SIGNAL CORPS
REPAIR STANDARD

NO. REP-1245
ISSUE NO. 1

SPECIFIC STANDARD

FOR

RADIO SET AN/TRC-47

8 October 1959

U. S. ARMY SIGNAL EQUIPMENT SUPPORT AGENCY
FORT MONMOUTH, N. J.

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U. S. ARMY SIGNAL EQUIPMENT SUPPORT AGENCY
FORT MONMOUTH, NEW JERSEY

Signal Corps Repair Standard No. REP-1245 has been prepared under the supervision of the Maintenance Methods Division and is published for the information and guidance of all concerned. Suggestions or criticisms relative to the form, contents, purpose or use of this publication should be referred to U. S. Army Signal Equipment Support Agency, Fort Monmouth, New Jersey. Attn: Chief, Maintenance Methods Division.

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SIGNAL CORPS
REPAIR STANDARD

NO. REP-1245
ISSUE NO. 1
AMENDMENT NO. 4
24 April 1961
This Amendment
Supersedes All
Previous Amendments

SPECIFIC STANDARD
FOR
RADIO SET AN/TRC-47

1. Page 2, Section III, paragraph A.4: Change "Frequency Counter AN/USM-26" to read, "Frequency Meter AN/USM-26."

2. Page 2, Section III, paragraph A.7: add stock number "6625-669-4031."

3. Page 2, Section III, paragraph B.7: delete in its entirety.

4. Page 3, Section IV, paragraph A.3.a: Change to read: "Transmitter, Jump terminals 1 and 2, 3-8 and 10 on J-3."

5. Page 3, Section IV, paragraph A.5: Change to read, "The speaker shall remain connected in the circuit for all tests, with the speaker VOLUME control in full counterclockwise position."

6. Page 4, Section IV, paragraph B.1.a: change to read, "Set R-50 (audio gain control), and the SENSITIVITY control fully clockwise."

7. Page 4, Section IV, paragraph B.1.b. and B.1.c: delete both in their entirety.

8. Page 4, Section IV, paragraph B.1.f: change to read, "- - - and the SQUELCH control in the "OPEN" position."

9. Page 4, Section IV, paragraph B.1.g: change to read, "- - - 30 percent, 1000 cps. Set the generator output to zero, and the SQUELCH coantrol to the "SQUELCH" position."

10. Page 4, Section IV, paragraph B.1.j: add "- - microvolts. (SQUELCH control to "OPEN" position.)"

11. Page 4, Section IV, paragraph B.1.m: change to read, "in k above."

12. Page 5, Section IV, paragraph B.2.a: change to read, "Set R-50 and the SENSITIVITY control fully clockwise and the SQUELCH control to the "OPEN" position."

13. Page 5, Section IV, paragraph B.2.c: change to read, "Apply a 200 microvolts 5.0 mc, modulated at 30 percent by 1,000 cps."

14. Page 5, Section IV, paragraph B.2.h: delete and substitute, "the reading shall be not more than ± 24 kc either side of center frequency."

15. Page 5, Section IV, paragraph B.3.a: change to read, "The SENSITIVITY and R-50 controls shall be set to maximum (fully clockwise)."

16. Page 6, Section IV, paragraph B.4.a: change to read, "The SENSITIVITY and R-50 controls shall be set to maximum (fully clockwise)."

17. Page 6, Section IV, paragraph B.5.A: change to read, "The SENSITIVITY and R-50 controls shall be set to maximum (fully clockwise)."

18. Page 6, Section IV, paragraph B.5.d: change "18 percent" to "25 percent." Also add "NOTE: A receiver operational check shall be performed with a received voice signal. The signal shall be clear and intelligible."

19. Page 7, Section IV, paragraph C.3.c: change to read, "Connect a jumper between terminals 1 and 2 and one between 3, 8 and 10, on plug J-3 (be sure to remove these jumpers when this test is complete)."

20. Page 9, Section IV, paragraph E.4: delete and substitute: "The voltage measured across TP1 and TP2 shall be .1 ± .01 volts (RMS). The voltage across the 600 ohm resistor connected to pins A and B of J1 shall be .01 ± .001 volts (RMS)."

21. Page 9, Section IV, paragraph E.5., E.6., E.7., and E.8: delete and substitute the following:

"5. Connect Frequency Meter AN/USM-26 across TP3 and TP4 (TP4 ground).

6. The frequency meter shall read 800 _ .4 cps."

22. Page 10, Section IV, paragraph F, shall read as follows:

"1. Connect the equipment as follows:

a. Using the frequency counter, measure the frequency of the audio oscillator which shall be 800 ± .4 cycle.

b. Connect the aduio oscillator to pins C and D of P2A, and the Voltmeter ME-30/U across J3 and J4.

c. Disconnect the frequency counter and connect it across TP3 and TP4 (TP4 Ground)

d. The counter shall indicate 800 cps ± 0.4 cycle.

e. The voltage measures across J3 and J4 shall be not less than 18 volts, when measured with the ME-30/U.

23. Page 10, Section IV, paragraph G.2: change to read "Connect a 600 ohm resistor across pins A and B of J-1."

24. Page 11, Fig. B: "Place capacitor in series with the TS-382A/U Oscillator and change 2 uuf to read 2 ufd."

25. Page 12: Delete Figure D in its entirety.

26. Page 13, Fig. E: after "600" add "ohms."

27. Page 13, Fig. f: after "600" add "ohms," delete "Signal Generator AN/USM-26" and substitute "Signal Generator AN/USM-44," also, change "Frequency Counter AN/USM-26" to "Frequency Meter AN/USM-26."

28. Page 14, Fig. H, delete in its entirety.

29. Antenna AS-813/TRC-47. The entire antenna with the exception of electrical and grounding connections shall be refinished with olive drab paint or gray chrome per lates issue of Signal Corps Repair Standard No. REP-1007 as amended.

AWG/deg

SIGNAL CORPS
REPAIR STANDARD

NO. REP-1245
ISSUE NO. 1
AMENDMENT NO. 3
9 February 1961
This Amendment
Supersedes All
Previous Amendments

SPECIFIC STANDARD
FOR
RADIO SET AN/TRC-47

1. Page 2, Section III, paragraph A.4: Change "Frequency Counter AN/USM-26" to read, "Frequency Meter AN/USM-26."

2. Page 2, Section III, paragraph A.7: add stock number "6625-669-4031."

3. Page 2, Section III, paragraph B.7: delete in its entirety.

4. Page 3, Section IV, paragraph A.3.a: change to read, "Transmitter, jump terminals 1 and 2, 3-8 and 10 on J-3."

5. Page 3, Section IV, paragraph A.5: Change to read, "The speaker shall remain connected in the circuit for all tests, with the speaker VOLUME control in full counterclockwise position."

6. Page 4, Section IV, paragraph B.1.a: change to read, "Set R-50 (audio gain control), and the SENSITIVITY control fully clockwise."

7. Page 4, Section IV, paragraph B.1.b. and B.1.c: delete both in their entirety.

8. Page 4, Section IV, paragraph B.1.f: change to read, "- - - and the SQUELCH control in the "OPEN" position."

9. Page 4, Section IV, paragraph B.1.g: change to read, "- - - 30 percent, 1000 cps. Set the generator output to zero, and the SQUELCH control to the "SQUELCH" position."

10. Page 4, Section IV, paragraph B1.j: add "- - microvolts. (SQUELCH control to "OPEN" position.)

11. Page 4, Section IV, paragraph B.1.m: change to read, "in k above."

12. Page 5, Section IV, paragraph B.2.a: change to read, "Set R-50 and the SENSITIVITY control fully clockwise and the SQUELCH control to the "OPEN" position."

13. Page 5, Section IV, paragraph B.2.c: change to read, "Apply a 200 microvolts 5.0 mc, modulated at 30 percent by 1,000 cps."

14. Page 5, Section IV, paragraph B.2.h: delete and substitute,"The reading shall be not more than ± 20 kc either side of center frequency."

15. Page 5, Section IV, paragraph B.3.a: change to read, "The SENSITIVITY and R-50 controls shall be set to maximum (fully clockwise)."

16. Page 6, Section IV, paragraph B.4.a: change to read, "The SENSITIVITY and R-50 controls shall be set to maximum (fully clockwise)."

17. Page 6, Section IV, paragraph B.5.A: change to read, "The SENSITIVITY and R-50 controls shall be set to maximum (fully clockwise)."

18. Page 6, Section IV, paragraph B.5.d: change "18 percent" to "25 percent." Also add "NOTE: A receiver operational check shall be performed with a received voice signal. The signal shall be clear and intelligible."

19. Page 7, Section IV, paragraph C.3.c: change to read, "Connect a jumper between terminals 1 and 2 and one between 3, 8 and 10, on plug J-3 (be sure to remove these jumpers when this test is complete)."

20. Page 9, Section IV, paragraph E.4: delete and substitute: "The voltage measured across TP1 and TP2 shall be .1 ± .01 volts (RMS). The voltage across the 600 ohm resistor connected to pins A and B of J1 shall be .01 ± .001 volts (RMS)."

21. Page 9, Section IV, paragraph E.5., E.6., E.7., and E.8: delete and substitute the following:

"5. Connect Frequency Meter AN/USM-26 across TP3 and TP4 (TP4 ground).

6. The frequency meter shall read 800 ± .4 cps."

22. Page 10, Section IV, paragraph F.1, F.2, F.3, and F.4: delete and substitute the following:

"1. Connect the equipment as shown in Fig. D (as amended).

2. Hold switch S1 in the RECEIVE position.

3. The output at J-3 and J-4 shall be not less than 18 volts."

23. Page 10, Section IV, paragraph G.2: change to read "Connect a 600 ohm resistor across pins A and B of J-1."

24. Page 11, Fig. B: Place capacitor in series with the TS-382A/U Oscillator and change 2 uuf to read 2 ufd."

25. Page 12, Fig. D: below "J3" add "J4," also delete, "Frequency Meter AN/USM-26 and Audio Oscillator TS-382A/U."

26. Page 13, Fig. E: after "600" add "ohms."

27. Page 13, Fig. F: after "600" add "ohms," delete "Signal Generator AN/USM-26" and substitute "Signal Generator AN/USM-44," also, change "Frequency Counter AN/USM-26" to "Frequency Meter AN/USM-26."

28. Page 14, Fig. H, delete in its entirety.

AMG;deg

P R E F A C E

Signal Corps Repair Standards (formerly Signal Corps Repaired Equipment Requirements) are prepared by the Maintenance Methods Division, Maintenance Engineering Department, Signal Equipment Support Agency, and cover various items of signal equipments which are subject to repair, test and inspection. These repair standards are documents which set forth the specific repair requirements and test standards to be applied to the individual equipments being repaired and tested.

Signal Corps Repair Standards are prepared for, and their use is mandatory by, fifth echelon Signal Repair Shops in the Continental United States, in determining the quality and acceptability of repaired signal equipments covered by these standards. The use of Signal Corps Repair Standards is also recommended as a guide and reference for any other agency having occasion to repair, test or inspect an item of signal equipment for which a repair standard has been prepared.

Army, Ft. Monmouth, NJ-MON2836-56

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SPECIFIC STANDARD
FOR
RADIO SET AN/TRC-47

I. STATEMENT COVERING APPLICABILITY

This Specific Standard covers inspection requirements to be used in determining the quality and acceptability of repaired Radio Set AN/TRC-47.

II. APPLICABLE REFERENCES

A. Repair Standard: Applicable paragraphs of Signal Corps Repair Standard No. REP-1001, General Standards for Repaired Signal Equipment, forms a part of this Standard.

B. Technical Publications: The following Technical Publications are applicable to this equipment:

	Title	Number	Date
1.	Radio Set AN/TRC-47	TM 11-212-10	
2.	Radio Set AN/TRC-47	TM 11-212-20	
3.	Radio Set AN/TRC-47	TM 11-212-35	

C. Modification Work Orders: All applicable Modification Work Orders pertaining to this equipment shall be performed.

III. TEST AND ADDITIONAL EQUIPMENT

The following equipments, or suitable equivalents, will be employed in determining compliance with the requirements of this Specific Standard.

A. Test Equipment	Stock No.	Quan.	REP
1. Analyzer, Spectrum TS-723/U	6625-668-9418	1	1192
2. Audio Oscillator TS-382/U	6625-192-5094	1	1135
3. Electronic Multimeter TS-505/U	6625-243-0562	1	
4. Frequency Counter AN/USM-26	6625-692-6553	1	
5. Oscilloscope OS-8A/U	6625-568-4898	1	
6. R.F.Wattmeter AN/URM-43	6625-635-9186	1	
7. Signal Generator AN/USM-44		1	
8. Voltmeter Meter ME-30A/U	6625-669-0742	1	1117
9. Test Set R.F.Power AN/USM-101		1	

B. Additional Equipment	Stock No.	Quan.	REP
1. Adapter, RF UG-28A/U		1	
2. Cable RG-8A/U		2 ft	
3. Capacitor 2 mfd		1	
4. Converter CV-542( )/TRC-47		2	
5. Plug PL-68		1	
6. Receiver R-748()/TRC-47		2	
7. Resistor, 4 ohm 5w		1	

B. Additional Equipment (Cont'd)	Stock No.	Quan.	REP
8. Telephone Set TA-43/PT		2	--
9. Transmitter T-593( )/TRC-47		2	-
10. Resistor 600 ohms 1w		1	-
11. Resistor 1500 ohms 1w		1	-

IV. REQUIREMENTS

A. General Test Conditions: All tests shall be conducted under the following conditions:

1. All tests shall be conducted in a screen room.

2. Line voltage shall be 117 volts ± 5%.

3. Jumper connections are necessary at terminals of receiver and transmitter in order to operate the components separately. No jumper connections are necessary for individual operation of the converter. Jumper connections shall be made as follows:

a. Transmitter, jump terminals 1 and 2, 3 and 10 on J-3.

b. Receiver, jump connections as indicated on Figure 54, TM 11-212-35, for Receiver R-748( )/TRC-47.

4. The SQUELCH-OPEN switch shall be in the "OPEN" position unless otherwise specified.

5. The speaker shall be disconnected and the 4 ohm output terminated into a 4 ohm 5 watt non-inductive load.

6. The 600 ohm output shall be terminated at pins 1 and 2 of Connector J3A with 600 non-inductive load.

7. Receiver and transmitter test frequencies should be the same and set to available crystals within 5 mc of each end of band.

B. Tests (Radio Receiver R-748/TRC-47)

1. AM Sensitivity

a. Set the volume control fully clockwise.

b. Set the squelch switch in "OPEN" position.

c. Terminate the 4 ohm output into a 4 ohm 5 watt resistor.

d. Connect the Voltmeter ME-30A/U across the 600 ohm resistor, output load.

e. Connect the Signal Generator AN/USM-44 to the R.F. Input (J1).

f. Set the receiver to a frequency on the high side of 132 mc but not more than 5 mc away (depending on crystal used) and the SQUELCH control in "SQUELCH" position.

g. Tune the signal generator to the receiver frequency, modulated 30 percent, 1000 cps with "0" output.

h. Increase the input signal level until squelch opens, as indicated by the front panel lights (STD BY light goes out, REC light goes on).

i. Record the input in microvolts, which shall be not more than 7.25 microvolts.

j. Set the R.F. Output to 4.5 microvolts.

k. Record the output on the ME-30A/U (db).

l. Turn modulation off and record the db output of the receiver.

m. This reading shall be not less than 10 db below the reading obtained in 1 above.

n. Retune the receiver to a frequency below 150 mc but not more than 5 mc away (depending on the crystal used) and apply the same frequency modulated 30 percent 1000 cps.

o. Repeat h through l above.

p. The difference shall be not less than 10 db.

2. Selectivity.

a. Set the volume control clockwise, SQUELCH control "OPEN".

b. Connect Signal Generator AN/USM-44 to pin 7 of tube V5, Fig. F, and the ME-30A/U across a 600 ohm output load resistor.

c. Apply a 200 microvolts 20.7 mc, modulated at 30 percent by 1,000 cps.

d. Adjust the frequency of the signal generator until maximum audio output is indicated, and record the output level.

e. Increase the output signal level to 400 microvolts.

f. Detune the signal generator (+ kc) until the receiver audio output returns to the same level as in d above. Record the + kc reading from the frequency counter (AN/USM-26).

g. Detune the signal generator (-kc) until the output returns to the same level as in d above. Record the -kc reading of the frequency counter.

h. The reading shall be at least ± 20 kc either side of center frequency.

i. Increase the signal generator output level to 100,000 microvolts and repeat f and g above.

j. The reading shall not exceed ± 120 kc either side of center frequency.

3. Automatic Gain Control

a. All controls shall be set to maximum (fully clockwise).

b. Connect the Signal Generator AN/USM-44 to the RF Input (J1), Figure E.

c. Connect the Voltmeter ME-30A/U across the 600 ohm output load resistor.

d. Tune the Signal Generator to same frequency as Receiver, (paragraph IV.B.1.f) modulated 30 percent at 1000 cps.

e. Adjust the input signal level to 5 microvolts.

f. The audio output power shall not increase more than 2 db as the RF input voltage is increased from 5 microvolts to 100,000 microvolts.

4. Maximum Output

a. All controls shall be set to maximum (fully clockwise).

b. Connect the Signal Generator AN/USM-44 to the RF input (J1).

c. Tune the generator and receiver to any frequency of the receiver spectrum.

d. Connect the Voltmeter ME-30A/U across the 600 ohm output load resistor.

e. Apply a 5 microvolt RF signal at the receiver operating frequency, modulated 30 percent at 1,000 cps.

f. The output shall be not less than 23 volts as indicated on the voltmeter.

5. Distortion

a. All controls shall be set to maximum (fully clockwise).

b. Connect the Signal Generator AN/USM-44 to the RF input (J1), Figure G.

c. Connect the Analyzer, Spectrum TS-723/U across a 600 ohm output load resistor.

d. With a RF input signal of not more than 15 microvolt, modulated 30 percent at 1000 cps, the distortion shall be not more than 18 percent.

C. Tests (Radio Transmitter T-593( )/TRC-47.) Equipment shall be setup as shown in Figure A.

1. Frequency Range

a. Connect RF Wattmeter AN/URM-43A to transmitter output at J-1.

b. Tune the transmitter to a frequency on the high side of 132 mc but not more than 5 mc away (depending upon crystal use.)

c. Set the "Coupline" adjustment to read between 9 and 10 on the coupling scale. Tune "PWR AMP" Control C-26 for minimum deflection on "Tuning Meter" with "Meter Switch" in PA IP position. Readjust "Coupling" control to get 5 watts indication on AN/URM-43A. Tune the ANT TUNING for maximum output. If output exceeds 5 watts, turn OUTPUT (R25) control counter-clockwise until the reading is 5 watts.

d. The power output shall be not less than 4 watts and not more than 5 watts.

e. Tune the transmitter to a frequency below 150 mc but not more than 5 mc away from that frequency. (depending upon crystal used.)

f. Repeat "c" above.

g. The power output shall be not less than 4 watts or more than 5 watts.

2. Power Output. The power output shall be not less than 4 watts or greater than 5 watts at any frequency tested.

3. Modulation Capabilities

a. Equipment shall be connected as shown in "B". The transmitter shall have an output of 5 watts.

b. To inject the audio signal, leads from the audio oscillator should be connected to the ring and sleeve of the PL-68 plug through a 2 mfd capacitor; the plug then inserted into the MIC jack.

c. Connect terminals on plug J-3 with a jumper (be sure to remove this jumper when this test is finished.) terminals 1 and 2.

d. Feed a 300 cps signal into MIC input circuit from the TS-382/U.

e. Adjust the output level of the audio oscillator until -20 dbm (.07 volts rms across 600 ohms) can be read on the meter on the ME-30A/U.

f. Observe the modulation envelope on an oscilloscope. The transmitter shall be capable of being modulated 100% troughs of the envelope approach the center line, 100% modulation is indicated.

g. The transmitter MOD GAIN control shall be adjusted and left at a point just below 100% modulation. The transmitter, however, shall be capable of producing 100% modulation.

h. Set the audio oscillator in turn to 1000, 2000, 3000 and 4000 cps and repeat f and g above.

i. Tune the transmitter to the frequency used in paragraph C.1.e and with an output of 5 watts, repeat e through h.

D. Transmitter Operational Check

1. Connect transmitter as shown in Figure A.

2. Tune PWR AMP control on transmitter for maximum indication on the Wattmeter AN/URM-43.

3. Adjust ANT TUNING to increase the reading if possible.

4. The reading shall be not less than 4 watts or more than 6 watts.

5. Place an auxiliary receiver tuned to the transmitter frequency some distance from the transmitter. The transmitter signal shall be clear, undistorted, and free of objectional hum, noise, or interaction when the transmitter is adjusted for a modulation percentage between 80-95.

6. Visual tuning indicators shall function properly.

7. All controls and relays shall work smoothly; positive electrical contact shall be provided at all points where such contact should be.

E. Tests (Telephone Signal Converter CV-542/TRC-47) The converter shall be set up as shown in Figure C.

1. With Switch S1 in the OPERATE position.

2. Turn "ON" the 117 volts ac to the converter, allow five (5) minutes to warm-up.

3. Crank the hand generator of the telephone set at a speed of approximately 200 rpm and observe the reading on the Voltmeter ME-30A/U.

4. The voltage when measured across A and B of P2 shall be .01 volts (RMS).

5. Connect the converter as shown in Figure D.

6. Adjust the audio oscillator for an output frequency of 800 cps $\pm$ .4 cycle. (It will be necessary to select the 10 sec. gate time in order to obtain above accuracy.)

7. Adjust the output of the audio oscillator until the Voltmeter ME-30/U reads .1 volts ac.

8. The output at J3 and J4 shall be not less than 25 volts when measured on the ME-30A/U.

F. 800 Cycle Oscillator Test

1. Connect the equipment as shown in Figure H.

2. Adjust the audio oscillator for "zero beat", with the converter as indicated by a circle on the oscilloscope with function switch (S1) in the TRANSMIT position.

3. Using the frequency counter, measure the frequency of the audio oscillator.

4. The counter shall indicate 800 cycles ± 0.4 cycle.

G. Hybrid Circuit Test

1. Connect the Voltmeter ME-30A/U to TP1 and TP2.

2. Connect a 600 ohm resistor across TP1 and TP2.

3. Hold switch S1 in the RECEIVE position and adjust R4 for minimum reading.

4. It shall be possible to adjust the voltage to 0.08 volts or less.

H. Operational System Check

1. To make performance checks on the overall set, a complete radio link consisting of two (2) Radio Sets AN/TRC-47 are required. (One complete set to be used at test position; one complete set to be used at a removed or remote position for netting) consisting of:

a. Antenna AS-813/TRC-47 w/cables.

b. Transmitter T-593( )/TRC-47.

c. Converter CV-542( )/TRC-47.

d. Receiver R-748( )/TRC-47.

e. Telephone Set TA-43/PT.

f. Test Set R.F. Power AN/USM-101.

2. The R.F. Wattmeter shall be connected between the transmitter and antenna to sample power output or reflected power. The reflected power shall be no greater than 10 percent of the forward power.

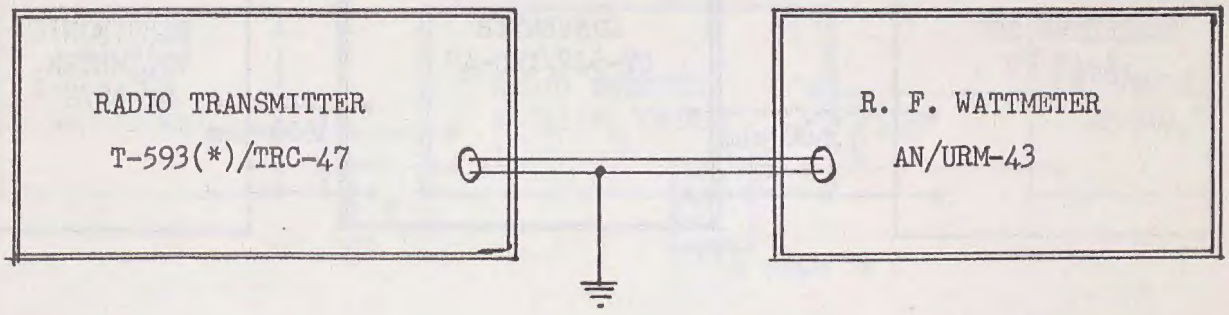


FIGURE A

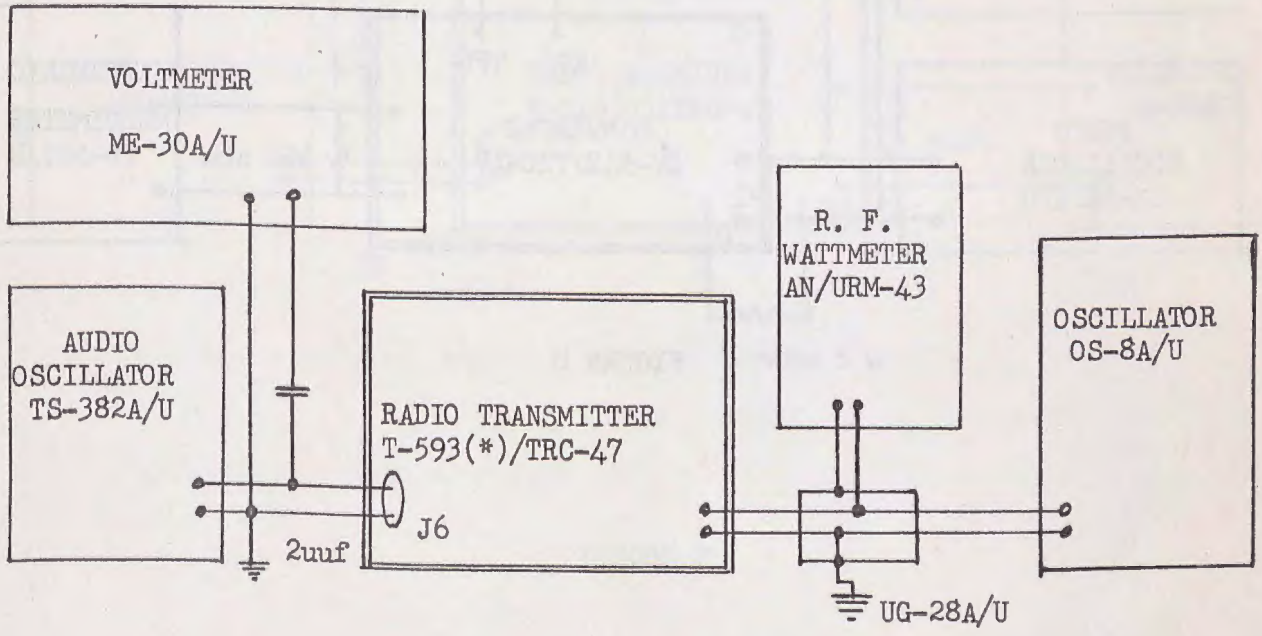
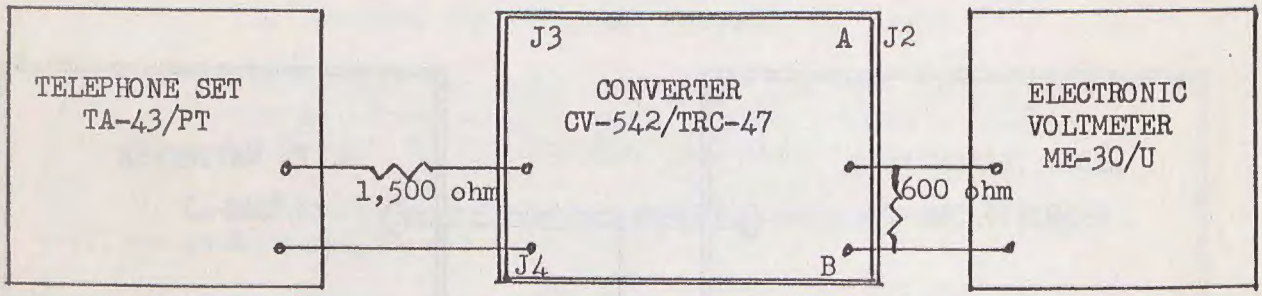


FIGURE B



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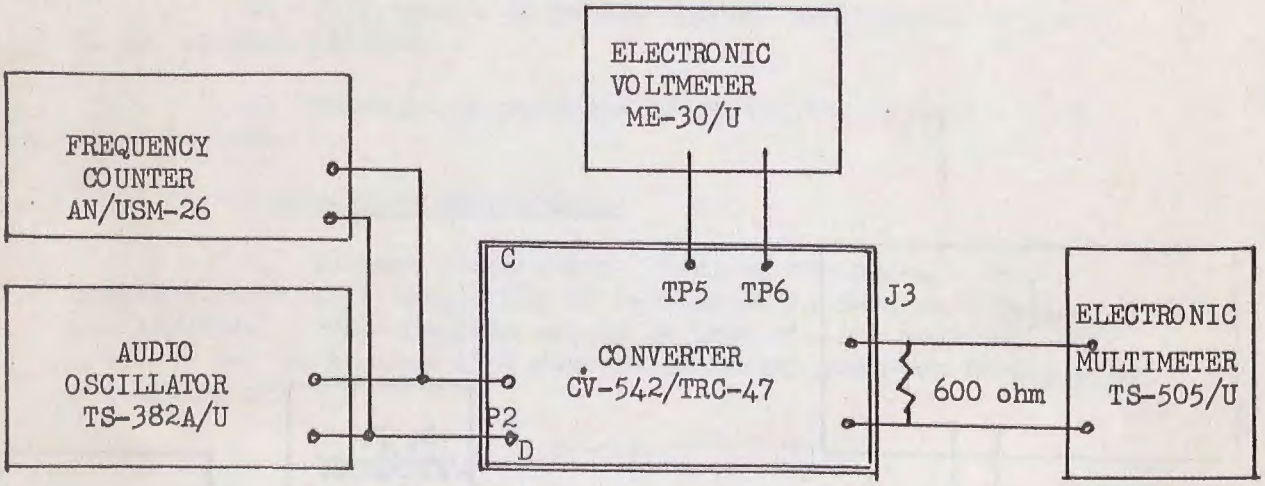

FIGURE D

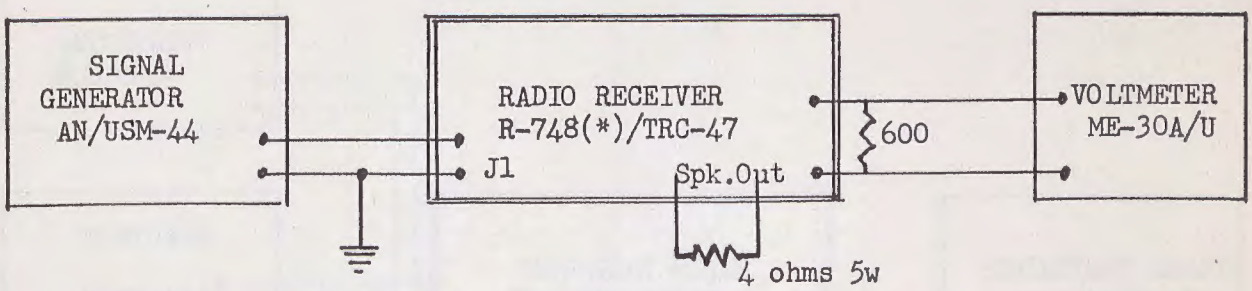

FIGURE E

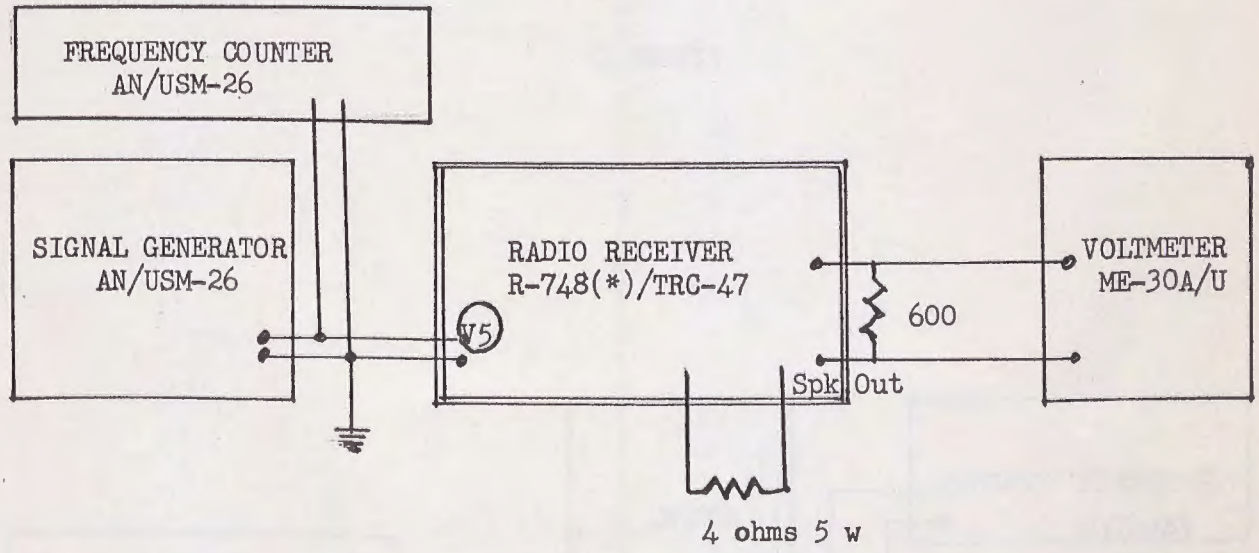

FIGURE F

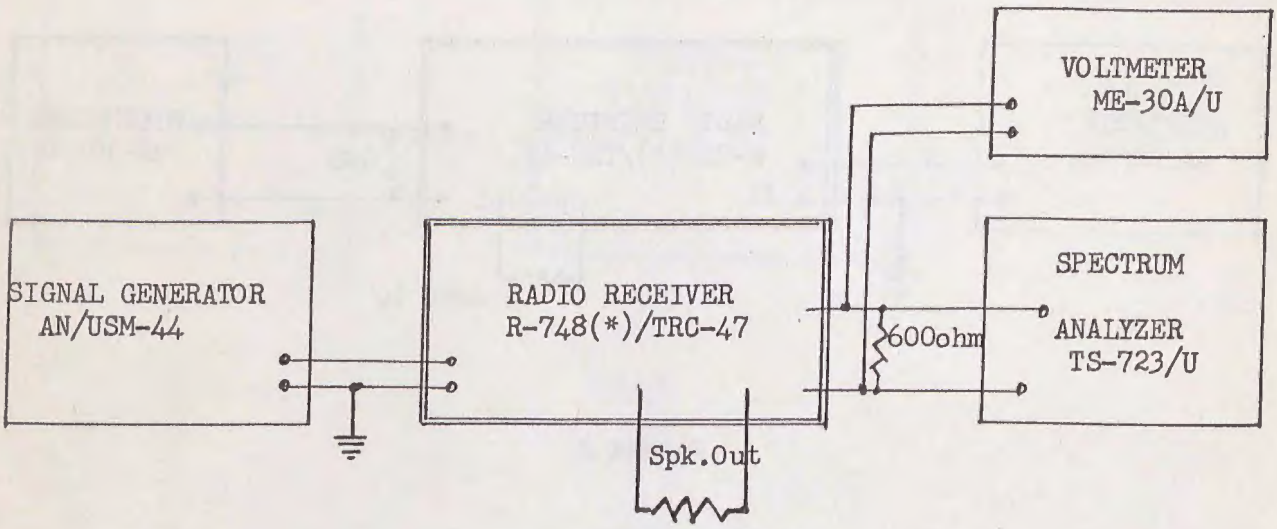

FIGURE G

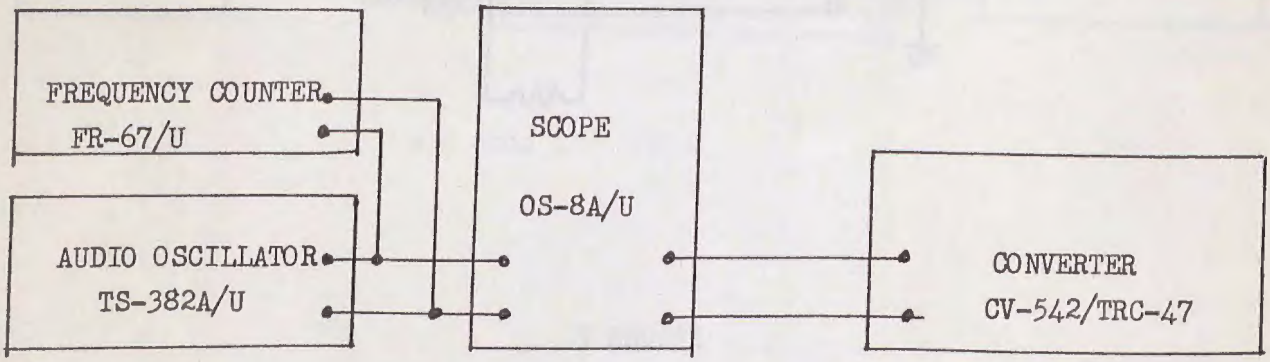

FIGURE H

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