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**TD-3 MICROWAVE RADIO**  
**J68386A AND J68386B TRANSMITTER-RECEIVER BAY**  
**RECEIVER TESTS**  
**TRANSMISSION**

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This section contains the procedures for measuring and adjusting the gain and amplitude response of a TD-3 microwave radio receiver. The 40-MHz oscillator and shift modulator checks are also included.

This section is reissued to add Charts 6 through 10 which are designed to be used with the J68428A test set. Since this is a general revision, arrows ordinarily used to indicate changes have been omitted.

Section 411-400-501, describing in-service checks, should be performed prior to this section and the results used as a guide to possible sources of trouble. The preliminary checks in Section 411-402-500 must be completed before performing the tests in this section. The IF return loss test in Section 411-404-502, when required by the Equipment Test List, must be completed prior to these tests.

The tests in Chart 1 or Chart 6 must be performed first if the bay is equipped with a 40-MHz oscillator and shift modulator.

This reissue affects the Equipment Test List.

For location of components in the bay, refer to Fig. 6.

**Caution 1:** *These tests are 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:** *When removing and replacing waveguide units, care should be taken to prevent foreign matter from entering the waveguide. Handle waveguide sections with care to prevent damage to flange mating surfaces. All open waveguide sections should be capped.*

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CHART	PAGE
<b>J68392A TEST SET</b>	
1—40-MHz Oscillator and Shift Modulator Checks . . . . .	2
2—Receiver Modulator BO Power Adjustment . . . . .	4
3—Overall Transmission Test . . . . .	6

**NOTICE**

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CHART	PAGE
4—Receiver Modulator Adjustment . . . . .	9
5—IF Main and AGC Amplifier Adjustment . . . . .	10
<b>J68428A TEST SET</b>	
6—40-MHz Oscillator and Shift Modulator Checks . . . . .	13
7—Receiver Modulator BO Power Adjustment . . . . .	14
8—Overall Transmission Test . . . . .	15
9—Receiver Modulator Adjustment . . . . .	18
10—IF Main and AGC Amplifier Adjustment . . . . .	20

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**CHART 1**
**40-MHz OSCILLATOR AND SHIFT MODULATOR CHECKS**


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**APPARATUS:**

1—J68392A Transmitter-Receiver Test Set

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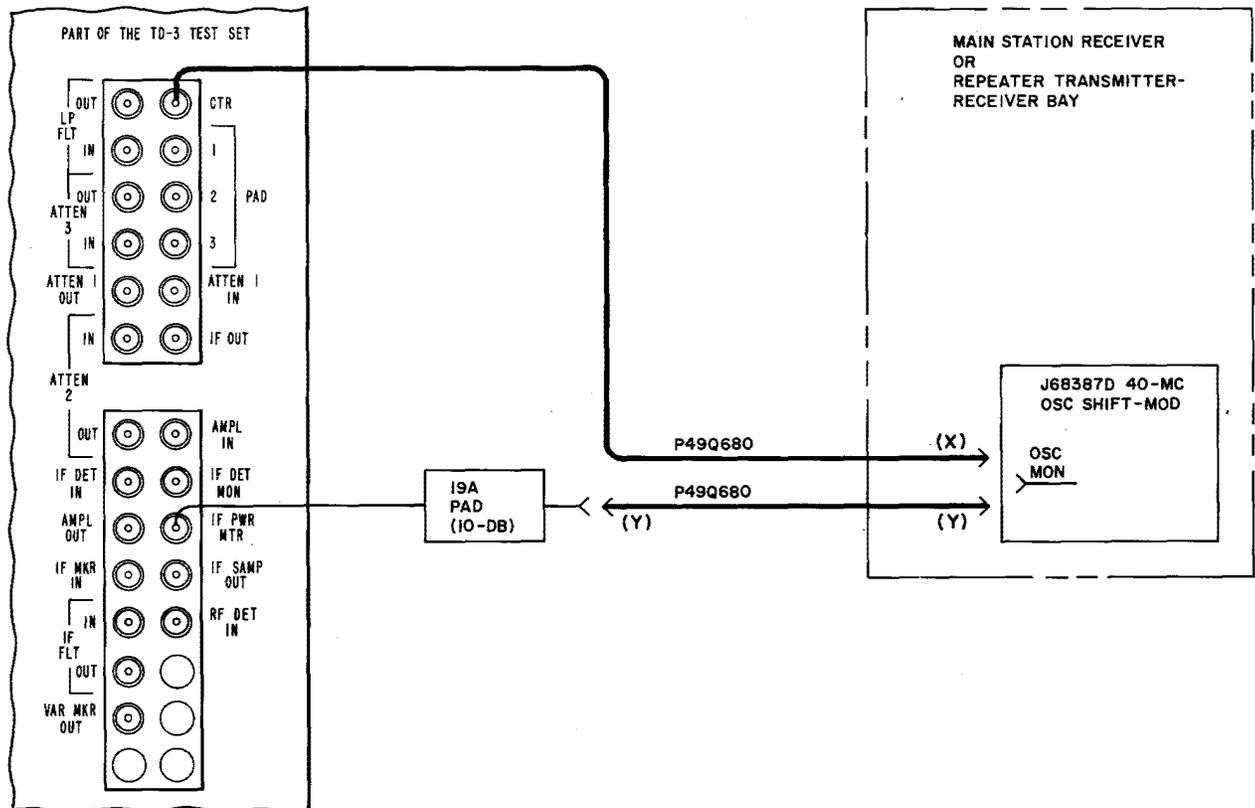
**STEP****PROCEDURE**

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- 1 Remove the 368A plug from the OSC MON jack on the 40-MC OSC (Fig. 6).
  - 2 Make test connections in accordance with Fig. 1, option (X). Set the CTR switch to the EXT position.
  - 3 Observe the frequency indicated by the counter.  
  
**Requirement:** 40 MHz  $\pm$ 400 Hz (limits: 39,999,600. to 40,000,400. Hz)  
  
If this requirement is not met, proceed to Step 6.
  - 4 Set the power meter INPUT CHANNEL switch to the IF position and the POWER RANGE DBM switch to -25, and adjust the METER ZERO control for a zero meter indication.
  - 5 Set the POWER RANGE DBM switch to -10 and connect option (Y). Measure the power.  
  
**Requirement:** -12.5 dBm  $\pm$ 0.2 dB (This corresponds to a power of -2.5 dBm  $\pm$ 0.2 dB at the OSC MON jack.)

## CHART 1 (Cont)

## STEP

## PROCEDURE



**Fig. 1—40-MHz Oscillator and Shift Modulator—Frequency and Power Measurements**

If the requirements of both Steps 3 and 5 are met, proceed to Step 10. If either requirement is not met, proceed with Step 6.

- 6 Connect Fig. 1, option (Y), and on the 40-MC OSC turn the LEV control fully clockwise. Adjust the OSC TUN and AMPL TUN controls for maximum power output.
- 7 Adjust the LEV control to obtain  $-12.5$  dBm.
- 8 Change the test connections to option (X). Adjust the FREQ ADJ control to obtain 40 MHz  $\pm 50$  Hz (limits 39,999,950. to 40,000,050. Hz).
- 9 Repeat Steps 7 and 8 until the requirements are met.

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**CHART 1 (Cont)**


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STEP	PROCEDURE
10	Replace the 368A plug in the OSC MON jack and reconnect the cables.
11	Press the SHIFT OSC pushbutton on the receiver control panel and adjust the MTR CAL control on the 40-MC OSC for an indication of 50 on the control panel meter.
12	On the receiver control panel, press the SHIFT MOD 1 and SHIFT MOD 2 pushbuttons and observe the meter indication.
<b>Requirement:</b> 80 $\pm$ 20 divisions for both positions	
If any of the requirements in Steps 3 through 12 are not met, refer to Section 411-402-503.	

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**CHART 2****RECEIVER MODULATOR BO POWER ADJUSTMENT****APPARATUS:**

1—J68392A Transmitter-Receiver Test Set

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STEP	PROCEDURE
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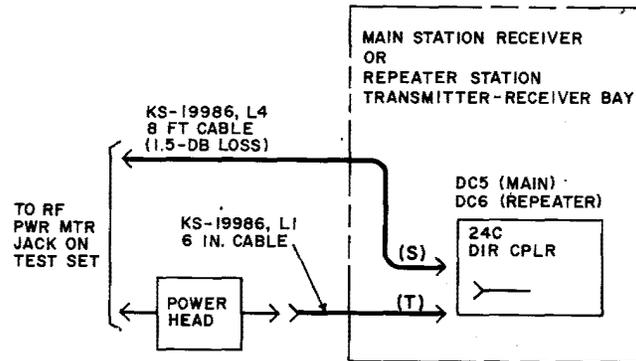
The following procedure establishes the correct BO power for the receiver modulator. For bays equipped with the J68387P receiver modulator and IF preamplifier and in which the J68387D 40-MHz oscillator and shift modulator *is not* installed, perform Step 4. For bays equipped with the J68387P receiver modulator and IF preamplifier and in which the J68387D 40-MHz oscillator and shift modulator *is* installed, perform Steps 1 through 4. For bays equipped with the J68387C receiver modulator and IF preamplifier, perform Step 5.

**J68387P Receiver Modulator**

- |   |  |
|---|--|
| 1 | Connect the test setup as shown in Fig. 2. Set the power meter INPUT CHANNEL switch to the RF position and the POWER RANGE DBM switch to -25, and adjust the METER ZERO control for a ZERO meter indication. |
| 2 | Adjust attenuator AT2 or AT3 (Fig. 6) for a power of -7.0 dBm when using option (S) or -5.5 dBm when using option (T).   |
| 3 | Remove the option (S) or option (T) connections.   |

## CHART 2 (Cont)

STEP	PROCEDURE
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## NOTE:

- OPTION (S) - FOR TEST SETS WITH INTERNALLY MOUNTED RF POWER HEAD.  
 OPTION (T) - FOR TEST SETS WITH AN EXTERNAL RF POWER HEAD.

Fig. 2—Test Setup for Measuring BO Power

- 4 Press the RCVR MOD 1 pushbutton and note the panel meter indication.

**Requirement:** Within  $\pm 0.5$  of the recorded value

**Note:** The recorded value on the front panel shall be equal to the sum of the REF BIAS value stamped on the receiver modulator block and the correction factor given in Table A. If the requirement is not met, adjust the DIODE BIAS control on the IF preamplifier to obtain the correct value. If the requirement still is not met, refer to Section 411-404-503.

**J68387C Receiver Modulator**

- 5 Press the RCVR MOD 1 and RCVR MOD 2 pushbuttons and note the meter indications.

**Requirement:** The average of the two meter indications should be 42 and the difference between the two indications shall be no more than 16.

If this requirement is not met, adjust attenuator AT2 or AT3 (Fig. 6). If the requirement still cannot be met, refer to Section 411-404-504.

TABLE A

**1337 FILTER CODE	BO FREQ (MHz)	CHANNEL NUMBER		CORRECTION FACTOR
A	3780	7A		+7.0 divisions
B	3800	1A	9A*	+6.0
C	3820	7B	3A*	+5.0
D	3840	1B	9B*	+4.0
E	3860	8A	3B*	+3.0
F	3880	2A	10A	+2.0
G	3900	8B	4A	+1.5
H	3920	2B	10B	+0.5
J	3940	9A*	4B	0
K	3960	3A*	11A	-1.0
L	3980	9B*	5A	-2.0
M	4000	3B*	11B	-3.0
N	4020		5B	-4.0
P	4040		12A	-5.0
R	4060		6A	-6.0
S	4080		12B	-7.0
T	4100		6B	-8.0

\* Depends on BO frequency arrangement. Determine correct position from BO frequency or 1337 letter code stamped on the filter.

\*\* The 1337 filter is connected to the receiver-modulator unit.

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**CHART 3**
**OVERALL TRANSMISSION TEST**


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**APPARATUS:**

1—J68392A Transmitter-Receiver Test Set

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**STEP**
**PROCEDURE**


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The following comprises a check of the overall receiver transmission performance.

**Note:** It is necessary to know the actual or calculated value of received carrier power at the drop arm of the channel dropping network. The typical nonfaded received carrier power will be in the range from -28 dBm to -22 dBm. Powers greater than -22 dBm

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**CHART 3 (Cont)**


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**STEP****PROCEDURE**

should not be encountered since SD-50575-01 specifies the use of waveguide pads to prevent the power from exceeding  $-22$  dBm. In the event that neither the calculated nor measured value is available, a reasonable value to use for these tests is  $-26$  dBm.

**Caution:** *If any of the requirements in this chart are not met, do not attempt adjustments in order to bring the transmission response within requirements. Proceed with Charts 4 and 5 for the complete receiver alignment.*

- 1 Connect the test setup and perform the Preparation for Test instructions in accordance with Fig. 3. This ensures that the IF detector is properly adjusted for the following tests.
- 2 Set up the RF oscillator frequency and output power as shown in Fig. 4.
- 3 Ensure that the AGC pushbutton is in the AGC position. (The switch lamp should be extinguished.)
- 4 If not already done, remove the 1322- or 1336-type bandpass filter and place a shorting plate on the flexible waveguide (which is attached to the separating network) as specified in Section 411-402-500. Connect the test setup in Fig. 5, options (W), (X), and (Y) and perform the Preparation for Test. DO NOT perform the OSCILLOSCOPE CALIBRATION procedure.
- 5 Measure the power.  
**Requirement:**  $0$  dBm  $\pm 5$  dB
- 6 Remove the cable from the IF PWR MTR jack and connect it to the CTR jack. Operate the CTR switch to the EXT position.
- 7 Adjust the RF oscillator CW control to obtain  $70 \pm 0.5$  MHz on the counter.
- 8 Remove the cable from the CTR jack, connect it to the IF PWR MTR jack, and operate the CTR switch to the MKR FREQ position.
- 9 Set ATTEN 2 to 8 dB and measure the power and note the actual value measured for later use.  
**Requirement:**  $-7.0$  dBm  $\pm 0.5$  dB
- 10 Press the RCVD SIG LEV pushbutton and note the meter indication.

**Requirement:**  $70 \pm 2$  for bays equipped with the J68387P receiver modulator, or  $56 \pm 2$  for bays equipped with the J68387C receiver modulator.

## CHART 3 (Cont)

STEP	PROCEDURE
11	Operate the AGC pushbutton to the MANUAL position and note the meter indication for RCVD SIG LEV.  <i>Requirement:</i> Same as that for Step 10  If the requirement is not met, adjust the MANUAL GAIN control to obtain the same indication.
12	Measure the power.  <i>Requirement:</i> $-7.0 \pm 1.0$ dB
13	Calibrate the oscilloscope as shown in Fig. 5.
14	Connect Fig. 5, option (Z), and measure the transmission response as shown by the test trace.  <i>Requirement:</i> The trace shall be flat to within 0.05 dB over the 64- to 76-MHz band and to within 0.1 dB over the 60- to 80-MHz band.
15	Change option (W) to option (T) and option (Z) to option (Y) in Fig. 5 and measure the power.  <i>Requirement:</i> Within 1.0 dB of that noted in Step 9  If the requirement is not met, check the filters, equalizers, and cables in the interconnection circuit. Typical losses of the IF components at 70 MHz are:  400A—2.1 dB  400B—2.1 dB  747A—0.6 dB  745A—2.6 dB  1080A—4.5 dB  793A—5.4 dB  794A—5.0 dB
16	Adjust the LEVEL control on the IF preamplifier to obtain $-7.0$ dBm.
17	Operate the AGC pushbutton to the AUTO position. Remove the cable from the IF IN jack of the IF main amplifier and note the RCVD SIG LEV meter indication.

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**CHART 3 (Cont)**


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STEP	PROCEDURE
	<b>Requirement:</b> $0 \pm 2$
18	Reconnect the cable to the IF IN jack of the IF main amplifier and restore all other IF cable connections to normal. Remove the shorting plate and 24A transducer and reconnect the 1322- or 1336-type bandpass filter at the input to the receiver. This completes all tests on the receiver.
	<b>Note:</b> As stated previously, if any of the requirements are not met, proceed with Charts 4 and 5 for receiver alignment.

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**CHART 4****RECEIVER MODULATOR ADJUSTMENT****APPARATUS:**

1—J68392A Transmitter-Receiver Test Set

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STEP	PROCEDURE
	The following is the adjustment procedure for both the J68387P and J68387C receiver modulator and IF preamplifier units. It is assumed that the IF detector has been calibrated as outlined in Fig. 3 and that the RF oscillator has been adjusted to the proper power and frequency and connected to the radio bay as shown in Fig. 5.
1	Remove the cable shown in Fig. 5, option (X), from the IF OUT jack of the IF main amplifier and connect it to the IF OUT jack on the receiver modulator and IF preamplifier unit.
	<b>J68387P Modulator (Fig. 6)</b>
2	Set the ATTEN 2 to 0 dB and connect Fig. 5, option (Y). Adjust the LEVEL control for 0 dBm.
3	Set ATTEN 2 to 7 dB.
4	Change option (Y) to option (Z) and measure the transmission response as shown by the test trace. (It may be necessary to calibrate the oscilloscope as outlined in Fig. 5.)

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**CHART 4 (Cont)**


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STEP	PROCEDURE
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**Requirement:** The trace shall be flat to within 0.03 dB over the 64- to 76-MHz band and to within 0.05 dB over the 60- to 80-MHz band.

If the requirement is not met, adjust the SHAPE and SLOPE controls while keeping the test and reference trace coincident at 70 MHz with the LEVEL control. If the requirement cannot be met, refer to Section 411-404-503.

5 Proceed to Chart 5.

**J68387C Modulator**

6 Set ATTEN 2 to 0 dB and connect Fig. 5, option (Y). Adjust the LEVEL control for -7.0 dBm.

7 Change option (Y) to option (Z) and measure the transmission responses as shown by the test trace. (It may be necessary to calibrate the oscilloscope as outlined in Fig. 5.)

**Requirement:** The trace shall be flat to within 0.03 dB over the 64- to 76-MHz band and to within 0.1 dB over the 60- to 80-MHz band.

If the requirement is not met, adjust the LOW SLOPE, HIGH SLOPE, and GAIN controls to obtain the required flatness and gain. If the requirement still cannot be met, refer to Section 411-404-504.

8 Proceed to Chart 5.

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**CHART 5**

**IF MAIN AND AGC AMPLIFIER ADJUSTMENT**

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**APPARATUS:**

1—J68392A Transmitter-Receiver Test Set

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STEP	PROCEDURE
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The following procedure is used for adjusting the gain and amplitude response of the IF main amplifier and AGC amplifier combination. For bays equipped with the J68387P receiver modulator, the objective is to establish a gain of 9 dB with -8.0 dBm in and +1.0 dBm out, an AGC range of 35 dB, and an amplitude response flat to within 0.01 dB over the 60- to 80-MHz band.

## CHART 5 (Cont)

STEP	PROCEDURE
	For bays equipped with the J68387C receiver modulator, the objectives are a gain of 16 dB with $-15$ dBm in and $+1$ dBm out, an AGC range of 28 dB, and an amplitude response flat to within 0.01 dB over the 60- to 80-MHz band.
	<b>IF Main Amplifier (Fig. 6)</b>
1	Prepare the test set in accordance with Fig. 3.
2	Disconnect the cables from the IF IN and IF OUT jacks on the IF main amplifier.
3	Connect Fig. 3, options (Y) and (Z).
4	Increase the setting of ATTEN 2 as follows: <p style="margin-left: 40px;">Bays equipped with the J68387P modulator, 1 dB</p> <p style="margin-left: 40px;">Bays equipped with the J68387C modulator, 8 dB</p>
5	On the receiver control panel set the AGC switch to the MANUAL position and adjust the MANUAL GAIN control for coincidence of the test and reference traces at 70 MHz. The test trace displays the amplitude response of the IF main amplifier. Measure the test trace flatness. <p><b>Requirement:</b> Flat to within 0.02 dB over the 60- to 80-MHz band</p> <p>If the requirement is not met, adjust the SLOPE 1 and SLOPE 2 controls on the IF main amplifier. Maintain coincidence of the test and reference trace with the MANUAL GAIN control. If the requirement still is not met, replace the IF main amplifier.</p>
6	Increase the setting of ATTEN 2 as follows: <p style="margin-left: 40px;">Bays equipped with the J68387P modulator, 35 dB</p> <p style="margin-left: 40px;">Bays equipped with the J68387C modulator, 28 dB</p> <p><b>Note:</b> If the J68392A test set is equipped with ATTEN 2 having only 3 drums, it will be necessary to use a 19A pad in series with ATTEN 2 to obtain the required attenuation.</p>
7	Turn the MANUAL GAIN control to its maximum counterclockwise (maximum gain) position.
8	Adjust the AGC RANGE control on the AGC amplifier for coincidence of the test and reference traces at 70 MHz. Measure the flatness of the test trace. <p><b>Requirement:</b> Flat to within 0.5 dB over the 60- to 80-MHz band.</p>
9	Turn the MANUAL GAIN control to its maximum clockwise (minimum gain) position.

## CHART 5 (Cont)

STEP	PROCEDURE
10	<p>Decrease the setting of ATTEN 2 as follows (remove the 19A pad if used in Step 6):</p> <p style="padding-left: 40px;">Bays equipped with the J68387P modulator, 35 dB</p> <p style="padding-left: 40px;">Bays equipped with the J68387C modulator, 28 dB</p>
11	Adjust the MANUAL GAIN control counterclockwise to obtain coincidence of the test and reference traces.
12	Press the AGC REF pushbutton and record the panel meter indication.
	<b>AGC Amplifier (Fig. 6)</b>
13	Increase ATTEN 2 by 1 dB and adjust the SENSITIVITY and VERNIER controls on the oscilloscope differential amplifier unit to obtain 5-cm displacement between the test and reference traces. This calibrates the oscilloscope for 5 cm per dB. Decrease ATTEN 2 by 1 dB.
14	Press the AGC pushbutton to extinguish the MANUAL lamp. Adjust the IF LEVEL control on the AGC amplifier for coincidence of the test and reference traces at 70 MHz. The test trace displays the loss characteristic of the AGC filter circuit.
	<b>Requirement:</b> The filter characteristic shall be centered about 70 MHz with the 64- and 76-MHz markers at equal levels and displaced 1.5 dB (7.5 cm) or less up from the 70-MHz marker. See Fig. 3 for a typical filter characteristic.
	If the requirement is not met, adjust the C6 and C7 controls on the AGC amplifier using a nonmetallic screwdriver (KS-20114). If the requirement still is not met, replace the AGC amplifier.
15	On the test set control panel turn the IF SWEEP WIDTH control fully counterclockwise (off).
16	Connect Fig. 3, option (S), and operate the CTR switch on the test set to the EXT position. Adjust the IF CENTER FREQ control if necessary to obtain $70 \pm 0.2$ MHz.
17	Connect Fig. 3, options (Z) and (W), and note the power meter indication.
18	<p>Increase the setting of ATTEN 2 as follows:</p> <p style="padding-left: 40px;">Bays equipped with the J68387P modulator, 35 dB</p> <p style="padding-left: 40px;">Bays equipped with the J68387C modulator, 28 dB</p>

**Note:** If the J68392A test set is equipped with ATTEN 2 having only 3 drums, it will be necessary to use a 19A pad in series with ATTEN 2 to obtain the required attenuation.

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**CHART 5 (Cont)**


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STEP	PROCEDURE
19	Note the power meter indication.  <b>Requirement:</b> The power shall not decrease by more than 0.5 dB from that noted in Step 17.
20	Decrease the setting of ATTEN 2 as follows (remove the 19A pad if used in Step 18):  Bays equipped with the J68387P modulator, 35 dB  Bays equipped with the J68387C modulator, 28 dB
21	On the receiver control panel press the RCVD SIG LEV pushbutton and adjust the RCVD SIG LEV ADJ control for the following:  J68387P modulator, 70  J68387C modulator, 56
22	Press the AGC switch to turn on the MANUAL lamp.
23	Perform the test in Chart 3.

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**CHART 6**
**40-MHz OSCILLATOR AND SHIFT MODULATOR CHECKS**


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**APPARATUS:**

1—J68428A Transmitter-Receiver Test Set

STEP	PROCEDURE
1	Remove the 368A plug from the OSC MON jack on the 40-MC OSC (Fig. 6).
2	Make the test connections in accordance with Fig. 7, option (X), and perform Step 1 of the Preparation for Test.
3	Observe the frequency indicated by the meter.

## CHART 6 (Cont)

STEP	PROCEDURE
	<p><b>Requirement:</b> 40 MHz <math>\pm</math>400 Hz (limits: 39,999,600. to 40,000,400. Hz)</p> <p>If this requirement is not met, perform Step 4 and then proceed to Step 6.</p>
4	Connect Fig. 7, option (Y), and perform Steps 2 and 3 of the Preparation for Test.
5	Measure the power.
	<p><b>Requirement:</b> -2.5 dBm <math>\pm</math>0.2 dB</p> <p>If the requirements of both Steps 3 and 5 are met, proceed to Step 10. If either requirement is not met, proceed with Step 6.</p>
6	On the 40-MC OSC turn the LEV control fully clockwise. Adjust the OSC TUN and AMPL TUN controls for maximum power output.
7	Adjust the LEV control to obtain -2.5 dBm.
8	Change the test connections to option (X). Adjust the FREQ ADJ control to obtain 40 MHz $\pm$ 50 Hz (limits: 39,999,950. to 40,000,050. Hz).
9	Repeat Steps 7 and 8 until the requirements are met.
10	Replace the 368A plug in the OSC MON jack and reconnect the cables.
11	Press the SHIFT OSC pushbutton on the receiver control panel and adjust the MTR CAL control on the 40-MC OSC for an indication of 50 on the control panel meter.
12	On the receiver control panel, press the SHIFT MOD 1 and SHIFT MOD 2 pushbuttons and observe the meter indication.
	<p><b>Requirement:</b> 80 <math>\pm</math>20 divisions for both positions</p> <p>If any of the requirements in Steps 3 through 12 are not met, refer to Section 411-402-503.</p>

## CHART 7

## RECEIVER MODULATOR BO POWER ADJUSTMENT

## APPARATUS:

1—J68428A Transmitter-Receiver Test Set

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**CHART 1 (Cont)**


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**STEP****PROCEDURE**

The following procedure establishes the correct BO power for the receiver modulator. For bays equipped with the J68387P receiver modulator and IF preamplifier and in which the J68387D 40-MHz oscillator and shift modulator *is not* installed, perform Step 4. For bays equipped with the J68387P receiver modulator and IF preamplifier and in which the J68387D 40-MHz oscillator and shift modulator *is* installed, perform Steps 1 through 4. For bays equipped with the J68387C receiver modulator and IF preamplifier, perform Step 5.

**J68387P Receiver Modulator**

- 1 Connect the test setup as shown in Fig. 8 and perform the Preparation for Test.
- 2 Adjust attenuator AT2 or AT3 (Fig. 6) for a power meter indication of  $-5.5$  dBm.
- 3 Remove the test setup from the bay.
- 4 Press the RCVR MOD 1 pushbutton and note the panel meter indication.

**Requirement:** Within  $\pm 0.5$  of the recorded value

**Note:** The recorded value on the front panel shall be equal to the sum of the REF BIAS value stamped on the receiver modulator block and the correction factor given in Table A. If the requirement is not met, adjust the DIODE BIAS control on the IF preamplifier to obtain the correct value. If the requirement still is not met, refer to Section 411-404-503.

**J68387C Receiver Modulator**

- 5 Press the RCVR MOD 1 and RCVR MOD 2 pushbuttons and note the meter indications.

**Requirement:** The average of the two meter indications should be 42 and the difference between the two indications shall be no more than 16.

If this requirement is not met, adjust attenuator AT2 or AT3 (Fig. 6). If the requirement still cannot be met, refer to Section 411-404-504.

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**CHART 8**
**OVERALL TRANSMISSION TEST****APPARATUS:**

- 1—J68428A Transmitter-Receiver Test Set
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## CHART 8 (Cont)

STEP	PROCEDURE
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The following comprises a check of the overall receiver transmission performance.

**Note:** It is necessary to know the actual or calculated value of the received carrier power at the drop arm of the channel dropping network. The typical nonfaded received carrier power will be in the range from  $-28$  dBm to  $-22$  dBm. Powers greater than  $-22$  dBm should not be encountered since SD-50575-01 specifies the use of waveguide pads to measured value is available, a reasonable value to use for these tests is  $-26$  dBm.

**Caution:** *If any of the requirements in this chart are not met, do not attempt adjustments in order to bring the transmission response within requirements. Proceed with Charts 9 and 10 for the complete receiver alignment.*

- 1 Connect the test setup and perform the Preparation for Test instructions in accordance with Fig. 9. This ensures that the IF detector is properly adjusted for the following tests.
- 2 Set up the RF oscillator frequency and output power as shown in Fig. 10.
- 3 Ensure that the AGC pushbutton is in the AGC position. (The switch lamp should be extinguished.)
- 4 If not already done, remove the 1322- or 1336-type bandpass filter and place a shorting plate on the flexible waveguide (which is attached to the separating network) as specified in Section 411-402-500. Connect the test setup in Fig. 11, options (W) and (X), and perform Steps 1 and 2 of the Preparation for Test. **Do not** perform the remaining steps at this time.
- 5 Measure the power.  
**Requirement:**  $-18.5$  dBm  $\pm 5$  dB
- 6 Adjust the RF CENTER FREQ control on the RF oscillator to obtain an indication of  $70 \pm 0.5$  MHz on the counter.
- 7 Measure the power and note the actual value measured for later use.  
**Requirement:** Between  $-18.0$  and  $-19.0$  dBm
- 8 Press the RCVD SIG LEV pushbutton and note the meter indication.  
**Requirement:**  $70 \pm 2$  for bays equipped with the J68387P receiver modulator, or  $56 \pm 2$  for bays equipped with the J68387C receiver modulator.
- 9 Operate the AGC pushbutton to the MANUAL position and note the meter indication for RCVD SIG LEV.

## CHART 8 (Cont)

STEP	PROCEDURE
	<p><b>Requirement:</b> Same as that in Step 8</p> <p>If the requirement is not met, adjust the MANUAL GAIN control to obtain the same indication.</p>
10	<p>Measure the power.</p> <p><b>Requirement:</b> <math>-17.5</math> through <math>-19.5</math> dBm</p>
11	<p>Perform Steps 3 through 11 shown in Fig. 11, Preparation for Test.</p>
12	<p>Measure the amplitude response as shown by the test trace.</p> <p><b>Requirement:</b> The trace shall be flat to within 0.05 dB over the 64- to 76-MHz band and to within 0.1 dB over the 60- to 80-MHz band.</p>
13	<p>Change option (W) to option (T) in Fig. 11 and measure the power.</p> <p><b>Requirement:</b> Within 1.0 dB of that noted in Step 7.</p> <p>If the requirement is not met, check the filters, equalizers, and cables in the interconnection circuit. Typical losses of the IF components at 70 MHz are:</p> <p style="margin-left: 40px;">400A—2.1 dB</p> <p style="margin-left: 40px;">400B—2.1 dB</p> <p style="margin-left: 40px;">747A—0.6 dB</p> <p style="margin-left: 40px;">745A—2.6 dB</p> <p style="margin-left: 40px;">1080A—4.5 dB</p> <p style="margin-left: 40px;">793A—5.4 dB</p> <p style="margin-left: 40px;">794A—5.0 dB</p>
14	<p>Adjust the LEVEL control on the IF preamplifier to obtain <math>-18.5</math> dBm.</p>
15	<p>Operate the AGC pushbutton to the AUTO position. Remove the cable from the IF IN jack of the IF main amplifier and note the RCVD SIG LEV meter indication.</p> <p><b>Requirement:</b> <math>0 \pm 2</math></p>

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**CHART 8 (Cont)**


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STEP	PROCEDURE
16	Reconnect the cable to the IF IN jack of the IF main amplifier and restore all other IF cable connections to normal. Remove the shorting plate and 24A transducer and reconnect the 1322- or 1336-type bandpass filter at the input to the receiver. This completes all tests on the receiver.
	<i>Note:</i> As stated previously, if any of the requirements are not met, proceed with Charts 9 and 10 for receiver alignment.

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**CHART 9****RECEIVER MODULATOR ADJUSTMENT****APPARATUS:**

1—J68428A Transmitter-Receiver Test Set

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STEP	PROCEDURE
	The following is the adjustment for both the J68387P and J68387C receiver modulator and IF preamplifier units. It is assumed that the IF detector has been calibrated as outlined in Fig. 9 and that the RF oscillator has been adjusted to the proper power and frequency and connected to the radio bay as shown in Fig. 10.
1	Connect the test setup and perform the Preparation for Test instructions in accordance with Fig. 12.
	<b>J68387P Modulator</b>
2	Set the ATTEN to 0 dB and adjust the LEVEL control on the IF preamplifier for a -0.3 dBm indication on the power meter.
3	Set ATTEN to 7 dB.
4	Change option (X) to option (Y) and calibrate the oscilloscope as follows:
	(a) Align the highest point of the test trace with the center of the graticule using the TEST TRACE control on the control unit.

## CHART 9 (Cont)

STEP	PROCEDURE
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(b) Adjust the horizontal POSITION and DISPLAY WIDTH controls on the oscilloscope to display the 64- and 76-MHz markers as shown in Fig. 12. Adjust the height of the markers with the MARKERS AMPLITUDE control on the control unit for the desired marker height.

(c) Insert 0.1-dB attenuation with ATTEN.

(d) Adjust the VERNIER control on the oscilloscope for a trace deflection of 2 centimeters (2 major divisions). Return ATTEN to its original setting. The oscilloscope is now calibrated for 0.05 dB per centimeter.

5 Measure the transmission response as shown by the test trace.

**Requirement:** The test trace shall be flat to within 0.03 dB over the 64- to 76-MHz band and to within 0.05 dB over the 60- to 80-MHz band.

If the requirement is not met, adjust the SHAPE and SLOPE controls while keeping the test trace and the reference line coincident at 70 MHz with the LEVEL control. If the requirement cannot be met, refer to Section 411-404-503.

6 Proceed to Chart 10.

**J68387C Modulator**

7 Set ATTEN to 0 dB and connect Fig. 12, option (X). Adjust the LEVEL control on the IF preamplifier for a -7.3 dBm indication on the power meter.

8 Change option (X) to option (Y) and calibrate the oscilloscope as outlined in Step 4 of this chart.

9 Measure the transmission response as shown by the test trace.

**Requirement:** The test trace shall be flat to within 0.03 dB over the 64- to 76-MHz band and within 0.1 dB over the 60- to 80-MHz band.

If the requirement is not met, adjust the LOW SLOPE, HIGH SLOPE, and GAIN controls to obtain the required flatness and gain. If the requirement still cannot be met, refer to Section 411-404-504.

10 Proceed to Chart 10.

## CHART 10

## IF MAIN AND AGC AMPLIFIER ADJUSTMENT

## APPARATUS:

1—J68428A Transmitter-Receiver Test Set

## STEP

## PROCEDURE

The following procedure is used for adjusting the gain and amplitude response of the IF main amplifier and AGC amplifier combination. For bays equipped with the J68387P receiver modulator, the objective is to establish a gain of 9 dB with  $-8.0$  dBm in and  $+1.0$  dBm out, an AGC range of 35 dB, and an amplitude response flat to within 0.01 dB over the 60- to 80-MHz band.

For bays equipped with the J68387C receiver modulator, the objectives are a gain of 16 dB with  $-15$  dBm in and  $+1$  dBm out, an AGC range of 28 dB, and an amplitude response flat to within 0.01 dB over the 60- to 80-MHz band.

- 1 Prepare the test set in accordance with Fig. 9, option (X), and perform the Preparation for Test.
- 2 Disconnect the cables from the IF IN and IF OUT jacks on the IF main amplifier.
- 3 Connect Fig. 9, option (Z).
- 4 Increase the setting of ATTEN as follows:
  - Bays equipped with the J68387P modulator, 6 dB
  - Bays equipped with the J68387C modulator, 13 dB
- 5 On the receiver control panel, set the AGC switch to the MANUAL position and adjust the MANUAL GAIN control for coincidence of the test trace and reference line at 70 MHz. The test trace displays the amplitude response of the IF main amplifier. Measure the test trace flatness.

**Requirement:** Flat to within 0.02 dB over the 60- to 80-MHz band

If the requirement is not met, adjust the SLOPE 1 and SLOPE 2 controls on the IF main amplifier. Maintain coincidence of the test trace and the reference line with the MANUAL GAIN control. If the requirement still is not met, replace the IF main amplifier.

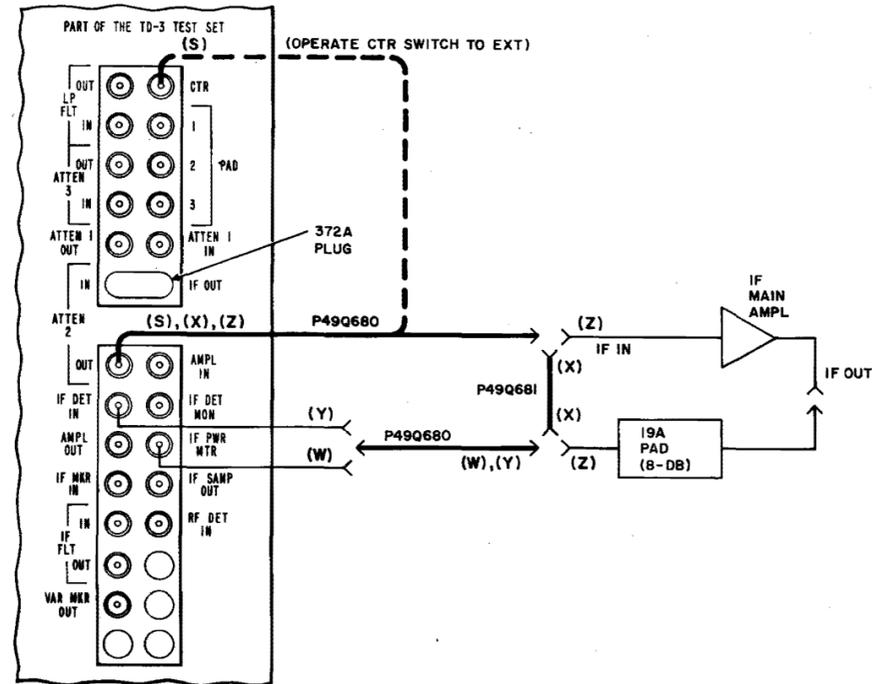
- 6 Insert a 20-dB 63A pad between ATTEN OUT and the 840543920 cable and increase the setting of ATTEN as follows:
  - Bays equipped with the J68387P modulator, 15 dB
  - Bays equipped with the J68387C modulator, 8 dB

## CHART 10 (Cont)

STEP	PROCEDURE
7	Turn the MANUAL GAIN control to its maximum counterclockwise (maximum gain) position.
8	Adjust the AGC RANGE control on the AGC amplifier for coincidence of the test trace and the reference line at 70-MHz. Measure the flatness of the test trace.  <i>Requirement:</i> Flat to within 0.5 dB over the 60- to 80-MHz band.
9	Turn the MANUAL GAIN control to its maximum clockwise (minimum gain) position.
10	Remove the 20-dB 63A pad from between the ATTEN OUT jack and the 840543920 cable and decrease the setting of ATTEN as follows:  Bays equipped with the J68387P modulator, 15 dB  Bays equipped with the J68387C modulator, 8 dB
11	Adjust the MANUAL GAIN control counterclockwise to obtain coincidence of the test trace and the reference line.
12	Press the AGC REF pushbutton and record the panel meter indication.  <b>AGC Amplifier</b>
13	Increase ATTEN by 1 dB and adjust the VERNIER control on the oscilloscope to obtain a 5-cm displacement between the test trace and the reference line. This calibrates the oscilloscope for 5 cm per dB. Decrease ATTEN by 1 dB.
14	Press the AGC pushbutton to extinguish the MANUAL lamp. Adjust the IF LEVEL control on the AGC amplifier for coincidence of the test trace and the reference line at 70 MHz. The test trace displays the loss characteristic of the AGC filter circuit.  <i>Requirement:</i> The filter characteristic shall be centered about 70 MHz with the 64- and 76-MHz markers at equal levels and displaced 1.5 dB (7.5 cm) or less up from the 70-MHz marker. See Fig. 9 for a typical filter characteristic.  If the requirement is not met, adjust the C6 and C7 controls on the AGC amplifier using a nonmetallic screwdriver (KS-20114). If the requirement still is not met, replace the AGC amplifier.
15	On the IF/RF sweep generator, position the IF MODE control to the IF CENTER FREQ position and the IF $\Delta$ F control to 0.
16	Connect Fig. 9, option (S), and operate the COUNTER INPUT switch to 135 MHz MAX. Adjust the IF CENTER FREQ control if necessary to obtain a 70 $\pm$ 0.2 MHz indication on the frequency counter.

## CHART 10 (Cont)

STEP	PROCEDURE
17	Connect Fig. 9, option (Z), and note the power meter indication.
18	Insert a 20-dB 63A pad between ATTEN OUT and the 840543920 cable and increase the setting of ATTEN as follows:  Bays equipped with the J68387P modulator, 15 dB  Bays equipped with the J68387C modulator, 8 dB
19	Note the meter indication.  <b>Requirement:</b> The power shall not decrease by more than 0.5 dB from that noted in Step 17.
20	Remove the 20-dB 63A pad from between the ATTEN OUT jack and the 840543920 cable and decrease the setting of ATTEN as follows:  Bays equipped with the J68387P modulator, 15 dB  Bays equipped with the J68387C modulator, 8 dB
21	On the receiver control panel, press the RCVD SIG LEV pushbutton and adjust the RCVD SIG LEV ADJ control for the following:  J68387P modulator, 70  J68387C modulator, 56
22	Press the AGC switch to turn on the MANUAL lamp.
23	Perform the test in Chart 8.



**PREPARATION FOR TEST**  
(FIG. 3)

1. Set ATTEN 2 at 3 dB.
2. Make the test connections using options (W) and (X).
3. Set the test set controls as follows:

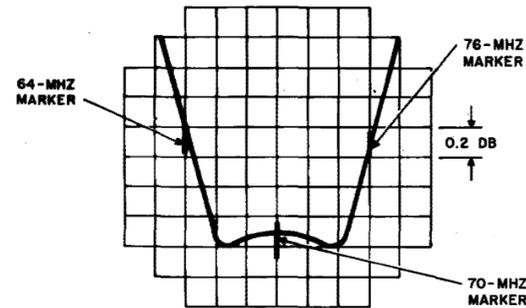
UNIT	CONTROL	POSITION
Control Panel	FUNCTION IF MARKER AMPLITUDE CTR	IF-IF Midrange MKR FREQ
Oscilloscope: Time Base Unit	INTENSITY	Midrange
	POSITION	Midrange
	MAGNIFIER	X10
	SWEEP TIME	EXT
Differential Amplifier Unit	VERNIER	Midrange
	SINGLE-NORMAL	NORMAL
	POSITION	Midrange
	BANDWIDTH	4
	AMPLIFIER	DC
	VERNIER	Midrange
Power Meter	SENSITIVITY	10 MV/CM
	AC-DC-OFF (+ INPUT)	DC
	AC-DC-OFF (- INPUT)	OFF
	INPUT CHANNEL POWER RANGE DBM	IF (Note) +10

- Requirement:* The power meter shall indicate  $-3.0 \pm 0.1$  (+10 dBm at the IF OUT jack).
4. If the requirement cannot be met, adjust the OUTPUT control on the IF sweep oscillator (rear of test set). If the requirement still cannot be met, refer to Sections 104-415-501 and 104-415-504.
  5. Set ATTEN 2 to 17 dB.
  6. Set the POWER RANGE DBM switch on the power meter to -5.
  7. Adjust ATTEN 2 for a -2 indication on the power meter (-7 dBm).
  8. Change option (W) to option (Y).
  9. Adjust the TEST TRACE controls on the control panel to center the trace on the oscilloscope.
  10. Adjust the SWEEP TIME and POSITION controls on the oscilloscope TIME BASE for approximately 10 centimeters horizontal deflection on the oscilloscope.
  11. Adjust the IF MARKER FREQ control on the control panel for a  $70 \pm 0.1$  MHz indication on the counter.
  12. Adjust the IF SWEEP WIDTH and IF CENTER FREQ controls on the control panel to obtain the oscilloscope display as shown at left.
- Note:* An extraneous marker appears at 89 MHz.
13. Adjust the REF TRACE control on the control panel to bring the reference trace into coincidence with the test trace at 70 MHz.
  14. Adjust the IF DET SLOPE control for coincidence between 60 and 80 MHz.
  15. Increase the attenuation of ATTEN 2 by 0.1 dB. Adjust the SENSITIVITY and POSITION controls on the oscilloscope DIFFERENTIAL AMPLIFIER for 2 centimeters deflection between the test trace and the reference trace. Return ATTEN 2 to its original setting. This calibrates the oscilloscope for 0.05 dB per centimeter.

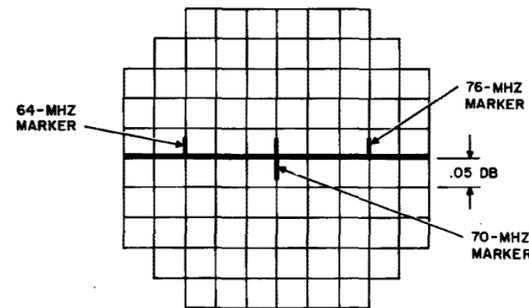
*Requirement:* The test trace shall be flat to within 0.01 dB between 60 and 80 MHz.

If this requirement is not met, adjust the IF DET SLOPE control on the control panel for a flat test trace. If the requirement cannot be met by adjusting the IF DET SLOPE control, see Section 104-415-504.

*Note:* With the INPUT CHANNEL switch set to IF, determine that no input is connected; then zero the power meter by setting the POWER RANGE DBM switch to -25 and adjusting the METER ZERO control for an indication of ZERO on the meter. Return the POWER RANGE DBM switch to the position shown in Step 3.



TYPICAL AGC FILTER CHARACTERISTIC



TYPICAL DISPLAY OF TEST SET  
IF TO IF RESPONSE

Fig. 3—IF-to-IF Amplitude Response Test Setup

TABLE B

KS-19974 RF OSCILLATOR USING KS-19983 OR KS-20498 PADS		KS-20383 RF OSCILLATOR USING KS-20498 PADS	
FOR THIS POWER INTO UNIT UNDER TEST (dBm)	USE THIS PAD (dB)	FOR THIS POWER INTO UNIT UNDER TEST (dBm)	USE THIS PAD (dB)
-40 to -30	40 + 10	-37 to -32	40 + 5
-30 to -20	40	-32 to -27	40
-20 to -10	30	-27 to -22	30 + 5
-10 to 0	20	-22 to -17	30
		-17 to -12	20 + 5
		-12 to -7	20
		-7 to -2	10 + 5
		-2 to +3	10

PREPARATION FOR TEST  
(FIG. 4)

1. The test set shall have been checked in accordance with Section 104-415-000 to ensure proper operation for the RF-to-RF mode.
2. Operate the test set controls to the following positions:

UNIT	CONTROL	POSITION
Power Meter	INPUT CHANNEL POWER RANGE DBM	RF (Note) 0
RF Sweep Oscillator (Alfred) KS-19974	LINE FUNCTION-SWEEP SELECTOR MARKER AMPL $\Delta F$	RF CW Max CCW 20
RF Sweep Oscillator KS-20383	BAND SELECTOR LINE MODE $\Delta F$	3.7 - 4.2 GHz RF CW 20
RF Sweep Oscillator Hewlett-Packard KS-19974	LINE SWEEP SELECTOR FUNCTION ALC MARKER AMPL STOP/ $\Delta F$	RF CW $\Delta F$ PRESS (on) Max CCW 20

3. Set the RF oscillator CW control to the desired channel center frequency.
4. Obtain the value of the calculated or measured received carrier power referred to the drop arm of the channel dropping network for the bay under test. Decrease this value by 0.5 dB to account for the 1322-type bandpass filter loss.
5. Adjust the RF sweep oscillator output to obtain the power determined in Step 4 as follows:
  - (a) Using Table B, select the pad to be used. For most installations the power will fall between -30 to -20 dBm so that a 40-dB pad will be required.
  - (b) Since it is desirable to measure powers in the range of 0 to -15 dBm with the power meter, use a 20-dB pad at the output of the LEV CPLR, connect to the power meter, and adjust the POWER OUTPUT control for the power of Step 5(a) increased by 20 dB.
  - (c) Remove the 20-dB pad and insert the pad value selected in Step 5(a). Disconnect from the power meter.

*Example:* Let the power required in Step 4 be -28 dBm. The pad required will be 40 dB from Step 5(a). Using a 20-dB pad, adjust the POWER OUTPUT control for  $-28 + 20 = -8$  dBm per Step 5(b). Remove the 20-dB pad and insert the 40-dB pad and the power will be -28 dBm.

*Note:* With the INPUT CHANNEL switch set to IF or RF, determine that no input is connected; then zero the power meter by setting the POWER RANGE DBM switch to -25 and adjusting the METER ZERO control for an indication of ZERO on the meter. Return the POWER RANGE DBM switch to the position shown in Step 2.

Fig. 4—RF Oscillator Setup

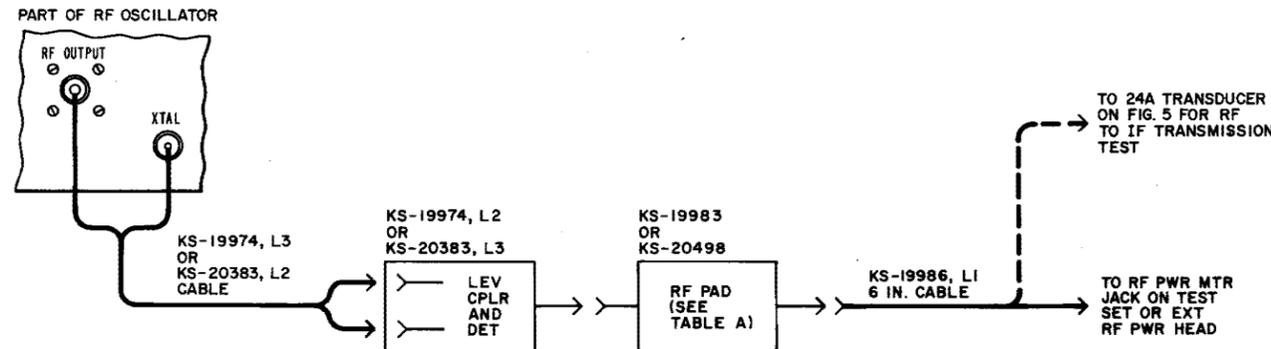
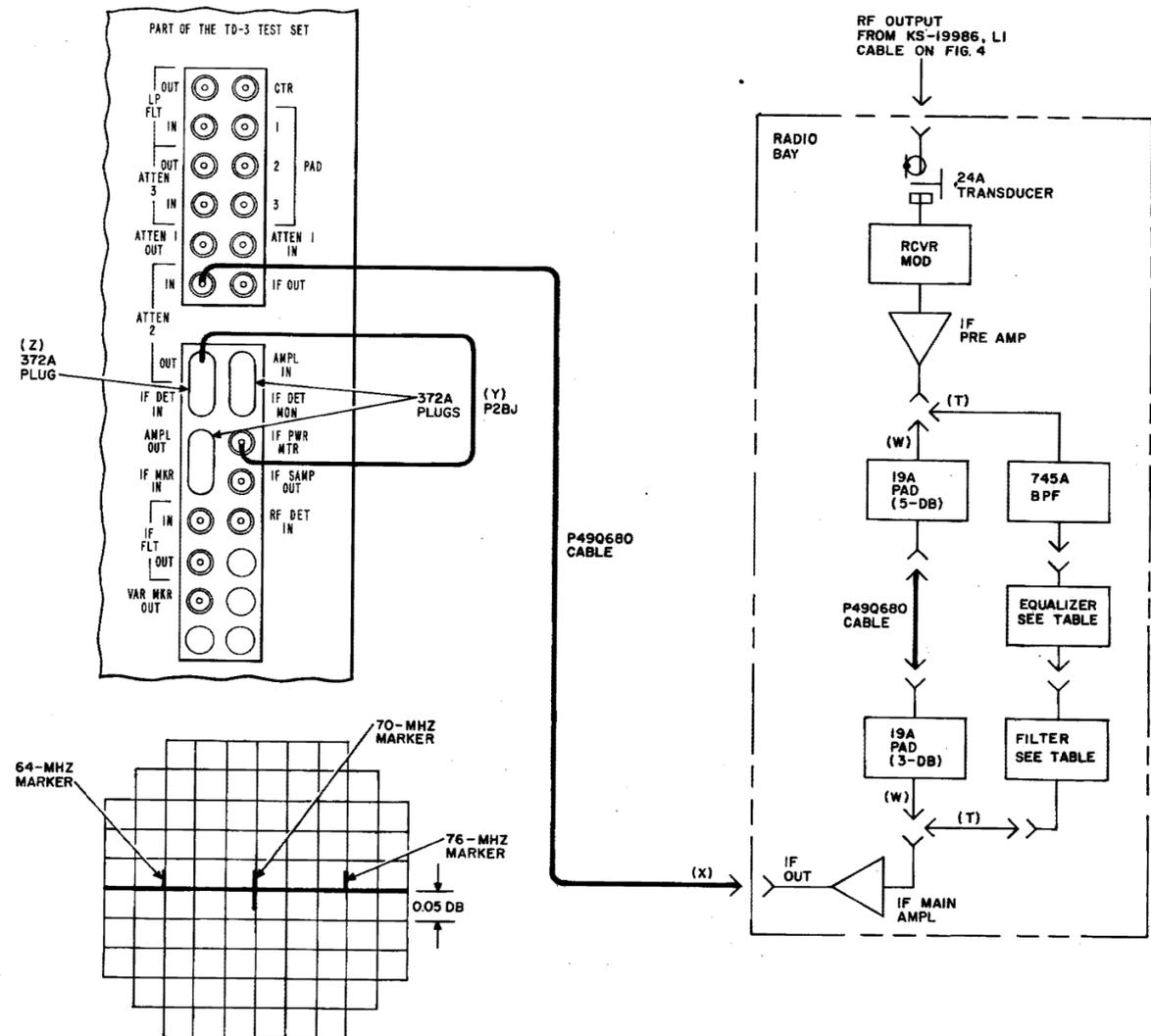


TABLE C

TYPE OF T/R BAY	EQUALIZER	FILTER
ORIGINAL T/R BAY (1200 CIRCUIT LOADING)	793A or 794A	747A LPF*
MODIFIED T/R BAY (1500 CIRCUIT LOADING)	400A or 400B	1080A BPF

\* The 747A LPF is relocated to the output of the IF main amplifier when the T/R bay is modified for 1500 circuit loading.



PREPARATION FOR TEST  
(FIG. 5)

1. Set ATTEN 2 at 0 dB.
2. Set the test set controls as follows:

UNIT	CONTROL	POSITION
Control Panel	FUNCTION RF MKR AM IF MARKER AMPLITUDE CTR	RF-IF Max CCW Midrange MKR FREQ
Oscilloscope:	INTENSITY	Midrange
Time Base Unit	POSITION MAGNIFIER SWEEP TIME VERNIER SINGLE-NORMAL	Midrange X10 EXT Midrange NORMAL
Differential Amplifier Unit	POSITION BANDWIDTH AMPLIFIER VERNIER SENSITIVITY AC-DC-OFF (+ INPUT) AC-DC-OFF (- INPUT)	Midrange 4 DC Midrange 2 MV/CM DC OFF
Power Meter	INPUT CHANNEL POWER RANGE DBM	IF (Note 2) 0

Oscilloscope Calibration

1. Adjust the TEST TRACE controls on the control panel to center the trace on the oscilloscope.
2. Adjust the SWEEP TIME and POSITION controls on the oscilloscope TIME BASE for approximately 10 centimeters horizontal deflection on the oscilloscope.
3. Adjust the IF MARKER FREQ control on the control panel for a  $70 \pm 0.1$  MHz indication on the counter, and set the RF SWEEP SELECTOR to  $\Delta F$ -AUTO, or the MODE switch to  $\Delta F$ .
4. Adjust the CW control on the RF sweep oscillator to center the 70-MHz marker as shown at left.
5. Adjust the  $\Delta F$  control on the RF sweep oscillator to place the 64- and 76-MHz markers as shown at left. Disregard any slope in the test trace.
6. Adjust the REF TRACE control on the control panel to bring the reference trace into coincidence with the test trace at 70 MHz.
7. Increase the attenuation of ATTEN 2 by 0.1 dB. Adjust the SENSITIVITY and POSITION controls on the oscilloscope DIFFERENTIAL AMPLIFIER for 2 centimeters deflection between the test trace and the reference trace. Return ATTEN 2 to its original setting. This calibrates the oscilloscope for 0.05 dB per centimeter.

Note 1: The frequency scale on the oscilloscope may be reversed for some units under test.

Note 2: With the INPUT CHANNEL switch set to IF or RF, determine that no input is connected; then zero the power meter by setting the POWER RANGE DBM switch to -25 and adjusting the METER ZERO control for an indication of ZERO on the meter. Return the POWER RANGE DBM switch to the position shown in Step 2.

Fig. 5—RF-to-IF Transmission Test Setup

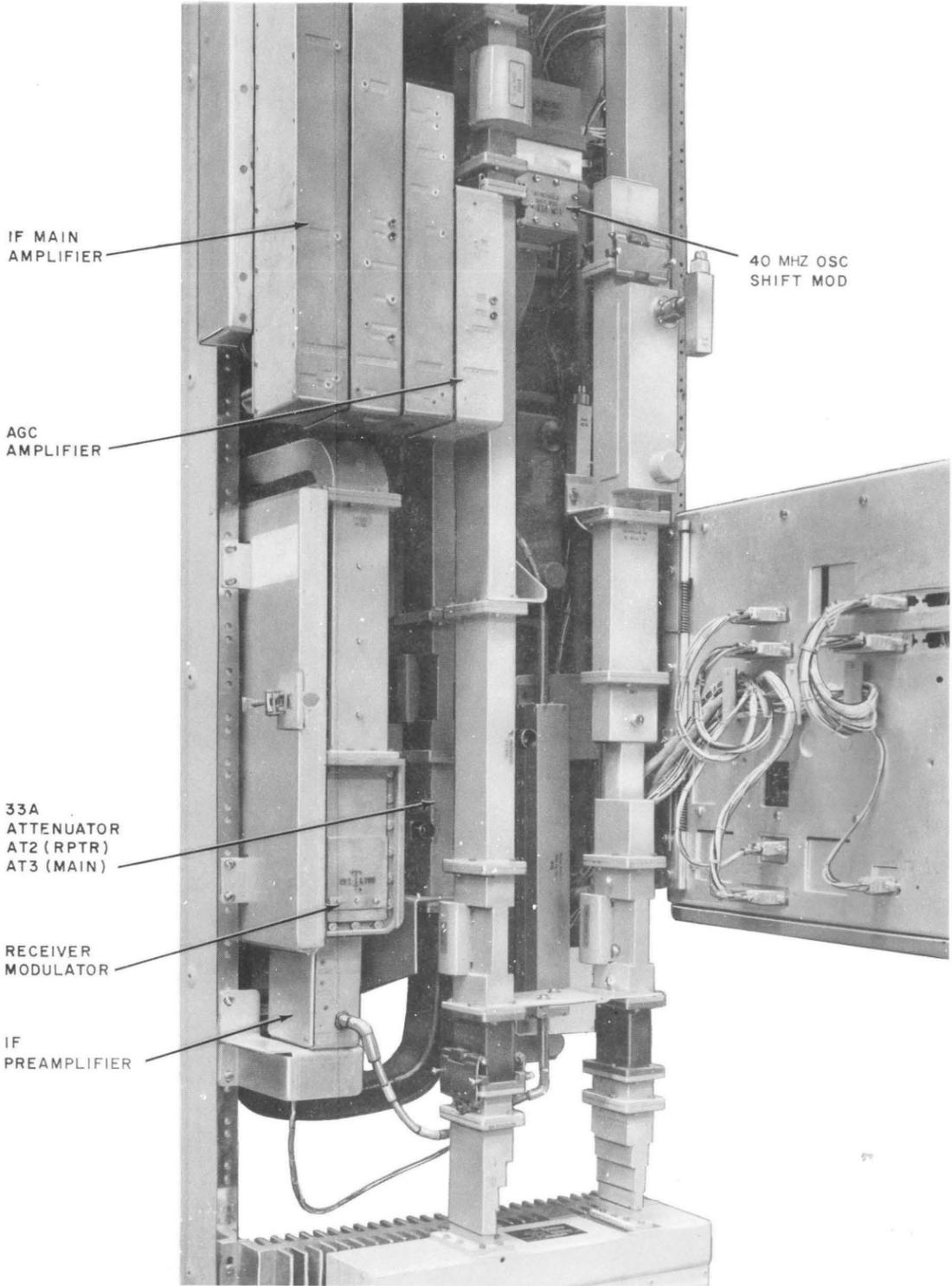
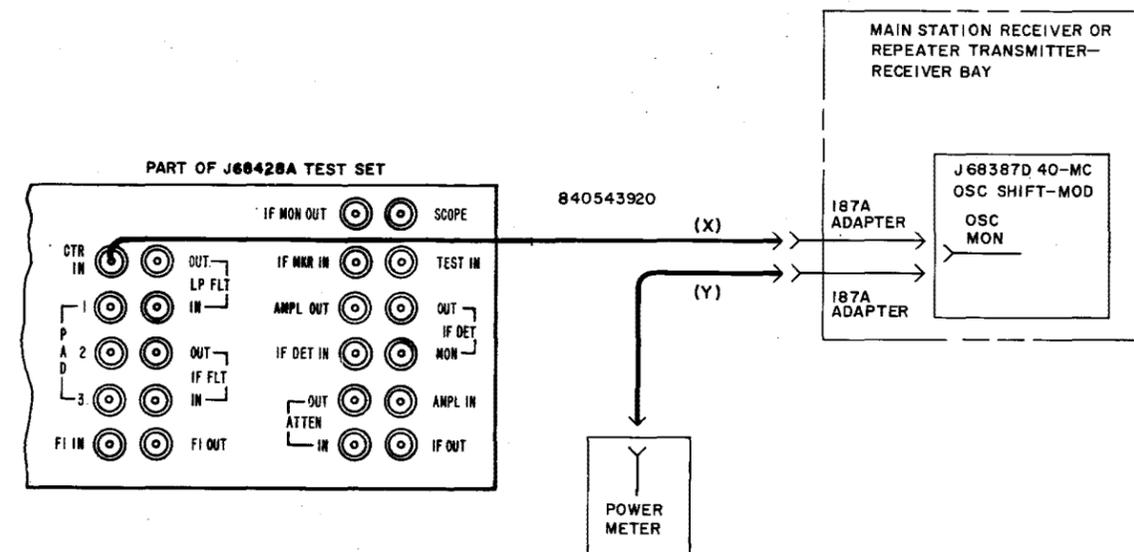


Fig. 6—Location of Components



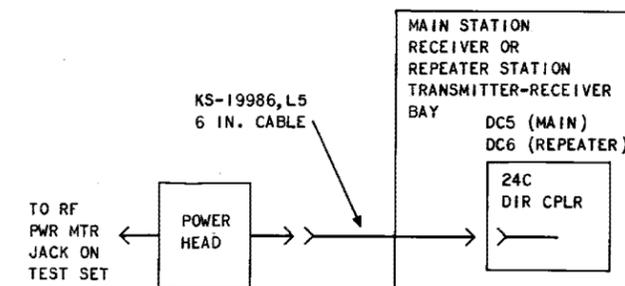
PREPARATION FOR TEST  
(FIG. 7)

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

UNIT	CONTROL	POSITION
Control Unit	COUNTER INPUT	135 MHZ MAX
Counter	FUNCTION	135 MHZ MAX
	SAMPLE RATE	Counterclockwise
	DISPLAY BLANKING	Depress the BLANKING DISPLAY pushbutton at the extreme right
Power Meter	MODE	ZERO
	INPUT	IF

2. Before connecting the IF cable to the power meter, zero the meter by adjusting the ZERO control for a 000 indication on the digital display.
3. Set the MODE control to the POWER METER position.

Fig. 7—40-MHz Oscillator and Shift Modulator—Frequency and Power Measurements

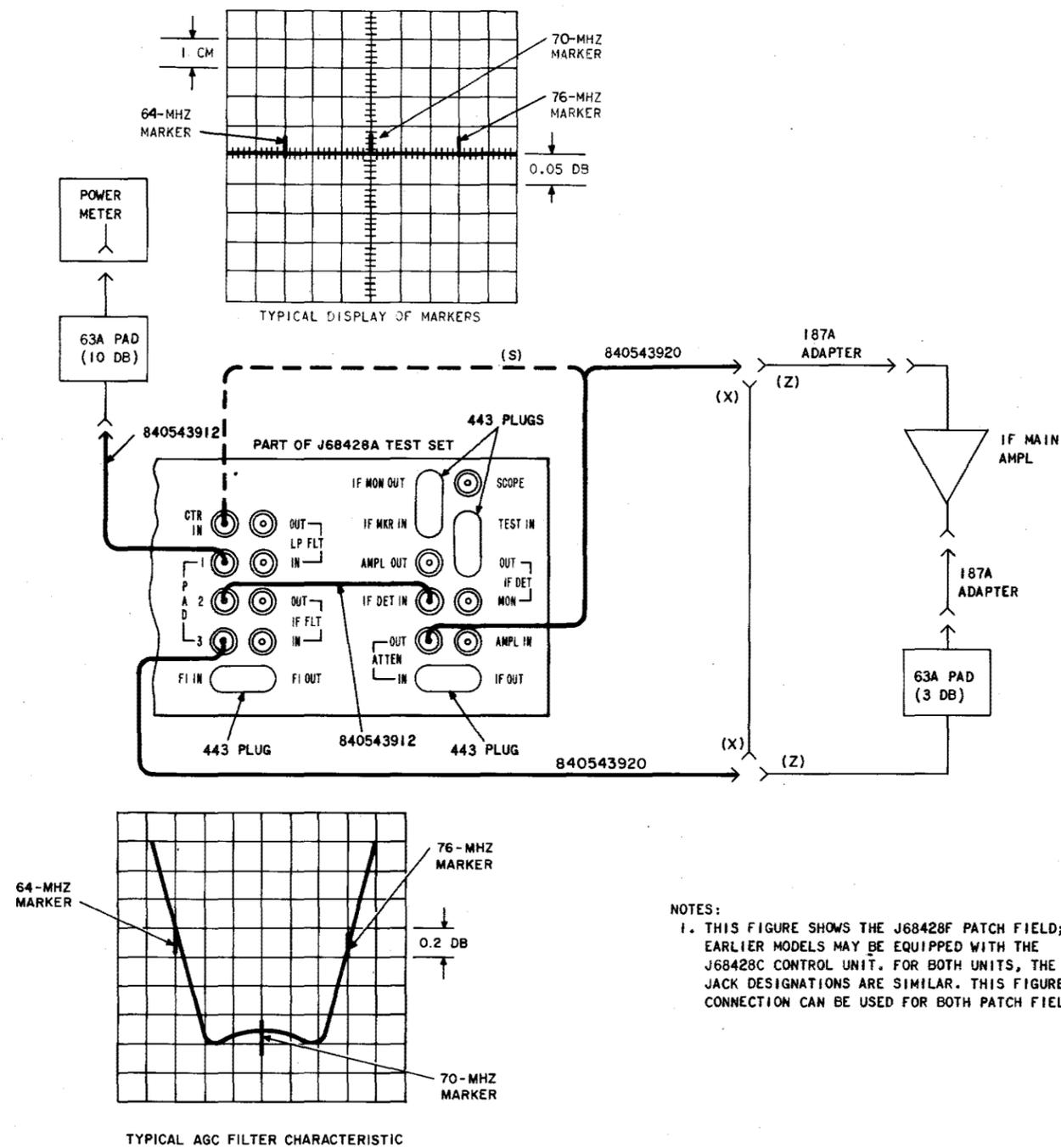


**PREPARATION FOR TEST  
(FIG. 8)**

1. On the power meter, set the INPUT switch to RF.
2. With the RF removed from the input to the RF power head, zero the power meter by setting the MODE switch to ZERO position and adjusting the ZERO control for a 000 indication on the digital display. Then set the MODE switch to the POWER METER position. Replace the connection to the RF power head.
3. Make the test connections as shown above.

**Fig. 8—Test Setup for Measuring the BO Power**

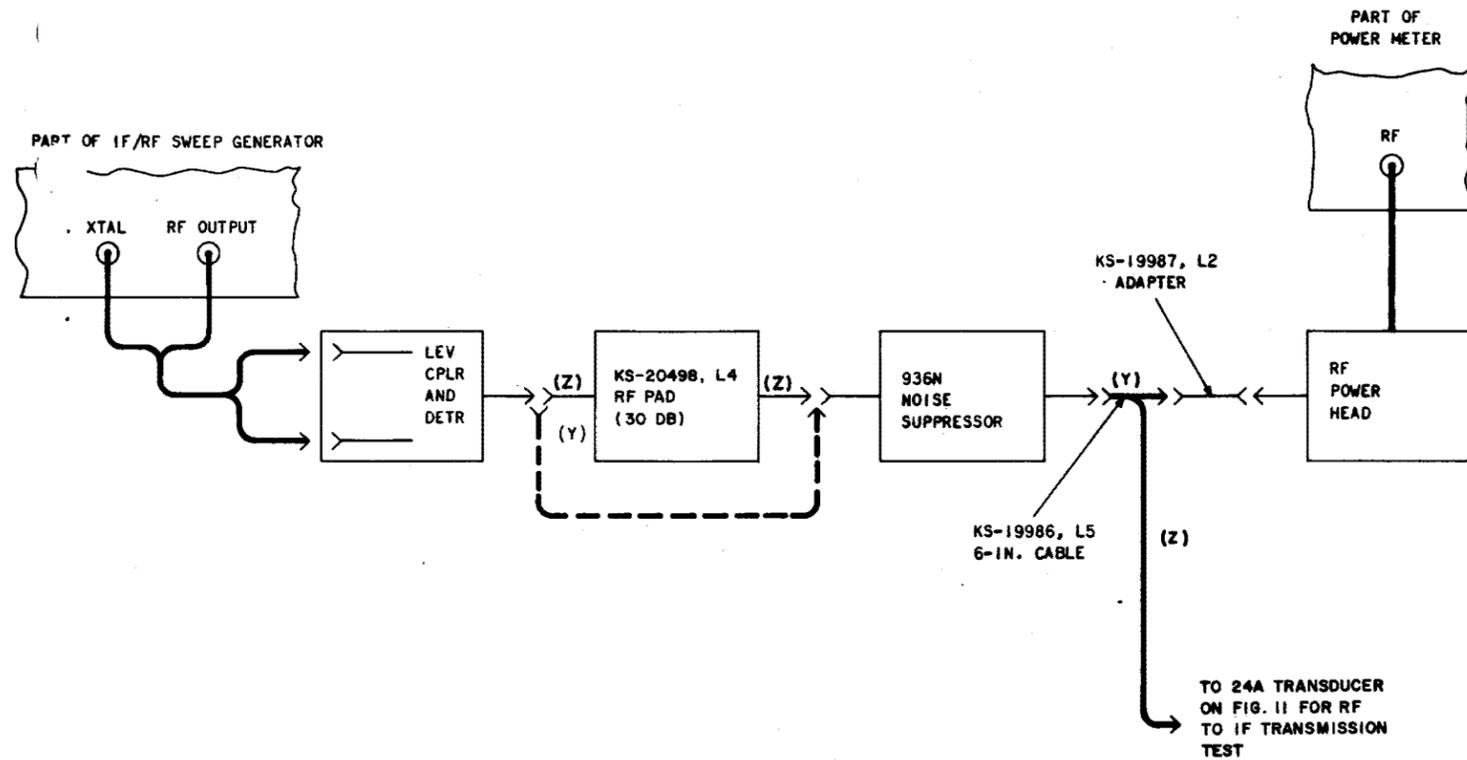
PREPARATION FOR TEST  
(FIG. 9)



- Energize the test set by operating the main POWER switch and the power switches on the oscilloscope, counter, power meter, and IF/RF sweep oscillator.
- On the power meter, set the INPUT switch to IF.
- With the IF input cable removed, zero the power meter by setting the MODE switch to ZERO and adjusting the ZERO control for 000 indication on the digital display. Then set the MODE switch to the POWER METER position.
- Make the test connections shown using option (X) for the IF detector calibration.
- Adjust ATTEN on the control panel for a power meter indication of  $-18.6$  dBm.
- On the frequency counter, set:
  - FUNCTION to 135 MHz MAX
  - SAMPLE RATE to counterclockwise\*
  - DISPLAY BLANKING pushbutton on the extreme right pushed in.
 \*On some units the power switch is combined with the SAMPLE RATE control. Make sure the power is on.
- On the control unit, set COUNTER INPUT to F1 and adjust MARKERS F1 control for 64 MHz on the counter.
- Set COUNTER INPUT to F2 and adjust MARKERS F2 control for 76 MHz on the counter.
- On the sweep oscillator, set IF CENTER. FREQ to 70, IF MODE to  $\Delta F$ , and IF  $\Delta F$  to 20.
- Remove the input cable from the oscilloscope, and adjust the vertical POSITION control to center the trace. Replace the cable. *Do not change the vertical POSITION control during this test.*
- Set the oscilloscope VOLTS/DIV switch to 1 m.
- Align the trace with the center of the graticule as shown. Use the TEST TRACE control on the control panel for adjustment.
- Adjust the MARKERS — AMPLITUDE control on the control panel for satisfactory marker height.
- Adjust the horizontal POSITION, DISPLAY WIDTH, IF  $\Delta F$ , and IF CENTER FREQ controls to position the markers as shown in the display.
- Insert 0.1-dB attenuation with ATTEN and observe trace.
- Adjust the vertical VERNIER control on the oscilloscope for a trace deflection of 2 major divisions (2 cm). Return ATTEN to its original setting. This calibrates the oscilloscope for 0.05 dB per major division (cm).
 

*Note:* On some test sets, the VERNIER control may be designated CAL.
- Adjust the IF DET SLOPE control on the control unit for a flat test trace. Keep the trace centered by adjusting the TEST TRACE control on the control unit.

Fig. 9—IF-to-IF Amplitude Response and IF Detector Calibration Test Setup



PREPARATION FOR TEST  
(FIG. 10)

1. Set the controls on the IF/RF sweep oscillator as follows:
  - BAND SELECTOR switch to 3.65-4.25 GHz
  - RF CENTER FREQ control to the desired frequency
  - RF ΔF (MHz) to 20
  - RF MODE to CW
  - RF POWER LEVEL to midrange
2. On the power meter, set the INPUT switch to RF.
3. With the RF removed from the input to the RF power head, zero the power meter by setting the MODE switch to ZERO and adjusting the ZERO control for a 000 indication on the digital display. Then set the MODE switch to the POWER METER position. Replace the connection to the RF power head.
4. Make the test connections shown using option (Y).
5. Obtain the value of the calculated or measured received carrier power at the drop arm of the 1355 ( ) receiver channel bandpass filter for the bay under test.
6. Obtain the calibrated value from the KS-20498, L4 30-dB RF pad and add it to the received carrier power value determined in Step 5.
 

<i>Example:</i>	Received carrier power	=	-28.0 dBm
	Calibrated RF pad	=	<u>30.2 dB</u>
			+ 2.2 dBm
7. Adjust the RF POWER LEVEL control on the sweep oscillator to produce a meter indication of the value determined in Step 6.
8. Make the test connections using option (Z).

Fig. 10—RF Oscillator Setup—J68428A Test Set

PREPARATION FOR TEST  
(FIG. 11)

1. Set the controls on the units as follow:

UNIT	CONTROL	POSITION
Oscilloscope	VOLTS/DIV	1m
Counter	FUNCTION	135 MHZ MAX
	SAMPLE RATE DISPLAY BLANKING	Counterclockwise* Depress the pushbutton at the extreme right.
Power Meter	INPUT	IF
Control Unit	ATTEN	3 dB
	COUNTER INPUT	135 MHZ MAX
	IF AMPL GAIN	CCW

\* On some units the power switch is combined with the SAMPLE RATE control. Make sure the power is on.

- With the input cable removed from the power meter, zero the power meter by setting the MODE switch to ZERO and adjusting the ZERO control for 000 indication on the digital display. Then set the MODE switch to the POWER METER position.
  - On the control unit, set the COUNTER INPUT to F1. Observe the counter, and adjust MARKERS F1 control for a 64-MHz indication on the counter. Similarly, set COUNTER INPUT to F2 and adjust MARKER F2 for 76 MHz.
  - On the sweep oscillator, set RF MODE to ΔF.
  - Remove the input cable from the oscilloscope, and adjust the vertical POSITION control to center the trace. Replace the cable.
- Do not change the vertical POSITION control during the test.*
- Align the trace with the center of the graticule as shown, using the TEST TRACE control on the control unit.
  - Make the test connections shown using option (Y).
  - Adjust the MARKERS — AMPLITUDE control for the desired marker height.
  - Adjust the horizontal POSITION, DISPLAY WIDTH, RF ΔF, and RF CENTER FREQ controls to position the markers as shown in the figure.
  - Insert 0.1-dB attenuation with ATTN, and observe the trace.
  - Adjust the vertical VERNIER control on the oscilloscope for a trace deflection of 2 major divisions (2 cm). Return ATTN to its original setting. This calibrates the oscilloscope for 0.05 dB per centimeter. Disregard any slope.

Note: On some test sets, the VERNIER control may be designated CAL.

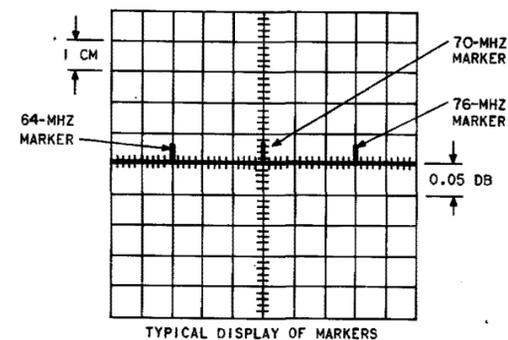
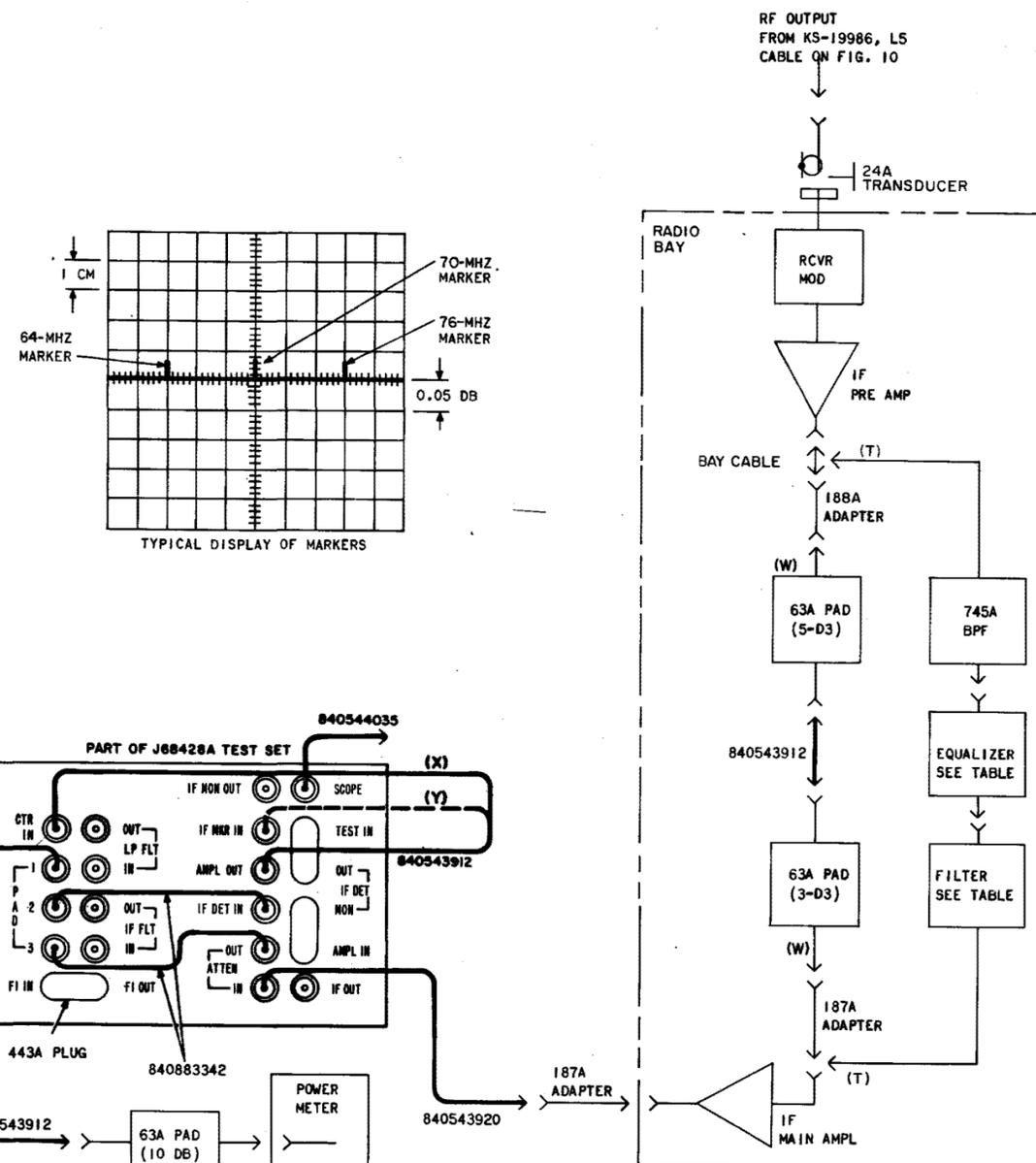
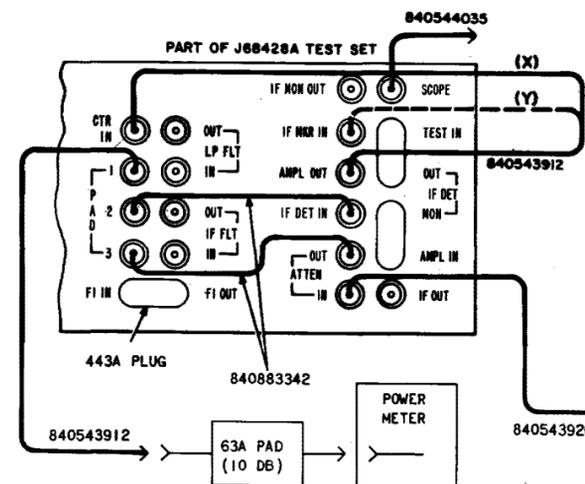


TABLE C

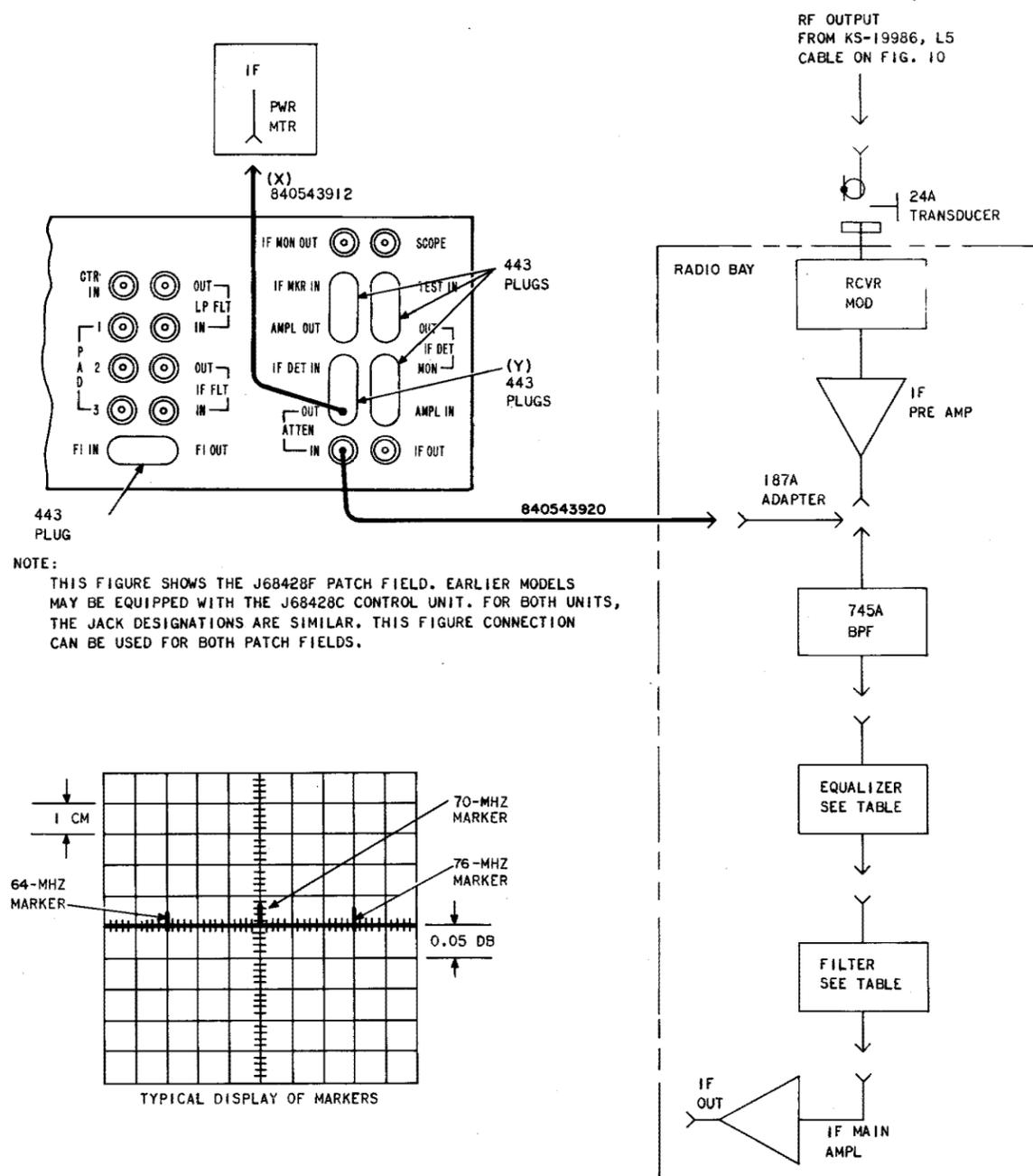
TYPE OF T/R BAY	EQUALIZER	FILTER
ORIGINAL T/R BAY (1200 CIRCUIT LOADING)	793A or 794A	747A LPF*
MODIFIED T/R BAY (1500 CIRCUIT LOADING)	400A or 400B	1080A BPF

\* The 747A LPF is relocated to the output of the IF main amplifier when the T/R bay is modified for 1500 circuit loading.



NOTE:  
THIS FIGURE SHOWS THE J68428F PATCH FIELD; EARLIER MODELS MAY BE EQUIPPED WITH THE J68428C CONTROL UNIT. FOR BOTH UNITS, THE JACK DESIGNATIONS ARE SIMILAR. THIS FIGURE CONNECTION CAN BE USED FOR BOTH PATCH FIELDS.

Fig. 11—RF-to-IF Transmission Setup—J68428A Test Set



PREPARATION FOR TEST  
(FIG. 12)

1. On the power meter, set the INPUT switch to IF and the MODE control to ZERO.
2. On the control unit, set the ATTEN to 0 dB and the IF AMPL GAIN control counterclockwise.
3. Before connecting the IF cable to the power meter, zero the meter by adjusting the ZERO control for a 000 indication on the digital display.
4. Set the MODE control to the POWER METER position.
5. Make the test connection as shown in option (X).

TABLE C

TYPE OF T/R BAY	EQUALIZER	FILTER
ORIGINAL T/R BAY (1200 CIRCUIT LOADING)	793A or 794A	747A LPF*
MODIFIED T/R BAY (1500 CIRCUIT LOADING)	400A or 400B	1080A BPF

\* The 747A LPF is relocated to the output of the IF main amplifier when the T/R bay is modified for 1500 circuit loading.

Fig. 12—RF-to-IF Transmission Setup for IF Preamplifier