JSC-11587

CONSOLE TEST REPORT

FOR SHUTTLE TASK 501

SHUTTLE CARRIER AIRCRAFT TRANSCEIVER CONSOLE

(SED 36115353-301)

NASA CR-
150986

Job Order 17-069

Prepared By

Lockheed Electronics Company, Inc.

Aerospace Systems Division

Houston, Texas

Contract NAS 9-12200

For

SPACECRAFT SYSTEMS TEST OFFICE

TRACKING AND COMMUNICATIONS DEVELOPMENT DIVISION

National Aeronautics and Space Administration

LYNDON B. JOHNSON SPACE CENTER

Houston, Texas

AUGUST 1976

LEC-9352

CONSOLE INTEGRATION DOCUMENT

FOR SHUTTLE TASK 501

SHUTTLE CARRIER AIRCRAFT TRANSCEIVER CONSOLE

Job Order 17-069

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AUGUST 1976

CONTENTS

ACKNOWLEDGMENT

This document was prepared in response to Action Document 76-17-069-44 submitted by the Manager, Spacecraft Systems Test of the Tracking and Communications Development Division. William C. Long, Manager, is technical monitor for this task. John H. Lane of the Spacecraft Systems Test Section of Lockheed Electronics Company, Inc., designed the console and prepared this Console Test Report for NASA/JSC Shuttle Task 501, Shuttle Carrier Aircraft Transceiver Console.

ACRONYMS AND ABBREVIATIONS

AC	Alternating Current
AGC	Automatic Gain Control
ALT	Approach and Landing Test
^{o}F	Degrees Farenheit
K	Kilo (x1000)
LRU	Line Replaceable Unit
RF	Radio Frequency
SCA	Shuttle Carrier Aircraft
SCR	Silicon Controlled Rectifier
SSO	Space Shuttle Orbiter

1. SUMMARY

The Shuttle Carrier Aircraft Transceiver Console performed as designed and met the objectives defined in the Design Document LEC-9065.

2. INTRODUCTION

The flight data for the Space Shuttle Orbiter (SSO) is transmitted via S-band to a transceiver in the Shuttle Carrier Aircraft (SCA) for relay to the ground during the mated portion of the Approach and Landing Test (ALT). The transceiver will be mounted in the SCA Transceiver Console for Shuttle Task 501 testing after satisfactory completion of the console test.

2.1 PURPOSE

This Console Test Report describes the testing of the Shuttle Carrier Aircraft (SCA) Transceiver Console (System 550).

2.2 CONSOLE DESCRIPTION

The SCA Transceiver Console is a single bay rack containing the flight model S-band Transceiver with forced air cooling, three power supplies, two digital voltage panel meters, a digital logic board with digital logic modules, and three relays. The top assembly drawing number is SED36115353-301. A conceptual drawing for the console is shown in figure 1.

2.3 TEST EQUIPMENT REQUIRED

The following items of test equipment are required for the console tests:

1. Digital Voltmeter (H-P 5245L Electronic Counter)
2. Digital Voltmeter Plug-in (H-P 5265A Digital Voltmeter)
3. Voltmeter or Multimeter (Simpson Model 270)
4. Hot Air Blower (Rayclad Model 500A)

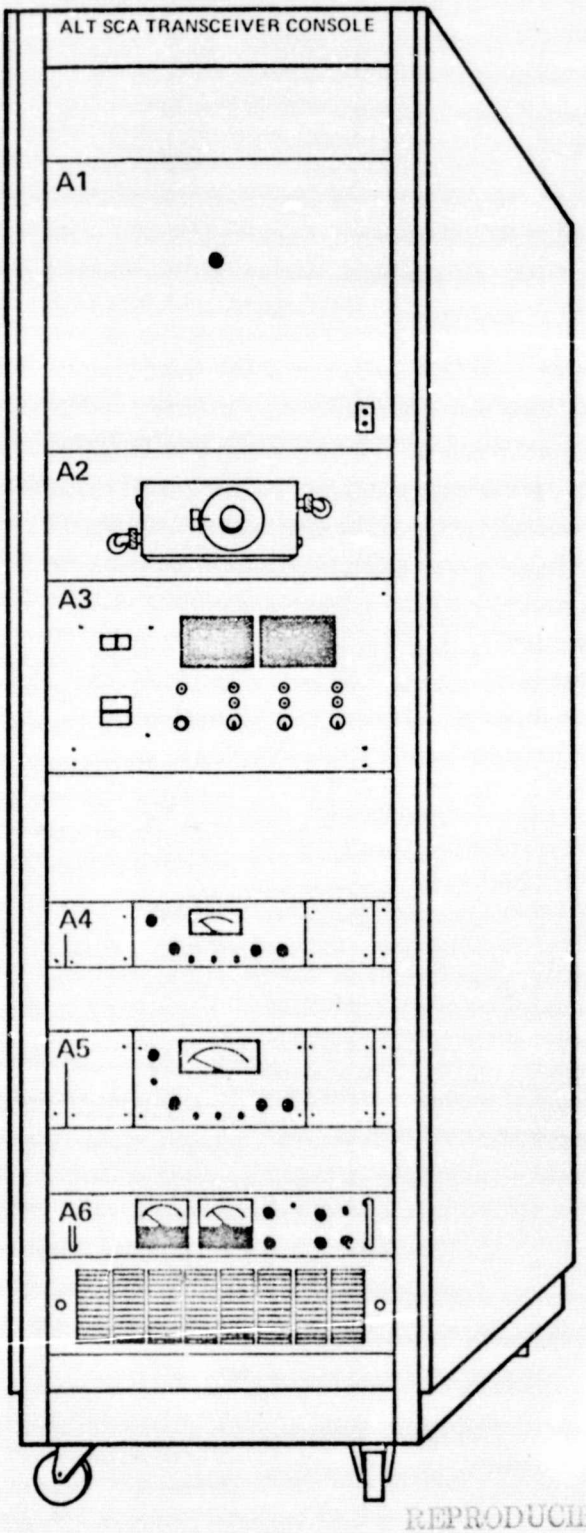

Figure 1 SCA Transceiver Console

3. WORK PERFORMED

3.1 PRETEST PREPARATIONS

No pretest preparations were required other than to obtain the necessary test equipment.

3.2 SUMMARY OF TESTS CONDUCTED

3.2.1 POWER SUPPLY VOLTAGES

All three power supplies were checked for correct output voltage and energization at the proper point in the turn on sequence.

3.2.2 COOLING SYSTEM

The LRU blower, overload sensors and circuitry, and thermocouple probe were all checked. The blower was checked for operation in conjunction with the Transceiver power switch. The temperatures at which the thermal overload sensors opened were measured. Operation in the Bypass mode was checked as was the necessity for manual reset of the sensors.

3.2.3 CONTROL CIRCUITS

The operation of the control logic in all combinations of modes was checked, including the provisions for remote control and display.

3.2.4 LRU VOLTAGES

The LRU connector was checked for presence of correct voltages and absence of incorrect voltages under both energized and deenergized conditions.

3.2.5 MONITOR CIRCUITS

The AGC and power output monitor circuits were checked.

3.3 DISCUSSION OF OPERATIONS

Operations were very simple since no RF was involved. Checking for thermal sensor trip temperature was somewhat difficult due to the high air temperature generated by the blower and the thermal inertia of the thermocouple probe housing. It was necessary to continuously monitor the thermocouple bridge to assure a slow temperature rise.

3.4 SUMMARY OF DATA OBTAINED

The data obtained were entirely GO/NO-GO in nature except for the trip temperatures of the two thermal sensors.

4. ANALYSIS AND INTERPRETATION OF RESULTS

4.1 REDUCED DATA SUMMARY

Since the data are all of the GO/NO-GO type, no data reduction was required. The data were all well within the specified limits. The only specific data were the trip temperatures which were within $\pm 2^{o}F$ of nominal. The manufacturer specifies $\pm 7^{o}F$ limits.

4.2 RESOLUTION OF ANOMALIES

There were no anomalies. However, a few points might be explained.

4.2.1 LAMP TEST

The Transceiver Power On pushbutton is designed to act as a Power On Discrete signal. It is energized from the LRU voltage and can only illuminate when the LRU is energized. Thus the Lamp Test cannot energize the lamp unless the LRU is on, in which case the lamp is already lit.

4.2.2 LRU POWER SUPPLY SHUTDOWN

The 28 volt LRU supply has an overvoltage protector set at 33 volts. Occasionally, the LRU turn on surge will cause a transient sufficient to trigger the overvoltage protector. This places the power supply in a maximum current/zero voltage condition with all of the current flowing through the SCR of the protector. Cycling the AC power switch of the LRU supply resets the protector.

5. CONCLUSIONS

It was concluded that the SCA Transceiver Console performed as designed and was ready for the transceiver to be installed.

The external resistor programmed power supplies produced correct output voltages. The control logic functioned properly. Temperature sensing and control functioned as designed.

APPENDIX A

CONSOLE TEST PLAN

The purpose of this test sequence is to insure that console wiring is correct and ready for installation of the S-band Transceiver.

A.1 POWER SUPPLIES

The SCA Transceiver power supplies will be energized and the voltages measured at specified points to verify correct polarities and voltages.

A.2 COOLING SYSTEM

Operation of the cooling system will be verified. A check will be made to insure that the blower operates when the LRU power supply is energized. Another check will be made to insure that the LRU power deenergizes and remains off when the temperature sensor(s) reaches the specified limit with the bypass switch in the NORMAL position. A check will be made with the switch in the BYPASS position to insure that the power can be reapplied to the transceiver despite operation of the termperature sensor(s).

A.3 CONTROL CIRCUITS

All switches on the control panel will be actuated and the operation of each verified.

A.4 LRU VOLTAGES

The voltage will be checked at the LRU connector end of the cable to insure correct voltage level and polarity.

A.5 MONITOR CIRCUITS

Voltages will be applied at the LRU connector end of the transceiver cable to verify operation of the AGC meter and power output meter.

A.6 INSTALLATION OF S-BAND TRANSCEIVER

The S-Band Transceiver will be installed after satisfactory completion of these checks.

APPENDIX B

CONSOLE TEST PLAN AS RUN

The following pages (2-1 through 2-14) are the Console Test Procedure as actually run.

1. TYPE: A Configuration Change; B Non Configuration Change X

TEST PREPARATION SHEET

NASA - LYNDON B. JOHNSON SPACE CENTER

2. TPS No. 34620018

3. S/C | Cat. | No.

4. Mod. Sheet Number

5. Page 1 of 2

6. S/C No./Model No.

7. Date 7-28-76

8. Time

9. Need Date

10. Drawings, Documents, Ocp's, & Part Number(s)
SED 36115353-301

11. Contract Number

12. Serial Number

13. System
SCA TRANSCEIVER (550/551)

14. Ref. E. O. Number

15. TPS Short Title
SCA TRANSCEIVER FIT CHECK

16. Wt. Req.

17. Reason for Work:
CHECK THAT LRU FITS INTO SPACE PROVIDED; THAT RETAINING LATCHES OPERATE; AND ESPECIALLY THAT J2 CONNECTOR MATES PROPERLY.

	18. DESCRIPTION (Print or Type)	21. Mech.	Insp. 22. CONT.	Insp. 23. NASA
~~1~~	~~RELEASE~~ RELID TO: LANE EE44			
1	RELEASE Transceiver from Bonded Storage Bldg 10. P/N ME478-0133 SER 98853-001	7/28/76		
2	Receive Rm 115 Bldg 44.	7/28/76		
3	Perform ID and Damage inspection.	7/28/76		
4	Release from Rm 115 Bldg 44.	7/28/76		
5	Receive Rm 244 Bldg 44.	7/28/76		
6	Verify that Console is unpowered.	7/28/76		
7	Perform mechanical fit check.	7/28/76		
8	Connect RF cables to J1 and J3. Check mechanical clearance.	7-28-76		
9	Check LRU J2 keying. ~~#~~ Change console P2 keying if required.	7/28/76		
10	Connect P2 to LRU.	7/28/76		
11	Operate retaining latches.	7/28/76		
12	Remove LRU blower AC power cord from console and connect to wall power (console remains ~~#~~ unconnected to any power source). (Blower in console)	7/28/76		

19. Prepared By: J. H. LANE

20. Final Acceptance Date: 7-29-76

REFER TO PROCEDURES FOR REQUIRED SIGNATURES

Contractor	Date
John H Lane	7-28-76
[illegible]	7-28-76
[illegible] (BAC)	7-28-76

REFER TO PROCEDURES FOR REQUIRED SIGNATURES

NASA	Date
R. C. Sutton	7-28-76
[illegible]	7/29/76

JSC FORM 1275 (JUL 69)

DIP RA 12 00 P 7/30/76.

COPY 1

TEST PREPARATION SHEET

CONTINUATION SHEET

NASA – LYNDON B. JOHNSON SPACE CENTER

TPS No.	34620018	
S/C	Cat.	No.

Page 2 of 2

	DESCRIPTION (Print or Type)	Tech.	Insp. Cont.	Insp. NASA
13	Check for adequate air flow from blower.		7/22/74	
14	Check for minimal air leakage under LRU		7/22/74	
15	Release Rm 244 Bldg 44		7/22/74	
16	Receive Bonded Storage area ~~Bldg~~ ~~Bldg 10~~ Rm 115 Bldg 44.		7/22/74	

JSC-11434

CONSOLE TEST PROCEDURE
FOR SHUTTLE TASK 501
SHUTTLE CARRIER AIRCRAFT TRANSCEIVER CONSOLE
(SED 36115353-301)

Job Order 17-069

SED 36115353-301

Prepared By

Lockheed Electronics Company, Inc.

Aerospace Systems Division

Houston, Texas

Contract NAS 9-12200

For

SPACECRAFT SYSTEMS TEST OFFICE

TRACKING AND COMMUNICATIONS DEVELOPMENT DIVISION

National Aeronautics and Space Administration

LYNDON B. JOHNSON SPACE CENTER

Houston, Texas

July 1976

LEC-9065
SHUTTLE

CONSOLE TEST PROCEDURE
FOR SHUTTLE TASK 501
SHUTTLE CARRIER AIRCRAFT TRANSCEIVER CONSOLE

Job Order 17-069

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LYNDON B. JOHNSON SPACE CENTER
HOUSTON, TEXAS

July 1976

LEC-9065
SHUTTLE

JSC-11434

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FOR SHUTTLE TASK 501
SHUTTLE CARRIER AIRCRAFT TRANSCEIVER CONSOLE

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LYNDON B. JOHNSON SPACE CENTER
HOUSTON, TEXAS

July 1976

LEC-9065
SHUTTLE

TECHNICAL REPORT INDEX/ABSTRACT

(See instructions on reverse side.)

1. TITLE AND SUBTITLE OF DOCUMENT

CONSOLE TEST PROCEDURE
FOR SHUTTLE TASK 501
SHUTTLE CARRIER AIRCRAFT TRANSCEIVER CONSOLE

2. JSC NO.

JSC- 11434

3. CONTRACTOR/ORGANIZATION NAME

Lockheed Electronics Co., Inc.

4. CONTRACT OR GRANT NO.

NAS 9-12200

5. CONTRACTOR/ORIGINATOR DOCUMENT NO.

LEC-9065

6. PUBLICATION DATE (THIS ISSUE)

July 1976

7. SECURITY CLASSIFICATION

Unclassified

8. OPR (OFFICE OF PRIMARY RESPONSIBILITY)

Tracking and Communications Development Division

9. LIMITATIONS

GOVERNMENT HAS UNLIMITED RIGHTS [X] YES [ ] NO

IF NO, STATE LIMITATIONS AND AUTHORITY

N/A

10. AUTHOR(S)

G. Doland

11. DOCUMENT CONTRACT REFERENCES

WORK BREAKDOWN STRUCTURE NO.

63-0991-7069

CONTRACT EXHIBIT NO.

DRL NO. AND REVISION

LINE ITEM NO.

12. HARDWARE CONFIGURATION

SYSTEM

Shuttle

SUBSYSTEM

MAJOR EQUIPMENT GROUP

13. ABSTRACT

This document describes the test procedure to be used in testing the Shuttle Carrier Aircraft Transceiver Console (SED 3611535-301).

14. SUBJECT TERMS

Shuttle

Communications

Transceiver

JSC Form 833 (Rev Sep 74)

NASA-JSC

ACKNOWLEDGMENT

This document was prepared in response to Action Document 75-17-069-44 submitted by the Manager, Spacecraft System Test Office of the Tracking and Communications Development Division. William C. Long, Manager, is technical monitor for this task. George D. Doland of the Spacecraft Systems Test Section of Lockheed Electronics Company, Inc., prepared this console test procedure for NASA/JSC Shuttle Task 501, Shuttle Carrier Aircraft Transceiver Console.

CONTENTS

ACRONYMS AND ABBREVIATIONS

AGC	Automatic Gain Control
ALT	Approach and Landing Test
dB	Decibel
FM	Frequency Modulation
LRU	Line-Replaceable Unit
RF	Radio Frequency
SCA	Shuttle Carrier Aircraft
SSO	Space Shuttle Orbiter
SSTL	Spacecraft Systems Test Laboratory
V	Volt(s)

1. INTRODUCTION

The flight data for the Space Shuttle Orbiter (SSO) is transmitted via S-band to a transceiver in the Shuttle Carrier Aircraft (SCA) for relay to the ground during the mated portion of the Approach and Landing Test (ALT). The transceiver is mounted in the SCA Transceiver Console for Shuttle Task 501 testing.

1.1 CONSOLE DESCRIPTION

The SCA Transceiver Console is a single bay rack containing the flight model S-band Transceiver with forced air cooling, three power supplies, two digital voltage panel meters, a digital logic board with digital logic modules, and three relays. The top assembly drawing number is SED36115353-301. A conceptual drawing for the console is shown in figure 1.

1.1.1 POWER

Power is provided by dedicated power supplies for the S-band Transceiver Line-Replaceable Unit (LRU), logic circuits, and console general use. These are energized using individual interlocked switches remotely located on the control panel. The LRU power supply provides power only to the S-band Transceiver, a chemical type running time meter, and the (LRU) POWER ON indicator lamp. The logic power supply provides power to only the digital logic. The console power supply provides power to the relays and lamps in the illuminated switches. The normal sequence of operations requires energizing the logic supply first, the console power supply second, and the LRU power supply last. The power system is energized with the S-band Transceiver OFF and in LOCAL control. The sequence in which the power supplies are energized is controlled by relays.

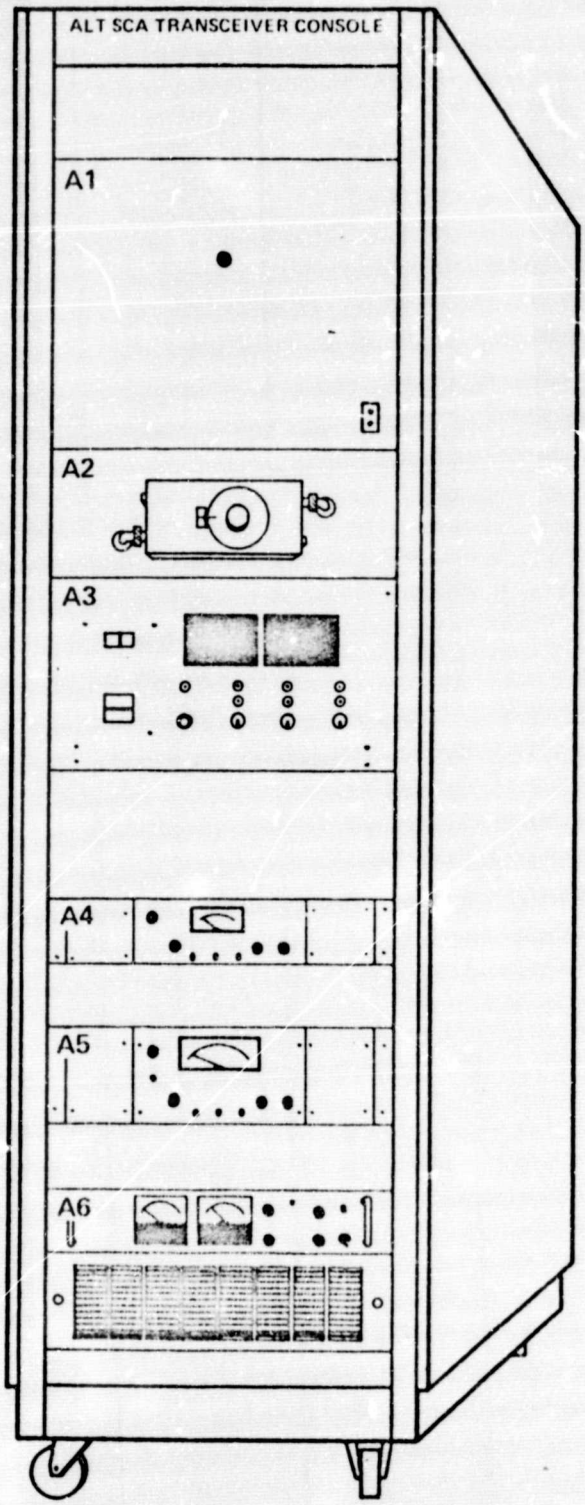

Figure 1.- SCA Transceiver Console.

1.1.2 MONITOR CIRCUITS

Zero-to-five volt analog voltages are available from the LRU as measures of input signal strength and transceiver power output. These measurements are obtained by digital voltmeter panel meters. These voltages are intended to provide only a relative indication for monitoring purposes and not absolute measurements. These meters provide 10 millivolts resolution.

1.1.3 FUNCTIONAL OPERATION

The S-band Transceiver is energized and deenergized by means of pushbutton switches which operate logic. The logic operates a relay which controls the power to the S-band Transceiver. When this relay is energized, the POWER ON switch illuminates. When the relay is deenergized, the POWER OFF switch illuminates.

The S-band Transceiver has controls for only the POWER ON/OFF function. The only signals available for monitoring are the automatic gain control (AGC) voltage and a relative radio frequency (RF) power output voltage. The only signal input is the received RF signal and the only output signal is the transmitted RF signal.

1.1.4 COOLING

A centrifugal blower provides forced air cooling of the S-band Transceiver. The capacity of the cooling system exceeds the minimum specified. A pair of thermal sensors are used to sense the case temperature. If the temperature should reach the sensor set value, digital logic circuits automatically turn off the power to the S-band Transceiver.

1.1.5 RF PATH

The SCA Console contains RF paths for the input and output RF signals. The input RF path consists of a 0 to 120-decibel (dB) variable attenuator with bypass capability. The variable attenuator will be used to control the signal level during Spacecraft Systems Test Laboratory (SSTL) tests. The RF signal source for this console is the ALT frequency modulation (FM) system. Fixed RF pads at the S-band Transceiver output provide a continuous load for the transceiver and lowers the RF signal level prior to leaving the RF shielded enclosure in order to reduce radiated RF levels. This reduced level also allows for measurement and use with associated test equipment. The output RF path provides 30 dB of attenuation plus a 20 dB directional coupler that provides a monitor point for a spectrum analyzer or power meter.

1.2 SPACECRAFT EQUIPMENT

The only spacecraft LRU is the S-band Transceiver designed in accordance with Rockwell International specification ME 478-0133. The function of the S-band Transceiver is to receive the radiated S-band signal from the Space Shuttle Orbiter and retransmit the information at a higher frequency. The S-band Transceiver is mainly used during the mated portion of the Orbiter flight where the antenna pattern of the Orbiter is blocked by the Shuttle Carrier Aircraft.

1.3 TEST EQUIPMENT REQUIRED

The following items of test equipment are required for the console tests:

1. Digital Voltmeter
2. Digital Voltmeter Plug-in
3. Voltmeter or Multimeter
4. Hot Air Blower

2. CONSOLE TEST PROCEDURE

The purpose for the console test is to insure that the console wiring is correct prior to installation of the S-band Transceiver. Since the same test equipment is to be used for all tests, record the equipment type, manufacturer, inventory or identification number, and calibration data on the data sheet (page 2-14).

2.1 POWER SUPPLY VOLTAGES

The purpose of this test is to set the power supply voltages to the correct values and verify the polarity.

		Data	Quality Control
1.	Place all three power switches on the power supplies to the OFF position.	✓	
2.	Place all three POWER switches on the TRANSCEIVER CONTROL panel in the OFF position.	✓	
3.	Connect facility power to the console.	✓	
4.	Place the three ON/OFF switches on the power supplies to the ON position.	✓	
5.	Verify that the bypass switch is in the NORMAL position.	✓	
6.	Connect a digital voltmeter to the +5-volt test point and the return.	✓	

1/22/16

		Data	Quality Control
7.	Place the LOGIC POWER switch on the control panel to the ON position.	✓	7/24/14
8.	Verify that the 5-volt power supply voltage is 5.0 ± 0.1 volts.	✓	
9.	Connect the digital voltmeter to the +24-volt test point and return.	✓	
10.	Place the CONSOLE power switch to the ON position.	✓	
11.	Verify that the voltage is 24.0 ± 1.0 volts.	✓	
12.	Connect the digital voltmeter to the +28-volt test point and return.	✓	
13.	Place the TRANSCEIVER ~~POWER~~ power switch to the ON position.	✓	
14.	Depress the LOCAL switch if not illuminated.	✓	
15.	Depress the TRANSCEIVER POWER ON switch.	✓	
16.	Verify that the voltage is 28.0 ± 0.5 volts.	✓	
17.	Place all three power switches on the TRANSCEIVER CONTROL panel OFF.	✓	

2.2 COOLING SYSTEM

The purpose of this test is to insure that the cooling system blower operates when power is applied, that the system automatically shuts down when the temperature sensor temperature limit is exceeded, and that power can be restored using the bypass switch.

		Data	Quality Control
1.	Place the LOGIC, CONSOLE and TRANSCEIVER power switches on the TRANSCEIVER CONTROL panel to the ON position.	✓	1/23/14
2.	Verify that the blower is operating.	✓	
3.	Place the ~~LOGIC~~, ~~CONSOLE and~~ TRANSCEIVER power switches in the OFF position and verify that the blower is turned off.	✓	
4.	Tape the thermocouple to one of the temperature sensors. Connect the thermocouple bridge to the thermocouple output connector on the TRANSCEIVER panel.	✓	
5.	Obtain a hot air blower to apply heated air to the thermocouple and temperature sensor when specified.	✓	

		Data	Quality Control
6.	Place the LOGIC power switch to the ON position.	✓	1/23/14
7.	Place the CONSOLE power switch to the ON position.	✓	
8.	Place the TRANSCEIVER power switch to the ON position.	✓ ✓	
9.	Depress the LOCAL and TRANSCEIVER POWER ON switches.	✓ ✓	
10.	Verify with a voltmeter the presence of a voltage (approximately 28 volts) at the 28-volt test point.	✓ ✓	
11.	Apply heat to the thermocouple and temperature sensor.	✓ ✓	
12.	Determine the temperature when the voltage is no longer present at the +28-volt test point. The temperature at which the power is no longer available at the test point must be at 135 ± 7° F.	136 °F	
13.	Record the temperature on this line for step 26 when the sequence is repeated.	137 °F	
14.	With the temperature at or greater than the temperature recorded in step 12, place the bypass switch in the BYPASS position and depress TRANSCEIVER POWER ON switch.	✓	

	Data	Quality Control
15. Verify that the voltage is present at the +28-volt test point.		
16. Verify that the BYPASS indicator is illuminated.		
17. Place the bypass switch in the NORMAL position with the temperature equal to or greater than that recorded in step 13.		
18. Verify that the BYPASS indicator is not illuminated.		
19. Verify that the voltage is not present at the +28-volt test point.		
20. Allow the sensor temperatures to decrease to 125° F or lower.		
21. Verify that the voltage is not present at the +28-volt test point.		
Wait approximately five (5) minutes.		
22. Depress the RESET switch on the sensor and determine that switch remains reset.		
23 → 23A Verify that the voltage is present at the +28-volt test point.		
24. Place the TRANSCEIVER power switch to the OFF position.		
25. Move the thermocouple to the other temperature sensor.		

7/23/14

23. Depress TRANSCEIVER POWER ON switch.

	Data	Quality Control
26. Repeat steps ~~6~~ 8 through 24, except refer to the temperature recorded in this sequence on line 13 instead of the temperature recorded in step 12.	/	
27. Remove the thermocouple bridge but leave the voltmeter connected in preparation for the next test.	/	

7/23/16

2.3 CONTROL CIRCUITS

The purpose of this test is to verify the remaining control circuits.

	Data	Quality Control
1. Turn ON TRANSCEIVER power switch and TRANSCEIVER POWER ON switch.		
~~1. Verify that all switches are in the ON position.~~	/	
2. Verify that the voltage is present at the +28-volt test point.	/	
3. Verify that the LOCAL indicator is illuminated.	/	
4. Verify that the TRANSCEIVER POWER ON indicator is illuminated.	/	
5. Verify that the TRANSCEIVER POWER OFF indicator and REMOTE indicator are not illuminated.	/	
6. Depress the TRANSCEIVER POWER OFF switch.	/	

7/26/16

	Data	Quality Control
7. Verify that the LOCAL indicator remains illuminated and that the REMOTE indicator remains in the not illuminated state.	✓	 7/26/76
8. Verify that the TRANSCEIVER POWER ON indicator is no longer illuminated and that the TRANSCEIVER POWER OFF indicator is now illuminated.	✓	
9. Verify that the voltage is no longer present at the +28-volt test point.	✓	
10. Depress the TRANSCEIVER POWER ON switch and observe no change in the state of the LOCAL and REMOTE indicators in that the TRANSCEIVER POWER ON switch is illuminated but not the TRANSCEIVER POWER OFF switch.	✓	
11. Depress the REMOTE switch.	✓	
12. Verify that the LOCAL indicator is not illuminated and that the REMOTE indicator is illuminated.	✓	
13. Verify that the TRANSCEIVER POWER ON indicator is illuminated and that the TRANSCEIVER POWER OFF indicator is not illuminated.	✓	

		Data	Quality Control
14.	Select LOCAL and at connector A3 J4, place a jumper between pins 3 and 4.		
15.	Select REMOTE and observe that the TRANSCEIVER POWER OFF indicator is illuminated and the TRANSCEIVER POWER ON indicator is not illuminated.		
16.	At connector A3 J4, remove the jumper between pins 3 and 4 and observe no change in indicator illumination.		
17.	Select LOCAL and connect a jumper between pins 1 and 2 of A3 J4.		
18.	Select REMOTE and verify that the TRANSCEIVER POWER OFF indicator is not illuminated and that the TRANSCEIVER POWER ON indicator is illuminated.		
19.	Remove the jumper between pins 1 and 2 and verify that there is no change in illumination.		
20.	Select LOCAL control and verify that the LOCAL indicator is illuminated and the REMOTE indicator is not illuminated.		
21.	Verify that the TRANSCEIVER POWER ON indicator remains illuminated and that the TRANSCEIVER POWER OFF indicator is not illuminated.		

	Data	Quality Control
22. Measure and record the voltage at connector A3 J4 between pin 5 and 2 (return) and between 5 and 4 (return). The voltage must be 5.0 ± 0.2 volts.	✓	7/24/16
23. Place a connector plug at A3 J4 with jumpers between 1 and 2 and between 3 and 4.	✓	
24. Select REMOTE control.	✓	
25. Verify that the TRANSMITTER (COVER) POWER OFF indicator is illuminated and the TRANSMITTER (COVER) POWER ON indicator is not illuminated.	✓	
26. Remove the connector plug from A3 J4.	✓	
27. Select LOCAL control and TRANSCEIVER POWER ON.	✓	
28. Connect a 10K resistor between pin 6 of connector A3 J5 and the terminals shown in the following table and verify the voltages at the pin in the table with respect to the 24-volt return on the Transceiver CONTROL panel.	✓	

PIN	VOLTAGE		
1	2 ± 2V	✓	
2	24 ± 4V	✓	
3	2 ± 2V	✓	
4	24 ± 4V	✓	
5	24 ± 4V	✓	

		Data	Quality Control
29.	Remove the 10K resistor.	✓	✓ 7/24/16
30.	Depress the Lamp Test switch and verify that all indicators are illuminated.	✓	
31.	Verify that the AGC and RF OUTPUT digital panel meters display +8.88.	✓	
32.	Select TRANSCEIVER POWER OFF and the REMOTE control.	✓	
33.	Place the bypass switch in the BYPASS position.	✓	
34.	Connect a 10K resistor between pin 6 of connector A3 J5 and the terminals shown in the following table and verify the voltage at the pin in the table with respect to the 24V return on the TRANSCEIVER CONTROL panel.	✓	

PIN	VOLTAGE	Data	Quality Control
1	24 ± 4V	✓	
2	2 ± 2V	✓	
3	24 ± 4V	✓	
4	2 ± 2V	✓	
5	2 ± 2V	✓	

		Data	Quality Control
35.	Remove the 10K resistor.	✓	✓ 1/26/76
36.	Depress the LAMP TEST switch and verify that all indicators are illuminated except for the TRANSCEIVER POWER ON indicator.	✓	✓
37.	Place the bypass switch in the NORMAL position.	✓	✓
38.	Place the TRANSCEIVER ~~POWER~~ Power switch in the OFF position.	✓	✓
39.	Place the LOGIC POWER switch in the OFF position.	✓	✓
40.	Alternately place the LOGIC POWER SWITCH in the ON and OFF position.	✓	✓
41.	Verify that the equipment energizes in the LOCAL and TRANSCEIVER POWER OFF mode each time.	✓	✓
42.	Repeat this procedure for 20 trials.	✓	✓

2.4 LRU VOLTAGES

The purpose of this test is to verify the voltages at the connector on cable W3 which connects to the LRU connector J2.

	Data	Quality Control
Place the TRANSCEIVER power switch in the ON position.		
1. Verify that the system is in LOCAL control and that the TRANSCEIVER POWER OFF switch is illuminated.	✓	
2. Verify that there is less than one volt between pin 7 and all other pins.	✓	
3. Select TRANSCEIVER POWER ON.	✓	
4. Verify that there are 27 ± 2 volts between pin 6 and the return at pin 7.	✓	
5. Verify that there is less than one volt between all pins except pin 6 and the return at pin 7.	✓	

2.5 MONITOR CIRCUITS

The purpose of this test is to verify the AGC and power monitor circuits.

	Data	Quality Control
A1J2		
1. Connect wires from ~~the cable W3 connector~~ J2 pin 10 and pin 5 to a test point return terminal on the control panel.	✓	

	Data	Quality Control
2. Connect a wire from A1J2 pin 4 to the +5-volt test point.	✓	121M 7/26/76
3. Verify that the voltage is +5.0 ± 0.3 volts as measured by the AGC meter.	✓	121M
4. With the same connections as used in steps 1 and 2, verify that there is 5.0 ± 0.3 volts at the AGC test connector A3 J1.	✓	121M
5. Remove the wire from A1J2 pin 4 ~~of the cable W3 connector~~ and connect it to pin 9.	✓	121M
6. Verify that the voltage is +5.0 ± 0.3 volts as measured by the RF output meter.	✓	121M
7. Remove the wires connected for test purposes and deenergize the system.	✓	121M

TEST EQUIPMENT USED
CONSOLE SED 36115353-301

Date 7-26-76

QUALITY CONTROL

DIGITAL VOLTMETER

HP 5245L ELECTRONIC COUNTER

CAL DATE = ~~JAN 20 1977~~ SEP 16 1976

DIGITAL VOLTMETER PLUG-IN

HP 5265A DIGITAL VOLTMETER

CAL DATE = JAN 20 1977

VOLTMETER OR MULTIMETER

SIMPSON 270

CAL DATE = APR 09 1977

OTHER (SPECIFY)