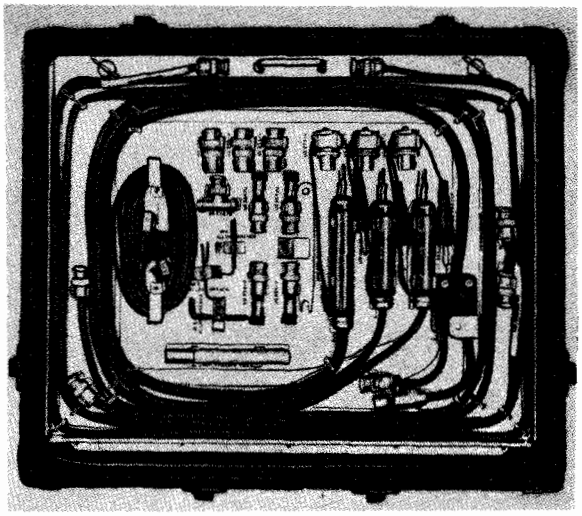
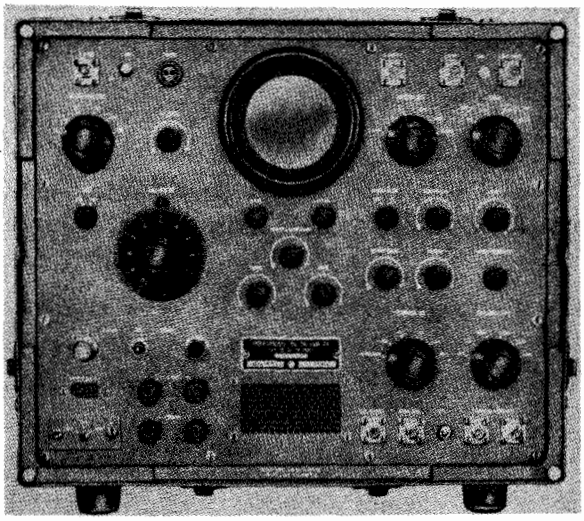
April 1958

Test-Wave Form Measuring

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

Waterman Products Co, Inc; Philadelphia, Pa.
Contr NObsr-49230, dated 19 June 1950.
Contr NObsr-52205, dated 15 Jan 1951.

No Crystals.

REFERENCE DATA AND LITERATURE

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

TUBE AND/OR CRYSTAL COMPLEMENT

(1) OA2WA
(2) 6AN5WA
(2) 1V2
(1) 6CB6
(1) 5744WA
(10) 12AU7
(1) 6J6WA
(1) 3JP1
(4) 6X4WA
(3) 5726/6AL5W
(4) 12AT7WA
(1) 6C4WA
(2) 6AH6

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

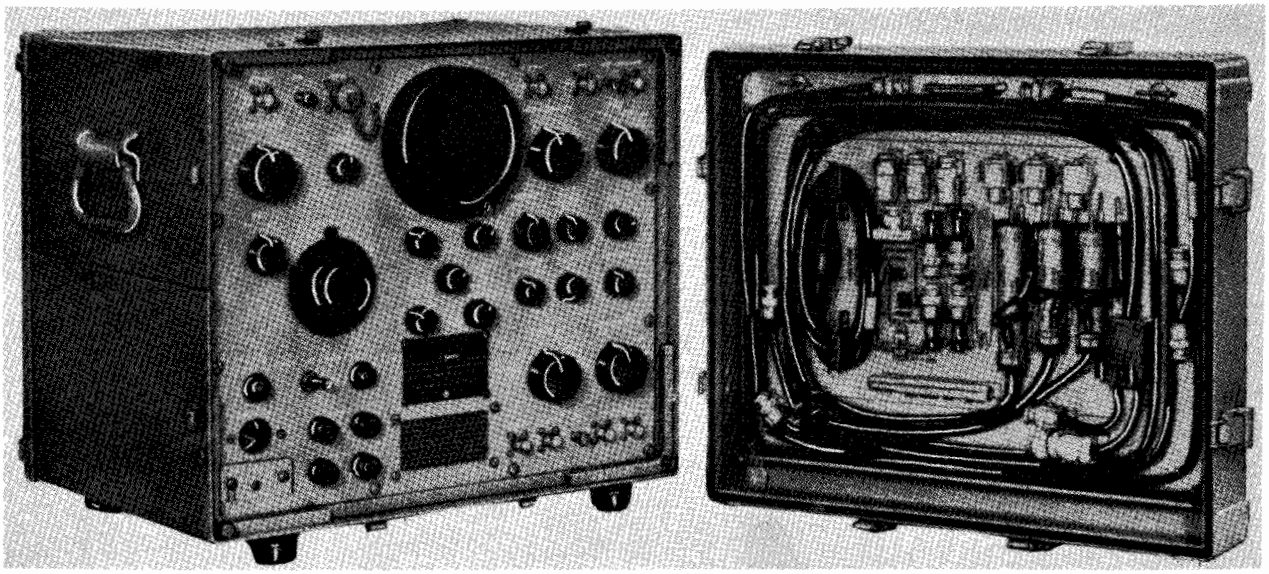
EQUIPMENT SUPPLIED DATA

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	1/2 od X 4	0.0625
	TWA002	7/16 od X 4	0.0625
1	Set of Equipment Spares		

April 1959

Test-Wave Form Measuring

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 $+55^{\circ}$ 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)

Test-Wave Form Measuring

April 1959

AN/USM-24A OSCILLOSCOPE

No Crystale used.

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

REFERENCE DATA AND LITERATURE

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

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		

June 1957

Test-Time Base Measuring and Counting

OSCILLOSCOPE AN/USM-24B

FUNCTIONAL DESCRIPTION

The AN/USM-24B 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. 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 (25 October 1956).

RELATION TO OTHER EQUIPMENT

Similar to and interchangeable with AN/USM-24 and AN/USM-24A for different component parts.

ELECTRICAL AND MECHANICAL CHARACTERISTICS

PRESENTATION: 3 in. CR tube.
SWEEP DATA
  FREQUENCY RANGE: 8 to 600000 cps recurrent.
  TIME DURATION: 1.25 to 125000 usec triggered.
DEFLECTION SENSITIVITY DATA
  VERTICAL: 0.035 v rms per in.
  HORIZONTAL: 4.0 v rms per in.
FREQUENCY RESPONSE DATA
  VERTICAL: 4 cps to 10 mc.
  HORIZONTAL: 0.5 cps to 700 kc.
  BEAM MODULATION: 50 cps to 10 mc.
INPUT IMPEDANCE
  HORIZONTAL: 300000 ohms.
  VERTICAL: 300000 ohms.
  BEAM MODULATION: 56000 ohms.
POWER REQUIREMENTS: 105, 115 or 125 v, 50 to 1000 cps, single phase, 215 W.

MANUFACTURER'S OR CONTRACTOR'S DATA

Waterman Products Company, Inc., Philadelphia, Pennsylvania.
Contract NObsr 52205, dated 15 January 1951.
Approximate Cost: $625.00 with equipment spares.

TUBE AND/OR CRYSTAL COMPLEMENT

No Electron Tubes.

REFERENCE DATA AND LITERATURE

Nomenclature Card for Oscilloscope AN/USM-24B.

TYPE CLASSIFICATION	
DESIGN COGNIZANCE	BUSHIPS
PROCUREMENT COGNIZANCE	MIL-O-15458A(SHIPS)
STOCK NO.	
R.D.B. IDENT. NO.	

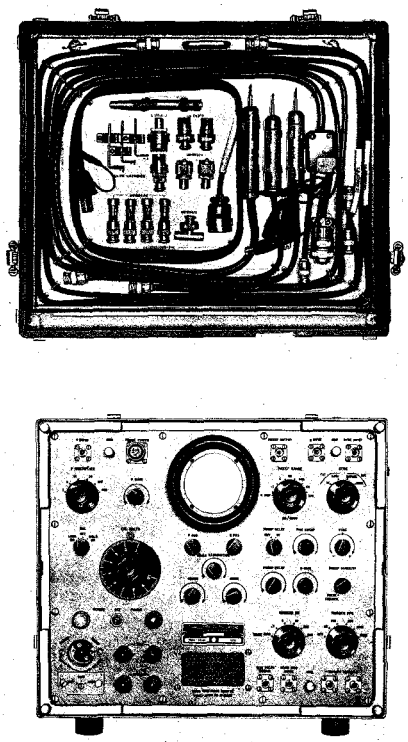
EQUIPMENT SUPPLIED DATA

QUANTITY PER EQUIPT	NAME AND NOMENCLATURE	OVERALL DIMENSIONS (inches)	WEIGHT (lbs.)
1	Oscilloscope AN/USM-24B including: (1) RF Cable Assembly with (2) Test Prod (2) RF Accessory Cable Assembly (3) Connector, Adapter UG-255/U (3) Connector, Adapter UG-273/U (1) Connector, Adapter UG-274/U (4) Connector, Adapter, Binding Post (1) Power Cable (1) Wrench, Spanner (1) Wrench, Hex, No. 6 Socket Head (1) Wrench, Hex, No. 8 Socket Head (2) Technical Manual (1) Set of Spare Parts	14-9/16 X 14-11/16 X 17-1/8	

6 June 1962	6625-643-2429	OSCILLOSCOPE AN/USM-24C
Cog Service:	FSN: 6625-643-3327 W/S	Functional Class:
USA	USN	USAF

TYPE CLASS:

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



Oscilloscope AN/USM-24C

FUNCTIONAL DESCRIPTION:

The Oscilloscope AN/USM-24C is a portable set for displaying a luminous plot of the time variation of a voltage pulse or wave, with self-contained means for measuring its duration, displacements and instantaneous magnitude of all portions of its shape. The Oscilloscope is primarily intended for use in testing of all types of electronic equipment.

No field changes in effect at time of preparation (1 June 1961).

TECHNICAL CHARACTERISTICS:

TYPE OF INSTALLATION: Portable.
SWEEP DATA
FREQUENCY RANGE: 8 to 800,000 cps.
TRIGGER DATA
DURATION: 1.25 to 125,000 usec for 2.5 in. deflection.

INTERNAL TRIGGER
DURATION: Approx 1.5 usec.
RISE TIME: 0.5 usec.
REPETITION RATE: 50, 300, 800, 2,000, 5,000 pps accurate to porm 5%.
AMPLITUDE: 25 to 50 v.
SCREEN MARKER INTERVALS: 0.2, 1, 10, 100, 500 usec.

DEFLECTION SENSITIVITY DATA
THRU AMPLIFIER (NOMINAL)
VERTICAL: 0.05 v rms per inch.
HORIZONTAL: 3.5 v rms per inch.
DIRECT TO PLATES
VERTICAL: 110 v rms per inch.
HORIZONTAL: 150 v rms per inch.

FREQUENCY RESPONSE (NOMINAL)
X-AXIS: 8 cps to 800 kc.
Y-AXIS: 2 cps to 8 mc.
Z-AXIS: 6 cps to 5 mc.

INPUT IMPEDANCE (NOMINAL)
X-AXIS: 5.6 meg.
Y-AXIS; 0.3 meg.
Z-AXIS: 0.656 meg.

OPERATING POWER RQMT: 110 to 130 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	Oscilloscope AN/USM-24 C consists of:		14-13/16 x 14-7/8 x 17-16/32	58
1	Oscilloscope OS-51/USM-24C		12-19/64 x 14-3/16 x 17-5/32	50.5
1	Cover, Combination Case CW-362/USM-24C		2-25/32 x 14-3/16 x 17-11/32	4.25
1*	Power, Cable CX-3092/USM-24C		1-5/32 od x 72 lg	3/8
2*	Test, Lead CG-409/U (8 ft 0 in.)		27/64 od x 96 lg	9/16
2*	Test, Lead CG-883A/USM-24		13/16 od x 58 lg	5/8
1*	Test, Lead CG-1277/USM-24C		1-1/4 od x 42-3/4	1/2
2*	Adapter UG-255/U		5/8 od x 1-3/8	1/8
4*	Adapter UG-924/U		9/16 od x 1-13/16	3/16
1*	Adapter UG-274/U		9/16 x 1-1/16 x 1-9/32	1/16
2*	Adapter UG-273/U		11/16 od x 1-5/16	1/8
1*	Adapter UG-201A/U		13/16 od x 1-5/16	1/16
1*	Adapter UG-349A/U		5/8 od x 1-9/16	1/16
1*	Wrench, Allen no. 4		3/64 x 5/8 x 1-13/16	
1*	Wrench, Allen no. 6		1/16 x 5/8 x 1-13/16	

4.8 AN/USM-24C: 2

QTY	ITEM	STOCK NUMBERS	DIMENSIONS (INCHES)	WEIGHT (LBS)
1*	Wrench, Allen no 8		5/64 x 11/16 x 1-15/16	
1*	Wrench, Spanner TWA003		7/16 od x 4-1/8 lg	1/16
2**	Technical Manual NAVSHIPS-92465		1/2 x 8-3/4 x 11-1/2	3-1/2

NOTE: *Mounted in cover CW-362/USM-24C.
**One book is contained in cover CW-362/USM-24C, the other is packed in the shipping container.

REFERENCE DATA AND LITERATURE:

NAVSHIPS 92465: Technical Manual TM-11-5103A for Oscilloscope AN/USM-24C.

TUBE, CRYSTAL AND/OR SEMI-CONDUCTOR DATA:

TUBES: (1) 0A2WA (2) 1V2 (1) 3JP1 (3) 6AH6 (2) 6AN5WA (5) 12AT7WA (7) 12AU7A
(1) 5719 (2) 5726/6AL5W (2) 6135 (4) 6203

CRYSTALS: None used.

SEMI-CONDUCTORS: None used.

SHIPPING DATA

PKGS	VOLUME (CU FT)	WEIGHT (LBS)
1	6.15	117
1	0.59	10

PROCUREMENT DATA

PROCURING SERVICE: DESIGN COG: TASSA
SPEC &/OR DWG: MIL-O-15458A(SHIPS)

CONTRACTOR	LOCATION	CONTRACT OR ORDER NO.	APPROX. UNIT COST
Waterman Products Co., Inc.	Philadelphia, Pa.	NObsr-59499, 30 June 1952	
Model Engineering & Mfg Inc.	Huntington, Ind.	NObsr-71353, 15 June 1956	
Speciality Engineering & Electronics Co.	Brooklyn, N. Y.	NObsr-64701, 1 April 1955	
Waterman Products Co., Inc.	Philadelphia, Pa.	NObsr-75320, 16 June 1958	