

SECTION III

OPERATING CHECKS AND ADJUSTMENTS

3-1. PREPARATION FOR USE.

3-2. Radio Test Set AN/TRM-3 is complete in one portable unit and is ready for use upon delivery. No permanent or special installation procedures are necessary. Upon delivery, the test set should be checked, however, to make certain that no damage has occurred during shipment. To prepare the test set for operation, proceed as directed in the following steps:

a. Unlatch the eight hooks from the cover of the test set case and lift the cover from the top of the case.
b. Grasp Sweep Generator SG-24/TRM-3 by the handles on the front panel and remove the equipment from the test set case. Place the sweep generator on a work bench in any convenient position near the equipment to be tested, but outside of any direct, strong r-f field.

c. To mount the equipment on a standard relay rack, of 19 inches width, remove the four guard-rail type handles from the front panel. Fabricate two mounting brackets, using 1/8 inch thick aluminum sheet metal, so that each bracket is 13-1/16 inches high by 1-17/32 inches wide. Drill and tap four No. 10-32 NC-2 holes in each bracket, using the front panel handle holes as a template. Use the same screws which normally secure the handles to the front panel as the attaching hardware for securing the newly fabricated aluminum mounting brackets to the front panel. Cut out notches in the sides of the brackets (opposite the threaded holes) to mate with the mounting center distances on the relay rack employed.

d. Remove Electrical Power Cable Assembly CX-3277/U (used on equipment serial Nos. 1-291) or CX-3135/U (used on equipment serial Nos. 292 and higher) from the stowage compartment of the test set case. Insert the female connector of the electrical power cable assembly into the front panel POWER INPUT receptacle, and connect the male connector to a 115-volt, 50 to 1000 cps, single phase power source. With the PWR switch in its OFF position, the front panel HEATER lamp will be illuminated, indicating that the space heaters are in operation. If the equipment has been subjected to excessive humidity, the space heaters should be left on as long as practicable in order to dry out condensed moisture.

3-3. RF POWER LEVEL ADJUSTMENT. (See figure 3-1.)

3-4. To calibrate the r-f output level of the sweep generator, adjust the equipment front panel controls as directed in figure 3-1 and the following steps:

a. Step 1. Apply operating power to the equipment, and set the PWR ON-OFF switch to its ON position.
b. Step 2. Rotate the function selector to the CW position, and allow the sweep generator to warm up for at least 20 minutes. Check to see that the RF OSC switch is in its ON position during the warm-up period.
c. Step 3. Set the BAND SELECTOR and the TUNING control to the desired operating frequency.

d. Step 4. Connect the equipment under test to the RF OUTPUT connector, using one of the r-f cable assemblies supplied.

e. Step 5. Set the RF OSC switch to the OFF position.

f. Step 6. Adjust the ZERO SET control to obtain a meter pointer deflection to the ZERO SET calibration mark on the meter scale.

g. Step 7. Place the RF OSC switch to the ON position.

h. Step 8. Adjust the PWR SET control to obtain a meter pointer deflection to the 0 DBM POWER SET calibration mark on the bottom meter scale. R-f power level available at the RF OUTPUT connector may now be read directly from the calibrated OUTPUT ATTENUATOR dial, at a dial indication of -7 dbm.

3-5. OPERATING CHECKS. (See figure 2-1.)

3-6. To ascertain that the equipment is in good operating order, make the following checks:

a. INPUT POWER SWITCHING. Throw the PWR switch (1) to the ON position. The HEATER panel lamp should now be extinguished, indicating that the equipment space heaters are disconnected from the power source. The front panel POWER lamp should light. Allow the sweep generator to warm up for approximately 20 minutes, to reach operating stability.

b. FUNCTION SELECTOR. Rotate the function selector (2) to the FM position. This action applies operating power to the self-contained horizontal sweep generator, which develops the sweep trace and drives the transducer.

c. INTENSITY CONTROL. Turn the INTENSITY control (13) to obtain a trace of suitable brightness on the scope screen.

d. FOCUS CONTROL. Turn the FOCUS control (12) to obtain the sharpest trace possible.

e. HOR POS AND VERT POS CONTROLS. Turn the HOR POS (14) and VERT POS (15) controls to center the sweep trace line on the screen.

f. HORIZONTAL GAIN CONTROL. Vary the HORIZONTAL GAIN control (20) and check to see that the width of the sweep trace line changes. Set the HORIZONTAL GAIN control to that position which produces a sweep trace line approximately three inches wide.

g. DEFL POL SWITCH. Place the DEFL POL switch (17) in its + (plus) position. Move the horizontal trace line about 1/2 inch above the center of the screen, by varying the VERT POS control (15). Place the DEFL POL switch in its - (minus) position. Check to see that the trace line moves past the center of the screen, and approximately 1/2 inch down.

h. BAND SELECTOR. Set the BAND SELECTOR (5) to band F. This action places the 215 mc to 400 mc frequency range of the r-f oscillator in operation.

i. 20 MC MARKERS. Set the MARKER SELECTOR (25) to the 20 MC position. Vary the MARKER GAIN control (16) to check that marker pips appear on the sweep trace. Set the gain control to obtain a suitable height of marker pips on the display. The interval between adjacent marker pips represents a 20-mc spacing on the trace line.

j. 5 MC MARKERS. Rotate the BAND SELECTOR to band D (75 to 120 mc) or to band E (120 to 215 mc). Rotate the MARKER SELECTOR to the 5 MC position. The interval between adjacent marker pips now represents a 5-mc spacing on the sweep trace.

k. 1 MC MARKERS. Rotate the BAND SELECTOR to band B (25 to 45 mc) or to band C (45 to 75 mc). Rotate the MARKER SELECTOR to the 1 MC position. The interval between adjacent marker pips now represents a 1-mc spacing on the sweep trace.

l. .2 MC MARKERS. Rotate the BAND SELECTOR to band A (15 to 25 mc). Rotate the MARKER SELECTOR to the .2 MC position. The interval between adjacent marker pips now represents a 0.2-mc spacing on the sweep trace.

m. MARKER TUNING. Vary the MARKER TUNING control (26) at any operating sequence in steps i through l, above, to check that marker pips of adequate amplitude are obtainable along the full width of the sweep trace.

n. REMOVING MARKERS. Rotate the MARKER SELECTOR to its OFF position. This action disconnects operating power from the self-contained marker generators. Observe the scope screen to check that no marker pips are now present on the display.

o. The steps outlined above complete the operating check of the power switching, oscilloscope, and

marker-generating circuits within the instrument, when using frequency-modulated operation. Failure to obtain the indications described above requires trouble-shooting, as directed in the applicable Handbook of Service Instructions for this equipment.

3-7. SWEEP GENERATOR LOADING CONSIDERATIONS.

3-8. When using the sweep generator, the external load connected to the instrument should be 50 ohms resistive, for best accuracy of indicated power output. The OUTPUT ATTENUATOR dial has been calibrated by using a 50-ohm load. At the same time, the internal impedance of the sweep generator has been maintained close to 50 ohms. These facts combine to give an accuracy of power level readings within ± 2 decibels, provided a 50-ohm resistive load is used. To obtain the highest accuracy of power level measurements, the standing wave ratio in the line to the load should always be minimized. A sometimes-overlooked factor which contributes error in high-frequency measurements is the improper assembly of coaxial connectors. A standing wave ratio of several db, with attendant error, can often be attributed to this cause. For proper fabrication of r-f cable assemblies, refer to the applicable illustrations in the Handbook of Service Instructions for this equipment.

SECTION IV

EMERGENCY OPERATION

4-1. GENERAL.

4-2. Sweep Generator SG-24/TRM-3 is a calibrated manually-operated instrument; consequently, no meth-

od of operation other than normal is possible. If the equipment fails to function as described in this handbook, refer to the applicable Handbook of Service Instructions for remedial steps to be taken.

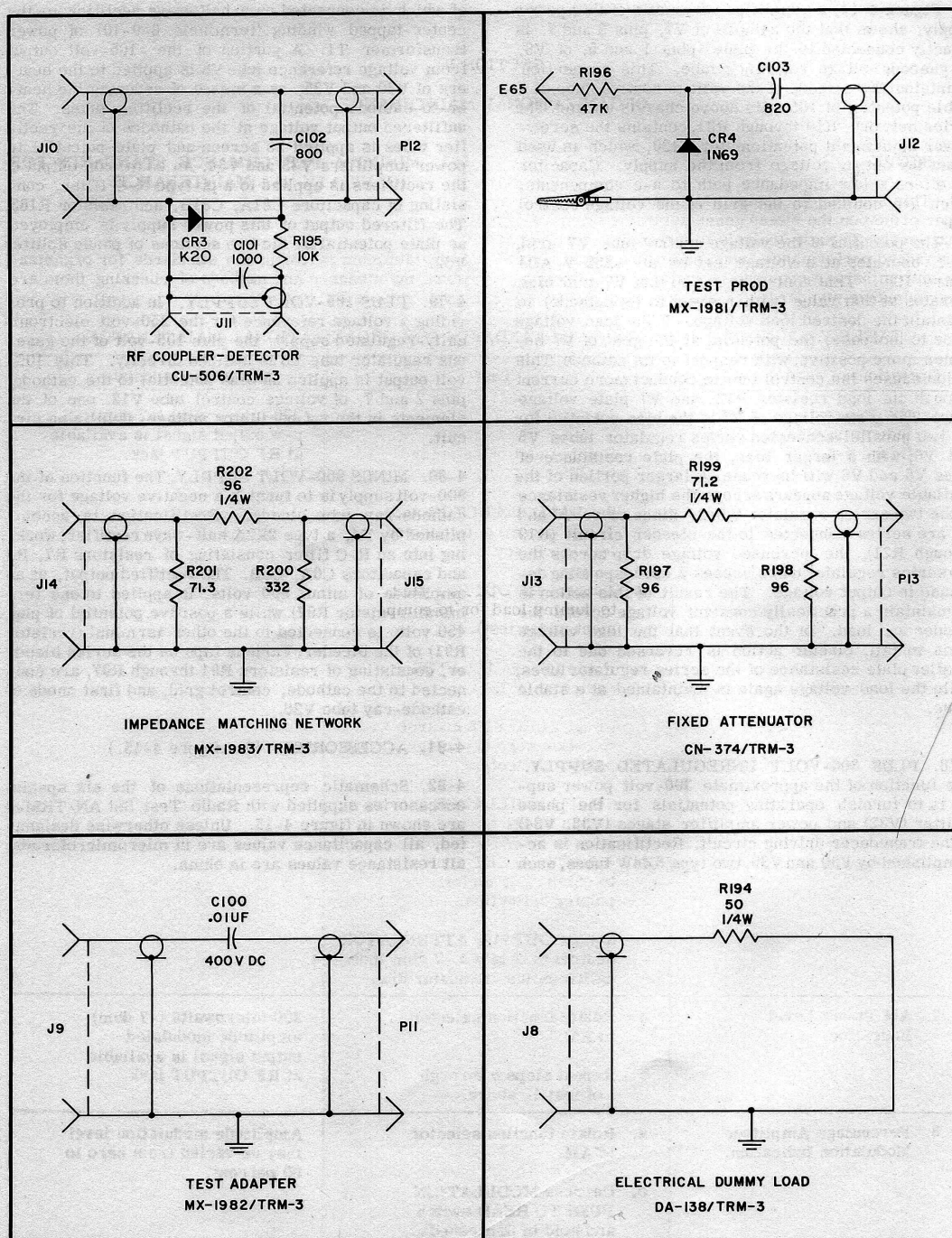


Figure 4-15. AN/TRM-3 Special Accessories, Schematic Diagrams

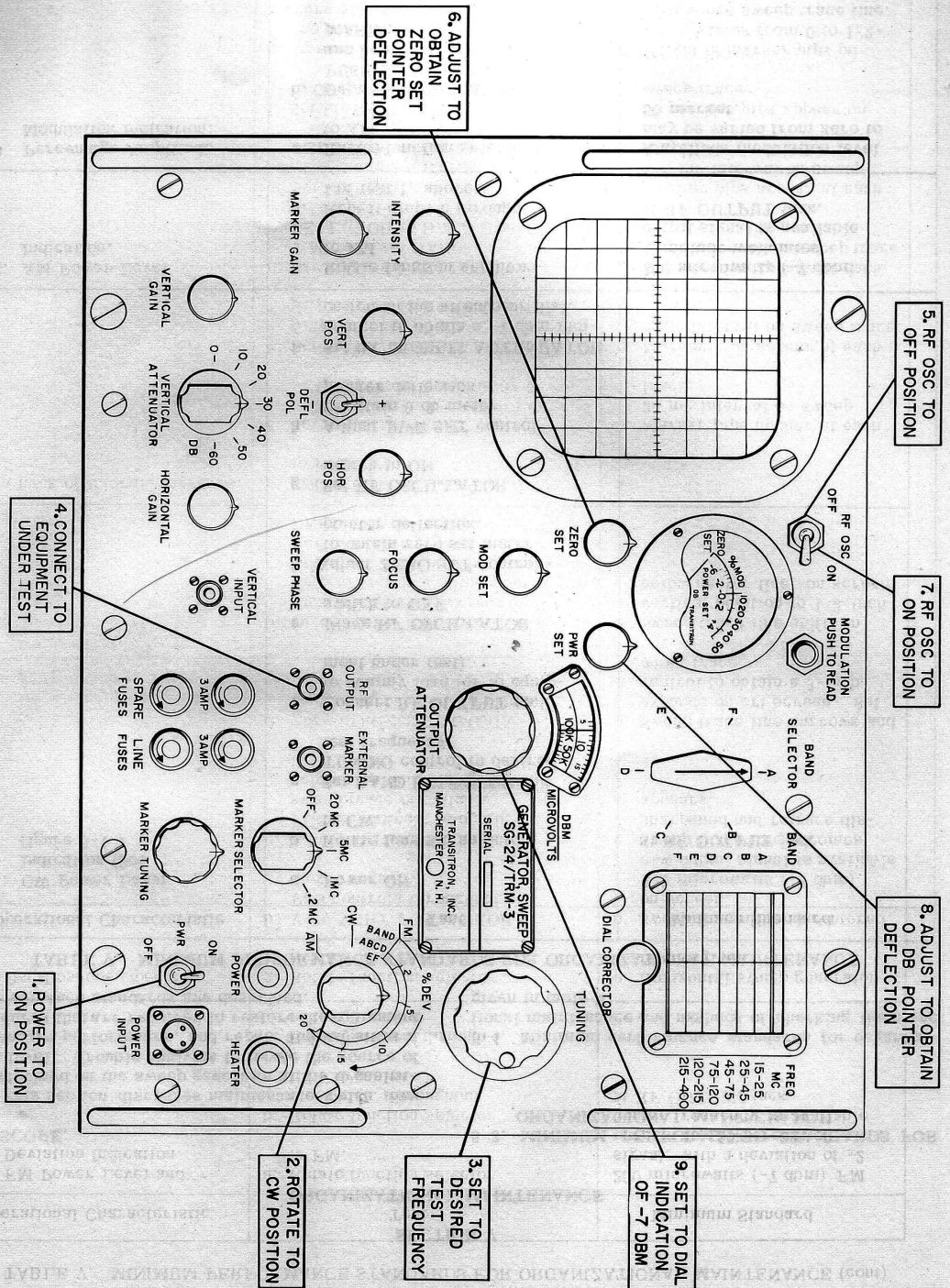


Figure 5-1. Operating Procedure for CW Calibrated Output Signal

(NAVY) NAVWEPS 16-30TRM3-501

(USAF) T.O. 33A1-3-99-1

Handbook

Operation Instructions

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RADIO TEST SET AN/TRM-3

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SECTION I
GENERAL DESCRIPTION

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1-1. SCOPE OF THE HANDBOOK.

1-2. The purpose of this handbook is to present information required for the operation of Radio Test Set AN/TRM-3, a portable test instrument manufactured by Transitron, Inc., Manchester, N.H. and Inland Electronics Corp., Aurora, Ill. A description of the physical and electrical characteristics of the equipment, as well as a brief explanation of its theory of operation, are included in section I of this publication. Procedures to be followed in operating the equipment are detailed in section II. Operational checks, adjustments, and directions for emergency operation are contained in sections III and IV.

1-3. PURPOSE OF THE EQUIPMENT.

1-4. Radio Test Set AN/TRM-3 is designed to provide low-power radio-frequency test signals in the frequency range of 15 to 400 megacycles per second, at a power level within the range of 0.1 microvolt to 100,000 microvolts (equivalent to a range of 7 to 127 db below one milliwatt) when terminated in a 50-ohm

load. The test set provides continuous-wave (c-w), amplitude modulated (a-m) and frequency modulated (f-m) signals having bandwidths from 600 kc to 160 mc, at center frequencies within the range of 15 to 400 mc. These output signals are used for testing, calibrating, aligning, and setting gain adjustments of i-f and r-f tuned circuits. The purpose of the oscilloscope section of the instrument is to display the bandpass curve of the equipment under test, when frequency modulated test signals are utilized. Internally generated marker pips are provided for calibrating the oscilloscope sweep trace line in terms of frequency.

1-5. DESCRIPTION OF THE EQUIPMENT

1-6. MAJOR COMPONENTS. (See figure 1-1.) Radio Test Set AN/TRM-3 consists of Sweep Generator SG-24/TRM-3, Test Set Case CY-1941/TRM-3, with the accessory cables, cords, probes, terminations, and adapters illustrated in figure 1-1 and listed in table I. These components form an operating equipment. No auxiliary equipment is required.

TABLE I. EQUIPMENT SUPPLIED

Qty per Equip.	Name of Unit	Type Designation	Overall Dimensions			Volume	Weight
			Length	Width	Height		
1	Sweep Generator	SG-24/TRM-3	17	17	13-3/16	2.27 ft	66.5
1	Test Set Case	CY-1941/TRM-3	18-3/8	20-1/16	21	4.4 ft	35.0
1	Electrical Power Cable Assembly	CX-3277/U (8 ft 0 in.) (as supplied on Contract NOAs 54-803	96	-	-	-	0.53
	or						
1	Electrical Power Cable Assembly	CX-3135/U (8 ft 0 in.) (as supplied on Contracts N383-45300A) and N383 (19-MIS) 68173A	96	-	-	-	0.53
1	R-f Coupler Detector	CU-506/TRM-3, NOAs 54-803 (on other contracts)	4	3/4	3-1/2	10.5	0.29
			4	3/4	2-5/8	7.8	0.25
1	Impedance Matching Network	MX-1983/TRM-3	3-1/8	3/4	3/4	1.75	0.16
1	Electrical Dummy Load	DA-138/TRM-3	2-1/16	3/4	3/4	1.15	0.09
1	Fixed Attenuator	CN-374/TRM-3	3-3/8	3/4	3/4	1.9	0.16
1	Test Prod	MX-1981/TRM-3	4-11/16	3/4 dia	-	2.6	0.11
1	Test Adapter	MX-1982/TRM-3	4	3/4	3/4	2.25	0.16
2	Cord	CG-409A/U (5 ft 0 in.)	60	-	-	-	0.26
1	Connector Adapter	UG-201/U	1-9/16	3/4 dia	-	-	0.05
1	Connector Adapter	UG-491A/U	1-5/16	9/16 dia	-	-	0.05

Unless otherwise stated, dimensions are in inches, volume is in cubic inches, weight is in pounds.