

NAVSHIPS 94200.4-2 Directory of Electronics Test
Equipment - Supplement 2
Section 4.4 Signal Generating Equipment

9 December 1965

Cog Service: USN FSN:

GENERATOR GROUP, SIGNAL AN/GGM-6

Functional Class:

USA

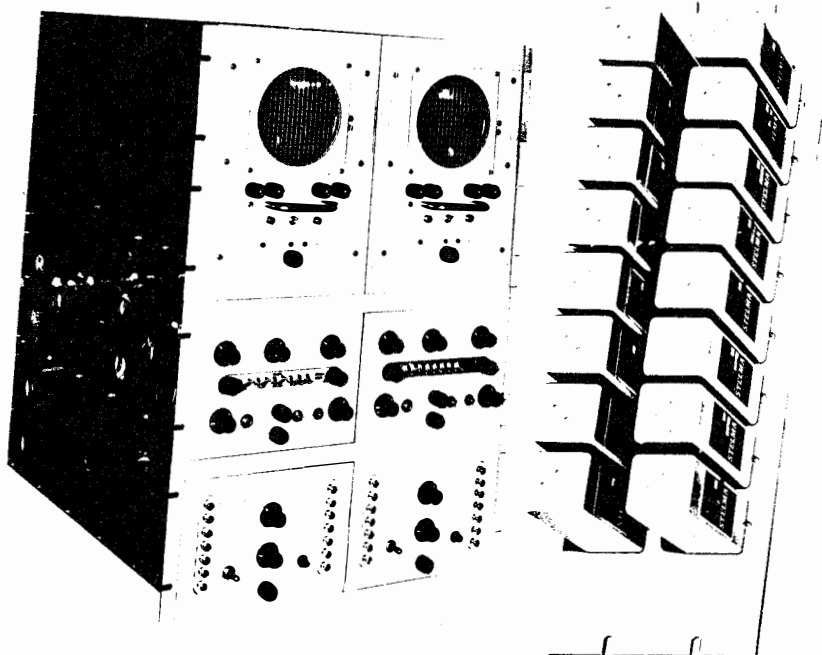
USN

USAF

TYPE CLASS:

Used by

MANUFACTURER'S NAME/CODE NUMBER: Steima Incorporated, (96238).



GENERATOR GROUP, SIGNAL AN/GGM-6

FUNCTIONAL DESCRIPTION:

Generator Group, Signal AN/GGM-6 provides facilities for generating synchronous and start-stop data/telegraph signals to determine the types and magnitudes of distortion present in the signal.

The test set is composed of four-major equipment: (1) A solid-state digital test pattern generator providing test messages with selectable format, speed, and direction; (2) A solid-state digital clock providing system timing signals; (3) A solid-state power supply providing dc power for operation of one Test Pattern Generator and one Time Base Generator; (4) A mounting shelf with 16 solid-state electronic switching relays providing output test signals.

No field changes in effect at time of preparation (13 October 1965).

GENERATOR GROUP, SIGNAL AN/GGM-6

RELATION TO OTHER EQUIPMENT:

The AN/GGM-6 differs from the AN/GGM-7 in the lesser number of relay assemblies supplied on the AN/GGM-6.

EQUIPMENT REQUIRED BUT NOT SUPPLIED: None.

TECHNICAL CHARACTERISTICS:

TEST PATTERN DISTORTION GENERATOR

OUTPUT TEST SIGNALS

PATTERNS: Test message, reversals and selected characters.

SELECTED CHARACTER CODES: 5 to 8 intervals/character.

BAUD RATES: Up to 600 baud.

CURRENT: Neutral or polar.

DISTORTION: Zero to 49%, marking, spacing, or switched bias.

CHARACTER RELEASE MODES: Stepped, steady mark and free running.

INPUT TIMING SIGNALS

WAVEFORM: Square wave.

FREQUENCY: 256 X operating baud.

ACCURACY OF SELECTED DISTORTION: $\pm 2\%$.

OUTPUT KEYING: Electronic provisions for mechanical relay.

OPERATING TEMPERATURE RANGE: 0°C to $+50^{\circ}\text{C}$.

INPUT POWER REQUIREMENTS: $+15\text{ v dc}$, 300 mw; -15 v dc , 11 W.

TIME BASE GENERATOR

OUTPUT TIMING SIGNAL

FREQUENCY: 256 X desired baud.

WAVEFORM: Square wave.

STABILITY: One part in 10,000.

POWER: 30 mw.

OUTPUT IMPEDANCE: 100 ohms.

FREQUENCY DETERMINING: Quartz crystals and stabilized Wein-bridge oscillator.

OPERATING TEMPERATURE RANGE: 0°C to $+50^{\circ}\text{C}$.

INPUT POWER REQUIREMENTS: 10 v ac , 60 cps, 4 W; $+15\text{ v dc}$, 90 mw; -15 v dc , 7 W; -120 v dc , 120 mw.

POWER SUPPLY

OUTPUT VOLTAGES: $+15\text{ v dc}$, -15 v dc , -120 v dc , $+21\text{ v dc}$, and 10 v ac .

REGULATION: $+15\text{ v dc}$, $\pm 1\%$; -15 v dc , $\pm 1\%$; -120 v dc , unregulated; $+21\text{ v dc}$, $\pm 5\%$; 10 v ac , unregulated.

OPERATING TEMPERATURE RANGE: 0°C to $+50^{\circ}\text{C}$.

INPUT POWER REQUIREMENTS: 110 to 117 v, 50 to 60 cps, 1 ph, 100 W.

RELAY ASSEMBLY

INPUT CURRENT: 60 ma, neutral dc signals (external battery required).

INPUT RESISTANCE: 100 ohms for 60 ma.

INPUT CIRCUIT: Isolated from ground. Inputs signals may be positive-battery grounded, negative-battery grounded or ungrounded. Input is dc isolated from output.

OUTPUTS: 15 available. Each output provides dry-contact, solid-stage keying for 60 ma, 120/130 v dc, isolated from ground. Effective output resistance on mark is 60 ohms; less than 100 ua leakage current on space.

GENERATOR GROUP, SIGNAL AN/GGM-6

KEYING RATE: 100 baud max.

RADIATION: Less than 1 uv conducted or radiated from 1 kc to 1000 mc, in mark condition.

ELECTRONIC RELAY

INPUT

SIGNAL: 20 ma or 60 ma neutral dc signals (strap selected).

IMPEDANCE: 100 ohms for 60 ma, 300 ohms for 20 ma.

CIRCUITS: Isolated from ground. Input signals: either positive battery grounded, negative battery grounded or ungrounded.

OUTPUT

SIGNAL: 20 ma to 60 ma, controlled by external circuits.

IMPEDANCE: 60 ohms in mark, less than 100 ua leakage on space.

CIRCUIT: Isolated from ground, requires external loop battery.

MAXIMUM VOLTAGE: 140 v, (steady state).

KEYING RATE: Up to 250 baud (250 bits per sec).

BIAS DISTORTION: Less than 3%.

OPERATING TEMPERATURES: - 20° C to + 55° C.

RADIATION: Less than 1 uv, conducted or radiated from 1 kc to 1000 mc in mark condition when case is properly grounded.

MAJOR COMPONENTS

QTY	ITEM	STOCK NUMBERS	DIMENSIONS (INCHES)	WEIGHT (LBS)
1	Generator Group, Signal AN/GGM-6 includes:			
2	Test Pattern Generator SG-431/GGM		5-1/4 x 8 x 19	12
2	Time Base Generator SG-430/GGM		5-1/4 x 8 x 19	7
2	Power Supply PP-2971/GGM		7 x 8 x 9-3/4	14
48	Electronic Relay ER-17A		1-1/2 x 1-1/2 x 3-1/4	0.5
1	Rack Shelf Adapter RS-1P		12-1/4 x 19 x 19-1/4	11
1	Rack Shelf Adapter RS-2C		6-1/2 x 19 x 19-1/4	7
1	Rack Shelf Adapter RS-2D		6-1/2 x 19 x 19-1/4	4
3	Mounting Shelf TDP-1B		1/4 x 5-1/4 x 19	2.750

REFERENCE DATA AND LITERATURE:

NAVSHIPS 94651: Technical Manual for Generator Set, Signal AN/GGM-6 and AN/GGM-7 (Stelma Model DAC V).

TUBE, CRYSTAL AND/OR SEMI-CONDUCTOR DATA:

TUBES: Not required.

CRYSTALS: (2) CR-37/U

SEMI-CONDUCTORS: (206) 1N270 (4) ST114 (2) 1N646 (84) ST122 (4) 1N752A (4) ST125

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GENERATOR GROUP, SIGNAL AN/GGM-6

SEMI-CONDUCTORS: (436) ST123 (10) 1N1227 (10) 1N1341 (4) ST201 (2) 1N3028
(36) ST204 (4) 2N398 (4) ST205 (2) 2N1231 (2) 2N1241 (6) 3N51
(8) C01 (2) ST103 (2) ST113

SHIPPING DATA

PKGS VOLUME (CU FT) WEIGHT (LBS)

PROCUREMENT DATA

PROCURING SERVICE: USN
SPEC &/OR DWG:

DESIGN COG:, USN, BuShips

CONTRACTOR	LOCATION	CONTRACT OR ORDER NO.	APPROX. UNIT COST
Stelma Incorporated	Stamford, Conn.	N0bsr 87373	\$10,170.41

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8 December 1965

Cog Service: USN FSN:

GENERATOR GROUP, SIGNAL AN/GGM-7

Functional Class:

USA

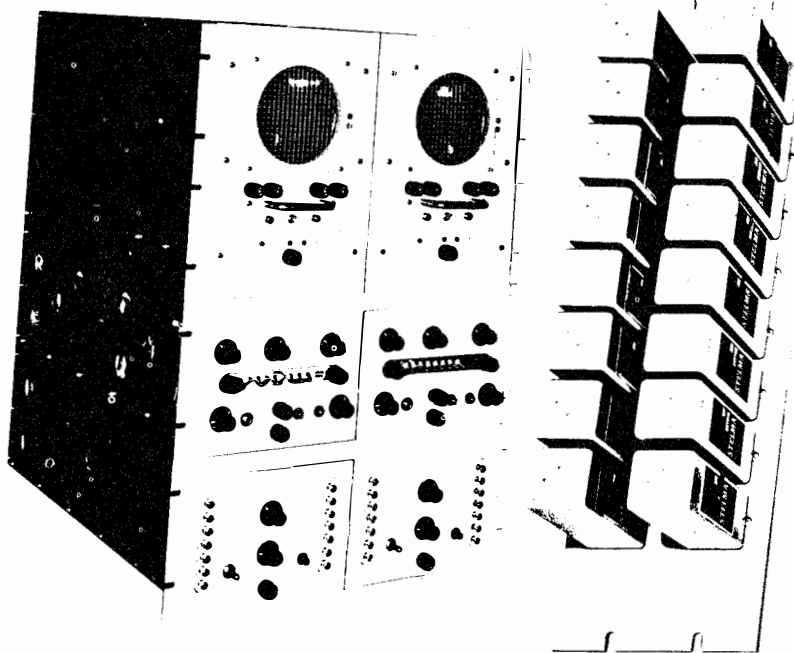
USN

USAF

TYPE CLASS:

Used by

MANUFACTURER'S NAME/CODE NUMBER: Stelma Incorporated, (96238).



GENERATOR GROUP, SIGNAL AN/GGM-7

FUNCTIONAL DESCRIPTION:

Generator Group, Signal AN/GGM-6 provides facilities for generating synchronous and start-stop data/telegraph signals to determine the types and magnitudes of distortion present in the signal.

The test set is composed of four major equipments: (1) A solid-state digital test pattern generator providing test messages with selectable format, speed, and direction; (2) A solid-state digital clock providing system timing signals; (3) A solid-state power supply providing dc power for operation of one Test Pattern Generator and one Time Base Generator; (4) A mounting shelf with 16 solid state electronic switching relays providing output test signals.

No field changes in effect at time of preparation (14 October 1965).

RELATION TO OTHER EQUIPMENT:

The AN/GGM-7 differs from the AN/GGM-6 in that it has more relay assemblies supplied than the AN/GGM-6.

4.4 AN/GGM-7: 1

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EQUIPMENT REQUIRED BUT NOT SUPPLIED: None.

TECHNICAL CHARACTERISTICS:

TEST PATTERN DISTORTION GENERATOR

OUTPUT TEST SIGNALS

PATTERNS: Test message, reversals and selected characters.
SELECTED CHARACTER CODES: 5 to 8 intervals/character.
BAUD RATES: Up to 600 baud.
CURRENT: Neutral or polar.
DISTORTION: Zero to 49%, marking, spacing, or switched bias.
CHARACTER RELEASE MODES: Stepped, steady mark and free running.

INPUT TIMING SIGNALS

WAVEFORM: Square wave.
FREQUENCY: 256 x operating baud.
ACCURACY OF SELECTED DISTORTION: $\pm 2\%$.
OUTPUT KEYING: Electronic provisions for mechanical relay.
OPERATING TEMPERATURE RANGE: 0° C to $+50^{\circ}$ C.
INPUT POWER REQUIREMENTS: + 15 v dc, 300 mw; - 15 v dc, 11 W.

TIME BASE GENERATOR

OUTPUT TIMING SIGNALS

FREQUENCY: 256 x desired baud.
WAVEFORM: Square wave.
STABILITY: One part in 10,000.
POWER: 30 mw.
OUTPUT IMPEDANCE: 100 ohms.
FREQUENCY DETERMINING: Quartz crystals and stabilized Wein-bridge oscillator.
OPERATING TEMPERATURE RANGE: 0° C to $+50^{\circ}$ C.
INPUT POWER REQUIREMENTS: 10 v ac, 60 cps, 4 W; + 15 v dc, 90 mw; - 15 v dc, 7 W. - 120 v dc, 120 mw.

POWER SUPPLY

OUTPUT VOLTAGES: + 15 v dc, - 15 v dc, - 120 v dc, + 21 v dc, and 10 v ac.
REGULATION: + 15 v dc, $\pm 1\%$; - 15 v dc, $\pm 1\%$; - 120 v dc, unregulated; + 21 v dc, $\pm 5\%$; 10 v ac, unregulated.
OPERATING TEMPERATURE RANGE: 0° C to $+50^{\circ}$ C.
INPUT POWER REQUIREMENTS: 110 to 117 v, 50 to 60 cps, 1 ph, 100 W.

RELAY ASSEMBLY

INPUT CURRENT: 60 ma, neutral dc signals (external battery required).
INPUT RESISTANCE: 100 ohms for 60 ma.
INPUT CIRCUIT: Isolated from ground. Inputs signals may be positive-battery grounded, negative-battery or ungrounded. Input is dc isolated from output.
OUTPUTS: 15 available. Each output provides dry-contact, solid-stage keying for 60 ma, 120/130 v dc, isolated from ground. Effective output resistance on mark is 60 ohms; less than 100 ua leakage current on space.
KEYING RATE: 100 baud max.
RADIATION: Less than 1 uv conducted or radiated from 1 kc to 1000 mc in mark condition.

ELECTRONIC RELAY

INPUT:

SIGNAL: 20 ma or 60 ma neutral dc signals (strap selected).

GENERATOR GROUP, SIGNAL AN/GGM-7

SIGNAL: 20 ma or 60 ma neutral dc signals (strap selected).
 IMPEDANCE: 100 ohms for 60 ma, 300 ohms for 20 ma.
 CIRCUITS: Isolated from ground. Input signals: either positive battery grounded,
 negative battery grounded or ungrounded.

OUTPUT

SIGNAL: 20 ma to 60 ma, controlled by external circuits.
 IMPEDANCE: 60 ohms in mark, less than 100 ua leakage on space.
 CIRCUIT: Isolated from ground, requires external loop battery.
 MAXIMUM VOLTAGE: 140 v, (steady state).
 KEYING RATE: Up to 250 baud (250 bits per sec).
 BIAS DISTORTION: Less than 3%.
 OPERATING TEMPERATURES: - 20° C to + 55° C.
 RADIATION: Less than 1 uv, conducted or radiated from 1 kc to 1000 mc in mark condition
 when case is properly grounded.

MAJOR COMPONENTS

QTY	ITEM	STOCK NUMBERS	DIMENSIONS (INCHES)	WEIGHT (LBS)
1	Generator Group, Signal AN/GGM-6 includes:			
2	Test Pattern Generator SG-431/GGM		5-1/4 x 8 x 19	12
2	Time Base Generator SG-430/GGM		5-1/4 x 8 x 19	7
2	Power Supply PP-2971		7 x 8 x 9-3/4	14
80	Electronic Relay ER-17A		1-1/2 x 1-1/2 x 3-1/4	0.5
1	Rack Shelf Adapter RS-1D		12-1/4 x 19 x 19-1/4	11
1	Rack Shelf Adapter RS-2C		6-1/2 x 19 x 19-1/4	7
1	Rack Shelf Adapter RS-2D		6-1/2 x 19 x 19-1/4	4
3	Mounting Shelf TDP-1B		1/4 x 5-1/4 x 19	2.750

REFERENCE DATA AND LITERATURE:

NAVSHIPS 94651: Technical Manual for Generator Set, Signal AN/GGM-6 and AN/GGM-7 (Stelma Model DAC V).

TUBE, CRYSTAL AN/OR SEMI-CONDUCTOR DATA:

TUBES: Not required.

CRYSTALS: (2) CR-37/U

SEMI-CONDUCTORS: (206) 1N270 (4) ST114 (2) 1N646 (84) ST122 (4) 1N752A (4) ST125
 (436) ST123 (10) 1N1227 (10) 1N1341 (4) ST201 (2) 1N3028
 (36) ST204 (4) 2N398 (4) ST205 (2) 2N1231 (2) 2N1241 (6) 3N51
 (8) C01 (2) ST103 (2) ST113

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GENERATOR GROUP, SIGNAL AN/GGM-7

SHIPPING DATA

PKGS VOLUME (CU FT) WEIGHT (LBS)

PROCUREMENT DATA

PROCURING SERVICE: USN
SPEC &/OR DWG:

DESIGN COG: USN, BuShips

CONTRACTOR	LOCATION	CONTRACT OR ORDER NO.	APPROX. UNIT COST
Stelma Incorporated	Stamford. Conn.	NObsr 87373	\$12,861.01

13 October 1964

TEST SET RADAR AN/SPM-5A

Cog Service: USN FSN:

Functional Class:

USA

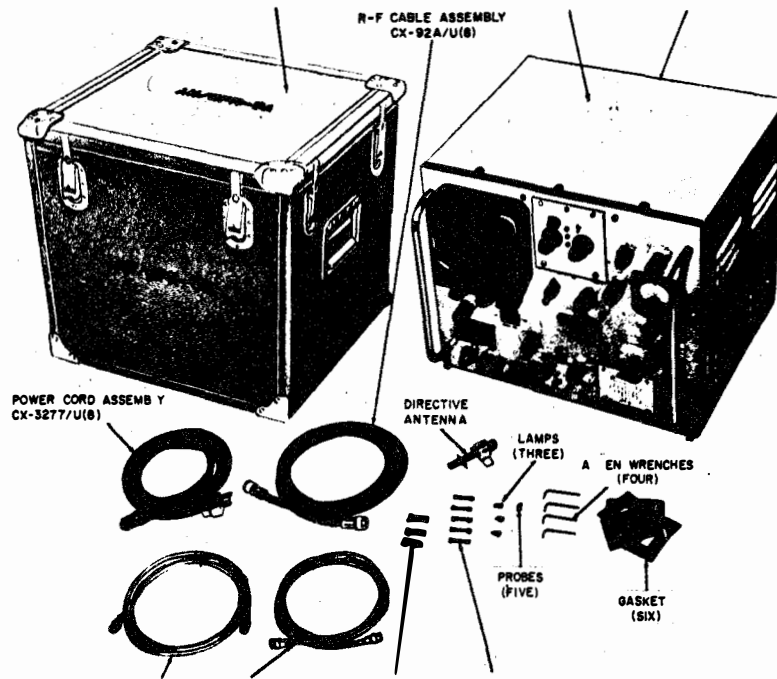
USN

USAF

TYPE CLASS:

Used by

MANUFACTURER'S NAME/CODE NUMBER: Sperry Gyroscope Co. Div. of Sperry Rand Corp., (56232).



TEST SET RADAR AN/SPM-5A

FUNCTIONAL DESCRIPTION:

Test Set Radar AN/SPM-5A is a portable test set designed for testing and adjusting radar systems which operate in the frequency range of 5100 to 5900 mc.

No field changes in effect at time of preparation (2 October 1964).

RELATION TO OTHER EQUIPMENT:

EQUIPMENT REQUIRED BUT NOT SUPPLIED:

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TECHNICAL CHARACTERISTICS:

POWER METER

FREQUENCY RANGE: 5100 to 5900 mc.

ACCURACY: + 5 to + 30 dbm at type N rf input connector.

ACCURACY: ± 1 db at 25° C, ± 1.5 db from - 20° C to + 40° C using correction chart on front panel.

INPUT VSWR: 2:1 max.

FREQUENCY METER

FREQUENCY RANGE: 5100 to 5900 mc cavity hermetically sealed.

ACCURACY AT 25° C: ± 2.5 mc from 5100 to 5900 mc.

ACCURACY OVER - 20° C to + 40° C TEMPERATURE RANGE: ± 4 mc from 5100 to 5900 mc.

RELATIVE ACCURACY: 1.0 mc over any 60 mc interval.

REACTION ON WATTMETER BRIDGE: 20% min on cw signals.

INDICATION: Direct reading in mc on counter.

SPECTRUM ANALYZER

TUNING RANGE: 5100 to 5900 mc.

INDICATOR: 5UP1CRT.

SWEEP FREQUENCY: 3 to 30 cps adjustable.

RF ATTENUATOR RANGE: 0 to 95 db calibrated.

IF ATTENUATION CONTROL: 0 to 30 db.

RF SENSITIVITY: - 50 dbm for ea in. deflection on CRT.

PULSE WIDTH: 0.2 to 3.0 usec.

SWEEP SYNCHRONIZATION: Capable of being sync w/subharmonics of line freq.

IF BANDWIDTH: 50 kc ± 10 kc.

MAXIMUM VERTICAL JITTER: 1/16 in. at max sensitivity.

PULSE-GATE WIDTH: 0.25 to 10 usec.

MAXIMUM PULSE SEPARATION: 4000 usec first to last pulse.

MINIMUM PULSE SEPARATION: 0.25 usec trailing edge to leading edge.

REQUIRED INPUT TRIGGER: 10 to 50 v pos or neg, 0.20 to 10 usec duration, 100 to 4000 pps, preceding first pulse to be gated by one usec min.

GATE RELAY: 1 to 4000 usec.

SIGNAL GENERATOR

TUNING RANGE: 5100 to 5900 mc.

ACCURACY AT 25° C: ± 2.5 mc from 5100 to 5900 mc.

ACCURACY OVER - 20° C to + 40° C TEMPERATURE: ± 4 mc from 5100 to 5900 mc.

POWER OUTPUT

RANGE: - 5 to - 95 dbm calibrated.

ACCURACY: ± 1 db from correction chart at 25° C, ± 1.5 db from correction chart, - 20 to + 40° C.

FREQUENCY MODULATION

DEVIATION RANGE: 0 to 30 mc adjustable.

PHASE RANGE: 3 to 50 usec after triggering.

TRIGGER REQUIREMENTS: Same as for synchroscope; 10 to 50 v.

PULSE MODULATION: 0.2 to 10.0 usec duration, 100 to 4000 pps.

PULSE WIDTH: 0.25 to 10 usec continuously variable.

PULSE WIDTH ACCURACY: $\pm 10\%$ or ± 0.1 usec whichever is greater.

PULSE RISE TIME: 0.05 usec max.

PULSE DELAY: 1 to 4000 usec after triggering.

TRIGGER REQUIREMENTS: Same as for synchroscope.

FM PULSE MODULATION

PULSE WIDTH: 0.25 to 4 usec continuously variable.
 PULSE WIDTH ACCURACY: ± 10% or 0.1 usec whichever is greater.
 PULSE RISE TIME: 0.05 usec max.
 PULSE DELAY: 1 to 4000 usec after triggering.
 TRIGGER REQUIREMENTS: Same as for synchroscope.
 FM SWEEP RATE RANGE: 0.5 mc/usec to 5 mc/usec.
 EXTERNAL MODULATION: Ext sawtooth, square wave or sine wave modulation v applied to re-
 flector of Klystron through a front panel jack.
 TRIGGER OUTPUT: 100 to 4000 pps, + 10 v output across 100 ohms.

SYNCHROSCOPE

DEFLECTION SENSITIVITY: 0.5 v per in.
 SWEEP LENGTH: 5, 20, 50, 250 and 4000 usec.
 REQUIRED RF TRIGGER: 50 to 1000 W peak 0.2 to 10.0 usec duration, 100 to 4000 pps avg
 pwr not to exceed one W.
 REQUIRED EXTERNAL VIDEO TRIGGER: 10 to 50 v, pos or neg 0.2 to 10 usec duration, 100 to
 4000 pps.
 INTERNAL TRIGGER: 100 to 4000 pps.
 BANDWIDTH: 100 cps to 6 mc.
 PULSE LENGTH: 0.1 to 1000 usec.
 PULSE AMPLITUDE: 0.2 to 50 v.
 PULSE REPETITION RATE: 100 to 4000 pps.

POWER REQUIREMENTS

POWER SOURCE: 103.5 to 126.5 v ac, 50 to 1000 cps single ph, 290 W.

MAJOR COMPONENTS

QTY	ITEM	STOCK NUMBERS	DIMENSIONS (INCHES)	WEIGHT (LBS)
1	Test Set Radar AN/SPM-5A		16 x 17-1/4 x 18-1/2	87
	includes:			
1	Transit Case		19-3/8 x 20-1/4 x 24-1/4	42
2	Video Cable Assembly CG-1433/U(8)			
1	Power Cord Assembly CX-3277/U(8)			
1	RF Cable Assembly CG-92A/U(8)			
1	Antenna (directive)			
3	Crystal Rectifier 1N23B			
5	Probe			
5	Fuse (cartridge)			
3	Lamp			
6	Gasket			
4	Allen Wrench			

REFERENCE DATA AND LITERATURE:

NAVWEPS OP 2857: Description, Operation and Maintenance for Radar Test Set AN/SPM-5A.

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AN/SPM-5A TEST SET RADAR

TUBE, CRYSTAL AND/OR SEMI-CONDUCTOR DATA:

TUBES: (3) 0A2WA (1) 1Z2 (1) 5UP1 (4) 6AH6WA (1) 6D4 (2) 12AT7WA (2) 5639
(1) 5651WA (3) 5654/6AK5W (3) 5687 (1) 5725/6AS6W (4) 5751 (1) 5842
(6) 5814WA (2) 6021 (2) 6080WA (6) 6111 (1) 6115/QK351

CRYSTALS: Not required;

SEMI-CONDUCTORS: (2) 1N23B (2) 1N127A (4) 1N227 (1) 1N459 (3) 1N540 (4) 1N560
(2) 1N1130

SHIPPING DATA

PKGS	VOLUME (CU FT)	WEIGHT (LBS)
1	10	182

PROCUREMENT DATA

PROCURING SERVICE: USN DESIGN COG: USN, BuWeps
SPEC &/OR DWG: MIL-R-18669

CONTRACTOR	LOCATION	CONTRACT OR ORDER NO.	APPROX. UNIT COST
Sperry Gyroscope Co. Div., of Sperry Rand Corp	Great Neck, L. I., N. Y.	Nord 18258	\$701.00

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23 June 1965

Cog Service: USN FSN:

GENERATOR, SIGNAL AN/URM-144(XN-1)
Functional Class:

USA

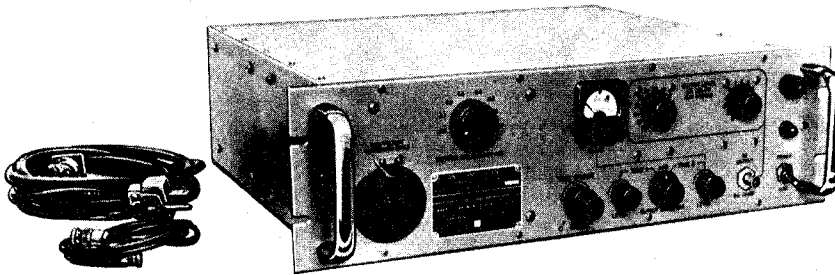
USN

USAF

TYPE CLASS:

Used by

MANUFACTURER'S NAME/CODE NUMBER: Panoramic Electronics Inc., (80052).



GENERATOR, SIGNAL AN/URM-144(XN-1)

FUNCTIONAL DESCRIPTION:

Generator, Signal AN/URM-144(XN-1) is a source of two tone RF excitation which may be used for testing distortion in receivers, transmitter power amplifiers, and other narrow-band network. When used with a spectrum analyzer, the dual outputs of the AN/URM-144(XN-1) permit accurate measurement of odd-order distortion in the output of single sideband and multiplexed communications equipments. The AN/URM-144(XN-1) provides crystal-controlled output frequencies in the range of 2 to 29.6 megacycles with adjustable frequency separation. The amplitude of each of the two signal channels in each frequency pair may be separately metered and adjusted or either signal channel in any of the eight pairs can be selected as the output of the AN/URM-144(XN-1). This permits the equipment to be used as a linear driver for power amplifiers. A calibrated output attenuator provides accurate level control of either the single or dual RF output.

No field changes in effect at time of preparation (14 June 1965).

GENERATOR, SIGNAL AN/URM-144(XN-1)

RELATION TO OTHER EQUIPMENT: None.

EQUIPMENT REQUIRED BUT NOT SUPPLIED: None.

TECHNICAL CHARACTERISTICS:

OUTPUT SIGNAL: Unmodulated RF.

NUMBER OF FREQUENCY PAIRS: Eight.

NOMINAL CARRIER FREQUENCIES (MC): 2.0, 3.7, 4.0, 7.4, 8.0, 14.8, 16.0, and 29.6.

FREQUENCY SEPARATION

AT 2.0, 3.7, 4.0, 7.4 AND 8.0 MC: Adj from 0 cyc to 0.1% of nom value.

AT 14.8, 16.0, AND 29.6: Adj from 0 cyc to 10 kc.

SPURIOUS RADIATION: All intermodulation distortion products at least 66 db below single-tone level. Hum and noise at least 60 db below single-tone level.

OUTPUT LEVEL: Adj from 0.1 to 100,000 uv.

OUTPUT LEVEL CALIBRATION: ± 10%.

ATTENUATION INCREMENTS: 0 to 120 db in 1 db steps for rated output level calibration.

OUTPUT IMPEDANCE: 50 ohms, coaxial.

MAJOR COMPONENTS

QTY	ITEM	STOCK NUMBERS	DIMENSIONS (INCHES)	WEIGHT (LBS)
1	Generator, Signal AN/URM-144(XN-1) includes:		5-1/2 x 15 x 19	18.5
1	Power Cable			
1	Output Cable			
1	50 Ohm Termination			
2	Technical Manual			

REFERENCE DATA AND LITERATURE:

NAVSHIPS 94423: Technical Manual for Generator, Signal AN/URM-144(XN-1).

TUBE, CRYSTAL AND/OR SEMI-CONDUCTOR DATA:

TUBES: Not required.

CRYSTALS: Not required.

SEMI-CONDUCTORS: (6) 2N1517 (2) HC7001 (2) 1N38A

SHIPPING DATA

PKGS	VOLUME (CU FT)	WEIGHT (LBS)
1	2.9	25

4.4 AN/URM-144(XN-1): 2

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GENERATOR, SIGNAL AN/URM-144(XN-1)

PROCUREMENT DATA

PROCURING SERVICE: USN
SPEC &/OR DWG:

DESIGN COG: USN, BuShips

CONTRACTOR	LOCATION	CONTRACT OR ORDER NO.	APPROX. UNIT COST
Panoramic Electronics Inc.	Mount Vernon, New York	N0bsr-81553	

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24 June 1965

Cog Service: USN

FSN: 2F6625-987-3439

GENERATOR, SWEEP CCTR-900-A

Functional Class:

USA

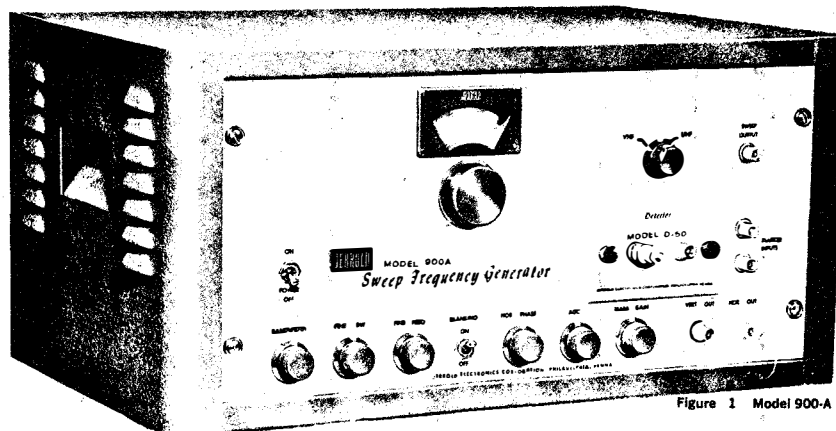
USN

USAF

TYPE CLASS:

Used by

MANUFACTURER'S NAME/CODE NUMBER: Jerrold Electronics Corporation, (01113).



GENERATOR, SWEEP CCTR-900-A

FUNCTIONAL DESCRIPTION:

Generator, Sweep CCTR-900-A is designed for mechanical and electrical stability and the extreme constancy of its output for use wherever careful and highly accurate sweep frequency measurements are to be made.

A flexible arrangement allows injecting a center frequency marker as well as sideband markers for any of the frequencies to which the sweep can be tuned. The side band marker arrangement is particularly convenient where it is desired to mark frequencies which are spaced a small distance away from a high, center-frequency. A built-in marker-amplifier provides ample gain in the marker channel to ensure clear indications from weak marker signals.

The plug-in detector is a full-wave, peak to peak type containing crystal diodes that are carefully matched with those in the ALC circuit of the sweep, in order to obtain flat response over the extreme wide band provided in this generator.

A phase reverse as well as a phasing adjustment control is provided in the horizontal deflection circuit of the sweep for proper adjustment of the oscilloscope pattern. The blanking

GENERATOR, SWEEP CCTR-900-A

circuit derives its voltage from the horizontal deflection of the sweep. Either the forward or return trace may be blanked on the oscilloscope.

A carefully designed filter network is included in the VHF section of the generator to prevent transmission of frequency components other than those desired, thus ensuring that the output voltage measured at the output by an untuned detector, is a true indication of the sweep output.

All critical voltages and the deflection voltages of the generator are regulated by gaseous voltage regulating tubes. This ensures absolute stability and freedom from changes in the sweep operation due to line voltage variations.

All parts of the sweep oscillator circuit are precisely machined from rugged, silver plated brass pieces. A slider of unique design moves in a rhodium-plated tube to provide long and trouble-free operation. The entire sweep unit is mounted on shock mounts within the cabinet to prevent transmission of external shocks to the sweep mechanism, as well as to prevent any mechanical hum being transmitted to the work bench on which the unit is mounted.

No field changes in effect at time of preparation (14 June 1965).

RELATION TO OTHER EQUIPMENT: None.

EQUIPMENT REQUIRED BUT NOT SUPPLIED: None.

TECHNICAL CHARACTERISTICS:

CENTER FREQUENCY RANGE

VHF: 500 kc to 400 mc.

UHF: 275 mc to 1200 mc.

SWEEP WIDTH

VHF: Min 100 kc; Max 400 mc.

UHF: Min 100 kc; Max 40% or more of center freq.

OUTPUT VOLTAGE

VHF: 0.25 v rms or more into 50 ohm load.

UHF: 0.5 v or more into 50 ohm load.

OUTPUT VOLTAGE VARIATION

VHF: ± 0.5 db, at max sweep W.

UHF: ± 0.5 db up to 800 mc; ± 1.5 db from 800 to 1200 mc; at max sweep W. On narrower sweep W, variations are less.

SPURIOUS BEATS AND HARMONICS: 20 db or more below fundamental output.

SOURCE IMPEDANCE: 50 ohm nominal.

PLUG-IN DETECTOR: Full wave, p-p, feed-thru type; VSWR less than 1.3:1 up to 900 mc, 1.4:1 to 1200 mc with a termination whose VSWR is 1.05 or better. May be unplugged and used externally.

LINEARITY OF FREQUENCY SCALE: Within 5% of sweep w (in relation to horizontal deflection v).

SWEEP REPETITION RATE: Line freq, sinusoidal.

HORIZONTAL DEFLECTION VOLTAGE: At least 10 v p-p, 60 cps sinusoidal.

MARKER INPUT: 20 mv or more; gain of marker amplifier is variable.

BLANKING: No blanking or blanking of either forward or return trace; output reduced to 0.

POWER REQUIREMENTS: 105 to 125 v rms or 200 to 360 v rms, 60 cps, single ph, 75 W.

GENERATOR, SWEEP CCTR-900-A

MAJOR COMPONENTS

QTY	ITEM	STOCK NUMBERS	DIMENSIONS (INCHES)	WEIGHT (LBS)
1	Generator, Sweep CCTR-900-A	2F6625-987-3439	10-5/8 x 15 x 22-1/2	

REFERENCE DATA AND LITERATURE:

NAVSHIPS 94482: Operating and Maintenance Manual No. 1901 Wide Band Sweep Generator Model 900-A.

TUBE, CRYSTAL AND/OR SEMI-CONDUCTOR DATA:

TUBES: (2) 12AT7 (2) 6AU6 (2) 6V6 (1) 0D-3/VR-150 (2) 0C-3/VR-90 (1) 5675
(1) 5675 Mod

CRYSTALS: Not required.

SEMI-CONDUCTORS: (1) 1N34 (9) K3A (4) CCTR-137-702

SHIPPING DATA

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

PROCURING SERVICE: USN
SPEC &/OR DWG:

DESIGN COG: Commercial

CONTRACTOR	LOCATION	CONTRACT OR ORDER NO.	APPROX. UNIT COST
Jerrold Electronics Corporation,	Philadelphia, Pennsylvania	N0bsr 89103 N600-24-60732 N600-24-62765	

9 November 1964

GENERATOR, SIGNAL SG-146/U

Cog Service: USN FSN:

Functional Class:

USA

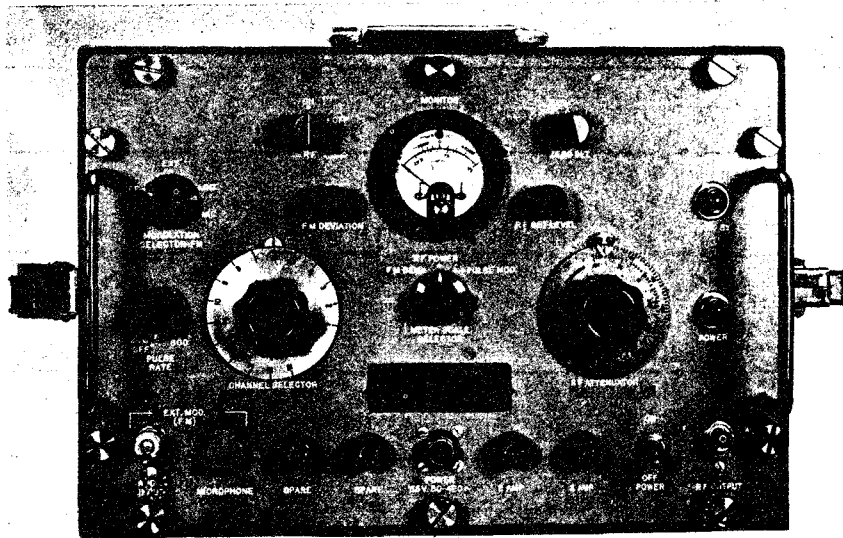
USN

USAF

TYPE CLASS:

Used by

MANUFACTURER'S NAME/CODE NUMBER: Magnavox Co., (37695); Jowil Electronics.



GENERATOR, SIGNAL SG-146/U

FUNCTIONAL DESCRIPTION:

Generator, Signal SG-146/U is a special purpose equipment designed to supply RF signals (at any one of 16 fixed frequencies) to Radio Receiving Set AN/ARR-26 and AN/ARR-26A during test and alignment procedures. The generator may be used to test amplifiers in the shop or in the aircraft.

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

RELATION TO OTHER EQUIPMENT:

EQUIPMENT REQUIRED BUT NOT SUPPLIED:

4.4 SG-146/U: 1

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SG-146/U GENERATOR, SIGNAL

TECHNICAL CHARACTERISTICS:

FREQUENCY RANGE: 162.25 to 173.5 mc in increments of 0.75 mc.
POWER INPUT: 102.5 to 126.5 v ac, 50 to 420 cps, 144 W approx.
RF POWER OUTPUT: 0.1 to 10,000 uv.

MODULATION

INTERNAL: 1000 cps, deviation adj from 0 to ± 125 kc.
EXTERNAL: 50 cps to 35 kc, deviation adj from 0 to ± 125 kc.

MAJOR COMPONENTS

QTY	ITEM	STOCK NUMBERS	DIMENSIONS (INCHES)	WEIGHT (LBS)
1	● Generator Signal SG-146/U includes:		10 x 13 x 14-3/4	32.5
1	Antenna Assy		16	
1	Power Cable Assy		72	
1	RF Cable Assy		48	
1	RF Cable Adapter		3/4 x 1-1/4	

REFERENCE DATA AND LITERATURE:

NAVSHIPS 00000: Handbook for Signal Generator SG-146/U.

TUBE, CRYSTAL AND/OR SEMI-CONDUCTOR DATA:

TUBES: (5) 5AK5W (2) 6HS6W (3) 12AT7WA (1) 5670 (3) 5644 (1) 47

CRYSTALS: Not required.

SEMI-CONDUCTORS: (5) 1N255 (6) 1N281

SHIPPING DATA

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

PROCURING SERVICE: USN DESIGN COG: USN, BuWeps
SPEC &/OR DWG: MIL-G-19660 (BuAer)

CONTRACTOR	LOCATION	CONTRACT OR ORDER NO.	APPROX. UNIT COST
Magnavox Co.	Fort Wayne, Ind.	N0a(S)55-597-d	
Jowil Electronics	Philadelphia, Pa.	N600A-46311	

4.4 SG-146/U: 2

21 April 1965

GENERATOR, SIGNAL SG-298/U

Cog Service: USN FSN: 2F6625-649-2032

Functional Class:

USA

USN

USAF

TYPE CLASS:

Used by

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



GENERATOR, SIGNAL SG-298/U

FUNCTIONAL DESCRIPTION:

Generator, Signal SG-298/U is a compact and versatile source of transient-free test voltages between 1200 and 0.008 cycles per second. It is useful for any general purpose low frequency testing application. Three types of output waveform are available; sine, square and triangular. Also a sync output pulse is available for external use.

No field changes in effect at time of preparation (13 April 1965).

RELATION TO OTHER EQUIPMENT: None.

EQUIPMENT REQUIRED BUT NOT SUPPLIED:

(1) Cable Assembly Hewlett-Packard Model AC-16A; (1) Cable Assembly Hewlett-Packard Model AC-16B.

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GENERATOR, SIGNAL SA-298/U

TECHNICAL CHARACTERISTICS:

FREQUENCY RANGE: 0.008 to 1200 cps in 5 decade ranges.
DIAL ACCURACY: 2% from 1.2 to 12; 3% from 0.8 to 1.2.
FREQUENCY STABILITY: Within 1% including warm-up drift.
OUTPUT WAVEFORMS: Sinusoidal, square, and triangular.
MAXIMUM OUTPUT VOLTAGE: At least 30 v peak to peak across rated load (4,000 ohms) for all three waveforms.
INTERNAL IMPEDANCE: Approx 40 ohms over the entire range.
SINEWAVE DISTORTION: Less than 2% on X100 range; Less than 1% on all other ranges.
FREQUENCY RESPONSE: Constant within 0.2 db.
HUM LEVEL: Less than 0.01% of max output.
SYNC PULSE: 10 v peak neg, less than 5 usec duration. Sync pulse occurs at crest of sine and triangular wave output.
POWER REQUIREMENTS: 115/230 v \pm 10%, 50/1000 cps 175 W.

MAJOR COMPONENTS

QTY	ITEM	STOCK NUMBERS	DIMENSIONS (INCHES)	WEIGHT (LBS)
1	Generator, Signal SG-298/U includes:	2F6625-649-2032	12-1/2 x 14-1/2 x 20-1/2	43
2	Operating and Servicing Manuals		1/2 x 8-1/2 x 11	1

REFERENCE DATA AND LITERATURE:

NAVSHIPS 93115: Technical Manual for Signal Generator SG-298/U.

TUBE, CRYSTAL AND/OR SEMI-CONDUCTOR DATA:

TUBES: (3) 6AU6 (3) 6AL5 (1) 6C4 (2) 0A2 (1) 0A3 (3) 12AX7 (3) 12AU7
(1) 5U4GA/B (2) 6AV5GT/6AU5GT (1) HP Type 212-G11A (12) HP Type G-29A-45A

CRYSTALS: Not required.

SEMI-CONDUCTORS: Not required.

SHIPPING DATA

PKGS	VOLUME (CU FT)	WEIGHT (LBS)
1*	4.76	63
1**	6.77	68

* Packaged for Domestic Shipment.

** Packaged for Export Shipment.

4.4 SG-298/U: 2

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GENERATOR, SIGNAL SA-298/U

PROCUREMENT DATA

PROCURING SERVICE: USN
SPEC &/OR DWG:

DESIGN COG: USN, BuShips

CONTRACTOR	LOCATION	CONTRACT OR ORDER NO.	APPROX. UNIT COST
Hewlett-Packard Co. Model 202A	Palo Alto, Calif.	N0bsr-85128	\$528.00

116

9 October 1964

Cog Service: USN FSN: 2F6625-980-1939

GENERATOR, SIGNAL SG-522/U

Functional Class:

USA

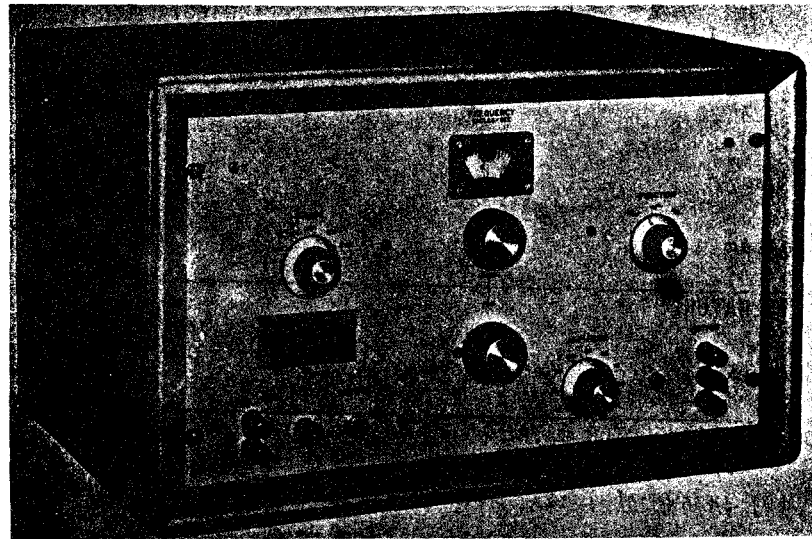
USN

USAF

TYPE CLASS:

Used by

MANUFACTURER'S NAME/CODE NUMBER: Electronic Designs Inc., (14048).



GENERATOR, SIGNAL SG-522/U

FUNCTIONAL DESCRIPTION:

Generator, Signal SG-522/U is a compact, convenient, and versatile source of transient-free test voltages between 1200 and .008 cycles per second. It is useful for any general purpose low frequency testing application and is particularly valuable in the testing of servo systems, geophysical equipment, vibration and stability characteristics of mechanical systems, electro-medical equipment, and for the electrical simulation of mechanical phenomena. Three types of output waveform are available; sine, square and triangular. Also a sync output pulse is available for external use.

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

RELATION TO OTHER EQUIPMENT:

SG-522/U GENERATOR, SIGNAL

EQUIPMENT REQUIRED BUT NOT SUPPLIED:**TECHNICAL CHARACTERISTICS:**

FREQUENCY RANGE: 0.008 to 1200 cps in five decade ranges with wide overlap at each extreme.

DIAL ACCURACY: Within $\pm 2\%$ from "1.2" to "12" on dial; $\pm 3\%$ from ".8" to "1.2".

FREQUENCY STABILITY: Within $\pm 1\%$ including warm-up drift and line voltage variations of $\pm 10\%$.

OUTPUT WAVEFORMS: Sinusoidal, square, and triangular. Selected by panel switch.

MAXIMUM OUTPUT VOLTAGE: At least 30 v peak-to-peak across rated load (4000 ohms) for all three waveforms. (10.6 v rms for sine wave).

INTERNAL IMPEDANCE: Approx 40 ohms over the entire range.

DISTORTION: Less than 1% on all ranges except X100. Less than 2% rms on X100.

OUTPUT SYSTEM: Can be operated either balanced or single-ended. Output system is direct-coupled; dc level of output voltage remains stable over long periods of time. DC adjustment available on front panel.

HUM LEVEL: Less than 0.05% at rated output.

SYNC PULSE: 10 v peak negative, less than 5 ms duration. Sync pulse occurs at crest of sine wave and with corresponding positions on other waveforms.

POWER: 115 to 230 v $\pm 10\%$, 50 to 1000 cyc source, 175 W.

MAJOR COMPONENTS

QTY	ITEM	STOCK NUMBERS	DIMENSIONS (INCHES)	WEIGHT (LBS)
1	Generator, Signal SG-522/U	2F6625-980-1939	14-1/8 x 15-3/4 x 21-5/8	

REFERENCE DATA AND LITERATURE:

NAVSHIPS 94671: Technical Manual, Operation, Service and Repair Instructions for Signal Generator SG-522/U.

TUBE, CRYSTAL AND/OR SEMI-CONDUCTOR DATA:

TUBES: (3) 6AU6WA (3) 6AL5W (1) 6C4WA (2) 0A2 (1) 0A3 (6) 12AX7 (1) 5U4GA/B
(2) 6AV5GT/6AU5GT

CRYSTALS: Not required.

SEMI-CONDUCTORS: (13) 2016-1285

SHIPPING DATA

PKGS	VOLUME (CU FT)	WEIGHT (LBS)
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4.4 SG-522/U: 2

PROCUREMENT DATA

PROCURING SERVICE: USN
SPEC &/OR DWG:

DESIGN COG: USN, BuShips

CONTRACTOR	LOCATION	CONTRACT OR ORDER NO.	APPROX. UNIT COST
Electronic Designs Inc.	Dallas, Texas	NObsr-87726	\$405.00

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