TD-3 MICROWAVE RADIO
MAINTENANCE CENTER
TRANSMITTER-RECEIVER BAY COMPONENTS
J68387W 40-MHz OSCILLATOR—SHIFT MODULATOR

This section provides a step-by-step procedure for locating trouble in the J68387W 40-MHz oscillator—shift modulator (Fig. 1).

The following drawing and section are related to this section.

SD-50586-01	TD-3 Radio, 40-MHz Oscillator—Shift Modulator Circuit
411-502-503	TD-3 Microwave Radio, J68386G and J86386H Transmitter-Receiver Bay, Common Equipment Tests, J68387W 40-MHz Oscillator—Shift Modulator

This section is reissued to change the requirement in Chart 1, Step 6.

CHART **PAGE**

CHART 1

40-MHz OSCILLATOR

APPARATUS:

1—J68396A Test Bench

1—J68392A or J68428A Test Set

CHART 1 (Cont)

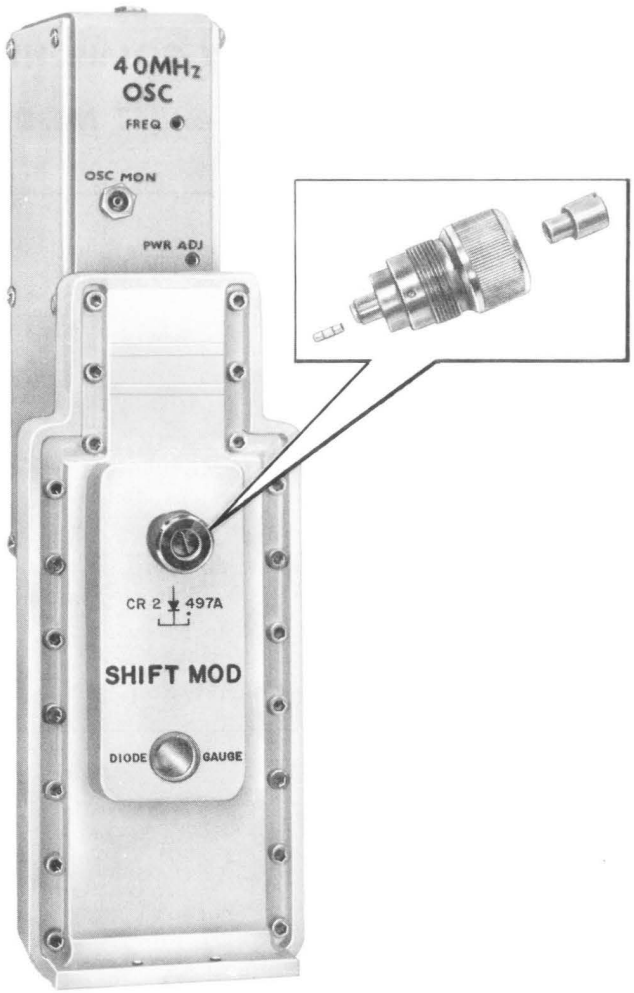
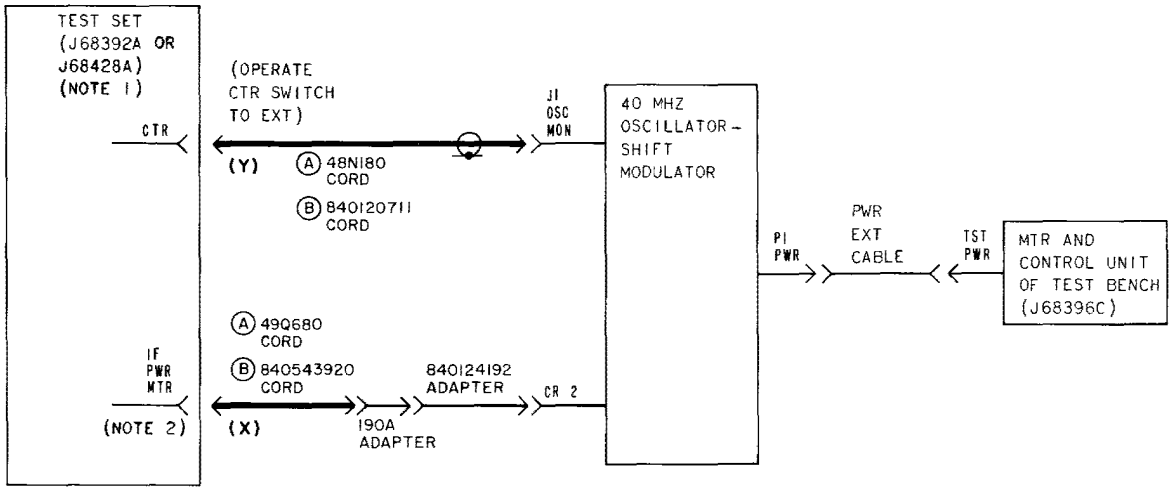


Fig. 1—J68387W 40-MHz Oscillator—Shift Modulator

STEP	PROCEDURE
	Note: If any of the requirements in this chart are not met, perform Chart 4 and repeat this chart.
1	Remove diode CR2 and insert the 840124192 adapter.
2	Connect the 40-MHz oscillator and modulator block assembly in accordance with Fig. 2.

CHART 1 (Cont)

STEP	PROCEDURE



NOTES:
1. USE THE (A) OPTION WITH THE J68392A TEST SET AND THE (B) OPTION WITH THE J68428A TEST SET.
2. SET THE INPUT CHANNEL CONTROL OF THE POWER METER TO THE IF POSITION.

PREPARATION FOR TEST (FIG. 2)

J68428A TEST SET

1. Set the MODE switch to the POWER METER position.
2. Set the FUNCTION switch on the counter to the 135 MHZ MAX position.
3. Set the COUNTER INPUT switch on the control unit to the 135 MHZ MAX position.

J68392A TEST SET

1. Set the INPUT CHANNEL control on the power meter to the IF position.
2. Set the CTR switch on the control panel to the EXT position.

Fig. 2—40-MHz Oscillator Transmission Tests—Test Setup

3 Adjust the PWR ADJ control on the oscillator unit to the maximum clockwise position.

4 On the oscillator, adjust the FREQ control for maximum IF power output.

5 Readjust the FREQ control to meet the following requirement.

Requirement: 40 $\pm$0.0002 MHz

CHART 1 (Cont)

STEP	PROCEDURE
6	Read the power meter indication. ***Requirement:*** The output power shall be a minimum of ♦+17♦ dBm.
7	Adjust the PWR ADJ control fully counterclockwise.
8	Read the power meter indication. ***Requirement:*** The output power shall be +5 dBm or less.
9	Adjust the PWR ADJ control for a +15 dBm indication.
10	Adjust the FREQ control clockwise and counterclockwise. ***Requirement:*** The frequency shall be adjustable from 39.999600 MHz to 40.000400 MHz.
11	Adjust the FREQ control to meet the following requirement. ***Requirement:*** 40 $\pm$0.0005 MHz
12	Adjust the PWR ADJ control for a +15 dBm indication.
13	If all the requirements in this chart have been met without need of repair, perform Chart 2 and proceed to Step 14.
14	Complete the procedures of Chart 3.

CHART 2

DIODE REPLACEMENT

APPARATUS:

1—AT-7825 Screwdriver

STEP	PROCEDURE
1	Disconnect the power cable from the 40-MHz oscillator—shift modulator unit.

CHART 2 (Cont)

STEP	PROCEDURE
	Caution: The 497A diode is a fragile device susceptible to damage from static discharge or mechanical shock. Extreme care should be exercised in handling the diode and diode mount while they are removed from the modulator assembly.
2	Unscrew the collet assembly by hand, and remove the collet assembly from the modulator housing.
3	Turn the recessed slotted-head nut counterclockwise to loosen the collet that holds the diode.
4	Remove the diode from the collet.
5	Insert the replacement diode, colored-dot end first, into the collet leaving as much as possible of the diode exposed. Lightly tighten the collet to the diode by turning the recessed slotted nut clockwise.
6	Insert the diode and collet assembly into the diode gauge machined into the front face of the modulator, and seat the assembly so that the gauge exerts pressure to seat the diode at the correct position in the collet.
7	Turning the slotted nut clockwise, tighten the collet so that the diode is held securely in the collet.
8	Remove the diode and collet assembly from the gauge.
9	Recheck the position of the diode by reinserting the diode and collet assembly into the diode gauge and checking that the diode is inserted far enough into the collet. If it is not inserted far enough, loosen the collet and repeat the procedure.
10	Remove the diode and collet assembly from the gauge.
11	Insert the diode and collet assembly into the modulator housing and hand tighten.
	Caution: To ensure proper diode contact when replacing the diode, examine the spring diode contacts in the modulator housing for bent or broken fingers.
12	Reconnect the power cable disconnected in Step 1.

CHART 3

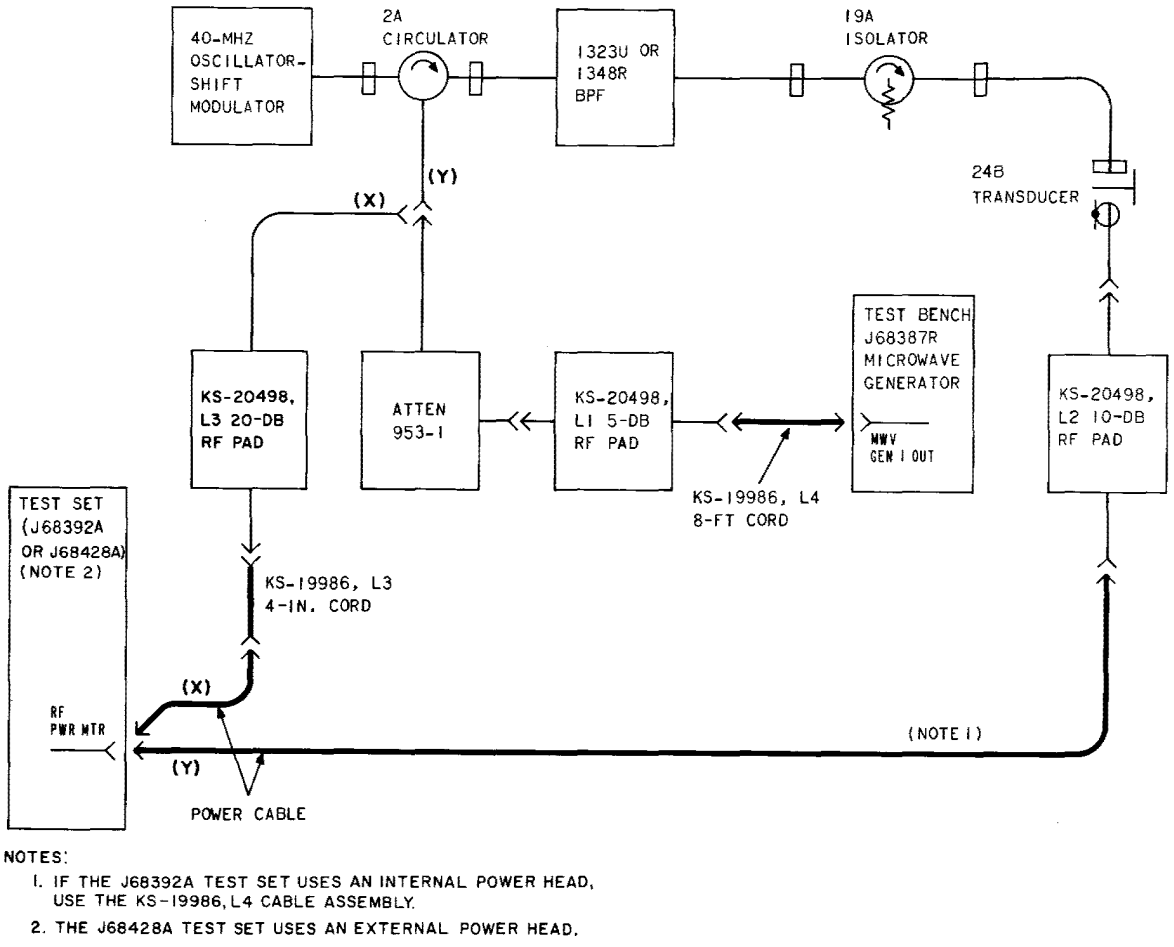
SHIFT MODULATOR

APPARATUS:

1—J68396A Test Bench

1—J68392A or J68428A Test Set

STEP	PROCEDURE
	Note: If Chart 2 was not performed, disconnect the power cable and replace the 840124192 adapter with the original diode and diode holder.
1	Prepare the test set in accordance with Fig. 3, option (X).
2	Adjust the 953-1 attenuator and microwave generator LEV ADJ control for a −1.75 dBm indication on the RF power meter in the J68428A test set and on the J68392A test set with an external power meter head. For test sets with internal power heads where 8-foot RF cables are used, the power meter indication should be −3.25 dBm at a microwave generator frequency of 4100 MHz.
3	Change from option (X) to option (Y).
4	Connect the power cable to the 40-MHz oscillator—shift modulator unit.
5	Adjust the PWR ADJ control fully clockwise and fully counterclockwise. ***Requirement 1:*** In the clockwise position, the power meter shall indicate −3.8 dBm or greater. ***Requirement 2:*** In the counterclockwise position, the power meter shall indicate −13.8 dBm or less.
6	Adjust the PWR ADJ for a −3.3 dBm indication at the power meter.
7	Check the panel meter positions on 13 and 15. ***Requirement:*** Position 13 shall indicate 55 ±15 units. Position 15 shall indicate 45 ±15 units.
8	If any of the requirements are not met, replace the 497A diode in accordance with Chart 2 and repeat this chart.



NOTES:

1. IF THE J68392A TEST SET USES AN INTERNAL POWER HEAD, USE THE KS-19986, L4 CABLE ASSEMBLY.
2. THE J68428A TEST SET USES AN EXTERNAL POWER HEAD.

Fig. 3—J68387W 40-MHz Oscillator—Shift Modulator—Test Setup

CHART 4

TROUBLE-LOCATING PROCEDURE

APPARATUS:

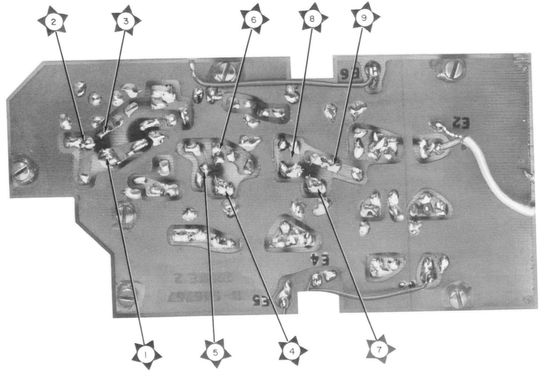
1—J68396A Test Bench

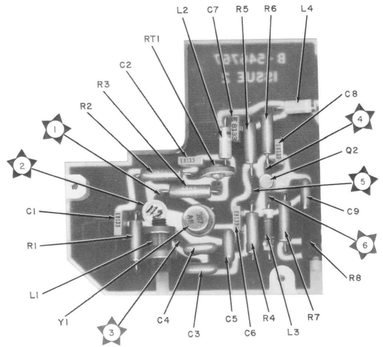
1—J68392A or J68428A Test Set

STEP	PROCEDURE
1	Visually inspect the unit for trouble symptoms, and check all screws fastening the printed circuit board to the chassis.

CHART 4 (Cont)

STEP	PROCEDURE
2	Make voltage measurements at the test points as indicated on Table A of Fig. 4.
3	Disconnect the power cable from the 40-MHz oscillator—shift modulator.
4	Make resistance measurements at the test points as indicated on Table A of Fig. 4.
5	Repair or replace components as required to eliminate the trouble condition.





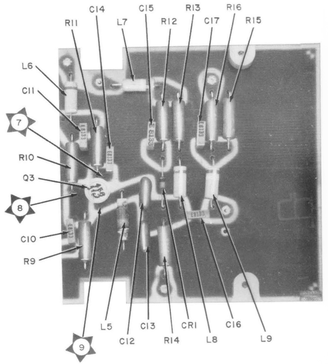


TABLE A

MEASURE	VOLTAGE AND RESISTANCE																			
FROM	★1		★2		★3		★4		★5		★6		★7		★8		★9		★10	
TO	GRD	-19V	GRD	-19V	GRD	-19V	GRD	-19V	GRD	-19V	GRD	-19V	GRD	-19V	GRD	-19V	GRD	-19V	GRD	-19V
VOLTS	-15.0	—	-14.4	—	0	—	-10.5	—	-10.0	—	0	—	-13.0	—	-12.4	—	0	—	-19.0	
OHMS	9K	6.5K	3.5K	2.5K	0	2.5K	3K	1K	2K	2K	0	2.5K	2.5K	200*	2.5K	2K	0	2.5K	2.3K	2.5K

MEASURE	VOLTAGE AND RESISTANCE					
FROM	★11		★12		★13	
TO	GRD	-19V	GRD	-19V	GRD	-19V
VOLTS	0	—	0	—	0	—
OHMS	0		0	2.5K	2.5K	125K

NOTES:
1. ALL VOLTAGE INDICATIONS ARE MADE USING THE 60 VOLT RANGE, AND ALL RESISTANCE INDICATIONS ARE MADE USING THE X1000 RANGE.
2. WHEN MAKING VOLTAGE AND RESISTANCE MEASUREMENTS, CONNECT THE POSITIVE TEST LEAD TO GROUND OR -19 VOLT POINT AS INDICATED IN TABLE A.

CAUTION:

TO PREVENT TRANSISTOR BREAKDOWN WHEN MAKING RESISTANCE MEASUREMENTS, CARE SHOULD BE TAKEN NOT TO USE THE X10000 RANGE ON THE KS-14510 METER.

* SET THE KS-14510 METER TO THE X100 RANGE FOR THIS MEASUREMENT.

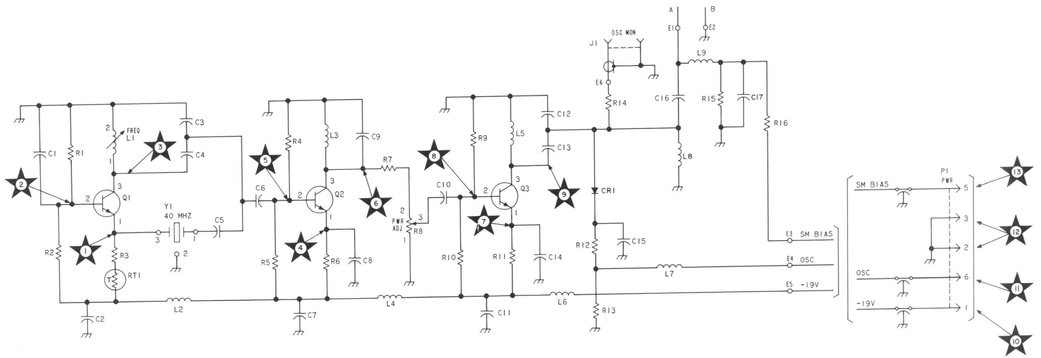


Fig. 4—40-MHz Oscillator—Trouble-Locating Information