
TD-3 MICROWAVE RADIO
J68386A AND J68386B TRANSMITTER-RECEIVER BAYS
COMMON EQUIPMENT TESTS
USING KRUSE 52011 IF/RF TEST SET
PRELIMINARY CHECKS

This appendix 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 in the main section are not met, refer to Section 411-402-502. If any of the requirements of this appendix 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 in the main section.

CHART A
MICROWAVE GENERATOR CHECKS

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.

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.

APPARATUS:

1—Kruse 52011 IF/RF Test Set

STEP

PROCEDURE

Frequency Check

1 Perform the Preparation for Test instructions shown on Exhibit 1.

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CHART A (Contd)

| STEP | PROCEDURE |
|------|---|
| 2 | Connect test setup in Exhibit 1 and measure the frequency. <i>Requirement:</i> 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. <i>Note:</i> 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 $f \pm 10$ 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 power meter INPUT CHANNEL switch to RF. |
| 4 | Depress 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 in the main section) AT5—Main Station Transmitter (Fig. 2 in the main section) <i>Note:</i> 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 in the main section) |
| 6 | Measure the power. <i>Requirement 1:</i> The associated microwave generator output Sensitrol shall trip. <i>Requirement 2:</i> $(+10.6 -L)$ dBm ± 0.5 dB. L is the calibrated coupler loss at the frequency nearest that of the microwave generator. This corresponds to a nominal power of the $+20.6$ dBm ± 0.5 in the through arm of the directional coupler. If Requirement 2 is met, proceed with Step 12. |

CHART A (Contd)

| STEP | PROCEDURE |
|------|--|
| | If Requirement 2 is not met, proceed with Step 7. |
| 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. |
| 11 | Adjust AT1 or AT5 to restore the power to (+10.6 -L) dBm. |
| 12 | Reconnect the detector to the directional coupler and operate the ALARM RESET switch. <i>Requirement:</i> The microwave generator output Sensitrol shall reset. |
| 13 | Depress the MWV GEN OUT pushbutton and record the meter indication. |
| 14 | Ensure that the cover is in place over the microwave generator. <i>Warning:</i> Do not open waveguide joints in the transmitter without first removing the IF carrier at the transmitter modulator. |
| 15 | 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. |
| 16 | Remove the transmitted carrier by removing the IF cable from the IF IN jack of the IF DRIVER AMPL-TRMTR MOD unit. |
| 17 | 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 in the main section). |
| 18 | Connect a 522A termination at the output of the 24B directional coupler DC3 (Fig. 2 in the main section). 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 place 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.

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 | 119.999800 – 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

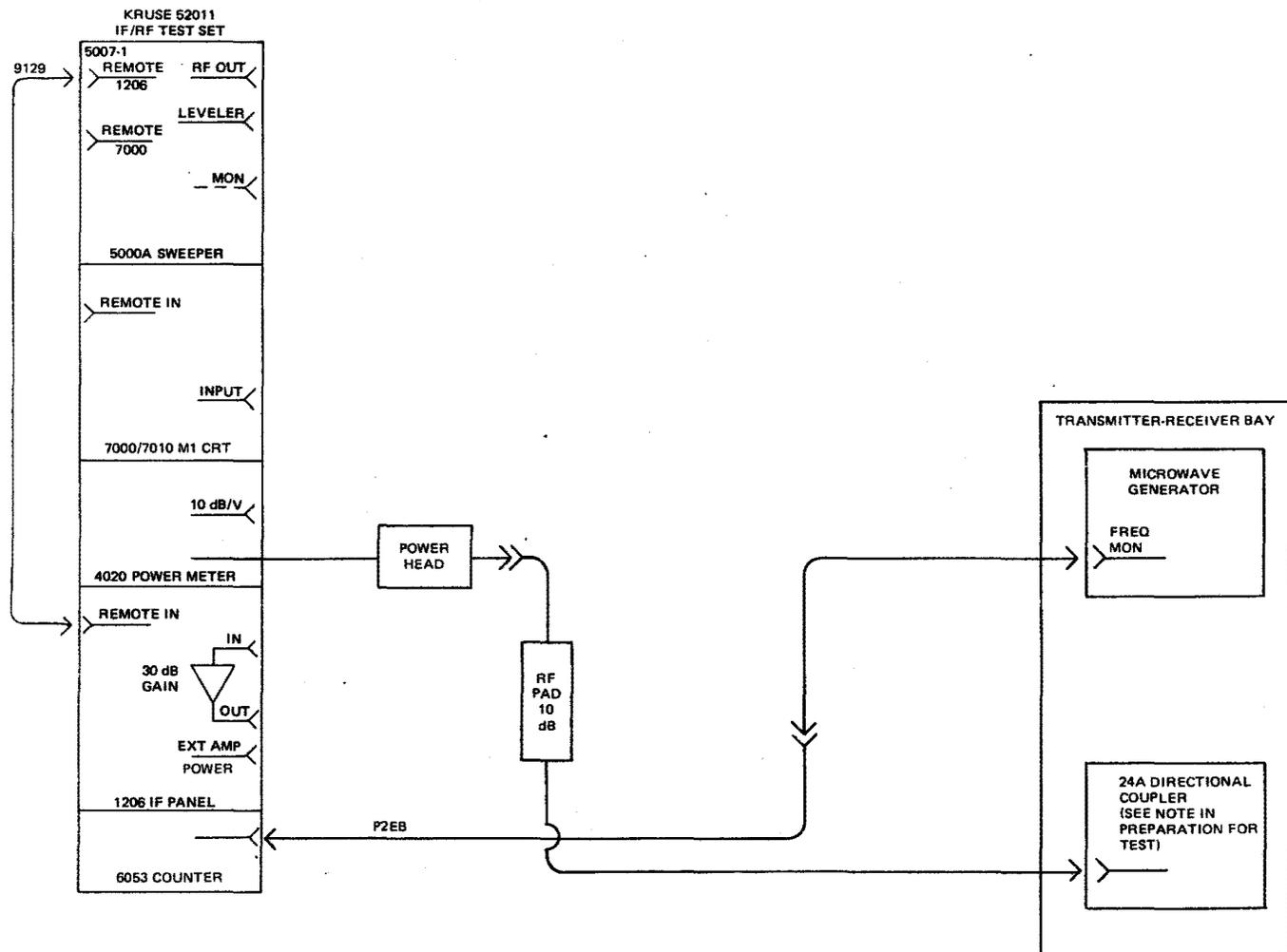
| RECEIVER | | MICROWAVE GENERATOR LOW-FREQUENCY OSCILLATOR | |
|--|---------|---|-------------------------|
| FREQUENCY (MHz) | CHANNEL | NOMINAL FREQUENCY (MHz) | LIMITS (MHz) |
| 3730 | 1A | 120.0000 | 119.999880 – 120.000120 |
| 3770 | 1B | 118.7500 | 118.749881 – 118.750119 |
| 3810 | 2A | 122.5000 | 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 |



PREPARATION FOR TEST

1. Connect power to the test set.
2. Observe that no fuse alarm lamps are lighted.
3. Energize the counter, oscilloscope, power meter, and the RF sweep oscillator.
4. Allow the equipment to warm up for at least 15 minutes.
5. Allowing 5 minutes warm-up, operate controls on the test set as follows:

| UNIT | CONTROL | POSITION |
|------------------|----------------|-----------|
| 4020 POWER METER | LEVEL | 10 DB/V |
| | GROUNDING | INT |
| | OFFSET | MID-SCALE |
| COUNTER | ATTENUATOR | X1 |
| | RESOLUTION | 1K |
| | EXT/INT (REAR) | INT |

6. Connect power meter head to CAL OUT jack. Depress DBM CAL key and adjust its control for +10.00 dBm reading. Depress ZERO key and adjust its control for 00.00 ± .01 reading. Depress DBM 75 OHM key.

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.

**Microwave Generator—Frequency and Power Checks
Exhibit 1**