UNCLASSIFIED

**ELECTRONIC EQUIPMENT - PRELIMINARY DATA** NAVSHIPS 93400
NAVSHIPS 4457 (Rev. 9-62)

| DESIGNATION |
|---|
| AN/FQM-4 |

| CLASSIFICATION | ITEM NAME | DATE |
|---|---|---|
| UNCLASSIFIED | Sonar Test Set | of Request 11 May 1962 |
| **SPECIFICATION** | **CONTRACT NUMBER AND DATE** | **QUANTITY ON ORDER** |
| - | NObsr-81284 | - |

CONTRACTOR'S NAME AND ADDRESS
Western Electric Company
Lexington Road
Winston-Salem, North Carolina

SERVICE APPROVAL LETTER - SERIAL AND DATE
-

## ELECTRICAL CHARACTERISTICS

| POWER INPUT | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 115 V | 60 CYCLE | 1 PHASE | AMPS | WATTS | V | CYCLE | PHASE | AMPS | WATTS |

| OUTPUT SIGNAL CHARACTERISTICS (REP. RATE, I.F. ETC.) | WAVE GUIDE OR CABLE LIMITATIONS | INPUT SIGNAL CHARACTERISTICS | POWER OUTPUT |
|---|---|---|---|
| - | -- | - | - |
| **OPERATING FREQ. AND FREQ. RANGE** | **EMISSION OR RECEPTION (TYPE)** | **FREQ. CONTROL (TYPE)** | **NO. OF CHANNELS** |
| - | - | - | - |

| ANTENNA OR TRANSDUCER (TYPE) | IMPEDANCE (OHMS) | FEED TYPE | BEAM PATTERN |
|---|---|---|---|
| - | - | - | °HORIZ. - °VERT. |

## REFERENCE DATA AND LITERATURE

| DRAWING | DWG. NUMBER | DIST. DATE | PUBLICATION | PUB. NUMBER |
|---|---|---|---|---|
| -- | - | - | TECHNICAL MANUAL | - |
| | | | OPERATING INSTRUCTION CHART | - |
| | | | PERFORMANCE STANDARD SHEET | - |
| | | | MAINTENANCE STANDARD BOOK | - |

## MAJOR UNITS

VC of G

| QTY | NOMENCLATURE AND NAME | OVERALL DIMENSIONS (IN) HEIGHT | WIDTH | DEPTH | H.D. (UNITS) (1 set) | WEIGHT (LBS) |
|---|---|---|---|---|---|---|
| | Sonar Test Set AN/FQM-4 (Mrf's Part/Spec No. GS-65330 L2) | 50 | 22-½ | 31 | 1.4 | |
| | consists of: | | | | | |
| 1 | Electronic Voltmeter ME-243/FQM | | | | | |
| 1 | Electronic Voltmeter ME-244/FQM | | | | | |
| 1 | Electrical Counter CP-688/FQM | | | | | |
| 1 | Oscilloscope AN/USM-164 | | | | | |
| 1 | Electrical Equipment Cabinet (Mobile) (Mfr's Part/Spec No. GS65331) | | | | | |
| 1 | Axial Fan (Mfr's Part No. G327248) | | | | | |
| 1 | Attenuator Panel SB-1731/FQM | | | | | |
| | 4.1 AN/FQM-4: 1 | | | | | |
| | CHANGE 74 - 689D | | | UNCLASSIFIED | | |

37 IF ADDITIONAL EQUIPMENTS OR UNITS ARE REQUIRED, ATTACH ADDITIONAL SHEETS AND SPECIFY SOURCE

B17419

| DESIGNATION | ITEM NAME |
|---|---|
| AN/FQM-4 | Sonar Test Set |

FUNCTIONAL DESCRIPTION: SKETCH. MFG. DIMENSIONS. ETC.

The AN/FQM-4 is used to make frequency, current, resistance, and voltage measurements and to align RF circuits on various sonar components. It is similar to Sonar Test Set AN/FQM-3 except for the addition of an attenuator panel which gives the added facility of making attenuation measurements. They are not interchangeable. One electronic voltmeter has a range of 0.001 v to 1000v ac. The other electronic voltmeter has three ranges: 0 to 300 v ac, 0 to 1000v dc, and 0.2 ohm to 500 megohms. The electrical counter has a range of 0 to 10,000,000 counts per second. The AN/FQM-4 is used with Sonar Sesa AN/FQQ-1A(V) and AN/FQQ-2A(V).

No unit cost available

Source of information: Request for Nomenclature

**Cog Service:** USN **FSN:** 2F6625-073-2227 **Functional Class:**

| USA | USN | USAF |
|---|---|---|

**TYPE CLASS:** Used by

**MANUFACTURER'S NAME/CODE NUMBER:** Electronic Equipment Engineering Inc., (08311).

MULTIMETER AN/PSM-4D

**FUNCTIONAL DESCRIPTION:**

Multimeter AN/PSM-4D is a completely portable volt-ohm-milliammeter capable of measuring dc current. dc resistance, and ac, dc, and output voltages. The equipment includes two test probes, a telephone plug, and a high voltage probe. The test probes may be used with their prod tips, alligator clips, or with the telephone plug. The high voltage probe makes it possible to obtain indications up to 5000 v dc. This probe contains a warning light to indicate high voltages.

No field changes in effect at time of preparation (30 June 1965).

**RELATION TO OTHER EQUIPMENT:**

The AN/PSM-4D contains a printed circuit board as versus conventional wiring in the previous models. Switches have been redesigned to be compatible with the printed circuit board, and resistors which were formally mounted on the decks of the switches have been relocated.

## EQUIPNENT REQUIRED BUT NOT SUPPLIED:

(1) Battery BA-30; (1) Battery BA-26 1/U.

## TECHNICAL CHARACTERISTICS:

INPUT IMPEDANCE
- DC VOLTS: 20,000 ohms per v.
- AC VOLTS: 1,000 ohms per v.
- OUTPUT VOLTS: 1,000 ohms per v.

RANGES AND QUANTITY OF STEPS
- DIRECT CURRENT VOLTS: 0 to 5,000 v dc in 10 steps.
- ALTERNATING CURRENT VOLTS: 0 to 1,000 v ac in 9 steps.
- DIRECT CURRENT AMPERE: 0 to 10 amps dc in 9 steps.
- OHMS: 0 to 100 meg in 5 steps.

ACCURACY
- DIRECT CURRENT VOLTAGE RANGE: ± 3% on 1,000 v dc range.
- DIRECT CURRENT VOLTAGE RANGE: ± 4% on 5,000 v dc range.
- ALTERNATING CURRENT VOLTAGE RANGE: ± 5% on ac range.
- DIRECT CURRENT VOLTAGE RANGE: ± 3% on dc range.
- RESISTANCE RANGE: ± 3% measured in deg of arc rather than ohms value.

SENSITIVITY: 50 ua.

OPERATING POWER REQUIREMENTS: Internal battery 1.5 v and 22.5 v.

## MAJOR COMPONENTS

| QTY | ITEM | STOCK NUMBERS | DIMENSIONS (INCHES) | WEIGHT (LBS) |
|---|---|---|---|---|
| 1 | Multimeter AN/PSM-4D includes: | 2F6625-073-2227 | | |
| 1 | Multimeter ME-48D/U | | 2-7/8 x 5-15/16 x 7-15/32 | |
| 1 | Cover CW-328/PSM-4A | | 2-3/8 x 5-15/16 x 7-15/32 | |
| 1 | Lead Test, Red CX-2353/PSM-4A | | 48 lg | |
| 1 | Lead Test, Black CX-2354/PSM-4A | | 48 lg | |
| 1 | Lead Test, High Voltage CX-2355/PSM-4A | | 55 lg | |
| 2 | Clip, Alligator | | 3/8 x 15/16 x 2-15/16 | |
| 2 | Technical Manual NAVSHIPS 92051 | | | |
| 1 | Telephone Plug | | | |

## REFERENCE DATA AND LITERATURE:

NAVSHIPS 92051: Technical Manual for Multimeter AN/PSM-4D.

## TUBE, CRYSTAL AND/OR SEMI-CONDUCTOR DATA:

TUBES: Not available.

CRYSTALS: Not available.

SEMI-CONDUCTORS: Not available.

## SHIPPING DATA

| PKGS | VOLUME (CU FT) | WEIGHT (LBS) |
|---|---|---|

## PROCUREMENT DATA

PROCURING SERVICE: USN
SPEC &/OR DWG: MIL-M-17096A

DESIGN COG: USN, BuShips

| CONTRACTOR | LOCATION | CONTRACT OR ORDER NO. | APPROX. UNIT COST |
|---|---|---|---|
| Electronic Equipment Engineering Inc. | Dallas, Texas | NObsr-87234<br>NObsr-85575-11<br>N600-24-60639 | |

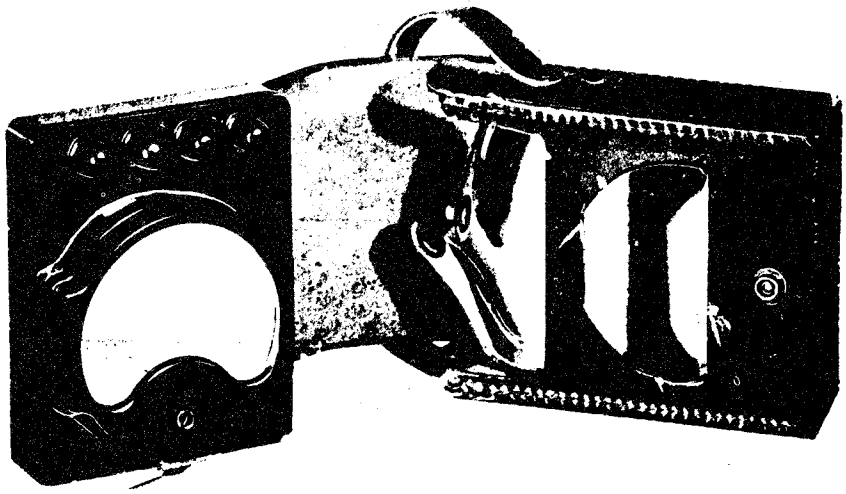
9 November 1964 VOLTMETER AN/URM-45

Cog Service: USN FSN: Functional Class:

| USA | USN | USAF |
|---|---|---|

TYPE CLASS: Used by

MANUFACTURER'S NAME/CODE NUMBER: Westinghouse Electric Mfg. Co., (65064).



VOLTMETER AN/URM-45

FUNCTIONAL DESCRIPTION:

Voltmeter AN/URM-45 is a portable, general purpose instrument used to measure dc in terms of volts and millivolts. The instrument is also adaptable for use as an ammeter by connecting standard aircraft 50-millivolt shunts across the appropriate terminals. Meter range is changed by selecting the appropriate binding post for connecting of the positive test lead. A shield protects the meter from external magnetic field.

No field changes in effect at time of preparation (3 November 1964).

RELATION TO OTHER EQUIPMENT:

**EQUIPMENT REQUIRED BUT NOT SUPPLIED:**

**TECHNICAL CHARACTERISTICS:**

VOLTAGE RANGES: 0 to 50 mv; 0 to 15 v; 0 to 30 v dc.
ACCURACY
0 TO 50 MV: ± 2%.
0 TO 15 V: ± 0.5% from 13.5 to 14.5 v; ± 1% from 12 v to full scale; ± 1.5% at all other points.
0 TO 30 V: ± 0.5% from 27 to 29 v; ± 1% from 24 v to full scale; ± 2.5% at all other points.
SENSITIVITY: 1000 ohms per v.
SCALE: 75 scale divisions, manually calibrated, black on white.

**MAJOR COMPONENTS**

| QTY | ITEM | STOCK NUMBERS | DIMENSIONS (INCHES) | WEIGHT (LBS) |
|---|---|---|---|---|
| 1 | Voltmeter AN/URM-45 includes: | | 1-3/4 x 4-1/4 x 5-1/4 | 2.5 |
| 2 | Test Lead | | | |
| 1 | Leather Carrying Case with Strap | | | |

**REFERENCE DATA AND LITERATURE:**

NAVAER 20-5A3-1: Description Data Sheet for Voltmeter AN/URM-45.

**TUBE, CRYSTAL AND/OR SEMI-CONDUCTOR DATA:**

TUBES: Not required.

CRYSTALS: Not required.

SEMI-CONDUCTORS: Not required.

**SHIPPING DATA**

| PKGS | VOLUME (CU FT) | WEIGHT (LBS) |
|---|---|---|

**PROCUREMENT DATA**

PROCURING SERVICE: USN
DESIGN COG: USN, BuWeps
SPEC &/OR DWG:

4.1 AN/URM-45: 2

| CONTRACTOR | LOCATION | CONTRACT OR ORDER NO. | APPROX. UNIT COST |
|---|---|---|---|
| Westinghouse Electric Mfg., Co.<br>Part No. PX-14 | East Pittsburgh, Penn. | | |

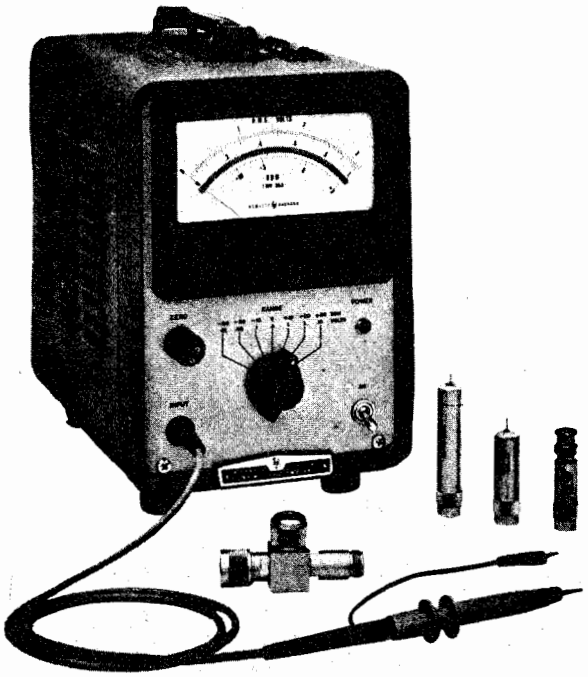
12 October 1964 RF MILLIVOLTMETER AN/URM-155

**Cog Service:** USN **FSN:** 2F6625-225-0239 **Functional Class:**

USA USN USAF

**TYPE CLASS:** Used by

**MANUFACTURER'S NAME/CODE NUMBER:** Hewlett Packard Co., (28480).



RF MILLIVOLTMETER AN/URM-155

**FUNCTIONAL DESCRIPTION:**

RF Millivoltmeter AN/URM-155 is a sensitive ac voltmeter which will measure accurately from 0.01 volt rms to 10 volts rms full scale in the frequency range of 500 kc to 1000 mc (1 gc). The 411A probe when used without accessories will respond to frequencies up to 4 gc and may be used as an indicator up to this frequency. The Model 411A is supplied with a BNC type screw on probe tip providing easy and rapid measurement at low frequencies. Other probe tips, which make possible convenient measurement at 1000 mc, are available. The Model 411A has a recorder output with an adjustable level.

No field changes in effect at time of preparation (6 October 1964).

**RELATION TO OTHER EQUIPMENT:**

This instrument is also available in a rack-mount version in addition to the cabinet model. The rack-mount version is identical electrically and similar physically except that the controls have been rearranged on the rack-mount version.

**EQUIPMENT REQUIRED BUT NOT SUPPLIED:**

**TECHNICAL CHARACTERISTICS:**

VOLTAGE RANGE: 10 mv rms full scale to 10 v rms full scale in seven ranges.
FULL SCALE READINGS: 0.01; 0.03; 0.3; 1, 3 and 10 v rms.
FREQUENCY RANGE: 500 kc to 1 gc w/accessory probe tips.
ACCURACY: 500 kc to 50 mc ± 3% of full scale; 50 mc to 150 mc ± 6% of full scale; 150 mc to 1 gc ± 1 db using appropriate probe tips.
METER SCALES: Two linear v scales; 0 to 1 and 0 to 3, calibrated in the rms value of a sine wave; db scale, calibrated from + 3 to − 12 db; 0 db = 1 mw in 50 ohms.
PROBE TIP FURNISHED: 411A-21E BNC open circuit probe tip 500 kc to 500 mc.
SHUNT CAPACITY: Less than 4 pf.
MAXIMUM INPUT: 200 v dc.
INPUT RESISTANCE: At 10 mc; typically 80 K ohms.
INPUT RESISTANCE
DEPENDS ON PROBE TIP: Freq and input v typically 200 K ohms at 1 mc and 1 v rms.
ACCESSORIES AVAILABLE
PROBE TIP: 411A-21B pen type probe tip 500 kc to 50 mc.
SHUNT CAPACITY: Less than 4 pf.
MAXIMUM INPUT: 200 v dc.
INPUT RESISTANCE: At 10 mc; typically 80 K ohms.
PROBE TIP: 411A-21C VHF, 500 kc to 250 mc.
SHUNT CAPACITY: Less than 2-1/2 pf.
MAXIMUM INPUT: 200 v dc.
INPUT RESISTANCE: At 10 mc; typically 80 K ohms.
PROBE TIP: 411A-31D Type N "Tee" 1 mc to 1 gc.
SWR: Is less than 1.15 when terminated in 50 ohms; max input 10 v dc.
CAPACITY DIVIDER PROBE TIP: 500 kc to 250 mc.
DIVISION ACCURACY: ± 1%.
SHUNT CAPACITY: 2 pf.
MAXIMUM INPUT: 1000 v peak (dc + peak ac).
PROBE KIT: 411A-21G
ACCESSORY PROBE KIT: This kit includes the 411A-21B; 411A-21C; 411A-21D; 411A-21F probe tips and a 411A-21A-3 replacement diode cartridge.
TERMINATION: Model 908A 50 ohm termination type N male; swr less than 1.05 from dc to 4000 mc.
GALVANOMETER RECORDER OUTPUT:
PROPORTIONAL TO METER DEFLECTION: 1 ma into 1000 ohms at full scale deflection.
POWER REQUIREMENTS: 115 or 230 v ± 10%, 50 to 60 cps, 35 W.

## MAJOR COMPONENTS

| QTY | ITEM | STOCK NUMBERS | DIMENSIONS (INCHES) | WEIGHT (LBS) |
|---|---|---|---|---|
| 1 | RF Millivoltmeter AN/URM-155 | 2F6625-225-0239 | 7-1/2 x 11-3/4 x 12 | 18 |

**REFERENCE DATA AND LITERATURE:**

NAVSHIPS 94859: Operating and Service Manual for 411A RF Millivoltmeter AN/URM-155.

**TUBE, CRYSTAL AND/OR SEMI-CONDUCTOR DATA:**

TUBES: (1) 6CB6A (1) 6X4 (1) 12AX7 (1) 6AU8 (2) OB2

CRYSTALS: Not required.

SEMI-CONDUCTORS: (1) CAQI-G-29G-79 (1) CC-COD1-159 (6) 1N90 (2) CAQI-411A-21A-3 (2) 2N404

## SHIPPING DATA

| PKGS | VOLUME (CU FT) | WEIGHT (LBS) |
|---|---|---|
| 1 | 0.8 | 28 |

## PROCUREMENT DATA

PROCURING SERVICE: USN DESIGN COG: USN, BuShips
SPEC &/OR DWG:

| CONTRACTOR | LOCATION | CONTRACT OR ORDER NO. | APPROX. UNIT COST |
|---|---|---|---|
| Hewlett Packard Co. | Palo Alto, Calif. | N600-24-61189 | |

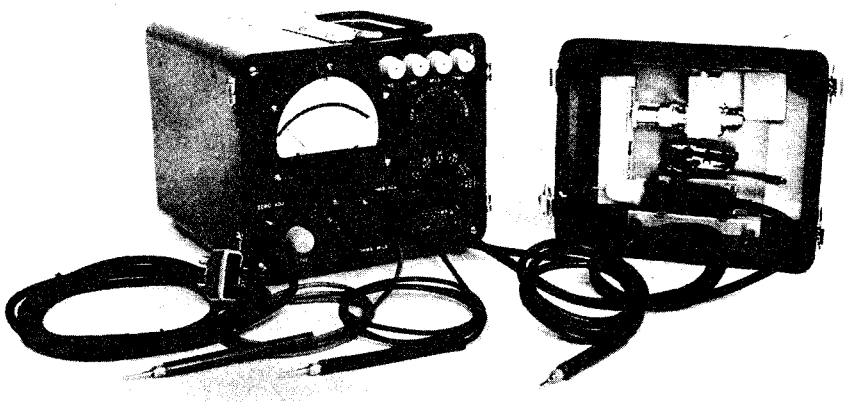
2 August 1965 ELECTRONIC MULTIMETER AN/USM-116C

Cog Service: USN FSN: Functional Class:

USA USN USAF

**TYPE CLASS:** Used by

**MANUFACTURER'S NAME/CODE NUMBER:** Raypar Incorporated, (11936).



ELECTRONIC MULTIMETER AN/USM-116C

**FUNCTIONAL DESCRIPTION:**

Electronic Multimeter, AN/USM-116C is a portable combination electronic instrument used for general servicing of electronic equipment. It is designed for use where precise voltage, current, and resistance measurements are required. It provides a direct reading of values on a single indicating meter mounted on the front panel.

No field changes in effect at time of preparation (18 June 1965).

**RELATION TO OTHER EQUIPMENT:** None.

**EQUIPMENT REQUIRED BUT NOT SUPPLIED:** None.

16

## TECHNICAL CHARACTERISTICS:

FREQUENCY RANGE: 20 cps to 700 mc.
ACCURACY
- DC VOLTAGE: ± 2% of full scale.
- AC VOLTAGE: ± 2% of full scale (to 300 v).
- DC CURRENT: ± 2% of full scale.
- RESISTANCE: ± 3%.

DC INPUT IMPEDANCE: 100 megohms.
FREQUENCY RESPONSE
- 50 CPS TO 100 MC: Flat within ± 2%.
- 20 CPS TO 100 MC: Flat within ± 1 db (using ac probe alone).,
- 100 MC TO 700 MC: Flat within ± 1 db (using ac probe w/coaxial tee connector).

RANGES
- AC VOLTS: 0 to 1, 3, 10, 30, 100, 300.
- DC VOLTS: 0 to 1, 3, 10, 30, 100, 300, 1000.
- DC MILLIAMPS: 0 to 1, 3, 10, 30, 100, 300, 1000.
- RESISTANCE: X1, X10, X100, X1K, X10K, X100K, X1M.

POWER REQUIREMENTS: 115 v ± 10%, 50, 60, or 400 cps, 1 ph, 40 W.

17

## MAJOR COMPONENTS

| QTY | ITEM | STOCK NUMBERS | DIMENSIONS (INCHES) | WEIGHT (LBS) |
|---|---|---|---|---|
| 1 | Electronic Multimeter AN/USM-116C includes: | | 6-7/8 x 9-3/16 x 12-3/4 | 17.0 |
| 1 | Adapter, Tee Connector | | 1 x 2 x 2-1/2 | 0.75 |
| 1 | Ground Lead | | 3/8 dia x 4-1/4 | 0.05 |
| 1 | Clip, Alligator w/Coupling | | 1/2 dia x 2-1/4 | 0.1 |
| 1 | Coaxial Termination Plug | | 7/8 dia x 1-1/2 | 0.25 |

## REFERENCE DATA AND LITERATURE:

None Available.

## TUBE, CRYSTAL AND/OR SEMI-CONDUCTOR DATA:

TUBES: (1) 6923/EA52 (3) 6AU6WA (1) 6X4WA

CRYSTALS: Not required.

SEMI-CONDUCTORS: (1) 2N297A

## SHIPPING DATA

| PKGS | VOLUME (CU FT) | WEIGHT (LBS) |
|---|---|---|
| 1 | 0.435 | 30 |

## PROCUREMENT DATA

PROCURING SERVICE: USN
SPEC &/OR DWG:

DESIGN COG: USN, BuShips

| CONTRACTOR | LOCATION | CONTRACT OR ORDER NO. | APPROX. UNIT COST |
|---|---|---|---|
| Raypar Incorporated | Chicago, Illinois | N600(24-126)62533 | |

18

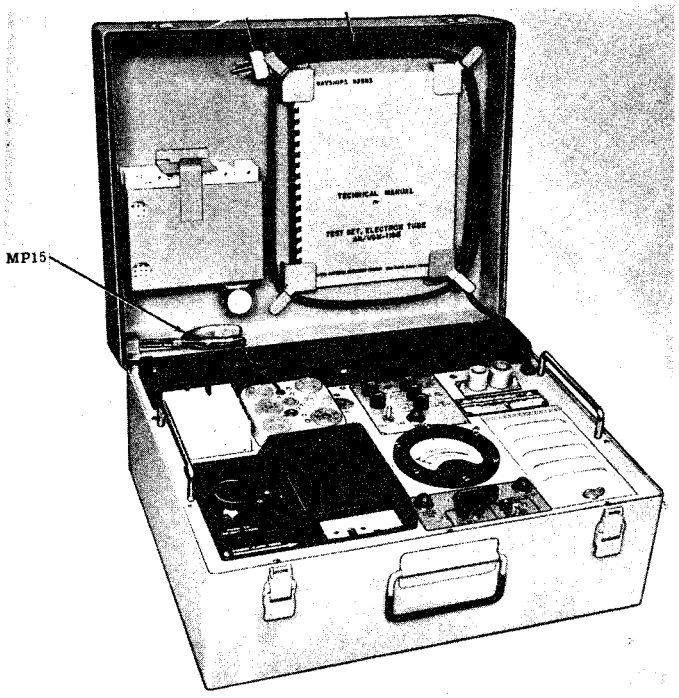
2 August 1965 TEST SET, ELECTRON TUBE AN/USM-118B

**Cog Service: USN** **FSN:** 2F6625-691-2576 **Functional Class:**

| USA | USN | USAF |
|---|---|---|

**TYPE CLASS:** Used by

**MANUFACTURER'S NAME/CODE NUMBER:** Hickok Electrical Instrument Co., (28569).




TEST SET, ELECTRON TUBE AN/USM-1188

**FUNCTIONAL DESCRIPTION:**

Test Set, Electron Tube, AN/USM-1188 provides a rapid yet highly accurate means of evaluating the operational capabilities of electron tubes. Test circuits for tube types are automatically selected by the insertion of punched plastic tube test data cards into the card switch. This automatic feature eliminates the possibilities for human error that is always present in testers which require manual operation of several circuit-selector switches and secondary controls. The design of the card switch and its associated circuits provide an extremely wide range of test voltages and test circuitry. This permits establishing test conditions which simulate actual operational conditions more closely than is possible in tube testers of conventional design.

No field changes in effect at time of preparation (18 June 1965).

**RELATION TO OTHER EQUIPMENT:**

The AN/USM-1188 is the same as the AN/USM-118A except that: (a) An electronic solid state

overload protection circuit is employed in place of earlier circuits which depend upon overload contacts in the meter; (b) The conventional jewel and pivot type meter has been replaced with a taut band type for greater reliability; (c) Many commercial type component have been replaced with military types.

**EQUIPMENT REQUIRED BUT NOT SUPPLIED:** None.

**TECHNICAL CHARACTERISTICS:**

SOCKETS PROVIDED: 4, 5, 6, 7, 9 pin jumbo octal, and loctal; 7 and 9 pin miniature; 7 pin in line and octal subminiature.
SCALE DATA
NUMERICAL SCALE: 0 to 100 direct reading.
SCALE 1: Leakage, marked in green and red areas Good-Replace.
SCALE 2: Quality, marked in green and red areas Good-Replace.
SCALE 3: Gas, marked in green and red areas Good-Replace.
FILAMENT VOLTAGES: 1199 filament voltages, from 0 to 119.9 v in 0.1 v steps.
DC FILAMENT RANGE: Up to 50 v, 0.1 v steps.
FIXED BIAS VOLTAGES: 0 to 100 v, 0.1 v steps.
SELF-BIAS RESISTANCE: 10 to 71,000 ohms, 10 ohms per step.
MICROMHO RANGES (GM SENSITIVITIES)
RANGE 1: 250 to 13,000 micromhos, 50 micromhos per step.
RANGE 2: 250 to 64,000 micromhos, 250 micromhos per step.
SIGNAL VOLTAGE: 222 mv, regulated.
LEAKAGE SENSITIVITY: Rejects values from 10 to 150 ua dependant on tube type.
CURRENT RANGE
RANGE 1: 50 to 2,600 ua, 10 ua per step.
RANGE 2: 50 ua to 12.8 ma, 50 ua per step.
RANGE 3: 1 to 255 ma, 1 ma per step.
SHORTS BETWEEN TUBE ELEMENTS: 1 megohm sensitivity; special high sensitivity for grid to cathode is 10 megohms.
VOLTAGE REGULATOR TESTS
METER RANGE: 5 to 300 v, 1 v per step (half scale value)
LOAD RESISTANCE: 10 to 71,000 ohms, 10 ohms per step.
RATED LOAD ON RECTIFIER TUBES: Up to 200 ma.
POWER REQUIREMENTS: 105 to 125 v, 50 to 400 cps, 1 ph, 55 W.

**MAJOR COMPONENTS**

| QTY | ITEM | STOCK NUMBERS | DIMENSIONS (INCHES) | WEIGHT (LBS) |
|---|---|---|---|---|
| 1 | Test Set, Electron Tube AN/USM-118B includes: | 2F6625-691-2576 | 9 x 16 x 19-1/2 | 50 |
| 1 | Test Set, Electron Tube TS-1479A/USM-118A | | | |
| 1 | Calibration Cell MX-4712/USM-118 | | | |
| 1 | Card Kit, Tube Test Programming MK-704/USM-118 | | | |

## TEST SET, ELECTRON TUBE AN/USM-118B

| QTY | ITEM | STOCK NUMBERS | DIMENSIONS (INCHES) | WEIGHT (LBS) |
|---|---|---|---|---|
| 2 | Technical Manuals NAVSHIPS 93883 | | | |
| 50 | Blank Tube Test Cards | | | |
| 1 | Special Hand Punch | | | |

**REFERENCE DATA AND LITERATURE:**

NAVSHIPS 93883: Technical Manual for Electron Tube Test Set AN/USM-118A and AN/USM-118B.

**TUBE, CRYSTAL AND/OR SEMI-CONDUCTOR DATA:**

TUBES: (1) 0A2WA (1) 5U4GB (1) 6AU8 (1) 6AW8A (1) 6C4WA (1) 6CD6GA (1) 6CL6 (1) 6203

CRYSTALS: None required.

SEMI-CONDUCTORS: (2) 1N4249 (12) 1N538 (2) 1N483B (4) 1N276 (1) 1N753 (1) CHK3870-123

**SHIPPING DATA**

| PKGS | VOLUME (CU FT) | WEIGHT (LBS) |
|---|---|---|

**PROCUREMENT DATA**

PROCURING SERVICE: USN DESIGN COG: USN, BuShips
SPEC &/OR DWG:

| CONTRACTOR | LOCATION | CONTRACT OR ORDER NO. | APPROX. UNIT COST |
|---|---|---|---|
| Hickok Electrical Instrument Co. Pt No. 501-265 | Cleveland, Ohio | NObsr-89502 | |

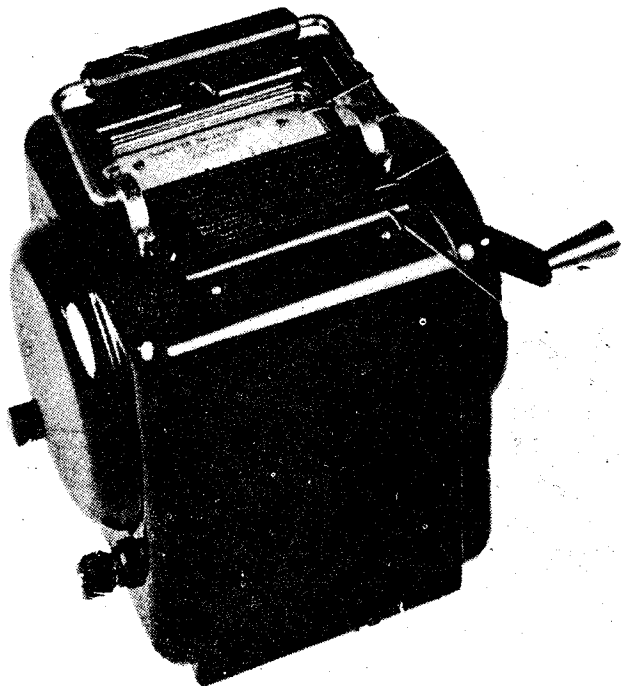
6 November 1964
**Cog Service:** USN **FSN:**

**TEST SET INSULATION RESISTANCE AN/USM-178**
**Functional Class:**

| USA | USN | USAF |
|---|---|---|

**TYPE CLASS:** Used by

**MANUFACTURER'S NAME/CODE NUMBER:** Winslow Electronics Inc., (66150).



TEST SET INSULATION RESISTANCE AN/USM-178

**FUNCTIONAL DESCRIPTION:**

Test Set Insulation Resistance AN/USM-178 is a portable, self powered resistance measuring instrument. It consists of a specially designed ohmmeter movement, a resistance net work and a hand operated direct current generator all mounted in a common case. The ohmmeter has a range form zero to 100 megohms and in addition a scale marking for infinite resistance. The generator delivers a potential of 500 volts at the test terminals. Ohmmeter type ZM-45/USM-178 is designed to be used for checking insulation resistance of cables; between conductors of multiple cables; between windings, and windings to frame in rotating equipment; and for other equipment where insulation resistance is an important factor. This instrument must not be used on equipment whose insulation cannot withstand a potential of 500 volts.

No field changes in effect at time of preparation (30 october 1964).

**RELATION TO OTHER EQUIPMENT:**

## AN/USM-178 TEST SET INSULATION RESISTANCE

**EQUIPMENT REQUIRED BUT NOT SUPPLIED:**

**TECHNICAL CHARACTERISTICS:**

RANGE: 0 to 100 megohms.
ACCURACY: ± 1% of any cardinal calibration point.
TEST POTENTIAL: 500 v dc + 10% (when measuring value below 2 megohms, the voltage drops materially).

**MAJOR COMPONENTS**

| QTY | ITEM | STOCK NUMBERS | DIMENSIONS (INCHES) | WEIGHT (LBS) |
|---|---|---|---|---|
| 1 | Test Set, Insulation Resistance AN/USM-178 includes: | | 11-1/4 x 13 x 13-3/4 | |
| 1 | Ohmmeter ZM-45/USM-178 | | 6 x 7-1/4 x 7-1/2 | 10.7 |
| 1 | Carrying Case CY-4009/USM-178 | | 6-1/2 x 8-1/4 x 9-3/4 | 2.7 |
| 2 | Test Leads | | 120 | 0.6 |

**REFERENCE DATA AND LITERATURE:**

NAVSHIPS 94527: Technical Manual for Insulation Resistance Test Set, AN/USM-178.

**TUBE, CRYSTAL AND/OR SEMI-CONDUCTOR DATA:**

TUBES: Not required.

CRYSTALS: Not required.

SEMI-CONDUCTORS: Not required.

**SHIPPING DATA**

| PKGS | VOLUME (CU FT) | WEIGHT (LBS) |
|---|---|---|
| 1 | 1.2 | 21 |

**PROCUREMENT DATA**

PROCURING SERVICE: USN
DESIGN COG: USN, BuShips
SPEC &/OR DWG: MIL-O-16485B

| CONTRACTOR | LOCATION | CONTRACT OR ORDER NO. | APPROX. UNIT COST |
|---|---|---|---|
| Winslow Electronics Inc. | Asbury Park, N. J. | N216-00420A<br>N216-00518A | |

4.1 AN/USM-178: 2

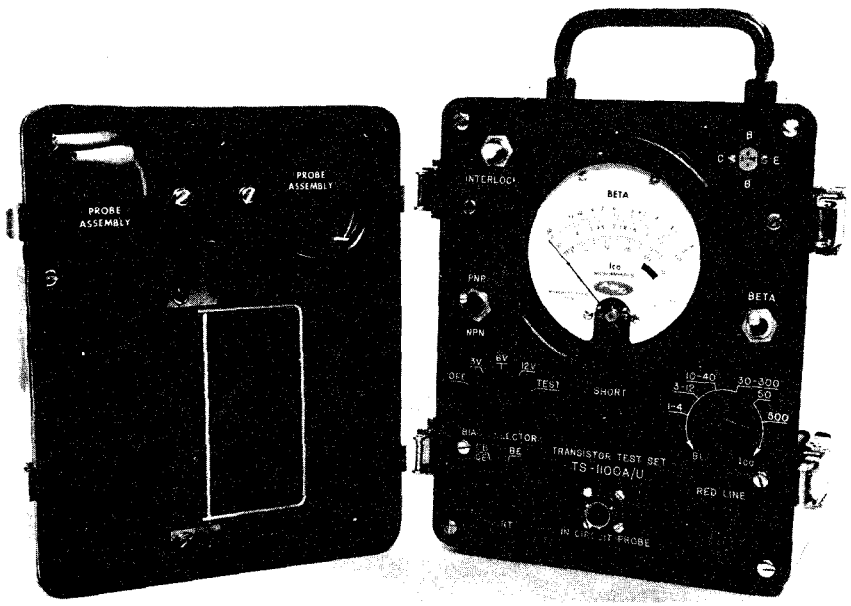
12 August 1965 TEST SET, TRANSISTOR TS-1100A/U

**Cog Service:** USN **FSN:** 2F6625-987-6621 **Functional Class:**

| USA | USN | USAF |
|---|---|---|

**TYPE CLASS:** Used by

**MANUFACTURER'S NAME/CODE NUMBER:** American Electronic Laboratories Inc., (93346).




TEST SET, TRANSISTOR TS-1100A/U

**FUNCTIONAL DESCRIPTION:**

Test Set, Transistor TS-1100A/U is a portable, battery-operated instrument which can be used for the measurement of transistor beta and leakage current and for the detection of short circuits across transistor junctions. Beta tests can be made with the transistor either connected into, or removed from, a circuit. Leakage current tests must be made with the transistor removed from the circuit.

Two special test cable assemblies are provided for connection to the transistor under test. One of these test cable assemblies is fitted with small spring clips for connecting to in-circuit transistors. The other test cable assembly is fitted with miniature alligator clips and can be used to connect to out-of-circuit transistors if desired. When transistors are removed from the circuit they may also be tested by inserting them in the front-panel test socket of the TS-1100A/U.

No field changes in effect at time of preparation (24 June 1965).

**RELATION TO OTHER EQUIPMENT:** None.

**EQUIPMENT REQUIRED BUT NOT SUPPLIED:**

(1) Oscilloscope AN/USM-117 or equivalent; (1) Multimeter AN/PSM-4( )/U or equivalent.

**TECHNICAL CHARACTERISTICS:**

TEST RANGES
BETA: 1 to 4, 3 to 12, 10 to 40 and 30 to 300. (On the 30 to 300 scale, an approximation of beta must be made between the valves of 120 and 300).
ICO: 0 to 50 ua, 0 to 500 ua.
OPERATING TEMPERATURE: 0° C to 50° C (32° F to 122° F).
POWER REQUIREMENTS: Two separate 12 v batteries.
ESTIMATED BATTERY LIFE
ZINC-CARBON BATTERIES: 75 hr.
MERCURY BATTERIES: 750 hr.
ALKALINE MANGANESE BATTERIES: 650 hr.

**MAJOR COMPONENTS**

| QTY | ITEM | STOCK NUMBERS | DIMENSIONS (INCHES) | WEIGHT (LBS) |
|---|---|---|---|---|
| 1 | Test Set, Transistor, TS-1100A/U includes: | 2F6625-987-6621 | 6-1/2 x 6-7/8 x 9-1/4 | 10.25 |
| 1 | In-Circuit Test Cable Assembly, W1 | | 25 lg | |
| 1 | Supplementary Test Cable Assembly, W2 | | 25 lg | |
| 1 | Condensed Operating Instructions Booklet for Test Set, Transistor, TS-1100A/U | | 1/2 x 2-7/8 x 3-3/4 | 0.2 |
| 2 | Technical Manuals for Test Set, Transistor, TS-1100A/U | | 1/2 x 9 x 11 | 1.0 |

**REFERENCE DATA AND LITERATURE:**

Preliminary Technical Manual for Test Set, Transistor TS-1100A/U.

**TUBE, CRYSTAL AND/OR SEMI-CONDUCTOR DATA:**

TUBES: Not required.

CRYSTALS: Not required.

SEMI-CONDUCTORS: (1) 1N270 (4) 2N404 (3) 2N467

**SHIPPING DATA**

| PKGS | VOLUME (CU FT) | WEIGHT (LBS) |
|---|---|---|

## PROCUREMENT DATA

PROCURING SERVICE: USN
SPEC &/OR DWG:

DESIGN COG: USN, BuShips

| CONTRACTOR | LOCATION | CONTRACT OR ORDER NO. | APPROX. UNIT COST |
|---|---|---|---|
| American Electronic Laboratories Inc. Pt No. 4250704-501 | Colmar, Pa. | NObsr 87673 (FBM) | |

3 August 1965

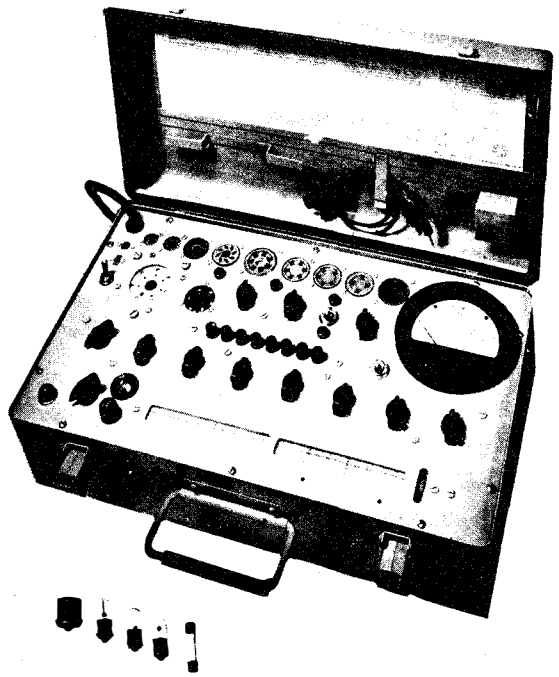
TEST SET, ELECTRON TUBE TV-10D/U

**Cog Service: USN** **FSN:** 2F6625-815-4855 **Functional Class:**

| USA | USN | USAF |
|---|---|---|

**TYPE CLASS:** Used by

**MANUFACTURER'S NAME/CODE NUMBER:** Western Reserve Electronics Inc., (13913).



TEST SET, ELECTRON TUBE TV-10D/U

**FUNCTIONAL DESCRIPTION:**

Test Set, Electron Tube TV-10D/U is a general purpose, manually operated type tube tester intended to test electron tubes of the receiving and low-power transmitting types. The basic test for amplifier tubes is dynamic mutual conductance. Emission tests are provided for rectifier tubes and diodes. the test set also provides for shorts tests, gas tests for amplifier tubes, operational tests for electronic indicator tubes and ballast tube tests.

No field changes in effect at time of preparation (21 June 1965).

**RELATION TO OTHER EQUIPMENT:**

The TV-10D/U is similar to the other models in the TV-10 series of equipments. The TV-10D/U incorporates permanent test sockets for the "Soptar type" and 2C39 "Lighthouse type" tubes in place of the separate adapters previously furnished.

**EQUIPMENT REQUIRED BUT NOT SUPPLIED:** None.

## TECHNICAL CHARACTERISTICS:

TUBE TYPES TESTED: Receiving and low power transmitting tubes with 4, 5, 6, 7 pin, octal, loctal, noval, miniature, acorn, subminiature, septar, and "lighthouse" bases.
METER RANGES: 0 to 3000, 6000, 15000 and 30000 micromhos.
METER ACCURACY: ± 10%.
CONTROLS
- LINE ADJUST: Controls the input v to the power transformer for proper standardization of the tube test circuits.
- ROLL CHART: Appropriate column headings on the panel above the index provides easy reference to tube test data printed on the roll chart.
- FILAMENT VOLTAGE SWITCH: Selects filament or heater v from 0.6 v thru 117 v ac in 18 steps. Another position provides for testing ballast tube.
- SELECTORS: Filament S107, Filament S106, Grid S105, Plate S104, Screen S103, Cathode S102 and Suppressor S101 provide proper switching of the internal circuits to apply correct test v to the various pins of the tube under test.
- BIAS CONTROL: Adjusts the bias v applied to tube under test to the proper value.
- SHUNT CONTROL: Adjusts the sensitivity of the meter circuit to the proper level for testing rectifier and diode type tubes.
- SHORT-MICROMHOS SWITCH: Selects the proper range of mutual conductance in micromhos for the tube under test as indicated on the roll chart. This switch also has 5 short test positions which connect the various elements of the tube under test to the short-test circuit containing the neon indicator lamp.

POWER REQUIREMENTS: 115 v, 50 to 400 cps, 1 ph, 75 W at 60 cps.

## MAJOR COMPONENTS

| QTY | ITEM | STOCK NUMBERS | DIMENSIONS (INCHES) | WEIGHT (LBS) |
|---|---|---|---|---|
| 1 | Test Set, Electron Tube TV-10D/U includes: | 2F6625-815-4855 | 7 x 10-3/8 x 18-3/8 | 23 |
| 1 | Lead (Plate Connector)W-102 | | | |
| 1 | Lead (Grid Connector)W-103 | | | |
| 2 | Technical Manuals NAVSHIPS 93069 w/change 1 | | | |

## REFERENCE DATA AND LITERATURE:

NAVSHIPS 93069: Technical Manual for Electron Tube Test Set TV-10A/U and TV-10D/U.

## TUBE, CRYSTAL AND/OR SEMI-CONDUCTOR DATA:

TUBES: (1) 5Y3WGTA (1) 83

CRYSTALS: None required.

SEMI-CONDUCTORS: None required.

## SHIPPING DATA

| PKGS | VOLUME (CU FT) | WEIGHT (LBS) |
|---|---|---|
| 1 | 2.1 | 35 |

## PROCUREMENT DATA

PROCURING SERVICE: USN
DESIGN COG: USN, BuShips
SPEC &/OR DWG:

| CONTRACTOR | LOCATION | CONTRACT OR ORDER NO. | APPROX. UNIT COST |
|---|---|---|---|
| Western Reserve Electronics Inc. | Cleveland, Ohio | NObsr 85308 | |