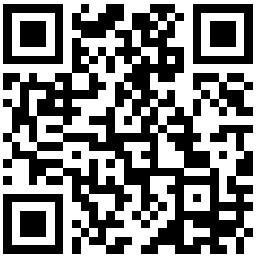

TM 11-487H

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

DIRECTORY OF SIGNAL CORPS EQUIPMENTS

TEST EQUIPMENT

DEPARTMENT OF THE ARMY • MARCH 1951

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

TM 11-487H

This manual supersedes so much of TM 11-487, 2 October 1944, as pertains to test equipment.

DIRECTORY OF SIGNAL CORPS EQUIPMENTS

TEST EQUIPMENT

DEPARTMENT OF THE ARMY • *APRIL 1951*

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J. LAWTON COLLINS
Chief of Staff, United States Army

OFFICIAL:
EDWARD F. WITSELL
Major General, USA
The Adjutant General

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FOREWORD

This is the eighth of a series of nine separate manuals, each covering the standard, substitute standard, and limited standard Signal Corps equipments in a particular field. The nine manuals cover, respectively, radio communication equipment, wire communication equipment, ground radar and recognition equipment, radio direction finding equipment, power equipment, photographic equipment, meteorological equipment, test equipment, and miscellaneous equipment.

This manual covers the principal items of test equipment. Items of equipment are presented in alpha-numerical sequence by type numbers. When the type number is known, use the Contents to find the page on which the equipment is illustrated and described. When the type number is unknown, it may be found in the Index, which is arranged alphabetically by nomenclature.

An illustration and the following applicable information are given for each item of equipment listed: nomenclature, status, Signal Corps stock number, technical manual reference, description, application, technical characteristics, principal components, and weights and dimensions.

The following abbreviations are used in this manual:

ac	alternating current
af	audio frequency
am	amplitude modulation
amp	ampere
C	centigrade
cps	cycles per second
CRT	cathode-ray tube
cu ft	cubic feet
cw	continuous wave
db	decibel
dbm	decibels referred to 1 milliwatt in 600 ohms
dc	direct current
diam	diameter
F	Fahrenheit
fm	frequency modulation
freq	frequency
ft	feet
h	henry
hf	high frequency
hr	hour
in	inch
i. f	intermediate frequency
kc	kilocycle
kw	kilowatt
lb	pound
ma	milliampere
mc	megacycle
meg	megohm
μa	microampere
μf	microfarad
μuf	micromicrofarad
μv	microvolt
μw	microwatt
μsec	microsecond
mh	millihenry
mi	mile
min	minute
mv	millivolt
mw	milliwatt
opm	operations per minute
prf	pulse repetition frequency
p/o	part of
rf	radio frequency
rms	root mean square
sec	second
uhf	ultrahigh frequency
u/w	used with
v	volt
vf	voice frequency
vhf	very-high frequency
VTVM	vacuum-tube voltmeter
vu	volume unit
w	watt
yd	yard

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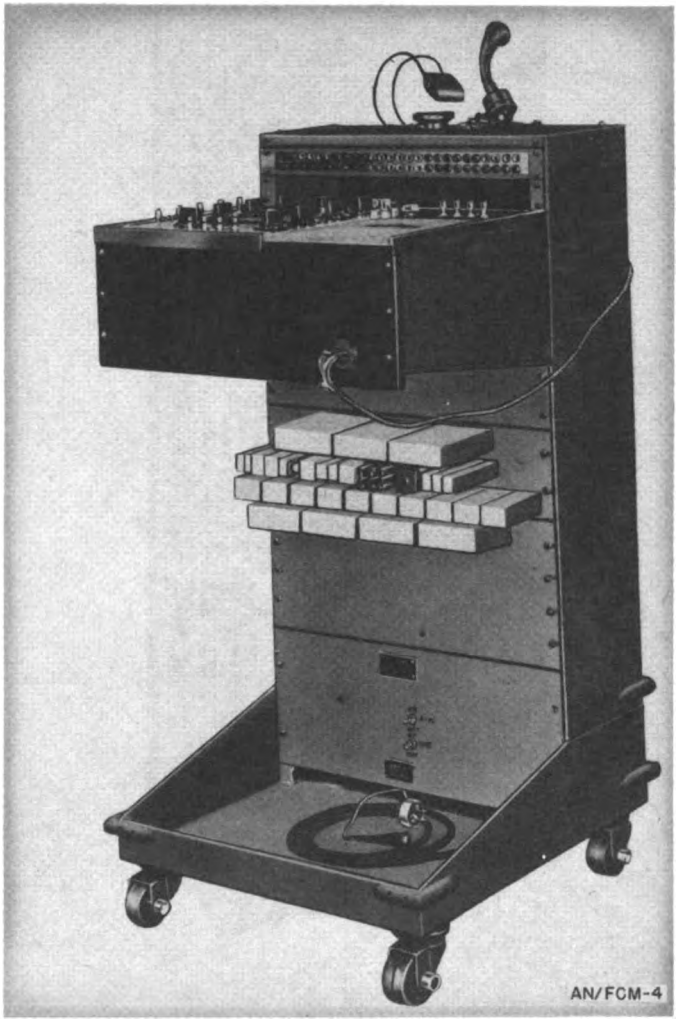


Figure 1. Test Set AN/FCM-4.

Status: Limited/Std. *Stock No.:* 3F4472. *Reference:* TM 11-2033.

Test Set AN/FCM-4 is a wire chief's and maintenance man's mobile test board, consisting of a telephone set, a volt-milliammeter, a 4-cycle pole changer, a Wheatstone bridge, and a power supply panel. All necessary patching cords, plugs, and tools are included with the equipment. Test Set AN/FCM-4 is used to maintain open-wire lines and cable circuits. It is also used to analyze troubles, such as grounds, shorts, and opens in any wire circuit.

TECHNICAL CHARACTERISTICS

RANGES:
- 0 to 150 v.
- 0 to 150 ma.
- .001 ohms to 10 meg.

POWER:
- Input—105 to 125 v, ac, 50 to 60 cps.
- Output—
  - 45 and 150 v, dc.
  - 6, 45, and 180 v, dc.
  - 24 v, talking battery supply
  - 24 v, ac.

WEIGHTS AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	45 x 21 x 24	378	12. 6
Export pack		605	20

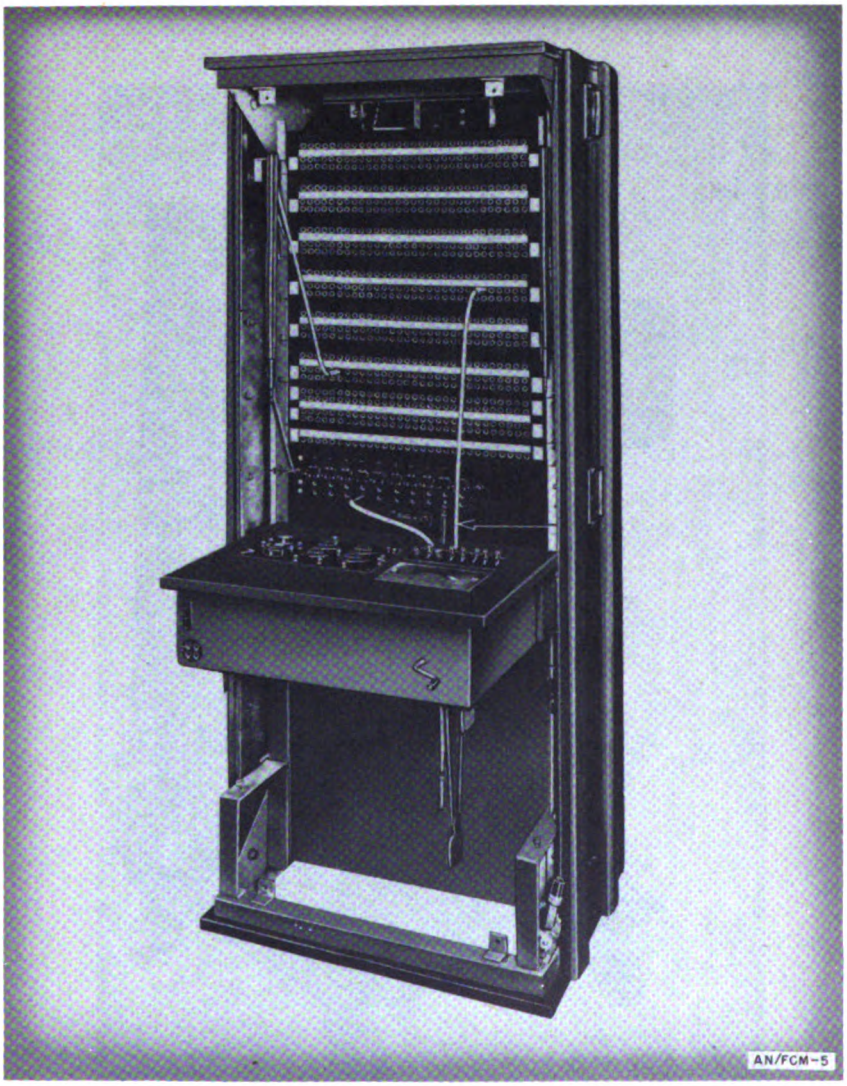


Figure 2. Test Set AN/FCM-5.

Status: Limited/Std. *Stock No.:* 3F4481. *Reference:* TM 11-2030.

Test Set AN/FCM-5 is a part of the packaged telephone and telegraph equipment for fixed plant use. The test equipment consists of test jacks, and a key shelf which includes a telephone set, a volt-milliammeter, and a Wheatstone bridge. All necessary cords and plugs are included with the equipment. Test Set AN/FCM-5 is used to restore service on telephone and telegraph lines which have become inoperative because of grounds, shorts, crosses, and opens on the lines. It may be used as line-testing equipment to supplement the portable test sets provided with the various packaged equipments. Means are provided for patching between line and drop equipment to restore service quickly on faulty circuits.

TECHNICAL CHARACTERISTICS

RANGES:
0 to 150 ma.
50 ohms to 6 meg.

JACK UNITS:
180 three-jack circuits, 60 two-jack circuits, and 26 miscellaneous jacks.

POWER:
Battery operated—3 Batteries BA-23.

WEIGHTS AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	68 x 29 x 28	525	32
Export pack	----------	850	34. 5

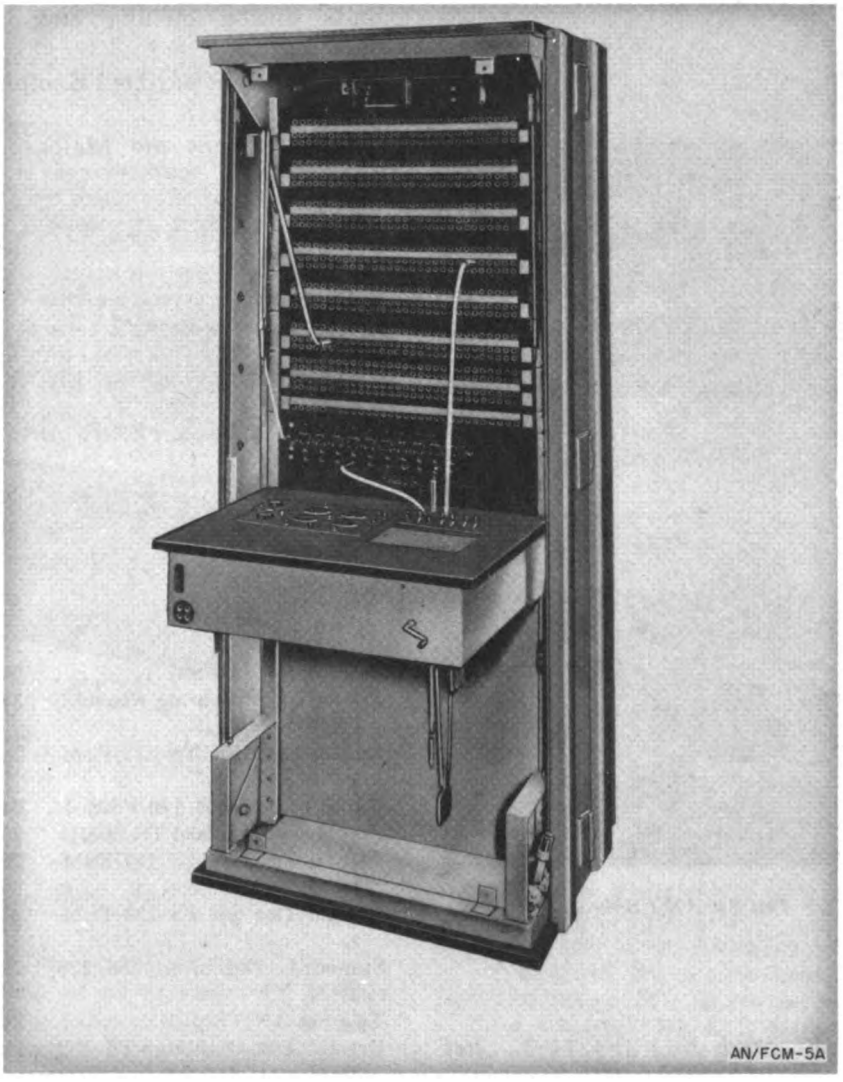


Figure 3. Test Set AN/FCM-5A.

Status: Limited/Std. *Stock No.:* 3F3965–5A. *Reference:* TM 11–2030.

Test Set AN/FCM–5A is a part of the packaged telephone and telegraph equipment for fixed-plant use. The test equipment consists of test jacks, and a key shelf which includes a telephone set, a volt-milliammeter, and a Wheatstone bridge. All necessary cords and plugs are included with the equipment. Test Set AN/FCM–5A is used to restore service on telephone and telegraph lines which have become inoperative because of grounds, shorts, crosses, and opens on the lines. It may also be used as line testing equipment to supplement the portable test sets provided with the various packaged equipments. Means are provided for patching between the line and drop equipment to restore service quickly on faulty circuits. Test Set AN/FCM–5A is the same as Test Set AN/FCM–5, except that it is equipped with simplex coils.

TECHNICAL CHARACTERISTICS

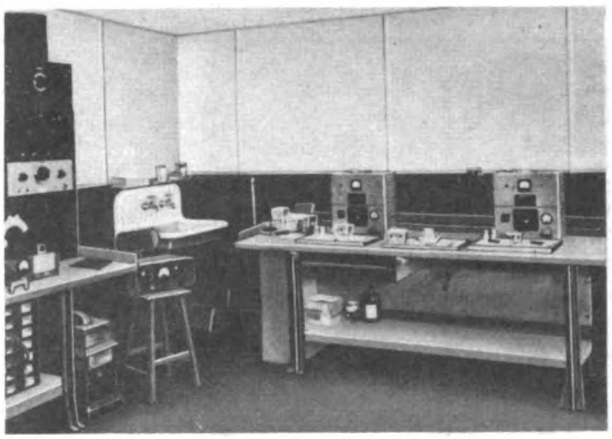
RANGES:
0 to 150 ma.
50 ohms to 6 meg.

JACK UNITS:
180 three-jack circuits, 60 two-jack circuits, and 26 miscellaneous jacks.

POWER:
Battery operated—3 Batteries BA–23.

WEIGHTS AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	68 x 29 x 28	700	32
Export pack	----------	1, 025	34. 5



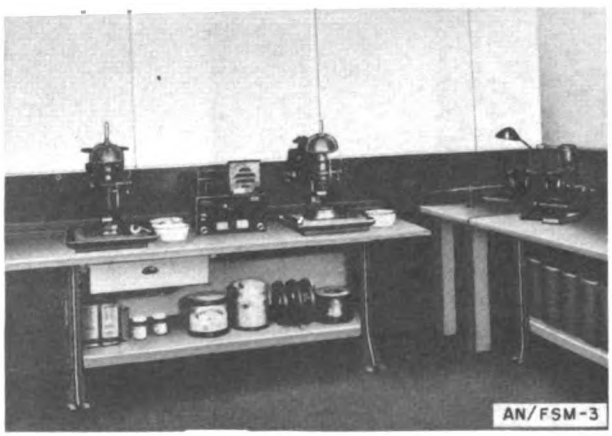


Figure 4. Test Set AN/FSM-3.

Status: Standard. *Stock No.:* 3F4314-3. *Reference:* TM 11-2606.

Test Set AN/FSM-3 is an assembly of test equipments consisting of crystal test sets, test meters, a meter set, a frequency standard, an oscilloscope, and a radio receiver. All necessary cables and couplings are included with the equipment. Test Set AN/FSM-3 is basic depot test equipment for use in testing and calibrating crystal units during etching and lapping and after finishing.

U/w but not p/o Tool Equipment TK-40/FSM-3.

U/w but not p/o Maintenance Kit MK-40/FSM-3.

TECHNICAL CHARACTERISTICS

RANGES:
0 to 5 ma, dc, crystal activity.
0 to 30 mc; frequency standard.
−40 to +90° C.; crystal operating test range.

FUNDAMENTAL FREQUENCIES: 10, 50, and 100 kc; frequency standard.

INPUT VOLTAGE PER IN. OF DEFLECTION:
.3 v, X-axis.
.5 v, Y-axis.

POWER: 110 v, ac, 60 cps.

PRINCIPAL COMPONENTS [1]

Item	*Dimensions (in.)*	*Weight (lb)*
Crystal Test Set TS-314/FSM-1.	22 x 13 x 13	64
Oscillator 0-14/FSM-1	24 x 18 x 13	94
Frequency Measuring Assembly CY-93/FSM-1.	34 x 19 x 38	126
Audio Oscillator TS-312/FSM-1.	24 x 13 x 10	60
Radio Receiver R-140/FSM-1	24 x 18 x 13	75
Frequency Standard TS-308/U	26 x 21 x 16	123
Crystal Test Set TS-137/FSM-1.	26 x 14 x 12	74
Crystal Test Set TS-139/FSM-1.	26 x 14 x 12	74
Standard Oscillator TS-220/TSM.	23 x 11 x 17	68
Test Set AN/TSM-1	24 x 12 x 17	-------
Crystal Test Oscillator TS-412/TSM.	23 x 12 x 17	-------

PACKED WEIGHT AND VOLUME [2]

	Total weight (lb)	*Total volume (cu ft)*
Export pack	10, 650	520

[1] For component in export packages.
[2] Includes AN/FSM-3, TK-40/FSM-3, and MK-40/FSM-3.

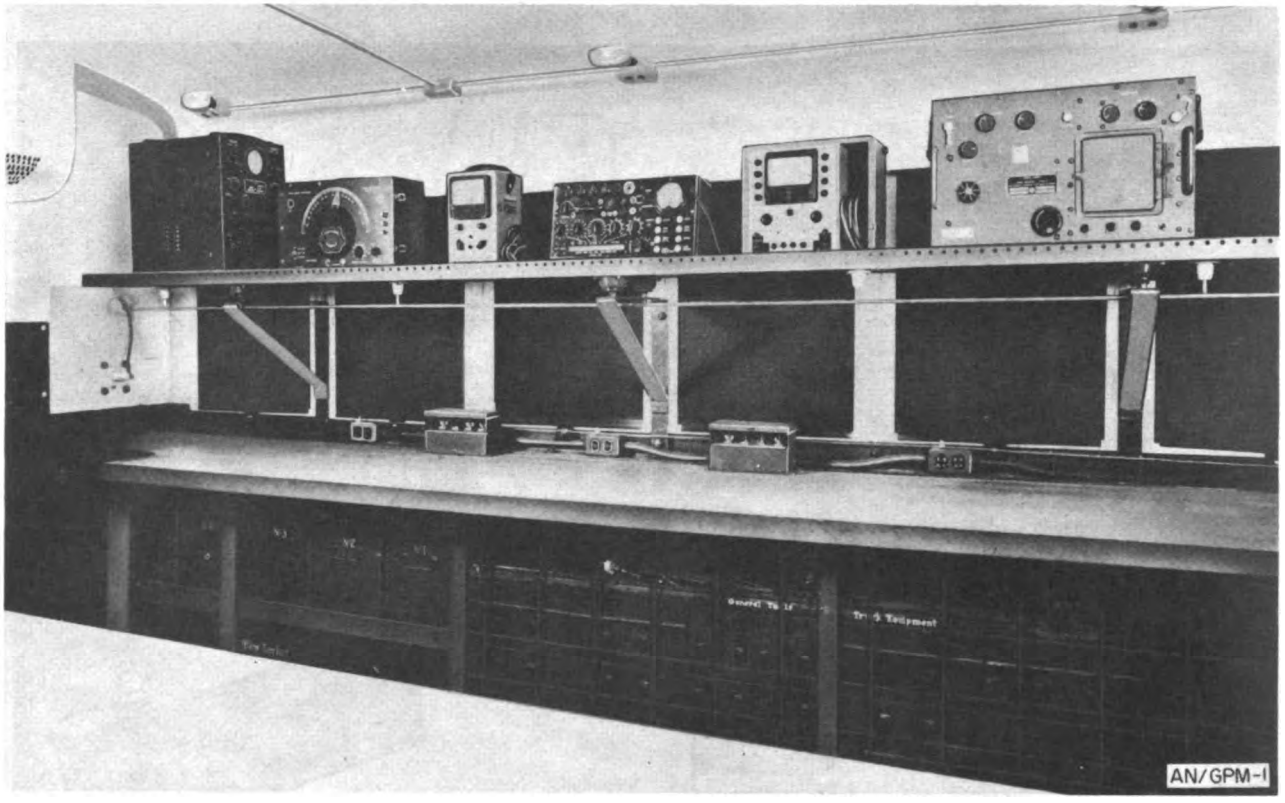


Figure 5. Test Set AN/GPM-1.

Status: Standard. *Stock No.:* 3F3942-1. *Reference:* TM 11-1080.

Test Set AN/GPM-1 is an assembly of test equipments consisting of an oscilloscope, a tube tester, an oscillator, a voltohmmeter, a test unit, a signal generator, a power unit, and all necessary cables and couplings. This equipment is mounted in Truck M-30. Test Set AN/GPM-1 is the basic test equipment for field and depot maintenance of Radar and IFF sets.

U/w but not p/o sets of AN/MPM series.

TECHNICAL CHARACTERISTICS

RANGES:
- 0 to 6,000 v, ac and dc; voltage measuring.
- 0 to 12 amp, ac and dc; current measuring.
- 0 to 1,000 meg; resistance measuring.
- 20 to 20,000 cps; oscillator output.
- 8 to 15 mc and 135 to 230 mc; signal generator.

OSCILLATOR BALANCED OUTPUT IMPEDANCE: 10, 250, 500, or 5,000 ohms.

OSCILLATOR UNBALANCED OUTPUT IMPEDANCE: 5, 125, 250, or 2,500 ohms.

POWER: 105 to 130 v, ac, 60 cps; Batteries—2 Batteries BA-2, 2 Batteries BA-42, 2 Batteries BA-205/U.

PRINCIPAL COMPONENTS

Item	*Dimensions (in.)*	*Weight (lb)*
Test Unit I-176	5½ x 11½ x 8½	9
Oscilloscope TS-239/UP	15½ x 17 x 10⅜	10
Tube tester I-177-( )	7½ x 15½ x 5¾	15
Oscillator I-151-( )	15 x 7 x 9½	15
Signal Generator I-222-A	19½ x 12 x 7½	50
Voltohmmeter TS-294(*)/U	9⅜ x 5⅞ x 5 5/16	14

PACKED WEIGHT AND VOLUME

	Total weight (lb)	*Total volume (cu ft)*
Export pack	300	15

Figure 6. Meter Test Equipment AN/GSM-1.

Status: Standard. *Stock No.:* 3F3941-1. *Reference:* TM 11-2535.

Meter Test Equipment AN/GSM-1 is an assembly of test equipments consisting of a voltage supply unit, a current supply unit, a voltmeter standards unit, an ammeter standards unit, a decade resistance box, a resistance box, a magnet charger, a frequency meter, and all necessary cables and couplings. Meter Test Equipment AN/GSM-1 is depot test equipment used to test and calibrate meters, except wattmeters, used as electrical measuring devices.

TECHNICAL CHARACTERISTICS

CALIBRATING RANGES:
- 0 to 100 v, ac and dc.
- 0 to 75 amp, ac and dc.
- 0 to 111, 110 ohms, in steps of 1 ohm.
- .1 to 1,000,000 meg.
- 50 to 70 cps.

INPUT: 100 to 125 v, ac, 60 cps (regulated).
- 6 v, dc.

OUTPUT:
- 0 to 1,500 v, ac and dc.
- 0 to 10 amp, ac and dc.

LEAKAGE: Less than 2 μa at 1,500 v.

PEAK DISCHARGE CURRENT: 50,000 amp.

PRINCIPAL COMPONENTS

Name	*Dimensions (in.)*	*Weight (lb)*
Test Set I-49	8⅞ x 7¾ x 5¾	8
Meter Test Set TS-682( )/GSM-1.	25 x 20 x 10	100
Decade Resistor TS-679( )/U.	18 x 5 x 5	6.25
Resistance Bridge ZM-9( )/U.	22 x 8¾ x 8¼	6.25
Magnet Charger (TS-336/GSM-1.	27¼ x 17⅝ x 14	250
Frequency Meter FR-40( )/GSM-1.	10⁷⁄₁₆ x 8¼ x 8³⁄₁₆	23
Test Set I-56-K	20½ x 14¾ x 9¾	55

PACKED WEIGHT AND VOLUME

	Total weight (lb)	*Total volume (cu ft)*
Export pack	735	28

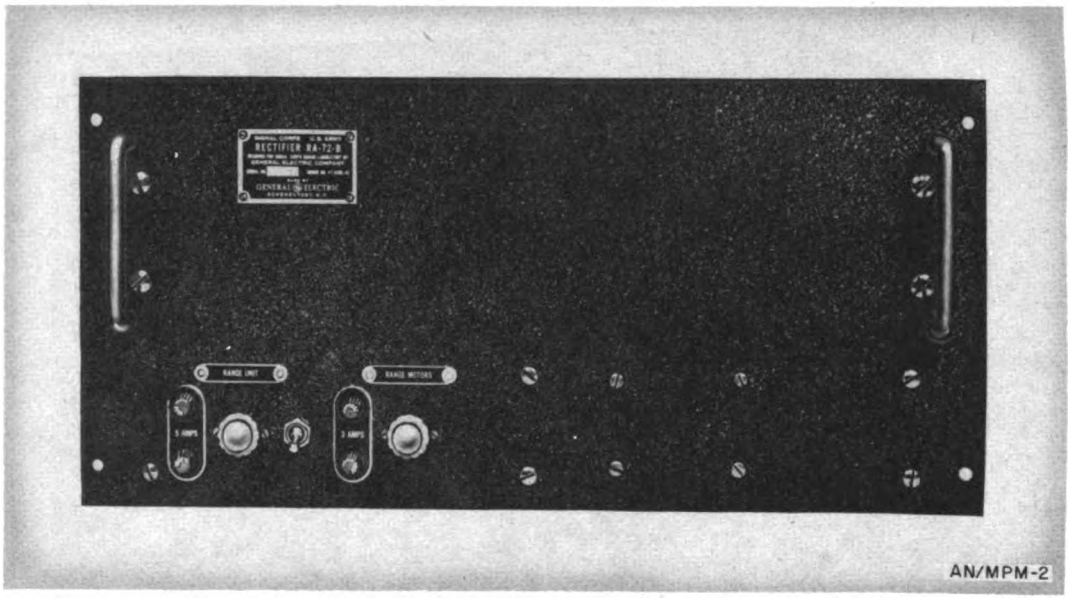


Figure 7. Altitude Converter Rectifier RA-70 of Test Set AN/MPM-2.[1]

Status: Standard. *Stock No.:* 3F3944-2. *Reference:* TM 11-1211.

Test Set AN/MPM-2 is an assembly of test equipments consisting of a dummy antenna, an echo box, a fluxmeter, a power meter, a range calibrator, signal generators, a wavemeter test set, and all necessary cables and couplings. This equipment is mounted in Truck M-30. Test Set AN/MPM-2 is used for special field and depot maintenance of Radio Sets SCR-584 and SCR-784 and Radio Equipment RC-184.

U/w but not p/o Test Set AN/GPM-1.

TECHNICAL CHARACTERISTICS

SIGNAL GENERATOR FREQUENCY RANGES:
15 to 50 mc.
2,700 to 2,900 mc.
R-F OUTPUT: Sine wave, modulated at 400 or 8,200 cps or unmodulated.
CALIBRATOR OUTPUT:
Sine wave at 163.94 kc.
Synchronizing pulse of 240 pulses per second.
Pulses having rising edge of .25 μsec.
FREQUENCY MEASUREMENTS: 2,400 to 3,400 mc; wavemeter.
FLUX DENSITY RANGE: 1,200 to 9,600 gausses.
POWER OUTPUT:
Regulated— −105 v.
Unregulated— +300 v.
Half-wave rectification— +4,500 v.
Full-wave rectification, unregulated— +300 v.
Full-wave rectification, regulated— +270 v.
POWER: 110 v, 50 to 60 cps, ac; 6-v, 12-v, and 24-v batteries.

PRINCIPAL COMPONENTS

Item	*Dimensions (in.)*	*Weight (lb)*
Fluxmeter TS-15 ( )/AP	4½ x 6 x 10	6½
Power Meter TS-125/AP	10 x 7⅞ x 5 5/16	12
Rectifier Test Set TS-268 ( )/U.	5¾ x 6¾ x 2½	3
Range Calibrator I-223-A	9¾ x 11 1/16 x 12¼	31
Signal Generator TS-452/U	19 x 9¾ x 16	55
Signal Generator TS-155( )/UP.	17 x 10 x 10	55
Wavemeter Test Set TS-117/GP.	4¾ x 5⅞ x 2¾	7
Receiver Rectifier RA-66-( ).	19 x 8¾ x 13¼	75
Plan Position Rectifier RA-69-( ).	19 x 8¾ x 13¼	75
Altitude Converter Rectifier RA-70-( ).	19 x 8¾ x 13¼	75
Range Rectifier RA-72-( )	19 x 8¾ x 13¼	75
Dummy Antenna TS-208/MPM.	1⅝ x ¾	
Test Antenna TS-210/MPM		
Radio Frequency Indicator TS-446/U.	4⅝ (length)	

PACKED WEIGHT AND VOLUME

	Total weight (lb)	*Total volume (cu ft)*
Export pack	2,035	120

[1] Detailed descriptions and illustrations of most major components may be found under their individual listings.

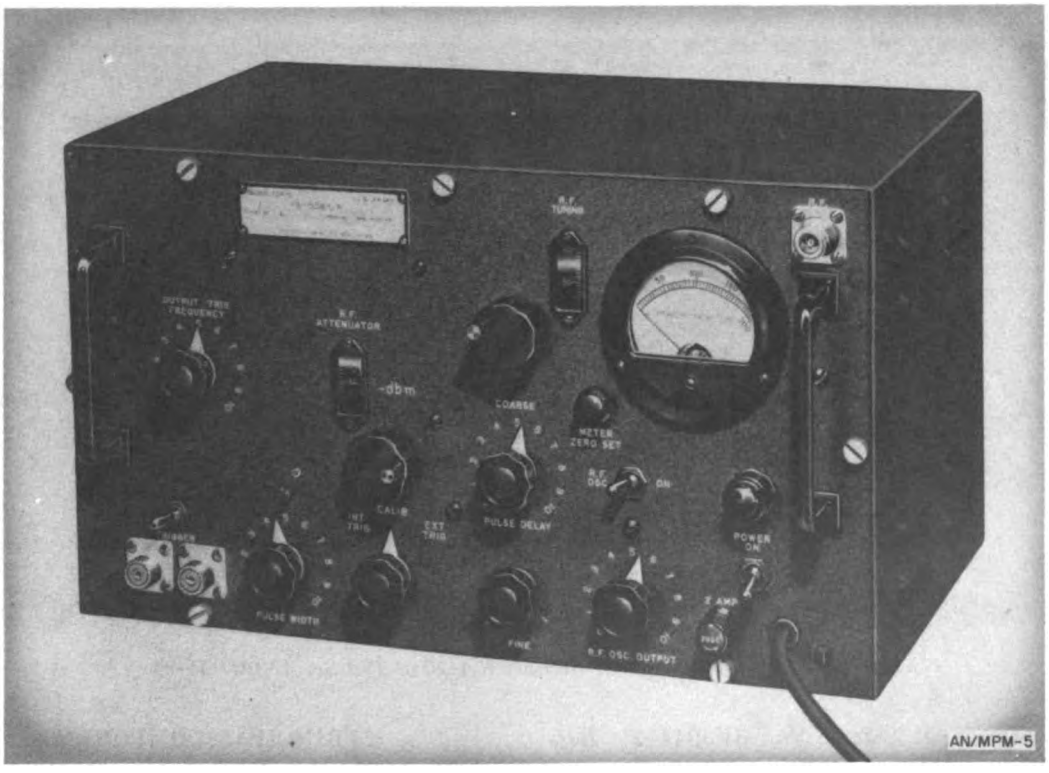


Figure 8. Signal Generator TS–155B/UP of Test Set AN/MPM–5.[1]

Status: Standard. *Stock No.:* 3F3944–5. *Reference:* TM 11–1221.

Test Set AN/MPM–5 is an assembly of test equipments consisting of a capacity divider, a dummy antenna, an echo box, an emergency receiver tuner, a fluxmeter, an oscilloscope, a power meter, a range calibrator, a signal generator, a rectifier test set, a wavemeter test set, and all necessary cables and coupling. Test Set AN/MPM–5 is used for special field and depot maintenance of Radio Sets SCR–582–( ) and SCR–682–( ) and Radio Equipment RC–282–A.

U/w but not p/o Test Set AN/GPM–1.

TECHNICAL CHARACTERISTICS

FREQUENCY RANGE:
- 14 to 235 mc; signal generator.
- 2,700 to 2,900 mc; signal generator.
- 30 to 1,000,000 cps; video input.

R–F POWER RANGE: 0 to 2 mw.

FLUX DENSITY RANGE: 1,200 to 9,600 gausses.

SWEEP SPEEDS:
- Triggered sweep—5, 60, and 250 μsec.
- Saw tooth—10 to 50,000 cps.

SIGNAL INPUT: .1 to 100 v, peak to peak.

SIGNAL OUTPUT:
- Sine wave at 163.94 kc.
- Synchronizing pulse at 240 pulses per sec.
- 1 μsec pulses at 163,940 pulses per sec.

POWER: 105 to 125 v, ac, 50 to 800 cps.

PRINCIPAL COMPONENTS

Item	*Dimensions (in.)*	*Weight (lb)*
Fluxmeter TS–15( )/AP..	6 x 10 x 4½	6. 5
Power Meter TS–125/AP..	10 x 7⅞ x 5½	12
Range Calibrator I–223–A.	9¾ x 11¾ x 12¼	31
Signal Generator TS–155 ( )/UP.	17 x 10 x 10	55
Wavemeter Test Set TS–117/GP.	6¼ x 7⅛ x 5½	7
Emergency receiver tuner..	4 1⅞₂ x 1⅞ (diam)	-----
Capacity divider.....	3 x 4 x 5	-----
Oscilloscope TS–239( )/UP.	21¾ x 14 x 16	60
Dummy Antenna TS–208/MPM.		
Rectifier Test Set TS–268 ( )/U.	5¾ x 6¾ x 2½	3
Probe Antenna AT–64/U..	1¼ (diam) x 1¾	-----
Test Antenna TS–210/MPM		
Echo Box TS–270( )/UP.	14⅝ x 8 x 12¼	25¾

PACKED WEIGHT AND VOLUME

	Total weight (lb)	*Total volume (cu ft)*
Export pack.....	809	47

[1] Detailed descriptions and illustrations of most major components may be found under their individual listing.

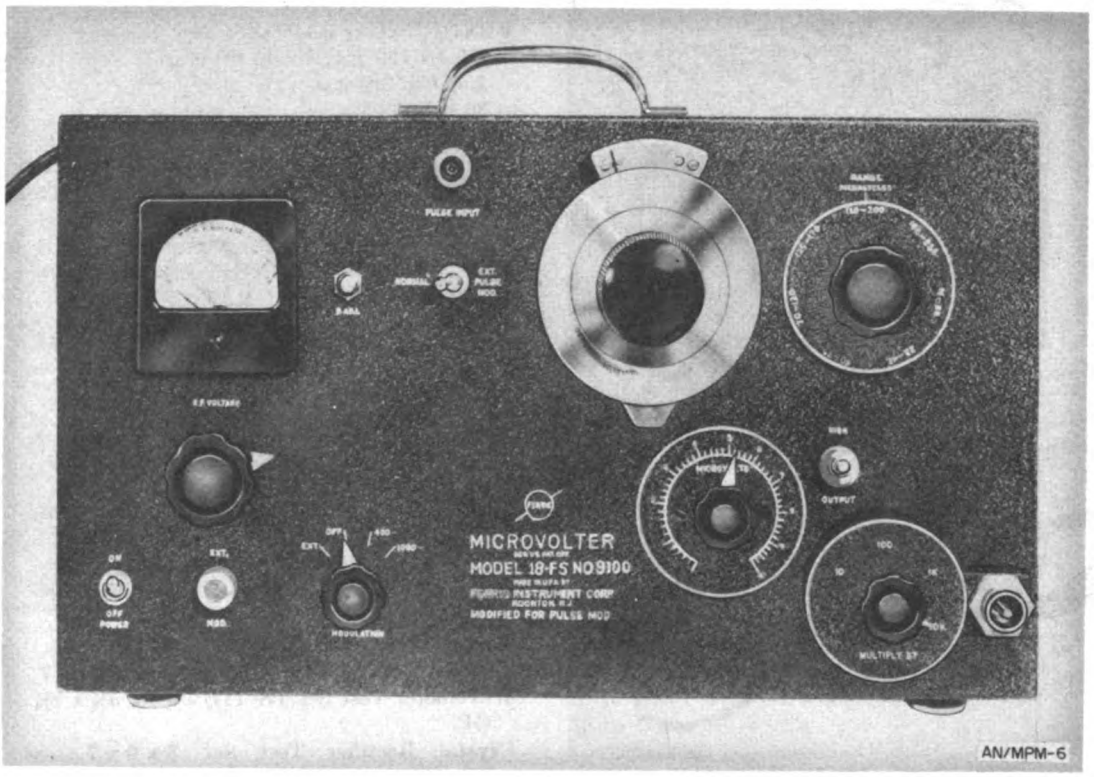


Figure 9. Signal Generator, Ferris model 18FS, of Test Set AN/MPM–6.[1]

Status: Standard. *Stock No.:* 3F3944–6. *Reference:* TM 11–1248.

Test Set AN/MPM–6 is an assembly of test equipments consisting of a crystal rectifier test set, dummy loads, a fluxmeter, a spectrum analyzer, a synchroscope, a signal generator, a voltmeter, a voltage divider, and all necessary cables and couplings. Test Set AN/MPM–6 is used for special field and depot maintenance of Radar Sets AN/FPG–1, AN/MPG–1, and AN/FPG–2.

U/w but not p/o Test Set AN/GPM–1.

TECHNICAL CHARACTERISTICS

SIGNAL GENERATOR FREQUENCY RANGES:
15 to 50 mc.
8,700 to 9,500 mc.
SYNCHROSCOPE INPUT IMPEDANCE: 100,000 ohms, 40 μμf.
RANGE MARKERS PROVIDED: 2, 10, or 25 μsec.
SWEEP SPEEDS:
Variable—1 to 2 μsec.
Fixed—10, 25, and 60 μsec.
Variable—100 to 4,000 μsec.
SIGNAL GENERATOR VOLTAGE OUTPUT: 1 to 100,000 μv.
R-F POWER INPUT: .1 to 2,000 mw.
POWER MEASUREMENT: 0 to 68 dbm.
FLUX DENSITY RANGE: 1,200 to 9,600 gausses.
VOLTMETER RANGE: 0 to 100 v, ac or dc.
VOLTAGE DIVIDER RATIOS: 10:1 and 100:1.
POWER: 110 v, 60 cps, ac; 6-v, 12-v, and 24-v batteries.

PRINCIPAL COMPONENTS

Item	*Dimensions (in.)*	*Weight (lb)*
Signal generator, Ferris model 18FS.	18 x 10½ x 6¼	22
Crystal Rectifier Test Set TS–268( )/U.	3 x 6 x 7	3
Fluxmeter TS–15( )/AP	4½ x 6 x 10	6½
Spectrum Analyzer TS–148/UP.	25 x 19 x 13	45
Synchroscope TS–28/UPN	19¼ x 14¼ x 8¾	65
Test Set TS–147/UP	11 x 18¾ x 12¼	35
Voltmeter TS–363( )/U	4¾ x 6 x 8½	6
Voltage Divider TS–265/UP	3 x 5 x 10	-----
Pick-up Antenna AT–68/UP	4½ x 2¼ x 6¾	-----
Dummy Load TS–264/MPG–1.	24 x 12 x 12	30
Dummy Load TS–267/MPG–1.	10 x 2 x 2	2

PACKED WEIGHT AND VOLUME

	Total weight (lb)	*Total volume (cu ft)*
Export pack	1,319	75

[1] Detailed descriptions and photographs of most major components may be found under their individual listings.

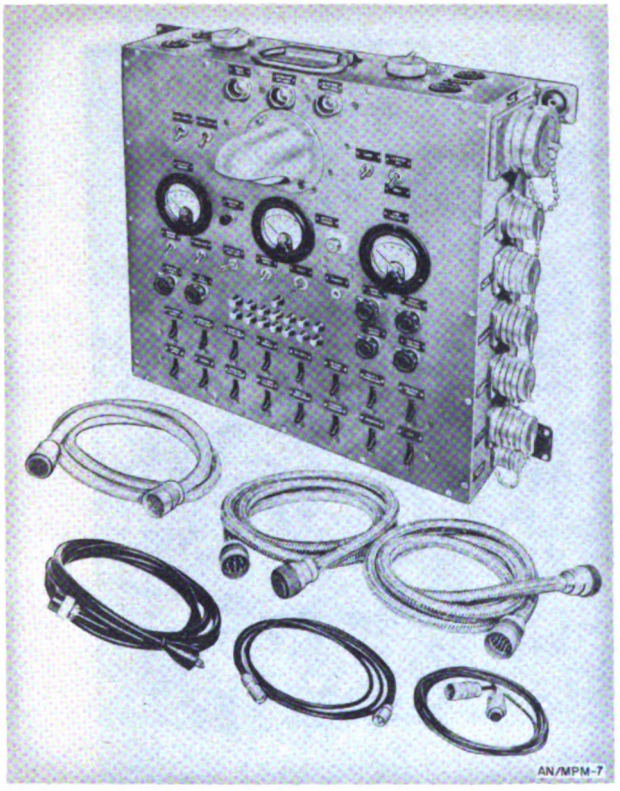


Figure 10. Test Set TS-216/TPL-1 of Test Set AN/MPM-7.[1]

Status: Standard. *Stock No.:* 3F3944-7. *Reference:* TM 11-1241.

Test Set AN/MPM-7 is an assembly of test equipments consisting of dummy antennas and probes, an echo box, a fluxmeter, an oscilloscope, a power unit, a power meter, a signal generator, a voltage divider, a wavemeter test set, a frequency meter, and all necessary cables and couplings. Test Set AN/MPM-7 is used for special field and depot maintenance of Radar Set AN/TPL-1 and Radio Equipment AN/TPX-4.

U/w but not p/o Test Set AN/GPM-1.

[1] Detailed descriptions and illustrations of most major components may be found under their individual listings.

TECHNICAL CHARACTERISTICS

FREQUENCY RANGES:
150 to 190 mc; signal generator.
2,500 to 3,300 mc; signal generator.
30 to 1,000,000 cps; video input.
SIGNAL INPUT: .1 to 100 v, peak to peak.
SWEEP SPEEDS: Triggered—5, 50, and 250 μsec.
Saw tooth—10 to 50,000 cps, continuously variable.
PEAK TRANSMITTED POWER RANGE: 0 to 800 w.
FLUX DENSITY RANGE: 1,200 to 9,600 gausses.
VOLTAGE DIVIDER RATIOS: 10:1 and 100:1.
POWER: 1.4 kw, 120 v, ac, 400 cps; .4 kw, 28 v, dc; 6-v, 12-v, and 24-v batteries.

PRINCIPAL COMPONENTS

Item	*Dimensions (in.)*	*Weight (lb)*
Echo Box TS-270( )/UP	14⅝ x 8 x 12¼	25¾
Fluxmeter TS-15( )/AP	4½ x 6 x 10	6½
Oscilloscope TS-239( )/UP	21¾ x 14 x 16	60
Power Unit PU-6/TPS-1	17 x 35 x 21	128
Power Meter TS-125/AP	10 x 7⅞ x 5 5/16	12
Signal Generator TS-155( )/UP.	17 x 10 x 10	55
Test Set TS-216/TPL-1	20 x 20 x 6	55
Test Set TS-159/TPX	8¼ x 13½ x 7	15½
Wavemeter Test Set TS-117/GP.	4¾ x 5⅞ x 2¾	7
Crystal Rectifier Test Set TS-268( )/U.	3 x 6 x 7	4
Voltage Divider TS-265/UP	3 x 6 x 10	-----
Antenna AT-67/AP	4¼ x 3½ x 2	7/16
Dummy Antenna TS-208/MPM.	1⅝ x ¾	-----
Probe Antenna AT-70/U	1¾ x 1½ (diam)	-----
Dummy Load TS-279/UPM	12¾ x 4 x 5½	-----
Frequency meter, JBT No. 33 FP.	5⅞ x 3 1/16 x 2⅝	-----

PACKED WEIGHT AND VOLUME

	Total weight (lb)	*Total volume (cu ft)*
Export pack	1, 394	77. 7

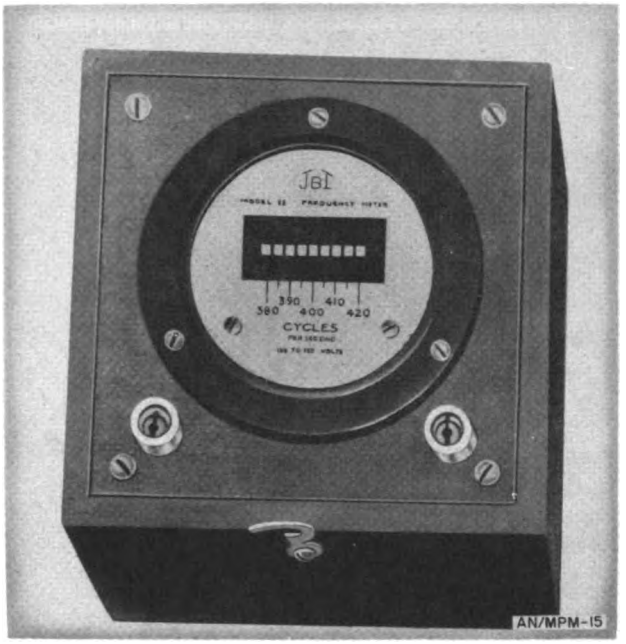


Figure 11. Frequency meter, JBT Model 33F, of Test Set AN/MPM-15.[1]

Status: Standard. *Stock No.:* 3F3944-15.

Test Set AN/MPM-15 is an assembly of test equipments consisting of dummy antennas, a frequency meter, an oscilloscope, a power unit, signal generators, a voltage divider, a wavemeter, a rectifier test set, an echo box, an r-f indicator, and all necessary cables and couplings. Test Set AN/MPM-15 is used for field and depot maintenance of Radar Set AN/TPS-3 and associated equipment.

U/w but not p/o Test Set AN/GPM-1.

[1] Detailed descriptions and illustrations of most major components may be found under their individual listings.

TECHNICAL CHARACTERISTICS

FREQUENCY RANGE:
14 to 235 mc; signal generator.
30 to 1,000,000 cps, video input.
IMPEDANCE: Input—50 ohms; dummy antenna.
OSCILLOSCOPE SIGNAL INPUT: .1 to 100 v, peak to peak.
INPUT VOLTAGE, CALIBRATOR: 105 to 120 v, ac, 60 to 1,200 cps.
OUTPUT VOLTAGE, SIGNAL GENERATOR: 1 μv to .1 v.
SWEEP SPEEDS:
Triggered sweep—5, 50, and 250 μsec.
Saw tooth—10 to 50,000 cps. continuously variable.
PEAK TRANSMITTED POWER MEASUREMENT: 0 to 800 w.
FREQUENCY METER RANGE: 380 to 420 cps.
VOLTAGE DIVIDER RATIOS: 10:1 and 100:1.
POWER:
1.4 kw at 120 v, ac, 400 cps; .4 kw at 28 v, dc; 6-v, 12-v, and 24-v batteries.

PRINCIPAL COMPONENTS

Item	*Dimensions (in.)*	*Weight (lb)*
Calibrator I-240	15⅜ x 12¾ x 13¾	60
Crystal Rectifier Test Set TS-268( )/U.	3 x 6 x 7	4
Dummy Antenna TS-208/MPM.		
Dummy Antenna TS-235/UP.	26 x 5 x 5	20
Echo Box TS-280/TPS-3	16 x 15¼ x 10	20
Frequency meter, JBT model 33F.	5⅞ x 3 1/16 x 2⅝	-----
Oscilloscope TS-34( )/AP	20¾ x 9 x 8	29
Power Unit PU-6/TPS-1	21½ x 40 x 23¼	235
Signal Generator TS-452( )/U.	19 x 9¾ x 16	55
Test Set TS-159/TPX	14 x 7 x 10	15½
Voltage Divider TS-265/UP	3 x 6 x 10	-----
Signal Generator TS-418/U	12¾ x 17⅝ x 14¾	59
Radio Frequency Indicator TS-446/U.	4⅝ (length)	-----

PACKED WEIGHT AND VOLUME

	Total weight (lb)	*Total volume (cu ft)*
Export pack	1,075	55

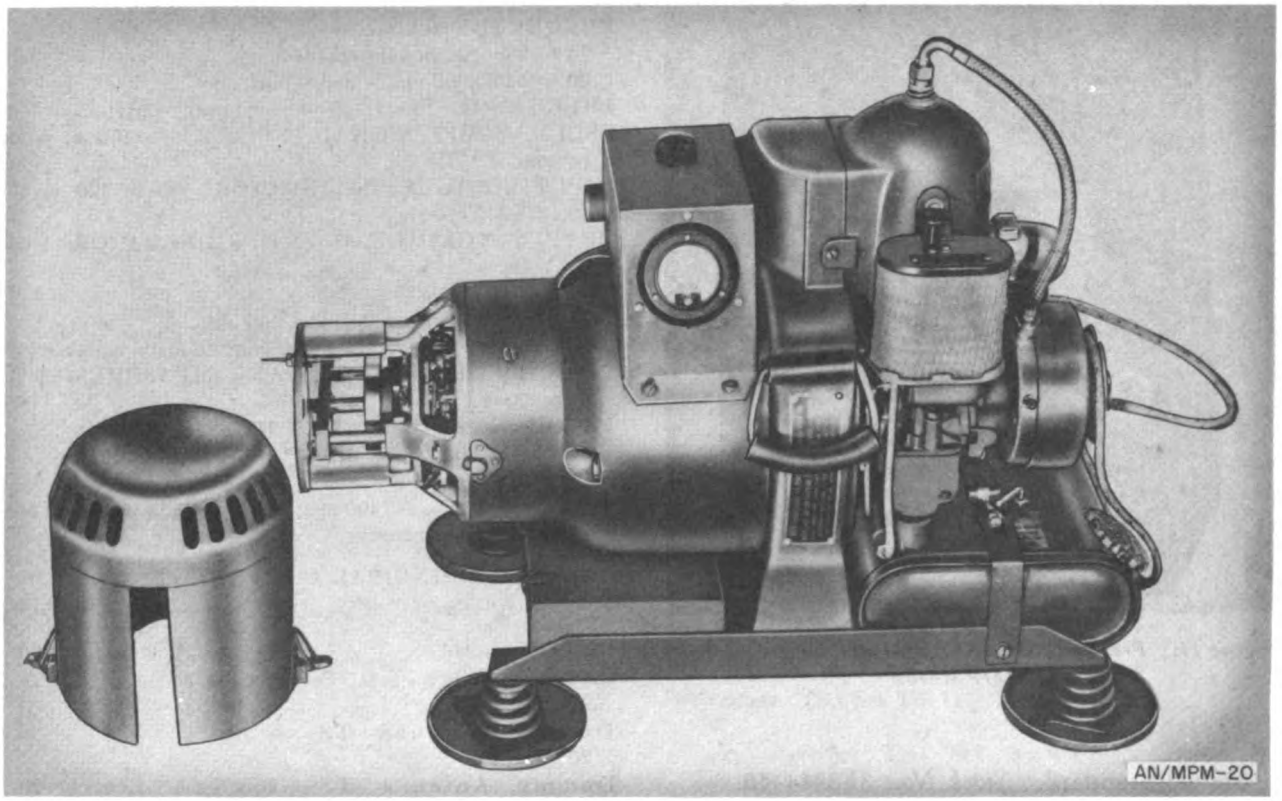


Figure 12. Power Unit PU-6/TPS-1 of Test Set AN/MPM-20.[1]

Status: Standard. *Stock No.:* 3F3944-20. *Reference:* TM 11-1253.

Test Set AN/MPM-20 is an assembly of test equipments consisting of a crystal rectifier test set, a dummy antenna, an echo box, signal generators, a frequency meter, oscilloscopes, a power unit, a wavemeter, and all necessary cables and couplings. Test Set AN/MPM-20 is used for special field and depot maintenance of Radar Set AN/TPQ-3.

U/w but not p/o Test Set AN/GPM-1.

TECHNICAL CHARACTERISTICS

SIGNAL GENERATOR.
FREQUENCY RANGE: 7.3 to 330 mc.
FIELD STRENGTH RANGE: 0 to 10 ma.
SIGNAL VOLTAGE: 0 to 16,000 v, peak amplitude.
SIGNAL OUTPUT VOLTAGE: 1 to 100,000 μv.
CIRCULAR SWEEP: 1 mi.
A-SWEEPS: 1, 30, and 350 mi.
A-C FREQUENCY MEASURING RANGE: 380 to 420 cps.
POWER: 1.4 kw, 120 v, ac, 400 cps; .4 kw, 27 v, dc.

PRINCIPAL COMPONENTS

Item	*Dimensions (in.)*	*Weight (lb)*
Crystal Rectifier Test Set TS-268( )/U.	3 x 6 x 7	4
Dummy Antenna TS-105/TPM-1.	3 x 4½ x 13½	-----
Echo Box TS-280/TPS-3	16 x 15¼ x 10	20
Frequency meter, JBT model 33FX.	2$\frac{3}{32}$ x 2$\frac{5}{16}$ (diam)	-----
Oscilloscope TS-34( )/AP	20¾ x 9 x 8	29
Power Unit PU-6/TPS-1	17 x 35 x 21	128
Signal Generator TS-418/U		
Signal Generator TS-452/U	19 x 9¾ x 16	55
Test Oscilloscope TS-100/AP	16½ x 8½ x 13¾	40
Voltage Divider TS-265/UP	3 x 6 x 10	-----

[1] Detailed descriptions and photographs of most major components may be found under their individual listings.

Figure 13. Radar Test Set AN/TPM-3.

Status: Standard. *Stock No.:* 3F3947-3.

Radar Test Set AN/TPM-3 is an assembly of test equipments consisting of a dummy load, an echo box, an oscilloscope, signal generators, an analyzer, a voltage divider, a multimeter, a tube tester, a rectifier test set, and a wavemeter. Radar Test Set AN/TPM-3 is used for organizational maintenance of Radar Set AN/TPL-1.

U/w but not p/o Radar Set AN/TPL-1.

TECHNICAL CHARACTERISTICS

FREQUENCY RANGE:
5 to 175 mc; signal generator.
30 to 1,000,000 cps; video input.
OSCILLOSCOPE SIGNAL INPUT: .1 to 100 v, peak to peak.
SIGNAL OUTPUT VOLTAGE: 1 μv to .1 v.
SWEEP SPEEDS:
Triggered sweep—5, 50, 250 μsec.
Saw tooth—10 to 50,000 cps, continuously variable.
POWER DISSIPATION: 100 w.
CURRENT MEASURING RANGE:
0 to 10 amp, ac.
0 to 1.5 amp, dc.
RESISTANCE MEASURING RANGE: 0 to 10 meg.
MUTUAL CONDUCTANCE MEASURING RANGE: 0 to 15,000 microhmos.
VOLTAGE DIVIDER RATIOS: 10:1 and 100:1.

PRINCIPAL COMPONENTS

Item	*Dimensions (in.)*	*Weight (lb)*
Antenna Assembly AT-67/AP	4¾ x 3¾ (diam)	½
Crystal Adapter UG-119/UP	2⅛ x 1 1/16	-----
Dummy Load TS-279/UPM	12¾ x 4 x 5½	-----
Echo Box TS-270( )/UP	8 x 12¼ x 12⅝	25
Oscilloscope TS-239( )/UP	21¾ x 14 x 16	60
Signal Generator TS-343/U	13 x 10 x 7	25
Test Set TS-216/TPL-1	20 x 20 x 6	55
Test Unit I-176-( )	5½ x 11½ x 8½	9
Voltage Divider TS-265/UP	3 x 6 x 10	-----
Wavemeter Test Set TS-117/GP.	6¼ x 7⅛ x 5½	7
Tube Tester I-177-( )	5¾ x 15½ x 8½	15¾
Rectifier Test Set TS-268( )/U	3 x 6 x 7	4

PACKED WEIGHT AND VOLUME

	Total weight (lb)	*Total volume (cu ft)*
Export pack	960	45

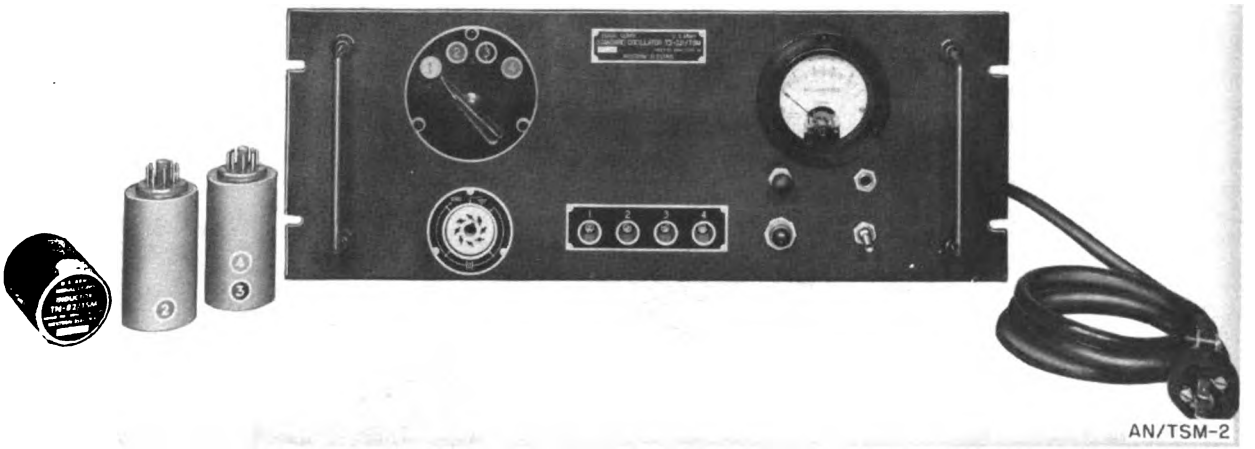


Figure 14. Standard Crystal Test Set AN/TSM-2.

Status: Standard.

Standard Crystal Test Set AN/TSM-2 consists of an oscillator and three inductors. It is used as a reference standard for specifying the frequency and activity requirements of Crystal Units CR-2/U, CR-3/U, and CR-4/U. It is not intended for use as a production testing device for crystal units, but as a reference standard against which production test sets are checked. The set may be adjusted to test other crystal unit types in the range of 200 to 1,200 kc.

TECHNICAL CHARACTERISTICS

CRYSTAL TEST FREQUENCY RANGE: 200 to 1,200 kc.

POWER: 110 to 120 v, ac, 50 to 1,720 cps.

PRINCIPAL COMPONENTS

Item	*Dimensions (in.)*
Standard Oscillator TS-221/TSM	19 x 7 x 8
Calibration Coil TN-82/TSM-2	3⅛ x 1¾ (diam)
Calibration Coil TN-83/TSM-2	3⅛ x 1¾ (diam)
Calibration Coil TN-84/TSM-2	3⅛ x 1¾ (diam)

PACKED DIMENSIONS AND VOLUME

	Dimensions (in.)	*Volume (cu ft)*
Export pack	25 x 12 x 10	1. 74

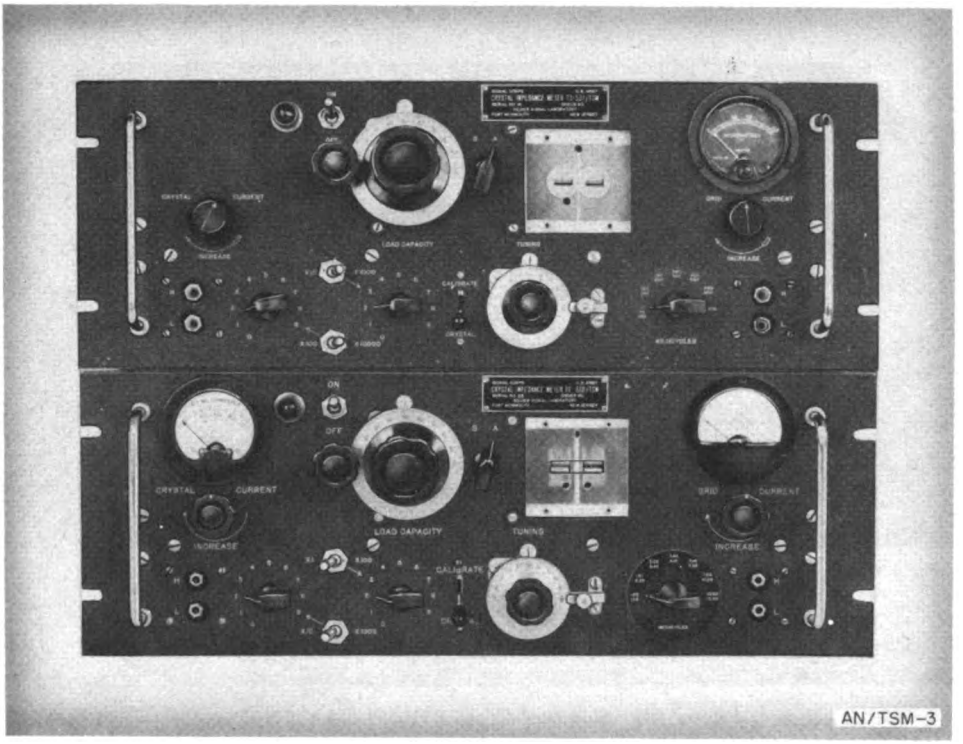


Figure 15. Standard Crystal Test Set AN/TSM-3.

Status: Standard.

Standard Crystal Test Set AN/TSM-3 consists of three crystal impedance meters. It is used to test crystal units operated at their series resonant and antiresonant frequencies. At present, Crystal Units CR-15/U, CR-16/U, CR-18/U, CR-25/U, CR-26/U, CR-27/U, CR-29/U, and CR-30/U may be tested.

TECHNICAL CHARACTERISTICS

FREQUENCY RANGE: 75 kc to 15 mc.

RESISTANCE CALIBRATION RANGE: 0 to 9,900 ohms in 1-ohm steps; 0 to 99,000 ohms in 10-ohm steps.

LOAD CAPACITANCE CALIBRATION: 12 to 110 $\mu\mu$f.

POWER: 115 v, 50 to 1,720 cps, ac.

PRINCIPAL COMPONENTS

Item	*Dimensions (in.)*	*Weight (lb)*
Crystal Impedance Meter TS-330/TSM.	19 x 10½ x 7	25
Crystal Impedance Meter TS-537/TSM.	19 x 10 x 7	-------

PACKED WEIGHT AND VOLUME

	Total weight (lb)	*Total volume (cu ft)*
Export pack	206	23

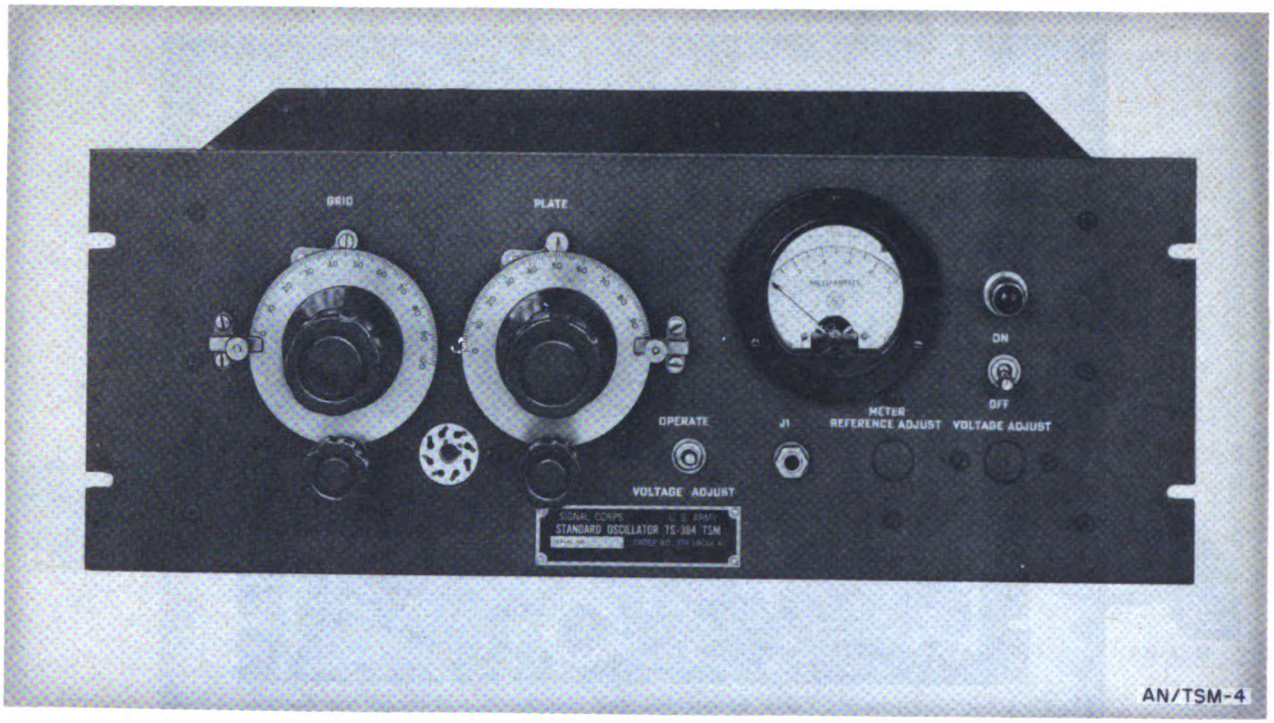


Figure 16. Standard Crystal Test Set AN/TSM-4.

Status: Standard.

Standard Crystal Test Set AN/TSM-4 consists of a standard oscillator and a calibration coil. It is used to measure crystal activity and frequency of Crystal Unit CR-5/U.

TECHNICAL CHARACTERISTICS

FREQUENCY RANGE: 1 to 10 mc.
POWER: 110 v, ac, 50 to 1,200 cps.

PRINCIPAL COMPONENTS

Item			*Dimensions (in.)*	*Weight (lb)*
Standard	Oscillator	TS-384/TSM.	19 x 7 x 7	20
Calibration Coil		TN-102/TSM.	3 x 1¾ (diam)	-----

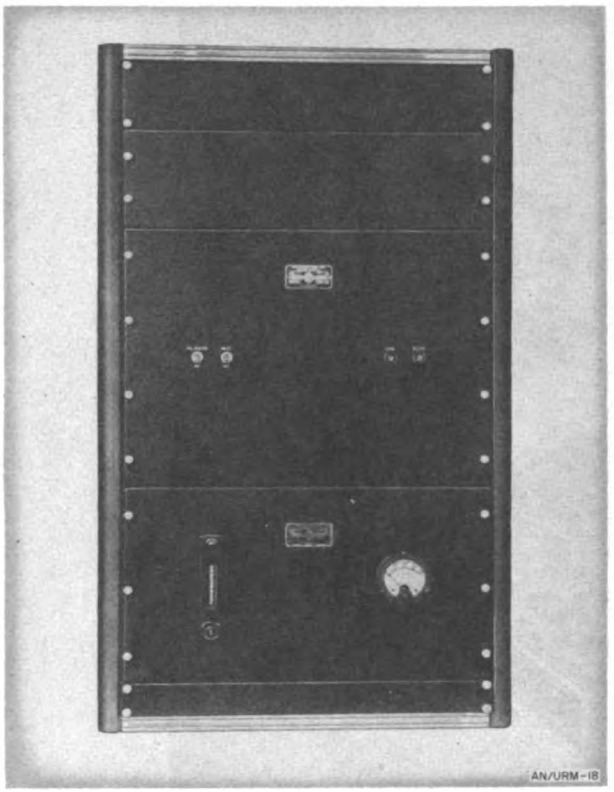


Figure 17. Frequency Calibrator-Meter Set AN/URM-18.

Status: Standard.

Frequency Calibrator-Meter Set AN/URM-18 is a secondary frequency standard and frequency measuring equipment consisting of a frequency calibrator group and a frequency meter group, both mounted in floor-type racks. It is used to make accurate frequency measurements of radio transmitters. As this equipment is a *secondary* standard, an accurate check of its frequency calibrations can be made only by comparison with standard-frequency radio transmissions, such as those of the National Bureau of Standards at Washington, D. C.

TECHNICAL CHARACTERISTICS

FREQUENCY CALIBRATOR GROUP:

FREQUENCY RANGE:

From 100-kc multivibrator—100 kc and its harmonics up to 50 mc.

From 10-kc multivibrator—10 kc and its harmonics up to 10 mc.

From 1-kc multivibrator—1 kc and its harmonics in the a-f range.

From 100-cps multivibrator—100 cps and its harmonics in the lower a-f range.

OUTPUT VOLTAGE:

(Harmonics—measured at the terminals of the frequency standard across a 65-ohm resistance).

At 100 kc—.2 v.

At 10 kc—1.2 v.

(A-f—measured at the terminal strip of the standard across a 10,000-ohm resistance).

At 10-kc—20 v.

At 1 kc—25 v.

At 100-cps—20 v.

FREQUENCY DRIFT: Below 5 parts in 10^8 per day.

FREQUENCY METER GROUP:

FREQUENCY RANGE: 100 kc to 100 mc.

OSCILLATOR MEASURING RANGE: 0 to 5,000 cps.

OSCILLOSCOPE SWEEPS: At line frequency, .1, 1, and 10 kc and at variable frequency obtained from the signal generator.

POWER, BOTH UNITS: 105 to 125 v or 210 to 250 v, ac, 40 to 60 cps.

PRINCIPAL COMPONENTS

Item	*Dimensions (in.)*	*Weight (lb)*
Frequency Calibrator Group OA-165/URM-18 consists of—	76⅛ x 22 x 20½	300
Frequency Calibrator FR-46/URM-18.		
Multivibrator-Power Supply O-122/URM-18.		
Rack MT-746/U.		
Frequency Meter Group OA-166/URM-18 consists of—	76⅛ x 22 x 20½	370
Frequency Meter FR-43/URM-18.		
Frequency Meter FR-44/URM-18.		
Frequency Meter FR-45/URM-18.		
AF Signal Generator SG-42/URM-18.		
Control Panel SB-105/URM-18.		
Oscilloscope OS-16/URM-18.		
Rack MT-747/U.		

WEIGHT AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	76⅛ x 44 x 20½	670	39.8

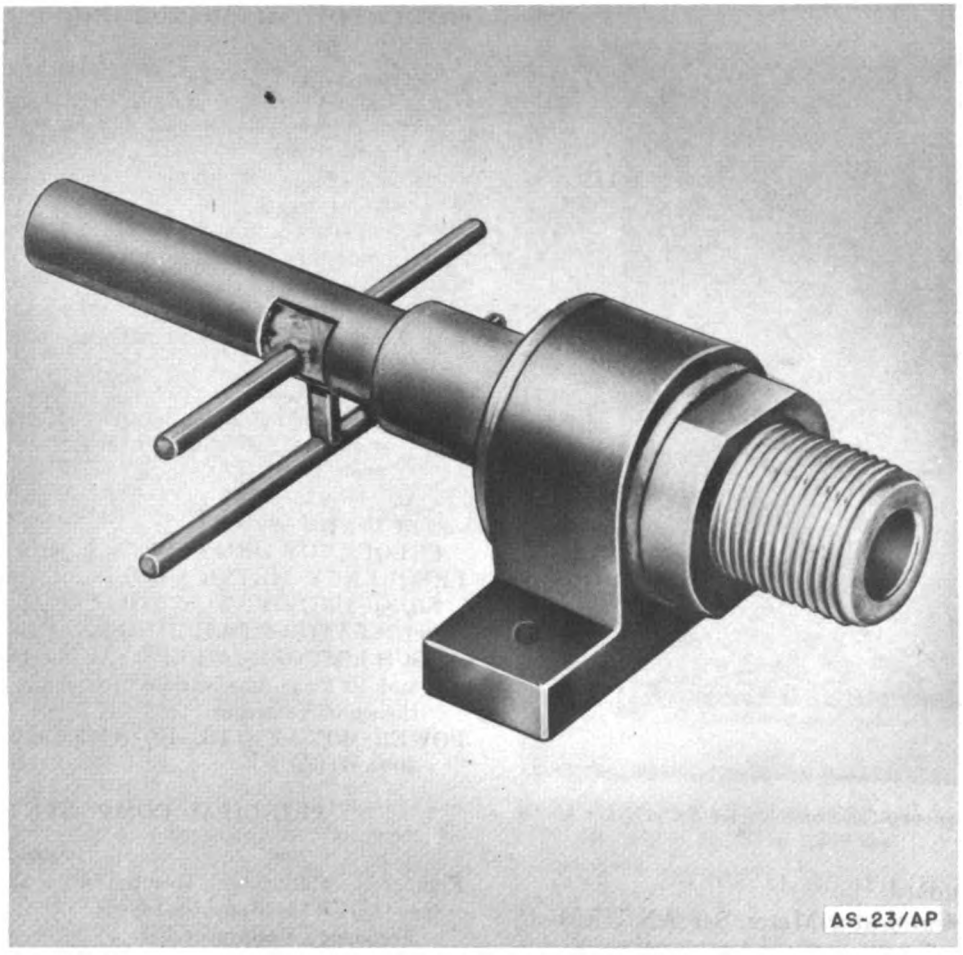


Figure 18. Antenna Assembly AS-23/AP.

Status: Standard, *Stock No.:* 2A264-23.

Antenna Assembly AS-23/AP is an S-band antenna consisting of two quarter-wavelength rods connected to a coaxial line, with a half-wavelength reflector rod mounted behind the dipole. It includes a jack which fits R-F Plug UG-21/U. It provides a pick-up signal for Phantom Target TS-48/AP.

P/o Wavemeter Test Set TS-117/GP.
P/o Signal Generator TS-155/UP.
P/o Phantom Target TS-48/AP.
U/w but not p/o Echo Box TS-207/UP.

TECHNICAL CHARACTERISTICS

FREQUENCY: 3,000 mc.

WEIGHT AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*
Unpacked	2⅝ x 2 x 2½	.2

AT-68/UP

Figure 19. Pick-up Antenna AT-68/UP.

Status: Standard. *Stock No.:* 3F3988-68.

Pick-up Antenna AT-68/UP is a small directive antenna assembly which can be used for signal transmission and reception. The antenna is connected to the test set by means of R-F Cable Assembly CG-92/U which is included with the antenna. It is used with X-band radar test equipment, and it provides a means for receiving and transmitting r-f energy in the band of 8,500 to 9,600 mc.

P/o Test Sets TS-146/UP, TS-147/UP, and AN/MPM-6.

P/o Spectrum Analyzer TS-148/UP.

TECHNICAL CHARACTERISTICS

FREQUENCY RANGE: 8,500 to 9,600 mc.

WEIGHT AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	4½ x 2¼ x 6¾	.14	.04

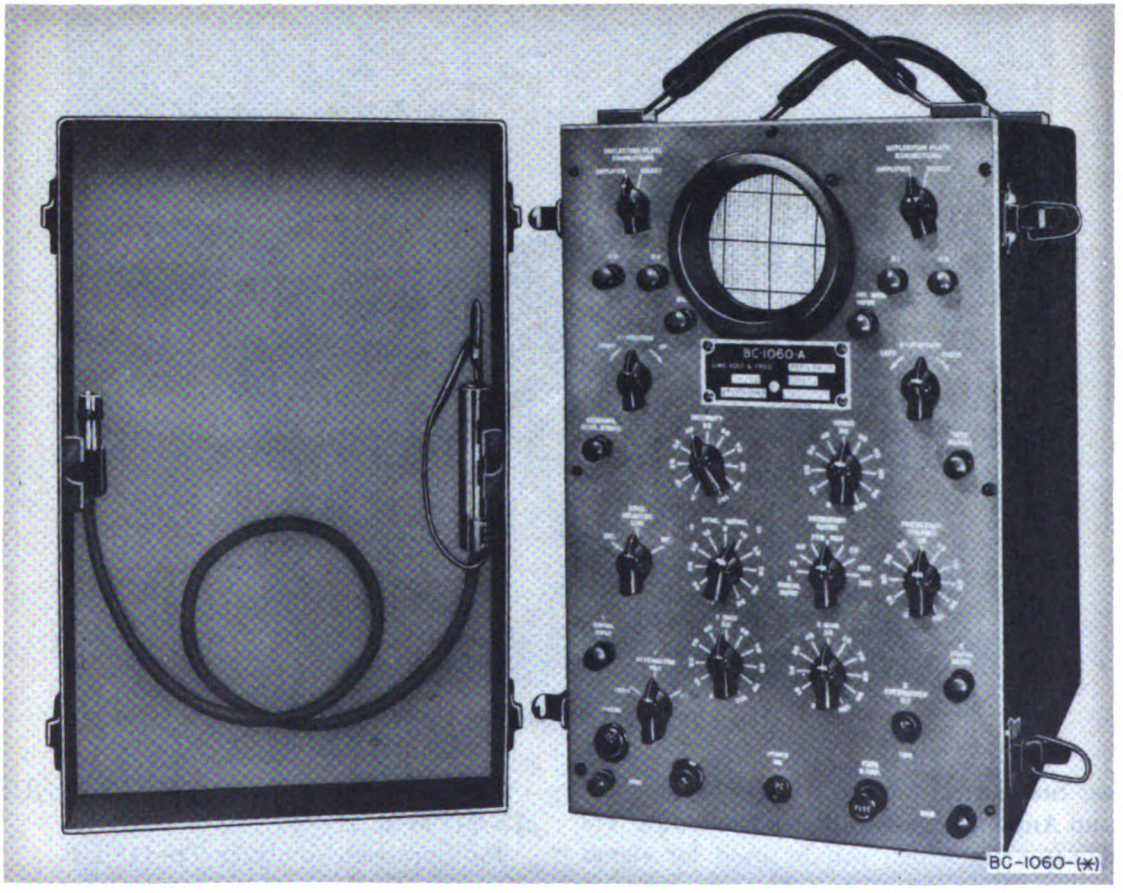


Figure 20. Oscilloscope BC-1060-A.

Status: Standard. *Stock No.:* 3F3630-1060. *Reference:* TM 11-2526.

Oscilloscope BC-1060-(*) represents BC-1060 and BC-1060-A. Oscilloscope BC-1060-(*) consists of a 3-inch cathode-ray tube, amplifiers, a linear time base, and associated power supplies. It is used to observe and measure pulse and video waveforms. A terminal is provided for intensity modulation and provision is made for external synchronization.

P/o Test Set AN/GPM-1.

Will replace Oscilloscope TS-489/U, Oscilloscope I-245-( ), and Oscilloscope OS-1/U.

TECHNICAL CHARACTERISTICS

ACCELERATING POTENTIAL: 1,000 v.

Y-AXIS RESPONSE: Sine wave uniform within 3 db from 20 cps to 2 mc at any attenuator setting; square wave at 50 cps, 500 cps, 25 kc, and 100 kc.

X-AXIS RESPONSE: Uniform within 3 db from 10 cps to 100 kc at any attenuator setting.

Z-AXIS RESPONSE: Uniform within 3 db from 30 cps to 3 mc.

SWEEP FREQUENCY RANGE: 15 to 30,000 cps.

INPUT IMPEDANCE:

Terminals—2 meg; 30 $\mu\mu$f (X- and Y-axis), .47 meg; 30 $\mu\mu$f (Z-axis).

Probe—1 meg; 20 $\mu\mu$f (Y-axis)

MAXIMUM INPUT POTENTIAL:

Y-axis through amplifier—400 v max dc or peak signal.

Y-axis direct to plates—400 v max signal dc.

X-axis through amplifier—400 v max dc, 50 v peak signal.

X-axis direct to plates—400 v max signal dc.

Z-axis—400 v dc.

DEFLECTION FACTOR:

Y-axis (terminals)—

with amplifier, .1 rms v/in.

to deflection plates, 75 rms v/in.

Y-axis (with probe)—with amplifier, .4 rms v/in.

X-axis (terminals)—

with amplifier, .9 rms v/in.

to deflection plates, 78 rms v/in.

Z-axis—15 v peak signal.

POWER: 105 to 125 v, ac, 50 to 60 cps.

WEIGHTS AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	15½ x 17 x 10⅜	60	1.58
Export pack		96	3.2

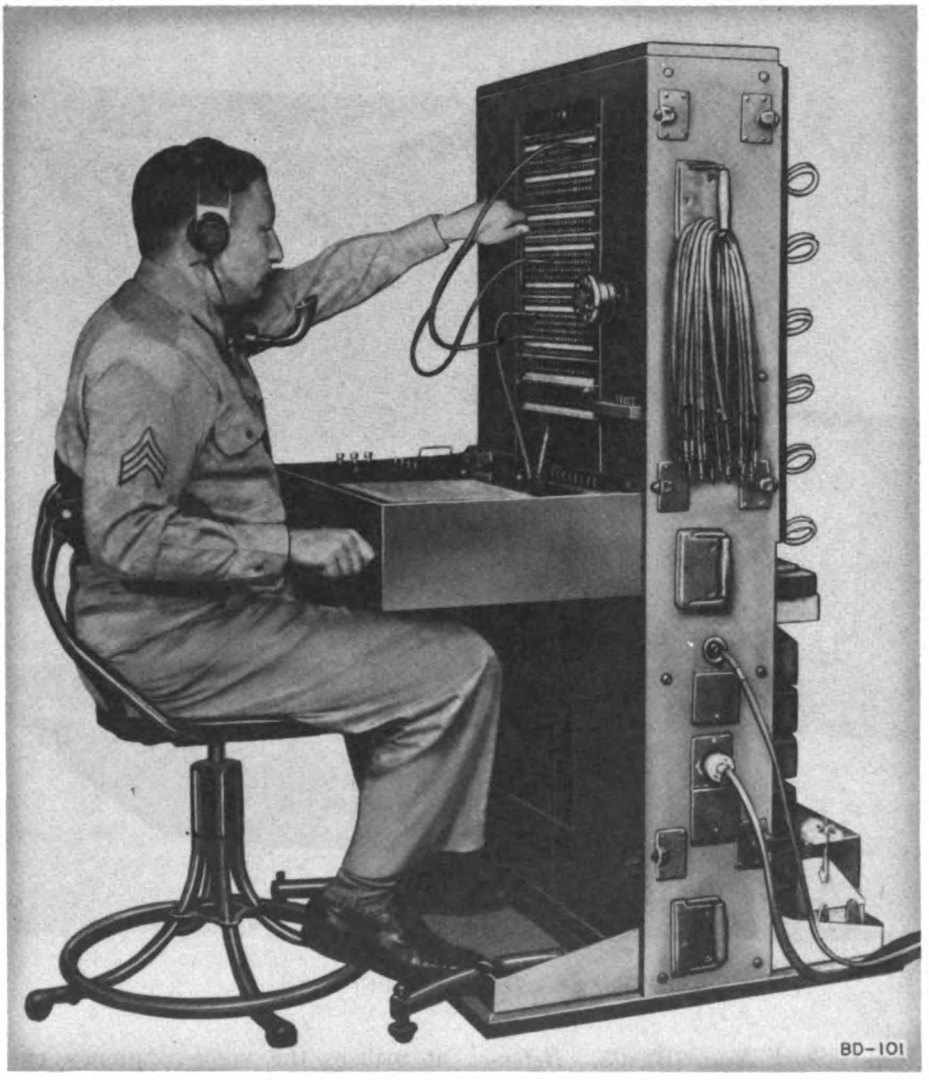


Figure 21. Test Board BD–101.

Status: Standard. *Stock No.:* 3F4480–101. *Reference:* TM 11–2063.

Test Board BD–101 is a portable, single-position, manually operated test board. It is used to provide a means for testing and locating faults in telephone and telegraph line facilities in either fixed plant or tactical use. All necessary cords and couplings, a headset, and a microphone are included.

TECHNICAL CHARACTERISTICS

CIRCUITS:
- 40 test jack circuits for simplex lines.
- 60 test jack circuits for nonsimplex lines

METER RANGES:
- 0 to 150 v, dc.
- 0 to 150 ma, dc.
- 1 ohm to 50 meg.

POWER:
- 110 v, ac, 50 to 60 cps.
- Battery operated (resistance measurements only)—6 Batteries.
- BA–8, 1 Battery BA–23, and 1 Battery BA–31.

WEIGHTS AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	64 x 27¼ x 29¼	650	29. 5
Export pack	70 x 33 x 35½	1, 075	39. 5

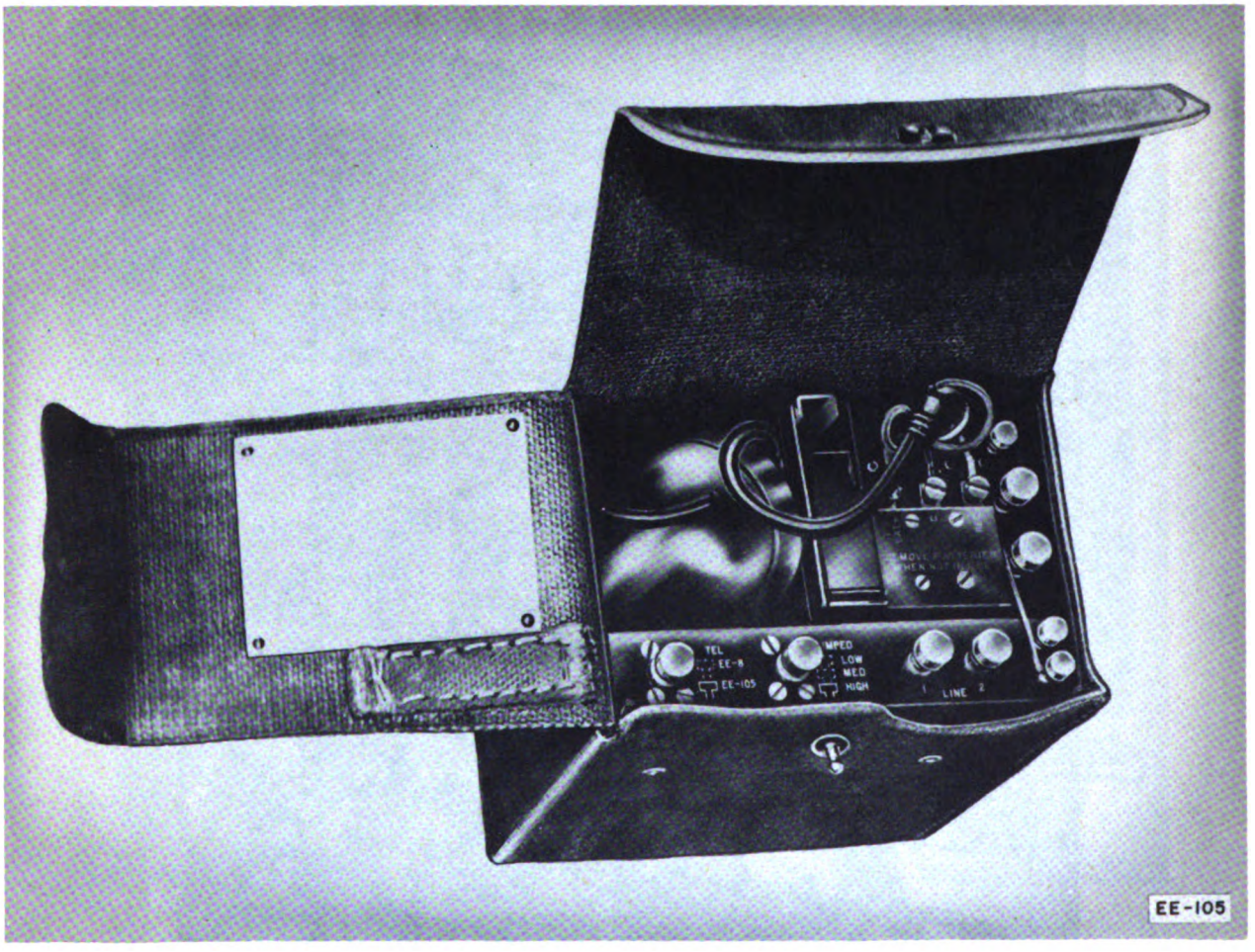


Figure 22. Telephone Unit EE-105

Status: Standard. *Stock No.:* 3B8405. *Reference:* TM 11-2014.

Telephone Unit EE-105 consists of a carrying case in which is mounted a Telephone EE-8-(*) with its associated handset, and on a separate chassis, a filter, an impedance control network, and four binding posts. A 1,000/20 whistle which is used for signaling is included with the unit. Telephone EE-105 is a portable telephone used by linemen and others on lines over which carrier systems are in operation. It may also be used on noncarrier lines, and it is particularly useful on such lines when they are equipped with voice-frequency repeaters. When used on carrier lines, it utilizes the voice-frequency channel for communication purposes.

TECHNICAL CHARACTERISTICS

IMPEDANCE:
- High—4,000 ohms.
- Medium—1,600 ohms.
- Low—negligible.

WHISTLE: 1,000/20 cps.

POWER: Battery operated—2 Batteries BA-30.

WEIGHT AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	9⅞ x 7¾ x 5	16	.22
Export pack	----------	----	.75

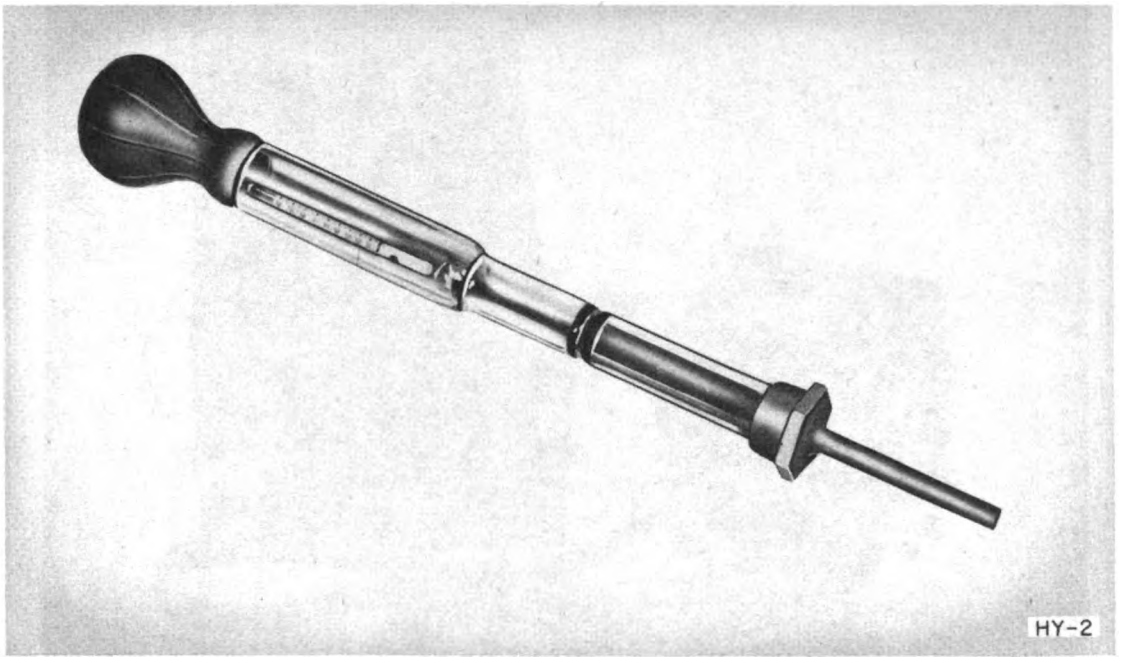


Figure 23. Hydrometer HY-2.

Status: Standard. *Stock No.*: 3B2202.

Hydrometer HY-2 is a syringe-type hydrometer consisting of a glass syringe and a glass hydrometer float. It is used for testing the specific gravity of storage battery electrolytes.

TECHNICAL CHARACTERISTICS

SPECIFIC GRAVITY RANGE: 1.100 to 1.300.

WEIGHTS AND VOLUMES

	Weight (lb)	*Volume (cu ft)*
Unpacked	.25	.02
Export pack	.7	.03

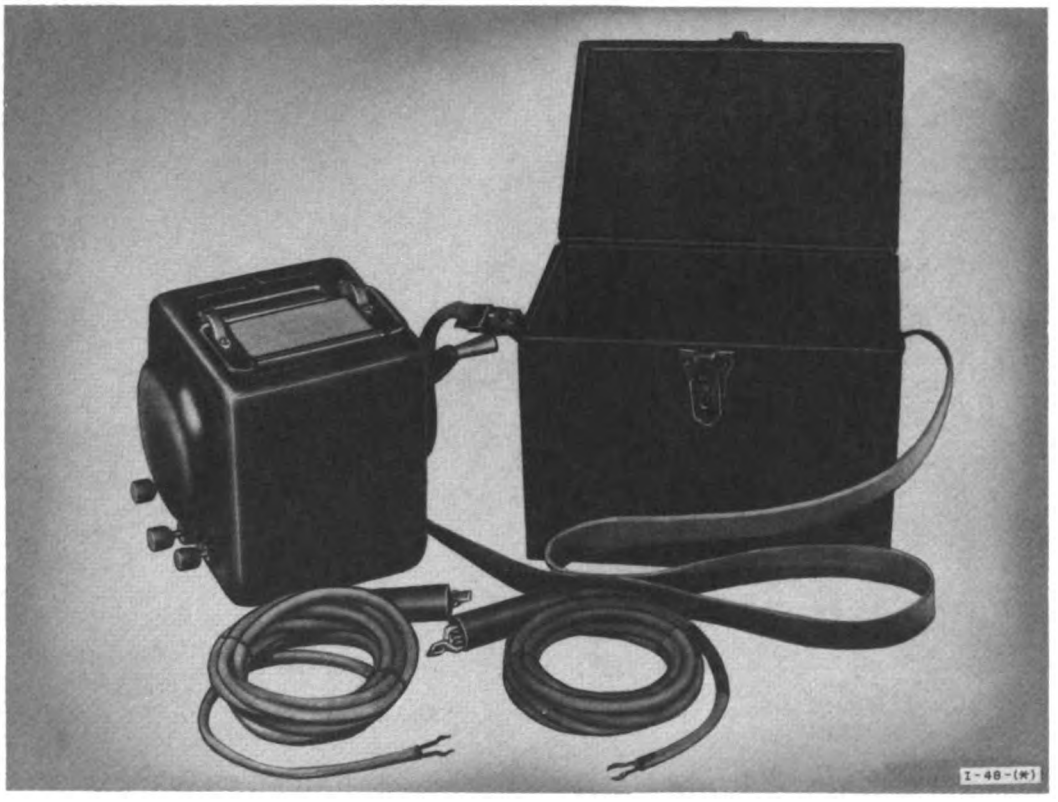


Figure 24. Test Set I-48-B.

Status: Standard. *Stock No.:* 3F4048A (I-4B-A) and 3F4048B (I-48-B). *Reference:* TM 11-2050.

Test Set I-48-(*) represents I-48-A and I-48-B. Test Set I-48-(*) is a portable insulation test set consisting of a high-range ohmmeter of special design mounted in the same case with a hand-operated d-c generator. Two test leads are furnished with the equipment. It is used to check insulation resistance of cables, between conductors of multiple cables, between windings and windings to ground in transformers, between windings and windings to frame in rotating equipment, and in other equipment where insulation resistance is an important factor. Test Set I-48-A differs from I-48-B in that it is equipped with a 1:10 ratio switch.

TECHNICAL CHARACTERISTICS

RANGE: 0 to 1,000 meg.
POTENTIAL: 500 v, dc.

WEIGHTS AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	9¾ x 6½ x 8½	13. 7	. 32
Export pack	----------	29¼	. 9

Figure 25. Test Set I–49.

Status: Standard. *Stock No.:* 3F4049. *Reference:* TM 11–2019.

Test Set I–49 is a portable direct-reading Wheatstone bridge having four decades in steps of 1, 10, 100, and 1,000 ohms. It is used to determine the location of faults in a circuit, to determine if a circuit is in normal condition, to determine unknown resistances, and as an auxiliary resistance box.

TECHNICAL CHARACTERISTICS

RANGE:
0 to 10 meg.
1/100 to 100/1 multiplying dial.
ACCURACY: ±.1%.
POWER: Battery operated—3 Batteries BA–30.

WEIGHTS AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	8⅞ x 7⅜ x 5¾	12	.22
Export pack	----------	19½	1.0

I-50

Figure 26. Voltammeter I–50.

Status: Standard. *Stock No.:* 3F6050.

Voltammeter I–50 is a portable dc voltammeter used for general purpose testing of electrical equipment.

TECHNICAL CHARACTERISTICS

RANGES:
0 to 150 v, dc.
0 to 30 amp, dc.
ACCURACY: ±1%

WEIGHTS AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	4⅜ x 4⅜ x 1½	1. 1	. 02
Domestic pack	----------	5. 4	. 19
Export pack	----------	9. 4	. 62

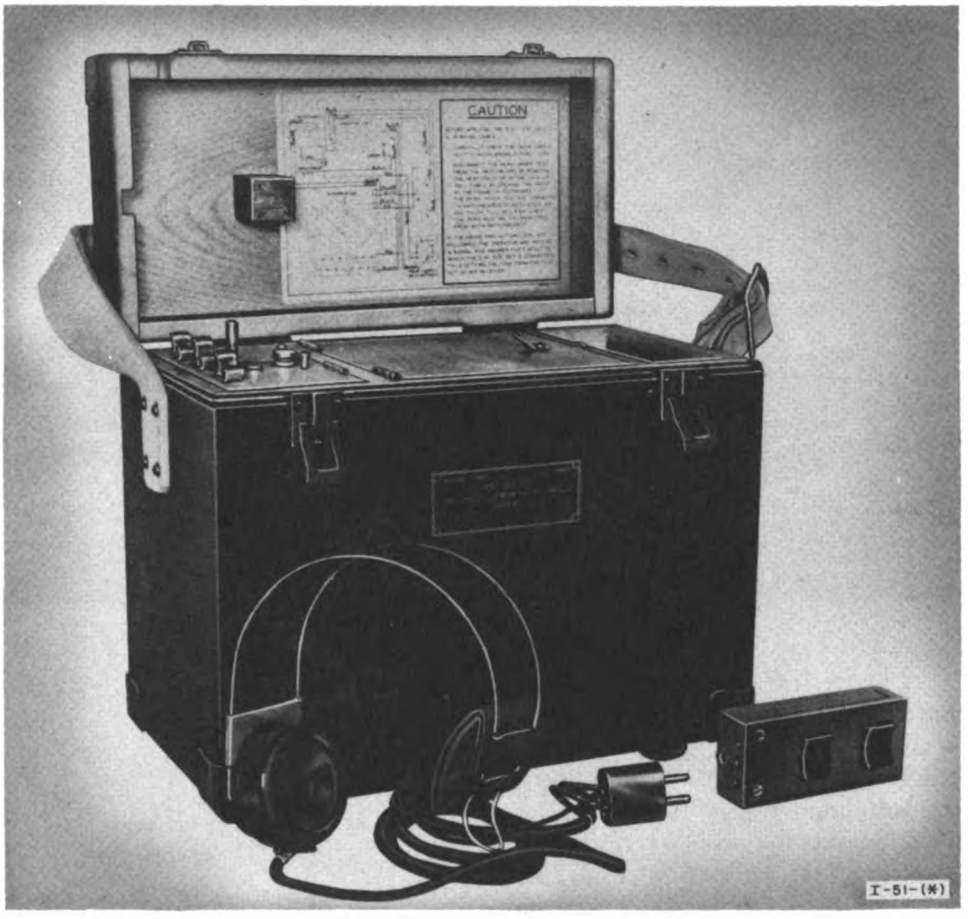


Figure 27. Test Set I-51.

Status: Standard. *Stock No.:* 3F4051. *Reference:* TM 11-379.

Test Set I-51-(*) represents I-51, I-51-A, I-51-B, and I-51-C. Test Set I-51-(*) is a cable repairman's portable test set consisting of a tone unit, an exploring coil, and a telephone receiver and cord. It is used to locate faults in short lengths of nonloaded telephone cable. It detects grounds, shorts, split pairs, and wet spots. It *cannot* be used to locate opens.

TECHNICAL CHARACTERISTICS

POWER: Battery operated—4 Batteries BA-23.

WEIGHTS AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	12 x 6½ x 10½	13	.47
Export pack	----------	33	1.45

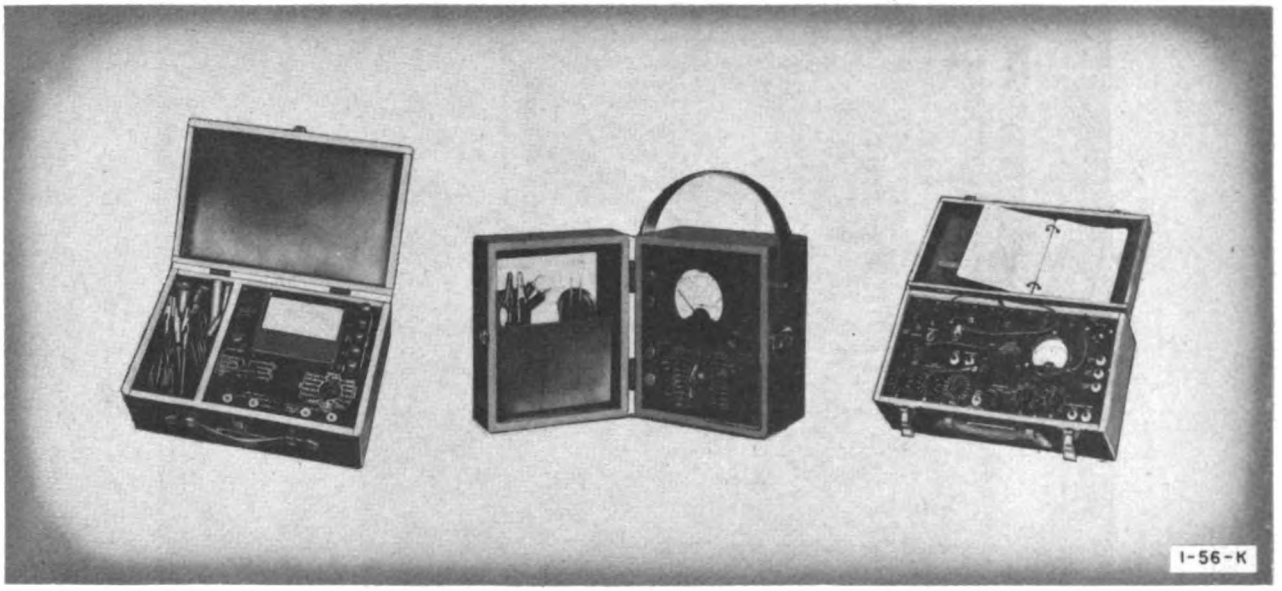


Figure 28. Test Set I-56-K.

Status: Limited/Std. *Stock No.:* 3F4056-K. *Reference:* TM 11-303.

Test Set I-56-K is a radio test set consisting of a multimeter, a voltohmmeter, and a tube tester. Test Set I-56-K is used to measure resistance, current, and voltage. It is used also to test vacuum tubes and to measure their mutual conductance values.

To be replaced by a combination of Multimeter TS-352/U and Tube Tester I-177-( ).

TECHNICAL CHARACTERISTICS

METER RANGES:
0 to 1,000 v, ac.
0 to 1,500 v, dc.
0 to 5 amp, ac.
0 to 10 amp, dc.
0 to 1 meg.
0 to 1,500 micromhos.
0 to 150 v, a-f output voltage.

POWER: 105 to 125 v, ac, 60 cps.

PRINCIPAL COMPONENTS

Item	*Dimensions (in.)*	*Weight (lb)*
Test Unit I-176-( )	11½ x 5½ x 8½	9. 0
Voltohmmeter I-166-( )	7 x 6 x 5½	3. 75
Tube Tester I-177-( )	15½ x 5¾ x 8½	15. 75

PACKED WEIGHT AND VOLUME

	Weight (lb)	*Volume (cu ft)*
Export pack	60	3. 0

Figure 29. Ohmmeter I–67.

Status: Limited/Std. *Stock No.:* 3F3467.1.

Ohmmeter I–67 is a general purpose multirange meter used for test of radio equipment. Two test leads are supplied with the instrument.

To be replaced by Multimeter TS–352/U.

TECHNICAL CHARACTERISTICS

RANGES:
0 to 10 meg.
0 to 1,000 v, dc.
0 to 100 ma, dc.

POWER: Battery operated—1 Battery BA–30.

WEIGHTS AND DIMENSIONS

	Dimensions (in.)	*Weight* (lb)	*Volume* (cu ft)
Unpacked	8¼ x 5½ x 3 27/32	5	.10
Domestic pack	----------	7	.5
Export pack	----------	10	.7

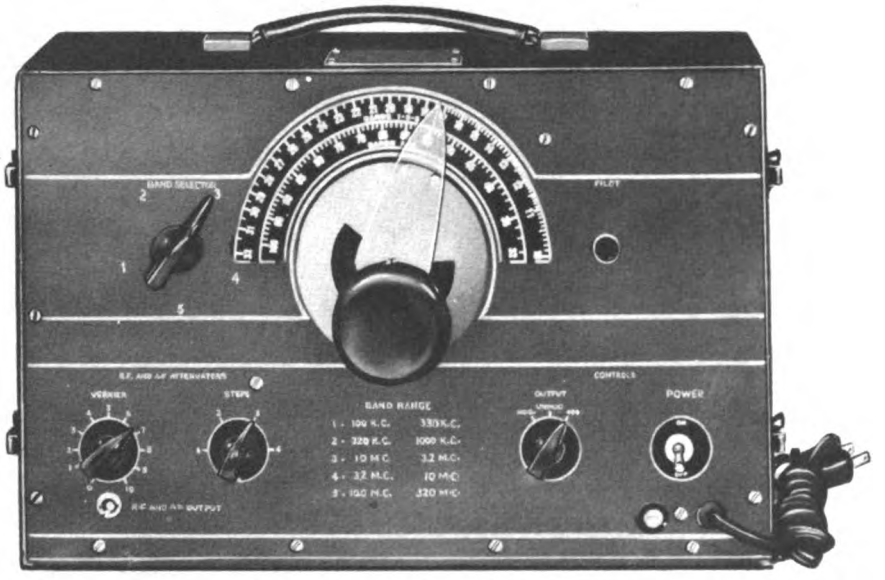


Figure 30. Signal Generator I-72-H.

Status: Standard. *Stock No.:* 3F3852. *References:* TM 11-307, TM 11-4052.

Signal Generator I-72-(*) represents I-72-G, I-72-H, I-72-J, I-72-K, and I-72-L. Signal Generator I-72-(*) is a portable instrument producing either unmodulated or amplitude-modulated r-f output. It is used to aline the r-f and i-f circuits of radio receivers. For this application, the signal generator normally is used with an a-f output meter (not p/o Signal Generator I-72-(*)).

TECHNICAL CHARACTERISTICS

FREQUENCY RANGE: R-f—100 kc to 32 mc, unmodulated or amplitude modulated approximately 30 percent by a 400-cps a-f signal voltage.

OUTPUT:

R-f—over 30,000 μv with attenuators set for maximum on all frequencies except in the region of 10,000 to 20,000 kc, where the maximum output may be exceed 10,000 μv.

A-f—approximately 1.5 rms v with the attenuators set for maximum.

POWER: 110 to 125 v, ac, 60 cps.

WEIGHTS AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	9 7/16 x 15½ x 6¾	23	.57
Domestic pack	----------	24.5	1.0
Export pack	----------	49	2.0

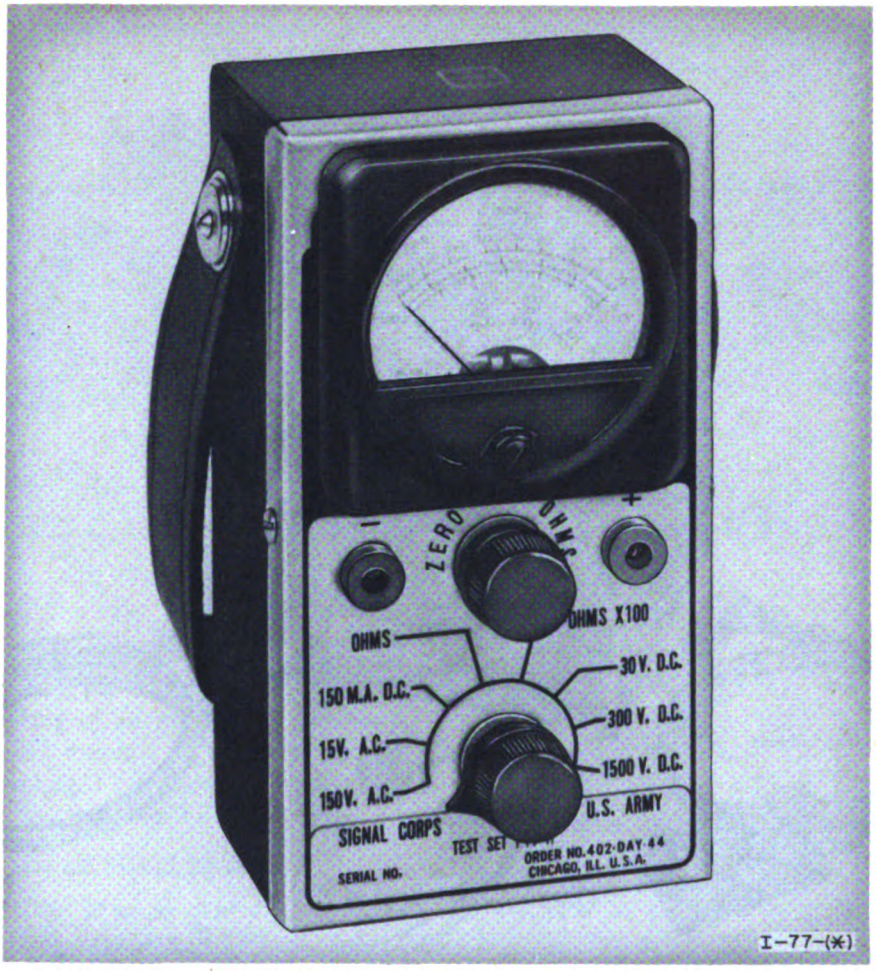


Figure 31. Test Set I–77.

Status: Standard. *Stock No.:* 3F4077.

Test Set I–77 is a pocket-type general purpose multimeter. Two test leads are included with the equipment. It is used to measure current, resistance, and voltage. It is possible to detect shorted capacitors with the set. The unit is not an output meter, but may be used to make *comparative* indications of ac output.

To be replaced by Multimeter TS–297/U.

TECHNICAL CHARACTERISTICS

RANGES:
0 to 150 v, ac.
0 to 1,500 v, dc.
0 to 150 ma, dc.
0 to 300,000 ohms.

POWER: Battery operated—1 Battery BA–42.

WEIGHTS AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	5⅝ x 3½ x 2⅜	2. 38	. 03
Export pack [1]		20	1. 0

[1] Packed two to a container.

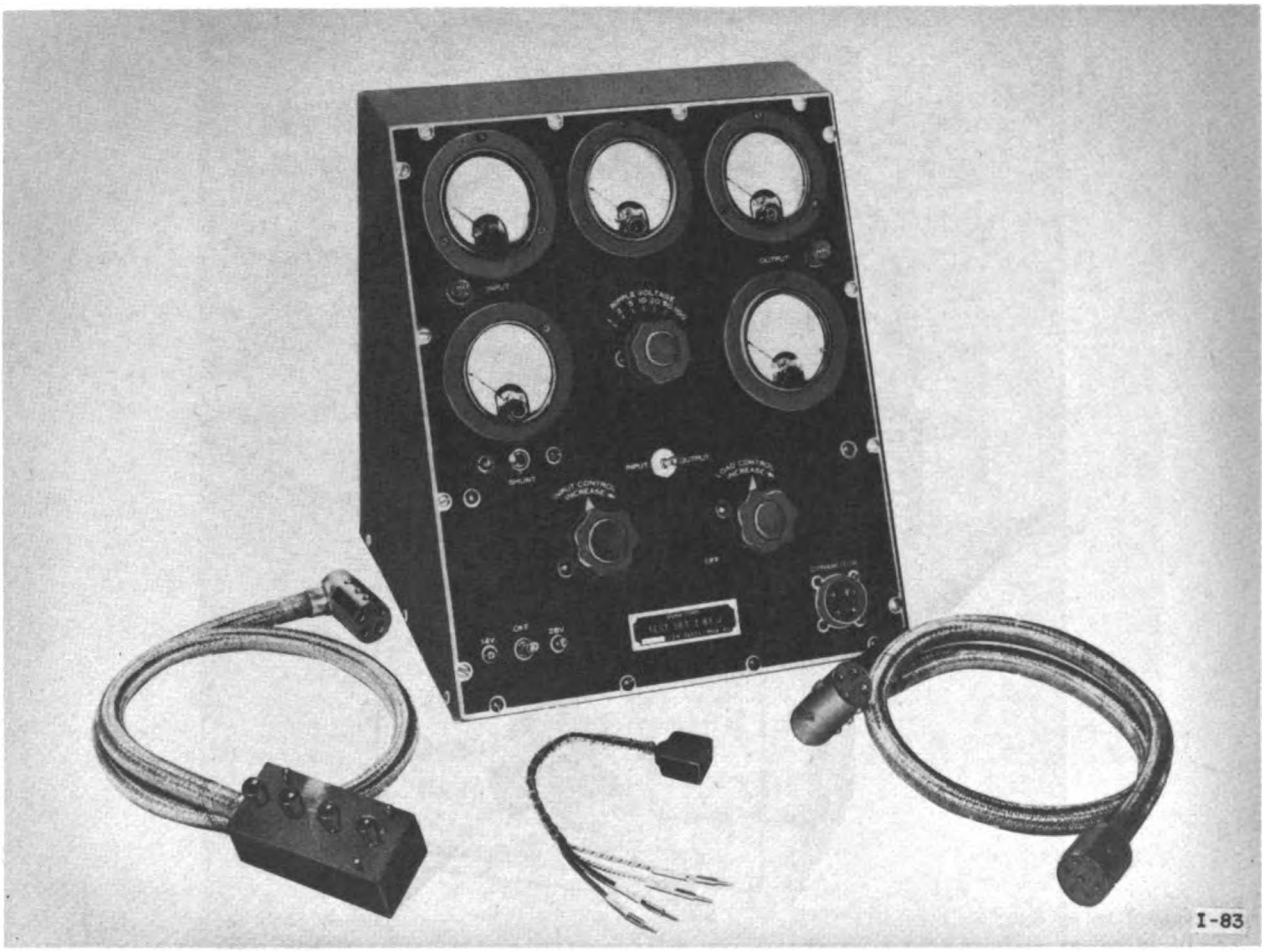


Figure 32. Test Set I-83-J.

Status: Standard. *Stock No.:* 3F4083. *Reference:* TM 11-2506.

Test Set I-83-(*) represents I-83-A, I-83-B, I-83-C, I-83-D, I-83-E, I-83-F, I-83-G, I-83-H, I-83-J, and I-83-K, Test Set I-83-(*) is a dynamotor test set with separate input and output metering and control facilities. Three cords are included with the equipment. It is used for dc measurements on low-voltage, high-current input dynamotors and on high-voltage, low-current output dynamotors. It is used for testing 14- and 28-v dynamotor units.

To be replaced by Test Set I-199. (See Test Equipment IE-9-C.)

TECHNICAL CHARACTERISTICS

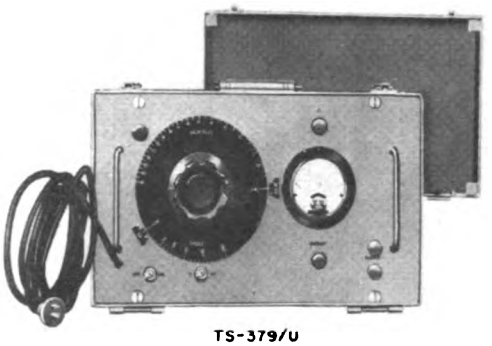
RANGES:
0 to 28 v, dc, input.
0 to 500 v, dc, output.
0 to 10 amp, dc, input.
0 to 250 ma, dc, output.

RIPPLE VOLTAGE MEASUREMENTS: 2 to 200 v, input and output.

POWER: None.

WEIGHTS AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	12⅜ x 10½ x 12⅛	20	.91
Export pack	----------	47	2.2


TS-379/U


TS-402/U


TS-399/U

I-120

Figure 33. Test Set I–120.

Status: Limited/Std. *Stock No.:* 3F4120.

Test Set I–120 is an assembly of telephone test equipments consisting of an attenuator, an oscillator, and a decibel meter. It is used for the maintenance of packaged telephone equipment.

To be replaced by Test Set TS–140/PCM.

TECHNICAL CHARACTERISTICS

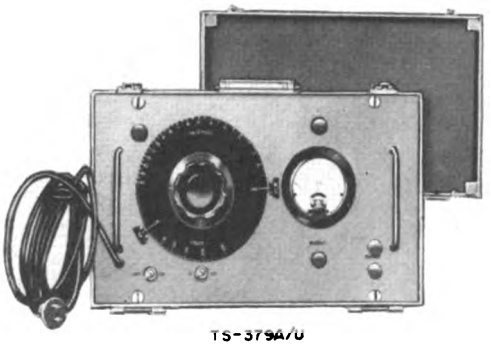
FREQUENCY RANGE: 30 cps to 15 kc.
MEASURING RANGE: −45 to +10 dbm.
ATTENUATION: 0 to 81 db.
IMPEDANCE: 600 ohms.
OUTPUT: −4 to +6 dbm.
POWER: 105 to 125 v, ac, 50 to 70 cps.

PRINCIPAL COMPONENTS

Item	*Dimensions (in.)*	*Weight (lb)*
Attenuator TS–402/U	6¾ x 4⅛ x 5	5
Audio Oscillator TS–379/U	15⅛ x 19¼ x 9⅝	27
Decibel Meter TS–399/U	11 x 6½ x 8	14

PACKED WEIGHT AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Export pack	14 x 27 x 14	110	3



I-120-A

Figure 34. Test Set I-120-A.

Status: Limited/Std. *Stock No.*: 3F4120.

Test Set I-120-A is an assembly of telephone test equipments consisting of an attenuator, an oscillator, and a decibel meter. It is used for the maintenance of packaged telephone equipment.

To be replaced by Test Set TS-140/PCM.

TECHNICAL CHARACTERISTICS

FREQUENCY RANGE: 30 cps to 15 kc.
MEASURING RANGE: −45 to +10 dbm.
ATTENUATION: 0 to 75 db.
IMPEDANCE: 600 ohms.
OUTPUT: −4 to +6 dbm.
POWER: 105 to 125 v, ac, 50 to 70 cps.

PRINCIPAL COMPONENTS

Item	*Dimensions (in.)*	*Weight (lb)*
Attenuator WECo No. ITE-4187.	8½ x 4 23/32 x 3	4¾
Audio Oscillator TS-379A/U	15⅛ x 19¼ x 9⅝	27
Decibel Meter TS-399A/U	11 x 6½ x 8	14

PACKED WEIGHT AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Export pack	14 x 27 x 14	110	3

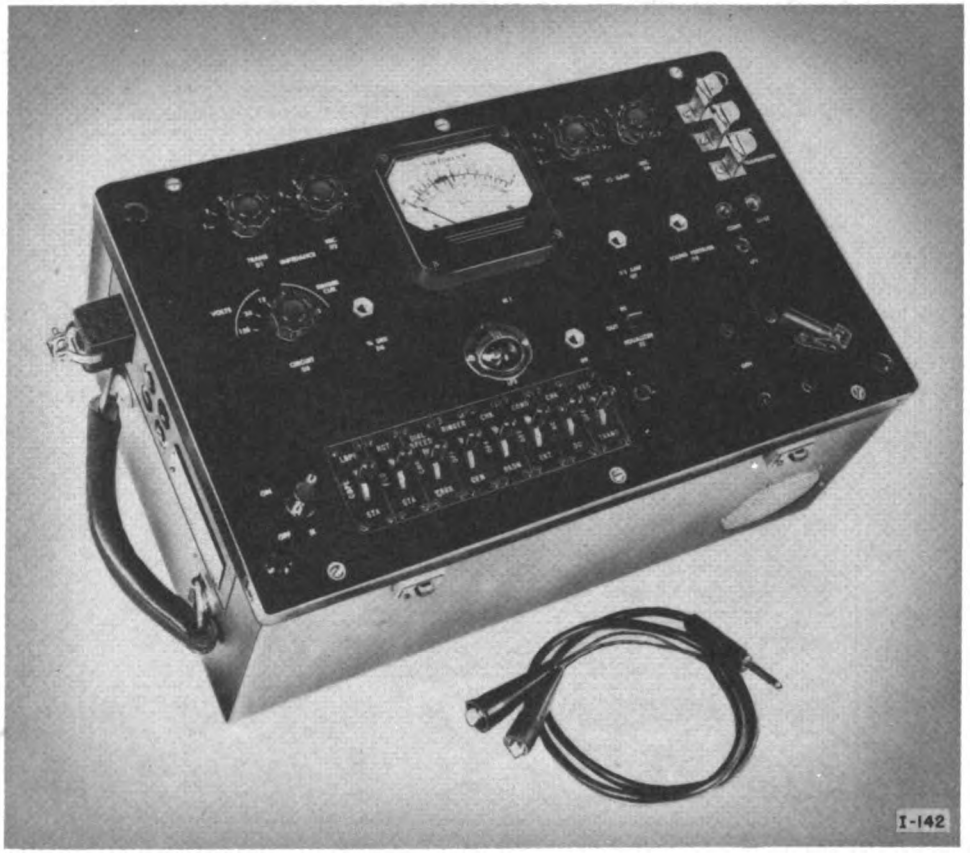


Figure 35. Test Set I-142.

Status: Standard. *Stock No.:* 3F4142. *Reference:* TM 11-2062.

Test Set I-142-(*) represents I-142, I-142-A, and I-142-B. Test Set I-142-(*) is a composite measuring instrument designed for measuring the electrical characteristics of telephone equipment. It consists of a sound source and the following independent test circuits: an output measuring circuit, a capacitor measuring circuit, a generator test circuit, a ringer test circuit, an insulation resistance test circuit, a dial test circuit, a continuity test circuit, and an instrument test circuit.

TECHNICAL CHARACTERISTICS

SOUND SOURCE: Acoustic output—10 dynes per square centimeter over a range of 500 to 2,500 cps.

MEASURING CIRCUIT:
- Input impedance—10,000 ohms.
- Range—.0002 to 3.8 v.
- Response—Uniform from 300 to 5,000 cps.

CAPACITOR TEST CIRCUIT: Testing range—Capacitors from .05 to 4μf, indicates open circuited units and those having a leakage resistance of less than 10 meg.

RINGER TEST CIRCUIT: Supplies operating current of 16⅔ cps to ringers of three different impedances.

INSULATION RESISTANCE TEST CIRCUIT:
- Resistance range—0 to 1 meg.
- Peak voltage—200 v into .2 meg.

INSTRUMENT TEST CIRCUITS:
- 600-ohm impedance circuit for local battery or sound-powered telephones.
- 24-v, 361-ohm dc resistance, 320-ohm ac impedance circuit for common battery telephones.
- 24-v, 361-ohm dc resistance of 3-v, 4-ohm dc resistance power efficiency circuit adjustable to match impedances of 30, 60, 75, 150, and 300 ohms for testing carbon type microphones.
- Resistive loads to match impedances of 128, 256, 512, 1,024, 5,000, and 10,000 ohms for testing receivers and magnetic microphones.

POWER: Battery operated—2 Batteries BA-23, 3 Batteries BA-26, 4 Batteries BA-210/U, 2 Batteries BB-49.

WEIGHTS AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	19 x 12 x 9	40	1. 18
Export pack	27 x 17½ x 15⅞	90	4. 34

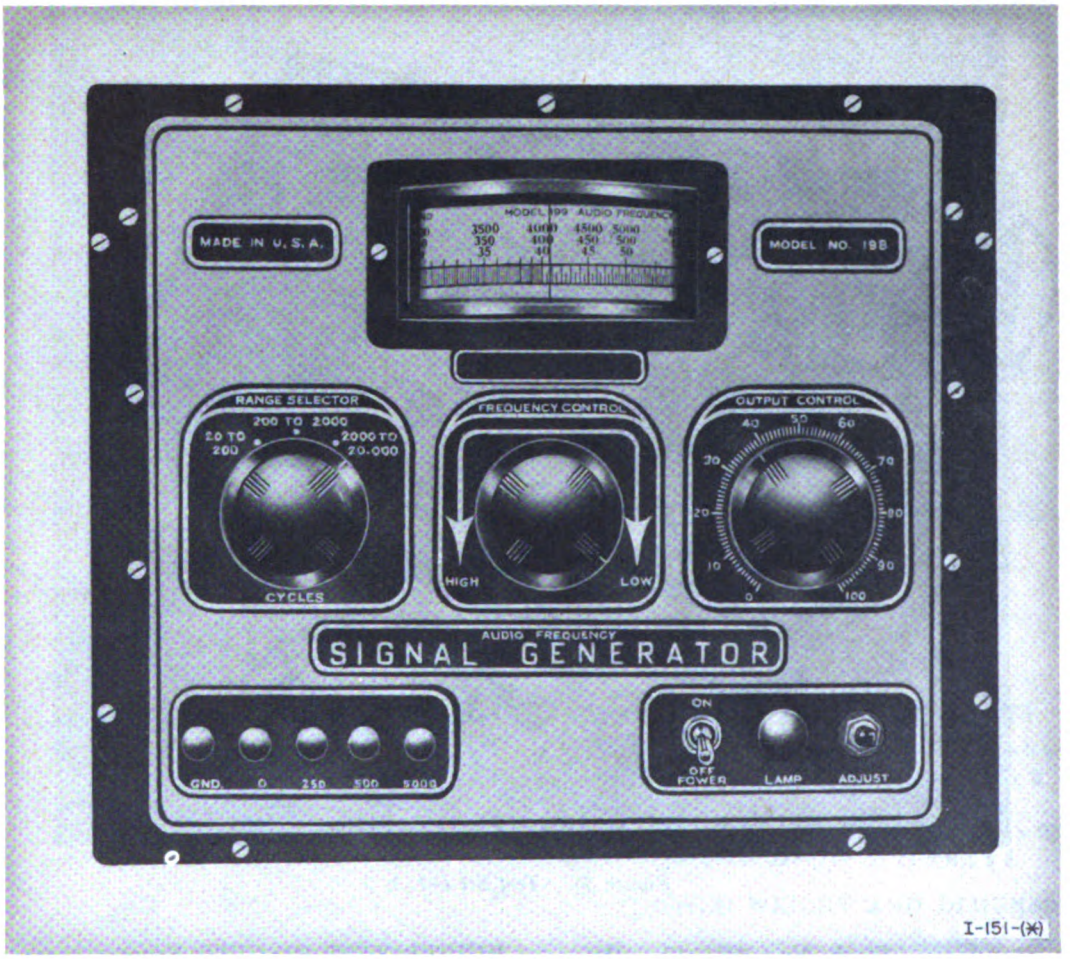


Figure 36. Oscillator I-151-B.

Status: Limited/Std. *Stock No.:* 3F3559. *Reference:* TM 11-2524.

Oscillator I-151-(*) represents I-151, I-151-A, I-151-B, I-151-C, I-151-D, and I-151-E. Oscillator I-151-(*) is a resistance-capacitance type audio oscillator. It is used to provide a-f test signals for various tests in electronic equipment. With a calibrated frequency dial, it also may be used as a secondary frequency standard.

TECHNICAL CHARACTERISTICS

FREQUENCY RANGE: 20 to 20,000 cps.
IMPEDANCE: 5,000, 500, 250, and 10 ohms.
POWER OUTPUT: 100 mw.
POWER: 110 to 120 v, ac, 60 cps.

WEIGHTS AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	15 x 7 x 9½	38. 4	. 58
Export pack		65	2. 0

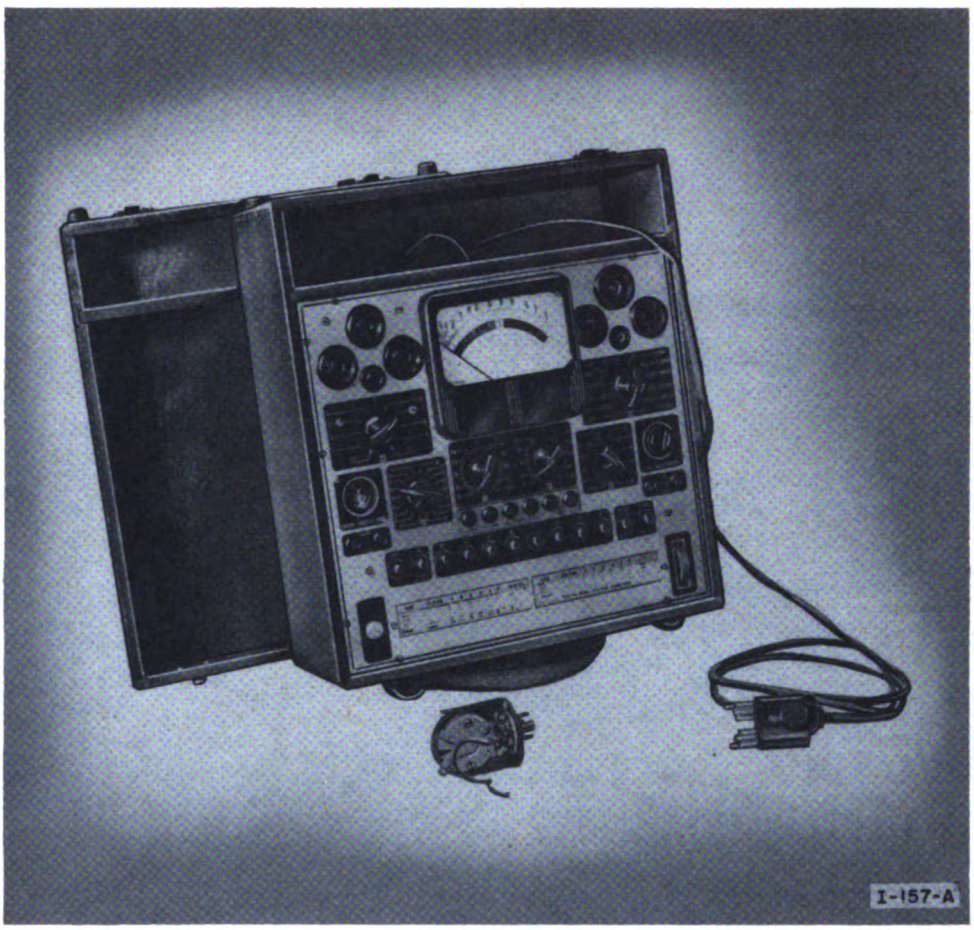


Figure 37. Test Set I-157-A.

Status: Standard. *Stock No.:* 3F4157. *Reference:* TM 11-1209.

Test Set I-157-A is a combination tube tester and multipurpose meter. It includes two test leads and is used to check radio tubes, portable radio batteries, pilot lights, and mica, paper, and electrolytic capacitors. It is also used to obtain rapid measurements of voltage, current, resistance, output readings, decibel readings, and dc leakage.

TECHNICAL CHARACTERISTICS

RANGES:
0 to 3,000 v, ac and dc.
0 to 12 amp dc.
0 to 10 meg.
−10 to +64 db.
0 to 3,000 v, output voltage.

POWER: 110 to 125 v, ac, 50 to 60 cps.

WEIGHTS AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	13 1/16 x 12 1/16 x 6	15	.60
Export pack	----------	36.9	1.25

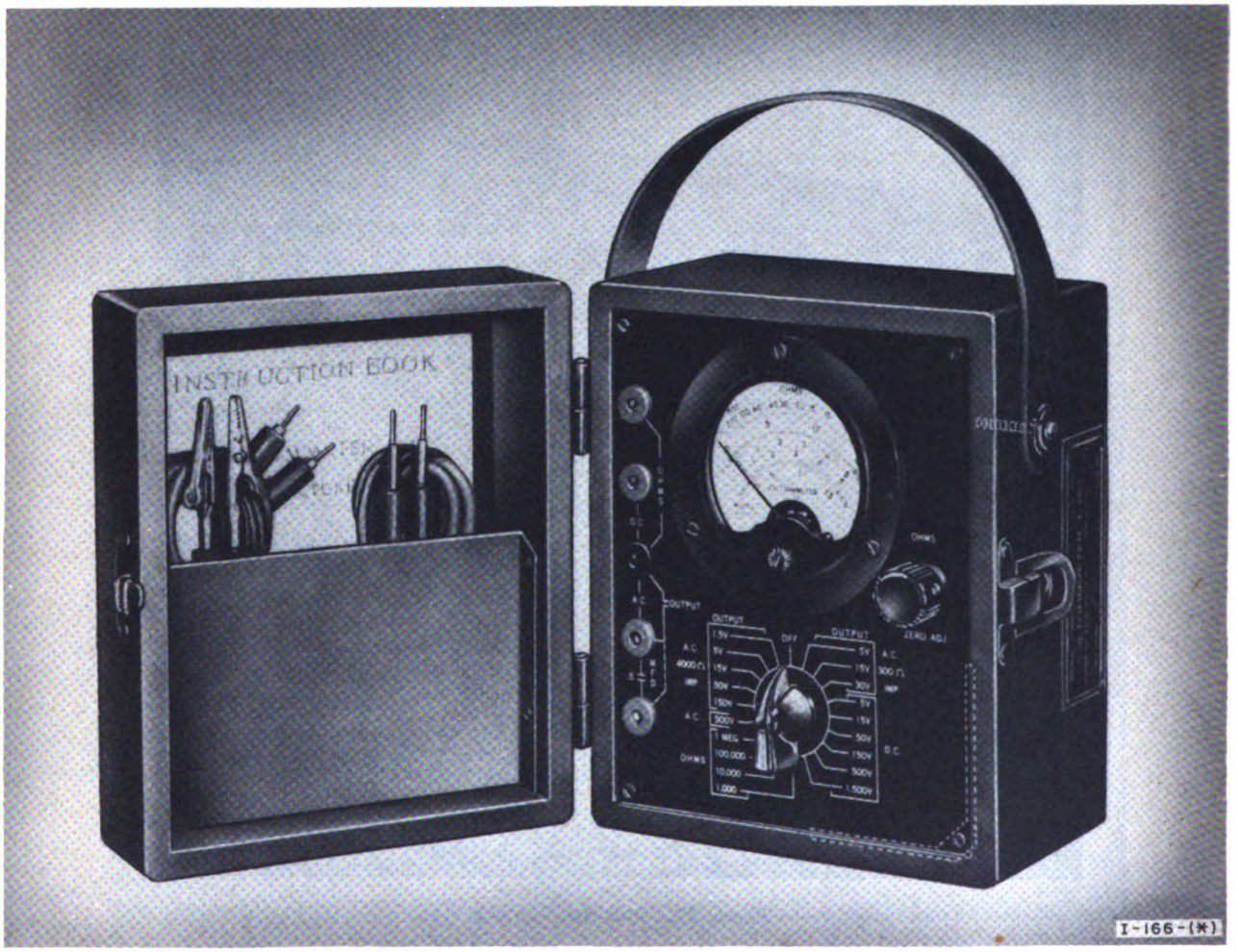


Figure 38. Voltohmmeter I-166.

Status: Limited/Std. *Stock No.:* 3F7166. *Reference:* TM 11-2613.

Voltohmmeter I-166-(*) represents I-166 and I-166-A. Voltohmmeter I-166-(*) is a general purpose measuring instrument used for servicing radio equipment. It is used to measure ac and dc voltages and dc resistances. The equipment includes two test leads and four test clips.

P/o Test Set I-56-K.

To be replaced by Multimeter TS-352/U.

TECHNICAL CHARACTERISTICS

RANGES:
0 to 500 v, ac.
0 to 1,500 v, dc.
0 to 1 meg.
0 to 150 v, a-f output voltage.

POWER: Battery operated—1 Battery BA-31.

WEIGHTS AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	7 x 6 x 5½	5½	.13
Domestic pack	9⅝ x 8⅝ x 7½	6	.36
Export pack		14¼	.54

Figure 39. Test Unit I-176.

Status: Limited/Std. *Stock No.:* 3F4470-176. *Reference:* TM 11-2626.

Test Unit I-176-(*) represents I-176, I-176-A, and I-176-B. Test Unit I-176-(*) is a general purpose ac and dc multimeter and is used to measure current and voltage over a wide range. The equipment includes a test lead, four test clips, and one pair of high-voltage multiplier leads.

P/o Test Set I-56-K.

To be replaced by Multimeter TS-352/U.

TECHNICAL CHARACTERISTICS

RANGES:
0 to 1,000 v, a-c.
0 to 5,000 v, dc.
0 to 10 amp, ac.
0 to 5 amp, dc.
0 to 10 meg.

POWER: Battery operated-1 Battery BA-2, 1 Battery BA-30

WEIGHTS AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	5½ x 11½ x 8½	9	.31
Export pack	----------	35	1.75

Figure 40. Tube Tester I-177.

Status: Standard. *Stock No.:* 3F5720-177. *Reference:* TM 11-2627.

Tube Tester I-177-(*) represents I-177, I-177-A, and I-177-B. Tube Tester I-177-(*) is a dynamic mutual conductance tube tester. A test lead is included with the equipment. Tube Tester I-177-(*) is used to provide either REPLACE or GOOD readings or mutual conductance values in micromhos. It is used to test the operating characteristics of receiving and small transmitting tubes and to test for gaseous tubes, noisy tubes, and short circuits between tube elements.

P/o Test Set I-56-K.

TECHNICAL CHARACTERISTICS

MUTUAL CONDUCTANCE RANGE: 0 to 15,000 micromhos.

POWER: 105 to 125 v, ac, 60 cps.

WEIGHTS AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	5¾ x 15½ x 8½	15¾	.44
Export pack		25½	1.0

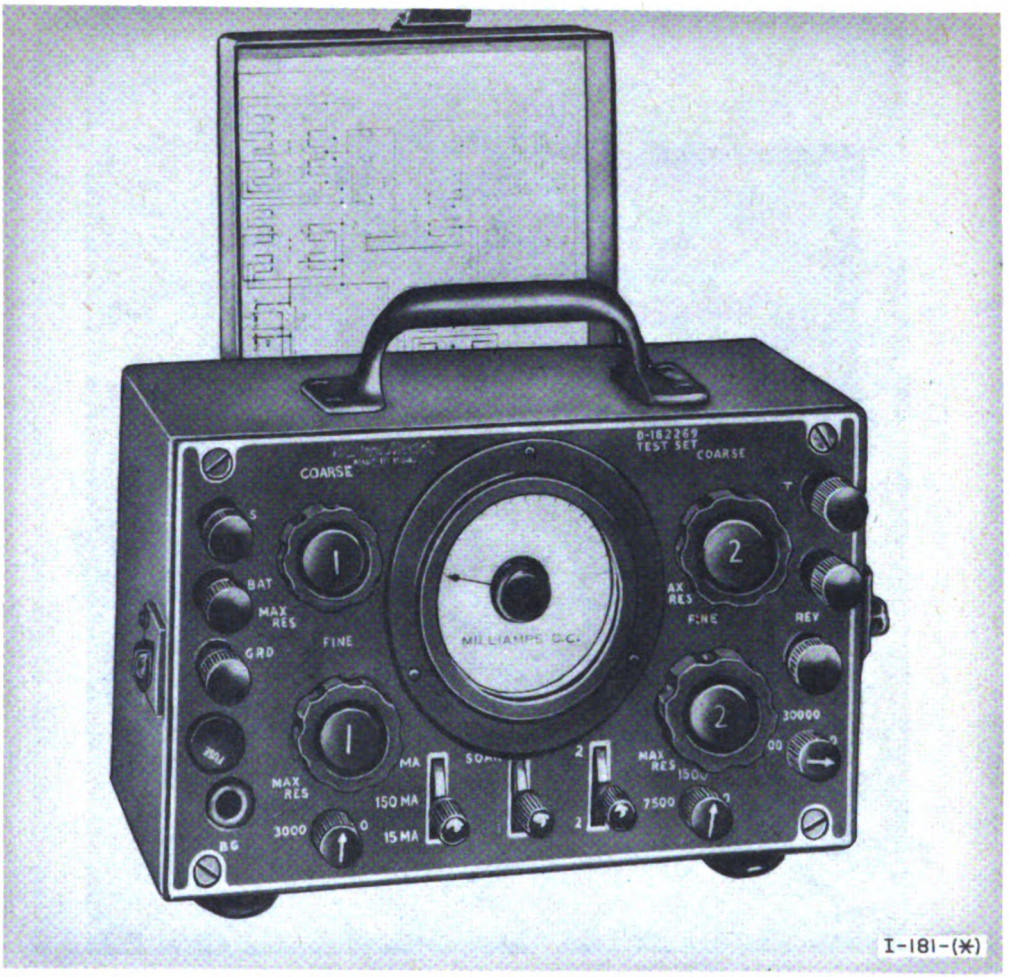


Figure 41. Test Set I-181.

Status: Standard. *Stock No.:* 3F4181. *Reference:* TM 11-2036.

Test Set I-181-(*) represents I-181, I-181-A, and I-181-B. Test Set I-181-(*) is a current-flow type relay adjusting set. It is adapted particularly for use with smaller installations of communications equipment because of its simplicity of operation and portability. Four cords and a test pick are included with the equipment. Test Set I-181-(*) is used to measure and control the amount of current flow through the windings of a relay, drop, or similar electromagnetic apparatus. It also may be used as a d-c milliammeter.

P/o Test Set AN/FCM-2.

TECHNICAL CHARACTERISTICS

CURRENT MEASURING RANGE: 0 to 150 ma, dc.
RESISTANCE: 5,000, or 500 and 10,000 ohms.

WEIGHTS AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	8¾ x 5⅛ x 5⅛	9	13
Export pack	----------	25	1

Figure 42. Test Set I-193-A.

Status: Standard. *Stock No.:* 3F4139 (I-193), 3F4139A (I-193-A), 3F4139B (I-193-B), 3F4139C (I-193-C). *Reference:* TM 11-2513.

Test Set I-193-(*) represents I-193, I-193-A, I-193-B, and I-193-C. Test Set I-193-(*) is a portable polar relay test unit. Two two-conductor and one three-conductor cords are included with the equipment. Test Set I-193-(*) is used to test and adjust polar relays 225A, D-163119A, and D-164816. It is used with repeaters TG-30 and TG-31.

P/o Test Set AN/FCM-6.

TECHNICAL CHARACTERISTICS

POWER: 115 to 130 v, dc.

WEIGHTS AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	23 x 12¾ x 11⅜	63	1. 93
Domestic pack	----------	82	3
Export pack	----------	100	6. 0

Figure 43. Test Set I-209-B.

Status: Standard. *Stock No.:* 3F4190-209B. *Reference:* TM 11-2501.

Test Set I-209-(*) represents I-209, I-209-A, and I-209-B. Test Set I-209-(*) consists of a vibrating reed frequency meter and an ac voltmeter. Two test leads and an adapter connector are supplied with the equipment. It is used to test the power supply systems of Radio Direction Finder Central TC-8 and Radio Intercept Central TC-9, or of any other system the voltage and frequency requirements of which are 110 v, and 60 cps, ac.

TECHNICAL CHARACTERISTICS

RANGES:
0 to 150 v, ac.
58 to 62 cps.

WEIGHTS AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	8¾ x 5¾ x 5¾	5¼	.17
Export pack	14 x 9 x 9	12	.65

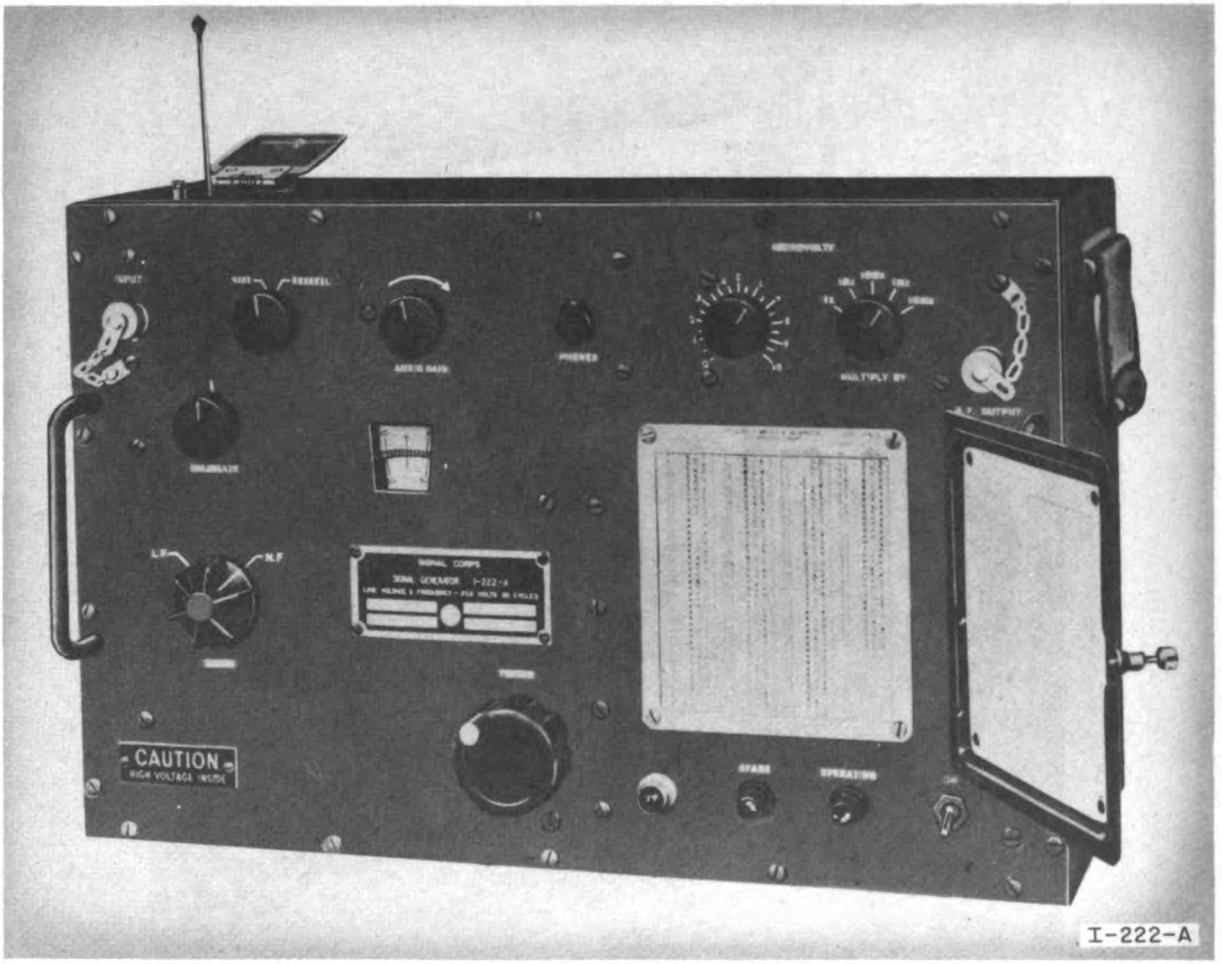


Figure 44. Signal Generator I-222-A.

Status: Standard. *Stock No.:* 3F4325-222A. *Reference:* TM 11-1082.

Signal Generator I-222-A is a combination signal generator and heterodyne-type frequency meter. Three cords are included with the equipment. Signal Generator I-222-A is used to provide an accurate and reliable method of checking the frequency output of radio transmitters and to aline radio receivers.

TECHNICAL CHARACTERISTICS

FREQUENCY RANGES:
8 to 15 mc.
45 to 76 mc.
135 to 230 mc.
POWER: 105 to 130 v, ac, 60 cps.

WEIGHTS AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	19½ x 12 x 7½	50	1.0
Export pack		85	3.0

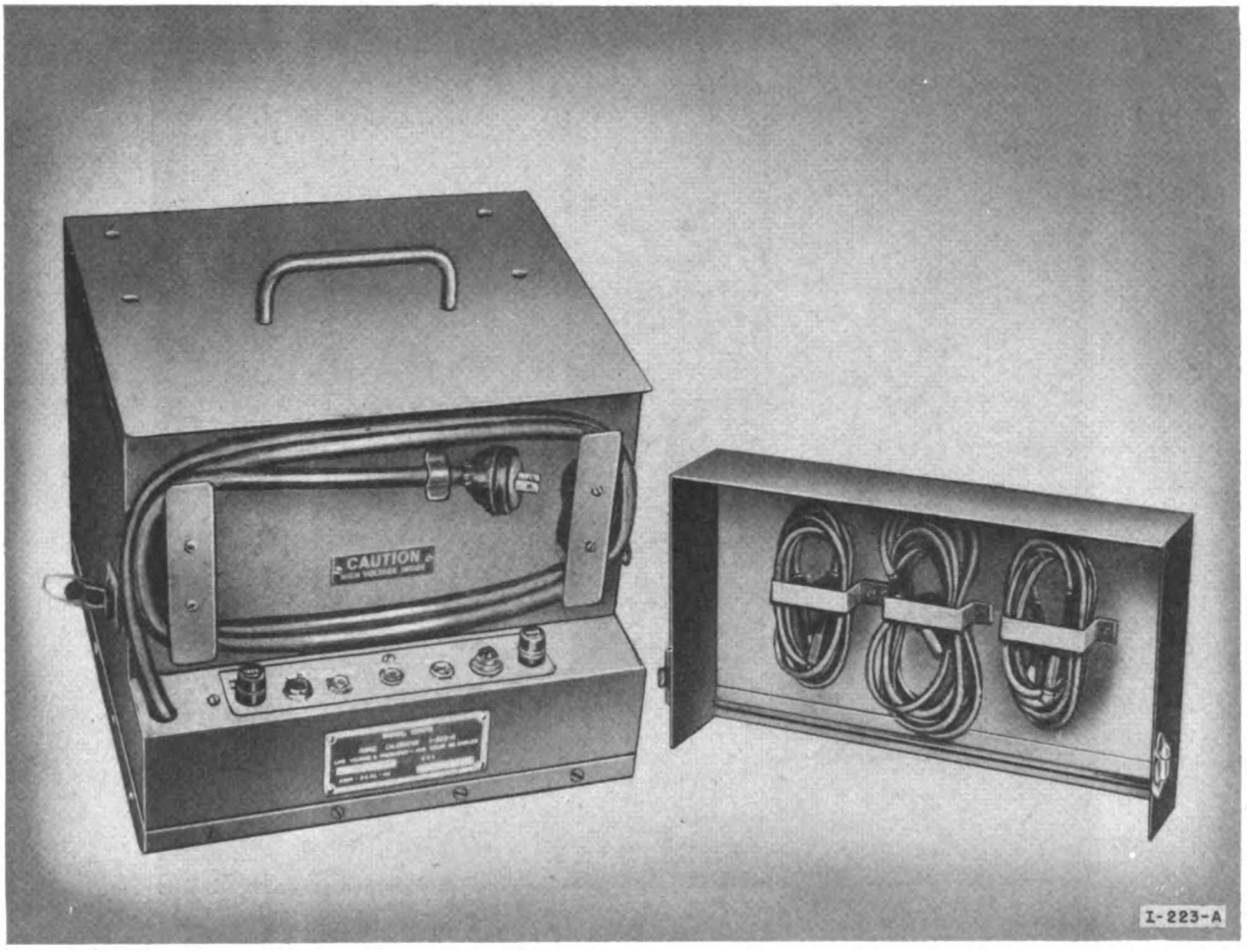


Figure 45. Range Calibrator I-223-A.

Status: Standard. *Stock No.:* 3F2440-223. *Reference:* TM 11-2528.

Range Calibrator I-223-A consists of a crystal oscillator and accessory equipment which provide signals of the proper frequency and pulse for checking the range measuring circuits of pulse-operated radar equipment.

P/o Radio Equipment RC-184.

TECHNICAL CHARACTERISTICS

OUTPUT:
Sine wave at 163.94 kc.
Synchronizing pulse at 240 pulses per sec.
¼-sec pulses at 163,940 pulses per sec.
POWER: 105 to 130 v, ac, 60 cps.

WEIGHTS AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	12¼ x 11 1/16 x 9¾	31	.81
Export pack		47	1.275

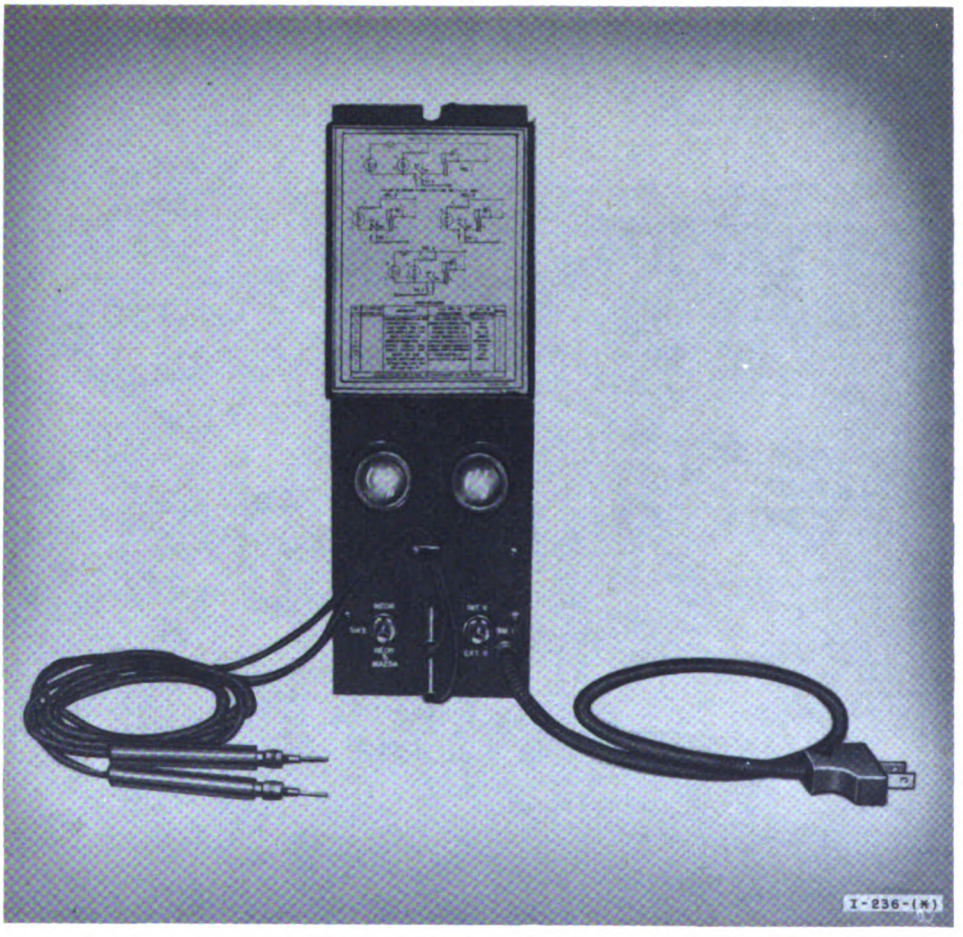


Figure 46. Test Unit I-236.

Status: Standard. *Stock No.:* 3F4470-236. *Reference:* TM 11-2056.

Test Unit I-236 is a portable test instrument used to test teletypewriter equipment. It utilizes neon and incandescent lamp indicators and is used to check continuity of circuits to differentiate between ac and dc voltages, to check fuses, and to test capacitors found in teletypewriter equipment.

To be replaced by Multimeter TS-297/U.

TECHNICAL CHARACTERISTICS

STARTING VOLTAGE OF NEON LAMP: 55 v, ac; 90 v, dc.
FUSE TEST RANGE: 2 ma or higher.
POWER: 115 to 130 v, ac or dc.

WEIGHTS AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	3¾ x 3¾ x 4½	2	.04
Domestic pack	----------	2.5	.14

Figure 47. Multimeter I-239.

Status: Standard. *Stock No.:* 3F4190-239.

Multimeter I-239-(*) represents I-239, I-239-A, 1-239-B, and I-239-C. Multimeter I-239-(*) is a pocket-type voltohmmeter and is used to measure voltage, current, and resistance for general purpose testing of radio and radar equipment.

To be replaced by Multimeter TS-297/U.

TECHNICAL CHARACTERISTICS

RANGES:

0 to 1,000 v, ac and dc.
0 to 250 ma, dc.
0 to 250,000 ohms.

POWER: Battery operated.

MODEL WEIGHTS AND DIMENSIONS

Item	*Dimensions (in.)*	*Weight (lb)*
Multimeter I-239	3 1/16 x 5 7/8 x 2 1/8	.8
Multimeter I-239-A	4 33/64 x 3 41/64 x 2 9/16	.8
Miltimeter I-239-B	3 1/16 x 5 7/8 x 2 1/8	.8
Multimeter I-239-C	3 x 6 x 2 5/8	.8

PACKED WEIGHT AND VOLUME

	Weight (lb)	*Volume (cu ft)*
Export pack	1.5	.05

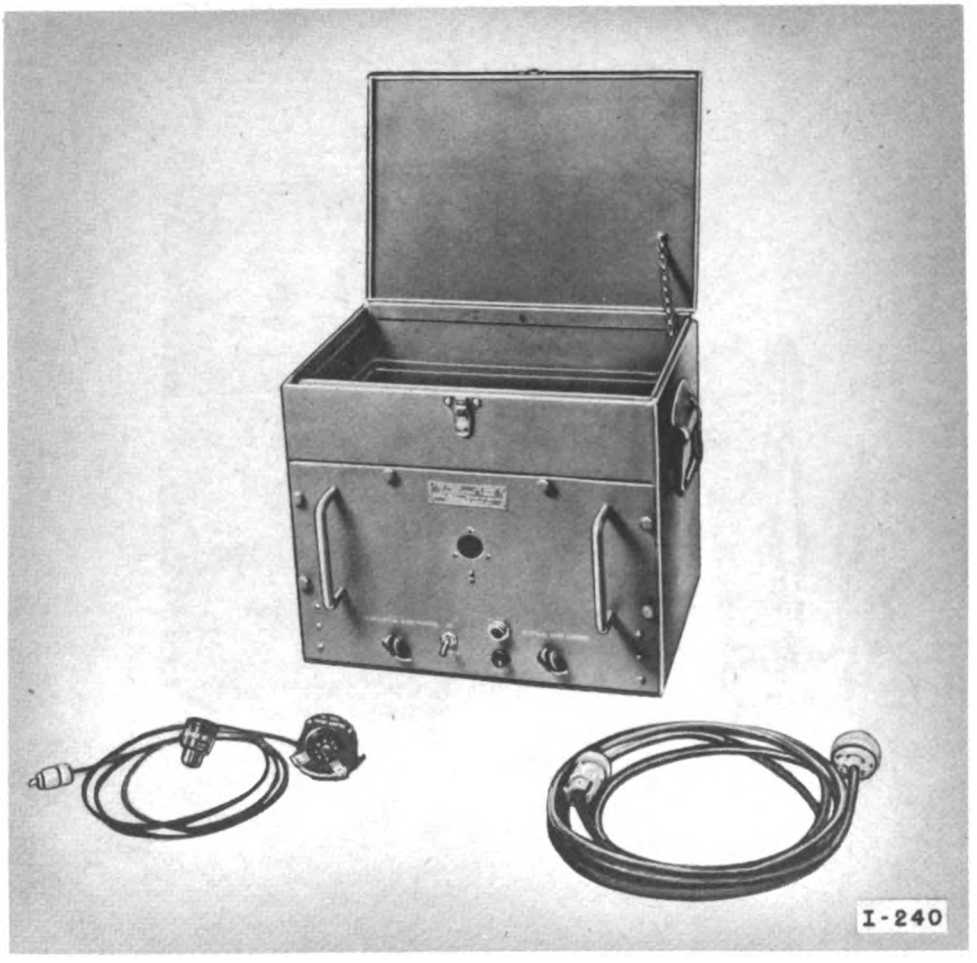


Figure 48. Calibrator I-240.

Status: Standard. *Stock No.:* 3F5790-240. *Reference:* TM 11-1226.

Calibrator I-240 consists of a magnetostriction oscillator and a cathode-ray tube. It is used to calibrate the frequency of the range-marker oscillator of radar sets. A cord with adapter and plug is furnished with the equipment.

P/o Test Set AN/MPM-15.

TECHNICAL CHARACTERISTICS

OSCILLATOR FREQUENCY: 18,624 cps sine-wave voltage.

POWER: 105 to 120 v, ac, 60 to 1,200 cps.

WEIGHTS AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	15⅛ x 12¾ x 13¾	40	1. 56
Domestic pack	----------	69	2. 3

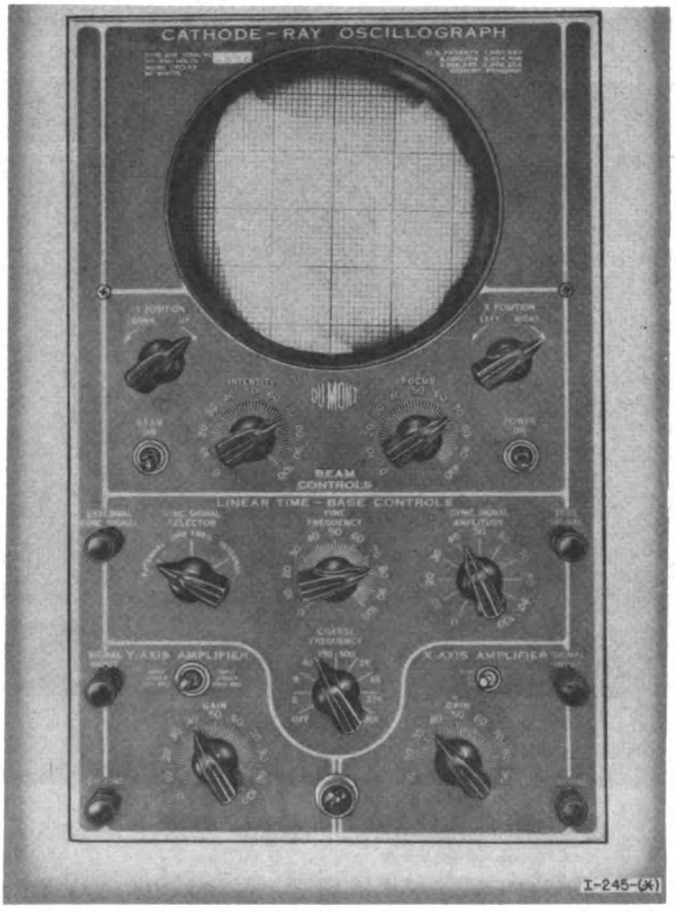


Figure 49. Oscilloscope I-245.

Status: Standard. *Stock No.:* 3F3640-245. *References:* TM 11-2689, TM 11-2689A.

Oscilloscope I-245-(*) represents I-245, I-245-A, and I-245-B. Oscilloscope I-245-(*) consists of a 5-inch cathode-ray tube using electrostatic focusing and deflection and is connected in a conventional oscilloscope circuit. It is used for viewing waveforms and for checking frequencies and phase relations at various test points in radio and radar sets.

P/o Radio Set SCR-784-( ).

To be replaced by Oscilloscope BC-1060-( ), Oscilloscope TS-239( )/UP, or Oscilloscope TS-34A/AP.

TECHNICAL CHARACTERISTICS

INPUT IMPEDANCE:
- Y-axis ..... 2 meg, 30 μμf.
- X-axis ..... 5 meg, 25 μμf.

MAXIMUM INPUT POTENTIAL:
- Y-axis ..... 250 rms v.
- X-axis ..... 25 rms v.

AMPLIFIER FREQUENCY RESPONSE:
- Y-axis ..... ±10 percent of maximum from 2 to 100,000 sinusoidal cps, 50 percent response at 325,000 cps.
- X-axis ..... ±10 percent of maximum from 2 to 100,000 sinusoidal cps, 50 percent response at 250,000 cps.

VOLTAGE GAIN:
- Y-axis ..... 2,000.
- X-axis ..... 43.

DEFLECTION FACTOR:
- Y-axis ..... .010 rms v per in.
- X-axis ..... .5 rms v per in.

SWEEP FREQUENCY: 2 to 50,000 cps.

POWER: 115 or 230 v, ac, 40 to 60 cps.

MODEL WEIGHTS AND DIMENSIONS

Item	*Dimensions (in.)*	*Weight (lb)*
Oscilloscope I-245	10¼ x 8 13/16 x 19½	54
Oscilloscope I-245-A	10 x 8¾ x 19½	53
Oscilloscope I-245-B	16¾ x 8 13/16 x 21½	56

PACKED WEIGHT AND VOLUME

	Weight (lb)	*Volume (cu ft)*
Export pack	125	4.6

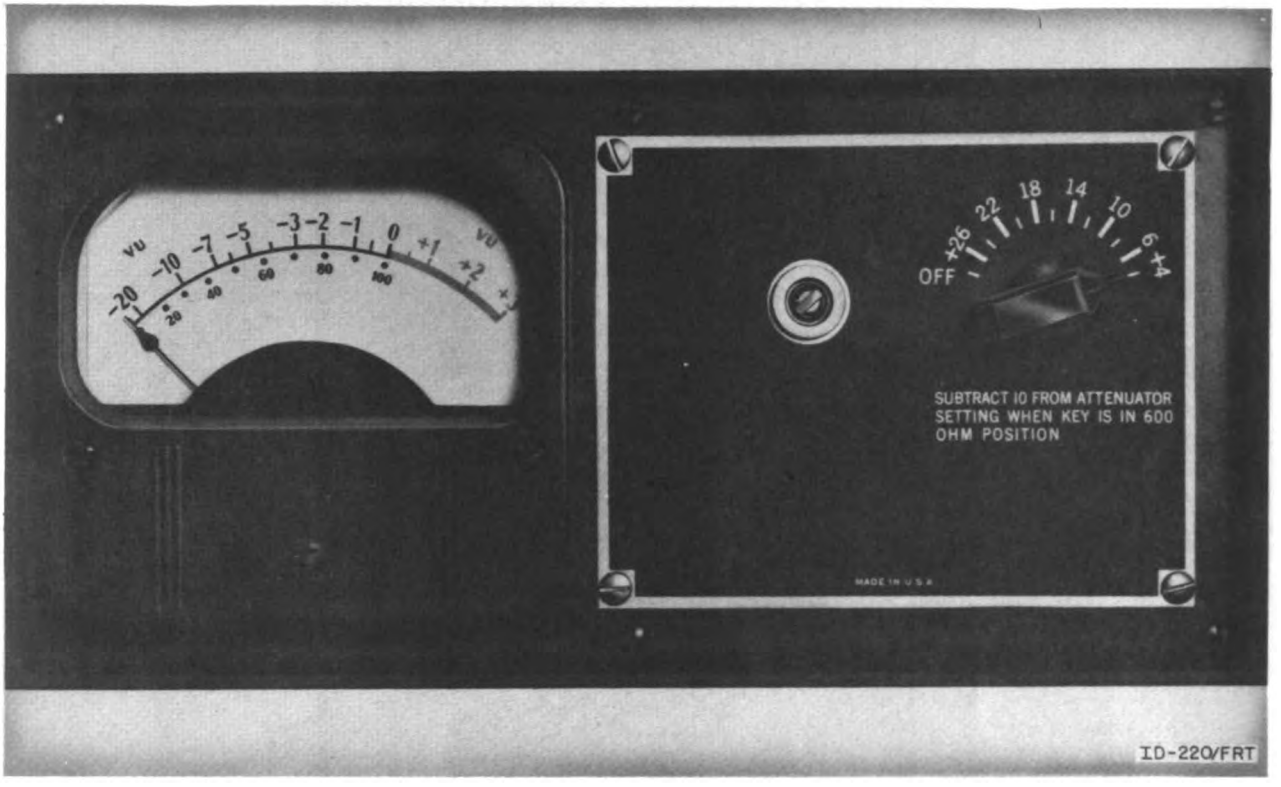


Figure 50. Volume Indicator ID–220/FRT.

Status: Limited/Std. *Stock No.:* 3F15600.

Volume Indicator ID–220/FRT is a copper-oxide, rectifier-type, audio output meter. It is used to measure volume levels in speech-input equipments for radio broadcasting and public address systems and in program line transmissions.

To be replaced by Output Meter TS–585( )/U.

TECHNICAL CHARACTERISTICS

RANGE: +4 to +26 vu.
INPUT IMPEDANCE: 7,500 ohms.

WEIGHT AND VOLUME

	Weight (lb)	*Volume (cu ft)*
Export pack	9. 5	. 53

Figure 51. Test Equipment IE-9-C.

Status: Standard. *Stock No.:* 3F3919C. *Reference:* TM 11-5026.

Test Equipment IE-9-C is an assembly of test equipments consisting of two frequency meter sets, two signal generators, a tube tester, a dynamotor test unit, a multimeter, an ammeter, headsets, antennas, cords, and adapters. Test Equipment IE-9-C is used for field and depot maintenance of radio equipment.

U/w but not p/o Field Radio Repair Truck M-30.

TECHNICAL CHARACTERISTICS

MEASURING RANGES:
- 100 kc to 45 mc.
- 0 to 15,000 micromhos.
- 0 to 1,000 v, ac.
- 0 to 5,000 v, dc.
- 0 to 10 amp, ac.
- 0 to 50 ma, dc.
- 0 to 1,000 meg.

INPUT:
- 0 to 60 v, dc.
- 0 to 120 v, ac.

OUTPUT:
- 0 to 1,200 v, dc.
- 0 to 120 v, ac.

PRINCIPAL COMPONENTS

Item	*Dimensions (in.)*	*Weight (lb)*
Frequency Meter Set SCR-211-( ).	15 x 11 x 10	39. 5
Frequency Meter Set I-129-( ).	13½ x 3½ x 5¾	3. 5
Signal Generator I-72-( )	9 7/16 x 15½ x 6¾	22. 2
Signal Generator I-208-( )	11½ x 12⅛ x 19	105
Tube Tester I-177-( )	5¾ x 15½ x 8½	16
Test Unit I-176-( )	5½ x 11½ x 8½	9
Electronic Multimeter TS-505 ( )/U.	11½ x 9½ x 9½	-----
Test Set I-199	----------	3. 75

PACKED WEIGHT AND VOLUME

	Weight (lb)	*Volume (cu ft)*
Export pack	850	40

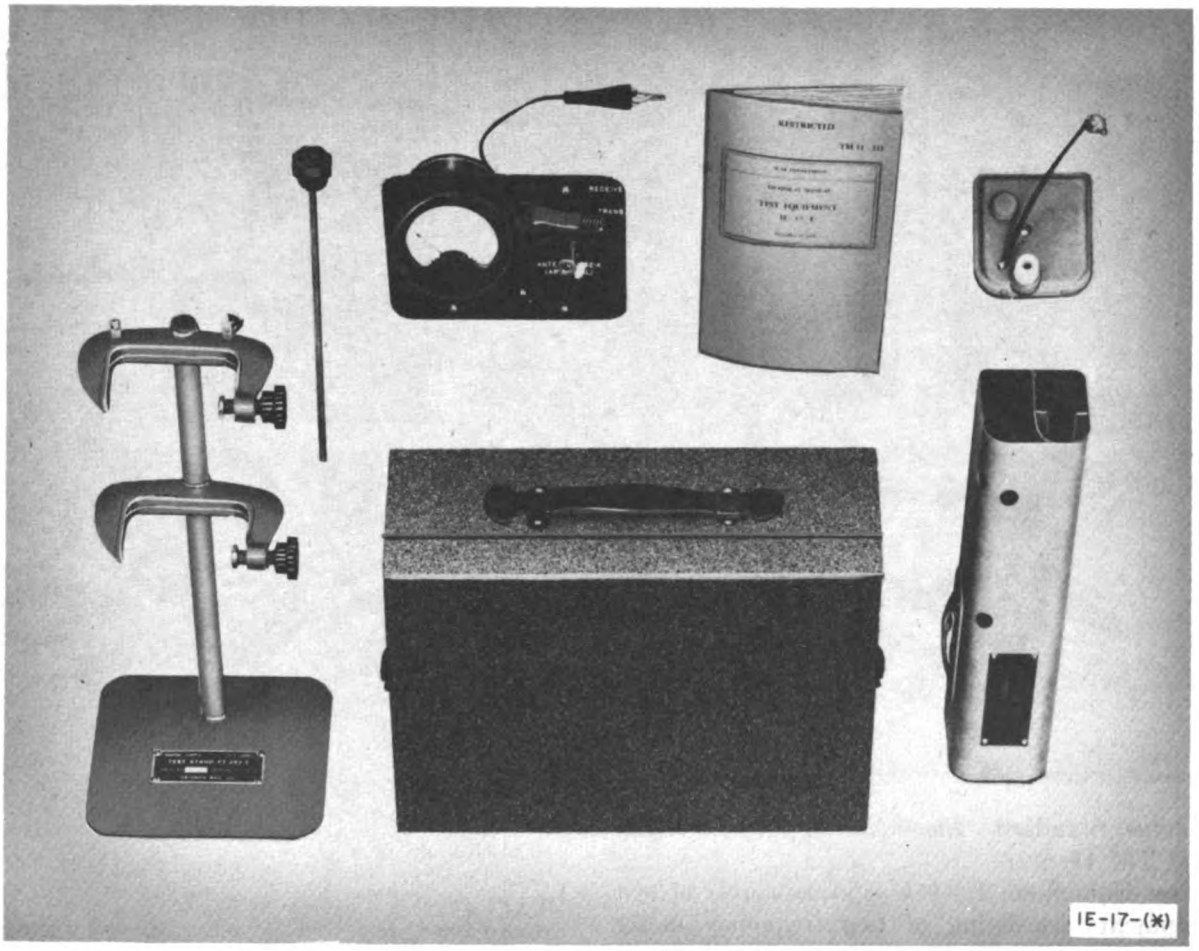


Figure 52. Test Equipment IE-17-E.

Status: Standard. *Stock No.:* 3F3927. *Reference:* TM 11-311.

Test Equipment IE-17-(*) represents IE-17, IE-17-A, IE-17-B, IE-17-C, IE-17-D, and IE-17-E. Test Equipment IE-17-(*) is an assembly of test equipments consisting of a multimeter-oscillator, a dummy antenna, a test stand, and a test case. Test Equipment IE-17-(*) is used for testing and alining Radio Set SCR-536-( ). It is also used to test the receiver and transmitter crystals and to measure the output of the batteries.

TECHNICAL CHARACTERISTICS

MEASURING RANGES:
0 to 60 v, ac.
0 to 150 v, dc.
0 to 600 ma, dc.

POWER: Battery operated—1 Battery BA-23, 2 Batteries BA-26.

PRINCIPAL COMPONENTS

Item	*Dimensions (in.)*	*Weight (lb)*
Antenna A-82-( )	4½ x 6½ x 13	1. 4
Test Case CS-81-( )	12¾ x 3¾ x 4⅜	1. 8
Test Stand FT-252-( )	13¼ x 7 x 7	3. 1
Test Unit I-135-( )	9¼ x 14⅝ x 6	13. 7

PACKED WEIGHTS AND VOLUMES

	Weight (lb)	*Volume (cu ft)*
Domestic pack	47	2. 7
Export pack	67	4

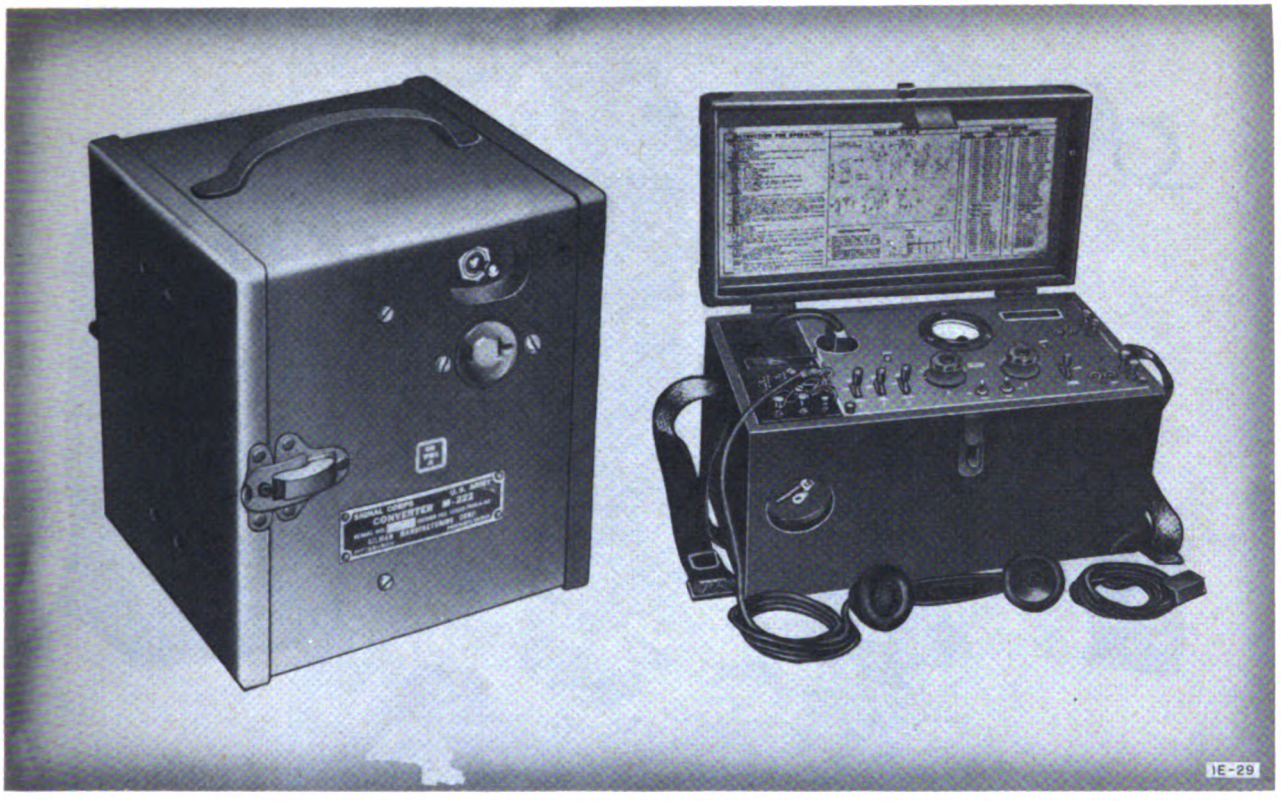


Figure 53. Converter M-222 and Test Set I-61-B of Test Equipment IE-29.

Status: Standard. *Stock No.:* 3F3933-29.

Test Equipment IE-29 is an assembly of test equipments consisting of a voltohmmeter, a tube tester, two test sets, and a converter. Test Equipment IE-29 is used as the basic test equipment for field and depot maintenance of wire communication equipment.

TECHNICAL CHARACTERISTICS

MEASURING RANGES:
- 0 to 150 v, a-f output.
- 0 to 500 v, ac.
- 0 to 1,500 v, dc.
- 0 to 1 meg.
- 0 to 15,000 micromhos.
- 500 to 2,500 cps.

POWER:
- 105 to 125 v, ac, 60 cps.
- Battery operated—6 Batteries BA-23, 1 Battery BA-31, 5 Batteries BA-30, 3 Batteries BA-56.

PRINCIPAL COMPONENTS

Item	*Dimensions (in.)*	*Weight (lb)*
Voltohmmeter I-166-( )	7 x 6 x 5½	3. 75
Tube Tester I-177-( )	15½ x 5¾ x 8½	15. 75
Test Set I-51	12 x 6½ x 10½	20
Test Set I-61-B	18¼ x 10⅛ x 11	47
Converter M-222	8¼ x 6¾ x 6⅝	11

PACKED WEIGHT

	Total weight (lb)
Export pack	137

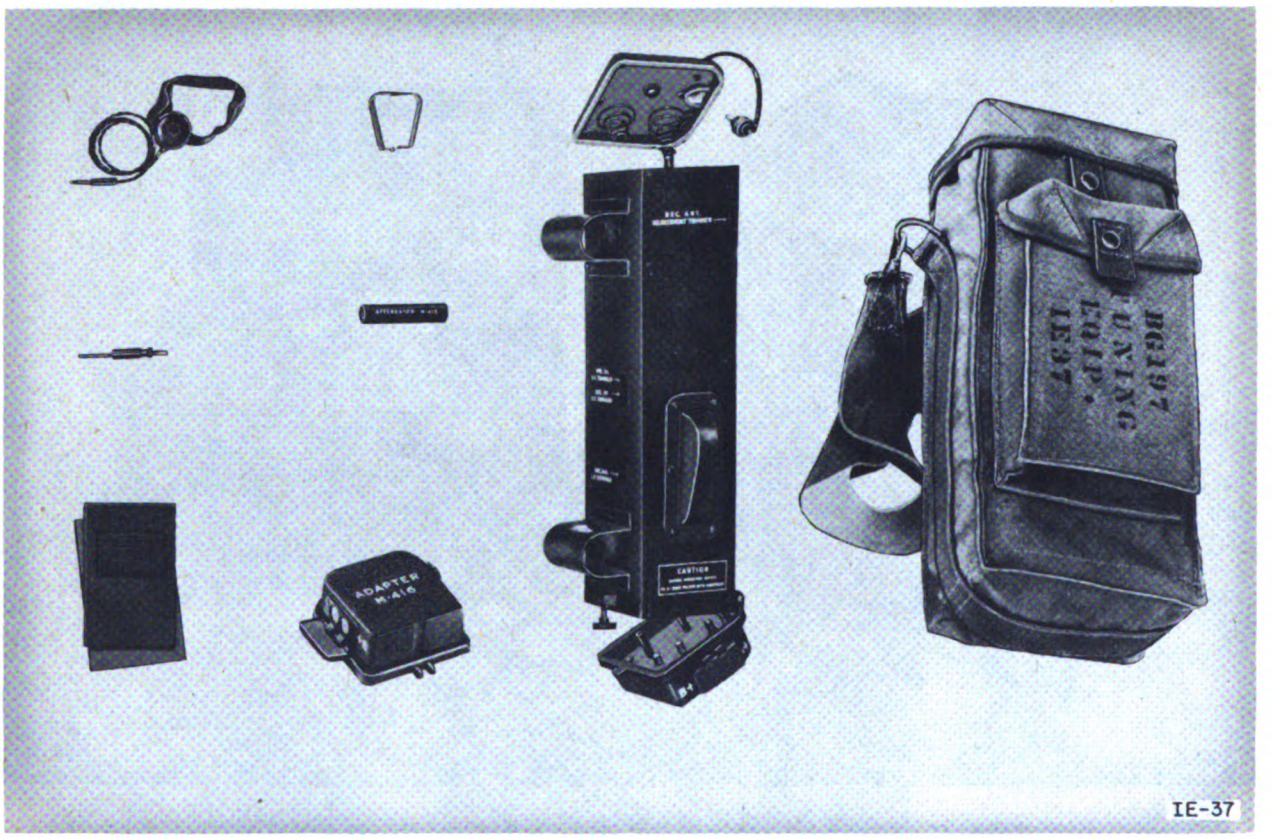


Figure 54. Tuning Equipment IE-37.

Status: Standard. *Stock No.:* 3F3933-37. *Reference:* TM 11-5009.

Tuning Equipment IE-37 is a meterless testing unit designed for lower echelon use. It is used to aline the transmitter and receiver circuits of Radio Set SCR-536-( ).

WEIGHTS AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	14 x 6 x 5½	4¼	.27
Export pack		8	.35

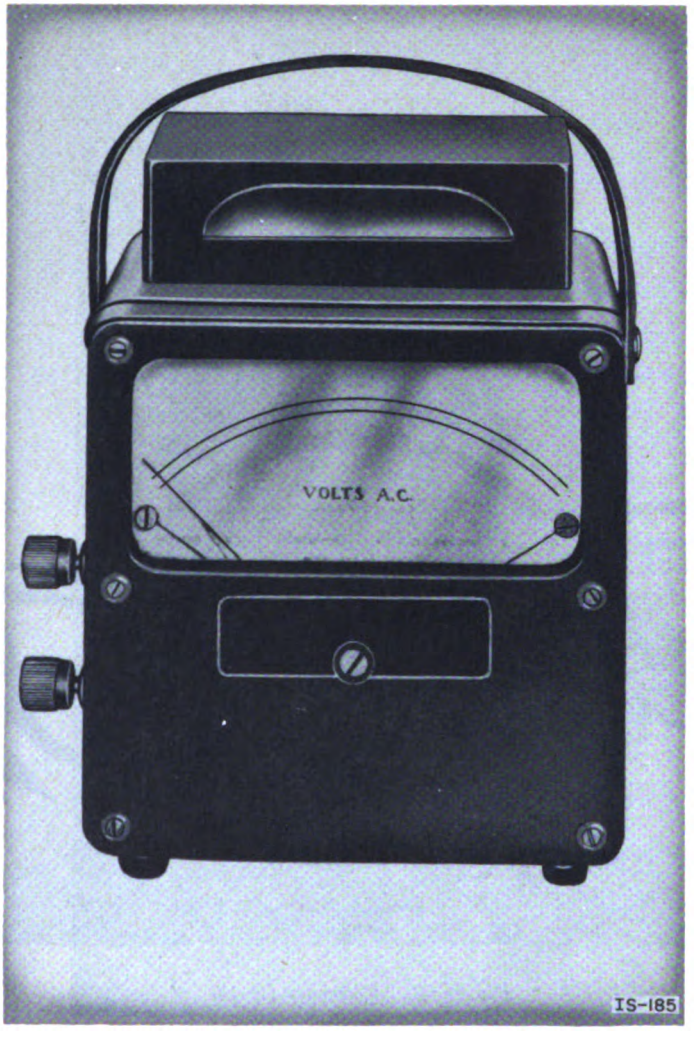


Figure 55. Voltmeter IS-185.

Status: Standard. *Stock No.:* 3F7385.

Voltmeter IS-185 is a portable ac voltmeter used for voltage testing of radio and radar equipment. The meter may be left in a circuit continuously without overheating.

P/o Test Set AN/MPM-23.

TECHNICAL CHARACTERISTICS

RANGE:
0 to 150 v, ac.
60 to 2,400 cps.

ACCURACY: ±.75 percent.
INPUT IMPEDANCE: 5,300 ohms.

WEIGHTS AND DIMENSIONS

	Dimensions (in)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	7 x 3½ x 5¾	2½	.08
Export pack	----------	11	.42

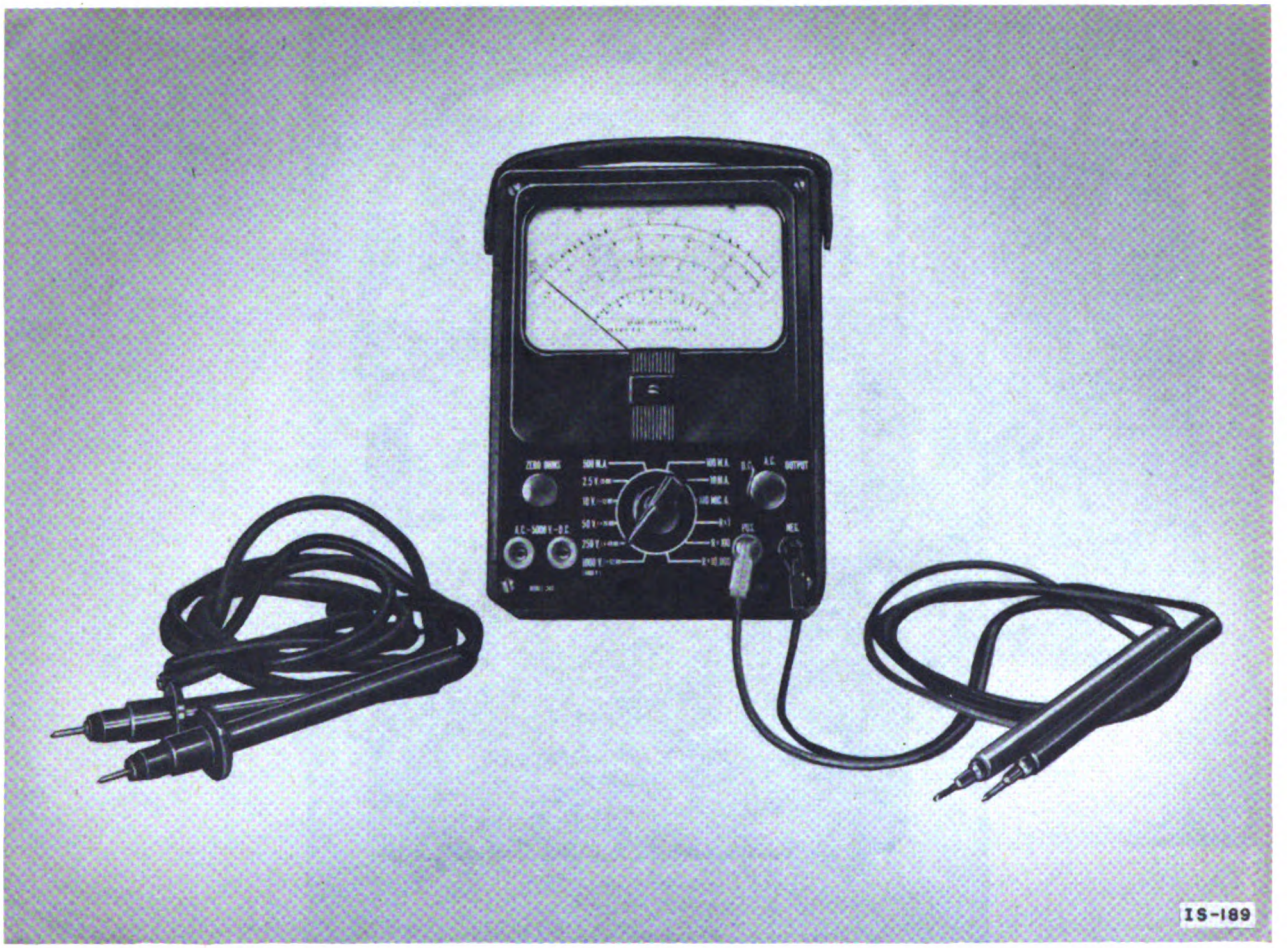


Figure 56. Voltmeter IS–189.

Status: Standard. *Stock No.:* 3F7389. *Reference:* TM 11–1244.

Voltmeter IS–189 is a portable combination test instrument. Two test leads are a part of the equipment. It is used to measure ac and dc voltage, current, resistance, and power in decibels.

To be replaced by Multimeter TS–352/U.

TECHNICAL CHARACTERISTICS

RANGES:
0 to 5,000 v, ac and dc.
0 to 500 ma, dc.
0 to 20 meg.
0 to +52 db.
0 to 5,000 v, output voltage.

POWER: Battery operated—1 Battery BA–42, 2 Batteries BA–208/U.

WEIGHTS AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	7 x 5½ x 3½	2. 5	. 08
Export pack	----------	6. 4	. 25

Figure 57. Multimeter ME-1/U.

Status: Standard. *Stock No.:* 3F6300.

Multimeter ME-1/U is a portable hook-on type ac voltammeter. It is used to measure ac voltage and current on insulated and uninsulated power lines without cutting conductors or interrupting normal service.

TECHNICAL CHARACTERISTICS

RANGES:

0 to 600 v, ac.
0 to 600 amp, ac.

A-C FREQUENCY: 25 to 90 cps.
ACCURACY: ±3 percent.

WEIGHT

	Weight (lb)
Unpacked	3½

Figure 58. Electronic Multimeter ME-6/U.

Status: Standard. *Stock No.:* 3F8100-3.

Electronic Multimeter ME-6/U is an ac vacuum-tube voltmeter. It is used for measuring the gain of audio amplifiers, for measuring the transmission losses in telephone circuits (including carrier systems), for measuring background noise at low transmission levels, and for measuring ripple voltage in rectifier systems. Provision is made for use of its high-gain amplifier through use of a switching output jack and an ac output control which are self-contained in the instrument.

TECHNICAL CHARACTERISTICS

RANGES:
500 μv to 500 v or −65 to +57 vu.
.01 to 1,000 rms v, with external multiplier.
−5 to +17 db.
INPUT IMPEDANCE: 2 meg, 15 μμf.
POWER: 115 v, a-c, 50 to 400 cps.

WEIGHTS AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	5⅞ x 5¾ x 11⁵⁄₁₆	9½	.25
Export pack	11⅝ x 12½ x 20	30	1.8

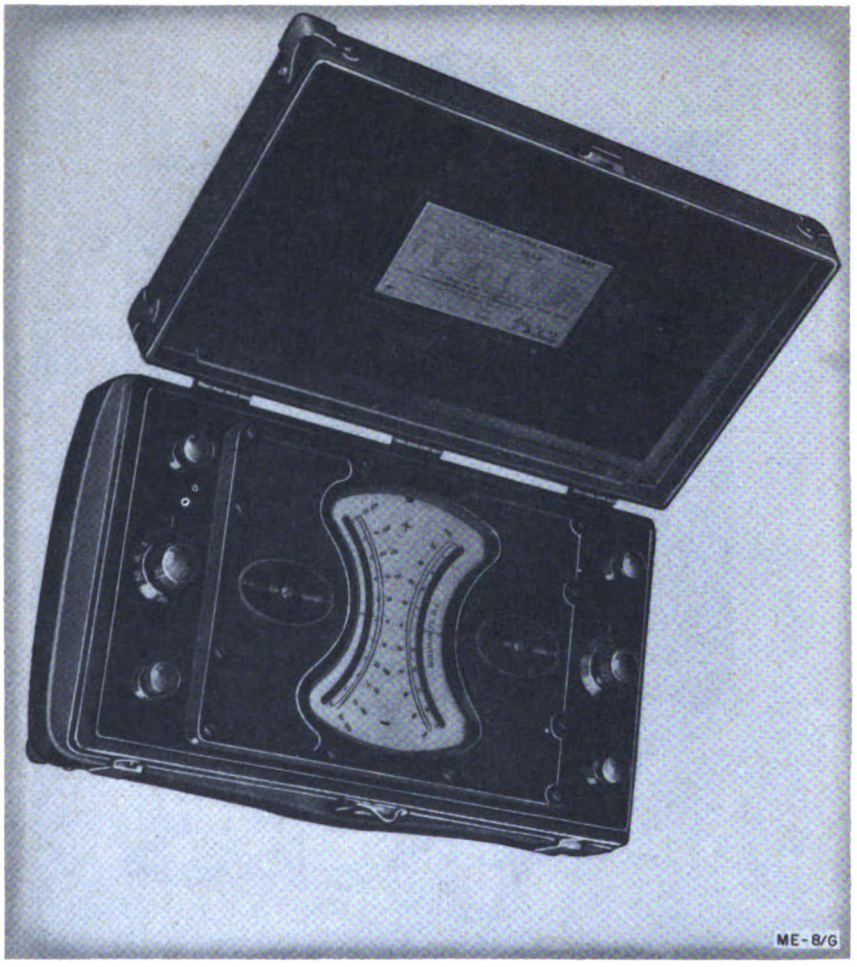


Figure 59. Multimeter ME-8/G.

Status: Standard.

Multimeter ME-8/G is a portable dc voltmeter and millivoltmeter. It is used to trace causes of electrolysis in cables.

TECHNICAL CHARACTERISTICS

RANGE: 0 to 250 v.
ACCURACY: ± ½ percent.

WEIGHT AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	13⅜ x 7 5/16 x 4 5/16	10½	.26

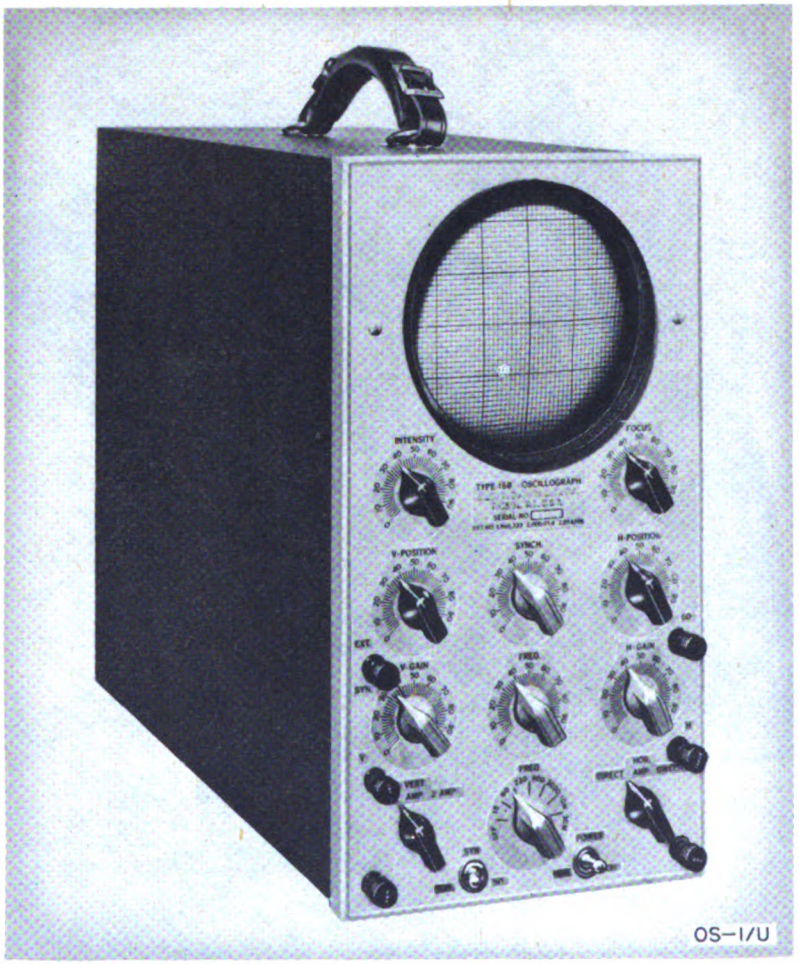


Figure 60. Oscilloscope OS-1/U.

Status: Limited/Std. *Stock No.:* 3F3585-2.

Oscilloscope OS-1/U is a 5-inch cathode-ray tube instrument. It is used for general purpose testing of radio and radar equipment.

To be replaced by Oscilloscope BC-1060-( ).

TECHNICAL CHARACTERISTICS

SWEEP FREQUENCY RANGE: 2 to 100,000 cps.
DEFLECTION SENSITIVITY:
.010 rms v per in., vertical.
.50 rms v per in., horizontal.
INPUT IMPEDANCE:
2 meg, 30 μμf, vertical.
5 meg, 25 μμf, horizontal.
MAXIMUM INPUT POTENTIAL:
250 rms v, vertical.
25 rms v, horizontal.
POWER: 115 or 230 v, ac, 40 to 60 cps.

WEIGHT AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	19½ x 10¼ x 8 13/16	54	1.0

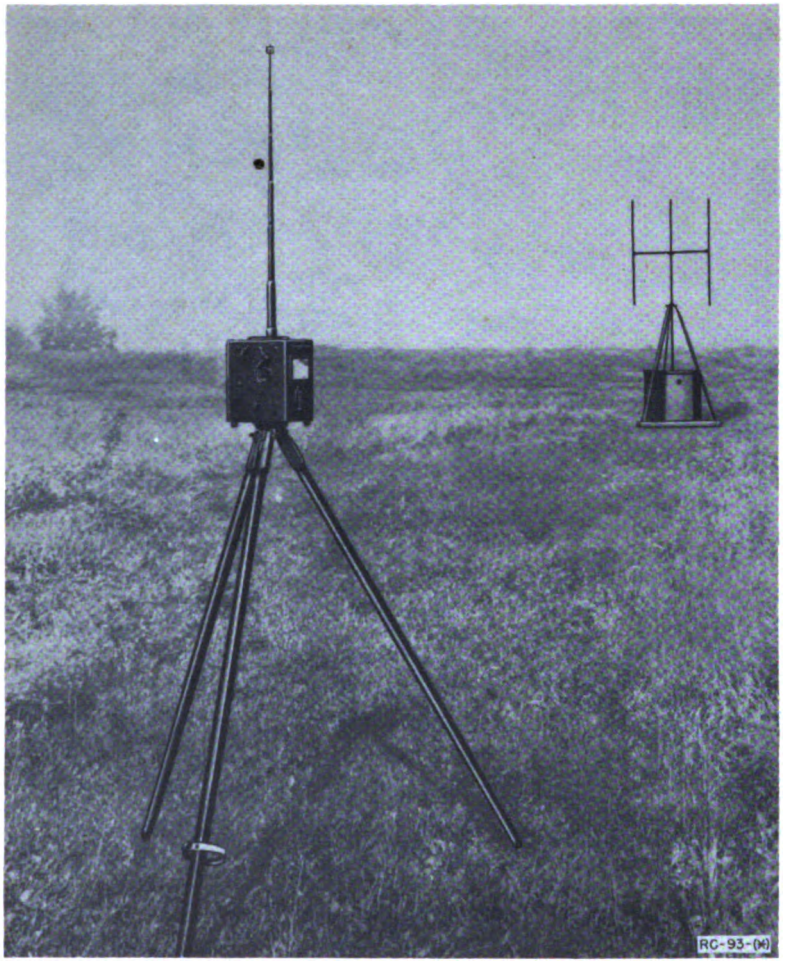


Figure 61. Oscillator Test Equipment RC-93-A.

Status: Standard. *Stock No.:* 3F3580. *Reference:* TM 11-5015.

Oscillator Test Equipment RC-93-(*) represents RC-93, RC-93-A, RC-93-B, and RC-93-C. Oscillator Test Equipment RC-93-(*) consists of a portable battery-operated radio transmitter and a target. It uses a vertical telescoping antenna mounted on a tripod. Oscillator Test Equipment RC-93-(*) is used to calibrate radio direction-finding stations electrically. It emits a signal, either modulated or unmodulated, to which the direction-finding equipment can be tuned.

P/o Radio Sets SCR-555-( ), SCR-555-T1, SCR-555-T2, SCR-566, and SCR-575.

TECHNICAL CHARACTERISTICS

RANGE: 17.5 to 158 mc.
POWER: Battery operated—2 Batteries BA-63, 1 Battery BA-65.

PRINCIPAL COMPONENTS

Item	*Dimensions (in.)*	*Weight (lb)*
Oscillator Test Equipment RC-93-(*), bare unit	8⅞ x 6⅞ x 11	13.38
Tripod	53 x 4 (diam)	8.13

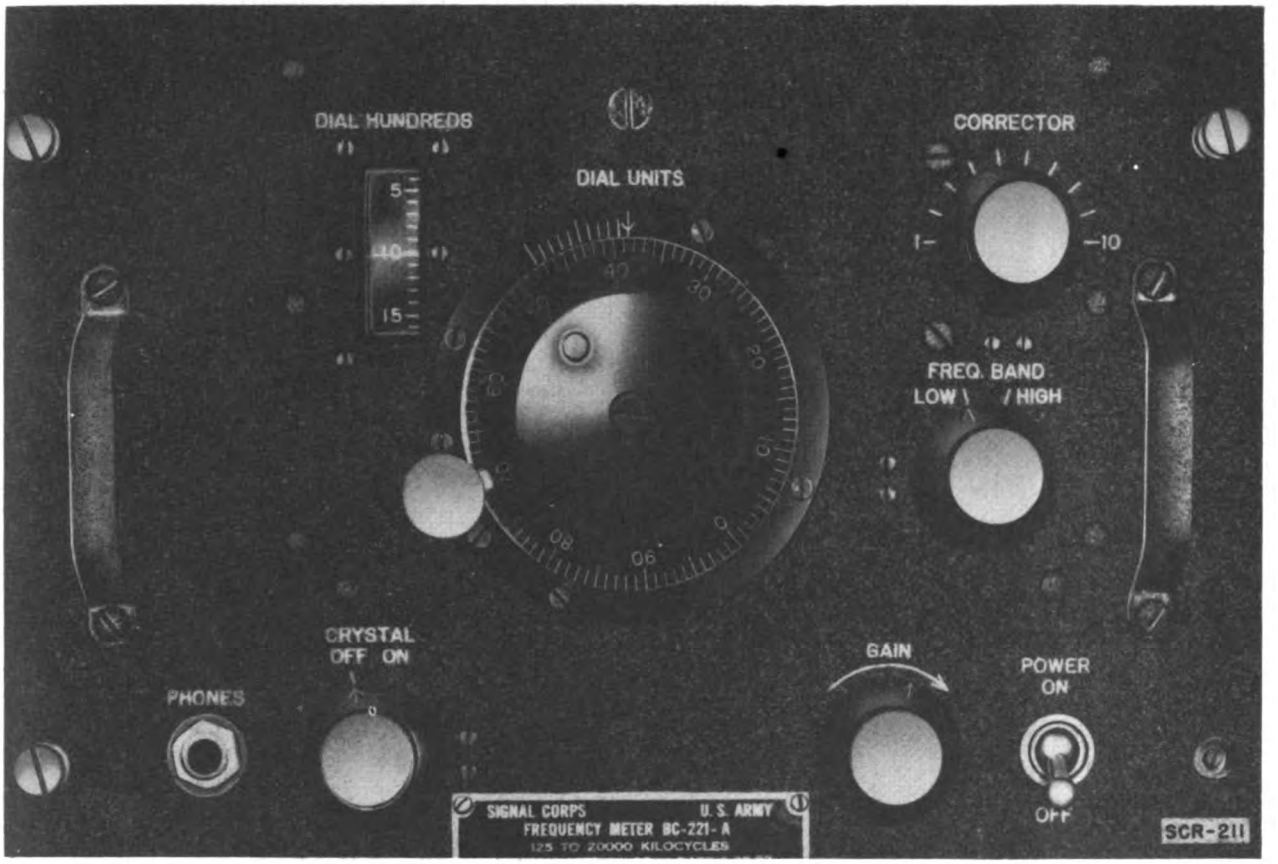


Figure 62. Frequency Meter Set SCR-211.

Status: Standard. *Stock No.:* 2C1411. *Reference:* TM 11-300.

Frequency Meter Set SCR-211 is a portable heterodyne-type frequency meter. All necessary connectors and a headset are included. It is used to calibrate field radio receivers and transmitters by direct comparison with the calibrated variable frequency oscillator of the frequency meter.

TECHNICAL CHARACTERISTICS

FUNDAMENTAL FREQUENCY: 1,000 kc, crystal controlled.

CALIBRATED RANGE: 125 kc to 20 mc.

POWER: Battery operated—6 Batteries BA-2; 4 Batteries BA-23.

WEIGHTS AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	15 x 11 x 10	39.5	.96
Export pack		93	4

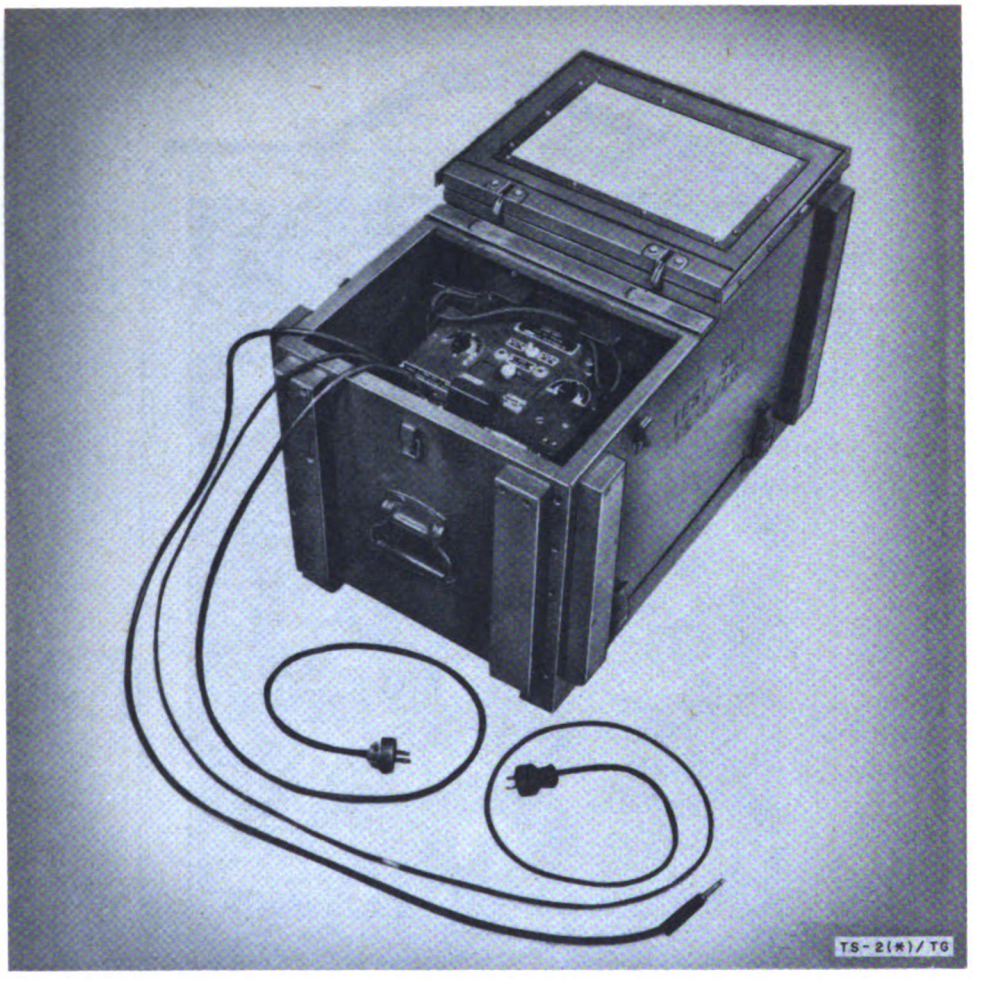


Figure 63. Test Set TS-2/TG.

Status: Standard. *Stock No.:* 2TED5766. *Reference:* TM 11-2208.

Test Set TS-2(*)/TG represents TS-2/TG and TS-2A/TG. Test Set TS-2(*)/TG is a portable, disk-operated teletypewriter signal distortion test set. It is used to test teletypewriter circuits and equipment by transmitting signals of predetermined distortion.

TECHNICAL CHARACTERISTICS

DISTORTION: 0 to 50 percent (bias or end distortion).
TEST MESSAGE: 68 character line.
NORMAL OPERATING SPEED: 368.2 opm.
POWER: 115 v, ac, 50 to 60 cps.

WEIGHTS AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	23 x 17 x 14	70	3.2
Export pack	----------	170	5.8

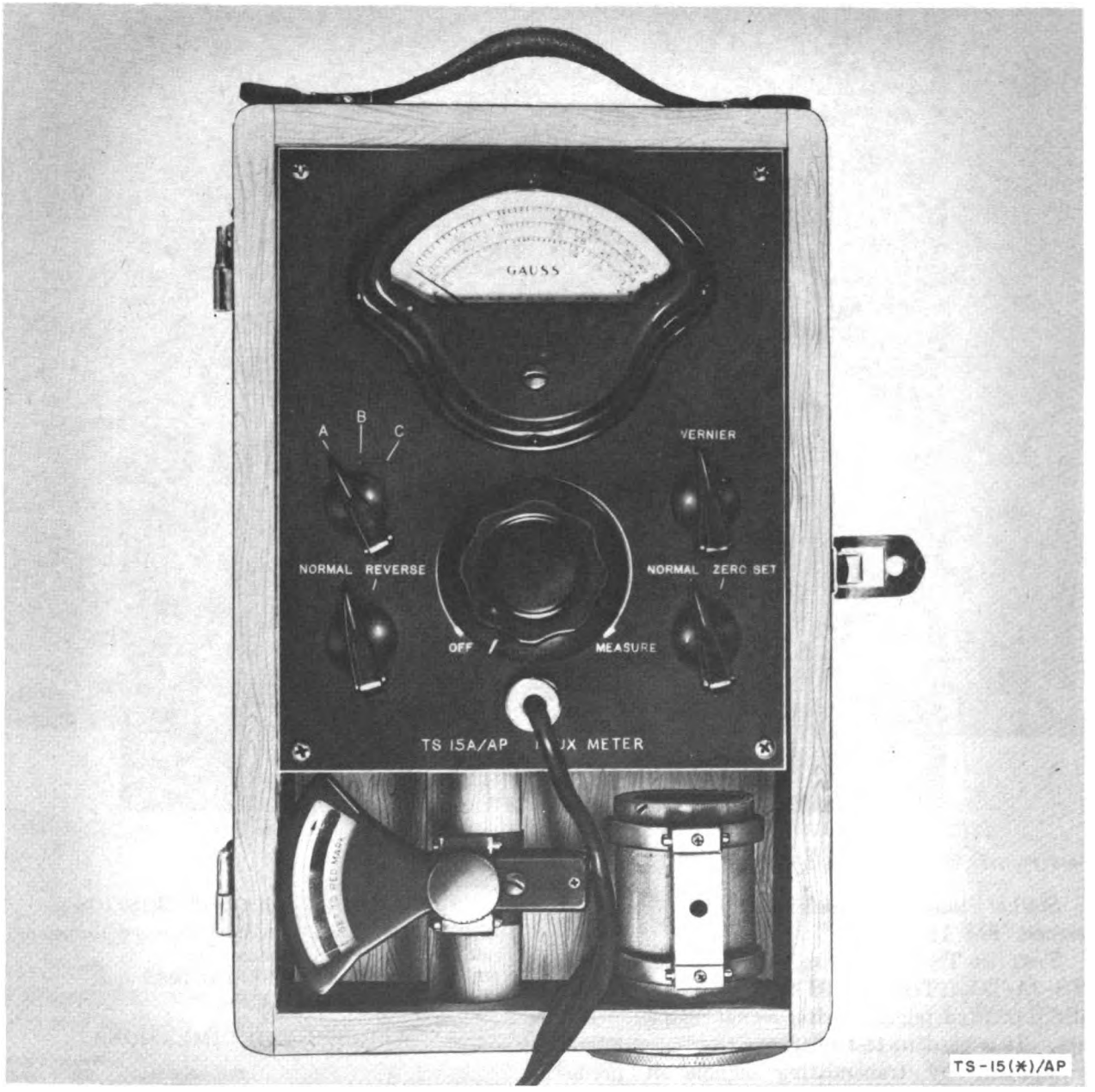


Figure 64. Fluxmeter TS–15A/AP.

Status: Standard. *Stock No.:* 3F4325–15A(TS–15A/AP) and 3F4325–15B (TS–15B/AP).

Fluxmeter TS–15(*)/AP represents TS–15A/AP and TS–15B/AP. Fluxmeter TS–15(*)/AP is a portable, direct-reading instrument consisting of a gauss meter and a probe meter. It is used to provide qualitative measurements of the flux densities in magnets used in the oscillatory circuits of X-band and S-band transmitters.

P/o Test Set AN/MPM–11.

TECHNICAL CHARACTERISTICS

RANGE: 1,200 to 9,600 gausses.
ACCURACY: ±2 percent.
POWER: Battery operated—1 Battery BA–30.

WEIGHTS AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	4½ x 6 x 10	6½	.16
Export pack		11.2	.45

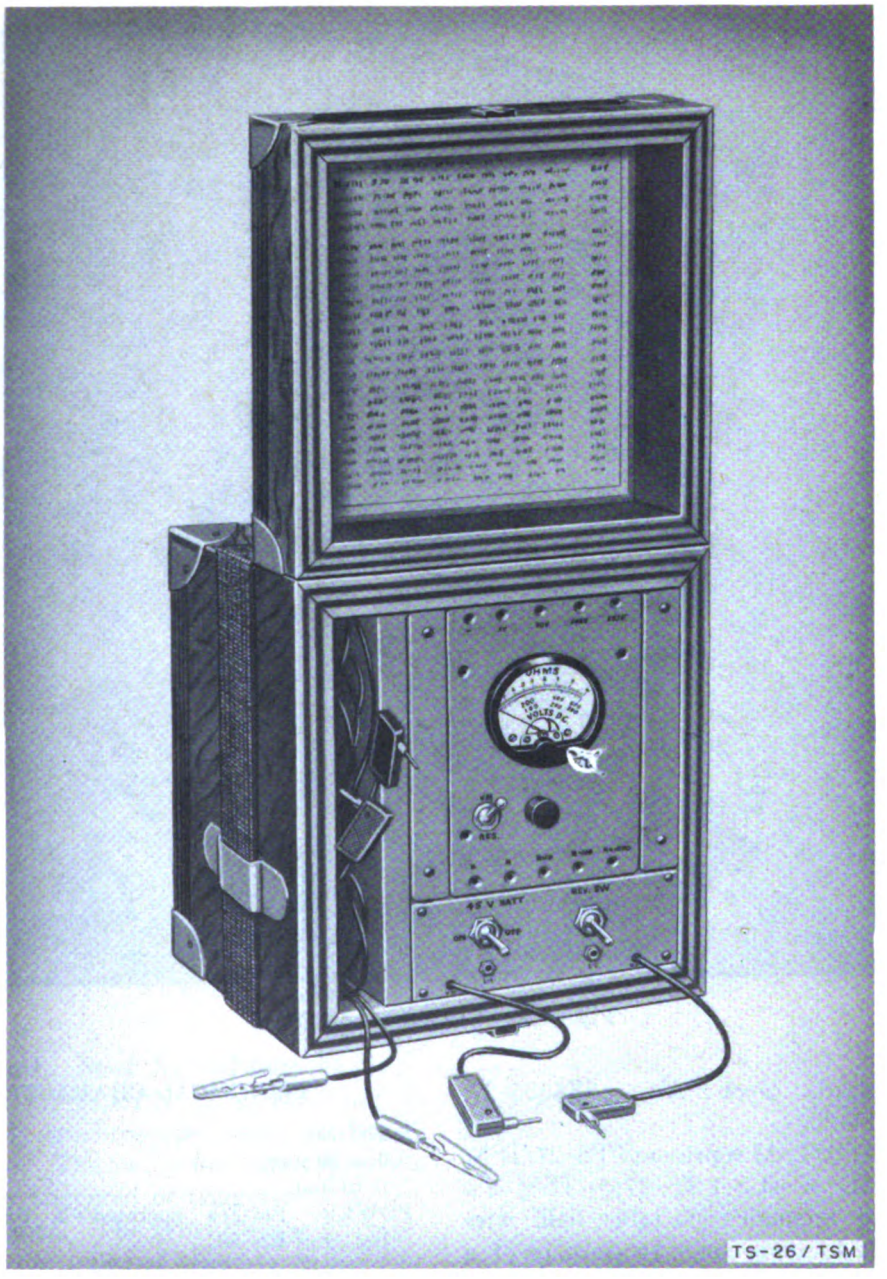


Figure 65. Test Set TS-26/TSM.

Status: Standard. *Stock No.:* 3F4325-26. *Reference:* TM 11-2017.

Test Set TS-26/TSM is a maintenance and lineman's multirange voltohmmeter, which includes two test leads. It is used to detect grounds, crosses, shorts, and opens, and to measure insulation and conductor resistance as well as line and battery voltage. The unit may also be used for the location of opens by the capacitance-kick method.

TECHNICAL CHARACTERISTICS

RANGES:
0 to 600 v, dc.
0 to 10 meg.
ACCURACY: ±2 percent.
POWER: Battery operated—1 Battery BA-31, 1 Battery BA-59.

WEIGHTS AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	8 9/32 x 7 1/8 x 5 1/2	8 1/2	.19
Export pack	----------	19	1.6

Figure 66. Test Set TS-27/TSM.

Status: Standard. *Stock No.:* 3F4325-27
Reference: TM 11-2057.

Test Set TS-27(*)/TSM represents TS-27/TSM and TS-27A/TSM. Test Set TS-27(*)/TSM is a maintenance and lineman's portable field wire testing and fault locating set. It consists of a combination bridge which is used for measurements of conductor and insulation resistance and for the location of grounds, crosses, opens, and shorts.

TECHNICAL CHARACTERISTICS

RANGES:
0 to 50 meg.
.1 to 3 μf.

POWER: Battery operated—2 Batteries BA-59, 2 Batteries BA-30.

WEIGHTS AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	15½ x 12¼ x 8 13/16	32	.97
Export pack	----------	50	3.0

Figure 67. Synchroscope TS-28/UPN.

Status: Standard. *Stock No.:* 3F4325-28.

Synchroscope TS-28/UPN is a combination oscilloscope and synchroscope using a 5-inch cathode-ray tube. The sweep for the oscilloscope can be internally triggered or triggered by an external pulse or signal. The synchroscope can supply a synchronizing pulse of negative or positive polarity for triggering other equipment under test. Synchroscope TS-28/UPN is used to test and maintain Radar Set AN/MPG-1.

P/o Test Set AN/MPM-6.

TECHNICAL CHARACTERISTICS

FAST SWEEP: 1 to 2, 10, 25, and 60 μsec per in.
SLOW SWEEP: 20 to 100, 100 to 400, and 400 to 3,000 cps.
INPUT IMPEDANCE: Less than 100,000 ohms, 40 μf.
OUTPUT IMPEDANCE: 4,000 ohms.
CALIBRATION MARKER SPACING: 2, 10, and 25 μsec.
SWEEP PHASING: −10 to ±100 μsec with respect to internal or external pulse.
POWER: 115 v, ac, 50 to 70 cps.

WEIGHT AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	19¼ x 14¼ x 8¾	65	1. 39

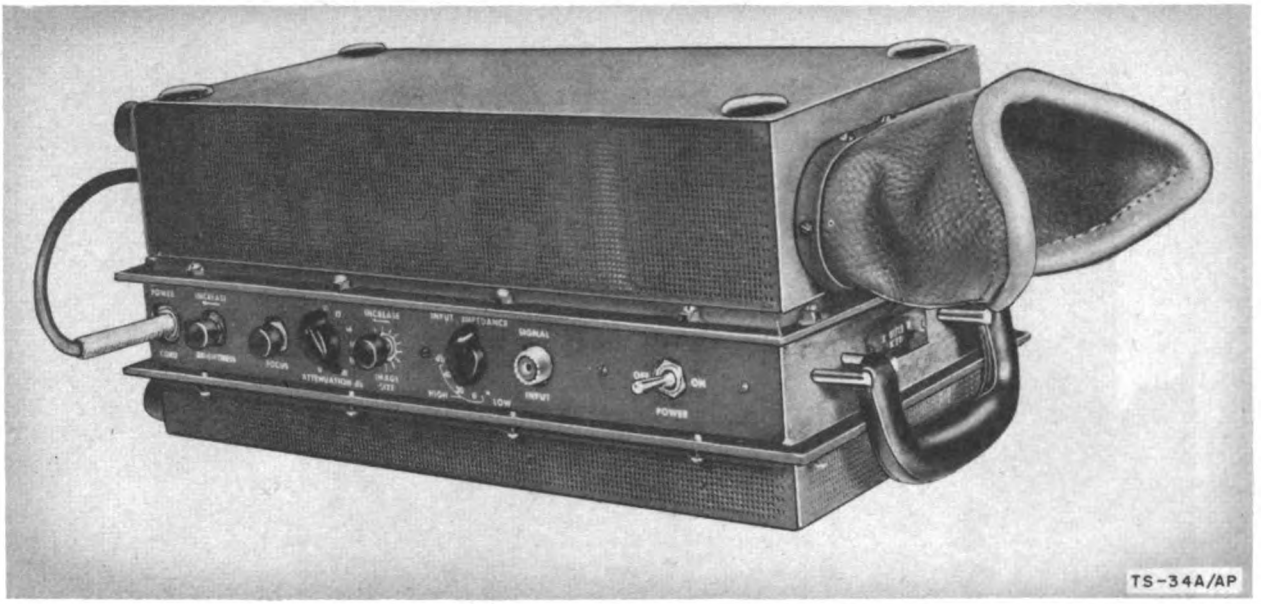


Figure 68. Oscilloscope TS-34A/AP.

Status: Standard. *Stock No.:* 3F4325-34A. *Reference:* TM 11-1067A.

Oscilloscope TS-34A/AP is a portable instrument using a 2-inch cathode-ray tube. All necessary cords and probes are included with the equipment. It is used to test and to maintain radar and other electrical equipment in the field and in the laboratory.

P/o Test Sets AN/MPM-11, AN/MPM-15, and AN/MPM-20.

Will replace Oscilloscope I-245-( ) and Oscilloscope TS-489/U.

TECHNICAL CHARACTERISTICS

PULSES AND SQUARE WAVES OBSERVABLE:
Duration—.25 to 30,000 μsec.
POLARITY: Positive or negative.
SINE WAVES OBSERVABLE: 30 to 1,000,000 cps.

INPUT VOLTAGE AND SENSITIVITY:
Oscilloscope alone:
Low-impedance input—.1 to 1 v.
High-impedance input—.1 to 100 v.
Oscilloscope with probe—1 to 450 v.
INPUT IMPEDANCE:
Oscilloscope alone—62 ohms, low, and 430,000 ohms, 30 μμf.
Oscilloscope with probe—4 meg. 12 μμf.
SYNCHRONIZING MEANS AND VOLTAGE:
Internal—by signal under observation.
External, without probe—2 to 100 v.
External, with probe—20 to 450 v.
POWER: 105 to 125 v, ac, 50 to 1,200 cps.

PRINCIPAL COMPONENTS

Item	*Dimensions (in.)*	*Weight (lb)*
Oscilloscope TS-34A/AP	20¾ x 9 x 8	29
Probe Assembly MX-50/AP	50 (lg)	1½

PACKED WEIGHT AND VOLUME

	Weight (lb)	*Volume (cu ft)*
Export pack	90	3

Figure 69. Test Oscillator TS-47/APR.

Status: Standard. *Stock No.:* 3F3901-47. *Reference:* TM 11-1034.

Test Oscillator TS-47/APR consists of a triode oscillator using a butterfly tuning circuit and an internal audio oscillator. The power output is coupled through a pick-up loop into a 50-ohm line connected to an output connector which serves as an adjustable antenna. Test Oscillator TS-47/APR is used to test various RCM receivers. It provides a calibrated h-f signal source for testing receivers in the field.

TECHNICAL CHARACTERISTICS

FREQUENCY RANGE: 40 to 500 mc.
USEFUL RANGE HARMONICS: 3,000 mc. maximum.
OUTPUT VOLTAGE: 3mv (cw, am, or fm).
MODULATION:
Sine wave—1,000 cps at 50 percent.
Pulsed—500 cps at 70 sec width.
OUTPUT IMPEDANCE: 50 ohms.
POWER:
80, 115, or 230 v, ac, 50 to 3,600 cps, or 200 v, dc.
6.3 v, dc.

WEIGHTS AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	6½ x 9½ x 11½	15	.41
Export pack	----------	25	1.2

Figure 70. Test Unit TS-104/TPM-1.

Status: Standard. *Stock No.:* 3F4325-104.

Test Unit TS-104/TPM-1 consists of a power meter and a variable power transformer. It is used with other depot testing equipment for bench testing of radar sets, such as Radio Set AN/TPS-1 and Mark XX. Its use permits the radar modulator to be tested without the associated r-f unit and permits making range marker calibration tests on the radar. P/o Test Sets AN/MPM-14 and AN/MPM-23.

TECHNICAL CHARACTERISTICS

MODULATOR POWER RANGE: 0 to 1 kw.
POWER: Obtained from radar indicator unit.

WEIGHT AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	9½ x 9¼ x 11	20½	.57

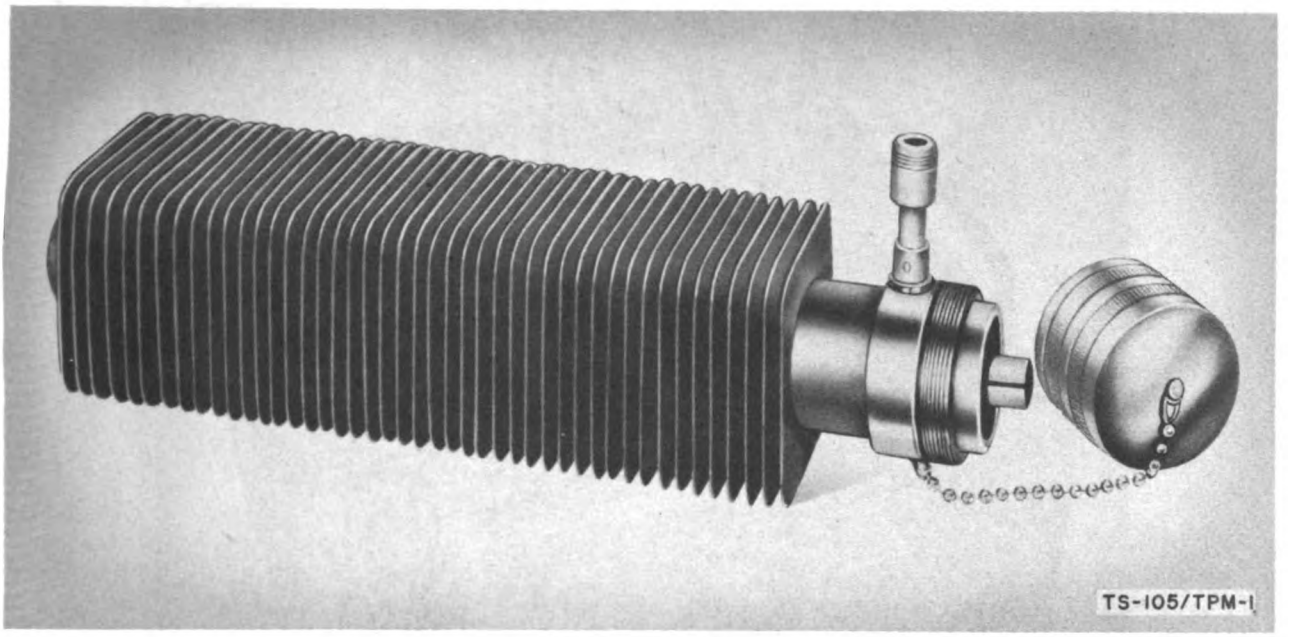


Figure 71. Dummy Antenna TS-105/TPM-1.

Status: Standard. *Stock No.:* 3F4325-105.

Dummy Antenna TS-105/TPM-1 provides a power-absorbing termination for Radar Sets AN/TPS-1 and -1A. It is used with its associated test equipment to check frequency and receiver sensitivity. It makes tests possible without using the antenna, remote control pedestal, or r-f cable.

P/o Test Sets AN/MPM-15, -20, and -23.

U/w but not p/o Radio Sets AN/TPX-1 and -1A.

TECHNICAL CHARACTERISTICS

FREQUENCY RANGE: 1,000 to 1,500 mc.
INPUT SIGNAL: Capable of withstanding average power of 200 w. at peak voltage of 4,000 v.
IMPEDANCE: 50 ohms.

WEIGHT AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	4½ x 3 x 14½	15	.11

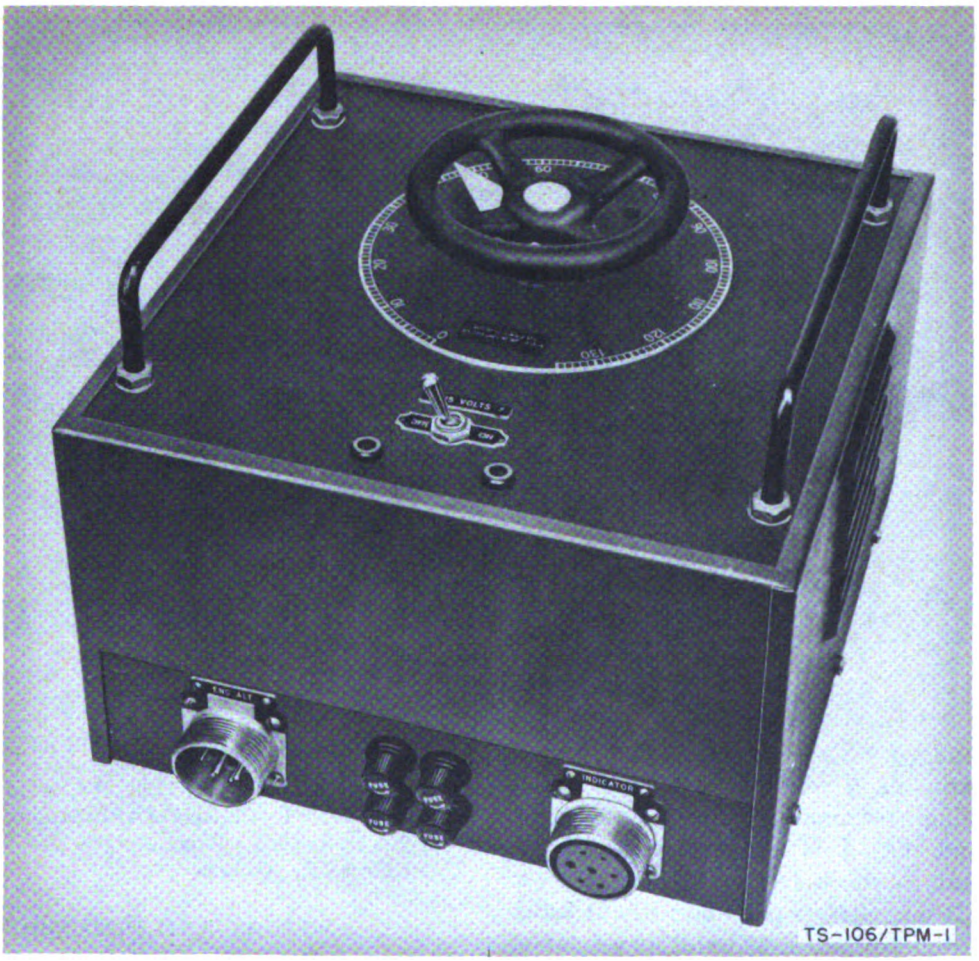


Figure 72. Line Monitor Unit TS-106/TPM-1.

Status: Standard. *Stock No.:* 3F4325-106.

Line Monitor Unit TS-106/TPM-1 consists of a variac mounted in a metal case. It is used to control the line voltage during the bench testing of radar equipment.

P/o Test Sets AN/MPM-14 and AN/MPM -23.

TECHNICAL CHARACTERISTICS

INPUT VOLTAGE: 105 to 120 v, ac, 60 to 400 cps.
OUTPUT VOLTAGE: 0 to 135 v, ac.
MAXIMUM CURRENT: 18 amp.

WEIGHTS AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	11 x 11 x 10	46. 5	. 70
Export pack	----------	68	2. 75

Figure 73. Wave and Power Meter Set TS-107/TPM-1.

Status: Standard. *Stock No.:* 3F4325-107.

Wave and Power Meter Set TS-107/TPM-1 consists of an r-f thermistor type power meter and a crystal detector circuit. A cable is included to connect the meter to the unit undergoing testing. It is used to measure or check the frequency of transmitters and signal generators and to measure the average power of c-w and pulsed signals.

P/o Test Sets AN/MPM-14 and AN/MPM-23.

TECHNICAL CHARACTERISTICS

INPUT FREQUENCY RANGE: 500 to 1,500 mc.
INPUT SIGNAL: .5 to 12.6 mw.
OUTPUT SIGNAL: Video for test oscilloscope.
INPUT IMPEDANCE: 50 ohms.
ACCURACY: ±.1 percent.
POWER: Battery operated—2 Batteries BA-27.

WEIGHT AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	14¾ x 9⁹⁄₁₆ x 7⁵⁄₁₆	18	.59

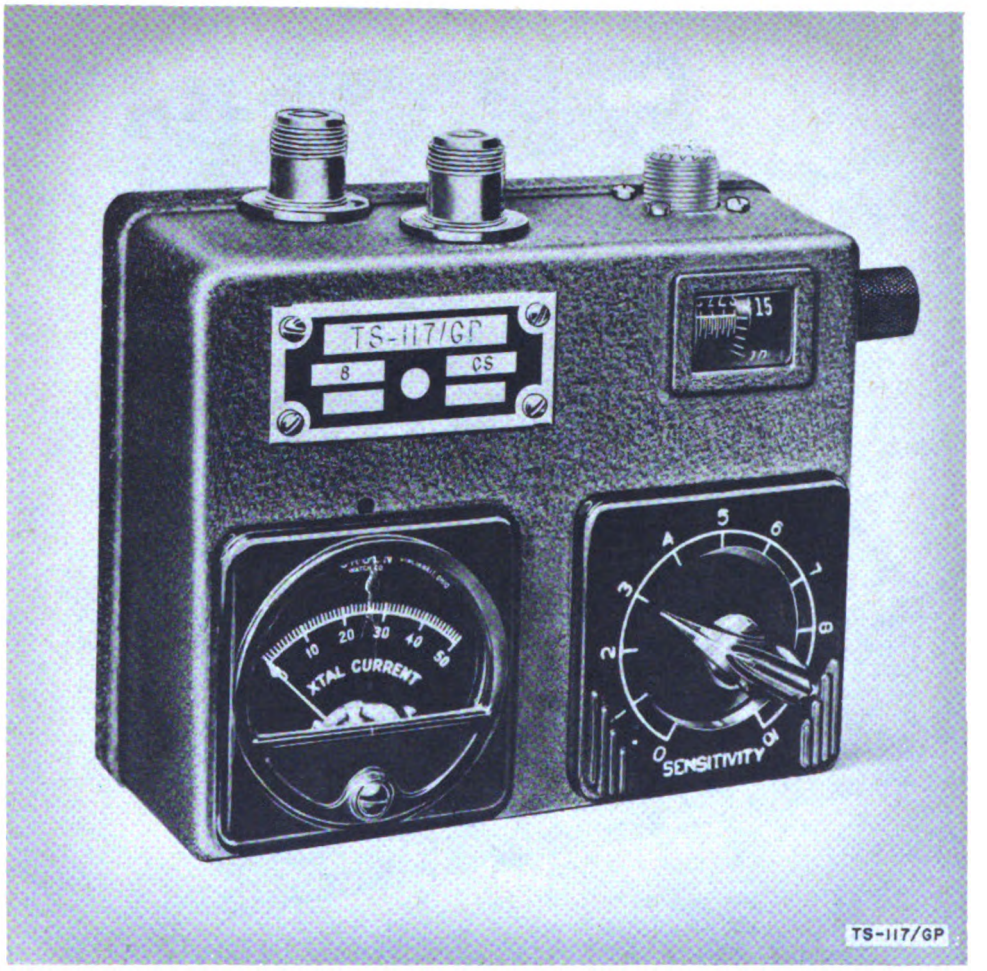


Figure 74. Wavemeter Test Set TS–117/GP.

Status: Standard. *Stock No.:* 3F4325–117. *Reference:* TM 11–2538.

Wavemeter Test Set TS–117/GP is a portable unit which requires no external source of power. The necessary couplings and directive antenna are housed in the lid of the carrying case. The set is used for frequency measurements of radar systems operating in the band from 2,400 to 3,400 mc.

TECHNICAL CHARACTERISTICS

RANGE: 2,400 to 3,400 mc.

ACCURACY: ±.1 percent.

INPUT SIGNAL RANGE: 2 mw.

PRINCIPAL COMPONENTS

Item	*Dimensions (in.)*	*Weight (lb)*
Wavemeter Test Set TS–117/GP.	4¾ x 5⅞ x 2¾	7
Directive Antenna AS–23/AP.		

PACKED WEIGHT AND VOLUME

	Total weight (lb)	*Total volume (cu ft)*
Export pack	12. 5	. 41

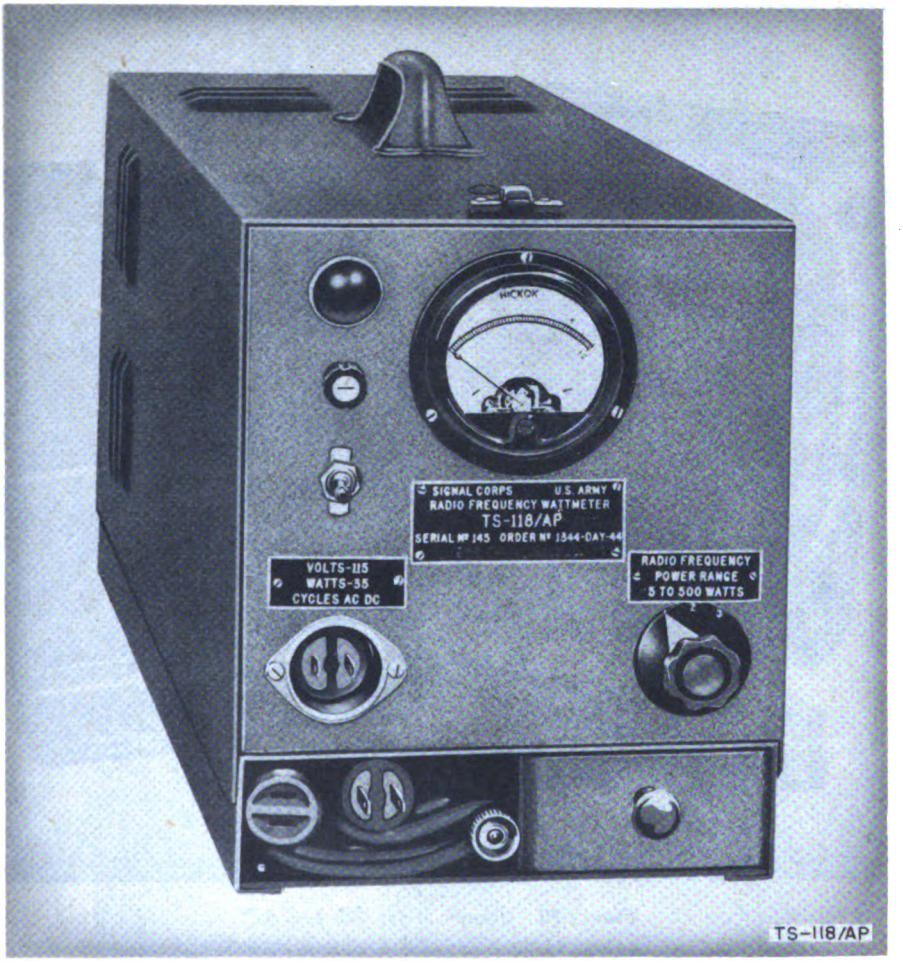


Figure 75. Radio Frequency Wattmeter TS–118/AP.

Status: Standard. *Stock No.:* 3F4325–118. *Reference:* TM 11–1036.

Radio Frequency Wattmeter TS–118/AP is a portable untuned thermocouple r-f power meter. Three test cords are included with the equipment. It is used to check the power output of transmitters and r-f amplifiers.

TECHNICAL CHARACTERISTICS

FREQUENCY RANGE: 20 to 750 mc.
POWER MEASUREMENTS: 5 to 500 w.
INPUT IMPEDANCE: 50-ohm.
POWER: 115 v, ac, 60 cps or 115 v, dc.

WEIGHT AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	24½ x 11 x 8½	26	1. 32

Figure 76. Power Meter TS-125/AP.

Status: Standard. *Stock No.:* 3F4325-125. *Reference:* TM 11-1217.

Power Meter TS-125/AP is a portable wattmeter packed with its accessory pick-up horn antenna and attenuators. It is used to measure average r-f power and to check periodically on the power output of radar transmitters.

TECHNICAL CHARACTERISTICS

POWER RANGE: 0 to 4 mw.
FREQUENCY RANGE: 2,400 to 3,335 mc.
POWER: Battery operated—3 Batteries BA-30.

WEIGHT AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	10 x 7⅞ x 5⁵⁄₁₆	12	.24

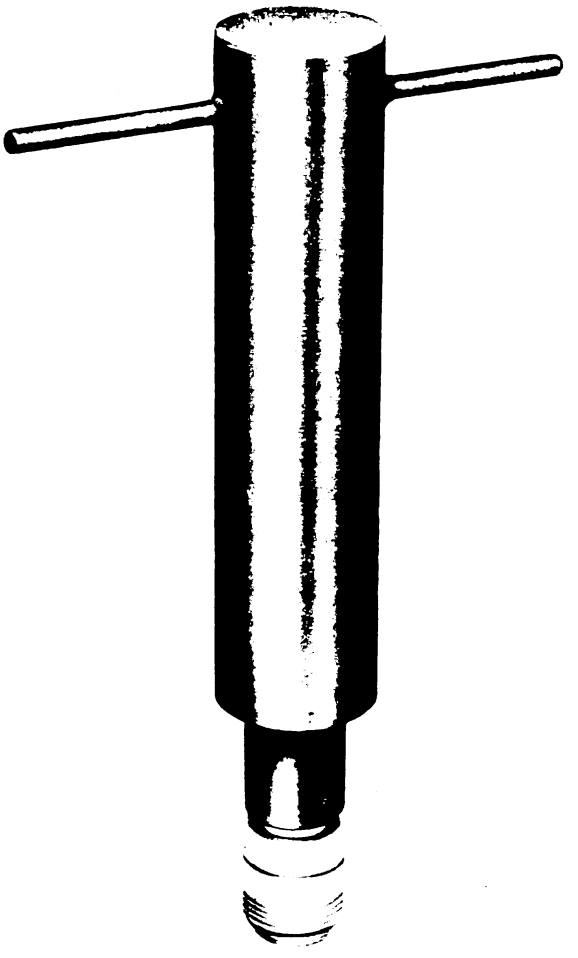


Figure 77. Test Antenna TS-129/UP.

Status: Standard. *Stock No.:* 3F4325-129.

Test Antenna TS-129/UP is a dipole-type antenna for general use. It is equipped with a type-N jack on one end and an adjustable, double-ended clamp on the other end. It is used with RF Signal Generator LAE-1 to pick up and radiate r-f energy for systems tests on radar sets.

P/o Test Sets AN/MPM-11 and AN/MPM-150.

TECHNICAL CHARACTERISTIC

RANGE: 1,000 to 1,500 mc.

WEIGHTS AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	8½ x 4½ x 1½	1	.03
Export pack		1.5	.05

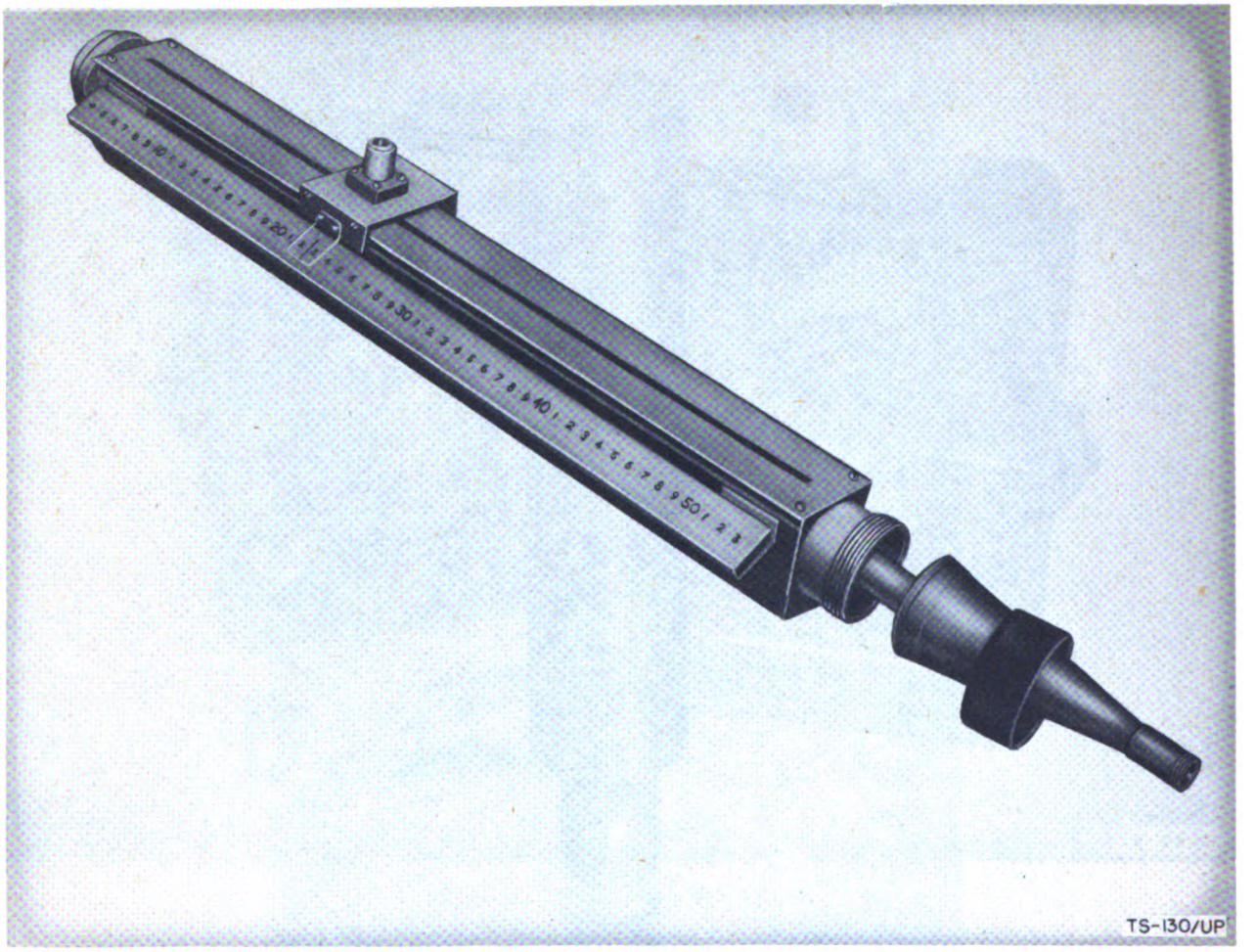


Figure 78. Standing Wave Meter TS-130/UP.

Status: Standard. *Stock No.:* 3F4325-130.

Standing Wave Meter TS-130/UP consists of a slotted coaxial line (of known characteristic impedance) and four mounting legs. It is used for measuring standing-wave ratios and r-f impedances. The unit is intended primarily for measurements of radar equipments operating in the 400- to 3,000-mc range.

P/o Test Sets AN/MPM-14 and AN/MPM-23.

TECHNICAL CHARACTERISTICS

FREQUENCY RANGE: 400 to 3,400 mc.
IMPEDANCE: 53.5 ohms.

WEIGHT AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	29½ x 3½ x 3¾	13½	.22

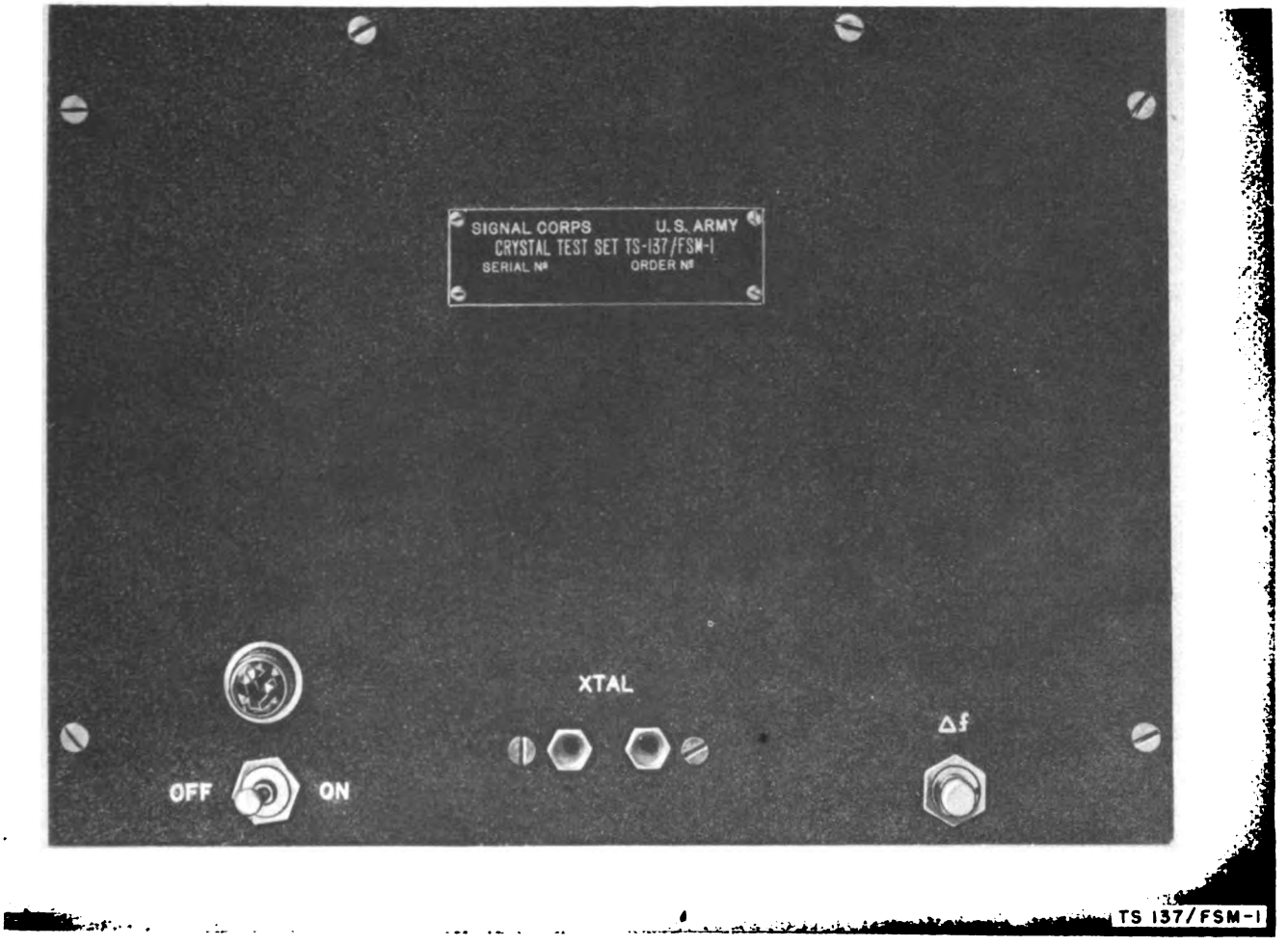


Figure 79. Crystal Test Set TS–137/FSM–1.

Status: Limited/Std. *Stock No.:* 3F4325–137. *Reference:* TM 11–2677.

Crystal Test Set TS–137/FSM–1 is a precision oscillator which simulates the crystal calibrator circuit of Radio Set SCR–694. It is used to test the activity at room temperature of the 200–kc calibrator crystals that are used in Radio Set SCR–694. Used with Frequency Measuring Assembly CY–93/FSM–1 and temperature control equipment, the set tests the frequency and activity of the crystals over a required temperature range.

P/o Test Set AN/FSM–3.
U/w but not p/o Radio Set SCR–694.

TECHNICAL CHARACTERISTICS

FREQUENCY: 200 kc.
ACTIVITY RANGE: 0 to 200 μa.
POWER: 105 to 130 v, ac, 50 to 60 cps.

WEIGHTS AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	7 1⅜16 x 11⅛ x 7¾	13½	.39
Domestic pack	9 x 14 x 16	18½	1.17
Export pack	26 x 14 x 12	74	2.5

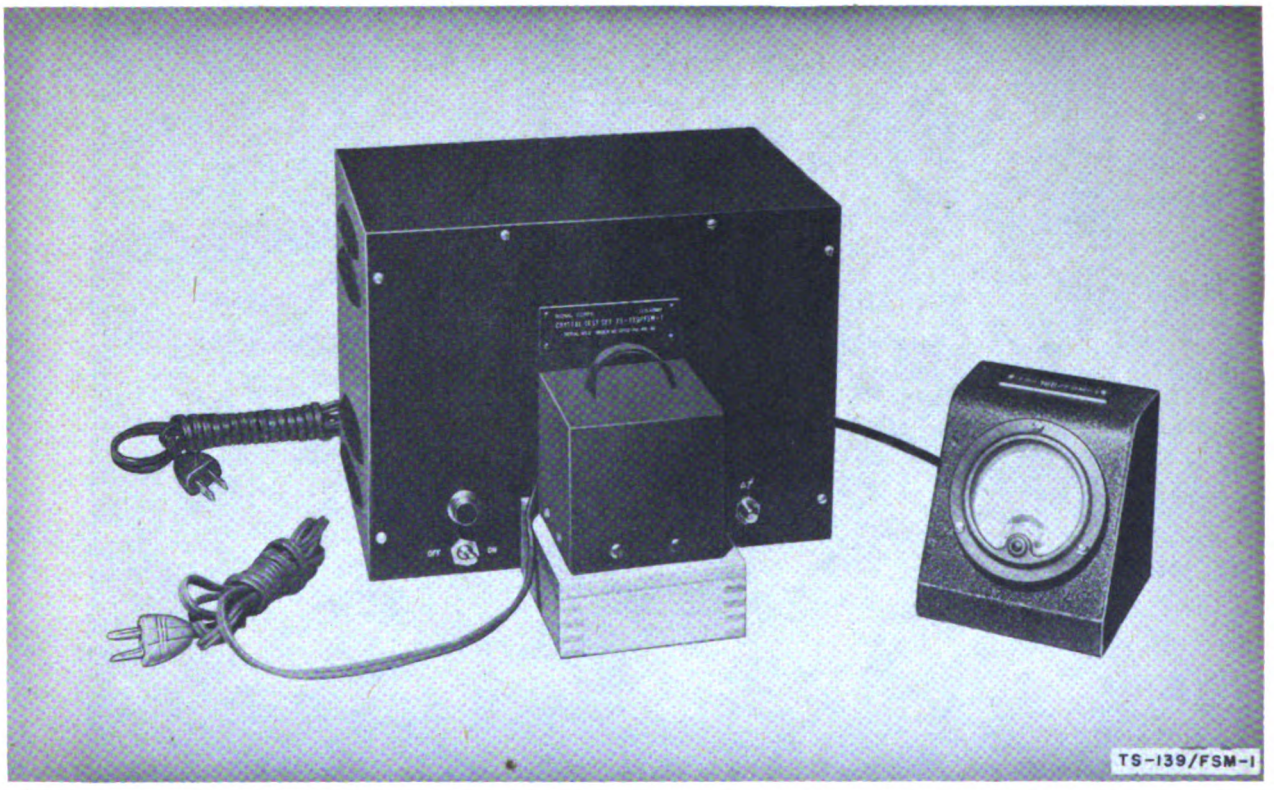


Figure 80. Crystal Test Set TS–139/FSM–1.

Status: Limited/Std. *Stock No.:* 3F4325–139. *Reference:* TM 11–2679.

Crystal Test Set TS–139/FSM–1 consists of a tuned-plate oscillator, a half-wave r-f rectifier, and a power supply. It is used to test the activity at room temperature of the 370- to 540-kc crystals used in Radio Transmitters BC–604–( ) and BC–684–( ). Used with Frequency Measuring Assembly CY–93/FSM–1 and temperature control equipment, the set tests the frequency and activity of the crystals over a required temperature range.

P/o Test Set AN/FSM–3.

U/w but not p/o Radio Transmitters BC–604–( ) and BC–684–( ).

TECHNICAL CHARACTERISTICS

FREQUENCY RANGE: 370 to 540 kc.
ACTIVITY RANGE: 0 to 1 ma.
POWER: 105 to 130 v, ac, 50 to 60 cps.

WEIGHTS AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	7¾ x 11⅛ x 7¾	12¾	.39
Domestic pack	9 x 14 x 16	17¾	1.17
Export pack	26 x 14 x 12	74	2.5

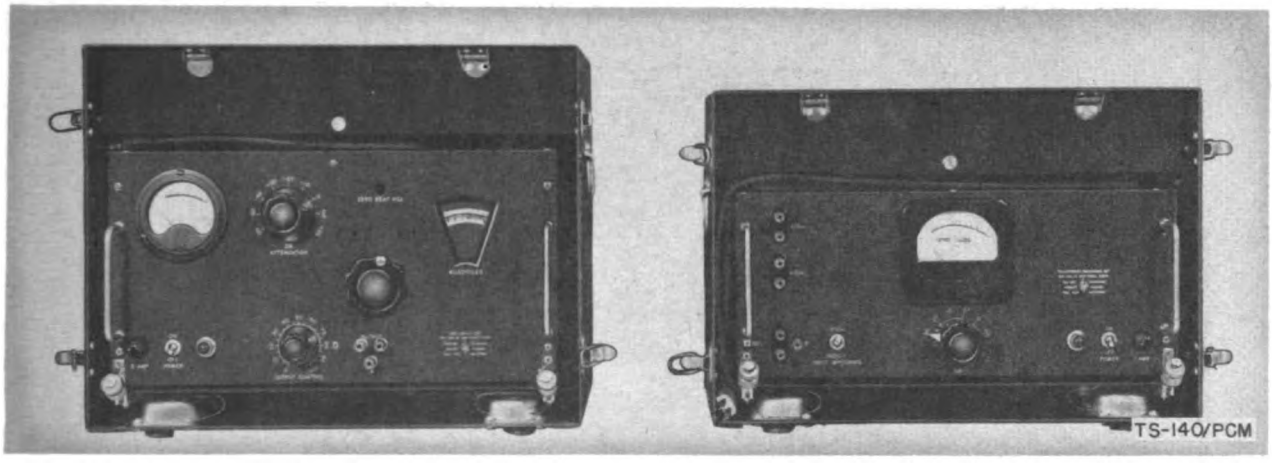


Figure 81. Test Set TS-140/PCM.

Status: Standard. *Stock No.:* 3F4325-140.

Test Set TS-140/PCM consists of a signal generator and a decibel meter. It is used as a transmission measuring set to facilitate the proper matching of circuits in the establishment of a wire or wire-radio communication circuit and for testing carrier and voice-frequency repeater and terminal equipment in depots.

This set will replace Test Set I-120-( ), Audio Oscillator TS-379( )/U, Decibel Meter TS-399( )/U, and Oscillator TS-401( )/U.

TECHNICAL CHARACTERISTICS

OUTPUT: −50 to +26 dbm.
MEASURING RANGE: −45 to +25 dbm, ±.5 dbm.
FREQUENCY RANGE: .2 to 35 kc.
POWER: 95 to 125, 210 to 250 v, ac, 50 to 70 cps.

PRINCIPAL COMPONENTS

Item	*Dimensions (in.)*
Signal Generator SG-15/PCM	8¾ x 13 x 19.
Decibel Meter ME-22/PCM	7 x 19 x 10⅞.

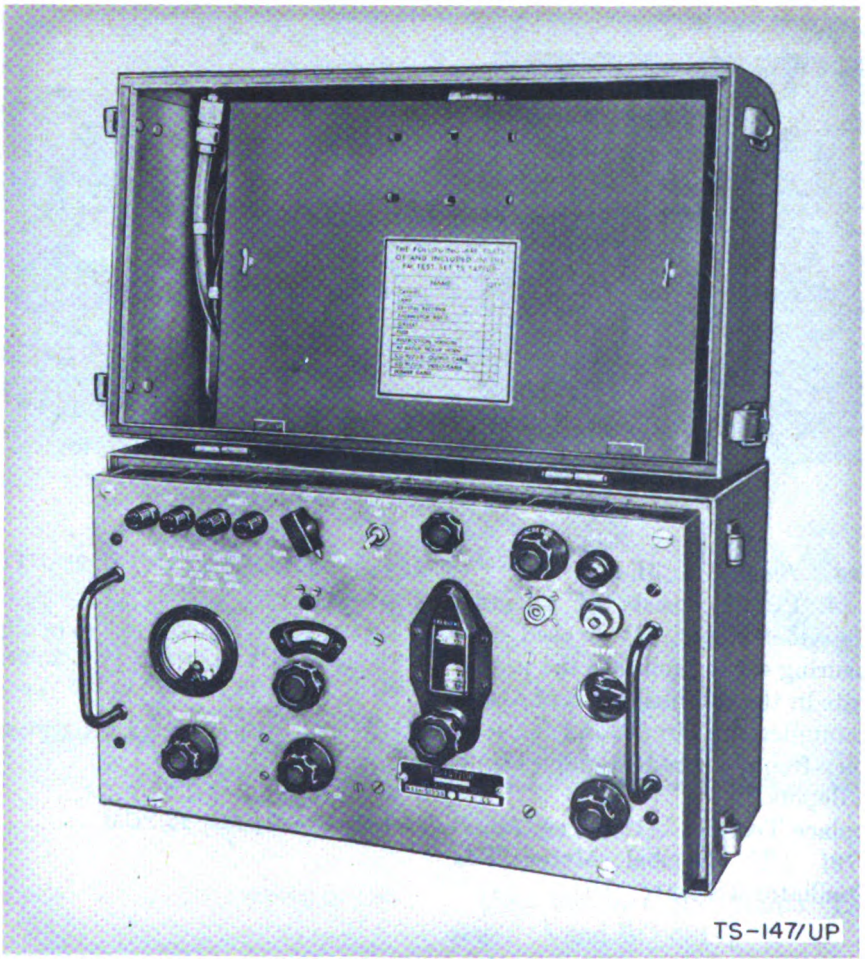


Figure 82. Test Set TS-147/UP.

Status: Standard. *Stock No.:* 3F4325-147. *Reference:* TM 11-1247.

Test Set TS-147/UP is a portable combination test set consisting of a frequency meter, a signal generator, and a power meter. The necessary coupling cords, adapter, and pick-up antenna are supplied with the equipment. It is used to test and adjust radar systems operating within the frequency range of 8,500 to 9,600 mc.

P/o Test Set AN/MPM-6.

Note.—Oscilloscope TS-34A/AP, or equivalent, is required but not supplied.

TECHNICAL CHARACTERISTICS

FREQUENCY RANGE: 8,500 to 9,600 mc.

POWER OUTPUT: −42 to −83 dbm at r-f jack.

FREQUENCY MODULATION:

Sweep rate—0 to 6 mc per μsec (for oscillators having at least 3 mc per v tuning range).

Phase range—3 to 50 μsec after trigger.

Frequency excursion of sweep—0 to over 60 mc.

TRIGGERS FOR SAW TOOTH SWEEP GENERATOR:

R-f trigger—5 to 500 w peak, .5 to 6 μsec duration, less than 5 μsec time rise.

Video trigger—Positive polarity, 10 to 50 v peak, .5 to 20 μsec duration at 10 percent of maximum amplitude, less than 5 μsec time of rise between 10 percent and 90 percent of maximum amplitude points.

POWER METERING:

Input signals (average power levels): +7 to +30 dbm.

Output signals (peak mode power): −42 to −83 dbm.

SAW TOOTH SWEEP:

Amplitude—0 to −100 v (negative polarity).

Slope—0 to +2 v per sec (positive slope).

Trigger amplifier gain—Approximately 500.

POWER: 115 v, ac, 50 to 1,600 cps.

WEIGHTS AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	11 x 18¾ x 12¼	35	1. 46
Export pack	22¾ x 12¾ x 16	65	2. 68

Figure 83. Spectrum Analyzer TS-148/UP.

Status: Standard. *Stock No.* 3F4325-148. *Reference:* TM 11-1249.

Spectrum Analyzer TS-148/UP is a portable instrument consisting of a narrow-band receiver whose output, which is displayed on a built-in oscilloscope, represents the frequency spectrum of the equipment being tested. A direct-reading frequency meter, cords, and a pick-up antenna are part of the equipment. Spectrum Analyzer TS-148/UP is used to measure the frequency characteristics and to test the operation of X-band signal generators, local oscillators, magnetrons, and T/R and R/T boxes. Visual alinement of plumbing, such as resonant chambers, mixer chambers, and R/T and T/R boxes may also be accomplished.

P/o Test Set AN/MPM-6.

TECHNICAL CHARACTERISTICS

FREQUENCY RANGE: 8,470 to 9,630 mc.
SWEEP FREQUENCIES: 10 to 30 cps.
ATTENUATION: 3 to 70 db.
FREQUENCY SWING OF R-F OSCILLATOR: 40 to 50 mc.
I-F BANDWIDTH: 50 kc.
SENSITIVITY TO CW: Spectrum amplified—80 db below 1 w. SPECTRUM—55 db below 1 w.
MAXIMUM DISPERSION OF SPECTRA: 1.5 mc per in.
POWER OUTPUT: 1 mw.
POWER: 105 to 125 v, ac, 50 to 1,200 cps.

WEIGHT AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	25 x 19 x 13	45	3.58

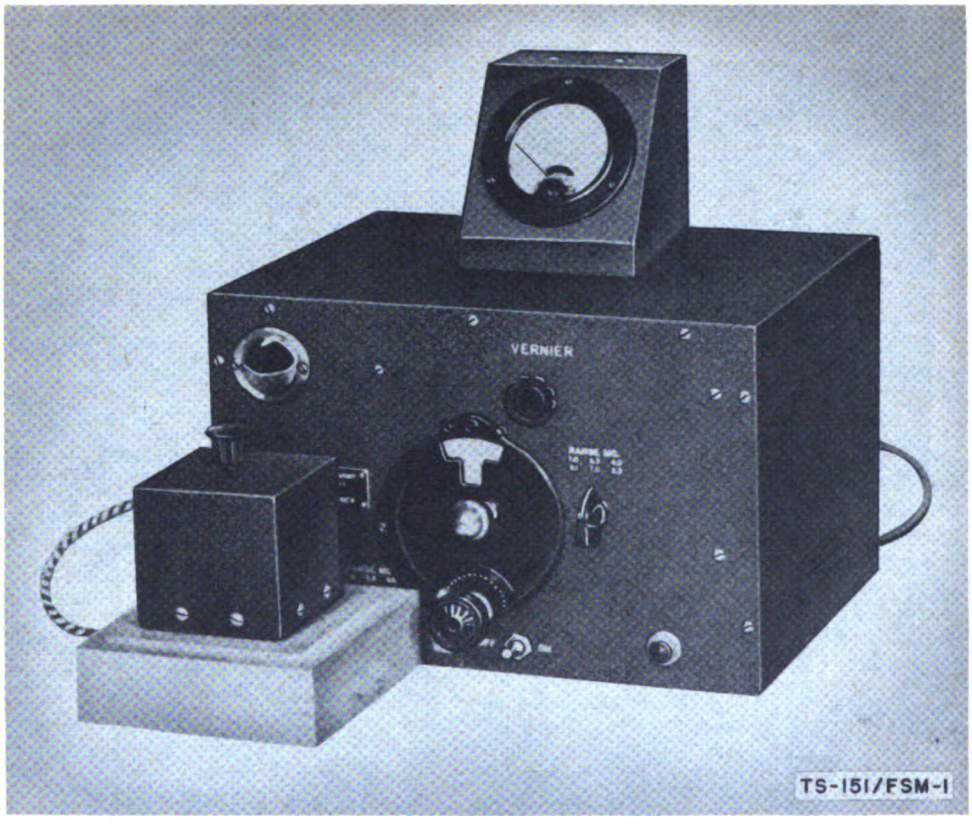


Figure 84. Crystal Test Set TS-151/FSM-1.

Status: Limited/Std. *Stock No.:* 3F4325-151. *Reference:* TM 11-2663.

Crystal Test Set TS-151/FSM-1 is designed to simulate the operating conditions of the crystal calibrator circuit of Radio Transmitters BC-457-A, -B, and -C; BC-458-A, -B, and -C; and BC-459-A. It is used to test the crystal activity of the crystals used in the above transmitters. Used with Frequency Measuring Assembly CY-93/FSM-1 and temperature testing and control equipment, the set tests the frequency and activity of the crystals over a temperature range of −40° C, to +90° C.

P/o Test Set AN/FSM-3.
U/w but not p/o Radio Set SCR-274-N.

TECHNICAL CHARACTERISTICS

FREQUENCY RANGE: 4.0 to 9.1 mc.
ACTIVITY RANGE: 0 to 200 μa.
POWER: 110 v, ac, 60 cps.

WEIGHT AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	8 x 12⅞ x 9½	19	.54

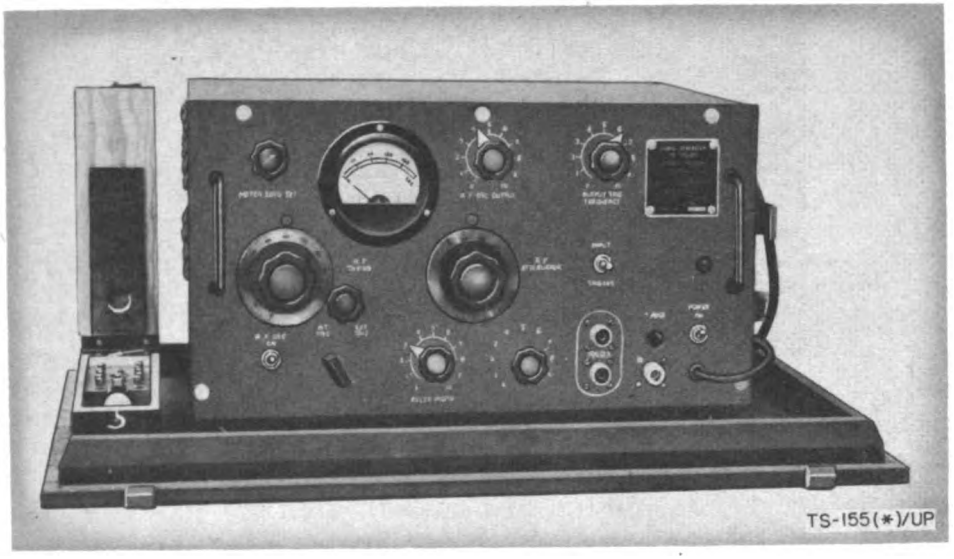


Figure 85. Signal Generator TS–155B/UP.

Status: Standard. *Stock No.:* 3F4325–155.
References: TM 11–2657, TM 11–2657B.

Signal Generator TS–155(*)/UP represents TS–155/UP, TS–155A/UP, and TS–155B/UP. Signal Generator TS–155(*)/UP is a generator of pulse-modulated, calibrated, r-f signals. It is used to test the operation of radar sets in the band of frequencies from 2,700 to 2,900 mc. As a signal generator, it measures or checks the sensitivity of the radar receiver; as an r-f wattmeter, it measures or checks the power output of the radar transmitter. A test antenna and three test leads are included with the equipment.

TECHNICAL CHARACTERISTICS

OUTPUT:
- R-f—2,700 to 2,900 mc.
- Standard—650 cps trigger frequency.

INTERNALLY SYNCHRONIZED:
- Trigger frequency—120 to 2,000 cps.
- Pulse width—.75 to 6.0 μsec.
- Pulse delay—5 to 1,800 μsec.
- Pulse shape—
  - Rectangular (TS–155/UP and TS–155A/UP).
  - Square wave (TS–155B/UP).

EXTERNALLY SYNCHRONIZED:
- Trigger frequency—120 to 2,000 cps.
- Width—.5 to 18.0 μsec.
- Polarity—Either positive or negative.
- Amplitude—10 to 100 v.
- Rise time—Less than .2 μsec to 20 v.
- Pulse width, delay, and shape—Same as internally synchronized output.

POWER: 105 to 125 v. ac, 50 to 800 cps.

WEIGHTS AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	9 x 17 x 12¾	36. 5	1. 13
Export pack		126	6. 0

Figure 86. Signal Generator TS-155C/UP.

Status: Standard. *Stock No.:* 3F4325-155. *Reference:* TM 11-2657C.

Signal Generator TS-155C/UP is a generator of pulse-modulated, calibrated, r-f signals. A test antenna and three test leads are included with the equipment. Signal Generator TS-155C/UP is used to check the operation of radar sets in any of the following frequency bands: 2,700 to 3,100 mc, and 3,100 to 3,400 mc. As an r-f wattmeter, it is used to measure the power output of the radar transmitter.

TECHNICAL CHARACTERISTICS

R-F OUTPUT: 2,700 to 3,400 mc.

INTERNALLY SYNCHRONIZED:
- R-f pulse width—.75 μ sec to 5.75 μ sec.
- Repetition-rate trigger—80 to 2,600 cps.
- Delay—Less than .75 μ sec and 5 to 1,800 sec.

R-F PULSE SHAPE:
- Rise time—.25 μ sec from 10 to 90 percent maximum.
- Fall time—.30 μ sec from 90 to 10 percent maximum.

OUTPUT TRIGGER CHARACTERISTICS:
- Amplitude—+100 to +50 v.
- Duration—.5 to 20 μ sec between 10 percent maximum amplitude points.
- Rise time—Less than .5 μ sec from 10 to 90 percent maximum amplitude.
- Flatness—Constant within $\pm$10 percent of maximum amplitude.
- Decay oscillations—Less than 10 percent of maximum amplitude.
- Pulse amplitude variations—Not more than $\pm$5 percent of maximum amplitude.
- Dc level—Not more than $\pm$10 percent v.

TRIGGER REQUIREMENTS FOR EXTERNAL SYNCHRONIZATION:

DELAY—DIRECT switch in DIRECT positions:
- Trigger frequency—2,500 cps.
- Delay—Paired trigger pulses, 2 μ sec apart.
- Width (trigger pulse)—.3 to 1 μ sec at half-voltage points.
- Width (r-f pulse)—.4 to 1.4 μ sec at half-voltage points.
- Amplitude: $\pm$30 to $\pm$50 v.
- Rise time—Less than .3 μ sec from 10 percent to 90 percent maximum amplitude.

DELAY—DIRECT switch in DELAY position:
- Trigger frequency—80 to 2,600 cps.
- Delay—4 to 1,900 μ sec.
- Width—.7 to 12 μ sec.

POWER:
- 105 to 125 v, ac, 50 to 1,600 cps.
- 210 to 250 v, ac, 50 to 1,600 cps; using 230-v power transformer.

WEIGHTS AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	9 x 15 1/16 x 12 13/16	41	1.04
Export pack	----------	126	6.0

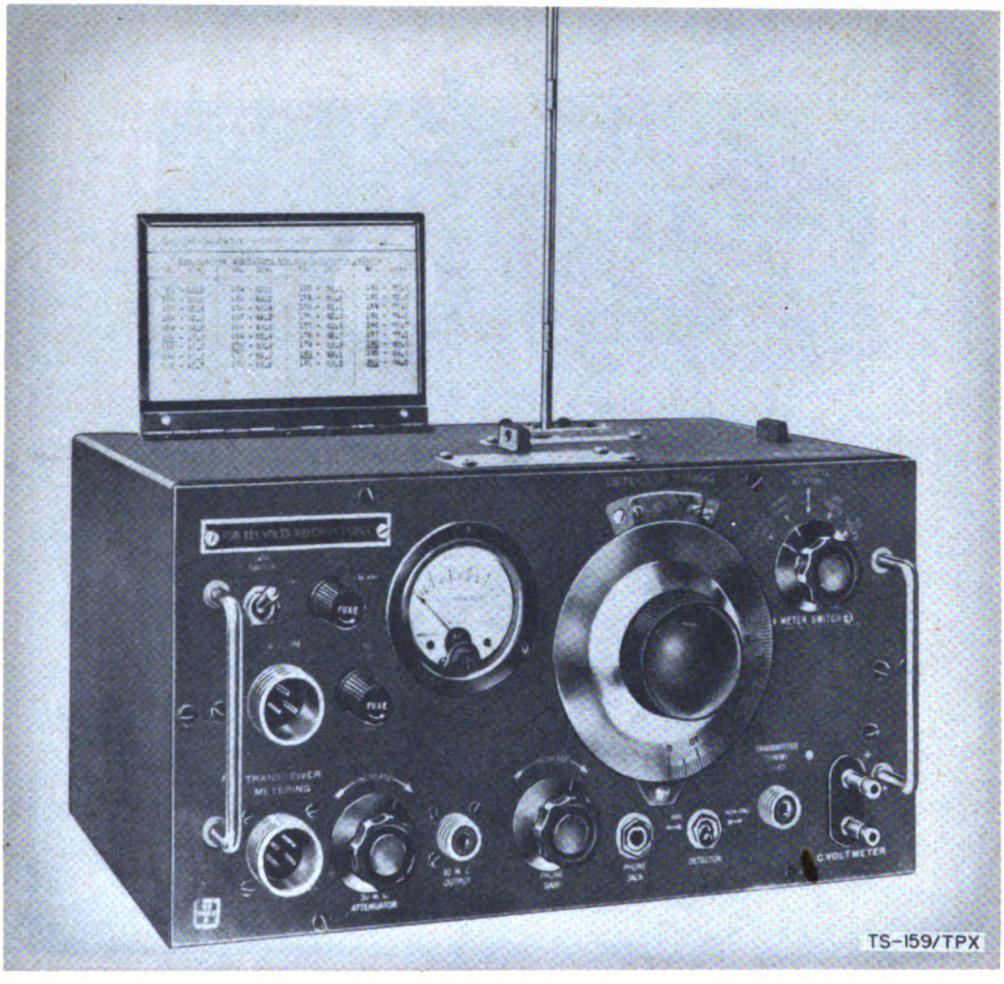


Figure 87. Test Set TS–159/TPX.

Status: Standard. *Stock No.:* 3F4325–159. *Reference:* TM 11–1243.

Test Set TS–159/TPX is a combination test set which consists of a signal generator, a frequency meter, an audio amplifier, a power meter, and a voltmeter. A tuning chart and a removable test antenna are mounted on the top of the instrument. Test Set TS–159/TPX is used to test, tune, and aline the circuits of Radar Sets AN/TPX–3 and AN/TPX–4. The instrument also can be used with any other radar or radio equipment which has ranges within the limits of the test set. It is also used to measure currents and voltages within the IFF transmitter-receiver units.

P/o Test Sets AN/MPM–7, –11, –15, –20, and –23.

Note. This instrument *cannot* be operated on a standard commercial 115v, ac, 60 cps power line.

TECHNICAL CHARACTERISTICS

R-F RANGE:
Signal generator—150 to 200 mc.
Frequency meter—150 to 200 mc.
Calibration points—150, 160, 170, 180, 190, and 200 mc.

I-F SIGNAL OUTPUT:
Frequency—30 mc.
Amplitude—0 to 200,000 v.

POWER MEASUREMENT:
Input circuit impedance—50 ohms.
Range—0 to 800 w, peak power.

POWER: 115 v, ac, *400 cps.*

WEIGHT AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	8¼ x 13½ x 7	15½	.45

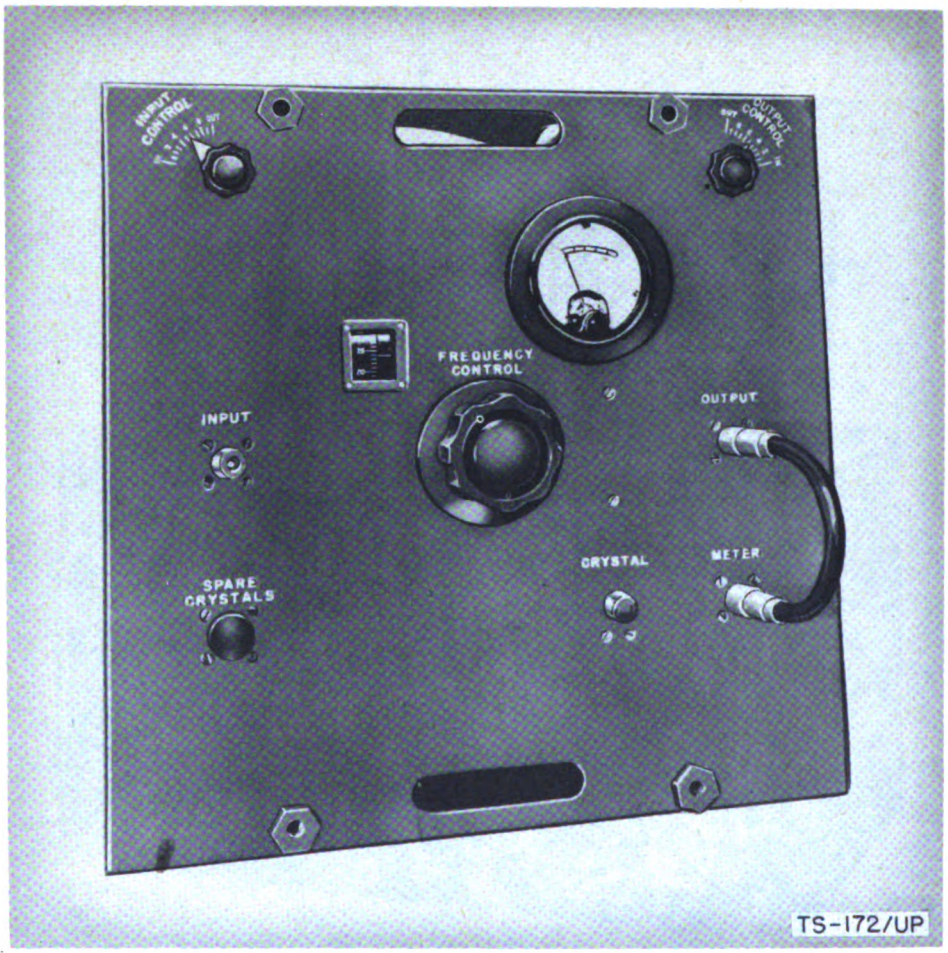


Figure 88. Test Set TS-172/UP.

Status: Standard. *Stock No.:* 3F4325–172.

Test Set TS–172/UP is a combined high-Q resonant cavity and microammeter which may be used for systems tests of, or to indicate faults in, the transmitter and receiver systems of radar sets. All necessary cords and connectors are included with the equipment. With the aid of an oscilloscope or a radar A-scan scope, it is used to make the following tests: over-all performance check, comparative measurement of transmitter frequencies, trouble location, indication of transmitter power output, analysis of transmitter frequency band, and receiver alinement.

P/o Test Set AN/MPM–23.

TECHNICAL CHARACTERISTIC

RESONANCE FREQUENCY: 1,215 to 1,360 mc.

WEIGHT AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu. ft.)*
Unpacked (in case)	19¾ x 17⅝ x 17⅝	40	3. 45

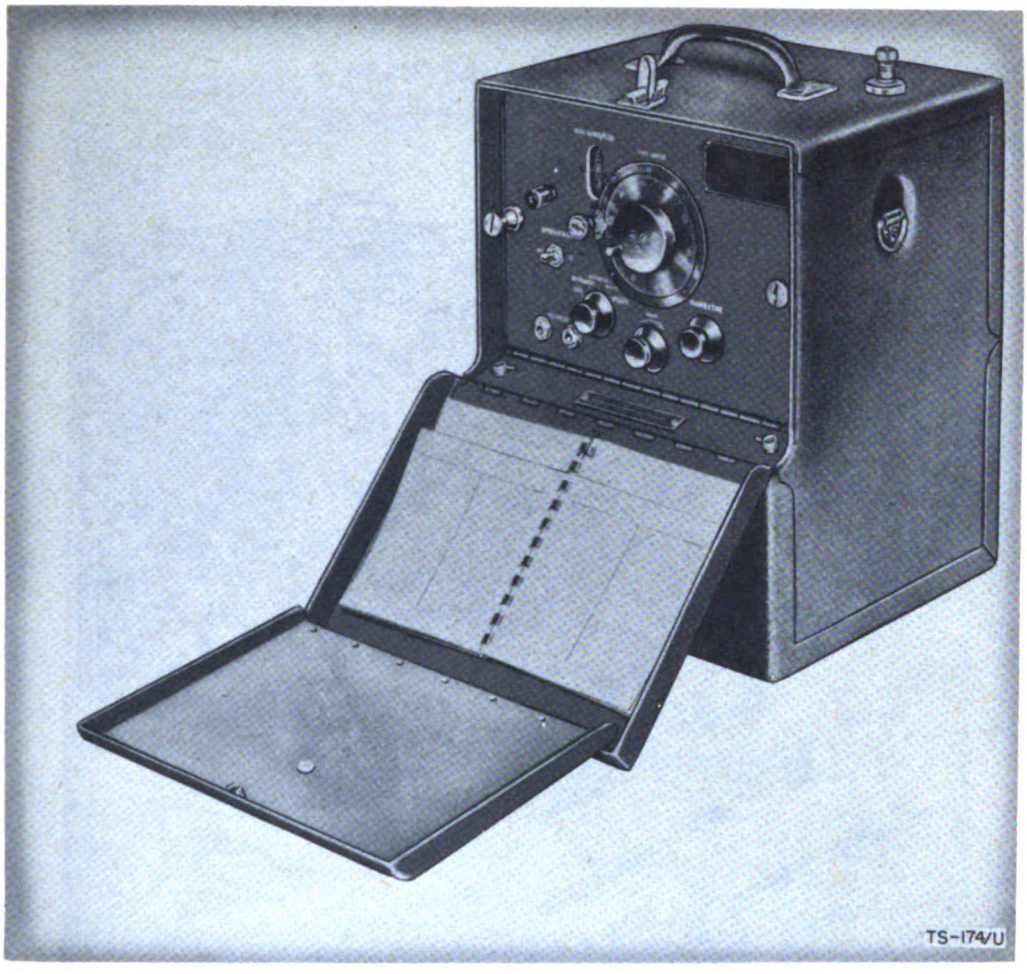


Figure 89. Frequency Meter TS-174/U.

Status: Standard. *Stock No.:* 3F4325-174.

Frequency Meter TS-174/U is a heterodyne frequency meter having crystal check points for calibrating equipment using cw or cw modulated by tone, voice, or noise. It is used to calibrate the frequency of transmitters, oscillators, and signal generators within its frequency range.

TECHNICAL CHARACTERISTICS

FREQUENCY RANGE:
Calibrated—20 to 280 mc.
Fundamental—20 to 40 mc.

SIGNAL INPUT: 20 mv to 2 v.
SIGNAL OUTPUT: 50 to 20 mv modulated at 1,000 cps.
POWER: Battery operated—4 Batteries BA-23, 6 Batteries BA-2.

WEIGHTS AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	10 5/16 x 14 x 9 3/4	25	.81
Export pack	----------	42	1.75

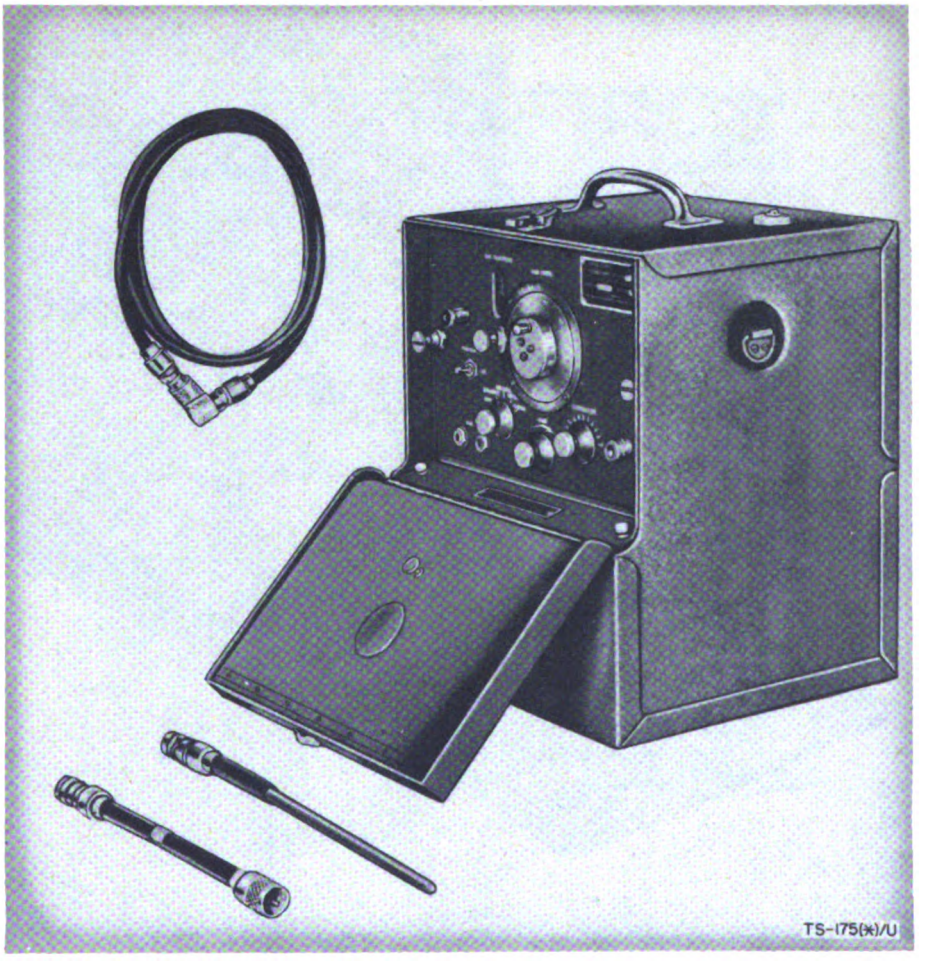


Figure 90. Frequency Meter TS–175/U.

Status: Standard. *Stock No.:* 3F4325–175.

Frequency Meter TS–175 (*)/U represents TS–175/U and TS–175A/U. Frequency Meter TS–175(*)/U is a crystal-controlled heterodyne frequency meter. The necessary cords and a pick-up antenna are included with the equipment. It is used to test radar systems within its frequency range. It is also used to measure or check the frequencies of transmitters or signal generators and may be used to calibrate receivers.

TECHNICAL CHARACTERISTICS

FREQUENCY RANGE: 85 to 1,000 mc.
FUNDAMENTAL FREQUENCY RANGE, OSCILLATOR: 80 to 200 mc.
ACCURACY: ±.04 percent.
SIGNAL INPUT: 20 mv to 2 v.
SIGNAL OUTPUT: 20 mv to 100 v, modulated at 1,000 cps.
POWER: Battery operated—6 Batteries BA–2, 4 Batteries BA–23.

PRINCIPAL COMPONENTS

Item	*Dimensions (in.)*	*Weight (lb)*
Frequency Meter TS–175/U, bare unit.	14 x 9¾ x 10⁵⁄₁₆	18
Antenna AT–66/U.		

PACKED WEIGHT AND VOLUME

	Weight (lb)	*Volume (cu ft)*
Export pack	40	1. 75

Figure 91. Battery Tester TS-183/U.

Status: Standard *Stock No.:* 3F4325-183. *Reference:* TM 11-2571.

Battery Tester TS-183(*)/U represents TS-183/U and TS-183A/U. Battery Tester TS-183(*)/U is a combination instrument consisting of a multiple-range voltmeter,a set of battery-loading resistors, a set of multiple resistors, and a jack-switching arrangement. Battery Tester TS-183(*)/U is used to measure the voltage of dry batteries under load and the terminal voltage of dry batteries.

TECHNICAL CHARACTERISTICS

RANGE: 0 to 200v.

WEIGHTS AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	15 x 9½ x 7	14. 6	. 58
Export pack	----------	48. 4	1. 65

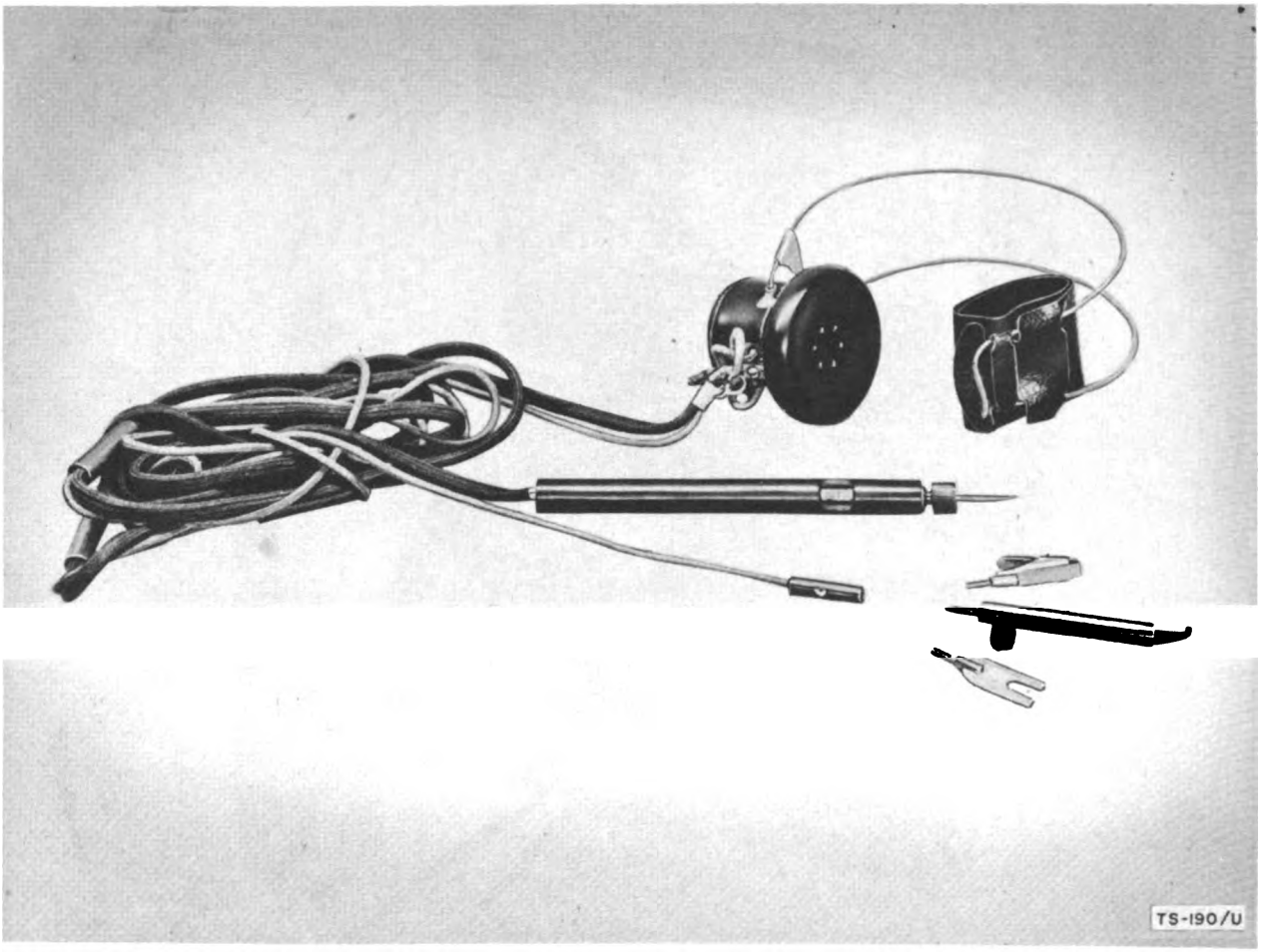


Figure 92. Test Set TS-190/U.

Status: Standard. *Stock No.:* 3F4316.1.

Test Set TS-190/U consists of a high-resistance test receiver with one lead terminating in a test prod and the other lead terminating in a small female connector into which fits a connecting clip, a test prod, or another connecting tool. It is used to detect the presence of battery or ground at a point within a telephone or telegraph circuit or to detect differences in voltage between points within the circuit. It also may be used for monitoring or for making continuity tests on working circuits without interfering with service.

TECHNICAL CHARACTERISTIC

RECEIVER RESISTANCE: 1,000 or 50,000 ohms.

WEIGHTS AND VOLUME

	Weight (lb)	*Volume (cu ft)*
Unpacked	.63	-------
Export pack	2.12	.08

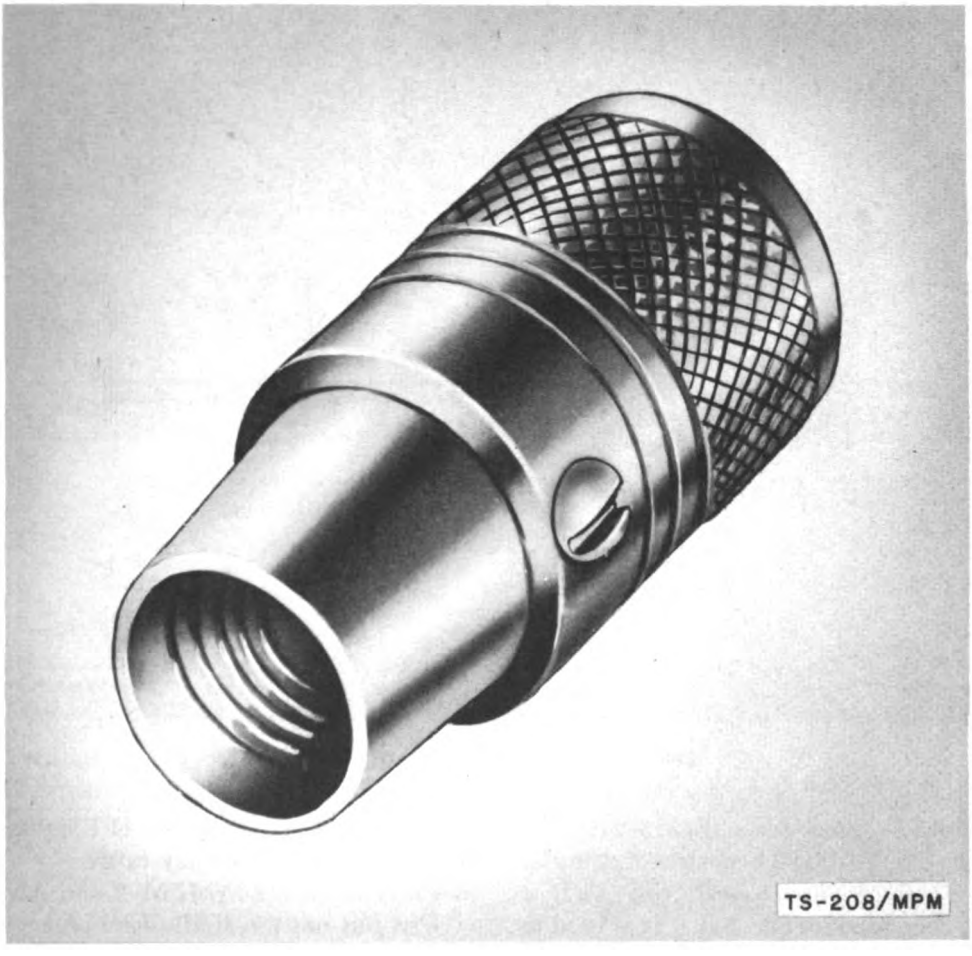


Figure 93. Dummy Antenna TS-208/MPM.

Status: Standard. *Stock No.:* 3F4325-208.

Dummy Antenna TS-208/MPM consists of Plug PL-259-A with a 47-ohm, 1-w resistor soldered between the center pins and the inside shell of the connector. It is used as an aid in the alinement of IFF equipment in the 157- to 187-mc frequency range.

P/o Test Sets AN/MPM-2 and AN/MPM-5.

U/w but not p/o Radio Equipment RC-184.

TECHNICAL CHARACTERISTICS

FREQUENCY RANGE: 157 to 187 mc.
INPUT IMPEDANCE: 50 ohms.

WEIGHTS AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	1⅝ x ¾	.1	-----
Export pack	----------	.4	.01

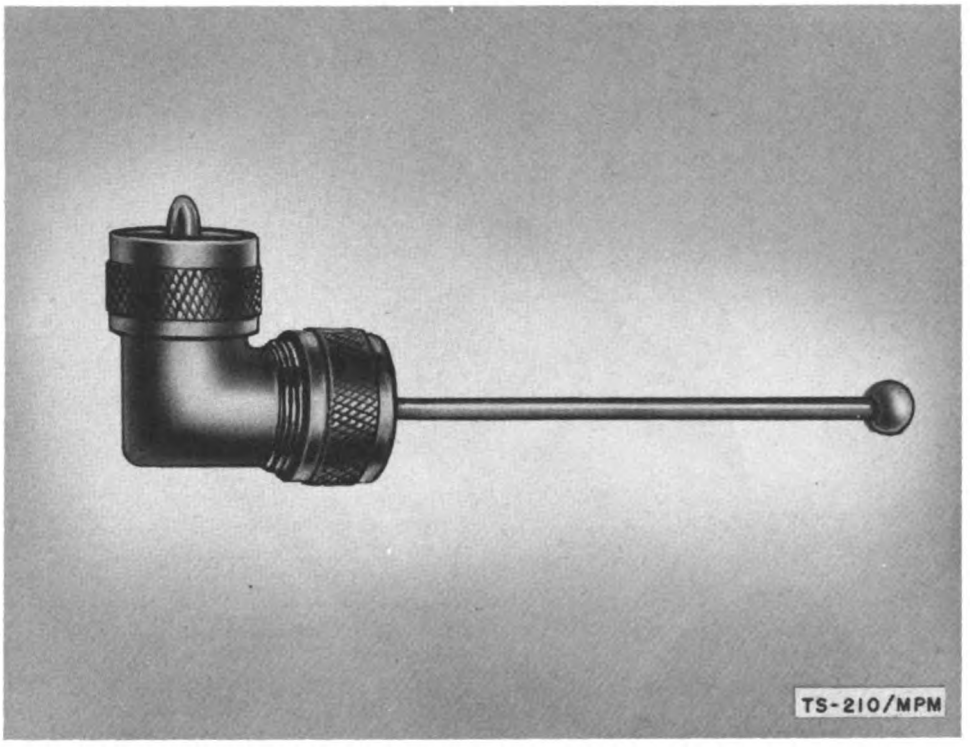


Figure 94. Test Antenna TS-210/MPM.

Status: Standard. *Stock No.*: 3F4325-210.

Test Antenna TS-210/MPM consists of Adapter M-359 and a silver-plated steel rod with a phenolic knob cemented on one end. It is used as an aid in the alinement of IFF equipment in the 157- to 187-mc frequency range.

P/o Test Sets AN/MPM-2 and AN/MPM-5.

U/w but not p/o Radio Equipment RC-184.

Figure 95. Standard Oscillator TS–220/TSM.

Status: Limited/Std. *Stock No.:* 3F4325–220. *Reference:* TM 11–2675.

Standard Oscillator TS–220/TSM is a crystal correlation oscillator designed to reproduce accurately the frequency and activity requirements of the radio set in which the crystal under test is to be used. It is used to test the frequency and activity of 1- to 10-mc crystals under conditions closely simulating actual operation.

P/o Test Set AN/FSM–3.

TECHNICAL CHARACTERISTICS

FREQUENCY RANGE: 1 to 10 mc.
POWER: 110 v, ac, 50 to 60 cps.

WEIGHTS AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	5¼ x 17 x 7¼	12½	.37
Export pack		52	3.9

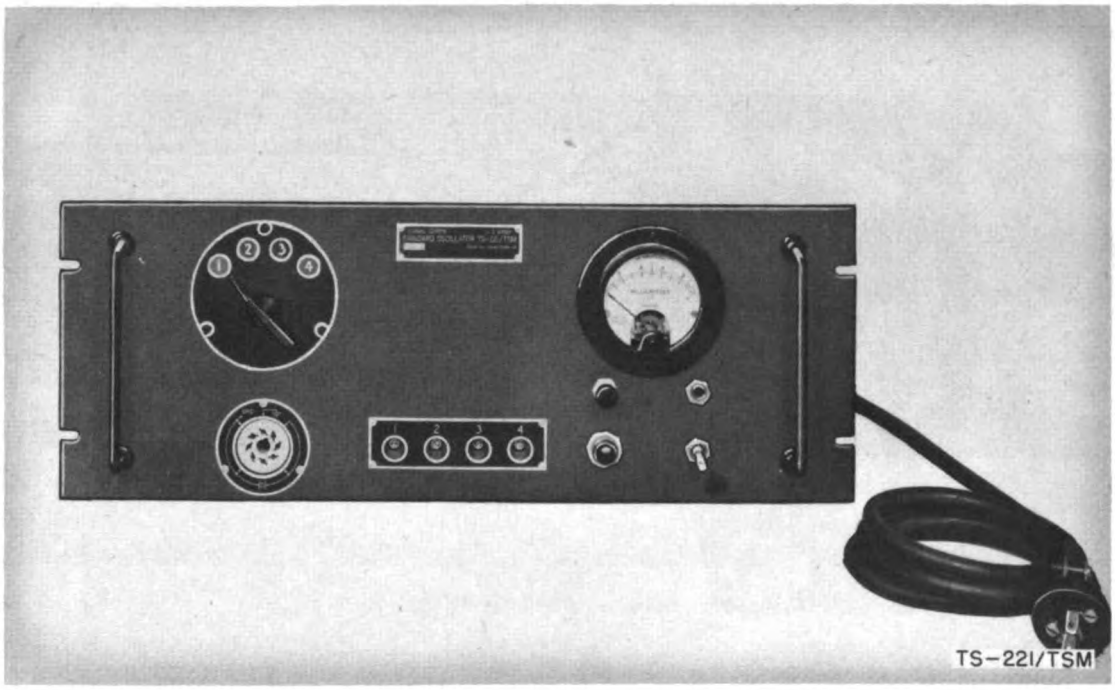


Figure 96. Standard Oscillator TS-221/TSM.

Status: Standard. *Stock No.:* 3F4325-221.

Standard Oscillator TS-221/TSM is a crystal test oscillator which uses a special circuit developed for testing low-frequency crystals. An r-f cord and crystal holder are included with the equipment. It is used as a reference standard to test the frequency and activity of Crystal Units CR-2/U, CR-3/U, and CR-4/U.

P/o Standard Crystal Test Set AN/TSM-2.

TECHNICAL CHARACTERISTICS

FREQUENCY RANGE: 200 to 1,200 kc.
POWER: 110 to 120 v, ac, 50 to 1,720 cps.

WEIGHT AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	19 x 7 x 7½	----	.58
Export pack	----------	80	3.0

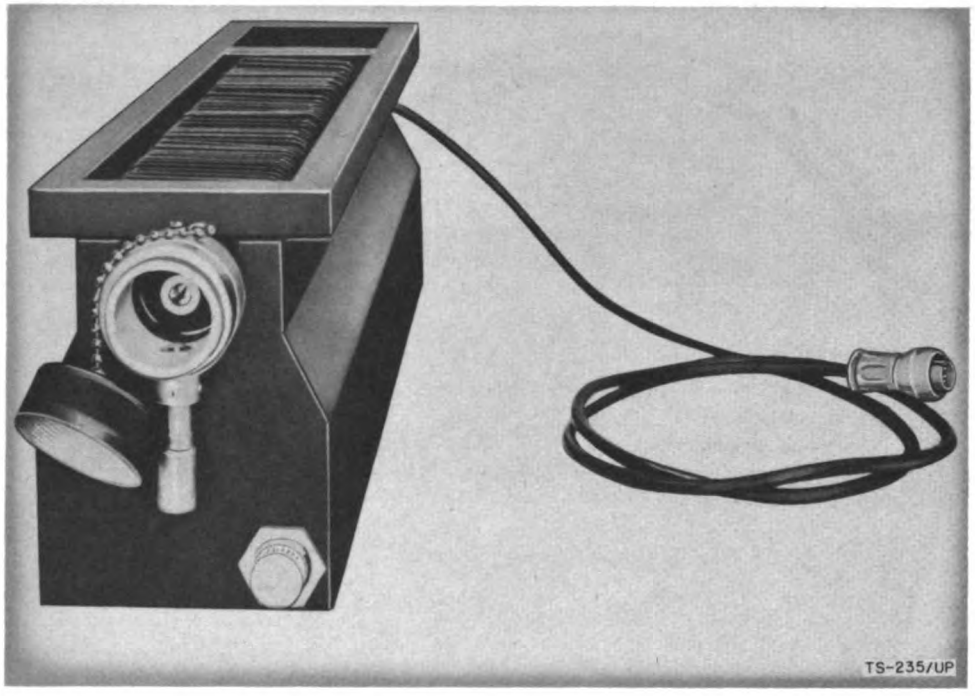


Figure 97. Dummy Antenna TS-235/UP.

Status: Standard. *Stock No.:* 3F4325-235.

Dummy Antenna TS-235/UP is used with radar transmitters to provide a power-absorbing termination for the transmitter when used with its associated test equipment to check frequency and receiver sensitivity.

P/o Test Sets AN/MPM-14 and AN/MPM-23.

TECHNICAL CHARACTERISTICS

FREQUENCY RANGE: 500 to 1,500 mc.
INPUT SIGNAL: Capable of withstanding an average power of 1,000 w.
IMPEDANCE: 50 ohms.

WEIGHTS AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	26 x 5 x 5	20	.38
Export pack	28 x 6½ x 8¼	27	.83

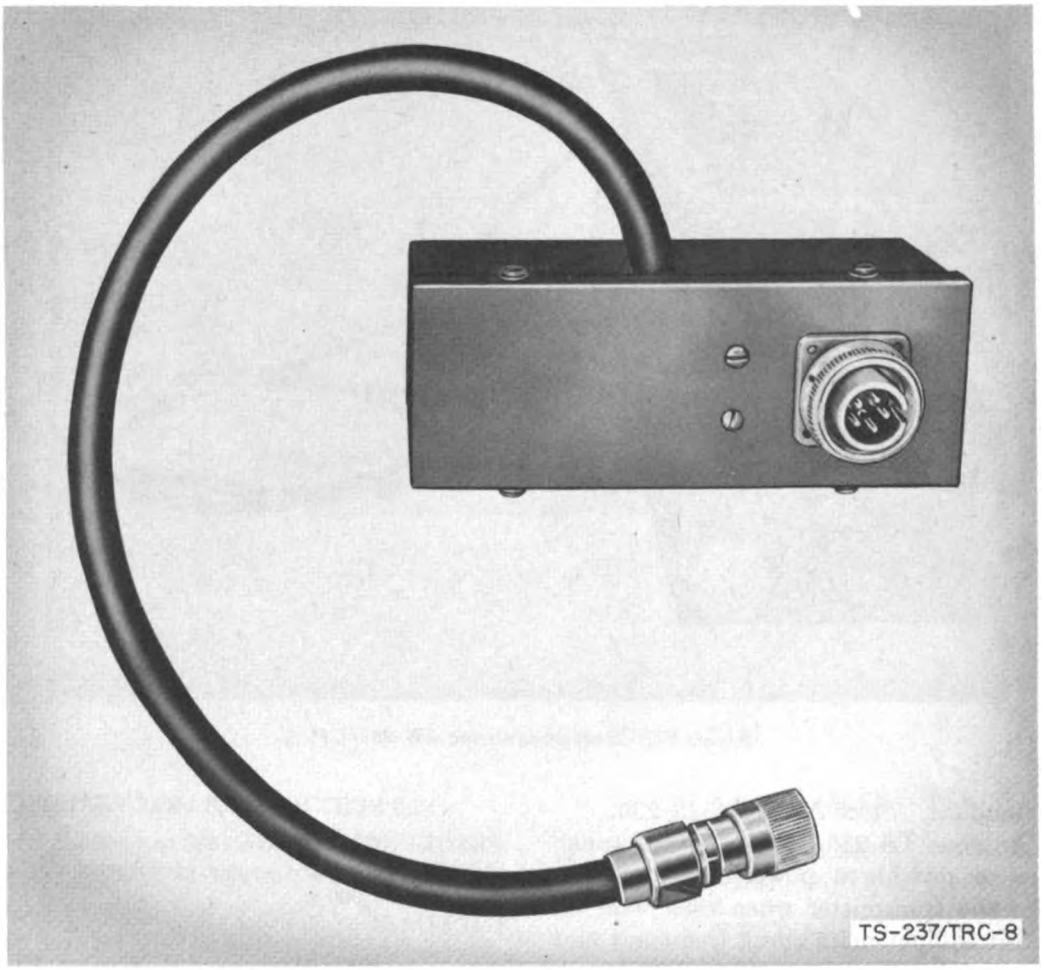


Figure 98. Test Oscillator TS-237/TRC-8.

Status: Substitute/Std. *Stock No.:* 3F4325-237.1. *Reference:* TM 11-618.

Test Oscillator TS-237/TRC-8 is a crystal-controlled signal generator designed to furnish the necessary signals for the alinement of the r-f and i-f stages of Radio Set AN/TRC-8. The necessary r-f cable and coupling are permanently fixed to the instrument.

U/w Radio Set AN/TRA-8.

TECHNICAL CHARACTERISTICS

OUTPUT:
30 mc for i-f alinement.
230 to 250 mc for r-f alinement.
POWER: Taken from Radio Receiver R-48/TRC-8.

WEIGHT AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	5⅜ x 3⅜ x 2⅛	----	.02
Export pack	----------	6	.15

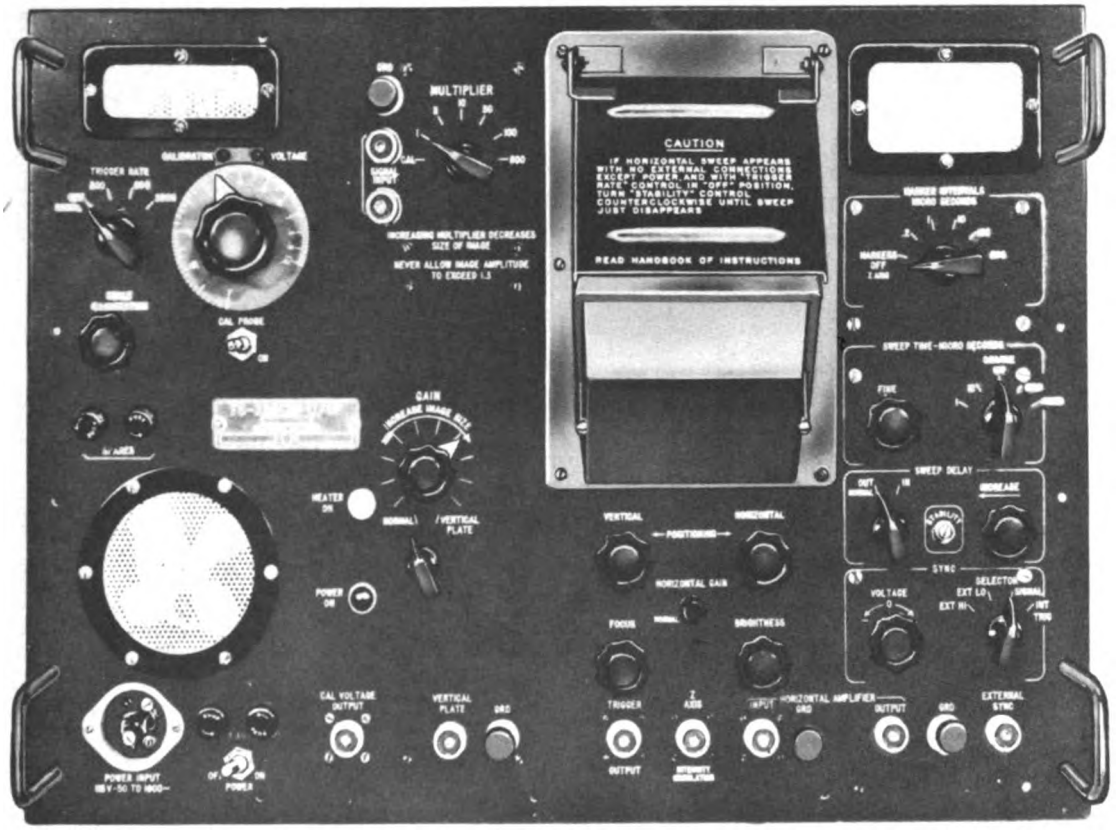


Figure 99. Oscilloscope TS-239/UP.

Status: Standard. *Stock No.:* 3F4325-239.

Oscilloscope TS-239(*)/UP represents TS-239/UP and TS-239A/UP. Oscilloscope TS-239(*)/UP is a portable high-speed oscilloscope which uses a 3-inch cathode-ray tube. It contains an internal calibrating circuit, a pulse generator, timing markers, and broad band video amplifiers for vertical and horizontal deflection. It also contains all necessary probes and binding posts. It is used for the maintenance of airborne electronic equipment.

P/o Test Sets AN/MPM-5, -7, and AN/TPM-3.

Will replace Oscilloscope I-245-( ) and Oscilloscope TS-489/U.

TECHNICAL CHARACTERISTICS

FREQUENCY RANGE: 10 cps to 5 mc.
TIMING PULSES: .2, 1, 10, 100, and 500 μsec.
SWEEP SPEED: .5 to 50,000 μsec per in.
INPUT IMPEDANCE:
  Sweep circuit—300,000 ohms, 30 μμf.
  Probe—3 meg, 12 μμf.
SINE WAVES: Observable of 10 cps to 2 mc, pulses observable of .15 to 5,000 μsec.
TRIGGER PULSES: 300, 800, or 2,000 cps.
POWER: 115 v, ac, 50 to 1,600 cps.

PRINCIPAL COMPONENTS

Item	*Dimensions (in.)*	*Weight (lb)*
Oscilloscope TS-239/UP, bare unit.	21¼ x 14 x 16	60
Probe Assembly MX-607/AP.		

TS-251/UP

Figure 100. Test Set TS-251/UP.

Status: Standard. *Stock No.:* 3F4325-251.

Test Set TS-251/UP is a small, portable r-f signal generator. It is supplied in a combination instrument and transit case complete with all necessary cords, couplings, and adapters. It is used for preflight, Navy-yard, and tender checking of Loran receivers.

TECHNICAL CHARACTERISTICS

FREQUENCY RANGE: 1,700 to 2,010 mc.

PRF:
Low—25.
High—33⅓.

POWER OUTPUT: 15 μv, 1 mv, and 1 v.

POWER: 80, 115, or 230 v, ac, 50 to 1,600 cps.

WEIGHT AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	11¾ x 10½ x 7¾	18.1	.55

Figure 101. Dummy Load TS-264/MPG-1.

Status: Standard. *Stock No.:* 3F4325-264.

Dummy Load TS-264/MPG-1 consists of five 10-ohm resistors in series with a pulse cable. It is used to terminate and absorb the power output of a pulse modulator while under test.

P/o Test Set AN/MPM-6.

WEIGHT AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	24 x 12 x 12	30	2.0

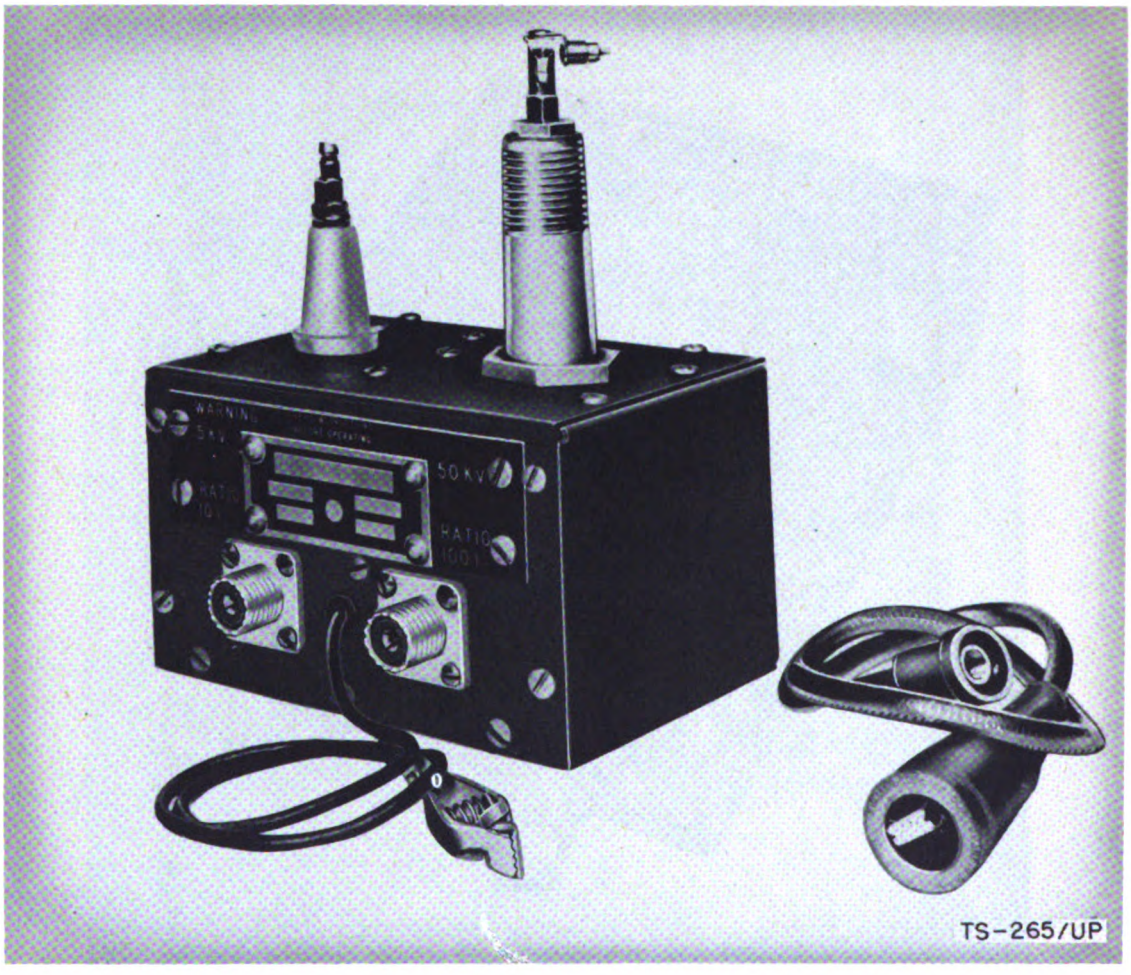


Figure 102. Voltage Divider TS-265/UP.

Status: Standard. *Stock No.:* 3F4325-265.

Voltage Divider TS-265/UP is used with Oscilloscope TS-34/AP. It provides a known step-down ratio which allows large amplitude pulses to be observed and measured with the oscilloscope.

P/o Test Sets AN/MPM-7, -11, -15.

TECHNICAL CHARACTERISTICS

VOLTAGE RATIOS:
100:1 for 5,000 to 50,000 v.
10:1 for 0 to 5,000 v.

WEIGHT AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	3 x 5 x 10	----	.09
Export pack	----------	15.5	-----

Figure 103. Crystal Rectifier Test Set TS–268(*)/U.

Status: Standard. *Stock No.:* 3F4325–268. *Reference:* TM 11–1242.

Crystal Rectifier Test Set TS–268(*)/U represents TS–268/U, TS–268A/U, TS–268B/U, and TS–268C/U. Crystal Rectifier Test Set TS–268(*)/U is a portable unit designed for testing crystal rectifiers of the 1N21, 1N23, and 1N25 series. It is used to make speedy qualitative tests on the above h-f crystal rectifiers. The forward and backward resistances of the crystal and the current flow through the crystal are measured to determine quality.

P/o test equipments of the AN/MPM series.

TECHNICAL CHARACTERISTICS

RANGES:
0 to 1 ma.
0 to 10,000 ohms.

ACCURACY: ±2 percent.

POWER: Battery operated: 1 Battery BA–30.

WEIGHTS AND DIMENSIONS

	Dimensions (in.)	*Weight (lb.)*	*Volume (cu ft)*
Unpacked	3 x 6 x 7	3	.07
Domestic pack	----------	4	.09
Export pack	----------	7.2	.24

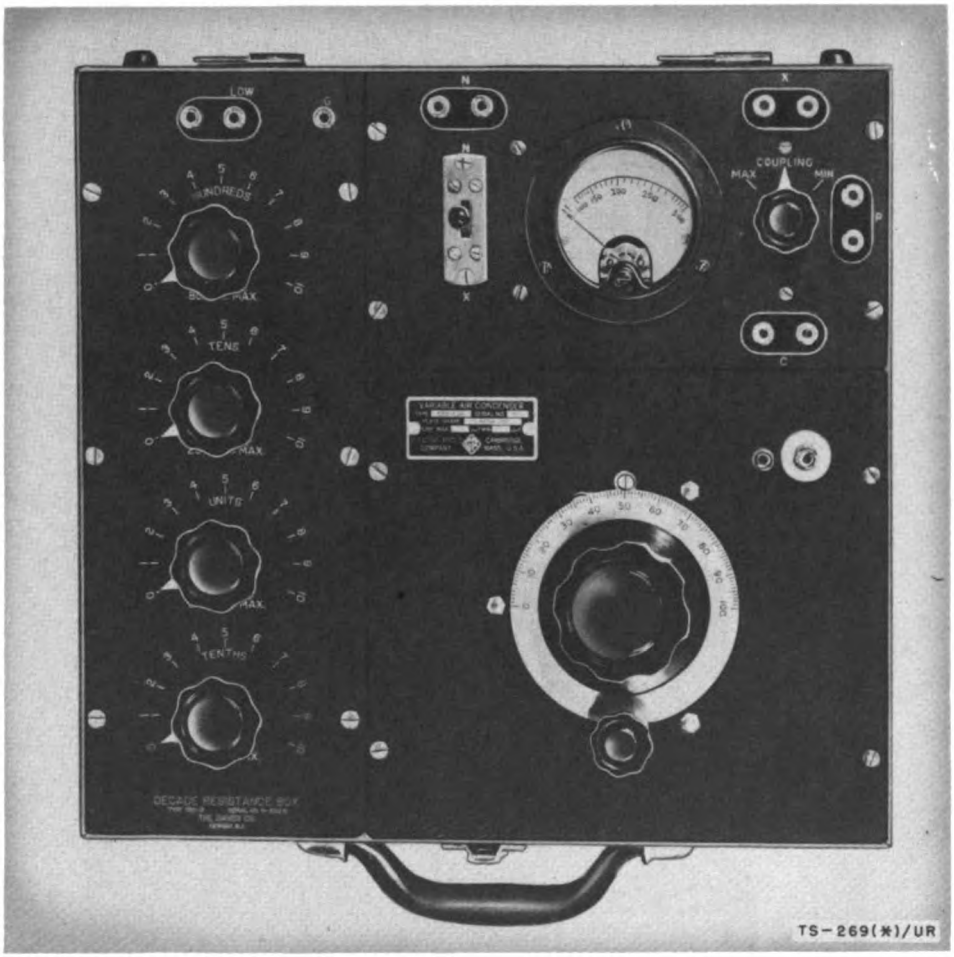


Figure 104. Test Set TS-269/UR.

Status: Standard (TS-269/UR), Limited/Std (TS-269A/UR). *Stock No.:* 3F4325-269. *Reference:* TM 11-2523.

Test Set TS-269(*)/UR represents TS-269/UR and TS-269A/UR. Test Set TS-269(*)/UR is a portable impedance measuring set. Four test leads are included with the equipment. It is used to measure reactive and resistive components of impedances of tuned circuits and antennas.

TECHNICAL CHARACTERISTICS

RANGES:

0 to 300 ma.
.1 to 1,111 ohms.
40 to 4,000 $\mu\mu$f.

POWER: External source; use transmitter or r-f oscillator which operates over range of 20 to 1,000 kc.

WEIGHTS AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	14⅜ x 13¼ x 10	26½	1. 10
Export pack	16½ x 16½ x 18¼	54½	2. 88

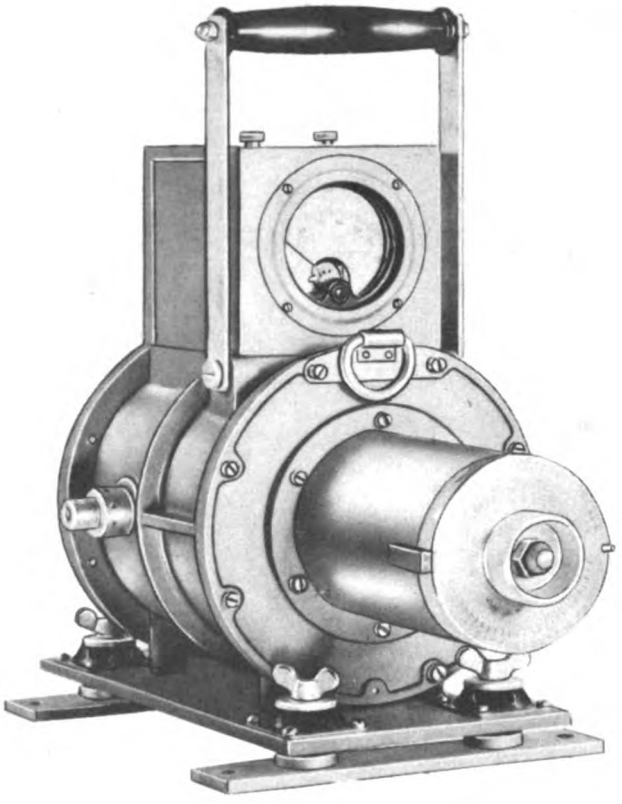


Figure 105. Echo Box TS-270A/UP.

Status: Standard. *Stock No.:* 3F4325-270. *Reference:* TM 11-1086.

Echo Box TS-270(*)/UP represents TS-270/UP, TS-270A/UP, and TS-270B/UP. Echo Box TS-270(*)/UP is a portable resonant cavity or echo box test set consisting of a hand-tuned cavity with an attached output meter circuit and a cable for coupling the set to the radar unit under test. It is used for making rough analyses of radar transmitters and receivers and for checking over-all performance when simple test equipment must be used.

TECHNICAL CHARACTERISTICS

FREQUENCY RANGE: 2,630 to 2,970 mc.

SENSITIVITY: Such that each loss of approximately 90 yd in ringtime indicates that the radar is down 1 db in performance.

POWER: None.

MODEL WEIGHTS AND DIMENSIONS

Item	*Dimensions (in.)*	*Weight (lb)*
Echo Box TS-270/UP	8 x 12¼ x 12⅝	25
Echo Box TS-270A/UP	8 x 14⅝ x 14¼	26
Echo Box TS-270B/UP	7½ x 14½ x 12½	29

PACKED WEIGHT AND VOLUME

	Weight (lb)	*Volume (cu ft)*
Export pack	53	1.75

Figure 106. Voltohmmeter TS-294(*)/U.

Status: Limited/Std. *Stock No.:* 3F14050. *Reference:* TM 11-2624B.

Voltohmmeter TS-294(*)/U represents TS-294A/U, TS-294B/U, and TS-294D/U. Voltohmmeter TS-294(*)/U is a portable electronic voltohmmeter (VTVM on dc only) and is used to measure voltage (ac and dc) resistance.

P/o Test Set AN/GPM-1.

To be replaced by Electronic Multimeter TS-505/U.

TECHNICAL CHARACTERISTICS

RANGES:
0 to 1,000 v, ac and dc.
0 to 1,000 meg.
ACCURACY: ±2 percent.
POWER:
115 v, ac, 60 cps.
Battery, for resistance measurements—1 Battery BA-205/U.

WEIGHTS AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	9½ x 6⁵⁄₁₆ x 6½	14	.23
Export pack		24¾	1.65

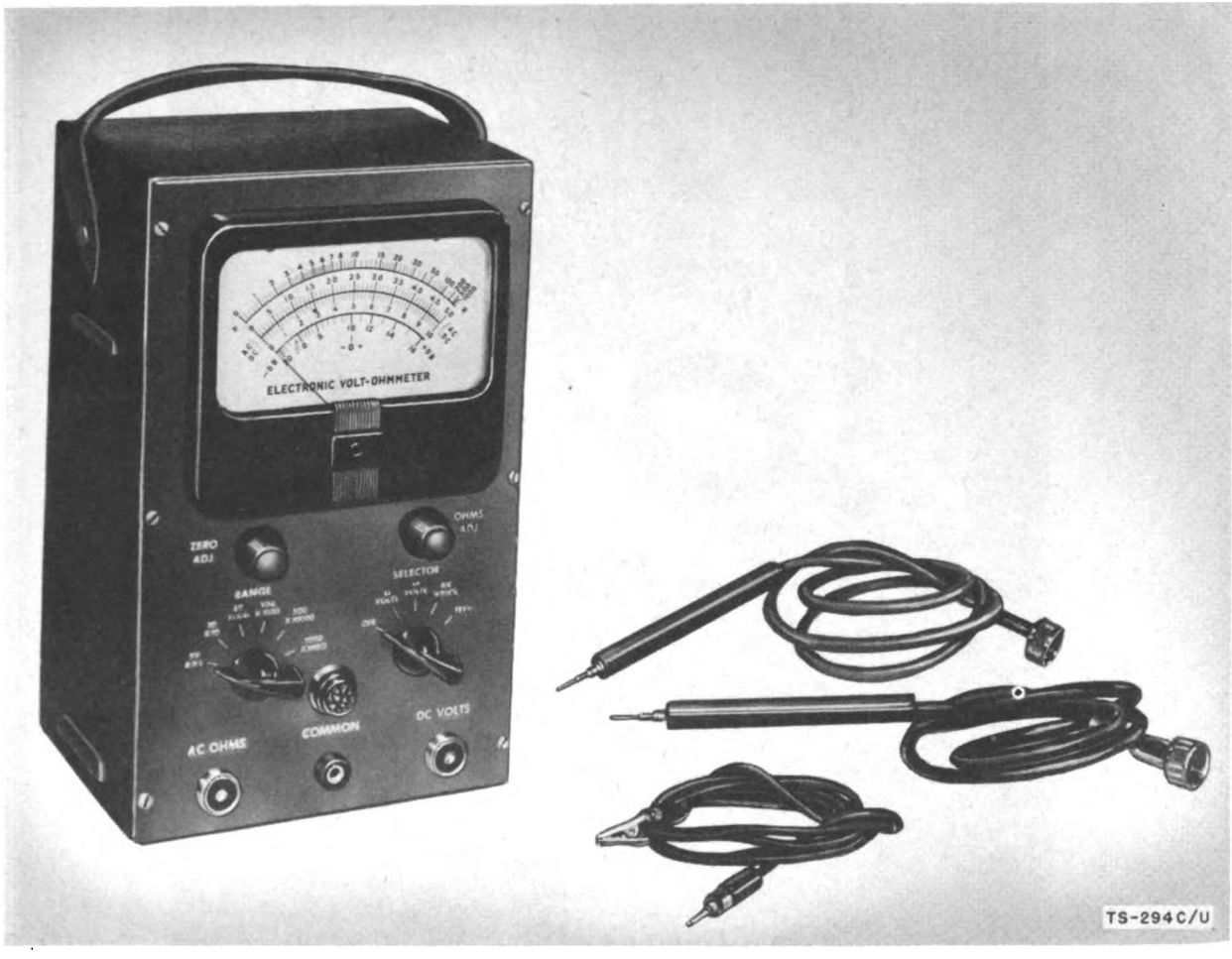


Figure 107. Voltohmmeter TS-294C/U.

Status: Limited/Std. *Stock No.:* 3F4072-1.1. *Reference:* TM 11-2624B.

Voltohmmeter TS-294C/U is a portable electronic voltohmmeter, (VTVM on dc and ac). It is used to measure voltage (ac and dc) and resistance, and also to aline f-m discriminator circuits.

To be replaced by Electronic Multimeter TS-505/U.

TECHNICAL CHARACTERISTICS

RANGES:
0 to 1,000 v, ac and dc.
.1 ohm to 1,000 meg.
−20 to 62 db.

ACCURACY: ±2 percent.

POWER:
115 v, ac, 60 cps.
Battery, for resistance measurements—2 Batteries BA-30.

WEIGHTS AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	9⅝ x 6⅜ x 6¾	14	.24
Export pack	----------	30	1.65

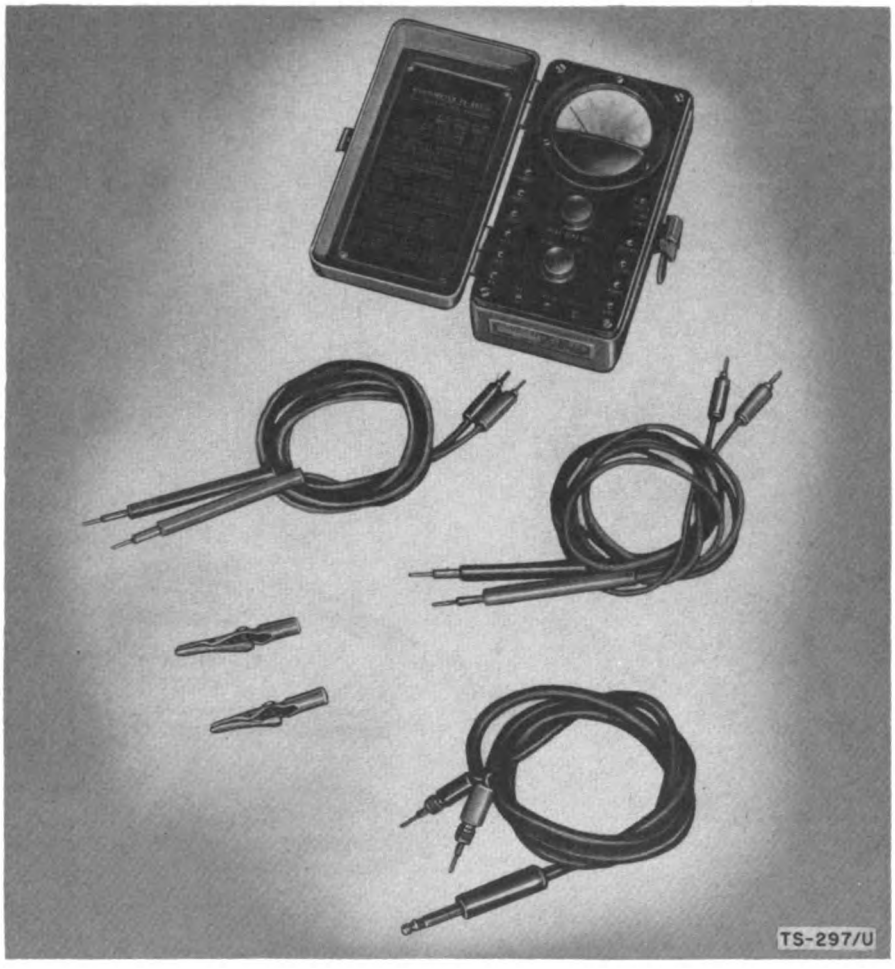


Figure 108. Multimeter TS-297/U.

Status: Standard. *Stock No.:* 3F4325-297. *Reference:* TM 11-5500.

Multimeter TS-297/U is a pocket-sized ac and dc voltohmmeter. Two sets of test leads are included with the equipment. It is used for general purpose testing of electronic equipment.

Will replace Test Set I-77, Test Unit I-236, Multimeter I-239-( ), and Multimeter TS-380( )/U individually and in all assemblies of which they are a part.

TECHNICAL CHARACTERISTICS

RANGE:
0 to 1,000 v, ac and dc.
0 to 100,000 ohms.
0 to 400 ma, dc.
POWER: Battery operated—1 Battery BA-42.

WEIGHTS AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	3 x 5½ x 3	4	.03
Export pack	----------	5.25	-----

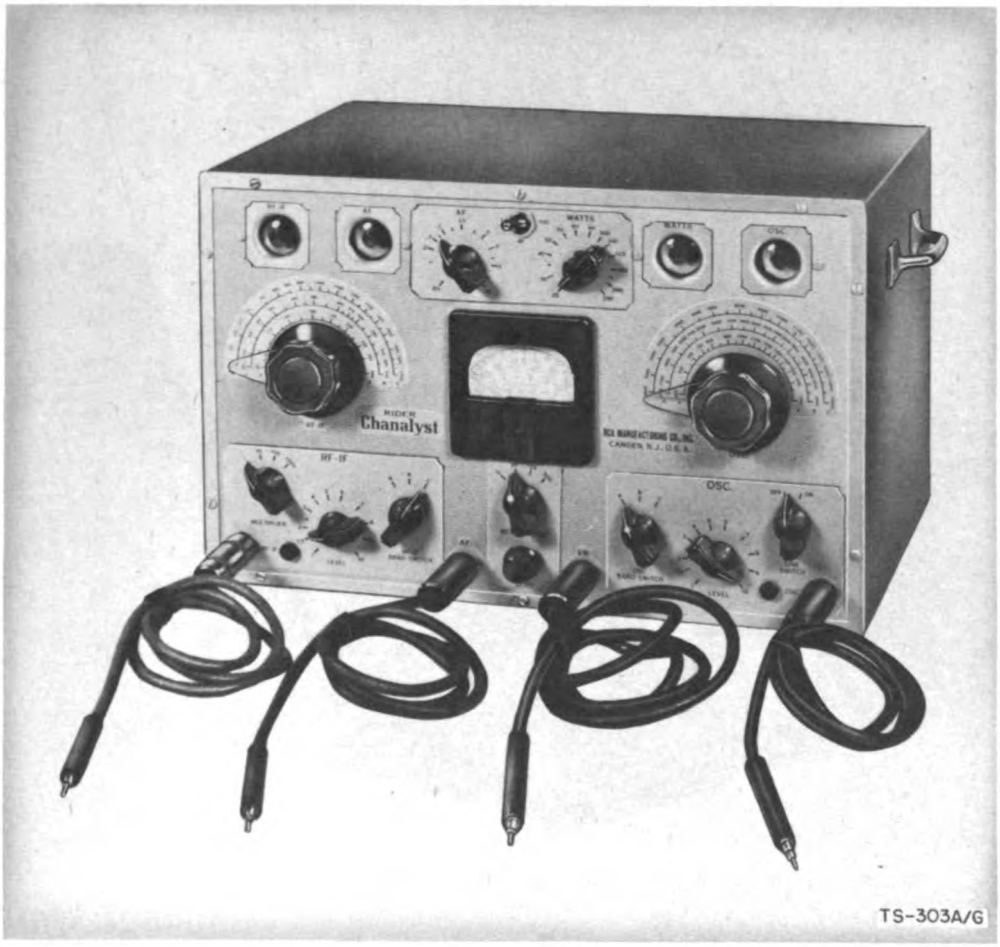


Figure 109. Test Set TS-303A/G.

Status: Standard. *Stock No.:* 3F4059-2. *Reference:* TM 11-2659.

Test Set TS-303A/G is a chanalyst which consists of an r-f/i-f channel, a power consumption indicator channel, an oscillator channel, an a-f channel, and a dc electronic voltmeter channel. Three test leads are included with the equipment. Test Set TS-303A/G is used to trace, with speed and accuracy, the passage of a signal in any portion of a receiver or amplifier.

TECHNICAL CHARACTERISTICS

RANGES:
96 to 1,700 kc, r-f/i-f channel.
600 to 15,000 kc, oscillator channel.
150 to 50,000 cps, a-f channel.
0 to 500 v, dc, voltmeter channel.
30 to 250 w, voltmeter channel.
INDICATOR: Vacuum-tube tuning.
POWER: 105 to 125 v, ac, 50 to 60 cps.

WEIGHT AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	9 x 16 x 10¾	28	.90

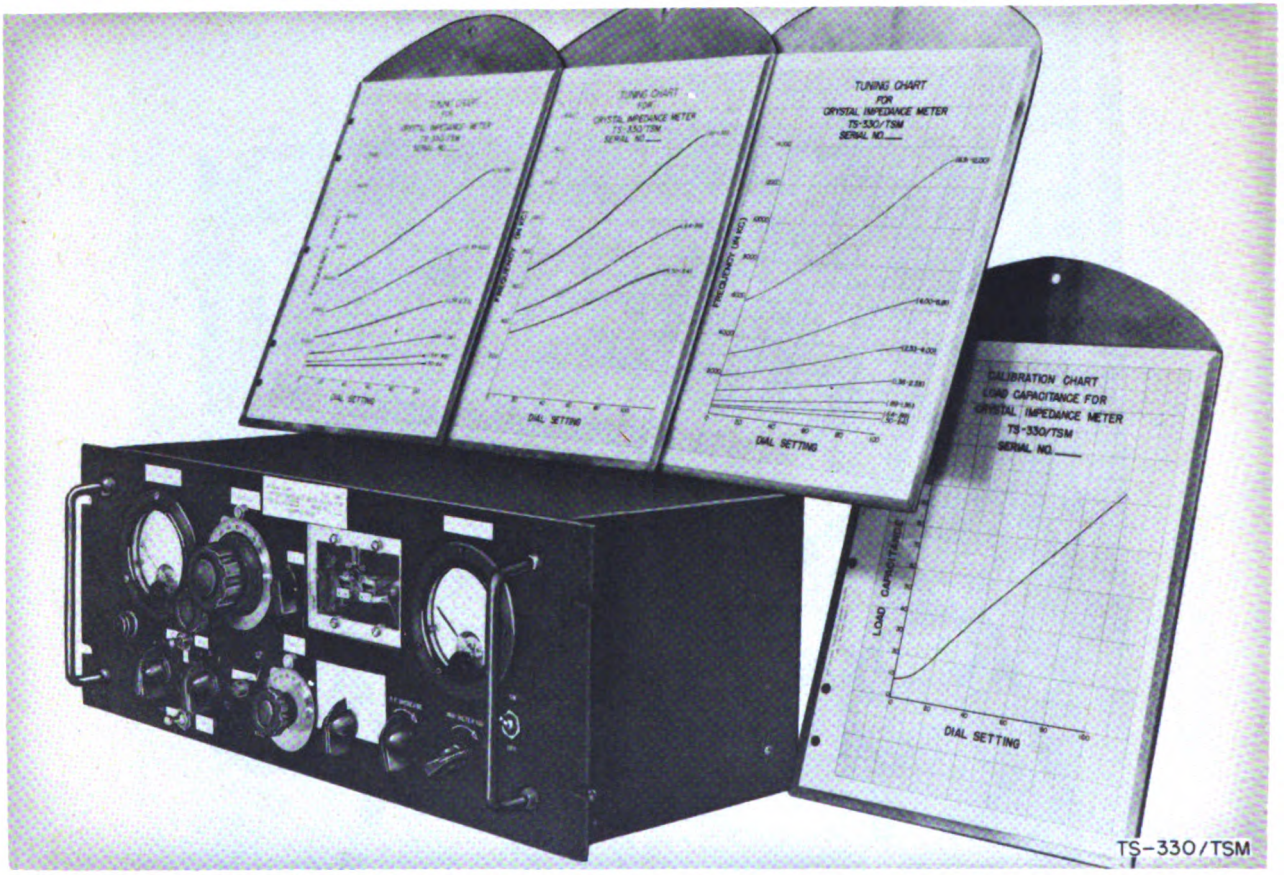


Figure 110. Crystal Impedance Meter TS-330/TSM.

Status: Standard. *Stock No.:* 3F4325-330.

Crystal Impedance Meter TS-330/TSM is a tuned-plate, tuned-grid oscillator. An r-f cord is supplied with the equipment. Crystal Impedance Meter TS-330/TSM is used to test crystal units which may be oscillated at either series or antiresonant frequency.

P/o Standard Crystal Test AN/TSM-3.

TECHNICAL CHARACTERISTICS

FREQUENCY RANGE: 1 to 15 mc.

RESISTANCE CALIBRATION: 0 to 9,900 in steps of 1 ohm.

LOAD CAPACITANCE CALIBRATION: 12 to 110 μμf.

POWER: 115 v, 50 to 1,720 cps, ac.

WEIGHTS AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	19 x 10½ x 7	25	.77
Export pack	29 x 20 x 17	60	5.7

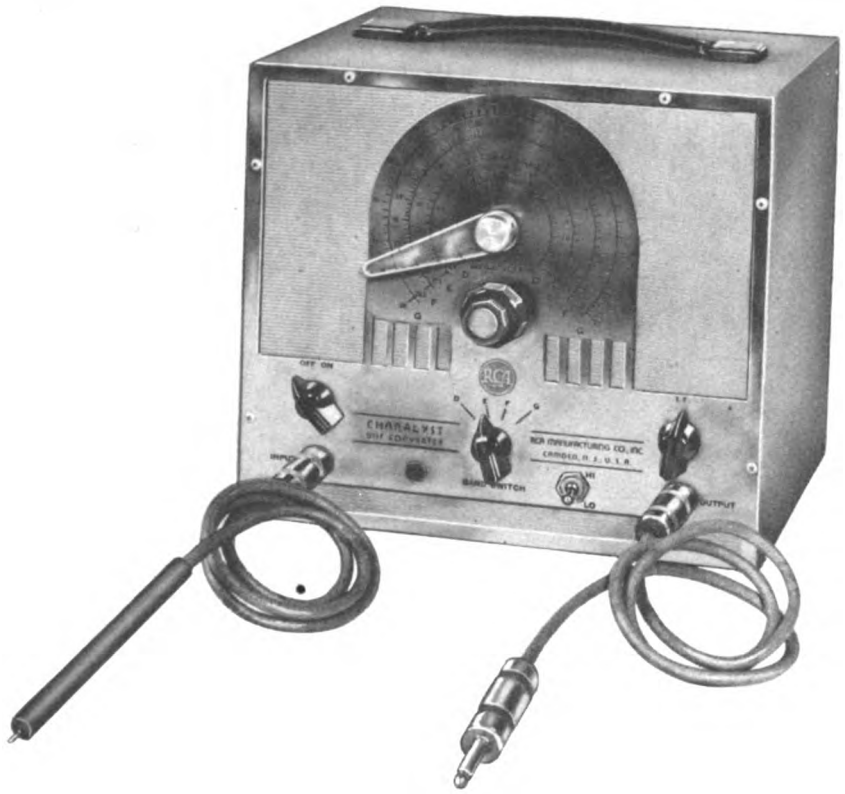


Figure 111. Converter TS-350/U.

Status: Limited/Std. *Stock No.:* 3F4059/1.

Converter TS-350/U is a v-h-f converter for use with Test Set TS-303A/G to increase the frequency range to 1,000 kc to 16 mc.

U/w but not p/o Test Set TS-303A/G.

TECHNICAL CHARACTERISTICS

FREQUENCY RANGE: 1,000 kc to 16 mc.
POWER: 105 to 125 v, ac, 50 to 60 cps.

WEIGHT AND VOLUME

	Weight (lb)	*Volume (cu ft)*
Export pack	38	2

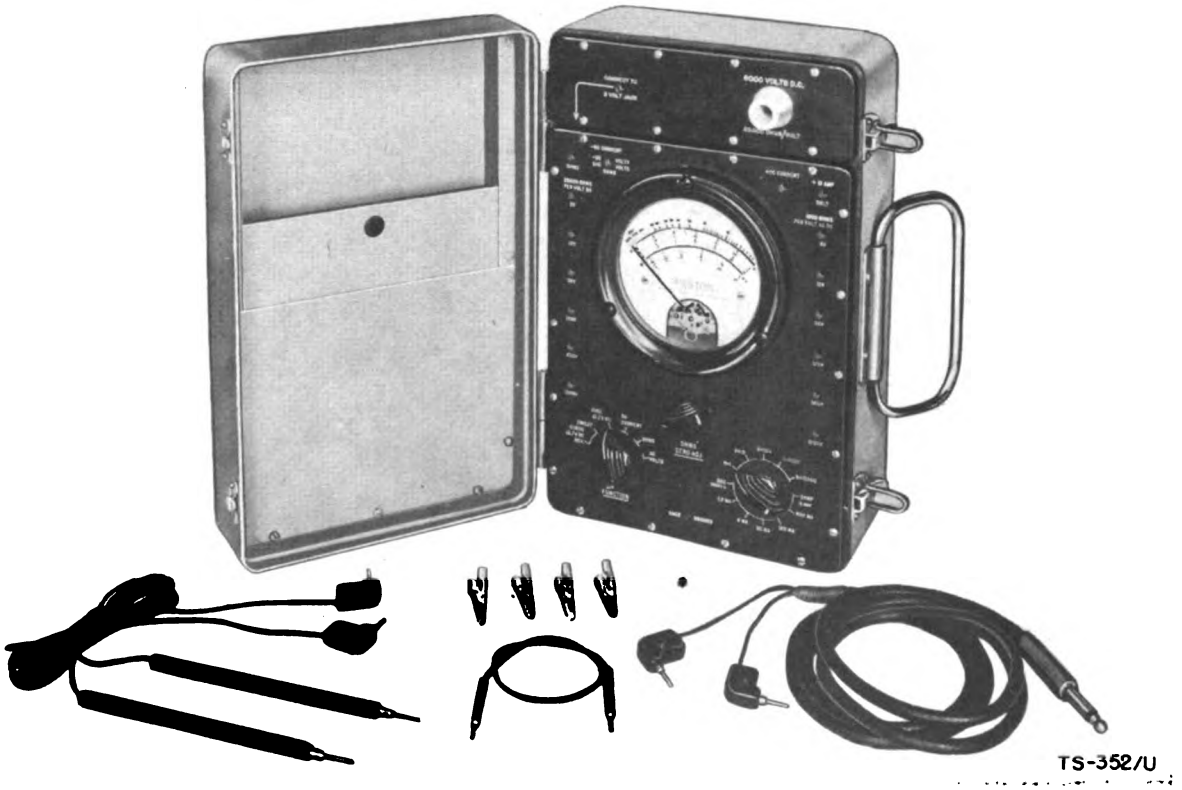


Figure 112. Multimeter TS-352/U.

Status: Standard. *Stock No.:* 3F4325-352.

Multimeter TS-352/U is a portable, sealed, general purpose instrument consisting of Multimeter ME-9/U and Multiplier Kit MX-815/U, both mounted in one transit case. Two test leads, one 500-v lead, one multiplier patch cord, several test clips, and battery connection links are furnished with the instrument. It is used for circuit analysis and trouble shooting in electrical and electronic equipment. Multiplier Kit MX-815/U is used to extend the range of the instrument to the 5,000-v dc range.

Will replace Ohmmeter I-67, Voltohmmeter I-166-( ), Test Set I-176-( ), and Voltmeter IS-189 individually and in all assemblies of which they are a part.

TECHNICAL CHARACTERISTICS

RANGES:
- 0 to 1,000 v, ac.
- 0 to 5,000 v, dc.
- 0 to 10 amp, dc.
- 0 to 30 meg.

POWER: Battery operated—3 Batteries BA-31, 1 Battery BA-30.

WEIGHT AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	6¼ x 8¾ x 11¼	14. 5	. 36

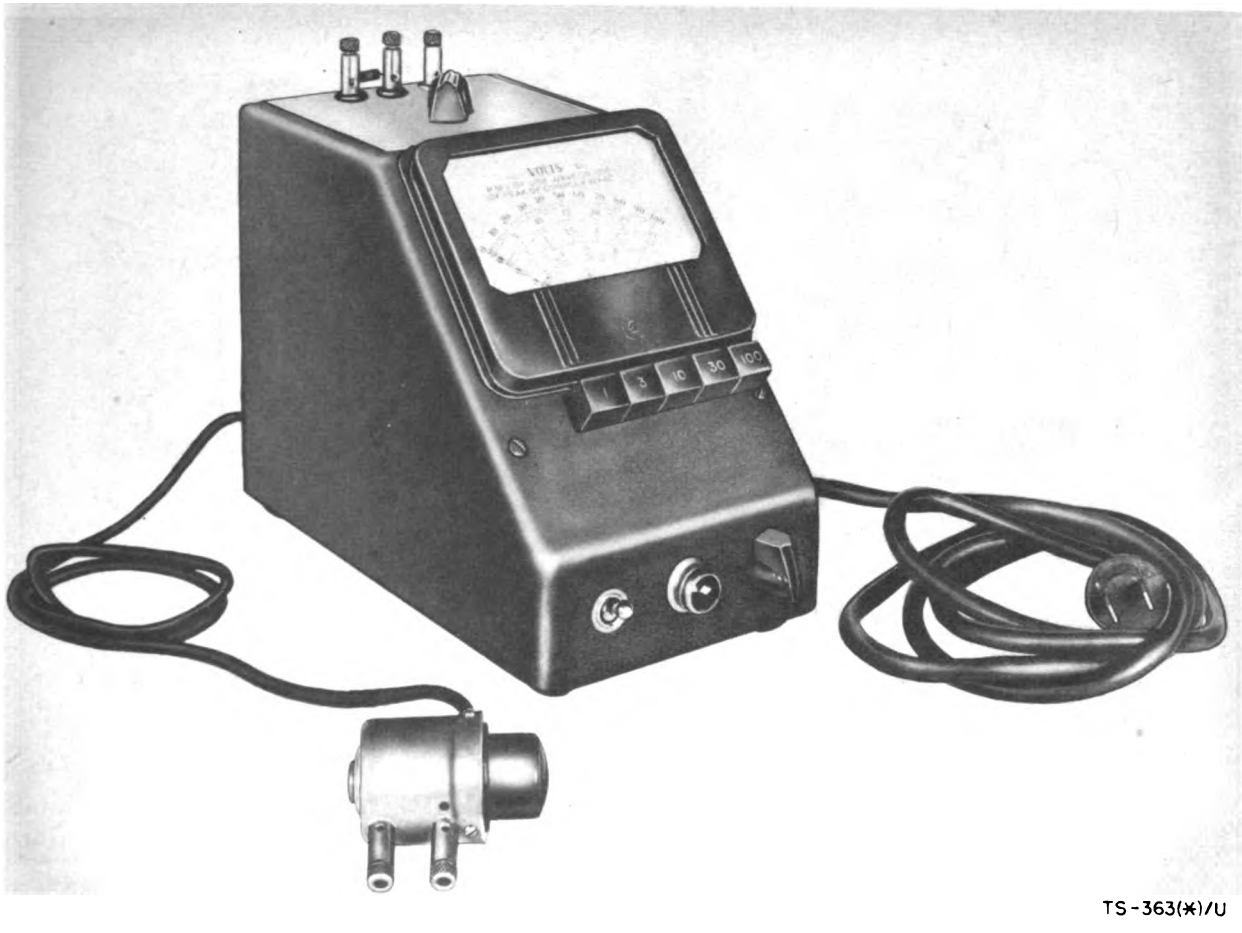


Figure 113. Voltmeter TS–363/U.

Status: Limited/Std. *Stock No.:* 3F4325–363. *Reference:* TM 11–1239.

Voltmeter TS–363(*)/U represents TS–363/U and TS–363A/U. Voltmeter TS–363(*)/U is a vacuum-tube voltmeter which contains a dc amplifier and a probe rectifier. It is used to measure ac and dc voltages. It is used in high-impedance circuits where ordinary meters cannot be used because of excessive current drain and high errors at high frequencies. R-f voltages at frequencies as high as 150 mc can be measured.

To be replaced by Electronic Multimeter TS–505/U.

TECHNICAL CHARACTERISTICS

RANGE: 0 to 100 v, ac and dc.
ACCURACY: ±2 percent.
FREQUENCY ERROR: At 60 cps, 4 percent lower than input voltage; at lower than 60 cps, error increases.
POWER: 115 v, ac, 60 cps.

WEIGHTS AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	4¾ x 6 x 8½	6	.14
Export pack	----------	10	.35

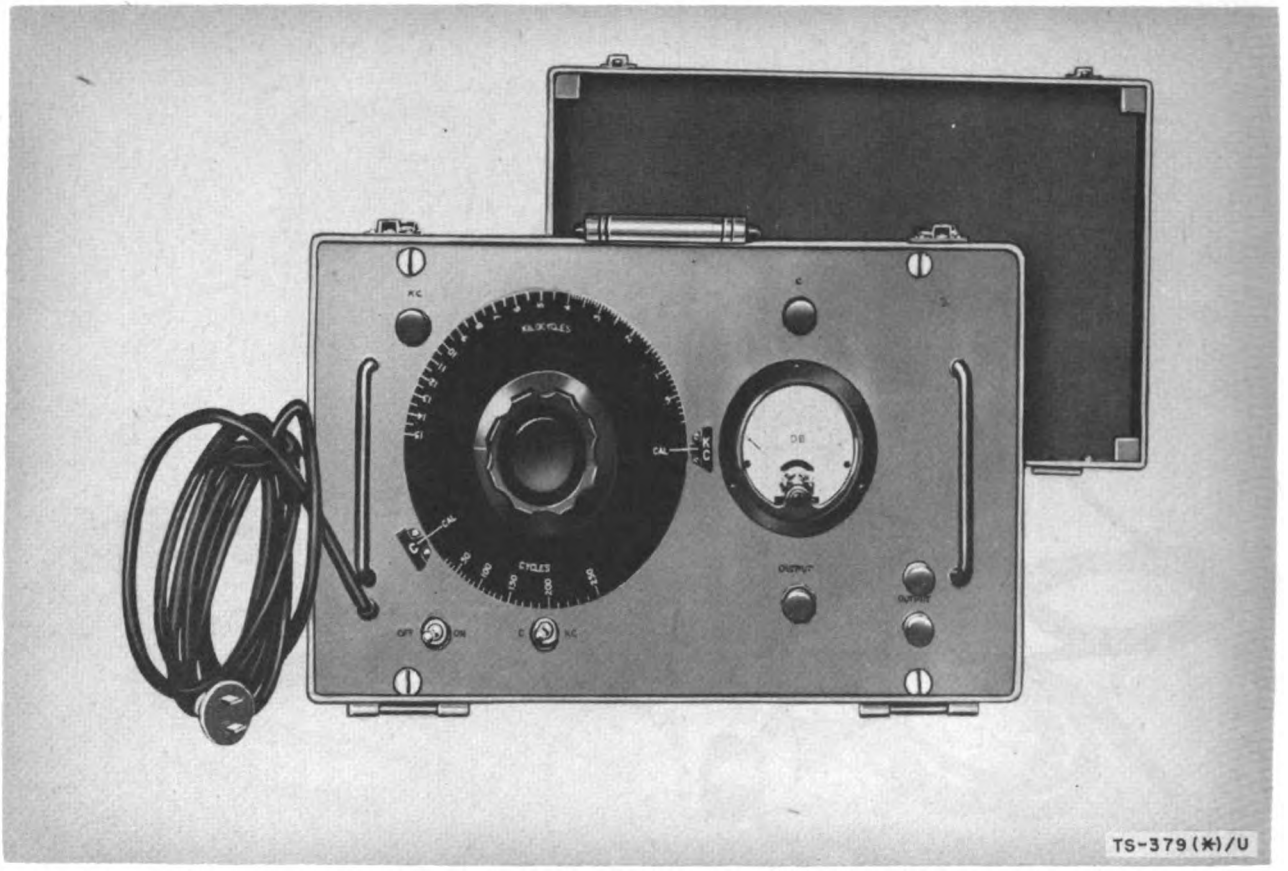


Figure 114. Audio Oscillator TS-379/U.

Status: Limited/Std. *Stock No.:* 3F3570-1.
Reference: TM 11-2039.

Audio Oscillator TS-379(*)/U represents TS-379/U, TS-379A/U, and TS-379B/U. Audio Oscillator TS-379(*)/U is a heterodyne-type, vacuum-tube oscillator. It is used to provide a source of testing current for transmission measurements on wire communication systems.

P/o Test Set I-120-( ).

To be replaced by Test Set TS-140/PCM.

TECHNICAL CHARACTERISTICS

FREQUENCY RANGE: 30 cps to 15 kc.
OUTPUT IMPEDANCE: 600 ohms.
OUTPUT: −4 to +6 dbm.
POWER: 105 to 125 v, ac, 50 to 60 cps.

WEIGHTS AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	15 x 19¼ x 9½	27	1. 59
Export pack	----------	70	2

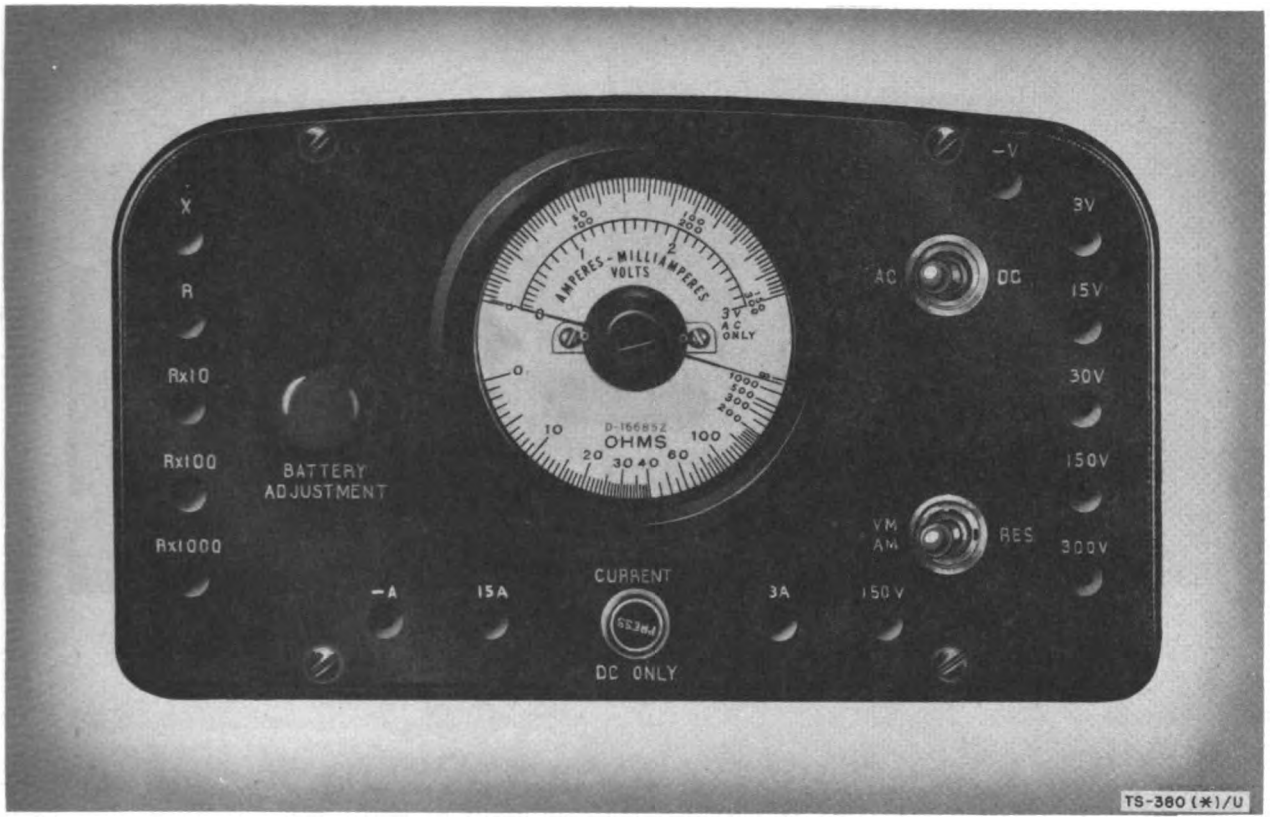


Figure 115. Multimeter TS-380/U.

Status: Standard. *Stock No.:* 3F7127. *Reference:* TM 11-2042.

Multimeter TS-380(*)/U represents TS-380/U and TS-380A/U. Multimeter TS-380(*)/U is a portable volt-ohm-milliammeter. Two test leads are supplied with the instrument. It is used to measure voltage, current, and resistance for general purpose testing of wire communication equipment.

P/o Operations Center AN/TTQ-1.

To be replaced by Multimeter TS-297/U.

TECHNICAL CHARACTERISTICS

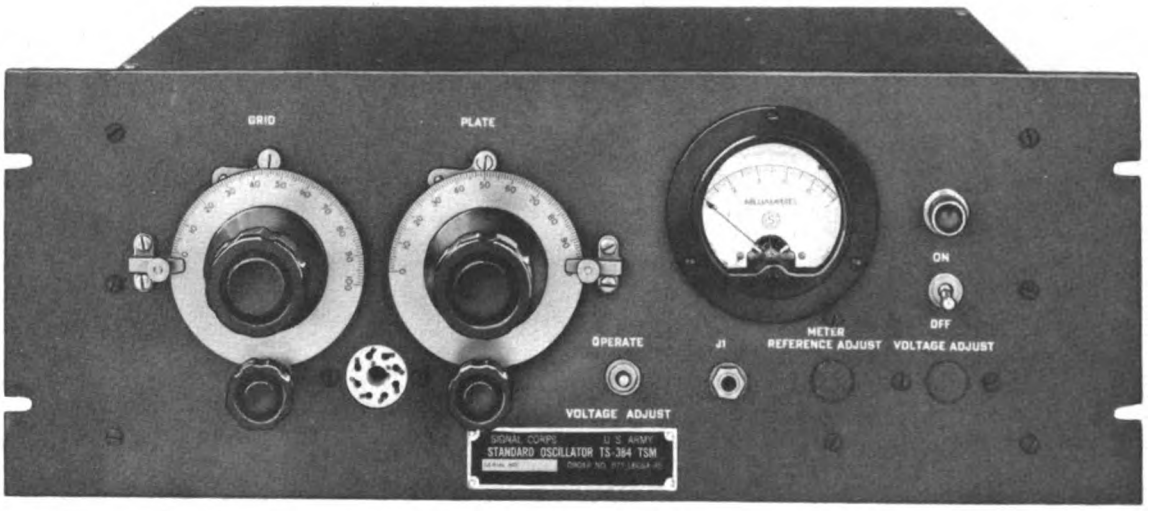
RANGES:
0 to 300 v, ac and dc.
0 to 15 amp, dc.
0 to 1 meg.

ACCURACY:
All dc measurements—±2 percent.
All ac measurements—±5 percent.

POWER: Battery operated—1 Battery BA-31

WEIGHTS AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	7½ x 4½ x 3	3¼	.06
Export pack	----------	6½	.28



TS-384/TSM

Figure 116. Standard Oscillator TS-384/TSM.

Status: Standard. *Stock No.:* 3F4325-384.

Standard Oscillator TS-384/TSM is a crystal correlation oscillator designed to reproduce accurately the frequency and activity requirements of the radio set in which the crystal under test is to be used. It is used to test the frequency and activity of 1- to 10-mc crystals under conditions closely simulating actual operation.

P/o Standard Crystal Test Set AN/TSM-4.

TECHNICAL CHARACTERISTICS

FREQUENCY RANGE: 1 to 10 mc.
POWER: 110 v, ac, 50 to 60 cps.

WEIGHT AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	19 x 7 x 7	20	.54

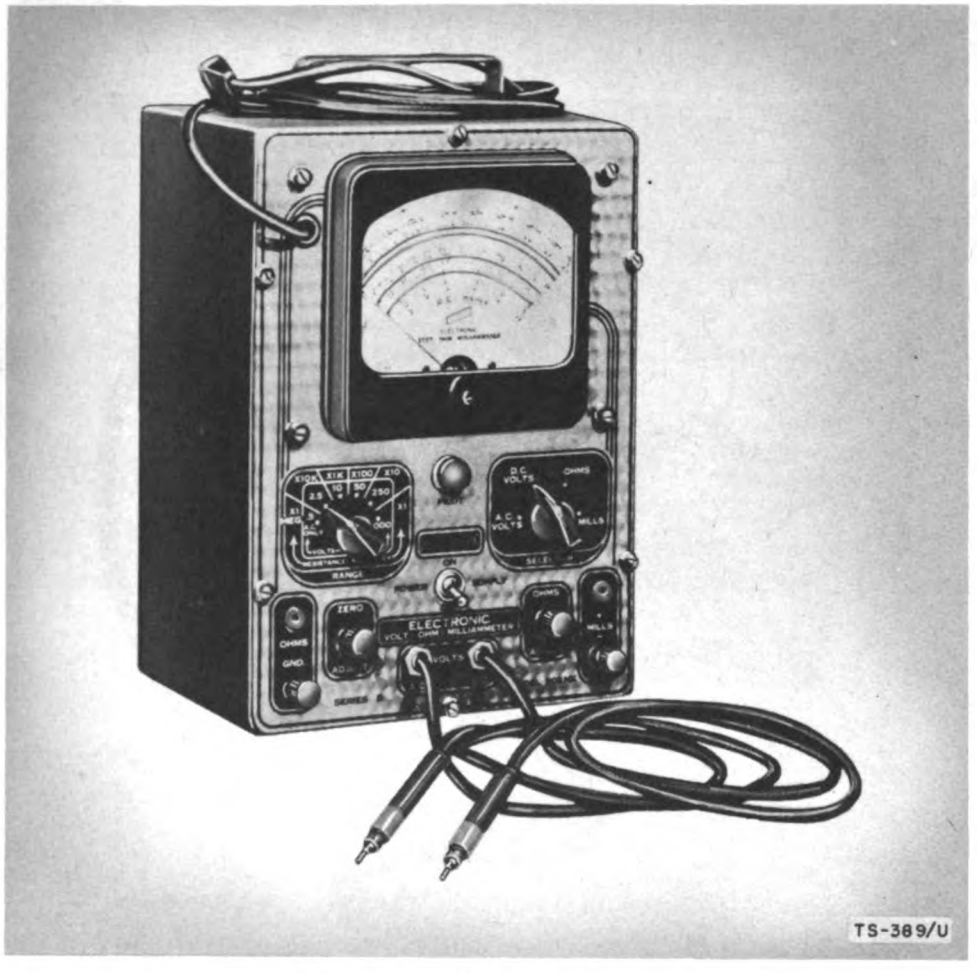


Figure 117. Multimeter TS–389/U.

Status: Limited/Std. *Stock No.:* 3F4072–14.
Reference: TM 11–2673.

Multimeter TS–389/U is a portable vacuum-tube voltmeter. It is an electronic measuring instrument combining the functions of four test instruments: a dc milliammeter, an ac voltmeter, a dc voltmeter, and an ohmmeter.

P/o Test Equipment IE–9–C.

To be replaced by Electronic Multimeter TS–505/U.

TECHNICAL CHARACTERISTICS

RANGES:
0 to 100 v, ac.
0 to 1,000 v, dc.
0 to 1,000 ma, dc.
0 to 1,000 meg.
ACCURACY: ±2 percent.
POWER: 110 v, ac, 50 to 60 cps.

WEIGHT AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	7⅞ x 6 x 12½	26	.33

Figure 118. Decibel Meter TS-399/U.

Status: Limited/Std. *Stock No.:* 3F4325-399. *Reference:* TM 11-2045.

Decibel Meter TS-399(*)/U represents TS-399/U and TS-399A/U. Decibel Meter TS-399(*)/U is a copper-oxide, rectifier-type telephone transmission measuring set. It is used to make telephone transmission measurements where portable apparatus is required. An external source of testing power of 1 mw is required for gain or loss measurements.

P/o Test Set I-120-( ).

To be replaced by Test Set TS-140/PCM.

TECHNICAL CHARACTERISTICS

RANGE: −45 to +10 dbm from 30 cps to 15 kc.
INPUT IMPEDANCE: 600 ohms.
POWER:
105 to 125 v, dc.
105 to 125 v, ac, 25 to 60 cps.

MODEL WEIGHT AND DIMENSIONS

Item	*Dimensions (in.)*	*Weight (lb)*
Decibel Meter TS-399/U	11 x 6½ x 8½	14
Decibel Meter TS-399A/U	9 29/32 x 6 7/32 x 7 5/16	-----

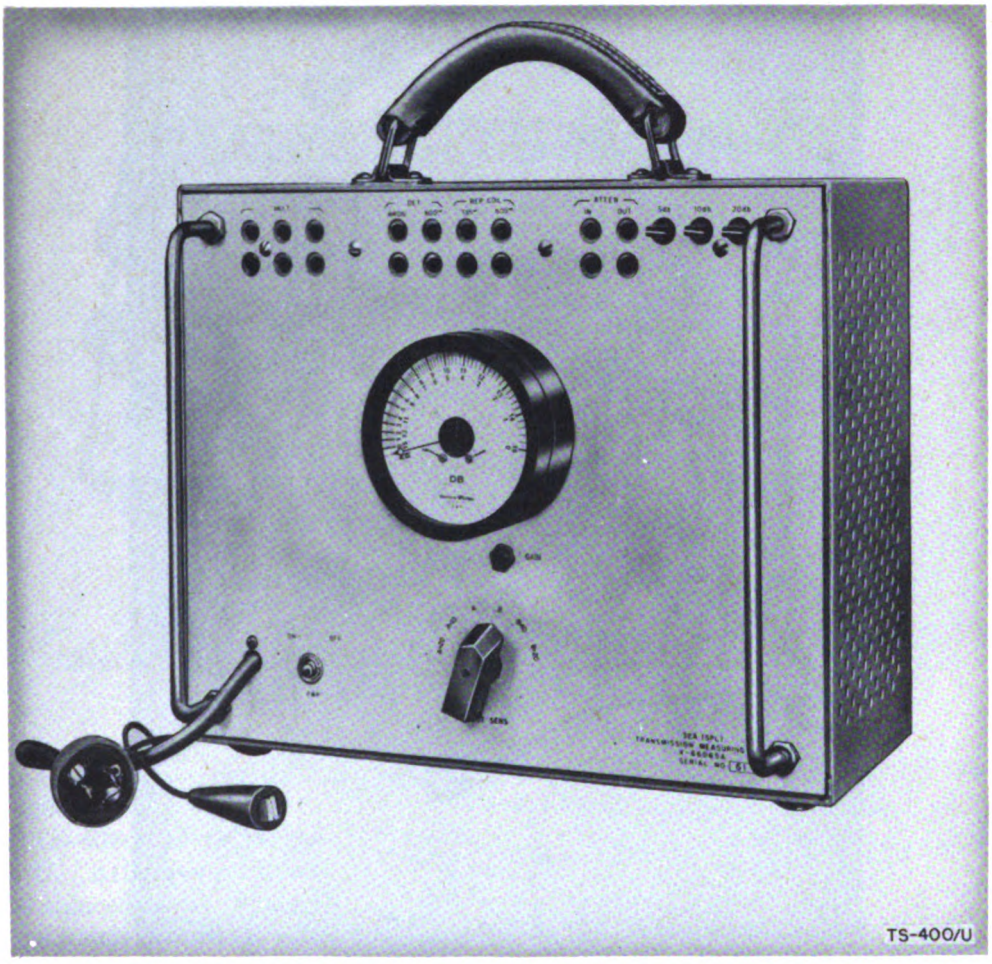


Figure 119. Decibel Meter TS-400/U.

Status: Limited/Std. *Stock No.:* 3F4270. *Reference:* TM 11-2048.

Decibel Meter TS-400/U is a portable, a-c, rectifier-type transmission measuring set. It is used to measure testing power over a frequency range of 150 cps to 150 kc. Power from a 600-ohm circuit can be measured either on a terminated or bridging basis. An attenuator is included with the equipment.

P/o Test Set AN/FCM-1.

To be replaced by Test Set TS-140/PCM.

TECHNICAL CHARACTERISTICS

RANGE: −35 to +35 dbm from 150 cps to 150 kc.
REPEATING COIL: 135: 600 ohms.
POWER: 105 to 125 v, ac 50 to 60 cps.

WEIGHT AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	12 x 11 x 8½	40	.65

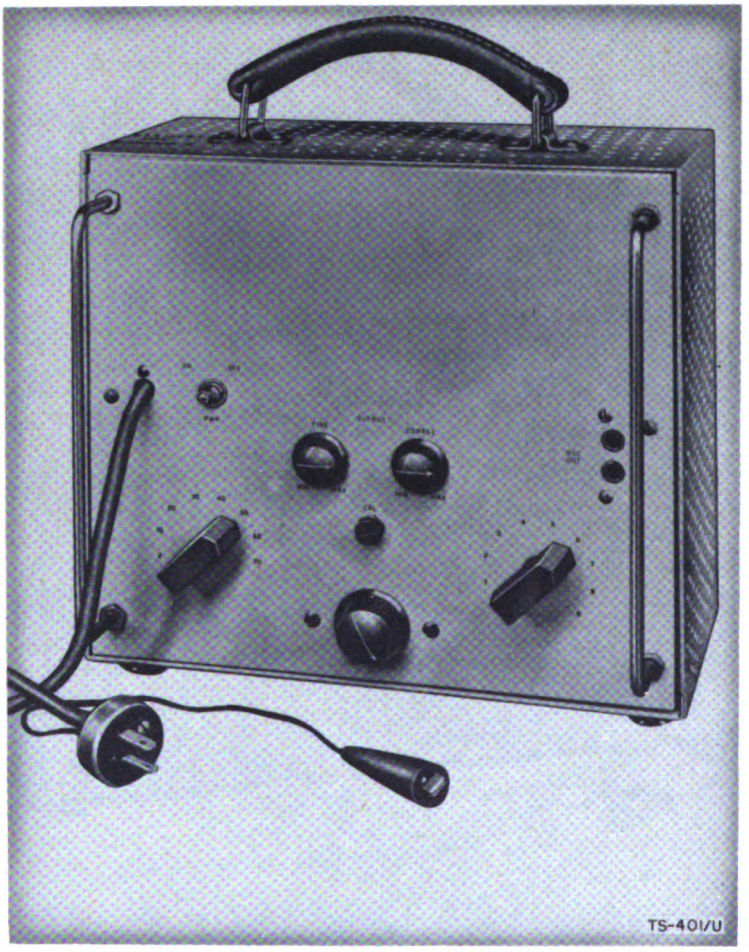


Figure 120. Oscillator TS-401/U.

Status: Limited/Std. *Stock No.:* 3F4325-401. *Reference:* TM 11-2040.

Oscillator TS-401/U is a portable, continuous-wave signal generator. It is used to supply frequencies in 1 kc steps from 2 kc to 79 kc in the testing of wire communication equipment.

P/o Test Set AN/FCM-1.

To be replaced by Test Set TS-140/PCM.

TECHNICAL CHARACTERISTICS

FREQUENCY RANGE: 2 to 79 kc in 1 kc steps.
OUTPUT: −75 to +16 dbm.
OUTPUT IMPEDANCE: 135 ohms.
REPEATING COIL: 135:600, for supplying testing power to 600-ohm circuits.
POWER: 105 to 125 v, ac, 50 to 60 cps.

WEIGHTS AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	11 x 12 x 7½	30	.57
Export pack		64	3.0

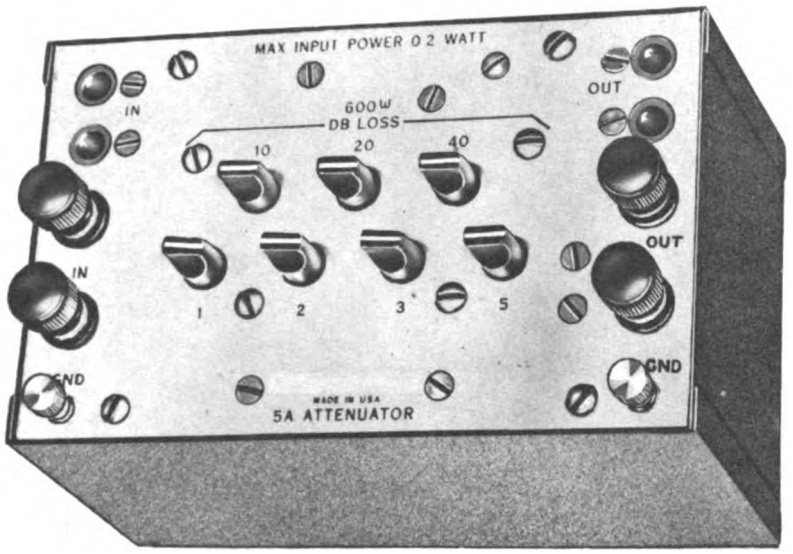


Figure 121. Attenuator TS-402/U.

Status: Standard. *Stock No.:* 3F1775. *Reference:* TM 11-2044.

Attenuator TS-402(*)/U represents TS-402/U and TS-402A/U. Attenuator TS-402(*)/U consists of seven balanced square type resistor pads. It is used in conjunction with an audio oscillator and transmission measuring set for general testing on voice- or carrier-frequency equipment when 600-ohm balanced losses are required. It is well balanced to ground and suitable for use up to 100 kc.

P/o Test Set I-120.

P/o Test Set AN/FCM-2.

TECHNICAL CHARACTERISTICS

ATTENUATION RANGE: 0 to 81 db when inserted between 600-ohm impedances over a frequency range of 0 to 100 kc.

POWER DISSIPATION:

.2 w, continuously.

.5 w for short period without impairing accuracy after cooling.

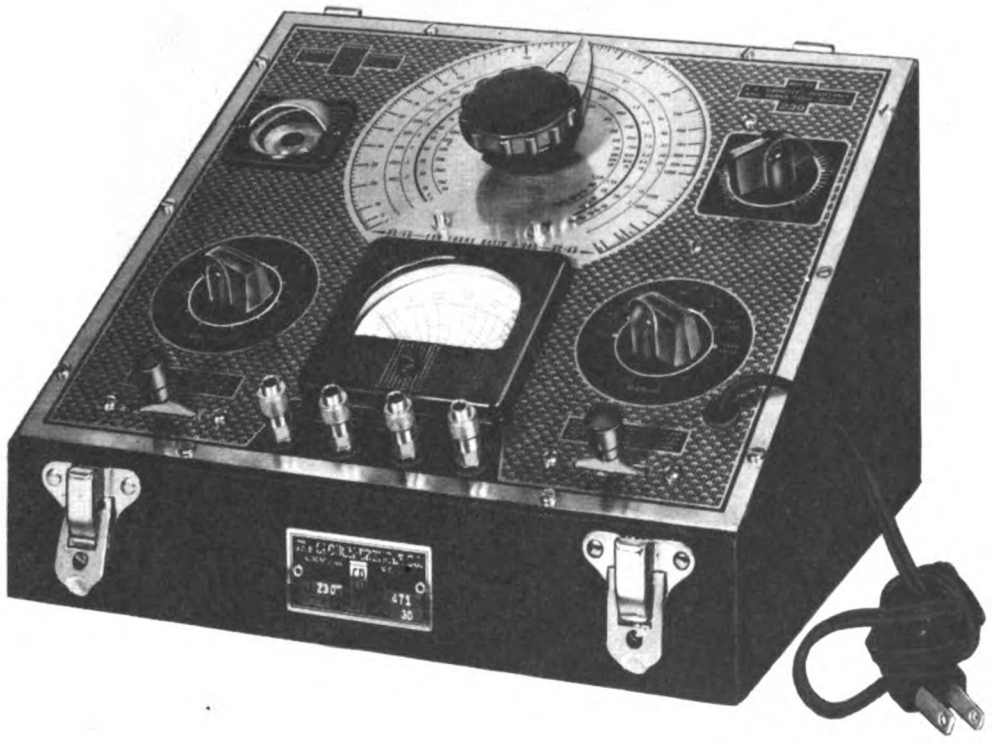
ACCURACY:

±.2 db for frequencies up to 50 kc.

±.3 db for frequencies up to 100 kc.

WEIGHTS AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	6¾ x 4⅛ x 5	5	.08
Export pack	8¾ x 6 x 7	9	.22



TS-415(*)/U

Figure 122. Analyzer TS–415B/U.

Status: Limited/Std. *Stock No.:* 3F4325–415.

Analyzer TS–415(*)/U represents TS–415/U, TS–415A/U, TS–415B/U, and TS–415C/U. Analyzer TS–415(*)/U is a resistance-capacitance measuring instrument. It is used to measure values of capacitors and resistors and to determine insulation resistance and capacitor leakage.

TECHNICAL CHARACTERISTICS

RANGES:
10 μμf to 2,000 μf.
50 ohms to 7.5 meg.

INSULATION RESISTANCE: 2 to 10,000 meg.

POWER FACTOR, ELECTROLYTIC CAPACITORS: 0 to 50 percent.

POWER: 110 v, ac, 50 to 60 cps.

MODEL WEIGHTS AND DIMENSIONS

Item	*Dimensions (in.)*	*Weight (lb)*
Analyzer TS–415/U	10 x 8½ x 7	11
Analyzer TS–415A/U	8½ x 11½ x 5½	12
Analyzer TS–415B/U	9¾ x 12 x 7	-----

PACKED WEIGHT AND VOLUME

	Weight (lb)	*Volume (cu ft)*
Export pack	25	1. 2

Figure 123. Test Set TS-420B/U.

Status: Standard. *Stock No.:* 3F4051C. *Reference:* TM 11-2069.

Test Set TS-420(*)/U represents TS-420/U and TS-420B/U. Test Set TS-420(*)/U is a cable splicer's test set consisting of a vacuum-tube oscillator whose tone output is of such character and magnitude that it may be introduced in exchange cables, v-f toll cables, and J or K carrier cables. It is used in exchange and toll cables for conductor identification, exploring coil tests, and Wheatstone bridge measurements. Specific applications include—establishing talking pairs and identifying pairs in working and dead exchange cable; buzzer, battery and receiver, and balance tests for detecting defective pairs; and furnishing battery for Test Set I-49.

U/w but not p/o Amplifier BC-1388.
P/o Tool Equipment TE-56-( ).

TECHNICAL CHARACTERISTICS

TONE OUTPUT: 500 cps with a 7-cps wobble tone.
RELAY OPERATING CURRENT:
Primary winding—100 ma.
Primary and secondary windings in series—7.5 ma.
NONOPERATE RELAY CURRENT: Primary winding—85 ma.
POWER: Battery operated—2 Batteries BA-27, 2 Batteries BA-2.

WEIGHTS AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	8¾ x 7¼ x 8⅜	16	.33
Export pack	18 x 14⅞ x 12¾	35	1.87

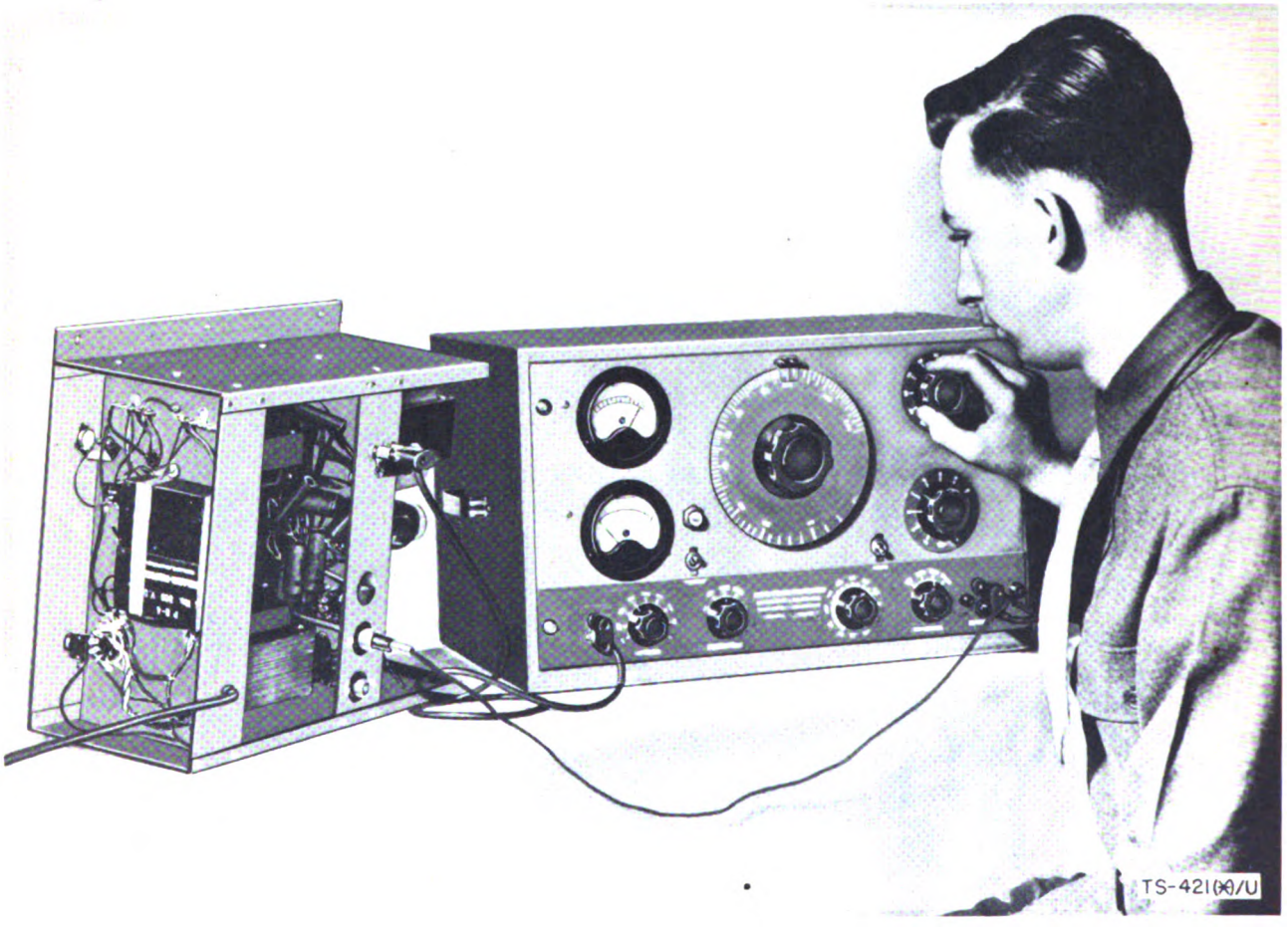


Figure 124. Audio Oscillator TS–421/U.

Status: Limited/Std. *Stock No.:* 3F3871–1 (TS–421/U), 3F4325–421A (TS–421A/U). *Reference:* TM 11–2649.

Audio Oscillator TS–421(*)/U represents TS–421/U and TS–421A/U. Audio Oscillator TS–421(*)/U consists of a resistance-tuned oscillator and a resistance-coupled amplifier. It is used to generate a-f signals for test purposes.

TECHNICAL CHARACTERISTICS

FREQUENCY RANGE: 20 to 20,000 cps.
MAXIMUM POWER OUTPUT: 5 w into matched load.
OUTPUT IMPEDANCE: 12.5, 50, 125, 200, 1,250, and 5,000 ohms.
DISTORTION: 1 percent below 30 cps.
STABILITY: 2 percent.
HUM: 60 db below output voltage or 90 db below 0 level.
OUTPUT LEVEL: +20 to +37 dbm.
OUTPUT ATTENUATOR: 0 to 110 db.
POWER: 110 to 120 v, 50 to 60 cps. ac.

MODEL WEIGHTS AND DIMENSIONS

Item	*Dimensions (in.)*	*Weight (lb)*
Audio Oscillator TS–421/U	22 1/32 x 13 3/16 x 11 5/8	75
Audio Oscillator TS–421A/U	19 3/4 x 17 x 12 1/4	-----

PACKED WEIGHT AND VOLUME

	Weight (lb)	*Volume (cu ft)*
Export pack	150	5

Figure 125. Electronic Switch TS–433/U.

Status: Standard. *Stock No.:* 3F3917.

Electronic Switch TS–433(*)/U represents TS–433/U and TS–433A/U. Electronic Switch TS–433(*)/U is a square-wave, a-f signal generator. It is used to permit the simultaneous display of two independent signals on the screen of a cathode-ray oscilloscope.

U/w Radio Set SCR–588–( ).

TECHNICAL CHARACTERISTICS

SWITCHING RATE: 10 to 2,000 cps.
FREQUENCY RANGE: 10 to 50 cps, square-wave.
OUTPUT: 30 v, peak to peak.
OUTPUT IMPEDANCE: 50,000 ohms.
POWER: 115 v, ac, 40 to 60 cps.

WEIGHTS AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	7⅞ x 11½ x 13	17	.64
Export pack	----------	49	3.5

Figure 126. Signal Generator TS-447/U.

Status: Limited/Std. *Stock No.:* 3F3868-1.

Signal Generator TS-447/U is an a-m and f-m signal generator without a power level meter. It is used to aline r-f and i-f stages of radio receivers and is also used in other test operations requiring a-f and r-f voltages.

TECHNICAL CHARACTERISTICS

R-F RANGE: 100 kc to 110 mc.
A-F RANGE: 100 to 10,000 cps.
A-F OUTPUT:
0 to .1 v, variable.
400 cps, fixed.
100 to 10,000 cps, variable.
F-M OUTPUT:
100 kc to 133 mc, modulated internally at 60 cps.
1,000 kc to 133 mc, modulated internally at 400 cps or modulated externally at 10 to 15,000 cps.
A-M OUTPUT: 100 kc to 110 mc, modulated at 400 cps internally or at 50 to 15,000 cps from an external source.
POWER: 110 v, ac, 40 to 65 cps.

WEIGHTS AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	13 x 13 x 7	25	.68
Export pack	----------	29	.8

Figure 127. Impedance Bridge TS–460A/U.

Status: Standard. *Stock No.:* 3F2008. *Reference:* TM 2634A.

Impedance Bridge TS–460(*)/U represents TS–460/U, TS–460A/U, and TS–460B/U. Impedance Bridge TS–460(*)/U is a portable measuring instrument consisting of a four-arm impedance bridge. It is direct reading for dc measurements, but for ac, headphones are used. Impedance Bridge TS–460(*)/U is used to measure resistance, capacitance, and inductance. It also may be used to measure the storage factor (Q) of coils and the dissipation factor (D) of capacitors.

TECHNICAL CHARACTERISTICS

RANGES:
.001 ohm to 1 meg.
1 μμf to 100 μf.
1 h to 100 h.
.002 to 1 (D).
.02 to 1000 (Q).

POWER: Battery operated—4 Batteries BA–23.

MODEL WEIGHTS AND DIMENSIONS

Item	*Dimensions (in.)*	*Weight (lb)*	*Volume (cu ft)*
TS–460/U	8½ x 12 x 20	20½	1. 18
TS–460A/U	12 x 17 x 10¾	23	1. 27
TS–460B/U	9½ x 13 x 22	25	1. 57

PACKED WEIGHT AND VOLUME

	Weight (lb)	*Volume (cu ft)*
Export pack	50	4. 23

Figure 128. Signal Generator TS-465/U.

Status: Standard. *Stock No.:* 3F3868.

Signal Generator TS-465(*)/U represents TS-465/U and TS-465A/U. Signal Generator TS-465(*)/U is an a-m or f-m signal generator. It is used for supplying continuously adjustable, known r-f voltages for tests on radio receivers.

Will replace Signal Generator TS-448/U.

TECHNICAL CHARACTERISTICS

FREQUENCY RANGE:
A-m—100 kc to 110 mc.
F-m—100 kc to 160 mc.
EXTERNAL MODULATION: A-m or f-m—continuously variable 0 to 15,000 cps.
OUTPUT: −10 to +34 db.
POWER: 105 to 125 v, ac, 50 to 70 cps.

WEIGHTS AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	14 x 16½ x 8	26	1.07
Export pack		75	5

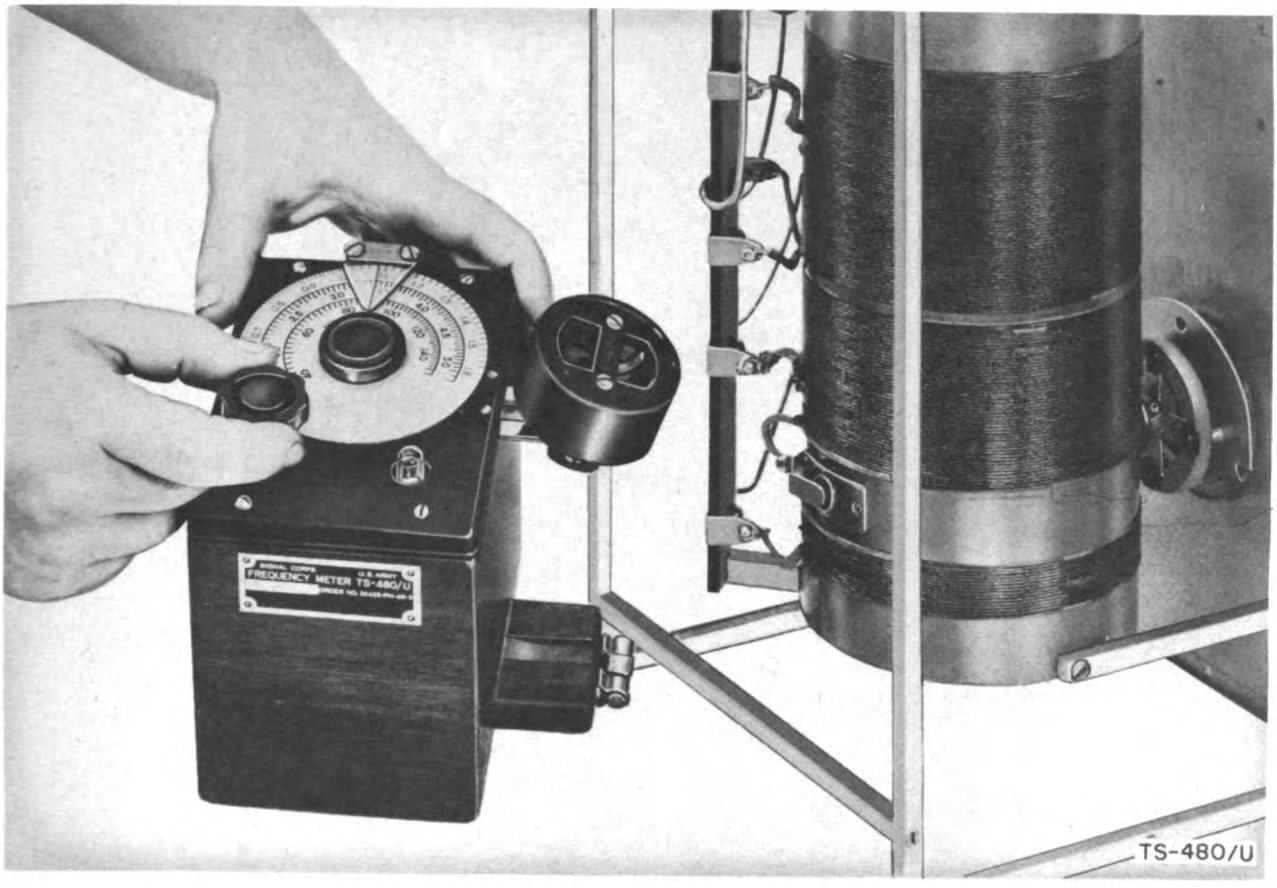


Figure 129. Frequency Meter TS-480/U.

Status: Standard. *Stock No.:* 3F26004-2. *Reference:* TM 11-5042.

Frequency Meter TS-480/U is a wide-range, general purpose absorption type frequency meter. Five plug-in inductors are utilized to cover a wide frequency range. It is used for rapid frequency checks of radio equipment in the laboratory or in the field.

TECHNICAL CHARACTERISTICS

RANGE: .5 to 150 mc.
ACCURACY:
  ±2 percent, .5 to 16 mc.
  ±3 percent, 16 to 150 mc.
RESONANCE INDICATOR: Incandescent lamp.

WEIGHTS AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	4¾ x 5⅞ x 5¾	3	.09
Export pack	7 x 7 x 9	7½	.23

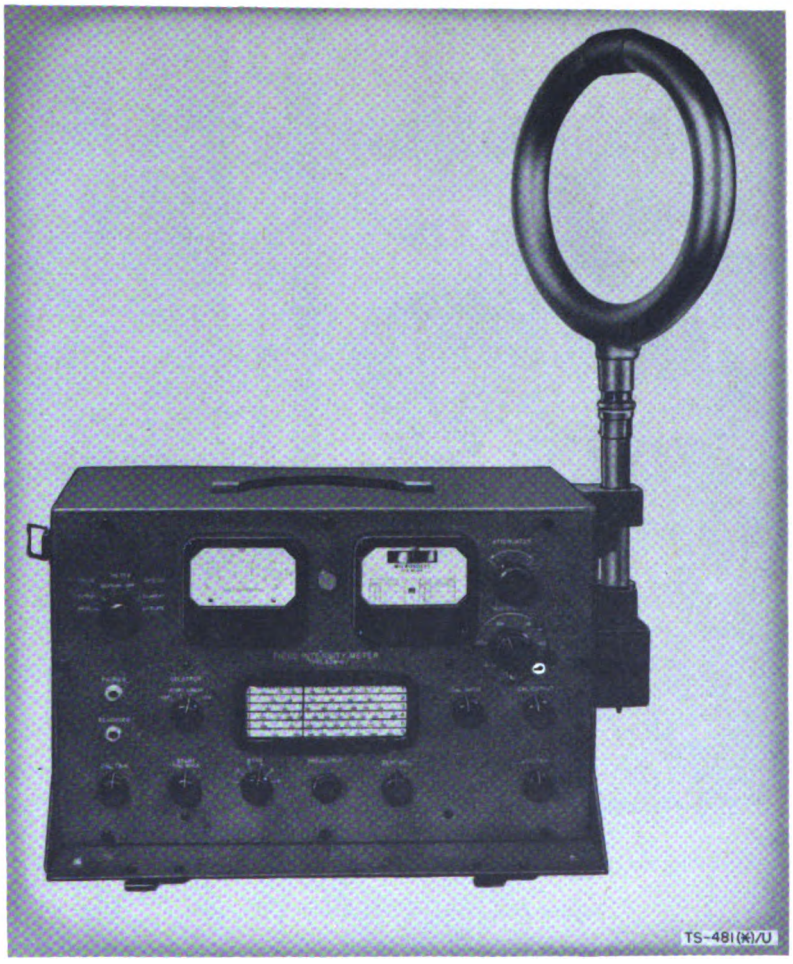


Figure 130. Field Strength Meter TS-481/U.

Status: Standard. *Stock No.:* 3F3309.2.

Field Strength Meter TS-481(*)/U represents TS-481/U and TS-481A/U. Field Strength Meter TS-481(*)/U consists of a superheterodyne receiver and a calibrating oscillator. It includes a loop antenna, headphones, and probe. The meter is used for field intensity measurements where portable apparatus is required.

TECHNICAL CHARACTERISTICS

RANGES:
120 to 18,000 kc.
20 μv to 20v.
ACCURACY: ±10 percent.
POWER: Battery operated.

WEIGHT AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	13½ x 20¼ x 13¼	48	2.09

Figure 131. Oscilloscope TS-489/U.

Status: Limited/Std. *Stock No.:* 3F3590.3.

Oscilloscope TS-489/U is a general purpose oscilloscope which uses a 5-inch cathode-ray tube. It is used for service testing and maintenance of radar and electronic equipment.

To be replaced by Oscilloscope BC-1060-( ), Oscilloscope TS-239( )/U, or Oscilloscope TS-34A/AP.

TECHNICAL CHARACTERISTICS

SWEEP FREQUENCY RANGE: 4 to 22,000 cps.
TUNING FREQUENCY RANGE: 4 cps to 18 kc.
DEFLECTION SENSITIVITY:
.4 rms v per in., vertical, w/cable.
.4 rms v per in., vertical, w/o cable.
AMPLIFIER FREQUENCY RESPONSE:
Flat within 1 db to 200 kc, vertical.
Flat within −3 db to 500 kc, vertical.
Flat within 1 db to 45 kc, horizontal.
Flat within 13 db to 100 kc, horizontal.
INPUT IMPEDANCE:
1.15 meg, 16 μf, w/o cable.
.15 meg, 38 μf, w/cable.
POWER: 110 to 120 v, ac, 50 to 60 cps.

WEIGHT AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	19 x 8 x 14	30	1. 23

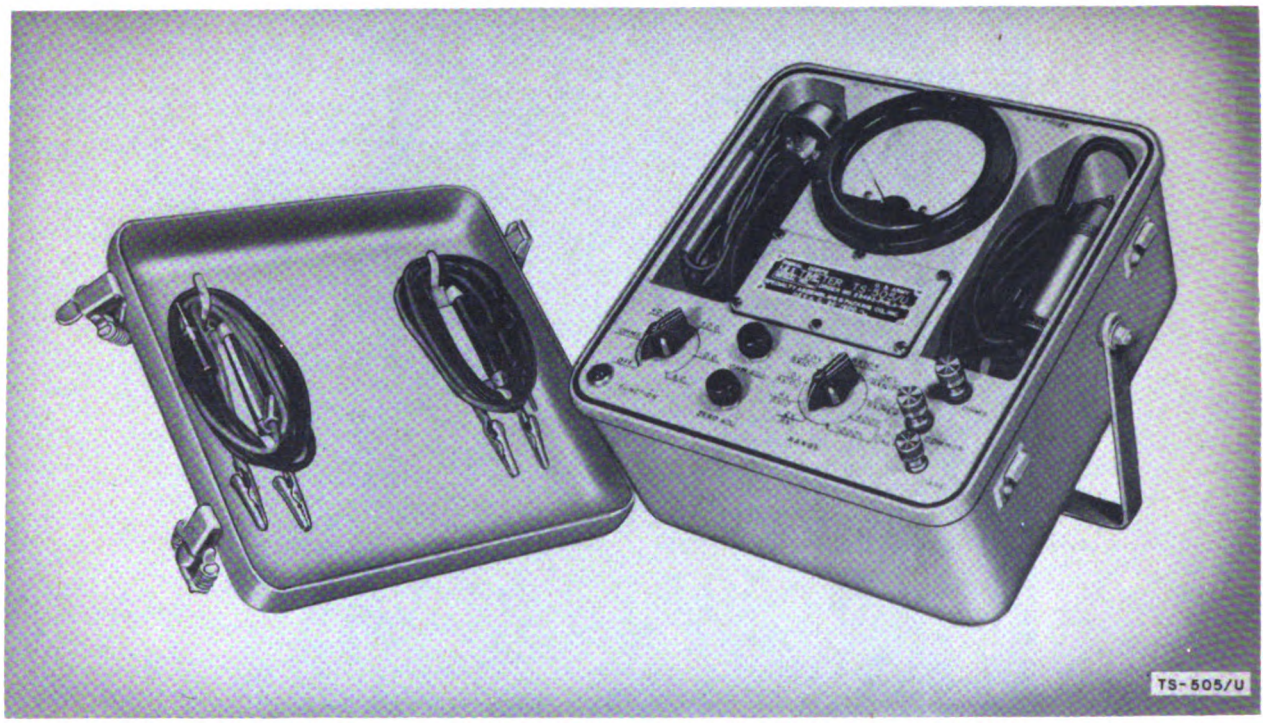


Figure 132. Electronic Multimeter TS-505/U.

Status: Standard. *Stock No.:* 3F4325-505.

Electronic Multimeter TS-505/U is a ruggedly designed, portable, high-impedance vacuum-tube voltmeter, which includes two test leads, an ac probe, and a dc probe. It is intended for field use in the measurement of voltage and resistance in high-impedance circuits of communications and radar equipment. The input impedance is sufficiently high to avoid measurement error due to power absorption from the circuit being measured.

This set will replace Voltohmmeter TS-294-( )/U, Voltmeter TS-363( )/U, Multimeter TS-389/U, Electronic Multimeter TS-520/U, Electronic Multimeter TS-619/U, and Electronic Multimeter TS-620( )/U individually and in all assemblies of which they are a part.

TECHNICAL CHARACTERISTICS

RANGES:
- 0 to 200 v, ac.
- 0 to 1,000 v, dc.
- 0 to 1,000 meg.

INPUT IMPEDANCE:
- Dc low ranges—20 meg.
- Dc, high ranges—50 meg.
- Ac, all ranges—6 meg, 2 $\mu\mu$f.

POWER:
- 110 v, ac, 50 to 1,600 cps.
- Battery operated—2 Batteries BA-30.

DIMENSIONS

	Dimensions (in.)
Unpacked	11½ x 9½ x 9½

Figure 133. Multimeter TS–506A/U.

Status: Limited/Std. *Stock No.:* 3F4490. *Reference:* TM 11–2658.

Multimeter TS–506A/U is a portable test instrument. It is used to determine the important electrical characteristics of all types of electrolytic, paper, mica, trimmer, and air capacitors. Capacitors may be tested for leakage, opens, shorts, and intermittent operation. The capacitance and the power factor of these capacitors may be measured.

TECHNICAL CHARACTERISTICS

RANGES:
10 μμf to 800 μf.
50 ohms to 2 meg.
POWER: 110 v, ac, 50 to 60 cps.

WEIGHTS AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	9¾ x 8¼ x 6⅝	8	.31
Export pack	----------	14	.42

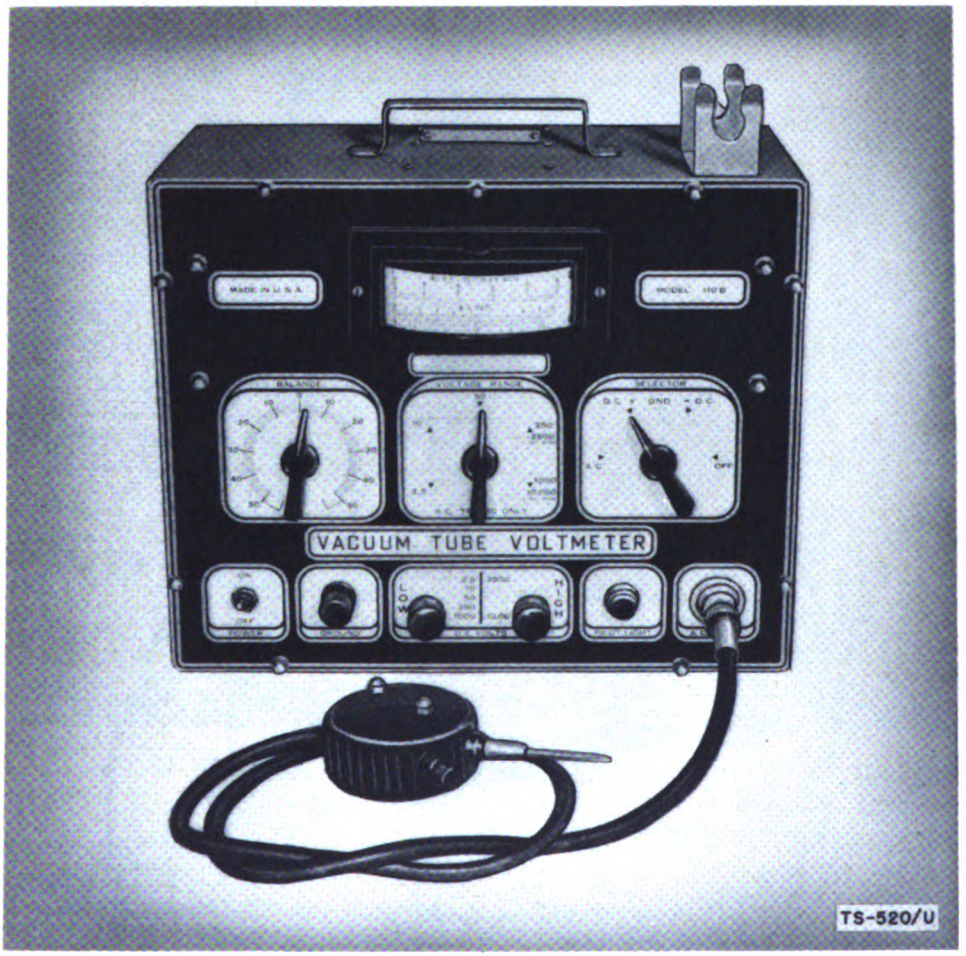


Figure 134. Electronic Multimeter TS-520/U.

Status: Limited/Std. *Stock No.:* 3F13750.5.
Reference: TM 11-2654.

Electronic Multimeter TS-520/U is a vacuum-tube voltmeter. It is used to measure either ac or dc voltages for trouble shooting and checking equipment in the field.

Replaced by Electronic Multimeter TS-505/U.

TECHNICAL CHARACTERISTICS

RANGES:
0 to 10,000 v, dc.
0 to 250 rms v, ac.
ACCURACY:
±5 percent, high range.
±3 percent, low ranges.
POWER: 105 to 125v, ac, or 220 v, ac, 50 to 70 cps.

WEIGHT AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	13¼ x 12¾ x 7¾	16	.76

Figure 135. Crystal Impedance Meter TS-537/TSM.

Status: Standard. *Stock No.:* 3F4325-537.

Crystal Impedance Meter TS-537/TSM consists of a tuned-plate, tuned-grid oscillator. It tests the impedance of crystal units which may be oscillated at either series or antiresonant frequency. The frequency is measured by external frequency measuring equipment which is *not* a part of Crystal Impedance Meter TS-537/TSM.

P/o Standard Crystal Test Set AN/TSM-3.

TECHNICAL CHARACTERISTICS

FREQUENCY RANGE: 75 to 1,100 kc.
RESISTANCE CALIBRATION: 0 to 99,000 ohms in 10-ohm steps.
LOAD CAPACITANCE CALIBRATION: 12 to 110 $\mu\mu$f.
POWER: 105 to 115 v, 50 to 1,720 cps, ac.

WEIGHT AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	19 x 10 x 7	----	.76
Export pack	29 x 17 x 20	60	5.7

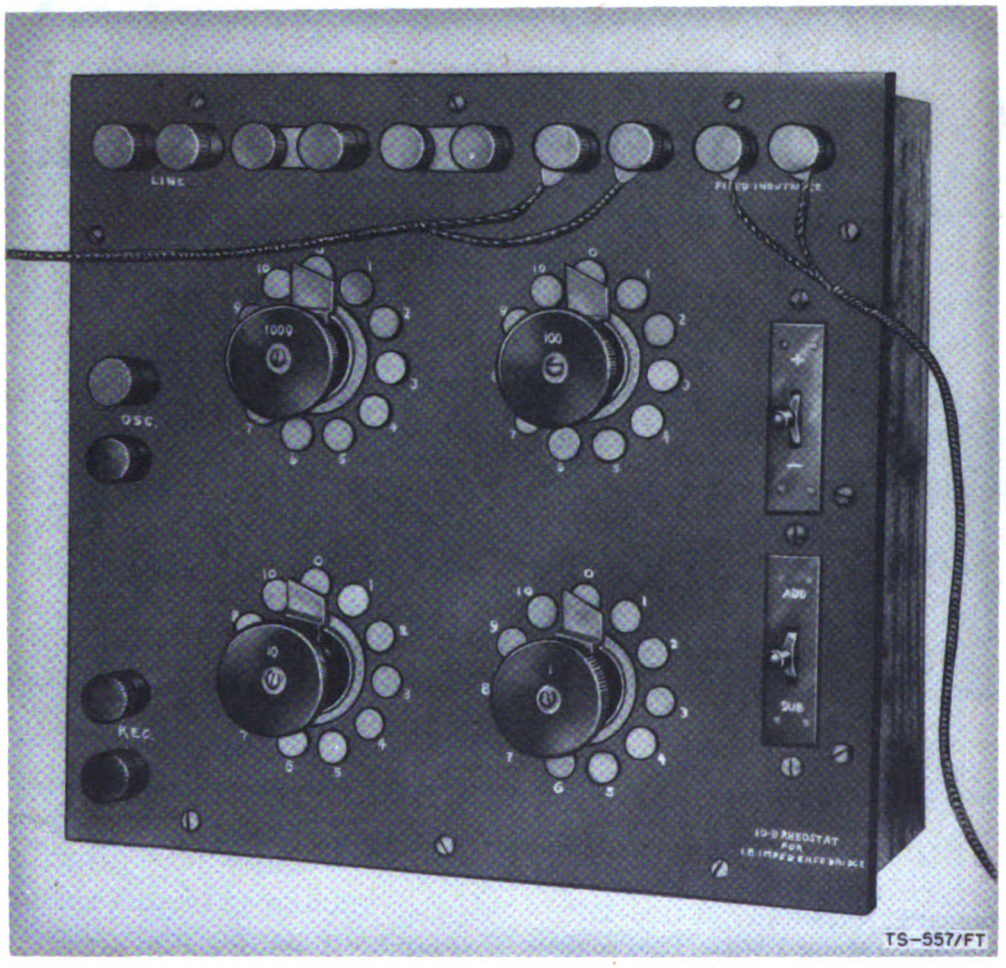


Figure 136. Impedance Bridge TS–557/FT.

Status: Standard. *Stock No.:* 3F2010.

Impedance Bridge TS–557/FT consists of a WECo. No. 14B Rheostat, a WECo. No. 2A Inductance, and a Brooks type inductometer. It utilizes the substitution method of measurement and uses headphone detection. A telephone receiver and v-f oscillator are required for operation but are not included with the equipment. The instrument is used for measuring impedance of telephone circuits.

TECHNICAL CHARACTERISTICS

RANGES:
0 to 550 mh.
0 to 11,110 ohms.
100 to 3000 cps.

WEIGHT AND VOLUME

	Weight (lb)	*Volume (cu ft)*
Export pack	97	8. 7

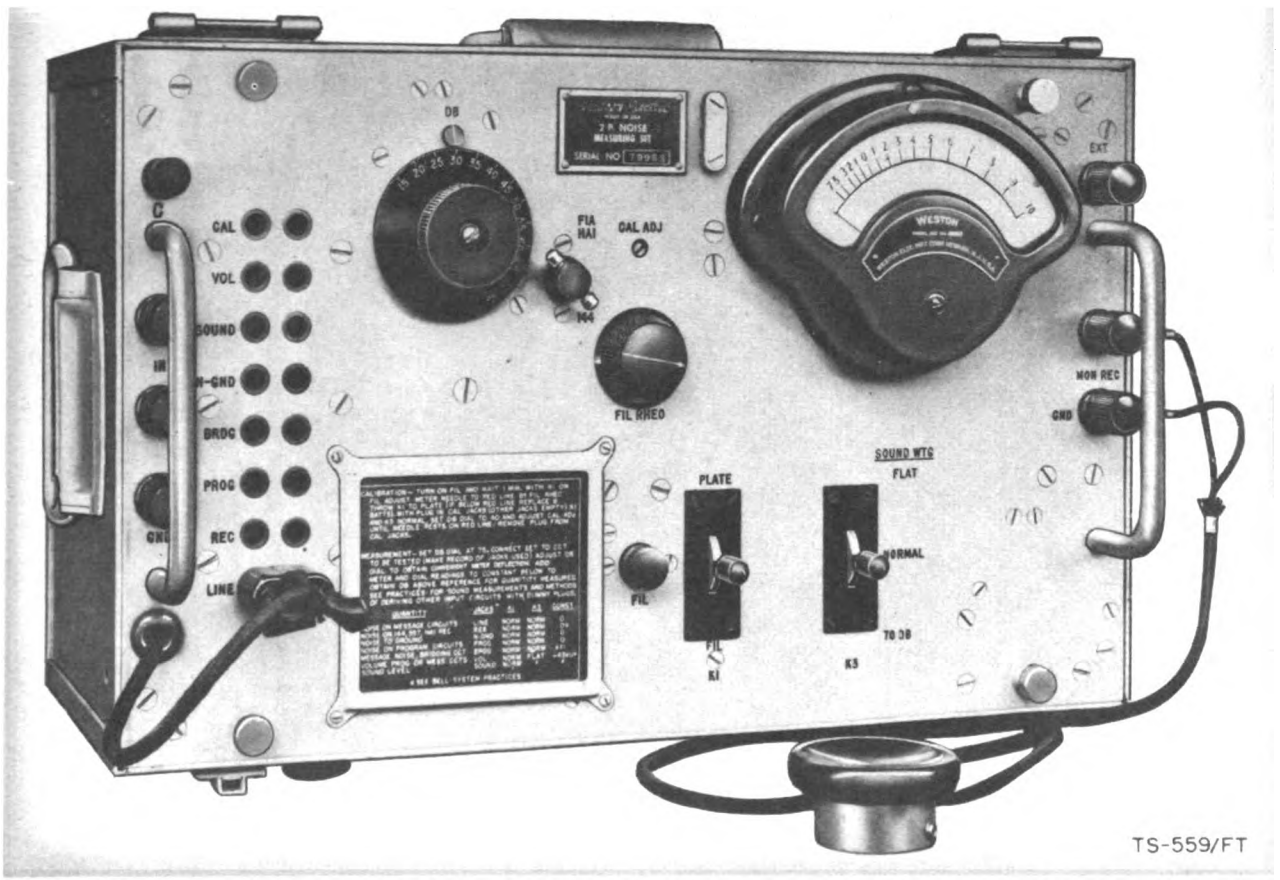


Figure 137. Transmission Measuring Set TS–559/FT.

Status: Standard. *Stock No.:* 3F4265.

Transmission Measuring Set TS–559/FT is a portable telephone test set. A telephone receiver, cords, and plugs are supplied. It is used to measure noise levels on telephone lines and equipment. The noise level is indicated visually by the deflection of a meter needle.

TECHNICAL CHARACTERISTICS

RANGE: 10 to 85 db above reference noise.

POWER: Battery operated—2 Batteries BA–23, 6 Batteries BA–2.

WEIGHT AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	18⅛ x 10⅛ x 11½	50	1. 22

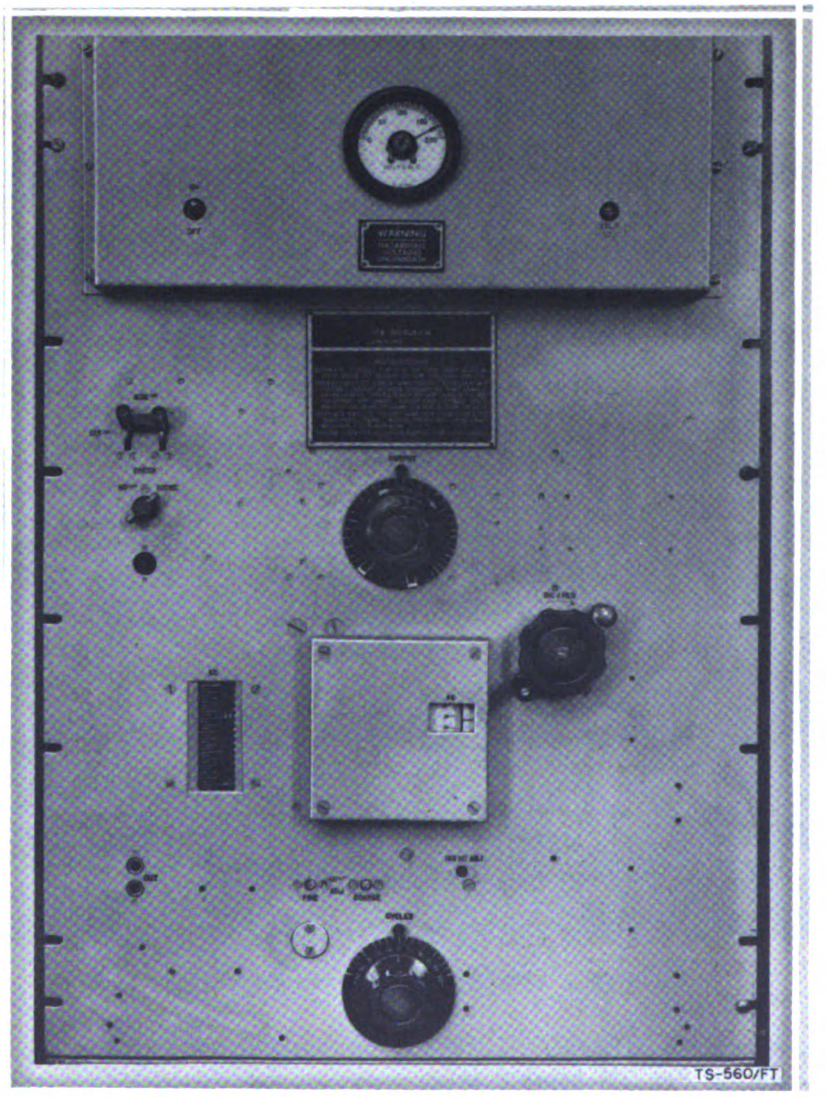


Figure 138. Audio Oscillator TS-560/FT.

Status: Limited/Std. *Stock No.:* 3F3570–3.

Audio Oscillator TS–560/FT is an a-f, heterodyne-type, vacuum-tube signal generator. It is used to provide audio frequencies for testing telephone equipment.

TECHNICAL CHARACTERISTICS

FREQUENCY RANGE: 50 cps to 150 kc.

OUTPUT: 1 to +30 dbm.
OUTPUT IMPEDANCE: 135 to 600 ohms.
POWER: 105 to 125 v, ac, 50 to 60 cps.

WEIGHTS AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	19 x 28 x 9⅝	80	2. 95
Export pack	----------	224	8

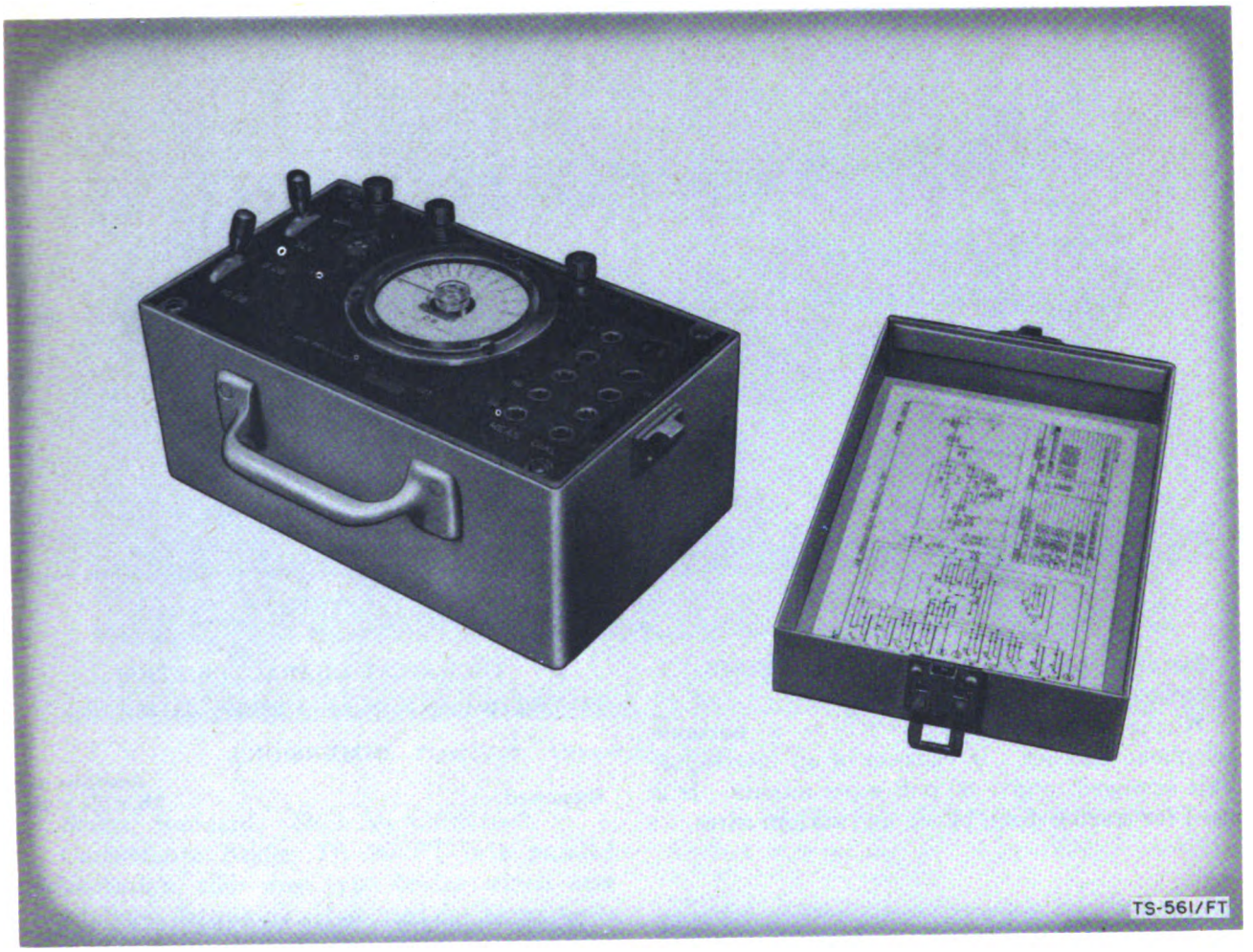


Figure 139. Transmission Measuring Set TS-561/FT.

Status: Limited/Std. *Stock No.:* 3F4270–1.

Transmission Measuring Set TS–561/FT is a telephone test set. It comes equipped with 10 jacks for connecting to WECo, plugs 109, 110, and 241. It is used to measure transmission levels on telephone circuits.

TECHNICAL CHARACTERISTICS

RANGE: 0 to 20 db below 1 mw over a frequency range of 350 to 10,000 cps.

POWER: None.

WEIGHTS AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	8½ x 5 x 5	7	.12
Export pack	----------	15	

930763 O—51——10

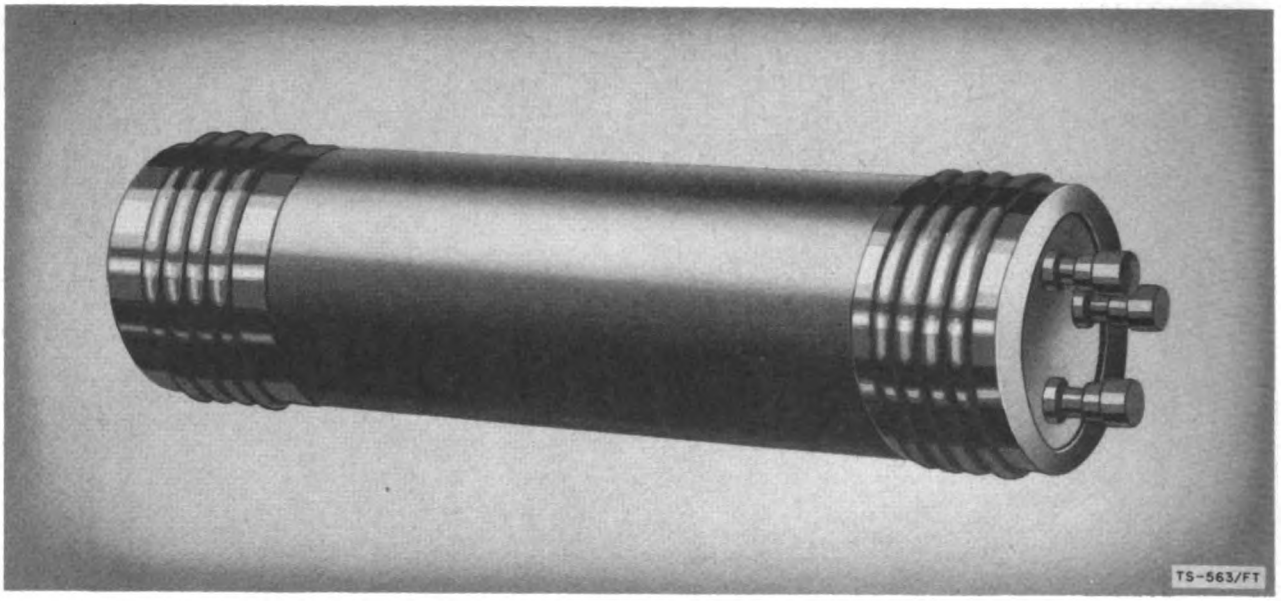


Figure 140. Wiring Test Set TS-563/FT.

Status: Standard. *Stock No.:* 3F4316-1.2. *Reference:* TM 11-468.

Wiring Test Set TS-563/FT is a portable telephone test set. It consists of an interrupter unit arranged to give 80 pulses per minute. It is used for tracing drop, block, and station wires.

TECHNICAL CHARACTERISTICS

POWER: Battery operated—1 Battery BA-36.

DIMENSIONS

	Dimensions (in.)
Unpacked	3⅜ x 2⅛ x 4¾.

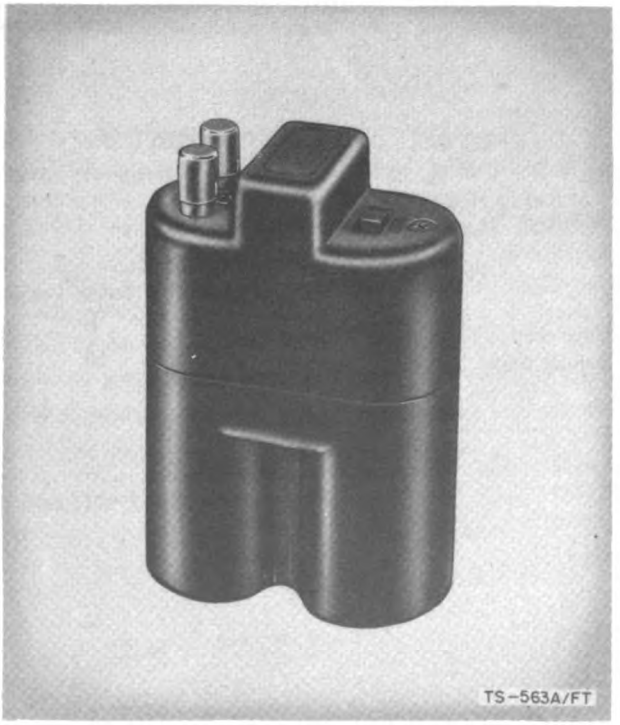


Figure 141. Wiring Test Set TS-563A/FT

Status: Standard. *Stock No.:* 3F4316-1.4. *Reference:* TM 11-468.

Wiring Test Set TS-563A/FT is a portable telephone test set consisting of a buzzer, a capacitor, two binding posts, and a three-position switch (off, tone test, and dc continuity), all contained in a plastic case. The instrument is used for making tone and dc continuity tests in tracing drops, blocks, and inside wires.

TECHNICAL CHARACTERISTICS

POWER: Battery operated—2 Batteries BA-30.

WEIGHTS AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	1 1/16 x 3⅛ x 4⅝	2	.02
Export pack		6	1.5

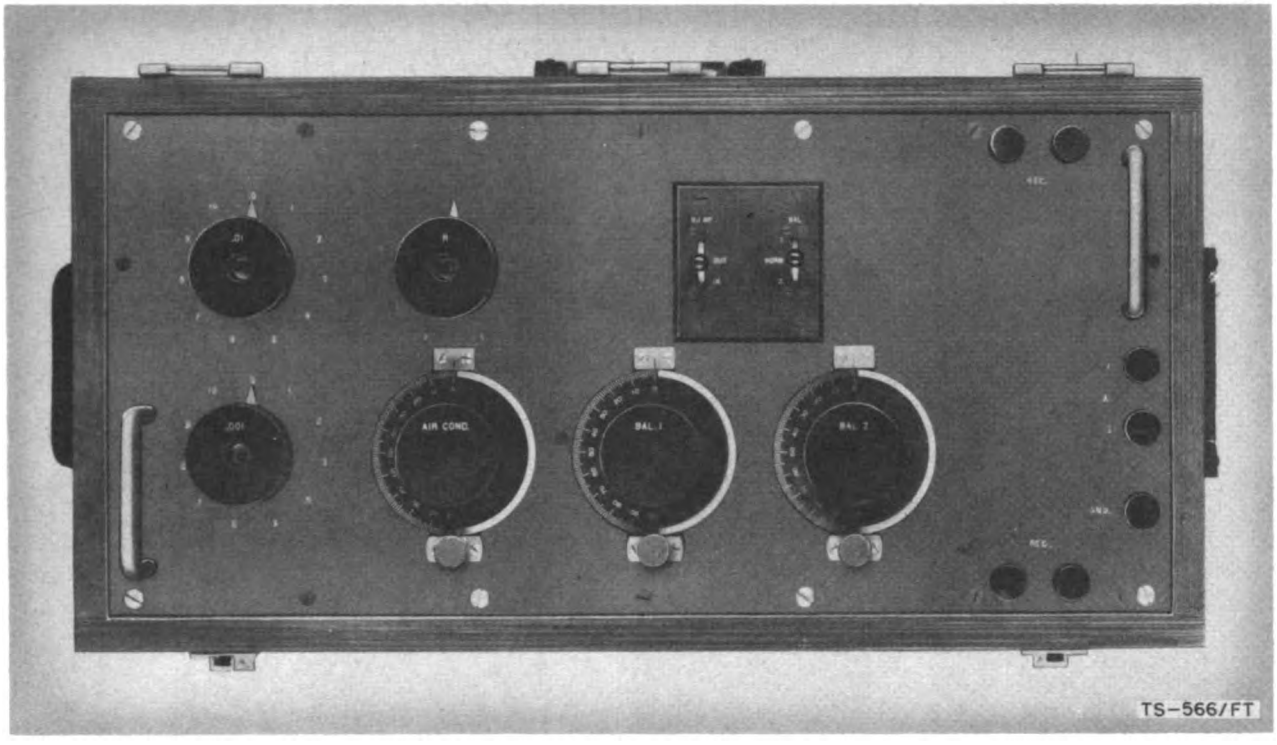


Figure 142. Capacitance Bridge TS-566/FT.

Status: Standard. *Stock No.:* 3F2010-2.

Capacitance Bridge TS-566/FT is a parallel substitution, slide-wire type bridge which uses headphone detection. It is used for capacitance measurements at voice frequency in telephone installations.

TECHNICAL CHARACTERISTICS

RANGE: 0 to 500 μμf over a range of 100 to 10,000 cps.
ACCURACY: ±2 percent.
POWER: Battery operated.

WEIGHT AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	23⅜ x 10¼ x 12	----	1. 75
Export pack	----------	130	6. 0

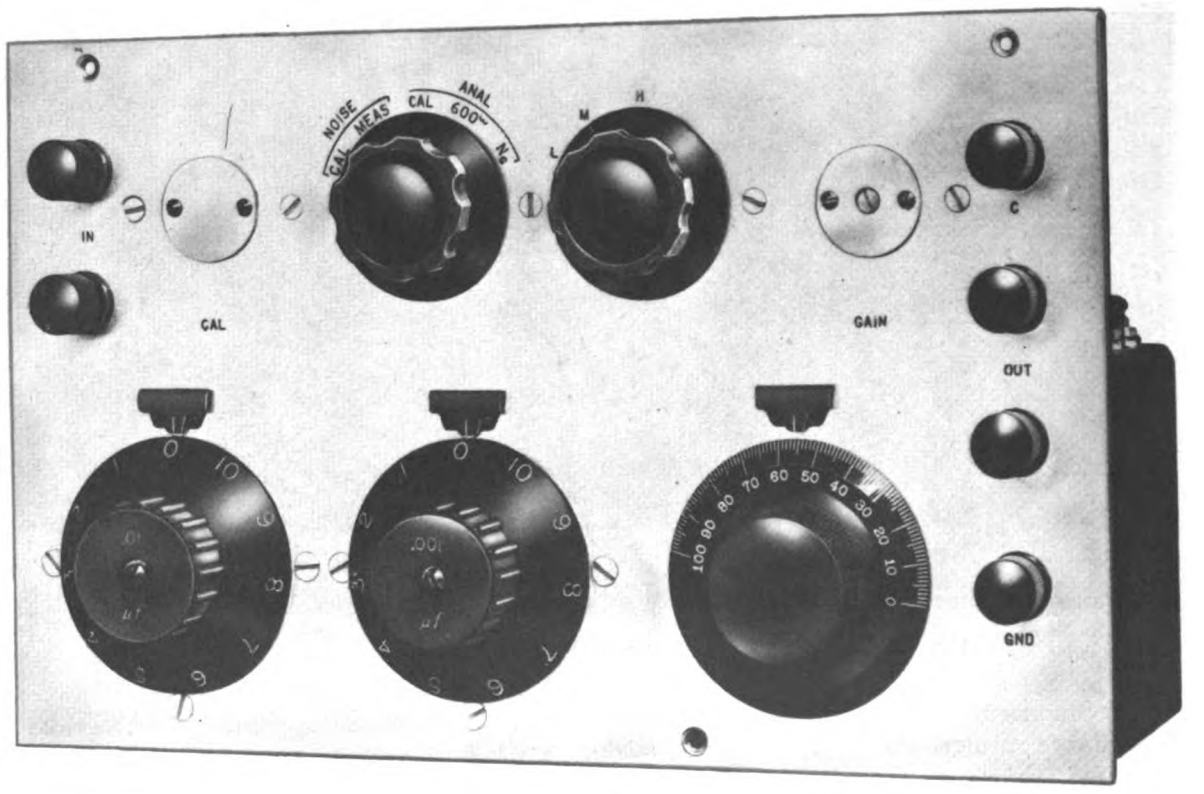


Figure 143. Transmission Measuring Set TS-568/FT.

Status: Standard. *Stock No.:* 3F4316.3. *Reference:* TM 11-2095.

Transmission Measuring Set TS-568/FT is a telephone test set. It is always used with Test Set TS-599/FT or any amplifier-indicator having similar input impedance or gain characteristics. The *combination* of transmission measuring set and amplifier is used for frequency and amplitude analyses of noise currents and voltages induced on telephone circuits and for measurements of harmonic currents and voltages on power circuits. The WECo D-99127 current TIF coupler and D-99128 voltage TIF coupler are also required if it is desired to make harmonic analyses of power circuit currents and voltages.

U/w but not p/o Transmission Measuring Set TS-559/FT.

TECHNICAL CHARACTERISTICS

FREQUENCY RANGE: 180 to 4,000 cps.

SELECTIVITY:
- Low range:
  - −24 db response 60 cps away.
  - −30 db response 120 cps away.
- Medium range:
  - −20 db response 60 cps away.
  - −25 db response 120 cps away.
- High range:
  - −16 db response 60 cps away.
  - −21 db response 120 cps away.

INPUT IMPEDANCE: 600 ohms.

BALANCE: Errors caused by unbalance will not exceed .03 μa per v to ground at 3,000 cps for metallic current measurement.

LINEARITY: Maximum error is about .2 db at 540 cps on low range.

WEIGHTS AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	9 x 8 x 14	25	.58
Export pack	14¼ x 23 x 14¼	60	2.7

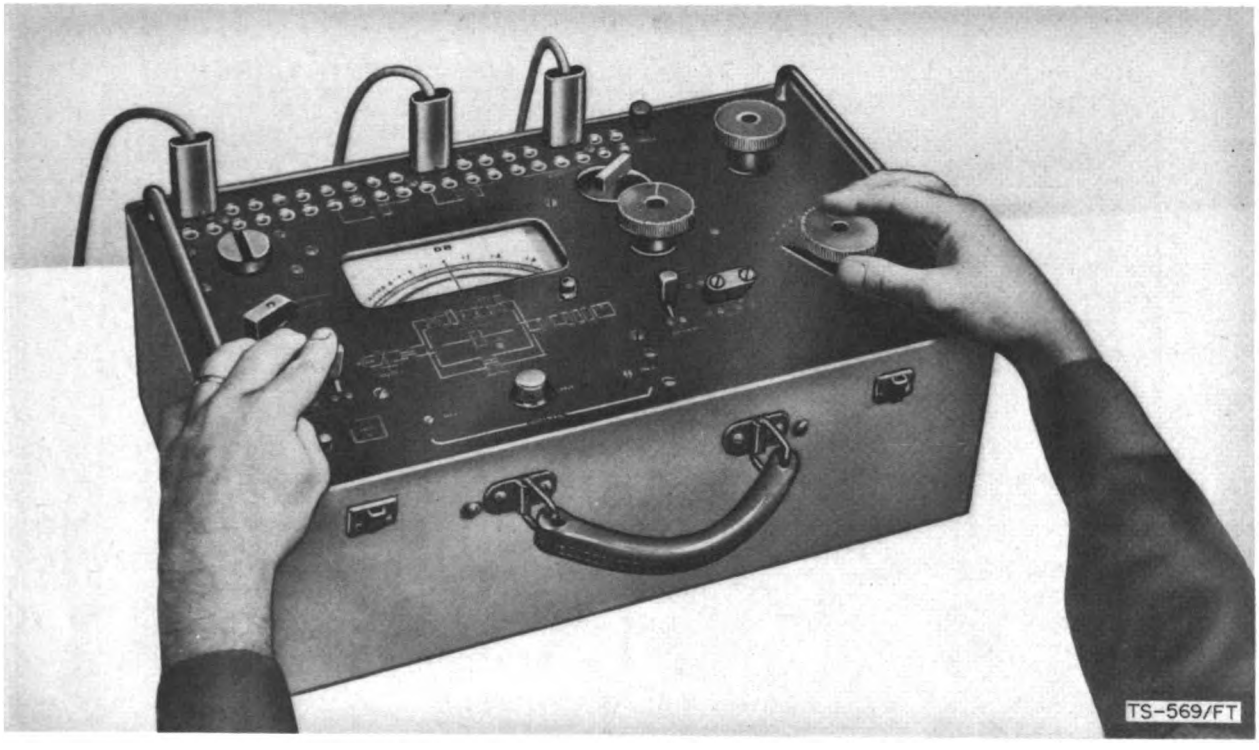


Figure 144. Transmission Measuring Set TS-569/FT.

Status: Standard. *Stock No.:* 3F3195. *Reference:* TM 11-2049.

Transmission Measuring Set TS-569/FT is a portable telephone test set which consists of a current measuring circuit and a comparison circuit. It is used to measure gain and loss and received power in telephone carrier circuits.

TECHNICAL CHARACTERISTICS

GAIN MEASUREMENTS: 0 to 120 db.

LOSS MEASUREMENTS: 0 to 90 db.

POWER MEASUREMENTS: 10 db below 1 mw to 37.8 db above 1 mw.

TESTING RANGE: 35 to 150,000 cps on 135- and 600-ohm circuits.

IMPEDANCE: 135 ohms.

POWER: Battery operated—1 Battery BA-30.

WEIGHT AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Export pack	21 x 29 x 17	140	3.75

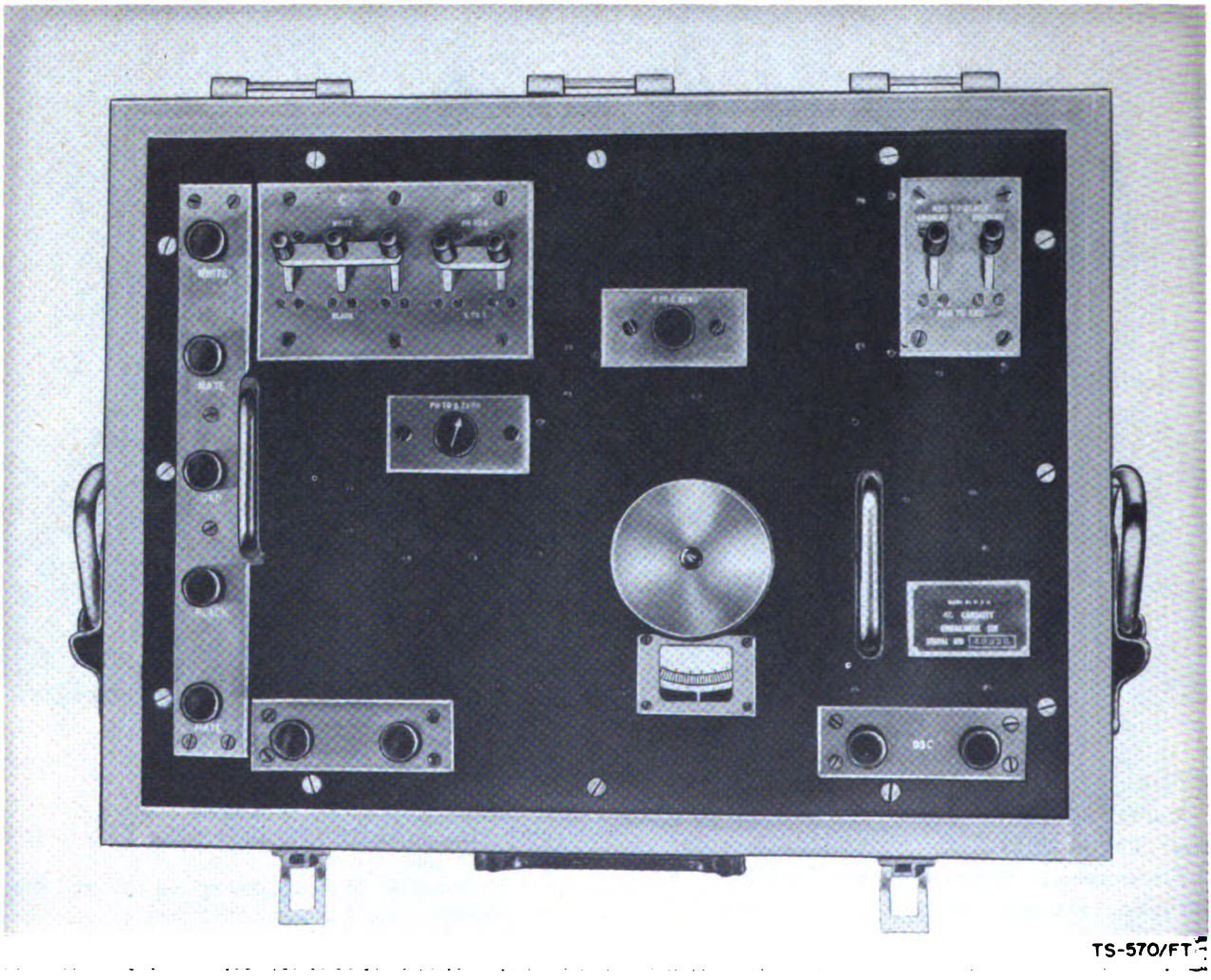


Figure 145. Cable Test Set TS–570/FT.

Status: Limited/Std. *Stock No.:* 3F2480.

Cable Test Set TS–570/FT is a telephone test set. It is equipped with two test cords with clips and a receiver. It is used for making capacitance unbalance tests between circuits in quadded cables.

U/w but not p/o Audio Oscillator TS–571/FT.

WEIGHTS AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	9 x 13⅞ x 18⅝	50	1. 34
Export pack	----------	110	7

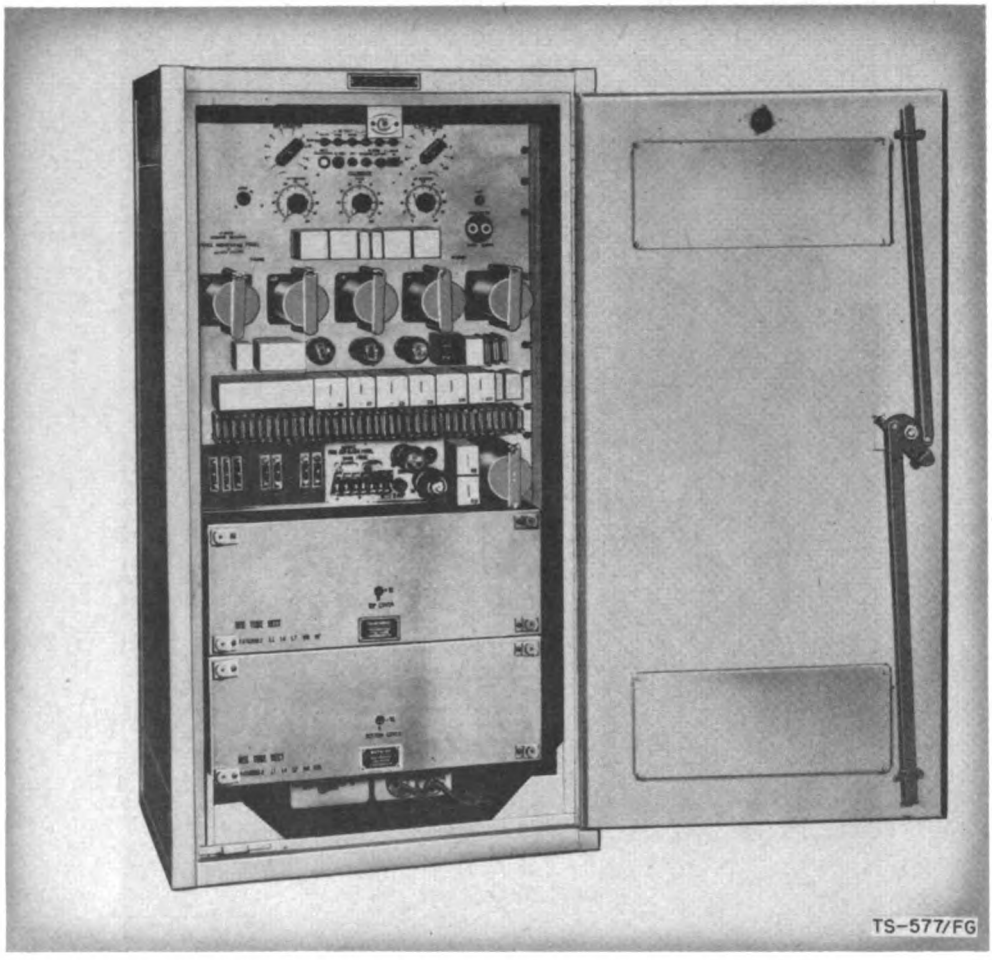


Figure 146. Telegraph Monitor TS-577/FG.

Status: Standard. *Stock No.:* 4A1485. *Reference:* TM 11-2053.

Telegraph Monitor TS-577/FG is an automatic telegraph service monitoring set which provides audible and visual measurements of telegraph signal distortion. It is used for continuous monitoring of telegraph signals in the loop circuits of telegraph terminals and repeaters.

TECHNICAL CHARACTERISTICS

RESPONSE: To neutral 60 ma or −30 ma teletypewriter signals transmitted at a speed of 60, 75, 100, or 150 words per min.

POWER: 115 or 230 v, ac, 50 to 60 cps.

WEIGHT AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	22¼ x 17 x 42	300	9. 20

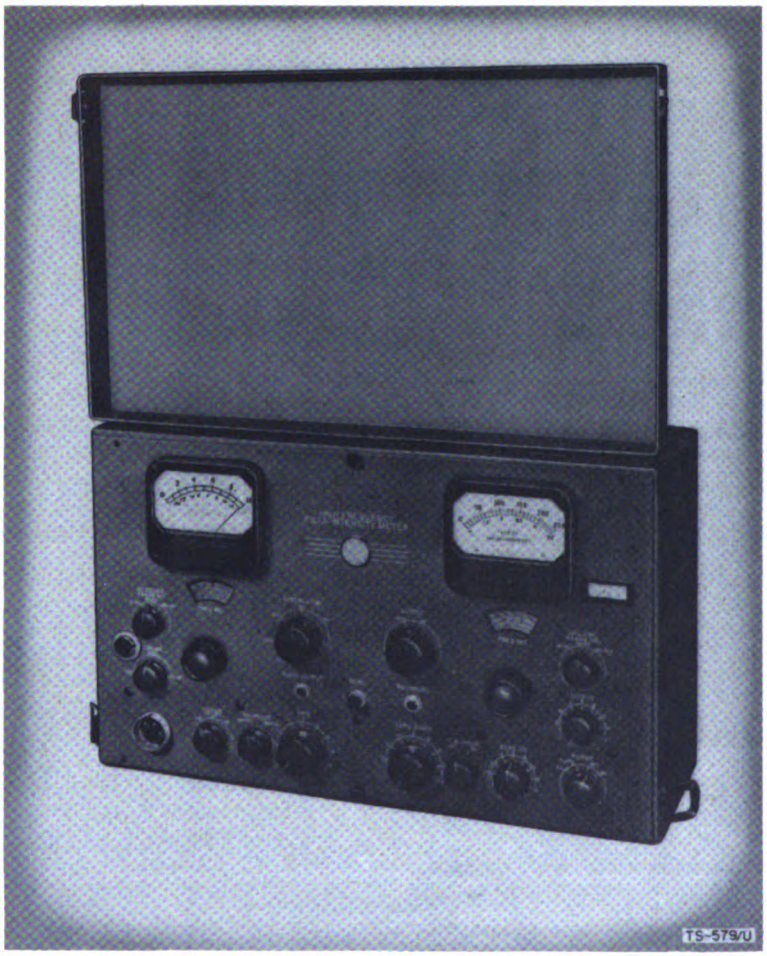


Figure 147. Field Strength Meter TS-579/U.

Status: Standard. *Stock No.:* 3F3309-1.

Field Strength Meter TS-579/U is a portable h-f field intensity meter. It is used to measure field intensities of f-m and a-m stations operating in the frequency range of 18 to 125 mc and to check antenna efficiency, directivity, and service range. When used with a recording meter, a permanent, continuous record may be made of variations in signal intensity.

TECHNICAL CHARACTERISTICS

FREQUENCY RANGE: 18 to 125 mc.
INTENSITY RANGE: 10 to 2,500,000 μv per meter.
OUTPUT: 20 or 40 db.
POWER: Battery operated.

WEIGHT AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	13 x 20 x 9¼	38	1.39

Figure 148. Direct Current Amplifier TS–580/U.

Status: Standard. *Stock No.:* 2C411. *Reference:* TM 11–2587.

Direct Current Amplifier TS–580/U consists of a three-stage, direct-coupled amplifier. It is used as a calibrated dc millivoltmeter or microvoltmeter in the measurement of small dc voltage. It is also used with a 5-ma, dc recorder for the recording of variation of any electrical quantity which may be translated into small variations of current.

TECHNICAL CHARACTERISTICS

INPUT VOLTAGE: .1 to 1.0 v.
RESISTANCE INPUT: 100 ohms to 10 meg.
OUTPUT:
6 ma in recorder circuit of 1,000 ohms.
105 to 125, 210 to 250 v, ac, 60 cps.

WEIGHTS AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	15¼ x 9 x 8½	22¼	.66
Export pack		59	2.5

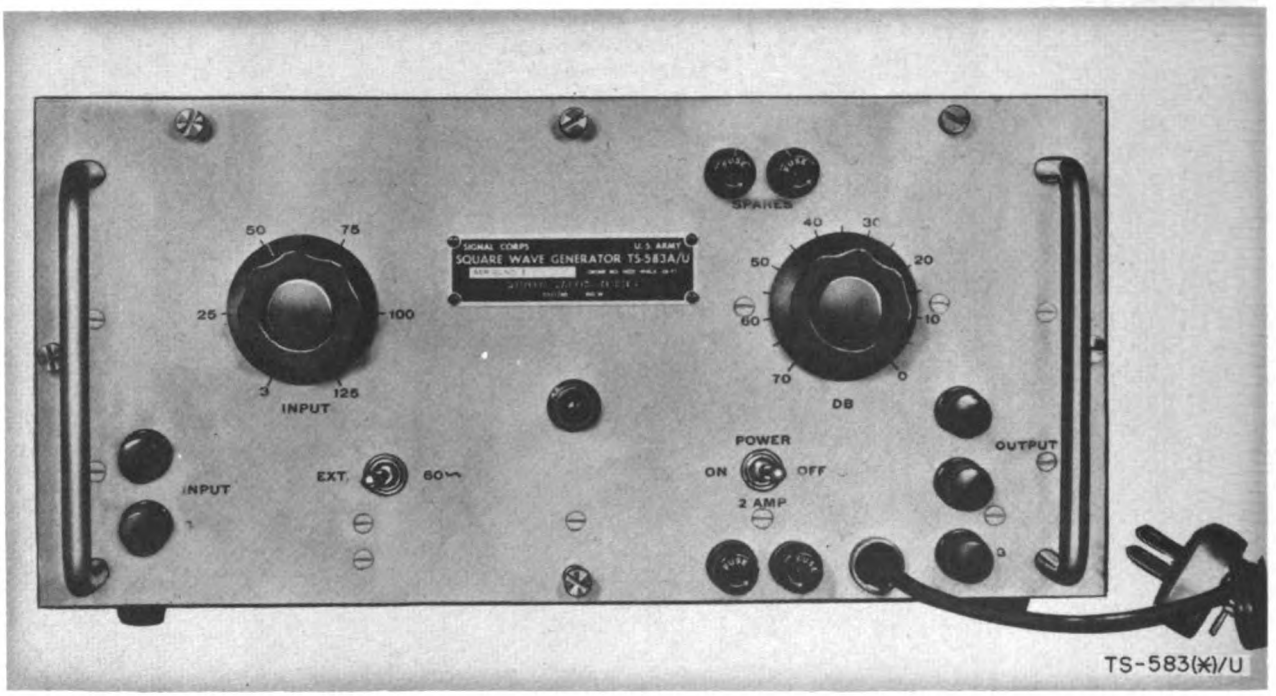


Figure 149. Square Wave Generator TS-583A/U.

Status: Standard. *Stock No.:* 3F3871-2. *Reference:* TM 11-5024.

Square Wave Generator TS-583(*)/U represents TS-584/U, TS-584A/U, and TS-584B/U. Square Wave Generator TS-583(*)/U is an audio frequency signal generator which provides an internally generated square wave voltage output at 60 cps. It is used to make timing measurements and to test the frequency and transient response of audio amplifiers and other networks.

TECHNICAL CHARACTERISTICS

FREQUENCY RANGE, NOMINAL: 20 cps to 10 kc.
MAXIMUM SIGNAL OUTPUT: 60 v, peak to peak.
ATTENUATION: 0 to 70 db.
INPUT IMPEDANCE:
  25,000 ohms, balanced.
  500 ohms unbalanced.
WAVE CHARACTERISTICS:
  Rise time—.5 μsec from base to top, no overshoot.
  Decay time—.5 μsec from base to top, no overshoot.
GENERATOR INPUT VOLTAGE: 3 to 125 v.
POWER: 115 v, ac, 50 to 60 cps.

WEIGHTS AND DIMENSIONS

	Dimension (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	7½ x 11 x 15	35	.72
Domestic pack	13 1/16 x 16⅛ x 21¼	44	2.8
Export pack	13 1/16 x 16⅛ x 21¼	60	2.8

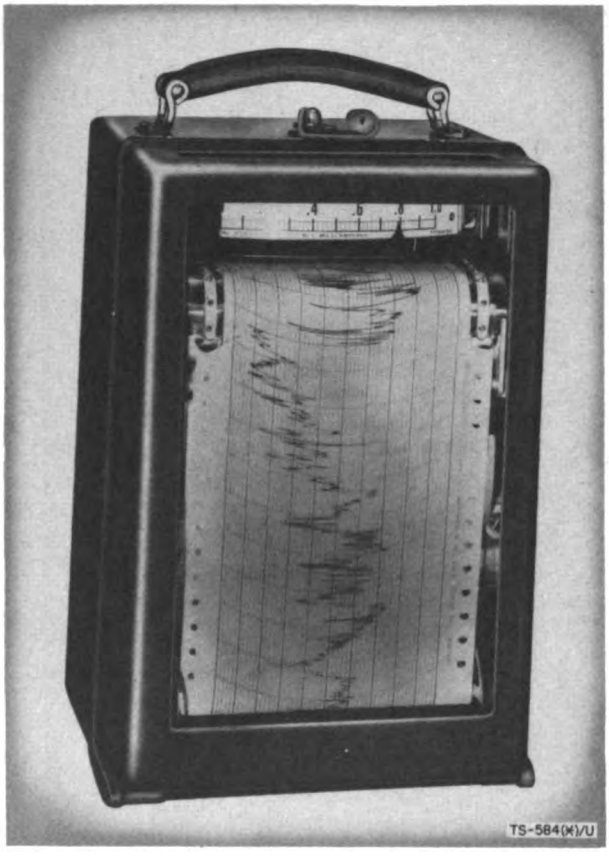


Figure 150. Milliammeter Recorder TS-584/U.

Status: Standard. *Stock No.:* 3F3395.

Milliammeter Recorder TS-584(*)/U represents TS-584/U, TS-584A/U, and TS-584B/U. Milliammeter Recorder TS-584(*)/U is used to provide a continuous, permanent record over a period of several days, of any quality which may be translated into small current fluctuations.

TECHNICAL CHARACTERISTICS

RANGE:
0 to 5 ma, self-contained.
0 to 10 ma, with external shunt.
ACCURACY: ±1 percent.
CAPACITY: Records for 15⅔ days at a tape speed of 3 ft per min. Has gears to provide for variable speeds.

WEIGHT AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	14½ x 9 x 8¾	8¾	.63

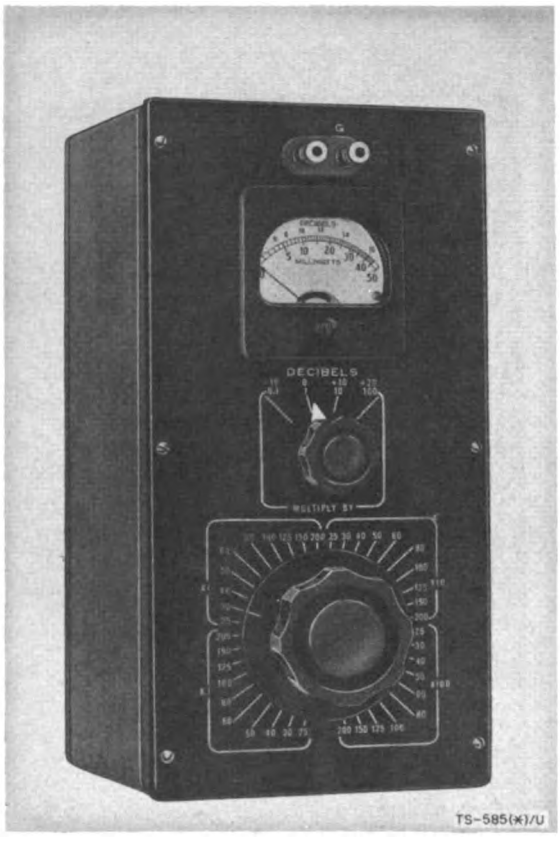


Figure 151. Output Meter TS-585/U.

Status: Standard. *Stock No.:* 3F3323. *Reference:* TM 11-5017.

Output Meter TS-585(*)/U represents TS-585/U, TS-585A/U, and TS-585B/U. Output Meter TS-585(*)/U is a direct-reading, audio-frequency power meter. It is used to measure the power output and the effect of load impedance on the power delivered by amplifiers, filters, oscillators, and similar equipment. Standard radio receiver tests such as noise pick-up level, bandwidth, selectivity, fidelity, and sensitivity may be made by using the scale of the instrument.

Will replace Volume Indicator ID-220/FRT.

TECHNICAL CHARACTERISTICS

RANGES:
20 to 10,000 cps.
.1 to 5,000 mw.
.10 to +37 dbm.
INPUT IMPEDANCE: .2 to 20,000 ohms.
ACCURACY: .5 percent.

WEIGHTS AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	12 x 6 x 7	9	.29
Export pack	----------	30.5	1.6

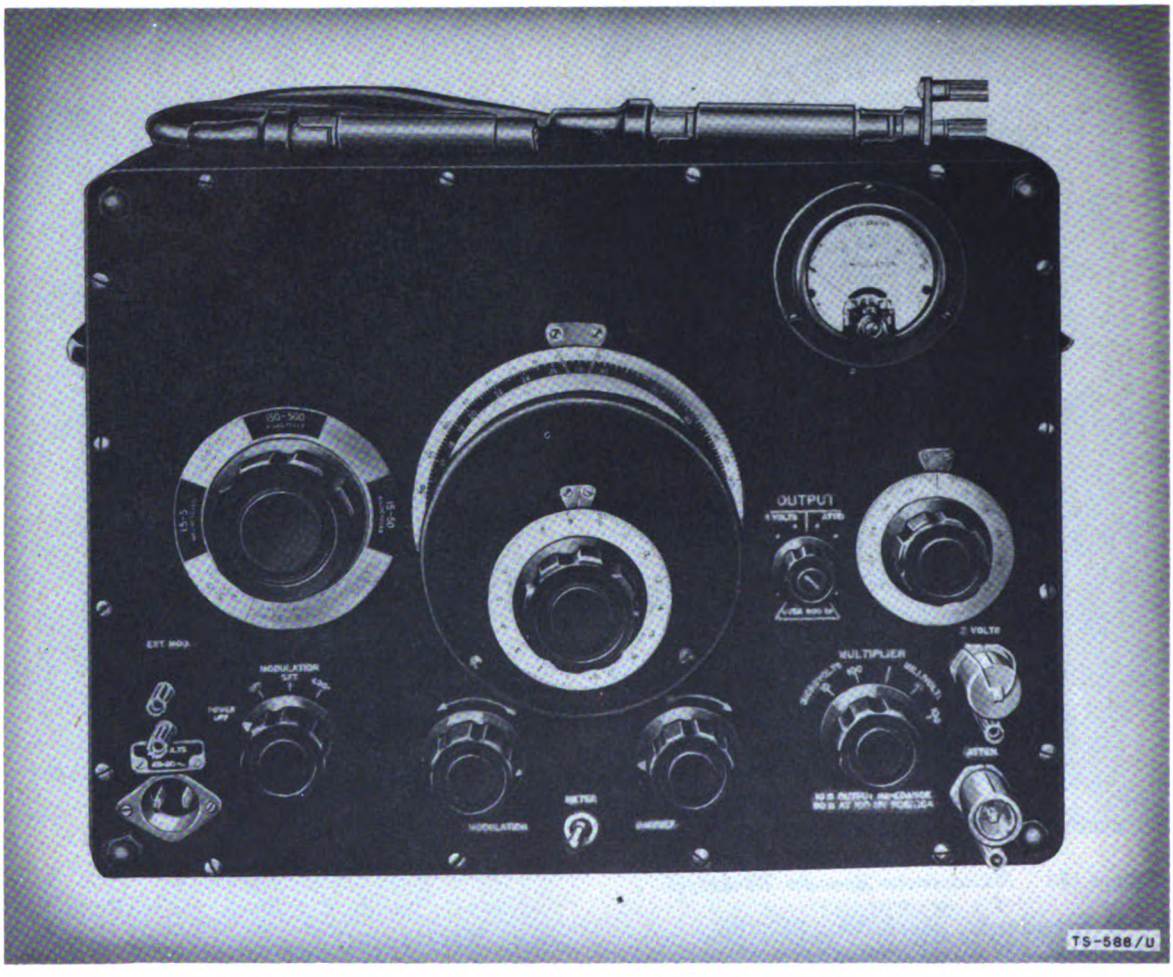


Figure 152. Signal Generator TS–588/U.

Status: Standard. *Stock No.:* 3F3820.2.

Signal Generator TS–588/U is a portable instrument consisting of three separate groups of circuits: a power supply, a completely shielded radio-frequency circuit, and a modulation and control circuit. Signal Generator TS–588/U is used to determine the performance of radio receivers and other equipment at radio and supersonic frequencies. It is also used as a power source for bridges and other measuring circuits where complete shielding and a wide frequency range are required. All necessary accessories are included with the equipment.

TECHNICAL CHARACTERISTICS

FREQUENCY RANGE: 5 kc to 50 mc.
OUTPUT VOLTAGE: .1 μv to 200 mv, continuously adjustable; 2 v at open circuit.
OUTPUT IMPEDANCE: 10, 50, and 500 ohms.
AMPLITUDE MODULATION: Metered and adjustable from 0 to 80 percent.
INTERNAL MODULATION: 400 cps.
EXTERNAL MODULATION: 20 cps to 15 kc, flat within 1 db.
POWER: 105 to 125 v, or 210 to 250 v, ac, 40 to 60 cps.

WEIGHT AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	14⅜ x 20¼ x 10⅞₁₆	52	1. 8

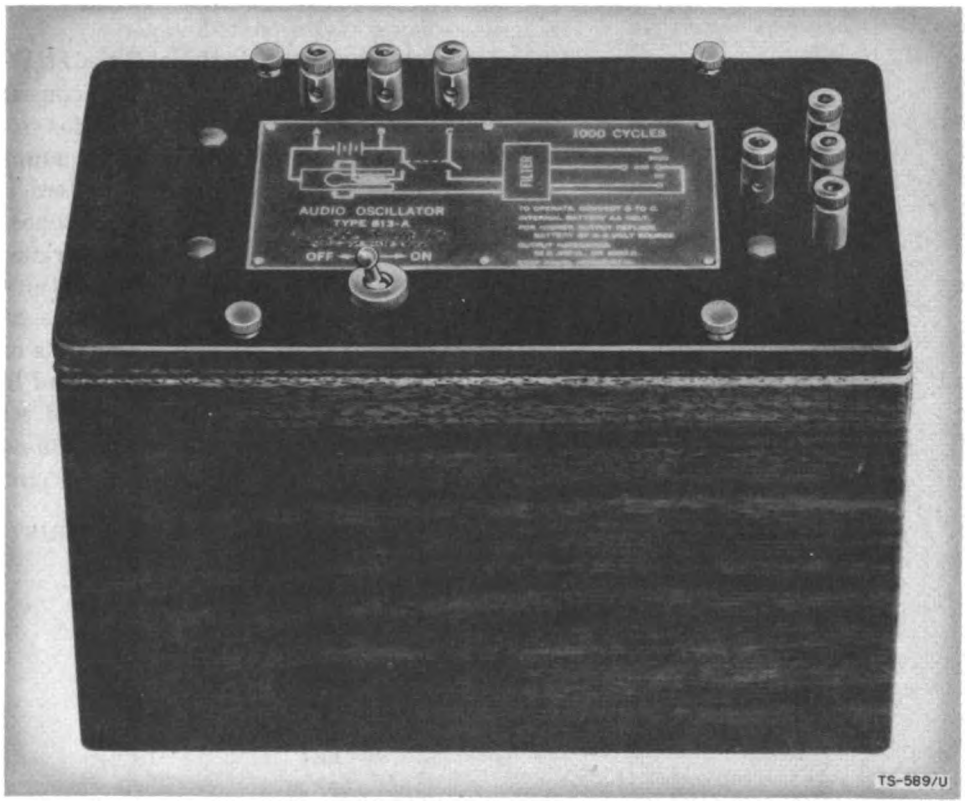


Figure 153. Audio Oscillator TS–589/U.

Status: Limited/Std. *Stock No.:* 3F3820–1.

Audio Oscillator TS–589/U is a battery operated electromechanical oscillator in which the frequency is determined by a tuning fork. It is used as a modulating source for standard-signal generators and as a test tone generator for communications equipment.

TECHNICAL CHARACTERISTICS

FREQUENCY: 1,000 cps.

ACCURACY: ±.1 percent.

POWER OUTPUT:

20 to 30 mw with a 6-v drive.

10 to 15 mw with a 4.5-v drive.

IMPEDANCE OUTPUT: 50, 500, and 5,000 ohms.

POWER: Battery operated.

WEIGHT AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	9 x 5 x 6	8¼	.12

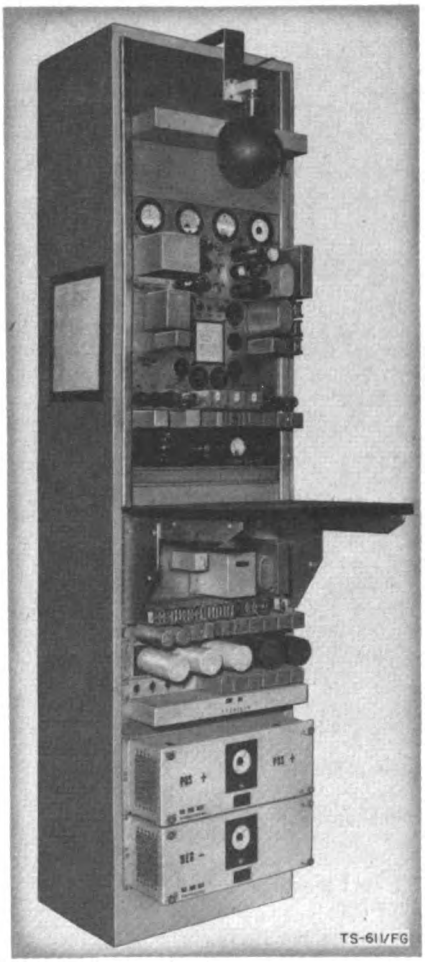


Figure 154. Teletypewriter Test Set TS-611/FG.

Status: Limited/Std.

Teletypewriter Test Set TS-611/FG is a fixed-plant teletypewriter test set consisting of the following units: a relay rack for ten extension circuits, a meter panel, a power supply unit with screwdriver-adjusted potentiometers, a distributor panel, and a strip of jacks, switches, and signal lamps for cross-connecting the various circuits for calibrating the equipment. Teletypewriter Test Set TS-611/FG provides a means of measuring the quality of teletypewriter signals on a working circuit. The percent distortion and bias are indicated on meters. It can be used with .020- or .0675-ampere neutral circuits, .035-ampere polar circuits, or 48-volt inverse neutral circuits.

TECHNICAL CHARACTERISTICS

CIRCUITS:
- Rectifying peak voltmeter—1.
- Power supply—1.
- Comparison—1.
- Distributor—1.
- Extension relay—1.
- Flashing challenge signal—1.
- Extension jack and meter—1.

SIGNAL: Measures 5- or 6-digit signals of 60, 75, and 100 speed.

INTERRUPTER CONNECTIONS REQUIRED:
- 60 interruptions per min (interrupted ground).
- 120 interruptions per min (interrupted ground).

POWER: 115 v, ac, 60 cps; 24-v, 48-v, and 130-v storage battery.

DIMENSIONS

	Dimensions (ft)
Unpacked	7 x 1¼ x 1.

Figure 155. Sound Analyzer TS-615/U.

Status: Standard. *Stock No.:* 3F1772-4.

Sound Analyzer TS-615/U is a heterodyne-type, vacuum-tube voltmeter. It is used to measure the amplitudes and frequencies of the components of a complex waveform; these include not only the components of harmonic distortion but also non-multiple voltages such as noise and hum.

TECHNICAL CHARACTERISTICS

RANGES:
20 to 16,000 cps.
300 μv to 300 v.
INPUT IMPEDANCE: 1 meg.
POWER: 105 to 125 v, ac, 40 to 60 cps.

DIMENSIONS

	Dimensions (in.)
Unpacked	25⅛ x 19½ x 10⅞

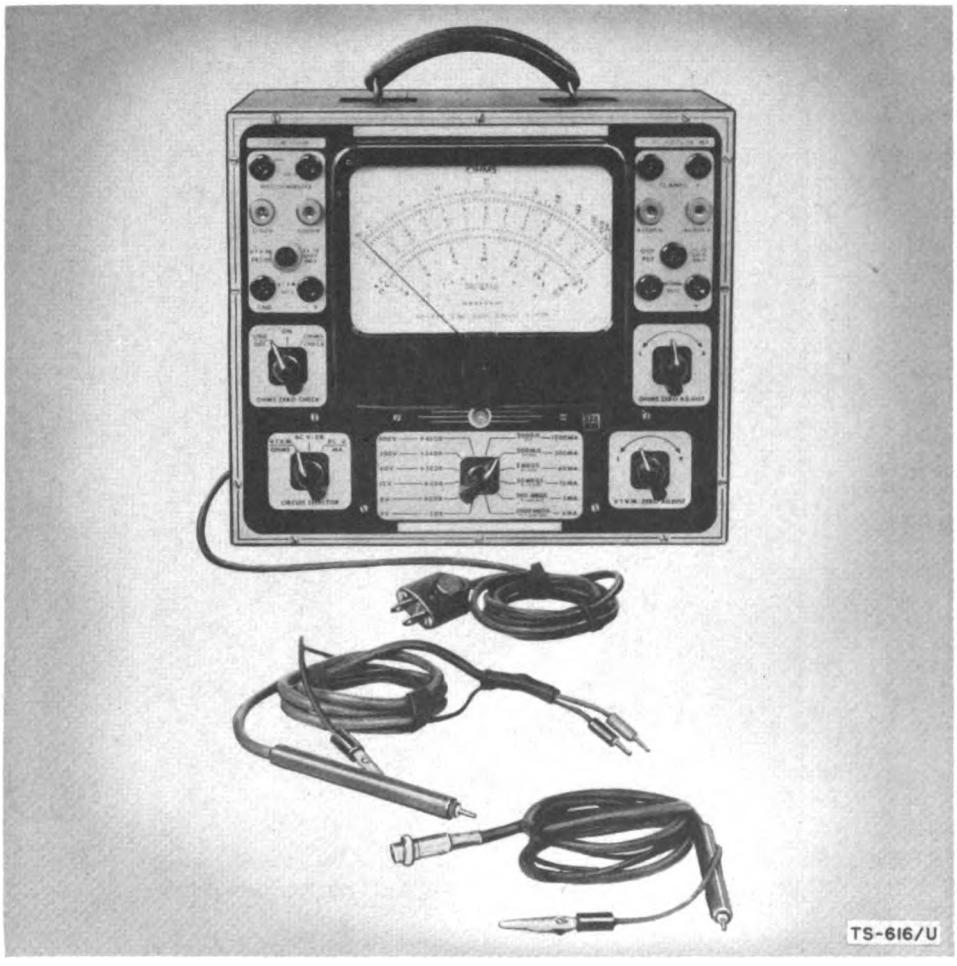


Figure 156. Multimeter TS-616/U.

Status: Limited/Std. *Stock No.:* 3F4073. *Reference:* TM 11-2653.

Multimeter TS-616/U is a portable combination test instrument which includes a vacuum-tube voltmeter. It is used for measuring voltage, current, and resistance, for circuit analysis, and for trouble shooting in electronic equipment.

TECHNICAL CHARACTERISTICS

RANGES:
- 0 to 6,000 v, dc.
- 0 to 6,000 rms v, ac. .
- 0 to 12 amp, dc.
- 0 to 2,000 meg.
- −26 to +70 db.

ACCURACY:
- ±3 percent, dc.
- ±5 percent, ac.

POWER: 110 to 120 v, ac, 50 to 60 cps.

WEIGHTS AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	12¼ x 11¾ x 7	17	.58
Export pack		60	3.14

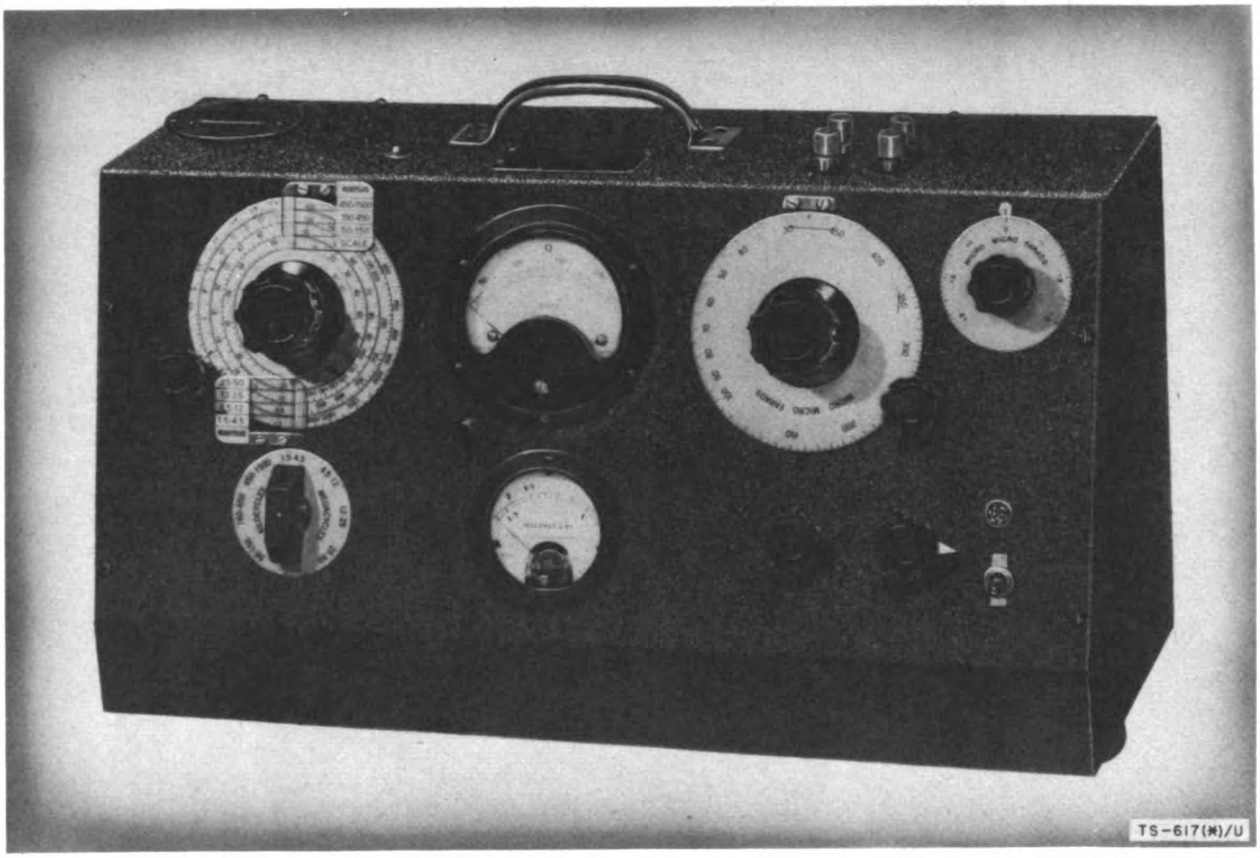


Figure 157. Qmeter TS–617/U.

Status: Standard. *Stock No.:* 3F3381. *Reference:* TM 11–2635.

Qmeter TS–617(*)/U represents TS–617/U and TS–617A/U. Qmeter TS–617(*)/U consists of an r-f oscillator and a measuring circuit. It is used for measuring Q of coils and capacitors.

TECHNICAL CHARACTERISTICS

RANGES:
0 to 625, Q.
1 to 50 kc, with external oscillator.
50 to 75 kc, self contained.
30 to 450 $\mu\mu$f.

ACCURACY: +5 percent.

POWER: 105 to 120 v, 210 to 240 v, ac, 50 to 60 cps.

WEIGHTS AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	12½ x 20 x 3½	40	.51
Export pack	----------	115	8

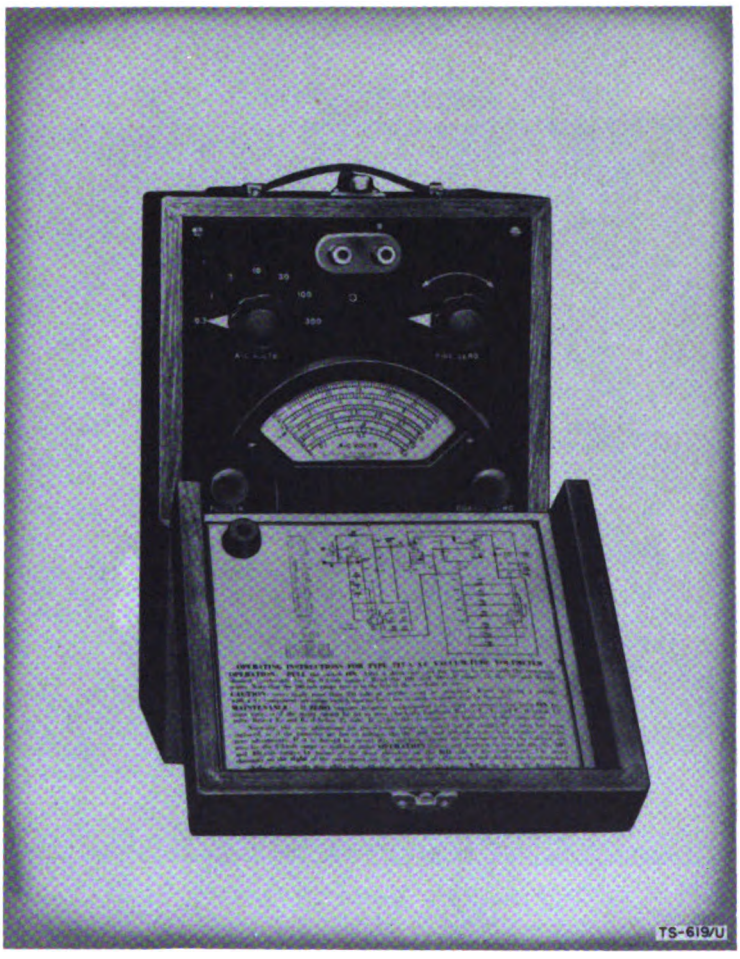


Figure 158. Electronic Multimeter TS–619/U.

Status: Limited/Std.

Electronic Multimeter TS–619/U is a vacuum-tube voltmeter designed for measuring ac voltages. It is used for circuit analysis, trouble shooting and for checking voltages in electronic equipment.

Replaced by Electronic Multimeter TS–505/U.

TECHNICAL CHARACTERISTICS

RANGE: 0 to 300 v, ac.
ACCURACY: ±2 to ±5 percent.
POWER: Battery operated.

WEIGHT AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	11 x 6⅝ x 5⅞	10¾	.25

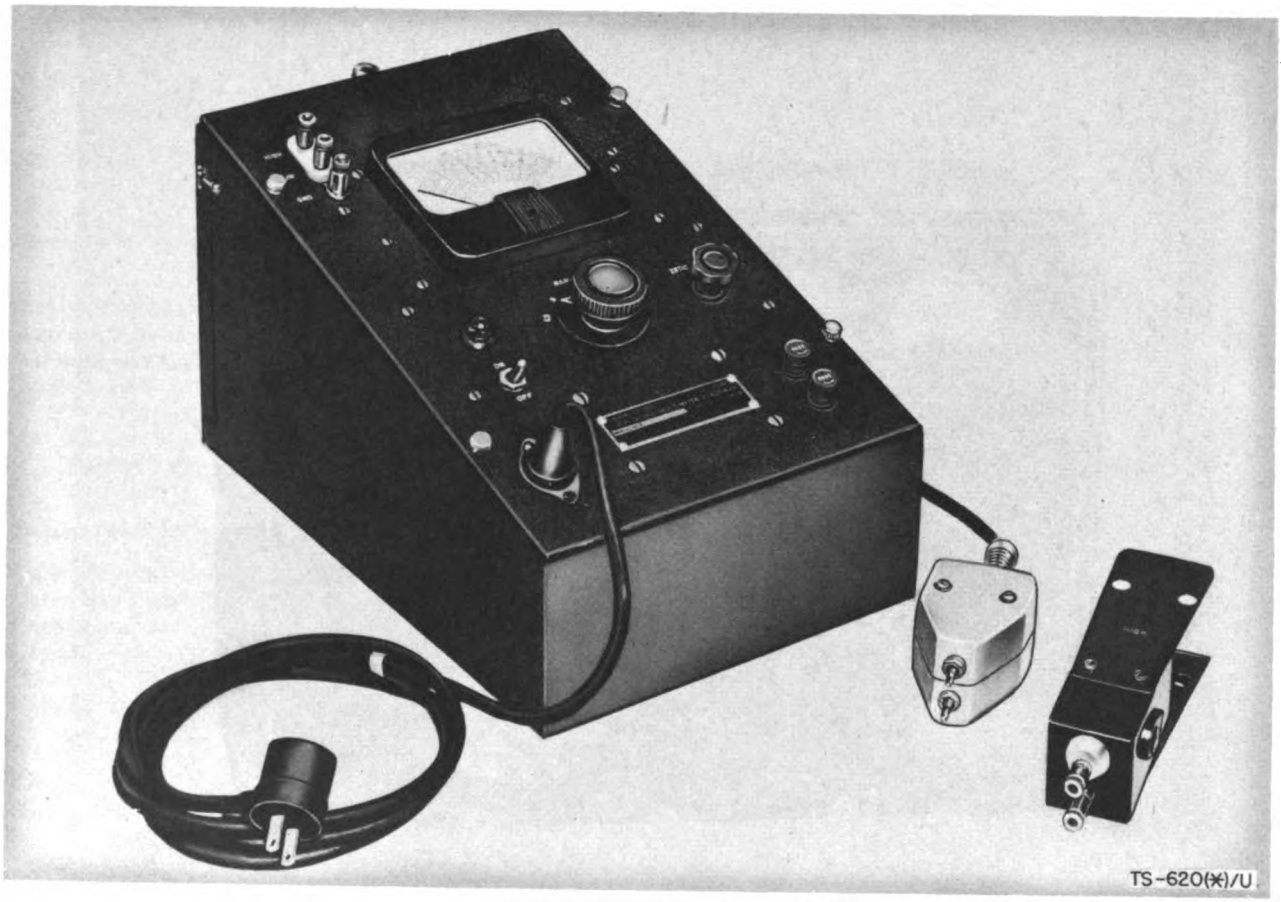


Figure 159. Electronic Multimeter TS-620/U.

Status: Limited/Std. *Stock No.:* 3F8150-34.2.

Electronic Multimeter TS-620(*)/U represents TS-620/U and TS-620A/U. Electronic Multimeter TS-620(*)/U is a high-impedance, wide-range vacuum-tube voltmeter. It is used to measure a-f and r-f output voltages.

To be replaced by Electronic Multimeter TS-505/U.

TECHNICAL CHARACTERISTICS

RANGE: 0 to 150 v, ac.
ACCURACY: ±2 percent.
POWER: 100 to 130 v, ac, 60 cps.

WEIGHTS AND DIMENSIONS

	Dimensions (in.)	*Weight (lb)*	*Volume (cu ft)*
Unpacked	9½ x 8½ x 14	17½	.65
Export pack	----------	28	.75

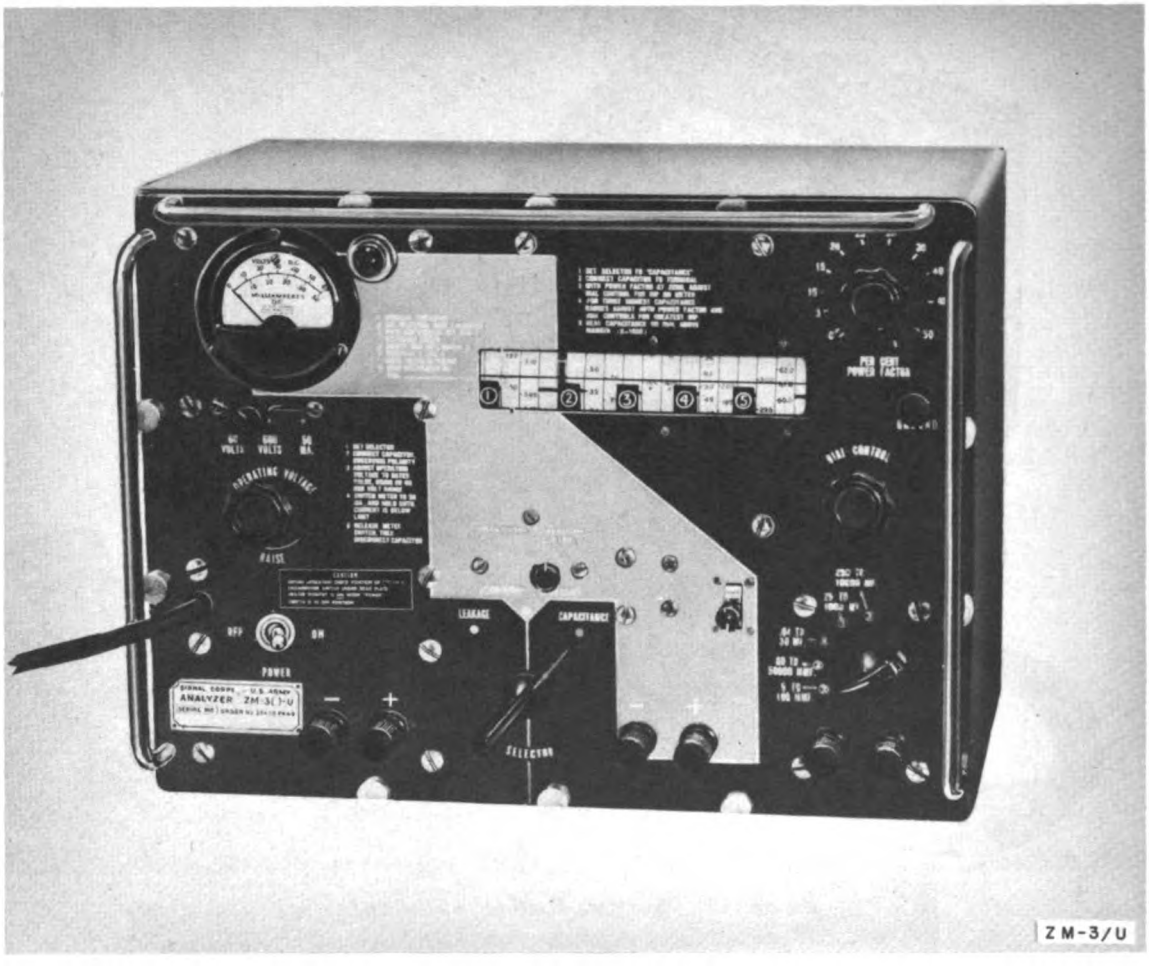


Figure 160. Capacity Analyzer ZM-3/U.

Status: Standard. *Stock No.:* 3F3936-3.

Capacity Analyzer ZM-3/U is a portable capacitance measuring set utilizing a bridge circuit. It is used to test paper, ceramic, mica, and electrolytic capacitors for capacitance, opens, shorts, intermittent shorts and opens, dc leakage, insulation resistance, and percent power factor.

Will replace Analyzer TS-415( )/U.

TECHNICAL CHARACTERISTICS

RANGE:

Capacitance—5 $\mu\mu$f to 10,000 μf.

D-c leakage—

0 to 600 v.

0 to 50 ma.

Insulation resistance—3 to 10,000 meg.

WEIGHT AND VOLUME

	Weight (lb)	*Volume (cu ft)*
Unpacked	18	1. 15

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