
TD-3 MICROWAVE RADIO
TRANSMITTER-RECEIVER BAY
TRANSMITTER TESTS
USING KRUSE 52011 IF/RF TEST SETS
J68387E IF DRIVER AMPLIFIER-TRANSMITTER MODULATOR

This appendix contains the procedures to be followed in checking the J68387E IF driver amplifier-transmitter modulator. The table below lists the particular charts of this appendix to be used when the requirements of Section 411-406-501 cannot be met.

Caution: Before performing these tests, check that the transmitter is not in service.

| REQUIREMENT IN SECTION 411-406-501 WHICH IS NOT MET | CHART SEQUENCE USED IN TROUBLESHOOTING UNIT |
|--|---|
| Single-Frequency Power Output Level | Chart A — Diode Holder Adjustment, Power Output Test, Beat Oscillator (BO) Suppression Test Chart B — IF Driver Amplifier Gain and Amplitude Response Tests (if necessary) |
| Transmission Flatness | Chart A — Diode Holder Adjustment, Power Output Test, Beat Oscillator (BO) Suppression Test Chart B — IF Driver Amplifier Gain and Amplitude Response Tests (if necessary) |

The following sections may be used as additional information if required:

- General Test Information—411-400-500
- Transmitter-Receiver Bay Level Diagrams—411-400-502
- Transmitter Tests, Gain and Amplitude Response—411-406-501

CHART A
DIODE HOLDER ADJUSTMENT
POWER OUTPUT TEST
BEAT OSCILLATOR (BO) SUPPRESSION TEST

APPARATUS:

1—Kruse 52011 IF/RF Test Set

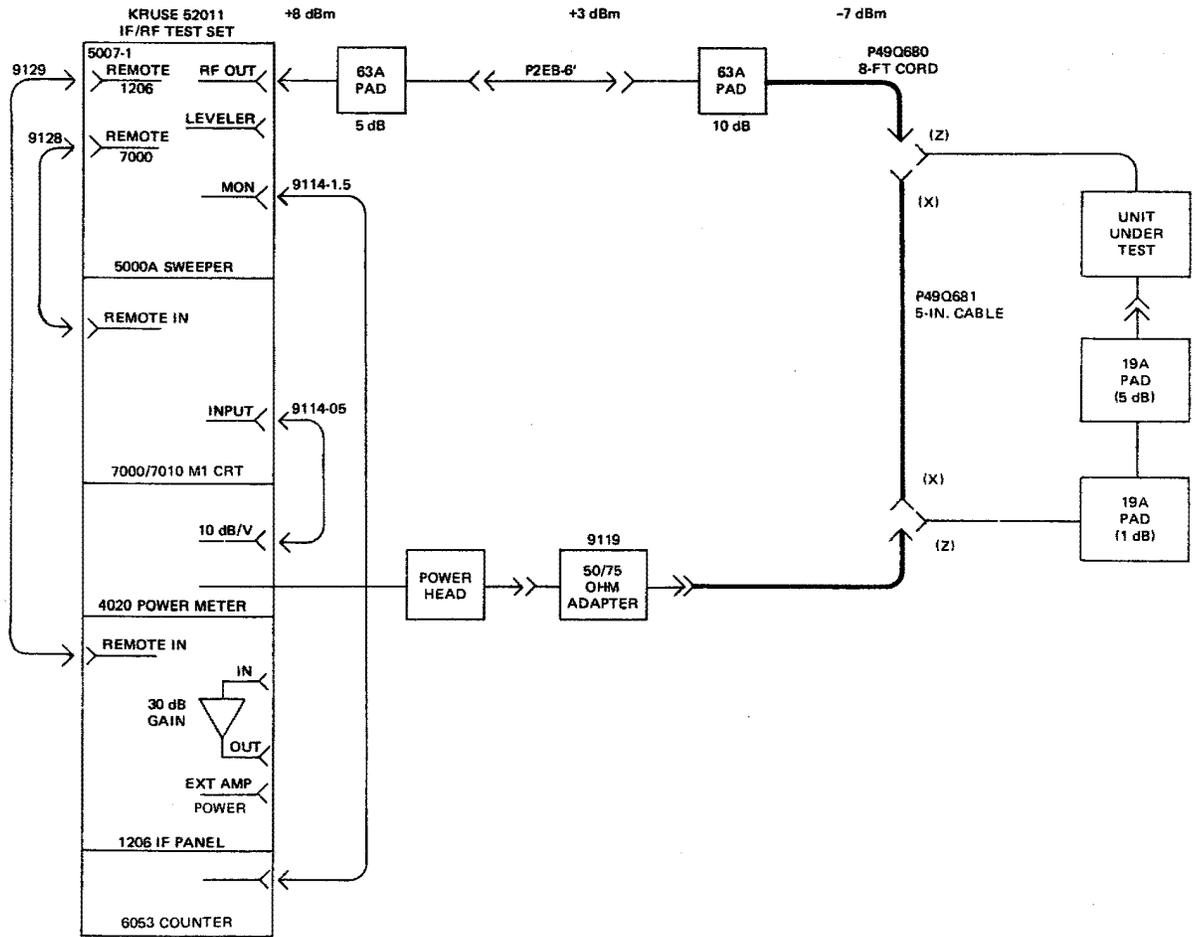
| STEP | PROCEDURE |
|------|---|
| 1 | If these tests are to be made at a repeater station, disconnect and remove isolator A6 and the flexible waveguide. If these tests are to be made at a main station, remove isolator A7 and the flexible waveguide. |
| 2 | Prepare for test in accordance with Exhibit 1. |
| 3 | Connect option (Z) and adjust RF LEVEL control for a reading of -7.0 dBm. |
| 4 | Adjust center frequency of sweeper for a reading of 70 MHz on the counter. |
| 5 | Set attenuator AT3 (repeater station bay) or AT4 (main station bay) for minimum attenuation and connect option (X). |
| 6 | Adjust the tuning screws on Z1 and Z2 on the transmitter modulator for maximum output as indicated on the RF power meter. <i>Requirement:</i> The power meter shall indicate between -3.5 and $+2.5$ dBm. This corresponds to a power level of between $+8$ and $+14$ dBm at the 24A transducer. If this requirement is not met, the most probable cause of trouble is either a defective driver amplifier or defective diodes. Proceed to Chart B. One indication of a defective diode is a large change from the marked reading on the transmitter control panel. If this requirement is met, proceed to Step 7. |
| 7 | Remove the 70-MHz signal from the IF IN jack and connect option (Y). |
| 8 | Tune the 1331A filter for maximum output as indicated on the RF power meter. If no signal is observed, detune the tuning screw on diode holder Z1 approximately one-half turn to obtain an unbalance and retune the 1331A filter for maximum output. |
| 9 | Reconnect the 70-MHz signal and adjust the tuning screw on Z1 for a minimum output as indicated on the RF power meter. <i>Requirement:</i> The power shall be less than $(15 \text{ dBm} + \text{filter loss})$. |
| 10 | If the requirement of Step 9 is not met, the most probable cause of trouble is a defective 471A diode. Replace the diodes in pairs and repeat the procedures of this chart starting with Step 3. If the BO suppression requirement (Step 9) is met, perform the tests on the IF driver amplifier — transmitter modulator given in Section 411-406-501. |

CHART B
IF DRIVER AMPLIFIER GAIN AND AMPLITUDE RESPONSE TESTS

APPARATUS:

- 1—Kruse 52011 IF/RF Test Set
 - 1—P48Q348 IF Test Jig
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| STEP | PROCEDURE |
|------|--|
| 1 | To check the IF driver amplifier, remove the IF driver amplifier by disconnecting the power plug and loosening the three screws which secure the amplifier to the transmitter modulator block and connect it to IF test jig P48Q348. |
| 2 | Obtain power for the IF driver amplifier by means of a P49Q685 patch cable connected to the EXT AMP PWR jack on the test set. |
| 3 | Prepare the test set in accordance with Exhibit 2. |
| 4 | Change to option (Z). The output is from either of the IF jacks on the test jig. Leave the second IF jack unterminated. |
| 5 | Turn the GAIN control fully counterclockwise and adjust for flatness by adjusting the HIGH SLOPE and LOW SLOPE controls. If the flatness requirement is difficult to meet, turn the GAIN control a small amount in the clockwise direction and readjust the HIGH SLOPE and LOW SLOPE controls to meet the requirement. Adjust the RF LEVEL control on the sweeper to coincide the traces at 70 MHz. <i>Requirement 1:</i> The amplitude response shall be flat within 0.01 dB from 64 to 76 MHz, and within 0.03 dB from 60 to 80 MHz. <i>Requirement 2:</i> The power at one output jack shall be between -0.5 and -2.0 dBm, and the power at the other output jack shall be within ± 0.25 dB of the power at the first jack. If requirements are not met, replace the IF driver amplifier with a spare unit and return the defective unit to the maintenance center. Retest the IF driver amplifier—transmitter modulator as specified in Section 411-406-501. |
| 6 | If the IF driver amplifier meets the requirements, defective 471A diodes were the probable cause of failure to meet the amplitude response requirements of Section 411-406-501. Reconnect the IF driver amplifier to the modulator block and replace the 471A diodes. |



OSCILLOSCOPE CALIBRATION

1. Set scope controls:

| CONTROL | POSITION |
|-------------------|-----------------------------|
| OFFSET | MID-SCALE (DO NOT READJUST) |
| GAIN | X1 |
| POLARITY | +UP |
| BW | 30 kHz |
| INPUT | DC |
| DB/DIV AT 10 DB/V | .05 DB/DIV - 5 MV/DIV |
| VARIABLE (RED) | MAX CW DETENT |

2. Adjust sweeper MODE control to WIDE F1-F2 position.
3. Adjust power meter OFFSET control to position trace on center of oscilloscope.
4. Adjust HORIZONTAL POS and GAIN controls to position trace ends at each extreme of horizontal scale. The horizontal scale calibration is 3 MHz/div with markers at 61, 70, and 79 MHz.
5. Switch vertical sensitivity control on scope to .05 dB/div - 5 mV/div. (This calibrates scope for 0.05 dB/div.)

PREPARATION FOR TEST

1. Prepare test setup in accordance with Exhibit 1, Steps 1 and 2.
2. Set sweeper MODE control to WIDE F1-F2 position.

**IF Driver Amplifier Test Setup
Exhibit 2**