
TD-3 MICROWAVE RADIO
J68386A AND J68386B TRANSMITTER-RECEIVER BAYS
COMMON EQUIPMENT TESTS
PRELIMINARY CHECKS

This section describes the procedures for making preliminary checks on a TD-3 microwave radio transmitter-receiver bay. Preliminary checks are made on the microwave generator and voltage regulator to establish the correct levels before performing other tests.

If any of the requirements of Chart 1 are not met, refer to Section 411-402-502. If any of the requirements of Chart 2 are not met, refer to Section 411-402-501 for J68387B microwave generators and Section 411-402-504 for J68387R microwave generators.

For location of components in the bay refer to Fig. 2.

This section is reissued to add reference to a 1336-type filter in the receiver input and transmitter output circuits (for 1500 circuit loading).

This issue does not affect the Equipment Test List.

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CHART 1

- 19 VOLT REGULATOR CHECKS

STEP	PROCEDURE
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Note: Repeater station radio bays use a common -19 volt regulator for the transmitter and receiver sections. Main station radio bays utilize separate -19 volt regulator units for the transmitter and receiver sections. The transmitter regulator is the right-hand unit located behind the front cover and below the microwave generators.

Caution: *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.*

CHART 1(Cont)

STEP

PROCEDURE

Main Station Transmitter Regulator

- 1 Depress the -19 VOLT CHECK pushbutton on the transmitter control panel.

Requirement: 70 ± 2

If the requirement is not met, adjust the ADJ VOLTS control on the transmitter regulator unit to meet the requirement.

- 2 Disconnect the power plug on the IF carrier resupply unit.

- 3 Depress and hold the ALARM RESET pushbutton.

Requirement: The TRMTR alarm lamp shall be extinguished.

- 4 Adjust the ADJ VOLTS control on the transmitter regulator unit to the maximum counterclockwise position.

Requirement: The TRMTR alarm lamp shall light.

- 5 Slowly adjust the ADJ VOLTS control to the maximum clockwise position.

Requirement: The TRMTR alarm lamp shall extinguish and then light again.

- 6 Adjust the ADJ VOLTS control counterclockwise until the TRMTR alarm lamp is extinguished.

- 7 Release the ALARM RESET pushbutton.

- 8 Depress the -19 VOLT CHECK pushbutton and adjust the ADJ VOLTS control for a red line indication (70).

- 9 Reconnect the power plug to the IF carrier resupply unit.

Main Station or Repeater Station Receiver Regulator

- 10 Depress the -19 VOLT CHECK pushbutton on the receiver control panel.

Requirement 1: 70 ± 2

Requirement 2: No receiver alarms present.

If Requirement 1 is not met, adjust the ADJ VOLTS control on the receiver regulator to meet Requirement 1.

- 11 Depress and hold the ALARM RESET pushbutton.

CHART 1(Cont)

STEP	PROCEDURE
	<i>Requirement:</i> The RCVR alarm lamp shall be extinguished.
12	Adjust the ADJ VOLTS control to the maximum counterclockwise position.
	<i>Requirement:</i> The RCVR alarm lamp shall light.
13	Slowly adjust the ADJ VOLTS control to the maximum clockwise position.
	<i>Requirement:</i> The RCVR alarm lamp shall extinguish and then light again.
14	Adjust the ADJ VOLTS control counterclockwise until the RCVR alarm lamp is extinguished.
15	Release the ALARM RESET pushbutton.
16	Depress the -19 VOLT CHECK pushbutton and adjust the ADJ VOLTS control for a red line indication (70).

CHART 2
MICROWAVE GENERATOR CHECKS

APPARATUS:

1—J68392A Transmitter-Receiver Test Set

STEP	PROCEDURE
	<p>The following is a check of the frequency and power output of the microwave generator. Repeater station bays use a single generator common to both the transmitter and receiver. Main station bays provide separate generators for the transmitter and receiver units with the upper unit being associated with the transmitter.</p> <p><i>Caution: Removing the cover will change the operating temperature of the generator and therefore its frequency. Replace the cover as soon as the frequency check is completed.</i></p> <p>Frequency Check</p>
1	Perform the preparation for test instructions on Fig. 1.

CHART 2(Cont)

STEP

PROCEDURE

- 2 **J68387B Generator:** Connect the test setup in Fig. 1A and measure the frequency.
- J68387R Generator:** Connection option (Y) Fig. 1B and position the power meter INPUT CHANNEL switch to IF. Adjust the test set IF AMPL GAIN control for a power of 0 dBm. Change option (Y) to option (Z) on Fig. 1B and measure the frequency.

Requirement: Within the limits shown in:

Table A—Transmitter microwave generator

Table B—Receiver microwave generators in bays equipped with a shift modulator

Table C—Receiver microwave generators in bays not equipped with a shift modulator

If the requirement is not met, adjust the FINE FREQ TUN (J68387B) or FREQ ADJ (J68387R) control to bring the frequency to within 10 Hz of nominal.

Note: The P-48Q352 adjusting tool has a slight frequency detuning effect when used on the FREQ ADJ control on the J68387R generator. Adjust the control for $f_0 \pm 10$ Hz with the tool inserted. Remove the tool and note the frequency shift. Readjust, taking the shift into account, so that the ± 10 Hz requirement is met with the tool removed.

Power Check

- 3 Position the power meter INPUT CHANNEL switch to RF.
- 4 Depress the MWV GEN OUT pushbutton for the associated generator and, if necessary, adjust one of the following attenuators to obtain the recorded meter reading.

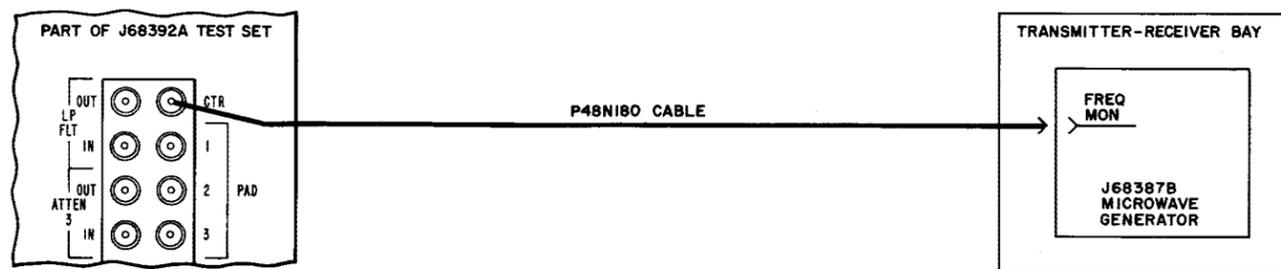
AT1—Main or Repeater Station Receiver (Fig. 2)

AT5—Main Station Transmitter (Fig. 2)

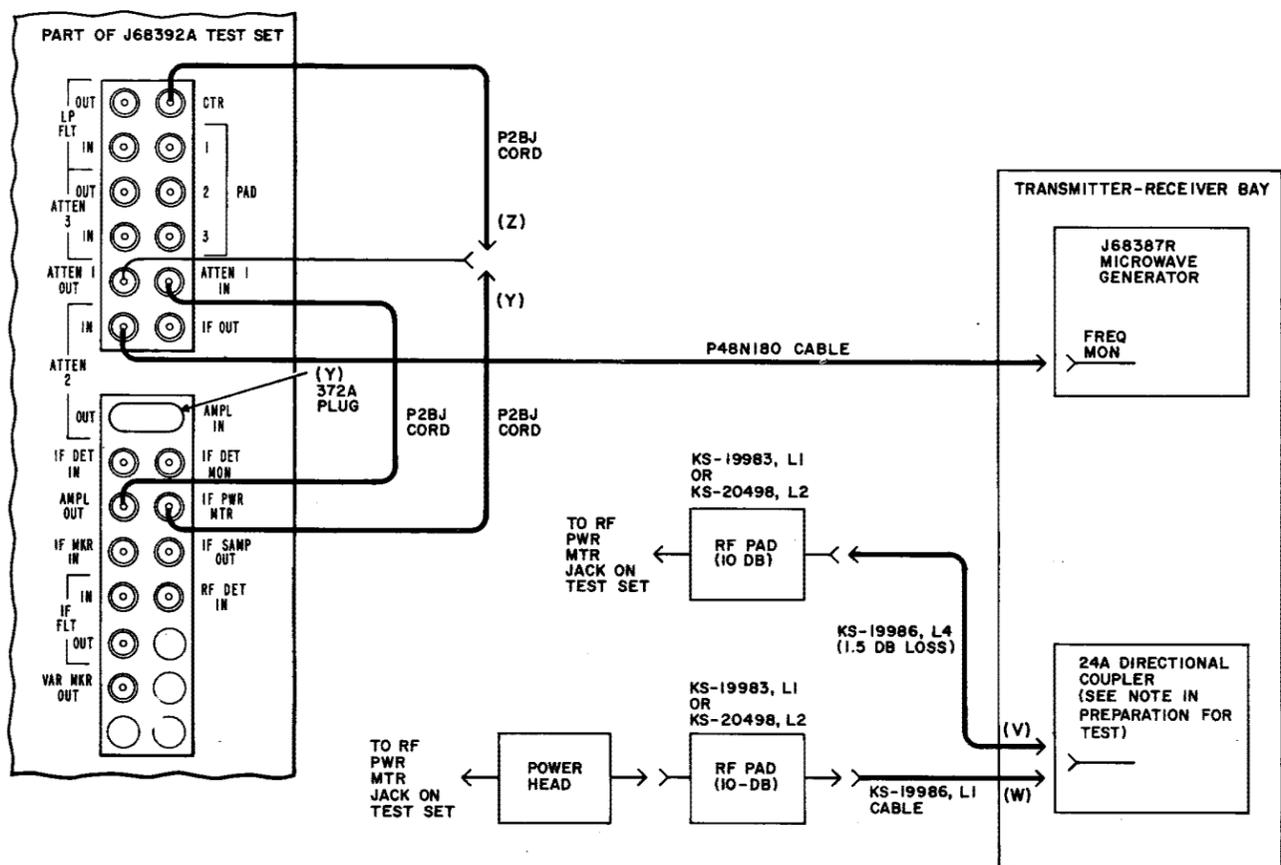
Note: If AT1 or AT5 runs out of adjustment range before the proper meter indication is obtained, refer to Section 411-402-501 for the J68387B generator or Section 411-402-504 for the J68387R generator for tune-up procedures.

- 5 Remove the detector from the 24A directional coupler (MON 1 on main or repeater station receiver; MON 2 on main station transmitter) (Fig. 2).
- 6 Connect option (V) or (W) in Fig. 1B and measure the power.

Requirement 1: The associated microwave generator output Sensitrol shall trip.



A. J68387B MICROWAVE GENERATOR



B. J68387R MICROWAVE GENERATOR

PREPARATION FOR TEST (FIG. 1)

1. Connect power to the test set.
2. Observe the pilot lamp at the top right front of the test set. If the lamp is not lighted, operate the toggle switch to the opposite position and the lamp should be lighted.
3. Observe that no fuse alarm lamps are lighted.
4. Energize the counter, oscilloscope, and power meter, and position the RF sweep oscillator to the STANDBY position, if equipped. If the STANDBY position is not equipped, position it to the ON position.
5. Allow the equipment to warm up for at least 15 minutes.
6. On the power meter, position the INPUT CHANNEL switch to RF, determine that no input is connected, then zero the power meter by placing the POWER RANGE DBM switch to -25 and adjusting the METER ZERO control for an indication of 0 on the meter.
7. Position the POWER RANGE DBM switch to 0.
8. Position the FUNCTION switch on the counter to TEST, depress the RESET button, and determine that the counter indicates 1 MHz ±1 count. Then operate the FUNCTION switch to FREQUENCY.
9. Position the CTR switch to EXT. The test set is now ready for operation.
10. Position the AMPL GAIN control to the maximum counterclockwise position.
11. Position attenuators ATTEN 2 to 20 dB and ATTEN 1 to 5 dB.

Caution: Never apply more than +10 dBm to the power meter.

Note: The 24A directional coupler is DC1 on a main station receiver and DC2 on a main station transmitter and repeater station receiver.

Fig. 1—Microwave Generator—Frequency and Power Checks

CHART 2(Cont)

STEP	PROCEDURE
	<p>Requirement 2: When using option (V), $(+9.1 - L)$ dBm ± 0.5 dB. When using option (W), $(+10.6 - L)$ dBm ± 0.5 dB. When using either option (V) or (W), L is the calibrated coupler loss at the frequency nearest that of the microwave generator.</p> <p>This corresponds to a nominal power of the $+20.6$ dBm ± 0.5 dB in the through arm of the directional coupler.</p> <p>If Requirement 2 is met, proceed with Step 12.</p> <p>If Requirement 2 is not met, proceed with Step 7.</p>
7	Adjust AT1 or AT5 for a power 2 dB below that specified in Requirement 2 of Step 6.
8	Reconnect the detector to its directional coupler.
9	Slowly adjust the MWV GEN ALM SET control until the associated Sensitrol just trips.
10	Remove the detector and reconnect the power meter, option (V) or (W), Fig. 1B.
11	Adjust AT1 or AT5 to restore the power to $(+9.1 - L)$ dBm when using option (V) Fig. 1B, or $(+10.6 - L)$ dBm when using option (W) Fig. 1B.
12	Reconnect the detector to the directional coupler and operate the ALARM RESET switch.
	<p>Requirement: The microwave generator output Sensitrol shall reset.</p>
13	Depress the MWV GEN OUT pushbutton and record the meter indication.
14	Ensure that the cover is in place over the microwave generator.
	<p>Warning: Do not open waveguide joints in the transmitter without first removing the IF carrier at the transmitter modulator.</p>
15	<p>◆ Determine that the transmitter or receiver to be tested has been removed from service. If routining a main station transmitter, perform Steps 16 through 19. If routining a main station receiver, perform only Step 20. If routining a repeater station T-R bay, perform Steps 16 through 20.◆</p>
16	Remove the transmitted carrier by removing the IF cable from the IF IN jack of the IF DRIVER AMPL—TRMTR MOD unit.
17	<p>◆ Remove the transmitter 1322-type bandpass filter (FL4) or 1336-type bandpass filter (FL14 in a repeater station bay or FL16 in a main station bay). This filter is located above the 24B directional coupler (see Fig. 2).◆</p>

TABLE A
TRANSMITTER MICROWAVE GENERATOR FREQUENCIES

TRANSMITTER		GENERATOR OUTPUT (MHz)	MICROWAVE GENERATOR LOW-FREQUENCY OSCILLATOR	
FREQUENCY (MHz)	CHANNEL		FREQUENCY (MHz)	LIMITS (MHz)
3710	7A	3780	118.1250	118.124882 — 118.125118
3730	1A	3800	118.7500	118.749881 — 118.750119
3750	7B	3820	119.3750	119.374881 — 119.375119
3770	1B	3840	120.0000	119.999880 — 120.000120
3790	8A	3860	120.6250	120.624879 — 120.625121
3810	2A	3880	121.2500	121.249879 — 121.250121
3830	8B	3900	121.8750	121.874878 — 121.875122
3850	2B	3920	122.5000	122.499878 — 122.500122
3870	9A*	3800	118.7500	118.749881 — 118.750119
3890	3A*	3820	119.3750	119.374881 — 119.375119
3910	9B*	3840	120.0000	119.999880 — 120.000120
3930	3B	3860	120.6250	120.624879 — 120.625121
3950	10A	3880	121.2500	121.249879 — 121.250121
3970	4A	3900	121.8750	121.874878 — 121.875122
3990	10B	3920	122.5000	122.499878 — 122.500122
4010	4B	3940	123.1250	123.124877 — 123.125123
4030	11A	3960	123.7500	123.749876 — 123.750124
4050	5A	3980	124.3750	124.374876 — 124.375124
4070	11B	4000	125.0000	124.999875 — 125.000125
4090	5B	4020	125.6250	125.624874 — 125.625126
4110	12A	4040	126.2500	126.249874 — 126.250126
4130	6A	4060	126.8750	126.874873 — 126.875127
4150	12B	4080	127.5000	127.499872 — 127.500128
4170	6B	4100	128.1250	128.124872 — 128.125128
* Early production bays had the following microwave generator frequencies for channels 3 and 9.				
3890	3A	3960	123.7500	123.749876 — 123.750124
3930	3B	4000	125.0000	124.999875 — 125.000125
3870	9A	3940	123.1250	123.124877 — 123.125123
3910	9B	3980	124.3750	124.374876 — 124.375124

TABLE B

RECEIVER MICROWAVE GENERATOR FREQUENCIES

FOR BAYS EQUIPPED WITH THE J68387D 40-MC OSCILLATOR AND SHIFT MODULATOR UNIT

RECEIVER		MICROWAVE GENERATOR LOW-FREQUENCY OSCILLATOR	
FREQUENCY (MHz)	CHANNEL	NOMINAL FREQUENCY (MHz)	LIMITS (MHz)
3730	1A	120.0000	119.999880 — 120.000120
3770	1B	118.7500	118.749881 — 118.750119
3810	2A	122.5000	122.499878 — 122.500122
3850	2B	121.2500	121.249879 — 121.250121
3890	3A	120.6250*	120.624879 — 120.625121
3930	3B	119.3750*	119.374881 — 119.375119
3970	4A	123.1250	123.124877 — 123.125123
4010	4B	121.8750	121.874878 — 121.875122
4050	5A	125.6250	125.624874 — 125.625126
4090	5B	124.3750	124.374876 — 124.375124
4130	6A	128.1250	128.124872 — 128.125128
4170	6B	126.8750	126.874873 — 126.875127
3710	7A	119.3750	119.374881 — 119.375119
3750	7B	118.1250	118.124882 — 118.125118
3790	8A	121.8750	121.874878 — 121.875122
3830	8B	120.6250	120.624879 — 120.625121
3870	9A	120.0000*	119.999880 — 120.000120
3910	9B	118.7500*	118.749881 — 118.750119
3950	10A	122.5000	122.499878 — 122.500122
3990	10B	121.2500	121.249879 — 121.250121
4030	11A	125.0000	124.999875 — 125.000125
4070	11B	123.7500	123.749876 — 123.750124
4110	12A	127.5000	127.499872 — 127.500128
4150	12B	126.2500	126.249874 — 126.250126
* The frequencies were changed on a Class B basis; some early production bays will have the following frequencies.			
3890	3A	125.0000	124.999875 — 125.000125
3930	3B	123.7500	123.749876 — 123.750124
3870	9A	124.3750	124.374876 — 124.375124
3910	9B	123.1250	123.124877 — 123.125123

TABLE C

RECEIVER MICROWAVE GENERATOR FREQUENCIES

FOR BAYS NOT EQUIPPED WITH THE J68387D 40-MC OSCILLATOR AND SHIFT MODULATOR UNIT

RECEIVER		MICROWAVE GENERATOR LOW-FREQUENCY OSCILLATOR	
FREQUENCY (MHz)	CHANNEL	NOMINAL FREQUENCY (MHz)	LIMITS (MHz)
3730	1A	118.7500	118.749881 — 118.750119
3770	1B	120.0000	119.999880 — 120.000120
3810	2A	121.2500	121.249879 — 121.250121
3850	2B	122.5000	122.499878 — 122.500122
3890	3A	119.3750	119.374881 — 119.375119
3930	3B	120.6250	120.624879 — 120.625121
3970	4A	121.8750	121.874878 — 121.875122
4010	4B	123.1250	123.124877 — 123.125123
4050	5A	124.3750	124.374876 — 124.375124
4090	5B	125.6250	125.624874 — 125.625126
4130	6A	126.8750	126.874873 — 126.875127
4170	6B	128.1250	128.124872 — 128.125128
3710	7A	118.1250	118.124882 — 118.125118
3750	7B	119.3750	119.374881 — 119.375119
3790	8A	120.6250	120.624879 — 120.625121
3830	8B	121.8750	121.874878 — 121.875122
3870	9A	118.7500	118.749881 — 118.750119
3910	9B	120.0000	119.999880 — 120.000120
3950	10A	121.2500	121.249879 — 121.250121
3990	10B	122.5000	122.499878 — 122.500122
4030	11A	123.7500	123.749876 — 123.750124
4070	11B	125.0000	124.999875 — 125.000125
4110	12A	126.2500	126.249874 — 126.250126
4150	12B	127.5000	127.499872 — 127.500128

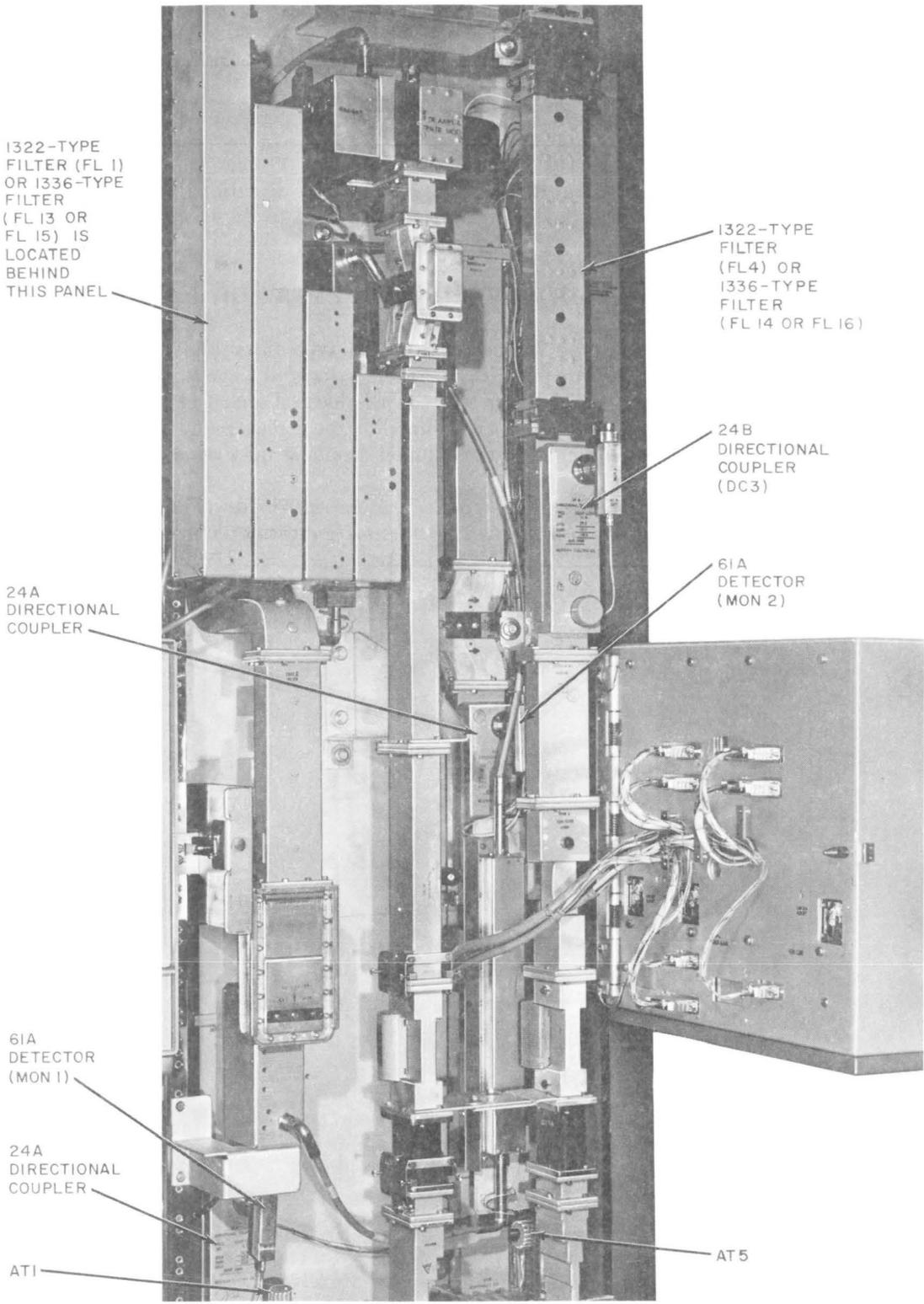


Fig. 2—Transmitter-Receiver Component Location—Preliminary Checks

CHART 2(Cont)

STEP	PROCEDURE
18	Connect a 522A termination at the output of the 24B directional coupler DC3 (Fig. 2). Place a shorting plate on the flexible waveguide attached to the channel combining network Z4.
19	Reconnect the IF cable to the IF DRIVER AMPL—TRMTR MOD unit.
20	◆ Remove the receiver 1322-type filter (FL1) or 1336-type filter (FL13 in a repeater station bay or FL15 in a main station bay). This filter is located between the channel dropping network Z1 and the 8A or 19A isolator A1 which is located ahead of the receiver modulator and IF preamplifier. Attach a 24A transducer to the isolator and place a shorting plate on the flexible waveguide attached to the channel dropping network.◆

Caution: Remove the cable from the IF main amplifier IF OUT jack to prevent the transmission of swept signals to the normally connected circuits.