

NAVSHIPS 94200.4 Directory of Electronics
Test Equipment
Section 4.3 - Waveform Measuring Equipment

10 January 1962

Cog Service:

FSN: 6625-893-4913

RADIO TEST SET AN/GRM-33A

Functional Class:

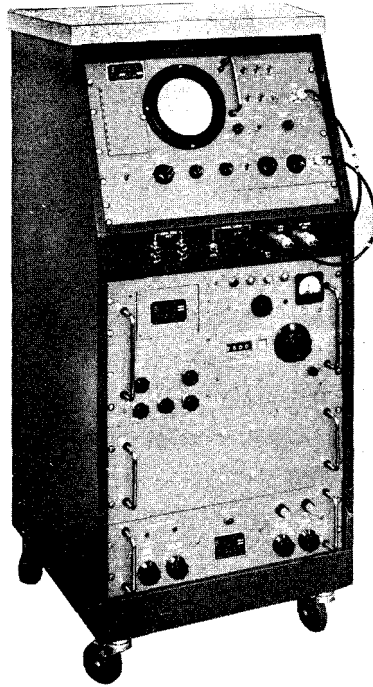
USA

USN

USAF

TYPE CLASS:

MANUFACTURER'S NAME/CODE NUMBER: The Technical Materiel Corp.



Radio Test Set AN/GRM-33A

FUNCTIONAL DESCRIPTION:

Radio Test Set AN/GRM-33A is designed for the specific purpose of tuning and aligning single sideband exciters and transmitters permitting a visual analysis of intermodulation distortion products, hum and noise.

No field changes in effect at time of preparation (12 July 1961).

TECHNICAL CHARACTERISTICS:

SWEEP WIDTHS

FIXED: 150, 500 cps, 2 kc, 10 kc, 30 kc.

CONTINUOUSLY VARIABLE: 0 to 100 kc, 0 to 2 kc.

INPUT CENTER FREQUENCY: 500 kc.

BANDPASS REGION: 450 to 500 kc.

IMAGE REJECTION: Better than 130:1 at input center frequency.

AN/GRM-33A RADIO TEST SET

INPUT IMPEDANCE: 50 ohms at each of the two terminals.

INPUT ATTENUATOR: 0 to 65 db attenuation of the input signal in 5 db steps. Accuracy form 2% of 30 mc.

AMPLITUDE SCALES: Linear and 2 decade log selectable by front panel switch. A front panel 20 db I.F. attenuation may be used to extend calibrated range to 60 db.

FREQUENCY RANGE: 2 to 64 mc, continuous tuning.

AF TEST TONES: 935 cps; 2805 cps.

RF TEST TONES: 1999 kc, 2001 kc crystal controlled.

HARMONIC DISTORTION

AF: More than 65 db down.

RF: More than 60 db down.

AF OUTPUT IMPEDANCE: 600 ohms unbalanced.

AF OUTPUT LEVEL: 0 to 0.5 v continuously variable.

POWER REQUIREMENTS: 115/230 v, 50 to 60 cyc, single ph, 315 W.

RELATION TO OTHER EQUIPMENT: None.

EQUIPMENT REQUIRED BUT NOT SUPPLIED: None.

MAJOR COMPONENTS

QTY	ITEM	STOCK NUMBERS	DIMENSIONS (INCHES)	WEIGHT (LBS)
1	Radio Test Set AN/GRM-33A includes:		23-1/2 x 24 x 51	
1	Electrical Equipment Cabinet CY-2805A/GRM-3			
1	Spectrum Analyzer Group AN/URM-116 consists of:			
1	Spectrum Analyzer TS-1236/URM-116		10-1/2 x 16 x 19	
1	Power Supply PP-2206/URM-116		8-3/4 x 16-1/4 x 19	
1	Oscillator, R.F. O-330B/FR		10-1/2 x 16 x 19	67
1	Signal Generator O-579/URT		6-31/32 x 10 x 19	

REFERENCE DATA AND LITERATURE:

Technical Manual for Radio Test Set AN/GRM-33A.

TUBE, CRYSTAL AND/OR SEMI-CONDUCTOR DATA:

TUBES: Data not available.

CRYSTALS: Data not available.

SEMI-CONDUCTORS: Data not available.

RADIO TEST SET AN/GRM-33A

SHIPPING DATA

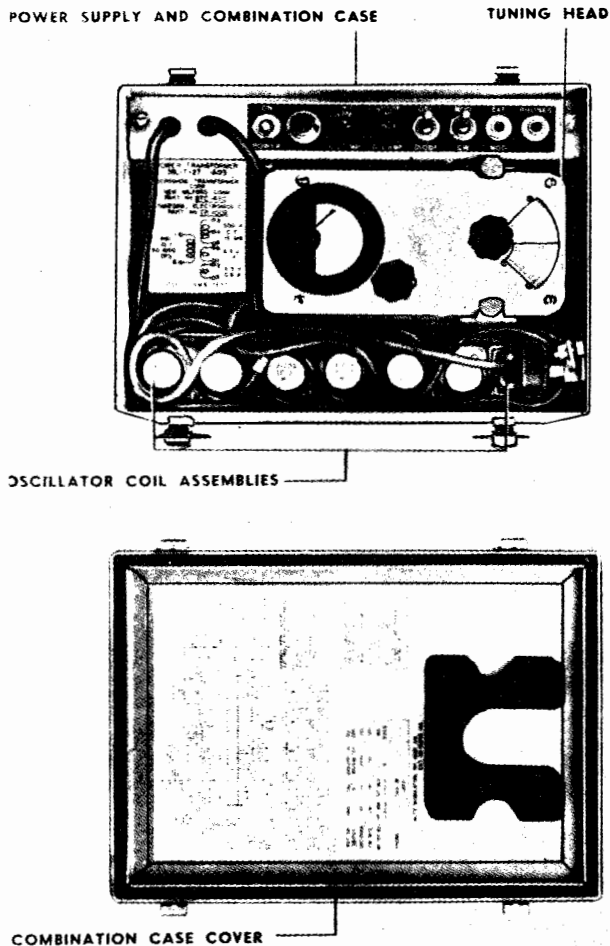
PKGS	VOLUME (CU FT)	WEIGHT (LBS)
1		500

PROCUREMENT DATA

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

CONTRACTOR	LOCATION	CONTRACT OR ORDER NO.	APPROX. UNIT COST
The Technical Materiel Corp. Model no. PTE-3	Mamaroneck, N. Y.	N0bsr-81599	\$3,833.00

March 1957

TEST OSCILLATOR SET**AN/PRM-10***Test Oscillator Set AN/PRM-10***FUNCTIONAL DESCRIPTION**

The AN/PRM-10 is a portable test equipment designed primarily to provide means for rapidly determining resonant frequencies of tuned circuits, or the frequency of radio signals. It may also be used as a variable frequency oscillator. This provides a choice of modulated or unmodulated signals for testing, aligning and calibrating radio receivers and similar equipment.

The test oscillator set may be regarded as a miniature radio receiver or transmitter. It is placed close to the equipment or circuit to be tested or calibrated. The word "coupling" is used to denote this action. The particular plug-in oscillator coil assembly plugged into the tuning head acts

as the receiving or transmitting antenna. Results are observed on the meter in the tuning head or heard in headphones. The "TUNING" dial scale provides definite frequency readings.

No field changes in effect at time of preparation (6 September 1956).

ELECTRICAL AND MECHANICAL CHARACTERISTICS

FREQUENCY RANGE: 2 to 400 mc in 7 ranges.
RANGE SELECTION: Provided by plug-in type oscillator coil assemblies.
RANGES: 2 to 5 mc, 5 to 10 mc, 10 to 22 mc, 22 to 45 mc, 45 to 100 mc, 100 to 250 mc and 250 to 400 mc.
RANGE OVERLAP: +10%.
TYPE OF SIGNAL: CW or MCW.
MODULATION FREQUENCY: 1000 cps.
DEGREE OF MODULATION: Approx 30%
POWER SOURCE: 105 to 125 v, 50 to 1000 cps, single ph, 20 W.

MANUFACTURER'S OR CONTRACTOR'S DATA

Stamford Electronics Co., Stamford, Connecticut.
 Contract AF28(099)-191.
 Approximate Cost: \$200.00 with equipment spares.

TUBE AND/OR CRYSTAL COMPLEMENT

(1) 0A2 (1) 6AV6 (1) 6X4W
 (1) 955 (1) 6005

Total Tubes: (5)

REFERENCE DATA AND LITERATURE

AN 16-30 PRM10-1 thru 4: Technical Manuals for Test Oscillator Set AN/PRM-10.

TYPE CLASSIFICATION
 DESIGN COGNIZANCE BUAER
 PROCUREMENT COGNIZANCE
 STOCK NO.
 R.D.B. IDENT. NO.

EQUIPMENT SUPPLIED DATA

QUANTITY PER EQUIPT	NAME AND NOMENCLATURE	OVERALL DIMENSIONS (inches)	WEIGHT (lbs.)
1	Test Oscillator Set AN/PRM-10 Consisting of:	4-7/8 X 9-1/4 X 11	13.44
1	Tuning Head		
1	Power Supply including (1) Combination Case		
1	Oscillator Coil Assy (2-5 mc)		
1	Oscillator Coil Assy (5-10 mc)		
1	Oscillator Coil Assy (10-22 mc)		
1	Oscillator Coil Assy (22-45 mc)		
1	Oscillator Coil Assy (45-100 mc)		
1	Oscillator Coil Assy (100-250 mc)		
1	Oscillator Coil Assy (250-400 mc)		

SPECTRUM ANALYZER SET**AN/UPM-17****FUNCTIONAL DESCRIPTION**

The AN/UPM-17 is a portable spectrum analyzer designed to display on a 5 inch cathode-ray tube the power distribution of radio frequency signals as a function of frequency. It is intended for use as a field or depot test equipment of various radar sets.

No field changes in effect at time of preparation (8 August 1957).

ELECTRICAL AND MECHANICAL CHARACTERISTICS

FREQUENCY RANGE: 10 to 16000 mc.
 FREQUENCY BANDS: 8.
 TYPE SIGNALS: CW, AM, FM, pulse, noise.
 PRESENTATION: 5 in. CR tube.
 INPUT IMPEDANCE: 50 ohms.
 POWER REQUIREMENTS: 115 v \pm 10%, 50 to 1000 cps, single ph, 300 W.

MANUFACTURER'S OR CONTRACTOR'S DATA

Lavoie Laboratories, Inc, Morgansville,
 N.J.

Contract AF33(604)-7606.

Approximate Cost: \$5296.00 with e-
 quipment spares.

TUBE AND/OR CRYSTAL COMPLEMENT

No Electron Tubes.

REFERENCE DATA AND LITERATURE

Nomenclature Card for Spectrum Analyzer Set
 AN/UPM-17.

TYPE CLASSIFICATION	
DESIGN COGNIZANCE	USAF
PROCUREMENT COGNIZANCE	MIL-S-4469 (USAF)
STOCK NO.	
R.D.B. IDENT. NO.	3.4.1

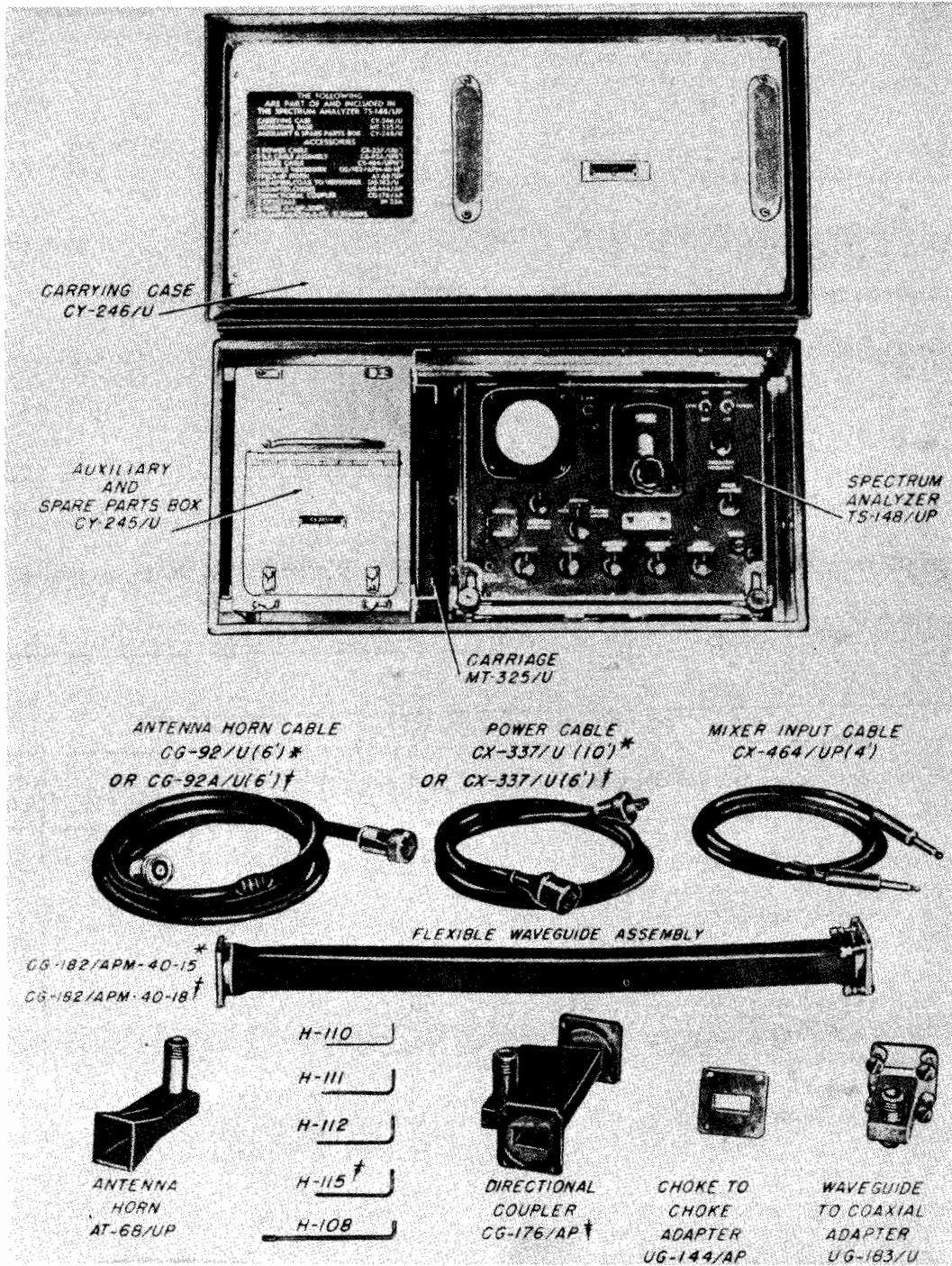
EQUIPMENT SUPPLIED DATA

QUANTITY PER EQUIPT	NAME AND NOMENCLATURE	OVERALL DIMENSIONS (inches)	WEIGHT (lbs.)
1	Spectrum Analyzer Set AN/UPM-17 consisting of: Pulse Analyzer Indicator IP-130/UPM-17 RF Tuner TN-188/UPM Variable Attenuator CN-211/U Variable Attenuator CN-319/UPM-17 Case CY-903/UPM-17 Cord CX-1059/U Cord CG-92E/U Cord CG-409E/U Cable Assembly CX-3163/U	22 x 23 x 30 120 lg 72 lg 72 lg 54 lg	300

Apr 11 1958

RADAR TEST SET

AN/UPM-33



Radar Test Set AN/UPM-33

Test-Wave Form Measuring

AN/UPM-33**RADAR TEST SET**

April 1958

FUNCTIONAL DESCRIPTION

The AN/UPM-33 is designed for use with radar and beacon equipment operating within the frequency range of 8470 to 9630 megacycles per second.

The AN/UPM-33 is the over-all nomenclature for the TS-148/UP spectrum analyzer.

The set provides a visual indication of the spectra of radio frequency oscillators. It incorporates a frequency meter which permits it to be used as a frequency measuring device.

This equipment can also be used as a frequency-modulated oscillator to tune TR Boxes and R-T Boxes in transmitter-converters. It can also be used to check magnetron pulling and audio frequency circuits.

No field changes in effect at time of preparation (5 March 1958).

RELATION TO OTHER EQUIPMENT

Equipment Required but not Supplied: The Directional Coupler CG-176/AP was not supplied in the first procurement, Contract NObsr-59108. Those equipments which were not supplied with the directional coupler require it only when extremely stable coupling is necessary.

ELECTRICAL AND MECHANICAL CHARACTERISTICS

FREQUENCY METER RANGE: 8470 to 9630 mc.

TUNING RANGE: Limited by local oscillator.

The range varies with different type 2K25 tubes.

SWEEP FREQUENCIES: Continuously variable from 10 to 30 cps.

ATTENUATION (SPECTRUM AMPLITUDE): Variable from 3 to 70 db. Uncalibrated.

OPERATING TEMPERATURE: -40 deg C to + 55 deg C.

FREQUENCY SWING (SAWTOOTH FM): 40 to 50 mc.

OVER-ALL IF BANDWIDTH AT 1/2 POWER POINTS: 50 kc.

MAX DISPERSION OF SPECTRA: 1.5 mc per in.

SENSITIVITY TO CW FOR 1 INCH OF DEFLECTION

SPECTRUM POSITION: 55 db below 1 W.

SPECTRUM AMPLIFIED POSITION: 80 db below 1 watt.

INDICATOR: Cathode ray tube.

POWER OUTPUT: 1 mw (approx).

CALIBRATION POINT: 9310 mc.

ACCURACY: ±2 mc at calibration point; ±5 mc (max) at other points on the dial.

POWER SOURCE REQUIRED: 50 to 1200 cps, 105 to 125 v, single ph, 125 W.

MANUFACTURER'S OR CONTRACTOR'S DATA

Contractor unknown for Contracts N383s-45628, N383s-46737, N383s-59577, N383s-61061, N383s-58410.

Garod Radio Co, Brooklyn, N.Y.

Contract N383s-75262.

Westinghouse Electric Corp, Pittsburg, Pa.

Contract NXss-59108.

Hazeltine Electronics Corp, New York, N.Y.

Contract N383s-1427.

TUBE AND/OR CRYSTAL COMPLEMENT

(1) 2K25

(1) 6AC7WA

(1) 6Y6G

(1) 2X2A

(1) 6SA7Y

(1) 884

(1) 3BP1A

(3) 6SJ7Y

(1) 5R4WGB

(3) 6SN7WGTA

Total Tubes: (14)

(1) 1N23B

Total Crystals: (1)

REFERENCE DATA AND LITERATURE

AN16-30UPM33-3, Technical Manual for Radar Test Set AN/UPM-33.

TYPE CLASSIFICATION	
DESIGN COGNIZANCE	BUAER
PROCUREMENT COGNIZANCE	
STOCK NO.	
R.D.B. IDENT. NO.	

SHIPPING DATA

NUMBER OF BOXES	CONTENTS AND IDENTIFICATION	VOLUME (Cu.Ft.)	OVERALL DIMENSIONS (inches)	WEIGHT PACKED (lbs.)
1	Radar Test Set AN/UPM-33	1.2	17 X 22-1/2 X 30-1/2	

April 1958

RADAR TEST SET

AN/UPM-33

EQUIPMENT SUPPLIED DATA

QUANTITY PER EQUIPT			NAME AND NOMENCLATURE	OVERALL DIMENSIONS (inches)	WEIGHT (lbs.)
See Note					
#1	#2	#3			
1	1	1	Spectrum Analyzer TS-148/UP	9-1/8 X 13-13/32 X 15-11/16	39
1	1	1	Waveguide to Coaxial Adapter UG-183/U	1 X 1-1/2 X 2-1/2	0.4
1	1	1	Antenna Horn AT-68/UP	1-3/64 X 2-13/64 X 3-21/64	0.25
1			Antenna Horn Cable CG-92/U (6 ft)	72 lg	1.0
	1	1	Antenna Horn Cable CG-92A/U (6 ft)	72 lg	1.0
1	1	1	Mixer Cable CX-464/UP (4 ft)	48 lg	0.25
1			Power Cable CX-337/U (10 ft)	120 lg	0.5
	1		Power Cable CX-337/U (6 ft)	72 lg	0.69
		1	Power Cable CX-337A/U (10 ft)	120 lg	0.4
1			Flexible Waveguide Assy CG-182/APM-40	21/32 X 1-1/8 X 15	0.25
	1	1	Flexible Waveguide Assy CG-182/APM-40	21/32 X 1-1/8 X 18	0.32
	1	1	Directional Coupler CG-176/AP	2-1/4 X 2-7/16 X 5	0.75
1	1	1	Auxiliary and Spare Parts Box CY-245/U	7-1/4 X 10-1/16 X 17-29/32	6
1	1	1	Carrying Case CY-246	13-1/2 X 19-1/8 X 25-9/16	49
1	1	1	Carriage, Shock Absorbing MT-325/U	11-11/16 X 14 X 16-7/16	
1	1	1	Choke to choke Adapter UG-144/AP	1/16 X 1-5/8 X 1-5/8	0.06
	1	1	Allen Wrench for No. 10 set screw		
1ea	1ea	1ea	Allen Wrench for No. 4, 6, 8 set screw		
1	1	1	Tuning Wrench		

Note #1 Supplied w/equip Serial #1 thru 817 Contract NXsa-59108

Note #2 Supplied w/equip Serial 1 thru 583 Contract N383s-58410

Supplied w/equip Serial #1001-1688 Contract N383s-1427

Supplied w/equip Serial #10000-10556 Contract N383s-45628

Supplied w/equip Serial #10557-10563 Contract N383s-46737

Supplied w/equip Serial #higher than 10563 Contract N383s-59577

Supplied w/equip Serial #higher than 10563 Contract N383s-61061

Note #3 Supplied w/equip Serial #1-1193 Contract N383s-75262

UNCLASSIFIED

April 1958

Test-Wave Form Measuring

RADAR TEST SET

AN/UPM-33A

FUNCTIONAL DESCRIPTION

The AN/UPM-33A is a portable test equipment designed for use with radar and beacon equipment operating within the frequency range of 8470 to 9630 megacycles. It provides a visual indication of the spectra of radio frequency oscillators within its range. It incorporates a frequency meter which permits it to be used as a frequency measuring device. It may also be used to measure the frequencies of resonant cavities, echo boxes, magnetrons, and local oscillators, if their frequencies lie within the range of the analyzer.

No field changes in effect at time of preparation (29 July 1958).

RELATION TO OTHER EQUIPMENT

The AN/UPM-33A is similar to and completely interchangeable with the AN/UPM-33, differing only in the carrying case and one type of cable supplied.

ELECTRICAL AND MECHANICAL CHARACTERISTICS

FREQUENCY RANGE: 8470 to 9630 mc.
 FREQUENCY CALIBRATION ACCURACY: ± 2 mc.
 PRESENTATION: 3 in. CR tube.
 SWEEP FREQUENCIES: Continuously variable from 10 to 30 cps.
 ATTENUATION (SPECTRUM AMPLITUDE): Uncalibrated, variable from 3 to 70 db.
 IF BANDWIDTH: 50 kc at half-power points.
 SENSITIVITY TO CW (For 1 INCH DEFLECTION)
 SPECTRUM POSITION: 55 db below 1 W.
 SPECTRUM AMPLIFIED POSITION: 80 db below 1 W.

POWER OUTPUT: Approx 1 mw.
 DISPERSION OF SPECTRA: 1.5 mc per in. max.
 OPERATING TEMPERATURE RANGE: -40 to +55 deg C.
 POWER REQUIREMENTS: 115 v $\pm 10\%$, 50 to 1200 cps, single ph, 125 W.

MANUFACTURER'S OR CONTRACTOR'S DATA

Jetronic Industries, Inc., Philadelphia, Pennsylvania.
 Contract N383s-12938A.

TUBE AND/OR CRYSTAL COMPLEMENT

(1) 2K25	(1) 2X2A	(1) 3BP1A
(1) 5R4WGB	(1) 6AC7	(1) 6SA7
(3) 6SJ7	(3) 6SN7GT	(1) 6Y6G
(1) 884	(4) 991	

Total Tubes: (18)
 (1) 1N23A
 Total Crystals: (1)

REFERENCE DATA AND LITERATURE

Nomenclature Card for Radar Test Set AN/UPM-33A.
 AN16-30UPM33-3: Technical Manual for Radar Test Set AN/UPM-33.

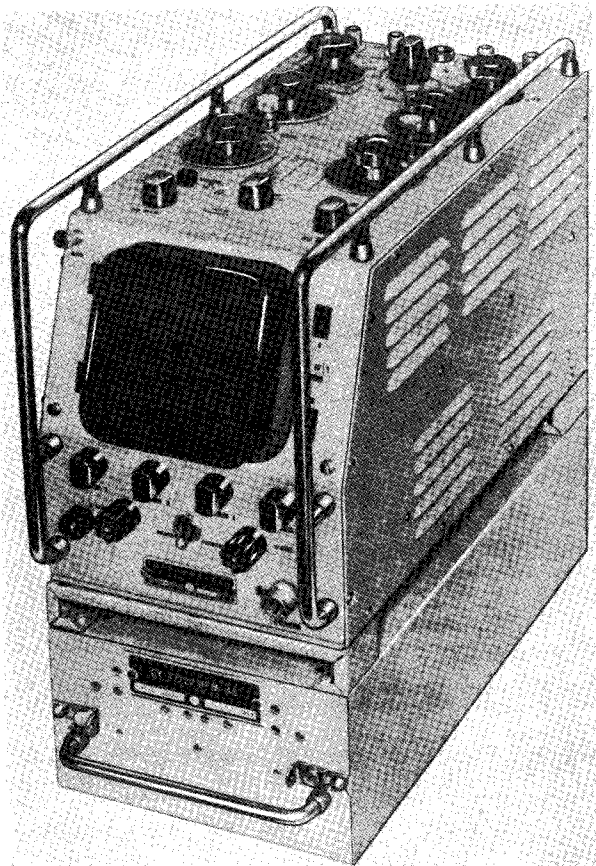
TYPE CLASSIFICATION
DESIGN COGNIZANCE BUAER
PROCUREMENT COGNIZANCE
STOCK NO.
R.D.B. IDENT. NO.

EQUIPMENT SUPPLIED DATA

QUANTITY PER EQUIPT	NAME AND NOMENCLATURE	OVERALL DIMENSIONS (inches)	WEIGHT (lbs.)
1	Spectrum Analyzer TS-148/UP	9-1/8 X 13-13/32 X 15-11/16	39
1	Carrying Case CY-1962/U including: Shock Absorbing Carriage MT-1671/U		
1	Auxiliary and Spare Parts Box CY-245/U	7-1/4 X 10-1/16 X 17-29/32	6
1	Power Cable CX-3277/U		
1	Antenna Horn AT-68/UP	1-3/64 X 2-13/64 X 3-21/64	0.25
1	Antenna Horn Cable CG-92A/U	73 lg	1
1	Directional Coupler CG-176/AP	2-1/4 X 2-7/16 X 5	0.75
1	Flexible Waveguide Assembly CG-182/APM-40	21/32 X 1-1/8 X 18	0.32
1	Mixer Cable CX-464/UP	51 lg	0.25
1	Adapter UG-144/AP	0.062 X 1-5/8 X 1-5/8	0.06
1	Adapter UG-183/U	1 X 1-1/2 X 2-1/2	0.4

UNCLASSIFIED

4.3 AN/UPM-33A: 1

OSCILLOSCOPE**AN/UPM-45**

Oscilloscope AN/UPM-45

FUNCTIONAL DESCRIPTION

Oscilloscope AN/UPM-45 is a portable dual cathode ray test instrument capable of portraying the variation of two pulses or waveforms with respect to a common time base. Included in this instrument is a means for measuring the instantaneous magnitudes of all or portions of the wave forms.

No field changes in effect at time of preparation (19 November 1959).

ELECTRICAL AND MECHANICAL CHARACTERISTICS**VERTICAL CHANNELS (General)**

TRANSIENT RESPONSE: 0.1 usec rise.

LOW FREQUENCY TILT: Less than 10% for 1

kc square wave.

POLARITY: Pos for upward deflection; neg for downward deflection.

BANDWIDTH(3db): 2 cy - 3.5 mc.

VERTICAL CHANNEL NO. 1 ONLY

SYNC DELAY: 0.5 usec.

INPUT IMPEDANCE

V1 AND V2 INPUT: 900,000 ohms paralleled by 40 uuf.

V1 OR V2 INPUT THROUGH CG-1346/UPM-45: 10 meg paralleled by 15 uuf.

V1 OR V2 INPUT THROUGH CG-1345/UPM-45: 2.7 meg paralleled by 11 uuf.

HORIZONTAL CHANNEL

SWEEP TIME: 6 fixed sweeps: 5, 15, 50, 150, 500, and 5000 usec.

BANDWIDTH: 2 cy to 750 kc (-6 db).

SWEEP MODE: Periodic or triggered.

CALIBRATION VOLTS: 0.1 to 1.0 v pp and 0.02 to 0.2 v pp of sawtooth wave for calibrating signal amplitude.

CATHODE RAY TUBE: 3 in. by 1-1/2 in.

POWER SUPPLY

VOLTS: 115 ±10%.

FREQUENCY: 47.5 to 440 cps.

CURRENT: 1.35 amp max at 115 v, 60 to 40 cps; 1.6 amp max at 115 v, 50 cy.

MANUFACTURER'S OR CONTRACTOR'S DATA

Waterman Products Co. Inc., Philadelphia, Pennsylvania.

Contract NObsr-52630.

TUBE AND/OR CRYSTAL COMPLEMENT

- | | |
|-----------|----------------|
| (1) NE2 | (2) 1V2 |
| (2) 3XP1 | (2) 6AW8 |
| (1) 6X4WA | (1) 12AT7WA |
| (3) 12AU7 | (2) 5670 |
| (1) 5718A | (1) 5726/6AL5W |
| (4) 5840 | |

Total Tubes: (20)

No Crystals used.

Test-Wave Form Measuring

February 1960

AN/UPM-45**OSCILLOSCOPE****REFERENCE DATA AND LITERATURE**

NAVSHIPS 92954(A): Technical Manual for
OSCILLOSCOPE AN/UPM-45.

TYPE CLASSIFICATION (NAVY)
DESIGN COGNIZANCE USN, BUSHIPS
PROCUREMENT COGNIZANCE
STOCK NO.
R.D.B. IDENT. NO. 3.1

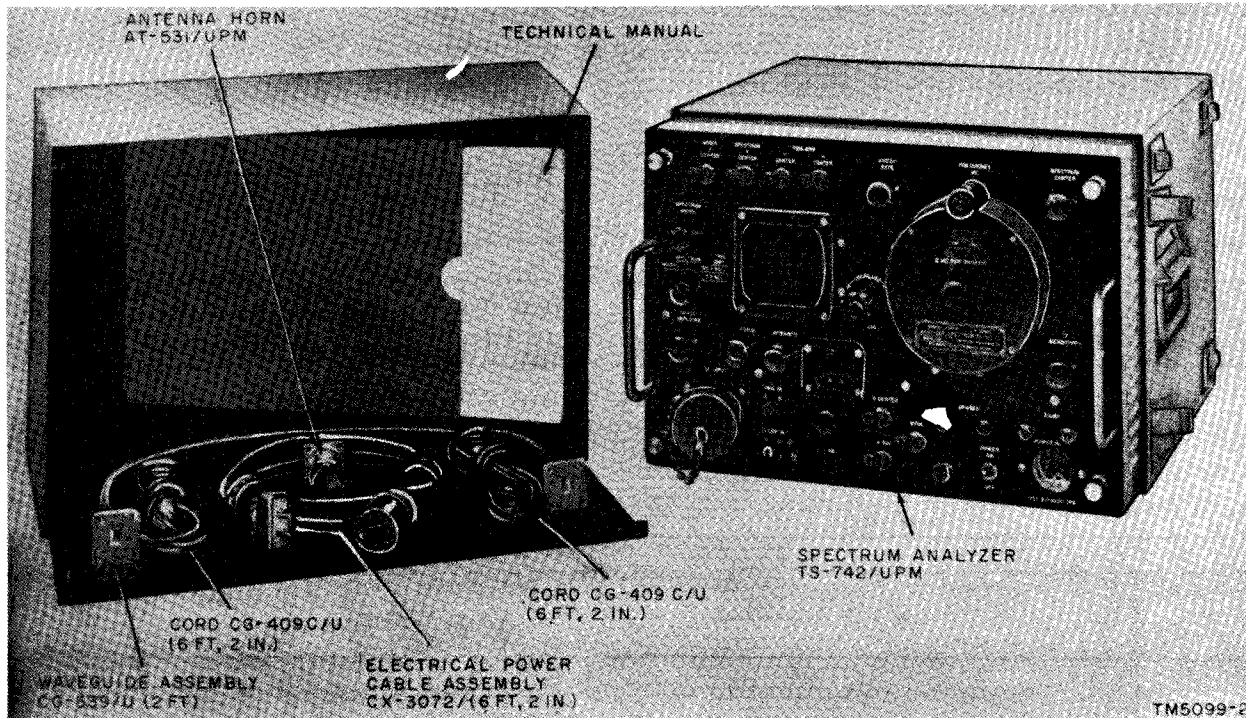
SHIPPING DATA

NUMBER OF BOXES	CONTENTS AND IDENTIFICATION	VOLUME (Cu.Ft.)	OVERALL DIMENSIONS (inches)	WEIGHT PACKED (lbs.)
1	Oscilloscope AN/UPM-45 w/Maint. Parts Kit	3	12-3/8 X 18-5/8 X 24	60

EQUIPMENT SUPPLIED DATA

QUANTITY PER EQUIPT	NAME AND NOMENCLATURE	OVERALL DIMENSIONS (inches)	WEIGHT (lbs.)
1.	Oscilloscope AN/UPM-45 consists of:	6-7/8 X 13-3/8 X 14	33
1	Oscilloscope OS-37/UPM-45	6-7/8 X 9-1/4 X 14	24
1	Case, Accessory CY-1722/UPM-45	4-7/8 X 6-5/8 X 13-3/4	4.5
*1	Cable, Power CX-3278/U	0.275 O.D X 94-3/4 1g	
*3	Lead, Test CG-409/U	27/64 O.D X 96 1g	9/16
*2	Lead, Test CG-1346/UPM-45	55-1/4 1g	1/2
*1	Lead, Test CG-1345/UPM-45	55-1/4 1g	5/8
*3	Adapter UG-924/U	9/16 O.D X 1-13/16 1g	3/16
*3	Extension, Probe Tip	5/16 O.D X 3-3/16 1g	1/16
*3	Clip, Insulated	9/16 O.D X 2-1/4 1g	1/16
*1	Wrench, Allen No. 4	5/8 X 3/64 X 1-13/16	
*1	Wrench, Allen No. 6	1/16 X 5/8 X 1/13/16	
*1	Wrench, Allen No. 8	5/64 X 11/16 X 1-15/16	
*1	Wrench, Spanner TW-A001-001	1/16 X 1/2 X 4	1/16
*1	Light Shield	0.025 X 3 X 9-1/4	
*2	Fuses (2 amp) 3AG	1/4 O.D X 1-1/4 1g	
2	Technical Manuals NAVSHIPS 92954(A)	1/2 X 8-3/4 X 11-1/2	2.5

*Stored in case, Accessory CY-1722/UPM-45.

SPECTRUM ANALYZER**AN/UPM-58***Spectrum Analyzer AN/UPM-58***FUNCTIONAL DESCRIPTION**

The AN/UPM-58 is a 1.87 centimeter spectrum analysis unit used to analyze power in pulsed or continuous-wave radar and beacon signals from 15,800 to 16,200 megacycles. It is capable of resolving into distinct transients, the spectrum resulting from the pulse modulation of radar transmitters whose modulation pulses vary in width from 0.2 to 2.0 microseconds and in repetition rate from 100 to 10,000 pulses per second. It can accommodate input RF power up to plus 30 decibels referred to 1 milliwatt. The desired input level is obtained by means of a variable attenuator that provides 50 decibels of attenuation, calibrated in 1 db steps for the first 45 db and uncalibrated for the rest of its range.

It may also function as a synchroscope for large amplitude-pulsed signals which can be displayed on the cathode-ray tube screen in a A-scope manner.

No field changes in effect at time of preparation (10 September 1957).

RELATION TO OTHER EQUIPMENT

Equipment Required but not Supplied: (1) Directional Coupler PRD Type 405 or equivalent.

ELECTRICAL AND MECHANICAL CHARACTERISTICS**ANALYZER CHARACTERISTICS**

FREQUENCY COVERAGE: 16000 \pm 200 mc.

FREQUENCY METER ACCURACY

ABSOLUTE: \pm 10 mc.

RELATIVE (OVER 100 MC): \pm 5 mc.

INPUT PULSE MODULATION (MEASURABLE)

PULSE WIDTH: 2 usec max.

RESOLUTION: At least 50 distinct transients between third min points.

RF INPUT ATTENUATION

CALIBRATED: 0 to 45 db.

UNCALIBRATED: 46 to 50 db.

IF CHARACTERISTICS

FIRST IF: 45 mc.

SECOND IF: 5 mc.

AN/UPM-58

SPECTRUM ANALYZER

FIRST IF BANDWIDTH: 700 kc.
 SECOND IF BANDWIDTH: 50 kc.
 GAIN CONTROL: 0 to 40 db.
 SENSITIVITY TO CW
 FOR 1 INCH CRT DEFLECTION: -60 dbm.
 FOR MIN DISCERNIBLE SIGNAL: -70 dbm.
 MAX DISPERSION: 1 in. per mc.
 SWEEP FREQUENCY RANGE: 5 to 40 cps,
 continuously variable.
 SYNCHROSCOPE CHARACTERISTICS
 TRIGGERED SWEEP SPEEDS: 5 and 150 usec.
 VERTICAL DEFLECTION SENSITIVITY: 115 to
 160 v per in.
 GENERAL CHARACTERISTICS
 PRESENTATION: 3 in. CR tube.
 POWER REQUIREMENTS: 105 to 125 v, 50 to
 1000 cps, single ph, 165 W.

(1) 6BA7 (6) 12AT7 (1) 6178
 (2) 6005/6AQ5W (3) 5651 (1) 6X4W
 Total Tubes: (28)
 (1) 1N26
 Total Crystals: (1)

REFERENCE DATA AND LITERATURE

TM11-5099: Technical Manual for Spectrum
 Analyzer AN/UPM-58.

TUBE AND/OR CRYSTAL COMPLEMENT

(1) 2X2A (1) 5Y3WGT (7) 6AU6
 (1) 3RP1 (3) 6AH6 (1) 6AS7G

TYPE CLASSIFICATION	
DESIGN COGNIZANCE	TASSA
PROCUREMENT COGNIZANCE	
STOCK NO.	
R.D.B. IDENT. NO.	3.4.1

SHIPPING DATA

NUMBER OF BOXES	CONTENTS AND IDENTIFICATION	VOLUME (Cu.Ft.)	OVERALL DIMENSIONS (inches)	WEIGHT PACKED (lbs.)
1	Spectrum Analyzer AN/UPM-58	3.6	14 x 20-1/4 x 22	105

EQUIPMENT SUPPLIED DATA

QUANTITY PER EQUIPT	NAME AND NOMENCLATURE	OVERALL DIMENSIONS (inches)	WEIGHT (lbs.)
1	Spectrum Analyzer TS-742/UPM	12-1/32 x 18-7/32 x 19	75
2	Technical Manual TM11-5099	3/16 x 7-7/8 x 10-1/4	
1	Antenna Horn AT-531/UPM	3.6 lg	
1	Waveguide Assembly CG-539/U	2" lg	
2	Cord CG-409C/U	74 lg	
1	Electrical Power Cable Assembly CX-3072/U	74 lg	
1	Set of Running Spares		

7 March 1963

SPECTRUM ANALYZER SET AN/UPM-84

Cog Service: USAF FSN:

Functional Class: 3.4.1

USA

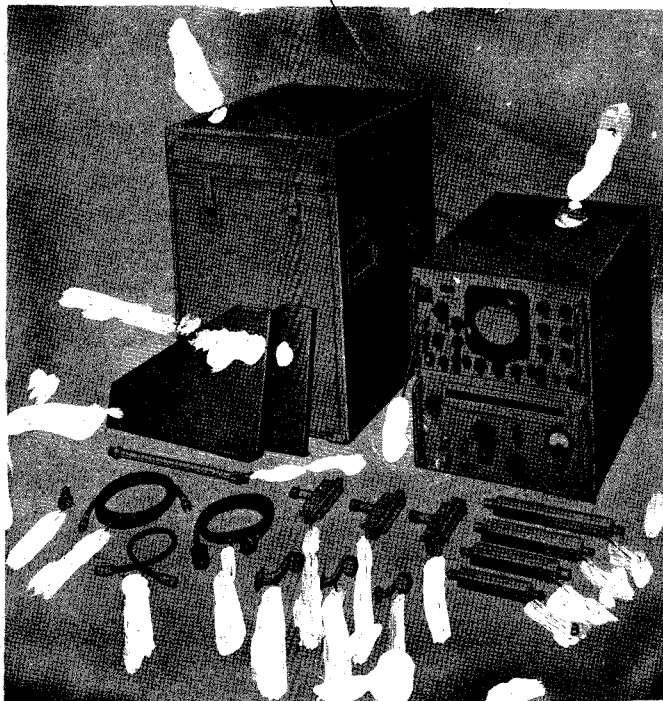
USN

USAF

TYPE CLASS:

Std

MANUFACTURER'S NAME/CODE NUMBER: Polarad Electronics Corp., (82199).



Spectrum Analyzer Set AN/UPM-84

FUNCTIONAL DESCRIPTION:

Spectrum Analyzer Set AN/UPM-84 is designed to provide a rapid and accurate spectral display of the frequency distribution of energy in rf signals over the frequency of 10 mc to 40,880 mc. CW and modulated radio signals are displayed as a spectrum on the cathode-ray tube screen with power amplitude plotted on the vertical axis, against frequency on the horizontal axis.

No field changes in effect at time of preparation (10 August 1962).

TECHNICAL CHARACTERISTICS:

POWER REQUIREMENTS: 103.5 to 126.5 v rms ac, 50 to 1,000 cyc, 380 W.

FREQUENCY RANGE: 10 to 40,880 mc, 8 bands.

SPECTRUM DISPLAY: Power on the vertical axis, versus frequency on the horizontal axis.

RESOLUTION BANDWIDTH (AT THE 3 DB POINTS): 20 kc at all frequencies.

AN/UPM-84 SPECTRUM ANALYZER SET

FREQUENCY DISPERSION

OVER THE TUNING RANGE FROM 10 TO 55 MC: 500 kc to 5 mc, adjustable.

OVER THE TUNING RANGE FROM 55 TO 40,880 MC: 500 kc to 25 mc, adjustable.

SWEEP REPETITION RATE: 1 to 30 cps, adjustable.

SWEEPER FREQUENCY: 224 mc center frequency, capable of porm 12.5 mc deviation.

SYNCHRONIZATION: Internal line frequency.

INTERMEDIATE FREQUENCIES

FIRST IF: 160 mc center frequency with a bandwidth of 25 mc.

SECOND IF: 64 mc.

THIRD IF: 6 mc.

FOURTH IF: 500 kc.

SPECTRUM CALIBRATOR FREQUENCY: 160 mc center frequency with a tuning range of porm 12.5 mc.

SPECTRUM CALIBRATOR ACCURACY: Porm 5% of the available display, or porm 1 mc for the maximum display.

FREQUENCY ACCURACY: Porm 1% of the fundamental local-oscillator frequency.

SENSITIVITY (MINIMUM DISCERNIBLE SIGNAL)

10 MC TO 150 MC: M63 dbm.

150 MC TO 300 MC: M57 dbm.

350 MC TO 1,000 MC: M51 dbm.

1,000 MC TO 2,000 MC: M50 dbm.

2,000 MC TO 16,000 MC: M40 dbm.

16,000 MC TO 40,880 MC: M40 dbm, nominal.

RF ATTENUATION

FROM 10 MC TO 12,400 MC: 100 db, uncalibrated, continuously variable through the use of two self-contained attenuators.

FROM 12,400 MC TO 40,880 MC: Uncalibrated; 3 external attenuators supplied (40 db range).

IF ATTENUATION: From 0 to 60 db, step-variable in nominal 6 db increments.

CATHODE-RAY TUBE: 5 in., phosphor coating.

OPERATING TEMPERATURE: 0 to 55 deg C (32 to 131 deg F).

RELATION TO OTHER EQUIPMENT: None.

EQUIPMENT REQUIRED BUT NOT SUPPLIED: None.

MAJOR COMPONENTS

QTY	ITEM	STOCK NUMBERS	DIMENSIONS (INCHES)	WEIGHT (LBS)
1	Spectrum Analyzer Set AN/UPM-84 Includes:			
1	Spectrum Analyzer TS-1011/UPM-84		17-1/4 x 19-1/4 x 26-1/8	144
1	Electronic Equipment Case CY-2074/UPM-84		20-3/4 X 23-1/8 x 31	73
1	Variable Attenuator (12.4 to 18.0 kmc) CN-409/UPM-84		1-5/16 x 4-1/4 x 6	0.62
1	Variable Attenuator (18.0 to 26.5 kmc) CN-411/UPM-84		7/8 x 4-1/8 x 6	0.56
1	Variable Attenuator (26.5 to 40.0 kmc) CN-410/UPM-84		3/4 x 4-1/8 x 6	0.56

4.3 AN/UPM-84: 2

SPECTRUM ANALYZER SET AN/UPM-84

QTY	ITEM	STOCK NUMBERS	DIMENSIONS (INCHES)	WEIGHT (LBS)
1	Bandpass Filter (750 to 1350 mc) F-338/UPM-84		1 dia x 15-3/4	0.69
1	Bandpass Filter (1175 to 2250 mc) F-341/UPM-84		1 x 1-5/16 x 12-3/8	1.44
1	Bandpass Filter (2000 to 3900 mc) F-337/UPM-84		1 x 1-5/16 x 9-3/8	1.12
1	Bandpass Filter (3375 to 7375 mc) F-336/UPM-84		1 x 1-11/16 x 10-1/2	1.69
1	Bandpass Filter (6100 to 12100 mc) F-335/UPM-84		1 x 1 x 8	0.89
1	Cable Assy, RF CG-1526/U		1/2 dia x 18	0.44
1	Cable Assy, RF CG-1526/U		1/2 dia x 72	1
1	Cable Assy, RF CG-1525/U		1/2 dia x 3	0.06
1	Electrical Power Cable Assy CX-3974/U		7/16 dia x 120	1
1	Coax-to-Waveguide Adapter (12.4 to 18.0 kmc) UG-1241/UPM-84		1-1/4 x 1-3/8 x 4	0.44
1	Coax-to-Waveguide Adapter (18.0 to 26.5 kmc) UG-1240/UPM-84		7/8 x 1-3/8 x 3-1/4	0.44
1	Coax-to-Waveguide Adapter (26.5 to 40.0 kmc) UG-1239/UPM-84		3/4 x 1-3/8 x 3	0.38
1	RF Cable Adapter UG-1242/UPM-84		1-3/8 x 1-3/8 x 1-3/4	0.38
1	Rack Mtg Bracket, Right Side D108775		2-1/8 x 14 x 19	3.69
1	Rack Mtg Bracket, Left Side D108774		2-1/8 x 14 x 19	3.69

REFERENCE DATA AND LITERATURE:

NAVAER 16-30UPM84-1: Handbook of Operation Instructions for Spectrum Analyzer Set AN/UPM-84.
 NAVAER 16-30UPM84-2: Handbook of Service Instructions for Spectrum Analyzer Set AN/UPM-84.
 NAVAER 16-30UPM84-3: Illustrated Parts Breakdown for Spectrum Analyzer Set AN/UPM-84.
 TO 33A1-13-57-1: Handbook of Operation Instructions for Spectrum Analyzer Set AN/UPM-84.
 TO 33A1-13-57-2: Handbook of Service Instructions for Spectrum Analyzer Set AN/UPM-84.
 TO 33A1-13-57-4: Illustrated Parts Breakdown for Spectrum Analyzer Set AN/UPM-84.

TUBE, CRYSTAL AND/OR SEMI-CONDUCTOR DATA:

TUBES: (4) 0A2WA (1) 0B2WA (1) 5ADP7 (2) 1Z2 (3) 5R4WGA (2) 6AF4A (1) 6AN5
 (2) 6AU6WA (1) 6BL6 (3) 6J4WA (2) 6X4W (4) 12AT7WA (3) 5654/6AK5W/6096
 (1) 5725/6AS6W/6187 (2) 5750/6BE6W (1) 5751WA (4) 5814WA (2) 6080WA
 (2) 6098/6AR6WA (3) 6186/6AG5WA

CRYSTALS: None used.

SEMI-CONDUCTORS: (1) 1N21B (3) 1N69 (1) 1N78 (1) 1N82

UNCLASSIFIED

February 1960

Test-Wave Form Measuring

SPECTRUM ANALYZER GROUP

AN/URM-116

FUNCTIONAL DESCRIPTION

Spectrum Analyzer Group AN/URM-116 is an instrument specifically designed to measure the amplitude, frequency and distortion constituents of a complex electrical wave form.

No field changes in effect at time of preparation (3 November 1959).

TUBE AND/OR CRYSTAL COMPLEMENT

No Electron Tube or Crystal Data Available.

REFERENCE DATA AND LITERATURE

Nomenclature Card for SPECTRUM ANALYZER GROUP AN/URM-116.

ELECTRICAL AND MECHANICAL CHARACTERISTICS

FREQUENCY RANGE: 450 to 550 kc.

INPUT IMPEDANCE: 50 ohms.

MANUFACTURER'S OR CONTRACTOR'S DATA

Technical Materiel Corp, Mamaroneck, N. Y.
Model FSA.
Contract NObsr-71790.

TYPE CLASSIFICATION (NAVY)

DESIGN COGNIZANCE USN, BUSHIPS

PROCUREMENT COGNIZANCE

STOCK NO.

R.D.B. IDENT. NO. 3.4.1

EQUIPMENT SUPPLIED DATA

QUANTITY PER EQUIPT	NAME AND NOMENCLATURE	OVERALL DIMENSIONS (inches)	WEIGHT (lbs.)
1	Spectrum Analyzer or Group AN/URM-116 consists of:		
1	Analyzer, Spectrum TS-1236/URM-116	10-1/2 X 16 X 19	
1	Power Supply PP-2206/URM-116		

UNCLASSIFIED

4.3 AN/URM-116: 1

19 February 1968

Cog Service: USN FSN: F6625-474-0350

RADIO TEST SET AN/URM-132

Functional Class: 3.4.1

USA

USN

USAF

TYPE CLASS:

Used by

MANUFACTURER'S NAME/CODE NUMBER: Panoramic Radio Products, Incorporated, (80052).

(No Illustration Available)

FUNCTIONAL DESCRIPTION:

Radio Test Set AN/URM-132 is designed to test radio receiver distortion, transmitter linearity checks, two tone linearity tests of narrow band networks such as filters and networks.

No field changes in effect at time of preparation (16 December 1962).

TECHNICAL CHARACTERISTICS:

SPECTRUM ANALYZER TS-1454/URM-133

FREQUENCY RANGE: 20 cps to 22.5 kc.

FREQUENCY SCALE: Linear and logarithmic.

SWEEP WIDTHS

PRESENT LOGARITHMIC: 40 cps to 20 kc.

PRESENT LINEAR: 200, 1,000, 5,000 cps.

CONTINUOUSLY VARIABLE CALIBRATED CENTER FREQUENCY RANGE: 0 to 20 kc (1 in. sweep).

SENSITIVITY: 500 uv to 500 v.

AMPLITUDE SCALES

LINEAR: 1.0 to 0.

LOGARITHMIC: 0 db to M40 db.

AMPLITUDE RESPONSE FLATNESS

ON LIN AMPLITUDE SCALE: Porm 10%.

ON LOG AMPLITUDE SCALE: Porm 1.5 db.

RESIDUAL DISTORTION

HARMONIC PROD: M60 db.

HUM: M55 db.

MODULATION: M60 db.

SIGNAL GENERATOR SG-402/URT

OUTPUT FREQUENCIES: 3, 6, 12, 21, 30 mc.

OUTPUT LEVEL: 0.1 v rms at 50 ohms output impedance. Adjustable by means of an attenuator to 10 uv porm 10%.

POWER REQUIREMENTS: 115 v, 60 cyc, single ph.

RELATION TO OTHER EQUIPMENT: None.

EQUIPMENT REQUIRED BUT NOT SUPPLIED: None.

AN/URM-132 RADIO TEST SET

MAJOR COMPONENTS

QTY	ITEMS	STOCK NUMBERS	DIMENSIONS (INCHES)	WEIGHT (LBS)
1	Radio Test Set AN/URM-132 includes:			
1	Spectrum Analyzer Set AN/URM-133			
1	Signal Generator SG-402/URT			
1	Cabinet, Electrical Equipment CY-3067/URM-132			

REFERENCE DATA AND LITERATURE:

TUBE, CRYSTAL AND/OR SEMI-CONDUCTOR DATA:

TUBES: Data not available.

CRYSTALS: Data not available.

SEMI-CONDUCTORS: Data not available.

SHIPPING DATA

PKGS	VOLUME (CU FT)	WEIGHT (LBS)
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PROCUREMENT DATA

PROCURING SERVICE: USN

DESIGN COG: USN, BuShips

SPEC &/OR DWG:

CONTRACTOR	LOCATION	CONTRACT OR ORDER NO.	APPROX. UNIT COST
Panoramic Radio Products, Incorporated Model no. LP-1aAM	Mount Vernon, New York	N0bsr-81246	

11 January 1962

Cog Service:

FSN:

SPECTRUM ANALYZER SET AN/URM-133

Functional Class:

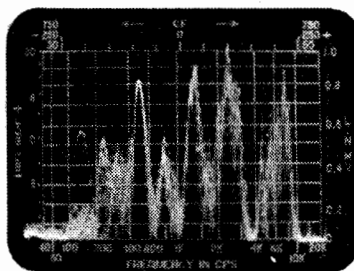
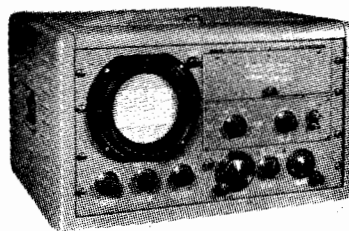
USA

USN

USAF

TYPE CLASS:

MANUFACTURER'S NAME/CODE NUMBER: Panoramic Radio Products, Inc.



Spectrum Analyzer Set AN/URM-133

FUNCTIONAL DESCRIPTION:

The Spectrum Analyzer Set AN/URM-133 is a general-purpose instrument to measure a complex electrical wave form in the frequency range of 40 cycles per second (CPS) to 22.5 kilocycles (KC). The measurement is in terms of amplitude versus frequency.

No field changes in effect at time of preparation (25 April 1961).

TECHNICAL CHARACTERISTICS:

TYPE OF INSTALLATION: Portable.

LOGARITHMIC SWEEP: 40 cps to 20 kc.

PRESET LINEAR SWEEP: 200, 1000, 5000 cps.

FREQUENCY RANGE: 20 cps to 22.5 kc.

SENSITIVITY (INPUT VOLTAGE RANGE FOR FULL SCALE LINEAR): 500 uv to 500 v.

AMPLITUDE RESPONSE FLATNESS

AN/URM-133 SPECTRUM ANALYZER SET

ON LINEAR SCALE: Porm 10%.

ON LOG AMPLITUDE SCALE: Porm 1.5 db.

RESIDUAL DISTORTION

RESIDUAL HARMONIC: M60 db.

RESIDUAL HUM: M55 db.

RESIDUAL CROSS MODULATION: M60 db.

INPUT IMPEDANCE: 250 k.

SWEEP REPETITION: 1 sweep/sec free running.

OPERATING POWER RQMT: 115 v ac, 60 cps, single ph.

RELATION TO OTHER EQUIPMENT:

The AN/URM-133 is designed as part of AN/URM-132.

The AN/URM-133 is designed to be used with but not part of Panel Control SB-1232/URM-13 and Calibrator, Frequency TS-1455/URM-133.

EQUIPMENT REQUIRED BUT NOT SUPPLIED: None.

MAJOR COMPONENTS

QTY	ITEM	STOCK NUMBERS	DIMENSIONS (INCHES)	WEIGHT (LBS)
	Spectrum Analyzer Set AN/URM-133 consists of:			
1	Sonic Spectrum Analyzer TS-1454/URM-133		12 x 18 x 22	
1	Power Supply PP-2844/URM-133		7-1/4 x 9-1/2 x 14	
1	Transformer, Power, Voltage, Regulating TF-351/URM-133		5-3/8 x 7-7/16 x 8-1/2	

REFERENCE DATA AND LITERATURE:

Panoramic Radio Products Incorporated Catalog ESO Copy no. 02526 for Spectrum Analyzer Set AN/URM-133 (Model LP-1a AM).

TUBE, CRYSTAL AND/OR SEMI-CONDUCTOR DATA:

TUBES: (1) 6J7 (2) 6AC7 (2) 6J5 (3) 6SL7 (2) 6SJ7 (1) 6SG7 (1) 5UP7 (1) 6SN7
(1) 12SN7 (2) 6X5 (1) 6AS7G (2) 5651 (1) 2X2A (1) 12AX7

CRYSTALS: None used.

SEMI-CONDUCTORS: None used.

SHIPPING DATA

PKGS	VOLUME (CU FT)	WEIGHT (LBS)
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4.3 AN/URM-133: 2

PROCUREMENT DATA

PROCURING SERVICE:
SPEC &/OR DWG:

DESIGN COG: USN, BuShips

CONTRACTOR	LOCATION	CONTRACT OR ORDER NO.	APPROX. UNIT COST
Panoramic Radio Products, Inc. Model no. LP-1a AM	Mount Vernon, N.Y.	N0bsr-81246	

19 February 1963

RADIO TEST SET AN/URM-134

Cog Service: USN FSN: F6625-474-0359

Functional Class: 3.4.1

USA

USN

USAF

TYPE CLASS:

Used by

MANUFACTURER'S NAME/CODE NUMBER: Panoramic Radio Products, Incorporated, (80052).

(No Illustration Available)

FUNCTIONAL DESCRIPTION:

Radio Test Set AN/URM-134 is designed to set up, adjust, monitor and trouble shoot SSB transmissions. It incorporates a spectrum analyzer, a built-in stable tuning head, a two-tone audio generator, a high-impedance input probe and internal self checking features.

No field changes in effect at time of preparation (15 December 1962).

TECHNICAL CHARACTERISTICS:

FREQUENCY RANGE: 2 to 40 mc, continuously tuned.

SWEEP WIDTHS

FIXED: 150 cps, 500 cps, 2 kc, 10 kc, 30 kc.

CONTINUOUSLY VARIABLE: 0 to 100 kc and 0 to 2 kc (with AFC).

AF TEST TONES: Two tones, each continuously variable between 100 cps to 10 kc.

RF TEST TONES: 3,000 kc, crystal controlled; 3,002 kc, crystal controlled.

INPUT CENTER FREQUENCY: 500 kc.

BANDPASS REGION (AFTER INPUT MIXER): 450 to 550 kc.

IMAGE REJECTION: Better than 130:1 at input center frequency.

INPUT IMPEDANCE: 50 ohms direct. 12 megohms shunted by 5 uuf with accessory high impedance probe.

INPUT ATTENUATOR: 0 to 65 db attenuation of the input signal in 5 db steps. Continuous 20 db gain control.

AMPLITUDE SCALES: Linear and 2 decade log selectable by a front panel switch. Front panel 20 db IF attenuation may be used to extend calibrated range to 60 db.

HARMONIC DISTORTION: More than 60 db down.

POWER REQUIREMENTS: 115 v, 50 to 400 cps, single ph.

RELATION TO OTHER EQUIPMENT: None.

EQUIPMENT REQUIRED BUT NOT SUPPLIED: None.

MAJOR COMPONENTS

QTY	ITEM	STOCK NUMBERS	DIMENSIONS (INCHES)	WEIGHT (LBS)
1	Test Set, Radio AN/URM-134			
1	includes:			
	Spectrum Analyzer Set			
1	AN/URM-135 consists of:			
	Analyzer, Spectrum			
	TS-1456/URM-135			

AN/URM-134 RADIO TEST SET

QTY	ITEM	STOCK NUMBERS	DIMENSIONS (INCHES)	WEIGHT (LBS)
1	Power Supply PP-2B45/URM-135			
1	Transformer, Power, Voltage Regulating TF-352/URM-135			
1	Probe, Cathode Follower MX-3328/URM-135			
1	Generator, Signal SG-403/URT			
1	Oscillator, Radio Frequency SG-404/UR			
1	Cabinet, Electrical Equipment CY-3068/URM-134			

REFERENCE DATA AND LITERATURE:

TUBE, CRYSTAL AND/OR SEMI-CONDUCTOR DATA:

TUBES: Data not available.

CRYSTALS: Data not available.

SEMI-CONDUCTORS: Data not available.

SHIPPING DATA

PKGS	VOLUME (CU FT)	WEIGHT (LBS)
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PROCUREMENT DATA

PROCURING SERVICE: USN
SPEC &/OR DWG:

DESIGN COG: USN, BuShips

CONTRACTOR	LOCATION	CONTRACT OR ORDER NO.	APPROX. UNIT COST
Panoramic Radio Products, Incorporated Model no. SSB-3a	Mount Vernon, New York	NObsr-81246	\$3,585.00

12 January 1962

Cog Service:

FSN:

SPECTRUM ANALYZER SET AN/URM-135

Functional Class:

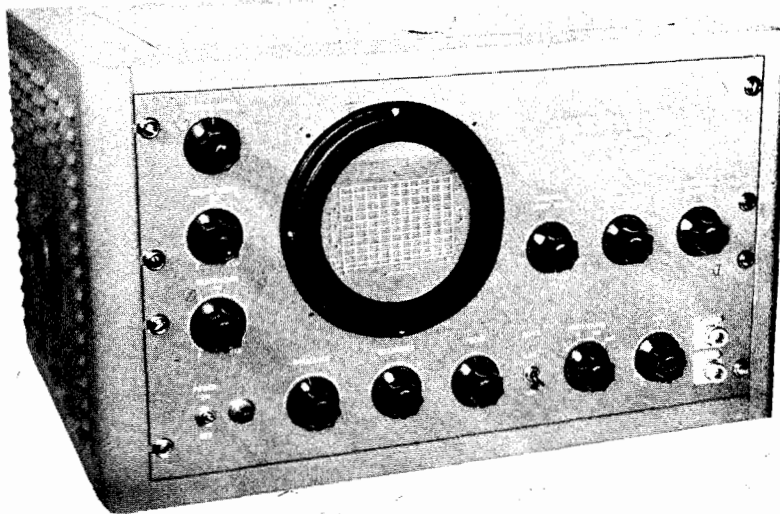
USA

USN

USAF

TYPE CLASS:

MANUFACTURER'S NAME/CODE NUMBER: Panoramic Radio Products, Incorporated.



Spectrum Analyzer Set AN/URM-135

FUNCTIONAL DESCRIPTION:

The Spectrum Analyzer Set AN/URM-135 is a general-purpose instrument designed to measure the amplitude, frequency, and distortion constituents of a complex electrical wave form.

No field changes in effect at time of preparation (25 April 1961).

TECHNICAL CHARACTERISTICS:

TYPE OF INSTALLATION: Portable.

MAXIMUM SWEEP WIDTH: 100 kc.

SCANNING RATES: 30 cps, 5 cps, 1 cps and 1 scan in 10 seconds.

MAXIMUM RESOLUTION: 3 kc to 10 cps.

SPURIOUS: Down by at least 40 db.

HUM: Down by at least 40 db.

FLATNESS: Within perm 5%.

AN/URM-135 SPECTRUM ANALYZER SET

INPUT FREQUENCY: 500 kc.
INPUT IMPEDANCE: 50 ohms.
PRODUCT INPUT SENSITIVITY: 10^{-4} volts x volts per 1/4 deflection.
OPERATING POWER RQMT: 115 v ac, 60 cps, single ph.

RELATION TO OTHER EQUIPMENT:

The AN/URM-135 is a part of Test Set, Radio AN/URM-134. The AN/URM-135 is the same as Panoramic Radio Products Inc. Model no. SB-12AS.

EQUIPMENT REQUIRED BUT NOT SUPPLIED: None.

MAJOR COMPONENTS

QTY	ITEM	STOCK NUMBERS	DIMENSIONS (INCHES)	WEIGHT (LBS)
	Spectrum Analyzer Set AN/URM-135 consists of:			
1	Analyzer Spectrum TS-1456/URM-135		10-1/2 x 19 x 21-7/8	
1	Power Supply PP-2845/URM-135		7-1/2 x 9-1/4 x 15-3/4	
1	Transformer, Power, Voltage Regulating TF-352/URM-135		4-15/32 x 7-7/32 x 8-1/16	

REFERENCE DATA AND LITERATURE:

Panoramic Radio Products Inc., Catalog ESO Copy no. 02526 for Spectrum Analyzer Set AN/URM-135 (Model SB-12AS).

TUBE, CRYSTAL AND/OR SEMI-CONDUCTOR DATA:

TUBES: (1) 6J7 (2) 6AC7 (2) 6J5 (3) 6SL7 (2) 6SJ7 (1) 6SG7 (1) 5UP7 (1) 6SN7
(1) 12SN7 (2) 6X5 (1) 6AS7G (2) 5651 (1) 2X2A (1) 12AX7

CRYSTALS: None used.

SEMI-CONDUCTORS: None used.

SHIPPING DATA

PKGS	VOLUME (CU FT)	WEIGHT (LBS)
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PROCUREMENT DATA

PROCURING SERVICE:
SPEC &/OR DWG:

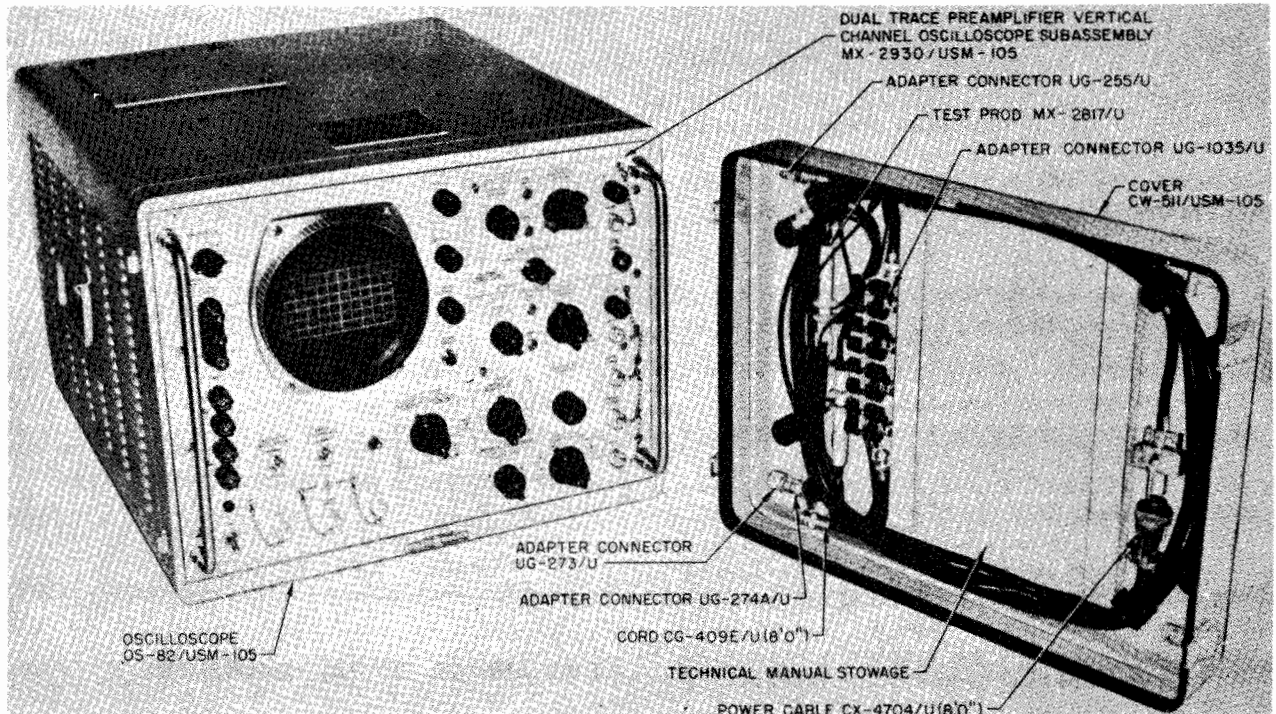
DESIGN COG: USN, BuShips

4.3 AN/URM-135: 2

SPECTRUM ANALYZER SET AN/URM-135

CONTRACTOR	LOCATION	CONTRACT OR ORDER NO.	APPROX. UNIT COST
Panoramic Radio Products, Inc. Model no. SB-12AS	Mt. Vernon, N.Y.	NObsr-81246	

OSCILLOSCOPE



Oscilloscope AN/USM-105

FUNCTIONAL DESCRIPTION

Oscilloscope AN/USM-105 is a general purpose, high speed laboratory type instrument designed for displaying complex waveforms and measuring ac and dc voltages.

No field changes in effect at time of preparation (18 December 1959).

ELECTRICAL AND MECHANICAL CHARACTERISTICS

SWEEP GENERATOR

INTERNAL SWEEP: 24 calibrated ranges provide sweep times from 0.1 usec/cm to 5 sec/cm; accurate to within 3%. A vernier control provides continuous adjustment of sweep time between calibrated ranges and extends slowest sweep to 15/sec/cm (approx).

MAGNIFICATION: 7 calibrated ranges, X1, X2, X5, X10, X20, X50, and X100. Increases fastest sweep speed to .02 usec/cm. X1 and X5 ranges retain accuracy of original sweep.

TRIGGERING: Internal, either from power line or vertical input signal which

causes 2 mm or more vertical deflection. External, either capacitive (AC only) or direct coupled with 1/2 volt peak-to-peak or more.

TRIGGER POINT: Sweep can be triggered from either a positive or a negative going voltage; the triggering voltage of external sync signals is continuously adjustable from -30 to +30 volts. Switch position automatically provides optimum sync stability for majority of uses.

SINGLE SWEEP Switch provides single-sweep operation with a manual or electrical arming.

SAWTOOTH OUTPUT: -50 to +50 volts (approx.) sawtooth output available concurrent with sweep.

GATE OUTPUT: +50 volt (approx.) pulse for duration of sweep.

HORIZONTAL AMPLIFIER

BANDWIDTH: DC to 1 mc.

SENSITIVITY: 7 ranges provide sensitivity from 0.1 volt/cm to 10 volts/cm. A vernier control provides continuous adjustment between ranges and extends the minimum sensitivity to 25 volts/cm.

AN/USM-105

OSCILLOSCOPE

cm.
INPUT IMPEDANCE: 1 megohm shunted by 30 uuf.
CALIBRATOR
TYPE: 1000 cycle square wave, having approximately 1 usec rise and decay time, is available at front-panel connector.
VOLTAGE: 9 calibrated ranges provide from 0.2 millivolt to 100 volts peak-to-peak, accurate to within 3%.
CURRENT: 5 ma peak-to-peak, accuracy to within $\pm 3\%$.
CATHODE RAY TUBE
TYPE: 5 AMP mono-accelerator, flat face, with P2 screen. 5000-volt accelerating potential.
FILTER SUPPLIED: Compatible with phosphor, green with P2.
GRATICULE: 10 cm long x 6 cm high marked in centimeter squares; 2 mm subdivisions on horizontal and vertical axes. Controlled edge lighting.
DEFLECTION: Pin type terminals to receive wires or special connector assembly for connection to plates.
DEFLECTION SENSITIVITY: Vertical sensitivity approximately 20 volts/cm. Horizontal sensitivity approximately 35 volts/cm.
INTENSITY MODULATION: +20 voltspulse required to blank CRT trace of normal intensity.
VERTICAL PREAMPLIFIER (EACH CHANNEL)
SENSITIVITY RANGE: 0.02 volt/cm to 50 volt/cm.
INPUT ATTENUATOR: Ten calibrated ranges in 1, 2, 5, 10 sequence from 0.02 volts/cm. Accuracy $\pm 5\%$. A vernier permits continuous adjustment between ranges and extends the 20 volts/cm range to at least 50 volts/cm.
PASS BAND: DC coupled: dc to 14 mc, 0.025 usec rise time. AC coupled: 2 cps to 14 mc.
INPUT IMPEDANCE: 1 megohm (nominal) shunted by 30 uuf.
VERTICAL POSITIONING: Individually adjustable.
POLARITY OF PRESENTATION: Positive up or negative up selectable by front panel control.
ELECTRONIC SWITCHING: By alternate sweep or chopped at approximately 1 mc. Trace blanked during switching.
DIFFERENTIAL INPUT: Both inputs may be

switched to one channel to give differential input. The input attenuators may be set separately to allow mixing signals of different levels.

INPUT ATTENUATOR: Use A and B channel attenuators simultaneously.
COMMON MODE REJECTION: At least 40 db at maximum sensitivity, 30 db when using attenuators.

GENERAL

BEAM FINDER: Pushbutton decreases sensitivity for easy trace location.
POWER REQUIREMENTS: 115 vac $\pm 10\%$, 50 - 400 cps, single phase, approximately 480 watts.

MANUFACTURER'S OR CONTRACTOR'S DATA

Hewlett-Packard Co., Palo Alto, Calif.
Model No. 160A and 162A.
Contract NObsr-75278.

TUBE AND/OR CRYSTAL COMPLEMENT

(2) 1X2B	(1) 5AMP2	(1) 5651WA
(1) 5726/6AL5W	(4) 6CL6	(2) 7308
(7) NE2	(30) 6922	(1) 6005/6AQ5W

Total Tubes: (49)

TRANSISTORS

(1) 2N174A	(6) 2N384	(6) 2N457
(10) 2N526		

Total Transistors: (23)

No Crystals used.

REFERENCE DATA AND LITERATURE

Technical Manual for OSCILLOSCOPE AN/USM-105.

TYPE CLASSIFICATION (NAVY)
DESIGN COGNIZANCE USN, BUSHIPS
PROCUREMENT COGNIZANCE SPEC: SHIPS-0-2955
STOCK NO.
R.D.B. IDENT. NO. 3.1

OSCILLOSCOPE

AN/USM-105

SHIPPING DATA

NUMBER OF BOXES	CONTENTS AND IDENTIFICATION	VOLUME (Cu.Ft.)	OVERALL DIMENSIONS (inches)	WEIGHT PACKED (lbs.)
1	Oscilloscope AN/USM-105	11	21-1/4 X 26-1/2 X 33-1/4	197*

*Includes 14 lbs of desicant.

EQUIPMENT SUPPLIED DATA

QUANTITY PER EQUIPT	NAME AND NOMENCLATURE	OVERALL DIMENSIONS (inches)	WEIGHT (lbs.)
1	Oscilloscope AN/USM-105 includes:	14-3/4 X 19-3/4 X 24	96
1	Oscilloscope OS-82/USM-105	12-1/4 X 18 X 22-7/8	68
1	Vertical Preamplifier (Plug-in Unit) MX-2930/USM-105	6 X 7 X 11-1/4	6
2	Prod, Test MX-2817/U		
2	Connector, Adapter UG-255/U		
2	Connector, Adapter UG-273/U		
4	Connector, Adapter UG-1035/U		
1	Cable Assy, Power Electrical CX-4704/U	96 lg	
2	Cord CG-409E/U	96 lg	
2	Connector, Adapter UG-274A/U		
1	Cover, Oscillator CW-511/USM-105	2-1/2 X 12-1/2 X 19-3/4	8
2	Technical Manual		

25 February 1963

Cog Service: USN

FSN: F6625-785-6500

OSCILLOSCOPE AN/USM-105A

Functional Class: 3.1

USA

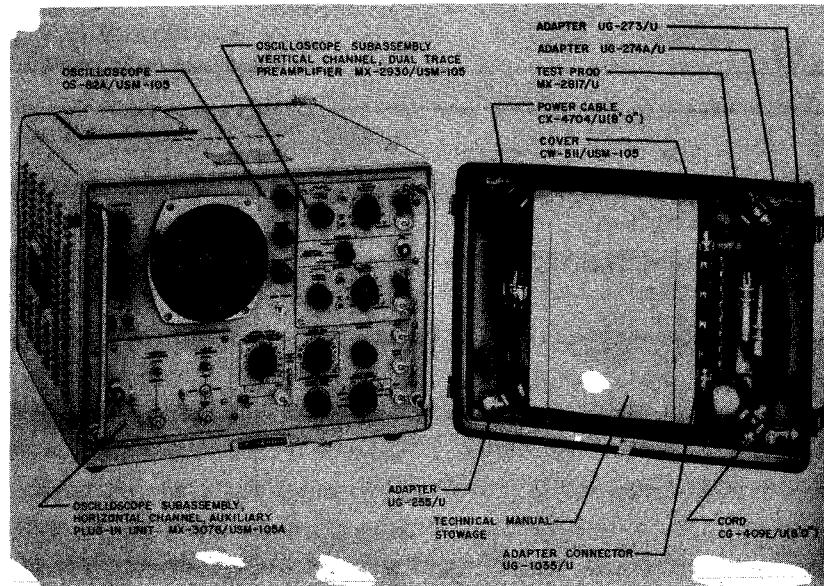
USN

USAF

TYPE CLASS:

Used by

MANUFACTURER'S NAME/CODE NUMBER: Hewlett-Packard Company, (28480).



Oscilloscope AN/USM-105A

FUNCTIONAL DESCRIPTION:

Oscilloscope AN/USM-105A is a general purpose, high-speed laboratory type oscilloscope. It produces a graphical display of simple and complex voltage variations which contain frequency components ranging from zero to 14 megacycles. To simplify operation and the interpretation of the display, the instrument provides calibrated vertical sensitivities, triggered internal sweeps, calibrated sweep times, calibrated expanded sweeps, beam finder, and calibrator.

No field changes in effect at time of preparation (9 November 1962).

TECHNICAL CHARACTERISTICS:

EACH VERTICAL CHANNEL

SENSITIVITY RANGE: .02 volt/cm to 50 volts/cm. Ten calibrated ranges in 1, 2, 5, 10 sequence from 0.02 volt/cm to 20 volts/cm. Accuracy perm 5%. Vernier extends minimum

AN/USM-105A OSCILLOSCOPE

sensitivity to at least 50 volts/cm.

PASS BAND: DC coupled: dc to 14 mc, 0.025 usec rise time. AC coupled: 2 cps to 14 mc.

INPUT IMPEDANCE: 1 megohm (nominal) shunted by 30 pf.

POLARITY OF PRESENTATION: (+)up or (-)up, selectable.

ELECTRONIC SWITCHING: By alternate sweep or chopped at approximately 1 mc, with blanking during switching.

DIFFERENTIAL INPUT: Both input attenuators may be switched to one channel to give differential input. The input attenuators may be set separately to allow mixing signals of different levels.

AMPLIFIER: Channel A.

COMMON MODE REJECTION: At least 40 db at maximum sensitivity; at least 30 db when using attenuators.

SWEEP GENERATOR

INTERNAL SWEEP: 24 ranges, 0.1 usec/cm to 5 sec/cm; perm 3%. Vernier extends slowest sweep to 15 sec/cm.

MAGNIFICATION: 7 calibrated ranges, X1, X2, X5, X10, X20, X50, and X100. Increases fastest sweep speed to 0.02 usec/cm. X1, X2, X5 ranges retain accuracy of original sweep except 0.02 usec/cm rate is 5%.

TRIGGERING: Internal, power line, or vertical input signal (5 mm or more vertical deflection). External (1/2 volt peak-to-peak or more).

TRIGGER POINT: Positive or negative going voltage. Trigger level of external trigger signal adjustable M30 to P30 volts.

SWEEP OUTPUT: M50 to P50 volts, approximately.

GATE OUTPUT: P50 volts approximately, for duration of sweep.

HORIZONTAL AMPLIFIER

PASS BAND: DC coupled: dc to 1 mc. AC coupled: 2 cps to 1 mc.

SENSITIVITY: 7 ranges 0.1 volt/cm to 10 volts/cm. Vernier extends minimum sensitivity to 25 volts/cm.

INPUT IMPEDANCE: 1 megohm (nominal) shunted by 30 pf.

CALIBRATOR

TYPE: 1000 cycle square wave, 1 usec rise and decay time.

VOLTAGE: 9 calibrated ranges perm 3%, 0.2 millivolts to 100 volts peak-to-peak.

CURRENT: 5 milliamperes peak-to-peak, perm 3%.

CATHODE RAY TUBE

TYPE: 5 amp mono-accelerator, flat face, normally with P2 screen. 5000-volt accelerating potential.

FILTER SUPPLIED: Compatible with phosphor, green with P2.

GRATICULE: 10 cm long x 6 cm high in centimeter squares; 2 mm subdivisions on horizontal and vertical axes. Controlled edge lighting.

DEFLECTION PLATE CONNECTION: Pin type terminals.

DEFLECTION SENSITIVITY: Vertical: approx 20 volts/cm. Horizontal: approx 35 volts/cm.

INTENSITY MODULATION: P20 v pulse blanks crt trace of normal intensity.

POWER REQUIREMENTS: 115 v perm 10%, 50 to 400 cps, single phase, approx 480 w.

RELATION TO OTHER EQUIPMENT: None.

EQUIPMENT REQUIRED BUT NOT SUPPLIED: None.

OSCILLOSCOPE AN/USM-105A

MAJOR COMPONENTS

QTY	ITEM	STOCK NUMBERS	DIMENSIONS (INCHES)	WEIGHT (LBS)
1	Oscilloscope AN/USM-105A includes:		14-3/4 x 19-3/4 x 24	96
1	Oscilloscope OS-82A/USM-105		12-1/4 x 18 x 22-7/8	68
1	Dual Trace Preamplifier MX-2930A/USM-105		6 x 7 x 11-1/4	6
2	Prod, Test MX-2817/U			
2	Connector, Adapter UG-255/U			
2	Connector, Adapter UG-273/U			
4	Connector, Adapter UG-1035/U			
1	Cable Assy, Power, Electrical CX-4704/U		96 lg	
2	Cord CG-409E/U		96 lg	
2	Connector, Adapter UG-274A/U			
1	Cover, Oscilloscope CW-511/USM-105		2-1/2 x 12-1/2 x 19-3/4	8
1	Auxiliary Plug-In MX-3078/USM-105A		4-5/8 x 6 x 10-7/8	1.9
2	Technical Manual NAVSHIPS 93658			

REFERENCE DATA AND LITERATURE:

NAVSHIPS 93658: Technical Manual for Oscilloscope AN/USM-105A.

TUBE, CRYSTAL AND/OR SEMI-CONDUCTOR DATA:

TUBES: (2) 1X2B (1) 6005/6AQ5W (1) 5AMP2 (1) 5651WA (1) 5726/6AL5W (4) 6CL6
(4) 7308 (29) 6922 (7) NE2

CRYSTALS: None used.

SEMI-CONDUCTORS: (1) 2N174A (6) 2N384 (8) 2N457 (10) 2N526

SHIPPING DATA

PKGS	VOLUME (CU FT)	WEIGHT (LBS)
1	1.1	197*

*Includes 14 lbs of desiccant.

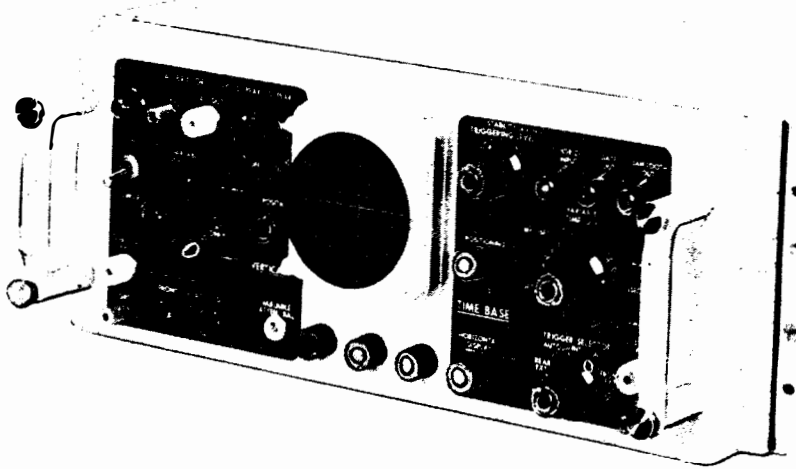
PROCUREMENT DATA

PROCURING SERVICE: USN
SPEC &/OR DWG: MIL-0-22237(SHIPS)

DESIGN COG: USN, BuShips

AN/USM-105A OSCILLOSCOPE

CONTRACTOR	LOCATION	CONTRACT OR ORDER NO.	APPROX. UNIT COST
Hewlett-Packard Company	Palo Alto, California	N0bsr-75278 N0bsr-81535	\$1,832.70 2,000.00

OSCILLOSCOPE**AN/USM-109****A 382***Oscilloscope AN/USM-109***FUNCTIONAL DESCRIPTION**

Oscilloscope AN/USM-109 is a compact, general purpose oscilloscope. It has calibrated vertical and horizontal amplifiers which permit easy measurement of various characteristics of the input signal, including amplitude, frequency, and pulse width.

No field changes in effect at time of preparation (12 January 1960).

EQUIPMENT REQUIRED BUT NOT SUPPLIED

(1) Senior Volt Ohmyst (RCA) Type WV-97A and High Voltage Probe (RCA) Type WG-289; (1) Square Wave Generator (Tektronix) Type 1-7 (or equal); (1) Time-Mark Generator (Tektronix) Type 180A (or equal); (1) Universal Polyranger (Sensitive Research and Instrument) Model USP; (1) Variac (General Radio) Model V-5MT; (1) Resistance Bridge ZM-4/U; (1) Signal Generator (Hewlett Packard) Model 650-A.

ELECTRICAL AND MECHANICAL CHARACTERISTICS**VERTICAL DEFLECTION**

UNCLASSIFIED

INPUT IMPEDANCE

DIRECT CONNECTION: 1 meg in parallel with 38 uuf.

WITH ATTENUATOR PROBE: 10 meg in parallel with 13 uuf.

SENSITIVITY

CALIBRATED, AC COUPLED: 9 calibrated vertical sensitivities 0.01 to 50 μ per scale div, accurate within 3%.

UNCALIBRATED: Continuously variable sensitivities, 0.01 to 125 v per scale.div.

FREQUENCY RESPONSE (VARIABLE VOLTS/DIV. SWITCH AT ANY POSITION BETWEEN 0.1 AND 50).

AC COUPLED: 2 cps to 10 mc.

DC COUPLED: DC to 10 mc.

AC COUPLED, WITH ATTENUATOR PROBE: 0.2 cps to 10 mc.

AC COUPLED, WITH ATTENUATOR PROBE (SWITCH BETWEEN 0.01 AND 0.05): 1.3 cps to 10 mc.

RISE TIME: 0.035 usec.

HORIZONTAL DEFLECTION**SWEEP RATE**

CALIBRATED: 22 calibrated sweep rates from 2 sec to 0.2 usec per scale div, accurate within 3%.

UNCALIBRATED: Continuously variable

Test-Wave Form Measuring

AN/USM-109

OSCILLOSCOPE

sweep rates from 6 sec to 0.2 usec per scale div.

MAGNIFIER: Expands sweep 5 times to the right and left of the screen center; extends fastest sweep to 0.04 usec per scale div, accurate within 5%.

TRIGGERING SIGNAL

INTERNAL: Pulse with an amplitude equal to 0.2 scale div.

EXTERNAL: 0.2 to 10 v peak-to-peak.

FREQUENCY RANGE: DC to 15 mc.

SYNCHRONIZING FREQUENCY RANGE: 5 mc to 15 mc.

HORIZONTAL INPUT

DEFLECTION FACTOR: Approx 1.3 v per scale div.

FREQUENCY RESPONSE: DC to 500 kc.

VOLTAGE CALIBRATOR

OUTPUT WAVEFORM: Square wave at approx. 1 kc.

VOLTAGES: 11 fixed voltages from 0.05 to 100 v peak-to-peak; accurate within 3%.

OUTPUT WAVEFORMS AVAILABLE

GATE OUTPUT: Positive gate of same duration as sweep, approx. 30 v.

SAWTOOTH OUTPUT: Positive-going sweep sawtooth, approx. 150 v.

POWER REQUIREMENTS

LINE VOLTAGE: 105, 115, or 125 v, 50 to 60 cy.

OPERATING POWER: 350 W (approx).

STARTING: 13 amp (first sec).

OPERATING CURRENT: 2.6 amp (after 5 sec).

MANUFACTURER'S OR CONTRACTOR'S DATA

Sylvania Electronic Systems, Div of Sylvania Electric Products Inc, Buffalo, New York.
Contract NObsr-75232.

TUBE AND/OR CRYSTAL COMPLEMENT

(3) 6AN8	(8) 6AU6WA	(1) 6AQ5WA
(7) 6BQ7A	(1) 5651WA	(1) T32P1
(2) 6CL6	(3) 6V8	(1) 12AT7WA
(2) 5642	(1) 6CB6	(1) 5687WA
(1) 5726	(1) 5814A	(1) 6080WA

Total Tubes: (34)
No Crystals used.

REFERENCE DATA AND LITERATURE

NAVSHIPS 93450: Technical Manual for OSCILLOSCOPE AN/USM-109 and OS-100/USM-109.

TYPE CLASSIFICATION (NAVY)
DESIGN COGNIZANCE USN, BUSHIPS
PROCUREMENT COGNIZANCE
STOCK NO.
R.D.B. IDENT. NO. 3.1

SHIPPING DATA

NUMBER OF BOXES	CONTENTS AND IDENTIFICATION	VOLUME (Cu.Ft.)	OVERALL DIMENSIONS (inches)	WEIGHT PACKED (lbs.)
1	Oscilloscope AN/USM-109	1.61	6.875 X 19.5 X 23.5	55

EQUIPMENT SUPPLIED DATA

QUANTITY PER EQUIPT	NAME AND NOMENCLATURE	OVERALL DIMENSIONS (inches)	WEIGHT (lbs.)
1	Oscilloscope AN/USM-109 includes:		
1	Oscilloscope OS-100/USM-109		
1	Green Filter F510-5		
1	Attenuator Probe P510A		
1	Binding-Post Adapter A510		

26 June 1962

Cog Service: USN FSN: 6625-787-0304

OSCILLOSCOPE AN/USM-117

Functional Class: 3.1

USA

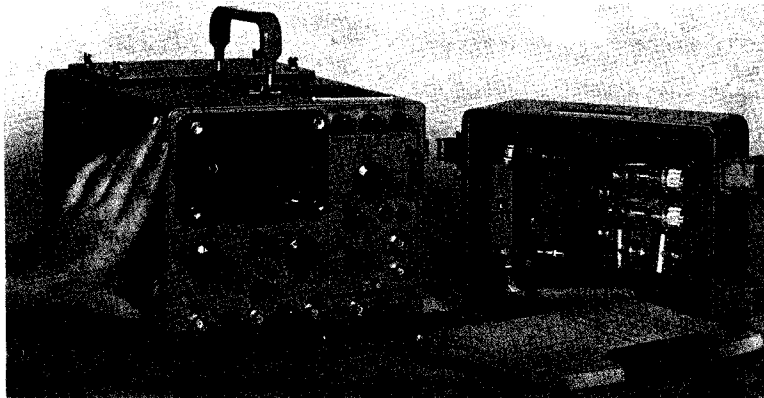
USN

USAF

TYPE CLASS:

Std

MANUFACTURER'S NAME/CODE NUMBER: Electronic Tube & Instrument Div.
of General Atronics Corp., (20183).



Oscilloscope AN/USM-117

FUNCTIONAL DESCRIPTION:

Oscilloscope AN/USM-117 is an instrument for observing and measuring wave forms to give visual indications on a cathode-ray tube of instantaneous values and variations in electrical voltage. It can be used also to indicate any of these values that can be converted into terms of electrical potential. It may include an integral pulse generator whose output can be used to trigger an external component. The oscilloscope may also be triggered by a pulse from an external source. The items that are separable and not operable when detached are the high gain plug-in, the preamplifier, and the dual trace switch preamplifier plug-in.

No field changes in effect at time of preparation (5 April 1962).

TECHNICAL CHARACTERISTICS:

POWER REQUIREMENTS: 115 v porm 10%, 50 to 60 cyc or 400 cyc, single ph, 25 W.

HORIZONTAL

AN/USM-117 OSCILLOSCOPE

BANDWIDTH: DC to 500 kc, within 3 db.
SENSITIVITY: 0.5 v per div, 1.0 per div, 2.5 v per div, 5.0 v per div.
INPUT IMPEDANCE: 100,000 ohms (min) shunted by 30 uuf (max).

SWEEP
SWEEP RANGE: Adjustable in 19 calibrated steps in 1, 2, 5, 10 sequence from 0.1 usec per div to 0.1 sec per div; accuracy 3%.
SWEEP MAGNIFIER: May be expanded 5 times with accuracy of 3% for sweep speed of 0.1 usec per div or slower.
GATE OUTPUT: Output voltage is approx. 20 v peak-to-peak.

TRIGGER
TRIGGER SLOPE
INTERNAL: +, - vertical signal at least 1/2 div.
EXTERNAL: +, - ac or dc coupled at least 0.5 v.
LINE: +, - line frequency.

VERTICAL PLUG-IN MX-2996/USM-117
BANDWIDTH
DIRECT COUPLED: DC to 5 mc within 3 db.
CAPACITY COUPLED: 2 cps to 5 mc within 3 db.
SENSITIVITY: Adjustable in 11 calibrated steps in 1, 2, 5, 10 sequence from 0.01 v per div to 20 v per div; accuracy 5%.
INPUT IMPEDANCE: 1 meg shunted by 47 uuf max.
INPUT ISOLATION: 50 db min between INPUT A and INPUT B.

CALIBRATOR
WAVE SHAPE: Square wave of 1 kc (porm 10%) with rise and fall time of 1.5 usec max.
VOLTAGE AMPLITUDE: 0.04 and 0.4 v peak-to-peak, accuracy 2%.

CATHODE-RAY TUBE CHARACTERISTICS
TYPE: 2-1/4 in. by 3-1/4 in. flat face, helical band, 3 kv post accelerator type 4QP crt with P2 phosphor screen.
GRATICULE: Edge illuminated type, 10 div long by 8 div high (1 div = 1/4 in.); green filter, compatible with P2 phosphor.

DEFLECTION FACTORS
VERTICAL DEFLECTION PLATE (D3-D4) FACTOR: Approx. 4.0 v per div.
HORIZONTAL DEFLECTION PLATE (D3-D4) FACTOR: Approx. 6.8 v per div.
INTENSITY MODULATION: Signal of P40 v is required to blank the screen.

RELATION TO OTHER EQUIPMENT:

This equipment replaces AN/USM-32, OS-8C/U, AN/USM-24C (in part), Tektronix 310, AN/UPN-45 (with dual trace plug-in preamplifier).

EQUIPMENT REQUIRED BUT NOT SUPPLIED: None.

MAJOR COMPONENTS

QTY	ITEM	STOCK NUMBERS	DIMENSIONS (INCHES)	WEIGHT (LBS)
1	Oscilloscope AN/USM-117 includes:		8-9/16 x 9-13/16 x 18-1/4	23

4.3 AN/USM-117: 2

OSCILLOSCOPE AN/USM-117

QTY	ITEM	STOCK NUMBERS	DIMENSIONS (INCHES)	WEIGHT (LBS)
1	Oscilloscope OS-106/USM-117		8-9/16 x 9-5/32 x 15-27/32	17
1	Vertical Channel, High Gain Preamplifier MX-2996/USM-117		3-1/8 x 4-13/16 x 9	2
2	Prod, Test MX-2817/U			
1	Cover, Oscilloscope CW-541/USM-117		4 x 7 x 9-13/16	4
1	Cable Ass'y, Power, Electric CX-4704/U		96 lg	
2	Cable Ass'y, R.F. CG-409E/U		96 lg	
2	Connector, Adapter UG-1035/U			
2	Connector, Adapter UG-255/U			
2	Connector, Adapter UG-273/U			
2	Connector, Adapter UG-274A/U			
2	Technical Manual NAVSHIPS 94344(A)			

REFERENCE DATA AND LITERATURE:

NAVSHIPS 94344(A): Technical Manual for Oscilloscope AN/USM-117.

TUBE, CRYSTAL AND/OR SEMI-CONDUCTOR DATA:

TUBES: (1) 4QP-2

CRYSTALS: None used.

SEMI-CONDUCTORS: (1) 2N388 (2) 2N780 (13) 2N711 (1) 2N965 (8) 2N1225 (1) 2N337
 (3) 2N1304 (4) 2N1226 (1) 2N706 (1) 2N338 (1) 2N1309 (1) 2N863
 (1) 2N1307 (6) 2N1305 (2) 2N1547 (5) 1N643 (2) 1N751A
 (1) 1N30318 (3) 1N752A (1) 1N756A (12) 1N538 (2) 1N914 (2) KX1140
 (1) KX1139 (1) 1N3051B (4) S2540 (4) 2N1546

SHIPPING DATA

PKGS	VOLUME (CU FT)	WEIGHT (LBS)
1		

PROCUREMENT DATA

PROCURING SERVICE: USN
 SPEC &/OR DWG: SHIPS-0-3284

DESIGN COG: USN, BuShips

AN/USM-117 OSCILLOSCOPE

CONTRACTOR	LOCATION	CONTRACT OR ORDER NO.	APPROX. UNIT COST
Electronic Tubes & Instrument Div. of General Atronics Corp. Model no. K-106	Philadelphia, Pa.	N0bsr-81021, 24 March 1960	\$1,143.30

18 February 1963
Cog Service: USN

FSN:

OSCILLOSCOPE AN/USM-120(XN-1)
Functional Class: 3.1

USA

USN

USAF

TYPE CLASS:

Used by

MANUFACTURER'S NAME/CODE NUMBER: Tektronix, Inc., (92404).

(No Illustration Available)

FUNCTIONAL DESCRIPTION:

The AN/USM-120(XN-1) is a cabinet mounted equipment designed for observing and precisely measuring wave-forms.

No field changes in effect at time of preparation (7 February 1963).

TECHNICAL CHARACTERISTICS:

TYPE OF PRESENTATION: 5-inch screen.

SWEEP CIRCUIT DATA: 12 sec per cm to 0.02 usec/cm.

TRIGGER DATA

TYPE OF SWEEP: Variable sweep.

DURATION: 0.2 to 100 v peak-to-peak amplitude.

RATED DEFLECTION SENSITIVITY THROUGH AMPLIFIER

VERTICAL: 0.05 v peak-to-peak per cm.

HORIZONTAL: 0.2 v peak-to-peak per cm.

RATED SENSITIVITY DATA FOR DIRECT CONNECTION

VERTICAL: 7 v peak-to-peak per cm.

HORIZONTAL: 33 v peak-to-peak per cm.

RATED FREQUENCY RESPONSE

X-AXIS: DC to 240 kc per sec.

Y-AXIS: DC to 24 kc per sec.

RATED IMPEDANCE FOR AMPLIFIER INPUT

X-AXIS: 1 meg.

Y-AXIS: 1 meg.

OPERATING POWER RQMT: 115 v ac, 50 to 450 cps, single ph.

RELATION TO OTHER EQUIPMENT:

The AN/USM-120(XN-1) is Tektronix, Inc., Model 945 plus Model MC dual trace plug-in.

EQUIPMENT REQUIRED BUT NOT SUPPLIED: None.

MAJOR COMPONENTS

QTY	ITEM	STOCK NUMBERS	DIMENSIONS (INCHES)	WEIGHT (LBS)
1	Oscilloscope AN/USM-120(XN-1) consists of:		13 x 18 x 25-1/2	

4.3 AN/USM-120(XN-1): 1

AN/USM-120(XN-1) OSCILLOSCOPE

QTY	ITEM	STOCK NUMBERS	DIMENSIONS (INCHES)	WEIGHT (LBS)
1	Oscilloscope OS-108/USM-120(XN-1)		13 x 18 x 25-1/2	
2	Adapter UG-255/U			
2	Adapter UG-273/U			
2	Connector, Adapter UG-1035/U			
2	Cable, BNC RG-58/U		24 lg	
1	Cable, BNC RG-58/U		48 lg	
2	Connector, Adapter UG-914/U			
2	Adapter UG-274A/U			
2	Cover, Oscilloscope CW-552/USM-120(XN-1)		3.7 x 14 x 18.3	
1	Oscilloscope Subassembly, Vertical Channel, Dual Trace Preamplifier MX-3057/USM-120(XN-1)			
1	Prod Test MX-3058/U		7/8 dia x 49 lg	
1	Set of Accessories			

REFERENCE DATA AND LITERATURE:

TUBE, CRYSTAL AND/OR SEMI-CONDUCTOR DATA:

TUBES: Data not available.

CRYSTALS: Data not available.

SEMI-CONDUCTORS: Data not available.

SHIPPING DATA

PKGS	VOLUME (CU FT)	WEIGHT (LBS)
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PROCUREMENT DATA

PROCURING SERVICE: USN
SPEC &/OR DWG: MIL-T-945A

DESIGN COG: USN, BuShips

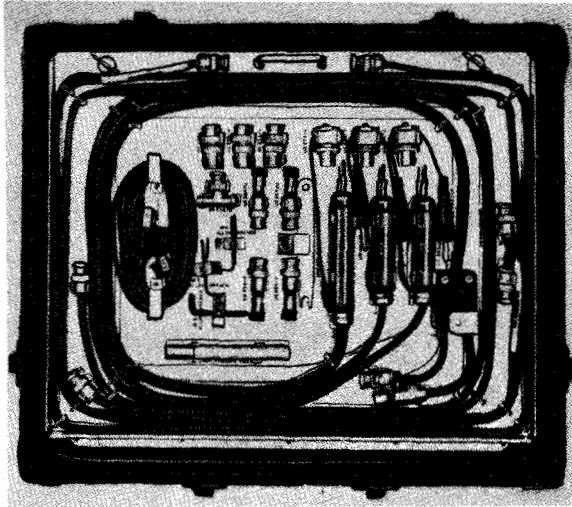
CONTRACTOR	LOCATION	CONTRACT OR ORDER NO.	APPROX. UNIT COST
Tektronix, Inc., Military Products Div., Model 945 Plus Model MC Dual Trace Plug-in	Beaverton, Oregon		

4.3 AN/USM-120(XN-1): 2

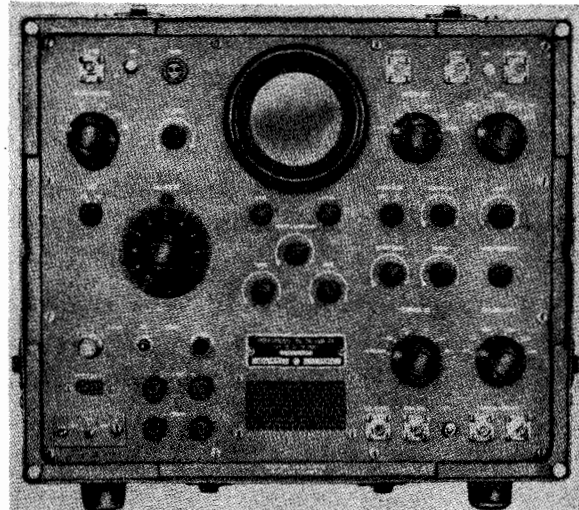
April 1958

OSCILLOSCOPE

AN/USM-24



Oscilloscope* AM/USM-24



Oscilloscope AM/USM-24

FUNCTIONAL DESCRIPTION

The AN/USM-24 is a portable test set for bench-testing all types of electronic equipment. It displays time variation of a voltage pulse or wave with self-contained means for measuring its duration, displacements, and instantaneous magnitude. A 3 inch cathode ray tube is used, equipped with a light shield assembly with an edge lit plexiglass graph screen and green light filter. Auxiliary features include a calibrating generator for accurate measurement of instantaneous values of signal without recourse to external standards, a choice of five time markers, for accurate time measurements and a trigger generator with five fixed ranges for triggering both the oscilloscope and external apparatus.

No field changes in effect at time of preparation (20 December 1957).

ELECTRICAL AND MECHANICAL CHARACTERISTICS

CRT SIZE: 3 in.
 SWEEP TIME: 0.5 to 50,000 usec per in. continuously adjustable.
 SWEEP CIRCUIT: Trigger or periodic.
 TIMING MARKERS: 0.2, 1, 10, 100 or 500 usec.
 TRIGGER PULSE OUTPUT
 VOLTS: 55.

PULSE WIDTH: 1.5 usec.
 RISE TIME: 0.1 usec.
 PULSE RATE: 50, 300, 800, 2000, or 5000 per sec.
 SINE WAVE RESPONSE: Flat within -3 db from 2.0 to 8.0 mc; flat within -6 db from 1.5 to 11 mc.
 TRANSIENTS RESPONSE: 0.04 usec rise.
 TILT: Less than 5% for 200 cps square wave.
 AMBIENT TEMP LIMITS: -54 deg C (-65 deg F) to 65 deg C (150 deg F).
 INPUT IMPEDANCE
 V INPUT: 300,000 ohms.
 V PLATE: 2.2 meg paralleled by 14 uuf.
 H INPUT: 5.6 meg paralleled by 25 uuf.
 SYNC INPUT: 300,000 ohms paralleled by 25 uuf.
 BEAM MOD: 56000 ohms paralleled by 25 uuf.
 OUTPUT VOLTAGE LOAD IMPEDANCE
 H OUTPUT: 65 v peak, 33000 ohms min.
 CAL OUTPUT: 65 v pp 50000 ohms min.
 TRIGGER: 55 v peak, 375 ohms min.
 INPUT SENSITIVITY VOLTAGE LIMITS

	Sig Volts	Total Peak Volts
V INPUT:	0.5v/in min to 150 v max	400
V PLATE:	110v/in min to 150 v max	+600, -150
H INPUT:	3.5v/in. min to 40 v max	400
SYNC INPUT:	0.5 v min to 150 v max	150
BEAM MOD:	1.5v min to 50 v max	400

 POWER SOURCE REQUIRED: 100 to 130 v, 50 to 1000 cps, 220 W.

Test-Wave Form Measuring

AN/USM-24**OSCILLOSCOPE**

April 1958

MANUFACTURER'S OR CONTRACTOR'S DATA

No Crystals.

Waterman Products Co, Inc; Philadelphia,
Pa.

Contr NObsr-49230, dated 19 June 1950.

Contr NObsr-52205, dated 15 Jan 1951.

REFERENCE DATA AND LITERATURENAVSHIPS 91687(A), Technical Manual for
Oscilloscope AN/USM-24.**TUBE AND/OR CRYSTAL COMPLEMENT**

(1) 0A2WA	(1) 3JP1
(2) 6AN5WA	(4) 6X4WA
(2) 1V2	(3) 5726/6AL5W
(1) 6CB6	(4) 12AT7WA
(1) 5744WA	(1) 6C4WA
(10) 12AU7	(2) 6AH6
(1) 6J6WA	

Total Tubes: (33)

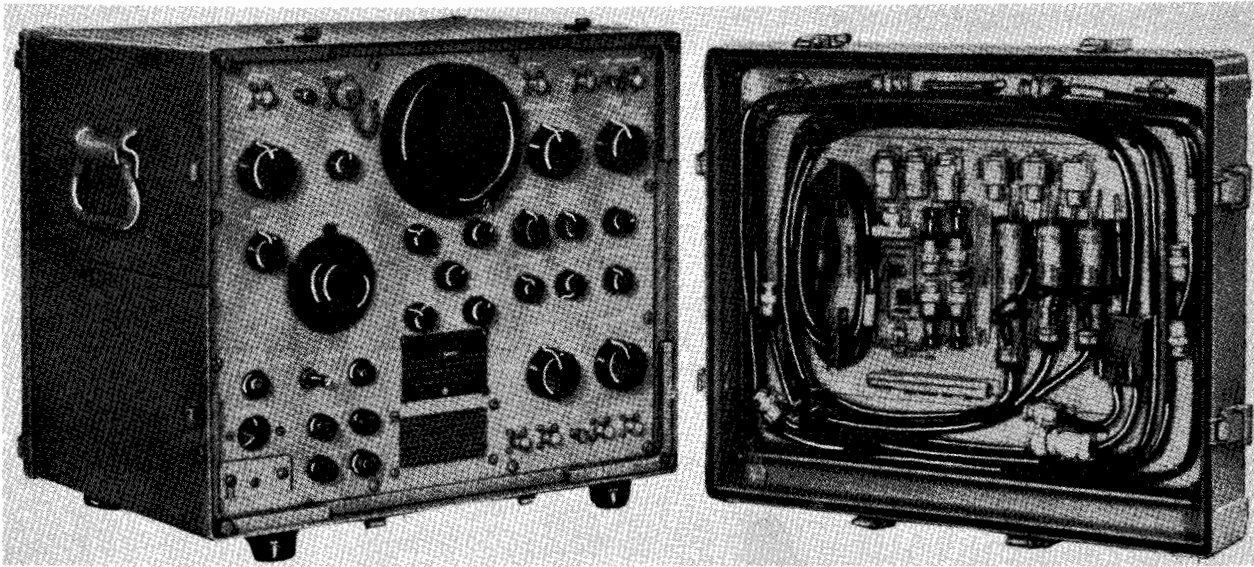
TYPE CLASSIFICATION
DESIGN COGNIZANCE BUSHIPS
PROCUREMENT COGNIZANCE
STOCK NO.

SHIPPING DATA

NUMBER OF BOXES	CONTENTS AND IDENTIFICATION	VOLUME (Cu.Ft.)	OVERALL DIMENSIONS (inches)	WEIGHT PACKED (lbs.)
1	Oscilloscope AN/USM-24	6.25	19-1/4 X 21-3/4 X 24-1/4	100

EQUIPMENT SUPPLIED DATA

QUANTITY PER EQUIPT	NAME AND NOMENCLATURE	OVERALL DIMENSIONS (inches)	WEIGHT (lbs.)
1	Oscilloscope OS-26/USM-24	13 X 15 X 17-1/8	48.0
1	Power Cable	72-3/4 lg	0.187
5	Lead Test		
	(2) CG-409/U	9/16 od X 96 lg	0.561
	(2) CG-883/USM-24	13/16 od X 58-1/2 lg	0.625
	(1) CG-944/AP	1-1/4 X 41-3/8 lg	0.5
11	Adaptors		
	(3) UG-255/U	5/8 od X 1-3/8	0.187
	(4) UG-924/U	9/16 od X 1-13/16	0.187
	(3) UG-273/U	3/4 od X 1-3/8	0.187
	(1) UG-274/U	9/16 od X 1-1/8 X 1-5/16	0.0625
1	Cover, Combination Case CW-268/USM-24	2-3/4 X 14-5/16 X 17-1/8	5.375
3	Allen Wrench #4, #6 and #8		
2	Spanner Wrench TWA001 and TWA002	1/2 od X 4	0.0625
		7/16 od X 4	0.0625
1	Set of Equipment Spares		

OSCILLOSCOPE**AN/USM-24A***Oscilloscope AN/USM-24A***FUNCTIONAL DESCRIPTION**

Oscilloscope AN/USM-24A is a portable, field-type synchroscope used in bench-testing of radar and communication equipment. It displays time variation of a voltage pulse or wave with self-contained means for measuring its duration, displacements, and instantaneous magnitude.

No field changes in effect at time of preparation (26 March 1959).

RELATION TO OTHER EQUIPMENT

This equipment, similar to Oscilloscope AN/USM-24 except for minor changes in components.

ELECTRICAL AND MECHANICAL CHARACTERISTICS

POWER REQUIREMENTS: 240 W, 100 to 130 v, 50 to 450 cps, 1 ph.
FREQUENCY RANGE: 8 to 800 kc.
INPUT IMPEDANCE: 4.5 meg paralleled by 25 uuf (hor); 300,000 ohms paralleled by 37

uuf (vert); 56,000 ohms paralleled by 25 uuf (beam modulation).

DEFLECTION SENSITIVITY: 0.158 v rms/in. (vert); 9.9 v rms/in. (horz).

FREQUENCY RESPONSE: 0.5 cy to 1.5 mc (hor); 1.5 cy to 10 mc (vert); 50 cy to 10 mc (beam modulation).

SWEEP TIME: 1.25 to 125,000 usec (continuously adjustable).

SENSITIVITY: 158 mv peak to peak/in.

TEMPERATURE RANGE: -54° C to +55° C.

MANUFACTURER'S OR CONTRACTOR'S DATA

Fada Radio and Electric Co., Inc., Belleville, New Jersey.

Contract NObsr-52510, 13 June 1952.

TUBE AND/OR CRYSTAL COMPLEMENT

(1) 0A2	(2) 1AX2	(1) 3JP1
(3) 6AH6	(2) 6AL5W	(2) 6AN5
(1) 6135	(1) 6J6W	(4) 6X4W
(5) 12AT7WA	(9) 5814	(1) 5744/WA

Total Tubes: (32)

April 1959

Test-Wave Form Measuring

AN/USM-24A**OSCILLOSCOPE**

No Crystale used.

REFERENCE DATA AND LITERATURE

NAVSHIPS 92043: Technical Manual for Oscilloscope AN/USM-24A.

TYPE CLASSIFICATION	
DESIGN COGNIZANCE	8USHIPS
PROCUREMENT COGNIZANCE	SPEC MIL-0-15458A
STOCK NO.	(SHIPS)
R.D.B. IDENT. NO.	3.2

SHIPPING DATA

NUMBER OF BOXES	CONTENTS AND IDENTIFICATION	VOLUME (Cu.Ft.)	OVERALL DIMENSIONS (inches)	WEIGHT PACKED (lbs.)
1	Oscilloscope AN/USM-24A	4.96	18-7/8 X 19-1/2 X 23	105

EQUIPMENT SUPPLIED DATA

QUANTITY PER EQUIPT	NAME AND NOMENCLATURE	OVERALL DIMENSIONS (inches)	WEIGHT (lbs.)
1	Oscilloscope AN/USM-24A including:	14-1/2 X 14-5/8 X 17-1/8	56
1	Oscilloscope OS-42/USM-24A	12-1/4 X 14-1/2 X 17-1/8	48
1	Cable Assy CX-2570/U	74 lg	0.19
2	Cable Assy CG-409/U	9/16 od X 96 lg	0.56
2	Test Lead CG-883/USM-24	13/16 od X 58-1/2 lg	0.63
1	Test Lead CG-1110/U	1-1/4 od X 41-3/8 lg	0.5
3	Adapter UG-255/U	5/8 od X 1-3/8 lg	0.03
4	Adapter UG-924/U	9/16 od X 1-3/16 lg	0.03
3	Adapter UG-273/U	3/4 od X 1-3/8 lg	0.03
1	Adapter UG-274/U	9/16 od X 1-1/8 X 1-5/16 lg	0.03
1	Allen Wrench No. 4		
1	Allen Wrench No. 6		
1	Allen Wrench No. 8		
1	Spanner Wrench, Flat	1/2 X 4 lg	0.06
1	Spanner Wrench, Round	7/16 od X 4 lg	0.06
1	Oscilloscope Cover CW-321/USM24A	2 3/4 X 14-15/16 X 17-1/8	5.38
2	Technical Manual		

20 February 1963

Cog Service: USN

FSN: F6625-635-4871

OSCILLOSCOPE AN/USM-25

Functional Class: 3.1

USA

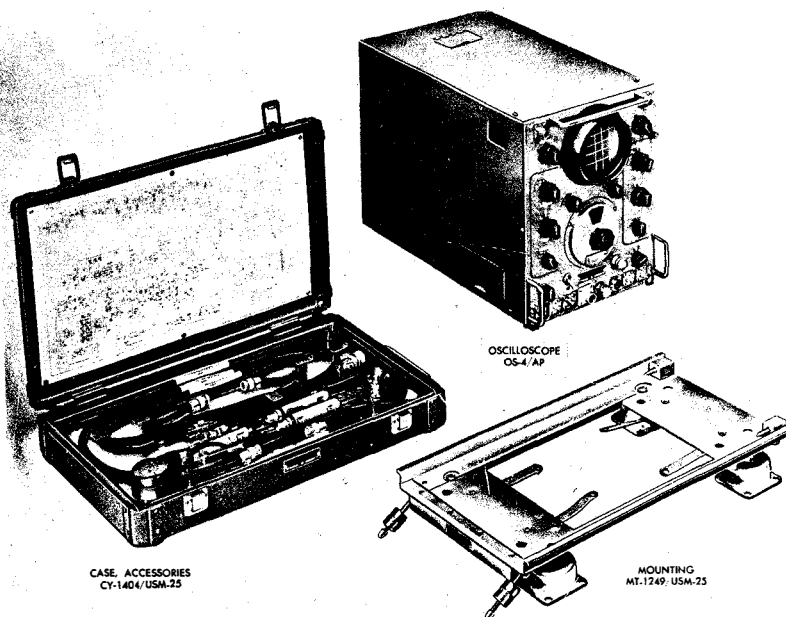
USN

USAF

TYPE CLASS:

Used by

MANUFACTURER'S NAME/CODE NUMBER: Waterman Products Co., Inc., (63982).



Oscilloscope AN/USM-25

FUNCTIONAL DESCRIPTION:

Oscilloscope AN/USM-25 is a portable instrument for portraying a luminous plot of instantaneous voltage against a time base. This equipment is intended for flight or non-flight auxiliary radar ranging, as well as bench-testing of radar equipment and other electronic devices.

No field changes in effect at time of preparation (22 May 1962).

TECHNICAL CHARACTERISTICS:

DISPLAY

CATHODE RAY TUBE: 3 in. face with 1000 v accelerating potential.

INTENSITY INPUT

DIRECT TO CATHODE OF CRT THRU 5000 UWF: Negative signal to intensify trace.

INPUT IMPEDANCE: 47000 ohms shunted by 33 uuf.

AN/USM-25 OSCILLOSCOPE

VIDEO

SENSITIVITY

AMPLIFIER ALONE: 0.5 v peak-to-peak/in.
WITH MX-1312/AP: 5.0 v peak-to-peak/in.
WITH CG-1075/USM-25: 0.8 v peak-to-peak/in.
CRT DIRECT TO VERTICAL DEFLECTING PLATE: 50 v peak-to-peak/in.

FREQUENCY RESPONSE

AMPLIFIER ALONE: 3 cps to 11 mc between 6 db points.
WITH CG-1075/USM-25: 20 cps to 8 mc between 6 db points.
WITH MX-1313/AP: 10 cps to 15000 cps between 6 db points.

PULSE RESPONSE

RISE TIME: Less than 0.07 usec.
DELAY TIME: Less than 0.07 usec.
200 CYCLE SQUARE WAVE DROOP: Less than 5%.

INPUT IMPEDANCE

AMPLIFIER: 1 meg shunted by 25 uuf.
MX-1312/AP: 1 meg shunted by 9 uuf.
CG-1075/USM-25: 1 meg shunted by 9 uuf.
MX-1313/AP: 24000 ohms shunted by 8 uuf.
CRT, VERTICAL DIRECT: 2.2 meg shunted by 20 uuf.

DELAY TIME: 0.55 usec.

DEFLECTION POLARITY: Spot deflects upward for positive input signal.

TIME BASE

SWEEP DIRECTION: Left to right.

SWEEP TYPE: Start-stop type, each sweep independent of preceding one; "S" mode sweeps can be recurrent.

SWEEP RANGES

"A" AND "S" MODES: 1.2 to 12000 usec.
"R" MODE: 2.4 to 24 usec; inoperative on 1.2 to 12 usec range.
SWEEP DELAY: 3 to 10000 usec; inoperative on 1.2 to 12 usec range.

SYNCHRONIZING

MARKERS

CONTROL: Crystal.
RATE: 10 usec or 2000 yds; 50 usec or 10000 yds.
ACCURACY: Form 0.03%.
POLARITY: Pos or neg.
PRESENTATION: Amplitude.

MARKER OUTPUT

INTERNAL IMPEDANCE: 70 ohms.
OUTPUT: 12 v peak.

SYNC INPUT

VOLTAGE

"A" AND "R" MODE

AMPLITUDE: 15 v peak min.
RISE TIME: 10 usec min.
POLARITY: Pos or neg.

"S" MODE

EXT: 1.1 v peak-to-peak.
SINE WAVE: 2 v peak-to-peak min.

INTERNAL

POSITIVE OR NEGATIVE PULSE: 0.15 v peak-to-peak min.
SINE WAVE: 0.3 v peak-to-peak min.

REPETITION RATE

"A" AND "R" MODE INTERNAL: 40 to 3300 pps.
"A" AND "R" MODE EXTERNAL: 6000 pps (max).
"S" MODE: 20000 pps; 20 to 1000000 cps sine wave input.

SYNC INPUT IMPEDANCE

"A" AND "R" MODES EXT
POSITIVE: 330000 ohms shunted by 15 uuf.
NEGATIVE: 330000 ohms shunted by 19 uuf.
"S" MODE: 1 meg shunted by 17 uuf.

TRIGGER OUTPUT

NO LOAD
AMPLITUDE: 55 v peak.
RISE TIME: 0.2 usec.
WITH LOAD OF 1,000 OHMS SHUNTED BY 200 UUF
AMPLITUDE: 45 v peak.
RISE TIME: 0.2 usec.

POWER REQUIREMENTS: 150 W, 115 v porm 10%, 50 to 1000 cyc, single ph.
AMBIENT TEMPERATURE: M40 to P55 deg C (M40 to P131 deg F).
ALTITUDE: 10000 ft.
MAXIMUM RELATIVE HUMIDITY: 95%.

RELATION TO OTHER EQUIPMENT: None.

EQUIPMENT REQUIRED BUT NOT SUPPLIED: None.

MAJOR COMPONENTS

QTY	ITEM	STOCK NUMBERS	DIMENSIONS (INCHES)	WEIGHT (LBS)
1	Oscilloscope AN/USM-25 includes:			
1	Oscilloscope OS-4/AP		9-1/8 x 11-1/4 x 17-1/4	31.5
1	Mounting MT-1249/USM-25		2-5/8 x 10 x 19-7/16	2.6
1	Case, Accessories CY-1404/USM-25		3-1/16 x 11-1/2 x 17-1/2	5.8
1	Prod, Test MX-1312/AP		7/8 dia x 4-9/16	0.18
1	Prod, Test MX-1313/AP		7/8 dia x 4-9/16	0.18
1	Lead, Test CG-1075/USM-25		1 dia x 5	0.44
1	Cable Assy, Power, Electrical CX-1862/U		1 dia x 72	0.35
1	RF Cable Assy CG-530/U		9/16 dia x 37	0.18
1	RF Cable Assy CG-530/U		9/16 dia x 97	0.37
1	Modification Kit includes:			
1	Dial, Outer		3-1/8 dia x 11/32	0.064
1	Dial, Inner		2-1/4 dia x 17/64	0.064

AN/USM-25 OSCILLOSCOPE

QTY	ITEM	STOCK NUMBERS	DIMENSIONS (INCHES)	WEIGHT (LBS)
1	Crystal		1-11/16 dia x 1-9/16	0.22
1	Wrench, Spanner		7/16 dia x 4-1/8	0.032
1	Wrench, Allen no. 4		1-3/4 x 5/8	0.08
1	Wrench, Allen no. 6		2 x 5/8	0.08
1	Wrench, Allen no. 8		3/4 x 2-1/4	0.008

REFERENCE DATA AND LITERATURE:

AN16-30USM25-11: Handbook of Operation Instructions for Oscilloscope AN/USM-25.
AN16-30USM25-12: Handbook of Service Instructions for Oscilloscope AN/USM-25.
AN16-30USM25-13: Handbook of Overhaul Instructions for Oscilloscope AN/USM-25.
AN16-30USM25-14: Illustrated Parts Breakdown for Oscilloscope AN/USM-25.

TUBE, CRYSTAL AND/OR SEMI-CONDUCTOR DATA:

TUBES: (1) 1V2 (2) 12AT7 (10) 12AU7 (1) 3KP1 (2) 5704 (1) 5726 (1) 5744
(1) 6AB4 (1) 6AH6 (1) 6AK5 (2) 6AN5 (1) 6AS6

CRYSTALS: (1) 100 kc (1) 81.94 kc

SEMI-CONDUCTORS: (2) 1N70

SHIPPING DATA

PKGS	VOLUME (CU FT)	WEIGHT (LBS)
1		

PROCUREMENT DATA

PROCURING SERVICE: USN
SPEC &/OR DWG:

DESIGN COG: USN, BuWeps

CONTRACTOR	LOCATION	CONTRACT OR ORDER NO.	APPROX. UNIT COST
Waterman Products Co., Inc.	Philadelphia, Pa.	NOas 52-1026-i	\$1,061.73

20 February 1963
Cog Service: USN

F6625-649-2870
FSN: F6625-500-0819 W/S

OSCILLOSCOPE AN/USM-25A
Functional Class: 3.1

USA

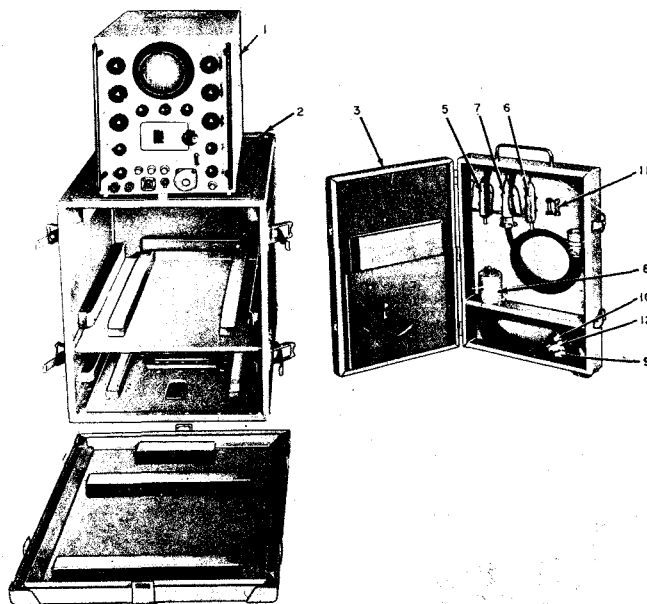
USN

USAF

TYPE CLASS:

Used by

MANUFACTURER'S NAME/CODE NUMBER: Industrial Television Inc., (93663).



Oscilloscope AN/USM-25A

FUNCTIONAL DESCRIPTION:

Oscilloscope AN/USM-25A is a portable instrument for portraying a luminous plot of instantaneous voltage against a time base. This equipment is intended for non-flight auxiliary radar ranging, as well as bench-testing of radar equipment and other electronic devices.

No field changes in effect at time of preparation (22 May 1962).

TECHNICAL CHARACTERISTICS:

DISPLAY

CATHODE RAY TUBE: 3 in. face with 1500 v accelerating potential.

INTENSITY INPUT

DIRECT TO CATHODE OF KRT THRU 5000 UUF: Negative signal to intensify trace.

INPUT IMPEDANCE: 47000 ohms shunted by 40 uuf.

VIDEO

AN/USM-25A OSCILLOSCOPE

SENSITIVITY

AMPLIFIER ALONE: 0.5 v peak-to-peak/in. (min).
WITH MX-1539/AP: 5.0 v peak-to-peak/in.
WITH CG-1099/USM-25A: 1.0 v peak-to-peak/in.
CRT DIRECT TO VERTICAL DEFLECTING PLATE: 43 to 52 v peak-to-peak/in.

FREQUENCY RESPONSE

AMPLIFIER ALONE: Porm 1 db (50 cyc to 5 mc); porm 3 db (10 cyc to 8 mc).
WITH CG-1099/USM-25A: Porm 1 db (50 cyc to 5 mc); porm 3 db (10 cyc to 8 mc).
WITH MX-1539/AP: 10 cps to 15000 cps between 6 db points.

PULSE RESPONSE

RISE TIME: Less than 0.1 usec.
DELAY TIME: Less than 0.2 usec.
200 CYCLE SQUARE WAVE DROOP: Less than 5%.

INPUT IMPEDANCE

AMPLIFIER: 1 meg shunted by 26 uuf.
MX-1537/AP: 1 meg shunted by 10 uuf.
CG-1099/USM-25A: 10 meg shunted by 8 uuf.
MX-1539/AP: 47000 ohms shunted by 8 uuf.
CRT, VERTICAL DIRECT: 560000 ohms shunted by 20 uuf.
DELAY TIME: 0.60 usec.
DEFLECTION POLARITY: Spot deflects upward for positive input signal.

TIME BASE

SWEEP DIRECTION: Left to right.
SWEEP TYPE: Start-stop type, each sweep independent of preceding one; "S" mode sweeps can be recurrent.
SWEEP RANGES
"A" AND "S" MODES: 1.2 to 12000 usec.
"R" MODE: 2.4 to 24 usec; inoperative on the fast sweep range.
SWEEP DELAY: 3 to 10000 usec; inoperative on the fast sweep range.

SYNCHRONIZING

MARKERS

CONTROL: Crystal.
RATE: 10 usec or 2000 yds (12.2 usec); 50 usec or 10000 yds (61.0 usec).
ACCURACY: Porm 0.03%.
POLARITY: Pos or neg.
PRESENTATION: Amplitude.

MARKER OUTPUT

INTERNAL IMPEDANCE: 56 ohms.
OUTPUT: 12 v peak in 100000 ohm load shunted by 200 uuf.

SYNC INPUT

VOLTAGE

"A" AND "R" MODE

AMPLITUDE: 5 v peak min.
RISE TIME: 0.1 to 1.0 usec.
POLARITY: Pos or neg.

"S" MODE

EXT: Pos or neg pulse.
SINE WAVE: 2.5 v rms min.

INTERNAL

OSCILLOSCOPE AN/USM-25A

POSITIVE OR NEGATIVE PULSE: 0.10 v peak-to-peak min.

SINE WAVE: 0.3 v rms min.

REPETITION RATE

"A" AND "R" MODE INTERNAL: 40 to 3300 pps.

"A" AND "R" MODE EXTERNAL: 6000 pps (max).

"S" MODE: 20 to 20000 pps; 20 to 1000000 cps sine wave input.

SYNC INPUT IMPEDANCE

"A" AND "R" MODES EXT

POSITIVE: 330000 ohms shunted by 15 uuf.

NEGATIVE: 330000 ohms shunted by 19 uuf.

"S" MODE: 1 meg shunted by 17 uuf.

TRIGGER OUTPUT

NO LOAD

AMPLITUDE: 75 v peak.

RISE TIME: 0.16 usec.

WITH LOAD OF 1000 OHMS SHUNTED BY 200 UUF

AMPLITUDE: 65 v peak.

RISE TIME: 0.16 usec.

POWER REQUIREMENTS: 180 W, 115 v porm 10%, 50 to 1000 cyc, single ph.

AMBIENT TEMPERATURE: M40 to P55 deg C (M40 to P131 deg F).

ALTITUDE: 40000 ft (transportable); 10000 ft (operable).

MAXIMUM RELATIVE HUMIDITY: 95%.

RELATION TO OTHER EQUIPMENT: None.

EQUIPMENT REQUIRED BUT NOT SUPPLIED: None.

MAJOR COMPONENTS

QTY	ITEM	STOCK NUMBERS	DIMENSIONS (INCHES)	WEIGHT (LBS)
1	Oscilloscope AN/USM-25A includes:			
1	Oscilloscope OS-4A/AP		9.0 x 11-1/8 x 17-1/2	35.0
1	Case, Oscilloscope CY-1094/AP			
1	Prod, Test MX-1537/AP		3/4 dia x 2-1/2	
1	Prod, Test MX-1539/AP		3/4 dia x 2-1/2	
1	Lead, Test CG-1099/USM-25A			
1	RF Cable Assy CG-530/U		96 lg	
1	RF Cable Assy CG-530/U		37 lg	
1	Cable Assy, Power, Electrical CX-2454/U		72 lg	
1	Crystal (81.94 kc)		1-3/4 dia x 2-3/8	
1	Case, Accessories CY-1456/USM-25A			

AN/USM-25A OSCILLOSCOPE

REFERENCE DATA AND LITERATURE:

- AN16-30USM25-1: Handbook of Operating Instructions for Oscilloscope AN/USM-25A and AN/USM-25B.
AN16-30USM25-2: Handbook of Service Instructions for Oscilloscope AN/USM-25A and AN/USM-25B.
AN16-30USM25-3: Handbook of Overhaul Instructions for Oscilloscope AN/USM-25A and AN/USM-25B.
NAVWEPS 16-30USM-25-4: Illustrated Parts Breakdown for Oscilloscope AN/USM-25A and AN/USM-25B.
TO 33A1-13-49-1: Handbook of Operating Instructions for Oscilloscope AN/USM-25A and AN/USM-25B.
TO 33A1-13-49-2: Handbook of Service Instructions for Oscilloscope AN/USM-25A and AN/USM-25B.
TO 33A1-13-49-3: Handbook of Overhaul Instructions for Oscilloscope AN/USM-25A and AN/USM-25B.
TO 33A1-13-49-3: Illustrated Parts Breakdown for Oscilloscope AN/USM-25A and AN/USM-25B.

TUBE, CRYSTAL AND/OR SEMI-CONDUCTOR DATA:

TUBES: (2) 0A2 (1) 1Z2 (5) 12AT7 (1) 3WP1 (1) 571B (1) 5725 (1) 5726
(2) 5763 (8) 5B14 (2) 6AH6

CRYSTALS: (1) 100 kc (1) 81.94 kc

SEMI-CONDUCTORS: (3) 1N69

SHIPPING DATA

PKGS	VOLUME (CU FT)	WEIGHT (LBS)
1		

PROCUREMENT DATA

PROCURING SERVICE: USN DESIGN COG: USN, BuWeps
SPEC &/OR DWG: MIL-0-7738A(AER), 1 December 1955

CONTRACTOR	LOCATION	CONTRACT OR ORDER NO.	APPROX. UNIT COST
Industrial Television Inc.	Clifton, N. J	N0as 52-693	
Model Engineering and Mfg Inc.	Huntington, Ind.	N383s-33623A N383-46496A	\$588.72 610.81

20 February 1963

Cog Service: USN

FSN: F6625-643-1733

OSCILLOSCOPE AN/USM-25B

Functional Class: 3.1

USA

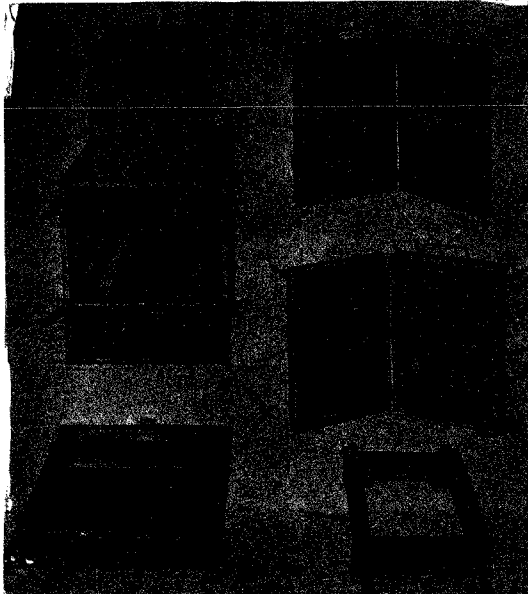
USN

USAF

TYPE CLASS:

Used by

MANUFACTURER'S NAME/CODE NUMBER: Industrial Television Inc.. (93663).



1. Oscilloscope OS-4A/AP (or OS-4B/AP)
2. Case, Oscilloscope CY-1094/AP
3. Case, Accessories CY-1456/USM-25A
(Contractor: Industrial Television, Inc.)
 - A. Prod. Test MX-1537/AP
 - B. Prod. Test MX-1539/AP
 - C. Lead, Test CG-1099/USM-25A
 - D. Crystal (81.94KC)
 - E. RF Cable Assembly CG-530/U (8'0")
 - F. Cable Assembly Power, Electrical CX-2454/U (6'0")
 - G. Fuse, Spares
 - H. Instruction Book
 - I. RF Cable Assembly CG-530/U (3'1")
4. Case, Accessories CY-1456/USM-25
(Contractor: Model Engineering & Manufacturing, Inc.)
 - A. Prod. Test MX-1537A/AP
 - B. Prod. Test MX-1539A/AP
 - C. Lead, Test CG-1099A/USM-25
 - D. Wrench, Probe
 - E. RF Cable Assembly CG-530/U (8'0")
 - F. Cable Assembly, Power CX-3277/U (8'0")
 - G. Fuse, Spares
 - H. Hex Key, 1/16 in.
 - I. Hex Key, 0.050 in.
 - J. Handbooks
 - K. RF Cable Assembly CG-530/U(3'1")
5. Mounting MT-1292/USM-25B

FUNCTIONAL DESCRIPTION:

Oscilloscope AN/USM-25B is a portable instrument for portraying a luminous plot of instantaneous voltage against a time base. The equipment is intended for flight use.

No field changes in effect at time of preparation (22 May 1962).

TECHNICAL CHARACTERISTICS:

DISPLAY

CATHODE RAY TUBE: 3 in. face with 1500 v accelerating potential.

INTENSITY INPUT

DIRECT TO CATHODE OF CRT THRU 5000 UUF: Negative signal to intensify trace.

INPUT IMPEDANCE: 47,000 ohms shunted by 40 uuf.

VIDEO

SENSITIVITY

AN/USM-25B OSCILLOSCOPE

AMPLIFIER ALONE: 0.5 v peak-to-peak/in. (min).
WITH MX-1539A/AP: 5.0 v peak-to-peak/in.
WITH CG-1099A/USM-25A: 1.0 v peak-to-peak/in.
CRT DIRECT TO VERTICAL DEFLECTING PLATE: 43 to 52 v peak-to-peak/in.

FREQUENCY RESPONSE

AMPLIFIER ALONE: Porm 1 db (50 cyc to 5 mc); porm 3 db (10 cyc to 8 mc).
WITH CG-1099A/USM-25A: Porm 1 db (50 cyc to 5 mc); porm 3 db (10 cyc to 8 mc).
WITH MX-1539A/AP: 10 cps to 15000 cps between 6 db points.

PULSE RESPONSE

RISE TIME: Less than 0.1 usec.
DELAY TIME: Less than 0.2 usec.
200 CYCLE SQUARE WAVE DROOP: Less than 5%.

INPUT IMPEDANCE

AMPLIFIER: 1 meg shunted by 26 uuf.
MX-1537A/AP: 1 meg shunted by 10 uuf.
CG-1099A/USM-25A: 10 meg shunted by 8 uuf.
MX-1539A/AP: 47000 ohms shunted by 8 uuf.
CRT, VERTICAL DIRECT: 560000 ohms shunted by 20 uuf.

DELAY TIME: 0.60 usec.

DEFLECTION POLARITY: Spot deflects upward for positive input signal.

TIME BASE

SWEEP DIRECTION: Left to right.

SWEEP TYPE: Start-stop, each sweep independent of preceding one; "S" mode sweeps can be recurrent.

SWEEP RANGES

"A" AND "S" MODES: 1.2 to 12000 usec.

"R" MODE: 2.4 to 24 usec; inoperative on the fast sweep range.

SWEEP DELAY: 3 to 10000 usec; not operative on the fast sweep range.

SYNCHRONIZING

MARKERS

CONTROL: Crystal.

RATE: 10 usec or 2000 yds (12.2 usec); 50 usec or 10000 yds (61.0 usec).

ACCURACY: Porm 0.03%.

POLARITY: Pos or neg.

PRESENTATION: Amplitude.

MARKER OUTPUT

INTERNAL IMPEDANCE: 56 ohms.

OUTPUT: 12 v peak in 100000 ohm load shunted by 200 uuf.

SYNC INPUT

VOLTAGE

"A" AND "R" MODE

AMPLITUDE: 5 v peak min.

RISE TIME: 0.1 to 1.0 usec.

POLARITY: Pos or neg.

"S" MODE

EXT: Pos or neg pulse.

SINE WAVE: 2.5 v rms min.

INTERNAL

OSCILLOSCOPE AN/USM-25B

POSITIVE OR NEGATIVE PULSE: 0.10 v peak-to-peak min.
SINE WAVE: 0.3 v rms min.

REPETITION RATE

"A" AND "R" MODE INTERNAL: 40 to 3300 pps.
"A" AND "R" MODE EXTERNAL: 6000 pps (max).
"S" MODE: 20 to 20000 pps; 20 to 1000000 cps sine wave input.

SYNC INPUT IMPEDANCE

"A" AND "R" MODES EXT
POSITIVE: 330000 ohms shunted by 15 uuf.
NEGATIVE: 330000 ohms shunted by 19 uuf.
"S" MODE: 1 meg shunted by 17 uuf.

TRIGGER OUTPUT**NO LOAD**

AMPLITUDE: 75 v peak.
RISE TIME: 0.16 usec.

WITH LOAD OF 1000 OHMS SHUNTED BY 200 UUF

AMPLITUDE: 65 v peak.
RISE TIME: 0.16 usec.

POWER REQUIREMENTS: 180 W, 115 v porm 10%, 50 to 1000 cyc, single ph.
AMBIENT TEMPERATURE: M40 to P55 deg C (M40 to P131 deg F).
ALTITUDE: 40000 ft (transportable); 10000 ft (operable).
MAXIMUM RELATIVE HUMIDITY: 95%.

RELATION TO OTHER EQUIPMENT: None.

EQUIPMENT REQUIRED BUT NOT SUPPLIED: None.

MAJOR COMPONENTS

QTY	ITEM	STOCK NUMBERS	DIMENSIONS (INCHES)	WEIGHT (LBS)
1	Oscilloscope AN/USM-25B includes:			
1	Oscilloscope OS-4B/AP		9.0 x 11-1/8 x 17-1/2	35.0
1	Mounting MT-1292/USM-25B			
1	Prod, Test MX-1537A/AP		3/4 dia x 2-1/2	
1	Prod, Test MX-1539A/AP		3/4 dia x 2-1/2	
1	Lead, Test CG-1099A/USM-25A			
1	RF Cable Assy CG-530/U		96 lg	
1	RF Cable Assy CG-530/U		37 lg	
1	Cable Assy, Power, Electrical CX-3277/U		96 lg	
1	Wrench, Probe			
1	Hex Key		1/16	
1	Hex Key		0.050	
1	Case, Accessories CY-1456/USM-25A			

AN/USM-25B OSCILLOSCOPE

REFERENCE DATA AND LITERATURE:

AN16-30USM25-1: Handbook of Operating Instructions for Oscilloscope AN/USM-25A and B.
AN16-30USM25-2: Handbook of Service Instructions for Oscilloscope AN/USM-25A and B.
AN16-30USM25-3: Handbook of Overhaul Instructions for Oscilloscope AN/USM-25A and B.
NAVWEPS 16-30USM25-4: Illustrated Parts Breakdown for Oscilloscope AN/USM-25A and AN/USM-25B.
TO 33A1-13-49-1: Handbook of Operating Instructions for Oscilloscope AN/USM-25A and AN/USM-25B.
TO 33A1-13-49-2: Handbook of Service Instructions for Oscilloscope AN/USM-25A and AN/USM-25B.
TO 33A1-13-49-3: Handbook of Overhaul Instructions for Oscilloscope AN/USM-25A and AN/USM-25B.
TO 33A1-13-49-4: Illustrated Parts Breakdown for Oscilloscope AN/USM-25A and AN/USM-25B.

TUBE, CRYSTAL AND/OR SEMI-CONDUCTOR DATA:

TUBES: (2) 0A2 (5) 12AT7 (1) 3WP1 (1) 5718 (1) 5725 (1) 5726 (2) 5763
(B) 5814 (2) 6AH6

CRYSTALS: (1) 100 kc (1) 81.94 kc

SEMI-CONDUCTORS: (3) 1N69

SHIPPING DATA

PKGS	VOLUME (CU FT)	WEIGHT (LBS)
1		

PROCUREMENT DATA

PROCURING SERVICE: USN DESIGN COG: USN, BuWeps
SPEC &/OR DWG: MIL-0-7738A(AER),
1 December 1955

CONTRACTOR	LOCATION	CONTRACT OR ORDER NO.	APPROX. UNIT COST
Industrial Television Inc.	Clifton, N. J.	N0as 52-693	
Model Engineering and Mfg Inc.	Huntington, Ind.	N383s-33623A N383-46496A	\$541.42 549.24

18 February 1963
Cog Service: USN

F6625-519-1954
FSN: F6625-643-3321 W/S

OSCILLOSCOPE AN/USM-32
Functional Class: 3.1

USA

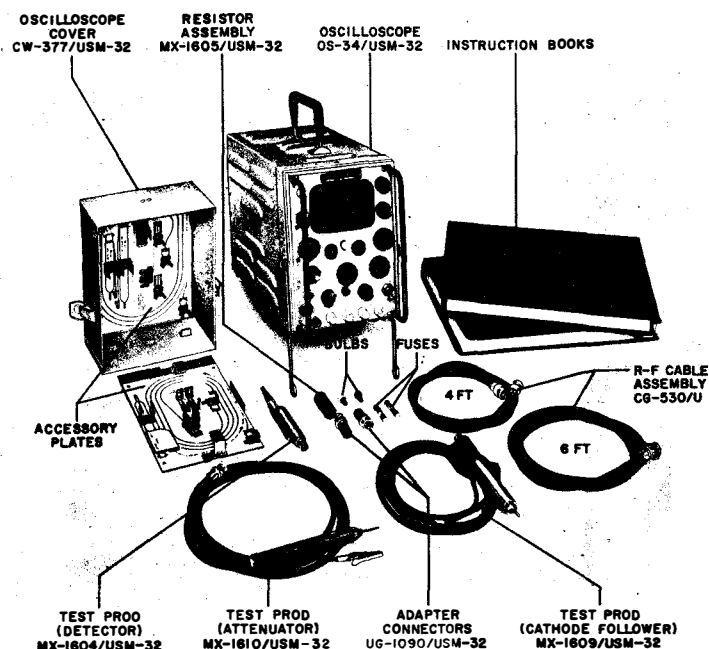
USN

USAF

TYPE CLASS:

Used by

MANUFACTURER'S NAME/CODE NUMBER: Allen B. DuMont Laboratories Inc., (18778).



Oscilloscope AN/USM-32

FUNCTIONAL DESCRIPTION:

Oscilloscope AN/USM-32 is a portable test instrument for use in observing electrical waveforms, primarily in the testing and maintenance of radar and related equipment. Facilities are provided to measure both the time duration and instantaneous amplitude of pulses.

Data on this sheet reflects the following field changes: F.C.1.

TECHNICAL CHARACTERISTICS:

CATHODE-RAY TUBE

TYPE: 3 WP1.

ACCELERATING POTENTIAL: 1400 v.

SCREEN SIZE: 2-1/4 in. by 2-1/2 in.

VERTICAL DEFLECTION CIRCUIT

DEFLECTION FACTOR

AN/USM-32 OSCILLOSCOPE

AMPLIFIER (AT FULL GAIN): 0.28 peak-to-peak (0.1 rms) v/in.

DIRECT: 43 to 52 peak-to-peak (15 to 18 rms) v/in.

SINUSOIDAL FREQUENCY RESPONSE: From 10 cyc to 4 mc; down not more than 2 db.

TRANSIENT RESPONSE: Rise time of 0.08 usec; overshoot less than 5%.

MAXIMUM INPUT VOLTAGE: 600 v (dc plus peak ac).

INPUT IMPEDANCE

AMPLIFIER: 1 meg, 28 uuf porm 2 uuf for all positions of the volts per inch switch.

DIRECT: 3 meg, 30 uuf.

INPUT ATTENUATION: Factors of 0.3, 1, 3, 10, 30, and 100 v/in. (vert, gain control fully clockwise).

POSITIONING: 2-1/4 in. (porm 1-1/8 in. from center).

SIGNAL DELAY: 0.35 usec by built in delay line.

HORIZONTAL DEFLECTION CIRCUIT

LINEAR-SWEEP TIME BASE

CIRCUIT: Driven sweep employing vacuum tube time-base generator.

TIME DURATION: Continuously variable from 10 to 200000 usec.

EXPANSION: To 2 times full-screen dia (5 in.) with no appreciable distortion.

POSITIONING: So any full-screen portion of expanded sweep may be examined on screen.

GATING: Gate turns beam on during forward sweep only.

SYNCHRONIZATION: External, line, or vertical amplifier signals of either polarity; internal trigger.

VERTICAL SIGNAL (INTERNAL): Sweep triggers on 1/2 in. of vertical deflection (max sensitivity).

EXTERNAL (SIGNAL APPLIED TO SYNC IN)

BELOW 50 CPS: Sweep triggers with 0.8 v peak-to-peak, provided rise time of sync signal is equal to or less than that of a 5 cps sine wave.

FROM 50 CYCLES TO 200 KC: Sweep triggers with 0.2 v peak-to-peak.

FROM 200 KC TO 2 MC: Sweep triggers with 0.8 v peak-to-peak.

MAXIMUM INPUT VOLTAGE: 600 v (dc plus peak ac).

INPUT ATTENUATION: Factors of 1 or 15 as selected by synchronization (selector) switch.

INPUT IMPEDANCE: 1 meg, 45 uuf (EX); 1.5 meg, 10 uuf (EX/15).

TIME CALIBRATION CIRCUIT (Z AXIS)

TIME-MARKER GENERATOR

SENSITIVITY: Sufficient to blank the beam with normal intensity settings.

INTERVAL: 1, 10, 100, 1000 or 10000 usec as selected.

ACCURACY: Porm 5%.

AVAILABILITY: Marker out terminal, 120000 ohms; also applied to cathode of crt.

POLARITY: Pos.

EXTERNAL MARKER INPUT (Z INPUT)

SENSITIVITY: 10 v peak (positive) will blank the beam with normal intensity settings.

INPUT IMPEDANCE: 1 meg, 30 uuf.

AMPLITUDE CALIBRATION

AVAILABILITY: Calibration voltage applied to input of vertical amplifier by depressing front-panel spring-return push-button; also available at cal out terminal on front panel at all times.

WAVESHAPE: Clipped sine wave.

FREQUENCY: Power line.

AMPLITUDE: 0.6 v peak-to-peak.

TRIGGER GENERATOR

AVAILABILITY: Plus trigger out terminal; also available for sweep initiation at trig position of synchronization (selector) switch.

DURATION: Approx. 1 to 2 usec.

REPETITION FREQUENCY: From 45 cps to 5.5 kc (min. range).

AMPLITUDE: 100 v porm 30%, into 5000 ohms shunted by 1500 uuf; 25 v into 75 ohms (approx.).

RISE TIME: Less than 0.5 usec.

POWER SUPPLY

LINE VOLTAGE: 115 v rms porm 10%.

FREQUENCY: 50 porm 5%, 60 porm 5%, 400 porm 10% cyc, single ph.

POWER CONSUMPTION: 110 w.

STANDBY HEATER DISSIPATION: 15 w.

FUSE PROTECTION: 2 amp fuse in each leg of primary circuit.

TEST PROD MX-1609/USM-32 (POWER SUPPLIED BY THE INSTRUMENT)

INPUT IMPEDANCE: 6 meg, 10 uuf.

APPROXIMATE GAIN: 0.7.

BANDWIDTH: 10 cyc to 7 mc.

MAXIMUM INPUT VOLTAGE: 2 v rms.

MAXIMUM DC VOLTAGE LEVEL: 600 v (dc plus peak ac).

TEST PROD MX-1610A/USM-32

INPUT IMPEDANCE: 10 meg, 16 uuf.

PASSIVE ATTENUATION: 10:1 porm 3% (vert sig terminal).

MAXIMUM INPUT VOLTAGE: 600 v (dc plus peak ac).

TEST PROD (DETECTOR) MX-1604/USM-32

CARRIER-FREQUENCY RANGE: 500 kc to 400 mc.

DEMODULATION-FREQUENCY

RANGE: DC to 15 kc.

RESPONSE: AF response porm 6 db from 1 kc value at any carrier frequency in the operating range.

INPUT IMPEDANCE: Greater than 20000 ohms, 7 uuf at 1 mc/sec.

PERMISSIBLE INVERSE PEAK

VOLTAGE ON CRYSTAL: 125 v.

RESISTOR ASSEMBLY MX-1605/USM-32

FUNCTION: Plug-in adapter connects to cf probe socket to provide 75 ohm termination for the vertical signal.

ACCURACY: Porm 5%.

POWER RATING: 2 w.

RELATION TO OTHER EQUIPMENT: None.

EQUIPMENT REQUIRED BUT NOT SUPPLIED: None.

MAJOR COMPONENTS

QTY	ITEM	STOCK NUMBERS	DIMENSIONS (INCHES)	WEIGHT (LBS)
1	Oscilloscope AN/USM-32 includes:			20

AN/USM-32 OSCILLOSCOPE

QTY	ITEM	STOCK NUMBERS	DIMENSIONS (INCHES)	WEIGHT (LBS)
1	Oscilloscope OS-34/USM-32		6-5/8 x 9-3/8 x 15-1/2	17
1	Oscilloscope Cover CW-337/USM-32		3-5/8 x 6 x 8-1/16	1
1	Test Prod (Cathode-Follower) MX-1609/USM-32			
1	Test Prod (Attenuator) MX-1610/USM-32 or MX-1610A/USM-32		5/8 od x 72-3/4	
1	Test Prod (Detector) MX-1604/USM-32			
1	Resistor Assy MX-1605/USM-32			
2	Adapter Connector UG-1090/U			
1	RF Cable Assy CG-530/U		72 lg	
1	RF Cable Assy CG-530/U		48 lg	
2	Fuse, 2A, Type 3AG			
2	Indicator Lamp (1 red, 1 white)			
2	Technical Manual			

REFERENCE DATA AND LITERATURE:

NAVAER 16-30USM32-501: Technical Manual for Oscilloscope AN/USM-32.
NAVSHIPS 92257: Technical Manual for Oscilloscope AN/USM-32.

TUBE, CRYSTAL AND/OR SEMI-CONDUCTOR DATA:

TUBES: (1) 1Z2 (1) 3WP1 (3) 6AN5WA (3) 6AU6WA (2) 6X4W (6) 12AT7WA (1) 5651WA
(3) 5702WA (1) 5726/6AL5W (1) 5654/6AK5W (3) 5814A

CRYSTALS: None used.

SEMI-CONDUCTORS: (2) 1N70

SHIPPING DATA

PKGS	VOLUME (CU FT)	WEIGHT (LBS)
1	2.7	46

PROCUREMENT DATA

PROCURING SERVICE: USN
SPEC &/OR DWG: MIL-0-18465A(SHIPS), Amend 1

DESIGN COG: USN, BuShips

OSCILLOSCOPE AN/USM-32

CONTRACTOR	LOCATION	CONTRACT OR ORDER NO.	APPROX. UNIT COST
Allen B. DuMont Laboratories Inc.	Clifton, N. J.	N0bsr-52688, 27 June 1951	
Munston Mfg and Service Inc.	Islip, N. Y.	N0bsr-64814, 23 June 1955	\$286.44
The Gruen Watch Co.	Cincinnati, Ohio	N0bsr-71137	282.50
Federal Television Corp.	Astoria, N. Y.	N0bsr-71829, 21 June 1957	322.36
Dynamic Electronics- N. Y. Inc.	Richmond Hill, L.I., N. Y.	N0bsr-75153, 31 March 1958	327.20

23 March 1962
Cog Service:

6625-649-4980
FSN: 6625-643-3336 W/S

OSCILLOSCOPE AN/USM-38
Functional Class:

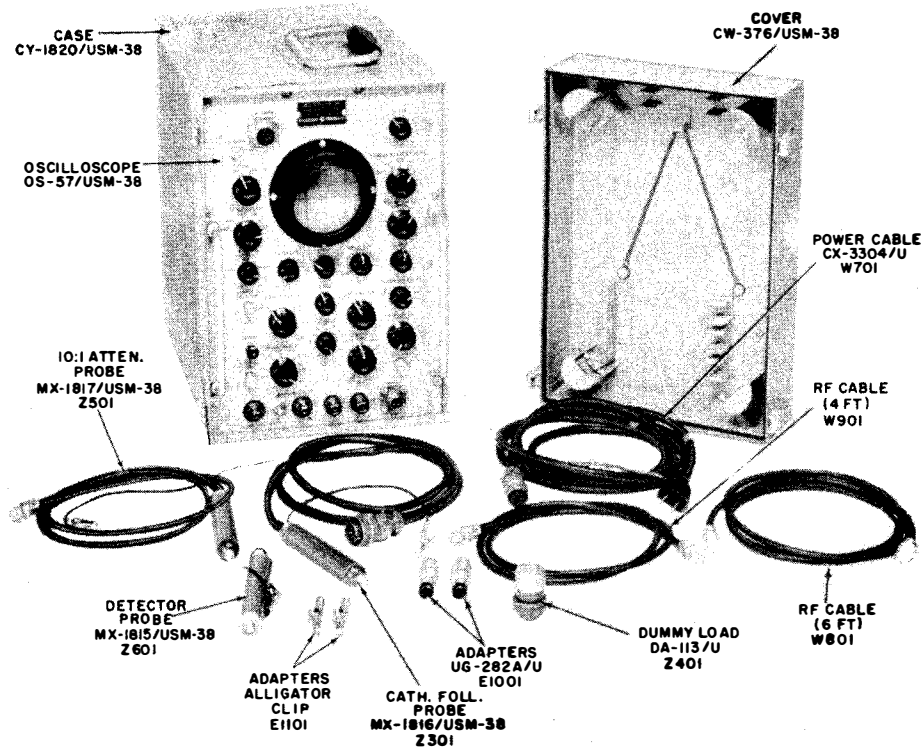
USA

USN

USAF

TYPE CLASS:

MANUFACTURER'S NAME/CODE NUMBER: Trad Electronics Corp.



Oscilloscope AN/USM-38

FUNCTIONAL DESCRIPTION

Oscilloscope AN/USM-38 is a portable, light-weight test instrument intended for general purpose use in testing and maintaining radar and other electronic equipment. It provides the means for observing visually the amplitude, duration, and shape of electrical wave-forms. Its application causes a minimum of disturbance in the functional operation of the circuit being tested.

No field changes in effect at time of preparation (11 January 1962).

TECHNICAL CHARACTERISTICS

SINE WAVE RESPONSE: Flat within 3 db from 10 cyc to 6 mc.

TRANSIENT RESPONSE: 0.06 usec rise.

SQUARE WAVE RESPONSE: Less than 10% tilt for 50 cyc square wave.

AN/USM-38 OSCILLOSCOPE

POLARITY: Positive for upward deflection; negative for downward deflection.

INPUT IMPEDANCES

V INPUT: 1 meg paralleled by 35 uuf.
V INPUT WITH EXTERNAL ADAPTER: 75 ohms.
V INPUT WITH 10:1 ATTENUATOR PROBE: 10 meg paralleled by 15 uuf.
V INPUT WITH DETECTOR PROBE: 20000 ohms paralleled by 7 uuf.
CF PROBE WITH CATHODE FOLLOWER PROBE: 8 meg paralleled by 10 uuf.
V DIRECT: 3.9 meg paralleled by 20 uuf.
H DIRECT: 3.9 meg paralleled by 20 uuf.
PLUS EXTERNAL SYNC: 1.5 meg paralleled by 25 uuf.
MINUS EXTERNAL SYNC: 1.5 meg paralleled by 75 uuf.
Z AXIS INPUT: 680 ohms paralleled by 20 uuf.

OUTPUT VOLTAGES

MINUS MARKER OUT: 3 v peak open circuit; 5.7k ohms minimum load impedance.
PLUS TRIGGER OUT: 100 v peak; 2000 ohms max internal impedance.

INPUT SENSITIVITY AND VOLTAGE LIMITS

	SIGNAL VOLTS		TOTAL
	MIN.	MAX.	PEAK VOLTS
V INPUT	0.1 rms*	150 rms*	600
V INPUT with attenuator probe	1 rms*	500 peak	500
V INPUT with detector probe		125 peak	500
CF PROBE with cathode follower probe	0.15 rms*	5 rms*	500
V DIRECT	50V peak		500
H DIRECT	75V peak		500
EXT SYNC	0.05 peak	100 peak	500
EXT SYNC with attenuator probe	0.05 peak	500 peak	500
Z AXIS INPUT	P1.0* peak	P50*peak	No DC

* = Volts per inch

SWEEP TIME: 1 to 100000 usec per in. continuously adjustable.

SWEEP CIRCUIT: Triggered or periodic.

CALIBRATION: 0 to 1 v peak-to-peak of line frequency flat-topped wave for calibrating signal amplifier.

TIMING MARKERS: Synchronized with sweep and available at intervals of .1, 10 and 100 usec.

TRIGGER PULSE OUTPUT: 100 v peak, 1.5 usec pulse, having a rise time of 0.5 usec; repetition rate continuously variable from 40 to 5000 times per sec.

SWEEP DELAY AND EXPANSION: Allows any 10% of trace to be expanded by a factor of 9.

CRT SCREEN DIAMETER: 3 in., 1-1/2 in. total deflection, 3/4 in. for pulse.

POWER REQUIREMENTS: 115 v, 50 to 400 cyc, single ph.

RELATION TO OTHER EQUIPMENT: None.

EQUIPMENT REQUIRED BUT NOT SUPPLIED: None.

MAJOR COMPONENTS

QTY	ITEM	STOCK NUMBERS	DIMENSIONS (INCHES)	WEIGHT (LBS)
1	Oscilloscope AN/USM-38 includes:			
1	Oscilloscope OS-57/USM-38		9 x 13 x 15-1/8	36
1	Power Cable CX-3304/U		96 lg	0.62
1	R. F. Cable		48 lg	0.25
1	R. F. Cable		66 lg	0.37
1	Detector Probe MX-1815/USM-38		6 lg	0.12
1	CF Probe MX-1816/USM-38		6 lg	0.62
1	Attenuator Probe MX-1817/USM-38		6 lg	0.31
1	Oscilloscope Cover CW-376/USM-38		3 x 9-5/16 x 13-13/32	0.06
1	Dummy Load DA-113/U		1-1/8 dia x 1-11/16	0.06
2	Connector Adapter UG-282A/U		1-1/4 lg	0.06
2	Alligator Clip			
2	Fuses (Spares)			
1	Allen Wrench No. 6			
1	Allen Wrench No. 8			

REFERENCE DATA AND LITERATURE:

NAVSHIPS 92671: Technical Manual for Oscilloscope AN/USM-38.

TUBE, CRYSTAL AND/OR SEMI-CONDUCTOR DATA:

TUBES: (2) 0A2 (1) 1Z2 (1) 3WP1 (1) 5R4GWB (6) 6AH6 (1) 6X4W (6) 12AT7WA
 (2) 12BY7 (1) 5718 (2) 5726 (5) 5814A

CRYSTALS: None used.

SEMI-CONDUCTORS: None used.

SHIPPING DATA

PKGS	VOLUME (CU FT)	WEIGHT (LBS)
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PROCUREMENT DATA

PROCURING SERVICE:
 SPEC &/OR DWG: SHIPS-0-1518, Addend 2

DESIGN COG: USN, BuShips

AN/USM-38 OSCILLOSCOPE

CONTRACTOR	LOCATION	CONTRACT OR ORDER NO.	APPROX. UNIT COST
Trad Electronics Corp. Part no. 124-D-101	Asbury Park, N. J.	NObsr-59445	\$321.77

25 February 1963

GENERATOR PULSE DELAY AN/USM-92

Cog Service: USN FSN:

Functional Class: 4.3

USA

USN

USAF

TYPE CLASS:

Used by

MANUFACTURER'S NAME/CODE NUMBER:

(No Illustration Available)

FUNCTIONAL DESCRIPTION:

The AN/USM-92 is for general purpose use. It is internally synchronized from an internal rate generator and externally synchronized from pulses. It is calibrated digitally in 0.1 usec steps (number of bands) with 0.1 usec interpolation. There are five control indicators and the accuracy of the crystal oscillator is form 0.001 percent.

No field changes in effect at time of preparation (7 February 1963).

TECHNICAL CHARACTERISTICS:

TYPE OF CALIBRATION: Digitally in 0.1 usec steps (number of bands) with 0.1 usec interpolation.

POLARITY: Negative or positive.

AMPLITUDE: 5 to 50 v into 1000 ohms.

PULSE WIDTH: 0.1 to 5.0 usec.

CRYSTAL OSCILLATOR ACCURACY: Porm 0.001%.

OVER-ALL ACCURACY: 0.1 usec over a range of 2.0 to 9999.9 usec.

NUMBER OF CONTROL INDICATORS USED: 5.

OUTPUT SIGNAL DATA

TYPE: Rectangular pulses.

OUTPUT SIGNAL CHARACTERISTICS: 50 to 5000 pps.

IMPEDANCE: 50 ohms.

OPERATING FREQUENCY RANGE: 0.1 to 9999.9 usec.

OPERATING POWER RQMT: 103.5 to 126.5 v ac, 50 to 420 cps, single ph.

RELATION TO OTHER EQUIPMENT: None.

EQUIPMENT REQUIRED BUT NOT SUPPLIED: None.

MAJOR COMPONENTS

QTY	ITEM	STOCK NUMBERS	DIMENSIONS (INCHES)	WEIGHT (LBS)
1	Generator, Pulse Delay AN/USM-92 consists of:		10-1/2 x 16 x 17	
1	Generator, Pulse Delay SG-156/UP		10-1/2 x 17 x 19	
1	Case			
1	Cable Assy, Power CX-3135/U		96 lg	

AN/USM-92 GENERATOR PULSE DELAY

REFERENCE DATA AND LITERATURE:

TUBE, CRYSTAL AND/OR SEMI-CONDUCTOR DATA:

TUBES: Data not available.

CRYSTALS: Data not available.

SEMI-CONDUCTORS: Data not available.

SHIPPING DATA

PKGS	VOLUME (CU FT)	WEIGHT (LBS)
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PROCUREMENT DATA

PROCURING SERVICE: USN

DESIGN COG: USN, BuWeps

SPEC &/OR DWG:

CONTRACTOR	LOCATION	CONTRACT OR ORDER NO.	APPROX. UNIT COST
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10 January 1962

Cog Service:

FSN: 6625-726-9479

OSCILLOSCOPE CAQI-120AR

Functional Class:

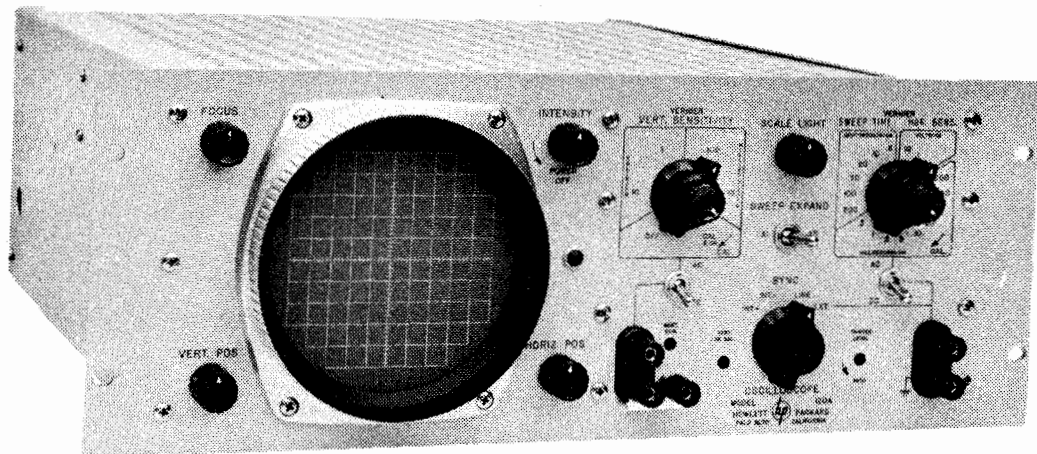
USA

USN

USAF

TYPE CLASS:

MANUFACTURER'S NAME/CODE NUMBER: Hewlett-Packard Co.



Oscilloscope CAQI-120AR

FUNCTIONAL DESCRIPTION:

Oscilloscope CAQI-120AR is a simple, easy to use, precision instrument. There are no trigger controls to be mis-set; just connect the signal and accurate sweeps are automatically triggered. Also, that search for a spot is ended since the base line is automatically presented even when no trigger signal is present. Yet, for photographic work involving transients, or whenever the automatic base line would interfere with observation, it may be easily locked-out.

No field changes in effect at time of preparation (11 April 1961).

TECHNICAL CHARACTERISTICS:

PRESENTATION: 5 in. screen.

SWEEP DATA

FREQUENCY RANGE: 0.2 to 250,000 cps.

OSCILLOSCOPE CAQI-120AR

TRIGGER

SWEEP DURATION: 4 usec to 5 sec.

AMPLITUDE: 2.5 v.

RATED DEFLECTION SENSITIVITY THROUGH AMPLIFIER

VERTICAL: 0.010 rms v per cm.

HORIZONTAL: 0.1 rms v per cm.

RATED DEFLECTION SENSITIVITY FOR DIRECT CONNECTION TO PLATES

VERTICAL: 20 rms v per cm.

HORIZONTAL: 20 rms v per cm.

FREQUENCY RESPONSE

X-AXIS: 0 to 20 kc per sec.

Y-AXIS: 0 to 20 kc per sec.

RATED IMPEDANCE FOR AMPLIFIER INPUT

X-AXIS: 1 meg.

Y-AXIS: 1 meg.

Z-AXIS: 2 meg.

POWER REQUIREMENTS: 130 w, 115 or 230 v, 50 to 1,000 cyc, single ph.

RELATION TO OTHER EQUIPMENT: None.**EQUIPMENT REQUIRED BUT NOT SUPPLIED:** None.

MAJOR COMPONENTS

QTY	ITEM	STOCK NUMBERS	DIMENSIONS (INCHES)	WEIGHT (LBS)
1	Oscilloscope CAQI-120AR		7 x 19 x 21-1/4	32

REFERENCE DATA AND LITERATURE:

NAVSHIPS 93836: Technical Manual for Oscilloscope Model 120AR.

TUBE, CRYSTAL AND/OR SEMI-CONDUCTOR DATA:TUBES: (1) 5AQP (1) 5V4GA (1) 6AN8 (1) 6AQ5 (1) 6AU6 (1) 6DJ8 (3) 6U8
(1) 6X4 (2) 12AT7 (5) 12AU7 (2) 12B4 (1) 5642 (1) 5651

CRYSTALS: None used.

SEMI-CONDUCTORS: (1) 2N301 (1) 2N383

SHIPPING DATA

PKGS	VOLUME (CU FT)	WEIGHT (LBS)
1		47

4.3 CAQI-120AR: 2

PROCUREMENT DATA

PROCURING SERVICE:
SPEC &/OR DWG:

DESIGN COG: Commercial

CONTRACTOR	LOCATION	CONTRACT OR ORDER NO.	APPROX. UNIT COST
Hewlett-Packard Co. Model no. 120AR	Palo Alto, California	Nobsr-81421, 17 June, 1960	\$435.00
		Nobsr-81456, 27 June 1960	\$435.00
		Nobsr-81557	\$391.50

17 May 1962

Cog Service: USN FSN:

SPECTRUM ANALYZER CBRP-4S

Functional Class: 3.4.1

USA

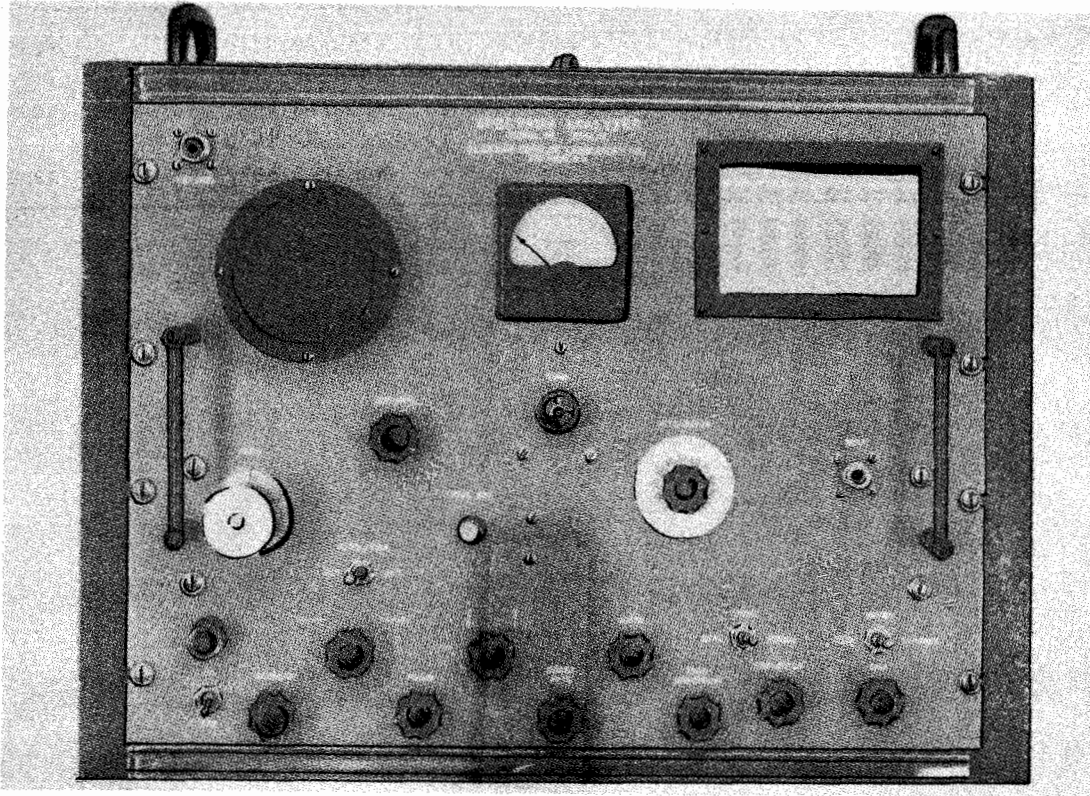
USN

USAF

TYPE CLASS:

Std

MANUFACTURER'S NAME/CODE NUMBER: Electro Impulse Laboratory Inc., (91161).



Spectrum Analyzer CBRP-4S

FUNCTIONAL DESCRIPTION:

Spectrum Analyzer CBRP-4S is a portable test equipment used for observing the spectra of pulsed oscillators for measuring frequency, for adjusting radar system local oscillators, for checking magnetron pulling and AFC circuits, for measuring standing waves and attenuation. This equipment may also be employed as a signal generator in measuring relative sensitivity of radar receivers.

No field changes in effect at time of preparation (7 March 1962).

TECHNICAL CHARACTERISTICS:

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

FREQUENCY MEASURING ACCURACY: Porm 4 mc; porm 0.5 mc on freq diff.

TEMPERATURE COEFFICIENT OF CALIBRATION: 0.05 mc/degree C.

AMBIENT TEMPERATURE: M40 to P155 deg C (M40 to P131 deg F).

MAXIMUM POWER INPUT: 1 W avg.

CBRP-4S SPECTRUM ANALYZER

MINIMUM POWER INPUT: 1 mw avg.

MAXIMUM POWER OUTPUT: 2 mw avg.

POWER REQUIREMENTS: 175 W, 110 or 220 v, 60 cyc, single ph.

RELATION TO OTHER EQUIPMENT: None.

EQUIPMENT REQUIRED BUT NOT SUPPLIED:

(1) R.F. Cable CG-92/U; (1) Pick-Up Antenna AT-48/UP or AT-68/UP; (1) Directional Coupler CG-176/AP.

MAJOR COMPONENTS

QTY	ITEM	STOCK NUMBERS	DIMENSIONS (INCHES)	WEIGHT (LBS)
1	Spectrum Analyzer CBRP-4S includes:		14.5 x 22.5 x 23.0	100
1	Technical Manual		0.25 x 9 x 11.5	0.25

REFERENCE DATA AND LITERATURE:

NAVSHIPS 91789: Technical Manual for Spectrum Analyzer Electro Impulse Laboratory Model 4X and 4S.

TUBE, CRYSTAL AND/OR SEMI-CONDUCTOR DATA:

TUBES: (1) 0C3/VR-105 (3) 0D3/VR-150 (1) 2K28/707B (1) 3BP1 (2) 5R4GY (1) 6J5GT
(1) 6L6GA (4) 6SH7L (2) 6SJ7GT (4) 6SN7GT (1) 6Y6G (1) 884

CRYSTALS: None used.

SEMI-CONDUCTORS: (1) 1N23

SHIPPING DATA

PKGS	VOLUME (CU FT)	WEIGHT (LBS)
1	12	130

PROCUREMENT DATA

PROCURING SERVICE: USN
SPEC &/OR DWG:

DESIGN COG: Commercial

CONTRACTOR	LOCATION	CONTRACT OR ORDER NO.	APPROX. UNIT COST
Electro Impulse Laboratory Inc. Model no. 4S	Red Bank, N. J.	NObsr-57342, 22 April 1952	\$1,880.00

4.3 CBRP-4S: 2

17 May 1962

Cog Service: USN FSN:

SPECTRUM ANALYZER CBRP-4X

Functional Class: 3.4.1

USA

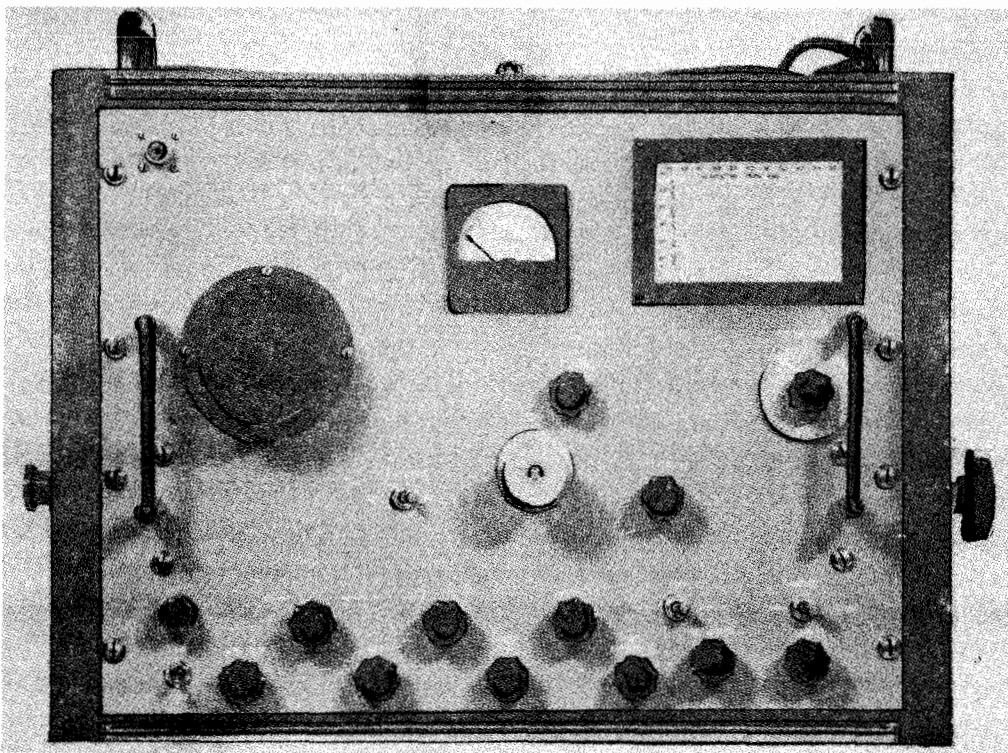
USN

USAF

TYPE CLASS:

Std

MANUFACTURER'S NAME/CODE NUMBER: Electro Impulse Laboratory Inc., (91161).



Spectrum Analyzer CBRP-4X

FUNCTIONAL DESCRIPTION:

Spectrum Analyzer CBRP-4X is a portable test equipment used for observing the spectra of pulsed oscillators for measuring frequency, for adjusting radar system local oscillators, for checking magnetron pulling and AFC circuits, for measuring standing waves and attenuation. This equipment may also be employed as a signal generator in measuring relative sensitivity of radar receivers.

No field changes in effect at time of preparation (7 March 1962).

TECHNICAL CHARACTERISTICS:

FREQUENCY RANGE: 2,700 to 3,400 mc.

FREQUENCY MEASURING ACCURACY: Porm 4 mc; porm 0.5 mc on freq diff.

TEMPERATURE COEFFICIENT OF CALIBRATION: 0.05 mc/deg C.

AMBIENT TEMPERATURE: M40 to 155 deg C (M40 to P131 deg F).

CBRP-4X SPECTRUM ANALYZER

MAXIMUM POWER INPUT: 1 W avg.
MINIMUM POWER INPUT: 1 mw avg.
MAXIMUM POWER OUTPUT: 2 mw avg.
POWER REQUIREMENTS: 175 W, 110 or 220 v, 60 cyc, single ph.

RELATION TO OTHER EQUIPMENT: None.

EQUIPMENT REQUIRED BUT NOT SUPPLIED:

(1) RF Cable CG-92/U; (1) Pick-Up Antenna AT-48/UP or AT-68/UP; (1) Directional Coupler CG-176/AD.

MAJOR COMPONENTS

QTY	ITEM	STOCK NUMBERS	DIMENSIONS	WEIGHT (LBS)
1	Spectrum Analyzer CBRP-4X includes:		14.5 x 22.5 x 23.0	100
1	Technical Manual		0.25 x 9 x 11.5	0.25

REFERENCE DATA AND LITERATURE:

NAVSHIPS 91789: Technical Manual for Spectrum Analyzer Electro Impulse Laboratory Model 4X and 4S.

TUBE, CRYSTAL AND/OR SEMI-CONDUCTOR DATA:

TUBES: (1) 0C3/VR-105 (3) 0D3/VR-150 (1) 2K25/723A (1) 3BP1 (2) 5R4GY (1) 6J5GT
(1) 6L6GA (4) 6SH7L (2) 6SJ7GT (4) 6SN7GT (1) 6Y6G (1) 884

CRYSTALS: None used.

SEMI/CONDUCTORS: (1) 1N23

SHIPPING DATA

PKGS	VOLUME (CU FT)	WEIGHT (LBS)
1	12	130

PROCUREMENT DATA

PROCURING SERVICE: USN DESIGN COG: Commercial
SPEC &/OR DWG:

CONTRACTOR	LOCATION	CONTRACT OR ORDER NO.	APPROX. UNIT COST
Electro Impulse Laboratory Inc. Model no. 4X	Red Bank, N.J.	NObsr-57342, 22 April 1952	\$1,880.00

4.3 CBRP-4X: 2

7 May 1962
Cog Service:

FSN:

OSCILLOSCOPE CBTV-310A
Functional Class:

USA

USN

USAF

TYPE CLASS:

MANUFACTURER'S NAME/CODE NUMBER: Tektronix.



Oscilloscope CBTV-310A

FUNCTIONAL DESCRIPTION:

Oscilloscope CBTV-310A is designed as a portable three (3)-inch instrument used in the observation and measurement of electrical waveforms.

No field changes in effect at time of preparation (22 June 1961).

TECHNICAL CHARACTERISTICS:

TYPE OF INSTALLATION: Portable-bench mounted.

FREQUENCY RESPONSE: DC to 4 mc, 2 cps to 3.5 mc.

TRANSIENT RESPONSE: 0.09 usec rise time.

SWEEP RANGE: 0.1 usec/div to 0.6 usec/div.

NUMBER OF CALIBRATED SWEEP RATES: 18.

TYPE OF TRIGGERING: Internal, external, line ac-coupled or dc-coupled, and automatic triggering.

CBTV-310A OSCILLOSCOPE

OPERATING LINE VOLTAGE FREQUENCY: 50 to 800 cps, but at 800 cps about 4% greater line voltage is required.

OPERATING POWER RQMT: 105 to 125 v ac, 50 to 800 cps, single ph, 175 W.

RELATION TO OTHER EQUIPMENT:

The CBTV-310A is designed to be used with, but not part of, the Loran "C" equipment.

EQUIPMENT REQUIRED BUT NOT SUPPLIED: None.

MAJOR COMPONENTS

QTY	ITEM	STOCK NUMBERS	DIMENSIONS (INCHES)	WEIGHT (LBS)
1	Oscilloscope CBTV-310A consists of:		6-3/4 x 10 x 17	23-1/2
1	Attenuator Probe 10-X			
1	Binding Post Adapter (013-004)			
1	Green Filter			
1	(3)-Conductor Power Cord (161-013)			
1	Technical Manual		1/2 x 7-1/2 x 10-1/4	

REFERENCE DATA AND LITERATURE:

Tektronix Technical Manual for Cathode-Ray Oscilloscope Type 310A.

NAVSHIPS 93400: Preliminary Data Form for Cathode-Ray Oscilloscope CBTV-310A.

TUBE, CRYSTAL AND/OR SEMI-CONDUCTOR DATA:

TUBES: (6) 6DJ8 (5) 6AU6 (1) 6AL5 (1) 6AN8 (5) 6BH6 (1) 6CL6 (1) 6AQ5
(1) 12AT7 (2) 12AU7 (3) 12B4 (1) 5651 (2) 5642

CRYSTALS: None used.

SEMI-CONDUCTORS: None used.

SHIPPING DATA

PKGS	VOLUME (CU FT)	WEIGHT (LBS)
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PROCUREMENT DATA

PROCURING SERVICE:
SPEC &/OR DWG: Commercial

DESIGN COG: USN, BuShips

OSCILLOSCOPE CBTV-310A

CONTRACTOR	LOCATION	CONTRACT OR ORDER NO.	APPROX. UNIT COST
Tektronix Model 310A	New York, N. Y.		\$625.00

2 April 1962
Cog Service:

FSM:

OSCILLOSCOPE CBTV-545A
Functional Class:

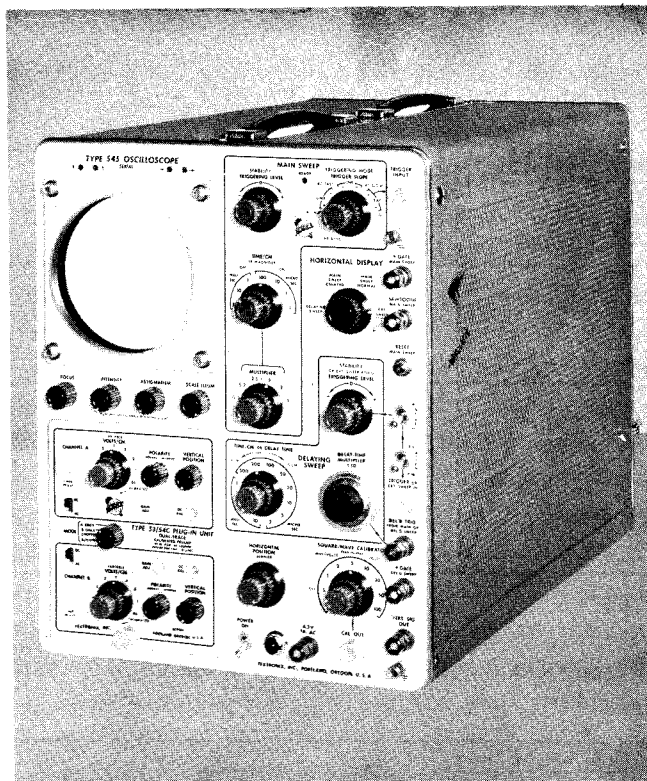
USA

USN

USAF

TYPE CLASS:

MANUFACTURER'S NAME/CODE NUMBER: Tektronix, Inc.



Oscilloscope CBTV-545A

FUNCTIONAL DESCRIPTION:

Oscilloscope CBTV-545A is a fast-risetime instrument. It combines the vertical and horizontal deflection characteristics of Oscilloscope CBTV-541A with the sweep-delay capabilities of Oscilloscope CBTV-535A.

No field changes in effect at time of preparation (22 June 1961).

TECHNICAL CHARACTERISTICS:

TYPE OF INSTALLATION: Portable-bench mounted.

CALIBRATED SWEEP DELAY RANGE: 1 usec to 0.1 sec, continuously variable.

OPERATING MODES

CONVENTIONAL OPERATION: Inherent time-jitter less than 1 part in 20,000.

TRIGGERED OPERATION: Jitter-free at any magnification, even in the presence of actual signal jitter.

CBTV-545A OSCILLOSCOPE

CALIBRATION ACCURACY

RANGE ACCURACY: Within 1%.

INCREMENTAL ACCURACY: Within 0.2% of full scale.

TRIGGER RATE SOURCE: 10 cycles to 40 kc, continuously variable.

OPERATING FREQUENCY: DC-30 mc.

OPERATING POWER RQMT: 105 to 125 v ac or 210 to 250 v ac, 50 to 60 cps, single ph, 560 w.

RELATION TO OTHER EQUIPMENT:

The CBTV-545A is designed to be used with, but not part of Oscilloscopes CBTV-541A and CBTV-535A.

EQUIPMENT REQUIRED BUT NOT SUPPLIED: None.

MAJOR COMPONENTS

QTY	ITEM	STOCK NUMBERS	DIMENSIONS (INCHES)	WEIGHT (LBS)
1	Oscilloscope CBTV-545A includes:		13 x 16-3/4 x 24	65
2	Probes Type P410			
2	Binding Post Adapter Type A510			
1	Test Lead Type W530B (012013)			
1	Green Filter F510-5 (378503)			

REFERENCE DATA AND LITERATURE:

Tektronix Catalog #16 for Cathode-Ray Oscilloscopes (Commerical Models) ES0 Copy #03338.
NAVSHIPS 93400: Preliminary Data Form for Oscilloscope CBTV-545A.

TUBE, CRYSTAL AND/OR SEMI-CONDUCTOR DATA:

TUBES: (23) 6DJ8 (9) 6AU6 (2) T12G (3) 12BY7 (1) 6AL5 (2) 6CL6 (1) 12AL5
(1) 12AU6 (3) 6080 (1) 5651 (2) 12AX7 (3) 12B4 (1) 6AU5 (3) 12AU7
(5) 5642 (1) T543/P2 (13) 6DK6

CRYSTALS: None used.

SEMI-CONDUCTORS: (5) 1N2070

SHIPPING DATA

PKGS	VOLUME (CU FT)	WEIGHT (LBS)
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PROCUREMENT DATA

PROCURING SERVICE:
SPEC &/OR DWG: Commercial

DESIGN COG: USN, BuShips

4.3 CBTV-545A: 2

CONTRACTOR	LOCATION	CONTRACT OR ORDER NO.	APPROX. UNIT COST
Tektronix, Inc. Model 545A	New York, New York		\$1550.00

20 June 1962

Cog Service: USN FSN:

CATHODE-RAY OSCILLOGRAPH CDU-304-A
Functional Class: 3.1

USA

USN

USAF

TYPE CLASS:

Used by

MANUFACTURER'S NAME/CODE NUMBER: Allen B. DuMont Laboratories Inc., (82170).



Cathode-Ray Oscilloscope CDU-304-A

FUNCTIONAL DESCRIPTION:

Cathode-Ray Oscilloscope CDU-304-A is a general-purpose, cathode-ray tube instrument that is useful in many applications, such as a null indicator in bridge circuits, an output meter or indicator, for precise measurements of electrical impulse, for transmitter and receiver measurements and trouble shooting, for aligning transmitters and receivers, and for vibration and similar tests. It is used to make rapid, accurate, amplitude and frequency measurements of any portion of a signal from 0 to 1,000 volts, from dc to over 50,000 cps. An additional feature is an internal voltage calibrator that permits direct measurements of peak-to-peak voltages on the crt screen.

No field changes in effect at time of preparation (21 March 1962).

TECHNICAL CHARACTERISTICS:

VERTICAL CHANNEL (Y-AXIS)
DEFLECTION FACTOR

CDU-304-A CATHODE-RAY OSCILLOGRAPH

AMPLIFIER (FULL GAIN): 0.1 v peak-to-peak full scale or 0.025 v peak-to-peak per in. (0.009 v rms/in.).

DIRECT: 32 to 39 peak-to-peak v/in. (12 to 14 rms v/in.).

UNDISTORTED DEFLECTION: At least 4 in. (limited by deflection plate cutoff in the CR tube).

SINUSOIDAL FREQUENCY RESPONSE (THRU AMPLIFIER)

DIRECT COUPLING: Flat to dc; down not more than 10% at 100 kc.

CAPACITIVE COUPLING: Down not more than 10% from 10 cps to 100 kc.

EITHER TYPE COUPLING: Down not more than 50% at 300 kc.

TRANSIENT RESPONSE (THRU AMPLIFIER)

RISE TIME (10% TO 90%): 2 usec or less.

OVERSHOOT: 2% or less.

DECAY

DIRECT COUPLING: None.

CAPACITIVE COUPLING: Less than 10% in 45 milliseconds.

MAXIMUM INPUT VOLTAGE (TO AMPLIFIER)

SINGLE-ENDED

CAPACITIVE COUPLING: 1,000 v (dc plus peak ac).

DIRECT COUPLING: 1,000 v (dc plus peak ac) on all attenuation ranges except 0.1 v where it is 100 v (dc plus peak ac).

BALANCED: P2 v dc with 6 v peak-to-peak between grids.

INPUT IMPEDANCE

AMPLIFIER

SINGLE-ENDED: 2 meg, 50 uuf.

BALANCED: 4 meg, 40 uuf.

DIRECT

SINGLE-ENDED: 1.5 meg, 20 uuf.

BALANCED: 3.0 meg, 20 uuf.

HORIZONTAL CHANNEL (X-AXIS)

DEFLECTION FACTOR

AMPLIFIER (FULL GAIN): 0.3 peak-to-peak v/in. (0.1 rms v/in.).

DIRECT: 40 to 50 peak-to-peak v/in. (14 to 18 rms v/in.).

SINUSOIDAL FREQUENCY RESPONSE (THRU AMPLIFIER): Same as Vertical Amplifier.

TRANSIENT RESPONSE (THRU AMPLIFIER): Same as Vertical Amplifier.

INPUT VOLTAGE (MAXIMUM) TO AMPLIFIER

ATTENUATOR AT 1:1: 18 peak-to-peak v.

ATTENUATOR AT 10:1: 180 peak-to-peak v.

ATTENUATOR AT AC: 1,000 v (dc plus peak ac).

INPUT COUPLING (TO AMPLIFIER): Capacitive or Direct.

ATTENUATION (AMPLIFIER CONNECTION): By factors of 1 or 10 perm 10% as selected.

INPUT IMPEDANCE

AMPLIFIER: 2.2 meg, 50 uuf.

DIRECT

SINGLE-ENDED: 1.5 meg, 50 uuf.

BALANCED: 3 meg, 20 uuf.

LINEAR-SWEEP TIME BASE

FREQUENCY (RECURRENT): 2 to 30,000 sawtooth cps.

TIME DURATION (DRIVEN): 0.5 sec to approx. 30 usec.

EXPANSION: To 6 times full scale diameter without appreciable distortion.

SYNCHRONIZATION: Internal, external, or line frequency.

CATHODE-RAY OSCILLOGRAPH CDU-304-A

INTENSITY MODULATION CIRCUIT (Z-AXIS)

INPUT IMPEDANCE: 0.2 meg, 80 uuf.

SENSITIVITY: 2 to 56 v peak-to-peak (negative).

POLARITY: Positive signals increase the intensity of the beam.

CALIBRATION VOLTAGE

WAVE SHAPE: Square wave.

FREQUENCY: Power line.

AMPLITUDE: 0.1 v peak-to-peak.

ACCURACY (AMPLITUDE): Form 5% or better.

SAWTOOTH OUTPUT

AMPLITUDE: 5 v peak-to-peak.

POLARITY: Positive.

FREQUENCY: 2 to 30,000 as selected.

IMPEDANCE: Approx 45,000 ohms.

POWER REQUIREMENTS: 110 W, 115 v, 50 to 400 cyc.

RELATION TO OTHER EQUIPMENT: None.**EQUIPMENT REQUIRED BUT NOT SUPPLIED:** None.

MAJOR COMPONENTS

QTY	ITEM	STOCK NUMBERS	DIMENSIONS (INCHES)	WEIGHT (LBS)
1	Cathode-Ray Oscillograph CDU-304-A		8-3/4 x 13-1/2 x 19-1/2	50

REFERENCE DATA AND LITERATURE:

NAVSHIPS 94283: Technical Manual for DuMont Cathode-Ray Oscillograph types 304-A and 304-AR.

TUBE, CRYSTAL AND/OR SEMI-CONDUCTOR DATA:TUBES: (1) 0B2WA (2) 1X2B (1) 5ADP1 (1) 5Y3WGTB (2) 5726/6AL5W (2) 6J6WA
(2) 6005/6AQ5W (1) 884 (8) 12AU7

CRYSTALS: None used.

SEMI-CONDUCTORS: None used.

SHIPPING DATA

PKGS	VOLUME (CU FT)	WEIGHT (LBS)
1		

PROCUREMENT DATA

PROCURING SERVICE: USN

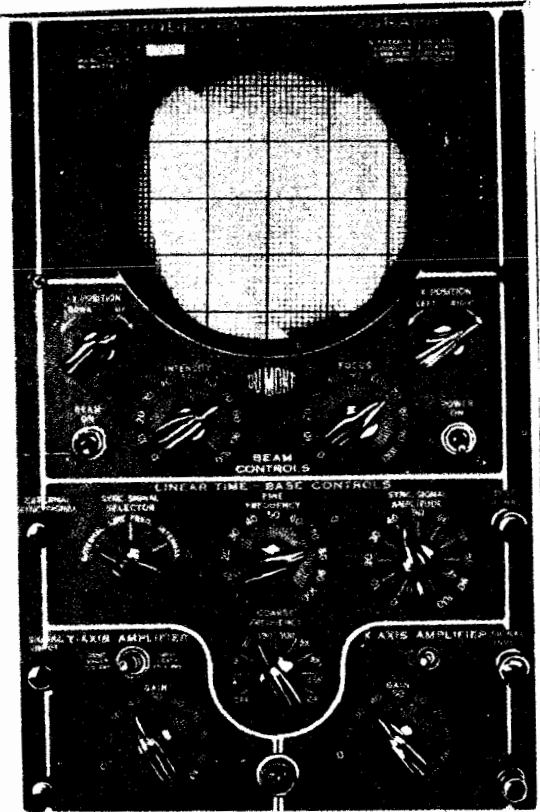
DESIGN COG: Commercial

SPEC &/OR DWG:

CDU-304-A CATHODE-RAY OSCILLOGRAPH

CONTRACTOR	LOCATION	CONTRACT OR ORDER NO.	APPROX. UNIT COST
Allen B. DuMont Laboratories Inc.	Clifton, N. J.	NObsr-75882 NObsr-84582	\$641.00 \$448.25

March 1957

OSCILLOSCOPE**I-245,-245-B**

Oscilloscope I-245, I-245B

FUNCTIONAL DESCRIPTION

The I-245 or I-245-B consists of a 5 inch cathode ray tube using electrostatic focusing and deflection and is connected in a conventional oscilloscope circuit. The instrument is provided with a removable calibrated scale which fits directly over the face of the cathode ray tube. It is used for viewing wave forms and for checking frequencies and phase relations at various test points in radio and radar sets.

No field changes in effect at time of preparation (17 July 1956).

RELATION TO OTHER EQUIPMENT

Similar to I-245-A except for changes in components parts. To be replaced by Oscilloscope BC-1060-(), Oscilloscope TS-239() /UP, or Oscilloscope TS-34A/AP.

ELECTRICAL AND MECHANICAL CHARACTERISTICS**INPUT IMPEDANCE**

Y-AXIS: 2 meg, 30 uuf.

X-AXIS: 5 meg, 25 uuf.
MAX INPUT POTENTIAL
 Y-AXIS: 250 rms v.
 X-AXIS: 25 rms v.
SINUSOIDAL FREQUENCY RESPONSE
 Y-AXIS: $\pm 10\%$ of max from 2 to 100,000 cps, 50% response at 325,000 cps.
 X-AXIS: $\pm 10\%$ of max from 2 to 100,000 cps, 50% response at 250,000 cps.
VOLTAGE GAIN
 Y-AXIS: 2000.
 X-AXIS: 43.
DEFLECTION FACTOR
 Y-AXIS: .010 rms v per inch.
 X-AXIS: .5 rms v per inch.
SWEEP FREQUENCY RANGE: 2 to 50,000 cps.
POWER SOURCE REQUIRED: 115 or 230 v, 40 to 60 cps, 90 W.

MANUFACTURER'S OR CONTRACTOR'S DATA

Dumont, Allen B. Labs, Passaic, N.J.
 Type 208-208B.
 Sig. C. Order 1352-Mfd-44, 16328-Phila.-49-2.

TUBE AND/OR CRYSTAL COMPLEMENT**I-245-B**

(5) 6V6 (1) 5LP1 (2) 80 (1) 6SJ7
 (1) 6Q5G (3) 6SN7GT (1) 6X5GT/G

Total Tubes: (14)

I-245

(5) 6V6 (1) 5LP1 (2) 80 (1) 6SJ7
 (3) 6F8G (1) 6Q5G (1) 6X5GT/G

Total Tubes: (14)

REFERENCE DATA AND LITERATURE

SIG-8-1-245.

Signal Supply Catalog for Oscilloscope I-245 and I-245-B.

TM11-487H.

Dept. of Army Technical Manual-Directory of Signal Corps Equipments for Test Equipment.

TYPE CLASSIFICATION	STANDARD
DESIGN COGNIZANCE	TASSA
PROCUREMENT COGNIZANCE	TASSA
STOCK NO.	
R.D.B. IDENT. NO.	3.3.1

I-245,-245-B

OSCILLOSCOPE

March 1957

SHIPPING DATA

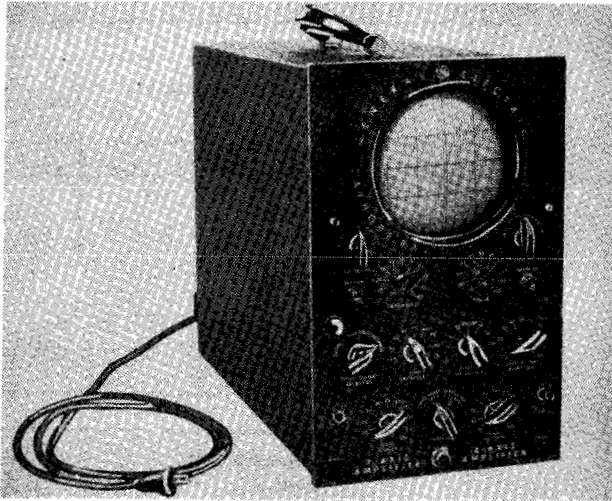
NUMBER OF BOXES	CONTENTS AND IDENTIFICATION	VOLUME (Cu.Ft.)	OVERALL DIMENSIONS (inches)	WEIGHT PACKED (lbs.)
1	Oscilloscope-I-245 or	4.6		125
1	Oscilloscope-I-245B	4.6		125

EQUIPMENT SUPPLIED DATA

QUANTITY PER EQUIPT	NAME AND NOMENCLATURE	OVERALL DIMENSIONS (inches)	WEIGHT (lbs.)
1	Oscilloscope I-245 or	8-13/16 X 10-1/4 X 19-1/2	54
1	Oscilloscope I-245-B	8-13/16 X 16-3/4 X 21-1/2	56

OSCILLOSCOPE

I-245-A



Oscilloscope I-245-A

FUNCTIONAL DESCRIPTION

The I-245-A is a general purpose test oscilloscope used for viewing waveforms and for checking frequencies and phase relations at various test points in radio and radar sets. The instrument incorporates a cathode ray tube using electrostatic focusing and deflection and connected in a conventional cathode-ray oscilloscope circuit. A linear sweep or timebase is generated internally. The amplitude and frequency of this sweep is variable. Different types of synchronizing signals with varying amplitudes may be applied. The signal to be viewed is applied to the vertical deflecting plates through an amplifier with variable gain. For special purposes external signals may be applied to the horizontal deflecting plates through the X-axis amplifier or to either pair of deflecting plates directly.

No field changes in effect at time of preparation (22 July 1957).

ELECTRICAL AND MECHANICAL CHARACTERISTICS

CATHODE-RAY TUBE

TYPE: 5CP1, high vacuum, intensifier.
 DIAMETER: 5 in.
 DEFLECTION: Electrostatic.
 FOCUSING: Electrostatic.

PERSISTANCE: Medium.
 ACCELERATING POTENTIAL: 1400 v.
 INPUT IMPEDANCE
 Y-AXIS AMPLIFIER: 2 meg, 42 uuf max.
 X-AXIS AMPLIFIER: 5 meg, 34 uuf max.
 MAX INPUT POTENTIAL
 Y-AXIS AMPLIFIER: 250 v, rms.
 X-AXIS AMPLIFIER: 25 v, rms.
 AMPLIFIER FREQUENCY RESPONSE
 Y-AXIS: $\pm 10\%$ of max from 2 to 100,000 sinusoidal cps -50% response at 325,000 sinusoidal cps.
 X-AXIS: $\pm 10\%$ of max from 2 to 100,000 sinusoidal cps -50% response at 250,000 sinusoidal cps.
 VOLTAGE GAIN
 Y-AXIS: 2000 times $\pm 10\%$.
 X-AXIS: 35 times.
 DEFLECTION FACTOR
 THROUGH AMPLIFIER
 Y-AXIS: 0.007 rms v/in.
 X-AXIS: 0.4 rms v/in.
 TO DEFLECTION PLATES
 Y-AXIS: 40 DC v/in.
 X-AXIS: 37 DC v/in.
 SWEEP CIRCUIT
 DIRECTION: Left to right.
 FREQUENCY: 2 to 50,000 cps.
 POWER SOURCE REQUIRED: 115/230 v, 40 to 60 cps, single ph, 100 W.

TUBE AND/OR CRYSTAL COMPLEMENT

(1) 5CP1	(3) 6SN7GT
(5) 6V6GT	(1) 6X5GT
(1) 5Y3GT	(1) 5R4GY
(1) 6SJ7	(1) 884
(1) VR105-30	

Total Tubes: (15)

REFERENCE DATA AND LITERATURE

TM11-2689A, Technical Manual for Oscilloscope I-245-A.

TYPE CLASSIFICATION	
DESIGN COGNIZANCE	TASSA
PROCUREMENT COGNIZANCE	
STOCK NO.	
R.D.B. IDENT. NO.	3.1

Test-Waveform Measuring

I-245-A

OSCILLOSCOPE

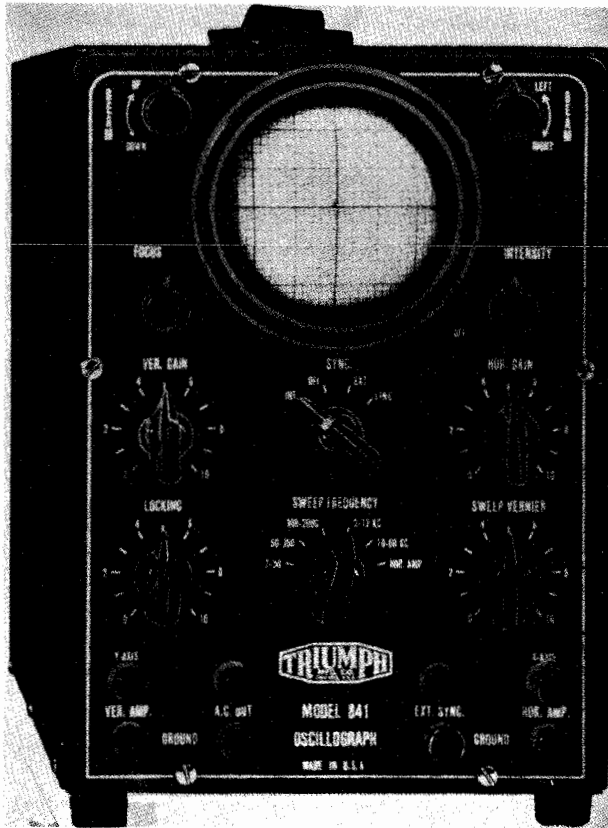
SHIPPING DATA

NUMBER OF BOXES	CONTENTS AND IDENTIFICATION	VOLUME (Cu.Ft.)	OVERALL DIMENSIONS (inches)	WEIGHT PACKED (lbs.)
1	Oscilloscope I-245-A	4.6	14 X 19 X 30	125

EQUIPMENT SUPPLIED DATA

QUANTITY PER EQUIPT	NAME AND NOMENCLATURE	OVERALL DIMENSIONS (inches)	WEIGHT (lbs.)
1	Oscilloscope I-245-A	8-7/8 X 14-1/4 X 18-3/4	

April 1958

CATHODE-RAY OSCILLOGRAPH**OBL, OBL-1,
-2,-3,-3a**

Cathode-Ray Oscilloscope Navy Model OBL-3

FUNCTIONAL DESCRIPTION

The Models OBL, OBL-1, OBL-2, OBL-3, and OBL-3a are instantaneous waveform indicating devices using a three-inch cathode-ray tube. They will present both recurrent and transient electrical and mechanical phenomena such as analysis of audio frequency distortion, amplifier gain, filter behaviour, phase shift, modulation in voice and tone transmission, and faults in radio and sound equipment. They also present a trace as a function of time on a substantially linear time base.

The Models OBL, OBL-1, OBL-2, and OBL-3 are portable equipments similar in design and function and intended for general use for viewing waveforms and for studying envelope characteristics. The Model OBL-3a is designed for rack mounting and is used mainly for measurement of frequency spread of FSK transmissions.

No field changes in effect at time of preparation (25 October 1957).

ELECTRICAL AND MECHANICAL CHARACTERISTICS**OBL**

SWEEP RANGE: 8 to 30000 cps.
 INPUT IMPEDANCE: 1 meg across 20 uuf.
 DEFLECTION SENSITIVITY (PER INCH):
 DIRECT TO PLATES: 35.0 v rms AC, 100v DC.
 THRU AMPLIFIERS: 0.5 v rms.
 FREQUENCY RESPONSE: Uniform from 10 to 100000 cps.
 VOLTAGE GAIN: Substantially in excess of 40.
 POWER REQUIREMENTS: 105 to 125 v, 60 to 70 cps, 65 W.

OBL-1

SWEEP RANGE: 15 to 30000 cps.
 INPUT IMPEDANCE

Y-AXIS

THRU AMPLIFIER: 1 meg across 37 uuf.
 DIRECT TO PLATES: 4.7 meg across 45 uuf.

X-AXIS: Same as for Y-axis.

Z-AXIS: 0.5 meg across 50 uuf.

DEFLECTION SENSITIVITY (PER INCH)

MAX AMPLIFICATION

VERTICAL: Approx 0.85 v rms.
 HORIZONTAL: Approx 0.70 v rms.

DIRECT TO PLATES

VERTICAL: 40 v rms.
 HORIZONTAL: 30 v rms.

AMPLIFIER GAIN (APPROX): 45.

FREQUENCY RESPONSE (AMPLIFIERS)

Y-AXIS

FULL GAIN: Uniform within 2 db of the value at 1000 between 10 and 100000 cps.

GAIN CONTROL AT MIDSCALE: Uniform within 14 db of the value at 1000 cps between 10 and 100000 cps.

X-AXIS: Same as for Y-axis.

Z-AXIS: Uniform within 2 db of the response at 1000 cps down to 30 cps.

POWER REQUIREMENTS: 115 or 230 v, 50 to 400 cps, 50 W.

OBL-2

SWEEP RANGE: 10 to 30000 cps.

INPUT IMPEDANCE

Y-AXIS

THRU AMPLIFIER: 1 meg across 25 uuf.

DIRECT TO PLATES: 6.5 meg across 10 uuf.

X-AXIS

THRU AMPLIFIER: 1 meg across 25 uuf.
 DIRECT TO PLATES: 6.5 meg across 8 uuf.

DEFLECTION SENSITIVITY (PER INCH): 0.4 v rms with gain control at max for vertical and horizontal amplifiers.

AMPLIFIER GAIN: Exceeds 60 at 1000 cps for vertical and horizontal amplifiers.

FREQUENCY RESPONSE (10 CPS TO 100 KC)

MAX GAIN: Uniform within 1 db.

Test-Wave Form Measuring

**OBL,OBL-1,
-2,-3,-3a****CATHODE-RAY OSCILLOGRAPH**

April 1958

GAIN CONTROL AT MIDSCALE: Uniform within
12 db (down 1 db at 15 kc).POWER REQUIREMENTS: 105 to 125 v, 50 to 60
cps, 30 W.

OBL-3,-3a

SWEEP RANGE: 7 to 30000 cps.

INPUT IMPEDANCE

Y-AXIS

THRU AMPLIFIER: 1 meg across 35 uuf.

DIRECT TO PLATES: 1 meg across 20
uuf.

X-AXIS

THRU AMPLIFIER: 1 meg across 35 uuf.

DIRECT TO PLATES: 2 meg across 20
uuf.

DEFLECTION SENSITIVITY (PER INCH)

MAX AMPLIFICATION

VERTICAL: 0.8 v rms.

HORIZONTAL: 1.0 v rms.

DIRECT TO PLATES

VERTICAL: 88.5 v DC or 31.5 v rms.

HORIZONTAL: 120 v DC or 42.5 v rms.

AMPLIFIER GAIN: 40.

FREQUENCY RESPONSE (AMPLIFIERS)

MAX GAIN: ± 2 db from 10 to 100000 cps.GAIN CONTROL AT MIDSCALE: Within 15 db.
from 10 to 100000 cps.POWER REQUIREMENTS: 105 to 125 v, 50 to
70 cps, 40 W.**MANUFACTURER'S OR CONTRACTOR'S DATA**Hickok Electrical Instrument Company,
Cleveland, Ohio.Contract NXsr-49743, dated 28 November
1944 (OBL).Allen B. DuMont Laboratories, Inc.,
Passaic, N.J.Contract NXsr-33622, dated 11 May 1943
(OBL-1).Reiner Electronics Company, Inc., New York,
N. Y.Contract NXsr-41057, dated 22 November
1943 (OBL-2).Triumph Manufacturing Company, Chicago,
Illinois.Contract NXsr-48370, dated 29 January
1944 (OBL-3).**TUBE AND/OR CRYSTAL COMPLEMENT**

OBL

(1) 3BP1 (1) 5R4WGB (1) 5Y3WGTB

(4) 6SJ7 (1) 884

Total Tubes: (8)

OBL-1

(1) 2X2A (1) 3BP1 (4) 6SJ7

(1) 6X5WGT (1) 884

Total Tubes: (8)

OBL-2

(1) 2X2A (1) 3BP1 (4) 6SH7

(1) 6X5WGT (1) 884

Total Tubes: (8)

OBL-3, -3A

(1) 2X2A (1) 3BP1 (2) 6AC7WA

(1) 6X5WGT (1) 884

Total Tubes: (6)

No Crystals.

REFERENCE DATA AND LITERATURENAVSHIPS 900471-1B: Technical Manual for
Navy Model OBL Cathode-Ray Oscillograph.NAVSHIPS 900227(A): Technical Manual for
Cathode-Ray Oscillograph Navy Model OBL-1.NAVSHIPS 900576: Technical Manual for
Cathode-Ray Oscillograph Model OBL-2.NAVSHIPS 900224-1B: Technical Manual for
Navy Model OBL-3 Cathode-Ray Oscillograph.NAVSHIPS 92228: Technical Manual for Trans-
mitter Control-Monitor Model AN/FRO-3.**TYPE CLASSIFICATION**

DESIGN COGNIZANCE BUSHIPS

PROCUREMENT COGNIZANCE

STOCK NO.

R.D.B. IDENT. NO. 3.3.1

SHIPPING DATA

NUMBER OF BOXES	CONTENTS AND IDENTIFICATION	VOLUME (C.u.Ft.)	OVERALL DIMENSIONS (inches)	WEIGHT PACKED (lbs.)
1	Cathode-Ray Oscillograph Model OBL	5.5	18 x 22 x 24	90
1	Cathode-Ray Oscillograph Model OBL-1	2.7		42
1	Cathode-Ray Oscillograph Model OBL-2	1.8	9-3/4 x 15 x 21	51

UNCLASSIFIED

Test-Wave Form Measuring

April 1958

CATHODE-RAY OSCILLOGRAPH

OBL, OBL-1,
-2, -3, -3a

EQUIPMENT SUPPLIED DATA

QUANTITY PER EQUIPT	NAME AND NOMENCLATURE	OVERALL DIMENSIONS (inches)	WEIGHT (lbs.)
1	OBL Cathode Ray Oscillograph OBL	8 x 11-1/2 x 14	30
1	OBL-1 Cathode-Ray Oscillograph Model OBL-1	8 x 11-1/2 x 14	28
1	OBL-2 Cathode-Ray Oscillograph Model OBL-2	6 x 10-3/4 x 14-1/4	26
1	OBL-3 Cathode-Ray Oscillograph Model OBL-3	7-1/2 x 11-1/8 x 14-1/2	23
1	OBL-3a Cathode-Ray Oscillograph Model OBL-3a	7 x 17-1/2 x 20-1/2	

UNCLASSIFIED

4.3 OBL: 3

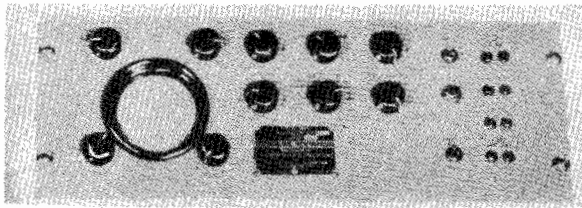
UNCLASSIFIED

April 1959

Test-Wave Form Measuring

CATHODE RAY OSCILLOSCOPE

OBL-3a



Cathode Ray Oscilloscope OBL-3a

Cathode Ray Oscilloscope OBL-3a, having a 3-inch cathode ray tube, is an instantaneous wave form indicating device used in viewing wave forms and in studying envelope characteristics.

No field changes in effect at time of preparation (23 March 1959).

RELATION TO OTHER EQUIPMENT

Similar to OBL-3.

ELECTRICAL AND MECHANICAL CHARACTERISTICS

POWER REQUIREMENTS: 40 W, 105 to 125 v, 50 to 70 cy.

SWEEP FREQUENCY: 7 to 30,000 cy.

INPUT VOLTAGE RANGE

X AND Y AXIS: 4v v (peak).

INPUT IMPEDANCE

X AXIS: 1 meg across 35 uuf.

DIRECT: 2 meg across 20 uuf.

Y AXIS: 1 meg across 35 uuf.

DIRECT: 1 meg across 20 uuf.

AMPLIFIER RESPONSE

X AND Y AXIS (FROM 10 CY TO 100 KC): ± 2 db.

AT HALF GAIN: ± 15 db.

DEFLECTION FACTOR

HORIZONTAL: 1 v rms/in. deflection.

VERTICAL: 0.8 v rms/in. deflection.

AMPLIFIER GAIN: 40.

TUBE AND/OR CRYSTAL COMPLEMENT

(1) 2X2 (1) 3BP1 (2) 6AC7

(1) 6X5GT (1) 884

Total Tubes: (6)

No Crystals used.

REFERENCE DATA AND LITERATURE

NAVSHIPS 92228: Technical Manual for Transmitter Control-Monitor AN/FRQ-3.

NAVSHIPS 900,224-IB: Technical Manual for Cathode Ray Oscillograph OBL-3.

TYPE CLASSIFICATION
 DESIGN COGNIZANCE BUSHIPS
 PROCUREMENT COGNIZANCE
 STOCK NO.
 R.D.B. IDENT. NO. 3.3

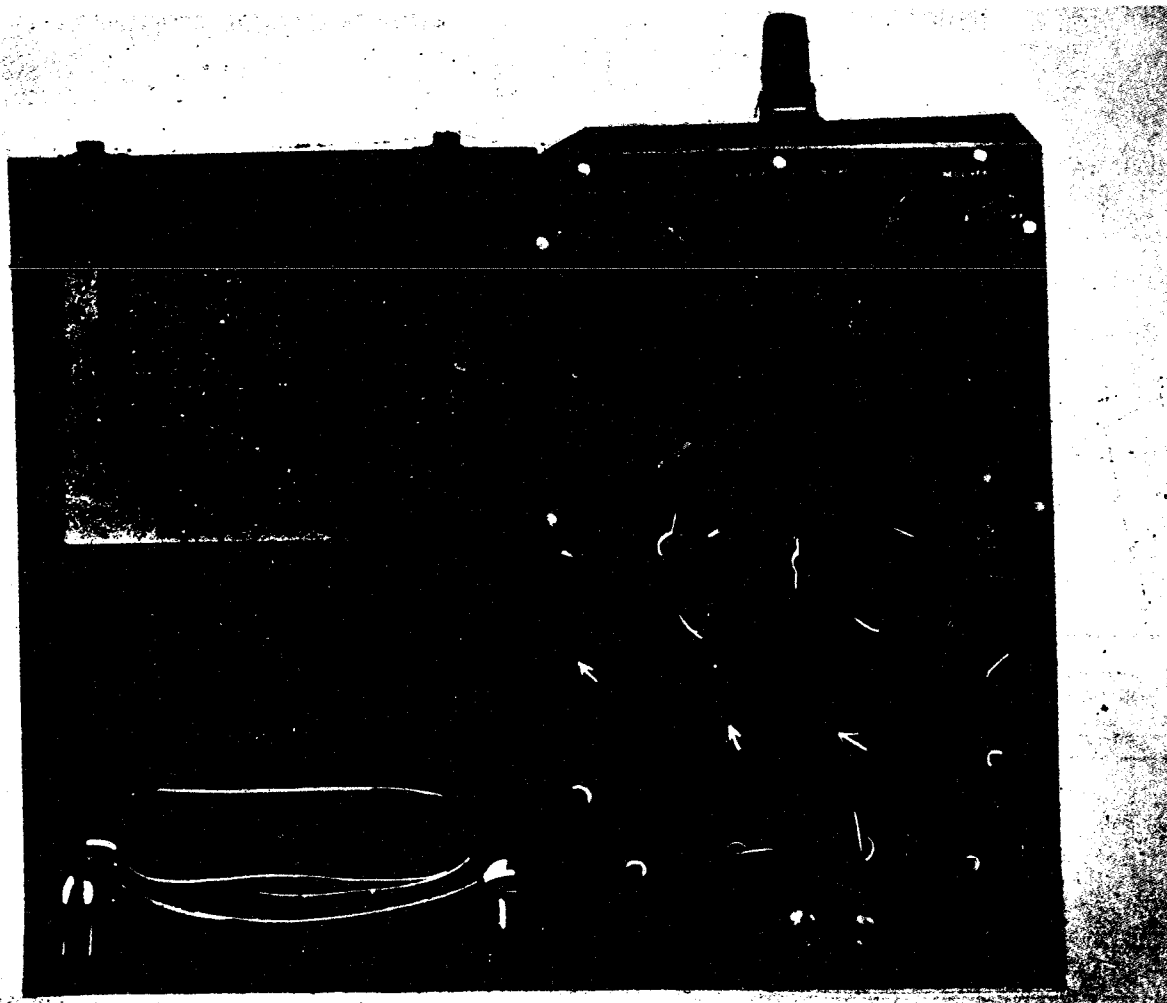
EQUIPMENT SUPPLIED DATA

QUANTITY PER EQUIPT	NAME AND NOMENCLATURE	OVERALL DIMENSIONS (inches)	WEIGHT (lbs.)
1	Cathode Ray Oscilloscope OBL-3a	7 X 17-1/2 X 20-1/2	

UNCLASSIFIED

4.3 OBL-3a: 1

TIMER MONITOR OSCILLOSCOPE EQUIPMENT



OBM Timer Monitor Oscilloscope Equipment

FUNCTIONAL DESCRIPTION

The Model OBM contains a cathode-ray tube, vertical and horizontal deflection amplifiers, a saw-tooth sweep circuit, power supplies and controls. Connectors at the rear of the equipment are for direct connection to the vertical deflection plates and for the introduction of a square wave to the grid of the cathode-ray tube to provide sufficient brilliance for observing short-time phenomena. Fast sweeps are applied to the input of the horizontal amplifier through binding posts when viewing sharp pulses. The equipment is used specifically for monitoring wave shapes of the Model B-1 Timer.

No field changes in effect at time of preparation (21 November 1956).

RELATION TO OTHER EQUIPMENT

Equipment Required but not Supplied:
Interconnecting Cables.

ELECTRICAL AND MECHANICAL CHARACTERISTICS

INPUT IMPEDANCE

Y-AXIS: 1 meg into 25 uuf at the terminals, 10 meg into 25 uuf direct balanced
5 meg into 25 uuf direct unbalanced.

X-AXIS: 1 meg into 25 uuf at terminals.

AMPLIFIER FREQUENCY RESPONSE

Y-AXIS: Sinewave response uniform within 3 db from 5 cycles to 100 kilocycles at any attenuator setting.

X-AXIS: Uniform within 3 db from 5 cps to 150 kc at any attenuator setting.

June 1957

Test-Waveform Measuring

OBM**TIMER MONITOR OSCILLOSCOPE
EQUIPMENT****DEFLECTION FACTOR:**WITH AMPLIFIER: Y-AXIS terminals, 0.15
v/in,

X-AXIS terminals, 0.70 v/in.

TO DEFLECTION PLATES: Y AXIS, 78 peak to
peak v/in.**HORIZONTAL SWEEP**

FREQUENCY RANGE: 15 to 30,000 cps.

DIRECTION OF SWEEP: Left to right.

SYNCHRONIZING SIGNAL SOURCES: Internal
(Y signal) 60 cps and external.SYNCHRONIZING POLARITY: Either polarity
of sync amplifier.POWER SOURCE REQUIRED: 105 to 125 v, 50 to
60 cps, single ph, 90 W.

POWER FACTOR: Unity (100%).

TUBE AND/OR CRYSTAL COMPLEMENT

(2) 6SN7GT	(2) 6SJ7GT	(5) 6V6GT/G
(1) 884	(1) 5CP1	(1) SU4G
(2) 2 X 2	(1) OC3/VR-105	
Total Tubes: (15)		

REFERENCE DATA AND LITERATURENAVSHIPS 900,222-A: Technical Manual for
Navy Model OBM Timer Monitor Oscilloscope
Equipment.**MANUFACTURER'S OR CONTRACTOR'S DATA**Sylvania Electric Products, Inc, Williams-
port, Pa.
Contract NXsr 41051, dated 18 November
1943,

TYPE CLASSIFICATION	
DESIGN COGNIZANCE	BUSHIPS
PROCUREMENT COGNIZANCE	
STOCK NO.	
R.D.B. IDENT. NO.	

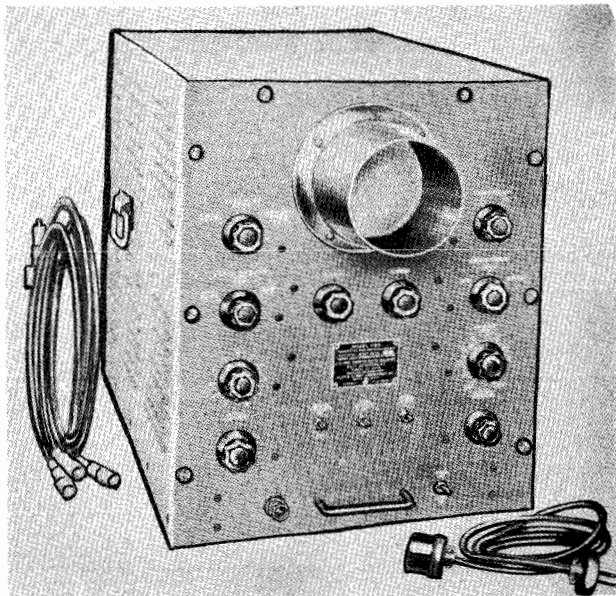
SHIPPING DATA

NUMBER OF BOXES	CONTENTS AND IDENTIFICATION	VOLUME (Cu.Ft.)	OVERALL DIMENSIONS (inches)	WEIGHT PACKED (lbs.)
1	Timer Monitor Oscilloscope Equipment Model OBM	3.84	12 X 18-7/8 X 29-3/8	96
1	Cathode Ray Tube Equipment	2.28	12-1/16 X 15 X 21-3/4	24
1	Set of Equipment Spares	2.84	11-1/4 X 18-1/2 X 23-1/2	72
2	Cathode Ray Tube Spares	3.43	12 X 20-5/8 X 28-3/4	39

EQUIPMENT SUPPLIED DATA

QUANTITY PER EQUIPT	NAME AND NOMENCLATURE	OVERALL DIMENSIONS (inches)	WEIGHT (lbs.)
1	Timer Monitor Oscilloscope Equipment Model OBM	9-5/8 X 15-3/4 X 21-1/4	62
1	Cathode Ray Tube	9-3/8 X 9-3/8 X 20	2
1	Set of Equipment Spares	9-1/4 X 16-3/8 X 19-1/4	39
2	Cathode Ray Tube Spares	9-3/8 X 18-3/4 X 20	4

December 1956

TRANSMITTER MONITOR OSCILLOSCOPE**OBN**

Transmitter Monitor Oscilloscope OBN

FUNCTIONAL DESCRIPTION

The OBN is a portable transmitter monitor oscilloscope, used to provide a periodic check on the frequency and pulse shape of the output of Loran Transmitting Equipment.

This instrument is provided with special sweep circuits, input characteristics and marker circuits to facilitate setting up and putting into operation Loran Transmitters, and to assure continued operation at maximum efficiency and correct frequency.

No field changes in effect at time of preparation (26 July 1956).

ELECTRICAL AND MECHANICAL CHARACTERISTICS

FREQUENCY RANGE: 1700 to 2000 kc.
 FREQUENCY CONTROL: Crystal.
 TYPE OF EMISSION MONITORED: RF pulses.
 SWEEP SPEEDS: 25, 100 and 20,000 usec.
 MARKER TIMING: 10 usec.
 TRIGGER DELAY: Adjustable to 300 usec.
 POWER SOURCE REQUIRED: 115 v AC, 60 cps, single phase, 160 W.

MANUFACTURER'S OR CONTRACTOR'S DATA

Allen B. DuMont Lab. Inc., Passaic, N.J.
 Contract NXsr 37599, dated 10 September 1943.

Approximate Cost: \$350.00 with equipment spares.

TUBE AND/OR CRYSTAL COMPLEMENT

(7) 6SN7W	(4) 6SJ7	(1) 5R4GY
(3) 6H6GT/G	(1) 5CP1	(2) 2X2A
(2) 6AC7	(2) 6V6GT/G	(1) OC3/VR-105
(1) 2050	(1) 6X5CT/G	

Total Tubes: (25)
 (4) Crystals
 Total Crystals: (4)

REFERENCE DATA AND LITERATURE

NAVSHIPS 900,429: Technical Manual for Transmitter Monitor Oscilloscope Navy Model OBN.

TYPE CLASSIFICATION
DESIGN COGNIZANCE BUSHIPS
PROCUREMENT COGNIZANCE
STOCK NO.
R.D.B. IDENT. NO.

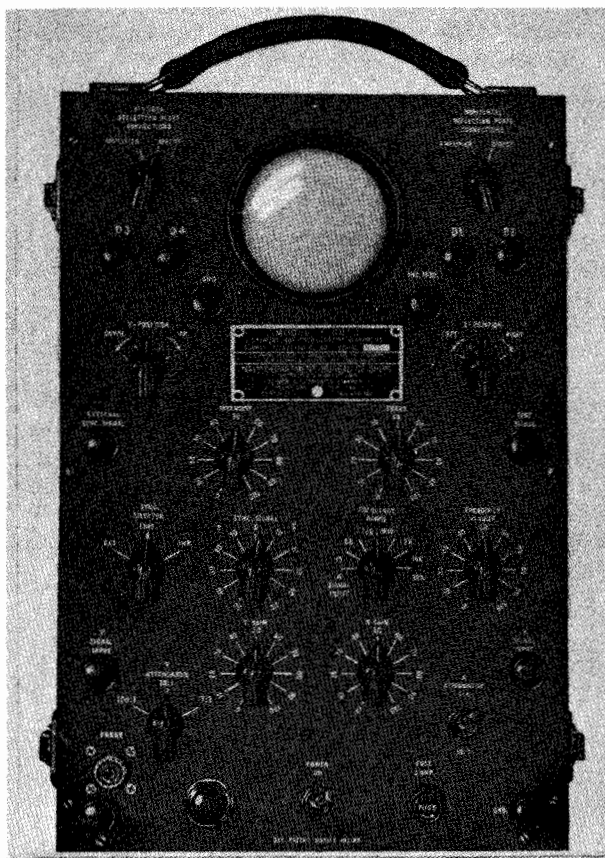
SHIPPING DATA

NUMBER OF BOXES	CONTENTS AND IDENTIFICATION	VOLUME (Cu.Ft.)	OVERALL DIMENSIONS (inches)	WEIGHT PACKED (lbs.)
1	Transmitter Monitor Oscilloscope NT-60132	13.16	25-3/8 X 26-3/4 X 33-1/2	180
1	Cathode-Ray Tube 5CP1	1.31	10 X 10 X 23-5/8	16
1	Set of Equipment Spares	10	21-1/2 X 23-1/4 X 35	220

EQUIPMENT SUPPLIED DATA

QUANTITY PER EQUIP	NAME AND NOMENCLATURE	OVERALL DIMENSIONS (inches)	WEIGHT (lbs.)
1	Transmitter Monitor Oscilloscope NT-60132	17-3/8 X 20-1/4 X 23-1/4	120
1	Cathode-Ray Tube 5CP1	5 X 5 X 16-3/4	3.5
1	Set of Equipment Spares	18 X 21 X 30	160

April 1958

CATHODE-RAY OSCILLOGRAPH**OBT, OBT-1**

Cathode-Ray Oscilloscope OBT, OBT-1

FUNCTIONAL DESCRIPTION

The Model OBT and Model OBT-1 are portable test instruments for instantaneously plotting a visual curve of one electrical quantity as a function of another on the screen of a cathode-ray tube. Their principal use is for the testing of radio and radar equipments, including measuring AC and DC voltages, measuring phase relationships and frequencies, checking of waveshapes and modulation, the neutralization of transmitters, and the checking of the alignment of various radar equipment.

No field changes in effect at time of preparation (28 October 1957).

RELATION TO OTHER EQUIPMENT

The Navy Models OBT and OBT-1 are similar

with different manufacturers and are superseded by Oscilloscope OS-8/U which is smaller and designed to military specifications.

ELECTRICAL AND MECHANICAL CHARACTERISTICS

SWEEP RANGE: 15 to 30000 cps.

PRESENTATION: 3 in. CR tube.

INPUT IMPEDANCE

TERMINAL

Y-AXIS: 2 meg across 30 uuf, probe
1 meg across 20 uuf.

X-AXIS: 2 meg across 30 uuf.

Z-AXIS: 0.47 meg across 30 uuf.

DIRECT (Y-AXIS AND X-AXIS)

BALANCED: 9.4 meg across 20 uuf.

UNBALANCED: 4.7 meg across 25 uuf.

INPUT POTENTIAL (MAX)

Y-AXIS: 400 v DC max or peak signal.

X-AXIS: 400 v max or 50 v peak signal.

Z-AXIS: 400 v DC direct to control
electrode.

AMPLIFIER FREQUENCY RESPONSE (ANY ATTENUATOR SETTING).

SINE WAVE RESPONSE

Y-AXIS: Uniform within 3 db from 20
cps to 2 mc.

X-AXIS: Uniform within 3 db from 10
cps to 100 kc.

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

DEFLECTION FACTOR (AT FULL GAIN AND NO ATTENUATION) WITH AMPLIFIER

Y-AXIS: 0.1 v rms per inch, probe 0.4
v rms per inch.

X-AXIS: 0.9 v rms per inch.

Z-AXIS: 15 v peak from barely visible
to normal brilliance beam.

DIRECT TO PLATES

Y-AXIS: 25 rms $\pm 20\%$ per inch.

X-AXIS: 28 v rms $\pm 20\%$ per inch.

POWER REQUIREMENTS: 105 to 125 v, 50 to 63
cps, 150 W.

MANUFACTURER'S OR CONTRACTOR'S DATA

Allen B. DuMont Laboratories, Inc., Passaic,
N.J.

Contract NXsr-44555, dated 21 December
1943 (OBT).

Reiner Electronic Company, Inc., New York,
N.Y.

Contract NObsr-42068, dated 22 January
1948 (OBT-1).

OBT,OBT-1

CATHODE-RAY OSCILLOGRAPH

April 1958

TUBE AND/OR CRYSTAL COMPLEMENT

Cathode-Ray Oscilloscope Navy Model OBT.
 TM11-5518: Technical Manual for Cathode-Ray
 Oscilloscope Navy Model OBT-1.

- | | |
|-----------|--------------|
| (1) 2X2A | (4) 6SJ7 |
| (1) 3GP1 | (1) 6SN7WGTA |
| (1) 5U4G | (1) 6V6GTY |
| (2) 6AG7Y | (1) 884 |
| (1) 6AC7 | |
- Total Tubes: (13)

TYPE CLASSIFICATION DESIGN COGNIZANCE BUSHIPS PROCUREMENT COGNIZANCE STOCK NO. R.D.B. IDENT. NO. 3.3.1
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REFERENCE DATA AND LITERATURE

NAVSHIPS 900296: Technical Manual for

SHIPPING DATA

NUMBER OF BOXES	CONTENTS AND IDENTIFICATION	VOLUME (Cu.Ft.)	OVERALL DIMENSIONS (inches)	WEIGHT PACKED (lbs.)
1	Cathode-Ray Oscilloscope Model OBT or OBT-1	6.9	19 X 22-3/8 X 28-1/8	100

EQUIPMENT SUPPLIED DATA

QUANTITY PER EQUIPT	NAME AND NOMENCLATURE	OVERALL DIMENSIONS (inches)	WEIGHT (lbs.)
1	OBT Cathode-Ray Oscilloscope Model OBT including: (1) Test Probe Assembly (2) Allen Wrench	10-3/8 X 15-1/2 X 17	60
1	OBT-1 Cathode-Ray Oscilloscope Model OBT-1 including: (1) Test Probe Assembly (2) Allen Wrench	10-3/8 X 15-1/2 X 17	60

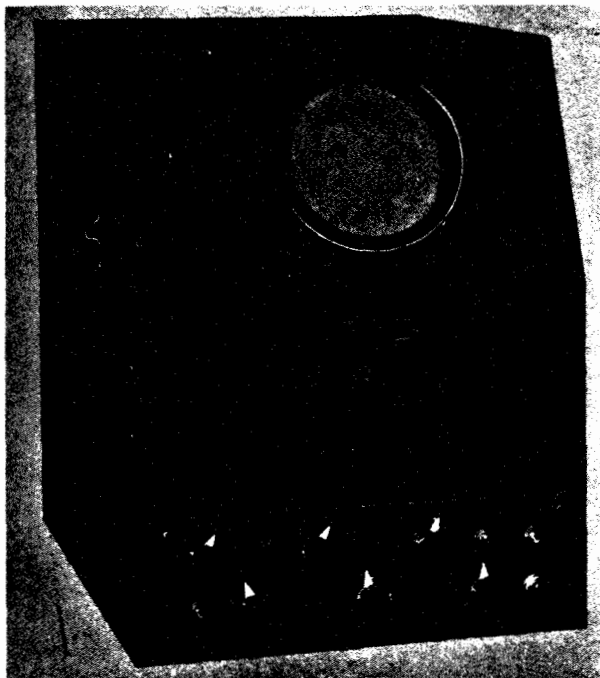
UNCLASSIFIED

June 1957

Test-Wave Form Measuring

TRANSMITTER MONITOR OSCILLOSCOPE

OCA



Transmitter Monitor Oscilloscope OCA

FUNCTIONAL DESCRIPTION

The model OCA is used to provide a frequent check on the frequency and output waveforms of Loran transmitting equipment. This instrument picks up a portion of the radiated energy of the transmitter and gives a picture of its waveform. It can also be used to compare the frequency of the transmitter with the frequency of the crystal-controlled oscillator in the oscilloscope. Controls are provided for starting, stopping and regulating the time period (speed) of the horizontal deflection sweep across the screen of the cathode-ray tube; for adjusting and defining the picture on this screen; and for selecting the source of the signal to be monitored.

No field changes in effect at time of preparation (26 November 1956).

RELATION TO OTHER EQUIPMENT

Replaces Transmitter Monitor Oscilloscope 60073.

ELECTRICAL AND MECHANICAL CHARACTERISTICS

FREQUENCY RANGE: 1700 to 2000 kc.
 FREQUENCY CONTROL: Local Oscillator is crystal controlled.
 TYPE OF EMISSION MONITORED: Pulsed C.W.
 VIEWING SCREEN SIZE: 5 in. dia.
 SWEEP SPEEDS: 25,200 and 20,000 usec.
 POWER SOURCE REQUIRED: 115 v 60 cps, single ph. 75 W.

MANUFACTURER'S OR CONTRACTOR'S DATA

Allen B. DuMont Laboratories Inc. Passaic, N. J.

Contract NXss 29060, dated 11 May 1956

TUBE AND/OR CRYSTAL COMPLEMENT

(4) 6SJ7 (4) 6H6GT/G
 (2) 2X2 (1) 5Y3GT/G
 (1) OD3/VR-150 (1) OC3/VR-105
 (1) SCP1

Total Tubes: (14)

(1) NT-40160 or (1) NT-40159
 Total Crystals: (1)

REFERENCE DATA AND LITERATURE

Technical Manual for Transmitter Monitor. NAVSHIPS 900,376-A: Oscilloscope Navy Model OCA.

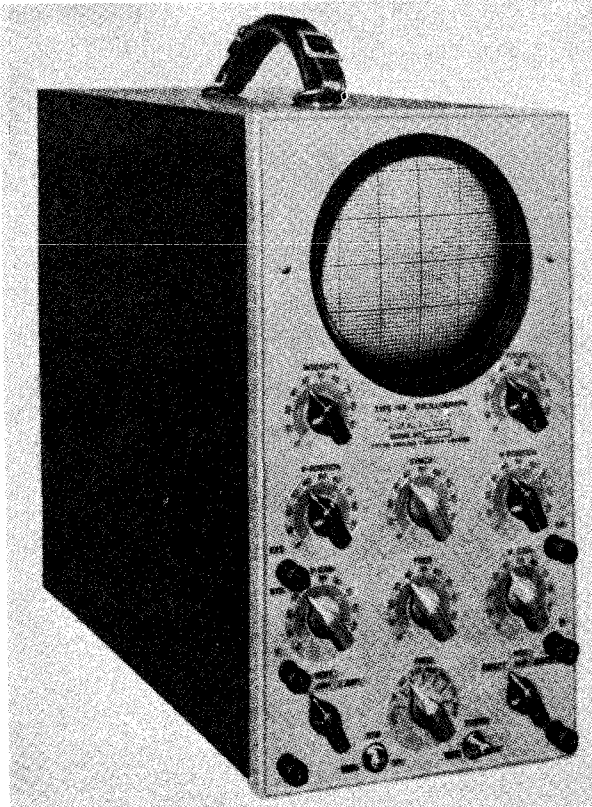
TYPE CLASSIFICATION
DESIGN COGNIZANCE BUSHIPS
PROCUREMENT COGNIZANCE
STOCK NO.
R.D.B. IDENT. NO.

EQUIPMENT SUPPLIED DATA

QUANTITY PER EQUIPT	NAME AND NOMENCLATURE	OVERALL DIMENSIONS (inches)	WEIGHT (lbs.)
1	Transmitter Monitor Oscilloscope OCA	14-3/4 X 18-1/4 X 19-1/2	

UNCLASSIFIED

4.3 OCA: 1

OSCILLOSCOPE**OS-1/U***Oscilloscope OS-1/U*

radio and radar equipment.

No field changes in effect at time of preparation (5 February 1957).

ELECTRICAL AND MECHANICAL CHARACTERISTICS

SWEEP FREQUENCY RANGE: 2 to 100,000 cps.

DEFLECTION SENSITIVITY

VERTICAL: 0.010 rms v per in.

HORIZONTAL: 0.50 rms v per in.

INPUT IMPEDANCE

VERTICAL: 2 meg, 30 uuf.

HORIZONTAL: 5 meg, 25 uuf.

MAXIMUM INPUT POTENTIAL

VERTICAL: 250 rms v.

HORIZONTAL: 25 rms v.

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

TUBE AND/OR CRYSTAL COMPLEMENT

No Electron Tubes.

REFERENCE DATA AND LITERATURE

TM11-487H: Technical Manual for Test Equipment.

TYPE CLASSIFICATION DESIGN COGNIZANCE TASSA PROCUREMENT COGNIZANCE STOCK NO. R.D.B. IDENT. NO.

FUNCTIONAL DESCRIPTION

The OS-1/U is a 5 in. CR tube instrument. It is used for general purpose testing of

EQUIPMENT SUPPLIED DATA

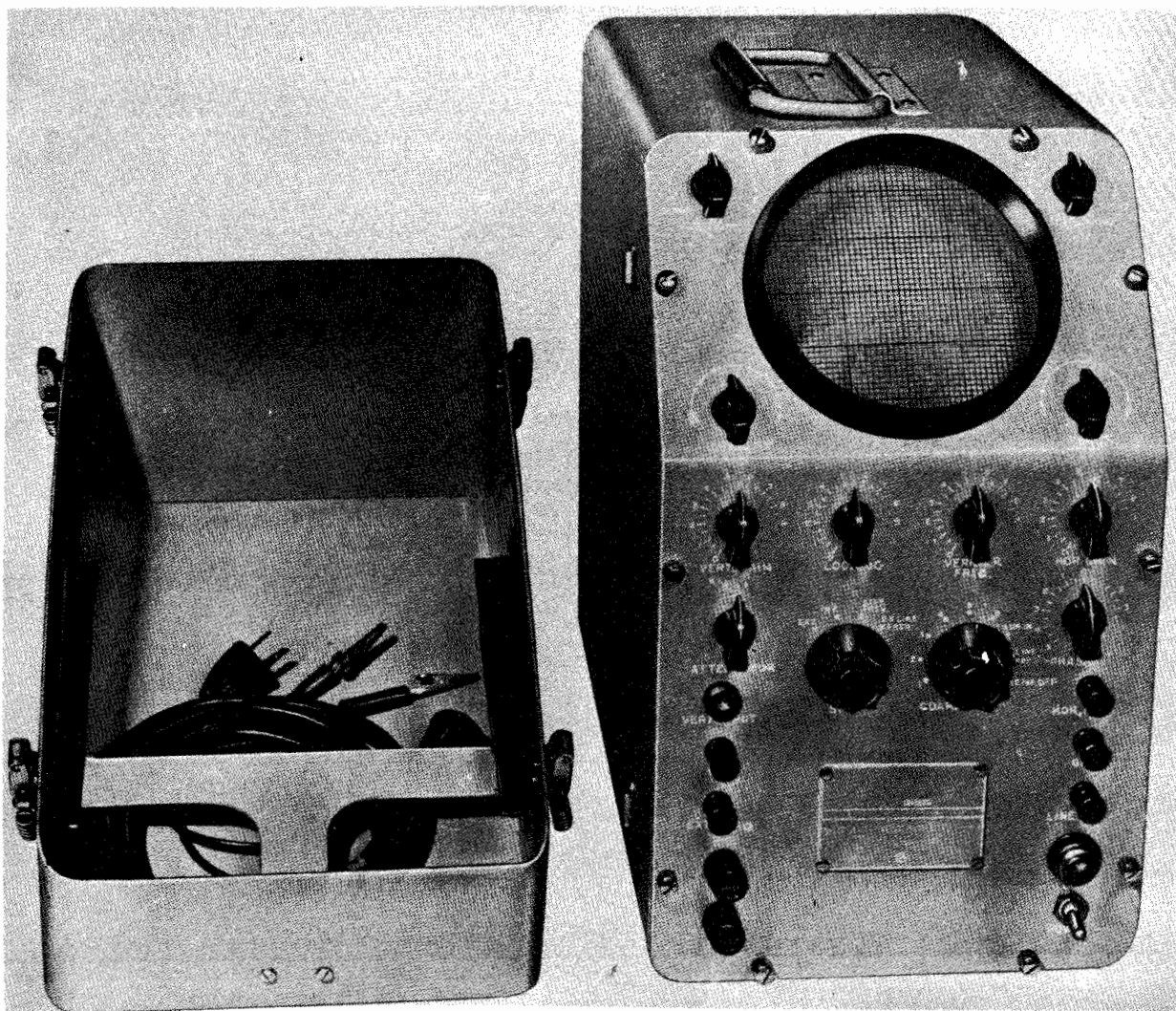
QUANTITY PER EQUIP	NAME AND NOMENCLATURE	OVERALL DIMENSIONS (inches)	WEIGHT (lbs.)
1	Oscilloscope OS-1/U	8-13/16 X 10-1/4 X 19-1/2	54

April 1958

OSCILLOSCOPE

Test-Wave Form Measuring

OS-10/U,-10A/U



Oscilloscope OS-10/U,-10A/U

FUNCTIONAL DESCRIPTION

The OS-10/U and OS-10A/U are portable visual test equipments used for servicing electronic equipments. They are capable of alignment and testing of radio and radar receiving and transmitting equipment, hum measurements, frequency comparison, observance of complex wave forms, percentage modulation measurements, and other operations within its rating.

No field changes in effect at time of preparation (26 December 1957).

ELECTRICAL AND MECHANICAL CHARACTERISTICS**FREQUENCY RANGE**

VERTICAL AMPLIFIERS: 10 to 500000 cps.

HORIZONTAL AMPLIFIER: 10 to 200000 cps.

SWEEP CIRCUIT OSCILLATOR: 3 to 60000 cps.

VERTICAL AMPLIFIERS SENSITIVITY: 0.03 rms v per in.

OVERALL ACCURACY

VERTICAL AMPLIFIERS: ± 3 db from 10 to 500000 cps.

HORIZONTAL AMPLIFIER: ± 3 db from 10 to 200000 cps, ± 6 db at 250000 cps.

Test-Wave Form Measuring

OS-10/U,-10A/U**OSCILLOSCOPE**

April 1958

INPUT IMPEDANCE

VERTICAL: 1 meg.

HORIZONTAL: 1 meg.

POWER REQUIREMENTS: 105 to 125 v, 50 to
1200 cps, single ph.

POWER CONSUMPTION: 50 W at 115 v.

TUBE AND/OR CRYSTAL COMPLEMENT

(1) 1B3GT

(1) 5UP1

(4) 6J6WA

(1) 6X4WA

Total Tubes: (7)

No Crystals.

MANUFACTURER'S OR CONTRACTOR'S DATAThe Hickok Electrical Instrument Co,
Cleveland, Ohio.Contract NObsr-39240, dated 13 June
1947 (OS-10/U).Reiner Electronics Co, Inc, New York, N.Y.
Contract NObsr-49204, dated 12 June
1950 (OS-10A/U).Approximate Cost: \$200.00 with equip-
ment spares.**REFERENCE DATA AND LITERATURE**NAVSHIPS 91204: Technical Manual for Oscil-
loscope OS-10/U.NAVSHIPS 91738: Technical Manual for Oscil-
loscope OS-10A/U.

TYPE CLASSIFICATION DESIGN COGNIZANCE BUSHIPS PROCUREMENT COGNIZANCE MIL-O-15287(SHIPS) STOCK NO.
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SHIPPING DATA

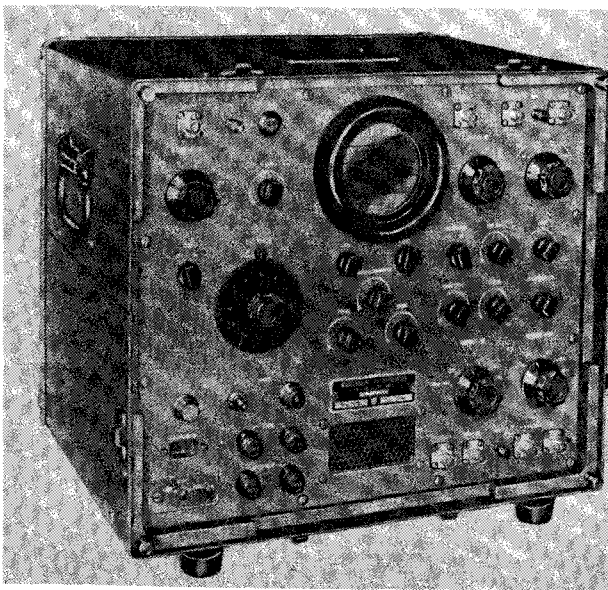
NUMBER OF BOXES	CONTENTS AND IDENTIFICATION	VOLUME (Cu.Ft.)	OVERALL DIMENSIONS (inches)	WEIGHT PACKED (lbs.)
1	OS-10/U Oscilloscope OS-10/U	2.67	12-1/4 X 18-1/8 X 20-1/2	41
1	OS-10A/U Oscilloscope OS-10A/U	3.8	15 X 20 X 22	42

EQUIPMENT SUPPLIED DATA

QUANTITY PER EQUIPT	NAME AND NOMENCLATURE	OVERALL DIMENSIONS (inches)	WEIGHT (lbs.)
1	OS-10/U Oscilloscope OS-10/U	8-3/4 X 15-1/2 X 16-1/2	35
1	Cable assembly, power NT-62486	84 lg	
1	Test Lead NT-491991		
1	Test Lead	48 lg	
1	Set of Equipment Spares	9 X 9 X 18	21
2	Technical Manual NAVSHIPS 91204 OS-10A/U	1/4 X 9 X 11-1/2	
1	OS-10A/U Oscilloscope OS-10A/U	10-1/4 X 15-1/2 X 17	35
1	Cable Assembly, Power	80-1/4 lg	
1	Test Lead RG-62/U	48 lg	
1	Test Lead	53 lg	
1	Set of Equipment Spares		
2	Technical Manual NAVSHIPS 91738	1/4 X 9 X 11-1/2	

April 1959

Test-Wave Form Measuring

OSCILLOSCOPE**OS-26/USM-24***Oscilloscope OS-26/USM-24***FUNCTIONAL DESCRIPTION**

Oscilloscope OS-26/USM-24 is a portable, field-type synchroscope used in bench-testing of radar and communication equipment. It displays time variation of a voltage pulse or wave with self-contained means for measuring its duration, displacements, and instantaneous magnitude.

No field changes in effect at time of preparation (23 March 1959).

RELATION TO OTHER EQUIPMENT

This oscilloscope is part of Oscilloscope AN/USM-24.

ELECTRICAL AND MECHANICAL CHARACTERISTICS

POWER REQUIREMENTS: 220 W, 100 to 130 v, 50 to 1,000 cps, 1 ph.

FREQUENCY RANGE: 8 cyc to 600 kc for recurrent sweep.

INPUT IMPEDANCE: 5.6 meg paralleled by 25 uuf (hor); 300,000 ohms paralleled by 37 uuf (vert); 56,000 ohms paralleled by 25 uuf (beam modulation).

DEFLECTION SENSITIVITY: 4 v rms/in. (hor); 0.035 v rms/in. (vert).

DELAYED SWEEP TIME EXPANSION SCALE: 10:1.

FREQUENCY RESPONSE: 0.5 cy to 700 kc (hor); 4 cy to 10 mc (vert); 50 cy to 10 mc (beam modulation).

SWEEP TIME: 0.5 to 50,000 usec/in. (continuously adjustable).

MANUFACTURER'S OR CONTRACTOR'S DATA

Waterman Products Co., Inc., Philadelphia, Pa.

Contract NObsr-49230, dated 19 June 1950.

Contract NObsr-52205, dated 15 January 1951.

TUBE AND/OR CRYSTAL COMPLEMENT

(1) OA2	(2) 1V2
(1) 3JP1	(2) 6AH6
(3) 6AL5	(2) 6AN5
(1) 6C4	(1) 6CB6
(1) 6J6	(4) 6X4
(4) 12AT7	(10) 12AU7

Total Tubes: (32)

No Crystals used.

REFERENCE DATA AND LITERATURE

NAVSHIPS 91687(A): Technical Manual for Oscilloscope AN/USM-24.

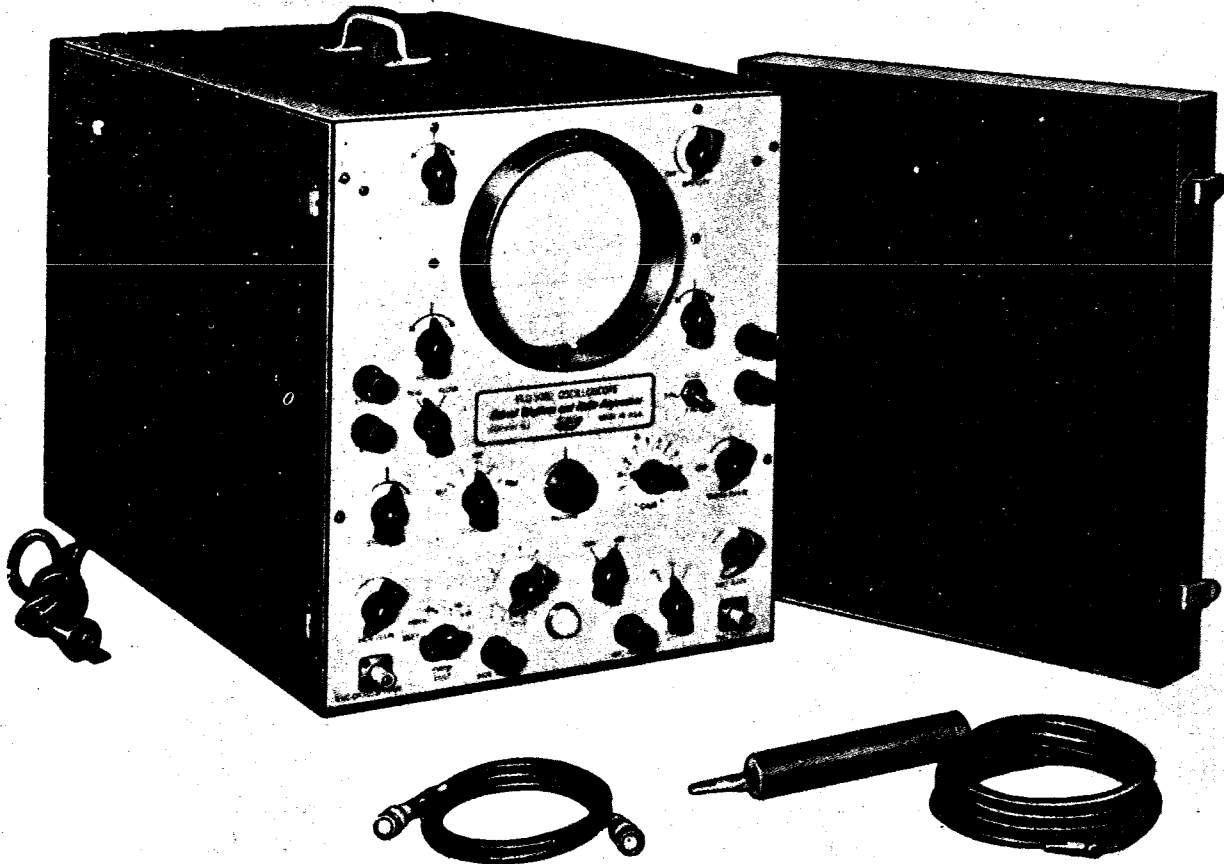
TYPE CLASSIFICAT
DESIGN COGNIZANCE BUSHIPS
PROCUREMENT COGNIZANCE MII-P-15458(SHIPS)
STOCK NO.
R.D.B. IDENT. NO. 3.2

EQUIPMENT SUPPLIED DATA

QUANTITY PER EQUIPT	NAME AND NOMENCLATURE	OVERALL DIMENSIONS (inches)	WEIGHT (lbs.)
1	Oscilloscope OS-26/USM-24	13 X 15 X 17-1/8	48

OSCILLOSCOPE

OS-38/FRC



Oscilloscope OS-38/FRC

FUNCTIONAL DESCRIPTION

The OS-38/FRC is a self contained, cathode ray tube, electrostatic deflection type test instrument designed as a laboratory aid for trouble shooting, aligning and testing electronic equipment. The instrument is particularly useful when testing and aligning microwave communications equipment pulse time modulation techniques.

Functions that can be performed by proper application of the oscilloscope are: measuring peak-to-peak AC voltages; measuring phase relations between two signals; setting the frequency of an equipment, or checking the frequency against a known standard; and setting the channel outputs of microwave PTM equipment.

No field changes in effect at time of preparation (14 Sept 1956).

ELECTRICAL AND MECHANICAL CHARACTERISTICS

CATHODE RAY TUBE

TYPE: 5UP1.

ANODE POTENTIALS

CATHODE: 130 v.

CONTROL GRID: 60 v.

FIRST ANODE: 600 v.

SECOND ANODE: 2200 v.

SCREEN DIAMETER: 5 in.

SWEEP GENERATOR

TYPE OF DEFLECTION: Electrostatic, push-pull.

FREQUENCY RANGE: 20 cps to 2 mc.

SYNCHRONIZING SIGNAL SOURCES: Internal, external, PTM.

SYNCHRONIZING SIGNAL POLARITY: Internal and/or external.

June 1957

Test-Wave Form Measuring

OS-38/FRC**OSCILLOSCOPE****VERTICAL SIGNAL CHANNEL**

ATTENUATION PROVIDED: 20 to 60 db.

FREQUENCY RESPONSE: 20 cps to 8 mc.

INPUT IMPEDANCE: 2 megohms.

MARKER CHANNEL

OSCILLATOR FREQUENCY: 192 kc.

MARKER SPACING: 5.2 usec.

POWER SOURCE: 110 to 220 v, 50 to 60 cps,
single phase.

(1) 6H6

(2) 6SN7WGTA

(6) 12AT7WA

(1) 6189/12AU7

(1) 6SH7

(1) 6U8

(3) 5726/6AL5W

Total Tubes: (28)

(3) IN38

Total Crystals: (3)

MANUFACTURER'S OR CONTRACTOR'S DATAFederal Telephone and Radio Corp, Clifton,
N. J.

Contract NObsr-52473, dated 10 Oct 1952.

Approximate Cost: \$1300.00 with equip-
ment spares.**REFERENCE DATA AND LITERATURE**

Technical Manual for Oscilloscope OS-38/FRC.

TUBE AND/OR CRYSTAL COMPLEMENT

(1) 6626/OA2WA

(1) OD3W

(1) 5UP1

(2) 6BG6G

(1) 2X2A

(1) 5U4G

(5) 6AG5

(1) 6C4WA

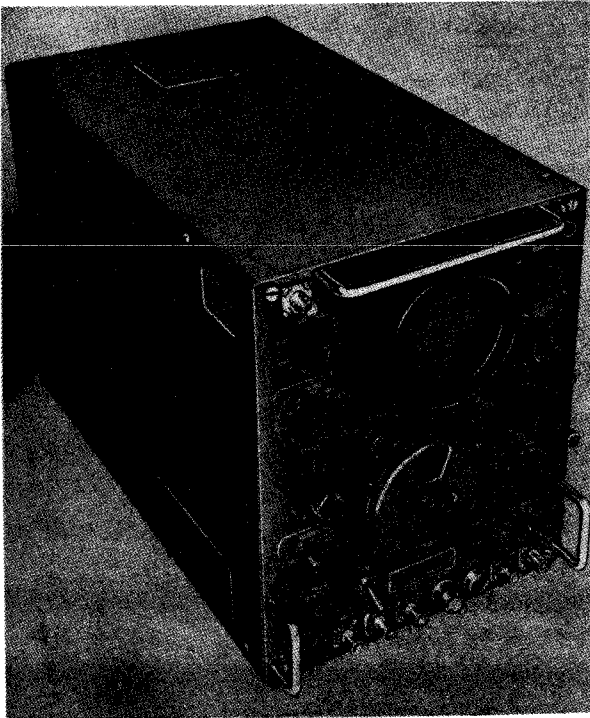
TYPE CLASSIFICATION
DESIGN COGNIZANCE
PROCUREMENT COGNIZANCE
STOCK NO.
R.D.B. IDENT. NO.

EQUIPMENT SUPPLIED DATA

QUANTITY PER EQUIP	NAME AND NOMENCLATURE	OVERALL DIMENSIONS (inches)	WEIGHT (lbs.)
1	Oscilloscope OS-38/FRC	12 X 13-1/2 X 19	55
1	RF Cable Assembly		
1	Test Probe Assembly		

OSCILLOSCOPE

Test-Wave Form Measuring
OS-4(XN-1)/AP



Oscilloscope OS-4(XN-1)/AP

FUNCTIONAL DESCRIPTION

The Oscilloscope OS-4(XN-1)/AP is primarily intended for auxiliary radar ranging and testing of all types of electronic equipment in the radar and communication fields. It is sometimes known as an "A and R Scope" which was originally designed for AEW (aircraft early warning) applications. It may be used as a general purpose synchroscope or oscilloscope. It will show shapes of pulses, triggers and video signals. It may be used to measure accurately pulse length, rise time, decay time, and to display wave shapes having a wide variety of characteristics.

No field changes in effect at time of preparation (2 May 1958).

RELATION TO OTHER EQUIPMENT

This equipment is a miniaturized version of, and supersedes Oscilloscope OS-5/U. It has similar characteristics and is equivalent in performance except that it has a 3-inch cathode-ray tube in place of a 5-inch tube.

ELECTRICAL AND MECHANICAL CHARACTERISTICS

POWER SUPPLY: 115 v ac $\pm 10\%$, 50 to 1000 cps, 150 W.

VIDEO AMPLIFIER

SENSITIVITY MAX: 0.5 v peak-to-peak per in.

ATTENUATOR PROBE: 5 v peak-to-peak per in.

LOW C PROBE: 0.75 v peak-to-peak per in.

DIRECT: 50 v peak-to-peak per in.

RESPONSE, SINE WAVE: 1.5 cps to 11 mc, 0 to -6 db.

RESPONSE, THRU LOW C PROBE: 10 cps to 7 mc, 0 to -6 db.

RESPONSE, THRU CRYSTAL DIODE PROBE: 10 cps to 15 kc, 0 to -6 db, 10 to 200 mc carrier.

PULSE RISE AND FALL TIME: 0.07 usec.

DROOP OF 1200 USEC SQUARE WAVE: 1%.

IMPEDANCE, INPUT: 1 meg shunted by 25 uu².

IMPEDANCE, ATTENUATOR PROBE INPUT: 1 meg shunted by 9 uuf.

IMPEDANCE, LOW C PROBE INPUT: 1 meg shunted by 8 uuf.

IMPEDANCE, CRYSTAL PROBE INPUT: 24k shunted by 8 uuf.

IMPEDANCE, DIRECT INPUT: 2.2 meg shunted by 20 uuf.

IMPEDANCE, Z AXIS TO CATHODE INPUT: 47k shunted by 33 uuf.

SWEEP RANGES

A, SWEEP: 1.2 to 12,000 usec, 200 to 2,000,000 yd.

R, SWEEP: 2.4 to 24 usec, 400 to 4000 yd.

R, DELAY: 3 to 10,000 usec.

R, PEDESTAL: 2.4 to 24 usec.

REP RATE, INTERNAL: 40 to 3300 pps.

REP RATE, EXTERNAL: Up to 6000 pps.

S, SWEEP: Up to 820k pps.

RANGE MARKERS: 10 usec or 50 usec, 2000 or 10,000 yd.

POLARITY: Positive or negative, amplitude presentation.

ACCURACY, TIMING: $\pm 0.02\%$

EXTERNAL TRIGGERING PULSE: ± 15 v min.

RISE TIME: 10 v per usec.

AT VIDEO INPUT JACK: 0.15 v peak-to-peak square wave; 0.3 v peak-to-peak sine wave.

S, SWEEP

SQUARE WAVES: 1.1 v peak-to-peak.

SINE WAVES: 2 v peak-to-peak.

Test-Wave Form Measuring

OS-4(XN-1)/AP

OSCILLOSCOPE

SYNC INPUT IMPEDANCE

A AND R, SWEEP: 330k shunted by 15 uuf.
 -A +R, SWEEP: 330k shunted by 19 uuf.
 ±S, SWEEP: 1 meg shunted by 17 uuf.

TRIGGER MARKER OUTPUTS A AND R: ±55 v peak.

RISE TIME: 0.2 usec.
 IMPEDANCE, SOURCE: 70 ohms.

AMBIENT TEMPERATURE: -40 to +55 deg C.

PRESENTATION AND CONTROLS: The following terminals and controls are located on the front panel.

(10) 12AU7 (1) 5725/6AS6W
 (1) 6AH6 (1) 3KP1
 (1) 5726/6AL5W (2) 6AN5WA
 Total Tubes: (23)

(1) Quartz (100kc) (1) Quartz (81.94)kc
 (2) 1N63
 Total Crystals: (4)

REFERENCE DATA AND LITERATURE

Technical Manual of Operating and Maintenance
 Instructions for Oscilloscope OS-4(XN-1)/
 AP.

MANUFACTURER'S OR CONTRACTOR'S DATA

Waterman Products Co, Inc, Philadelphia,
 Pennsylvania.

TUBE AND/OR CRYSTAL COMPLEMENT

(1) 1V2 (1) 5654/6AK5W
 (1) 5744 (2) 12AT7WA
 (1) 5704 (1) 6AB4

TYPE CLASSIFICATION STANDARD
 DESIGN COGNIZANCE BUAER
 PROCUREMENT COGNIZANCE
 STOCK NO.
 R.D.B. IDENT. NO. 3.2

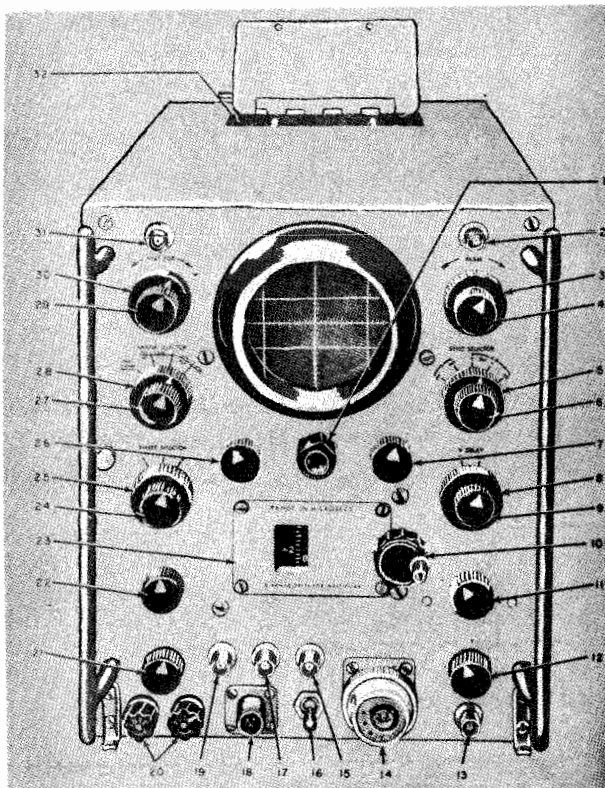
EQUIPMENT SUPPLIED DATA

QUANTITY PER EQUIPT	NAME AND NOMENCLATURE	OVERALL DIMENSIONS (inches)	WEIGHT (lbs.)
1	Oscilloscope	9-1/8 X 11-1/4 X 17-1/4	33.5
1	Low Capacity Probe	41 lg	7/16
1	Attenuator Probe	4-9/16 lg X 1 dia	3/16
1	Crystal Probe	4-9/16 lg X 1 dia	3/16
1	Cable for Attenuator or Crystal Probe	37 lg X 9/16 dia	3/16
2	Video Cables	97 lg X 9/16 dia	3/8
1	Power Cord	73 lg X 13/16 dia	3/16
2	Adaptor UG-273/U	1-3/8 lg X 3/4 dia	ea 1/16
2	Adaptor UG-146/U	1-3/8 lg X 13/16 dia	ea 1/8
2	Adaptor UG-83/U	1-3/4 lg X 11/16 dia	ea 1/8
2	Adaptor UG-201/U	1-9/16 lg X 3/4 dia	ea 1/16
2	Adaptor UG-255/U	1-5/16 lg X 5/8 dia	ea 1/16
1	Conversion kit including:		
	1 Crystal	2-5/16 X 1-11/16 dia	3/32
	1 Dial	1/32 X 2-1/4 dia	1/64
	1 Dial	3-1/8 X 1/16	1/32
	1 Transit Case	12-1/8 X 14-1/8 X 22-7/8	

December 1956

OSCILLOSCOPE

OS-4A/AP



Oscilloscope OS-4A/AP,

Oscilloscope OS-4A/AP, Front Panel Controls

- | | |
|---------------------------|-----------------------|
| 1. Heater (Press To Test) | 17. A Trig |
| 2. Sync Input | 18. Power Input |
| 3. Beam | 19. Marker |
| 4. Focus | 20. Fuse |
| 5. Sync Selector | 21. A-R Trig Polarity |
| 6. Int Trig Rate | 22. Marker |
| 7. Sync S Sweep | 23. Dial Window |
| 8. V Delay | 24. R Sweep |
| 9. Sensitivity S Sweep | 25. Sweep Selector |
| 10. Range | 26. H Gain |
| 11. V Gain | 27. Fine S A Sweep |
| 12. V Attenuator | 28. Range Selector |
| 13. Cal Volt | 29. Hor Pos |
| 14. V Input-Probe | 30. Vert Pos |
| 15. R Trig | 31. Intensity Input |
| 16. Power | 32. Refer To Table IV |

FUNCTIONAL DESCRIPTION

The OS-4A/AP is a portable instrument for portraying a luminous plot of instantaneous voltage against a time base. As a major component of Oscilloscope AN/USM-25A, it can be used for non-flight auxiliary radar ranging as well as bench testing of radar equipment and other electronic devices or as the principal component of Oscilloscope AN/USM-25B for flight use.

No field changes in effect at time of preparation (23 July 1956).

RELATION TO OTHER EQUIPMENT

Similar to OS-4/AP except for changes in circuitry.

Equipment Required but not Supplied: (1) Test Prod MX-1537/AP, (1) Test Prod MX-1539/AP, (1) Test Lead CO-1099/USM-25A, (1) RF Cable Assembly CG-530/U(8' 0"), (1) RF Cable Assembly CG-530/U(3' 1"), (1) Cable Assembly Power Electrical CX-2454/U(6' 0"), (1) Crystal Bliley Electric Corp type B-H8(81.94 kc).

ELECTRICAL AND MECHANICAL CHARACTERISTICS

FREQUENCY RESPONSE: ± 1 db between 50 cps and 5 mc; ± 3 db between 10 cps and 8 mc.
 SENSITIVITY: 0.5 v peak to peak per inch. min.

PULSE RESPONSE

RISE TIME: Less than 0.1 usec.
 DELAY TIME: Less than 0.2 usec.
 200 CYCLE SQUARE WAVE DROOP: Less than 5%.

INPUT IMPEDANCE: 1 meg shunted by 26 uuf.
 OUTPUT IMPEDANCE: 47000 ohms shunted by 40 uuf.

DEFLECTION FACTOR: 43 to 52 v peak to peak per inch.

SIGNAL DELAY TIME: 0.60 usec.

OPERATING POWER REQUIREMENTS: 115 v, 50 to 1000 cps, 180 W at 115 v, 60 cps.

AMBIENT TEMPERATURE RANGE: -40°C to $+55^{\circ}\text{C}$.

MAXIMUM ALTITUDE OF OPERATION: 10000 ft.

DISPLAY: 3 inch cathode ray tube.

OS-4A/AP

OSCILLOSCOPE

December 1956

MANUFACTURER'S OR CONTRACTOR'S DATA

Industrial Television Inc., Clifton, New Jersey.
Contract NOas 52-693-1, Type No. IT-120T.

REFERENCE DATA AND LITERATURE

Technical Manual for Oscilloscope AN/USM-25A and B, AN16-30USM25-1.

TUBE AND/OR CRYSTAL COMPLEMENT

(8) 5814	(1) 5725	(5) 12AT7
(1) 5726	(1) 1Z2	(2) 0A2
(2) 5763	(2) 6AH6	(1) 3WP1

Total Tubes: (23)

TYPE CLASSIFICATION
DESIGN COGNIZANCE BUAER
PROCUREMENT COGNIZANCE MIL-0-7738(AER)
STOCK NO. 4 July 1951
R.D.B. IDENT. NO.

EQUIPMENT SUPPLIED DATA

QUANTITY PER EQUIPT	NAME AND NOMENCLATURE	OVERALL DIMENSIONS (inches)	WEIGHT (lbs.)
1	Oscilloscope OS-4A/AP	9 X 11-1/8 X 17-1/2	35

26 June 1962

6625-643-3307

OSCILLOSCOPE OS-46/U

Cog Service: USA

FSN: 6625-643-2277 W/S

Functional Class: 3.1

USA

USN

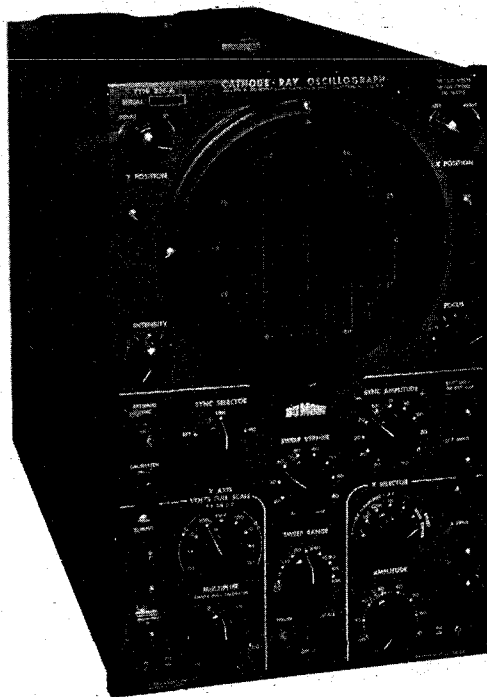
USAF

TYPE CLASS:

Std

Used by

MANUFACTURER'S NAME/CODE NUMBER: Allen B. DuMont Laboratories Inc., (82170).



Oscilloscope OS-46/U

FUNCTIONAL DESCRIPTION:

Oscilloscope OS-46/U is a general-purpose, cathode-ray tube instrument that is useful in many applications, such as a null indicator in bridge circuits, an output meter or indicator for precise measurements of electrical impulses, for transmitter and receiver measurements and troubleshooting, for aligning transmitters and receivers, and for vibration and similar tests. It is used to make rapid, accurate, amplitude and frequency measurements of any portion of a signal from 0 to 1,000 volts, from dc to over 50,000 cps. An additional feature is an internal voltage calibrator that permits direct measurement of peak-to-peak voltages on the crt screen.

No field changes in effect at time of preparation (21 March 1962).

TECHNICAL CHARACTERISTICS:

VERTICAL CHANNEL (Y-AXIS)

OS-46/U OSCILLOSCOPE

DEFLECTION FACTOR

AMPLIFIER (FULL GAIN): 0.1 v peak-to-peak full scale or 0.025 v peak-to-peak per in. (0.009 v rms/in.).

DIRECT: 32 to 39 peak-to-peak v/in. (12 to 14 rms v/in.).

UNDISTORTED DEFLECTION: At least 4 in. (limited by deflection plate cutoff in the cr tube).

SINUSOIDAL FREQUENCY RESPONSE (THRU AMPLIFIER)

DIRECT COUPLING: Flat to dc; down not more than 10% at 100 kc.

CAPACITIVE COUPLING: Down not more than 10% from 10 cps to 100 kc.

EITHER TYPE COUPLING: Down not more than 50% at 300 kc.

TRANSIENT RESPONSE (THRU AMPLIFIER)

RISE TIME (10% TO 90%): 2 usec or less.

OVERSHOOT: 2% or less.

DECAY

DIRECT COUPLING: None.

CAPACITIVE COUPLING: Less than 10% in 45 milliseconds.

MAXIMUM INPUT VOLTAGE (TO AMPLIFIER)

SINGLE-ENDED

CAPACITIVE COUPLING: 1,000 v (dc plus peak ac).

DIRECT COUPLING: 1,000 v (dc plus peak ac) on all attenuation ranges except 0.1 v where it is 100 v (dc plus peak ac).

BALANCED: P2 v dc with 6 v peak-to-peak between grids.

INPUT IMPEDANCE

AMPLIFIER

SINGLE-ENDED: 2 meg, 50 uuf.

BALANCED: 4 meg, 40 uuf.

DIRECT

SINGLE-ENDED: 1.5 meg, 20 uuf.

BALANCED: 3.0 meg, 20 uuf.

HORIZONTAL CHANNEL (X-AXIS)

DEFLECTION FACTOR

AMPLIFIER (FULL GAIN): 0.3 peak-to-peak v/in. (0.1 rms v/in.).

DIRECT: 40 to 50 peak-to-peak v/in. (14 to 18 rms v/in.).

SINUSOIDAL FREQUENCY RESPONSE (THRU AMPLIFIER): Same as Vertical Amplifier.

TRANSIENT RESPONSE (THRU AMPLIFIER): Same as Vertical Amplifier.

INPUT VOLTAGE (MAXIMUM) TO AMPLIFIER

ATTENUATOR AT 1:1: 18 peak-to-peak v.

ATTENUATOR AT 10:1: 180 peak-to-peak v.

ATTENUATOR AT AC: 1,000 v (dc + peak ac).

INPUT COUPLING (TO AMPLIFIER): Capacitive or Direct.

ATTENUATION (AMPLIFIER CONNECTION): By factors of 1 or 10 from 10% as selected.

INPUT IMPEDANCE

AMPLIFIER: 2.2 meg, 50 uuf.

DIRECT

SINGLE-ENDED: 1.5 meg, 50 uuf.

BALANCED: 3 meg, 20 uuf.

LINEAR-SWEEP TIME BASE

FREQUENCY (RECURRENT): 2 to 30,000 sawtooth cps.

TIME DURATION (DRIVEN): 0.5 sec to approx. 30 usec.

OSCILLOSCOPE OS-46/U

EXPANSION: To 6 times full scale diameter without appreciable distortion.

SYNCHRONIZATION: Internal, external, or line frequency.

INTENSITY MODULATION CIRCUIT (Z-AXIS)

INPUT IMPEDANCE: 0.2 meg, 80 uuf.

SENSITIVITY: 2 to 56 v peak-to-peak (negative).

POLARITY: Positive signals increase the intensity of the beam.

CALIBRATION VOLTAGE

WAVE SHAPE: Square wave.

FREQUENCY: Power line.

AMPLITUDE: 0.1 v peak-to-peak.

ACCURACY (AMPLITUDE): Form 5% or better.

SAWTOOTH OUTPUT

AMPLITUDE: 5 v peak-to-peak.

POLARITY: Positive.

FREQUENCY: 2 to 30,000 as selected.

IMPEDANCE: Approx. 45,000 ohms.

POWER REQUIREMENTS: 110 w, 115 v, 50 to 400 cyc, single ph.

RELATION TO OTHER EQUIPMENT: None.

EQUIPMENT REQUIRED BUT NOT SUPPLIED: None.

MAJOR COMPONENTS

QTY	ITEM	STOCK NUMBERS	DIMENSIONS (INCHES)	WEIGHT (LBS)
1	Oscilloscope OS-46/U		8-3/4 x 13-1/2 x 19-1/2	50

REFERENCE DATA AND LITERATURE:

NAVSHIPS 92553-A: Technical Manual for Oscilloscope OS-67/U, OS-46/U.

TM11-5131: Technical Manual for Oscilloscope OS-46/U and OS-5001/U.

TO 33A1-13-58-1: Technical Manual for Oscilloscope OS-46/U and OS-5001/U.

TUBE, CRYSTAL AND/OR SEMI-CONDUCTOR DATA:

TUBES: (1) 0B2WA (2) 1X2B (1) 5ADP1 (1) 5Y3WGTB (2) 5726/6AL5W (2) 6J6WA
(2) 6005/6AQ5W (1) 884 (8) 12AU7

CRYSTALS: None used.

SEMI-CONDUCTORS: None used.

SHIPPING DATA

PKGS	VOLUME (CU FT)	WEIGHT (LBS)
1	8.4	114

4.3 OS-46/U: 3

OS-46/U OSCILLOSCOPE

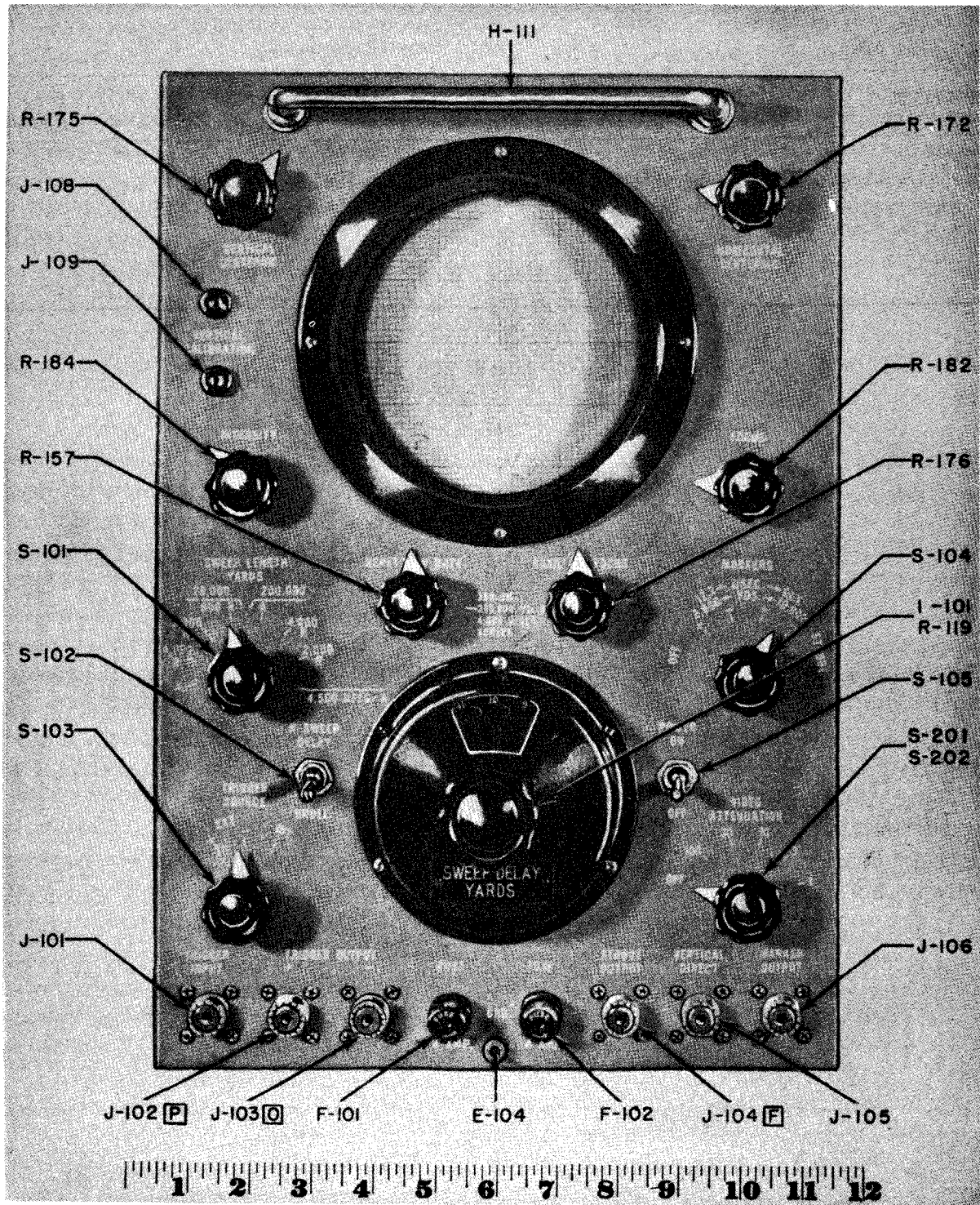
PROCUREMENT DATA

PROCURING SERVICE: USA
SPEC &/OR DWG:

DESIGN COG: USA, Sig C

CONTRACTOR	LOCATION	CONTRACT OR ORDER NO.	APPROX. UNIT COST
Allen B. DuMont Laboratories Inc. Type no. 304-A, Catalog no. 1622-K	Clifton, N. J.	N0bsr-64819 N0bsr-71804 N0bsr-75586	\$364.40 \$426.50

OSCILLOSCOPE



Oscilloscope OS-5/U

April 1958

Test-Wave Form Measuring

OS-5/U**OSCILLOSCOPE****FUNCTIONAL DESCRIPTION**

The OS-5/U is designed to be used on Naval Vessels in conjunction with AEW radar systems as a test oscilloscope and auxiliary range unit to increase their accuracy in ranging, extend their range scale, provide accurate crystal-controlled markers, provide delayed or undelayed expanded sweeps, and act as a precision test scope and calibrator. It will increase the radar set accuracy in ranging from 2 to 3 percent to 0.1 percent when using the "R" sweep of the oscilloscope. It can be used to align itself, and its calibration accuracy is assured by the locking of the trigger to the markers.

No field changes in effect at time of preparation (24 April 1958).

RELATION TO OTHER EQUIPMENT

The OS-5/U is similar to, and supersedes DuMont Model 256B, and is superseded by Oscilloscope OS-4/U, which is miniaturized and has added features.

ELECTRICAL AND MECHANICAL CHARACTERISTICS

PRESENTATION: 5 in. CR tube.

SWEEP RANGE

A-SWEEPS: 200000, 20000, 4000, 2000, 800 yds, and 4500 usec sweep for observing entire duty cycle at repetition rates above 300 pps.

R-SWEEPS AND RANGING: 4000, 2000, 800 yds delayed to cover any portion of 20000 yd A-sweep; 4000, 2000 yd delayed to cover any portion of 200000 yd A-sweep.
ACCURACY(R-SWEEP): $\pm 0.1\%$ of full scale in 500 to 20000 yd or 1000 to 200000 yd region.

INTERNALLY TRIGGERED OPERATION

TRIGGER OUTPUT: +100 v peak or -100 v peak

TRIGGER RISE: 0.3 usec.

TRIGGER DURATION: 1.0 usec.

TRIGGER REPETITION RATE: 80 to 400 pps on 200000 yd and 4500 usec range; 80 to 2000 pps on 20000 yd range.

RANGE MARK DATA

RISE TIME: 0.25 usec.

DURATION: 1.0 usec.

ACCURACY: $\pm 0.02\%$.

EXTERNALLY TRIGGERED OPERATION

INPUT: ± 15 v min at 100 v per usec rise time.

REPETITION RATE: 2000 pps max on 20000 yd scale; 400 pps max on 200000 yd scale.

RANGE MARKS: None available.

VERTICAL DEFLECTION DATA**DIRECT**

DEFLECTION FACTOR: 79 v per inch DC

$\pm 20\%$.

POLARITY: Positive signal deflects upward.

MAX SIGNAL (PLUS DC INPUT): 600 v peak.

VIDEO AMPLIFIER

ATTENUATOR: 1 to 1, 3 to 1, 10 to 1, 30 to 1, and 100 to 1 stepped R-C compensated attenuator.

INPUT IMPEDANCE: 1 meg, 20 uuf.

GAIN: Approx 100.

SINEWAVE RESPONSE: Down 3 db at 7 mc, down 6 db at 10 mc.

PULSE RESPONSE: 0.08 usec for 1.0 usec pulse with rise and fall of 0.01 usec.

INPUT TO OVERLOAD: Approx 1 v with no attenuation.

DEFLECTION: $3/4$ in. min for 0.2 v with full video gain.

MAX SIGNAL (PLUS DC INPUT): 600 v peak.

POLARITY: Positive signal deflects upward.

POWER REQUIREMENTS: 115 v $\pm 10\%$, 50 to 1600 cps, single ph, 270 W.

MANUFACTURER'S OR CONTRACTOR'S DATA

Sylvania Electric Products, Inc, New York N.Y.

Contract NObsr-39285, dated 18 June 1947.

Contract NObsr-43091, dated 16 November 1948.

Approximate Cost: \$1580.00 with equipment spares.

TUBE AND/OR CRYSTAL COMPLEMENT

(2) 2X2A	(1) 5CP1A
(1) 5U4G	(1) 6AC7WA
(1) 6AG7Y	(2) 6H6
(9) 6SN7WGTA	(1) 807

Total Tubes: (18)

(1) 81.940KC

Total Crystals: (1)

REFERENCE DATA AND LITERATURE

NAVSHIPS 91188: Technical Manual for Oscilloscope OS-5/U.

TYPE CLASSIFICATION

DESIGN COGNIZANCE BUSHIPS

PROCUREMENT COGNIZANCE CS-1002

STOCK NO.

R.D.B. IDENT. NO. 3.2

UNCLASSIFIED

April 1958

Test-Wave Form Measuring

OSCILLOSCOPE

OS-5/U

SHIPPING DATA

NUMBER OF BOXES	CONTENTS AND IDENTIFICATION	VOLUME (Cu.Ft.)	OVERALL DIMENSIONS (inches)	WEIGHT PACKED (lbs.)
1	Oscilloscope OS-5/U	7.0	17 X 21-1/4 X 33-1/4	167
1	Cathode-Ray Tube 5CP1A	1.2	10 X 10 X 20	4.5
1	Set of Equipment Spares	0.3	5-9/16 X 7-7/8 X 13-5/16	17.25

EQUIPMENT SUPPLIED DATA

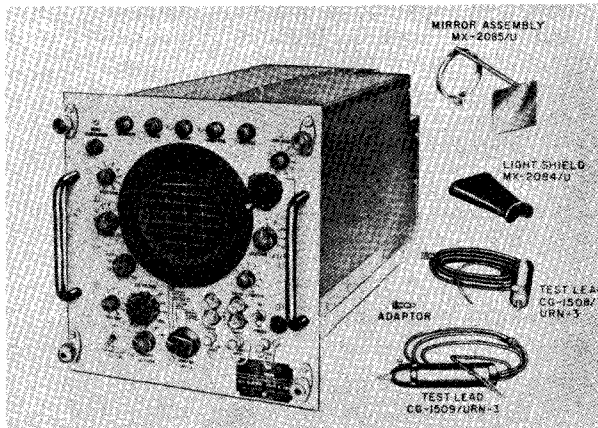
QUANTITY PER EQUIPT	NAME AND NOMENCLATURE	OVERALL DIMENSIONS (inches)	WEIGHT (lbs.)
1	Oscilloscope OS-5/U	11-3/8 X 16-1/4 X 25-3/4	104
1	Set of Equipment Spares	4-1/2 X 7-1/4 X 12-3/8	16.375
2	Technical Manual	1/2 X 8-1/2 X 11	

UNCLASSIFIED

4.3 OS-5/II 3

OSCILLOSCOPE

OS-54/URN-3



Oscilloscope OS-54/URN-3

MARKER INTERVALS: 1.0 or 10 usec.
 DEFLECTION SENSITIVITY
 VERTICAL: 0.035 v per in.
 HORIZONTAL: 5 v per in.
 FREQUENCY RESPONSE
 VERTICAL: 5 cycle to 2 mc.
 HORIZONTAL: Up to 1 mc.
 INPUT IMPEDANCE
 VERTICAL: 1 meg shunted by 40 uuf.
 HORIZONTAL: 100,000 ohms shunted by 100 uuf.

MANUFACTURER'S OR CONTRACTOR'S DATA

Allen B. DuMont Laboratories Inc., Clifton, New Jersey.
 Contract NObsr-64732, dated 6 June 1955.

FUNCTIONAL DESCRIPTION

Oscilloscope OS-54/URN-3 is a unit of special purpose test equipment for use in observing electrical waveforms in the testing and maintenance of AN/URN-3, AN/GRN-9, AN/SRN-6, TS-890/URN-3, and SG-121/URN-3. The unit consists of a 5-inch electrostatically deflected and focused cathode ray tube, vertical and horizontal deflection circuits, synchronizing and time marking circuits, and power supply.

No field changes in effect at time of preparation (14 October 1959)

ELECTRICAL AND MECHANICAL CHARACTERISTICS

POWER REQUIREMENTS: 305 W, 120 v $\pm 10\%$, 60 cy $\pm 5\%$, 1 ph.
 SWEEP DATA: Sweep circuit included, 25 to 2,500,000 cps, 0.4 usec to 40,000 usec.
 AMPLITUDE VOLTAGE: 0.5 v.

TUBE AND/OR CRYSTAL COMPLEMENT

- (2) OB2WA (2) 2X2A (1) 5ADP-1
- (2) 5R4WGB (3) 6AN5WA (3) 6AU6WA
- (2) 6C4WA (2) 6X4WA (4) 12AT7WA
- (3) 5670WA (2) 5687WA (1) 6336
- (1) 5726/6AL5W (1) 5751 (2) 5763
- (4) 5814A
- Total Tubes: (35)
- (2) 1N220 (1) 1N210 (1) CR-19/U
- Total Crystals: (4)

REFERENCE DATA AND LITERATURE

NAVSHIPS 92778: Technical Manual for OSCILLOSCOPE OS-54/URN-3.

TYPE CLASSIFICATION	(NAVY)
DESIGN COGNIZANCE	USAF
PROCUREMENT COGNIZANCE SPECS:	
STOCK NO.	MIL-R-18428A(SHIPS);
R.D.B. IDENT. NO. 3.1	MIL-R-19851(SHIPS)

SHIPPING DATA

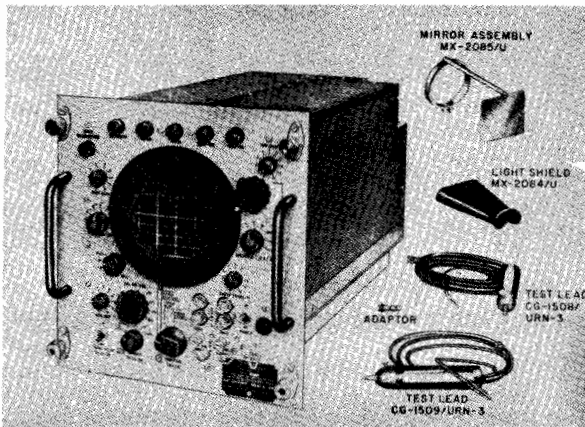
NUMBER OF BOXES	CONTENTS AND IDENTIFICATION	VOLUME (Cu.Ft.)	OVERALL DIMENSIONS (inches)	WEIGHT PACKED (lbs.)
1*	Oscilloscope OS-54/URN-3	9	20 X 22 X 35	170
1**	Oscilloscope OS-54/URN-3 *Packed for domestic shipment. **Packed for overseas shipment.	11	21 X 24 X 37	200

EQUIPMENT SUPPLIED DATA

QUANTITY PER EQUIPT	NAME AND NOMENCLATURE	OVERALL DIMENSIONS (inches)	WEIGHT (lbs.)	
1	Oscilloscope OS-54/URN-3 Including:	11-3/8 X 14-13/32 X 26-1/2	85	
1	Test Lead CG-1508/URN-3.			3/4
1	Test Lead CG-1509/URN-3.			3/4
1	Mirror Assembly MX-2085/U			1
1	Light Shield MX-2084/U.			3/4

OSCILLOSCOPE

OS-54A/URN-3



Oscilloscope OS-54A/URN-3

FUNCTIONAL DESCRIPTION

Oscilloscope OS-54A/URN-3 is a unit of special purpose test equipment for use in observing electrical wave forms in the testing and maintenance of AN/URN-3, AN/GPN-9, AN/SRN-6, TS-890/URN-3, and SG-121/URN-3. The unit consists of a 5-inch electrostatically deflected and focused cathode ray tube, vertical and horizontal deflection circuits, synchronizing and time marking circuits, and power supply.

No field changes in effect at time of preparation (14 October 1959).

ELECTRICAL AND MECHANICAL CHARACTERISTICS

POWER REQUIREMENTS: 120 W, 120 v, 60 cy, 1 ph.

SWEEP DATA: Sweep circuit included, 25 to 2,500,000 cps, 0.4 usec to 40,000 usec.

AMPLITUDE VOLTAGE: 0.5 v.

MARKER INTERVALS: 1.0 or 10 usec.

DEFLECTION SENSITIVITY

VERTICAL: 0.035 v per in.
 HORIZONTAL: 5 v per in.
 FREQUENCY RESPONSE
 VERTICAL: 5 cycle to 2 mc.
 HORIZONTAL: Up to 1 mc.
 INPUT IMPEDANCE
 VERTICAL: 1 meg shunted by 40 uuf.
 HORIZONTAL: 100,000 ohms shunted by 100 uuf.

MANUFACTURER'S OR CONTRACTOR'S DATA

Electronics of Clearfield, Inc.,
 Clearfield, Pa.
 Contract NObsr-75229.

TUBE AND/OR CRYSTAL COMPLEMENT

(2) OB2WA	(1) 5ADP-1	(1) 5726/6ALW5
(2) 2X2A	(2) 5R4WGB	(3) 6AN5WA
(2) 6AU6WA	(2) 6C4WA	(2) 6X4WA
(4) 12AT7WA	(3) 5670WA	(2) 5687W
(1) 5751	(3) 5763	(4) 5814A
(1) 6336		
Total Tubes:	(35)	
(2) 1N220	(1) 1N210	(1) CR-19/U
Total Crystals:	(4)	

REFERENCE DATA AND LITERATURE

NAVSHIPS 93400: Preliminary Data Sheet for
 OSCILLOSCOPE OS-54A/URN-3.

TYPE CLASSIFICATION (NAVY)	
DESIGN COGNIZANCE USAF	
PROCUREMENT COGNIZANCE SPECS:	
	MIL-R-18428A (SHIPS)
	MIL-R-19851 (SHIPS)
STOCK NO.	
R.D.B. IDENT. NO. 3.1	

EQUIPMENT SUPPLIED DATA

QUANTITY PER EQUIPT	NAME AND NOMENCLATURE	OVERALL DIMENSIONS (inches)	WEIGHT (lbs.)
1	Oscilloscope OS-54A/URN-3 including:	11-3/8 x 14-13/32 x 26-1/2	85
1	Test Lead CG-1508/URN-3		3/4
1	Test Lead CG-1509/URN-3		3/4
1	Mirror Assembly MX-2085/U		1
1	Light Shield MX-2084/U		3/4

27 June 1962

Cog Service: USN FSN:

OSCILLOSCOPE OS-67/U

Functional Class: 3.1

USA

USN

USAF

TYPE CLASS:

Used by

MANUFACTURER'S NAME/CODE NUMBER: Allen B. DuMont Laboratories, (82170).



Oscilloscope OS-67/U

FUNCTIONAL DESCRIPTION:

Oscilloscope OS-67/U is a general-purpose, cathode-ray tube instrument that is useful in many applications, such as a null indicator in bridge circuits, an output meter or indicator, for precise measurements of electrical impulses, for transmitter and receiver measurements and trouble shooting, for aligning transmitters and receivers, and for vibration and similar tests. It is used to make rapid, accurate, amplitude and frequency measurements of any portion of a signal from 0 to 1,000 volts, from dc to over 50,000 cps. An additional feature is an internal voltage calibrator that permits direct measurement of peak-to-peak voltages on the crt screen.

No field changes in effect at time of preparation (21 March 1962).

TECHNICAL CHARACTERISTICS:

VERTICAL CHANNEL (Y-AXIS)

OS-67/U OSCILLOSCOPE

DEFLECTION FACTOR

AMPLIFIER (FULL GAIN): 0.1 v peak-to-peak full scale or 0.025 v peak-to-peak per in. (0.009 v rms/in.).

DIRECT: 32 to 39 peak-to-peak v/in. (12 to 14 rms v/in.).

UNDISTORTED DEFLECTION: At least 4 in. (limited by deflection plate cutoff in the CR tube).

SINUSOIDAL FREQUENCY RESPONSE (THRU AMPLIFIER)

DIRECT COUPLING: Flat to dc; down not more than 10% at 100 kc.

CAPACITIVE COUPLING: Down not more than 10% from 10 cps to 100 kc.

EITHER TYPE COUPLING: Down not more than 50% at 300 kc.

TRANSIENT RESPONSE (THRU AMPLIFIER)

RISE TIME (10% TO 90%): 2 usec or less.

OVERSHOOT: 2% or less.

DECAY

DIRECT COUPLING: None.

CAPACITIVE COUPLING: Less than 10% in 45 milliseconds.

MAXIMUM INPUT VOLTAGE (TO AMPLIFIER)

SINGLE-ENDED

CAPACITIVE COUPLING: 1,000 v (dc plus peak ac).

DIRECT COUPLING: 1,000 v (dc plus peak ac) on all attenuation ranges except 0.1 v where it is 100 v (dc plus peak ac).

BALANCED: P2 v dc with 6 v peak-to-peak between grids.

INPUT IMPEDANCE

AMPLIFIER

SINGLE-ENDED: 2 meg, 50 uuf.

BALANCED: 4 meg, 40 uuf.

DIRECT

SINGLE-ENDED: 1.5 meg, 20 uuf.

BALANCED: 3.0 meg, 20 uuf.

HORIZONTAL CHANNEL (X-AXIS)

DEFLECTION FACTOR

AMPLIFIER (FULL GAIN): 0.3 peak-to-peak v/in. (0.1 rms v/in.).

DIRECT: 40 to 50 peak-to-peak v/in. (14 to 18 rms v/in.).

SINUSOIDAL FREQUENCY RESPONSE (THRU AMPLIFIER): Same as Vertical Amplifier.

TRANSIENT RESPONSE (THRU AMPLIFIER): Same as Vertical Amplifier.

INPUT VOLTAGE (MAXIMUM) TO AMPLIFIER

ATTENUATOR AT 1:1: 18 peak-to-peak v.

ATTENUATOR AT 10:1: 180 peak-to-peak v.

ATTENUATOR AT AC: 1,000 v (dc plus peak ac)

INPUT COUPLING (TO AMPLIFIER): Capacitive or Direct.

ATTENUATION (AMPLIFIER CONNECTION): By factors of 1 or 10 porm 10% as selected.

INPUT IMPEDANCE

AMPLIFIER: 2.2 meg, 50 uuf.

DIRECT

SINGLE-ENDED: 1.5 meg, 50 uuf.

BALANCED: 3 meg, 20 uuf.

LINEAR-SWEEP TIME BASE

FREQUENCY (RECURRENT): 2 to 30,000 sawtooth cps.

TIME DURATION (DRIVEN): 0.5 sec to approx. 30 usec.

EXPANSION: To 6 times full scale diameter without appreciable distortion.

SYNCHRONIZATION: Internal, external, or line frequency.
INTENSITY MODULATION CIRCUIT (Z-AXIS)
INPUT IMPEDANCE: 0.2 meg, 80 uuf.
SENSITIVITY: 2 to 56 v peak-to-peak (negative).
POLARITY: Positive signals increase the intensity of the beam.
CALIBRATION VOLTAGE:
WAVE SHAPE: Square wave.
FREQUENCY: Power line.
AMPLITUDE: 0.1 v peak-to-peak.
ACCURACY (AMPLITUDE): Porm 5% or better.
SAWTOOTH OUTPUT
AMPLITUDE: 5 v peak-to-peak.
POLARITY: Positive.
FREQUENCY: 2 to 30,000 as selected.
IMPEDANCE: Approx. 45,000 ohms.
POWER REQUIREMENTS: 110 W, 115 v, 50 to 400 cyc.

RELATION TO OTHER EQUIPMENT: None.

EQUIPMENT REQUIRED BUT NOT SUPPLIED: None.

MAJOR COMPONENTS

QTY	ITEM	STOCK NUMBERS	DIMENSIONS (INCHES)	WEIGHT (LBS)
1	Oscilloscope OS-67/U		8-3/4 x 19 x 19-1/2	50

REFERENCE DATA AND LITERATURE:

NAVSHIPS 92553A: Technical Manual for Oscilloscope OS-67/U and OS-46/U.

TUBE, CRYSTAL AND/OR SEMI-CONDUCTOR DATA:

TUBES: (1) 0B2WA (2) 1X2B (1) 5ADP1 (1) 5Y3WGTB (2) 5726/6AL5W (2) 6J6WA
 (2) 6005/6AQ5W (1) 884 (8) 12AU7

CRYSTALS: None used.

SEMI-CONDUCTORS: None used.

SHIPPING DATA

PKGS	VOLUME (CU FT)	WEIGHT (LBS)
1		

OS-67/U OSCILLOSCOPE

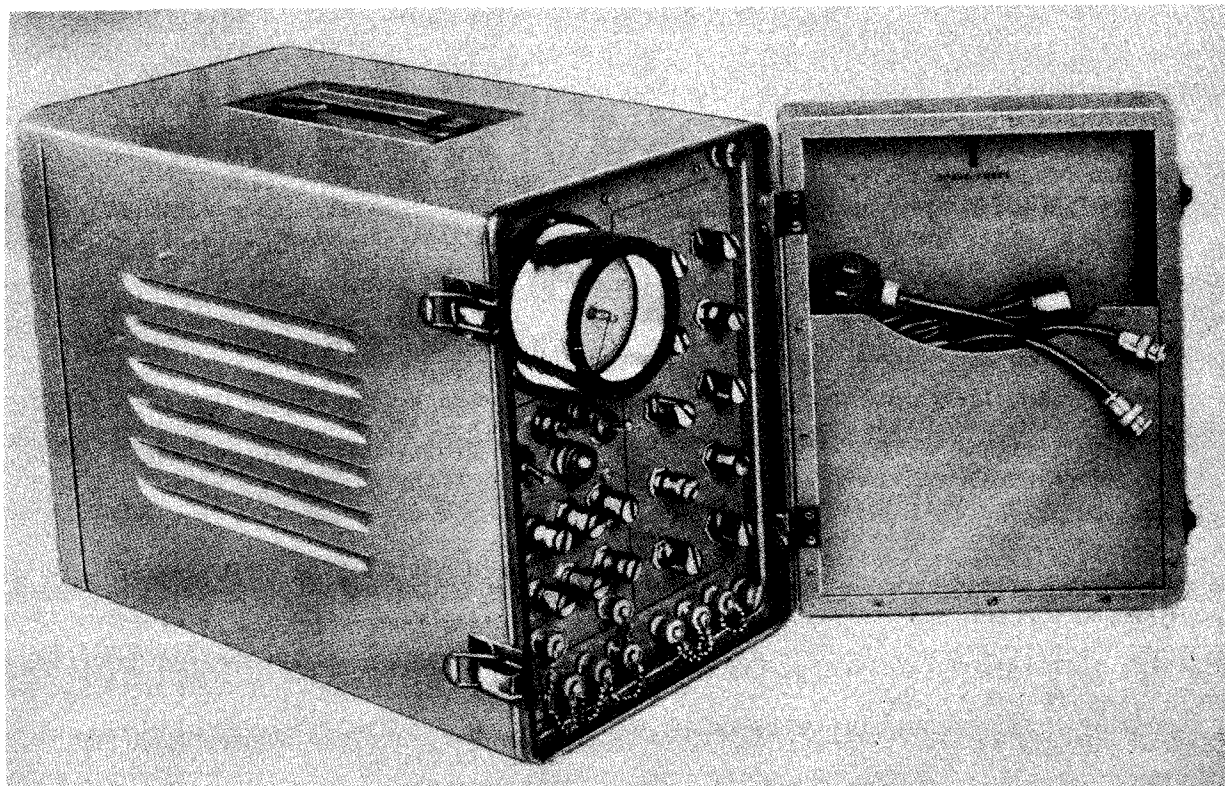
PROCUREMENT DATA

PROCURING SERVICE: USN
SPEC &/OR DWG:

DESIGN COG: USN, BuShips

CONTRACTOR	LOCATION	CONTRACT OR ORDER NO.	APPROX. UNIT COST
Allen B. DuMont Laboratories Type no. 304-AR, Catalog no. 1642-K	Clifton, N. J.	N0bsr-64819 N0bsr-71804 N0bsr-75586 N0bsr-81101 N0bsr-81551	\$439.25 \$508.50 \$571.80 \$537.75

OSCILLOSCOPE-RANGE CALIBRATOR



Oscilloscope-Range Calibrator OS-7/U

FUNCTIONAL DESCRIPTION

The OS-7/U is a precision instrument designed primarily to provide a means of calibrating the marker and ranging circuits in various types of radar equipment using a 2000-yard radar mile. It is so arranged that it can also be used as a conventional oscilloscope or as a synchroscope for general test purposes over a limited range of sweep frequencies. The types of presentation obtainable are linear undelayed, linear delayed, circular undelayed, and circular delayed.

It will accept either positive or negative synchronizing trigger pulses from the equipment under test, or it will supply trigger pulses of either polarity to the equipment being tested. Video signal input to the unit may be applied to the deflection plates either directly or through a video amplifier. Accurately spaced 1000-yard and 10,000-yard markers are generated within the unit and are available for external use.

No field changes in effect at time of preparation (21 April 1958).

RELATION TO OTHER EQUIPMENT

The OS-7/U is similar to and supersedes Oscilloscopes NT-60ACZ and NT-60ACZ-1. Its oscilloscope functions are similar to those of Oscilloscopes TS-239/UP, OS-5/U, and OS-4/U. It will be superseded in its range calibration functions by Range Calibrator TS-573/UP.

ELECTRICAL AND MECHANICAL CHARACTERISTICS

PRESENTATION: 3 in. CR tube.
CRYSTAL OSCILLATOR FREQUENCY: 163.934 kc $\pm 0.01\%$.
SWEEP DATA (INTERNAL OSCILLATOR)
CIRCULAR (J and X)
LENGTH: 1000 yds per revolution $\pm 0.01\%$.

Test-Waveform Measuring

OS-7/U

OSCILLOSCOPE-RANGE CALIBRATOR

UNBLANKING GATE

DELAY: 700 to 100000 yds.
WIDTH: 700 to 1100 yds

LINEAR (A and R)

LENGTH: 1000, 60000, 400000 yds $\pm 5\%$.
DELAY: 700 to 100000 yds for 1000 and 60000 yd sweeps only.

UNBLANKING GATE

DELAY: Less than 700 to 100000 yds.
WIDTH: 1000, 60000, 400000 yds.

DEFLECTION DATA

DIRECT

DEFLECTION FACTOR: Approx 150 v per in.

POLARITY (POSITIVE SIGNAL)

CIRCULAR SWEEP: Gives inward deflection.

LINEAR SWEEP: Gives upward deflection for Main Video Input Jack, downward deflection for Aux, Video Input Jack.

INPUT IMPEDANCE: 1 meg min.

WITH VIDEO AMPLIFIER

AMPLIFIER VOLTAGE GAIN: 30.
SINE-WAVE RESPONSE: Flat within 3 db for 200 cps to 3 mc.
POLARITY DEFLECTION: Opposite to direct deflection.

INPUT IMPEDANCE: Approx 1 meg.

INTERNALLY TRIGGERED OPERATION

TRIGGER OUTPUT: +100 v or -70 v min.
TRIGGER DURATION: Less than 1 usec at 50% amplitude.
RISE TIME: 400 v per usec.
REPETITION RATE: 59 to 1600 pps.

RANGE MARKS

TYPE: Crystal-controlled 1000 and 10000 yd positive.

OUTPUT: Approx 2 v.

DURATION: 0.5 usec max at 70% peak amplitude.

EXTERNALLY TRIGGERED OPERATION

TRIGGER INPUT

AMPLITUDE: 20 to 100 v.

DURATION: 0.25 to 20 usec.

RISE: 5 v per usec will trigger sweep.

REPETITION RATE

1000 YD SWEEP: 2000 pps max.

60000 YD SWEEP: 1370 pps max.

400000 YD SWEEP: 205 pps max.

RANGE MARKS: None available.

POWER REQUIREMENTS: 110 v $\pm 10\%$, 50 to 1600 cps, single ph, 1.57 amps, 150 W, 87% pf min.

MANUFACTURER'S OR CONTRACTOR'S DATA

Raytheon Manufacturing Company, Waltham, Mass.
Contract NObsr-39329, dated 26 June 1947.

TUBE AND/OR CRYSTAL COMPLEMENT

(1) 12AT7WA (11) 12AU7
(1) 2X2A (1) 3DP1A/S3
(1) 5Z4 (1) 6AN5WA
(1) 6V6GT

Total Tubes: (17)

(1) 163.934 KC

Total Crystals: (1)

REFERENCE DATA AND LITERATURE

NAVSHIPS 91248: Technical Manual for Oscilloscope-Range Calibrator OS-7/U.

TYPE CLASSIFICATION
DESIGN COGNIZANCE BUSHIPS
PROCUREMENT COGNIZANCE CS-731
STOCK NO.
R.D.B. IDENT. NO. 3.2

SHIPPING DATA

NUMBER OF BOXES	CONTENTS AND IDENTIFICATION	VOLUME (Cu.Ft.)	OVERALL DIMENSIONS (inches)	WEIGHT PACKED (lbs.)
1	Oscilloscope-Range Calibrator OS-7/U including: (1) Set of Accessories (1) Set of Equipment Spares (2) Technical Manual NAVSHIPS 91248	5.4	17 X 19 X 29	80

UNCLASSIFIED

April 1958

Test-Waveform Measuring

OSCILLOSCOPE-RANGE CALIBRATOR

OS-7/U

EQUIPMENT SUPPLIED DATA

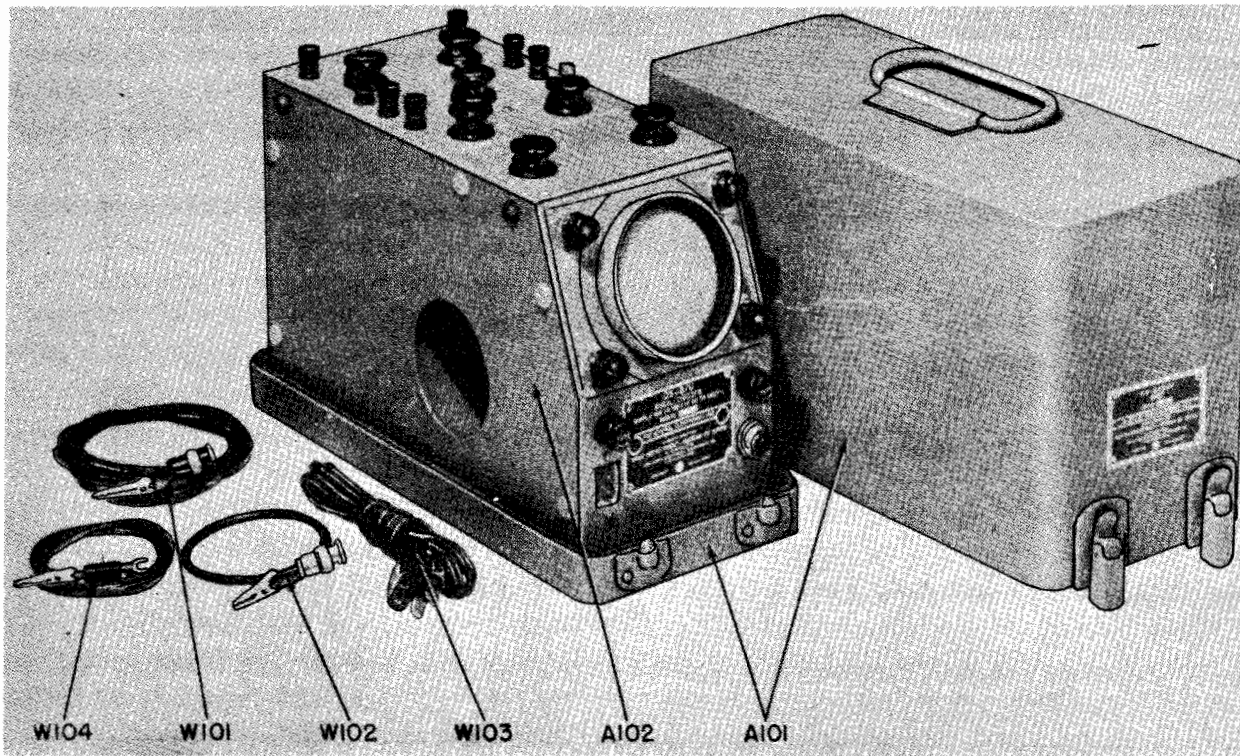
QUANTITY PER EQUIPT	NAME AND NOMENCLATURE	OVERALL DIMENSIONS (inches)	WEIGHT (lbs.)
1	Oscilloscope-Range Calibrator OS-7/U including: (1) Test Lead Type SJ (2) Test Lead No. 20AWG (2) Test Lead No. 18AWG (1) Set of Equipment Spares (2) Technical Manuals NAVSHIPS 91248	9-1/8 x 12 x 18-3/8 84 lg 39-1/2 lg 39-1/2 lg 1/2 x 8-1/2 x 11-1/2	39.25

UNCLASSIFIED

4.3 OS-7/U: 3

OSCILLOSCOPE

OS-8/U



Oscilloscope OS-8/U

FUNCTIONAL DESCRIPTION

Oscilloscope OS-8/U, having a 3-inch cathode ray tube, is a portable device used in the visual analysis of wave forms of varying electrical potential.

No field changes in effect at time of preparation (11 December 1959).

ELECTRICAL AND MECHANICAL CHARACTERISTICS

POWER REQUIREMENTS: 50 W, 105 to 125 v, 50 to 1600 cy, 1 ph.

FREQUENCY RANGE

VERTICAL AMPLIFIERS: 0 to 2 mc.

HORIZONTAL AMPLIFIERS: 25 cy to 100 kc.

SWEEP CIRCUIT OSCILLATOR: 3 to 50,000 cy.

INPUT IMPEDANCE

VERTICAL: 1.5 meg shunted by 25 uuf (ac);
2 meg (dc).

HORIZONTAL: 2 meg, paralleled by 25 uuf.

VERTICAL DIRECT: 12 meg shunted by 15 uuf.

HORIZONTAL DIRECT: 12 meg shunted by 15 uuf.

DEFLECTION SENSITIVITY

VERTICAL: 22 rms v/in. (direct).

HORIZONTAL: 28 rms v/in. (direct).

OVERALL ACCURACY

VERTICAL AMPLIFIER: ± 3 db.

HORIZONTAL AMPLIFIER: +2 db.

MANUFACTURER'S OR CONTRACTOR'S DATA

The Hickok Electrical Instrument Co.,
Cleveland, Ohio.

Contract NObsr-42167, dated 18 March 1948.

Contract NObsr-42368, dated 2 February 1949.

Contract NObsr-59046.

Test-Wave Form Measuring

OS-8/U

OSCILLOSCOPE

TUBE AND/OR CRYSTAL COMPLEMENT

OSCILLOSCOPE OS-8/U.

- (1) 3RP1 (1) 6AG5 (2) 6AK6
- (1) 6J6 (1) 6X4 (1) 12AT7
- (1) 12AX7

Total Tubes: (8)

No Crystals used.

TYPE CLASSIFICATION (NAVY) S/STD
DESIGN COGNIZANCE USN, BUSHIPS
PROCUREMENT COGNIZANCE SPEC: CS-835(NAVY)
STOCK NO.
R.D.B. IDENT. NO. 3.1

REFERENCE DATA AND LITERATURE

NAVSHIPS 91272: Technical Manual for OSCIL-

SHIPPING DATA

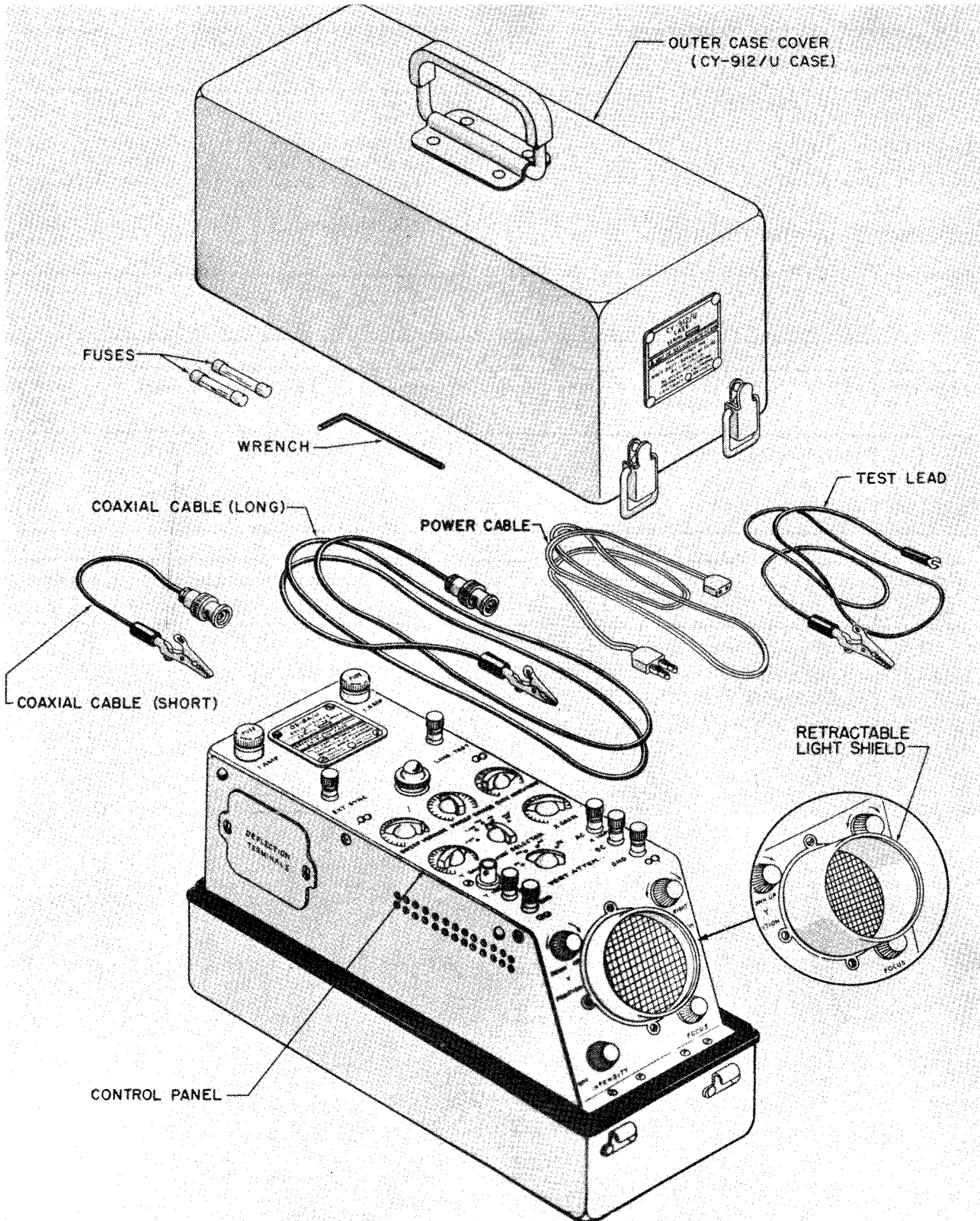
NUMBER OF BOXES	CONTENTS AND IDENTIFICATION	VOLUME (Cu.Ft.)	OVERALL DIMENSIONS (inches)	WEIGHT PACKED (lbs.)
1	Oscilloscope OS-8/U		11-1/8 X 14-3/4 X 20-1/4	34

EQUIPMENT SUPPLIED DATA

QUANTITY PER EQUIPT	NAME AND NOMENCLATURE	OVERALL DIMENSIONS (inches)	WEIGHT (lbs.)
1	Oscilloscope OS-8/U including:	6 X 9 X 13-1/2	14
1	Case CY-845/U	6 X 9 X 13-1/2	
1	Test Lead CG-656/U	48 lg	
1	Test Lead CG-656/U	12 lg	
1	Ground Lead	48 lg	
1	Cathode Ray Tube Screen	2-7/8 dia	
1	Technical Manual NAVSHIPS 91272	9 X 11-1/2	

OSCILLOSCOPE

OS-8A/U



Test-Wave Form Measuring

OS-8A/U

OSCILLOSCOPE

FUNCTIONAL DESCRIPTION

Contract NObsr-49286, dated 30 June 1950.

Oscilloscope OS-8A/U, having a 3-inch cathode ray tube, is a portable device used in the visual analysis of wave forms of varying electrical potential.

No field changes in effect at time of preparation (11 December 1959).

TUBE AND/OR CRYSTAL COMPLEMENT

- (1) 3RP1 (1) 6AG5 (1) 6AH6
- (3) 6J6 (1) 6X4 (2) 12AT7
- (1) 1Z2

ELECTRICAL AND MECHANICAL CHARACTERISTICS

Total Tubes: (10)

No Crystals used.

POWER REQUIREMENTS: 65 W, 105 to 125 v, 50 to 1,000 cy, 1 ph.

FREQUENCY RANGE

- VERTICAL AMPLIFIERS: 0 to 2 mc.
- HORIZONTAL AMPLIFIERS: 0 to 100 kc.
- SWEEP CIRCUIT OSCILLATOR: 3 to 50,000 cy.

REFERENCE DATA AND LITERATURE

NAVSHIPS 91364: Technical Manual for OSCILLOSCOPE OS-8A/U.

INPUT IMPEDANCE

- VERTICAL: 1.5 meg shunted by 25 uuf (ac); 2 meg (dc).
- HORIZONTAL: 1 meg shunted by 25 uf.

DEFLECTION SENSITIVITY

- VERTICAL: 0.1 rms v/in. (amp 1); 48 v/in. (direct).
- HORIZONTAL: 0.1 rms v/in. (amp 1); 67 v/in. (direct).

TYPE CLASSIFICATION (NAVY) STD
DESIGN COGNIZANCE USN, BUSHIPS
PROCUREMENT COGNIZANCE SPEC: SHIPS-0-108
STOCK NO.
R.D.B. IDENT. NO. 3.1

MANUFACTURER'S OR CONTRACTOR'S DATA

Hycon Mfg Co., Pasadena, California.

SHIPPING DATA

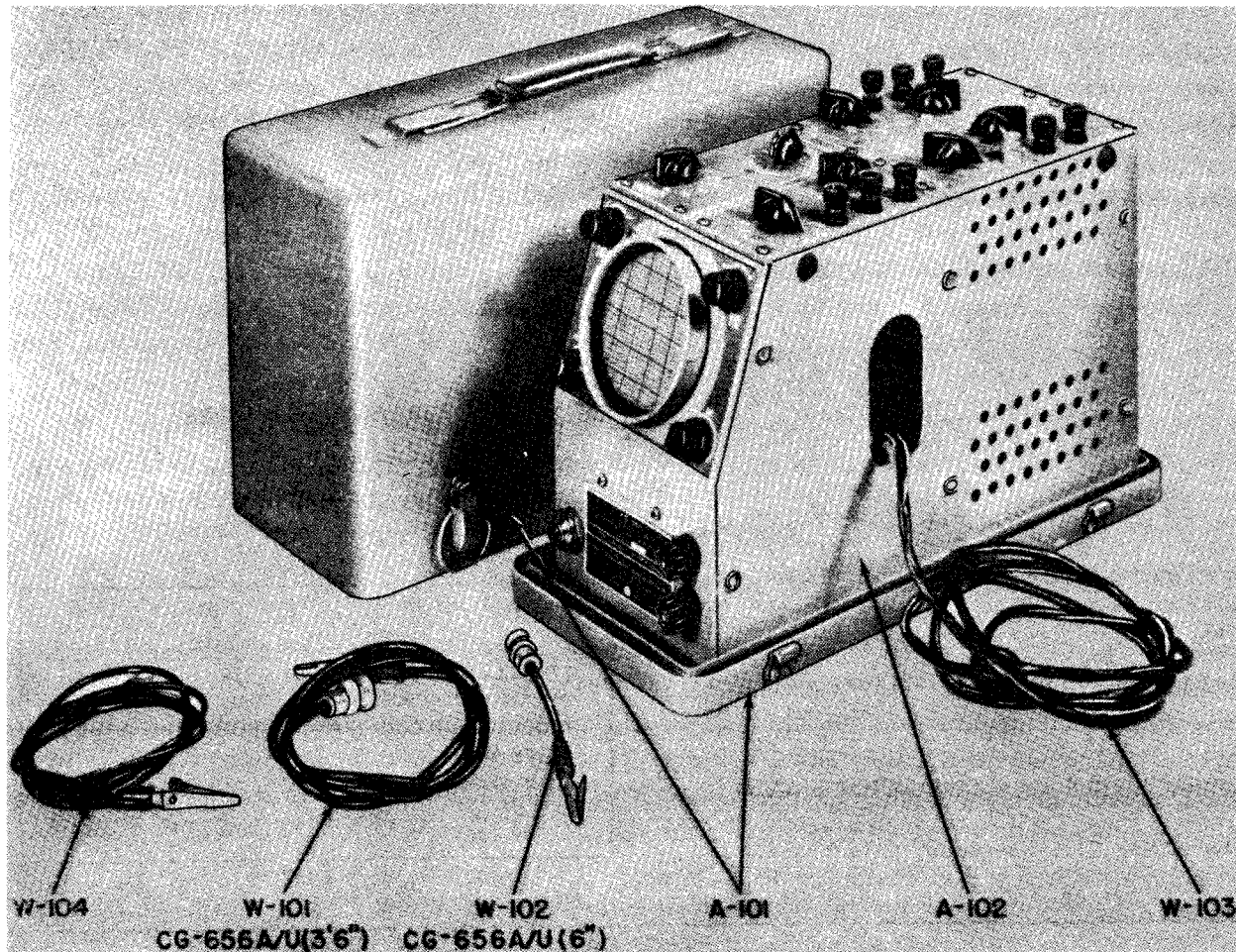
NUMBER OF BOXES	CONTENTS AND IDENTIFICATION	VOLUME (Cu.Ft.)	OVERALL DIMENSIONS (inches)	WEIGHT PACKED (lbs.)
1	Oscilloscope OS-8A/U			

EQUIPMENT SUPPLIED DATA

QUANTITY PER EQUIP	NAME AND NOMENCLATURE	OVERALL DIMENSIONS (Inches)	WEIGHT (lbs.)
1	Oscilloscope OS-8A/U including:	6 x 9-1/4 x 15-3/8	
1	Case CY-912/U	6 x 9-1/4 x 15-3/8	
1	Test Lead	48 lg	
1	Test Lead	12 lg	
1	Ground Lead	48 lg	
1	Cathode Ray Tube Screen	2-7/8 dia	
1	Technical Manual NAVSHIPS 91364	9 x 11-1/2	
1	Power Cable	72 lg	

OSCILLOSCOPE

OS-8B/U



Oscilloscope OS-8B/U

FUNCTIONAL DESCRIPTION

Oscilloscope OS-8B/U, having a 3-inch cathode-ray tube, is a portable device used in the visual analysis of wave forms of varying electrical potential.

No field changes in effect at time of preparation (11 December 1959).

ELECTRICAL AND MECHANICAL CHARACTERISTICS

POWER REQUIREMENTS: 60 W, 105 to 125 v. 50 to 1,000 cy, 1 ph.

FREQUENCY RANGE

VERTICAL AMPLIFIERS: 0 to 2 mc.

HORIZONTAL AMPLIFIERS: 0 to 5 kc.

SWEEP CIRCUIT OSCILLATOR: 3 to 50,000 cy.

INPUT IMPEDANCE

VERTICAL: 1.5 meg shunted by 25 uuf (ac); 2 meg (dc).

HORIZONTAL: 1.5 meg shunted by 25 uuf (ac); 2 meg (dc).

VERTICAL DIRECT: 9 meg shunted by 11 uuf.

HORIZONTAL DIRECT: 9 meg shunted by 11 uuf.

DEFLECTION SENSITIVITY

VERTICAL: 0.075 rms v/in. (amp 1); 17 rms W v/in. (direct).

HORIZONTAL: 0.075 rms v/in. (amp 1); 25

Test-Wave Form Measuring

OS-8B/U

OSCILLOSCOPE

rms v/in. (direct).
OVERALL ACCURACY: ± 3 d.

No Crystals used.

MANUFACTURER'S OR CONTRACTOR'S DATA

The Hickok Electrical Instrument Co.
Cleveland, Ohio.
Contract NObsr-52654, dated 25 June 1951.
Contract NObsr-57541, dated 27 June 1952

REFERENCE DATA AND LITERATURE

NAVSHIPS 91707: Technical Manual for OSCILLOSCOPE OS-8B/U.

TUBE AND/OR CRYSTAL COMPLEMENT

- (1) 3RP1 (2) 6AH6 (2) 6J6
- (1) 6X4 (4) 12AT7

Total Tubes: (10)

TYPE CLASSIFICATION (NAVY) STD
DESIGN COGNIZANCE USN, BUSHIPS
PROCUREMENT COGNIZANCE SPEC: MIL-0-15525B
STOCK NO. (SHIPS)
R.D.B. IDENT. NO. 3.1

SHIPPING DATA

NUMBER OF BOXES	CONTENTS AND IDENTIFICATION	VOLUME (Cu.Ft.)	OVERALL DIMENSIONS (inches)	WEIGHT PACKED (lbs.)
1	Oscilloscope OS-8B/U		11-1/8 X 14-3/4 X 20-1/4	34

EQUIPMENT SUPPLIED DATA

QUANTITY PER EQUIPT	NAME AND NOMENCLATURE	OVERALL DIMENSIONS (inches)	WEIGHT (lbs.)
1	Oscilloscope OS-8B/U including:	6 X 9 X 13-1/2	14.5
1	Case CY-1300/U	6 X 9 X 13-1/2	
1	Test Lead CG-656A/U	36 lg	
1	Test Lead CG-656A/U	6 lg	
1	Ground Lead W-104	36 lg	
1	Cathode Ray Tube Screen O-104	2-7/8 dia	
1	Technical Manual NAVSHIPS 91707	9 X 11-1/2	

6 May 1962
Cog Service: USN

6625-026-9414
FSN: 6625-643-3335 W/S

OSCILLOSCOPE OS-8C/U
Functional Class: 3.1

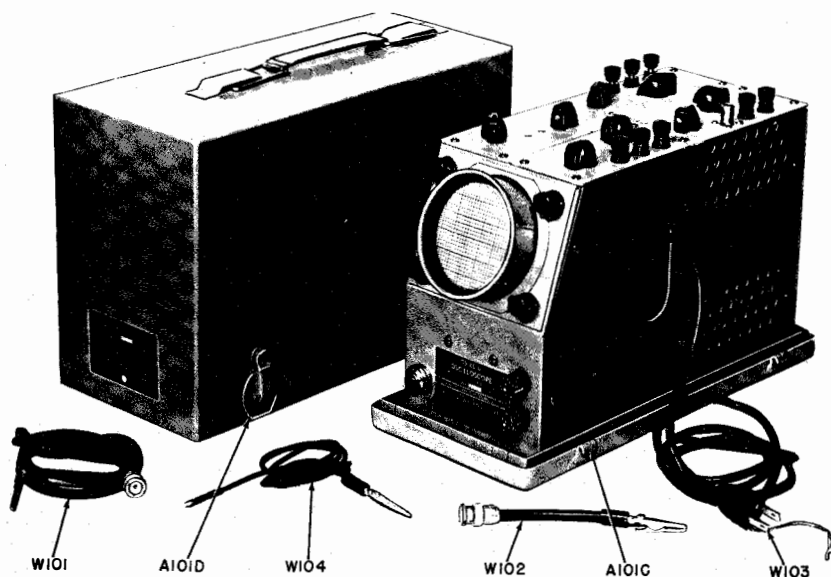
USA

USN

USAF

TYPE CLASS: Std Std

MANUFACTURER'S NAME/CODE NUMBER: Jetronic Industries Inc., (91820).



Oscilloscope OS-8C/U

FUNCTIONAL DESCRIPTION:

Oscilloscope OS-8C/U, having a 3-inch cathode ray tube, is a portable device used in the visual analysis of wave forms of varying electrical potential.

No field changes in effect at time of preparation (1 February 1962).

TECHNICAL CHARACTERISTICS:

POWER REQUIREMENTS: 60 W, 105 to 125 v, 50 to 1,000 cyc, single ph.

FREQUENCY RANGE

VERTICAL AMPLIFIERS: 0 to 2 mc at full gain control setting; 5 to 2 mc, independent of gain control setting.

HORIZONTAL AMPLIFIERS: 0 to 5 kc at full gain control setting; 1 to 5 kc, independent of gain control setting.

SWEEP CIRCUIT OSCILLATOR: 3 to 50,000 cyc.

OS-8C/U OSCILLOSCOPE

INPUT IMPEDANCE

VERTICAL: 1.5 meg shunted by 25 uuf (ac); 2 meg (dc).
HORIZONTAL: 1.5 meg shunted by 25 uuf (ac); 2 meg (dc).
VERTICAL DIRECT: 9 meg shunted by 11 uuf.
HORIZONTAL DIRECT: 9 meg shunted by 11 uuf.

DEFLECTION SENSITIVITY

VERTICAL: 0.075 rms v/in. (ampl); 17 rms v/in. (direct).
HORIZONTAL: 0.075 rms v/in. (ampl); 25 rms v/in. (direct).
OVER-ALL ACCURACY: Form 3 db.

RELATION TO OTHER EQUIPMENT: None.

EQUIPMENT REQUIRED BUT NOT SUPPLIED: None.

MAJOR COMPONENTS

QTY	ITEM	STOCK NUMBERS	DIMENSIONS (INCHES)	WEIGHT (LBS)
1	Oscilloscope OS-8C/U includes:		6 x 9 x 13-1/2	14.5
1	Case CY-1300/U		6 x 9 x 13-1/2	
1	Test Lead CG-1207/U		36 lg	
1	Test Lead CG-1207/U		6 lg	
1	Ground Lead (W-104)		36 lg	
1	Cathode Ray Tube Screen (0-104)		2-7/8 dia	
2	Technical Manual NAVSHIPS 92251		9 x 11-1/2	

REFERENCE DATA AND LITERATURE:

NAVSHIPS 92251: Technical Manual for Oscilloscope OS-8C/U and OS-8E/U.
TM11-1214A: Technical Manual for Oscilloscope OS-8C/U.

TUBE, CRYSTAL AND/OR SEMI-CONDUCTOR DATA:

TUBES: (1) 3RP1 (2) 6AH6 (2) 6J6 (1) 6X4 (4) 12AT7WA

CRYSTALS: None used.

SEMI-CONDUCTORS: None used.

SHIPPING DATA

PKGS	VOLUME (CU FT)	WEIGHT (LBS)
1	2.0	34

4.3 OS-8C/U: 2

PROCUREMENT DATA

PROCURING SERVICE: USN

DESIGN COG: USN, BuShips

SPEC &/OR DWG: MIL-0-15225D(SHIPS)

CONTRACTOR	LOCATION	CONTRACT OR ORDER NO.	APPROX. UNIT COST
Jetronic Industries Inc.	Philadelphia, Pa.	NObsr-63378,	\$127.60
		31 March 1953	
		NObsr-64806	
		NObsr-71197	\$116.00
Polytronic Research Inc.	Rockville, Md.	NObsr-71348	
		NObsr-71777	\$125.00
		NObsr-71766,	\$114.75
		29 March 1957	
		NObsr-75609(FBM)	\$225.00
		20 January 1959	

4 April 1962

OSCILLOSCOPE OS-8E/U

Cog Service: USN

FSN: 6625-649-9284

Functional Class: 3.1

USA

USN

USAF

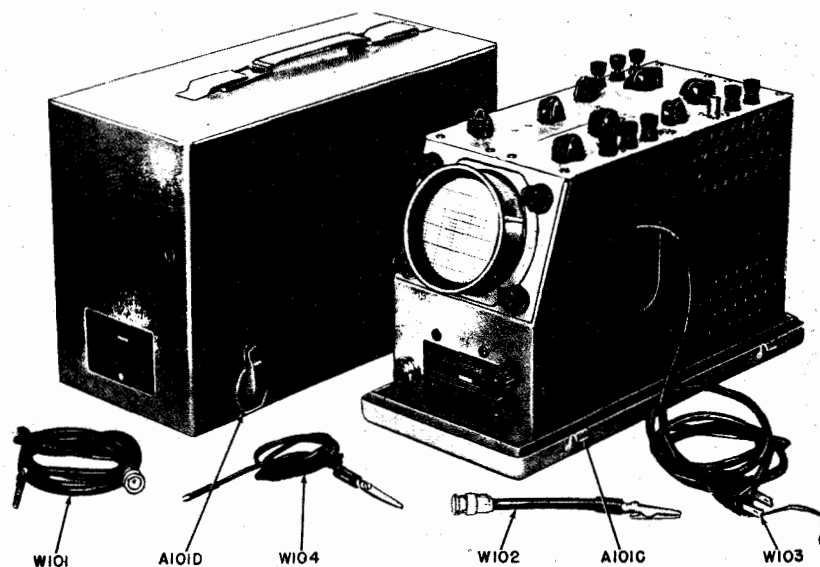
TYPE CLASS:

Std

Std

Std

MANUFACTURER'S NAME/CODE NUMBER: Carol Electronics Corp., (82076).



Oscilloscope OS-8E/U

FUNCTIONAL DESCRIPTION:

Oscilloscope OS-8E/U, having a 3-inch cathode-ray tube, is a portable device used in the visual analysis of wave forms of varying electrical potential.

No field changes in effect at time of preparation (1 February 1962).

TECHNICAL CHARACTERISTICS:

POWER REQUIREMENTS: 60 W, 105 to 125 v, 50 to 1,000 cyc, single ph.

FREQUENCY RANGE

VERTICAL AMPLIFIERS: 0 to 2 mc at full gain control setting; 5 to 2 mc, independent of gain control setting.

HORIZONTAL AMPLIFIERS: 0 to 5 kc at full gain control setting; 1 to 5 kc, independent of gain control setting.

SWEEP CIRCUIT OSCILLATOR: 3 to 50,000 cyc.

OS-8E/U OSCILLOSCOPE

INPUT IMPEDANCE

VERTICAL: 1.5 meg shunted by 25 uuf (AC); 2 meg (DC).
HORIZONTAL: 1.5 meg shunted by 25 uuf (AC); 2 meg (DC).
VERTICAL DIRECT: 9 meg shunted by 11 uuf.
HORIZONTAL DIRECT: 9 meg shunted by 11 uuf.

DEFLECTION SENSITIVITY

VERTICAL: 0.075 rms v/in. (ampl); 17 rms v/in. (direct).
HORIZONTAL: 0.075 rms v/in. (ampl); 25 rms v/in. (direct).

OVERALL ACCURACY: Porm 3 db.

RELATION TO OTHER EQUIPMENT: None.

EQUIPMENT REQUIRED BUT NOT SUPPLIED: None.

MAJOR COMPONENTS

QTY	ITEM	STOCK NUMBERS	DIMENSIONS (INCHES)	WEIGHT (LBS)
1	Oscilloscope OS-8E/U includes:		6 x 9 x 13-1/2	14.5
1	Case CY-1300A/U		6 x 9 x 13-1/2	
1	Test Lead CG-1207/U		36 lg	
1	Test Lead CG-1207/U		6 lg	
1	Ground Lead (W-104)		36 lg	
1	Cathode Ray Tube Screen (O-104)		2-7/8 dia	
2	Technical Manual NAVSHIPS 92251		9 x 11-1/2	

REFERENCE DATA AND LITERATURE:

NAVSHIPS 92251: Technical Manual for Oscilloscope OS-8C/U and OS-8E/U.

TUBE, CRYSTAL AND/OR SEMI-CONDUCTOR DATA:

TUBES: (1) 3RP1 (2) 6AH6 (2) 6J6WA (1) 6X4W (4) 12AT7WA

CRYSTALS: None used.

SEMI-CONDUCTORS: None used.

SHIPPING DATA

PKGS	VOLUME (CU FT)	WEIGHT (LBS)
1	2.0	34

4.3 OS-8E/U: 2

PROCUREMENT DATA

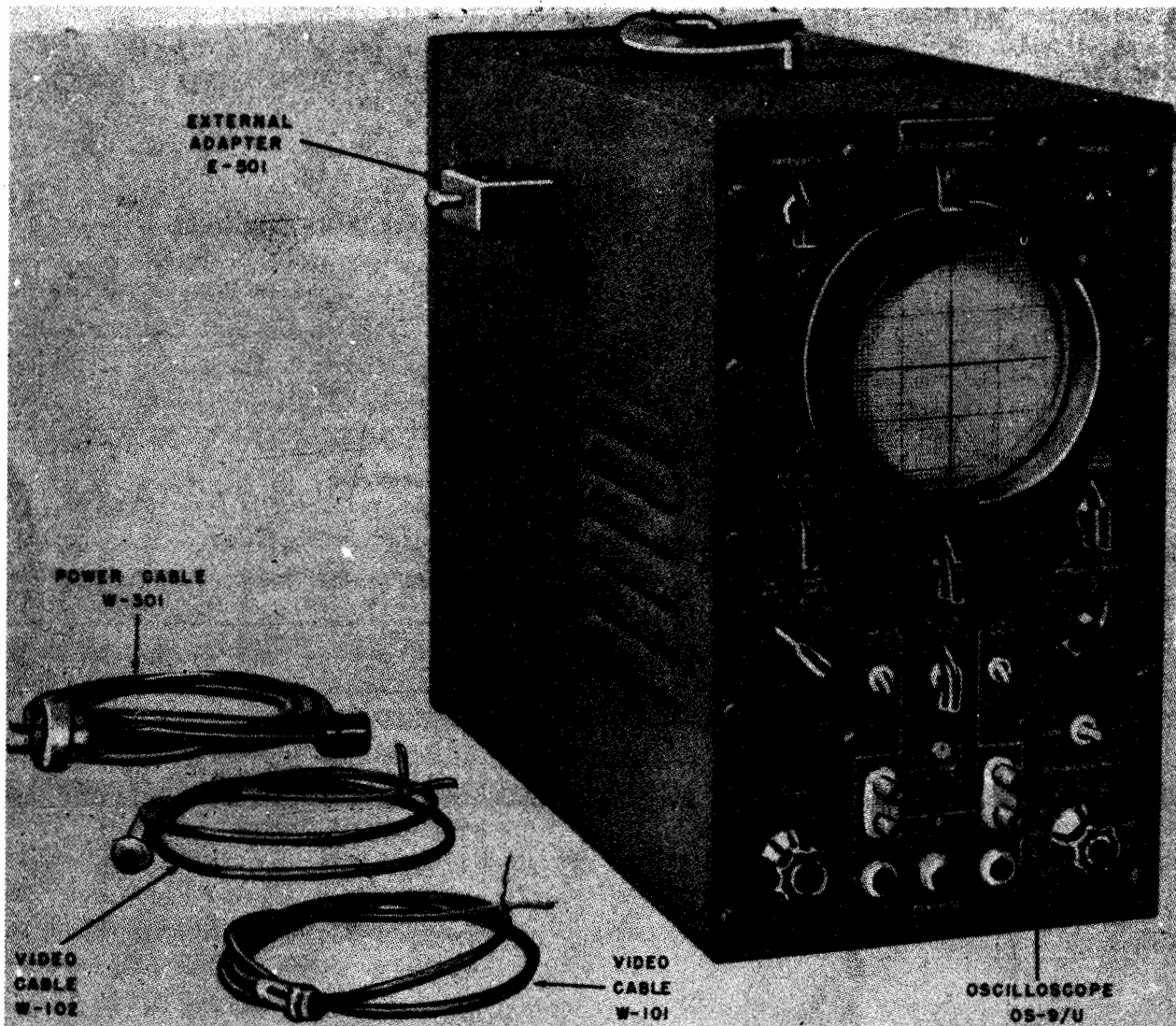
PROCURING SERVICE: USN

DESIGN COG: USN, BuShips

SPEC &/OR DWG: MIL-0-15525D(SHIPS)

CONTRACTOR	LOCATION	CONTRACT OR ORDER NO.	APPROX. UNIT COST
Carol Electronics Corp.	Martinsburg, W. Va.	NObsr-75143, 26 February 1958	\$117.15
		NObsr-75682, 23 January 1959	\$116.06
		NObsr-81229	\$124.06

OSCILLOSCOPE

Test-Waveform Measuring
OS-9/U

Oscilloscope OS-9/U

FUNCTIONAL DESCRIPTION

The OS-9/U is a cathode ray type instrument which provides facilities for the precise measurement of time and amplitude characteristics of radar type voltage pulses. The instrument supplies a precisely formed and controlled sweep voltage to its cathode-ray tube horizontal deflection plates. The voltage pulse to be measured is applied to the vertical deflection plates of the tube, thus presenting a waveform display upon the cathode ray screen. The following features are incorporated in the design; (1) no internal amplifier is employed, (2) it contains an internal trigger-pulse generator, (3) sweep durations of 1, 5, 20 and 100 usec are

provided (4) expansion or contraction of the sweep is possible (5) means are provided which permit the measurement of the voltage amplitude of any selected point of a pulse waveform display by use of an external DC voltmeter.

No field changes in effect at time of preparation (21 November 1956).

ELECTRICAL AND MECHANICAL CHARACTERISTICS

CATHODE RAY TUBE TYPE: 5JP1.
DEFLECTION SENSITIVITY: 0.0087 in. per v.
SWEEP CIRCUIT RANGE: 1, 5, 20 and 100 usec.
VERTICAL DEFLECTION SENSITIVITY: 115V/in.
REPETITION FREQUENCY: 200 to 1200 and 800

June 1957

Test-Waveform Measuring
OS-9/U.

OSCILLOSCOPE

to 4700 cps.
MIN RISE TIME OF OBSERVED PULSES: 0.05
usec.
PEAK VOLTAGE OF TRIGGER PULSE: ± 55 v.
MAX DELAY: 92 usec.
POWER SOURCE REQUIRED: 115 v, 60 cps, single
ph, 210 w.

(1) 5U4G (4) 6AK5 (2) 6B4G
(3) 6H6GT (2) 6L6GA (5) 6SJ7GT
(1) OC-3/VR-105
Total Tubes: (27)

MANUFACTURER'S OR CONTRACTOR'S DATA

Hazeltine Electronics Corp, New York, N.Y.
Contract NObsr 42470.
Approximate Cost: \$300.00 with equipment
spares.

REFERENCE DATA AND LITERATURE

NAVSHIPS 91135: Technical Manual for Oscil-
loscope OS-9/U.

TUBE AND/OR CRYSTAL COMPLEMENT

(6) 6SN7GT (2) 2X2A (1) 5JP1

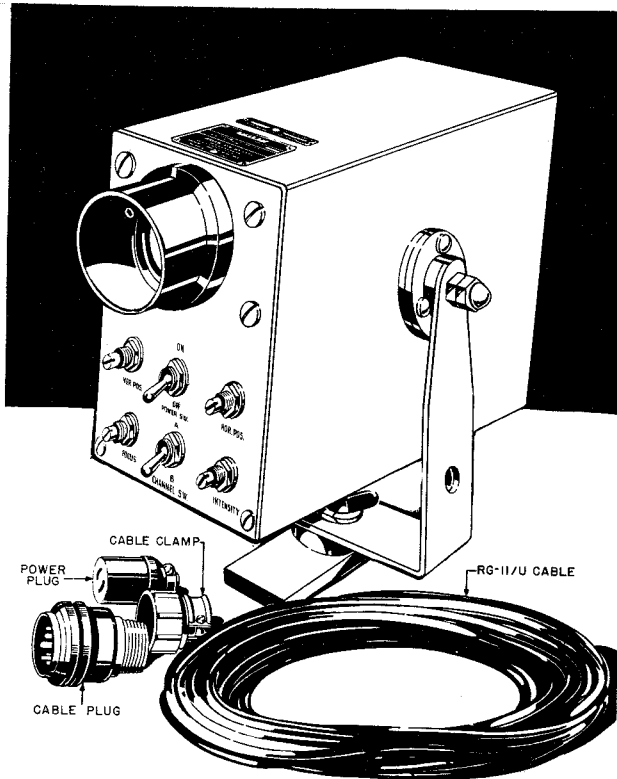
TYPE CLASSIFICATION	BUSHIPS
DESIGN COGNIZANCE	
PROCUREMENT COGNIZANCE	
STOCK NO.	
R.D.B. IDENT. NO.	

EQUIPMENT SUPPLIED DATA

QUANTITY PER EQUIPT	NAME AND NOMENCLATURE	OVERALL DIMENSIONS (inches)	WEIGHT (lbs.)
1	Oscilloscope OS-9/U	9-1/2 X 16 X 20-1/4	62
1	External Adapter		
1	Detachable Power Cord		
2	Video Cables		

MOUNTING OSCILLOSCOPE

OSA



Monitoring Oscilloscope Model OSA

FUNCTIONAL DESCRIPTION

The monitoring oscilloscope is a test instrument embodying the features of a modified oscilloscope.

It is used as a visual indicator in monitoring and adjusting frequency-shift con-

verters, employed in the reception of frequency-shift radio teletype signals. In addition, it exhibits the prevailing reception conditions when signals are monitored.

No field changes in effect at time of preparation (31 July 1956).

ELECTRICAL AND MECHANICAL CHARACTERISTICS

QUANTITY OF CHANNELS MONITORED: 2 individually.

POWER SOURCE REQUIRED: 115 v AC, 60 cps, single phase, 2 amps.

MANUFACTURER'S OR CONTRACTOR'S DATA

Federal Telephone and Radio Corporation,
Newark, N. J.
Contract: N5sr-17901.

Approximate Cost: \$300.00 with equipment spares.

TUBE AND/OR CRYSTAL COMPLEMENT

(1) 6X5GT/G (1) 913
Total Tubes: (2)

REFERENCE DATA AND LITERATURE

NAVSHIPS-900937(A): Technical Manual for Monitoring Oscilloscope OSA.

TYPE CLASSIFICATION
DESIGN COGNIZANCE BUSHIPS
PROCUREMENT COGNIZANCE
STOCK NO.
R.D.B. IDENT. NO.

SHIPPING DATA

NUMBER OF BOXES	CONTENTS AND IDENTIFICATION	VOLUME (Cu.Ft.)	OVERALL DIMENSIONS (inches)	WEIGHT PACKED (lbs.)
1	Monitoring Oscilloscope OSA	5	14 X 16 X 39	100
1	Stock Spares	1.94	11 X 16 X 21-1/4	60

EQUIPMENT SUPPLIED DATA

QUANTITY PER EQUIPT	NAME AND NOMENCLATURE	OVERALL DIMENSIONS (inches)	WEIGHT (lbs.)
1	Monitoring Oscilloscope OSA		20
	Consisting of:		
1	Cable RG-11/U	50 ft	
1	Cable Clamp		
1	Power Plug		
2	Cable Plug		
2	Technical Manual		
1	Spare Parts Box		

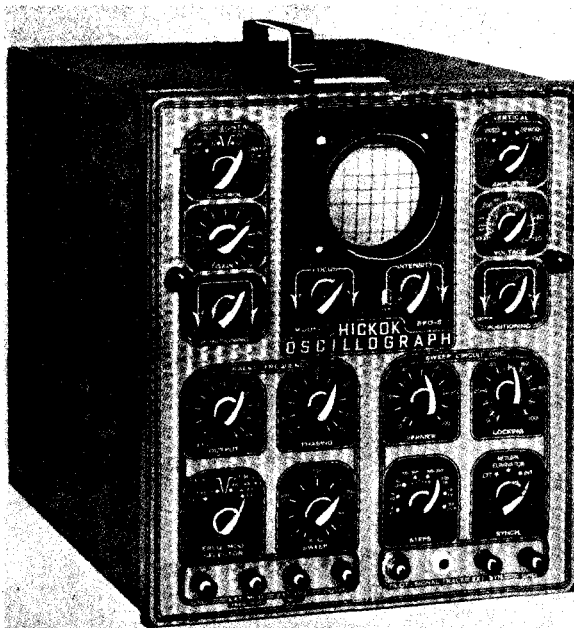
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Test Waveform Measuring

March 1957

OSCILLOGRAPH

RFO-5



Oscillograph RFO-5

VERTICAL: 1 meg, 25 uuf, 1 meg direct.
 HORIZONTAL: 1 meg 25 uuf, 3 meg direct.
 SWEEP FREQUENCY RANGE: 10 to 25,000 cps.
 F.M. OPERATING FREQUENCY
 NARROW BAND: 100 kc.
 WIDE BAND: 23 mc.
 SWEEP WIDTH
 NARROW BAND: 10 to 30 kc.
 WIDE BAND: 100 to 900 kc.
 RATE OF SWEEP: 60 cps both FM bands.
 POWER SOURCE: 105 to 130 v, 50 to 60 cps,
 single ph, 75 W.

MANUFACTURER'S OR CONTRACTOR'S DATA

The Hickok Electrical Instrument Co.
 Cleveland, Ohio.
 Contract NXss 33161, No date.

TUBE AND/OR CRYSTAL COMPLEMENT

- | | |
|--------------|---------|
| (1) 906-3AP1 | (2) 6J7 |
| (1) 6K8 | (2) 7V7 |
| (1) 6J5 | (2) 5Y3 |
| | (1) 884 |

Total Tubes: (10)

REFERENCE DATA AND LITERATURE

- NAVSHIPS 900,328: Technical Manual for Hickok Model RFO-5 Oscilloscope.
 NAVSHIPS 95503: Practical Application of the Oscilloscope to Modern Radio Servicing by Walter Weiss.

FUNCTIONAL DESCRIPTION

The RFO-5 is a general purpose use Oscilloscope employing a 5 inch cathode ray tube. The instrument provides for the dynamic visual analysis of the waveforms existing in the various circuits of Radio and Radar Receiving and transmitting circuits. It is a portable instrument with a carrying handle. All operating controls are located on the front panel.

No field changes in effect at time of preparation (1 October 1956).

ELECTRICAL AND MECHANICAL CHARACTERISTICS

DEFLECTION SENSITIVITY

VERTICAL: 0.2 v/in. standard, 4v/in. video.

HORIZONTAL: 0.3 v/in.

INPUT IMPEDANCE

TYPE CLASSIFICATION
 DESIGN COGNIZANCE COMMERCIAL
 PROCUREMENT COGNIZANCE
 STOCK NO.
 R.D.B. IDENT. NO.

SHIPPING DATA

NUMBER OF BOXES	CONTENTS AND IDENTIFICATION	VOLUME (Cu.Ft.)	OVERALL DIMENSIONS (inches)	WEIGHT PACKED (lbs.)
1	OSCILLOGRAPH RFO-5	9.42	21 x 25 x 31	120

UNCLASSIFIED

4.3 RFO-5: 1

Test Waveform Measuring

RFO-5

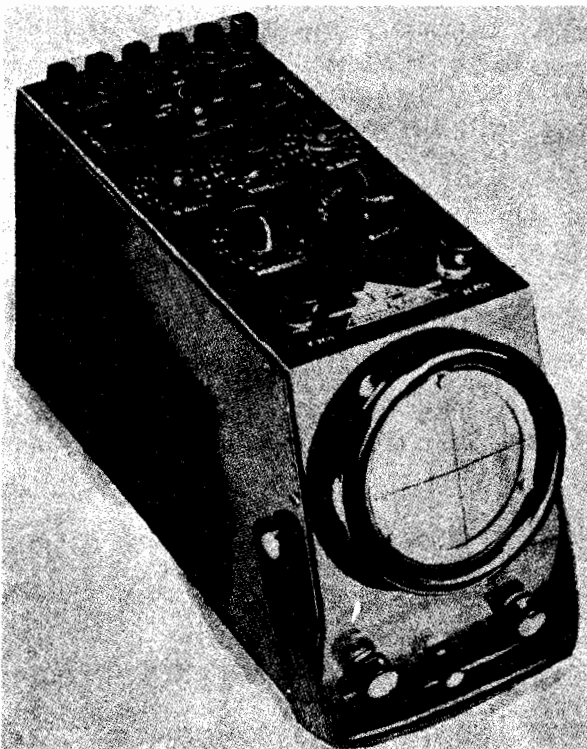
OSCILLOGRAPH

March 1957

EQUIPMENT SUPPLIED DATA

QUANTITY PER EQUIPT	NAME AND NOMENCLATURE	OVERALL DIMENSIONS (inches)	WEIGHT (lbs.)
1	OSCILLOGRAPH -- RFO-5	11-3/8 x 13-1/2 x 17	35

March 1957

OSCILLOSCOPE**S-11-A***Oscilloscope S-11-A***FUNCTIONAL DESCRIPTION**

The Model S-11-A (Waterman Prod.) is a small compact and lightweight instrument for observing electrical circuit phenomena. The flexibility of the instrument permits its use for AC measurements as well as for DC.

No field changes in effect at time of preparation (10 October 1956).

ELECTRICAL AND MECHANICAL CHARACTERISTICS

RESPONSE DATA (VERTICAL AND HORIZONTAL)
 SENSITIVITY: 0.1 v rms per in., 0.28 v DC per in.
 PLATES: 28 v rms per in.
 SINEWAVE (~2 DB): DC to 20000 cps.
 PULSE RISE: 2 usec.

RESPONSE DATA (INTENSITY)
 THRESHOLD THRU AMPLIFIER: 0.1 v.
 THRESHOLD DIRECT: 1.0 v.
 LINEAR TIME BASE DATA
 RANGE: 3 to 50000 cps.
 TYPE: Repetitive.
 BLANKING: Yes.
 LINEARIZATION: No.
 SYNCHRONIZATION DATA
 POLARITY: Positive.
 WAVE SHAPE: Any.
 THRESHOLD: 0.1 v.
 INPUT SHUNT IMPEDANCE DATA
 VERTICAL AND HORIZONTAL
 THRU AMPLIFIER: 0.5 ohm or 10 meg,
 35 or 10 uuf.
 DIRECT: 10 meg, 10 uuf.
 INTENSITY
 DIRECT: 47000 ohm, 10 uuf.
 PRESENTATION: 3 in. CR tube.
 POWER REQUIREMENTS: 115 v, 60 cps, single
 ph, 30 W.

MANUFACTURER'S OR CONTRACTOR'S DATA

Waterman Products Co, Philadelphia, Pa.

TUBE AND/OR CRYSTAL COMPLEMENT

(1) 3MP1
 (5) 6J6WA
 (1) 117Z6GT
 Total Tubes: (7).

REFERENCE DATA AND LITERATURE

Waterman Products Company Catalog for Model S-11-A.

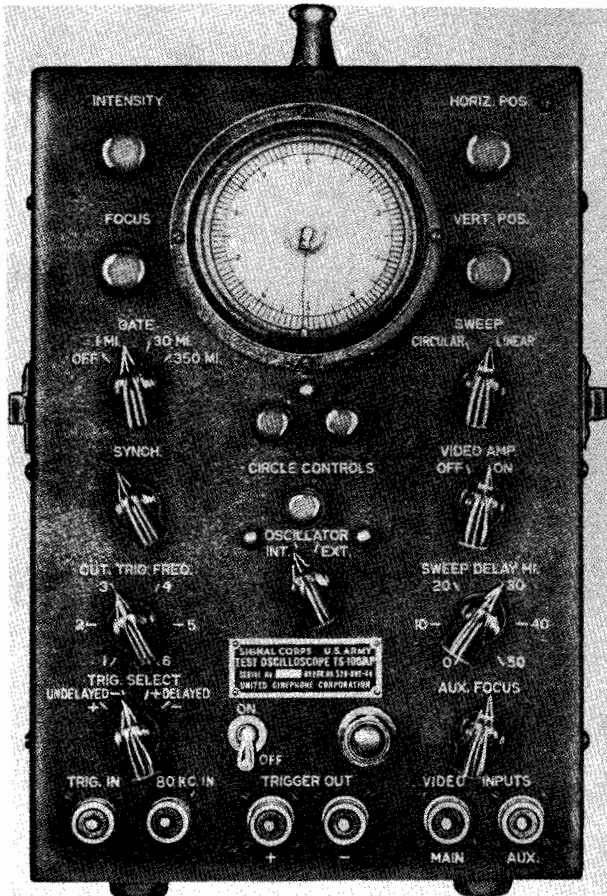
TYPE CLASSIFICATION
DESIGN COGNIZANCE Commercial
PROCUREMENT COGNIZANCE
STOCK NO.
R.D.B. IDENT. NO.

EQUIPMENT SUPPLIED DATA

QUANTITY PER EQUIPT	NAME AND NOMENCLATURE	OVERALL DIMENSIONS (inches)	WEIGHT (lbs.)
1	Oscilloscope S-11-A	5 X 7 X 11	8.75

TEST OSCILLOSCOPE

TS-100/AP



Test Oscilloscope TS-100/AP

INTERNALLY TRIGGERED OPERATION

FREQUENCY: 300 to 1500 cps.
DURATION: 1.25 usec.
REPETITION RATE: 300 to 1500 cps.
RISE TIME: 100 v per 0.2 usec.

CIRCULAR AND LINEAR SWEEP

LENGTH: 1, 30, 350 mi.
CIRCULAR SWEEP ACCURACY: 1 mi \pm 1 yd.

WAVEFORMS

DURATION: 0.1 to 43 usec.
POLARITY: Pos or neg.
AMPLITUDE: 1 to 300 v.
POWER SOURCE REQUIRED: 115 or 230 v, 50 to 1200 cps, 1 ph, 110 W, 95% pf.

MANUFACTURER'S OR CONTRACTOR'S DATA

United Cinephone Corp, Torrington, Conn.
Order No. 520-DAY-44.

TUBE AND/OR CRYSTAL COMPLEMENT

(1) 2X2/879
(1) 5Y3GT/G
(7) 6SN7GT
(1) 3DP1
(1) 6AG7

Total Tubes: (11)
No Crystals used.

FUNCTIONAL DESCRIPTION

The TS-100/AP is a portable test oscilloscope used for viewing short videopulses and for measuring the time intervals between pulses when testing radar equipments.

No field changes in effect at time of preparation (17 April 1958).

ELECTRICAL AND MECHANICAL CHARACTERISTICS

TYPE OF SWEEP: Linear, delayed linear, circular, and delayed circular.

EXTERNAL TRIGGER OPERATION

INPUT PULSE: 15 to 150 v (pos); 25 to 150 v (neg).

REPETITION RATE: 100 to 3000 cps.

REFERENCE DATA AND LITERATURE

AN16-35TS100-2: Handbook of Maintenance Instructions for Test Oscilloscope TS-100/AP.

TYPE CLASSIFICATION
DESIGN COGNIZANCE USAF
PROCUREMENT COGNIZANCE
STOCK NO.
R.D.B. IDENT. NO.

TS-100/AP

TEST OSCILLOSCOPE

EQUIPMENT SUPPLIED DATA

QUANTITY PER EQUIPT	NAME AND NOMENCLATURE	OVERALL DIMENSIONS (inches)	WEIGHT (lbs.)
1	Test Oscilloscope TS-100/AP including:	9 X 14 X 16-1/2	42
1	Cord CG-128/AP	12	1/8
2	Cord CG-129/AP	36	1/5
1	Cord CG-130/AP	36	1/5
2	Cord CX-242/AP	36	1/5
1	Cord CX-237/U	120	1

2 April 1962
Cog Service:

FSN:

SPECTRUM ANALYZER TS-1379(XN-1)/U
Functional Class:

USA

USN

USAF

TYPE CLASS:

MANUFACTURER'S NAME/CODE NUMBER: Panoramic Radio Products, Inc.

(No Illustration Available)

FUNCTIONAL DESCRIPTION:

Spectrum Analyzer TS-1379(XN-1)/U is designed to measure inband, third order distortion in single sideband transmitters. It is a selective superheterodyne wave analyzer which sweeps repetitively through a narrow frequency band, centered between 2 and 40 mc.

Frequency components of signals within its sweep limits are displayed in vertical "pips" on a cathode-ray tube indicator, with the horizontal spot position proportional to frequency. Frequency calibration is accurate to form 1%. The indicator is a cathode-ray tube which displays component amplitude on vertical (logarithmic) axis and frequency on horizontal axis.

No field changes in effect at time of preparation (22 June 1961).

TECHNICAL CHARACTERISTICS:

FREQUENCY RANGE: 2 to 40 mc, 4 bands.

INPUT IMPEDANCE: 50 ohms.

POWER REQUIREMENTS: 105 to 125 v, 47.5 to 450 cyc, single ph.

RELATION TO OTHER EQUIPMENT:

This equipment is used with, but not part of, Generator, Signal SG-376(XN-1)/U.

EQUIPMENT REQUIRED BUT NOT SUPPLIED: None.

MAJOR COMPONENTS

QTY	ITEM	STOCK NUMBERS	DIMENSIONS (INCHES)	WEIGHT (LBS)
1	Spectrum Analyzer TS-1379(XN-1)/U		16-1/2 x 16-3/4 x 21-1/2	

REFERENCE DATA AND LITERATURE:

NAVSHIPS 93400: Preliminary Data Sheet for Analyzer, Spectrum TS-1379(XN-1)/U.

TUBE, CRYSTAL AND/OR SEMI-CONDUCTOR DATA:

TUBES: Data not available.

CRYSTALS: Data not available.

SEMI-CONDUCTORS: Data not available.

TS-1379(XN-1)/U SPECTRUM ANALYZER

SHIPPING DATA

PKGS	VOLUME (CU FT)	WEIGHT (LBS)
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PROCUREMENT DATA

PROCURING SERVICE:	DESIGN COG: USN, BuShips
SPEC &/OR DWG: SHIPS-A-2906	

CONTRACTOR	LOCATION	CONTRACT OR ORDER NO.	APPROX. UNIT COST
Panoramic Radio Products Inc.	Mount Vernon, N.Y.	NObsr-75318, 3 June 1958	

SYNCHROSCOPE

Testing-Wave Form Measuring
TS-143/CPM-1



Synchroscope TS-143/CPM-1

ELECTRICAL AND MECHANICAL CHARACTERISTICS

TRIGGER PULSE RECURRENCE RATE: 200, 400 or 800 cps.
RISE TIME: 0.7 max amplitude in less than 1 usec.
SWEEP LENGTH: 2, 10, 25, and 60 usec.
BAND PASS (VIDEO AMPLIFIER) 5 mc and a max gain of 10 mc is provided for observing negative signals up to 40 v in amplitude.
PULSE VOLTAGES: +70 v or -100 v.
POWER REQUIREMENTS: 117 v, 1 ph, 60 cps, 220 w.
INDICATION: 5 in. CR tube.

MANUFACTURER'S OR CONTRACTOR'S DATA

Galvin Mfg Co., Chicago, Illinois
Order 531-DAY-44
Approximate Cost: \$2500.00.

FUNCTIONAL DESCRIPTION

The TS-143/CPM-1 (SYN-15A) is designed to analyze wave forms, the shape of pulses, to measure pulse width (or duration), pulse intervals, and pulse repetition rate, It is capable of producing a pulse output to trigger the equipment under test.

The synchroscope is a cathode-ray oscilloscope designed to provide sweeps which are synchronized by a trigger pulse for the observation and adjustment of receiver, recorder, and transmitter pulses.

No field changes in effect at time of preparation (31 May 1956).

RELATION TO OTHER EQUIPMENT

Equipment Required but not Supplied: (1)
Capacity Divider when required.

TUBE COMPLEMENT

(9) 6SN7 (5) 6AC7 (1) 5U4G
(1) 6Y6G (1) 6SJ7 (1) 2X2
(1) 5BP1 (1) OC3/VR-195
Total Tubes: (20)

REFERENCE DATA AND LITERATURE

AN 16-35TS143-2: Technical Manual Handbook of Maintenance Instructions for Synchroscope TS-143/CPM-1.

TYPE CLASSIFICATION
DESIGN COGNIZANCE BUSHIPS
PROCUREMENT COGNIZANCE
STOCK NO.
R.D.B. IDENT. NO.

EQUIPMENT SUPPLIED DATA

QUANTITY PER EQUIPT	NAME AND NOMENCLATURE	OVERALL DIMENSIONS (inches)	WEIGHT (lbs.)
1	Synchroscope TS-143/CPM-1	9 X 17 X 20.5	68
1	Power Cable		
1	Trigger Cable		

SPECTRUM ANALYZER

TS-148/UP



Spectrum Analyzer TS-148/UP

FUNCTIONAL DESCRIPTION

The TS-148/UP is a portable unit used in testing the over-all system performance of radar systems. It checks the frequency of TR and RT boxes, signal generators, local oscillators, and magnetrons, and measures pulse width, RF spectrum width, and the Q of resonant cavities. Application is in depot testing.

No field changes in effect at time of preparation (22 April 1958).

RELATION TO OTHER EQUIPMENT

The latest version of this equipment bears the nomenclature, Radar Test Set AN/UPM-33.

ELECTRICAL AND MECHANICAL CHARACTERISTICS

FREQUENCY RANGE: 8,470 to 9,630 mc \pm 5 mc (input); 8.

INTERMEDIATE FREQUENCY: 22.5 mc (1st); 3 mc (2nd).

IF BANDWIDTH: 50 kc.

FREQUENCY MODULATION

SWEEP RANGE: 40 to 50 mc.

DEVIATION RATE: 10 to 30 cps.

TYPE OF RECEPTION: CW, pulse.

TYPE OF EMISSION: CW, FM.

POWER RANGE: +12 to +70 dbm (input); 1 mw (output).

ATTENUATION: 3 to 7 db.

DISPERSION OF SPECTRA: 1.5 mc per in. (max).

OPERATING TEMPERATURE: -40° C to $+55^{\circ}$ C.

POWER REQUIREMENTS: 125 W, 105 to 125 v, 50 to 1,200 cyc.

TS-148/UP

SPECTRUM ANALYZER

MANUFACTURER'S OR CONTRACTOR'S DATA

Hazeltine Electronic Corp, Little Neck,
N.Y.
Contract N383s-1427, 10 June 1948.
Contract N383s-37357, 1950.
Order No. 47-2877, 1947.
Westinghouse Electric Corp, Pittsburgh,
Pa.
Contract NXsa-51586.
Contract NXsa-59108.
Order No. 108-DAY-45RA, 13 Sept 1946.

(1) 1N23A
Total Crystals: (1)

REFERENCE DATA AND LITERATURE

NAVSHIPS 900,745: Handbook of operating and
Maintenance Instructions for Test Equip-
ment Spectrum Analyzer TS-148/UP.

TUBE AND/OR CRYSTAL COMPLEMENT

- | | |
|--------------------|------------|
| (1) 2K25 or 723A/B | (1) 2X2A |
| (1) 3BP1 | (1) 5R4GY |
| (1) 6AC7 | (1) 6SA7Y |
| (3) 6SJ7 | (3) 6SN7GT |
| (1) 6Y6G | (1) 884 |
| (4) 991 | |

Total Tubes: (18)

TYPE CLASSIFICATION
DESIGN COGNIZANCE BUAEER
PROCUREMENT COGNIZANCE Spec 16A48 (BuAer)
STOCK NO.
R.D.B. IDENT. NO.

SHIPPING DATA

NUMBER OF BOXES	CONTENTS AND IDENTIFICATION	VOLUME (Cu.Ft.)	OVERALL DIMENSIONS (inches)	WEIGHT PACKED (lbs.)
1	Spectrum Analyzer TS-148/UP	1.2	17 X 22-1/2 X 30-1/2	149

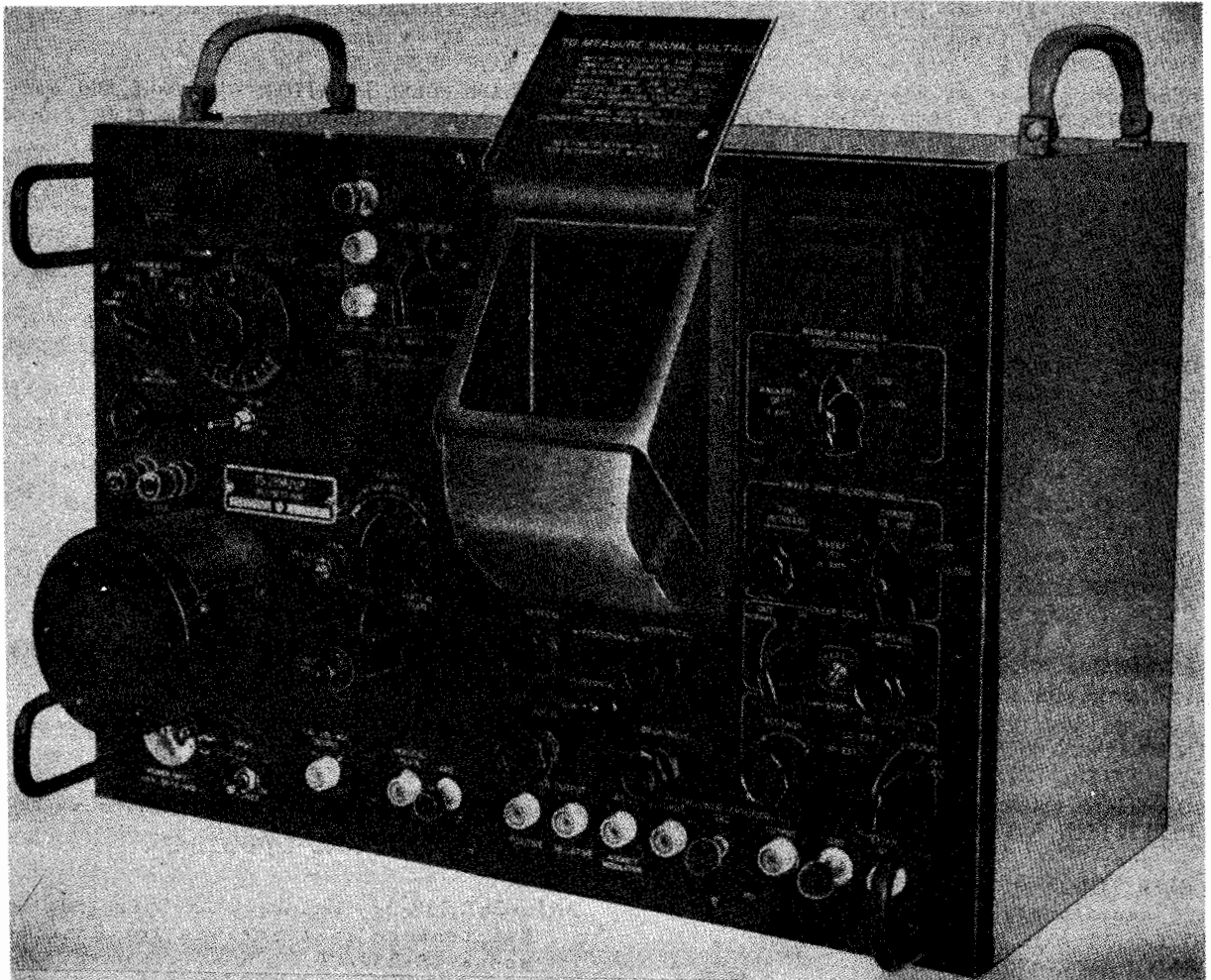
EQUIPMENT SUPPLIED DATA

QUANTITY PER EQUIPT	NAME AND NOMENCLATURE	OVERALL DIMENSIONS (inches)	WEIGHT (lbs.)
1	Spectrum Analyzer TS-148/UP including:	9 X 13 X 14	39
1	Antenna Horn AT-68/UP	1-3/64 X 2-13/16 X 3-21/64	0.25
1	Antenna Horn Cable CG-92/U	72 lg	
1	Power Cable CX-337/U	72 lg	
1	Mixer Cable CX-464/UP	48 lg	
1	Flexible wave-Guide Assy CG-182/APM-40	15 lg	0.25
1	Carrying Case CY-246/U	13-1/2 X 19 X 25-9/16	
1	Auxiliary-Spare Parts Box CY-245/U	7-1/4 X 10-1/16 X 17-29/32	6
1	Carriage, Shock Absorbing MT-325/U	11-11/16 X 13-3/4 X 16-11/32	
1	Adapter UG-144/AP	1/16 X 1-5/8 X 1-5/8	0.25
1	Adapter UG-183/U	1 X 1-1/2 X 2-1/2	
1	Allen Wrench No. 8		
1	Allen Wrench No. 6		
1	Allen Wrench No. 4		
1	Tuning wrench	1/8 dia X 2-9/16	

UNCLASSIFIED
April 1958

OSCILLOSCOPE

Test-Wave Form Measuring
TS-239/UP, TS-239A/UP



Oscilloscope TS-239A/UP

FUNCTIONAL DESCRIPTION

The TS-239/UP and TS-239A/UP are a portable measuring instrument used in testing all types of electronic equipment in radar and communication fields. A luminous plot of the time-variation of a voltage pulse or wave, from 10 cycles to 5 megacycles, indicates the duration and instantaneous magnitude of the impulse.

The equipment consists essentially of a calibrating voltage generator, a timing marker generator, and a trigger generator.

No field changes in effect at time of preparation (23 April 1958).

RELATION TO OTHER EQUIPMENT

Both Models of this equipment, part of Test Set AN/GPM-1, are identical except that the A model has a negative trigger output of 5000 pps.

ELECTRICAL AND MECHANICAL CHARACTERISTICS

FREQUENCY RANGE: 1 cyc to 3 mc.

CALIBRATING VOLTAGES, VERTICAL Y: 0.1 to 1 v, (peak-to-peak).

DIRECT VERTICAL PLATE CONNECTION

INPUT: 450 v (peak).

INPUT IMPEDANCE: 2.2 meg through 0.1 uuf.

SENSITIVITY: 110 v/in. deflection.

UNCLASSIFIED

4.3 TS-239/UP: 1

TS-239/UP, TS-239A/UP

OSCILLOSCOPE

HORIZONTAL, X AXIS AMPLIFIER

INPUT: 450 v (peak).
 INPUT IMPEDANCE: 0.5 meg.
 RESPONSE: 10 to 10,000 cyc.
 SENSITIVITY: 8 to 200 v/in. deflection.

INTENSITY, Z AXIS (Normally used for internal markers).

INPUT: ±75 v (max).
 INPUT IMPEDANCE: 0.1 meg through 0.01 uf.
 SQUARE WAVE AMPLITUDE: 75 v (peak-to-peak).

SWEEP (STOP-START) X AXIS

OUTPUT IMPEDANCE: 0.1 meg in series w/ 0.05 uf.
 OUTPUT TRIGGER AMPLIFIER: +150 v.
 SPEED: 0.05 to 50,000 usec/in.

SYNCHRONIZATION

EXTERNAL WITH PROBE: ±5 to ±450 v (peak).
 EXTERNAL WITHOUT PROBE: ±0.5 to ±150 v (peak).

INPUT IMPEDANCE

OSCILLOSCOPE WITH PROBE: 3 meg shunted by 12 uuf.
 OSCILLOSCOPE WITHOUT PROBE: 0.3 meg shunted by 30 uuf.
 INTERNAL: Trigger generator.

TIMING MARKERS (SYNCHRONIZED WITH SWEEP):

0.2, 1, 10, 100 or 500 usec.

TRIGGER PULSE OUTPUT

AMPLIFIER: ±25 v.
 DURATION: 4 usec.
 REPETITION RATE: 300; 800; 2,000; or 5,000 pps.
 RISE TIME: 0.5 usec (10% to 90% to full amplitude).

VERTICAL, Y AXIS AMPLIFIER

INPUT IMPEDANCE
 OSCILLOSCOPE WITH PROBE: 3 meg shunted by 12 uuf.
 OSCILLOSCOPE WITHOUT PROBE: 0.3 meg shunted by 30 uuf.

POLARITY: Pos or neg.

SENSITIVITY FOR STANDARD DEFLECTION

OSCILLOSCOPE WITH PROBE: 1 to 450 v (peak).

OSCILLOSCOPE WITHOUT PROBE: 0.1 to 100 v (peak).

SINE WAVE RESPONSE: 10 cyc to 5 mc.
 SQUARE PULSE DURATION: 0.2 to 5,000 usec.
 TRANSIENTS, OBSERVABLE RISE TIME: 0.08 usec (max) 10% to 90% of full amplitude.

MANUFACTURER'S OR CONTRACTOR'S DATA

TS-239/UP

Western Electric Co. New York, N.Y.
 Contract NXsa-97713, April 1947.

TS-239A/UP

Lavoie Laboratories, Morganville, N.J.
 Contract NObsr-39422, 15 Dec 1948.
 Contract NObsr-43344, 10 June 1949.

TUBE AND/OR CRYSTAL COMPLEMENT

- | | |
|----------------|-----------|
| (1) OC3/VR-105 | (1) 3JP1 |
| (1) 5R4GY | (2) 6AG7 |
| (3) 6AK5 | (1) 6AL5 |
| (2) 6C4 | (2) 6SN7W |
| (2) 6X5GT | (8) 7F8 |

Total Tubes: (23)
 No Crystals used.

REFERENCE DATA AND LITERATURE

- AN16-35TS239-3: Handbook of Operating and Maintenance Instructions for Oscilloscope TS-239/UP.
 NAVSHIPS 91,148: Technical Manual for Oscilloscope TS-239A/UP.

TYPE CLASSIFICATION
 DESIGN COGNIZANCE BUSHIPS
 PROCUREMENT COGNIZANCE
 STOCK NO.
 R.D.B. IDENT. NO.

SHIPPING DATA

NUMBER OF BOXES	CONTENTS AND IDENTIFICATION	VOLUME (Cu.Ft.)	OVERALL DIMENSIONS (inches)	WEIGHT PACKED (lbs.)
1	Oscilloscope TS-239/UP			
1	Equipment Spares			
1	Oscilloscope TS-239A/UP	7.64	20 X 22 X 30	150
1	Equipment Spares	7.8	16 X 19 X 44	160

UNCLASSIFIED

April 1958

Test-Wave Form Measuring

OSCILLOSCOPE

TS-239/UP, TS-239A/UP

EQUIPMENT SUPPLIED DATA

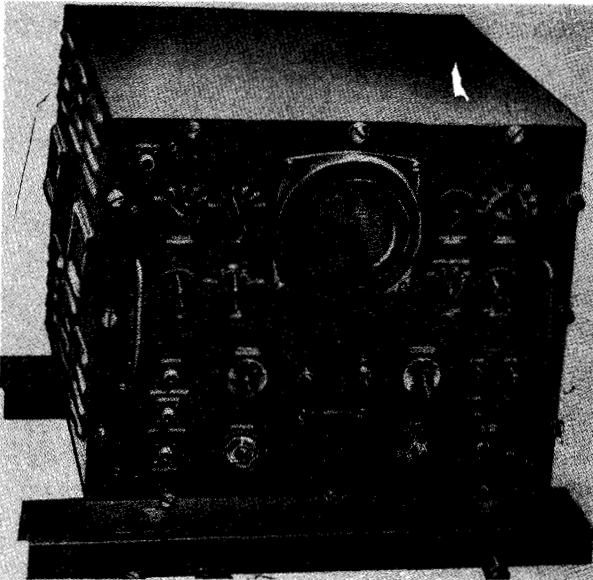
QUANTITY PER EQUIPT		NAME AND NOMENCLATURE	OVERALL DIMENSIONS (inches)	WEIGHT (lbs.)
TS-239/UP	TS-239A/ UP			
1		Oscilloscope TS-239/UP	13-1/2 X 16-1/2 X 21-1/2	63
	1	Oscilloscope TS-239A/UP	13-1/2 X 16-1/2 X 21-1/2	66
2	2	Probe MX-607/AP	1-1/4 dia X 52	1
2	2	Cord CG-332/U	96 lg	0.69
1	1	Cord CX-337/U	72 lg	0.5
1	1	Adapter M-358 or NT-49199	3/4 X 1-1/4 X 1-15/16	0.13
4	4	Adapter NT-491429	2-3/32 OD X 1-7/8	0.31
3	3	Adapter UG-255/U	5/8 OD X 1-3/8	0.19
3	3	Adapter UG-273/U	3/4 OD X 1-3/8	0.19
1	1	Transit Case CY-573/UP	16-3/4 X 19 X 25-1/2	24

UNCLASSIFIED

4.3 TS-239/UP: 3

SYNCHROSCOPE

TS-28/UPN



Synchroscope TS-28/UPN

TRIGGER FREQUENCY: 330 to 4,000 cycles.
IMPEDANCE: 4,000 ohms (trigger out); less than 100,000 ohms with 40 uuf load (input).
MARKER TIME INTERVALS: 2 usec, 10 usec, 25 usec.
SWEEP DELAY: -10 to +100 usec.
POWER REQUIREMENTS: 300 W, 105 to 125 v, 50 to 70 cps.

MANUFACTURER'S OR CONTRACTOR'S DATA

Belmont Radio Corp, Chicago, Illinois.
Contract NXsr-69266, dated 17 August 1944.
Contract N5sr-4674.
Galvin Mfg Corp, Chicago, Illinois.
Contract NXsa-30305, dated 31 May 1943.
Approximate Cost: \$2,200.00 with equipment spares.

FUNCTIONAL DESCRIPTION

The TS-28/UPN is used in testing radar, radio and associated equipment. It furnishes calibration markers, a synchronized or phase-shifted sweep, and a synchronized positive or negative pulse for test triggering. It may also be triggered externally by the equipment under test. Output and circuit wave forms may be examined for amplitude, duration and shape.

No field changes in effect at time of preparation (14 April 1958).

ELECTRICAL AND MECHANICAL CHARACTERISTICS

VIDEO AMPLIFIER FREQUENCY: 1,000 cycle to 5 mc.
SWEEP FREQUENCY: 20 to 3,000 cycle; 1 to 2, 10, 25, 60 usec per in.

TUBE AND/OR CRYSTAL COMPLEMENT

(2) OC3/VR-105	(2) 2X2/879
(1) 5CP1	(1) 5R4GY
(4) 6AC7	(3) 6AG7
(1) 6H6	(12) 6SN7GT
(1) 6X5GT	(1) 6Y6G
(1) 884	

Total Tubes: (29)
No Crystals used.

REFERENCE DATA AND LITERATURE

NAVSHIPS 900,521(A): Technical Manual for Synchroscope TS-28/UPN.

TYPE CLASSIFICATION
DESIGN COGNIZANCE BUSHIPS
PROCUREMENT COGNIZANCE Navy Specs RE16S23, RE9054A
STOCK NO.
R.D.B. IDENT. NO.

SHIPPING DATA

NUMBER OF BOXES	CONTENTS AND IDENTIFICATION	VOLUME (Cu.Ft.)	OVERALL DIMENSIONS (inches)	WEIGHT PACKED (lbs.)
1	Synchroscope TS-28/UPN (complete w/accessories)	14.2	26-1/2 X 29 X 34-1/4	303
1	Spare Parts Box	9.2	21-1/2 X 23-3/4 X 35-1/4	207

TS-28/UPN

SYNCHROSCOPE

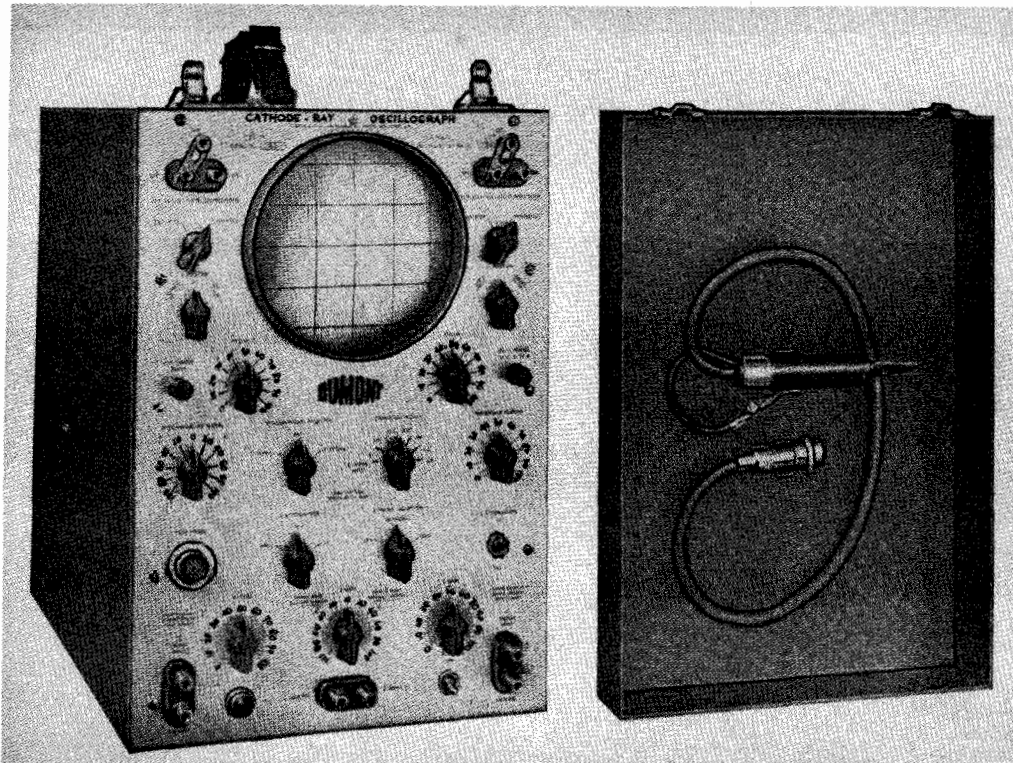
EQUIPMENT SUPPLIED DATA

QUANTITY PER EQUIPT	NAME AND NOMENCLATURE	OVERALL DIMENSIONS (inches)	WEIGHT (lbs.)
1	Synchroscope TS-28/UPN including:	18 X 21 X 22	283
1	Attenuator CN-25/UPA-1	1 X 1 X 5-1/8	0.28
3	Radio Frequency Cable RG-11/U of w/conn. NT-49190	54 lg	0.53
1	Dummy Load TS-288/UPA-1	1 X 1 X 5-1/8	0.27
1	Clip Lead Adapter		0.50
1	Cord, AC Line		0.5
1	Shock Mount Assy	5/8 X 17-5/8 X 20-5/8	10

April 1958

Test-Wave Form Measuring

CATHODE-RAY OSCILLOGRAPH TS-324/U, OCG, 60109



FUNCTIONAL DESCRIPTION

The TS-324/U, Navy Model OCG, and Navy Type 60109 is a portable five-inch cathode-ray oscillograph used for plotting a visual curve of one electrical quantity as a function of another. It does not distort pulses or square waves and is provided with Z-axis modulation to permit the use of timing signals or blanking pulses. It is provided with a test probe that can be connected to relatively high impedance circuits without serious loading effects.

No field changes in effect at time of preparation (24 October 1957).

RELATION TO OTHER EQUIPMENT

The TS-324/U, Navy Model OCG, and Navy Type 60109 are the same as Allen B. Dumont Type 241. These models are being replaced by Oscilloscope OS-8/U.

ELECTRICAL AND MECHANICAL CHARACTERISTICS

INPUT IMPEDANCE (TERMINALS)

Y-AXIS: 2 meg, 40 uuf, prove 1 meg, 10 uuf.

X-AXIS: 2 meg, 40 uuf.

Z-AXIS: 1 meg, 20 uuf.

INPUT POTENTIAL (MAX)

Y-AXIS(THRU AMPLIFIER): 400 rms signal v (600 v DC max).

Y-AXIS(DIRECT TO PLATES): 400 rms signal v (600 v DC max).

Y-AXIS(THRU PROBE): 400 v DC or peak signal.

X-AXIS(THRU AMPLIFIER): 50 rms signal v (600 v DC max).

X-AXIS(DIRECT TO PLATES): 400 rms signal v (600 v DC max).

Z-AXIS: 5 rms signal v (600 v DC max).

EXTERNAL SYNC: 10 peak to peak signal v (600 v DC max).

AMPLIFIER FREQUENCY RESPONSE

Y-AXIS: Uniform within 3 db from 20 cps to 2 mc at any attenuator setting.

Test-Wave Form Measuring

TS-324/U, OCG, 60109 CATHODE-RAY OSCILLOGRAPH

April 1958

X-AXIS: Uniform within 3 db from 5 cps to 100 kc at any attenuator setting.

Z-AXIS: Uniform within 3 db from 30 cps to 2 mc.

AMPLIFIERS VOLTAGE GAIN (APPROX)

Y-AXIS: 250 times.

X-AXIS: 100 times.

Z-AXIS: 10 times.

DEFLECTION FACTOR WITH AMPLIFIER

Y-AXIS (TERMINALS): 0.07 rms v per inch.

Y-AXIS (WITH PROBE): 0.70 rms v per inch.

X-AXIS: 0.70 rms v per inch.

TO DEFLECTION PLATES

Y-AXIS: 22 rms v per inch.

X-AXIS: 21 rms v per inch.

LINEAR TIME BASE

FREQUENCY RANGE: 15 to 3000 cps.

SWEEP DIRECTION: Left to right.

POWER REQUIREMENTS: 115 v, 60 cps, single ph, 160 W.

Contract N5sr-10515.

Approximate Cost: \$350.00 with equipment spares.

TUBE AND/OR CRYSTAL COMPLEMENT

- (1) 5JP1
- (1) 5Z3
- (2) 6AC7WA
- (2) 6AG7Y
- (1) 6J5
- (2) 6SG7Y
- (1) 6SJ7
- (3) 6SN7WGTA
- (1) 6V6Y
- (1) 80
- (1) 884

Total Tubes: (16)

REFERENCE DATA AND LITERATURE

NAVSHIPS 95562: Technical Manual for DuMont Cathode-Ray Oscillograph Type 241.

MANUFACTURER'S OR CONTRACTOR'S DATA

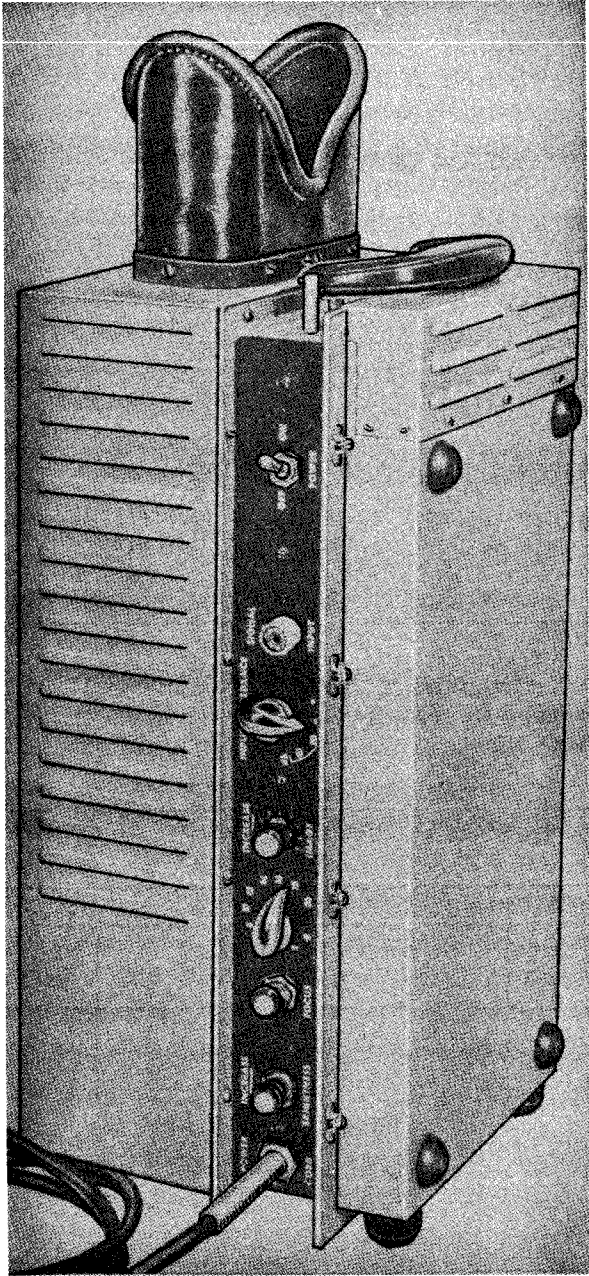
Allen B. DuMont Laboratories, Inc., Passaic, N.J.

TYPE CLASSIFICATION
 DESIGN COGNIZANCE BUSHIPS
 PROCUREMENT COGNIZANCE
 STOCK NO.
 R.D.B. IDENT. NO.

EQUIPMENT SUPPLIED DATA

QUANTITY PER EQUIPT	NAME AND NOMENCLATURE	OVERALL DIMENSIONS (inches)	WEIGHT (lbs.)
1	Cathode-Ray Oscillograph Navy Model OCG including: (1) Test Probe	10-3/4 x 17-1/2 x 21	65

April 1958

OSCILLOSCOPE**TS-34/AP, TS-34A/AP***Oscilloscope TS-34A/AP*

Application is in testing and maintenance of radar and other electronic equipment.

No field changes in effect at time of preparation (14 April 1958).

ELECTRICAL AND MECHANICAL CHARACTERISTICS

POWER REQUIREMENTS: 90 W at 60 cps, 115 v $\pm 10\%$, 50 to 1,200 cps.

PULSES AND SQUARE WAVE OBSERVABLE

DURATION: 1/4 to 30,000 usec.

POLARITY: Pos or neg.

SINE WAVE OBSERVABLE: 30 to 1,000,000 cps.

INPUT IMPEDANCE

OSCILLOSCOPE ALONE, LOW: 62 ohms.

OSCILLOSCOPE ALONE, HIGH: 430,000 ohms shunted by 30 uuf.

OSCILLOSCOPE WITH PROBE: 4 meg shunted by 12 uuf.

INPUT VOLTAGE

OSCILLOSCOPE ALONE, LOW: 0.1 to 100 v.

OSCILLOSCOPE WITH PROBE: 1 to 450 v.

SYNCHRONIZATION

(TS-34/AP) EXTERNAL: 0.5 to 75 v.

(TS-34A/AP) EXTERNAL, WITH PROBE: 20 to 450 v.

EXTERNAL, WITHOUT PROBE: 2 to 100 v.

INPUT IMPEDANCE

TS-34/AP: 1,000 to 2,000 ohms.

TS-34A/AP: 400,000 ohms shunted by 30 0 uuf.

SWEEP SPEEDS

START-STOP DURATION

FAST: 4.5 to 8 usec.

MEDIUM: 20 to 50 usec.

SLOW: 120 to 280 usec.

SAWTOOTH DURATION

FAST: 20 to 200 usec.

MEDIUM: 200 to 4,000 usec.

SLOW: 4,000 to 100,000 usec.

SAWTOOTH FREQUENCY

FAST: 50,000 to 5,000 cps.

MEDIUM: 5,000 to 250 cps.

SLOW: 250 to 10 cps.

ATTENUATION Y AMPLIFIER

INPUT ATTENUATOR: 0 to 20 db.

INPUT IMPEDANCE SWITCH: 0, 20, or 40 db on high impedance position.

AMBIENT TEMPERATURE RANGE: -40 deg F to +120 deg F.

RELATIVE HUMIDITY: 95%.

MANUFACTURER'S OR CONTRACTOR'S DATA

Western Electric Co, NY, NY.

TS-34/AP

Contract NOas-1277.

Contract 342-44.

Contract 569-44.

Contract 267-44.

Contract 709-44.

FUNCTIONAL DESCRIPTION

The TS-34/AP and TS-34A/AP, having a 2 inch CR tube, is a portable instrument used in observing electrical wave forms and in measuring their voltage, power, and duration.

Test-Wave Form Measuring
TS-34/AP, TS-34A/AP

OSCILLOSCOPE

Contract 468-44.
Contract 85-44.
TS-34A/AP
Contract NXsr-51503, dated March 1949.

REFERENCE DATA AND LITERATURE

AN08-35TS34-3: Handbook of Maintenance Instructions for Oscilloscope TS-34/AP.
NAVSHIPS 95343 (AN08-35TS34-4): Handbook of Maintenance Instructions for Oscilloscope TS-34A/AP.

TUBE AND/OR CRYSTAL COMPLEMENT

(1) 2AP1
(1) 5Y3GT/6
(2) 6AG7
(4) 6AK5
Total Tubes: (12)

(2) 6SL7GT
(1) 6SN7GT
(1) 6X5GT/C

No Crystals used.

TYPE CLASSIFICATION	
DESIGN COGNIZANCE	BUSHIPS
PROCUREMENT COGNIZANCE	SPEC MIL-0-15630 (SHIPS);USAF SPEC
STOCK NO.	71-5043
R.D.B. IDENT. NO.	

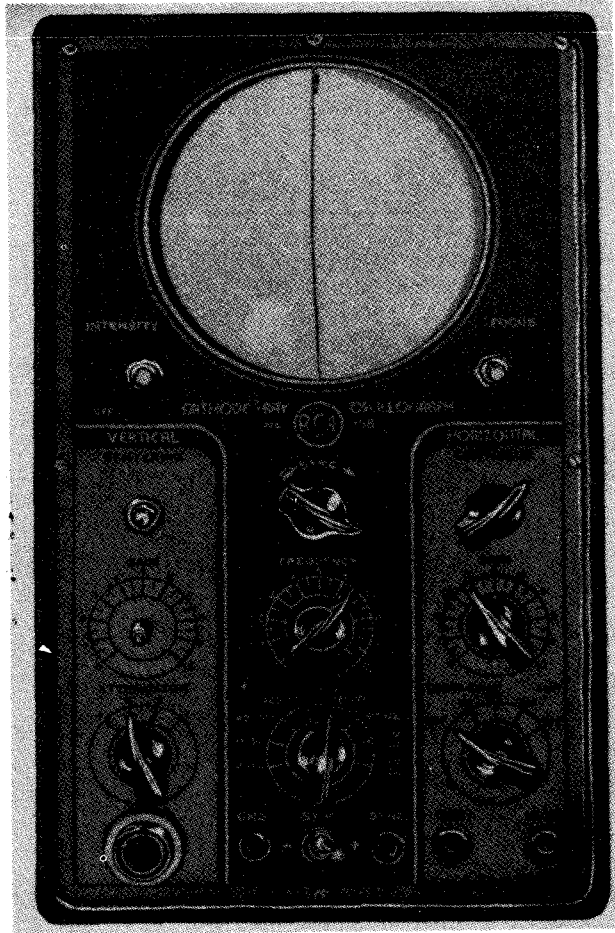
SHIPPING DATA

NUMBER OF BOXES	CONTENTS AND IDENTIFICATION	VOLUME (Cu.Ft.)	OVERALL DIMENSIONS (inches)	WEIGHT PACKED (lbs.)
1	Oscilloscope TS-34/AP w/accessories	3.17	14 x 17 x 33	56
1	Oscilloscope TS-34A/AP w/accessories			

EQUIPMENT SUPPLIED DATA

QUANTITY PER EQUIPT	NAME AND NOMENCLATURE	OVERALL DIMENSIONS (inches)	WEIGHT (lbs.)
1	TS-34/AP Oscilloscope TS-34/AP including:	6 x 8 x 15	26
2	Coaxial Cord CG-72/U	120 lg	2.5
1	Cord CX-150/U	180 lg	0.75
2	Cord CX-152/U	12 lg	0.25
1	Case CY-110/U	9-3/4 x 10 x 29	15.75
1	Probe Assy MX-150/AP	1 dia x 50	1
1	TS-34A/AP Oscilloscope TS-34A/AP	8 x 9 x 20-3/4	29
2	Coaxial Cord CG-72/U	120 lg	2.5
1	Cord CX-150/U	180 lg	0.75
2	Cord CX-152/U	12 lg	0.25
1	Case CY-213/AP	11 x 12 x 23	6
1	Probe Assy MX-50/AP	1 dia x 50	1

OSCILLOSCOPE



Oscilloscope TS-489/U

FUNCTIONAL DESCRIPTION

The TS-489/U is a general purpose oscilloscope which uses a 5 in. CR tube. It is used for service testing and maintenance of radar and electronic equipment.

No field changes in effect at time of preparation (20 December 1956).

RELATION TO OTHER EQUIPMENT

Same as RCA Model 158.

ELECTRICAL AND MECHANICAL CHARACTERISTICS

SWEEP FREQUENCY RANGE: 4 to 22,000 cps.
TUNING FREQUENCY RANGE: 4 cps to 18 kc.
DEFLECTION SENSITIVITY: 0.4 rms v per in,
Vertical, u/cable; 0.4 rms v per in,
Vertical, u/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 2100 kc, horizontal.

INPUT IMPEDANCE
WITHOUT CABLE: 1.15 meg, 16 uf.
WITH CABLE: 0.15 meg, 38 uf.
OPERATING POWER: 110 to 120 v, 50 to 60 cps,
single ph.

MANUFACTURER'S OR CONTRACTOR'S DATA

R.C.A. Mfg Corp Inc., Camden, N.J.

TUBE AND/OR CRYSTAL COMPLEMENT

(1) 2X2A	(1) 6SJ7
(1) 5BP1	(1) 80
(1) 6AC7WA	(1) 884
(1) 6C6	

Total Tubes: (7)

REFERENCE DATA AND LITERATURE

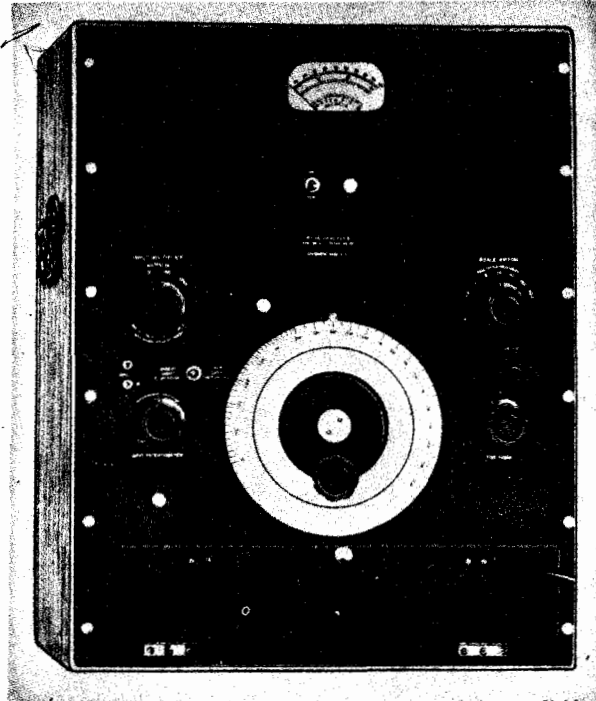
TM11-487H: Technical Manual for Test Equipment.

TYPE CLASSIFICATION
DESIGN COGNIZANCE TASSA
PROCUREMENT COGNIZANCE
STOCK NO.
R.D.B. IDENT. NO.

EQUIPMENT SUPPLIED DATA

QUANTITY PER EQUIPT	NAME AND NOMENCLATURE	OVERALL DIMENSIONS (inches)	WEIGHT (lbs.)
1	Oscilloscope TS-489/U	8 x 14 x 19	30

March 1957

SOUND ANALYZER**TS-615/U***Sound Analyzer TS-615/U***FUNCTIONAL DESCRIPTION**

The 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 nonmultiple voltages such as noise and hum.

No field changes in effect at time of preparation (5 October 1956).

ELECTRICAL AND MECHANICAL CHARACTERISTICS

RANGES: 20 to 16000 cps, 1 band.

300 uv to 300 v.
 ACCURACY: $\pm 5\%$.
 INPUT IMPEDANCE: 1 meg.
 OPERATING POWER: 105 to 125 v, 40 to 60 cps, single ph.

MANUFACTURER'S OR CONTRACTOR'S DATA

General Radio Co, Cambridge, Mass.
 Contract NObsr 40865
 Approximate Cost: \$650.00 with equipment spares.

TUBE AND/OR CRYSTAL COMPLEMENT

(1) 6B8	(1) 6X5WGT
(1) 6C5	(2) 6K6GT
(3) 6C6	(3) 6J7
Total Tubes: (12)	(1) 6F5GT

REFERENCE DATA AND LITERATURE

TM-11-487: Technical Manual for Test Equipment.
 NAVSHIPS 900,155 VOL II: Technical Manual for Electronic Test Equipment.

TYPE CLASSIFICATION
DESIGN COGNIZANCE TESSA
PROCUREMENT COGNIZANCE
STOCK NO.
R.D.B. IDENT. NO.

EQUIPMENT SUPPLIED DATA

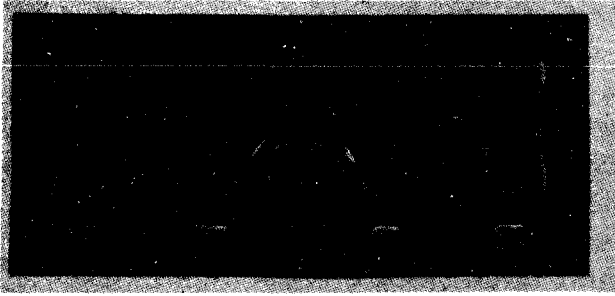
QUANTITY PER EQUIPT	NAME AND NOMENCLATURE	OVERALL DIMENSIONS (inches)	WEIGHT (lbs.)
1	Analyzer TS-615/U	10-7/8 x 19-1/2 x 25-1/8	85

June 1957

Test-Wave Form Measuring

TS-64/MPN-1

SYNCHRO SCOPE



Synchroscope TS-64/MPN-1

ELECTRICAL AND MECHANICAL CHARACTERISTICS

SWEEP SPEED: 3 to 600 usec per in.

SWEEP FREQUENCY: 150 to 7500 cps.

TUBE AND/OR CRYSTAL COMPLEMENT

(6) 6SN7-GT	(1) 6AC7	(1) 3AP1
(2) 6V6-GT	(1) 884	(1) 2X2
(2) 6SJ7-GT	(1) 5R4GY	

Total Tubes: (15)

REFERENCE DATA AND LITERATURE

TM11-1200: Technical Manual for Radar Test Equipment:

TYPE CLASSIFICATION
DESIGN COGNIZANCE USAF
PROCUREMENT COGNIZANCE
STOCK NO.
R.D.B. IDENT. NO.

FUNCTIONAL DESCRIPTION

The TS-64/MPN-1 is used to test and align components of radar system. The synchroscope makes possible the observation and voltage measurements of waveforms of short duration. The unit is part of Radar Set AN/MPN-1 and may be used as a range scope in the operation of the set.

The synchroscope may be triggered either internally or from an external source, and will provide either positive or negative trigger pulses at the system repetition rate.

No field changes in effect at time of preparation (3 December 1956).

EQUIPMENT SUPPLIED DATA

QUANTITY PER EQUIPT	NAME AND NOMENCLATURE	OVERALL DIMENSIONS (inches)	WEIGHT (lbs.)
1	Synchroscope TS-64/MPN-1		

16 May 1962

SPECTRUM ANALYZER TS-833A/U

Cog Service: USN FSN:

Functional Class: 3,4,1

USA

USN

USAF

TYPE CLASS:

Used by

MANUFACTURER'S NAME/CODE NUMBER: Polytechnic Research and Development Co., Inc., (77327).

(No Illustration Available)

FUNCTIONAL DESCRIPTION:

Spectrum Analyzer TS-833A/U is designed for oscilloscope viewing of detected RF spectrum of any type of signal in the frequency range of 2400 to 3445 mc, and for checking or adjusting spectra of pulsed RF energy, transmitter frequency, frequency pulling and measurement of standing waves, attenuation, and leakage.

No field changes in effect at time of preparation (8 January 1962).

TECHNICAL CHARACTERISTICS:

FREQUENCY RANGE: 2400 to 3445 mc.

FREQUENCY METER ACCURACY: Form 1 mc.

IF FREQUENCY: 20 mc.

IF BANDWIDTH: 50 kc.

GAIN: Crystal noise visible for max gain control setting.

SWEEP RANGE: 5 to 20 cps.

POWER REQUIREMENTS: 115 or 230 v, 50 to 1700 cyc, single ph.

RELATION TO OTHER EQUIPMENT: None.

EQUIPMENT REQUIRED BUT NOT SUPPLIED: None.

MAJOR COMPONENTS

QTY	ITEM	STOCK NUMBERS	DIMENSIONS (INCHES)	WEIGHT (LBS)
1	Spectrum Analyzer TS-833A/U includes:		17-7/16 x 21-13/16 x 22-11/16	58
1	Indicator, Pulse Analyzer IP-323/U			
1	Tuner, RF TN-242/U			
1	Power Cable			
1	Technical Manual			

REFERENCE DATA AND LITERATURE: None.

TUBE, CRYSTAL AND/OR SEMI-CONDUCTOR DATA:

TUBES: (3) 0A2 (1) 082 (1) 2K28 (1) 2X2A (2) 5R4GY (1) 5UP1 (2) 6AU6 (1) 6BE6
(1) 6C4 (1) 6L6GA (1) 6SJ7GT (4) 6SN7GT (2) 6Y6G (1) 884 (1) 12AT7

TS-833A/U SPECTRUM ANALYZER

CRYSTALS: None used.

SEMI-CONDUCTORS: (1) 1N34 (1) 1N21B

SHIPPING DATA

PKGS	VOLUME (CU FT)	WEIGHT (LBS)
1		

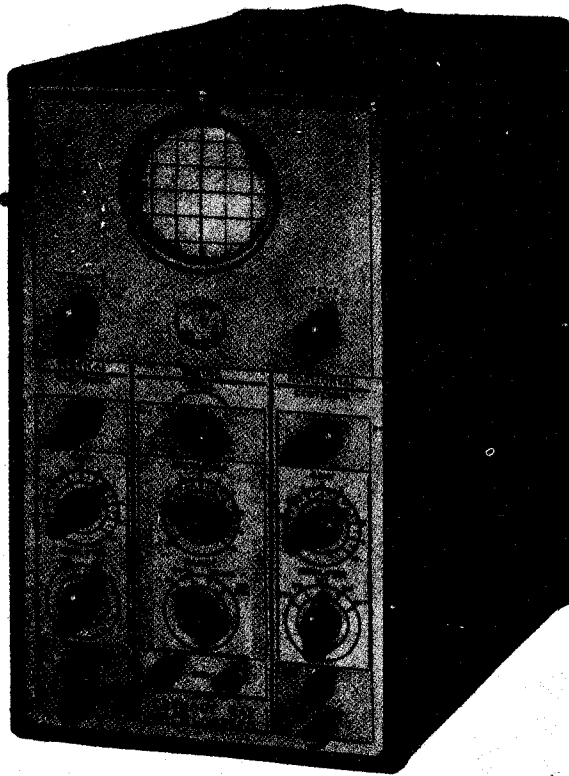
PROCUREMENT DATA

PROCURING SERVICE: USN
SPEC &/OR DWG:

DESIGN COG: USN, BuShips

CONTRACTOR	LOCATION	CONTRACT OR ORDER NO.	APPROX. UNIT COST
Polytechnic Research and Development Co., Inc. Model no. 853B	Brooklyn, N. Y.	NObsr-59827	\$1,846.79

March 1957

CATHODE-RAY OSCILLOGRAPH**155A***Cathode-Ray Oscilloscope 155A***FUNCTIONAL DESCRIPTION**

The Radio Corp of America Stock No. 155A Cathode-Ray Oscilloscope is a three-inch CR tube portable instrument for the observation of electrical circuit phenomena. Its common uses include the study of wave shapes and transients, measurement of modulation, adjustment of radio receivers and transmitter, determination of peak voltages, and tracing of vacuum-tube characteristics.

Its major advantage over older types of visual devices is its freedom from inertia, allowing the observation of very rapid changes of current or voltage without appreciable distortion.

No field changes in effect at time of preparation (6 September 1956).

ELECTRICAL AND MECHANICAL CHARACTERISTICS

DEFLECTION SENSITIVITY: 0.8 volts/inch rms (max gain) at amplifier inputs, 30 volts/inch rms at cathode-ray tube inputs.

INPUT CHARACTERISTICS

THROUGH EITHER AMPLIFIER: 500,000 ohms, approx 20 uufd.

WITHOUT EITHER AMPLIFIER: 2,200,000 ohms, approx 40 uufd.

FREQUENCY RESPONSE RANGE (AMPLIFIERS): 20 to 90,000 cps.

SIGNAL INPUT: 700 v rms max with amplifier.
FREQUENCY RANGE (TIMING AXIS): 15 to 20,000 cps.

INPUT VOLTAGE: 300 v DC max across binding posts.

INDICATION: 3 in. CR tube.

POWER REQUIREMENT: 110 to 120 v, 50 to 60 cps, 50 W.

MANUFACTURER'S OR CONTRACTOR'S DATA

Radio Corp of America, Camden, New Jersey

TUBE AND/OR CRYSTAL COMPLEMENT

(2) 6C6

(1) 884

(1) 906

(2) 80

Total Tubes: (6)

REFERENCE DATA AND LITERATURE

Radio Corp of America Technical Manual for Cathode-Ray Oscilloscope Stock No. 155A.

TYPE CLASSIFICATION
DESIGN COGNIZANCE
PROCUREMENT COGNIZANCE
STOCK NO.
R.D.B. IDENT. NO.

EQUIPMENT SUPPLIED DATA

QUANTITY PER EQUIP	NAME AND NOMENCLATURE	OVERALL DIMENSIONS (inches)	WEIGHT (lbs.)
1	Cathode-Ray Oscilloscope RCA Model 155A	8 X 14-1/4 X 14-3/8	21

UNCLASSIFIED

4.3 155A: 1

March 1957

CATHODE-RAY OSCILLOGRAPH

164-E

FUNCTIONAL DESCRIPTION

The Dumont Type 164-E is a light weight portable unit having a three-inch CR tube, best suited where light weight and portability are important factors as opposed to a wide range of operating characteristics. Nearly all of the general-purpose features contained in larger units are incorporated in this instrument.

No field changes in effect at time of preparation (5 September 1956).

VOLTAGE INPUT (AMPLIFIERS)

ALLOWABLE AC: 250 v max.
ALLOWABLE DC: 400 v max.

POWER SUPPLY VOLTAGE OUTPUT

HIGH VOLTAGE SECTION: 110 v DC.
LOW VOLTAGE SECTION: 415 v DC.

INDICATION: 3 in. CR tube.

MANUFACTURER'S OR CONTRACTOR'S DATA

Allen B. Dumont Laboratories, Inc.,
Passaic, N.J.

ELECTRICAL AND MECHANICAL CHARACTERISTICS

DEFLECTION SENSITIVITY (MAX AMPLIFICATION)

VERTICAL: 0.70 rms volts/inch.

HORIZONTAL: 0.55 rms volts/inch.

DEFLECTION SENSITIVITY: 30 rms volts/inch
direct connection to CR tube plates.

INPUT CHARACTERISTICS (AMPLIFIER)

VERTICAL: 1 megohm.

HORIZONTAL: 0.8 megohm.

VOLTAGE GAIN (AMPLIFIER)

VERTICAL: 43 times.

HORIZONTAL: 55 times.

FREQUENCY RANGE

AMPLIFIERS: 5 to 100,000 sinusoidal cps.

TIMING AXIS: 15 to 30,000 sawtooth cps.

TUBE AND/OR CRYSTAL COMPLEMENT

(1) 3AP1/3AP5 (2) 80
(2) 6C6 (1) 2B4

Total Tubes: (6)

REFERENCE DATA AND LITERATURE

Allen B. Dumont Laboratories Inc. Technical
Manual for Cathode-Ray Oscilloscope Model
164-E.

TYPE CLASSIFICATION
DESIGN COGNIZANCE
PROCUREMENT COGNIZANCE
STOCK NO.
R.D.B. IDENT. NO.

EQUIPMENT SUPPLIED DATA

QUANTITY PER EQUIPT	NAME AND NOMENCLATURE	OVERALL DIMENSIONS (inches)	WEIGHT (lbs.)
1	Cathode-Ray Oscilloscope-Allen B. Dumont Laboratories Inc. Model 164-E	7-3/8 X 11-5/8 X 14	20

CATHODE-RAY OSCILLOGRAPH**233**

Cathode-Ray Oscillograph 233

FUNCTIONAL DESCRIPTION

The Dumont Type 233 is a complete self-contained instrument designed particularly for use in lecture-room demonstrations, although its characteristics are such as to make it valuable for general laboratory investigations. It is housed in a specially-designed enclosed cabinet mounted on rubber-tired locking casters.

The intensifier-type cathode-ray tube has a diameter of twenty inches, providing traces of adequate size for demonstration purposes or for the study of fine structure. The total accelerating potential is 6000 volts, providing an intense spot of good resolving power.

No field changes in effect at time of preparation (29 April 1957).

ELECTRICAL AND MECHANICAL CHARACTERISTICS

PRESENTATION: 20 in. CR tube, 6000 v accelerating potential.

INPUT CIRCUITS: X and Y axis arranged for either conductive or capacitive coupling through a stepped attenuator, Z axis and synchronizing circuit capacitively coupled.

INPUT IMPEDANCE

X AND Y AXIS: 2 meg, 30 uuf.

Z AXIS: 2 meg.

SYNC SIGNAL: 100000 ohms.

MAX INPUT POTENTIAL

X AND Y AXIS

INPUT CIRCUIT SELECTOR**SETTING:**

CONDUCTIVE

CAPACITIVE

INPUT ATTENUATOR**SETTING:**

1:1

10:1

1:1

10:1

MAXIMUM SIGNAL:

15 rmsv 150 rmsv 15 rmsv 150 rms v
or or
21 dcv 210 dcv

MAXIMUM SIGNAL PLUS DC

21 peak v 210 peak v 400 peak v 400 peak v
Z AXIS

MAXIMUM SIGNAL: 5 rms v.

MAXIMUM SIGNAL PLUS DC: 400 peak v.

SYNCHRONIZING SIGNAL

MAXIMUM SIGNAL: 10 v peak to peak.

MAXIMUM SIGNAL PLUS DC: 400 peak v.

AMPLIFIER FREQUENCY RESPONSE

X AND Y AXIS: 2 to 75000 sinusoidal cps $\pm 15\%$, with direct-coupled input circuit, down 30% at 0 cps.

Z AXIS: 10 to 750000 sinusoidal cps $\pm 15\%$.

AMPLIFIER VOLTAGE GAIN

X AND Y AXIS: Approx 500 times.

Z AXIS: 10 times.

DEFLECTION FACTOR (X AND Y AXIS)

THROUGH AMPLIFIER: Approx 0.060 rms. per in.

DIRECT TO DEFLECTION PLATES: Approx 29 rms v per in.

Z AXIS SIGNAL (100% INTENSITY MODULATION):

Approx 1.0 rms v positive or negative polarity of signal available.

LINEAR-TIME-BASE GENERATOR

RECURRENCE OF SWEEP: Single or continuous.

FREQUENCY RANGE: 8 to 30000 sawtooth cps.

SYNCHRONIZATION: Positive or negative polarity of power line frequency, external signal, or X-axis signal.

233**CATHODE-RAY OSCILLOGRAPH**

POWER REQUIREMENTS: 115 v, 50 to 60 cps,

REFERENCE DATA AND LITERATURENAVSHIPS 95561: Technical Manual for Dumont
Cathode-Ray Oscillograph Type 233.**MANUFACTURER'S OR CONTRACTOR'S DATA**Allen B. Dumont Laboratories, Inc, Passaic,
N.J.**TUBE AND/OR CRYSTAL COMPLEMENT**

(1) 20AP1	(4) 6L6G	(1) 6Q5G	(2) 5X3
(2) 7A4	(3) VR90	(1) 6AC7	(1) 80
(4) 6J5	(3) 7N7	(2) 2X2	(1) 6A3
	(2) 6X5GT	(1) 7F7	(3) VR150

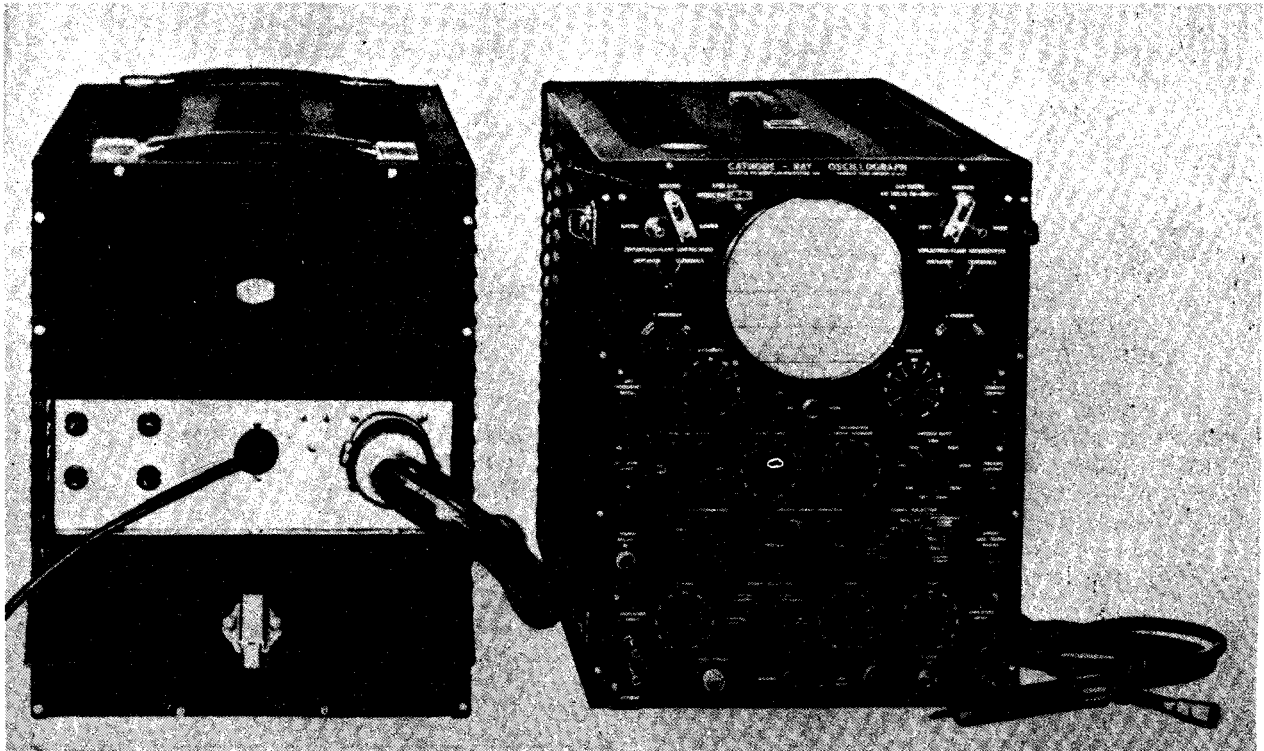
TYPE CLASSIFICATION
DESIGN COGNIZANCE COMMERCIAL
PROCUREMENT COGNIZANCE
STOCK NO.
R.D.B. IDENT. NO.

Total Tubes: (30)

EQUIPMENT SUPPLIED DATA

QUANTITY PER EQUIP	NAME AND NOMENCLATURE	OVERALL DIMENSIONS (inches)	WEIGHT (lbs.)
1	Cathode-Ray Oscillograph Type 233	28 x 36 x 60	325

CATHODE-RAY OSCILLOGRAPH



Cathode-Ray Oscilloscope 248

FUNCTIONAL DESCRIPTION

The Dumont Type 248 is a portable instrument designed for plotting a curve of one electric potential as a function of another, on the screen of a cathode-ray tube. Its great utility lies in the fact that its function, that of automatic curve plotting, is of value in the solution of almost every scientific problem. Any physical variable from which a corresponding voltage can be obtained can be shown as a function of time or of some other quantity.

It is housed in two cases, the indicator cabinet containing the cathode-ray tube and associated circuits; the power-supply cabinet, all power components.

No field changes in effect at time of preparation (29 April 1957).

ELECTRICAL AND MECHANICAL CHARACTERISTICS

PRESENTATION: 5 in. CR tube, 4000 v accelerating potential.

INPUT IMPEDANCE

Y - AXIS

TERMINALS: 1 meg, 40 uuf.

DIRECT (BALANCED): 10 meg, 15 uuf.

DIRECT (UNBALANCED): 5 meg, 25 uuf.
PROBE: 5 meg, 10 uuf.

X - AXIS

TERMINALS: 1 meg, 60 uuf.

DIRECT (BALANCED): 10 meg, 15 uuf.

DIRECT (UNBALANCED): 5 meg, 25 uuf.

Z - AXIS

TERMINALS: 1 meg, 25 uuf.

SYNC AMPLIFIER

TERMINALS: 2 meg, 45 uuf.

PERMISSIBLE INPUT POTENTIALS (MAX DENOTES DC PLUS PEAK AC)

Y - AXIS

AMPLIFIER: 600 v max.

DIRECT: 1000 v max.

PROBE: 1000 v max.

X - AXIS

AMPLIFIER: 210 v peak AC, 600 v max.

DIRECT: 1000 v max.

Z - AXIS (AMPLIFIER):

5 v peak AC, 600 v max.

SYNC AMPLIFIER:

250 v peak AC, 600 v max.

AMPLIFIER RESPONSE

Y - AXIS: Uniform within 30% from 20 cps to 5 mc.

X - AXIS: Uniform within 30% from 20 cps to 2 mc.

Z - AXIS: Blanks on 3 v peak input from 30 cps to 5 mc.

248

CATHODE-RAY OSCILLOGRAPH

DEFLECTION FACTORS

Y - AXIS

AMPLIFIER GAIN (MAX): 0.1 rms v per in. total deflection (0.28 DC v per in.)

DIRECT TO PLATES: Approx 32 rms v per in. total deflection (90 DC v per in.)

X - AXIS

AMPLIFIER GAIN (MAX): 2.75 rms v per in. total deflection (7.75 DC v per in.)

DIRECT TO PLATES: Approx 37 rms v per in. total deflection (103 DC v per in.)

LINEAR TIME BASES

CONTINUOUS SWEEP FREQUENCY: 15 cps to 150 kc. Will synchronize with any repetitive signal having a frequency between 15 cps and 3 mc, a peak amplitude of 1 v, and with peaks lasting more than 0.1 usec.

DRIVEN SWEEP DURATIONS: 5, 25, 100, 1000 usec. Can be initiated by any signal having a repetition rate up to 3 mc, a peak amplitude of 1.5 v, and with peaks lasting more than 0.1 usec.

MARKERS: 1, 10, 100 usec intervals $\pm 5\%$ accuracy, operative on driven sweeps only.

TRIGGER GENERATOR: Between 50 and 100 v pulse peak amplitude, approx 200 to 3000 per sec pulse rate, both polarities available.

POWER REQUIREMENTS: 105 to 125 v rms. 50 to 400 cps, 550 w.

MANUFACTURER'S OR CONTRACTOR'S DATA

Allen B. Dumont Laboratories, Inc, Passaic, New Jersey.

TUBE AND/OR CRYSTAL COMPLEMENT

(5) 6AG7	(8) 6AC7
(4) 807	(5) 6SN7GT
(3) 6SJ7	(1) 5JP1
(2) 5R4GY	(3) 6B4G
(1) OC3/VR105	(2) 2X2

Total Tubes: (34)

REFERENCE DATA AND LITERATURE

Technical Manual for Dumont Type 248 Cathode-Ray Oscillograph.

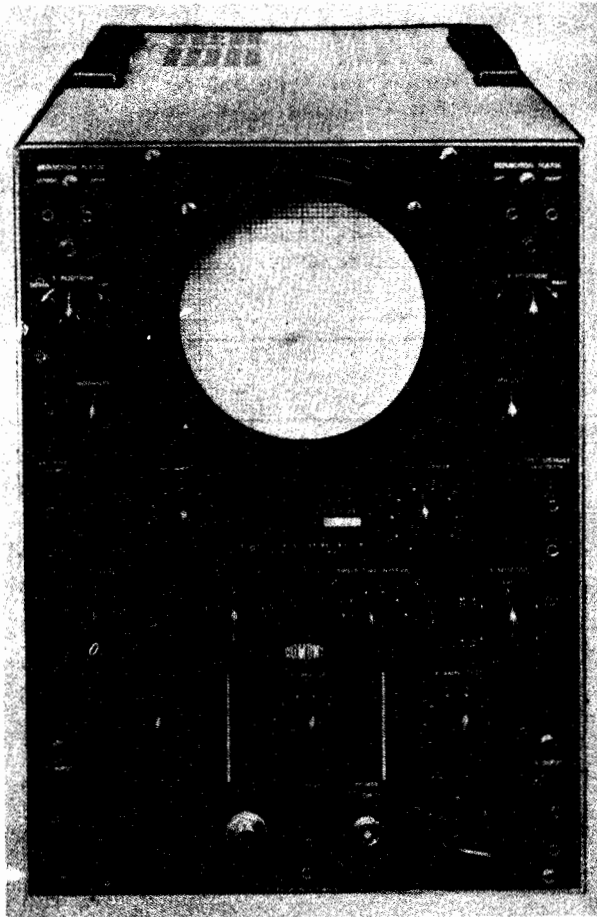
TYPE CLASSIFICATION
DESIGN COGNIZANCE COMMERCIAL
PROCUREMENT COGNIZANCE
STOCK NO.
R.D.B. IDENT. NO.

EQUIPMENT SUPPLIED DATA

QUANTITY PER EQUIPT	NAME AND NOMENCLATURE	OVERALL DIMENSIONS (inches)	WEIGHT (lbs.)
1	Indicator Unit	13 X 16-1/2 X 21-7/16	60
1	Power Supply Unit	13 X 16-1/2 X 20	110

CATHODE-RAY OSCILLOGRAPH

250-AH



Cathode-Ray Oscilloscope

FUNCTIONAL DESCRIPTION

The Dumont Type 250-AH is a portable instrument designed for general purpose laboratory use. It has both AC and DC signal amplifiers, a built-in voltage calibrator allows accurate measurement on input-signal amplitudes, the time-base generator furnishes a wide range of linear sweep speeds, both recurrent and driven and intensity of the cathode-ray beam may be modulated from an external source to produce timing marks or reference points on the trace. It also has provision by means of which intensifier voltage for its high-voltage cathode-ray tube may be supplied from an external source. The greater over-all accelerating potentials which are therefore possible make available much more light from the screen of the tube, an important factor in observation or photography of traces which are produced at high writing rates.

The intensifier of the cathode-ray tube, by a simple jumper arrangement, may be connected to an internal high-voltage supply instead of an external supply when low voltage operation is desired for applications where low deflection factor is more important than high light output from the screen.

No field changes in effect at time of preparation (26 April 1957).

ELECTRICAL AND MECHANICAL CHARACTERISTICS

PRESENTATION: 5 in. CR tube with 19000 v max accelerating potential.

VERTICAL DEFLECTION DATA

DEFLECTION FACTOR (WITH 13500 V ACCELERATING POTENTIAL).

AC AMPLIFIER (MAX GAIN): 25 rms mv per in.

AC AMPLIFIER WITH PROBE (MAX GAIN): 250 rms mv per in.

DC AMPLIFIER: 1.7 DC v per in.

DIRECT TO DEFLECTION PLATES: 45 rms v per in. $\pm 20\%$.

SINUSOIDAL FREQUENCY RESPONSE

AC AMPLIFIER: Uniform within 10% from 5 to 200000 cps, within 60% at 500000 cps.

DC AMPLIFIER: Uniform within 10% from 0 to 200000 cps.

INPUT IMPEDANCE

AMPLIFIER TERMINALS: 2 meg, 50 uuf.

THROUGH PROBE: 4.7 meg, 10 uuf.

TO DEFLECTION PLATES: 4 meg, 30 uuf balanced, 2 meg 40 uuf unbalanced.

HORIZONTAL DEFLECTION DATA

DEFLECTION FACTOR

AC AMPLIFIER (MAX GAIN): 0.7 rms.v per in.

DC AMPLIFIER (MAX GAIN): 2 DC v per in.

DIRECT TO DEFLECTION PLATES: 48 rms v per in. $\pm 20\%$.

SINUSOIDAL FREQUENCY RESPONSE: Identical to response of vertical deflection amplifiers.

INPUT IMPEDANCE

AMPLIFIER TERMINALS: 2 meg, 40 uuf.

TO DEFLECTION PLATES: 4 meg, 30 uuf balanced, 2 meg 40 uuf unbalanced.

LINEAR TIME-BASE

RECURRENT SWEEPS: 5 sec to 10 usec time intervals.

DRIVEN SWEEPS: 5 sec to 10 usec, sweep starts in 2 usec.

INTENSITY MODULATION

INPUT IMPEDANCE: 10000 ohms, 50 uuf.

SENSITIVITY: Input signal of 3 v peak amplitude for visible modulation of beam intensity.

POWER REQUIREMENTS: 115 or 230 v, 50 to 60 cps, 250 W.

250-AH

CATHODE-RAY OSCILLOGRAPH

MANUFACTURER'S OR CONTRACTOR'S DATA

Allen B. Dumont Laboratories, Inc, Clifton,
N. J.

REFERENCE DATA AND LITERATURE

Technical Manual for Type 250-A, Type 250-AH
Cathode-Ray Oscillographs.

TUBE AND/OR CRYSTAL COMPLEMENT

- (1) 5RP-A (1) 6AL5 (5) 12AU7
- (4) 6AG7 (7) 6AU6 (2) 6AQ5
- (1) OA3/VR75 (1) 6X4 (1) OA2
- (1) 5U4G (2) 2X2A

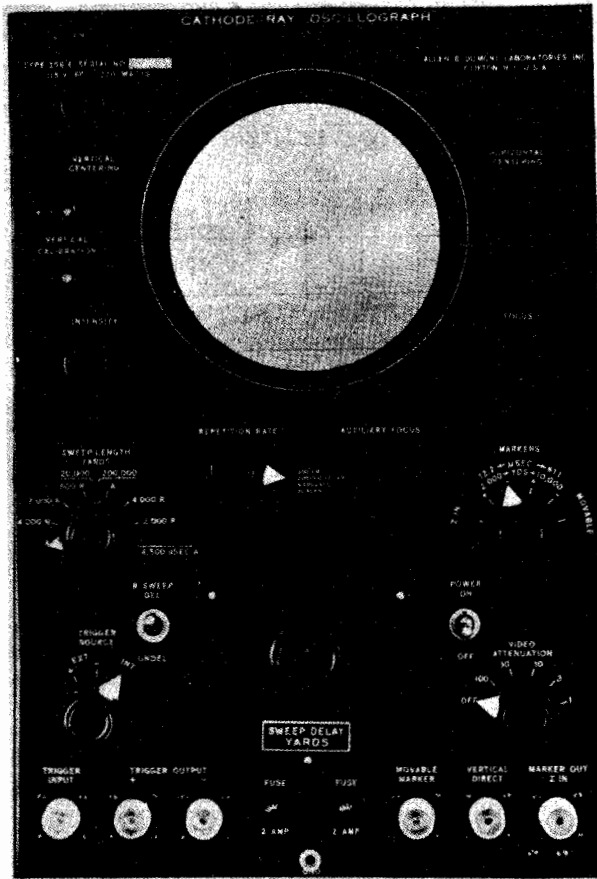
Total Tubes: (26)

TYPE CLASSIFICATION
DESIGN COGNIZANCE COMMERCIAL
PROCUREMENT COGNIZANCE
STOCK NO.
R.D.B. IDENT. NO.

EQUIPMENT SUPPLIED DATA

QUANTITY PER EQUIPT	NAME AND NOMENCLATURE	OVERALL DIMENSIONS (inches)	WEIGHT (lbs.)
1	Cathode-Ray Oscillograph Model 250-AH	11 x 15 x 19	68

CATHODE-RAY OSCILLOGRAPH



Cathode-Ray Oscilloscope 256-D, E

FUNCTIONAL DESCRIPTION

The Dumont Type 256-D is an auxiliary ranging unit and test oscilloscope which can be used with existing radar systems to increase their accuracy in ranging, extend their range scale, provide accurate crystal controlled markers, provide expanded, delayed or undelayed sweeps, and act as precision test oscilloscope and calibrator. By means of this unit, the accuracy in ranging is increased from plus or minus 2 to 3 percent as seen on the PPI, to plus or minus 0.1 percent when using the R Sweep, the expanded and delayed portion of the A Sweep which is a trace on the CR tube which starts simultaneously with the initiating trigger pulse. It can be used to align itself, and its calibration accuracy is assured by the locking of the trigger to the markers.

The Dumont Type 256-E is similar to the Model 256-D except that it is calibrated in yards instead of in microseconds.

No field changes in effect at time of preparation (26 April 1957).

ELECTRICAL AND MECHANICAL CHARACTERISTICS

A SWEEPS

256-D: 1000, 100, 25, 10, 4 usec and a 4500 usec sweep for observing entire duty cycle at repetition rates above 300 per sec.

256-E: 200000, 20000, 4000, 2000, 800 yds and a 4500 usec sweep for observing entire duty cycle at repetition rates above 300 per sec.

R SWEEPS

256-D: 25, 10, 4 usec which may be delayed to cover any portion of the 100 usec A sweep, 25 and 10 usec which may be delayed to cover any portion of the 1000 usec A sweep, delay is read directly on a dial with an accuracy of $\pm 0.1\%$ of full scale in the 4 to 100 usec or 5 to 1000 usec regions.

256-E: 4000, 2000, 800 yds which may be delayed to cover any portion of the 20000 yd A sweep, 4000 and 2000 yds which may be delayed to cover any portion of the 200000 yd A sweep, delay is read directly on a dial with an accuracy of $\pm 0.1\%$ of full scale in the 500 to 20000 yd or 1000 to 200000 yd regions.

INTERNALLY TRIGGERED OPERATION

TRIGGER OUTPUT

POSITIVE: 100 v peak.

NEGATIVE: 100 v peak.

TRIGGER RISE: 0.3 usec.

TRIGGER DURATION: 1.0 usec.

TRIGGER REPETITION RATE

256-D: 80 to 400 per sec on 1000 and 4500 usec range, 80 to 2000 per sec on 100 usec range.

256-E: 80 to 400 per sec on 200000 yd and 4500 usec range, 80 to 2000 per sec on 20000 yd range.

TIME AND RANGE MARKS (CRYSTAL CONTROLLED)

256-D: Each 10 and 50 usec, first 50 usec mark appears at 40 usec and each subsequent one 50 usec later.

256-E: Each 2000 and 10000 yds, first 10000 yd mark appears at 8000 yds and each subsequent one 10000 yds later.

MARK RISE: 0.25 usec.

MARK DURATION: 1.0 usec.

MARK ACCURACY: $\pm 0.02\%$.

EXTERNALLY TRIGGERED OPERATION

TRIGGER INPUT: ± 15 v min input necessary at 100 v per usec rise for accurate timing or ranging.

TRIGGER AMPLIFIER: Makes operation independent of waveform so that an input trigger rise of 10 v per usec will

Test-Wave Form Measuring

256-D, E

CATHODE-RAY OSCILLOGRAPH

trigger the sweep, but the instrument must be recalibrated for accurate timing or ranging.

POWER REQUIREMENTS: 115 v $\pm 10\%$, single ph, 60 cps, 220 W, usable to 1200 cps.

REPETITION RATE

256-D: 2000 max on 100 usec scale and and 400 max on 1000 usec scale.

256-E: 2000 max on 20000 yd scale and 400 max on 200000 yd scale.

TIME OR RANGE MARKS AVAILABLE: None.

MANUFACTURER'S OR CONTRACTOR'S DATA

Allen B, Dumont Laboratories, Inc, Clifton, N.J.

VERTICAL DEFLECTION DATA

DIRECT

DEFLECTION FACTOR: 79 DC v per inch $\pm 20\%$.

POLARITY: Positive signal deflects upward.

MAX SIGNAL PLUS DC INPUT: 600 v peak.

VIDEO AMPLIFIER

ATTENUATOR: 1:1, 3:1, 10:1, 30:1 and 100:1, stepped R-C compensated.

INPUT IMPEDANCE: 1 meg, 20 uuf.

GAIN: Approx 125.

SINEWAVE RESPONSE: Down 3 db at 8 mc, down 6 db at 11 mc.

PULSE RESPONSE: Sum of rise and fall times of a 1.0 usec pulse with rise and fall of 0.01 usec does not exceed 0.08 usec when passed thru video amplifier. 1000 usec pulse does not change vertical position of base line after pulse by more than 10% of the pulse height.

INPUT TO OVERLOAD: Approx 1 v with no attenuation.

DEFLECTION: 0.25 v rms with full video gain gives at least 1 inch deflection for type 256-D, 0.2 v with full video gain gives at least 3/4 inch deflection for type 256-E.

MAX SIGNAL PLUS DC INPUT: 600 v peak.

POLARITY: Positive signal deflects upward.

TUBE AND/OR CRYSTAL COMPLEMENT

(9) 6SN7GT	(2) 2X2A	(1) 6AC7
(2) 6H6	(1) 5CP1A	(1) 6AG7
(1) 5U4G	(1) 6AL5	(1) 807

Total Tubes: (19)

(1) 100KC

Total Crystals: (1)

REFERENCE DATA AND LITERATURE

NAVSHIPS 91578: Technical Manual for DuMont Types 256-D and 256-E Cathode-Ray Oscillographs.

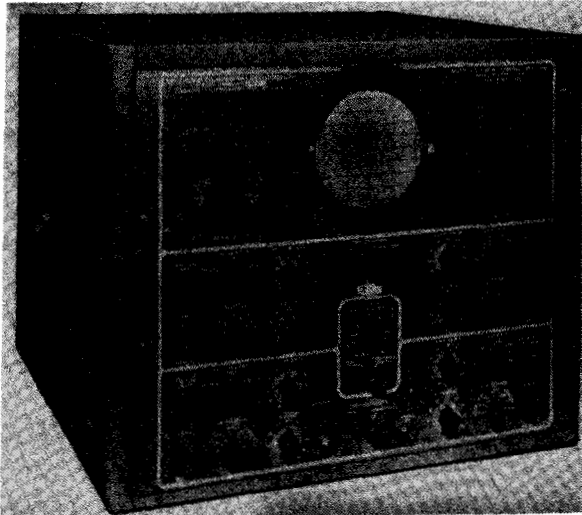
TYPE CLASSIFICATION DESIGN COGNIZANCE COMMERCIAL PROCUREMENT COGNIZANCE STOCK NO. R.D.B. IDENT. NO.

EQUIPMENT SUPPLIED DATA

QUANTITY PER EQUIPT	NAME AND NOMENCLATURE	OVERALL DIMENSIONS (inches)	WEIGHT (lbs.)
1	Cathode-Ray Oscillograph Model 256-D or Model 256-E	11-3/8 x 16-1/4 x 26	104

DUAL-BEAM CATHODE-RAY OSCILLOGRAPH

279



Dual-Beam Cathode-Ray Oscillograph 279

FUNCTIONAL DESCRIPTION

The Dumont Type 279 has been designed as a general purpose dual-channel instrument well suited to comparison of two waveforms on the same or independent time scales. Phase, amplitude, and frequency relationships are easily measured, and an expanded presentation of the initial portion of many types of signals can be viewed simultaneously with the entire waveform.

It utilizes the type 5SP2 dual-beam CR tube operated at a total accelerating potential of 4500 volts, producing a pattern of high brightness. Each beam is provided with separate controls for intensity, focus, and X and 6 position. Z-axis connections to the cathodes of the CR tube may be made through the input terminals located in the rear to permit intensity modulation. There are no Z-axis amplifiers.

Identical linear time-bases are provided for each beam which consist of gas-triode sweep generators having continuous sweep frequencies between 2 and 30,000 cps. Single sweep is also available with automatic beam control so that the spot is extinguished except during active sweep time. It is ideally suited for photographic work or observation of single transients with relatively high writing rates.

It is portable with carrying handles, but may be removed from its cabinet for standard rack mounting.

No field changes in effect at time of preparation (26 April 1957).

ELECTRICAL AND MECHANICAL CHARACTERISTICS

INPUT CIRCUITS

X AND Y AXIS AMPLIFIERS

INPUT COUPLING: Capacitive or conductive.

ATTENUATORS: 1:1, 10:1, 100.1 stepped, 10:1 variable.

IMPEDANCE: 2 meg, 60 uuf.

DIRECT TO DEFLECTION PLATES

INPUT COUPLING: Capacitive.

IMPEDANCE: 1 meg, 20 uuf single-ended, 2 meg, 20 uuf balanced.

Z AXIS

INPUT COUPLING: Capacitor to CRT cathode.

POLARITY: Positive signal decreases intensity.

IMPEDANCE: 10000 ohms, 40 uuf.

LINEAR TIME-BASE

FREQUENCY RANGE: 2 to 30000 sawtooth cps.

SWEEP RECURRENCE: Single or continuous.

COMMON SWEEP: Provision made for Sweep A to deflect both beams simultaneously with correction to allow superposition of time-base traces.

BLANKING

CONTINUOUS SWEEP: Return trace blanked.

SINGLE SWEEP: Beam on only during sweep.

SYM CIRCUITS

SIGNAL SOURCES: Internal (Y-axis), external, or power line frequency.

USABLE SYNC SIGNAL POLARITY: Positive or negative.

SWEEP OUTPUT: Sweep A at front panel terminal.

AMPLIFIERS

RESPONSE (NO POSITIVE SLOPE ABOVE 1000 CPS)

LOW FREQUENCY CAPACITIVE INPUT: Sine wave 1 db at 10 cps, square wave 10% saw at 10 cps.

LOW FREQUENCY DIRECT INPUT: Sine wave flat to DC.

HIGH FREQUENCY Y-AXIS: Sine wave 1 db at 100 kc, 3 db at 200 kc, square wave no distortion at 20 kc.

HIGH FREQUENCY X-AXIS (INDIVIDUAL): Sine wave 1 db at 70 kc, 3 db at 150 kc, square wave no distortion at 10 kc.

Test-Wave Form Measuring

279

**DUAL-BEAM CATHODE-RAY
OSCILLOGRAPH**

HIGH FREQUENCY X-AXIS (A-COMMON): Sine wave 1 db at 40 kc, 3 db at 70 kc, square wave no distortion at 5 kc.

(1) 2X2A	(1) 6B4G	(4) 6SN7
(1) 3B24	(1) 6H6	(4) 6SJ7
(1) 5U4G	(4) 6J5	(1) 6X5GT
(1) 5SP2A	(2) 6Q5G	

VOLTAGE CALIBRATION

AVAILABILITY: Either Y-axis through input attenuator but not simultaneously.

VOLTAGE: 0.1, 1, 10, 100 v ±5%.

WAVEFORM: Square-wave at line frequency.

POWER REQUIREMENTS: 115 or 230 v rms ±10%, 50 to 60 cps, 300 W.

Total Tubes: (30).

Total Crystals: (None)

REFERENCE DATA AND LITERATURE

NAVSHIPS 91150: Technical Manual for Type 279 Dual-Beam Cathode-Ray Oscillograph.

MANUFACTURER'S OR CONTRACTOR'S DATA

Allen B. Dumont Laboratories, Inc, Clifton, N. J.

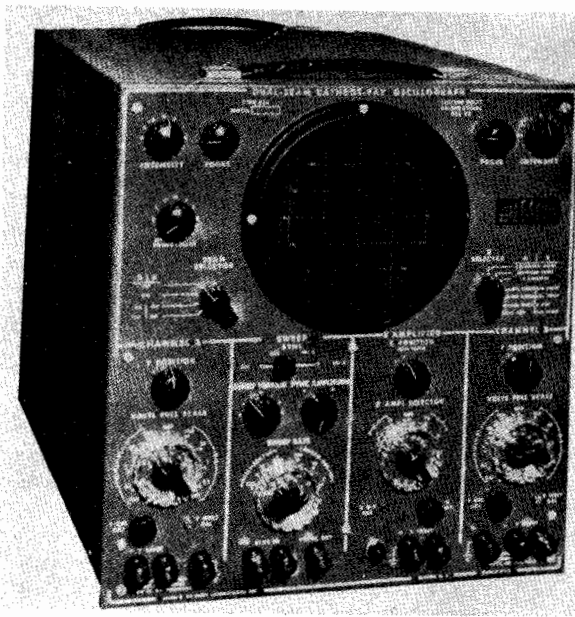
TYPE CLASSIFICATION
DESIGN COGNIZANCE COMMERCIAL
PROCUREMENT COGNIZANCE
STOCK NO.
R.D.B. IDENT. NO.

TUBE AND/OR CRYSTAL COMPLEMENT

(2) OD3 (8) 6AG7 (2) 6SL7

EQUIPMENT SUPPLIED DATA

QUANTITY PER EQUIPT	NAME AND NOMENCLATURE	OVERALL DIMENSIONS (inches)	WEIGHT (lbs.)
1	Oscillograph Type 279	17 x 21-3/4 x 22-1/4	125

DUAL-BEAM CATHODE-RAY OSCILLOGRAPH**333**

Dual Beam Cathode-Ray Oscilloscope 333

FUNCTIONAL DESCRIPTION

The DuMont Type 333 is designed for viewing two separate waveforms at the same time or for viewing an expanded portion of a given wave simultaneously with the complete waveform. It is a portable instrument designed for modern, general-purpose oscillography requiring the simultaneous comparison of various waveforms in complex circuits, thus eliminating the necessity of making photographic recordings of the various phenomena for comparison purposes.

No field changes in effect at time of preparation (11 June 1958).

ELECTRICAL AND MECHANICAL CHARACTERISTICS

PRESENTATION: 5 in. CR tube.

VERTICAL DEFLECTION DATA

INPUT COUPLING

THRU AMPLIFIER

SINGLE-ENDED SIGNALS: Direct or thru capacitor.

BALANCED SIGNALS: Only in 0.1 and 0.01 DC position of Full Scale Volt Switch and all Multiplier settings.

DIRECT: Thru capacitors.

INPUT SIGNAL RANGE

SINGLE-ENDED SIGNALS

RANGE: 4 mv to 400 v full scale.

MAX GRID SIGNAL: 0.8 v peak-to-peak at all Volts Full Scale settings.

BALANCED SIGNALS

RANGES: 400, 200, 100, 40, 20, 10, and 4 mv full scale.

MAX COMMON MODE SIGNAL: 0.4 v minus peak amplitude of observed signal.

MAX GRID-TO-GRID SIGNAL: 0.8 v peak-to-peak.

INPUT IMPEDANCE (MAX)

DIRECT TO DEFLECTION PLATE

SINGLE-ENDED: 2 meg, 15 uuf.

BALANCED: 4 meg, 15 uuf.

DEFLECTION FACTOR

AMPLIFIER (FULL GAIN): 10 mv DC or peak-to-peak full scale, 4mv at reduced performance.

DEFLECTION PLATES: 120 v DC or peak-to-peak $\pm 10\%$ for full scale deflection.

VERTICAL CALIBRATION ACCURACY: $\pm 5\%$ of full scale deflection.

VERTICAL POSITIONING: Permits 4 times full scale expansion of any portion of signal.

SINUSOIDAL FREQUENCY RESPONSE (TO SENSITIVITY AT 1 KC)

HIGH FREQUENCY SCALES (FULL SCALE)

100 MV TO 400 V: Less than 30% down at 300 kc.

10 MV TO 100 MV: Improves from 30% down at 100 kc to 30% down at 300 kc as range is increased.

4 MV SCALE: Less than 30% down at 60 kc.

LOW FREQUENCY

DIRECT COUPLED: Flat from DC to specified upper frequency limit.

CAPACITIVELY COUPLED: Down not more than 30% at 1 cycle.

PULSE RESPONSE DATA

RISE TIME: Less than 1 usec at all full scale positions at or over 400 mv, increases to 5 usec at 4 mv sensitivity.

OVERSHOOT: Less than 2%.

DECAY AT TOP

CAPACITIVELY COUPLED: Less than 10% in 45 millisecond.

April 1958

Test-Wave Form Measuring

333

DUAL-BEAM CATHODE-RAY OSCILLOGRAPH

DIRECT COUPLED: Less than 2% of deflection in 5 sec.

AMPLITUDE CALIBRATION

WAVEFORM: Flat top with max ratio of periods of 2 to 1.

FREQUENCY: Power line.

AMPLITUDE: 0.4 v \pm 2%.

HORIZONTAL DEFLECTION DATA

HORIZONTAL AMPLIFIER

INPUT ATTENUATION: Factors of 1 or 10 for single-ended external signals.

INPUT COUPLING: Capacitively or direct.

MAX INPUT IMPEDANCE

DIRECT TO DEFLECTION PLATES

SINGLE-ENDED: 2 meg, 15 uuf.

BALANCED: 4 meg, 15 uuf.

SINUSOIDAL FREQUENCY RESPONSE (TO SENSITIVITY AT 1 KC)

LOW FREQUENCY

DIRECT COUPLED: Flat to DC.

CAPACITIVELY COUPLED: Down not more than 30% at 1 cycle.

HIGH FREQUENCY: Down not more than 30% at 300 kc.

DEFLECTION FACTOR

AMPLIFIER (FULL GAIN): 3 v DC or peak-to-peak full scale.

DEFLECTION PLATES: 200 v DC or peak-to-peak \pm 10% for full scale deflection.

POSITIONING

EXPANDED SIGNAL: Permits examination of any portion of the X-signal or uncalibrated sweep expanded to 5 times full scale.

NO-SCREEN DISPLAY LINEARITY: Any 10% increment within 10% of any other 10% increment within 4-inch full scale limit, reduced performance at 1 and 2 usec per major division sweep rates.

LINEAR-SWEEP TIME BASE

CIRCUIT: Driven or recurrent vacuum tube direct coupled high-level sweep.

SWEEP-WRITING RATE

CALIBRATED: 100 msec to 2 usec per inch in fixed steps.

UNCALIBRATED: 1 sec to 3 usec per inch, continuously variable.

FIXED SWEEP POSITIONING: \pm 0.5 in.

SWEEP LENGTH

FIXED: 4 in. \pm 0.5 in.

VARIABLE: 20 in. max except at 1

and 2.5 usec per in.; 1.5 in. min.

SWEEP STARTING POINT SHIFT

FIXED SWEEP RATE: 0.05 in. with varying trigger rate.

RANGE TO RANGE: 0.01 in.

LINEARITY

FIXED SWEEP: Any 10% increment is within 5% of any other 10% increment.

VARIABLE SWEEP: Any 10% increment is within 15% of any other 10% increment except the first half usec which may degrade to 20%, up to 2 usec per major division.

SWEEP BEAM GATE: Automatic beam brightening during forward sweep; not disabled when using X-amplifier for external signals.

SYNCHRONIZATION

SOURCES: External signal, power-line signal, internal Y-amplifier A, and internal Y-amplifier B.

POLARITY: Positive or negative.

SENSITIVITY

INTERNAL SYNC: Sweep will synchronize on 2.5 divisions of vertical deflection (min).

EXTERNAL SYNC: Sweep will synchronize on 2 v peak (min).

SIGNAL TYPE: Sine wave of 2 cps to 100 kc, pulses of 0.023 usec to 20 msec per v rise; can be synchronized to 500 kc in recurrent mode.

INTENSITY MODULATION DATA

AVAILABILITY: Terminal on rear deflection board.

INPUT IMPEDANCE: 39000 ohms, 20 uuf.

FREQUENCY RESPONSE: 30% down at 250 cps and 10 mc.

POLARITY AND SENSITIVITY: Positive signals decrease beam intensity; 2 to 56 v peak will blank the beam depending upon intensity control setting.

BEAM CONTROL CIRCUIT: Turns both beams on or off and either of two on and off.

POWER REQUIREMENTS: 115 or 230 v \pm 10%, 50 to 400 cps, single ph, approx 280 W, 310 va at nom line voltage.

MANUFACTURER'S OR CONTRACTOR'S DATA

Allen B. DuMont Laboratories, Inc, Clifton, New Jersey.

Contract NObsr-75225, dated 15 May 1958.

UNCLASSIFIED

April 1958

Test-Wave Form Measuring

DUAL-BEAM CATHODE-RAY OSCILLOGRAPH

333

Approximate Cost: \$1130.00 with equipment spares.

(2) 1N69
Total Crystals: (2)

TUBE AND/OR CRYSTAL COMPLEMENT

- (1) OA2
- (1) 5U4GA
- (2) 6AQ5
- (2) 6J6
- (3) 6U8
- (3) 12AT7
- (1) 5651
- (2) 4H3
- (1) 18-3
- (2) 1X2A
- (2) 6AL5
- (1) 6AS7G
- (4) 6CL6
- (4) 12AU6
- (10) 12AU7
- (1) 5ARP1 or 5ARP2 or 5ARP7 or 5ARP11

Total Tubes: (40)

REFERENCE DATA AND LITERATURE

NAVSHIPS 92885: Technical Manual for DuMont Type 324/324-R Single Beam and Type 333 Dual-Beam Cathode-Ray Oscillographs.

TYPE CLASSIFICATION
DESIGN COGNIZANCE
PROCUREMENT COGNIZANCE COMMERCIAL
STOCK NO.
R.D.B. IDENT. NO.

SHIPPING DATA

NUMBER OF BOXES	CONTENTS AND IDENTIFICATION	VOLUME (Cu.Ft.)	OVERALL DIMENSIONS (inches)	WEIGHT PACKED (lbs.)
1	Dual-Beam Cathode-Ray Oscillograph Type 333		14 X 14-5/8 X 20-1/4	50
2	Technical Manual NAVSHIPS 92885		1/4 X 8-1/2 X 11	

UNCLASSIFIED

March 1957

OSCILLOSCOPE**505****FUNCTIONAL DESCRIPTION**

The 505 (Hickok) is a portable electronic device designed to display the waveform of varying electrical potential and can be used to determine causes of trouble in receivers, visually analysis each section of a receiver, align IF and RF transformers and discriminator circuits, trace a signal through a receiver and check for gain.

No field changes in effect at time of preparation (17 October 1956).

X-AXIS: 4 meg, 25 uuf.

Y-AXIS: 1 meg, 25 uuf.

PRESENTATION: 5 in. CR tube.

POWER REQUIREMENTS: 105 to 125 v, 50 to 70 cps, single ph, 75 W at 115 v.

MANUFACTURER'S OR CONTRACTOR'S DATA

Hickok Electrical Instrument Co, Cleveland, Ohio

TUBE AND/OR CRYSTAL COMPLEMENT

No Electron Tubes.

ELECTRICAL AND MECHANICAL CHARACTERISTICS**SWEEP DATA**

FREQUENCY RANGE: 10 to 25000 cps.

DEFLECTION SENSITIVITY DATA**THRU AMPLIFIER**

VERTICAL: 0.09 v rms per in.

HORIZONTAL: 0.2 v rms per in.

DIRECT TO PLATE: 15 v rms per in (vertical and Horizontal)

FREQUENCY RESPONSE DATA

VERTICAL: 30 cps to 1 mc.

HORIZONTAL: 10 cps to 50 kc.

IMPEDANCE DATA (AMPLIFIER INPUT)**REFERENCE DATA AND LITERATURE**

NAVSHIPS 900,155 VOL I: Electronic Test Equipment Handbook.

TYPE CLASSIFICATION

DESIGN COGNIZANCE COMMERCIAL

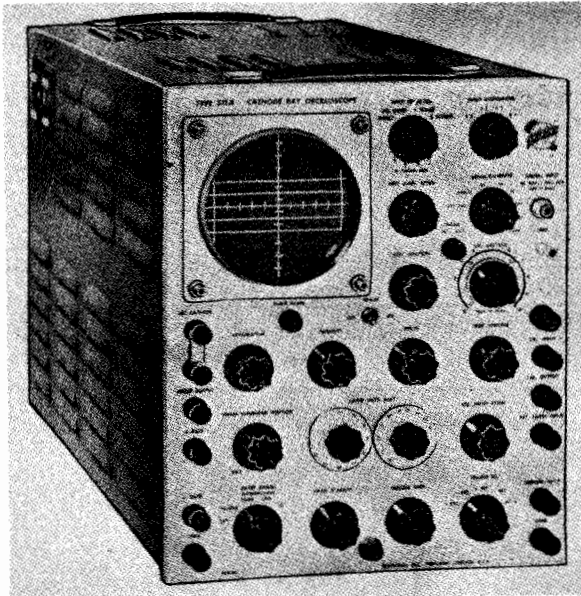
PROCUREMENT COGNIZANCE

STOCK NO.

R.D.B. IDENT. NO.

EQUIPMENT SUPPLIED DATA

QUANTITY PER EQUIPT	NAME AND NOMENCLATURE	OVERALL DIMENSIONS (inches)	WEIGHT (lbs.)
1	Oscilloscope Hickok Model 505	11-1/2 X 14 X 19	35
1	Screen, Calibration		
1	Shield, Light, Retractable		



Oscilloscope 511A

FUNCTIONAL DESCRIPTION

The Tektronix Type 511-A is a wide range, portable oscilloscope, making possible the observation of a wide variety of electrical waveshapes. It is primarily intended for laboratory and shop use, in the development and testing of all types of electronic equipment.

No field changes in effect at time of preparation (18 May 1956).

RELATION TO OTHER EQUIPMENT

Same as 511-AD except does not contain Tektronix Type 1-AD-25 Delay Network.

ELECTRICAL AND MECHANICAL CHARACTERISTICS

OBSERVED SIGNALS

SINE WAVES: 10 cps to 10 mc.

PULSES: 0.1 usec to 1/50 sec.

SWEEP CIRCUIT: Hard tube type, either triggered or recurrent.

SWEEP SPEEDS: Continuously variable from 0.01 sec/cm to 0.1 usec/cm.

TRIGGER DATA: 0.5 to 50 v (peak) sine wave or pulse of either polarity; pulse as short as 0.05 usec will trigger satisfactorily; for triggering single sweeps a 3 v battery and key is suitable.

SWEEP LAG: CRT is unblanked and sweep is operating linearly in less than 0.1 after receipt of a infinitely sharp trigger pulse.

SWEEP MAGNIFICATION: Any 20% of sweep can be spread over the entire trace except for sweep speeds faster than 0.5 usec/cm.

EXTERNAL SWEEP INPUT

DC COUPLED: By a 100 K potentiometer and sweep amplifier.

DEFLECTION SENSITIVITY (MAX): 1.5 v/cm DC or peak to peak AC.

BANDWIDTH: DC to 800 kc (3 db down at 800 kc).

VERTICAL DEFLECTION SENSITIVITY

WITHOUT AMPLIFIER: 27 v/cm max, 200 v/cm minimum, DC or peak to peak AC.

ONE STAGE: 2.7 v/cm max, 40 v/cm minimum.

TWO STAGES: 0.27 v/cm max, 4 v/cm minimum

PROBE: Sensitivity is reduced by a factor of 10 when probe is used.

INPUT ATTENUATOR: Frequency compensated RC type with attenuation ratios of 2, 4 and 8.

INPUT IMPEDANCE: 1 meg shunted by 40 uuf ($\pm 5\%$) for any setting of the input selector and input attenuator; with probe, 10 meg shunted by 14 uuf.

VERTICAL AMPLIFIER

BANDWIDTH: 1 stage down 3 db (max) (from 1 mc response) at 5 cps and 10 mc; 2 stages, down 3 db (max) (from 1 mc response) at 5 cps and 8 mc.

TRANSIENT RESPONSE

RISE TIME: 1 stage 0.04 usec (10% to 90%); 2 stages 0.05 usec (10% to 90%).

CALIBRATING VOLTAGE: Sine wave of power line frequency. Three ranges 0 to 1, 10, 100 v peak to peak. Accuracy for line voltage of 117 v is $\pm 5\%$ of full scale.

EXTERNAL WAVE FORMS: Sweep sawtooth, 20 v peak; positive and negative gate, 40 v peak (same duration as sweep).

POWER REQUIREMENTS: 105 to 125 v or 210 to 250 v, 50 to 60 cps, 230 W.

MANUFACTURER'S OR CONTRACTOR'S DATA

Tektronix Inc., Portland, Oregon.

TUBE AND/OR CRYSTAL COMPLEMENT

(2) 6AC7	(7) 6AG7	(3) 6AL5	(4) 6C4
(1) 6J6	(4) 6AU6	(1) 5CP1A	(2) 6X4
(2) 5V4G	(2) 6AQ5	(1) 5651	(1) VR150
(2) 1B3GT/8016	(1) 6AS7G		

Total Tubes: (33)

511A

CATHODE-RAY OSCILLOSCOPE

September 1956

REFERENCE DATA AND LITERATURE

NAVSHIPS 91273: Technical Manual for Oscilloscope Type 511A.

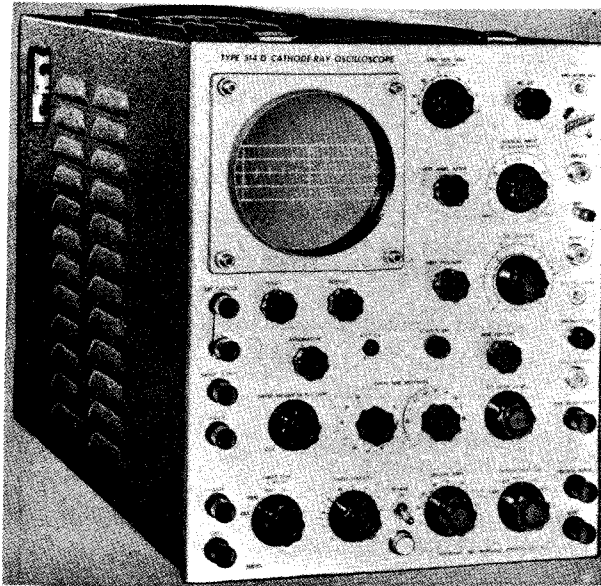
TYPE CLASSIFICATION
DESIGN COGNIZANCE
PROCUREMENT COGNIZANCE
STOCK NO.
R.D.B. IDENT. NO.

EQUIPMENT SUPPLIED DATA

QUANTITY PER EQUIPT	NAME AND NOMENCLATURE	OVERALL DIMENSIONS (inches)	WEIGHT (lbs.)
1	Oscilloscope CBTV-511A	12-1/2 X 15-1/2 X 21-1/2	

April 1958

OSCILLOSCOPE

Test-Wave Form Measuring
514-AD (TEKTRONIX)

Oscilloscope 514-AD

FUNCTIONAL DESCRIPTION

The type 514-AD (Tektronix) is a self-contained general purpose precision instrument designed specifically to incorporate the advantages of direct coupling, excellent transient response, high gain and portability by the use of distributed amplifier techniques.

The accurate measurements of timing and amplitude are obtained with carefully calibrated controls by use of precision and matched components in fully compensated circuits.

The vertical deflection system permits the display of a wide range of signal amplitude without distortion by using a high gain amplifier and inserting precision, frequency compensated attenuator networks permitting a range in vertical deflection sensitivity of 0.03 volts per centimeter to 100 volts per centimeter.

The sweep-circuit system is a highly adaptable system operating over a wide range of sweep rates, which can be triggered from a versatile trigger selector system, offering convenient adaptation to the test conditions.

The sweep generating circuitry is such that a slight adjustment of the sweep stability control is sufficient to obtain either recurrent or triggered sweeps.

No field changes in effect at time of preparation (19 March 1958).

RELATION TO OTHER EQUIPMENT

The type 514A Cathode Ray Oscilloscope is identical to the Type 514AD except that the 0.25 usec Signal Delay Network is omitted.

ELECTRICAL AND MECHANICAL CHARACTERISTICS

SWEEP CIRCUIT: Hard tube type, single sweep, triggered or recurrent operation as desired.

SWEEPS: Continuously variable, 0.01 sec/cm to 0.1 usec/cm, $\pm 5\%$ calibration accuracy.

TRIGGER REQUIREMENTS (EXTERNAL)

SINE WAVE: 0.15 to 15 v peak.

PULSES: 0.15 to 15 v, as short as 0.05 usec.

SIGNAL DEFLECTION: Under observation producing 5 mm or more.

SWEEP LAG: 0.1 usec max.

SWEEP MAGNIFICATION: 5 times indicated sweep, except on fastest range.

EXTERNAL SWEEP INPUT: DC coupled via 100000 ohm potentiometer and sweep amplifier, 1.5 v/cm deflection sensitivity.

VERTICAL AMPLIFIER: 4 stages, 3rd & 4th stage are direct coupled push-pull, also distributed output for 4th stage.

VERTICAL DEFLECTION SENSITIVITY

AC: 0.3v/cm to 100v/cm peak to peak continuously variable.

DC: 0.3v/cm to 100v/cm continuously variable.

INPUT IMPEDANCE: 1 megohm shunted by 40 uaf; with probe, 10 megohms shunted by 14 uaf.

VERTICAL AMPLIFIER RESPONSE: DC to 10 mc, sensitivity of 0.3v/cm or lower; 2 cps to 10 mc, sensitivity of 0.03 v/cm to 3v/cm.

VERTICAL AMPLIFIER TRANSIENT RESPONSE: Rise time (10 to 90%) 0.04 usec.

SIGNAL DELAY NETWORK: Provides 0.25 usec signal which permits observation of the wave form that triggers the sweep.

CALIBRATING VOLTAGE DATA

TYPE: Variable duty cycle square wave.

RANGES: 7 ranges, 0.05 v to 50 v full scale (continuously variable).

ACCURACY: Within 2% of full scale.

DUTY CYCLE: 2 to 98% variable.

OUTPUT WAVEFORMS: Sweep sawtooth, positive

Test-Wave Form Measuring

514-AD (TEKTRONIX)**OSCILLOSCOPE**

April 1958

gate, negative gate, square wave calibration signal.

PRESENTATION: 5 in. CR tube.

POWER SOURCE REQUIRED: 105 to 125 v or 210 to 250 v, 50 to 60 cps, 360 W.

(1) 12AX7

(1) 6AS7

(2) 6AS5

(1) OD3

Total Tubes: (54)

(3) 5642

(1) 12AU6

(3) 6U8

No Crystals used.

MANUFACTURER'S OR CONTRACTOR'S DATA

Tektronix, New York, New York.
Contract: NObsr-63237.

REFERENCE DATA AND LITERATURE

Instruction Manual for Cathode-Ray Oscilloscope Tektronix type 514AD.

TUBE AND/OR CRYSTAL COMPLEMENT

(2) 6AC7

(2) 6AL5

(5) 12AT7

(3) 12AU7

(9) 6AG7

(1) 6C4

(1) 6J6

(8) 6AU6

(2) 6CB6

(2) 6X4

(2) 6AQ5

(1) 5ABP1

(3) 5V4

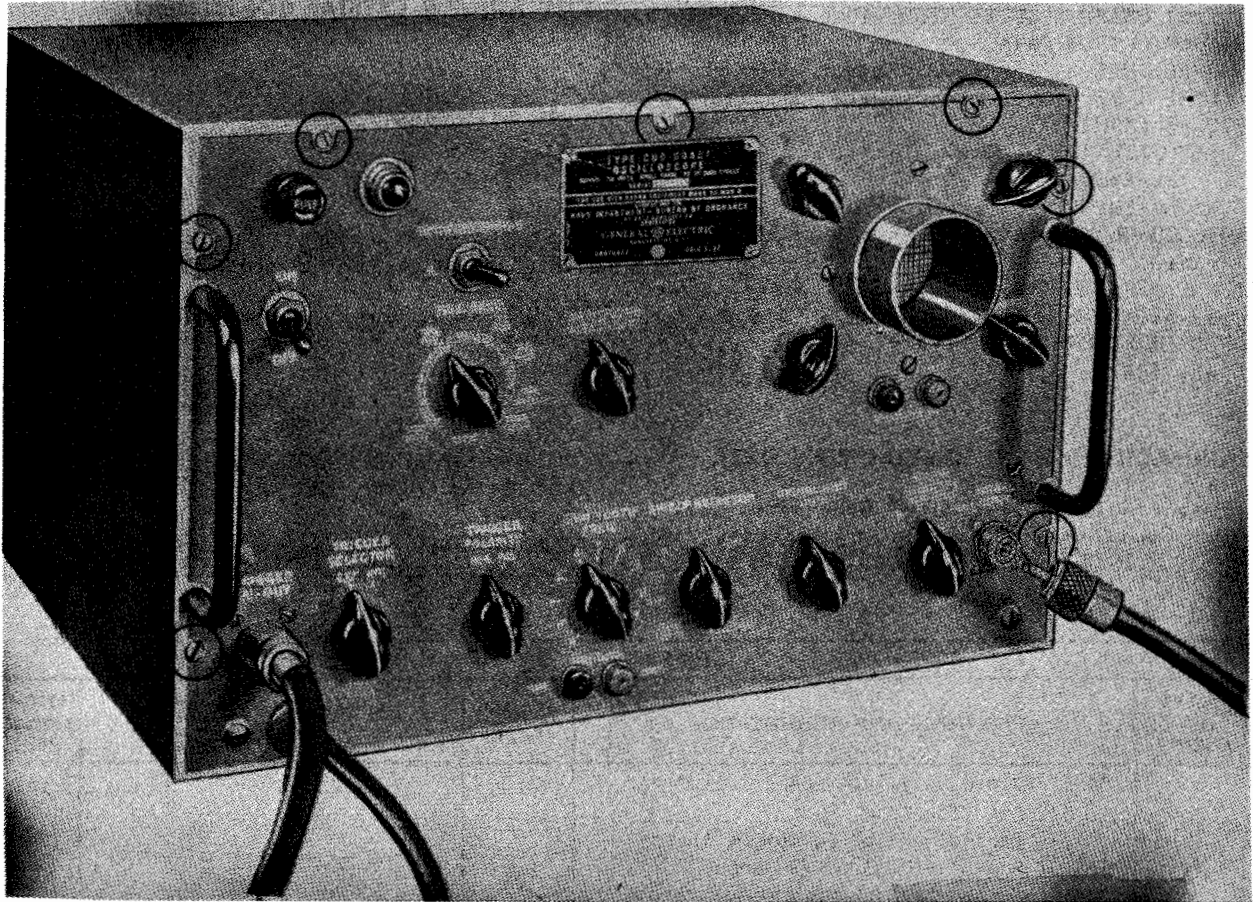
(1) 5651

TYPE CLASSIFICATION
DESIGN COGNIZANCE
PROCUREMENT COGNIZANCE
STOCK NO.
R.D.B. IDENT. NO.

EQUIPMENT SUPPLIED DATA

QUANTITY PER EQUIPT	NAME AND NOMENCLATURE	OVERALL DIMENSIONS (inches)	WEIGHT (lbs.)
1	Cathode Ray Oscilloscope 514-AD	12-1/2 x 15-1/2 x 24-1/2	60

April 1958

TEST OSCILLOSCOPE**60ACF***Test Oscilloscope 60ACF***FUNCTIONAL DESCRIPTION**

The Navy Type 60ACF is a portable instrument designed for viewing and measuring voltage waveforms. It will show continuous-wave signals at frequencies from about 25 cycles to 2.5 megacycles, and pulse signals of 0.25 to 1000 microseconds. The determination of voltage amplitude and of input frequency or pulse width may be made directly on a transparent graph provided over the screen. It includes an internal triggering circuit, used to initiate the triggered sweeps when no external pulse or trigger is used, and both the internal trigger and the sawtooth sweep voltage are available as outputs for use in other equipment. The slower sweeps are based on a conventional sawtooth oscillator and its amplifier circuit.

No field changes in effect at time of preparation (21 November 1957).

RELATION TO OTHER EQUIPMENT

The Navy Model 60ACF has been superseded by Oscilloscope AN/USM-24.

ELECTRICAL AND MECHANICAL CHARACTERISTICS**VIEWING RANGES**

CONTINUOUS WAVE: 25 cps to 2.5 mc.

SAWTOOTH: 3000 cps max.

PULSE DURATION: 0.25 to 1000 usec.

SWEEP RANGES

SAWTOOTH: 25 to 75, 75 to 210, 210 to 900, 900 to 3000 cps.

60ACF

TEST OSCILLOSCOPE

April 1958

FAST SWEEP: 4, 15, 250, 1000 usec.
 TRIGGER OUTPUT DATA
 AMPLITUDE: +150 v or -75 v.
 RISE TIME: 0.75 usec to max amplitude.
 TRIGGER INPUT DATA
 AMPLITUDE: 10 to 150 v, positive or negative.
 RISE TIME: 10 v per usec min.
 SAWTOOTH OUTPUT: 250 v over entire frequency range.
 SIGNAL AMPLIFIER GAIN: 5 at 30 cps, 14 or 15 at 500 cps to 1.5 mc, 11 at 2.5 mc.
 POWER REQUIREMENTS: 115 v, 60 cps, single ph, 100 W.

TUBE AND/OR CRYSTAL COMPLEMENT

(1) 2AP1 (4) 6SN7
 (2) 5Y3GT (1) 884
 (1) 6AC5
 Total Tubes: (9)
 No Crystals.

REFERENCE DATA AND LITERATURE

NAVSHIPS 900569: Technical Manual for Test Oscilloscope Navy Type CUO-60ACF.

MANUFACTURER'S OR CONTRACTOR'S DATA

Maguire Industries, Inc, Greenwich, Conn.
 Contract NOrd-5232, dated 21 January 1944.

TYPE CLASSIFICATION
 DESIGN COGNIZANCE BUORD
 PROCUREMENT COGNIZANCE 3.1
 STOCK NO.
 R.D.B. IDENT. NO.

SHIPPING DATA

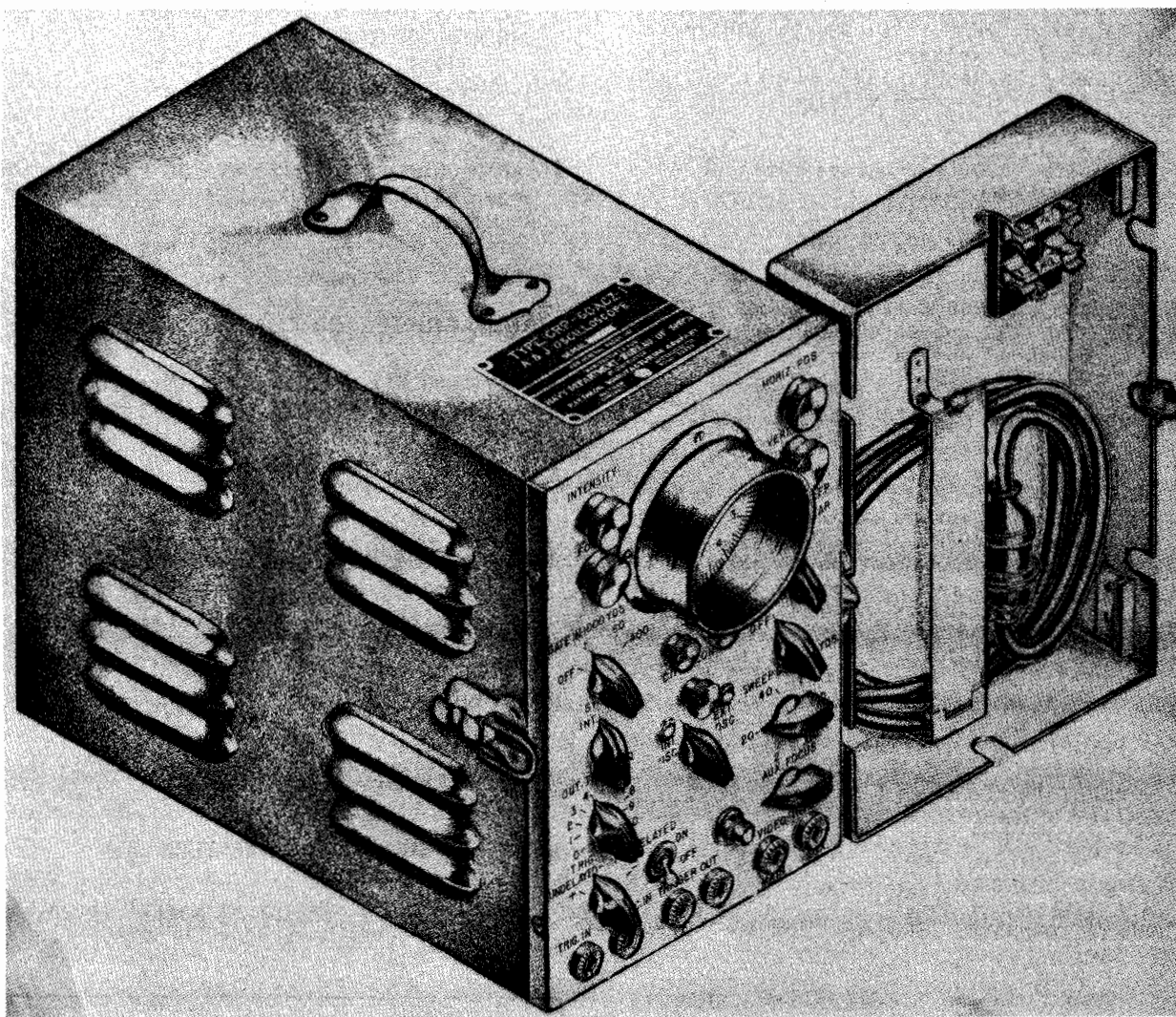
NUMBER OF BOXES	CONTENTS AND IDENTIFICATION	VOLUME (Cu.Ft.)	OVERALL DIMENSIONS (inches)	WEIGHT PACKED (lbs.)
1	Oscilloscope Navy Type 60ACF including: (1) Carrying Case (1) Partial Set of Equipment Spares	6.0	17 X 19 X 32	108
1	Set of Equipment Spares (Balance)	3.0	14 X 16 X 23	52

EQUIPMENT SUPPLIED DATA

QUANTITY PER EQUIPT	NAME AND NOMENCLATURE	OVERALL DIMENSIONS (inches)	WEIGHT (lbs.)
1	Oscilloscope Navy Type 60ACF	9-5/8 X 12-1/8 X 15	45
1	Carrying Case including: (1) Partial Set of Equipment Spares	12-1/4 X 14-1/4 X 27-1/2	30
1	Set of Equipment Spares (Balance)	6 X 10-1/2 X 17	35

OSCILLOSCOPE

60ACZ-1



Oscilloscope NT-60ACZ-1

FUNCTIONAL DESCRIPTION

The Navy Type 60ACZ-1 is a portable instrument designed for calibrating the marker and ranging circuits in various types of radar equipment that use a 2000 yard radar mile. It can be used for calibrating ranging units or markers based on the nautical mile by replacing the crystal with one which oscillates at 161.72 kilocycles.

It gives either a linear (A) or a circular (J) presentation and is useful as a general test synchroscope. It will accept or supply both positive and negative triggers for

synchronization of external equipment under test or calibration. The oscillator supplies accurately spaced markers and generates the circular sweep, thus accurately synchronizing the markers and sweep.

No field changes in effect at time of preparation (6 May 1958).

ELECTRICAL AND MECHANICAL CHARACTERISTICS

PRESENTATION: 3 in. CR tube.

Test-Wave Form Measuring
60ACZ-1

OSCILLOSCOPE

CRYSTAL OSCILLATOR ACCURACY(CIRCULAR SWEEP)
NORMAL-SIZE SWEEP: 163.934 kc ±30 cps at 115 v line voltage.

EXTREME-SIZE SWEEP: 163.934 kc ±50 cps at 115 v ±10% line voltage.

SWEEP DATA

CIRCULAR(J)

LENGTH: 1000 yds per revolution.

INTENSIFYING GATE

DELAY: 700 to 100000 yds.

WIDTH: 750 to 990 yds.

LINEAR(A)

LENGTH: 1000 yds (actually 750 to 990 yds); 60000 and 400000 yds -10% +25%.

DELAY: 700 to 100000 yds for 1000 and 60000 yd sweeps only.

DEFLECTION DATA

DIRECT

DEFLECTION FACTOR: Approx 150 v per in. peak to peak.

POLARITY

CIRCULAR SWEEP: Positive signal gives inward deflection.

LINEAR SWEEP: Positive signal gives upward deflection to main video input jack, downward deflection to auxiliary video input jack.

INPUT IMPEDANCE: 1 meg.

WITH VIDEO AMPLIFIER

AMPLIFIER GAIN: 25 db at 100 kc.

SINE-WAVE RESPONSE: 25 +3 db from 60 cps to 2 mc.

POLARITY: Opposite to direct deflection.

INPUT IMPEDANCE: 1 meg.

INTERNALLY TRIGGERED OPERATION

TRIGGER OUTPUT: Undetermined, positive and negative, min of 75 v peak.

TRIGGER DURATION: 1 usec.

RISE TIME: 0.4 usec.

REPETITION RATE: 300 pps -20% to 750 pps +30%.

RANGE MARKS

TYPE: Crystal controlled, 1000 yd positive and negative.

OUTPUT: 15 v peak to peak.

DURATION: 1usec at 70% peak amplitude.

EXTERNALLY TRIGGERED OPERATION

TRIGGER INPUT

AMPLITUDE: 5 to 50 v.

DURATION: 0.25 to 20 usec.

REPETITION RATE

1000 YD SWEEP: 2000 pps max.

6000 YD SWEEP: 400 pps max.

400000 YD SWEEP: 200 pps max.

RANGE MARKS: None.

POWER REQUIREMENTS: 115 or 230 v, 50 to 400 cps, 98 W.

CURRENT AND POWER FACTOR

115 V: 0.89 amps, 102 va, 96% pf.

230 V: 0.48 amps, 110 va, 89% pf.

MANUFACTURER'S OR CONTRACTOR'S DATA

Raytheon Mfg Co., Waltham, Mass.

Contract NObsr-30225, dated 28 June 1946.

Approximate Cost: \$1500.00 with equipment spares.

TUBE AND/OR CRYSTAL COMPLEMENT

(1) 2X2A (1) 3DP1A

(1) 5Y3WGTB (1) 6AG7Y

(7) 6SN7WGTA

Total Tubes: (11)

(1) 1N34 (1) 163.934KC

Total Crystals: (2)

REFERENCE DATA AND LITERATURE

NAVSHIPS 900983: Technical Manual for A and J Oscilloscope Navy Type CRP-60ACZ-1.

TYPE CLASSIFICATION
DESIGN COGNIZANCE BUSHIPS
PROCUREMENT COGNIZANCE
STOCK NO.
R.D.B. IDENT. NO. 3.2

SHIPPING DATA

NUMBER OF BOXES	CONTENTS AND IDENTIFICATION	VOLUME (Cu.Ft.)	OVERALL DIMENSIONS (inches)	WEIGHT PACKED (lbs.)
1	Oscilloscope NT-60ACZ-1	4.65	14-1/2 X 18-3/4 X 29-1/2	81
1	Set of Equipment Spares	3.0	14-1/4 X 15-1/4 X 23-3/4	79
1	Set of Spare Tubes	3.0	14-1/4 X 15-1/4 X 23-3/4	30

UNCLASSIFIED

Test-Wave Form Measuring

OSCILLOSCOPE

60ACZ-1

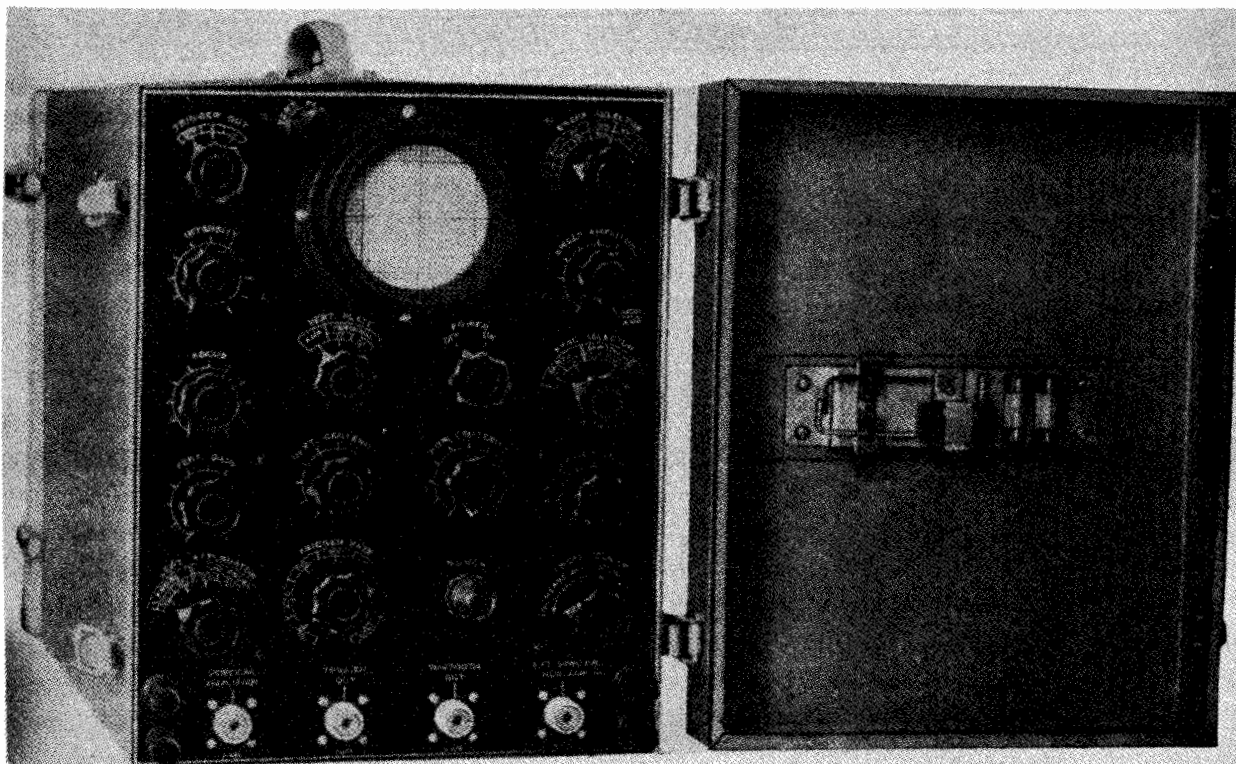
EQUIPMENT SUPPLIED DATA

QUANTITY PER EQUIPT	NAME AND NOMENCLATURE	OVERALL DIMENSIONS (inches)	WEIGHT (lbs.)
1	Oscilloscope NT-60ACZ-1	9-1/8 X 13-1/2 X 16	40
1	Set of Equipment Spares	12 X 12 X 18	53
1	Set of Spare Tubes	12 X 12 X 18	4

UNCLASSIFIED

4.3 60ACZ-1: 3

TEST OSCILLOSCOPE



Test Oscilloscope 60ADM

FUNCTIONAL DESCRIPTION

The type 60ADM provides a visual means of examining and measuring all types of electrical waveforms in radar and other circuits. It will supply either positive or negative triggers to the equipment being tested and it may be used as a synchroscope or as a conventional oscilloscope.

It will furnish servo sweeps, operated by a positive or negative trigger from the equipment under test, or operated by the internal trigger generator which furnishes a positive or negative trigger to the equipment under test, sawtooth sweeps synchronized either internally or from an external source, and external sweeps applied through the horizontal amplifier.

No field changes in effect at time of preparation (28 Nov 1956).

ELECTRICAL AND MECHANICAL CHARACTERISTICS

FREQUENCY RANGE

SERVO SWEEPS: 10 to 5000 usec.

SAWTOOTH SWEEPS: 20 to 20000 cps.

HORIZONTAL AMPLIFIER: 20 to 20000 cps.

VERTICAL AMPLIFIER: 20 cps to 2.5 mc for sine waves good down to 100 cps square wave response.

HEAT DISSIPATION: 115 W with unit designed to operate at 50 deg C ambient temperature.

EQUIPMENT POWER FACTOR: 91%.

POWER REQUIREMENTS: 115 v, 60 cps, single ph.

August 1957

Test-Wave Form Measuring
60ADM

TEST OSCILLOSCOPE

MANUFACTURER'S OR CONTRACTOR'S DATA

Submarine Signal Company, Boston, Mass.
Contract NXsr-88821.
Contract NXsr-95081.

(1) 6SJ7

Total Tubes: 17

REFERENCE DATA AND LITERATURE

NAVSHIPS 900992: Technical Manual for Test
Oscilloscope Navy Type CBM-60ADM.

TUBE AND/OR CRYSTAL COMPLEMENT

(1) OA3/VR-75	(6) 6SN7W
(1) 3JP1	(2) 6X5GT/G
(2) 6AC7W	(1) 6Y6G
(1) 6H6GY/G	(2) 8016

TYPE CLASSIFICATION
DESIGN COGNIZANCE BUSHIPS
PROCUREMENT COGNIZANCE
STOCK NO.
R.D.B. IDENT. NO.

SHIPPING DATA

NUMBER OF BOXES	CONTENTS AND IDENTIFICATION	VOLUME (Cu.Ft.)	OVERALL DIMENSIONS (inches)	WEIGHT PACKED (lbs.)
1	Test Oscilloscope NT-60ADM	5.8	16-15/16 x 20-11/16 x 28-1/2	88

EQUIPMENT SUPPLIED DATA

QUANTITY PER EQUIPT	NAME AND NOMENCLATURE	OVERALL DIMENSIONS (inches)	WEIGHT (lbs.)
1	Test Oscilloscope NT-60ADM	10-15/16 x 4-11/16 x 22-1/2	68

April 1958

OSCILLOSCOPE**60018****RELATION TO OTHER EQUIPMENT**

The NT-60018 is Triumph Model 830 Oscillograph Wobbulator.

ELECTRICAL AND MECHANICAL CHARACTERISTICS

AMPLIFIER RESPONSE RANGE: 10 to 100000 cps.
 LINEAR SWEEP FREQUENCY: 7 to 30000 cps.
 MAX ALLOWABLE DC VOLTAGE INPUT: 400 v.
 RF OSCILLATOR FREQUENCY: 1000 kc.
 BANDWIDTH: 0 to 50 kc.
 FREQUENCY MODULATOR SWEEP: 60 cps sinusoidal.
 POWER REQUIREMENTS: 115 v, 50 to 60 cps, single ph.

MANUFACTURER'S OR CONTRACTOR'S DATA

Triumph Mfg Co., Chicago, Illinois.
 Contract NOs-86943, dated 10 June 1941.
 Contract NXss-4707, dated 17 November 1942.
 Approximate Cost: \$300.00 with equipment spares.

TUBE AND/OR CRYSTAL COMPLEMENT

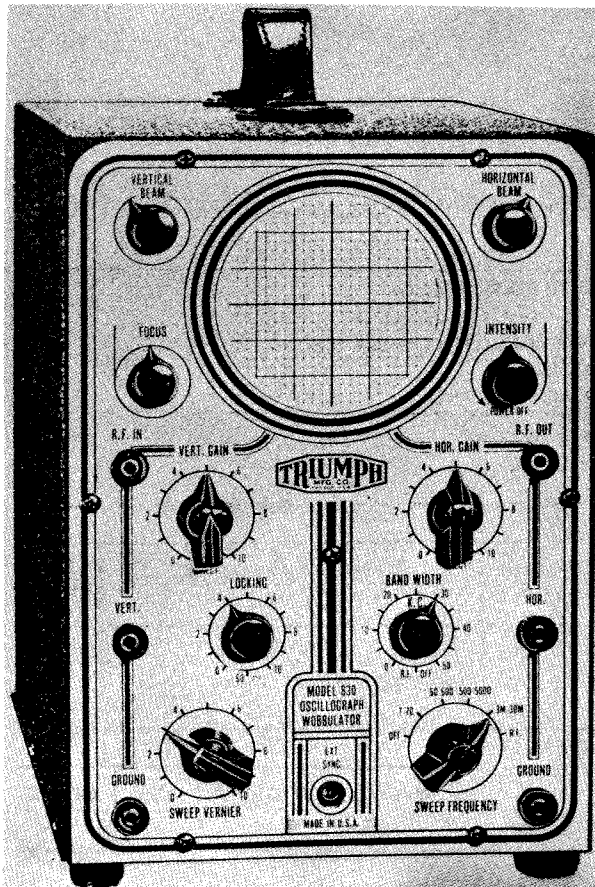
(2) 6SJ7WGT	(1) 6X5GT
(1) 884	(1) 1V
(1) 6J5GT	(1) 3AP1
(1) 6K8	
Total Tubes: (8)	

No Crystals Used.

REFERENCE DATA AND LITERATURE

NAVSHIPS 95430: Technical Manual for NT-60018 Oscilloscope.

TYPE CLASSIFICATION
DESIGN COGNIZANCE BUSHIPS
PROCUREMENT COGNIZANCE
STOCK NO.
R.D.B. IDENT. NO.



Oscilloscope 60018

FUNCTIONAL DESCRIPTION

The NT-60018 is a combination of 3 in. cathode ray Oscillograph with a thyatron linear sweep, and a synchronized sweep frequency modulator or wobbulator which will produce a variable frequency modulated signal at the RF output terminals. The NT-60018 may be used to check wave shapes, electronic equipment operation, and to measure AC voltages between 10 and 100,000 cycles.

No field changes in effect at time of preparation (7 May 1958).

SHIPPING DATA

NUMBER OF BOXES	CONTENTS AND IDENTIFICATION	VOLUME (Cu.Ft.)	OVERALL DIMENSIONS (inches)	WEIGHT PACKED (lbs.)
1	Oscilloscope			27

60018

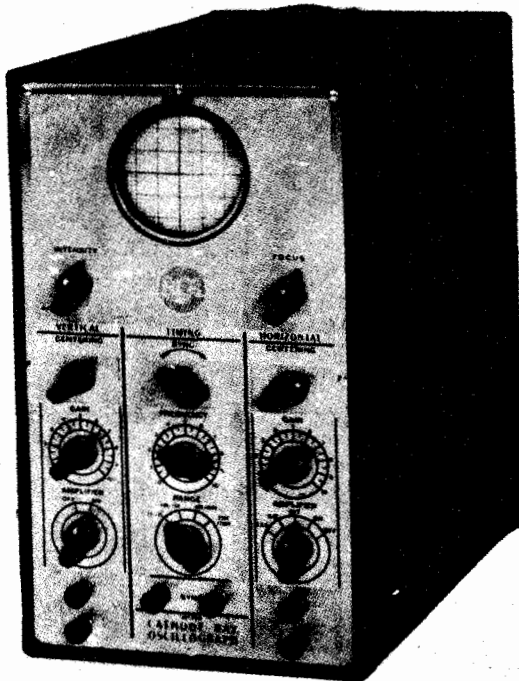
OSCILLOSCOPE

EQUIPMENT SUPPLIED DATA

QUANTITY PER EQUIPT	NAME AND NOMENCLATURE	OVERALL DIMENSIONS (inches)	WEIGHT (lbs.)
1	Oscilloscope NT-60018	7-1/8 x 14 x 10-3/4	22

OSCILLOGRAPH

60020



Oscilloscope 60020

FUNCTIONAL DESCRIPTION

The 60020 is a reliable instrument for the observation of electrical circuit phenomena. Some of its more common uses include the study of wave shapes and transients, measurement of modulation, adjustment of radio receivers and transmitters, determination of peak voltages and tracing of vacuum tube characteristics. It allows the observation of very rapid changes of current or voltage without appreciable distortion. The instrument is entirely portable and operates from an AC source of 110 to 120 volts, 50 to 60 cycles, an integral power supply unit furnishing all operating voltages required for operation.

No field changes in effect at time of preparation (31 August 1956).

ELECTRICAL AND MECHANICAL CHARACTERISTICS

DEFLECTION SENSITIVITY: 20 v per in.

INPUT CHARACTERISTICS

Through either amplifier: 500,000 ohm;
approx 20 uufd.

WITHOUT EITHER AMPLIFIER: 2.2 megohms
approx 40 uufd.

FREQUENCY RESPONSE RANGE OF AMPLIFIERS: 20
to 90,000 cps.

MAX SIGNAL INPUT(W/AMPLIFIER): 700 v rms.

FREQUENCY RANGE OF TIMING AXIS: 15 to 22,000
cps.

MAX DC VOLTAGE ACROSS INPUT BINDING POST:
300 v.

POWER REQUIREMENTS: 110 to 120 v, 50 to 60
cps, single ph, 50 W.

MANUFACTURER'S OR CONTRACTOR'S DATA

Radio Corp. of America, New York, N.Y.

Approximate Cost: \$300.00 with equip-
ment spares.

TUBE AND/OR CRYSTAL COMPLEMENT

(1) 3AP1 (2) 6C6

(2) 80 (1) 884

Total Tubes: (6)

REFERENCE DATA AND LITERATURE

Technical Manual for RCA Cathode-Ray Oscil-
lograph 155B, NT-60020

TYPE CLASSIFICATION	
DESIGN COGNIZANCE	BUSHIPS
PROCUREMENT COGNIZANCE	
STOCK NO.	
R.D.B. IDENT. NO.	

EQUIPMENT SUPPLIED DATA

QUANTITY PER EQUIP	NAME AND NOMENCLATURE	OVERALL DIMENSIONS (inches)	WEIGHT (lbs.)
1	Oscillograph NT-60020	8 X 14-1/4 X 14-3/8	21