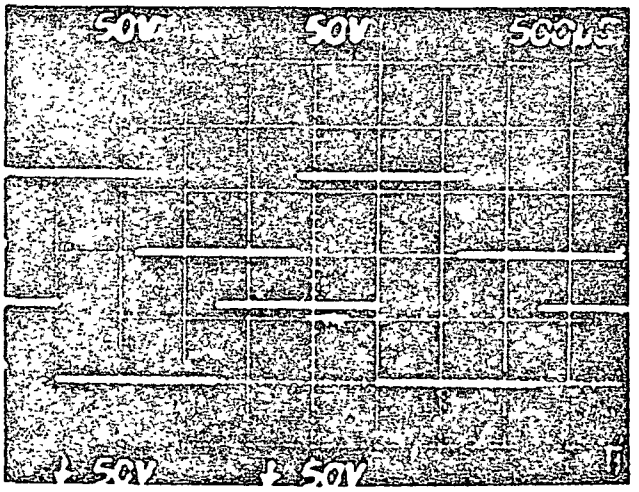
E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO 11323	NUMBER 16704
	SCALE	REV 2	SHEET 5

DATA SHEET NO. 6 OF 11 PARAGRAPH NO. 4.17

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1000

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
5.3	Door Closing. Execute commands: COOLER DOOR MOTOR ON. COOLER DOOR CLOSE. COOLER DOOR MOVE INHIBIT. COOLER DOOR MOVE.	 S2 S6 S8 S7	✓ ✓ ✓	(✓) (✓) (✓) (✓)
5.4	Observe the phase 2 test point shifted 270° with respect to the phase 1 test point. Photograph the waveform and attach it below:		✓	(✓)



PHASE 1

PHASE 2

TEST ENGINEER [signature] DATE 7 Dec 71 QA

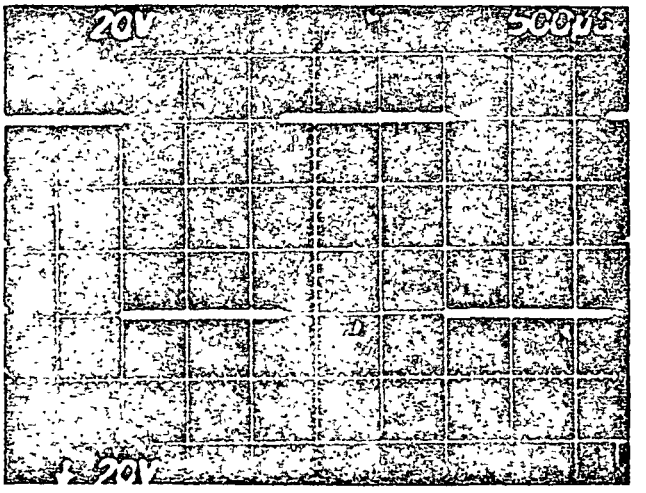
E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO 11323	NUMBER 16704
	SCALE	REV	SHEET 6

DATA SHEET NO. 7 OF 11 PARAGRAPH NO. 4.17

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1000

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
5.5	Verify via the CRT that digital			
	Word C bit 4 = 1		✓	(✓)
	Word I bit 4 = 1		✓	(✓)
	bit 5 = 0.		✓	(✓)
5.6	Connect the oscilloscope to Door Motor Phase 1, No. (+) TP and Door Motor Phase 1, No. (-) TP.			
	Differentially measure voltage,	50(±12)	60	Vp-p
	frequency.	400(±12)	400	Hz
	(Note: since the door motor output is a clocked signal it may be necessary to reissue cooler door Move Enable command 88/87 periodically. Do so as needed.)			
	Photograph waveform and attach below:			



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TEST ENGINEER [signature] DATE 7 Dec 81 QA

E.M. MODULE UNIT TEST

SIZE	CODE IDENT NO	NUMBER
A	11323	16704

SCALE | REV C | SHEET 7

DATA SHEET NO. 8 OF 11 PARAGRAPH NO. 4.17

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1000

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
5.7	Connect an oscilloscope to test points J20-44 "Phase 1, No. 1 Test" and J20-45 "Phase 1, No. 2 Test." Issuing command 38/87 as needed, verify that each test point produces a 30 V p-p squarewave output.	30(±6)	✓ 30 ✓	(✓) Vp-p
5.8	Repeat 4.17.5.6 above for Door Motor Phase 2 outputs.			
	voltage	50(±12)	60 ✓	Vp-p
	frequency	400(±12)	400 ✓	Hz
	Photograph:			

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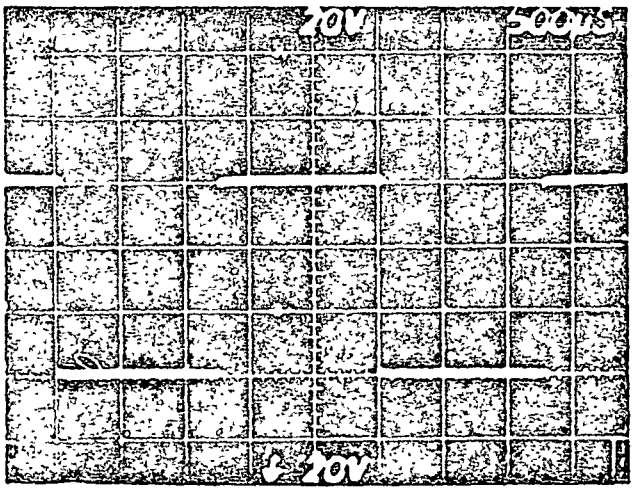

TEST ENGINEER [signature] DATE 7 Dec '81 QA [signature]

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO 11323	NUMBER 16704
	SCALE	REV	SHEET

DATA SHEET NO. 9 OF 11 PARAGRAPH NO. 4.17

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1000

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
5.9	Connect an oscilloscope to test points J20-46 "Phase 2, No. 1 Test" and J20-47 "Phase 2, No. 2 Test." Issuing command 88/87 as needed, verify that each test point produces a 30V p-p squarewave output.	30 ± 6	✓ 30 ✓	(✓) Vp-p
6.	Gated Clock Test			
6.1	Execute command: COOLER DOOR MOVE INHIBIT.	88	✓	(✓)
	Verify via the CRT that digital Word I bit 4 = 0.		✓	(✓)
6.2	Connect the oscilloscope across the Door Motor Phase 2 Outputs and set it for a slow sweep Rate.		✓	(✓)
	Execute command: COOLER DOOR MOVE	87	✓	(✓)
6.3	Verify that the door motor output waveform appears for 15(±2) seconds.	15(±2)	14 ✓	sec.
	Connect another oscilloscope to test point J20-48 "3.2 kHz Clock Test."		✓	(✓)
	Execute command 88/87 and verify a 3.2 kHz TTL signal on J20-48.	3.2±0.2	3.2 KHz	kHz
	Verify via the CRT that digital Word I bit 4 = 1.		✓	(✓)
6.4	Set the Cooler Door Switch "Closed" in the up (grounded) position.		✓	(✓)
	Execute commands 88/87.	88/87	✓	(✓)

TEST ENGINEER [signature] DATE 7 Dec '91 QA [signature]

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO 11323	NUMBER 16704
	SCALE	REV C	SHEET 9

FORM NO 3132 A 5 89 DIETERICH POST CLEARPRINT 0004

DATA SHEET NO. 10 OF 11 PARAGRAPH NO. 4.17

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1000

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(6.4)	ORIGINAL PAGE IS OF POOR QUALITY		✓	(✓)
6.5				
	COOLER DOOR MOVE INHIBIT.	88	✓	(✓)
	COOLER DOOR MOVE.	87	✓	(✓)
	Verify that the door motor output waveform appears across the Phase 2 outputs for 0.5(±0.2) seconds.	0.5(±0.2)	.61 ✓	sec.
7.	Reset.			
7.1	Set all switches down.		✓	(✓)
.2	Execute commands:	IF		
	COOLER DOOR MOVE INHIBIT.	88	✓	(✓)
	COOLER DOOR MOTOR OFF.	53	✓	(✓)
7.3	Verify via the CRT that digital			
	Word C bit 0 = 0		✓	(✓)
	bit 1 = 0		✓	(✓)
	bit 2 = 0		✓	(✓)
	bit 3 = 0		✓	(✓)
	bit 4 = 0		✓	(✓)
	Word I bit 4 = 0.		✓	(✓)

TEST ENGINEER [signature] DATE 7 Dec 91 QA [signature]

E.M. MODULE UNIT TEST | SIZE A | CODE IDENT NO 11323 | NUMBER 16704

SCALE | REV C | SHEET 20

Word/Bit	Function	CMD On	CMD Off
C/0	Cooler Door Closed	N/A	N/A
C/1	Cooler Door Outgas Position	N/A	N/A
C/2	Cooler Door Full Open	N/A	N/A
C/3	Cooler Door Magnet On	1E	1F
C/4	Cooler Door Motor On	52	53
I/4	Cooler Door Move Enable/Inhibit	87	88
I/5	Cooler Door Open	85*	86†

* Door is Opening

† Door is Closing

Table 4.17

DATA SHEET NO. 1 OF 22 PARAGRAPH NO. 4.19

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1100

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(4.19)	POST AMPLIFIER TESTS			
1.	Band 1			
1.1	Connect cables between Electronics Module connectors J30 and breakout boxes and between J35 and breakout boxes. Verify that test cable 45 is connected between the EM and the FTP.		✓	(✓)
1.2	Short all unused signal inputs of Band 1 to their respective signal returns [(15 of 16 channels X (2inputs (HI/LO)) = 30 shorts] . Short all signal returns to power return.		✓	(✓)
1.3	Connect P11 and P12 (from the EM) and J11 and J12 extender cable (from the MUX) into the MUX Channel Selector Box. Select output channel via the Mux Channel Selector keyboard.		✓	(✓)
1.4	Connect breakout box betweeen EM connector P13 and MUX Connector J13. Using the test Equipment Configuration shown in Figure 4.19, connect the DC Restore Sync Signal on P13-H3/H4 (breakout box PINS 38 and 39) to the "inhibit" input of the phase splitter, and to the triggers of both oscilloscopes.		✓	(✓)
1.5	Execute command:			
	CALIBRATION SHUTTER ON/BACKUP SHUTTER OFF/DC RESTORE NORMAL SELECT.	D	✓	(✓)
	BAND 1 ON.	25	✓	(✓)
	Verify via the CRT that digital			

TEST ENGINEER [signature] DATE 8/Aug '82 QA [signature] 8/11/82

E.M. MODULE UNIT TEST | SIZE A | CODE IDENT NO 11323 | NUMBER 16704 | SCALE | REV | SHEET

DATA SHEET NO. 2 OF 12 PARAGRAPH NO. 4.19

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1100

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(1.5)	Word B bit 0 = 1.		✓	(✓)
	Word G bit 2 = 1.		✓	(✓)
1.6	Set the function generator at 1 KHz. Adjust the sine wave so that it is all positive relative to DC Restore level and has an amplitude of 4 Vp-p out of the postamps.		✓	(✓)
1.7	Record the amplitude of the signal going into the postamps (E.g.: 1.2 Vp-p) in the data column of the Band 1 data table.		✓	(✓)
1.8	Observe both sides of the Differential Signal from each Post Amplifier Channel and Verify that the signals are of equal amplitude and 180° out of phase with each other.		✓	(✓)
1.9	After steps 1.2 and 1.6-1.8 have been completed for each channel, execute command:			
	BAND 1 OFF	26	✓	(✓)
	SHUTTERS OFF.	F	✓	(✓)
	Verify via the CRT that digital			
	Word B bit 0 = 0.		✓	(✓)
	G bit 2 = 0.		✓	(✓)

TEST ENGINEER [signature] DATE FEB 14 QA 2/3/87

E.M. MODULE UNIT TEST

SIZE	CODE IDENT NO	NUMBER
A	11323	16704

SCALE REV SHEET

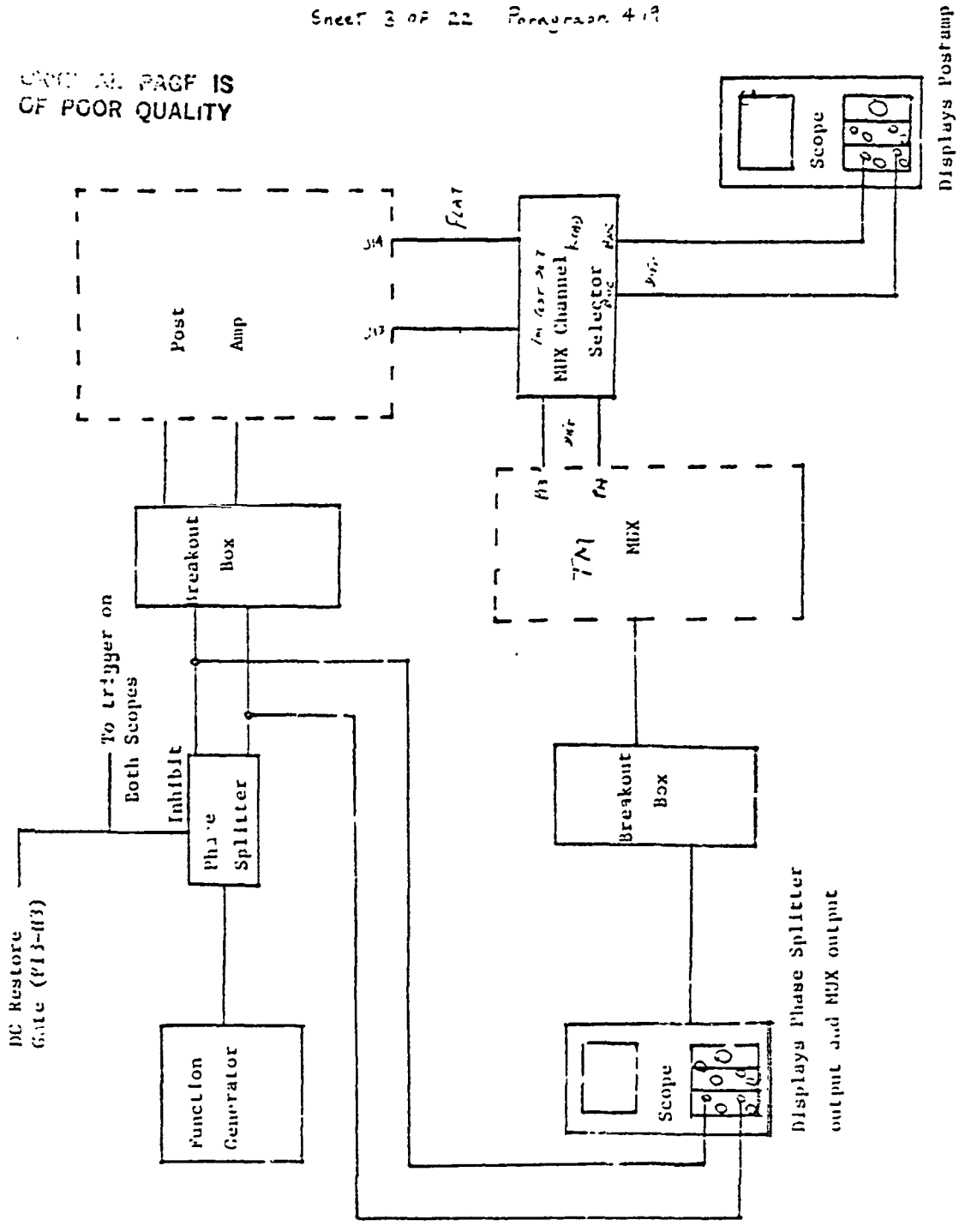

Figure 4.19

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DATA SHEET 4 of PARA. 4.19.1

IND	PARAMETER		Input	Signal Ret	Output	Post Amp. output Reference Spec Limit	Post Amp. Input Spec Limit	Actual Data	Units
1	Nominal Gain = 7.8								
	Channel 1	HI	J30-C3	J30-C4	P11-A2	4(±3%)VPP	270≤V≤570	440	mVp-p
		LO	J30-C5	J30-C4	A1				
	2	HI	J35-K3	J35-K4	A4			470	
		LO	J35-K5	J35-K4	A3				
	3	HI	J30-D3	J30-D4	B1			490	
		LO	J30-D5	J30-D4	A5				
	4	HI	J35-J3	J35-J4	B3			470	
		LO	J35-J5	J35-J4	B2				
	5	HI	J30-E3	J30-E4	B5			560	
		LO	J30-E5	J30-E4	B4				
	6	HI	J35-H3	J35-H4	C2			530	
		LO	J35-H5	J35-H4	C1				
	7	HI	J30-F3	J30-F4	C4			480	
		LO	J30-F5	J30-F4	C3				
	8	HI	J35-G3	J35-G4	D1			480	
		LO	J35-G5	J35-G4	C5				
	9	HI	J30-G3	J30-G4	D3			550	
		LO	J30-G5	J30-G4	D2				
	10	HI	J35-F3	J35-F4	D5			490	
		LO	J35-F5	J35-F4	D4				
	11	HI	J30-H3	J30-H4	E2			490	
		LO	J30-H5	J30-H4	E1				
	12	HI	J35-E3	J35-E4	E4			440	
		LO	J35-E5	J35-E4	E3				
	13	HI	J30-J3	J30-J4	F1			550	
		LO	J30-J5	J30-J4	E5				
	14	HI	J35-D3	J35-D4	F3			450	
		LO	J35-D5	J35-D4	F2				
	15	HI	J30-K3	J30-K4	F5			460	
		LO	J30-K5	J30-K4	F4				
	16	HI	J35-C3	J35-C4	G2			440	
		LO	J35-C5	J35-C4	P11-G1	4(±3%)VPP	270≤V≤570		mVp-p

See E.O. 40594

J Euyton 8 Jan 82

SIZE	CODE IDENT NO	NUMBER
A	11323	16704

SCALE | REV | SHEET

DATA SHEET NO. 5 OF 22 PARAGRAPH NO. 4.19

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1100

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(4.19)	POST AMPLIFIER TESTS			
2.	Band 2			
2.1	Connect cables between Electronics Module connectors J31 and breakout boxes and between J36 and breakout boxes. Verify that test cable 45 is connected between the EM and the FTP.		✓	(✓)
2.2	Short all unused signal inputs of band 2 to their respective signal returns [(15 of 16 channels X(2 inputs (HI/LO)) = 30 shorts] . Short all signal returns to power return.		✓	(✓)
2.3	Connect P11 and P12 (from the EM) and J11 and J12 Extender cables (from the MUX) into the MUX channel selector box. Select the output channel via the MUX Channel Selector keyboard.		✓	(✓)
2.4	Connect breakout box between EM connector P13 and MUX connector J13. Using the test equipment configuration shown in Figure 4.19, connect the DC Restore Sync. Signal on P13-H3/H4 (breakout box PINS 38 and 39) to the "inhibit" input of the phase splitter and to the triggers of both oscilloscopes.		✓	(✓)
2.5	Execute command: CALIBRATION SHUTTER ON/BACKUP SHUTTER OFF/DC RESTORE NORMAL SELECT.	D	✓	(✓)
	BAND 2 ON.	27	✓	(✓)
	Verify via the CRT that digital			
	WORD B bit 1 = 1.		✓	(✓)
	G bit 2 = 1.		✓	(✓)

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TEST ENGINEER [signature] DATE 8 JAN 82 QA [signature] 1/12/82

E MODULE UNIT TEST

SIZE	CODE IDENT NO	NUMBER
A	11323	16704

SCALE REV SHEET

DATA SHEET NO. 6 OF 22 PARAGRAPH NO. 4.19

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1102

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
2.6	Set the function generator at 1 KHz. Adjust the sinewave so that it is all positive relative to the DC Restore level and it has an amplitude of 4Vp-p out of the postamps.		✓	(✓)
2.7	Record the amplitude of the signal going into the postamps (E.G., 1.2 Vp-p) in the data column of the BAND 2 data table.		✓	(✓)
2.8	Observe both sides of the Differential Signal from each Post Amplifier Channel and verify that the signals are of equal amplitude and 180° out of phase with each other.		✓	(✓)
2.9	After steps 2.2 and 2.6-2.8 have been completed for each channel, execute command:			
	BAND 2 OFF	28	✓	(✓)
	SHUTTERS OFF.	F	✓	(✓)
	Verify via the CRT that digital			
	Word B bit 1 = 0 .		✓	(✓)
	G bit 2 = 0.		✓	(✓)

TEST ENGINEER JGuyton DATE 6JAN'82 QA 1/6/82

DATA SHEET 7 of 22

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PARAGRAPH 4.19.2

BAND	PARAMETER			Input	Signal Ret	Output	Post Amp. output Reference Spec Limit	Spec Limit	Actual Data	Units
-	Nominal Gain 2.6									
	Channel	1	HI	J31-C3	J31-C4	P11-G4	4(+3%)VPP	909<V<1990	~~1500~~ 1230	mVp-p
			LO	J31-C5	J31-C4	G3				
		2	HI	J36-K3	J36-K4	H1			1300	
			LO	J36-K5	J36-K4	G5				
		3	HI	J31-D3	J31-D4	H3			1380	
			LO	J31-D5	J31-D4	H2				
		4	HI	J36-J3	J36-J4	H5			1340	
			LO	J36-J5	J36-J4	H4				
		5	HI	J31-E3	J31-E4	J2			1390	
			LO	J31-E5	J31-E4	J1				
		6	HI	J36-H3	J36-H4	J4			1570	
			LO	J36-H5	J36-H4	J3				
		7	HI	J31-F3	J31-F4	K1			1390	
			LO	J31-F5	J31-F4	J5				
		8	HI	J36-G3	J36-G4	K3			1500	
			LO	J36-G5	J36-G4	K2				
		9	HI	J31-G3	J31-G4	K5			1600	
			LO	J31-G5	J31-G4	K4				
		10	HI	J36-F3	J36-F4	L2			1350	
			LO	J36-F5	J36-F4	L1				
		11	HI	J31-H3	J31-H4	L4			1550	
			LO	J31-H5	J31-H4	L3				
		12	HI	J36-E3	J36-E4	M1			1440	
			LO	J36-E5	J36-E4	L5				
		13	HI	J31-J3	J31-J4	M3			1180	
			LO	J31-J5	J31-J4	M2				
		14	HI	J36-D3	J36-D4	M5			1580	
			LO	J36-D5	J36-D4	M4				
		15	HI	J31-K3	J31-K4	N2			1230	
			LO	J31-K5	J31-K4	N1				
		16	HI	J36-C3	J36-C4	N4			1500	
			LO	J36-C5	J36-C4	P11-N3	4(+3%)VPP	909<V<1990		mVp-p

see ED 4059 107

Guyton 8 JAN '92

SIZE	CODE IDENT NO	NUMBER
A	11323	16706
SCALE	REV	SHEET

DATA SHEET NO. 8 OF 22 PARAGRAPH NO. 4.19

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1100

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
4.19	POST AMPLIFIER TESTS			
3.	Band 3			
3.1	Connect cables between Electronics Module connectors J32 and breakout boxes and between J37 and breakout boxes. Verify that test cable 45 is connected between the EM and the FTP.		✓	(✓)
3.2	Short all unused signal inputs of Band 3 to their respective signal returns [(15 of 16 channels X(2 inputs Hi/LO)) = 30 shorts]. Short all signal returns to power return.		✓	(✓)
3.3	Connect P11 and P12 (from the EM) and J11 and J 12 Extender cables (from the MUX) into the MUX channel selector. Select the output channel via the MUX Channel Selector Keyboard.		✓	(✓)
3.4	Connect breakout box between EM connector P13 and MUX connector J 13. Using the test Equipment Configuration shown in Figure 4.19, connect the DC Restore Sync signal on P13-H3/H4 (breakout box PINS 38 and 39) to the "inhibit" input of the phase splitter and to the triggers of both oscilloscopes.		✓	(✓)
3.5	Execute command:			
	CALIBRATION SHUTTER ON/BACK SHUTTER OFF/DC RESTORE NORMAL SELECT.	D	✓	(✓)
	BAND 3 ON.	29	✓	(✓)
	Verify via the CRT that digital Word B bit 2 = 1.		✓	(✓)
	G bit 2 = 1.		✓	(✓)

TEST ENGINEER [signature] DATE 13 JAN 'Y— QA 2/12/92

M. MODULE UNIT TEST

SIZE	CODE IDENT NO	NUMBER
A	11323	16704

SCALE | REV | SHEET

DATA SHEET NO. 9 OF 22 PARAGRAPH NO. 4.19

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1109

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
3.6	Set the function generator at 1 KHz. Adjust the sinewave so that it is all positive relative to the DC Restore level and it has an amplitude of 4Vp-p out of the postamps.		✓	(✓)
3.7	Record the amplitude of the signal going into the postamps (E.g., 1.2Vp-p) in the data column of the Band 3 data table.		✓	(✓)
3.8	Observe both sides of the Differential Signal from each Post Amplifier Channel and Verify that the signals are of equal amplitude and 180°out of phase with each other.		✓	(✓)
3.9	After steps 3.2 and 3.6-3.8 have been completed for each channel, execute command:			
	BAND 3 OFF	2A	✓	(✓)
	SHUTTERS OFF. Verify via the CRT that digital	F	✓	(✓)
	Word B bit 2 = 0. G bit 2 = 0.		✓	(✓)

TEST ENGINEER [illegible] DATE 13 Jan '82 QA [illegible]

DATA SHEET 10 of 22

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PARAGRAPH 4.19.3

JFG JAN 13 '82

BAND	PARAMETER		Input	Signal Ret	Output	Post Amp Output Reference Spec Limit	Spec Limit	Actual Data	Units
3	Nominal Gain = 3.4								
	Channel 1	HI	J32-C3	J32-C4	P11-P1	4(±3%)VPP	760 ≤V≤ ~~1660~~ 1670	1950	mVp-p
		LO	J32-C5	J32-C4	N5		see CO 4059 A JFG		
	2	HI	J37-K3	J37-K4	P3			~~2200~~ ~~1950~~ JFG	
		LO	J37-K5	J37-K4	P2				
	3	HI	J32-D3	J32-D4	P5			1950	
		LO	J32-D5	J32-D4	P4				
	4	HI	J37-J3	J37-J4	R2			2200	
		LO	J37-J5	J37-J4	R1				
	5	HI	J32-E3	J32-E4	R4			1900	
		LO	J32-E5	J32-E4	R3				
	6	HI	J37-H3	J37-H4	S1			2000	
		LO	J37-H5	J37-H4	R5				
	7	HI	J32-F3	J32-F4	S3			1900	
		LO	J32-F5	J32-F4	S2				
	8	HI	J37-G3	J37-G4	S5			2100	
		LO	J37-G5	J37-G4	S4				
	9	HI	J32-G3	J32-G4	T2			1950	
		LO	J32-G5	J32-G4	T1				
	10	HI	J37-F3	J37-F4	T4			2200	
		LO	J37-F5	J37-F4	T3				
	11	HI	J32-H3	J32-H4	U1			1950	
		LO	J32-H5	J32-H4	T5				
	12	HI	J37-E3	J37-E4	U3			1950	
		LO	J37-E5	J37-E4	U2				
	13	HI	J32-J3	J32-J4	U5			1950	
		LO	J32-J5	J32-J4	U4				
	14	HI	J37-D3	J37-D4	V2			2400	
		LO	J37-D5	J37-D4	V1				
	15	HI	J32-K3	J32-K4	V4			1850	
		LO	J32-K5	J32-K4	V3				
	16	HI	J37-C3	J37-C4	W1			2200	
		LO	J37-C5	J37-C4	P11-V5	4(±3%)VPP	760≤V≤1660 mVp-p		mVp-p

JKuyper 13 JAN '82 1/12/82

SIZE	CODE IDENT NO	NUMBER
A	11323	16704

SCALE | REV 2 | SHEET 34

FORM NO 3-22 A S 891 DIETERICH POST CLEARPRINT 300M

DATA SHEET NO. 11 OF 22 PARAGRAPH NO. 4.19

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1100

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(4.19)	POST AMPLIFIER TESTS.			
4.	Band 4			
4.1	Connect cables between Electronics Module connectors J33 and breakout boxes and between J38 and breakout boxes. Verify that test cable 45 is connected between the EM and the FTP.		✓	(✓)
4.2	Short all unused signal inputs of Band 4 to their respective signal returns (15 of 15 channels X(2 inputs (HI/LO)) = 30 shorts . Short all signal returns to power return.		✓	(✓)
4.3	Connect P11 and P12 (from the EM) and J11 and J12 extender cable (from the MUX) into the MUX Channel Selector box. Select the output channel via the MUX Channel Selector keyboard.		✓	(✓)
4.4	Connect breakout box between EM connector P13 and MUX connector J13. Using the test Equipment Configuration shown in Figure 4.19, connect the DC Restore Sync Signal on P13-H3/H4 (breakout box pins 38 and 39) to the "inhibit" input of the phase splitter and to the triggers of both oscilloscopes.		✓	(✓)
4.5	Execute command:			
	CALIBRATION SHUTTER ON/BACKUP SHUTTER OFF/DC RESTORE NORMAL SELECT.	D	✓	(✓)
	BAND 4 ON.	2B	✓	(✓)
	Verify via the CRT that digital			
	Word B bit 3 = 1.		✓	(✓)
	G bit 2 = 1.		✓	(✓)

TEST ENGINEER J Gaston DATE 6 JAN 82 QA 2/7/82

E.M. MODULE UNIT TEST

SIZE	CODE IDENT NO	NUMBER
A	11323	16704

SCALE | REV | SHEET

DATA SHEET NO. 12 OF 22 PARAGRAPH NO. 4.19

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1100

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
4.6	Set the function generator at 1 KHz. Adjust the sinewave so that it is all positive relative to the DC Restore level and it has an amplitude of 4Vp-p out of the postamps.		✓	(✓)
4.7	Record the amplitude of the signal going into the postamps (E.g., 1.2 Vp-p) in the data column of the Band 4 data table.		✓	(✓)
4.8	Observe both sides of the Differential Signal from each Post Amplifier Channel and verify that the signals are of equal amplitude and 180° out of phase with each other.		✓	(✓)
4.9	After steps 4.2 and 4.6-4.8 have been completed for each channel, execute command:			
	BAND 4 OFF.	2C	✓	(✓)
	SHUTTERS OFF.	F	✓	(✓)
	Verify via the CRT that digital			
	Word B bit 3 = 0.		✓	(✓)
	G bit 2 = 0.		✓	(✓)

TEST ENGINEER J Curtin DATE 8 JAN '82 QA [illegible]

E.M. MODULE UNIT TEST | SIZE A | CODE IDENT NO. 11323 | NUMBER 16704 | SCALE | REV 1 | SHEET 3 of

DATA SHEET 13 of 22

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PARAGRAPH 4.19.4

BAND	PARAMETER		Input	Signal Ret	Output	Post Amp. output Reference Spec Limit	Post Amp. input Spec Limit	Actual Data	Units
4	Nominal Gain = 1.5								
	Channel 1	HI	J33-C3	J33-C4	P12-A2	4(+3%)VPP	~~1600<V<3630~~ 912 ~~to 50 4059~~	1750	mVp-p
		LO	J33-C5	J33-C4	A1				
	2	HI	J38-K3	J38-K4	A4			1700	
		LO	J38-K5	J38-K4	A3				
	3	HI	J33-D3	J33-D4	B1			1750	
		LO	J33-D5	J33-D4	A5				
	4	HI	J38-J3	J38-J4	B3			1500	
		LO	J38-J5	J38-J4	B2				
	5	HI	J33-E3	J33-E4	B5			1950	
		LO	J33-E5	J33-E4	B4				
	6	HI	J38-H3	J38-H4	C2			1750	
		LO	J38-H5	J38-H4	C1				
	7	HI	J33-F3	J33-F4	C4			2000	
		LO	J33-F5	J33-F4	C3				
	8	HI	J38-G3	J38-G4	D1			1750	
		LO	J38-G5	J38-G4	C5				
	9	HI	J33-G3	J33-G4	D3			1650	
		LO	J33-G5	J33-G4	D2				
	10	HI	J38-F3	J38-F4	D5			1750	
		LO	J38-F5	J38-F4	D4				
	11	HI	J33-H3	J33-H4	E2			1750	
		LO	J33-H5	J33-H4	E1				
	12	HI	J38-E3	J38-E4	E4			1600	
		LO	J38-E5	J38-E4	E3				
	13	HI	J33-J3	J33-J4	F1			1650	
		LO	J33-J5	J33-J4	E5				
	14	HI	J38-D3	J38-D4	F3			1650	
		LO	J38-D5	J38-D4	F2				
	15	HI	J33-K3	J33-K4	F5			1610	
		LO	J33-K5	J33-K4	F4				
	16	HI	J38-C3	J38-C4	G2			1720	
		LO	J38-C5	J38-C4	P12-G1	4 (±3%) VPP	1600<V<3630		mVp-p

J Guyton 8 JAN '87

SIZE	CODE IDENT NO	NUMBER
A	11323	16704

SCALE	REV	SHEET
		37

FORM NO 3132 A 3 291 DIETERICH POST CLEARPRINT 1000H

DATA SHEET NO. 14 OF 22 PARAGRAPH NO. 4.19

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1100

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(4.19)	POST AMPLIFIER TESTS.			
5.	Band 5			
5.1	Connect cables between Electronics Module connectors J41 and breakout boxes. Verify that test cable 45 is connected between the EM and the FTP.		ORIGINAL PAGE IS OF POOR QUALITY	
5.2	Short all unused signal inputs of Band 5 to their respective signal returns (15 of 16 channels X(2 inputs (HI/LO))= 30 shorts / Short all signal returns to power return.			
5.3	Connect P11 and P12 (from the EM) and J11 and J12 Extender cables (from the MUX) into the MUX channel selector box. Select the output channel via the MUX channel selector keyboard.		✓	(✓)
5.4	Connect breakout box between EM connector P13 and MUX connector J13. Using the test Equipment configuration shown in Figure 4.19, connect the DC Restore Sync signal on P13-H3/H4 (breakout box pins 38 and 39) to the "inhibit" input of the phase splitter and to the triggers of both oscilloscopes.		✓	(✓)
5.5	Execute command:			
	CALIBRATION SHUTTER ON/BACKUP SHUTTER OFF/DC RESTORE NORMAL SELECT.	D	✓	(✓)
	BAND 5 ON.	2D	✓	(✓)
	Verify via the CRT that digital			
	Word B bit 4 = 1.		✓	(✓)
	G bit 2 = 1.		✓	(✓)

TEST ENGINEER Guyton DATE 28 JAN'82 QA 2/3/82

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO. 11323	NUMBER 16704
	SCALE	REV 2	SHEET 33

DATA SHEET NO. 15 OF 22 PARAGRAPH NO. 4.19

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1100

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
5.6	Set the function generator at 1KHz. Adjust the sinewave so that it is all positive relative to the DC Restore level and it has an amplitude of 4Vp-p out of the postamps.		✓	(✓)
5.7	Record the amplitude of the signal going into the postamps (E.g., 1.2 Vp-p) in the data column of the Band 5 data table.		✓	(✓)
5.8	Observe both sides of the Differential Signal from each Postamplifier channel and verify that the signals are of equal amplitude and 180° out of phase with each other.		✓	(✓)
5.9	After steps 5.2 and 5.6-5.8 have been completed for each channel, execute command:			
	BAND 5 OFF.	2E	✓	(✓)
	SHUTTERS OFF.	F	✓	(✓)
	Verify via the CRT that digital			
	Word B bit 4 = 0.		✓	(✓)
	G bit 2 = 0.		✓	(✓)

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TEST ENGINEER [illegible] DATE 29 Oct 82 QA 2/3/82

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PARAGRAPH 4.19.5

BAND	PARAMETER			Input	Signal Ret	Output	Post Amp Output Reference Spec Limit	Post Amp Input Spec Limit	Actual Data	Units
5	Nominal Gain = 24									
	Channel	1	HI	J41-W1	J41-P4	P12-G4	±(±3%)Vpp	110≤V≤360 mVp-p	150	mVp-p
			LO	W2		G3				
		2	HI	W4		H1			120	
			LO	W5		G5				
		3	HI	V3		H3			120	
			LO	W3		H2				
		4	HI	U4		H5			120	
			LO	U5		H4				
		5	HI	T1		J2			120	
			LO	T2		J1				
		6	HI	R4		J4			120	
			LO	R5		J3				
		7	HI	T3		K1			120	
			LO	U3		J5				
		8	HI	T4		K3			120	
			LO	T5		K2				
		9	HI	S1		K5			120	
			LO	S2		K4				
		10	HI	S3		L2			120	
			LO	R3		L1				
		11	HI	R1		L4			120	
			LO	P1		L3				
		12	HI	N1		M1			120	
			LO	N2		L5				
		13	HI	M1		M3			120	
			LO	L1		M2				
		14	HI	M4		M5			120	
			LO	N4		M4				
		15	HI	L3		N2			120	
			LO	M3		N1				
		16	HI	L4		N4			120	
			LO	J41-L5	J41-P4	P12-N3	±(±3%)Vpp	110≤V≤360 mVp-p		mVp-p

J Guyton 29 Jan '8– 3/4/81

SIZE	CODE IDENT NO	NUMBER
A	11323	16704
SCALE	REV	SHEET

FORM NO 2122 DIETERICH POST CLEARPRINT 1000H

DATA SHEET NO. 17 OF 22 PARAGRAPH NO. 4.19

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 150

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
4.19	POST AMPLIFIER TEST.			
6.	Band 6			
6.1	Connect cables between Electronics Module connectors J40 and breakout boxes. Verify that test cable 45 is connected between the EM and the FTP.		✓	(✓)
6.2	Short all unused signal inputs of Band 1 to their respective signal returns (3 of 4 channels X(2 inputs (HI/LO)) = 6 shorts Short all signal returns to power return.			
6.3	Connect P11 and P12 (from the EM)and J11 and J12 Extender cables (from the MUX) into the MUX Channel Selector box. Select the output channel via the MUX Channel keyboard.		✓	(✓)
6.4	Connect breakout box between EM connector P13 and MUX connector J13. Using the test Equipment Configuration shown in Figure 4.19, connect the DC Restore Sync signal on P13-H3/H4 (breakout box PINS 38 and 39) to the "inhibit" input of the phase splitter and to the triggers of both oscilloscopes.		✓	(✓)
6.5	Execute command:			
	CALIBRATION SHUTTER ON/BACKUP SHUTTER OFF/DC RESTORE NORMAL SELECT.	D	✓	(✓)
	BAND 6 ON.	2F	✓	(✓)
	DC RESTORE ON.	3E	✓	(✓)
	Verify via the CRT that digital Word 3 bit 5 = 1.		✓	(✓)
	G bit 2 = 1.		✓	(✓)
	L bit 0 = 1.		✓	(✓)

TEST ENGINEER [signature] DATE 1/20/82 QA [signature] 1/21/82

E.M. MODULE UNIT TEST

SIZE	CODE IDENT NO	NUMBER
A	11323	16704

SCALE | REV | SHEET

DATA SHEET NO. 18 OF 22 PARAGRAPH NO. 4.19

DETAILED FUNCTIONAL TESTS

LOG AHR OPER/500

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
6.6	Set the function generator at 1KHz. Adjust the sinewave so that it is all positive relative to the DC Restore level and it has an amplitude of 4Vp-p out of the postamps.		✓	(✓)
6.7	Record the amplitude of the signal going into the postamps (E.g., 1.2 Vp-p) in the data column of the Band 6 data table.		✓	(✓)
6.8	Observe both sides of the Differential Signal from each Postamplifier channel and verify that the signals are of equal amplitude and 180° out of phase with each other.		✓	(✓)
6.9	After steps 6.2 and 6.6-6.8 have been completed for each channel, execute command:			
	SHUTTERS OFF	F	✓	(✓)
	BAND 6 OFF	30	✓	(✓)
	DC RESTORE OFF/TELEMETRY SCALING OFF.	6	✓	(✓)
	Verify via the CRT that digital Word B bit 5 = 0.		✓	(✓)
	G bit 2 = 0.		✓	(✓)
	L bit 0 = 0.		✓	(✓)

TEST ENGINEER R A Barnes DATE 1/22/82 QA 1/15/82

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO 11323	NUMBER 16704
	SCALE	REV	SHEET

DATA SHEET 19 of 22

PARAGRAPH 4.19.6

BAND	PARAMETER		Input	Signal Ret	Output	Post Amp Output Reference Spec Limit	Post Amp Input Spec Limit	Actual Data	Units
6	Nominal Gain = 20								
	Channel 1	HI	J40-M1	J40-J1	P11-W3	4 (±3%) VPP	25≤V≤250 mVp-p	200	mVp-p
		LO	N1		W2			200	
	2	HI	M2		W5			200	
		LO	N2		P11-W4			200	
	3	HI	M3		P12-W3			200	
		LO	N3		W2			200	
	4	HI	M4		W5			200	
		LO	J40-N4	J40-J1	P12-W4	4 (±3%) VPP	25≤V≤250 mVp-p	200	mVp-p

Branch 3/84
1/23/82

SIZE	CODE IDENT NO	NUMBER
A	11323	54-01
SCALE	REV	SHEET

DATA SHEET NO. 20 OF 22 PARAGRAPH NO. 4.19

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1100

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(4.19)	POST AMPLIFIER TESTS.			
7.	Band 7			
7.1	Connect cables between Electronics Module connectors J42 and breakout boxes. Verify that test cable 45 is connected between the EM and the FTP.		✓	(✓)
7.2	Short all unused signal inputs of Band 7 to their respective signal returns [(15 of 16 channels X(2 inputs (Hi/LO)) = 30 shorts]. Short all signal returns to power return.			
7.3	Connect P11 and P12 (from the EM) and J11 and J12 Extender cables (from the MUX) into the MUX Channel Selector Box. Select the output channel via the MUX Channel Selector Keyboard.		✓	(✓)
7.4	Connect a breakout box between EM connector P13 and MUX connector J13. Using the test equipment configuration shown in Figure 4.19, connect the DC Restore Sync signal on P13-H3/H4 (break out box PINS 38 and 39) to the "inhibit" input of the phase splitter and to the triggers of both oscilloscopes.		✓	(✓)
7.5	Execute command: CALIBRATION SHUTTER ON/BACKUP SHUTTER OFF/DC RESTORE NORMAL SELECT.	D	✓	(✓)
	BAND 7 ON.	31	✓	(✓)
	Verify via the CRT that digital Word 3 bit 6 = 1.		✓	(✓)
	G bit 2 = 1.		✓	(✓)

TEST ENGINEER [signature] DATE 29 Jan 87 QA [signature] 2/2/87

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO 11323	NUMBER 16704
	SCALE	REV C	SHEET --

DATA SHEET NO. 21 OF 22 PARAGRAPH NO. 4.19

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1100

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
7.6	Set the function generator at 1KHz. ORIGINAL PAGE IS OF POOR QUALITY Adjust the sinewave so that it is all positive relative to the DC Restore level and it has an amplitude of 4Vp-p out of the postamps.		✓	(✓)
7.7	Record the amplitude of the signal going into the postamps (E.G., 1.2Vp-p) in the data column of the Band 7 data table.		✓	(✓)
7.8	Observe both sides of the Differential Signal from each Postamplifier channel and verify that the signals are of equal amplitude and 180° out of phase with each other.		✓	(✓)
7.9	After steps 7.2 and 7.6-7.8 have been completed, execute command:			
	BAND 7 OFF.	32	✓	(✓)
	SHUTTERS OFF.	F	✓	(✓)
	Verify via the CRT that digital			
	Word B bit 6 = 0.		✓	(✓)
	G bit 2 = 0.		✓	(✓)

TEST ENGINEER [signature] DATE 28 JAN 82 QA 2/3/82

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO 11323	NUMBER 16704
	SCALE	REV C	SHEET 5

FORM NO. 3132 1 A-5 69 DIETERICH POST CLEARPRINT COPY

DATA SHEET 22 of 22

PARAGRAPH 4.19.7

BAND	PARAMETER Nominal Gain = 26		Input	Signal Ret	Output	Post Amp Output Reference Spec Limit	Post Amp Input Spec Limit	Actual Data	Units
7	Channel 1	HI	J42-W1	J42-P4	P12-P1	4 (±3%) Vpp	90≤V≤300 mVp-p	120	mVp-p
		LO	W2		N5				
	2	HI	W4		P3			120	
		LO	W5		P2				
	3	HI	V3		P5			120	
		LO	W3		P4				
	4	HI	U4		R2			120	
		LO	U5		R1				
	5	HI	T1		R4			120	
		LO	T2		R3				
	6	HI	R4		S1			120	
		LO	R5		R5				
	7	HI	T3		S3			120	
		LO	U3		S2				
	8	HI	T4		S5			120	
		LO	T5		S4				
	9	HI	S1		T2			120	
		LO	S2		T1				
	10	HI	S3		T4			120	
		LO	R3		T3				
	11	HI	R1		U1			120	
		LO	P1		T5				
	12	HI	N1		U3			120	
		LO	N2		U2				
	13	HI	M1		U5			120	
		LO	L1		U4				
	14	HI	M4		V2			120	
		LO	N4		V1				
	15	HI	L3		V4			120	
		LO	M3		V3				
	16	HI	L4		W1				
		LO	J42-L5	J42-P4	P12-V5	4 (±3%) Vpp	90≤V≤300 mVp-p	120	mVp-p

SIZE	CODE IDENT NO	NUMBER
A	11323	16704

SCALE | REV 2 | SHEET 2

FORM NO 3122 A 3 OF DIETERICH POST CLEARPRINT 0004

DATA SHEET NO. 1 OF 24 PARAGRAPH NO. 4.23

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1800

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(4.23)	POWER SUPPLY HANDSHAKE			
1.	Remove PWB's A01 - A22, observing proper handling and record-keeping procedures.		✓	(✓)
	Verify that power distribution cables TJ46 and TJ47 are disconnected from the electronics module.			
2.	Install breakout boxes between the power supply and module connectors J46/P46 (Boxes 1,2) and		✓	(✓)
	J47/P47 (Boxes 3,4).		✓	(✓)
	Connect Bus Power Supply cable TPS 1 to power supply connector J19.		✓	(✓)
	Execute commands:			
	POWER SUPPLY 1 OFF.	3A TM-58	✓	(✓)
	POWER SUPPLY 2 OFF.	3B TM 59	✓	(✓)
	Turn on Bus Power at HP62743 power supply circuit breaker within the test set.		✓	(✓)
3.	Using a DVM verify at the breakout boxes that the cooler door parasitic load is in the system and measures 90(±3) ohm. Measure at:			
	(+) Rtn			
	P46-L4,M4 (Box 1-54,59) P46-L5,M5 (Box 1-55,60)	90(±3)	89.6	ohms
	P46-N4,P4 (Box 2-3,8) P46-N5,P5 (Box 2-4,9)	90(±3)	89.4	ohms
4.	Non-Synchronous Mode-Redundant			
4.1	Verify that the Power Converter Sync Backup lines at P46-U5,V5 (Box 2-29,34) are switched open.		✓	(✓)
4.2	Execute commands:			
	POWER SUPPLY 2 ON.	2 TM 62	✓	(✓)
	MULTIPLEXER OFF (P/S 2).	3D TM 62	✓	(✓)
	THERMAL SHUTDOWN ENABLED.	4 TM 62	✓	(✓)

TEST ENGINEER Enoch DATE 2/13/82 QA

	SIZE	CODE IDENT NO	NUMBER
E.M. MODULE UNIT TEST	A	11323	16704
	SCALE	REV	SHEET 2.0

FORM NO 3122 1 A 3 69 DIETERICH POST CLEARPRINT 000M

DATA SHEET NO. 2 OF 24 PARAGRAPH NO. 4.23

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1400

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
4.3	Verify that the voltage across the parasitic load (see para. 4.23.3) is 30 ±3.0 vdc.	30(±3.0)	31.40	vdc
4.4	Execute command: MULTIPLEXER ON (P/S 2)	3C TM 60	✓	(✓)
5	Synchronous Mode-Redundant			
5.1	Execute command: POWER SUPPLY 2 OFF.	3B TM 57	✓	(✓)
5.2	Close Power Converter Sync Backup lines at P46-U5,V5. (Box 2-29/34)		✓	(✓)
5.3	Execute command: POWER SUPPLY 2 ON.	2	✓	(✓)
5.4	Verify multiplexer 208(±6)kHz period TTL sync signal at P46-U5/V5 (Box 2-29/34)	208±6	208	kHz
5.5	Verify sync mode by observing ripple at sync carrier frequency at the Multiplexer +30v waveform output on P46-T1,V1 (Box 2-20,30)		✓	(✓)
5.6	Execute commands: MULTIPLEXER OFF (P/S 2). POWER SUPPLY 2 OFF.	3D TM 61 3B TM 57	✓ ✓	(✓) (✓)
5.7	TURN OFF BUS POWER at HP62743 power supply.		✓	(✓)
5.8	Disconnect Bus Power Supply cable TPS1 from power-supply connector J19.		✓	(✓)
5.9	Connect Bus Power Supply cable TPS1 to power-supply connector J18.		✓	(✓)
5.10	TURN ON BUS POWER at HP62743 power supply.		✓	(✓)

TEST ENGINEER Bench DATE 2/13/82 QA

	SIZE	CODE IDENT NO	NUMBER
C.M. MODULE UNIT TEST	A	11323	16704
	SCALE	REV C	SHEET 21

FORM NO 3122 - A S-681 DIETERICH-POST CLEARPRINT 5004

DATA SHEET NO. 3 OF 29 PARAGRAPH NO. 4.23

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1800

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
6.	Non-Synchronous Mode - Primary			
6.1	Verify that the Power Converter Sync lines at P46-R5,S5 (Box 2-14,19) are switched open.		✓	(✓)
6.2	Execute commands: POWER SUPPLY 1 ON. MULTIPLEXER OFF (P/S 1)	1 8	✓ ✓	(✓) (✓)
6.3	Verify that the voltage across the parasitic load (see para. 4.23.3) is 30(±3)vdc	30(±3)	30.84	vdc
6.4	Execute command: MULTIPLEXER ON (P/S 1)	5	✓	(✓)
6.5	Verify that the voltage across multiplexer power pins P46-T1,V1 (Box 2-20,30) reads 30(±3.9)vdc.	30(±3.9)	29.54	vdc
6.6	Execute command: POWER SUPPLY 1 OFF.	3A	✓	(✓)
7.0	Synchronous Mode - Primary			
7.1	Close Power Converter Sync lines at P46-R5,S5 (Box 2-14,19).		✓	(✓)
7.2	Execute command: POWER SUPPLY 1 ON.	1	✓	(✓)
7.3	Verify multiplexer 208 (±6) kHz period TTL sync signal at P46-R5/S5.	208±6	✓	kHz
7.4	Verify sync mode by observing ripple at sync carrier frequency at the multiplexer +30v waveform output on P46-T1,V1 (Box 2-20,30).		✓	(✓)

TEST ENGINEER Branch DATE 2/13/82 QA

E.M. MODULE UNIT TEST

SIZE	CODE IDENT NO	NUMBER
A	11323	16704

SCALE | REV C | SHEET 12

DATA SHEET NO. 4 OF [illegible] PARAGRAPH NO. 4.23

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 420

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
7.5	Verify that all power forms are present. (Table 3.4B) Note that unloaded power forms can be as much as +40% from nominally defined reference values as shown in Table 3.4B.		✓	✓
7.6	Execute command: POWER SUPPLY 1 OFF.	3A 5m·5%	✓	✓
7.7	TURN OFF BUS POWER at HP62743 power supply.		✓	✓
8.0	Setup for Application of Electronic Loads to Power Supply			
8.1	Install all PWB's.		✓	✓
8.2	Add the following load simulation resistors to the breakout box at tip jacks away from power supply (white jacks).			

Load Nomenclature	Value (ohm) (5%)	Breakout Box Jacks From	To	
SMA +28v	240, ½W	1-1, 1-2	1-~~8~~ 6	✓ ✓
SMA -28v	240, ½W	1-11, 1-12	1-~~8~~ 7	✓ ✓
SMA +7v	2.8, 20W	1-16, 1-21	1-17, 1-22	✓ ✓
		1-26, 1-31	1-27, 1-32	✓ ✓
Band 1, +19v PreAmps	360, 2W	3-1	3-2	✓ ✓
Band 1, -19v PreAmps	360, 2W	3-8	3-7	✓ ✓
Band 2, +19v PreAmps	360, 2W	3-11	3-12	✓ ✓
Band 2, -19v PreAmps	360, 2W	3-18	3-17	✓ ✓
Band 3, +19v PreAmps	360, 2W	3-21	3-22	✓ ✓
Band 3, -19v PreAmps	360, 2W	3-28	3-27	✓ ✓
Band 4, +19v PreAmps	360, 2W	3-31	3-32	✓ ✓
Band 4, -19v PreAmps	360, 2W	3-38	3-37	✓ ✓
Band 5/7, +19v PreAmps	360, 2W	3-41	3-42	✓ ✓
Band 5/7, -19v PreAmps	360, 2W	3-48	3-47	✓ ✓
Band 6, +19v PreAmps	360, 2W	3-51	3-56	✓ ✓
Band 6, -19v PreAmps	360, 2W	3-61	3-57	✓ ✓

TEST ENGINEER Bench DATE 2/13/82 QA

E.M. MODULE UNIT TEST

SIZE	CODE IDENT NO	NUMBER
A	11323	16704

SCALE | REV | SHEET 3 3

DATA SHEET NO. 5 OF 24 PARAGRAPH NO. 4.23

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1800

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
8.3	Open the following Breakout Box switches to initially disconnect all Electronic Module loads from the Power Supply.			
	Nomenclature — Breakout Box Switch			
	SMA +28v — 1-1		/	VDC
	SMA +28v — 1-2		/	VDC
	80v — 1-3		/	VDC
	+8.5v — 1-5		/	VDC
	80v — 1-8		/	VDC
	+8.5v — 1-10		/	VDC
	SMA -28v — 1-11		/	VDC
	SMA -28v — 1-12		/	VDC
	+8v CDVU — 1-14		/	VDC
	+8v CDVU — 1-19		/	VDC
	SMA +7v — 1-21, 1-16		/	VDC
	SMA +7v — 1-26, 1-31		/	VDC
	+21v — 1-29		/	VDC
	+21v — 1-30		/	VDC
	-21v — 1-39		/	VDC
	-21v — 1-40		/	VDC
	+33v — 1-44		/	VDC
	+33v — 1-49		/	VDC

TEST ENGINEER Smith DATE 2/17/82 QA

	SIZE	CODE IDENT NO	NUMBER
E.M. MODULE UNIT TEST	A	11323	16704
	SCALE	REV	SHEET

DATA SHEET NO. 6 OF 24 PARAGRAPH NO. 4.23

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1800

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
8.3	Nomenclature — Breakout Box switches to be opened			
	Band 1 +19V — 3-1, 3-6		/	(✓)
	Band 1 -19V — 3-3, 3-8		/	(✓)
	Band 2 +19V — 3-11, 3-16		/	(✓)
	Band 2 -19V — 3-13, 3-18		/	(✓)
	Band 3 +19V — 3-21, 3-26		/	(✓)
	Band 3 -19V — 3-23, 3-28		/	(✓)
	Band 4 +19V — 3-31, 3-36		/	(✓)
	Band 4 -19V — 3-33, 3-38		/	(✓)
	Band 5/7 +19V — 3-41, 3-46		/	(✓)
	Band 5/7 -19V — 3-43, 3-48		/	(✓)
	Band 6 +19V — 3-51, 3-52		/	(✓)
	Band 6 -19V — 3-61, 4-1		/	(✓)
	Multiplexer 30V — 2-20, 2-21, 2-22, 2-23, 2-25, 2-26, 2-27, 2-28		/	(✓)
8.4	Turn on bus power at HP62745 power supply		✓	(✓)
9.0	SEQUENTIAL ELECTRONICS LOAD APPLICATION TO SIMULATE PICTURE MODE OF OPERATION.			
9.1	Jumper across multiplexer 30V input breakout box jacks 2-20, 2-21, 2-22 and 2-23. Attach current probe around jumpers in order to measure transient and steady state load currents.		✓	(✓)
			✓	(✓)
9.2	Execute commands: Power Supply 1 multiplexer ON	5	✓	(✓)
	Power Supply 1 ON	1	✓	(✓)
	Photograph Transient Multiplexer Turn On Current.		✓	(✓)
	Measure steady state multiplexer current 4.0 (±0.4) amps	4.0 (±0.4)	4.0	Amps

TEST ENGINEER [signature] DATE 10 FEB 82 QA [signature]

E.M. MODULE UNIT TEST

SIZE	CODE IDENT NO	NUMBER
A	11323	16704

SCALE | REV | SHEET 6 of 24

FORM NO 3132 A 3 PAT. DIETERICH-POST CLEARPRINT 0004

DATA SHEET NO. 7 OF 24 PARAGRAPH NO. 4.2.3

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1805

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
9.2	Measure steady state multiplexer voltage at 2-20 ret 2-30	30.0(±3.9)	29.6	VOLTS ~~AMPS~~
	Execute Command: Power Supply 1 Multiplexer OFF	8 TM-5?	✓	(✓)
	Photograph transient Multiplexer turn off current		✓	(✓)
	Execute Command: Power supply 1 Multiplexer ON	5 TM-5?	✓	(✓)
	Photograph transient multiplexer turn ON Current from initial condition of power supply ON.			
	Execute Command: Power Supply 1 OFF	3A TM-5?	✓	(✓)
9.3	Remove jumpers and current probe and close switches 2-20, 2-21, 2-22, 2-23, 2-25, 2-26, 2-27, 2-28.			
	Jumper across SMA +7V input breakout box jacks on electronics module side of the switches.		✓	(✓)
	Verify that 2.3Ω load is across breakout box jacks on electronics module side of the switches.		✓	(✓)
	Attach current probe around jumpers in order to measure transient load current.		✓	(✓)

TEST ENGINEER [signature] DATE 11 FEB 87 QA [signature]

E.M. MODULE UNIT TEST | SIZE A | CODE IDENT NO 11323 | NUMBER 16704 | SCALE | REV | SHEET 2 of 6

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DATA SHEET NO. 8 OF 24 PARAGRAPH NO. 4.23

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1600

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
9.4	Execute Command: Power Supply 1 ON	1	✓	(✓)
	Photograph transient +7V turn on current		✓	(✓)
	Measure steady state SMA +7V voltage	7.0(±1.0)	7.7	VDC
	Execute Command: Power supply 1 OFF	3A Tol 5R	✓	(✓)
	Photograph transient +7V OFF current at power supply shutdown		✓	(✓)
9.5	Remove jumpers and current probe and close switches 1-16, 1-21, 1-26, 1-31.		✓	(✓)
	Jumper across SMA ±28V Input breakout box jacks 1-1, 1-2, 1-11, 1-12.		✓	(✓)
	Attach current probe around jumpers across jacks 1-1 and 1-2 in order to measure SMA +28V transient load current.		✓	(✓)
9.6	Execute Command: Power Supply 1 ON	1	✓	(✓)
	Photograph transient SMA +28V turn on current		✓	(✓)
	Measure steady state SMA +28V see ECO 4159A	28<V<31 ~~29<V<30.5~~	30.9 ~~31.2~~	VDC
	Execute Command: Power supply 1 OFF	3A Tol 5R	✓	(✓)

TEST ENGINEER [signature] DATE 14 FEB 92 QA [signature]

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO 11323	NUMBER 16704
	SCALE	REV 2	SHEET 2 of 7

FORM NO 3122 1 A 5 69 DIETERICH-POST CLEARPRINT 200M

DATA SHEET NO. 9 OF 24 PARAGRAPH NO. 4.23

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 180

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
	Photograph transient SMA +28V turn OFF current.		✓	(✓)
9.7	Remove current probe from around jumpers across jacks 1-1 and 1-2. Attach current probe around jumpers across jacks 1-11 and 1-12 in order to measure SMA -28V transient load current.		✓	(✓)
9.8	Execute Command: Power Supply 1 ON	1 Table	✓	(✓)
	Photograph transient SMA -28V turn ON current		✓	(✓)
	Measure steady state SMA -28V see ED 4159A	-31 > V > -31 ~~-28 ≥ V ≥ -30.5~~	-30.9	VDC
	Execute Command: Power Supply 1 OFF	3A Table	✓	(✓)
	Photograph transient SMA -28V turn OFF current.		✓	(✓)
9.9	Remove jumpers and current probe and close switches 1-1, 1-2, 1-11, 1-12.			
	Jumper across CDVU +8V input breakout box jacks 1-14, 1-19.		✓	(✓)
	Attach current probe around jumpers across jacks 1-14, 1-19 in order to measure CDVU +8V transient load current.		✓	(✓)

TEST ENGINEER Gunton DATE 10 FEB 86 QA

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO 11323	NUMBER 16704
	SCALE	REV	SHEET 9

DATA SHEET NO. 10 OF 24 PARAGRAPH NO. 4.2.3

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1800

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
9.10	Execute Commands:			
	Macrodiscrete command generator A primary ON	35 TM 53	✓	(✓)
	Macrodiscrete command generator B primary ON	37 TM 55	✓	(✓)
	Serial Command receiver 1 ON	33 TM 51	✓	(✓)
	Power supply 1 ON	1 TM 01	✓	(✓)
	Photograph transient CDVU turn on current		✓	(✓)
	Measure steady state CDVU +8V current		.64	Amps
	Measure steady state CDVU +8V voltage	8.0(±0.8)	7.45	VDC
	Verify on CRT that digital Word F bit 2=1		✓	(✓)
	Word F bit 4=1		✓	(✓)
	Word A bit 4=1		✓	(✓)
	Execute Command: Power supply 1 OFF	3A TM 59	✓	(✓)
	Photograph transient CDVU turn OFF current.		✓	(✓)
9.11	Remove jumpers and current probe and close switches 1-14 (5) and 1-19 (3).		✓	(✓)
	Jumper across radiometer +8V input breakout box jacks 1-5 (14), 1-10 (17)		✓	(✓)
	Jumper across analog +21V input breakout box jacks 1-29, 1-30 and across analog -21V input breakout box jacks 1-39, 1-40.		✓	(✓)

TEST ENGINEER [signature] DATE 14 FEB 84 QA [signature]

E.M. MODULE UNIT TEST | SIZE A | CODE IDENT NO 11323 | NUMBER 16704 | SCALE | REV | SHEET

FORM NO 3122 A 3 69 DIETERICH-POST CLEARPRINT CCDN

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1800

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
	Jumper across +33V electro Mechanical input breakout box jacks 1-44, 1-49.			
	Attach current probe around jumpers across jacks 1-29, 1-30 in order to measure analog +21V transient load current.		✓	(✓)
	Verify that temperature simulating resistors used in para 4.21.4are still connected at the Function Generator test panel.		✓	(✓)
9.12	Execute Commands:			
	Main calibration Shutter On	D TM 13	✓	(✓)
	DC restore On	3E TM 03	✓	(✓)
	Telemetry Scaling ON	7 TM 7	✓	(✓)
	Calibration Lamp 1 ON	10 TM 16	✓	(✓)
	Calibration Lamp 2 ON	11 TM 17	✓	(✓)
	Calibration Lamp 3 ON	12 [illegible]	✓	(✓)
	Blackbody controller OFF	24 TM 26	✓	(✓)
	Blackbody Controller ON	20 TM 22	✓	(✓)
	CFPA heater/controller OFF	1D TM [illegible]	✓	(✓)
	CFPA controller ON	19 TM 25	✓	(✓)
	Power supply 1 ON	1 TM 01	✓	(✓)
	Scan line corrector ON #1	4A TM 74	✓	(✓)
	Cold Stage controller OFF	59 TM [illegible]	✓	(✓)
	Cold Stage controller ON	58 TM [illegible]	✓	(✓)
	Baffle heater controller OFF	56 TM 55	✓	(✓)
	Baffle heater controller ON	54 TM [illegible]	✓	(✓)
	Intermediate stage heater disabled	47 TM 71	✓	(✓)

TEST ENGINEER [signature] DATE 15 Feb 82 QA [signature]

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO 11323	NUMBER 16704
	SCALE	REV	SHEET

DATA SHEET NO. 12 OF 24 PARAGRAPH NO. 4.2.3

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1800

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
9.12	Intermediate stage heater controller ON	46 TM 70	✓	(✓)
	Power supply 1 OFF	3A TM 57	✓	(✓)
	Photograph transient analog +21 turn OFF current.		✓	(✓)
	Execute Command: Power supply 1 ON	1 TM 01	✓	(✓)
	Photograph transient analog +21V turn on current.		✓	(✓)
	Measure average analog +21V current.		.880	Amps
	Measure steady state analog +21V voltage	21(±2.1)	22.6	VDC
	Verify on CRT that digital Word B bit 7=1		✓	(✓)
	Word D bits 0,1,2=1		✓	(✓)
	Word F bit 0=1		✓	(✓)
	Word G bit 0=1		✓	(✓)
	Word G bits 2,3,4=1		✓	(✓)
	Word H bits 0,2,4,7=1		✓	(✓)
	Execute Command: Power Supply 1 OFF	3A TM 57	✓	(✓)

TEST ENGINEER [signature] DATE 15 FEB [illegible] QA [signature]

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO 11323	NUMBER 16704
	SCALE	REV 2	SHEET 22

DATA SHEET NO. 13 OF 24 PARAGRAPH NO. 4.23

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1800

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
	ORIGINAL PAGE IS OF POOR QUALITY		✓	(✓)
9.13	Remove current probe from around jumpers across jacks 1-29, 1-30. Attach current probe around jumpers across jacks 1-39, 1-40 in order to measure analog -21V transient load current.		✓	(✓)
	Execute Command: Power supply 1 ON	1	✓	(✓)
	Photograph transient analog -21V turn ON current.		✓	(✓)
	Measure average analog -21V current		120	mA
	Measure steady state analog -21V voltage	-21(±2.1)	-23.1	VDC
	Execute Command: Power supply 1 OFF	3A [illegible]	✓	(✓)
	Photograph transient analog -21V turn OFF current.		✓	(✓)
9.14	Remove current probe from around jumpers across jacks 1-39, 1-40. Attach current probe around jumpers across jacks at 1-44 and 1-49 in order to measure +33V elect mech transient load current.		✓	(✓)

TEST ENGINEER [illegible] DATE 15 Feb 84 QA [illegible]

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO 11323	NUMBER 16704
	SCALE	REV -	SHEET 2 2

FORM NO 3132 - A 3 69 DIETERICH-POST CLEARPRINT 3CON

DATA SHEET NO. 14 OF 24 PARAGRAPH NO. 4.23

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 180

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
	Execute Command: Power supply 1 ON	1	✓	(✓)
	Photograph transient +33V turn ON current		✓	(✓)
	Measure average +33V current see PHOTO		100	MA
	Measure steady state +33V voltage.	33(±3.3)	34	VDC
	Execute Command: Power supply 1 OFF	3A T-57	✓	(✓)
	Photograph transient +33V turn OFF current.		✓	(✓)
.15	Remove current probe from around jumpers across jacks 1-44, 1-49. Attach current probe around jumpers across jacks 1-47, 1-19 in order to measure +8V radiometer transient load current.		✓	(✓)
9.15	Execute Command: Power supply 1 ON	1	✓	(✓)
	Photograph transient +8V RAD turn ON current.		✓	(✓)
	Measure steady state +8V RAD current		200	MA
	Measure steady state +8V RAD voltage	8.5(±0.85)	8.80	VDC
	Execute Command: Power supply 1 OFF	3A T-62	✓	(✓)
	Photograph transient +8V RAD turn OFF current		✓	(✓)

TEST ENGINEER [signature] DATE 15 FEB 85 QA

E.M. MODULE UNIT TEST

SIZE	CODE IDENT NO	NUMBER
A	11323	16704

SCALE | REV | SHEET 223

DATA SHEET NO. 15 OF 24 PARAGRAPH NO. 4.23

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 18D

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
9.16	Remove jumpers and current probe and close switches 1-5, 1-10, 1-29, 1-30, 1-39, 1-40, 1-44, 1-49		✓	(✓)
9.17	Jumper across input to output at break-out box jacks: Band 1 +19V 3-1, 3-6		✓	(✓)
	Band 1 -19V 3-3, 3-8		✓	(✓)
	Verify that termination jumpers still are installed in wearsaver connectors mounted to J31, J35.		✓	(✓)
	Attach current probe around jumpers across jacks 3-1, 3-6 in order to measure Band 1 +19V transient load current.		✓	(✓)
	Execute Commands: Band 1 ON	25 ~ 37	✓	(✓)
	Power supply 1 ON	1	✓	(✓)
	- Photograph transient band 1 +19V turn ON current		✓	(✓)
	Verify on CRT that digital word 3 bit 0=1.		✓	(✓)
	Measure steady state +19V current		130 mA ✓	MA
	Measure steady state +19V voltage at 3-1 ret 3-2	18<V<23	20.8	VDC
	Execute Command: Power supply 1 OFF	3A ~ 5	✓	(✓)
	- Photograph transient band 1 +19V turn OFF current		✓	(✓)

TEST ENGINEER [signature] DATE 15 FEB 17 QA _____

E.M. MODULE UNIT TEST

SIZE	CODE IDENT NO	NUMBER
A	11323	16704

SCALE | REV 2 | SHEET 2-2

DATA SHEET NO. 16 OF 24 PARAGRAPH NO. 4.3

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 180

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
9.18	Remove current probe from around jumpers across jacks 3-1, 3-6. Attach current probe around jumpers across jacks at 3-3, 3-8 in order to measure Band 1-19V transient load current.		✓	(✓)
	Execute Command: Power supply 1 ON	11	✓	(✓)
	Photograph transient Band 1-19V turn ON current.		✓	(✓)
	Measure steady state -19V current.		130mA	MA
	Measure steady state -19V voltage at 3-3 ret 3-2	-18>V>-23	-20.75	VDC
	Execute Command: Power supply 1 OFF	BA Twice	✓	(✓)
	Photograph transient Band 1-19V turn OFF current		✓	(✓)
9.19	Remove jumpers and current probe and close switches 3-1, 3-6, 3-3, 3-8, 3-11, 3-16, 3-13, 3-18 3-21, 3-26, 3-23, 3-28, 3-31, 3-36, 3-33, 3-38, 3-41, 3-46, 3-43, 3-48, 3-51, 3-52, 3-61, 4-1		✓	(✓)
	Verify that termination jumpers still are installed in wearsaver connectors mounted to J32, J36, J33, J37, J34, J38 J40, J41 J42.		✓	(✓)

TEST ENGINEER [illegible] DATE 15 Feb 77 QA

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO 11323	NUMBER 16704
	SCALE	REV	SHEET

FORM NO 3122 • A.S.T. DIETERICH • POST CLEARPRINT 000M

DATA SHEET NO. 17 OF 24 PARAGRAPH NO. 4.23

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 180

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
	Execute Commands: Power supply 1 ON Band 2 ON	1 27 Tm:39	✓ ✓	(✓) (✓)
	Verify on CRT that digital Word B bit 1=1		✓	(✓)
	Measure steady state Band 2 +19V voltage at 3-11 ret 3-12	18<V<23	20.5	VDC
	Measure steady Band 2 -19V voltage at 3-13 ret 3-12	-18>V>-23	-20.7	VDC
9.20	Execute Command: Band 3 ON	29 Tm:41	✓	( )
	Verify on CRT that digital Work B bit 2=1		✓	( )
	Measure steady state Band 3 +19V at 3-21 ret 3-22	18<V<23	20.4	VDC
	Measure steady state Band 3 -19V at 3-23 ret 3-22	-18>V>-23	-20.6	VDC
9.21	Execute Command: Band 4 ON	2B Tm:43	✓	( )
	Verify on CRT that digital Word B bit 3=1		✓	( )

TEST ENGINEER [signature] DATE 15 FEB 84 QA _____

E.M. MODULE UNIT TEST | SIZE A | CODE IDENT NO 11323 | NUMBER 16704 | SCALE | REV | SHEET

DATA SHEET NO. 3 OF 24 PARAGRAPH NO. 4.23

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1800

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
	Measure steady state Band 4 +19V at 3-31 ret 3-32	18<V<23	20.5	VDC
	Measure steady state Band 4 -19V at 3-33 ret 3-32	-19>V>-23	-20.8	VDC
9.22	Execute Commands:			
	Band 5 ON	2D	✓	(✓)
	Band 7 ON	31	✓	(✓)
	Verify on CRT that digital Word B bit 4=1		✓	(✓)
	bit 4=1 Word B bit 6=1		✓	(✓)
	Measure steady state Band 5/7 +19V at 3-41 ret 3-42.	19(±1.9)	20.4	VDC
	Measure steady state Band 5/7 -19V at 3-43 ret 3-42	-19(±1.9)	-20.4	VDC
9.23	Execute Command:			
	Band 6 ON	2F 37	✓	(✓)
	Verify on CRT that digital Word bit 5=1		✓	(✓)
	Measure steady state Band 6 +19V at 3-51 ret 3-56	19(±1.9)	20.4	VDC
	Measure steady state Band 6 -19V at 3-61 ret 3-56	-19(±1.9)	-20.3	VDC

TEST ENGINEER J Kuyton DATE 15 Feb 91 QA

E.M. MODULE UNIT TEST

SIZE	CODE IDENT NO	NUMBER
A	11323	16704

SCALE | REV - | SHEET

DATA SHEET NO. 10 OF 24 PARAGRAPH NO. 4.23

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1800

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
9.24	Attach current probe to power supply input at TJ1 cable wires for pins 2,3,5, 6 to measure +28V spacecraft input current		✓	(✓)
	Execute Command: Power Supply 1 OFF	3A	✓	(✓)
	Photograph 28V turn OFF current at nominal 28(±0.5) VDC with full picture mode load		✓	(✓)
	Execute Command: Power supply 1 ON	1	✓	(✓)
	Photograph +28V turn ON current nominal line, full picture mode.		✓	(✓)
	Measure steady state +28V S/C load current		11.5 ~~10.5~~	AMPS
9.25	Set S/C simulated line voltage to 35(+0, -0.5) VDC		✓	(✓)
	Measure steady state S/C load current		8.0	AMPS

TEST ENGINEER [signature] DATE 15 FEB 72 QA

E.M. MODULE UNIT TEST

SIZE	CODE IDENT NO	NUMBER
A	11323	16704

SCALE | REV | SHEET

DATA SHEET NO. 20 OF 24 PARAGRAPH NO. 4.23

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1800

PARA OR STEP NO.	PROCEDURE STEP			SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
	Measure Power Sypply output voltages during HI LINE at the following break-out box test points:					
	Nomenclature	DVM (+)	DVM ret			
	Multiplexer 30VDC	2-20	2-30	30(±3.9)	29.75	VDC
	SMA +28V	1-1	1-6	28<V<30.5	30.94	VDC
	SMA -28V	1-11	1-6	-28>V>-30.5	30.4	VDC
ED 4199A	~~CDVS~~ Radiometer +8V	1-14	1-15	8.5±.85 ~~8(±0.8)~~	8.8	VDC
(5)	SMA +7V	1-16	1-17	7(±0.7)	6.9	VDC
ED 4199A	~~Radiometer~~ +8V	1-5	1-4	8(±.8) ~~8.5(±0.85)~~	7.5	VDC
	Analog +21V	1-29	1-34	21(±2.1)	22.3	VDC
	Analog -21V	1-39	1-34	-21(±2.1)	-22.7	VDC
	Electro Mech +33V	1-44	1-45	33(±3.3)	34.0	VDC
	SMA (Isolated) +19V, no load	4-6	4-11	+19(+8,-2)	25.1	VDC
	SMA (Isolated) -19V, no load	4-16	4-11	-19(-8,+2)	-25.1	VDC
	Band 1 +19V	3-1	3-2	18<V<23	20.7	VDC
	Band 1 -19V	3-3	3-2	-18>V>-23	-20.6	VDC
	Band 2 +19V	3-11	3-12	18<V<23	20.4	VDC
	Band 2 -19V	3-13	3-12	-18>V>-23	-20.5	VDC
	Band 3 +19V	3-21	3-22	18<V<23	20.3	VDC
	Band 3 -19V	3-23	3-22	-18>V>-23	-20.6	VDC
	Band 4 +19V	3-31	3-32	18<V<23	20.5	VDC
	Band 4 -19V	3-33	3-32	-18>V>-23	-20.9	VDC
	Band 5/7 +19V	3-41	3-42	+19(±1.9)	20.4	VDC
	Band 5/7 -19V	3-43	3-42	-19(±1.9)	-20.4	VDC
	Band 6 +19V	3-51	3-56	+19(±1.9)	20.5	VDC
	Band 6 -19V	3-61	3-56	-19(±1.9)	-20.5	VDC
	80V No Load	1-3	1-13	80V(+30,-8)	105.4	VDC
	Execute Command: Power Supply 1 OFF			3A	✓	(✓)

TEST ENGINEER JGuyton DATE 15 Feb 12 QA

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO. 11323	NUMBER 16704
	SCALE	REV	SHEET 20

FORM NO. 3122 1 A 5 69 DIETERICH-POST CLEARPRINT 000M

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HUGHES

HUGHES AIRCRAFT COMPANY
SPACE AND COMMUNICATIONS GROUP
EL SEGUNDO CALIFORNIA

SPACE AND COMMUNICATIONS GROUP
FAILURE REPORT

S 8343

ORIGINATOR

1 PROGRAM NAME AND NUMBER: THEMATIC MAPPER
2 GLA:
3 MODEL: FLT
4 TIME OBSERVED:
5 DATE OBSERVED: MO 2 DA 16 YR 82

6 HARDWARE LEVEL WHEN FAILURE WAS OBSERVED: ☐ SPACECRAFT ☐ SYSTEM ☐ SUBSYSTEM ☑ UNIT ☐ ASSEMBLY ☐ SUBASSEMBLY ☐ MODULE ☐ MICAM ☐ CARD ☐ PART

EQUIPMENT IDENTIFICATION	NAME	PART NUMBER	S/N	MANUFACTURER
7 SUBSYSTEM				
8 UNIT	ELECTRONICS MODULE	32347	201	
9 ☐ ASSEMBLY ☐ SUBASSEMBLY				
10 ☐ MODULE ☐ MICAM ☐ CARD				
11 OTHER				

12 TEST WHEN FAILURE WAS OBSERVED: ☐ DEVELOPMENT ☐ IN PROCESS ☐ QUALIFICATION ☒ ACCEPTANCE ☐ INTEGRATION ☐ SYSTEM ☐ LAUNCH OPERATIONS ☐

13 ENVIRONMENT WHEN FAILURE WAS OBSERVED: ☑ AMBIENT ☐ EMC/RFI ☐ RADIATION ☐ VIBRATION ____ AXIS FOR ____ MIN TYPE ____ ☐ TEMP ____° ☐ THERMAL VAC ____ HRS AT ____° ☐ OTHER

14 DESCRIPTION OF FAILURE: SMA VOLTAGES OUT OF SPEC, ±28 ; AS ±27.5 , 7 LINE 1 2
SEE ATTACHED DATA SHEET (OPER 1800)
CDVU and RADIOMETER TOLERANCES REVERSED ON HI/LO LINE SPECS - BOTH READINGS OUT OF SPEC

15 TEST PROCEDURE: 16704 PARA 4.23.9.26
16 ORIGINATOR: GUYTON ORG 22-13 DATE 4 MAR 82
17 ☐ CONTINUATION SHEET USED

ENGINEERING EVALUATION

18 VERIFICATION AND FAILURE ANALYSIS: TP 16704 PARA 4.23.9.26 SETS LOW LINE POWER SUPPLY INPUT TO 21, +.5, -0 VDC . SHOULD HAVE BEEN TESTED AT 23, +.5 -0 VDC CDVU and Radiometer Voltage tolerances should have been reversed

19 FAILED ITEM NAME AND PART NUMBER:

20 ☑ FOLLOWING REWORK/RETEST REQUIRED ☐ REWORK RETEST NOT REQUIRED BECAUSE
RETEST PER PARA 4.23.9.26 EO 4180A

21 AUTHORIZATION: J A Banach ORG 22-13 DATE 3-5-82
22 ☐ CONTINUATION SHEET USED

MANUFACTURING AND TEST

23 REWORK/RETEST ACTION TAKEN: PARA 4.23.9.26 PERFORMED SMA +28V READ 30.8VDC SMA -28V READ -30.7 VDC BOTH WITHIN SPEC EO 4180A IMPLEMENTED
SEE ATTACHED COPY OF TEST DATA SHEET (OPER 1850)
EO 4199A CORRECTED VOLTAGE LIMITS AND TOLERANCES - ALL READINGS ARE WITHIN SPEC

24 QA: [stamp]
25 QA: [stamp]

26 LIST ALL PARTS REPLACED PART NUMBER	CKT SYM	PART LOT NUMBER	DATE CODE	MANUFACTURER	PROBABLE DEFECT	ANALYSIS NUMBER

27 REWORK BY: ORG: DATE:
28 RETESTED BY: J A Banach ORG 22-13 DATE 3/5/82
29 ☐ CONTINUATION SHEET USED

ENGINEERING/RELIABILITY

30 CAUSE AND CORRECTIVE ACTION: CAUSE: ELECTRONIC MODULE UNIT TEST PROCEDURE CALLED OUT IMPROPER VOLTAGE SETTINGS PLUS THE CDVU AND RADIOMETER TOLERANCES WERE REVERSED.
C/A: EO 4180A AND 4199A CORRECT THE ELECTRONIC MODULE TEST PROCEDURE.
[signature] 3/10/82
COPIES OF EO4180A + 4199A ARE ATTACHED.

31 ☐ CONTINUATION SHEET USED

32 DOCUMENT IMPLEMENTING CORRECTIVE ACTION: EO 4180A EO 4199A - EFFECTIVITY S/N 003

33 FRB CLOSURE: [signature] 3/10/82

34 BASIC CAUSE OF VERIFIED FAILURE: ☐ DESIGN ☐ ENVIRONMENTAL ☐ DEFECTIVE PARTS ☐ TEST EQUIPMENT ☒ TEST PROCEDURE ☐ TEST SET UP ☐ MFG PROCEDURE ☐ ASSY/FAB ERROR ☐ WORKMANSHIP ☐ WIRING ERROR ☐ ROUGH HANDLING ☐ WEAR OUT ☐ UNKNOWN
DEFECT CODE:

35 FAILURE TYPE: ☐ PRIMARY ☐ INDUCED ☐ UNKNOWN ☐ NO FAILURE
36 FAILURE CLASSIFICATION: ☐ CRITICAL ☐ MAJOR ☒ MINOR ☐ SAFETY

37 RESPONSIBLE ENGINEER: J A Banach ORG 22-13 DATE 3-9-82
38 SPACECRAFT SYSTEM ENGINEER: [signature] ORG 22-41 DATE 3/10/82
39 RELIABILITY: [signature] ORG 51-41 DATE 3-10-82
40 CUSTOMER OR SUPPLIER: [signature] DATE:

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3/ /82

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DATA SHEET NO. 21 OF 24 PARAGRAPH NO. 4.2.3

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1/20

PARA OR STEP NO.	PROCEDURE STEP			SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
9.25	Execute Command:					
	Power Supply 1 ON			1	✓	(✓)
	Photograph S/C Turn On Current					
	HI LINE, FULL PICTURE MODE				✓	(✓)
9.26	Set + S/C Simulated Line Voltage to					
EO 4180A	~~21~~ 23 (+0.5, -0) VDC				✓	(✓)
	Measure Steady State S/C Load Current				14 (107)	Amps
	LO LINE					
	Measure Power Supply Output Voltages during HI LINE at the following Breakout Box test points					
	Nomenclature	DVM (+)	DVM ret			
	Multiplexer 30 VDC	2-20	2-30	30 (±3.9)	27.2	VDC
	SMA +28V	1-1	1-6	28<V<30.5	27.5	VDC
	SMA -28V	1-11	1-6	-28>V>-30	-27.5	VDC
SEE EO 4199A	~~DDVU +8V~~ RADIOMETER +8V	1-14	1-15	~~8.5 (±.85)~~ 8 (±0.8) (107)	7.8	VDC
	SMA +7V P/F/R 8343 3/1/87 (107)	1-16	1-17	7 (±0.7)	6.2	VDC
SEE EO 4199A	~~Radiometer DVU~~ +8V	1-5	1-4	~~8.5 (±.85)~~ 8 (±0.8) (107)	7.6	VDC
	Analog +21V	1-29	1-34	21 (±2.1)	20.3	VDC
	Analog -21V	1-39	1-34	-21 (±2.1)	20.7	VDC

3/1/87 (107) P/F/R 8343

TEST ENGINEER [signature] DATE 16 FEB 87 QA [signature]

E.M. MODULE UNIT TEST

SIZE	CODE IDENT NO.	NUMBER
A	11323	16704

SCALE | REV | SHEET

FORM NO 3122 A.S 891 DIETERICH-POST CLEARPRINT 000H

DATA SHEET NO. 3 OF 24 PARAGRAPH NO. 4.3.3

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1850

PARA OR STEP NO.	PROCEDURE STEP			SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
.25	Execute Command:					
	Power Supply 1 ON			1	_____	(✓)
	Photograph S/C Turn On Current					
	HI LINE, FULL PICTURE MODE			ORIGINAL PAGE IS OF POOR QUALITY	_____	(✓)
.26 3/12/86 EO 4180A	Set + S/C Simulated Line Voltage to 28 (+0.5, -0)VDC				✓	(✓)
	Measure Steady State S/C Load Current					
	LO LINE				14	Amps
	Measure Power Supply Output Voltages during RD LINE at the following Breakout Box test points					
	Nomenclature	DVM (+)	DVM ret			
	Multiplexer 30 VDC	2-20	2-30	30(±3.9)	30.3	VDC
	SMA +28V	1-1	1-6	28<V<~~39.5~~ 31.0 EC 4159	~~30.4~~ 30.7	VDC
	SMA -28V	1-11	1-6	-28>V>-~~30.5~~ -31.0	-30.7	VDC
EO 4199A 3/12/86	~~Radiometer~~ +8V	1-14	1-15	~~8(±0.8)~~ 8.5±.85	8.68	VDC
	SMA +7V	1-16	1-17	7(±0.7)	7.17	VDC
EO 4199A 3/12/86	~~Radiometer~~ CDVU +8V	1-5	1-4	~~8(±0.8)~~	7.6	VDC
	Analog +21V	1-29	1-34	21(±2.1)	22.0	VDC
	Analog -21V	1-39	1-34	-21(±2.1)	-22.60	VDC

TEST ENGINEER Brad DATE 3/5/86 QA 3/12/86

	SIZE	CODE IDENT NO	NUMBER
M. MODULE UNIT TEST	A	11323	16704
	SCALE	REV	SHEET

DATA SHEET NO. [illegible] OF [illegible] PARAGRAPH NO. [illegible]

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1850

PARA OR STEP NO.	PROCEDURE STEP			SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
.26 ont.)	Nomenclature	DVM (+)	DVM ret			
	Electro Mech +33V	1-44	1-45	33(±3.3)	34.7	VDC
	SMA (Isolated) +19V no load	4-6	4-11	+19(+8,-2)	24.5	VDC
	SMA (Isolated) -19V no load	4-16	4-11	-19(-8,+2)	-24.8	VDC
	Band 1 +19V	3-1	3-2	18<V<23	20.8	VDC
	Band 1 -19V	3-3	3-2	-18>V>-23	-20.7	VDC
	Band 2 +19V	3-11	3-12	18<V<23	+20.6	VDC
	Band 2 -19V	3-13	3-12	-18>V>-23	-20.7	VDC
	Band 3 +19V	3-21	3-22	18<V<23	20.6	VDC
	Band 3 -19V	3-23	3-22	-18>V>-23	-20.9	VDC
	Band 4 +19V	3-31	3-32	18<V<23	20.6	VDC
	Band 4 -19V	3-33	3-32	-18>V>-23	-21.0	VDC
	Band 5/7 +19V	3-41	3-42	+19(±1.9)	19.8	VDC
	Band 5/7 -19V	3-43	3-42	-19(±1.9)	-20.0	VDC
	Band 6 +19V	3-51	3-56	+19(±1.9)	20.4	VDC
	Band 6 -19V	3-61	3-56	-19(±1.9)	-20.2	VDC
	80V no load	1-3	1-13	80V(+30,-8)	102	VDC

TEST ENGINEER J GUYTON DATE 3/5/82 QA

DATA SHEET NO. 22 OF 24 PARAGRAPH NO. 4.2.2

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1800

PARA OR STEP NO.	PROCEDURE STEP			SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
9.26 (Cont.)	Nomenclature	DVM (+)	DVM ret			
	Electro Mech +33V	1-44	1-45	33(±3.3)	30.7	VDC
	SMA (Isolated) +19V no load	4-6	4-11	+19(+8,-2)	21.5	VDC
	SMA (Isolated) -19V no load	4-16	4-11	-19(-8,+2)	-21.6	VDC
	Band 1 +19V	3-1	3-2	18<V<23	18.5	VDC
	Band 1 -19V	3-3	3-2	-18>V>-23	-18.4	VDC
	Band 2 +19V	3-11	3-12	18<V<23	18.3	VDC
	Band 2 -19V	3-13	3-12	-18>V>-23	-18.5	VDC
	Band 3 +19V	3-21	3-22	18<V<23	18.4	VDC
	Band 3 -19V	3-23	3-22	-18>V>-23	-18.6	VDC
	Band 4 +19V	3-31	3-32	18<V<23	18.3	VDC
	Band 4 -19V	3-33	3-32	-18>V>-23	-18.7	VDC
	Band 5/7 +19V	3-41	3-42	+19(±1.9)	18.6	VDC
	Band 5/7 -19V	3-43	3-42	-19(±1.9)	-18.6	VDC
	Band 6 +19V	3-51	3-56	+19(±1.9)	18.6	VDC
	Band 6 -19V	3-61	3-56	-19(±1.9)	-18.6	VDC
	80V no load	1-3	1-13	80V(+30,-8)	94.9	VDC

TEST ENGINEER [signature] DATE 16 FEB 82 QA

E.M. MODULE UNIT TEST

SIZE	CODE IDENT NO	NUMBER
A	11323	16704

SCALE | REV | SHEET

DATA SHEET NO. 23 OF 24 PARAGRAPH NO. 4.2.2

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1800

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
9.26 (Cont.)	Execute Command:			
	Power Supply 1 OFF	3A	✓	(✓)
	Photograph +S/C Turn Off Current			
	LO LINE, FULL PICTURE MODE		✓	(✓)
9.27	Execute Command:			
	Power Supply 1 ON	1	✓	(✓)
	Main Calibration Shutter OFF	F	✓	(✓)
	Scan Line Corrector 1 OFF	4C	✓	(✓)
	Power Supply 1 Multiplexer OFF	8	✓	(✓)
	Close Breakout Box switch 1-3, 1-8		✓	(✓)
	Check 80V at test jack 1-3, ret 1-13 with Baffle Heater load applied		101.6	VDC
	(Check simulated thermistor at Function Panel)			
	Execute Commands:			
	Baffle Heater OFF	56	✓	(✓)
	Cooler Intermediate Stage Heater OFF	47	✓	(✓)
9.28	Picture Mode Video Noise Level Check			
	Execute Commands:			
	Power Supply 1 Multiplexer ON	5	✓	(✓)
	Main Calibration Shutter ON	D	✓	(✓)

TEST ENGINEER [signature] DATE 16 FEB '72 QA [signature]

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO 11323	NUMBER 16704
	SCALE	REV A	SHEET 23

FORM NC 3-23 a 3 BY DIETZGEN POST CLEARPRINT 300M

DATA SHEET NO. [illegible] OF [illegible] PARAGRAPH NO. [illegible]

DETAILED FUNCTIONAL TESTS

LOG AHR OPER [illegible]

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
9.28 (Cont.)	Scan Line Corrector 1 ON	4A	✓	(✓)
	Connect Breakout Box through mating connector at Multiplexer Test Access Connector J2		✓	(✓)
	Measure the background noise of the Electronics Module Post Amplifiers and Analog Portion of the Multiplexer at Band 1 Channel 1 Breakout Box Test Point 10 Return 61		100	mVPP
	Photograph the Band 1 Channel 1 Noise Level		✓	(✓)
9.29	Execute Commands at Para. 4.22.2 for controlled System Load Shutdown		✓	(✓)
	Execute Command:			
	Power Supply 1 OFF	3A	✓	(✓)
	THEMATIC MAPPER INTEGRATION OF ELECTRONICS MODULE TO MULTIPLEXER AND POWER SUPPLY IS COMPLETED.			

TEST ENGINEER [illegible] DATE 16 Feb 82 QA [illegible]

5.0 QUALITY ASSURANCE PROVISION

5.1 Notification of QA Engineer

The QA Engineer shall be notified before tests are performed. When possible, this notification should precede the test by one day.

5.2 Witnessing by QA Engineer

The QA Engineer may witness any or all tests. He should be notified of a test even though he has waived the right to witness a previous test.

5.3 Handling of Flight Assemblies

All flight assemblies shall be handled in accordance with Assembly History Record Sheet Provisions.

6.0 PREPARATION FOR DELIVERY

6.1 Authorizing Signatures

The test data sheets must be signed by the Test Engineer and QA Engineer. When the QA Engineer has not witnessed the test, he should sign the data sheet after it is reviewed by the Design Engineer.

6.2 Distribution of Test Records

After the test data sheet is signed, place one (1) copy in the traveling file, one (1) copy and the original in the Engineering file, and one (1) copy will be provided for QA.

DATA SHEET NO. 1 OF 4 PARAGRAPH NO. 4.5

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 5805

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
	Note: To Perform This Test Board A04-50942 must be installed.			
(4.5)	BLACKBODY CONTROL TEST			
1.	Confirm that test cable 45 is connected properly between the Electronics Module and the Function Test Panel.		HG	(✓)
	Connect test cable 20 and its breakout box to J20 on the Electronics Module.		HG	(✓)
2.	To simulate the blackbody sensor, connect Decade Resistor #1 to the Blackbody Heater Input TP's on the Function Test Panel. Set DR #1 at 30000 ohms ("cold") to start.		HG	(✓)
3.	Backup On.			
3.1	Execute commands:			
	BLACKBODY HEATER CONTROL OFF/ BACKUP OFF.	24	✓	(✓)
	BLACKBODY HEATER CONTROL ON/ T1 SELECT	20	✓	(✓)
	BLACKBODY BACKUP ON.	23	✓	(✓)
3.2	Verify via the CRT that digital			
	Word E bit 2 = 1		✓	(✓)
	bit 3 = 0		✓	(✓)
	bit 4 = 0		✓	(✓)
	bit 5 = 1.		✓	(✓)

TEST ENGINEER Hutton DATE 25 FEB 82 QA

E.M. MODULE UNIT TEST | SIZE A | CODE IDENT NO 11323 | NUMBER 16704 | SCALE | REV | SHEET

DATA SHEET NO. 2 OF 4 PARAGRAPH NO. 4.5

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 5800

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
3.3	Verify via the CRT that analog telemetry			
	Channel 53 "Blackbody Current" is .5≤V≤1.5 volts.	.5≤V≤1.5	1.14 ~~1.8~~	volts
3.4	Using a DVM verify that test point J20-12 is in the range -12 < V < 0 volts.	-12 <V <0	-3.4	volts
	Using a DVM verify that test point J20-11 is in the range .5 < V < 1 volt.	.5 <V <1	.8	volts
4.	Normal T1 On.			
4.1	Execute commands:			
	BLACKBODY HEATER CONTROL OFF/ BACKUP OFF.	24	✓	(✓)
	BLACKBODY HEATER CONTROL ON/ T1 SELECT.	20	✓	(✓)
4.2	Verify via the CRT that digital			
	Word E bit 2 = 1		✓	(✓)
	bit 3 = 0		✓	(✓)
	bit 4 = 0		✓	(✓)
	bit 5 = 0.		✓	(✓)
5.	Normal T2 On.			
5.1	Execute commands:			
	BLACKBODY HEATER CONTROL OFF/ BACKUP OFF.	24	✓	(✓)
	BLACKBODY HEATER CONTROL ON/ T1 SELECT.	20	✓	(✓)

TEST ENGINEER [signature] DATE 2/25/82 QA [signature]

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO 11323	NUMBER 16704
	SCALE	REV	SHEET

DATA SHEET NO. 3 OF 4 PARAGRAPH NO. 4.5

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 5500

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(5.1)	BLACKBODY T2 SELECT.	21	✓	(✓)
5.2	Verify via the CRT that digital			
	Word E bit 2 = 1		✓	(✓)
	bit 3 = 1		✓	(✓)
	bit 4 = 0		✓	(✓)
	bit 5 = 0.		✓	(✓)
6.	Normal T3 On.			
6.1	Execute commands:			
	BLACKBODY HEATER CONTROL OFF/ BACKUP OFF.	24	✓	(✓)
	BLACKBODY HEATER CONTROL ON/ T1 SELECT.	20	✓	(✓)
	BLACKBODY T3 SELECT.	22	✓	(✓)
6.2	Verify via the CRT that digital			
	Word E bit 2 = 1		✓	(✓)
	bit 3 = 0		✓	(✓)
	bit 4 = 1		✓	(✓)
	bit 5 = 0.		✓	(✓)
7.	Thermistor Test.			
7.1	Set DR #1 at 05000 ohms ("hot").		✓	(✓)
	Verify via the CRT that analog telemetry Channel 53 is ≤1.0V.	≤1.0	0.0	volts

TEST ENGINEER Linton DATE 2/25/82 QA

E.M. MODULE UNIT TEST

SIZE	CODE IDENT NO	NUMBER
A	11323	16704

SCALE REV SHEET

DATA SHEET NO. 4 OF 4 PARAGRAPH NO. 4.5

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 5800

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
7.2	Using a DVM verify that test point J20-12 is in the range 0 < V < 12 volts.	0 < V < 12	1.31	volts
	Using a DVM verify that test point J20-11 is in the range -.5<V<.5	-.5<V<.5	0.0	volts
7.3	Change DR #1 to 30000 ohms ("cold").		✓	(✓)
	Verify via the CRT that analog telemetry			
	Channel 53 is ≥2.5 volts.	≥2.5	3.72	volts
8.	Reset Relays.			
8.1	Execute command:			
	BLACKBODY HEATER CONTROL OFF/ BACKUP OFF.	24	✓	(✓)
8.2	Verify via the CRT that digital			
	Word E bit 2 = 0		✓	(✓)
	bit 5 = 0.		✓	(✓)

TEST ENGINEER Clayton DATE 2/25/82 QA (✓)

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO 11323	NUMBER 16704
	SCALE	REV	SHEET

DATA SHEET NO. 1 OF 5 PARAGRAPH NO. 4.6

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 5800

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(4.6)	Note: To Perform This Test Board A04(50942) Must Be Installed.			
	CFPA TESTING			
1.	Confirm that test cable 40 is properly connected between the Electronics Module and the Function Test Panel.		✓	(✓)
	Connect test cable 20 and its breakout box to J20 on the Electronics Module. Connect DVM's set to their 20V scales to points J20-13 and J20-14 on the breakout box.		✓	(✓)
2.	To simulate the control diode connect Decade Resistor #1 across the CFPA Heater Control TP's on the Function Test Panel. Set DR #1 at 18000 ohms ("hot").		✓	(✓)
	To simulate the monitor diode connect Decade Resistor #2 across the CFPA Monitor TP's on the Function Test Panel. Set DR #2 at 18000 ohms ("hot").		✓	(✓)
3.	CFPA Heater Monitor and Controller Off			
3.1	Execute commands:			
	CFPA HEATER CONTROL ON/T1 SELECT/ CFPA TELEMETRY ON.	19	✓	(✓)
	CFPA TELEMETRY OFF.	1C	✓	(✓)
	CFPA HEATER CONTROL OFF.	1D	✓	(✓)
3.2	Verify via the CRT that digital			
	Word H bit 4 = 0		✓	(✓)
	bit 5 = 0		✓	(✓)

TEST ENGINEER Hayton DATE 2/25/87 QA

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO 11323	NUMBER 16704
	SCALE	REV	SHEET

DATA SHEET NO. 2 OF 5 PARAGRAPH NO. 4.6

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 5803

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(3.2)	bit 6 = 0		✓	(✓)
	bit 7 = 0.		✓	(✓)
3.3	Verify via the CRT that analog telemetry			
	Channel 68 "CFPA Heater Current" is ≤1.0V.	≤1.0	0.0	volts
	Channel 70 "CFPA Monitor Temperature" is ≤1.0V.	≤1.0	0.0	volts
	Channel 67 "CFPA Control Temperature" is ≤1.0V.	≤1.0	0.0	volts
3.4	Verify that the DVM monitoring J20-13 "Control Diode Output Test" is measuring in the range 0 ≤ V < .1 volts.	0 ≤V <.1	0.0	volts
3.5	Verify that the DVM monitoring J20-14 "CFPA Temp Error Test" is measuring in the range 0 ≤ V < .1 volts.	0 ≤V <.1	0.0	volts
4.	CFPA Heater Controller Off			
4.1	Execute commands:			
	CFPA HEATER CONTROL ON/T1 SELECT/ CFPA TELEMETRY ON.	19	✓	(✓)
	CFPA HEATER CONTROL OFF.	1D	✓	(✓)
4.2	Verify via the CRT that digital			
	Word H bit 4 = 0		✓ 0.0	(✓)
	bit 5 = 0		✓	(✓)
	bit 6 = 0		✓	(✓)
	bit 7 = 1.		✓	(✓)

TEST ENGINEER [signature] DATE 2/21/84 QA

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO 11323	NUMBER 16704
	SCALE	REV	SHEET

DATA SHEET NO. 3 OF 5 PARAGRAPH NO. 4.6

DETAILED FUNCTIONAL TESTS

LOG AHR OPER Stol

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
4.3	Verify via the CRT that analog telemetry			
	Channel 68 is ≤1.0V.	≤1.0	0.0	volts
5.	Heater Concroller Off/T2 On			
5.1	Execute commands:			
	CFPA HEATER CONTROL ON/T1 SELECT/ CFPA TELEMETRY ON.	19	✓	(✓)
	CFPA HEATER CONTROL OFF.	1D	✓	(✓)
	CFPA T2 SELECT.	1A	✓	(✓)
5.2	Verify via the CRT that digital			
	Word H bit 4 = 0		✓	(✓)
	bit 5 = 1		✓	(✓)
	bit 6 = 0		✓	(✓)
	bit 7 = 1.		✓	(✓)
5.3	Verify via the CRT that analog telemetry			
	Channel 68 is ≤1.0V.	≤1.0	0.0	volts
6.	Heater Controller Off/T3 On			
6.1	Execute commands:			
	CFPA HEATER CONTROL ON/T1 SELECT/ CFPA TELEMETRY ON.	19	✓	(✓)
	CFPA HEATER CONTROL OFF.	1D	✓	(✓)
	CFPA T3 SELECT.	1B	✓	(✓)

TEST ENGINEER [signature] DATE 2/25/86 QA [signature]

E.M. MODULE UNIT TEST

SIZE	CODE IDENT NO	NUMBER
A	11323	16704

SCALE | REV | SHEET

DATA SHEET NO. 4 OF 5 PARAGRAPH NO. 4.6

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 5800

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
6.2	Verify via the CRT that digital			
	Word H bit 4 = 0		✓	(✓)
	bit 5 = 0		✓	(✓)
	bit 6 = 1		✓	(✓)
	bit 7 = 1.		✓	(✓)
6.3	Verify via the CRT that analog telemetry			
	Channel 68 is ≤1.0V.	≤1.0	0.0	volts
7.	Heater Controller On/T1 On			
7.1	Execute Command:			
	CFPA HEATER CONTROL ON/T1 SELECT/ CFPA TELEMETRY ON.	119	✓	(✓)
7.2	Verify via the CRT that digital			
	Word H bit 4 = 1		✓	(✓)
	bit 5 = 0		✓	(✓)
	bit 6 = 0		✓	(✓)
	bit 7 = 1.		✓	(✓)
8.	Test Control Diode			
8.1	With DR #1 set at 18000 ohms verify via the CRT that analog telemetry			
	Channel 67 is ≤1.0V.	≤1.0	0.0	volts
	Channel 68 is ≤1.0V.	≤1.0	0.0	volts

TEST ENGINEER [signature] DATE 2/25/[illegible] QA [signature]

DATA SHEET NO. 5 OF 5 PARAGRAPH NO. 4.6

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DETAILED FUNCTIONAL TESTS

LOG AHR OPER 5803

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(8.1)	Verify that J20-13 is in the range .5 < V < 1.5 volts.	.5 < V <1.5	1.0	volts
	Verify that J20-14 is in the range 0 < V < 15 volts.	0 < V <15	2.5	volts
8.2	Reset DR #1 to 19000 ohms. Record the level of analog telemetry channel 67		1.4	volts
	channel 68		6.0	volts
8.3	Reset DR #1 to 20000 ohms ("cold").			
	Verify that analog telemetry			
	Channel 67 is ≥2.5 volts	≥2.5	4.96	volts
	Channel 68 is ≥2.5 volts	≥2.5	4.86	volts
8.4	Verify that J20-13 is in the range .5 < V < 1.5 volts.	.5 <V <1.5	1.1	volts
	Verify that J20-14 is in the range -15 < V < 0 volts.	-15 <V < 0	-.5	volts
9.	Test Monitor Diode			
9.1	With DR #2 set at 18000 ohms verify that analog telemetry channel 70 is ≤1.0 volts.	≤1.0	0.0	volts
9.2	Reset DR #2 to 19000 ohms and observe the level of analog telemetry channel 70.		1.55	volts
9.3	Reset DR #2 to 20000 ohms ("cold"), and verify that analog telemetry channel 70 is ≥2.5V.	≥2.5	5.1	volts volts
10.	Reset. Repeat 4.6.3.		✓	(✓)

TEST ENGINEER [signature] DATE 2/27/86 QA [signature]

E.M. MODULE UNIT TEST

SIZE	CODE IDENT NO	NUMBER
A	11323	16704

SCALE REV SHEET

DATA SHEET NO. 1 OF 3 PARAGRAPH NO. 4.8

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 5803

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(4.8)	NOTE: In Order To Perform This Test Boards A08(809201) & A08(81-02) Must Be Installed.			
	DC RESTORE/CAL SHUTTER SENSORS	ORIGINAL OF POOR	PAGE IS QUALITY	
1.	Confirm that test cables 45, 46 and P13 are connected properly between the Electronics Module and the Function Test Panel Connect a DVM set on its 20V scale between the DC Restore TP and signal ground. If the Mux is already connected to the harness, then use a breakout box and monitor connector P13, PINS M1 and M2.		✓	(✓)
2.	To simulate the Main Shutter Sensor, connect Decade Resistor #1 across TP's 1 and 7 on the FTP.		✓	(✓)
	To simulate the Backup Shutter Sensor connect Decade Resistor #2 across TP's 2 and 8 on the FTP.		✓	(✓)
3.	DC Restore Off			
3.1	Execute commands: SHUTTERS OFF.	F	✓	( )
	DC RESTORE OFF/TELEMETRY SCALING OFF.	6	✓	(✓)
3.2	Verify via the CRT that digital Word L bit 0=0.		✓	(✓)
3.3	Verify via the CRT that analog telemetry Channel 61 "Calibration Shutter Temperature" is zero.	<0.1	.04	volts
	Channel 62 "Backup Shutter Temperature" is zero	<0.1	.04	volts
3.4	Verify that the DVM is measuring zero voltage.	<0.1	0.0	volts

TEST ENGINEER Fulton DATE 2/25/[illegible] QA

E.M. MODULE UNIT TEST

SIZE	CODE IDENT NO	NUMBER
A	11323	16704

SCALE | REV | SHEET

DATA SHEET NO. 2 OF 3 PARAGRAPH NO. 4.8

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DETAILED FUNCTIONAL TESTS

LOG AHR OPER 5803

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
4.	DC Restore On/Normal Mode Select			
4.1	Set DR #1 at 05000 ohms("hot").		✓	(✓)
	Set Dr #2 at 30000 ohms ("cold").		✓	(✓)
4.2	Execute commands:			
	DC RESTORE ON.	3E	✓	(✓)
	CALIBRATION SHUTTER ON/BACKUP SHUTTER OFF/DC RESTORE NORMAL SELECT.	D	✓	(✓)
4.3	Verify via the CRT that digital Word L bit 0=1.		✓	(✓)
4.4	Verify via the CRT that analog telemetry			
	Channel 61 is ≤1.0V.	≤1.0	0.0	volts
	Channel 62 is ≥2.5V.	≥2.5	4.6	volts
4.5	Verify that the DVM is measuring ≤1.0V.	≤1.0	.5	volts
4.6	Set DR #1 to 30000 ohms ("cold").		✓	(✓)
	Set DR #2 to 05000 ohms ("hot").		✓	(✓)
4.7	Verify via the CRT that analog telemetry			
	Channel 61 is ≥2.5V.	≥2.5	4.6	volts
	Channel 62 is ≤1.0V.	≤1.0	0.0	volts
4.8	Verify that the DVM is measuring ~~≥1.8~~ 1.45 volts.	~~≥1.8~~ 1.45 566 60 3977A	1.59	volts
5.	DC Restore On/Backup Mode Select			
5.1	Set DR #1 at 05000 ohms		✓	(✓)
	Set DR #2 at 30000 ohms.		✓	(✓)

TEST ENGINEER [signature] DATE 2/23/84 QA [signature]

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO 11323	NUMBER 16704
	SCALE	REV	SHEET

DATA SHEET NO. 3 OF 3 PARAGRAPH NO. 4.8

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 5800

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
5.2	Execute commands:			
	DC RESTORE OFF/TELEMETRY SCALING OFF.	6	.C	(✓)
	DC RESTORE ON.	3E	✓	(✓)
	BACKUP SHUTTER ON/CALIBRATION SHUTTER OFF/DC RESTORE BACKUP SELECT.	E	✓	(✓)
5.3	Verify via the CRT that digital Word L bit 0=0.		✓	(✓)
5.4	Verify via the CRT that analog telemetry			
	Channel 61 is ≤1.0V.	≤1.0	0.0	volts
	Channel 62 is ≥2.5V.	≥2.5	4.6	volts
5.5	Verify that the DVM is measuring ≥~~1.8~~ 1.45V.	≥~~1.8~~ 1.45 per GO 39874	1.59	volts
5.6	Set DR #1 to 30000 ohms.		✓	(✓)
	Set DR #2 to 05000 ohms.		✓	(✓)
5.7	Verify via the CRT that analog telemetry			
	Channel 61 is ≥2.5V.	≥2.5	4.6	volts
	Channel 62 is ≤1.0V.	≤1.0	0.0	volts
5.8	Verify that the DVM is measuring ≤1.0 volts.	≤1.0	.5	volts
6.	Reset. Repeat 4.8.3.		✓	(✓)

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E.M. MODULE UNIT TEST

SIZE	CODE IDENT NO	NUMBER
A	11323	16704

SCALE	REV	SHEET

DATA SHEET NO. 1 OF 1 PARAGRAPH NO. 4.11

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DETAILED FUNCTIONAL TESTS

LOG AHR OPER 5800

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
	Note: In Order To Perform This Test Boards A01 & A02(52250-1, 52250 -2) Must Be Installed.			
(4.11)	SCAN LINE CORRECTOR TEST			
1.	Confirm that test cable 44 is connected properly between the Electronics Module and the Function Test Panel.		✓	(✓)
	Connect test cable 20 and its breakout box to J20 on the Electronics Module.		✓	(✓)
2.	SLC #1 On/SLC #2 Off			
2.1	Execute commands:			
	SCAN LINE CORRECTORS OFF.	4C	✓	(✓)
	SCAN LINE CORRECTOR 1 ON/2 OFF.	4A	✓	(✓)
2.2	Verify via the CRT that digital			
	Word G bit 0 = 1		✓	(✓)
	bit 1 = 0.		✓	(✓)
2.3	Verify via the CRT that analog telemetry			
	Channel 44 "SLC 1 Drive Current" is 2.5 ± 2.5V.*	2.5 ± 2.5*	2.50	volts
	Channel 46 "SLC 1 ± 15V" is 2.5 ± 0.3V.	2.5 ± 0.3	2.52	volts
	Channel 47 "SLC 1 + 5V" is 2.5 ± 0.1V.	2.5 ± 0.1	2.52	volts
	* Waveform is a sawtooth shown in figure 4-15			

TEST ENGINEER [signature] DATE [illegible] QA [illegible]

E M MODULE UNIT TEST	SIZE A	CODE IDENT NO 11323	NUMBER 16704
	SCALE	REV	SHEET

DATA SHEET NO. 2 OF 3 PARAGRAPH NO. 4.11

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DETAILED FUNCTIONAL TESTS

LOG AHR OPER 5 hrs

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
2.4	Using an oscilloscope confirm that the output of test point J20-1 "SLC 1 Integrator" corresponds to Figure 4.11A.	Fig. 4.11A	✓	(✓)
2.5	Using an oscilloscope confirm that the output of J20-2 "SLC 1 Torquer Current" corresponds to Figure 4.11B. Note peak amplitude	Fig. 4.11B	✓	(Vpk)
2.6	Using an oscilloscope confirm that the output of J20-3 "SLC 1 Switch Tach" corresponds to Figure 4.11C.	Fig. 4.11C	✓	(✓)
3.	SLC #1 Off/SLC #2 On			
3.1	Execute command:			
	SCAN LINE CORRECTOR 2 ON/1 OFF.	4B	✓	(✓)
3.2	Verify via the CRT that digital			
	Word G bit 0 = 0		✓	(✓)
	bit 1 = 1.		✓	(✓)
3.3	Verify via the CRT that analog telemetry			
	Channel 45 "SLC 2 Drive Current" is 2.5 ± 2.5V.*	2.5 ± 2.5*	2.8	volts
	Channel 48 "SLC 2 ± 15V" is 2.5 ± 0.3V.	2.5 ± 0.3	2.44	volts
	Channel 49 "SLC 2 + 5V" is 2.5 ± 0.1V.	2.5 ± 0.1	2.47	volts
	* Waveform is a sawtooth shown in Figure 4.11b			

TEST ENGINEER [signature] DATE 2/25/86 QA [signature]

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO 11323	NUMBER 16704
	SCALE	REV	SHEET

DATA SHEET NO. 3 OF 3 PARAGRAPH NO. 4.11

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 5800

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
3.4	Using an oscilloscope confirm that the output of J20-4 "SLC 2 Integrator" corresponds to Figure 4.11A.	Fig. 4.11A	✓	(✓)
3.5	Using an oscilloscope confirm that the output of J20-5 "SLC 2 Torquer Current" corresponds to Figure 4.11B. Note peak amplitude	Fig. 4.11B	✓	(V_{pk})
3.6	Using an oscilloscope confirm that the output of J20-6 "SLC 2 Switch Tach" corresponds to Figure 4.11C.	Fig. 4.11C	✓	(✓)
4.	SLC #1 Off/SLC #2 Off			
4.1	Execute command:			
	SCAN LINE CORRECTORS OFF.	4C	✓	(✓)
2	Verify via the CRT that digital			
	Word G bit 0 = 0		✓	(✓)
	bit 1 = 0.		✓	(✓)
4.3	Verify via the CRT that analog telemetry			
	Channel 44 is zero.	< 0.1	.0	volts
	Channel 45 is zero.	< 0.1	.0	volts
	Channel 46 is zero.	< 0.1	.0	volts
	Channel 47 is zero.	< 0.1	.0	volts
	Channel 48 is zero.	< 0.1	.0	volts
	Channel 49 is zero.	< 0.1	.0	volts

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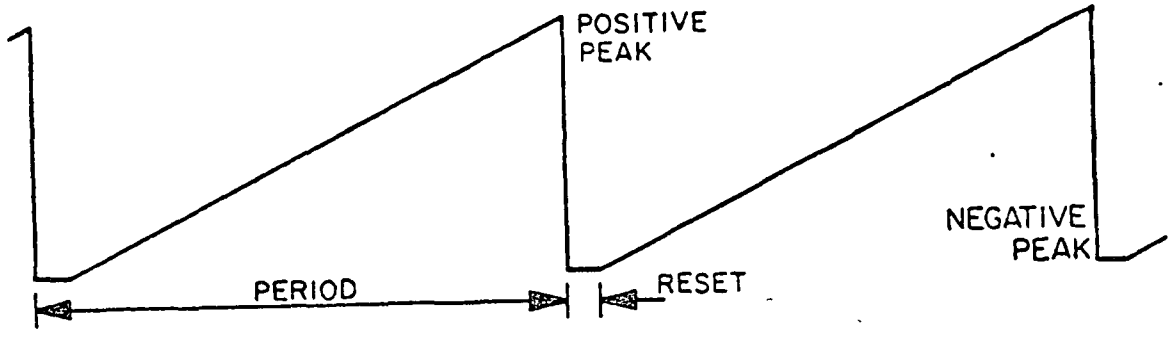
E.M. MODULE UNIT TEST

SIZE	CODE IDENT NO	NUMBER
A	11323	16704

SCALE | REV | SHEET



PERIOD	71 mS ±3%
RESET	5.12 mS ±3%

NOTE: 3% IS THE OSCILLOSCOPE'S ACCURACY.
ACTUAL ACCURACY IS BETTER THAN 1%.

NEGATIVE PEAK	−2V ±0.5V
POSITIVE PEAK	+2V ±0.5V

FIGURE 4.11A

SIZE	CODE IDENT NO.	NUMBER
A	11323	16704
SCALE	REV	SHEET

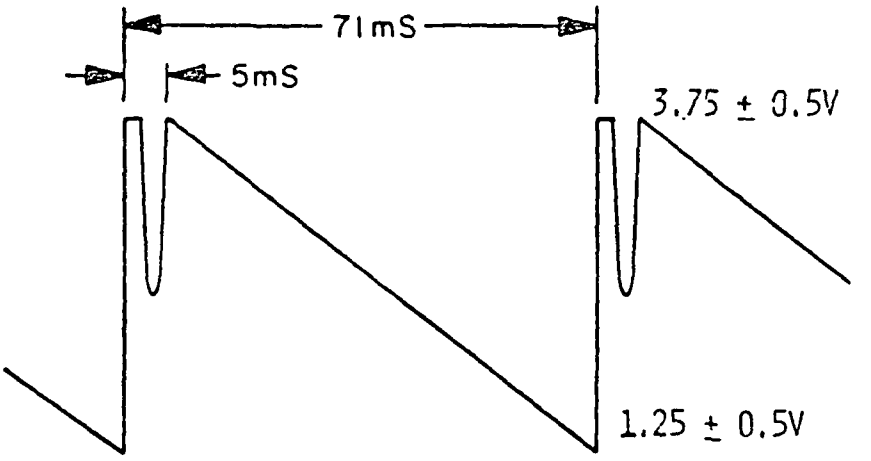


FIGURE 4.11B

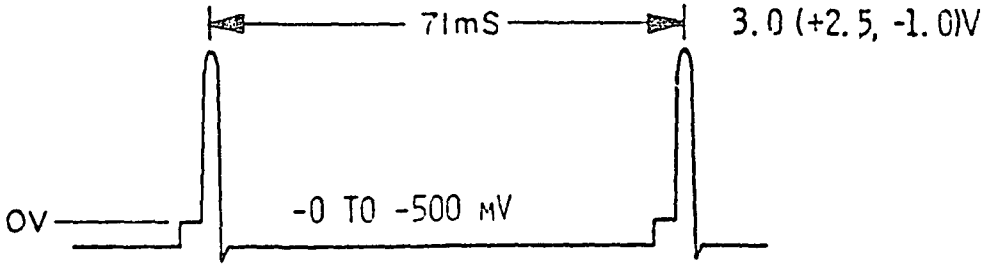


FIGURE 4.11C

SIZE	CODE IDENT NO.	NUMBER
A	11323	16704
SCALE	REV	SHEET

DATA SHEET NO. 1 OF 3 PARAGRAPH NO. 4.12

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DETAILED FUNCTIONAL TESTS

LOG AHR OPER 5802

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
4.12)	Note: In Order To Perform This Test Boards A06(50916) & A07(51398) Must Be Installed.			
	CAL SHUTTER CONTROL TEST			
1.	Confirm that test cable 45 is connected between J45 on the electronics module and TJ45 on the Function Test Panel.		✓	(✓)
	Connect test cable 20 and its breakout box to J20 on the Electronics Module.		✓	(✓)
2.	MAIN SHUTTER ON/BACKUP SHUTTER OFF			
2.1	Execute Commands: SHUTTERS OFF.	F	✓	(✓)
	CAL SHUTTER ON/BACKUP SHUTTER OFF/DC RESTORE NORMAL SELECT.	D	✓	(✓)
2.2	Verify via the CRT that digital Word G bit 2 = 1		✓	(✓)
	bit 5 = 0.		✓	(✓)
2.3	Use TLMY Scan Mode (XBC00) Wait one minute, then verify that digital Word G bit 3 = 1		✓	(✓)
	bit 4 = 1.		✓	(✓)
2.4	Using an oscilloscope, Verify relationship of the following test points as shown in Figure 4.12a			
	J20-23 "7 Hz Test"		✓	(✓)
	J20-24 "DC Restore Sync Signal"		✓	(✓)
	J20-25 "16° Signal"		✓	(✓)
	J20-26 "0° Signal."		✓	(✓)
	Using an oscilloscope, verify that test point J20-28 "Motor (+) Test" is toggling between gND and 28 VDC		✓	(✓)
	and that J20-29 "Motor (-) Test" is toggling between gND and 28 VDC. Frequency or period is indeterminant.		✓	(✓)

TEST ENGINEER [signature] DATE 2/27/86 QA [signature]

E.M. MODULE UNIT TEST | SIZE A | CODE IDENT NO 11323 | NUMBER 16704 | SCALE | REV | SHEET 58

DATA SHEET NO. 2 OF 3 PARAGRAPH NO. 4.12

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 5802

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
2.5	Using a DVM record test point J20-37 (ref A26 E04) "Amplitude Error" reading		2.5	VDC
	Verify that a TTL "1" level signal is at test points J20-30 "Phase Unlock Test," and J20-31 "Amplitude Unlock Test."	> 2.4 > 2.4	4.0 ✓ 3.8 ✓	VDC(✓) VDC(✓)
	After lock-up, jumper J20-32 to J20-51 and verify that J20-28 goes to 18 VDC (±3) and that word G bit 3=0, bit 4=0.		✓	(.)
3.	MAIN SHUTTER OFF/BACKUP SHUTTER ON			
3.1	Execute command: BACKUP SHUTTER ON/ CAL SHUTTER OFF/ DC RESTORE BACKUP SELECT.	E	✓	(✓)
3.2	Verify via the CRT that digital Word G bit 2 = 0		✓	(✓)
	bit 5 = 1.		✓	(✓)
3.3	Wait three minutes, then verify that digital Word G bit 6 = 1		✓	(✓)
	bit 7 = 1.		✓	(✓)
3.4	Using an oscilloscope.			
	Verify relationship of the following test points as shown in Figure 4.12b. J20-34 "7Hz Test"		✓	(✓)
	J20-35 "DC Restore Sync Signal"		✓	(✓)
	J20-36 "13° Signal"		✓	(✓)
	J20-37 "0° Signal".		✓	(✓)
3.5	Using a DVM, record test point J20-38 (ref A26 E04) "Amplitude Error" reading		.2	VDC

TEST ENGINEER [signature] DATE 2/25/86 QA [signature] 1/12

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO 11323	NUMBER 16704
	SCALE	REV	SHEET 80

DATA SHEET NO. 3 OF 3 PARAGRAPH NO. 4.12

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 5800

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
3.5 (contd)	Verify that a TTL level signal is at test points			
	J20-39 "Phase Unlock Test	>2.4	4.0	(✓) VDC
	J20-40 "Amplitude Unlock Test".	>2.4	4.0	(✓) VDC
4.	BOTH SHUTTERS OFF			
4.1	Execute command: SHUTTERS OFF.	F	✓	(✓)
4.2	Verify via the CRT that digital Word G bit 2 = 0		✓	(✓)
	bit 3 = 0		✓	(✓)
	bit 4 = 0		✓	(✓)
	bit 5 = 0		✓	(✓)
	bit 6 = 0		✓	(✓)
	bit 7 = 0.		✓	(✓)

TEST ENGINEER J Guyton DATE 2/15/85 QA

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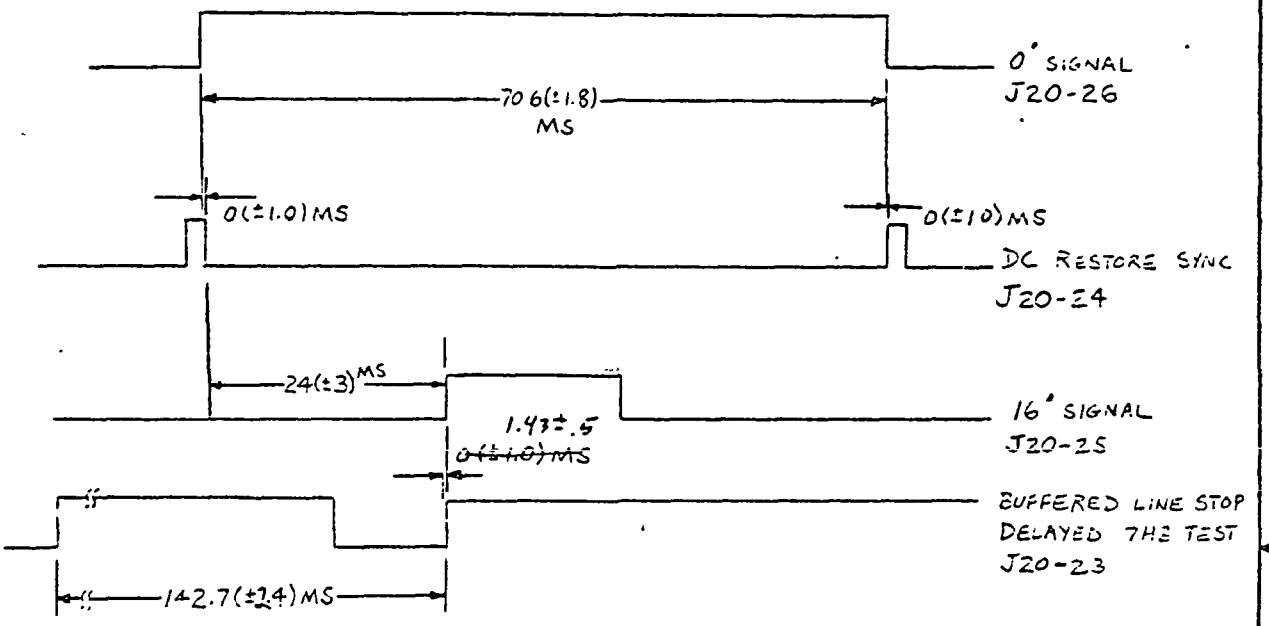

Figure 4.12a Main Shutter Timing

SIZE	CODE IDENT NO	NUMBER
A	11323	16704
SCALE	REV	SHEET

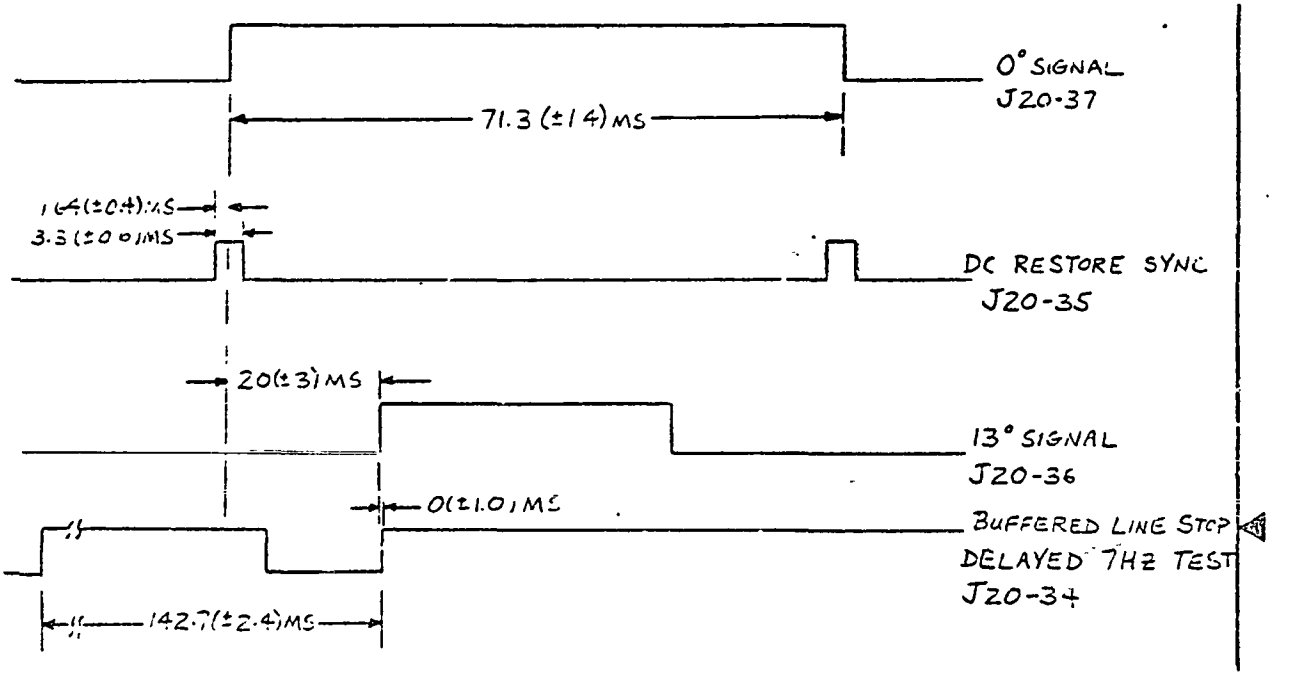

Figure 4.12 b Backup Shutter Timing

SIZE	CODE IDENT NO	NUMBER
A	11323	16704
SCALE	REV	SHEET

DATA SHEET NO. 1 OF 6 PARAGRAPH NO. 4.14

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DETAILED FUNCTIONAL TESTS

LOG AHR OPER 5803

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
	Note: In Order To Perform This Test Board A3A3(81-12) Must Be Installed.			
(4.14)	FUSIBLE LINK TEST			
	WARNING: When the Electronics Module Is linked to Radiometer hardware shutter fusible link switch closure commands and cooler door fusible link switch closure commands shall not be transmitted if the flight plug (P14) is			
1.	installed. Note that J43 is connected to Function Test Panel.			
	Install plug P14.		✓	(✓)
	Connect a DVM across the Cooler Door Fusible Link Test Points.		✓	(✓)
	Connect a DVM across the Main Shutter Fusible Link TP's.		✓	(✓)
	Set both DVM's to read in the 20V range.		✓	(✓)
2.	All Fusible Link Switches Open			
2.1	Execute command:			
	FUSIBLE LINK SWITCHES OPEN	60	✓	(✓)
2.2	Verify via the CRT that digital			
	Word A bit 5 = 0		✓	(✓)
	bit 6 = 0		✓	(✓)
	bit 7 = 0		✓	(✓)
	Word C bit 5 = 0		✓	(✓)
	bit 6 = 0		✓	(✓)
	bit 7 = 0.		✓	(✓)

TEST ENGINEER [signature] DATE 2/6/86 QA [signature] 2/12/86

E.M. MODULE UNIT TEST

SIZE	CODE IDENT NO	NUMBER
A	11323	16704

SCALE REV SHEET

DATA SHEET NO. 2 OF 6 PARAGRAPH NO. 4.14

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 5803

PARA OR STEP NO	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
2.3	Verify that the voltage across the Cooler Door Fusible Link TP's is ≤10 mV, and that the voltage across the Main Shutter Fusible Link TP's is ≤10 mV.	≤10	0.000	mvolts
3.	Cooler Door Fusible Link Switch A Closed			
3.1	Execute command: COOLER DOOR FUSIBLE LINK SWITCH A CLOSE.	5A	✓	(✓)
3.2	Verify via the CRT that digital			
	Word C bit 5 = 1		✓	(✓)
	bit 6 = 0		✓	(✓)
	bit 7 = 0		✓	(✓)
	Word A bit 5 = 0		✓	(✓)
	bit 6 = 0		✓	(✓)
	bit 7 = 0.		✓	(✓)
3.3	Verify that the voltage across the Cooler Door Fusible Link TP's and across the Main Shutter Fusible Link TP's is ≤10mV.	≤10	✓	mvolts
4.	Cooler Door Fusible Link Switches A and B Closed.			
4.1	Execute commands:			
	COOLER DOOR FUSIBLE LINK SWITCH A CLOSE.	5A	✓	(✓)
	COOLER DOOR FUSIBLE LINK SWITCH B CLOSE.	4B	✓	(✓)

TEST ENGINEER [signature] DATE 2/4/86 QA [signature]

DATA SHEET NO. 3 OF 6 PARAGRAPH NO. 4.14

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 5800

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
4.2	Verify via the CRT that digital			
	Word C bit 5 = 1		✓	(✓)
	bit 6 = 1		✓	(✓)
	bit 7 = 0		✓	(✓)
	Word A bit 5 = 0		✓	(✓)
	bit 6 = 0		✓	(✓)
	bit 7 = 0.		✓	(✓)
4.3	Verify that the voltage across the Cooler Door Fusible Link TP's and across the Main Shutter Fusible Link TP's is ≤10 mV.	≤10	✓	mvolts
..	All Cooler Door Switches Closed/Cooler Door Fusible Link Activated.			
5.1	Execute Commands:			
	COOLER DOOR FUSIBLE LINK SWITCH A CLOSE.	5A	✓	(✓)
	COOLER DOOR FUSIBLE LINK SWITCH B CLOSE.	4B	✓	(✓)
	COOLER DOOR FUSIBLE LINK SWITCH C CLOSE.	5C	✓	(✓)
5.2	Verify via the CRT that digital			
	Word C bit 5 = 1		✓	(✓)
	bit 6 = 1		✓	(✓)
	bit 7 = 1		✓	(✓)

TEST ENGINEER [signature] DATE 2-27-84 QA [signature]

E.M. MODULE UNIT TEST

SIZE	CODE IDENT NO	NUMBER
A	11323	16704

SCALE REV SHEET

DATA SHEET NO. 4 OF 6 PARAGRAPH NO. 4.14

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 5801

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(5.2)	Word A bit 5 = 0		✓	(✓)
	bit 6 = 0		✓	(✓)
	bit 7 = 0.		✓	(✓)
5.3	Verify that the Cooler Door Fusible Link Sonalert is switched to the Alarm position and is sounding (it may be turned off after verification). Verify that the indicator LED is lit.	--	✓	(✓)
5.4	Verify that there is 1.5V (±20%) across the Cooler Door Fusible Link TP's.	1.5± 0.3	1.43	volts
5.5	Verify that there is ≤10 mV across the Main Shutter Fusible Link TP's.	≤10	1.5	mvolts
	Reset all Switches. Repeat 4.14.2.		✓	(✓)
7.	Shutter Fusible Link Switch A Closed.			
7.1	Execute command:			
	SHUTTER FUSIBLE LINK SWITCH A CLOSE.	5D	✓	(✓)
7.2	Verify via the CRT that digital			
	Word A bit 5 = 1		✓	(✓)
	bit 6 = 0		✓	(✓)
	bit 7 = 0		✓	(✓)
	Word C bit 5 = 0		✓	(✓)
	bit 6 = 0		✓	(✓)
	bit 7 = 0.		✓	(✓)

TEST ENGINEER Layton DATE 2/27/86 QA

E.M. MODULE UNIT TEST

SIZE	CODE IDENT NO	NUMBER
A	11323	16704

SCALE	REV	SHEET

DATA SHEET NO. 5 OF 6 PARAGRAPH NO. 4.14

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 5800

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
7.3	Verify that the voltage across the Cooler Door Fusible Link TP's and across the Main Shutter Fusible Link TP's is ≤10mV.	≤10	01.5 ✓	mvolts
8.	Shutter Fusible Link Switches A and B Closed.			
8.1	Execute commands:			
	SHUTTER FUSIBLE LINK SWITCH A CLOSE.	5D	✓	(✓)
	SHUTTER FUSIBLE LINK SWITCH B CLOSE.	49	✓	(✓)
8.2	Verify via the CRT that digital			
	Word A bit 5 = 1		✓	(✓)
	bit 6 = 1		✓	(✓)
	bit 7 = 0		✓	(✓)
	Word C bit 5 = 0		✓	(✓)
	bit 6 = 0		✓	(✓)
	bit 7 = 0.		✓	(✓)
8.3	Verify that the voltage across the Cooler Door Fusible Link TP's and the Shutter Fusible Link TP's are ≤10 mV.	≤10	01.5	mvolts
9.	All Shutter Switches Closed/Shutter Fusible Link Activated.			
9.1	Execute Commands:			
	SHUTTER FUSIBLE LINK SWITCH A CLOSE.	5D	✓	(✓)

TEST ENGINEER [signature] DATE 2/27/86 QA [signature]

DATA SHEET NO. 6 OF 6 PARAGRAPH NO. 4.14

DETAILED FUNCTIONAL TESTS

LOGAHR OPER 5803

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(9.1)	SHUTTER FUSIBLE LINK SWITCH B CLOSE.	49	✓	(✓)
	SHUTTER FUSIBLE LINK SWITCH C CLOSE.	5F	✓	(✓)
9.2	Verify via the CRT that digital			
	Word A bit 5 = 1		✓	(✓)
	bit 6 = 1		✓	(✓)
	bit 7 = 1		✓	(✓)
	Word C bit 5 = 0		✓	(✓)
	bit 6 = 0		✓	(✓)
	bit 7 = 0.		✓	(✓)
9.3	Verify that the Shutter Fusible Link Sonalert is switched to the Alarm position and is sounding. Verify that the indicator LED is lit.		✓	(✓)
9.4	Verify that there is 1.5V(±20%)across the Shutter Fusible Link TP's.	1.5 ± 0.5	1.44	volts
9.5	Verify that there is ≤10mV across the Cooler Door Fusible Link TP's.	≤10	1.5	mvolts
10.	Reset. Repeat 4.14.2.		✓	(✓)
11.	Remove plug P14.		✓	(✓)

TEST ENGINEER [signature] DATE 2/25/14 QA [signature] 1/17

E.M. MODULE UNIT TEST

SIZE	CODE IDENT NO	NUMBER
A	11323	16704

SCALE | REV | SHEET

DATA SHEET NO. 1 OF 4 PARAGRAPH NO. 4.15

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DETAILED FUNCTIONAL TESTS

LOG AHR OPER 5807

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(4.15)	Note: In Order To Perform This Test Board A08(31-12) Must Be Installed.			
	BAFFLE HEATER TEST			
1.	Confirm that test cable 44 is properly connected between the Electronics Module and the Function Test Panel.		✓	(√)
	Connect test cable 20 and its breakout box to J20 on the Electronics Module.		✓	(√)
2.	In order to simulate the Baffle Heater Controller thermistor, connect Decade Resistor #1 across the Baffle Heater Input Test Points on the Function Test Panel. Set DR #1 at 05000 ohms ("hot"). To simulate the Baffle Temp Sensor thermistor connect Decade Resistor #2 across TP's 4 and 10 on the Function Test Panel. Set DR #2 at 05000 ohms ("hot").		✓	(√)
			✓	(√)
3.	To measure Baffle Heater Current connect a DVM across the Baffle Heater current Test Points on the Function Test Panel. The output will be measured in volts, with a scaling of 1 V indicating a 1 A current flow.		✓	(√)
4.	Heater and Backup Off.			
4.1	Execute command: BAFFLE HEATER CONTROLLER OFF/BACKUP OFF.	56	✓	(√)
4.2	Verify via the CRT that digital Word F bit 0 = 0		✓	(√)
	bit 1 = 0.		✓	(√)
4.3	Verify that the baffle heater current is ≤ 1 mA (≤ 1 mV reading on the DVM).	≤1	0.0 ✓	mvolts
	Verify that analog telemetry Channel 54 "Baffle Heater Current" is ≤ 1.0V.	≤1.0	0.040 ✓	volts

TEST ENGINEER Kinton DATE 2/25/86 QA

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO 11323	NUMBER 16704
	SCALE	REV	SHEET

DATA SHEET NO. 2 OF 4 PARAGRAPH NO. 4.15

ORIGINAL PAGE IS OF POOR QUALITY

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 58C3

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
5.	Baffle Heater Controller On.			
5.1	Execute commands: TELEMETRY SCALING ON. BAFFLE HEATER CONTROLLER	7	✓	( )
	OFF/ BACKUP OFF.	56	✓	(√)
	BAFFLE HEATER CONTROL ON.	54	✓	(√)
5.2	Verify via the CRT that Digital Word F bit 0 = 1		✓	(√)
	bit 1 = 0.		✓	(√)
5.3	Verify that the baffle heater current DVM is measuring ≤1 mV.	≤1	0.0000	mvolts
5.4	Using a DVM verify that test point J20-41 "Baffle Temp Error Test" is in the range 0<V<1V.	0<V<1	+0.239	volts
	Using a DVM verify that test point J20-42 "Baffle Heater Current Test" is in the range 0<V<.1V.	0<V<.1	0.0001	volts
5.5	Set DR #1 at 30000 ohms ("cold").		✓	(√)
	Verify that the baffle heater current DVM is reading ≥300 mV.	≥300	553	mvolts
	Verify that analog telemetry Channel 54 is ≥ 2.5V.	≥2.5	5.100	volts
5.6	Using a DVM verify that test point J20-41 is in the range 2<V<15V.	2<V<15	4.66	volts
	Verify that test point J20-42 is in the range 0.2<V<1V.	.2<V<1	0.704	volts

TEST ENGINEER Fenton DATE 2/22/84 QA (I 1/2)

E.M. MODULE UNIT TEST

SIZE	CODE IDENT NO	NUMBER
A	11323	16704

SCALE | REV | SHEET

DATA SHEET NO. 3 OF 4 PARAGRAPH NO. 4.15

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 5300

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
6.	Heater and Backup On.			
6.1	Execute commands: BAFFLE HEATER CONTROLLER OFF/			
	OFF/BACKUP OFF.	56	✓	(√)
	BAFFLE HEATER CONTROL ON	54	✓	(√)
	BAFFLE HEATER BACKUP ON.	55	✓	(✓)
6.2	Verify via the CRT that digital Word F bit 0 = 1		✓	(√)
	bit 1 = 1.		✓	(√)
3	Verify that the baffle current DVM is measuring ≥300 mV.	≥300	371	mvolts
	Verify that analog telemetry Channel 54 is ≥2.5V.	≥2.5	4.16	volts
7.	Reset/Controller On.			
7.1	Execute commands: BAFFLE HEATER CONTROLLER OFF/			
	BACKUP OFF.	56	✓	(√)
	BAFFLE HEATER CONTROL ON	54	✓	(√)
7.2	Verify via the CRT that digital Word F bit 0 = 1		✓	(√)
	bit 1 = 0.		✓	(.)

TEST ENGINEER [signature] DATE 2-21-86 QA [signature] 172

E.M. MODULE UNIT TEST

SIZE	CODE IDENT NO	NUMBER
A	11323	16704

SCALE	REV	SHEET

DATA SHEET NO. 4 OF 4 PARAGRAPH NO. 4.15

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DETAILED FUNCTIONAL TESTS

LOG AHR OPER 5805

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
8.	Baffle Temperature Telemetry.			
8.1	Execute command: DC RESTORE OFF/TELEMETRY SCALING OFF.	6	✓	(√)
8.2	Verify via the CRT that analog telemetry Channel 69 "Baffle Temperature" is ≤1.0V.	≤1.0	0.000	volts
8.3	Execute command: TELEMETRY SCALING ON.	7	✓	(√)
8.4	Verify that analog telemetry Channel 69 is ≥ 2.5V.	≥2.5	5.0	volts
8.5	Reset DR #2 to 30000 ohms ("cold").		✓	(√)
	Verify that analog telemetry Channel 69 is ≤1.0V.	≤1.0	.44	volts
9.	Baffle Heater Off/Backup Off.			
1	Execute commands:			
	BAFFLE HEATER CONTROLLER OFF/ BACKUP OFF.	56	✓	(√)
	DC RESTORE OFF/TELEMETRY SCALING OFF.	6	✓	(√)
9.2	Verify via the CRT that digital Word F bit 0 = 0.		✓	(√)
	bit 1 = 0		✓	(√)
	Word L bit 2 = 0.		✓	(√)
9.3	Verify that the baffle current DVM is measuring ≤1 mV.	≤1 mV.	-0.0	mvolts
	Verify that analog telemetry Channel 54 is ≤1.0V.	≤1.0	0.0	volts

TEST ENGINEER Layton DATE 2/21/86 QA 172

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO 11323	NUMBER 16704
	SCALE	REV	SHEET

TA SHEET NO. ___ OF 11 PARAGRAPH NO. 4.17

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DETAILED FUNCTIONAL TESTS

LOG AHR OPER 5700

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
	Note: In Order To Perform This Test Boards A09(50932) & A16(50912) Must Be Installed.			
(4.17)	COOLER DOOR TEST			
1.	Confirm that test cable 43 is properly connected between the Electronics Module and the Function Test Panel.		✓	(✓)
	Attach test cable 20 and its breakout box to J20 on the Electronics Module		✓	(✓)
1.1	Set all cooler door switches on the Function Test Panel (ungrounded).			
	Execute command: COOLER DOOR ELECTROMAGNET OFF/ FRAME DC RESTORE SELECT.	1F	✓	(✓)
	COOLER DOOR MOVE INHIBIT.	88	✓	(✓)
	COOLER DOOR MOTOR OFF.	53	✓	(✓)
2.	Electromagnet off.			
2.1	Execute command: COOLER DOOR ELECTROMAGNET ON.	1E	✓	(✓)
2.2	Verify via the CRT that digital Word C bit 3 = 1.			
2.3	Execute command: COOLER DOOR ELECTROMAGNET OFF/ FRAME DC RESTORE SELECT.	1F	✓	(✓)
2.4	Verify via the CTT that digital Word C bit 3 = 0		✓	(✓)
3.	Break Release.			
	Execute command: COOLER DOOR MOTOR OFF.	53	✓	(✓)
3.1	Verify via the CRT that digital			

TEST ENGINEER [signature] DATE 2-5-86 QA [signature]

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO 11323	NUMBER 16704
	SCALE	REV C	SHEET 1

DATA SHEET NO. 2 OF 11 PARAGRAPH NO. 4.17

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 5800

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
3.1 -	Word C bit 4 = 0.		✓	( )
3.2	Connect a DVM across the Cooler Door Brake TP's on the Function Test Panel, observing the proper polarities.		✓	(✓)
3.3	Execute commands:			
	COOLER DOOR MOTOR ON.	52	✓	(✓)
	COOLER DOOR MOVE INHIBIT.	88	✓	(✓)
	COOLER DOOR MOVE.	87	✓	
3.4	Verify via the CRT that digital Word I bit 4 = 1.		✓	(✓)
	C bit 4 = 1.		✓	
	Verify that the DVM is measuring 33 (±3.0) VDC.	33 (±3.0)	31.9 ✓	volts
3.5	Execute command:			
	COOLER DOOR MOTOR OFF.	53	✓	(✓)
	COOLER DOOR MOVE INHIBIT.	88	✓	(✓)
4.	Cooler Door Switches			
4.1	Door Closed. Set the cooler door switches on the Function Test Panel as follows:			
	"open" - down.	down	✓	(✓)
	"closed" - up (grounded).	up	✓	(✓)
	"outgas" - down.	down	✓	(✓)
4.2	Execute command:			
	COOLER DOOR MOTOR ON.	52	✓	(✓)
4.3	Verify via the CRT that digital			
	Word C bit 0 = 1		✓	(✓)
	bit 1 = 0		✓	(✓)

TEST ENGINEER [illegible] DATE 2/21/84 QA [illegible]

E.M. MODULE UNIT TEST

SIZE	CODE IDENT NO	NUMBER
A	11323	16704

SCALE | REV | SHEET

DATA SHEET NO. 3 OF 11 PARAGRAPH NO. 4.17

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DETAILED FUNCTIONAL TESTS

LOG AHR OPER 5800

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
4.3)	bit 2 = 0		✓	(✓)
	bit 4 = 1.		✓	(✓)
4.4	Outgas position. Set the cooler door switches on the Function Test Panel as follows:			
	"open" - down.		✓	(✓)
	"closed" - down.		✓	(✓)
	"outgas" - up (grounded).		✓	(✓)
	Execute command: COOLER DOOR MOTOR ON.	52	✓	(✓)
4.5	Verify via the CRT that digital			
	Word C bit 0 = 0		✓	(✓)
	bit 1 = 1		✓	(✓)
	bit 2 = 0		✓	(✓)
	bit 4 = 1.		✓	(✓)
4.6	Full open. Set the cooler door switches on the Function Test Panel as follows:			
	"open" - up (grounded).		✓	(✓)
	"closed" - down.		✓	(✓)
	"outgas" - down.		✓	(✓)
	Execute command: COOLER DOOR MOTOR ON.	52	✓	(✓)
4.7	Verify via the CRT that digital			
	Word C bit 0 = 0		✓	(✓)
	bit 1 = 0		✓	(✓)
	bit 2 = 1		✓	(✓)

TEST ENGINEER [signature] DATE 2/2/84 QA (1) 7/2

E.M. MODULE UNIT TEST

SIZE	CODE IDENT NO	NUMBER
A	11323	16704

SCALE | REV | SHEET

DATA SHEET NO. 4 OF 11 PARAGRAPH NO. 4.17

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 5800

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(4.7)	bit 4 = 1.	–	✓	(✓)
4.8	Reset. Set all switches down.			
	Execute command:			
	COOLER DOOR MOTOR OFF.	53	✓	(✓)
	Verify via the CRT that digital			
	Word C bit 0 = 0		✓	(✓)
	bit 1 = 0		✓	(✓)
	bit 2 = 0		✓	(✓)
	bit 4 = 0.		✓	(✓)
5	Motor Test			
	Connect an oscilloscope to Door Motor Phase 1, No. 1 (+) TP and Door Motor Phase 2, No. 1 (+) TP on the Function Test Panel.		✓	(✓)
5.1	Door Opening.			
	Execute commands:			
	COOLER DOOR MOTOR ON.	52	✓	(✓)
	COOLER DOOR OPEN.	85	✓	(✓)
	COOLER DOOR MOVE INHIBIT.	88	✓	(✓)
	COOLER DOOR MOVE	87	✓	(✓)

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TEST ENGINEER [signature] DATE 2/25/82 QA [stamp]

E.M. MODULE UNIT TEST

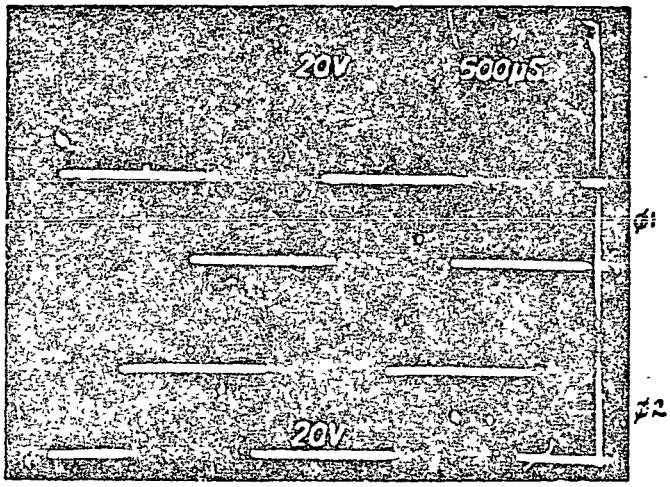
SIZE	CODE IDENT NO	NUMBER
A	11323	16704

SCALE REV – SHEET –

DATA SHEET NO. 5 OF 11 PARAGRAPH NO. 4.1?

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 5800

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
5.1	Observe the phase 2 test point shifted 90° with respect to the phase 1 test point. Photograph the waveform and attach it below:  	ORIGINAL PAGE IS OF POOR QUALITY	✓	(✓)
5.2	Verify via the CRT that digital Word C bit 4 = 1		✓	(✓)
	Word I bit 4 = 1		✓	(✓)
	bit 5 = 1.		✓	(✓)

TEST ENGINEER Hinton DATE 2/24/82 QA

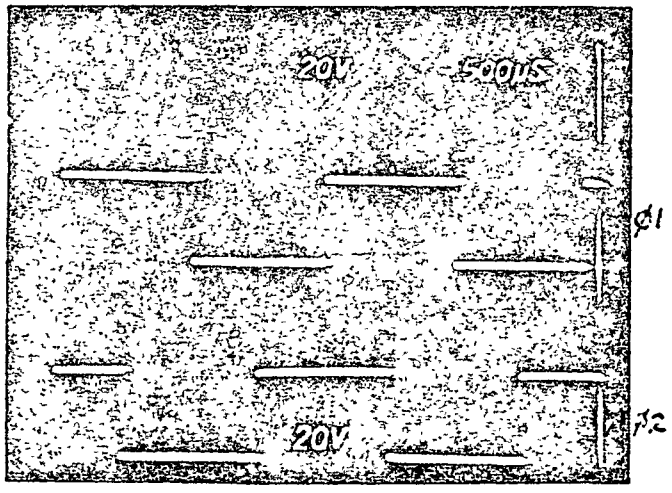
E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO 11323	NUMBER 16704
	SCALE	REV	SHEET

DATA SHEET NO. 6 OF 11 PARAGRAPH NO. 4.17

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 5803

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
5.3	Door Closing.			
	Execute commands:			
	COOLER DOOR MOTOR ON.	52	✓	(✓)
	COOLER DOOR CLOSE.	86	✓	(✓)
	COOLER DOOR MOVE INHIBIT.	88	✓	(✓)
	COOLER DOOR MOVE.	87	✓	(✓)
5.4	Observe the phase 2 test point shifted 270° with respect to the phase 1 test point.		✓	(—)
	Photograph the waveform and attach it below:			



TEST ENGINEER [signature] DATE 2/24/82 QA [signature] 3/3/82

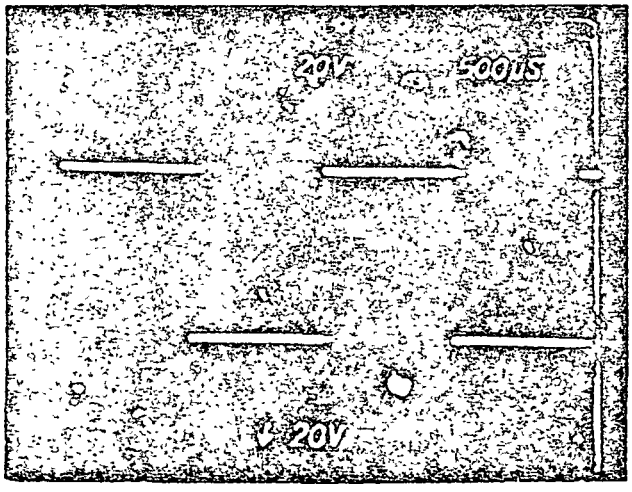
E.M. MODULE UNIT TEST | SIZE A | CODE IDENT NO 11323 | NUMBER 16704 | SCALE | SHEET

DATA SHEET NO. 7 OF 11 PARAGRAPH NO. 4.12

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 5200

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
5.5	Verify via the CRT that digital			
	Word C bit 4 = 1		✓	(✓)
	Word I bit 4 = 1		✓	(✓)
	bit 5 = 0.		✓	(✓)
5.6	Connect the oscilloscope to Door Motor Phase 1, No. (+) TP and Door Motor Phase 1, No. (-) TP.			
	Differentially measure voltage,	50(±12)	60	Vp-p
	frequency.	400(±12)	400	Hz
	(Note: since the door motor output is a clocked signal it may be necessary to reissue cooler door Move Enable command 88/87 periodically. Do so as needed.)			
	Photograph waveform and attach below:			



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TEST ENGINEER Fenton DATE 8/26/82 QA —

E.M. MODULE UNIT TEST

SIZE	CODE IDENT NO	NUMBER
A	11323	16704

SCALE REV SHEET —

DATA SHEET NO. 8 OF 11 PARAGRAPH NO. 4.17

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 5X07

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
5.7	Connect an oscilloscope to test points J20-44 "Phase 1, No. 1 Test" and J20-45 "Phase 1, No. 2 Test." Issuing command 88/87 as needed, verify that each test point produces a 30V p-p squarewave output.	30(±6)	✓ ✓31	(✓) Vp-p
5.8	Repeat 4.17.5.6 above for Door Motor Phase 2 outputs.			
	voltage	50(±12)	60	Vp-p
	frequency	400(±12)	✓400	Hz

Photograph:

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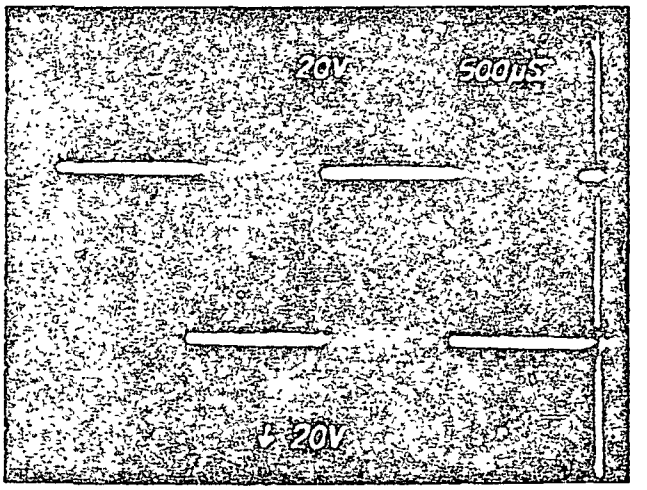

TEST ENGINEER Leyton DATE 2/26/[illegible] QA

E.M. MODULE UNIT TEST

SIZE	CODE IDENT NO	NUMBER
A	11323	16704

SCALE REV SHEET

DATA SHEET NO. 9 OF 11 PARAGRAPH NO. 4.17

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 580

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
5.9	Connect an oscilloscope to test points J20-46 "Phase 2, No. 1 Test" and J20-47 "Phase 2, No. 2 Test." Issuing command 88/87 as needed, verify that each test point produces a 30V p-p squarewave output.	30 ± 6	✓ / 31	(✓) / Vp-p
6.	Gated Clock Test			
6.1	Execute command: COOLER DOOR MOVE INHIBIT.	88	✓	(✓)
	Verify via the CRT that digital Word I bit 4 = 0.		✓	(✓)
6.2	Connect the oscilloscope across the Door Motor Phase 2 Outputs and set it for a slow sweep Rate.		✓	(✓)
	Execute command: COOLER DOOR MOVE	87	✓	(✓)
6.3	Verify that the door motor output waveform appears for 15(±2) seconds.	15(±2)	14	sec.
	Connect another oscilloscope to test point J20-48 "3.2 kHz Clock Test."		✓	(✓)
	Execute command 88/87 and verify a 3.2 kHz TTL signal on J20-48.	3.2±0.2	3.1	kHz
	Verify via the CRT that digital Word I bit 4 = 1.		✓	(✓)
6.4	Set the Cooler Door Switch "Closed" in the up (grounded) position.		✓	(✓)
	Execute commands 88/87.	88/87	✓	(✓)

TEST ENGINEER [signature] DATE 2/26/86 QA

E.M. MODULE UNIT TEST

SIZE	CODE IDENT NO	NUMBER
A	11323	16704

SCALE | REV | SHEET

DATA SHEET NO. 10 OF 11 PARAGRAPH NO. 4.17

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 580

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(6.4)	ORIGINAL PAGE IS OF POOR QUALITY		✓	(✓)
6.5				
	COOLER DOOR MOVE INHIBIT.	88	✓	(✓)
	COOLER DOOR MOVE.	87	✓	(✓)
	Verify that the door motor output waveform appears across the Phase 2 outputs for 0.5(±0.2) seconds.	0.5(±0.2)	.6	sec.
7.	Reset.			
7.1	Set all switches down.		✓	(✓)
	Execute commands:			
	COOLER DOOR MOVE INHIBIT.	88	✓	(✓)
	COOLER DOOR MOTOR OFF.	53	✓	(✓)
7.3	Verify via the CRT that digital			
	Word C bit 0 = 0		✓	(✓)
	bit 1 = 0		✓	(✓)
	bit 2 = 0		✓	(✓)
	bit 3 = 0		✓	(✓)
	bit 4 = 0		✓	(✓)
	Word I bit 4 = 0.		✓	(✓)

TEST ENGINEER J. LUYTON DATE 2/26/85 QA

E.M. MODULE UNIT TEST

SIZE	CODE IDENT NO	NUMBER
A	11323	16704

SCALE REV SHEET

Word/Bit	Function	CMD On	CMD Off
C/0	Cooler Door Closed	N/A	N/A
C/1	Cooler Door Outgas Position	N/A	N/A
C/2	Cooler Door Full Open	N/A	N/A
C/3	Cooler Door Magnet On	1E	1F
C/4	Cooler Door Motor On	52	53
I/4	Cooler Door Move Enable/Inhibit	87	88
I/5	Cooler Door Open	85*	86†

* Door is Opening

† Door is Closing

Table 4.17

DATA SHEET NO. 1 OF 3 PARAGRAPH NO. 4.18

DETAILED FUNCTIONAL TESTS

LOGAHR OPER 5850

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(4.18)	LVDT POWER CONTROL			
1.	Confirm that test cable 46 is connected properly between the Electronics Module and the Function Test Panel (FTP).		✓	(✓)
2.	LVDT Power Check.			
2.1	Execute command:			
	LVDT POWER OFF.	5E	✓	(✓)
	LVDT POWER ON	5B	✓	(✓)
2.2	Verify via the CRT that digital			
	Word E bit 1 = 1.		✓	(✓)
2.3	Connect a DVM between LVDT Power 1 TP and LVDT Return TP on the FTP.		✓	(✓)
	Confirm that the DVM measures +15(±0.3)VDC	14.7 ≤V≤15.3	15.0	VDC
2.4	Connect a DVM between LVDT Power 2 TP and LVDT Return TP on FTP.		✓	(✓)
	Confirm that the DVM measures +15(±0.3)VDC	14.7 ≤V≤15.3	15.0	VDC
2.5	Connect a DVM between LVDT Power 3 TP and LVDT Return TP on FTP		✓	(✓)
	Confirm that the DVM measures +15(±0.3)VDC	14.7 ≤V≤15.3	15.0	VDC
2.6	Execute command:			
	LVDT POWER OFF.	5E	✓	(✓)
2.7	Verify via the CRT that digital			
	Word E bit 1 = 0.		✓	(✓)

TEST ENGINEER J Guyton DATE 2/26/82 QA

E.M. MODULE UNIT TEST | SIZE A | CODE IDENT NO 11323 | NUMBER 16704 | SCALE | REV | SHEET

DATA SHEET NO. 2 OF 3 PARAGRAPH NO. 4.1S

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 5200

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
2.8	Repeat subparagraphs 2.3 to 2.5 and confirm the following DVM measurement:			
	2.3: 0(±0.1)VDC	-0.1≤V≤0.1	✓	VDC
	2.4: 0(±0.1)VDC	-0.1≤V≤0.1	✓	VDC
	2.5: 0(±0.1)VDC	-0.1≤V≤0.1	✓	VDC
3.	LVDT #1 Output Buffer Check.			
3.1	Execute command:			
	LVDT POWER ON	5B	✓	(✓)
3.2	Verify via the CRT that digital			
	Word E bit 1 = 1.		✓	(✓)
3.3	Connect the Power Design 2005 voltage reference between LVDT Output 1 TP and LVDT Return		✓	(✓)
3.4	Request analog telemetry Channel 56 "Inchworm 1 position" on CRT.		✓	(✓)
3.5	With voltage reference adjusted for -1.50(±0.20)VDC input, verify that analog telemetry channel 56 output reads 0.20(±0.40)VDC.	-0.20≤V≤0.60	.08	VDC
3.6	With voltage reference adjusted for 0.00(±0.20)VDC input, verify that channel 56 output reads 2.50(±0.40)VDC.	2.10≤V≤2.90	2.56	VDC
3.7	With voltage reference adjusted for 1.50(±0.20)VDC input verify that channel 56 output reads 5.00(±0.40)VDC.	4.60≤V≤5.40	4.96	VDC

TEST ENGINEER J. GUYTON DATE 2/26/86 QA

E.M. MODULE UNIT TEST

SIZE	CODE IDENT NO	NUMBER
A	11323	16704

SCALE REV SHEET

DATA SHEET NO. 3 OF 3 PARAGRAPH NO. 4.18

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DETAILED FUNCTIONAL TESTS

LOG AHR OPER 5800

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
-.0	LVDT #2 Output Buffer Check.			
4.1	Reset voltage reference to 0.0(±0.20)VDC, remove it from LVDT Output 1 TP, and connect it to LVDT Output 2 TP.		✓	(✓)
4.2	Request analog telemetry Channel 57 "Inchworm 2 position" on CRT.		✓	(✓)
4.3	Repeat subparagraphs 3.5 to 3.7 and verify that Channel 57 outputs read as follows			
	3.5: 0.20(±0.40)VDC	-0.20≤V≤0.60	.08	VDC
	3.6: 2.50(±0.40)VDC	2.10≤V≤2.90	2.56	VDC
	3.7: 5.00(±0.40)VDC.	4.60≤V≤5.40	5.1	VDC
	LVDT #3 Output Buffer Check.			
5.1	Reset voltage reference to 0.0(±0.20)VDC, remove it from LVDT Output 2 TP, and connect it to LVDT Output 3 TP.		✓	(✓)
5.2	Request analog telemetry Channel 58 "Inchworm 3 position" on CRT.		✓	(✓)
5.3	Repeat subparagraphs 3.5 to 3.7 and verify that Channel 58 outputs read as follows			
	3.5: 0.20(±0.40)VDC	-0.20≤V≤0.60	.08	VDC
	3.6: 2.50(±0.40)VDC	2.10≤V≤2.90	2.62	VDC
	3.7: 5.00(±0.40)VDC.	4.60≤V≤5.40	4.96	VDC
6.	Reset.			
6.1	Execute command: LVDT POWER OFF	5E	✓	(✓)
6.2	Verify via the CRT that digital Word E bit 1 = 0.		✓	(✓)

TEST ENGINEER Hinton DATE 2/26/88 QA

E.M. MODULE UNIT TEST

SIZE	CODE IDENT NO	NUMBER
A	11323	16704

SCALE | REV | SHEET

Appendix E

Electronics Module Performance Test

Part 3

Post-Vibration Test Data

DATA SHEET NO. 1 OF 10 PARAGRAPH NO. 4.2

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 200

PARA OR STEP NO.	PROCEDURE STEP		SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(4.2)	CDVU TEST				
1.	Auxiliary Circuits (A22) Test				
1.1	Install Board A22 (Aux Circuits Board - 52798) on a card extender.			✓	(✓)
1.2	Turn on power. Turn on multiplexer/ multiplexer simulator.			✓	(✓)
1.3	Using an oscilloscope, verify the presence of the following output signals on the specified pins (refer to Table 4.2A for details):				
	Signal	Pins			
	208.1 kHz SLC Delay Clk (PRI)	177,178	Table 4.2A	✓	(✓)
	$\overline{208.1 \text{ kHz SLC Delay Clk (PRI)}}$	179,180	Table 4.2A	✓	(✓)
	104 kHz Sync. (PRI)	169,170	Table 4.2A	✓	(✓)
	208.1 kHz SLC Delay Clk (Rdt)	175,176	Table 4.2A	✓	(✓)
	$\overline{208.1 \text{ kHz SLC Delay Clk (Rdt)}}$	173,174	Table 4.2A	✓	(✓)
	104 kHz Sync. (Rdt)	83,84	Table 4.2A	✓	(✓)
	Buffered Line Stop	77,78	Table 4.2A	✓	(✓)
	$\overline{\text{Buffered Line Stop}}$	75,76	Table 4.2A	✓	(✓)
	End of Scan	79,80	Table 4.2A	✓	(✓)
	$\overline{\text{End of Scan}}$	81,82	Table 4.2A	✓	(✓)
1.4	Turn power off. Turn off multiplexer/multiplexer simulator. Take A22 off extender card and install directly in its connector.			✓	(✓)

TEST ENGINEER [signature] DATE 9/22/81 QA [signature]

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO 11323	NUMBER 16704
	SCALE	REV 2	SHEET 27

Table 4.2A

A22 Test Matrix

STEP	MUX OUTPUT PINS (REF.)	A22 INPUT PINS (REF.)	A22 OUTPUT PINS	OUTPUT TYPE* SIGNAL	VERIFY
1	P09-D3	A22-151,152	177,178	208.1 kHz Clk (2a) Frequency 208.1 (±4 ¼ kHz); duty cycle 20 (± 17) %	✓
2	P09-D4	-67,68	179,180	$\overline{208.1}$ kHz Clk (2b) Increase of above step 1 tmg	✓
3			169,170	104 kHz Sync (1) Freq. 104 (±2.1)kHz; duty cycle 40(±8)%	✓
4	P09-A1	A22-171,172	175,176	208.1 kHz Dly Clk (2a) Same as above Step 1 timing	✓
5	P09-A2	-73,74	173,174	$\overline{208.1}$ kHz Dly Clk (2b) Same as above Step 2 timing	✓
6			83,84	104 kHz Sync Rdt (1) Same as above Step 3 timing	✓
7	P09-A5	A22-69,70	77,78	Buffered Line Stop (2a) 9.61 (±1.0)μs pulse; period 71.3 (±2.0) ms	✓
8	P09-B5	-71,72	75,76	$\overline{\text{Buffered Line Stop}}$ (2b) Inverse of above Step 7 wavfm	✓
9			79,80	End of Scan (2a) Same as above Step 7 waveform	✓
10			81,82	$\overline{\text{End of Scan}}$ (2b) Inverse of above Step 9 waveform	✓

* Type 1. TTL Compatible

Logic "1" +2.4 to +5.5V

Logic "0" -1.0 to +1.5V

Type 2. Line Receiver Compatible

2a { Logic "1"; AND: 2.4 to 5.0V; NAND: 0.0 to 0.4V }

2b { Logic "0"; NAND: 0.0 to 0.4V; AND: 2.4 to 5.0V }

SIZE	CODE IDENT NO	NUMBER
A	11323	16704

SCALE	REV	SHEET

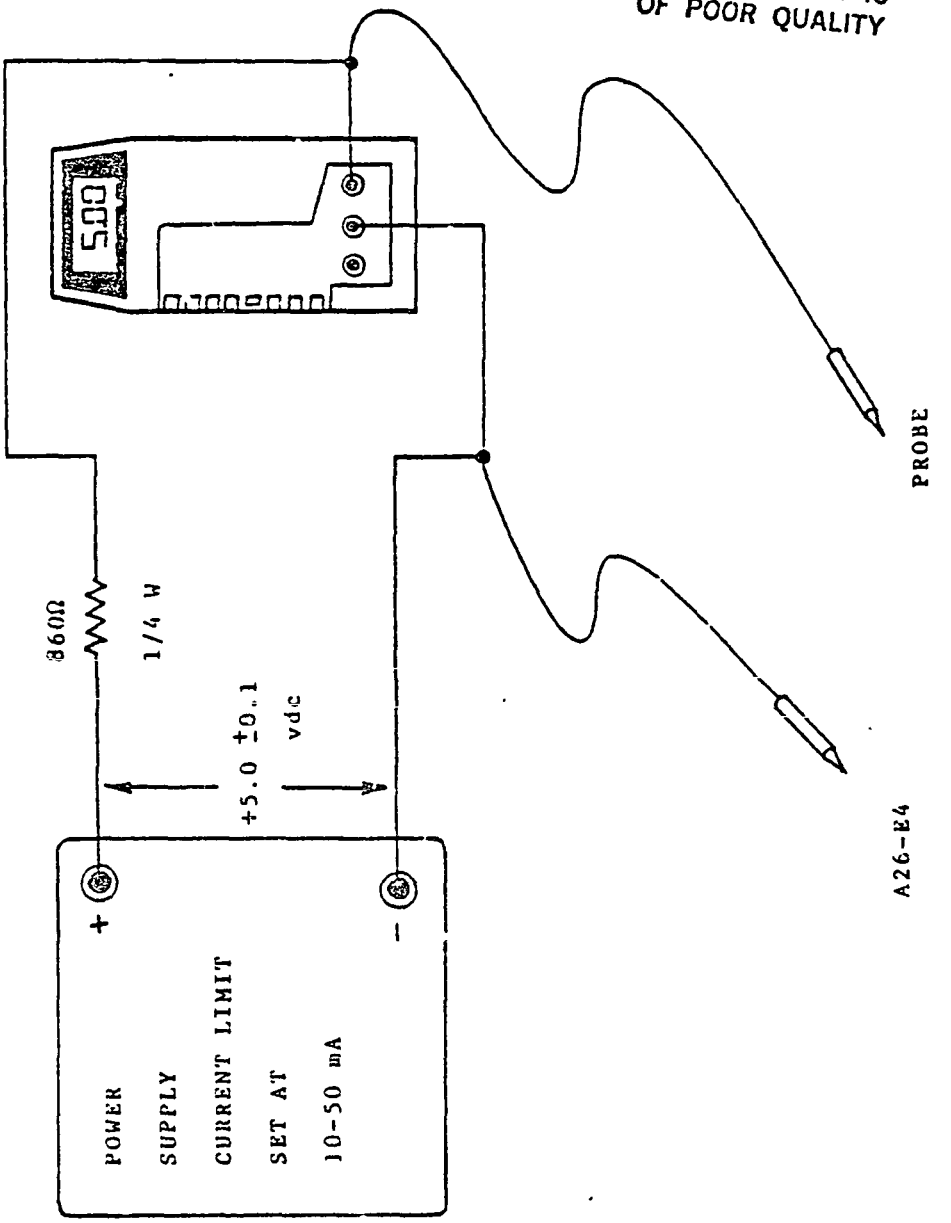

Figure 4.2-1. A10 Test Circuit
Pull up to +5 vdc is unnecessary

SIZE	CODE IDENT NO	NUMBER
A	11323	16704
SCALE	REV C	SHEET

DATA SHEET NO. 2 OF 12 PARAGRAPH NO. 4.2

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 700

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
2.	Serial Magnitude Board (A10) Test			
2.1	With power off, install board A10 (Serial Magnitude Command Receiver/Decoder Board - 50901) on an extender card.		✓	(✓)
	Install board A11 (Verification Register Unit - 50949) in its connector.		✓	(✓)
	Turn on power.		✓	(✓)
2.2	Execute command: SERIAL COMMAND RECEIVER 2 ON/1 OFF.	34	✓	(✓)
2.3	Verify via the CRT that digital Word A bit 4 = 0.		✓	(✓)
2.4	Execute command: SERIAL COMMAND RECEIVER 1 ON/2 OFF.	33	✓	(✓)
2.5	Verify via the CRT that digital Word A bit 4 = 1.		✓	(✓)
2.6	Issue commands as indicated in the second column of data sheet 4.2.2A. After each command is issued, use the test circuit in Figure 4.2-1 (or equivalent) to verify the output signal bit/state status at the points indicated on A10. (The status of test points is determined as follows): Logic "1" = +2.4 to +5.5 VDC Logic "0" = -1.0 to +1.5 VDC)			

TEST ENGINEER [signature] DATE 4/22/71 QA [signature]

E.M. MODULE UNIT TEST

SIZE A | CODE IDENT NO 11323 | NUMBER 16704

SCALE | REV | SHEET

DATA SHEET 4.2.2A

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A10 TEST MATRIX

TEST STEP	CMD (HEX)	A10 OUTPUT BIT/STATE	OUTPUT SIGNAL CARD/PIN(S)	OUTPUT SIGNAL DESTINATION (REF ONLY)	TLMY WORD/BIT	VERIFY OUTPUT	VERIFY TLMY
1	94	7/1	A10 - 5,	A3 - 25,	J/6=0	✓	✓
2	93	7/0	6	26	=1	✓	✓
3	92	8/1	A10 - 95,	A3 - 111,	J/7=0	✓	✓
4	91	8/0	96	112	=1	✓	✓
5	90	9/1	A10 - 167,	A3 - 107,	I/0=0	✓	✓
6	8F	9/0	168	108	=1	✓	✓
7	8E	10/1	A10 - 77,	A3 - 93,	I/1=0	✓	✓
8	8D	10/0	78	94	=1	✓	✓
9	8C	11/1	A10 - 83,	A3 - 11,	I/2=0	✓	✓
10	8B	11/0	84	12	=1	✓	✓
11	8A	12/1	A10 - 173,	A3 - 13,	I/3=0	✓	✓
12	89	12/0	174	14	=1	✓	✓
13	88	13/1	A10 - 71,	A9 - 31,	I/4=0	✓	✓
14	87	13/0	72	32	=1	✓	✓
15	86	14/1	A10 - 161,	A9 - 21,	I/5=0	✓	✓
16	85	14/0	162	22	=1	✓	✓
17	84	15/0	A10 - 163,	MUX J13-A1	I/6=0	✓	✓
18	83	15/1	164	A2	=1	✓	✓
19	82	16/0	A10 - 73,	MUX J13-A3	I/7=0	✓	✓
20	81	16/1	74	A4	=1	✓	✓

SIZE	CODE IDENT NO	NUMBER
A	11323	16704
SCALE	REV C	SHEET 2

DATA SHEET NO. 3 OF 10 PARAGRAPH NO. 4.2

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 700

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
2.7	After each command is issued in 4.2.2.7, telemetry Words I and J shall be monitored. Verify that these status words reflect the "bit/state" status of Column 3 of Data Sheet 4.2.2A.			
3.	Macro Discrete No. 2 Command Generator (A14)			
3.1	With power off, install board A14 (Macro Discrete No. 2 Command Generator - 51814).		✓	(✓)
	Install extender cards in connectors A12 and A13.		✓	(✓)
	Turn power on.		✓	(✓)
3.2	Execute command:			
	MACRODISCRETE COMMAND GENERATOR OFF.	39	✓	(✓)
	Verify via the CRT that digital			
	Word F bit 2 = 0		✓	(✓)
	bit 3 = 0		✓	(✓)
	bit 4 = 0		✓	(✓)
	bit 5 = 0.		✓	(✓)
3.3	With an oscilloscope, monitor power-on voltage at A12, pins 81, 82.		✓	(✓)
	Execute command:			
	MACRODISCRETE COMMAND GENERATOR A PRIMARY ON/A REDUNDANT OFF.	35	✓	(✓)

TEST ENGINEER [signature] DATE 4 Jan '81 QA [signature]

E.M. MODULE UNIT TEST

SIZE	CODE IDENT NO	NUMBER
A	11323	16704

SCALE REV C SHEET

DATA SHEET NO. 4 OF 10 PARAGRAPH NO. 4.2

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 200

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(3.3)	Verify an initial TTL high voltage (power on reset) at A12 pins 81, 82.		✓	(✓)
3.4	Verify via the CRT that digital			
	Word F bit 2 = 1		✓	(✓)
	bit 3 = 0		✓	(✓)
	bit 4 = 0		✓	(✓)
	bit 5 = 0.		✓	(✓)
3.5	Repeat 4.2.3.2. (CMD 39)			
3.6	With a DVM, monitor power-on voltage at A12, pins 17, 18.		✓	(✓)
	Execute command:			
	MACRODISCRETE COMMAND GENERATOR A REDUNDANT ON/A PRIMARY OFF.	36	✓	(✓)
	Verify an initial TTL high voltage (power-on reset) at A12, pins 17, 18.		✓	(✓)
3.7	Verify via the CRT that digital			
	Word F bit 2 = 0		✓	(✓)
	bit 3 = 1		✓	(✓)
	bit 4 = 0		✓	(✓)
	bit 5 = 0.		✓	(✓)
3.8	Repeat 4.2.3.2 (CMD 39)			

TEST ENGINEER [signature] DATE 12 Dec '11 QA

E.M. MODULE UNIT TEST

SIZE	CODE IDENT NO	NUMBER
A	11323	16704

SCALE | REV C | SHEET 22

DATA SHEET NO. 5 OF 10 PARAGRAPH NO. 4.2

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 200

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
3.9	With a DVM, monitor power-on voltage at A13, pins 81, 82.		✓	(✓)
	Execute command:			
	MACRODISCRETE COMMAND GENERATOR B PRIMARY ON/B REDUNDANT OFF.	37	✓	(✓)
	Verify an initial TTL high voltage (power on reset) at A13, pins 81, 82.		✓	( )
3.10	Verify via the CRT that digital			
	Word F bit 2 = 0		✓	(✓)
	bit 3 = 0		✓	(✓)
	bit 4 = 1		✓	(✓)
	bit 5 = 0.		✓	(✓)
3.11	Repeat 4.2.3.2. (CMD 39)		✓	(✓)
3.12	With a DVM, monitor power-on voltage at A13, pins 17, 18.		✓	(✓)
	Execute command:			
	MACRODISCRETE COMMAND GENERATOR B REDUNDANT ON/B PRIMARY OFF.	38	✓	(✓)
	Verify an initial TTL high voltage (power-on reset) at A13, pins 17, 18.		✓	(✓)
3.13	Verify via the CRT that digital			
	Word F bit 2 = 0		✓	(✓)
	bit 3 = 0		✓	(✓)

TEST ENGINEER [signature] DATE 9 DEC '81 QA

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO. 11323	NUMBER 16704
	SCALE	REV C	SHEET 5

DATA SHEET NO. 6 OF 13 PARAGRAPH NO. 4.2

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 700

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(3.13)	bit 4 = 0		✓	(✓)
	bit 5 = 1.		✓	(✓)
3.14	Repeat 4.2.3.2. (CMD 39)		✓	(✓)
4.	Macro Discrete Command Generator No. 1 Ch. 1 (A12)			
4.1	With power off, install board A12 (Macro Discrete Command Generator No. 1 - 51796) on extender card.		✓	(✓)
	Turn power on.		✓	(✓)
4.2	Execute command: MACRODISCRETE COMMAND GENERATOR A PRIMARY ON/A REDUNDANT OFF.	35	✓	(✓)
4.3	Connect breakout boxes and cable 46 to J46 on the Electronics Module.		✓	(✓)
			✓	(✓)
	Connect a DVM across test points J46-M3 (+) and J46-M4 (-).		✓	(✓)

TEST ENGINEER [signature] DATE 4 Dec '81 QA [signature]

E.M. MODULE UNIT TEST

SIZE	CODE IDENT NO	NUMBER
A	11323	16704

SCALE | REV C | SHEET 55

DATA SHEET NO. 7 OF 10 PARAGRAPH NO. 4.2

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 700

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
4.4	Execute command:			
	INCHWORM POWER ON.	4F	✓	(✓)
	Verify that +30 ± 2VDC appears between J46-M3 and J46-M4.	+30 ± 2	31.0 ✓	volts
4.5	Execute command:			
	INCHWORM POWER OFF.	50	✓	(✓)
	Verify that the voltage between J46-M3 and J46-M4 returns to 0.0 ± .1VDC.	0.0 ± .1	0.0 ✓	volts
	Execute command:			
	MACRODISCRETE COMMAND GENERATOR OFF.	39	✓	(✓)
			✓	(✓)

TEST ENGINEER [signature] DATE 4 Dec '91 QA

E.M. MODULE UNIT TEST

SIZE	CODE IDENT NO	NUMBER
A	11323	16704

SCALE | REV | SHEET

DATA SHEET NO. 8 OF 33 PARAGRAPH NO. 4.2

DETAILED FUNCTIONAL TESTS

LOG A'HR OPER 700

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
5.	Macro Discrete Command Generator No.1 Ch.2			
5.1	With power off, install board A13 (Macro Discrete Command Generator No. 1 - 51796) on extender card.		✓	(✓)
	Turn power on.		✓	(✓)
5.2	Execute command: MACRODISCRETE COMMAND GENERATOR B PRIMARY ON/B REDUNDANT OFF.	37	✓	(✓)
5.3	Install an extender card in position A08.			
5.4	Use an oscilloscope to monitor the voltage between A08 pin 165 (+) and A08 pin 61 (-1) with 2.0KΩ resistor between oscilloscope probes.		✓	(✓)
	Execute command: COOLER DOOR FUSIBLE LINK SWITCH A CLOSE	5Ⓐ	✓	(✓)
	Verify that a +28V pulse, minimum 30 millisecond pulse width, appears across A08 pin 165 and pin 61.		✓	(✓)
5.5	Use an oscilloscope to monitor the voltage between A08 pin 165 (+) and A08 pin 157 (-) with 2.0KΩ resistor between oscilloscope probes.		✓	(✓)
	Execute command: FUSIBLE LINK SWITCHES OPEN.	6Ⓐ	✓	(✓)

TEST ENGINEER [signature] DATE 4 Dec '81 QA

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO 11323	NUMBER 16704
	SCALE	REV C	SHEET 3

DATA SHEET NO. 9 OF 13 PARAGRAPH NO. 4.2

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 700

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(5.5)	Verify that a +28V pulse, minimum 30 milliseconds pulse width, appears across A08 pins 165 and 157.		✓	(✓)
5.6	Execute command:			
	MACRODISCRETE COMMAND GENERATOR OFF.	39	✓	(✓)
6.0	Redundant Command Circuitry			
6.1	Attach the cables from the Telemetry/ Command Interconnection Box receptacles TJ9,TJ9A; TJ10,TJ10A; TJ11,TJ11A; TJ16, TJ16A; to J12, J13, J15 and J17("Redundant RIU Connectors") on the Electronics Module.		✓	(✓)
6.2	Execute command:			
	SERIAL COMMAND RECEIVER 2 ON/1 OFF.	34	✓	(✓)
	Verify via the CRT that digital			
	Word A bit 4 = 0.		✓	(✓)
6.3	Perform the tests specified in Table 4.2-3, issuing the commands specified and verifying via the CRT the telemetry responses indicated. Where the telemetry state is unspecified verify that the microprocessor in the test set received the expected command Echo. Use "V" command mode (see para 3.3.8.1).		✓	(✓)

TEST ENGINEER D Emanuel DATE 12/5/91 QA

E.M. MODULE UNIT TEST | SIZE A | CODE IDENT NO 11323 | NUMBER 16704 | SCALE | REV C | SHEET 33

Table 4.2-3

REDUNDANCY TEST MATRIX

TEST STEP	CMD (HEX)	TLMY WORD/BIT/STATE	VERIFY TLMY
1	94	J/6 = 0	✓
2	93	J/6 = 1	✓
3	92	J/7 = 0	✓
4	91	J/7 = 1	✓
5	90	I/0 = 0	✓
6	8F	I/0 = 1	✓
7	8E	I/1 = 0	✓
8	8D	I/1 = 1	✓
9	8C	I/2 = 0	✓
10	8B	I/2 = 1	✓
11	8A	I/3 = 0	✓
12	89	I/3 = 1	✓
13	88	I/4 = 0	✓
14	87	I/4 = 1	✓
15	86	I/5 = 0	✓
16	85	I/5 = 1	✓
17	84	I/6 = 0	✓
18	83	I/6 = 1	✓
19	82	I/7 = 0	✓
20	81	I/7 = 1	✓
21	25	B/0 = N/A	✓
22	5A	C/5 = N/A	✓

Fonach
12/5/'91

SIZE	CODE IDENT NO.	NUMBER
A	11323	16704

SCALE | REV | SHEET

Table 4.2-3
(Continued)

REDUNDANCY TEST MATRIX

TEST STEP	CMD (HEX)	TLMY WORD/BIT/STATE	VERIFY TLMY
23	12	D/2 = N/A	✓
24	5B	E/1 = N/A	✓
25	35	F/2 = 1	✓
26	36	F/3 = 1	✓
27	37	F/4 = 1	✓
28	38	F/5 = 1	✓
29	39	F/2,3,4,5 = 0	✓
30	4B	G/1 = N/A	✓
31	1B	H/6 = N/A	✓
32	7	L/2 = N/A	✓

Bonsch
12/5/81

SIZE	CODE IDENT NO.	NUMBER
A	11323	16704

SCALE | REV C | SHEET

DATA SHEET NO. 10 OF 10 PARAGRAPH NO. 4.2

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 700

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
6.4	Before continuing to any further tests return the cabling between the Electronics Module and the Telemetry/Comand Interconnection Box to its Primary Configuration. (prior to 4.2.6.1).			
6.5	Execute commands:			
	SERIAL COMMAND RECEIVER 1 ON/2 OFF	33	✓	( )
	MACRODISCRETE COMMAND GENERATOR A PRIMARY ON/A REDUNDANT OFF	35	✓	( )
	MACRODISCRETE COMMAND GENERATOR B PRIMARY ON/B REDUNDANT OFF	37	✓	( )
	Verify via the CRT that digital			
	Word A bit 4 = 1		✓	( )
	Word F bit 5 = 0		✓	( )
	4 = 1		✓	( )
	2 = 1		✓	( )
	3 = 0		✓	( )

TEST ENGINEER Banach DATE 12/5/21 QA

E.M. MODULE UNIT TEST

SIZE	CODE IDENT NO	NUMBER
A	11323	16704

SCALE | REV C | SHEET

DATA SHEET NO. 1 OF 3 PARAGRAPH NO. 4.11

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 900

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
	Note: In Order To Perform This Test Boards A01 & A02(52250-1, 52250 -2) Must Be Installed.			
(4.11)	SCAN LINE CORRECTOR TEST			
1.	Confirm that test cable 44 is connected properly between the Electronics Module and the Function Test Panel.		✓	(✓)
	Connect test cable 20 and its breakout box to J20 on the Electronics Module.		✓	(✓)
2.	SLC #1 On/SLC #2 Off			
2.1	Execute commands:			
	SCAN LINE CORRECTORS OFF.	4C	✓	(✓)
	SCAN LINE CORRECTOR 1 ON/2 OFF.	4A	✓	(✓)
2.2	Verify via the CRT that digital			
	Word G bit 0 = 1		✓	(✓)
	bit 1 = 0.		✓	(✓)
2.3	Verify via the CRT that analog telemetry			
	Channel 44 "SLC 1 Drive Current" is 2.5 ± 2.5V.*	2.5 ± 2.5*	3.26	volts
	Channel 46 "SLC 1 ± 15V" is 2.5 ± 0.3V.	2.5 ± 0.3	2.52	volts
	Channel 47 "SLC 1 + 5V" is 2.5 ± 0.1V.	2.5 ± 0.1	2.52	volts
	* Waveform is a sawtooth shown in Figure 4.11.b.			

TEST ENGINEER [signature] DATE 11 Dec '91 QA [signature]

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO. 11323	NUMBER 16704
	SCALE	REV C	SHEET 22

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DATA SHEET NO. 2 OF 3 PARAGRAPH NO. 4.11

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 900

FARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
2.4	Using an oscilloscope confirm that the output of test point J20-1 "SLC 1 Integrator" corresponds to Figure 4.11A.	Fig. 4.11A	✓	(✓)
2.5	Using an oscilloscope confirm that the output of J20-2 "SLC 1 Torquer Current" corresponds to Figure 4.11B. Note peak amplitude	Fig. 4.11B	3.9 / 1.45 } 2.5V peak	(V pk)
2.6	Using an oscilloscope confirm that the output of J20-3 "SLC 1 Switch Tach" corresponds to Figure 4.11C.	Fig. 4.11C	✓	(✓)
3.	SLC #1 Off/SLC #2 On			
3.1	Execute command:			
	SCAN LINE CORRECTOR 2 ON/1 OFF.	4B	✓	(✓)
3.2	Verify via the CRT that digital			
	Word G bit 0 = 0		✓	(✓)
	bit 1 = 1.		✓	(✓)
3.3	Verify via the CRT that analog telemetry			
	Channel 45 "SLC 2 Drive Current" is 2.5 ± 2.5V.*	2.5 ± 2.5*	3.26	volts
	Channel 48 "SLC 2 ± 15V" is 2.5 ± 0.3V.	2.5 ± 0.3	2.44	volts
	Channel 49 "SLC 2 + 5V" is 2.5 ± 0.1V.	2.5 ± 0.1	2.48	volts
	* Waveform is a sawtooth shown in Figure 4.11b			

TEST ENGINEER [signature] DATE 11 Dec '81 QA [signature] 12/11/81

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO 11323	NUMBER 16704
	SCALE	REV C	SHEET

FORM NO 3122 A 5 81 DIETERICH POST CLEARPRINT 200M

DATA SHEET NO. 3 OF 3 PARAGRAPH NO. 4.11

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 880

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
3.4	Using an oscilloscope confirm that the output of J20-4 "SLC 2 Integrator" corresponds to Figure 4.11A.	Fig. 4.11A	✓	(✓)
3.5	Using an oscilloscope confirm that the output of J20-5 "SLC 2 Torquer Current" corresponds to Figure 4.11B. Note peak amplitude	Fig. 4.11B	3.0	(Vpk)
3.6	Using an oscilloscope confirm that the output of J20-6 "SLC 2 Switch Tach" corresponds to Figure 4.11C.	Fig. 4.11C	✓	(✓)
4.	SLC #1 Off/SLC #2 Off			
4.1	Execute command:			
	SCAN LINE CORRECTORS OFF.	4C	✓	(✓)
4.2	Verify via the CRT that digital			
	Word G bit 0 = 0		✓	(✓)
	bit 1 = 0.		✓	(✓)
4.3	Verify via the CRT that analog telemetry			
	Channel 44 is zero.	< 0.1	0.00	volts
	Channel 45 is zero.	< 0.1	0.00	volts
	Channel 46 is zero.	< 0.1	0.02	volts
	Channel 47 is zero.	< 0.1	0.02	volts
	Channel 48 is zero.	< 0.1	0.00	volts
	Channel 49 is zero.	< 0.1	0.02	volts

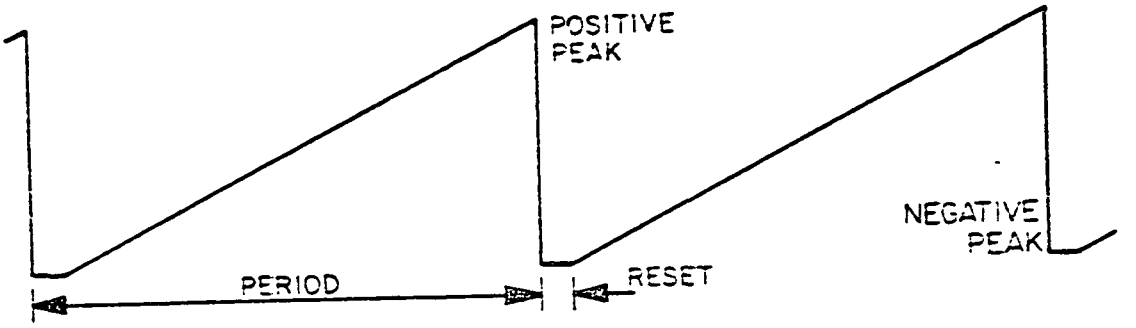
TEST ENGINEER [signature] DATE 11 Dec 81 QA [signature]

E.M. MODULE UNIT TEST

SIZE	CODE IDENT NO	NUMBER
A	11323	16704

SCALE REV 2 SHEET 32

FORM NO 3122 A 5-69 DIETZGEN "DST CLEARPRINT" 0004



PERIOD 71mS ±3%

RESET 5.12mS ±3%

NOTE: 3% IS THE OSCILLOSCOPE'S ACCURACY.
ACTUAL ACCURACY IS BETTER THAN 1%.

NEGATIVE PEAK −2V ±0.5V

POSITIVE PEAK +2V ±0.5V

FIGURE 4.11A

SIZE	CODE IDENT NO.	NUMBER
A	11323	16704
SCALE	REV	SHEET

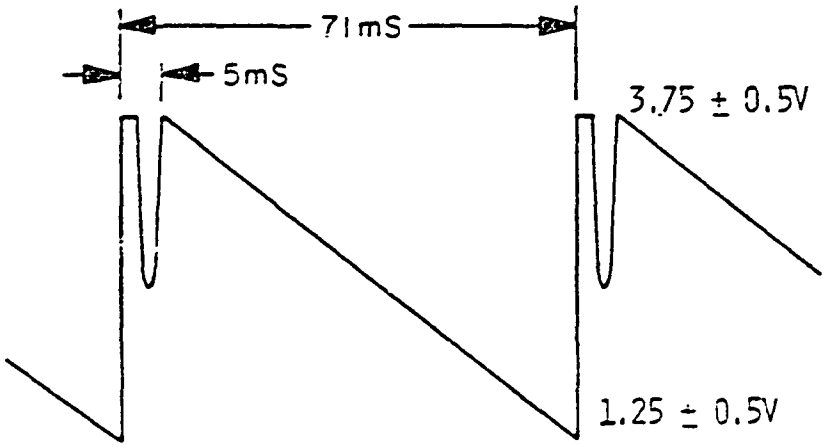


FIGURE 4.11B

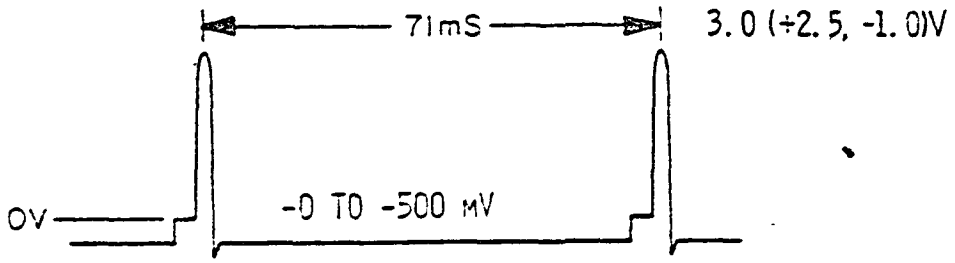


FIGURE 4.11C

SIZE	CODE IDENT NO.	NUMBER
A	11323	16704
SCALE	REV 2	SHEET 3

DATA SHEET NO. 1 OF 3 PARAGRAPH NO. 4.12

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1000

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(4.12)	Note: In Order To Perform This Test Boards A06(50916) & A07(51398) Must Be Installed.			
	CAL SHUTTER CONTROL TEST			
1.	Confirm that test cable 45 is connected between J45 on the electronics module and TJ45 on the Function Test Panel.		✓	(✓)
	Connect test cable 20 and its breakout box to J20 on the Electronics Module.		✓	(✓)
2.	MAIN SHUTTER ON/BACKUP SHUTTER OFF			
2.1	Execute Commands: SHUTTERS OFF.	F	✓	(✓)
	CAL SHUTTER ON/BACKUP SHUTTER OFF/DC RESTORE NORMAL SELECT.	D	✓	(✓)
2.2	Verify via the CRT that digital Word G bit 2 = 1		✓	(✓)
	bit 5 = 0.		✓	(✓)
	Use TLMT Scan Mode (XBC00)			
2.3	Wait one minute, then verify that digital Word G bit 3 = 1		✓	(✓)
	bit 4 = 1.		✓	(✓)
2.4	Using an oscilloscope, Verify relationship of the following test points as shown in Figure 4.12a			
	J20-23 "7 Hz Test"		✓	(✓)
	J20-24 "DC Restore Sync Signal"		✓	(✓)
	J20-25 "15° Signal"		✓	(✓)
	J20-26 "0° Signal"		✓	(✓)
	Using an oscilloscope, verify that test point J20-28 "Motor (+) Test" is toggling between gND and 28 VDC		✓	(✓)
	and that J20-29 "Motor (-) Test" is toggling between gND and 28 VDC. Frequency or period is indeterminant.		✓	(✓)

TEST ENGINEER [signature] DATE 29 Jan 82 QA [signature]

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO 11323	NUMBER 16704
	SCALE	REV -	SHEET 88

DATA SHEET NO. 2 OF 3 PARAGRAPH NO. 4.12

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1000

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
2.5	Using a DVM record test point J20-27 (ret A26 E04) "Amplitude Error" reading		2.5	VDC
	Verify that a TTL "1" level signal is at test points J20-30 "Phase Unlock Test," and J20-31 "Amplitude Unlock Test."	> 2.4 > 2.4	4.0 4.0	VDC(✓) VDC(✓)
	After lock-up, jumper J20-32 to J20-51 and verify that J20-28 goes to 13 VDC (±3) and that word G bit 3=0, bit 4=0.		✓ 15[illegible]	(✓)
3.	MAIN SHUTTER OFF/BACKUP SHUTTER ON			
3.1	Execute command: BACKUP SHUTTER ON/ CAL SHUTTER OFF/ DC RESTORE BACKUP SELECT.	E	✓	(✓)
3.2	Verify via the CRT that digital Word G bit 2 = 0		✓	(✓)
	bit 5 = 1.		✓	(✓)
3.3	Wait three minutes, then verify that digital Word G bit 6 = 1		✓	(✓)
	bit 7 = 1.		✓	(✓)
3.4	Using an oscilloscope.			
	Verify relationship of the following test points as shown in Figure 4.12b.			
	J20-34 "7Hz Test"		✓	(✓)
	J20-35 "DC Restore Sync Signal"		✓	(✓)
	J20-36 "13° Signal"		✓	(✓)
	J20-37 "0° Signal".		✓	(✓)
3.5	Using a DVM, record test point J20-38 (ret A26 E04) "Amplitude Error" reading		.01	VDC

TEST ENGINEER [signature] DATE 2/-Jan-82 QA [signature]

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO 11323	NUMBER 16704
	SCALE	REV C	SHEET 20

DATA SHEET NO. 3 OF 3 PARAGRAPH NO. 4.12

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1000

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
3.5 (contd)	Verify that a TTL level signal is at test points			
	J20-39 "Phase Unlock Test	>2.4	✓	(4) VDC
	J20-40 "Amplitude Unlock Test".	>2.4	✓	(4) VDC
4.	BOTH SHUTTERS OFF			
4.1	Execute command: SHUTTERS OFF.	F	✓	(4)
4.2	Verify via the CRT that digital Word G bit 2 = 0		✓	(4)
	bit 3 = 0		✓	(4)
	bit 4 = 0		✓	(4)
	bit 5 = 0		✓	(4)
	bit 6 = 0		✓	(4)
	bit 7 = 0.		✓	(4)

TEST ENGINEER J Brock DATE 1/28/82 QA 3/2/82

E.M. MODULE UNIT TEST

SIZE	CODE IDENT NO.	NUMBER
A	11323	16704

SCALE | REV | SHEET 90

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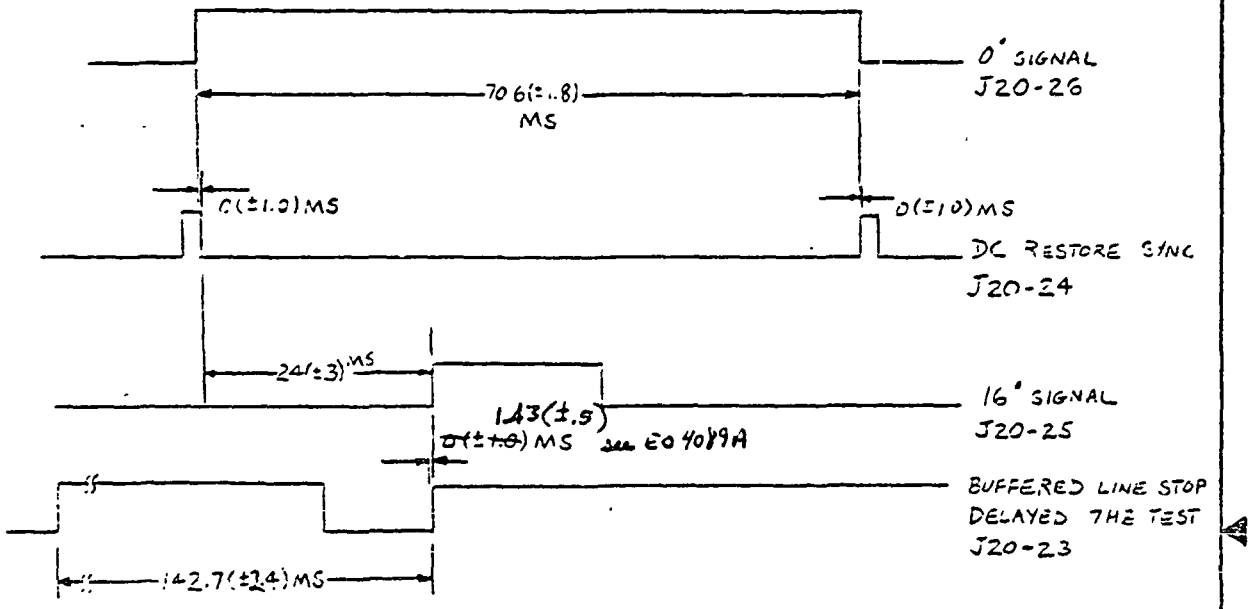

Figure 4.12.a Main Shutter Timing

SIZE	CODE IDENT NO	NUMBER
A	11323	16704
SCALE	REV C	SHEET

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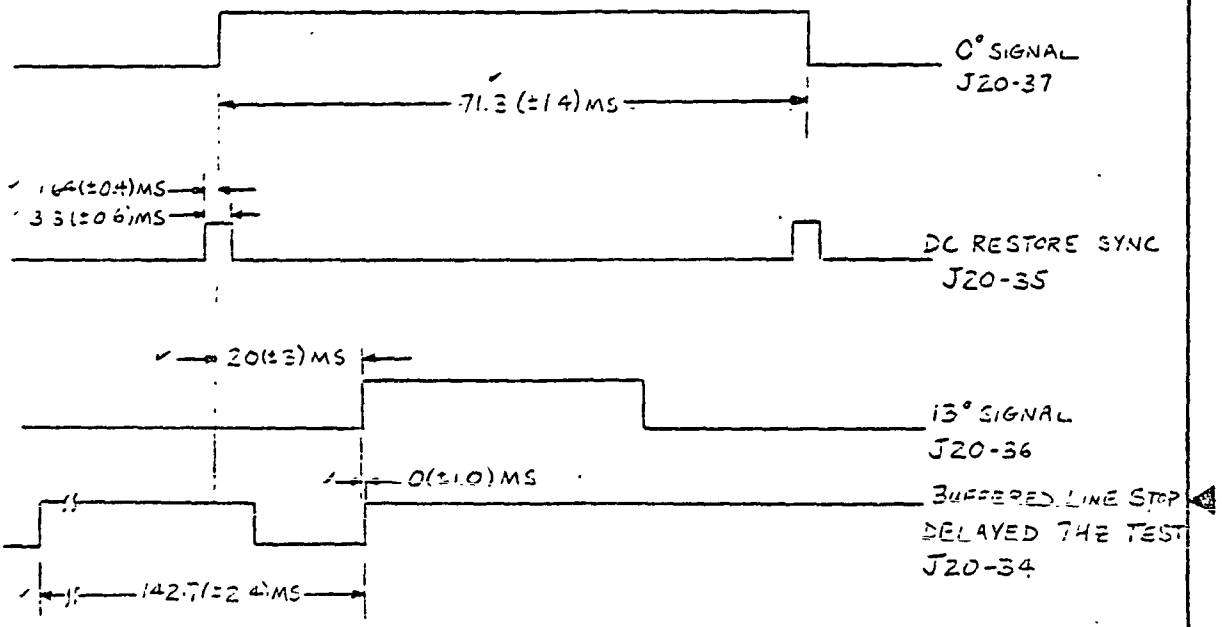

Figure 4.12.5 Backup Shutter Timing

SIZE	CODE IDENT NO	NUMBER
A	11323	16704
SCALE	REV	SHEET

DATA SHEET NO. 1 OF 6 PARAGRAPH NO. 4.14

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 500

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(4.14)	Note: In Order To Perform This Test Board A08(51402) Must Be Installed. FUSIBLE LINK TEST			
	WARNING: When the Electronics Module is linked to Radiometer hardware shutter fusible link switch closure commands and cooler door fusible link switch closure commands shall not be transmitted if the flight plug (P14) is installed. Note that J+3 is connected to Function Test Panel.	ORIGINAL PAGE IS OF POOR QUALITY		
1.	Install plug P14.		✓	(✓)
	Connect a DVM across the Cooler Door Fusible Link Test Points.		✓	(✓)
	Connect a DVM across the Main Shutter Fusible Link TP's.		✓	(✓)
	Set both DVM's to read in the 20V range.		✓	(✓)
2.	All Fusible Link Switches Open			
2.1	Execute command:			
	FUSIBLE LINK SWITCHES OPEN	60	✓	(✓)
2.2	Verify via the CRT that digital			
	Word A bit 5 = 0		✓	(✓)
	bit 6 = 0		✓	(✓)
	bit 7 = 0		✓	(✓)
	Word C bit 5 = 0		✓	(✓)
	bit 6 = 0		✓	(✓)
	bit 7 = 0.		✓	(✓)

TEST ENGINEER [signature] DATE 15 Dec '81 QA _____

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO 11323	NUMBER 16704
	SCALE	REV C	SHEET 59

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DATA SHEET NO. 2 OF 6 PARAGRAPH NO. 4.14

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 800

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
2.3	Verify that the voltage across the Cooler Door Fusible Link TP's is ≤10 mV, and that the voltage across the Main Shutter Fusible Link TP's is ≤10 mV.	≤10	0.0 ~~0.0~~	mvolts
3.	<u>Cooler Door Fusible Link Switch A Closed</u>			
3.1	Execute command: COOLER DOOR FUSIBLE LINK SWITCH A CLOSE.	5A	✓	(✓)
3.2	Verify via the CRT that digital			
	Word C bit 5 = 1		✓	(✓)
	bit 6 = 0		✓	(✓)
	bit 7 = 0		✓	(✓)
	Word A bit 5 = 0		✓	(✓)
	bit 6 = 0		✓	(✓)
	bit 7 = 0.		✓	(✓)
3.3	Verify that the voltage across the Cooler Door Fusible Link TP's and across the Main Shutter Fusible Link TP's is ≤10mV.	≤10	0.00 ~~0.00~~	mvolts
4.	<u>Cooler Door Fusible Link Switches A and B Closed</u>.			
4.1	Execute commands:			
	COOLER DOOR FUSIBLE LINK SWITCH A CLOSE.	5A	✓	(✓)
	COOLER DOOR FUSIBLE LINK SWITCH B CLOSE.	48	✓	(✓)

TEST ENGINEER [signature] DATE 15 Dec '81 QA

E.M. MODULE UNIT TEST | SIZE A | CODE IDENT NO 11323 | NUMBER 16704

SCALE | REV 2 | SHEET 73

FORM NO 2102 · 4 · 1981 DIETZGEN POST CLEARPRINT CORP

DATA SHEET NO. 3 OF 6 PARAGRAPH NO. 4.14

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 600

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
4.2	Verify via the CRT that digital			
	Word C bit 5 = 1		✓	(✓)
	bit 6 = 1		✓	(✓)
	bit 7 = 0		✓	(✓)
	Word A bit 5 = 0		✓	(✓)
	bit 6 = 0		✓	(✓)
	bit 7 = 0.		✓	(✓)
4.3	Verify that the voltage across the Cooler Door Fusible Link TP's and across the Main Shutter Fusible Link TP's is ≤10 mV.	≤10	0.0 0.0	mvolts
5.	All Cooler Door Switches Closed/Cooler Door Fusible Link Activated.			
5.1	Execute Commands:			
	COOLER DOOR FUSIBLE LINK SWITCH A CLOSE.	5A	✓	(✓)
	COOLER DOOR FUSIBLE LINK SWITCH B CLOSE.	4B	✓	(✓)
	COOLER DOOR FUSIBLE LINK SWITCH C CLOSE.	5C	✓	(✓)
5.2	Verify via the CRT that digital			
	Word C bit 5 = 1		✓	(✓)
	bit 6 = 1		✓	(✓)
	bit 7 = 1		✓	(✓)

TEST ENGINEER [signature] DATE 15 Dec 81 QA _____

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO 11323	NUMBER 16704
	SCALE	REV C	SHEET 13

FORM NO 3122 * A 3-69 * DIETERICH-POST CLEARPRINT 6004

DATA SHEET NO. 4 OF 6 PARAGRAPH NO. 4.14

DETAILED FUNCTIONAL TESTS

LOG AHR OPER for

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(5.2)	Word A bit 5 = 0		✓	(✓)
	bit 6 = 0		✓	(✓)
	bit 7 = 0.		✓	(✓)
5.3	Verify that the Cooler Door Fusible Link Sonalert is switched to the Alarm position and is sounding (it may be turned off after verification). Verify that the indicator LED is lit.	—	✓	(✓)
5.4	Verify that there is 1.5V (±20%) across the Cooler Door Fusible Link TP's.	1.5± 0.5	1.45	volts
5.5	Verify that there is ≤10 mV across the Main Shutter Fusible Link TP's.	≤10	✓	mvolts
6.	Reset all Switches. Repeat 4.14.2.		✓	(✓)
7.	Shutter Fusible Link Switch A Closed.			
7.1	Execute command:			
	SHUTTER FUSIBLE LINK SWITCH A CLOSE.	5D	✓	(✓)
7.2	Verify via the CRT that digital			
	Word A bit 5 = 1		✓	(✓)
	bit 6 = 0		✓	(✓)
	bit 7 = 0		✓	(✓)
	Word C bit 5 = 0		✓	(✓)
	bit 6 = 0		✓	(✓)
	bit 7 = 0.		✓	(✓)

TEST ENGINEER [signature] DATE 15 Dec 81 QA

DATA SHEET NO. 5 OF 6 PARAGRAPH NO. 4.14

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 600

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
7.3	Verify that the voltage across the Cooler Door Fusible Link TP's and across the Main Shutter Fusible Link TP's is ≤10mV.	≤10	0.0 0.0	mvolts
8.	Shutter Fusible Link Switches A and B Closed.			
8.1	Execute commands:			
	SHUTTER FUSIBLE LINK SWITCH A CLOSE.	5D	✓	(✓)
	SHUTTER FUSIBLE LINK SWITCH B CLOSE.	49	✓	(✓)
8.2	Verify via the CRT that digital			
	Word A bit 5 = 1		✓	(✓)
	bit 6 = 1		✓	(✓)
	bit 7 = 0		✓	(✓)
	Word C bit 5 = 0		✓	(✓)
	bit 6 = 0		✓	(✓)
	bit 7 = 0.		✓	(✓)
8.3	Verify that the voltage across the Cooler Door Fusible Link TP's and the Shutter Fusible Link TP's are ≤10 mV.	≤10	0.0 0.0	mvolts
9.	All Shutter Switches Closed/Shutter Fusible Link Activated.			
9.1	Execute Commands:			
	SHUTTER FUSIBLE LINK SWITCH A CLOSE.	5D	✓	(✓)

TEST ENGINEER [signature] DATE 15 Dec 81 QA

E.M. MODULE UNIT TEST

SIZE	CODE IDENT NO	NUMBER
A	11323	16704

SCALE REV C SHEET 21

DATA SHEET NO. 6 OF 6 PARAGRAPH NO. 4.14

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 100

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(9.1)	SHUTTER FUSIBLE LINK SWITCH B CLOSE.	49	✓	(✓)
	SHUTTER FUSIBLE LINK SWITCH C CLOSE.	5F	✓	(✓)
9.2	Verify via the CRT that digital			
	Word A bit 5 = 1		✓	(✓)
	bit 6 = 1		✓	(✓)
	bit 7 = 1		✓	(✓)
	Word C bit 5 = 0		✓	(✓)
	bit 6 = 0		✓	(✓)
	bit 7 = 0.		✓	(✓)
9.3	Verify that the Shutter Fusible Link Sonalert is switched to the Alarm position and is sounding. Verify that the indicator LED is lit.		✓	(✓)
9.4	Verify that there is 1.5V(±20%)across the Shutter Fusible Link TP's.	1.5 ± 0.5	1.46	volts
9.5	Verify that there is ≤10mV across the Cooler Door Fusible Link TP's.	≤10	✓	mvolts
10.	Reset. Repeat 9.14.2.		✓	(✓)
11.	Remove plug P14.		✓	(✓)

TEST ENGINEER [signature] DATE 15 Dec 81 QA

E.M. MODULE UNIT TEST

SIZE	CODE IDENT NO	NUMBER
A	11323	16704

SCALE | REV 2 | SHEET 2 2

DATA SHEET NO. 1 OF 4 PARAGRAPH NO. 4.15

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 500

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(4.15)	Note: In Order To Perform This Test Board A08(51402) Must Be Installed.			
	BAFFLE HEATER TEST			
1.	Confirm that test cable 44 is properly connected between the Electronics Module and the Function Test Panel.		✓	(√)
	Connect test cable 20 and its breakout box to J20 on the Electronics Module.		✓	(√)
2.	In order to simulate the Baffle Heater Controller thermistor, connect Decade Resistor #1 across the Baffle Heater Input Test Points on the Function Test Panel. Set DR #1 at 05000 ohms ("hot").		✓	(√)
	To simulate the Baffle Temp Sensor thermistor connect Decade Resistor #2 across TP's 4 and 10 on the Function Test Panel. Set DR #2 at 05000 ohms ("hot").		✓	(√)
3.	To measure Baffle Heater Current connect a DVM across the Baffle Heater current Test Points on the Function Test Panel. The output will be measured in volts, with a scaling of 1 V indicating a 1 A current flow.		✓	(√)
4.	Heater and Backup Off.			
4.1	Execute command: BAFFLE HEATER CONTROLLER OFF/BACKUP OFF.	56	✓	(√)
4.2	Verify via the CRT that digital Word F bit 0 = 0		✓	(√)
	bit 1 = 0.		✓	(√)
4.3	Verify that the baffle heater current is ≤ 1 mA (≤ 1 mV reading on the DVM).	≤1	0.0	mvolts
	Verify that analog telemetry Channel 54 "Baffle Heater Current" is ≤ 1.0V.	≤1.0	0.0	volts

C-4

TEST ENGINEER [signature] DATE 16 Dec '81 QA

DATA SHEET NO. 2 OF 4 PARAGRAPH NO. 4.15

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 800

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
5.	Baffle Heater Controller On.			
5.1	Execute commands: TELEMETRY SCALING ON. BAFFLE HEATER CONTROLLER	7	✓	( )
	OFF/ BACKUP OFF.	56	✓	(√)
	BAFFLE HEATER CONTROL ON	~~54~~ 54 is ON/OFF	✓	(√)
5.2	Verify via the CRT that Digital Word F bit 0 = 1		✓	(√)
	bit 1 = 0.		✓	(√)
5.3	Verify that the baffle heater current DVM is measuring ≤1 mV.	≤1	✓	mvolts
5.4	Using a DVM verify that test point J20-41 "Baffle Temp Error Test" is in the range 0<V<1V.	0<V<1	0.0	volts
	Using a DVM verify that test point J20-42 "Baffle Heater Current Test" is in the range 0<V<.1V.	0<V<.1	0.0	volts
5.5	Set DR #1 at 30000 ohms ("cold").		✓	(√)
	Verify that the baffle heater current DVM is reading ≥300 mV.	≥300	505	mvolts
	Verify that analog telemetry Channel 54 is ≥ 2.5V.	≥2.5	5.1	volts
5.6	Using a DVM verify that test point J20-41 is in the range 2<V<15V.	2<V<15	4.64	volts
	Verify that test point J20-42 is in the range 0.2<V<1V.	.2<V<1	.661	volts

TEST ENGINEER [signature] DATE 16 Dec 81 QA

E.M. MODULE UNIT TEST

SIZE	CODE IDENT NO.	NUMBER
A	11323	16704

SCALE REV SHEET

DATA SHEET NO. 3 OF 4 PARAGRAPH NO. 4.15

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 500

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
6.	Heater and Backup On.			
6.1	Execute commands: BAFFLE HEATER CONTROLLER OFF/			
	OFF/BACKUP OFF.	56	✓	(√)
	BAFFLE HEATER CONTROL ON	54	✓	(√)
	BAFFLE HEATER BACKUP ON.	55	✓	(✓)
6.2	Verify via the CRT that digital Word F			
	bit 0 = 1		✓	(√)
	bit 1 = 1.		✓	(√)
6.3	Verify that the baffle current DVM is measuring ≥300 mV.	≥300	340	mvolts
	Verify that analog telemetry Channel 54 is ≥2.5V.	≥2.5	3.94	volts
7.	Reset/Controller On.			
7.1	Execute commands: BAFFLE HEATER CONTROLLER OFF/			
	BACKUP OFF.	56	✓	(√)
	BAFFLE HEATER CONTROL ON	54	✓	(√)
7.2	Verify via the CRT that digital Word F			
	bit 0 = 1		✓	(√)
	bit 1 = 0.		✓	(√)

TEST ENGINEER [signature] DATE 16 Dec 1981 QA

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DATA SHEET NO. 4 OF 4 PARAGRAPH NO. 4.15

DETAILED FUNCTIONAL TESTS

LOG AHR OPER LD

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
8.	Baffle Temperature Telemetry.			
8.1	Execute command: DC RESTORE OFF/TELEMETRY SCALING OFF.	6	✓	(√)
8.2	Verify via the CRT that analog telemetry Channel 69 "Baffle Temperature" is ≤1.0V.	≤1.0	0.0	volts
8.3	Execute command: TELEMETRY SCALING ON.	7	✓	(√)
8.4	Verify that analog telemetry Channel 69 is ≥ 2.5V.	≥2.5	5.04	volts
8.5	Reset DR #2 to 30000 ohms ("cold").		✓	(√)
	Verify that analog telemetry Channel 69 is ≤1.0V.	≤1.0	.440	volts
9.	Baffle Heater Off/Backup Off.			
9.1	Execute commands:			
	BAFFLE HEATER CONTROLLER OFF/ BACKUP OFF. DC RESTORE OFF/TELEMETRY SCALING OFF.	56	✓	(√)
		6	✓	(√)
9.2	Verify via the CRT that digital Word F bit 0 = 0		✓	(√)
	bit 1 = 0		✓	(√)
	Word L bit 2 = 0.		✓	(√)
9.3	Verify that the baffle current DVM is measuring ≤1 mV.	≤1 mV.	0.0	mvolts
	Verify that analog telemetry Channel 54 is ≤1.0V.	≤1.0	0.0	volts

TEST ENGINEER [signature] DATE 16 Dec '91 QA [signature]

E.M. MODULE UNIT TEST	SIZE A	CODE IDENT NO 11323	NUMBER 16704
	SCALE	REV C	SHEET 4

DATA SHEET NO. 1 OF 3 PARAGRAPH NO. 4.18

DETAILED FUNCTIONAL TESTS

LOGAHR OPER 1000

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
(4.18)	LVDT POWER CONTROL			
1.	Confirm that test cable 46 is connected properly between the Electronics Module and the Function Test Panel (FTP).		✓	(✓)
2.	LVDT Power Check.			
2.1	Execute command:			
	LVDT POWER OFF.	5E	✓	(✓)
	LVDT POWER ON	5B	✓	(✓)
2.2	Verify via the CRT that digital			
	Word E bit 1 = 1.		✓	(✓)
2.3	Connect a DVM between LVDT Power 1 TP and LVDT Return TP on the FTP.		✓	(✓)
	Confirm that the DVM measures +15(±0.3)VDC.	14.7 ≤V≤15.3	15.0 ✓	VDC
2.4	Connect a DVM between LVDT Power 2 TP and LVDT Return TP on FTP.		✓	(✓)
	Confirm that the DVM measures +15(±0.3)VDC.	14.7 ≤V≤15.3	15.0 ✓	VDC
2.5	Connect a DVM between LVDT Power 3 TP and LVDT Return TP on FTP		✓	(✓)
	Confirm that the DVM measures +15(±0.3)VDC.	14.7 ≤V≤15.3	15.0 ✓	VDC
2.6	Execute command:			
	LVDT POWER OFF.	5E	✓	(✓)
2.7	Verify via the CRT that digital			
	Word E bit 1 = 0.		✓	(✓)

TEST ENGINEER [signature] DATE 7 Dec '81 QA

E.M. MODULE UNIT TEST

SIZE	CODE IDENT NO	NUMBER
A	11323	16704

SCALE REV SHEET 2

DATA SHEET NO. 2 OF 3 PARAGRAPH NO. 4.18

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1000

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
2.8	Repeat subparagraphs 2.3 to 2.5 and confirm the following DVM measurement:			
	2.3: 0(±0.1)VDC	-0.1≤V≤0.1	0.0 ✓	VDC
	2.4: 0(±0.1)VDC	-0.1≤V≤0.1	0.0 ✓	VDC
	2.5: 0(±0.1)VDC	-0.1≤V≤0.1	0.0 ✓	VDC
3.	LVDT #1 Output Buffer Check.			
3.1	Execute command:			
	LVDT POWER ON	5B	✓	(✓)
3.2	Verify via the CRT that digital			
	Word E bit 1 = 1.		✓	(✓)
3.3	Connect the Power Design 2005 voltage reference between LVDT Output 1 TP and LVDT Return		✓	(✓)
3.4	Request analog telemetry Channel 56 "Inchworm 1 position" on CRT.		✓	(✓)
3.5	With voltage reference adjusted for -1.50(±0.20)VDC input, verify that analog telemetry channel 56 output reads 0.20(±0.40)VDC.	-0.20≤V≤0.60	.08 ✓	VDC
3.6	With voltage reference adjusted for 0.00(±0.20)VDC input, verify that channel 56 output reads 2.50(±0.40)VDC.	2.10≤V≤2.90	2.58	VDC
3.7	With voltage reference adjusted for 1.50(±0.20)VDC input verify that channel 56 output reads 5.00(±0.40)VDC.	4.60≤V≤5.40	4.96	VDC

TEST ENGINEER [signature] DATE 7 Dec '81 QA

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DATA SHEET NO. 3 OF 3 PARAGRAPH NO. 4.18

DETAILED FUNCTIONAL TESTS

LOG AHR OPER 1000

PARA OR STEP NO.	PROCEDURE STEP	SPEC OR COMMAND	RECORD DATUM / VERIFY	UNITS
4.0	LVDT #2 Output Buffer Check.			
4.1	Reset voltage reference to 0.0(±0.20)VDC, remove it from LVDT Output 1 TP, and connect it to LVDT Output 2 TP.		✓	(✓)
4.2	Request analog telemetry Channel 57 "Inchworm 2 position" on CRT.		✓	(✓)
4.3	Repeat subparagraphs 3.5 to 3.7 and verify that Channel 57 outputs read as follows			
	3.5: 0.20(±0.40)VDC	-0.20≤V≤0.60	0.06 ✓	VDC
	3.6: 2.50(±0.40)VDC	2.10≤V≤2.90	2.58	VDC
	3.7: 5.00(±0.40)VDC.	4.60≤V≤5.40	5.08	VDC
	LVDT #3 Output Buffer Check.			
5.1	Reset voltage reference to 0.0(±0.20)VDC, remove it from LVDT Output 2 TP, and connect it to LVDT Output 3 TP.		✓	(✓)
5.2	Request analog telemetry Channel 58 "Inchworm 3 position" on CRT.		✓	(✓)
5.3	Repeat subparagraphs 3.5 to 3.7 and verify that Channel 58 outputs read as follows			
	3.5: 0.20(±0.40)VDC	-0.20≤V≤0.60	0.06	VDC
	3.6: 2.50(±0.40)VDC	2.10≤V≤2.90	2.58	VDC
	3.7: 5.00(±0.40)VDC.	4.60≤V≤5.40	4.94	VDC
6.	Reset.			
6.1	Execute command: LVDT POWER OFF	5E	✓	(✓)
6.2	Verify via the CRT that digital Word E bit 1 = 0.		✓	(✓)

TEST ENGINEER [signature] DATE 7 Dec '91 QA

E.M. MODULE UNIT TEST

SIZE	CODE IDENT NO	NUMBER
A	11323	16704

SCALE | REV C | SHEET 2

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