TD-3 MICROWAVE RADIO
J68386G AND J68386H TRANSMITTER-RECEIVER BAYS
TESTS
29A AND 30A INTEGRATED CIRCUIT—REPLACEMENT

This section contains the procedures to be followed in checking and replacing, if necessary, the 29A or 30A integrated circuit when trouble is experienced with a unit. The tests in Section 411-506-501 should be done before performing any of the procedures given in this section. If the trouble is associated with the 29A integrated circuit, begin with Chart 1. If the trouble is associated with the 30A integrated circuit, begin with Chart 2.

This section is reissued to add a caution to be observed when working on systems equipped with Hot Standby/Space Diversity Switching.

This reissue does not affect the Equipment Test List.

Note: Spares are not normally provided for the circuits tested in this section.

Caution 1: These tests are to be performed on an out-of-service basis. Obtain a release from the designated control office and remove the channel from service as directed by local practice.

Caution 2: On Hot Standby/Space Diversity equipped bays, consult Section 411-600-500 for forced switching procedures to remove service from the desired transmitter. Exercise extra caution during tests since the receiver in this bay may be carrying service.

Caution 3: When removing and replacing waveguide units, care should be exercised to prevent foreign matter from entering the waveguide. Handle all types of waveguide carefully in order to prevent damage to the mating surfaces. When connecting waveguide units, flange mating surfaces must be carefully aligned and all screws tightened securely to prevent RF leakage.

Warning: DO NOT leave energized waveguides unterminated. The RF power density that may be encountered is potentially hazardous to the eyes and body tissue.

CHART **PAGE**

1—Troubleshooting Procedure—29A Integrated Circuit 2

2—Troubleshooting Procedure—30A Integrated Circuit 2

3—29A Integrated Circuit—Test and Calibration 3

4—30A Integrated Circuit Test 4

5—29A or 30A Integrated Circuit Removal and Replacement 5

CHART 1

TROUBLESHOOTING PROCEDURE—29A INTEGRATED CIRCUIT

STEP	PROCEDURE
	Note: Perform the step which applies to the situation.
1	If the trouble in the 29A integrated circuit appears to be associated with the detector which provides voltage for the TWT IN meter indication, perform the following sequence of operations: (a) Perform Chart 3 to determine if the 29A integrated circuit is defective. (b) Replace the circuit, if defective, as directed in Chart 5. (c) If the circuit is replaced, it will be necessary to again perform Chart 3 in order to calibrate the detector in the replaced circuit. (d) Whether or not the circuit is replaced, perform Chart 1 in Section 411-506-501 before returning the bay to service.
2	If the trouble is associated with the 29A integrated circuit but does not involve the detector circuit, the sequence of operations may begin with (b) in Step 1.

CHART 2

TROUBLESHOOTING PROCEDURE—30A INTEGRATED CIRCUIT

APPARATUS:

None

STEP	PROCEDURE
	Note: Perform the step which applies to the situation.

CHART 2 (Cont)

STEP	PROCEDURE
1	If the trouble in the 30A integrated circuit appears to be associated with the detector which provides voltage for the TRMTR OUT meter indication, and for the transmitter output power alarm circuit, perform the following sequence of operations: (a) Perform Chart 4 to determine if the 30A integrated circuit is defective. (b) Replace the circuit, if defective, as directed in Chart 5. (c) Whether or not the circuit is replaced, perform Charts 1 and 6 in Section 411-506-501 before returning the bay to service.
2	If the trouble is associated with the 30A integrated circuit but does not involve the detector circuit, the sequence of operations may begin with (b) in Step 1.

CHART 3

29A INTEGRATED CIRCUIT—TEST AND CALIBRATION

APPARATUS:

1—J68392A Transmitter-Receiver Test Set

STEP	PROCEDURE
1	Remove the termination from the TEST port of the 29A integrated circuit.
2	Connect test apparatus to the TEST port as shown in Fig. 1. Remove drive to the IF limiter-carrier resupply circuit and make sure that the normal bay cable connection between that circuit and the IF driver-amplifier is made.
3	Adjust the ATT control on the 29A integrated circuit for maximum power at the TEST port.
4	Adjust the GAIN control on the IF driver-amplifier for +9 dBm at the TEST port.
5	Remove the test apparatus from the TEST port on the 29A integrated circuit and replace the termination.
6	Readjust the ATT control on the 29A integrated circuit for maximum TWT IN meter indication.

CHART 3 (Cont)

STEP	PROCEDURE
	Requirement: Between 85 and 95
	If the requirement is met, the TWT IN detector circuit in the 29A integrated circuit is functioning properly.
	If the requirement is not met, recalibrate the 29A integrated circuit by performing Steps 7, 8, and 9.
7	Adjust the TUNE 1 and TUNE 2 controls in the 29A integrated circuit for maximum transmitter power as indicated by the TRMTR OUT meter indication.
8	If the TWT IN meter indication is off-scale, adjust the MON ADJ control on the 29A for an on-scale indication and check that the ATT control has been adjusted for maximum TWT IN indication.
	Note: The MON ADJ control may have been secured at the factory with Glyptol. If so, it will be necessary to break the seal.
9	Adjust the MON ADJ control to obtain a TWT IN indication of 90.
10	If the requirement cannot be met by recalibrating, replace the 29A integrated circuit as directed in Chart 5.
	Note: Before replacing the circuit, make sure that the problem does not lie in some other portion of the bay, ie, the meter circuit or the bay wiring.

CHART 4

30A INTEGRATED CIRCUIT TEST

APPARATUS:

1—J68392A Transmitter-Receiver Test Set

1—KS-14510 Volt-Ohm-Milliammeter

CHART 4 (Cont)

STEP	PROCEDURE
1	Disconnect the P14 plug from the IF driver-amplifier input jack in order to remove drive to the transmitter. This prevents hazardous RF power from radiating from unterminated ports in the transmitter.
2	Remove the 3-inch piece of flexible waveguide located at the output of the 30A integrated circuit.
3	Set up the test set in accordance with Fig. 2.
4	Adjust ATTEN 2 in the test set for a power meter indication equal to +34 dBm minus the calibrated loss of the 24A directional coupler, the RF pad, and the RF cable if the cable is used.
5	Operate the KS-14510 volt-ohm-milliammeter to the 3-volt scale and connect the test leads to terminals A (negative) and G (positive). Adjust the MON ADJ control for a meter indication between 0.7 and 0.9 volt. If such an indication is possible, the detector circuit in the 30A integrated circuit is operating properly. If adjustment cannot produce the required voltage indication, replace the 30A integrated circuit as directed in Chart 5. ***Note:*** Before replacing the circuit, make sure that the problem does not lie in some other part of the bay, ie, the alarm circuit, the meter circuit, or bay wiring.

CHART 5

29A OR 30A INTEGRATED CIRCUIT REMOVAL AND REPLACEMENT

APPARATUS:

1—0X1-8 Wrench (Waveguide Wrench)

1—Soldering Iron

STEP	PROCEDURE
1	Disconnect the P14 plug from the IF driver-amplifier input jack in order to remove drive to the transmitter. This prevents hazardous RF power radiation from unterminated parts of the transmitter.
2	Operate the INPUT switch on the oscillator section of the TWT power supply to the OFF position.

CHART 5 (Cont)

STEP	PROCEDURE
3	Unsolder and remove the leads connected to the A and G terminals on the integrated circuit.
4	Remove the screws connecting the integrated circuit to the TWT amplifier and the bay waveguide. Remove the integrated circuit from the bay.
5	To replace the integrated circuit, reverse the procedure in Steps 1 through 4.

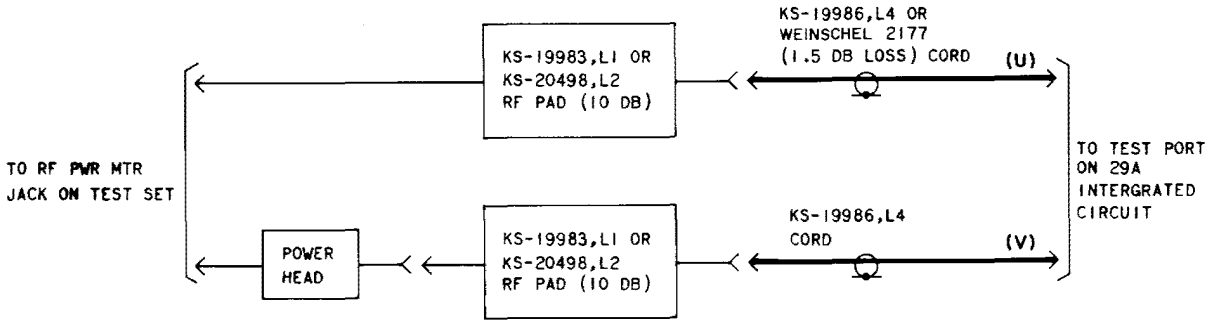

Fig. 1—29A Test and Calibration Test Setup

PREPARATION FOR TEST

1. Operate the POWER RANGE DBM control on the power meter to —25 and the INPUT CHANNEL control to RF.

2. With the power meter input disconnected, adjust the METER ZERO control for an indication of ZERO.

3. Set the POWER RANGE DBM control to the 0 position.

4. Connect option (U) or (V) to the TEST port on the 29A integrated circuit.

   Note: Option (U) is used when an internal power head is provided in the test set; option (V) when an external power head is provided.

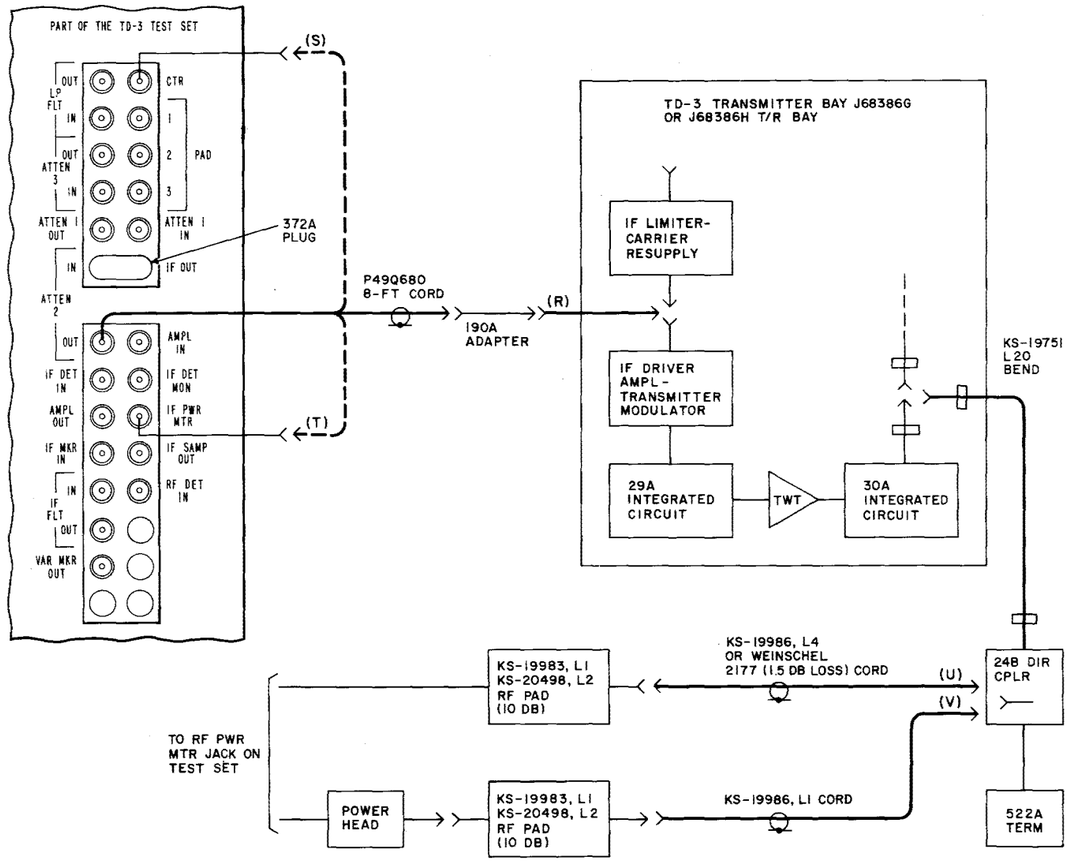

Fig. 2—30A Test Setup

PREPARATION FOR TEST

1. Operate the test set controls to the following positions:

UNIT	CONTROL	POSITION
Control Panel	CTR	EXT
	IF SWEEP WIDTH	Maximum CCW
Power Meter	INPUT CHANNEL	IF
	POWER RANGE DBM	−25

2. With the power meter input disconnected, adjust the METER ZERO for an indication of ZERO.

3. Set the POWER RANGE DBM control to the −5 position.

4. Set ATTEN 2 to 17 dB.

5. Connect option (S), and adjust the IF CENTER FREQ control until the counter indicates 70 ±0.2 MHz.

6. Connect option (T).

7. Adjust ATTEN 2 to obtain −7 dBm on the power meter.

8. Connect option (U) or (V).

   Note: Option (U) is used when an internal power head is provided in the test set; option (V) when an external head is provided.

9. Connect option (R).