

ELECTRICAL & ELECTRONIC
TEST **E**QUIPMENT **D**ATA
HANDBOOK

VOLUME 4

**SIGNAL GENERATING
EQUIPMENT**

FREDERICK RESEARCH CORPORATION

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TO THE USERS OF THIS HANDBOOK:

In recognition of the many problems associated with the selection of electrical-electronic test equipment for specific applications, Frederick Research Corporation has compiled a series of volumes which contain test equipment descriptions. The items described in the volumes are primarily those used by government agencies and contractors. At the request of the government, and in the interest of providing users with the desired information without the necessity of costly search and compilation, this firm has made this unclassified data available to government agencies and contractors for many years.

The United States Senate has twice cited the Frederick Research Corporation in the Congressional Record (1955 and 1960) for its achievements in efforts to save the government millions of dollars by avoiding duplication in government purchases and promoting the development and utilization of the best test equipment at the lowest cost consistent with quality. We believe that the material in these volumes should provide a means for users to review their test equipment requirements with a minimum expenditure of funds and technical man-hours.

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AIDS TO USE OF THE VOLUMES

This series of volumes has been prepared for the purpose of aiding engineers and other personnel in the selection of electrical-electronic test equipment to satisfy numerous test requirements. Thus, the format of the descriptive sheets has been specifically designed to provide the concise equipment data necessary for the selection procedure - functional description, electromechanical characteristics, reference source data, and other pertinent information. All data is as complete and current as the information available at the time the equipment description was prepared.

To save the maximum amount of time and to facilitate easy location of a particular item, the complete series has been divided into volumes based upon the accepted functional classification of equipment types. Thus, all equipments performing a specific type of test, monitoring, or measurement function are contained in one volume. For example, all equipments performing Voltage and Current Measuring functions are contained in Volume 1. Where the number of equipment descriptions in a particular class is insufficient to warrant an entire book, more than one volume (class) of equipment descriptions may be included in one book. For example, Volumes 5, 6, 7, 8 and 9 are contained in one book. The volumes are separated by green divider sheets.

Conversely, where the number of equipment descriptions is so large that a single book would be cumbersome, the volume will consist of two or more parts. For instance, Volume 10 is sufficiently large to warrant its division into parts.

Within each functional class and its subclasses, the descriptive sheets are arranged in alpha-numerical order based upon the equipment designation, e. g. , ME-6B/U, ME-6D/U, ME-30/U, TS-375/U, and similarly until all descriptions in one particular class are covered.

The definitions and index of the functional classification categories and subclassifications will be found on the following pages. The alpha-numerical arrangement is provided to aid the user in his search for items in the event that only item nomenclature is known.

As an example of use of the Handbook, assume specific test requirements arise which dictate the use of a vacuum tube voltmeter (VTVM). To determine if there is an equipment having the necessary characteristics, locate the List of Handbook Volumes on Page iii in any

of the Handbook volumes and note that voltage and current measuring equipments are located in Volume 1.

In Volume 1 turn to the Electronics Test Equipment Functional Classifications to find the functional class under which VTVM's appear. From the listing, it is seen that voltage measuring equipments are assigned the functional class of 1.1 and that VTVM's are most likely included in the subclass 1.1.1 Electronic Voltmeter. A check of the functional class definitions provided on Page vii will verify this.

Next, turn to the yellow divider, 1.1 Voltage Measuring Equipment, and proceed in that section to the equipment descriptions assigned the functional class 1.1.1. All VTVM descriptions will appear in alpha-numerical order within this section. Alpha-numerical listings of equipment descriptions within each subclass are provided in the Table of Contents.

Data on specific pieces of test equipment may also be quickly located. For instance, assume that one wanted to look up the characteristics of the ME-6D/U Electronic Multimeter. First, locate the correct volume as in the above example, which in this case is again Volume 1. In Volume 1 refer to the Alpha-Numerical Index, locate the item and note its functional class as being 1.1.1. Next, turn to the yellow divider 1.1 Voltage Measuring Equipment and proceed in that section to the descriptions assigned the functional class 1.1.1. The ME-6D/U is placed alpha-numerically in this class, physically located between the ME-6B/U and the ME-30/U.

A standard data format is used throughout the Handbook. Once the user has become familiar with this format, he will find it easy to locate specific data on a given instrument as well as convenient for the comparison of several instruments.

LIST OF HANDBOOK VOLUMES

Title	Volume
Voltage and Current Measuring Equipment	1
Frequency Measuring Equipment	2
Waveform Measuring and/or Analyzing Equipment	3
Signal Generating Equipment	4
Field Strength and Intensity Measuring Equipment	5
Impedance and Standing Wave Ratio Measuring Equipment	6
Active Networks for Test Purposes	7
Time Measuring and Counting Equipment	8
Nuclear Energy Test and Measuring Equipment	9
Multifunction Test and Measuring Equipment	10
Associated Devices for Test and Measuring Equipment	11
Passive Networks for Test Purposes	12
Standards and Calibration Equipment for Test and Measuring Equipment	13
Power and Energy Measuring Equipment	14
Temperature Indicating, Measuring, and Recording Equipment	15
Stress, Strain and Flaw Detecting and Measuring Equipment	16
Gas and/or Liquid Measuring and Analyzing Equipment	17
Kinematic Test and Measuring Equipment	18
Optical Testing, Measuring and Aligning Equipment	19

ELECTRONICS TEST EQUIPMENT
FUNCTIONAL CLASSIFICATION

- 4. SIGNAL GENERATING EQUIPMENT
 - 4.1 Signal Generator
 - 4.1.1 Unmodulated Signal Generator
 - 4.1.2 Modulated Signal Generator
 - 4.1.3 Electronic Frequency - Synthesizer
 - 4.2 Test Oscillator
 - 4.2.1 Unmodulated Test Oscillator
 - 4.2.2 Modulated Test Oscillator
 - 4.3 Complex Wave Generator
 - 4.3.1 Function Generator
 - 4.3.2 Pulse Generator
 - 4.3.3 Square Wave Generator
 - 4.3.4 Triangular Wave and Saw Tooth Generator
 - 4.3.5 Time Delay Generator
 - 4.4 Random Function Generator
 - 4.4.1 Random Noise Generator
 - 4.4.2 Impulse Noise Generator
 - 4.4.3 Random Impulse Generator
 - 4.5 Waveform Synthesizer
 - 4.5.1 Electronic Waveform - Synthesizer
 - 4.5.2 Mechanical Waveform - Synthesizer

ELECTRONICS TEST EQUIPMENT
FUNCTIONAL CLASSIFICATION - DEFINITIONS

- 4. SIGNAL GENERATING EQUIPMENT
Equipments used to generate varying voltages or electrical currents for test purposes.
- 4.1 SIGNAL GENERATOR
An equipment used to generate an electrical alternating signal of known frequency and amplitude and having a calibrated output.
- 4.1.1 UNMODULATED SIGNAL GENERATOR
A device whose output is a sine wave and which is calibrated in units of both power (or voltage) and frequency.
- 4.1.2 MODULATED SIGNAL GENERATOR
A device whose output signal may be changed in amplitude and/or frequency according to a desired pattern, and which is calibrated in units of both power (or voltage) and frequency.
- 4.1.3 ELECTRONIC FREQUENCY SYNTHESIZER
A device which generates two or more selectable frequencies from one or more fixed frequency sources.
- 4.2 TEST OSCILLATOR
An equipment used to generate an alternating uncalibrated voltage or electrical current.
- 4.2.1 UNMODULATED TEST OSCILLATOR
An uncalibrated device producing a continuous sine wave signal of constant frequency and amplitude.
- 4.2.2 MODULATED TEST OSCILLATOR
A device producing an uncalibrated output signal whose amplitude and/or frequency may be changed according to a desired pattern.
- 4.3 COMPLEX WAVE GENERATOR
A device which generates a nonsinusoidal signal having a desired repetitive characteristic and waveform.
- 4.3.1 FUNCTION GENERATOR
A device which may generate two or more desired waveforms.

ELECTRONICS TEST EQUIPMENT
FUNCTIONAL CLASSIFICATION - DEFINITIONS

4. 3. 2 PULSE GENERATOR
A device which generates a controlled series of electrical pulses.
4. 3. 3 SQUARE WAVE GENERATOR
A device which generates a waveform having equal "on" and "off" periods.
4. 3. 4 TRIANGULAR WAVE AND SAW TOOTH GENERATOR
A device which generates an electrical triangular waveform or a saw tooth waveform.
4. 3. 5 TIME DELAY GENERATOR
A device which accepts an input signal and provides a delay in time before the initiation of an output signal.
4. 4 RANDOM FUNCTION GENERATOR
A device which generates signals which are distributed over a broad frequency range, or provides an output which is nonrepetitive.
4. 4. 1 RANDOM NOISE GENERATOR
An equipment used to generate a continuous succession of random signals which are distributed over a wide frequency spectrum.
4. 4. 2 IMPULSE NOISE GENERATOR
An equipment used to generate repetitive pulses which provide random noise signals uniformly spread over a wide band of frequencies.
4. 4. 3 RANDOM IMPULSE GENERATOR
An equipment used to generate electrical impulses which are randomly distributed in time.
4. 5 WAVEFORM SYNTHESIZER
An equipment used to generate an electrical signal of a desired waveform.

ELECTRONICS TEST EQUIPMENT
FUNCTIONAL CLASSIFICATION - DEFINITIONS

- 4.5.1 **ELECTRONIC WAVEFORM - SYNTHESIZER**
 A device which generates an electrical signal of a desired waveform by means of electron tubes.
- 4.5.2 **MECHANICAL WAVEFORM - SYNTHESIZER**
 A device which generates an electrical signal of a desired waveform by mechanical means.

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Functional Classification	Designation	Name
4.	SIGNAL GENERATING EQUIPMENT	
4.	Kay Rada Sweep 380-A	Generator, Sweep Signal
4. 1	SIGNAL GENERATORS	
4. 1. 1	AN/URM-9(XW)	Shielding Test Set
4. 1. 1	TS-382A/U	Audio Oscillator
4. 1. 1	TS-382B/U	Audio Oscillator
4. 1. 1	TS-382C/U	Audio Oscillator
4. 1. 1	TS-382D/U	Audio Oscillator
4. 1. 1	TS-382E/U	Audio Oscillator
4. 1. 1	TS-421A/U	Audio Oscillator
4. 1. 1	Hewlett-Packard 200D	Audio Oscillator
4. 1. 2	AN/GPM-15	Signal Generator
4. 1. 2	AN/GRM-4	Signal Generator
4. 1. 2	AN/URM-15	Signal Generator Set
4. 1. 2	AN/URM-25	RF Signal Generator Set
4. 1. 2	AN/URM-25A	RF Signal Generator Set
4. 1. 2	AN/URM-25B	RF Signal Generator Set
4. 1. 2	AN/URM-25E	RF Signal Generator Set
4. 1. 2	AN/URM-25F	RF Signal Generator Set
4. 1. 2	AN/URM-26	RF Signal Generator Set
4. 1. 2	AN/URM-33	Signal Generator
4. 1. 2	AN/URM-34	Signal Generator
4. 1. 2	AN/URM-35	Signal Generator
4. 1. 2	AN/URM-36	Signal Generator
4. 1. 2	AN/URM-44	Radio Test Set
4. 1. 2	AN/URM-48	Signal Generator
4. 1. 2	AN/URM-49	Signal Generator
4. 1. 2	AN/URM-52	Signal Generator

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Functional Classification	Designation	Name
4. 1. 2	AN/URM-61	Signal Generator
4. 1. 2	AN/URM-61A	Signal Generator
4. 1. 2	AN/URM-64	Signal Generator
4. 1. 2	AN/URM-64A	Signal Generator
4. 1. 2	AN/URM-70	Signal Generator
4. 1. 2	AN/USM-16	Signal Generator Set
4. 1. 2	AN/USM-44	Signal Generator
4. 1. 2	AN/USM-47	Signal Generator
4. 1. 2	AN/USM-48	Signal Generator
4. 1. 2	I-137-B	Signal Generator
4. 1. 2	I-208	Signal Generator
4. 1. 2	LAE	Signal Generator
4. 1. 2	LAE-3	RF Signal Generator Equipment
4. 1. 2	LAE-4	RF Signal Generator Equipment
4. 1. 2	LAF	Signal Generator
4. 1. 2	LAF-3	RF Signal Generator Equipment
4. 1. 2	LAG	Signal Generator
4. 1. 2	SG-1/ARN	Signal Generator
4. 1. 2	SG-1A/ARN	Signal Generator
4. 1. 2	SG-6/U	Signal Generator
4. 1. 2	SG-13/ARN	Signal Generator
4. 1. 2	SG-20/U	RF Signal Generator
4. 1. 2	SG-28(XW)/U	RF Signal Generator
4. 1. 2	SG-31/U	RF Signal Generator
4. 1. 2	SG-50(XN-1)/ARN	RF Signal Generator

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Functional Classification	Designation	Name
4. 1. 2	SG-77(XC-1)/U	Signal Generator
4. 1. 2	SG-91/U	Signal Generator
4. 1. 2	SG-146/U	Signal Generator
4. 1. 2	T-216/GR	Radio Transmitter
4. 1. 2	TS-67/ARN-5	Test Set
4. 1. 2	TS-67A/ARN-5	Test Set
4. 1. 2	TS-128/UP	Signal Generator
4. 1. 2	TS-170/ARN-5	Test Oscillator
4. 1. 2	TS-197/CPM-4	Signal Generator
4. 1. 2	TS-251/UP	Test Set
4. 1. 2	TS-348/AP	Signal Generator
4. 1. 2	TS-403/U	Signal Generator
4. 1. 2	TS-403A/U	Signal Generator
4. 1. 2	TS-413/U	Signal Generator
4. 1. 2	TS-413A/U	Signal Generator
4. 1. 2	TS-413B/U	Signal Generator
4. 1. 2	TS-413C/U	Signal Generator
4. 1. 2	TS-418/U	Signal Generator
4. 1. 2	TS-419/U	Signal Generator
4. 1. 2	TS-437(XA-A)/U	Signal Generator
4. 1. 2	TS-465/U	Signal Generator
4. 1. 2	TS-497/URR	Signal Generator
4. 1. 2	TS-497A/URR	Signal Generator
4. 1. 2	TS-497B/URR	Signal Generator
4. 1. 2	TS-510/U	Signal Generator
4. 1. 2	TS-588/U	Signal Generator
4. 1. 2	TS-588A/U	Signal Generator

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Functional Classification	Designation	Name
4. 1. 2	TS-606/U	Signal Generator
4. 1. 2	TS-608/U	Signal Generator
4. 1. 2	Boonton 202-B	Signal Generator
4. 1. 2	Boonton 202-D	Signal Generator
4. 1. 2	Ferris 16C	Standard Signal Generator
4. 1. 2	General Radio 805-C	Standard Signal Generator
4. 1. 2	Hewlett-Packard 608A	VHF Signal Generator
4. 1. 2	Hewlett-Packard 608B	Signal Generator
4. 1. 2	Hewlett-Packard 608D	Signal Generator
4. 1. 2	Hewlett-Packard 650A	Test Oscillator
4. 1. 2	Measurements 84-TRV	Standard Signal Generator
4. 1. 2	Philco 5005	Mobiliner
4. 1. 2	Polarad, Model MSG-1	Signal Generator
4. 1. 2	Polytechnic 902	Signal Generator
4. 1. 3	CV-301/U	Electronic Frequency Converter
4. 1. 3	TS-999/U	DRT Test Set
4. 1. 3	Boonton 207-A	Frequency Converter Accessory
4. 2	TEST OSCILLATORS	
4. 2. 1	TS-221/TSM	Standard Oscillator
4. 2. 1	TS-237/TRC-8	Test Oscillator
4. 2. 1	TS-560()/FT	Audio Oscillator
4. 2. 1	General Radio 723	Vacuum Tube Fork Test Kit
4. 2. 1	General Radio 1301-A	Oscillator, Low Distortion
4. 2. 1	Hewlett-Packard 200CD	Wide Range Oscillator

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Functional Classification	Designation	Name
4. 2. 1	Kay CP 932-B	Generator, Sweep
4. 2. 1	Measurements 82	Standard Signal Generator
4. 2. 1	Teletronics TO-100	Oscillator, Test
4. 2. 1	Waveforms 510-B	Audio Oscillator
4. 2. 2	AN/UPM-46	Test Oscillator
4. 2. 2	AN/URM-75	Generator, Sweep
4. 2. 2	BC-638-A	Frequency Meter
4. 2. 2	BC-1149-C	Radio Transmitter
4. 2. 2	I-72-G	Signal Generator
4. 2. 2	I-72-H	Signal Generator
4. 2. 2	I-72-J	Signal Generator
4. 2. 2	I-72-K	Signal Generator
4. 2. 2	I-72-L	Signal Generator
4. 2. 2	I-96-A	Signal Generator
4. 2. 2	I-130-A	Signal Generator
4. 2. 2	I-196-A	Signal Generator
4. 2. 2	I-196-B	Signal Generator
4. 2. 2	RC-93-A	Oscillator Test Equipment
4. 2. 2	RC-93-B	Oscillator Test Equipment
4. 2. 2	RC-93-C	Oscillator Test Equipment
4. 2. 2	TS-1/ARR-1	Test Set
4. 2. 2	TS-24/ARR-2	Test Oscillator
4. 2. 2	TS-24A/ARR-2	Test Oscillator
4. 2. 2	TS-47/APR	Test Oscillator

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Functional Classification	Designation	Name
4. 2. 2	TS-189/U	Test Set
4. 2. 2	TS-202A/U	Signal Generator
4. 2. 2	TS-252/AP	Test Oscillator
4. 2. 2	TS-278/AP	Test Set
4. 2. 2	TS-406/UP	Test Oscillator
4. 2. 2	TS-508/UP	Test Oscillator
4. 2. 2	Hewlett-Packard 686A	Sweep Oscillator
4. 2. 2	Sperry 1, 000, 131	Analyzer, Accelerometer
4. 3	COMPLEX WAVE GENERATORS	
4. 3	General Electric ST-4A	Sweep Generator
4. 3	Kay Marka-Sweep Model Video	Generator, Sweep, Video
4. 3. 1	AN/UPM-101	Radar Test Set
4. 3. 1	Berkeley 903	Double Pulse Generator
4. 3. 1	Hewlett-Packard 202A	Oscillator, Audio
4. 3. 2	AN/UPM-15	Pulse Generator Set
4. 3. 2	AN/UPM-55	Pulse Generator
4. 3. 2	AN/USM-27A	Signal Generator
4. 3. 2	BC-1203-B	Modulator Unit
4. 3. 2	IE-45-A	Test Equipment
4. 3. 2	IE-45-B	Test Equipment
4. 3. 2	SG-18/U	Signal Generator
4. 3. 2	SG-30(XN)/UP	Pulse Generator
4. 3. 2	SG-142/DPM-1	Generator, Pulse Delay
4. 3. 2	TS-592/UPM-15	Pulse Generator
4. 3. 2	Electro-Pulse 2120A	Pulse Generator
4. 3. 2	Measurements 79B	Pulse Generator

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Functional Classification	Designation	Name
4. 3. 2	Minneapolis-Honeywell HT117	Pulse Generator, Servo Test
4. 3. 2	Minneapolis-Honeywell HT172	Generator, Pulse, Servo Run-In
4. 3. 2	Tektronix 180	Time-Mark Generator
4. 3. 3	SG-106/MPQ-25	Signal Generator
4. 3. 3	TS-583A/U	Square Wave Generator
4. 4	RANDOM FUNCTION GENERATORS	
4. 4. 1	I-173-A	Test Set
4. 4. 1	SG-8/U	Noise Generator
4. 4. 1	SG-51/U	Interference Generator
4. 4. 1	TS-195/GP	Noise Generator
4. 4. 1	General Radio 1390-B	Random Noise Generator
4. 4. 1	Kay Mega-Node	Generator, Noise
4. 4. 3	SG-23/U	Interference Generator
4. 5	WAVEFORM SYNTHESIZERS	
4. 5. 2	MD-83/ARN	Modulator
4. 5. 2	MD-83A/ARN	Modulator
4. 5. 2	SG-116/DSM-13	Signal Generator

ALPHA-NUMERICAL INDEX

Designation	Name	Functional Classification
AN/GPM-15	Signal Generator	4. 1. 2
AN/GRM-4	Signal Generator	4. 1. 2
AN/UPM-15	Pulse Generator Set	4. 3. 2
AN/UPM-46	Test Oscillator	4. 2. 2
AN/UPM-55	Pulse Generator	4. 3. 2
AN/UPM-101	Radar Test Set	4. 3. 1
AN/URM-9(XW)	Shielding Test Set	4. 1. 1
AN/URM-15	Signal Generator Set	4. 1. 2
AN/URM-25	RF Signal Generator Set	4. 1. 2
AN/URM-25A	RF Signal Generator Set	4. 1. 2
AN/URM-25B	RF Signal Generator Set	4. 1. 2
AN/URM-25E	RF Signal Generator Set	4. 1. 2
AN/URM-25F	RF Signal Generator Set	4. 1. 2
AN/URM-26	RF Signal Generator Set	4. 1. 2
AN/URM-33	Signal Generator	4. 1. 2
AN/URM-34	Signal Generator	4. 1. 2
AN/URM-35	Signal Generator	4. 1. 2
AN/URM-36	Signal Generator	4. 1. 2
AN/URM-44	Radio Test Set	4. 1. 2
AN/URM-48	Signal Generator	4. 1. 2
AN/URM-49	Signal Generator	4. 1. 2
AN/URM-52	Signal Generator	4. 1. 2
AN/URM-61	Signal Generator	4. 1. 2
AN/URM-61A	Signal Generator	4. 1. 2
AN/URM-64	Signal Generator	4. 1. 2
AN/URM-64A	Signal Generator	4. 1. 2
AN/URM-70	Signal Generator	4. 1. 2

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Designation	Name	Functional Classification
AN/URM-75	Generator, Sweep	4. 2. 2
AN/USM-16	Signal Generator Set	4. 1. 2
AN/USM-27A	Signal Generator	4. 3. 2
AN/USM-44	Signal Generator	4. 1. 2
AN/USM-47	Signal Generator	4. 1. 2
AN/USM-48	Signal Generator	4. 1. 2
BC-638-A	Frequency Meter	4. 2. 2
BC-1149-C	Radio Transmitter	4. 2. 2
BC-1203-B	Modulator Unit	4. 3. 2
CV-301/U	Electronic Frequency Converter	4. 1. 3
I-72-G	Signal Generator	4. 2. 2
I-72-H	Signal Generator	4. 2. 2
I-72-J	Signal Generator	4. 2. 2
I-72-K	Signal Generator	4. 2. 2
I-72-L	Signal Generator	4. 2. 2
I-96-A	Signal Generator	4. 2. 2
I-130-A	Signal Generator	4. 2. 2
I-137-B	Signal Generator	4. 1. 2
I-173-A	Test Set	4. 4. 1
I-196-A	Signal Generator	4. 2. 2
I-196-B	Signal Generator	4. 2. 2
I-208	Signal Generator	4. 1. 2
IE-45-A	Test Equipment	4. 3. 2
IE-45-B	Test Equipment	4. 3. 2
LAE	Signal Generator	4. 1. 2
LAE-3	RF Signal Generator Equipment	4. 1. 2
LAE-4	RF Signal Generator Equipment	4. 1. 2

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Designation	Name	Functional Classification
LAF	Signal Generator	4. 1. 2
LAF-3	RF Signal Generator Equipment	4. 1. 2
LAG	Signal Generator	4. 1. 2
MD-83/ARN	Modulator	4. 5. 2
MD-83A/ARN	Modulator	4. 5. 2
RC-93-A	Oscillator Test Equipment	4. 2. 2
RC-93-B	Oscillator Test Equipment	4. 2. 2
RC-93-C	Oscillator Test Equipment	4. 2. 2
SG-1/ARN	Signal Generator	4. 1. 2
SG-1A/ARN	Signal Generator	4. 1. 2
SG-6/U	Signal Generator	4. 1. 2
SG-8/U	Noise Generator	4. 4. 1
SG-13/ARN	Signal Generator	4. 1. 2
SG-18/U	Signal Generator	4. 3. 2
SG-20/U	RF Signal Generator	4. 1. 2
SG-23/U	Interference Generator	4. 4. 3
SG-28(XW)/U	RF Signal Generator	4. 1. 2
SG-30(XN)/UP	Pulse Generator	4. 3. 2
SG-31/U	RF Signal Generator	4. 1. 2
SG-50(XN-1)/ARN	RF Signal Generator	4. 1. 2
SG-51/U	Interference Generator	4. 4. 1
SG-77(XC-1)/U	Signal Generator	4. 1. 2
SG-91/U	Signal Generator	4. 1. 2
SG-106/MPQ-25	Signal Generator	4. 3. 3
SG-116/DSM-13	Signal Generator	4. 5. 2
SG-142/DPM-1	Generator, Pulse Delay	4. 3. 2
SG-146/U	Signal Generator	4. 1. 2

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Designation	Name	Functional Classification
T-216/GR	Radio Transmitter	4. 1. 2
TS-1/ARR-1	Test Set	4. 2. 2
TS-24/ARR-2	Test Oscillator	4. 2. 2
TS-24A/ARR-2	Test Oscillator	4. 2. 2
TS-47/APR	Test Oscillator	4. 2. 2
TS-67/ARN-5	Test Set	4. 1. 2
TS-67A/ARN-5	Test Set	4. 1. 2
TS-128/UP	Signal Generator	4. 1. 2
TS-170/ARN-5	Test Oscillator	4. 1. 2
TS-189/U	Test Set	4. 2. 2
TS-195/GP	Noise Generator	4. 4. 1
TS-197/CPM-4	Signal Generator	4. 1. 2
TS-202A/U	Signal Generator	4. 2. 2
TS-221/TSM	Standard Oscillator	4. 2. 1
TS-237/TRC-8	Test Oscillator	4. 2. 1
TS-251/UP	Test Set	4. 1. 2
TS-252/AP	Test Oscillator	4. 2. 2
TS-278/AP	Test Set	4. 2. 2
TS-348/AP	Signal Generator	4. 1. 2
TS-382A/U	Audio Oscillator	4. 1. 1
TS-382B/U	Audio Oscillator	4. 1. 1
TS-382C/U	Audio Oscillator	4. 1. 1
TS-382D/U	Audio Oscillator	4. 1. 1
TS-382E/U	Audio Oscillator	4. 1. 1
TS-403/U	Signal Generator	4. 1. 2
TS-403A/U	Signal Generator	4. 1. 2
TS-406/UP	Test Oscillator	4. 2. 2

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Designation	Name	Functional Classification
TS-413/U	Signal Generator	4. 1. 2
TS-413A/U	Signal Generator	4. 1. 2
TS-413B/U	Signal Generator	4. 1. 2
TS-413C/U	Signal Generator	4. 1. 2
TS-418/U	Signal Generator	4. 1. 2
TS-419/U	Signal Generator	4. 1. 2
TS-421A/U	Audio Oscillator	4. 1. 1
TS-437(XA-A)/U	Signal Generator	4. 1. 2
TS-465/U	Signal Generator	4. 1. 2
TS-497/URR	Signal Generator	4. 1. 2
TS-497A/URR	Signal Generator	4. 1. 2
TS-497B/URR	Signal Generator	4. 1. 2
TS-508/UP	Test Oscillator	4. 2. 2
TS-510/U	Signal Generator	4. 1. 2
TS-560()/FT	Audio Oscillator	4. 2. 1
TS-583A/U	Square Wave Generator	4. 3. 3
TS-588/U	Signal Generator	4. 1. 2
TS-588A/U	Signal Generator	4. 1. 2
TS-592/UPM-15	Pulse Generator	4. 3. 2
TS-606/U	Signal Generator	4. 1. 2
TS-608/U	Signal Generator	4. 1. 2
TS-999/U	DRT Test Set	4. 1. 3
Berkeley 903	Double Pulse Generator	4. 3. 1
Boonton 202-B	Signal Generator	4. 1. 2
Boonton 202-D	Signal Generator	4. 1. 2
Boonton 207-A	Frequency Converter Accessory	4. 1. 3
Electro-Pulse 2120A	Pulse Generator	4. 3. 2

ALPHA-NUMERICAL INDEX (Continued)

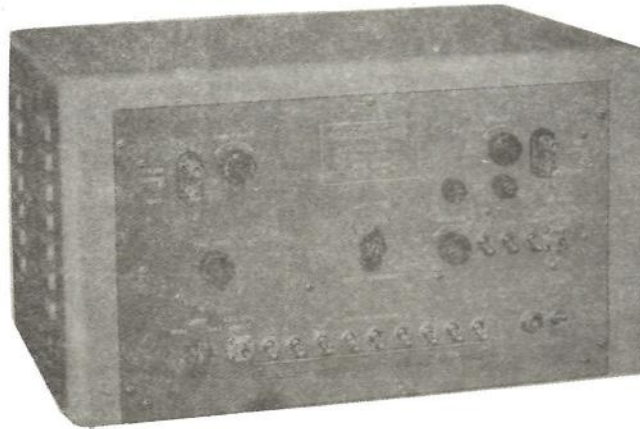
Designation	Name	Functional Classification
Ferris 16C	Standard Signal Generator	4. 1. 2
General Electric ST-4A	Sweep Generator	4. 3
General Radio 723	Vacuum Tube Fork Test Set	4. 2. 1
General Radio 805-C	Standard Signal Generator	4. 1. 2
General Radio 1301-A	Oscillator, Low Distortion	4. 2. 1
General Radio 1390-B	Random Noise Generator	4. 4. 1
Hewlett-Packard 200CD	Wide Range Oscillator	4. 2. 1
Hewlett-Packard 200D	Audio Oscillator	4. 1. 1
Hewlett-Packard 202A	Oscillator, Audio	4. 3. 1
Hewlett-Packard 608A	VHF Signal Generator	4. 1. 2
Hewlett-Packard 608B	Signal Generator	4. 1. 2
Hewlett-Packard 608D	Signal Generator	4. 1. 2
Hewlett-Packard 650A	Test Oscillator	4. 1. 2
Hewlett-Packard 686A	Sweep Oscillator	4. 2. 2
Kay CP 932-B	Generator, Sweep	4. 2. 1
Kay Marka-Sweep Model Video	Generator, Sweep, Video	4. 3
Kay Mega-Node	Generator, Noise	4. 4. 1
Kay Rada Sweep 380A	Generator, Sweep Signal	4.
Measurements 79B	Pulse Generator	4. 3. 2
Measurements 82	Standard Signal Generator	4. 2. 1
Measurements 84-TRV	Standard Signal Generator	4. 1. 2
Minneapolis-Honeywell HT 117	Pulse Generator, Servo Test	4. 3. 2
Minneapolis-Honeywell HT 172	Generator, Pulse, Servo Run-In	4. 3. 2
Philco 5005	Mobiliner	4. 1. 2
Polarad, Model MSG-1	Signal Generator	4. 1. 2

ALPHA-NUMERICAL INDEX (Continued)

Designation	Name	Functional Classification
Polytechnic 902	Signal Generator	4. 1. 2
Sperry 1, 000, 131	Analyzer, Accelerameter	4. 2. 2
Teletronics TO-100	Oscillator, Test	4. 2. 1
Tektronix 180	Time-Mark Generator	4. 3. 2
Waveforms 510-B	Audio Oscillator	4. 2. 1

4. SIGNAL GENERATING EQUIPMENT

GENERATOR, SWEEP SIGNAL
Rada-Sweep 380-A
(Kay Electric Company)



FUNCTIONAL DESCRIPTION:

This is a portable, general purpose, electronic sweep generator designed for rapid laboratory and production alignment of radar IF systems. In conjunction with an oscilloscope it will display the amplitude vs frequency response curves of IF amplifiers as well as marking up to nine frequencies for identification.

RELATIONSHIP TO OTHER EQUIPMENT:

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The sweep oscillator is driven by an electronic sawtooth generator. The generator voltage is available at the output terminals for deflection of an external oscilloscope. A true zero level baseline is produced on the oscilloscope display during the retrace time. The output levels of sweep signal and marker pulses are adjusted by separate controls.

Power Supply: 105 to 125 volts, AC, 50 to 60 cycles per second, single-phase, 100 watts input.

Sweep Width: 3 or 20 megacycles per second.

Center Frequencies: 30 and 60 megacycles per second.

Markers: Sharp, crystal positioned, pulse type marks are provided at 25, 35, 55, and 65 megacycles per second. Individual on-off control is provided for each mark.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.	7CAC-363916-9		
PROCUREMENT INFO.:			
PROCUREMENT COG.:	DESIGN COG.: Commercial		
F.I.I.N.:	FUNCTIONAL CLASS. NO.: 4		
- Electronics Test Equipment - Kay Rada-Sweep 380-A			

GENERATOR, SWEEP SIGNAL
Rada-Sweep 380-A
(Kay Electric Company)

ELECTROMECHANICAL DESCRIPTION: (Continued)

Amplitude Modulation While Sweeping: Less than 0.05 decibel per megacycle.
 Marker Output Voltage: Positive pulse, approximately 10 volts peak.
 Marker Output Control: Continuously variable, 0 to maximum.
 RF Output Voltage: 250 millivolts across 70 ohms.
 RF Output Control: Switched attenuator: 20 decibels, 20 decibels, 10 decibels. Continuous attenuator: Covers approximately 5:1 ratio.

MANUFACTURERS' OR CONTRACTORS' DATA:

Kay Electric Company, 14 Maple Avenue, Pine Brook, New Jersey; Approximate Cost per Unit, \$395.00.

TUBE COMPLEMENT:

None.

REFERENCE DATA AND LITERATURE:

Manufacturer's Catalog.

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Generator, Sweep Signal (Kay Rada-Sweep 380-A)		7CAC-363916-9	10-1/2	18	11	36

Kay Rada-Sweep 380-A - Electronics Test Equipment -

4. 1 SIGNAL GENERATORS

SHIELDING TEST SET AN/URM-9(XW)



FUNCTIONAL DESCRIPTION:

A high power test set used to evaluate the effectiveness of shields, conduits, and coupling joints which are used in radio, radar, electromechanical, and communication devices to reduce interference. This equipment is designed for laboratory use only. It consists of a signal generator, modulator, power assembly, signal amplifier, and a shielded test chamber.

RELATIONSHIP TO OTHER EQUIPMENT:

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The output from the signal generator is fed into a radiating coil which is placed on a movable platform within the shielded chamber. A pickup coil nearby feeds the induced signal out of the shielded chamber and into the signal amplifier. A meter mounted on the signal amplifier indicates relative signal

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Substitute Standard		
STOCK NOS.			
PROCUREMENT INFO.: USAF Exhibit WLENG-1190-A, 8 March 1949			
PROCUREMENT COG.: USAF		DESIGN COG.: USAF, Rome	
F.I.I.N.:		FUNCTIONAL CLASS NO.: 4.1.1	
- Electronics Test Equipment -			AN/URM-9(XW)

SHIELDING TEST SET AN/URM-9(XW)

ELECTROMECHANICAL DESCRIPTION: (Continued)

strength with and without a shielding device covering the radiating coil.
 Power Supply: 115 volts, $\pm 10\%$, AC, single phase, 60 cycles per second, 450 watts.
 Frequency Range: 2 cycles per second to 150 kilocycles per second.
 Type of Transmission: Continuous Wave or Pulse Modulated.
 Pulse Length: 1.5 to 200 microseconds.
 Percentage of Modulation: Can be controlled.

MANUFACTURERS' OR CONTRACTORS' DATA:

White Tuning Corporation, 421 W. 54th Street, New York 19, New York; Contract No. AFZ28(099)-88; June 1949.

TUBE COMPLEMENT:

3 JAN-6J7, 2 JAN-6V6, 3 JAN-5Y3, 3 JAN-6F6, 1 JAN-6F5, 1 JAN-6H6, 2 JAN-6K7, 1 JAN-884, 2 JAN-6J5, 2 JAN-6SN7, 1 JAN-5U4G, 1 JAN-6X5GT, 1 JAN-6SF5, 2 JAN-807, 1 JAN-6AG5, 4 JAN-6AK5, 2 JAN-6C4, 1 JAN-6Y6, 1 JAN-6A26, 2 JAN-6AC7, 2 JAN-1N34 (Crystal Rectifier).

REFERENCE DATA AND LITERATURE:

White Tuning Corporation, Handbook of Operating Instructions for AN/URM - 9(XW).

SHIPPING DATA:

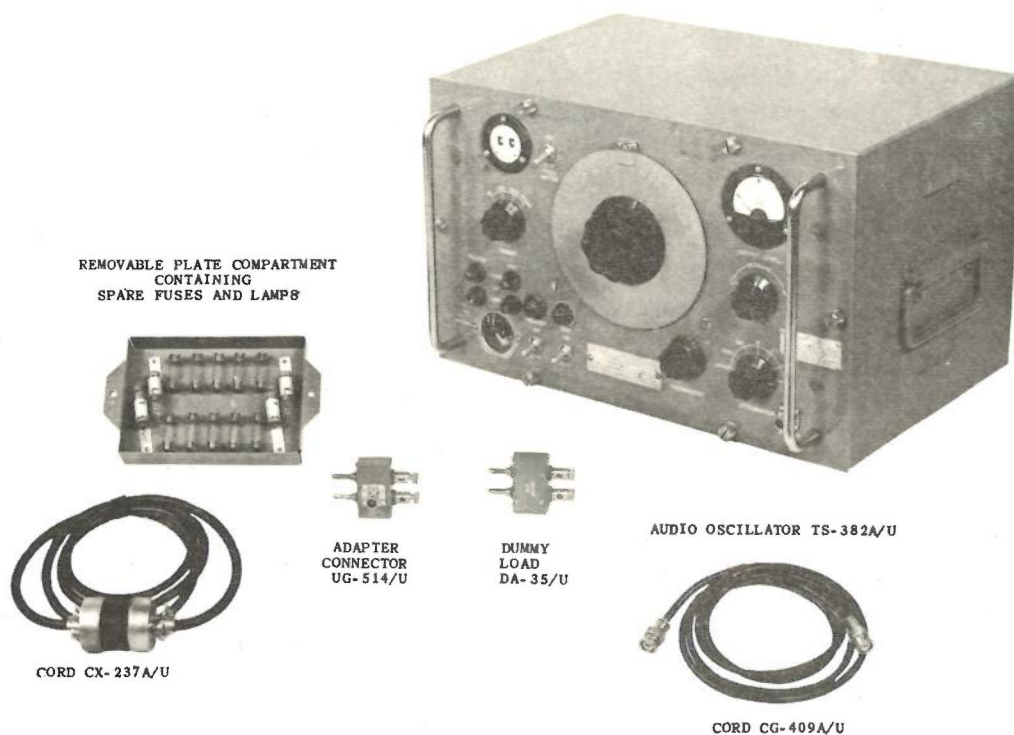
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
AN/URM-9(XW) - Electronics Test Equipment -						

SHIELDING TEST SET AN/URM-9(XW)

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Shielding Test Set AN/URM-9(XW) Including:						
1	Signal Generator			8-3/4	19	14	26
1	Modulator			8-3/4	19	14	16
1	Power Amplifier			8-3/4	19	14	41
1	Shielded Chamber			18-1/2	28	20	145
1	Signal Amplifier			8-1/4	19	16-1/4	29
9	Interconnecting Cables						4
4	Radiating Coils						1
9	Pickup Coils						4
1 Set	Caster						3
1	Cabinet			33-1/4	22-1/2	16	48
						Total:	317

AUDIO OSCILLATOR TS-382A/U
(GENERATOR, SIGNAL, TS-382A/U)



FUNCTIONAL DESCRIPTION:

A portable, general purpose audio oscillator which provides a sine wave output voltage over its frequency range. A vibrating reed frequency meter, mounted on the front panel, provides a frequency check at two points. A thermostatically controlled heater is incorporated in the equipment. The thermostat is adjustable from the front panel.

RELATIONSHIP TO OTHER EQUIPMENT:

Electrically and mechanically interchangeable with Audio Oscillator, TS-382/U, except for more rugged components, 7 range precision attenuator, output monitoring voltmeter (0-10 volts), and 60-400 cycles per second dual frequency vibrating reed meter for low-frequency calibration checks.

TS-382A/U replaces TS-382/U.

ELECTROMECHANICAL DESCRIPTION:

Power Supply: 115 volts, AC, single phase, 50 to 1600 cycles per second.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Substitute Standard		
STOCK NOS.	7CAC-363808		3F4325-382A
PROCUREMENT INFO.:	USAF Spec. No. 7204, 16 August 1948.		
PROCUREMENT COG.:	USAF	DESIGN COG.: USAF, C&N	
F.I.I.N.:	FUNCTIONAL CLASS NO.: 4.1.1		
	- Electronics Test Equipment -		TS-382A/U

AUDIO OSCILLATOR TS-382A/U
(GENERATOR, SIGNAL, TS-382A/U)

ELECTROMECHANICAL DESCRIPTION: (Continued)

Frequency Range: 20 to 200,000 cycles per second.
 Type of Transmission: Continuous Wave.
 Output Voltage: 0 to 10 volts.
 Frequency Meter Check Points: 60 and 400 cycles per second.
 Power Output: 100 milliwatts.
 Output Impedance: 1000 ohms.
 Accuracy: +2 to -3 microvolts on 1 to 10 microvolts range.
 ±3% on 10 microvolts to 10 volts range.
 ±2% of indicated frequency value.
 Temperature Range: -40° C. to +55° C. operative; -40° C. to +85° C. storage.
 Altitude Range: Sea level to 10,000 feet.
 Humidity Range: 0 to 100% relative.

MANUFACTURERS' OR CONTRACTORS' DATA:

Hewlett-Packard Company, 395 Page Mill Road, Palo Alto, California; Contract No. W-33(038)AC15148; Approximate Cost per Equipment, \$380.00.

Specialty Assembling and Packing Company, Inc., 79 Clifton Place, Brooklyn, New York; Contract No. AF 33(038)7516, AF 33(038)26089, and AF 33(038)15831.

Gray Television and Research Company, Inc., Boston, Massachusetts; Contract No. AF-10290 and Contract No. AF-12984.

TUBE COMPLEMENT:

1 JAN-0A3/VR75, 1 JAN-5Y3GT, 1 JAN-6AG7, 1 JAN-6J5, 2 JAN-6SJ7, 1 JAN-6SQ7, 1 JAN-6V6, 1 JAN-6Y6.

REFERENCE DATA AND LITERATURE:

- TO 16-35TS382-2 (Operation and Service Instructions).
- TO 16-35TS382-4 (Parts Catalog).
- TO 16-35TS382-6.
- TO 16-35TS382-8.
- TO 16-35TS382-16 (TM 11-2684A) (Instruction Book).

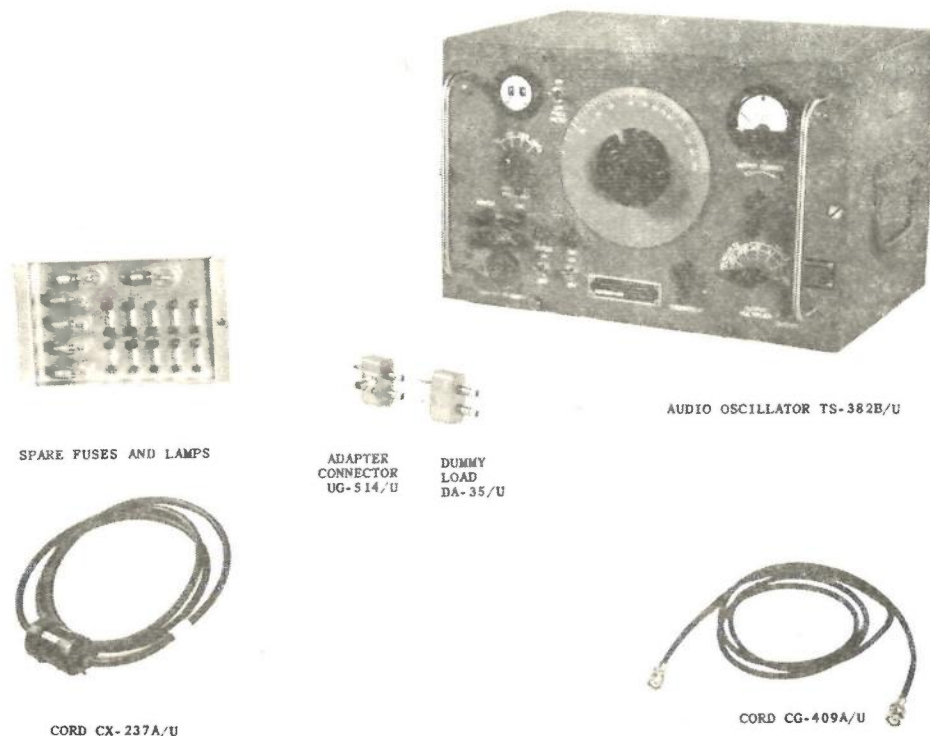
SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Audio Oscillator with accessories, TS-382A/U (Domestic Packed)	8	22	24-1/2	23-1/2	115

TS-382A/U

- Electronics Test Equipment -

AUDIO OSCILLATOR TS-382B/U
(OSCILLATOR, AUDIO FREQUENCY, TS-382B/U)



FUNCTIONAL DESCRIPTION:

A portable, general purpose audio oscillator which provides a sine wave output voltage over its frequency ranges. A vibrating reed frequency meter, mounted on the front panel, provides a frequency check at two points. A thermostatically controlled heater is incorporated in the equipment. The thermostat is adjustable from the front panel.

RELATIONSHIP TO OTHER EQUIPMENT:

ELECTROMECHANICAL DESCRIPTION:

Power Supply: 115 volts, AC, single phase, 50 to 1600 cycles per second.
 Frequency Range: 20 to 200,000 cycles per second in four ranges.
 Type of Transmission: Continuous Wave.
 Output Voltage: 0 to 10 volts in seven ranges.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Substitute Standard		
STOCK NOS.	7CAC-365317		3F4325-382B
PROCUREMENT INFO.:	USAF Spec. 7204, dated 16 Aug '48, and Am. 2 dated 17 Nov '49		
PROCUREMENT COG.:	USAF	DESIGN COG.: USAF, C&N	
F.I.I.N.:	FUNCTIONAL CLASS NO.:		4.1.1
- Electronics Test Equipment -			TS-382B/U

AUDIO OSCILLATOR TS-382B/U
(OSCILLATOR, AUDIO FREQUENCY, TS-382B/U)

ELECTROMECHANICAL DESCRIPTION: (Continued)

Frequency Meter Check Points: 60 and 400 cycles per second.

Power Output: 100 milliwatts.

Output Impedance: 1000 ohms.

Accuracy: $\pm 2\%$ of indicated frequency; +2 to -3 microvolts on 1 to 10 microvolt ranges; $\pm 3\%$ on 10 microvolts to 10 volt ranges; $\pm 0.3\%$ for frequency at check points.

Temperature Range: -40° C. to $+55^{\circ}$ C., operational; -40° C. to $+85^{\circ}$ C., storage.

Altitude Range: Sea level to 10,000 feet.

Humidity Range: 0 to 100%, relative.

MANUFACTURERS' OR CONTRACTORS' DATA:

Gray Television and Research Company, Inc., Boston, Massachusetts; Contract No. AF 33(038)-12984, dated 13 June 1950; Approximate Cost per Unit, \$172.00.

TUBE COMPLEMENT:

1 JAN-0A3/VR-75, 1 JAN-5Y3GT, 1 JAN-6AG7, 1 JAN-6J5, 2 JAN-6SJ7, 1 JAN-6SQ7, 1 JAN-6V6, 1 JAN-6Y6.

REFERENCE DATA AND LITERATURE:

TO 16-35TS382-21 (Operation Instructions).

TO 16-35TS382-22 (Service Instructions).

TO 16-35TS382-23 (Overhaul Instructions).

TO 16-35TS382-24 (Illustrated Parts Breakdown).

SHIPPING DATA:

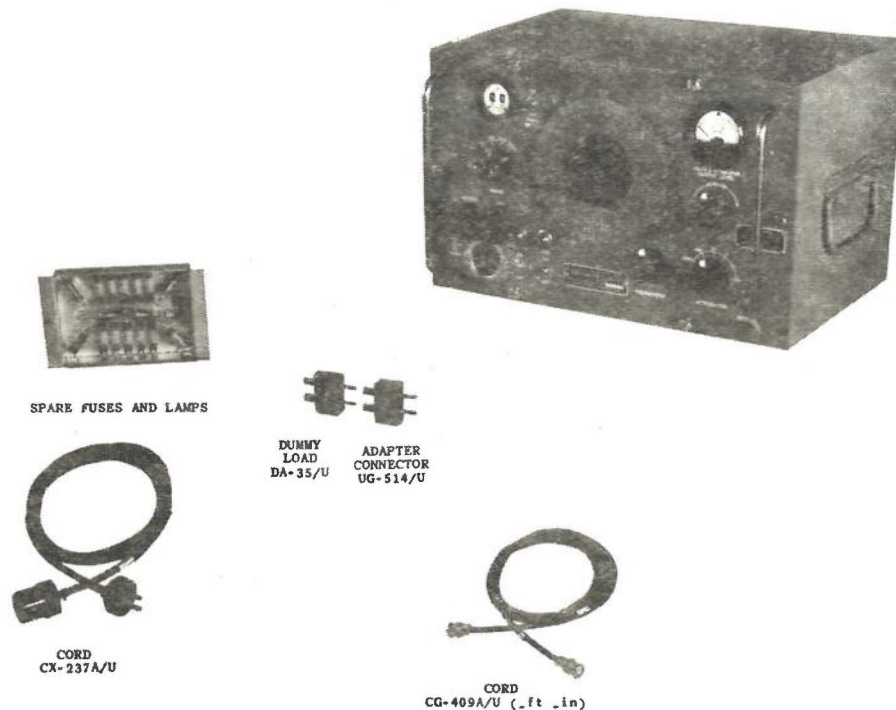
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Audio Oscillator with accessories, TS-382B/U (Domestic Packed)	8	22	24-1/2	23-1/2	115
TS-382B/U - Electronics Test Equipment -						

AUDIO OSCILLATOR TS-382B/U
(OSCILLATOR, AUDIO FREQUENCY, TS-382B/U)

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Audio Oscillator TS-382B/U	Alum- inum	7CAC-365317 3F4325-382B	11	18	12-3/4	46.5
1	Transit Case CY-688/U	Alum- inum	7CAC-176555-2 2Z2499-688	16	22	18	30.5
1	Cord CG-409A/U		7CAC-170265-565 1F430-409A-60	60 long			
1	Cord CX-237A/U		7CAC-170264-83 3E6000-237A-60	60 long	0.375 dia.		
1	Dummy Load DA-35/U		7CAC-274424 2Z3905-35				
1	Adapter Connector UG-514/U		7CAC-222475 2Z7390-514				

AUDIO OSCILLATOR TS-382C/U
(OSCILLATOR, AUDIO FREQUENCY, TS-382C/U)



FUNCTIONAL DESCRIPTION:

A portable, general purpose audio oscillator which provides a sine wave output voltage over its frequency ranges. A vibrating reed frequency meter, mounted on the front panel, provides a frequency check at two points. A thermostatically controlled heater is incorporated in the equipment. The thermostat is adjustable from the front panel. This equipment is used in field testing.

RELATIONSHIP TO OTHER EQUIPMENT:

ELECTROMECHANICAL DESCRIPTION:

Power Supply: 115 volts, AC, single phase, 50 to 1600 cycles per second.
 Frequency Range: 20 to 200,000 cycles per second in four ranges.
 Type of Transmission: Continuous Wave.
 Output Voltage: 0 to 10 volts in seven ranges.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.	7CAC-604337		3F4325-382C
PROCUREMENT INFO.:	USAF Spec. 7204 dated 16 Aug '48 and Am. 2 dated 17 Nov '49.		
PROCUREMENT COG.:	USAF	DESIGN COG.: USAF, C&N	
F.I.I.N.:	FUNCTIONAL CLASS. NO.:		4.1.1
- Electronics Test Equipment -			TS-382C/U

AUDIO OSCILLATOR TS-382C/U
(OSCILLATOR, AUDIO FREQUENCY, TS-382C/U)

ELECTROMECHANICAL DESCRIPTION: (Continued)

Frequency Meter Check Points: 60 and 400 cycles per second.

Power Output: 100 milliwatts.

Output Impedance: 1000 ohms.

Accuracy: $\pm 2\%$ of indicated frequency; +2 to -3 microvolts on 1 to 10 microvolt ranges; $\pm 3\%$ on 10 microvolt to 10 volt ranges; $\pm 0.75\%$ for frequency at check points.

Temperature Range: -40° C. to $+55^{\circ}$ C., operational; -40° C. to $+85^{\circ}$ C., storage.

Altitude Range: Sea level to 10,000 feet.

Humidity Range: 0 to 100% relative.

MANUFACTURERS' OR CONTRACTORS' DATA:

Specialty Assembling and Packing Company, Inc., 79 Clifton Place, Brooklyn, New York; USAF Contract No. AF 33(038)-26089 dated 14 May 1951; Approximate Cost per Unit, \$363.00.

TUBE COMPLEMENT:

1 JAN-0A3/VR-75, 1 JAN-5Y3GT, 1 JAN-6AG7, 1 JAN-6J5, 2 JAN-6SJ7, 1 JAN-6SQ7, 1 JAN-6V6, 1 JAN-6Y6.

REFERENCE DATA AND LITERATURE:

TO 16-35TS382-2 (Operation and Service Instructions).

TO 16-35TS382-4 (Parts Catalog).

SHIPPING DATA:

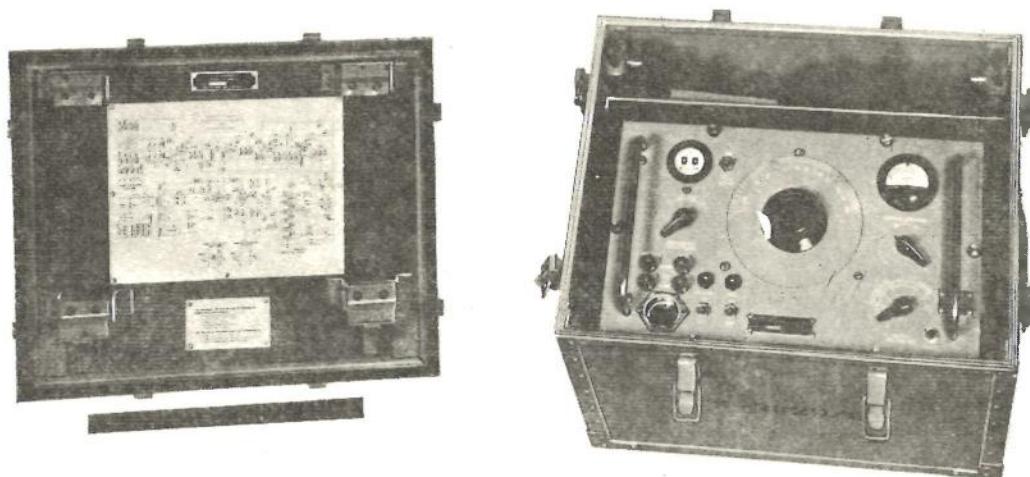
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Audio Oscillator, with accessories, TS-382C/U (Domestic Packed)	8	22	24-1/2	23-1/2	115
TS-382C/U - Electronics Test Equipment -						

AUDIO OSCILLATOR TS-382C/U
(OSCILLATOR, AUDIO FREQUENCY, TS-382C/U)

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Audio Oscillator TS-382C/U	Alum- inum	7CAC-604337 3F4325-382C	11	18	12-3/4	46.5
1	Transit Case CY-688/U	Alum- inum	7CAC-176555-2 2Z2499-688	16	22	18	30.5
1	Cord CG-409A/U		7CAC-170265-565 1F430-409A-60	60 long			
1	Cord CX-237A/U		7CAC-170264-83 3E6000-237A-60	60 long	0.375 dia.		
1	Dummy Load DA-35/U		7CAC-274424 2Z3905-35				
1	Adapter Connector UG-514/U		7CAC-222475 2Z7390-514				

AUDIO OSCILLATOR TS-382D/U
(OSCILLATOR, AUDIO FREQUENCY, TS-382D/U)



FUNCTIONAL DESCRIPTION:

A portable, general purpose audio oscillator which provides a sine wave output voltage over its frequency range. A vibrating reed frequency meter, mounted on the front panel, provides a frequency check at two points. A thermostatically controlled heater is incorporated in the equipment. The thermostat is preset before assembly of the equipment.

RELATIONSHIP TO OTHER EQUIPMENT:

ELECTROMECHANICAL DESCRIPTION:

Power Supply: 115 volts, AC, single phase, 50 to 1600 cycles per second.

Frequency Range: 20 to 200,000 cycles per second in four ranges.

Type of Transmission: Continuous Wave.

Output Voltage: 0 to 10 volts in seven ranges.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.	7CAC-363916-5		3F4325-382D
PROCUREMENT INFO.: Spec. MIL-A-4291 (USAF) dated 8 May 1951			
PROCUREMENT COG.: USAF		DESIGN COG.: USAF, C&N	
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 4.1.1	
- Electronics Test Equipment -			TS-382D/U

AUDIO OSCILLATOR TS-382D/U
(OSCILLATOR, AUDIO FREQUENCY, TS-382D/U)

ELECTROMECHANICAL DESCRIPTION: (Continued)

Frequency Meter Check Points: 60 and 400 cycles per second.

Power Output: 100 milliwatts.

Output Impedance: 1000 ohms.

Accuracy: $\pm 2\%$ of indicated frequency; +2 to -3 microvolts on 1 to 10 microvolt ranges; $\pm 3\%$ on 10 microvolts to 10 volts ranges; $\pm 0.3\%$ for frequency at check points.

Temperature Range: -40° C. to $+55^{\circ}$ C., operational; -40° C. to $+85^{\circ}$ C., storage.

Altitude Range: Sea level to 10,000 feet.

Humidity Range: 0 to 100% relative.

MANUFACTURERS' OR CONTRACTORS' DATA:

Trav-ler Radio Corporation, Chicago, Illinois; USAF Contract AF 33(038)29558, dated 25 June 1951; Approximate Cost per Unit \$204.00.

TUBE COMPLEMENT:

1 JAN-OA3/VR75, 1 JAN-5Y3GT, 1 JAN-6AG7, 1 JAN-6J5, 2 JAN-6SJ7, 1 JAN-6SL7GT, 1 JAN-6Y6, 1 JAN-6V6.

REFERENCE DATA AND LITERATURE:

TO 16-35TS382-11 (Operation Instructions).

TO 16-35TS382-12 (Service Instructions).

TO 16-35TS382-13 (Overhaul Instructions).

TO 16-35TS382-14 (Illustrated Parts Breakdown).

SHIPPING DATA:

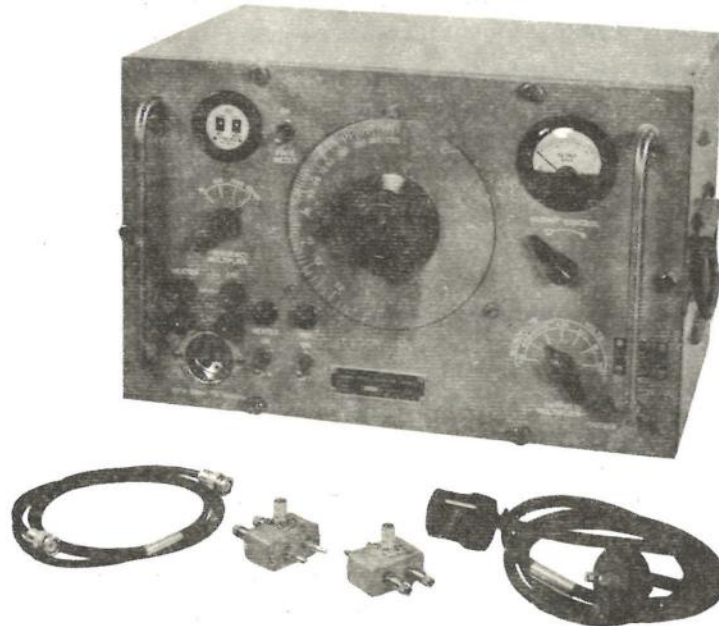
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Audio Oscillator with accessories, TS-382D/U (Domestic Packed)	8	22	24-1/2	23-1/2	115
TS-382D/U - Electronics Test Equipment -						

AUDIO OSCILLATOR TS-382D/U
(OSCILLATOR, AUDIO FREQUENCY, TS-382D/U)

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Audio Oscillator TS-382D/U	Alum- inum	7CAC-363916-5 3F4325-382D	11	18	12-3/4	46.5
1	Transit Case CY-688/U	Alum- inum	7CAC-176555-2 2Z2499-688	16	22	18	30.5
1	Cord CG-409A/U		7CAC-170265-565 1F430-409A-60	60 long			
1	Cord CX-237A/U		7CAC-170264-83 3E6000-237A-60	60 long	0.375 dia.		
1	Dummy Load DA-35/U		7CAC-274424 2Z3905-35				
1	Adapter Connector UG-514/U		7CAC-222475 2Z7390-514				

AUDIO OSCILLATOR TS-382E/U
(OSCILLATOR, AUDIO FREQUENCY, TS-382E/U)



FUNCTIONAL DESCRIPTION:

This is a portable, general purpose audio oscillator which provides a sine wave output voltage over its frequency range. It is used as a general test oscillator in the field for free point servicing of various radio equipment.

RELATIONSHIP TO OTHER EQUIPMENT:

The Audio Oscillator TS-382E/U is functionally, mechanically, and electrically interchangeable with Audio Oscillator TS-382D/U except that the transit case is smaller and the internal electronic components are not interchangeable.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The indicator of a vibrating reed frequency meter is located on the front panel to provide a frequency check at two points. A thermostatically controlled heater is incorporated in the equipment. The thermostat is preset before assembly of the equipment.

The circuit consists of an oscillator section, an amplifier, an output metering circuit, a power supply, a voltage regulating system, and a cathode follower stage.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREMENT INFO.:	Spec. MIL-A-4291 and MIL-T-945A		
PROCUREMENT COG.:	USAF	DESIGN COG.: USAF, WADC, C & N	
F.I.I.N.:	FUNCTIONAL CLASS. NO.: 4.1.1		
- Electronics Test Equipment -			TS-382E/U

AUDIO OSCILLATOR TS-382E/U
(OSCILLATOR, AUDIO FREQUENCY, TS-382E/U)

ELECTROMECHANICAL DESCRIPTION: (Continued)

The oscillator section is a two-stage resistance coupled amplifier. A positive feedback causes the oscillator to oscillate. A resistance-capacity network controls the frequency of oscillation.

The output amplifier section consists of a two-stage resistance coupled amplifier employing negative feedback to minimize distortion and to provide uniform output.

The output metering circuit contains an output level meter, output level control, and a six-section ladder type attenuator. The output meter operates from a full wave rectifier type circuit which uses germanium crystals as rectifying elements.

The power supply provides filament voltage to all the tubes and filtered DC voltage to the plates and screen grids.

The voltage regulating system provides a constant voltage of 230 volts to the plate circuits of the various tubes; to accomplish this action, the regulator employs three electron tubes.

The cathode follower stage isolates the frequency meter from the oscillator section to prevent shifts in frequency when the equipment is in operation.

Power Supply: 115 ± 10 volts, AC, single-phase, 50 to 1,000 cycles per second.

Frequency Range: 20 to 200,000 cycles in four ranges.

Type of Transmission: Continuous Wave.

Output Voltage: 0 to 10 volts in seven ranges.

Frequency Meter Check Points: 60 and 400 cycles per second.

Power Output: 100 milliwatts.

Output Impedance: 1,000 ohms.

Accuracy: ±2% of indicated frequency; +2 to -3 microvolts on 1 to 10 microvolt ranges; ±3% on 10 microvolts to 10 volts ranges; ±0.3% for frequency at check points.

Temperature Range: -40°C. (-40°F.) to +55°C. (+131°F.), operational.

-40°C. (-40°F.) to +85°C. (+185°F.), storage.

Altitude Range: Sea level to 10,000 feet operational.

Relative Humidity Range: 0 to 100%.

Thermostat Setting: +20°C. (+68°F.).

MANUFACTURERS' OR CONTRACTORS' DATA:

Carol Electronics Corporation, 315 West Stephen Street, Martinsburg, West Virginia; Contract No. AF 33(604)8566.

TUBE COMPLEMENT:

1 JAN-OA-3, 1 JAN-5Y3GT, 1 JAN-6J5, 2 JAN-6SJ7, 1 JAN-6SL7GT, 1 JAN-6Y6G, 1 JAN-6V6GT, 1 JAN-6AG7.

REFERENCE DATA AND LITERATURE:

TO 33A1-8-82-21 (Operation and Service Instructions).

TO 33A1-8-82-24 (Parts Breakdown).

AUDIO OSCILLATOR TS-382E/U
(OSCILLATOR, AUDIO FREQUENCY, TS-382E/U)

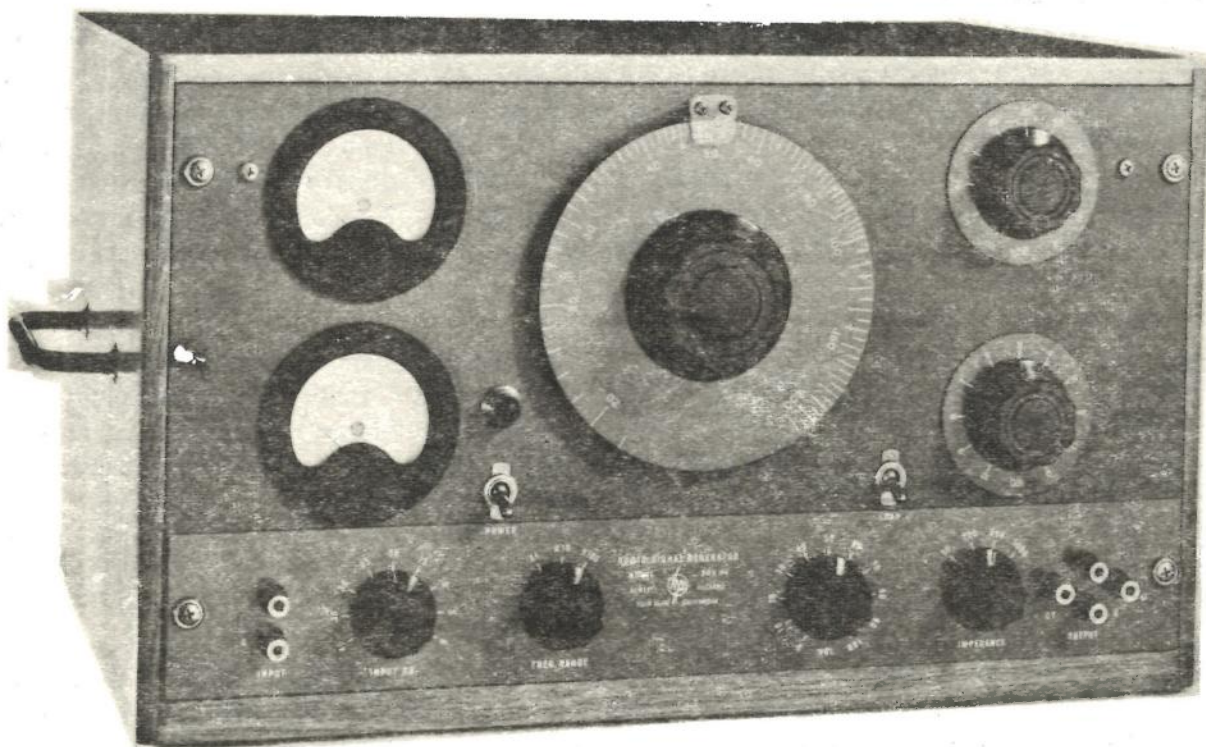
SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Audio Oscillator TS-382E/U	Aluminum		10	14	10	35
1	Case CY-688A/U	Aluminum		10	14	10	
1	Cable CG-409A/U			60 long			
1	Cable CX-237A/U			60 long	0.375 dia.		
1	Dummy Load DA-35/U						
1	Adapter Connector UG-514/U						

AUDIO OSCILLATOR TS-421A/U
(GENERATOR, SIGNAL, TS-421A/U)



FUNCTIONAL DESCRIPTION:

A portable, special purpose, low power, resistance tuned oscillator used in the testing and repair of audio amplifiers and associated lines and equipment. Indication is provided on an input level meter (volts and dbm), an output level meter (volts and dbm), a main tuning dial (megacycles per second), a frequency range switch (x1, x10, x100), an input attenuator dial (decibel), two output attenuator dials (decibel), and impedance selector switch (ohms), and a volume control (arbitrary units), all located on the front panel of the equipment. Also located on the front panel are input terminals, power switch, power-on indicator lamp, load switch, and output terminals.

RELATIONSHIP TO OTHER EQUIPMENT:

This equipment is used in testing Telemeter Transmitting Equipment AN/AKT-6. It is similar to the TS-421/U (Hewlett-Packard Model 205-A) except that the TS-421/U has no input meter and slightly different dimensions. It is also similar to Hewlett-Packard Model 205-AG.

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.	1600-326980210	N16-G54567-7709	3F3871-1
PROCUREMENT INFO.:			
PROCUREMENT COG.:	Army	DESIGN COG.:	Army, CSL
F.I.I.N.:	FUNCTIONAL CLASS. NO.:		4.1.1
- Electronics Test Equipment -			TS-421A/U

AUDIO OSCILLATOR TS-421A/U
(GENERATOR, SIGNAL, TS-421A/U)

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The equipment consists electrically of an oscillator section, amplifier, output meter, and attenuator section, line matching transformer, input meter, and conventional power supply. The oscillator is a two-stage resistance-coupled amplifier which is made to oscillate by a positive feedback network. This network is a variable resistance-capacitance combination whose varying characteristics control the frequency of oscillation. The amplifier consists of a voltage amplifier tube directly coupled to a phase inverter which feeds the push-pull output stage. The output meter and attenuator section consists of an average reading type voltmeter and two bridged T-type attenuators. These are connected across the line between the output transformer secondary and the primary of the line matching transformer. The output meter itself is made up of a full wave diode rectifier and a milliammeter. The input level meter is an average reading type voltmeter consisting of a two stage amplifier, a full wave diode rectifier, and a milliammeter.

Power Supply: 110 to 120 volts, AC, 50 to 60 cycles per second, single phase, 125 watts, fuse rating 1-1/2 amperes.

Frequency Range: 20 to 20,000 cycles per second.

Frequency Dial Calibration: 20 to 200.

Frequency Response: Down 2 decibels at 20 cycles per second, down 1 decibel at 20,000 cycles per second, at levels from +37 to -10 decibels referred to 1 milliwatt. Drop in response exceeds these limits at levels below -10 decibels.

Frequency Stability: Less than 2% for normal temperatures.

Power Output Rating: 5 watts into rated load. (+37 decibels or 54.7 volts, 600 ohms resistive load).

Distortion: Less than 1% at rated output at all frequencies above 30 cycles per second.

Hum Level: 60 decibels below output voltage or 90 decibels below zero level, whichever is larger.

Load Impedance: 50, 200, 500, 5,000 ohms resistive. Center taps provide 12.5, 125, and 1,250 ohms. All impedances are ungrounded.

Approximate Internal Impedance: 1/6 of load impedance with zero attenuator setting. Internal impedance approaches load impedance with attenuator settings of 20 decibels or more.

Output Level Meter Calibration: 0 to 60 volts, +20 to +37 decibels. (0 decibel = 1 milliwatt into 500 ohms load).

Output Attenuator: 0 to 110 decibels using 2 attenuators; 0 to 100 decibels in 10 decibel steps, 0 to 10 decibels in 1 decibel steps.

Input Level Meter Calibration: 0 to 2 volts, -5 to +9 decibels (0 decibel = 1 milliwatt into 500 ohms load).

Input Voltmeter Impedance: 5,000 ohms.

Input Voltmeter Attenuator: 0 to 40 decibels in 5 decibel steps.

Input Voltmeter Frequency Response: 20 to 20,000 cycles per second within 0.2 decibel of 400 cycles per second reference.

AUDIO OSCILLATOR TS-421A/U
(GENERATOR, SIGNAL, TS-421A/U)

MANUFACTURERS' OR CONTRACTORS' DATA:

Hewlett-Packard Company, Palo Alto, California; Army Order No. 15389-PHILA-45-10; Approximate Cost per Unit, \$425.00.

TUBE COMPLEMENT:

1 JAN-6J7, 1 JAN-6J5, 1 JAN-6F6, 2 JAN-6H6, 1 JAN-6SF5, 1 JAN-5U4G,
2 JAN-6L6G, 1 JAN-6SN7GT

REFERENCE DATA AND LITERATURE:

TM 11-2649 (TO 16-35TS421-5) (Operating and Maintenance Instructions).

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Audio Oscillator TS-421A/U Including:	Alum- inum	1600-326980210 N16-G54567-7709 3F3871-1	12-1/4	19-3/4	17	75
1	Set Spare Tubes						2.8
2	Instruction Book						0.75

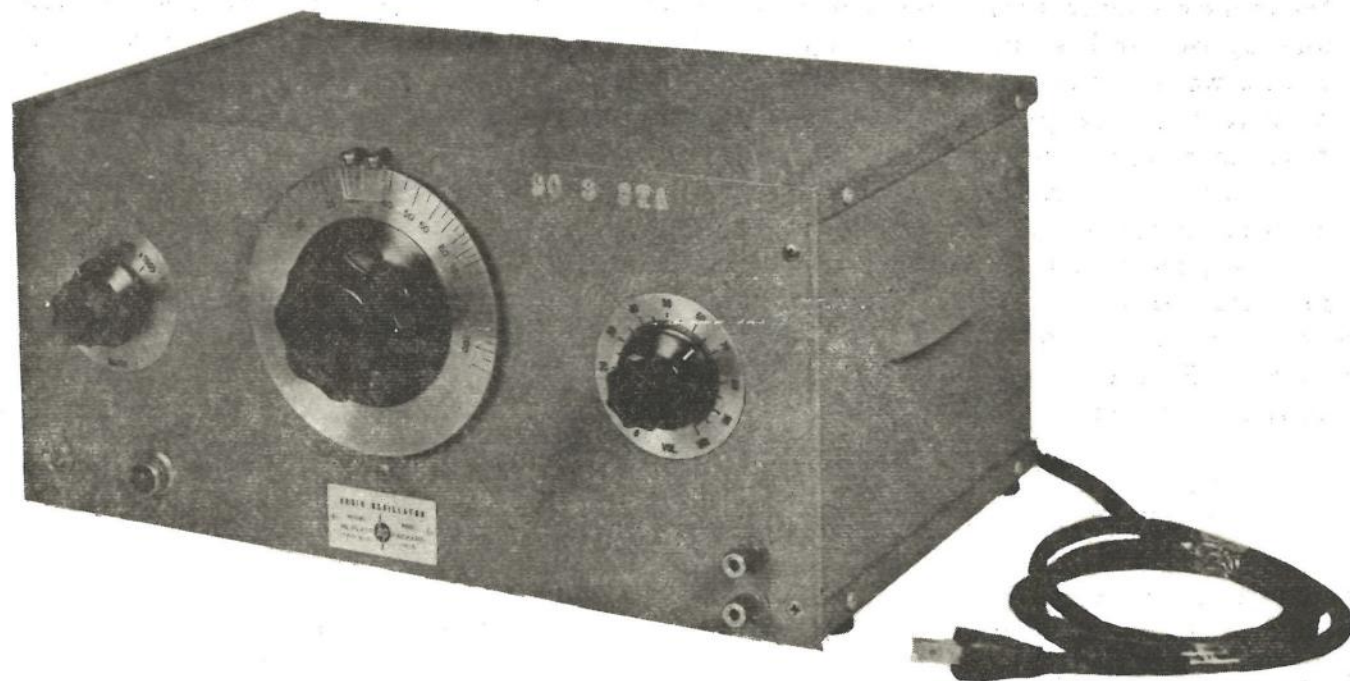
SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Audio Oscillator TS-421A/U (Domestic Packed in Wooden Crates)	6.46	19-1/4	29	20	116

- Electronics Test Equipment -

TS-421A/U

AUDIO OSCILLATOR
MODEL 200D
(Hewlett-Packard Company)



FUNCTIONAL DESCRIPTION:

A portable, general purpose, test instrument that generates a signal in the audio and supersonic range to check the performance of audio amplifiers, broadcast transmitters, and similar equipment. Other functions would include: modulating signal generators; use as a voltage source for bridge measurements; synchronizing pulse generators; use for loud speaker resonance tests. The frequency dial is calibrated in cycles per second for the lowest frequency range. The amplitude (output voltage) control is calibrated in arbitrary units.

RELATIONSHIP TO OTHER EQUIPMENT:

Similar to Audio Oscillator TS-382/U except that the TS-382/U is tropicalized, includes a panel cover, and has a different location for the AC power cord entrance.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The oscillator is a two-stage resistance-coupled amplifier

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.	7CAC-606100		
PROCUREMENT INFO.:			
PROCUREMENT COG.:	DESIGN COG.: Commercial		
F.I.I.N.:	FUNCTIONAL CLASS. NO.: 4.1.1		
- Electronics Test Equipment - Hewlett-Packard 200D			

AUDIO OSCILLATOR
MODEL 200D
(Hewlett-Packard Company)

ELECTROMECHANICAL DESCRIPTION: (Continued)

which oscillates by the use of a positive feedback network. This network is a frequency - selective, resistance - capacity combination which controls the frequency of oscillation. By using a variable tuning condenser for the capacity of the network, it is possible to tune the oscillator over a 10:1 range; and by using a switching arrangement to select different values of resistance for the network, several ranges are given the oscillator.

The output amplifier section utilizes negative feedback in order to minimize distortion and provide a good frequency response.

The power supply includes a conventional full-wave rectifier with a low-pass pi filter for removing AC components from the rectifier wave.

Power Supply: 115 volts, AC, 50 to 60 cycles per second, single phase, 60 watts.

Frequency Range: 20 to 200,000 cycles per second.

Dial Calibration: 20 to 200 cycles per second.

Range: X1 20 to 200 cycles per second.

X10 200 to 2000 cycles per second.

X100 2000 to 20,000 cycles per second.

X1000 20,000 to 200,000 cycles per second.

Calibration Accuracy: $\pm 2\%$.

Frequency Response: ± 1 decibel, 20 to 150,000 cycles per second.

Frequency Stability:

$\pm 2\%$ or 0.2 cycles per second (whichever is greater) under normal temperature conditions, including initial warm-up.

$\pm 10\%$ power line voltage variations change the frequency less than $\pm 0.2\%$ at 1000 cycles per second.

Power Output: 100 milliwatts into rated load (10 volts across a 1000 ohms load).

Distortion: Less than 1% of rated output from 20 to 100,000 cycles per second.

Hum: Less than 0.1% of rated output.

Load Impedance: 1000 ohms (resistive).

Internal Impedance (Approximate): 30 ohms from 100 to 100,000 cycles per second.

MANUFACTURERS' OR CONTRACTORS' DATA:

Hewlett-Packard Company, 395 Page Mill Road, Palo Alto, California; Approximate Cost per Unit, \$150.00, December 1951.

TUBE COMPLEMENT:

2 RETMA-6J7, 1 RETMA-6F6, 1 RETMA-6V6, 1 RETMA-5Y3GT.

REFERENCE DATA AND LITERATURE:

Manufacturer's Instruction Handbook.

Manufacturer's Catalog 20-A, 1950.

Hewlett-Packard Journal, Volume 3, No. 4, December 1951.

AUDIO OSCILLATOR
MODEL 200D
(Hewlett-Packard Company)

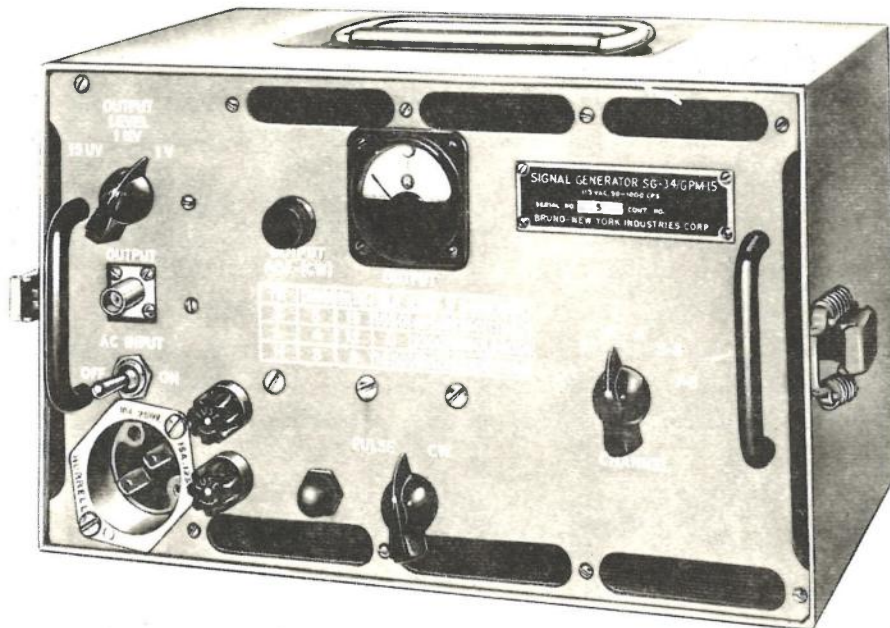
SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Audio Oscillator Model 200D	Steel	7CAC-606100	7-1/4	15-1/4	10-5/8	23

SIGNAL GENERATOR AN/GPM-15
(GENERATOR, SIGNAL, AN/GPM-15)



FUNCTIONAL DESCRIPTION:

A portable, general purpose set which supplies crystal-controlled RF signals for all Loran channels. It is used to perform the following preflight checks on Loran receivers: (a) accuracy of time delay measurements; (b) receiver alignment and sensitivity; (c) timer performance and crystal oscillator frequency; (d) stability of sweep generating circuits; (e) receiver distortion due to insufficient signal handling capacity on all receiver channels; (f) video distortion; (g) performance of "Gain" and "Amplitude Balance" controls; (h) performance of "Left-Right" control.

RELATIONSHIP TO OTHER EQUIPMENT:

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: A small pulse and/or continuous wave generator is connected through proper cabling, adapters, dummy loads, and a 50-ohm coaxial line, to the antenna terminal of the set being tested, and simulates a Loran transmitting station.

The various output and frequency selections enable the test set to check the performance of the radar set being tested.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Standard		
STOCK NOS.	7CAC-363924-5		
PROCUREMENT INFO.: USAF Spec. MIL-G-4477			
PROCUREMENT COG.: USAF		DESIGN COG.: USAF, WADC, C&N	
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 4.1.2	
- Electronics Test Equipment -			AN/GPM-15

SIGNAL GENERATOR AN/GPM-15
(GENERATOR, SIGNAL, AN/GPM-15)

ELECTROMECHANICAL DESCRIPTION: (Continued)

Power Supply: 115 volts $\pm 10\%$, AC, single-phase, 50 to 1000 cycles per second, 38 voltamperes, supplied from a receptacle on a Loran receiver, or can be supplied separately.

Frequency Range: (1) 100 kilocycles per second, (2) 180 kilocycles per second, (3) 1750 kilocycles per second, (4) 1850 kilocycles per second, (5) 1900 kilocycles per second, (6) 1950 kilocycles per second.

Type of Transmission: Continuous Wave or Pulse Modulated.

Output Voltage Range: 15 microvolts, 1 millivolt, 1 volt, calibrated.

Output Impedance: 50 ohms, nominal coaxial.

Output Pulse Repetition Rate: 303.03 pulses per second.

Accuracy: 10%, voltage.
0.0065%, frequency.

Temperature Range: $-40^{\circ}\text{C.} (-40^{\circ}\text{F.})$ to $+55^{\circ}\text{C.} (+131^{\circ}\text{F.})$.

MANUFACTURERS' OR CONTRACTORS' DATA:

Bruno-New York Industries Corporation, 460 West 34th Street, New York 1, New York; USAF Contract No. AF 33(604)9831, dated 30 June 1954; Approximate Cost per Unit, \$309.00.

TUBE COMPLEMENT:

1 JAN-OB2, 1 JAN-6X4W, 2 JAN-5751, 2 JAN-5814A, 1 JAN-12AT7WA, 1 JAN-5814A, 1 JAN-5654/6AK5W, 1 JAN-IN34A.

REFERENCE DATA AND LITERATURE:

TO 16-30 GPM 15-2 (Operation and Service Instructions).

TO 16-30 GPM 15-4 (Illustrated Parts Breakdown).

SHIPPING DATA:

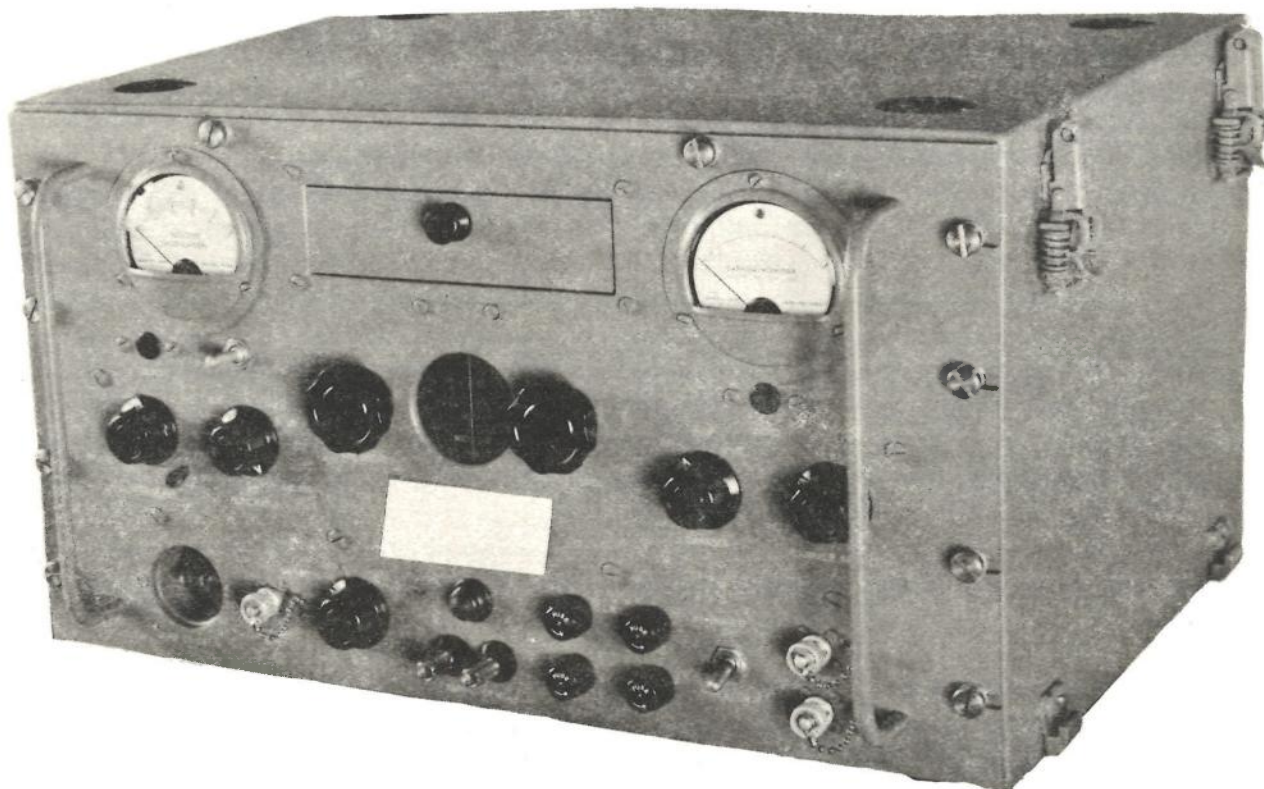
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
AN/GPM-15 - Electronics Test Equipment -						

SIGNAL GENERATOR AN/GPM-15
(GENERATOR, SIGNAL, AN/GPM-15)

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Signal Generator AN/GPM-15	Alumi- num	7CAC-363924-5	7	12	9	20
	Including:						
1	Signal Generator SG-34/GPM-15	Alumi- num					
1	Adapter U-45/U		8850-110749				
1	Adapter UG-197/U		8850-102700 2X308-197				
1	Adapter UG-255/U		8850-108880				
1	Adapter UG-273/U		8850-102000				
1	Power Cord CX-404/UP		1690-322975394	120 long			
1	Electrical Dummy Load DA-62/U						
1	Cord CG-409D/U		7CAC-170265-685	120 long			
1	Special Purpose Electrical Cable Assembly CX-2005/U			60 long			
1	Neutralizing Tool						
1	Set Screw Wrench						
2	Spare Fuse						

SIGNAL GENERATOR AN/GRM-4



FUNCTIONAL DESCRIPTION:

A depot test instrument used to test glide slope receiving equipment. Radio frequency output is crystal controlled and monitored as to amplitude and modulation percentage. The percent modulation is indicated on a modulation meter located on the front panel. The RF output is calibrated in microvolts.

RELATIONSHIP TO OTHER EQUIPMENT:

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: RF frequencies are available in increments of 0.3 megacycles per second selected by a twenty-position switch. This switch dial is calibrated directly in frequency and is used to switch in the desired crystals. 20 crystals are used.

Power Supply: 110 volts $\pm 10\%$, AC, single phase, 60 cycles per second.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Substitute Standard		
STOCK NOS.	7CAC-363885		3F3940-4
PROCUREMENT INFO.:	USAF, Spec. MIL-S-4249		
PROCUREMENT COG.:	USAF	DESIGN COG.:	USAF, C&N
F.I.I.N.:	FUNCTIONAL CLASS NO. : 4.1.2		
	- Electronics Test Equipment -		AN/GRM-4

SIGNAL GENERATOR AN/GRM-4

ELECTROMECHANICAL DESCRIPTION: (Continued)

Frequency Range: 15 to 30 megacycles per second, for IF test alignment; 329.3 to 335 megacycles per second, 20 channels.

Voltage Output: 1.0 to 100,000 microvolts calibrated.

Output Impedance: 53 ohms.

Type of Transmission: Continuous Wave, Amplitude Modulation.

Modulation Data: 90, 150, and 1000 cycles per second, internal signals capable of 0 to 100 percent amplitude modulation. 90 and 150 can be applied simultaneously at 40% modulation each to simulate the on course conditions in glide slope equipment. Provision is made for external modulation.

Accuracy: $\pm 1\%$ of Decibel Ratio Control Indication; $\pm 0.0015\%$ of indicated RF; $\pm 15\%$ of the 1000 cycle modulation frequency; accuracy of the 90 and 150 cycle signals depends only on the power line frequency. $\pm 10\%$ of output level indication.

RF Leakage: Less than 3 microvolts measured by a standard noise meter with its antenna held one foot from the case and oriented in the most favorable attitude.

Temperature Range: -40° C. to $+55^{\circ}$ C.

Decibel Ratio Control: 90 to 150 cycles per second signals may be attenuated by manipulating a calibrated knob on the front panel, in the following steps: 0, ± 0.5 decibels, ± 1.0 decibels, ± 2.0 decibels, ± 3.3 decibels and \pm infinity decibels.

MANUFACTURERS' OR CONTRACTORS' DATA:

Boonton Radio Corporation, Boonton, New Jersey; Contract No. AF 33(600)17024;
Approximate Cost Per Unit, \$1500.00.

TUBE COMPLEMENT:

4 JAN-6AU6, 5 JAN-12AT7, 1 JAN-5726/6AL5W, 1 JAN-6AS7G, 1 JAN-6AQ5,
1 RETMA-6173, 2 JAN-6X4-W, 1 JAN-0B2.

REFERENCE DATA AND LITERATURE:

- TO 16-30GRM4-1 (Operating Instructions).
- TO 16-30GRM4-2 (Service Instructions).
- TO 16-30GRM4-3 (Overhaul Instructions).
- TO 16-30GRM4-4 (Parts Breakdown).

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	

AN/GRM-4

- Electronics Test Equipment -

SIGNAL GENERATOR AN/GRM-4

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Signal Generator SG-2/GRM-4	Alum- inum		19-1/2	12	12	63.687
1	Signal Generator Case CY-1070/GRM4			27	19	15	36.000
1	Adapter UG-201/U		8850-101950 2Z308-201	1-9/16	3/4 O.D.		0.062
1	IF Output Cable CG-1102/GRM-4			72 long			0.312
2	Cord CG409/U		7CAC-170265-637	72 long			0.187
1	Cord CX-237/U		7CAC-170264-495 3E6000-237-120	120 long			0.750
1	Adapter Con- nector UG-528/U		8850-109900	3-5/16	1-1/4	1-1/8	0.312
1	Adapter Con- nector UG-529/U		8850-110100	3-5/16	1-1/4	1-1/8	0.312
- Electronics Test Equipment -							AN/GRM-4

SIGNAL GENERATOR SET AN/URM-15
(GENERATOR, SIGNAL, AN/URM-15)



FUNCTIONAL DESCRIPTION:

A portable test set for use with VHF receiver-transmitters such as Radio Set AN/ARC-33 in order to perform receiver sensitivity tests, receiver calibration and adjustment, IF and automatic gain control transformer alignment, modulation capability tests, monitor bandpass adjustment, and squelch threshold determination. The radio frequency generator produces seven separate signal outputs: audio frequency, monitor test frequencies, intermediate frequencies, radio frequencies, calibrator frequencies, modulated intermediate frequencies, and modulated radio frequencies.

RELATIONSHIP TO OTHER EQUIPMENT:

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Limited Standard		
STOCK NOS.	7CAC-801319-2663		3F3901.2-15
PROCUREMENT INFO.:	USAF Spec. MCREE 551, MIL-P-6324 (USAF)		
PROCUREMENT COG.:	USAF	DESIGN COG.: USAF, C&N	
F.I.I.N.:	FUNCTIONAL CLASS NO.: 4.1.2		
	- Electronics Test Equipment -		AN/URM-15

SIGNAL GENERATOR SET AN/URM-15
(GENERATOR, SIGNAL, AN/URM-15)

ELECTROMECHANICAL DESCRIPTION:

Power Supply:

AC Operation: 115 volts $\pm 10\%$, AC, 60 to 1600 cycles per second, single phase, 60 watts approximately.

DC Operation: 25.5 to 28.5 volts, DC, 2 amperes.

B+ Voltage: 210 volts, DC, ± 6 volts.

B+ Voltage Regulation: 4 volts (minimum load to maximum load).

Type of Transmission: Amplitude Modulated Carrier.

Audio Section:

Frequency: 1000 cycles per second, $\pm 19\%$.

Output: 10 volts, AC, across 5000 ohms, $\pm 10\%$.

Total Harmonic Distortion: 10% maximum at specified output.

IF and Monitor Section:

IF Crystal Frequencies: 2,807, 15,290, 15,325, 15,360 kilocycles per second, $\pm 0.01\%$.

IF Output: 10,000, 1,000, 100 microvolts, $\pm 10\%$ CW or modulated CW across 51.5 ohms.

Percent Modulation: 20% to 40%.

Modulating Frequency: 1000 cycles per second, $\pm 10\%$.

Monitor Crystal Frequencies: 12,056, 12,477, 12,881, 20,802 kilocycles per second, $\pm 0.01\%$.

Monitor Output: 300,000 microvolts, $\pm 10\%$, CW only, across 51.5 ohms.

Calibrator Section:

Generates harmonics of 25 megacycles per second $\pm 0.01\%$ throughout the frequency range of 225 to 400 megacycles per second. With the RF output fed to the calibrator input, audible beats are heard in the headset every 25 megacycles per second throughout the RF tuning range.

RF Section:

Frequency: Continuous tuning from 225 to 400 megacycles per second with calibration accuracy of $\pm 1.0\%$.

Output: Continuously variable from 1 to 20,000 microvolts with calibration accuracy of $\pm 30\%$ or 1 microvolt, whichever is greater, CW or modulated CW across 51.5 ohms.

Percent Modulation: 20% to 40%.

Modulating Frequency: 1000 cycles per second, $\pm 10\%$.

Attenuation Accuracy: $\pm 5\%$ in the range of 1 to 10,000 microvolts.

Temperature Range: -40° C. to $+85^{\circ}$ C., operative.

Altitude Range: To approximately 10,000 feet, operative; and to approximately 50,000 feet, inoperative.

Humidity Range: Up to 100% relative humidity at temperatures up to $+50^{\circ}$ C., operative.

**SIGNAL GENERATOR SET AN/URM-15
(GENERATOR, SIGNAL, AN/URM-15)**

MANUFACTURERS' OR CONTRACTORS' DATA:

Bendix Aviation Corporation, East Joppa Road, Towson, Baltimore 4, Maryland
Contract No. AF 33(038)14117; Approximate Cost per Unit, \$713.00, June 1950.

TUBE COMPLEMENT:

8 JAN-5670, 1 JAN-6X5WGY, 2 JAN-OC3/VR105.

REFERENCE DATA AND LITERATURE:

- TO 16-30URM15-1 (Operating Instructions).
- TO 16-30URM15-2 (Service Instructions).
- TO 16-30URM15-3 (Overhaul Instructions).
- TO 16-30URM15-4 (Illustrated Parts Breakdown).

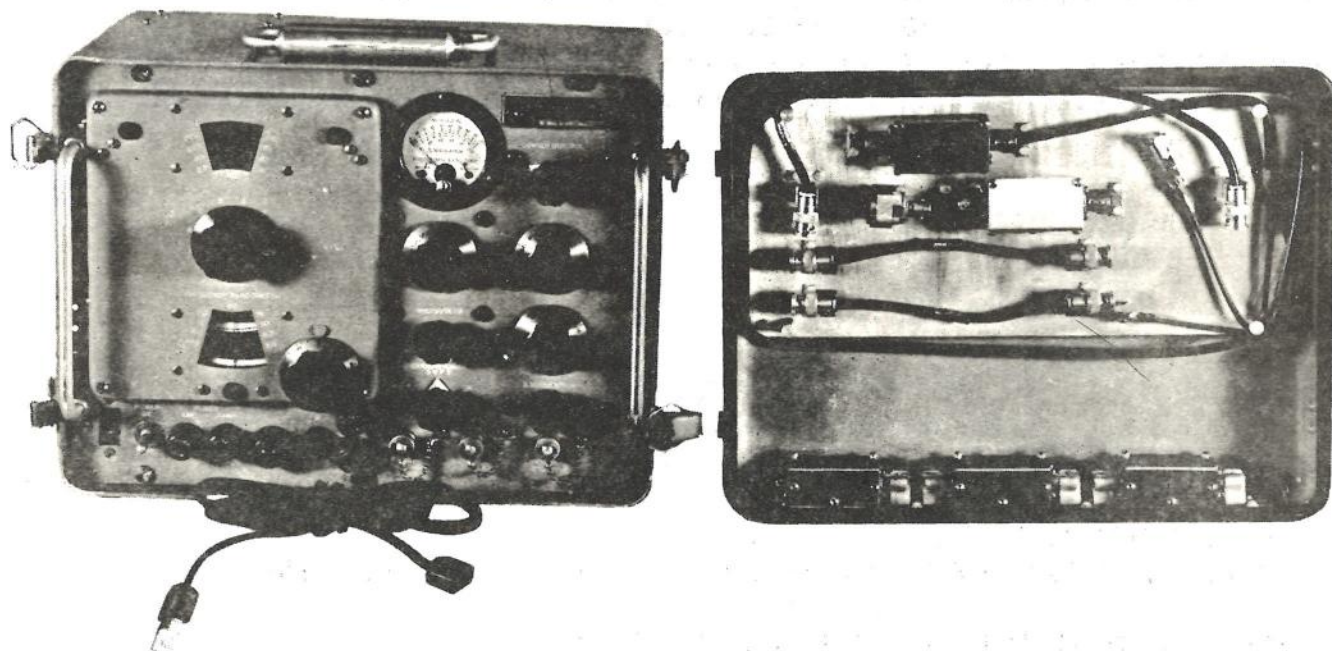
SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Signal Generator Set AN/URM-15 Including:		7CAC-801319-2663 3F3901.2-15				
1	Signal Generator SG-38/URM-15		7CAC-365315	11.88	22-3/4	15.64	42
1	RF Cable Assembly CG-636/U		7CBR-C212662-1	60 long			0.25
							(Continued)

RF SIGNAL GENERATOR SET AN/URM-25



FUNCTIONAL DESCRIPTION:

A portable, general purpose, radiofrequency signal generator used to test sensitivity, selectivity, and audio response of receivers to align RF and IF stages, and to provide a signal which can be used when measuring receiver gain and output power.

RELATIONSHIP TO OTHER EQUIPMENT:

Superseded by RF Signal Generator Set AN/URM-25B which includes a crystal controlled calibrator.

ELECTROMECHANICAL DESCRIPTION:

Power Supply: 115 volts, $\pm 10\%$, AC, 50 to 1600 cycles per second, single-phase, 45 watts.

Frequency Range: 10 to 50,000 kilocycles per second.

Type of Transmission: Amplitude Modulation.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREMENT INFO.:	Spec. MIL-R-15281A (Ships) 1952		
PROCUREMENT COG.:	Navy	DESIGN COG.: Navy, BuShips	
F.I.L.N.:	FUNCTIONAL CLASS. NO.: 4.1.2		
	- Electronics Test Equipment -		AN/URM-25

RF SIGNAL GENERATOR SET AN/URM-25

ELECTROMECHANICAL DESCRIPTION: (Continued)

Amplitude Modulation: 0 to 80%.

Modulation Frequency: 400 to 1000 cycles per second, internal.
100 to 15,000 cycles per second, external.

Output Voltage: 0.1 to 100,000 microvolts continuously variable across 53.5 ohm external load; 2 volts, open circuit; 1 volt across 500 ohm external load.

Output Impedance: X Mult: 53.5 ohms at RF output jack.
X 20,000: 500 ohms at RF output jack.

Accuracy: Frequency: $\pm 0.5\%$.

Amplitude: $\pm 10\%$.

Internal Modulation Frequency: $\pm 5\%$.

Voltage: $\pm 10\%$.

MANUFACTURERS' OR CONTRACTORS' DATA:

Federal Manufacturing and Engineering Company, Brooklyn 5, New York; Contract No. NObsr-43410, 30 June 1949.

TUBE COMPLEMENT:

2 12AU7, 1 6J4, 1 6J6, 1 OD3/VR-150, 1 6AL5, 1 9006, 1 6X4.

REFERENCE DATA AND LITERATURE:

NAVSHIPS 91283 (Instruction Book).

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	RF Signal Generator Set AN/URM-25 (With Spares)	4.5	16	25	19	55
	(Without Spares)	2.2	14	17	15	44
AN/URM-25 - Electronic Test Equipment -						

RF SIGNAL GENERATOR SET AN/URM-25

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	RF Signal Gen- erator Set AN/ URM-25			10-1/4	13	10-1/4	35
1	RF Signal Gen- erator SG-44/ URM-25						
1	Power Supply PP-562/URM-25						
1	Impedance Adapter MX-1074/URM- 25						
1	Antenna Simulator SM-35/URM-25						
1	5/1 Fixed Attenuator CN-132/URM-25						
1	10/1 Fixed Attenuator CN-136/URM-25						
1	Test Lead CX-1363/U						
1	RF Cable Assembly CG-409/U		7CAC-170265-26	48 long			

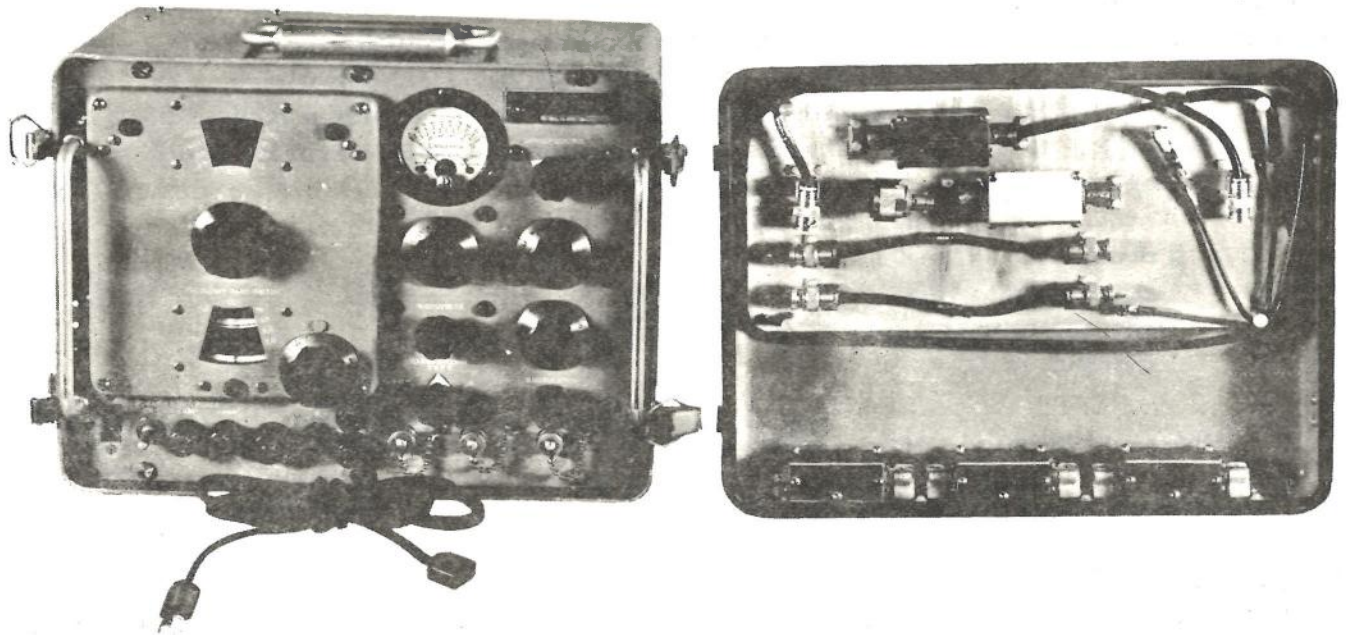
(Continued)

RF SIGNAL GENERATOR SET AN/URM-25

EQUIPMENT SUPPLIED: (Continued)

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
2	RF Cable Assembly CG-409/U		7CAC-170265-395	7 long			
1	AC Line Cable Assembly						
1	Coaxial Adapter UG-201/U		8850-101950 N17-C-67990-2447				
1	Instruction Book NAVSHIPS 91283						
					Sub-	Total:	35
1	Equipment Spares			6	9	12	8
						Total	43

**RF SIGNAL GENERATOR SET AN/URM-25A
(GENERATOR, SIGNAL, AN/URM-25A)**



FUNCTIONAL DESCRIPTION:

A portable, general purpose, radio frequency signal generator used to test sensitivity, selectivity, and audio response of receivers, to align RF and IF stages, and to provide a signal which can be used when measuring receiver gain and output power.

RELATIONSHIP TO OTHER EQUIPMENT:

Superseded by RF Signal Generator Set AN/URM-25B which includes a crystal controlled calibrator.

ELECTROMECHANICAL DESCRIPTION:

Power Supply: 115 volts $\pm 10\%$, AC, 50 to 1600 cycles per second, single phase, 45 watts.

Frequency Range: 10 to 50,000 kilocycles per second in eight bands: 10 to 27 kilocycles, 27 to 80 kilocycles, 80 to 230 kilocycles, 230 to 680 kilocycles, 0.68 to

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREMENT INFO.:			
PROCUREMENT COG.: Navy		DESIGN COG.: Navy, BuShips	
F.I.I.N.:		FUNCTIONAL CLASS NO.: 4.1.2	
- Electronics Test Equipment -			AN/URM-25A

RF SIGNAL GENERATOR SET AN/URM-25A
(GENERATOR, SIGNAL, AN/URM-25A)

ELECTROMECHANICAL DESCRIPTION: (Continued)

2 megacycles, 2 to 8.3 megacycles, 8.3 to 18 megacycles, 18 to 50 megacycles.
 Type of Transmission: Continuous Wave, Amplitude Modulated Carrier.
 Amplitude Modulation: 0 to 80%.
 Modulation Frequency: 400 to 1000 cycles per second, internal.
 100 to 15,000 cycles per second, external.
 Output Voltage: 0.1 to 100,000 microvolts, continuously variable across 53.5 ohm
 external load; 2 volts, open circuit; 1 volt across 500 ohm external load.
 Output Impedance: X Mult: 53.5 ohms at RF output jack.
 X 20,000: 500 ohms at RF output jack.
 Accuracy: Frequency: $\pm 0.5\%$.
 Amplitude: $\pm 10\%$.
 Internal Modulation Frequency: $\pm 5\%$.
 Voltage: $\pm 10\%$.

MANUFACTURERS' OR CONTRACTORS' DATA:

Federal Manufacturing and Engineering Corporation, 199 Steuben Street, Brooklyn 5, New York; Navy Contract No. NObsr-49203, dated 13 June 1950.

TUBE COMPLEMENT:

2 JAN-12AU7, 1 JAN-6AL5, 1 JAN-6J4, 1 JAN-9006, 1 JAN-6J6, 1 JAN-6X4,
 1 JAN-0D3/VR-150.

REFERENCE DATA AND LITERATURE:

NAVSHIPS 91379 (Instruction Book).

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	RF Signal Generator Set AN/URM-25A (Domestic Packed)	3.35	17	20	17	50
1	Equipment Spares	0.53	7	10	13	10
AN/URM-25A - Electronics Test Equipment -						

**RF SIGNAL GENERATOR SET AN/URM-25A
(GENERATOR, SIGNAL, AN/URM-25A)**

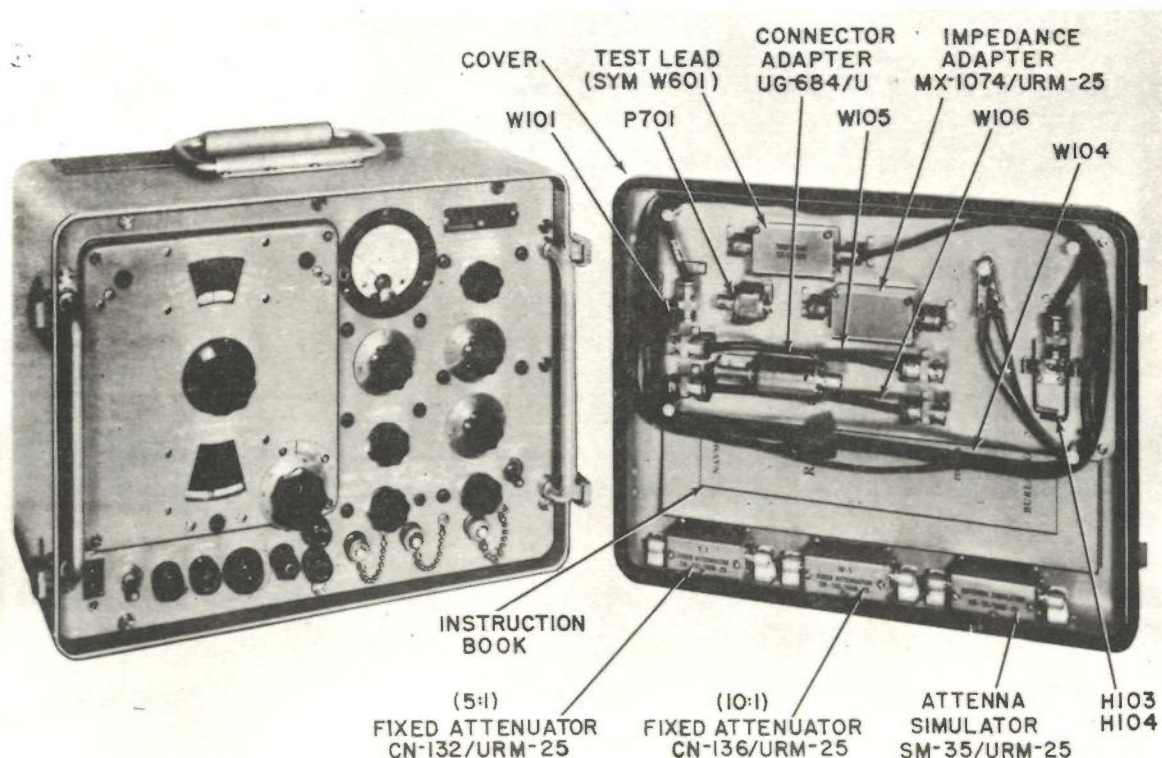
EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	RF Signal Generator Set AN/URM-25A			10-1/4	13	10-1/4	35
2	Cord CG-409/U		7CAC-170265-395	7 long			
1	Cord CG-409/U		7CAC-170265-26	48 long			
1	Test Lead CX-136B/U						
1	AC Line Cable Assembly						
1	Impedance Adapter MX-1074/URM-25						
1	Antenna Simulator SM-35/URM-25						
1	10:1 Fixed Attenuator CN-136/URM-25						
1	5:1 Fixed Attenuator CN-132/URM-25						
1	Adapter UG-201/U		8850-101950 NI7-C-67990-2447				
1	Power Supply PP-562A/URM-25						
1	Signal Generator SG-44A/URM-25						
1	Equipment Spares Box			6	9	12	8

- Electronics Test Equipment -

AN/URM-25A

**RF SIGNAL GENERATOR SET AN/URM-25B
(GENERATOR, SIGNAL, AN/URM-25B)**



FUNCTIONAL DESCRIPTION:

A portable, general purpose, radiofrequency signal generator used to test sensitivity, selectivity, and audio response of receivers, to align RF and IF stages, and to provide a signal which can be used when measuring receiver gain and output power.

RELATIONSHIP TO OTHER EQUIPMENT:

Similar to previous models except the "B" includes a crystal controlled calibrator.
Similar to Federal Manufacturing Company Model 315.

ELECTROMECHANICAL DESCRIPTION:

Power Supply: 115 volts $\pm 10\%$, AC, 50 to 1000 cycles per second, single phase.

Frequency Range: 10 to 50,000 kilocycles per second in eight bands.

Type of Transmission: Amplitude Modulation.

Amplitude Modulation: 0 to 80%.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.	7CAC-363903-3		
PROCUREMENT INFO.:	Spec. No. MIL-R-15281 (Ships) and Amendment 1.		
PROCUREMENT COG.:	Navy	DESIGN COG.: Navy, BuShips	
F.I.I.N.:	FUNCTIONAL CLASS NO.: 4.1.2		
	- Electronics Test Equipment -		AN/URM-25B

**RF SIGNAL GENERATOR SET AN/URM-25B
(GENERATOR, SIGNAL, AN/URM-25B)**

ELECTROMECHANICAL DESCRIPTION: (Continued)

Modulation Frequency: 400 to 1000 cycles per second, internal.
 100 to 15,000 cycles per second, external.

Output Voltage: 0.1 to 100,000 microvolts, continuously variable across 53.5 ohm external load; 2 volts, open circuit; 1 volt across 500 ohm external load.

Output Impedance: X Mult: 53.5 ohms at RF output jack.
 X 20,000: 500 ohms at RF output jack.

Accuracy: Frequency: $\pm 0.5\%$.
 Amplitude: $\pm 10\%$.
 Internal Modulation Frequency: $\pm 5\%$.
 Voltage: $\pm 10\%$.

MANUFACTURERS' OR CONTRACTORS' DATA:

Federal Manufacturing and Engineering Corporation, 199 Steuben Street, Brooklyn 5, New York; Navy Contract No. NObsr-52099, dated 8 December 1950.

TUBE COMPLEMENT:

2 JAN-12AU7, 1 JAN-6AL5, 1 JAN-6J4, 1 JAN-9006, 1 JAN-6J6, 1 JAN-6BE6, 1 JAN-6X4, 1 JAN-0D3/VR-150.

REFERENCE DATA AND LITERATURE:

NavShips 91472 (Instruction Book).

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	RF Signal Generator Set AN/URM-25B (Domestic Packed)	3.35	17	20	17	50
1	Equipment Spares	0.53	7	10	13	10
AN/URM-25B - Electronics Test Equipment -						

RF SIGNAL GENERATOR SET AN/URM-25B
(GENERATOR, SIGNAL, AN/URM-25B)

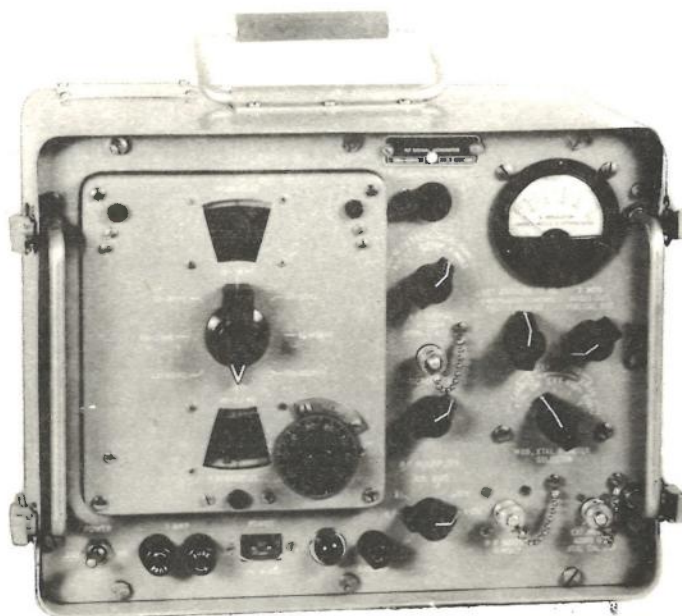
EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	RF Signal Generator Set AN/URM-25B		7CAC-363903-3	10-1/4	13	10-1/4	35
1	Signal Genera- tor, RF, SG-44B/URM-25						
1	Power Supply PP-562A/URM-25						
1	Impedance Adapter MX-1074/URM-25						
1	Antenna Simulator SM-35/URM-25						
1	(5:1) Fixed Attenuator CN-132/URM-25						
1	(10:1) Fixed Attenuator CN-136/URM-25						
1	Test Lead CX-1363/U						
1	RF Cable Assembly CG-409A/U		7CAC-170265-265	48 long			
2	RF Cable Assembly CG-409A/U			7 long			
1	AC Line Cable Assembly						
1	Coaxial Adapter UG-201/U		8850-101950 N17-C-67990-2447				
1	Adapter Connector UG-684/U						
1	Equipment Spares Box			6	9	12	8

- Electronics Test Equipment -

AN/URM-25B

RF SIGNAL GENERATOR SET AN/URM-25E



FUNCTIONAL DESCRIPTION:

A portable general purpose radio frequency signal generator used to test sensitivity, selectivity, and audio response of receivers, to align RF and IF stages, and to provide a signal which can be used when measuring receiver gain and output power. It is designed especially for field use.

RELATIONSHIP TO OTHER EQUIPMENT:

ELECTROMECHANICAL DESCRIPTION:

Power Supply: 115 volts, $\pm 10\%$, AC, 50 to 1000 cycles per second, single-phase.

Frequency Range: 10 to 50,000 kilocycles per second in 8 bands.

Crystal Frequency: 1 megacycle per second.

Type of Transmission: Amplitude Modulated, Continuous Wave.

Modulation Frequency: 400 and 1000 cycles per second, internal, 0 to 50% modulation; 100 to 15,000 cycles per second, external.

Output Voltage: 0.2 to 200,000 microvolts, continuously variable, open circuit;
0.1 to 100,000 microvolts, continuously variable across 50-ohm external load;
2 volts, open circuit, at 500-ohm jack.

Output Impedance: 50 and 500 ohms.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			3F4036-25E
PROCUREMENT INFO.:	Spec. MIL-R-15281 (Ships) and Am. 6		
PROCUREMENT COG.:	USN	DESIGN COG.: USN, BuShips	
F.I.I.N.:	FUNCTIONAL CLASS. NO.: 4.1.2		
	- Electronics Test Equipment -		AN/URM-25E

RF SIGNAL GENERATOR SET AN/URM-25E

ELECTROMECHANICAL DESCRIPTION: (Continued)

Accuracy: Frequency: $\pm 0.5\%$.

Internal Modulation Frequency: $\pm 5\%$.

Crystal: $\pm 0.005\%$.

MANUFACTURERS' OR CONTRACTORS' DATA:

Harvey Wells Electronics, Inc., North Street, Southbridge, Massachusetts; Navy Contract No. NObsr-63060, dated 12 April 1954.

TUBE COMPLEMENT:

3 JAN-6AH6, 1 JAN-6AG7, 1 JAN-5726, 1 JAN-OA2WA, 1 JAN-5814A, 1 JAN-6X4W, 1 JAN-5750.

REFERENCE DATA AND LITERATURE:

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	RF Signal Generator Set AN/URM-25E (Domestic Packed)	3.35	17	20	17	50

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	RF Signal Generator Set AN/URM-25E	Aluminum	3F4036-25E	11-1/4	14-1/8	10-5/8	36.25
	Including:						
1	RF Signal Generator SG-111/URM-25E						
1	Power Supply PP-1205/URM-25E			7	9	3-5/8	
							(Continued)

AN/URM-25E

- Electronics Test Equipment -

RF SIGNAL GENERATOR SET AN/URM-25E

EQUIPMENT SUPPLIED: (Continued)

Quant. Per Eq't	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Signal Generator Cover CW-355/ URM-25E	Alumi- num		1-13/16	13-9/16	10-3/16	
1	Fixed Attenuator CN-283/U			2	1-5/32	29/32	
1	Fixed Attenuator CN-284/U			2	1-5/32	29/32	
1	Test Lead CX-2962/U						
1	RF Cable Assembly CG-409/U			48 long			
2	RF Cable Assembly CG-409/U			6 long			
1	Coaxial Adapter UG-201/U		8850-101950				
1	Impedance Matching Net- work CU-410/ URM-25E			2	1-5/32	29/32	
1	Electrical Dummy Load DA-106/URM-25E			2	1-5/32	29/32	
1	Impedance Matching Net- work CU-411/ URM-25E			2	1-5/32	29/32	
1	Adapter UG-273/U						
1	Adapter UG-283/U						

RF SIGNAL GENERATOR SET AN/URM-25F



FUNCTIONAL DESCRIPTION:

This is a portable, general purpose radio frequency signal generator designed for field use in the general maintenance of electronic equipment. It is used to test the sensitivity, selectivity, and audio response of receivers, to align RF and IF stages, and to provide a signal which can be used when measuring receiver gain and output power.

RELATIONSHIP TO OTHER EQUIPMENT:

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The panel contains a band switch, a twelve-position attenuation selector, a monitor meter, a meter function switch, an RF level control, a microvolts control, a tuning control, and output jacks. The AC power cable is permanently attached to the panel. A pilot lamp indicates when the set is on. The power supply is contained within the set.

Power Supply: 115 ± 15 volts, AC, 50 to 1000 cycles per second, single-phase.

Frequency Range: 10 kilocycles to 50 megacycles per second in 9 bands.

Crystal Frequency: 1 megacycle per second.

Type of Transmission: Amplitude Modulated, Continuous Wave.

Modulation Frequency: 400 and 1000 cycles per second, internal modulation, 0 to 50% modulation; 100 to 15,000 cycles per second, external.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.	7CAC-363903-7		
PROCUREMENT INFO.: Specification MIL-G-15281A (SHIPS)			
PROCUREMENT COG.: USN		DESIGN COG.: USN, BuShips	
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 4.1.2	
- Electronics Test Equipment -			AN/URM-25F

RF SIGNAL GENERATOR SET AN/URM-25F

ELECTROMECHANICAL DESCRIPTION: (Continued)

Output Voltage: 0.1 microvolt to 0.1 volt, into a 50-ohm load.

Output Impedance: 50 ohms.

Accuracy: $\pm 0.5\%$ (frequency dial).

$\pm 10\%$ (attenuator).

$\pm 2\%$ (monitor meter).

MANUFACTURERS' OR CONTRACTORS' DATA:

New London Instrument Company, P.O.Box 189, New London, Connecticut; Contract NObsr-59613, 12 April 1954.

TUBE COMPLEMENT:

5 JAN-6AH6, 1 JAN-6AG7Y, 1 JAN-6X4W, 1 JAN-OA3, 1 JAN-1N145, 2 JAN-1N69.

REFERENCE DATA AND LITERATURE:

New London Instrument Company Bulletin No. 162-3; NRL Memorandum Report 448.

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	RF Signal Generator Set AN/URM-25F	Aluminum	7CAC-363903-7	11-1/4	14-3/4	11-1/8	35
	Including:						
1	Signal Generator SG-103/URM-25F						
1	Cord CG-409A/U			50 long			
2	Cord CG-409A/U			6 long			
AN/URM-25F							(Continued)

RF SIGNAL GENERATOR SET AN/URM-26



FUNCTIONAL DESCRIPTION:

A portable, general purpose, signal generator used for aligning and testing various electronic equipments within its frequency range. The output indication is made possible by a bolometer circuit connected to a meter on the front panel. Indication is in microvolts. A direct reading frequency scale, vernier, single tuning control, and band switch are provided. Provision is made for external modulation.

RELATIONSHIP TO OTHER EQUIPMENT:

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: An RF oscillator provides the carrier, which can be amplitude modulated by internal circuitry. The signal is fed to an attenuator and output level indicator. Attenuator output is fed into the RF stage of the equipment to be tested after suitable impedance matching.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.		F16-Q-123655-200	
PROCUREMENT INFO.:	Navy Spec. MIL-S-15463 (Ships), 15 July 1950		
PROCUREMENT COG.:	Navy	DESIGN COG.: Navy, BuShips	
F.I.I.N.:	FUNCTIONAL CLASS NO.: 4.1.2		
	- Electronics Test Equipment -		AN/URM-26

RF SIGNAL GENERATOR SET AN/URM-26

ELECTROMECHANICAL DESCRIPTION: (Continued)

Power Supply: 115 volts, $\pm 10\%$, AC, single phase, 50 to 1600 cycles per second, 65 watts approximately.

Frequency Range: 4 to 408 megacycles per second in six bands, calibrated: 4 to 7, 7 to 15, 15 to 30, 30 to 68, 68 to 156, 156 to 408 megacycles per second.

Type of Transmission: Amplitude Modulated, Continuous Wave, External Pulse Modulated.

Output Voltage: 0.1 to 100,000 microvolts, calibrated, (-127 to -7 dbm).

Output Impedance: 50 ohms, resistive.

Input Impedance: (External Modulation) 5000 ohms at 1000 cycles per second.

Voltage Standing Wave Ratio: 3.31 maximum at 100 megacycles per second. With matching pad: 1.33 maximum to 408 megacycles per second.

Modulation Data:

Amplitude Modulation: 0 to 50%.

Internal: 400 or 1000 cycles per second.

External: 100 to 20,000 cycles per second.

Pulse Modulation, External:

Pulse Amplitude: +40 volts minimum.

Pulse Repetition Rate: 50 to 5000 pulses per second.

Pulse Duration: 2 to 40 microseconds up to 100 megacycles per second, 1 to 40 microseconds from 100 to 408 megacycles per second.

Accuracies: $\pm 0.5\%$ of frequency; $\pm 10\%$ (up to 100 megacycles per second) and $\pm 20\%$ (up to 408 megacycles per second) of voltage.

MANUFACTURERS' OR CONTRACTORS' DATA:

Federal Manufacturing and Engineering Corporation, 199 Steuben Street, Brooklyn 5, New York; Navy Contract No. NObsr-43410, dated 30 June 1949.

Measurements Corporation, Boonton, New Jersey; Navy Contract No. NObsr-52212.

TUBE COMPLEMENT:

1 JAN-12AU7, 1 JAN-6AQ5, 1 JAN-6F4, 2 JAN-6X4, 1 JAN-0D3/VR-150.

REFERENCE DATA AND LITERATURE:

NAVSHIPS 91474 (Instruction Book).

SHIPPING DATA:

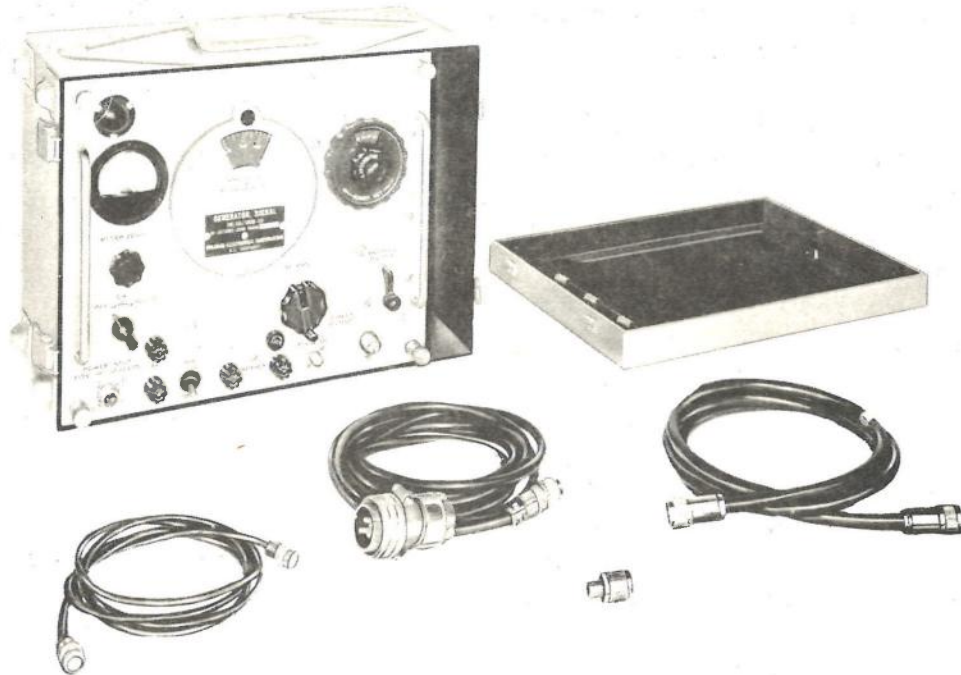
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	RF Signal Generator Set AN/URM-26 with one set equipment spares (Export Packed)	10.42	23	29	27	75
AN/URM-26 - Electronics Test Equipment -						

RF SIGNAL GENERATOR SET AN/URM-26

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	RF Signal Generator Set AN/URM-26 Including:		F16-Q-123655-200	10	14	10	38
1	Signal Generator SG-45/URM-26						
1	Attenuator Unit CN-163/URM-26		N16-A-96075-4871				
1	RF Cable CG-409A/U		16-C-11944-2021	48 long			
1	AC Line Cable		N17-C-48225-4590				
2	RF Cable CG-409A/U		16-C-11943-2360	7 long			
1	Combination Case						
1	Accessory Power Cable						
2	Instruction Book						
1	Attenuator Unit CN-147/URM-26		N16-A-96184-1163				
1	Test Adapter MX-1247/URM-26		N16-A-22081-1009				
1	Power Supply PP-644/URM-26						
1	Set Equipment Spares			6	9	12	8

SIGNAL GENERATOR AN/URM-33



FUNCTIONAL DESCRIPTION:

A portable, field type radio frequency signal generator used for pre-flight operational check of broadband radar receivers, antenna, transmission lines, and indicators used with search and direction finding equipment. Radio frequency output is available at either a panel jack or a horizontally or vertically polarized antenna. The equipment also furnishes a video signal having characteristics similar to the RF pulse which is used to check various types of pulse equipment. Indication is provided on a power level indicating meter showing 1 milliwatt power level at a midscale mark. At 0 dbm output this power level indication is adjusted by a control knob through a bridge balance control. Frequency indication is provided in kilomegacycles per second on a calibrated dial, and a knob adjusts the internal radio frequency oscillator tuning. A dial calibrated in minus dbm indicates the power output level. This dial operates in conjunction with a control for varying the attenuation of the output attenuator. Circuit test point terminals are available on the chassis to facilitate the location of the most probable circuit malfunctions likely to occur within the equipment. All indicators, controls, and connections are on the front panel.

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Alternate Standard		
STOCK NOS.	7CAC-363973-5		
PROCUREMENT INFO.: USAF Exhibit WCE-301 dtd 8 May 52; USAF Spec. ML-E-15090			
PROCUREMENT COG.: USAF		DESIGN COG.: USAF, ARL	
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 4.1.2	
- Electronics Test Equipment -			AN/URM-33

SIGNAL GENERATOR AN/URM-33

RELATIONSHIP TO OTHER EQUIPMENT:

This equipment is functionally interchangeable with Signal Generator AN/URM-33(XA) but is built to more rigid electrical and mechanical specifications.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The signal generator is basically a klystron oscillator with associated power supplied and pulse circuitry.

Power Supply: 115 volts, $\pm 10\%$, AC, 380 to 1000 cycles per second, single phase, 270 watts maximum.

Frequency Range: 1000 to 2300 megacycles per second.

Type of Transmission: Continuous Wave, Pulse Modulated.

Power Output: 0 to -100 dbm continuously variable.

Peak Power of Radio Frequency Pulses: Within ± 1 decibel of the power level of corresponding continuous wave signals.

Amplitude of Video Pulses: 1.25 volts ± 0.5 volt.

Characteristics Common to Radio Frequency and Video Pulses:

Pulse Width: 3.5 ± 0.5 microseconds, measured at 50% peak amplitude points.

Pulse Repetition Rate: 1000 ± 100 pulses per second.

Pulse Rise and Decay Time: 0.35 microsecond measured between the 10% and 90% amplitude points.

Pulse Variation: Not over 10% of the peak pulse amplitude (pulses are essentially flat topped).

Direct Radio Frequency Output Impedance: 50 ohms, nominal.

Video Output Terminating Impedance: 50 ohms, resistive.

Antenna Voltage Standing Wave Ratio: Less than 3:1.

Antenna Beam Width: 15°, at half power points.

Frequency Stability: CW: 0.025% incidental frequency modulation or less.

Pulse: 0.2% frequency shift or less, at operating frequencies.

Accuracy: Frequency: $\pm 1.0\%$ at ambient room conditions; $\pm 1.5\%$ under all required conditions.

Power Output: ± 3 decibels at ambient room conditions; ± 5 decibels under all required conditions.

Radio Frequency Leakage: At least 20 decibels below the calibrated direct output signal, as measured at a distance of one foot from each face of the signal generator and its power cord.

Spurious Responses or Harmonics: At least 20 decibels below the signal generator fundamental frequency power level.

Temperature Range: -40°C. to +55°C., operating; -65°C. to +85°C., storage.

Humidity Range: Up to 90% relative, operating or storage. (The combination case is rainproof.)

Altitude Range: Up to 10,000 feet, operating; up to 50,000 feet, storage.

MANUFACTURERS' OR CONTRACTORS' DATA:

Polarad Electronics Corporation, 43-20 34th Street, Long Island City 1, New York; Contract No. AF 33(604)5758; Approximate Cost per Unit, \$1,800.00.

SIGNAL GENERATOR AN/URM-33

TUBE COMPLEMENT:

3 JAN-6X4W, 1 JAN-6005/6AQ5W, 1 JAN-6AU6, 2 JAN-OB2, 4 JAN-12AT7,
1 JAN-5837, 1 JAN-5R4WGY, 3 JAN-5651, 1 JAN-5Y3WGT-A, 1 JAN-6098/CT,
1 JAN-1N69.

REFERENCE DATA AND LITERATURE:

TO 16-30URM33-1 (Operating Instructions).
TO 16-30URM33-2 (Service Instructions).
TO 16-30URM33-4 (Illustrated Parts Breakdown).

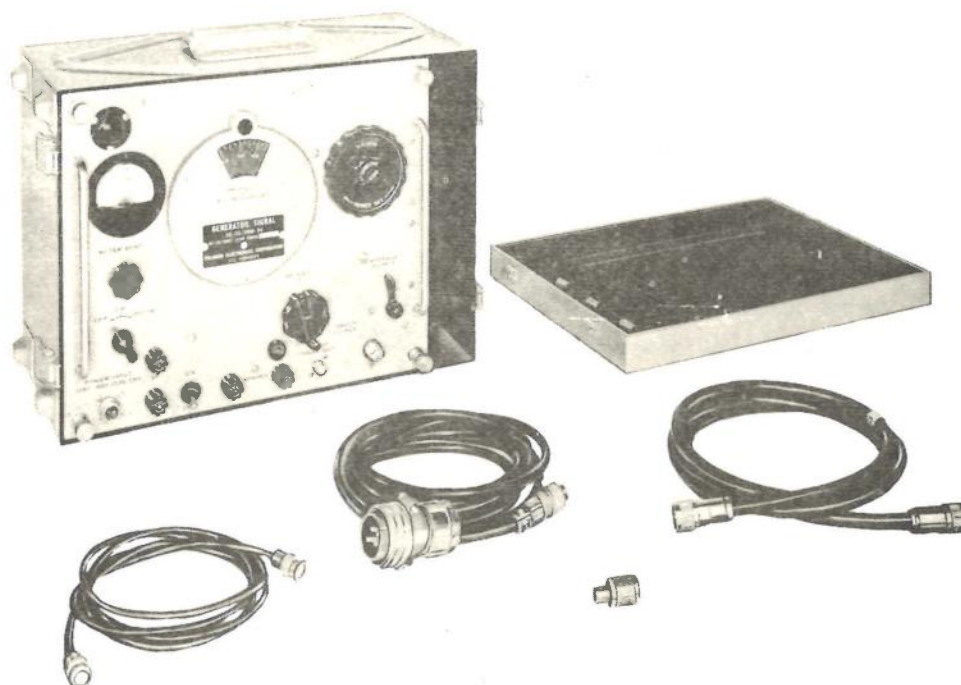
SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Signal Generator AN/URM-33	1.5	15-1/2	17-1/2	11-1/2	45

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Signal Generator AN/URM-33 Including:	Aluminum	7CAC-363973-5	11-1/4	15-1/4	8-7/8	36
1	Signal generator SG-54/URM-33						
1	Cord CG-92B/U		7CAC-170265-6	72 long			
1	Cable Assembly CX-2470/U			120 long			
1	Cord CG-409C/U			72 long			
1	Adapter UG-273/U		8850-102000				
1	Combination Case	Aluminum		11-1/4	15-1/4	8-7/8	
1	Handbook of Operating Instructions						

SIGNAL GENERATOR AN/URM-34



FUNCTIONAL DESCRIPTION:

A portable, field type radio frequency signal generator used for pre-flight operational check of broadband radar receivers, antenna, transmission lines, and indicators used with search and direction finding equipment. Radio frequency output is available at either a panel jack or a horizontally or vertically polarized antenna. The equipment also furnishes a video signal having characteristics similar to the RF pulse which is used to check various types of pulse equipment. Indication is provided on a power level indicating meter showing 1 milliwatt power level at a midscale mark. At 0 dbm output this power level indication is adjusted by a control knob through a bridge balance control. Frequency indication is provided in megacycles per second on a calibrated dial, and a knob adjusts the internal radio frequency oscillator tuning. A dial calibrated in minus dbm indicates the power output level. This dial operates in conjunction with a control for varying the attenuation of the output attenuator. Circuit test point terminals are available on the chassis to facilitate the location of the most probable circuit malfunctions likely to occur within the equipment. All indicators, controls, and connections, are on the front panel.

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Alternate Standard		
STOCK NOS.	7CAC-363974-7		
PROCUREMENT INFO.: USAF Exhibit WCE-302 dtd 12 May 52; USAF Spec. MIL-E-15090			
PROCUREMENT COG.: USAF		DESIGN COG.: USAF, ARL	
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 4.1.2	
- Electronics Test Equipment -			AN/URM-34

SIGNAL GENERATOR AN/URM-34

RELATIONSHIP TO OTHER EQUIPMENT:

This equipment is functionally interchangeable with Signal Generator AN/URM-34(XA) but is built to more rigid electrical and mechanical specifications.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The signal generator is basically a klystron oscillator with associated power supplies and pulse circuits.

Power Supply: 115 volts, $\pm 10\%$, AC, 380 to 1000 cycles per second, single phase, 270 watts maximum.

Frequency Range: 2150 to 4600 megacycles per second.

Type of Transmission: Continuous Wave, Pulse Modulated.

Power Output: 0 to -100 dbm continuously variable.

Peak Power of Radio Frequency Pulses: Within ± 1 decibel of the power level of corresponding continuous wave signals.

Amplitude of Video Pulses: 1.25 volts ± 0.5 volt.

Characteristics Common to Radio Frequency and Video Pulses:

Pulse Width: 3 ± 0.5 microseconds, measured at 50% peak amplitude points.

Pulse Repetition Rate: 1000 ± 100 pulses per second.

Pulse Rise and Decay Time: 0.35 microsecond measured between the 10% and 90% amplitude points.

Pulse Variation: Not over 10% of the peak pulse amplitude (pulses are essentially flat topped).

Direct Radio Frequency Output Impedance: 50 ohms, nominal.

Video Output Terminating Impedance: 50 ohms, resistive.

Antenna Voltage Standing Wave Ratio: Less than 3:1.

Antenna Beam Width: 15° , at half power points.

Frequency Stability: CW: 0.025% incidental frequency modulation or less.

Pulse: 0.2% frequency shift or less, at operating frequencies.

Accuracy: Frequency: $\pm 1.0\%$ at ambient room conditions; $\pm 1.5\%$ under all required conditions.

Power Output: ± 3 decibels at ambient room conditions; ± 5 decibels under all required conditions.

Radio Frequency Leakage: At least 20 decibels below the calibrated direct output signal, as measured at a distance of one foot from each face of the signal generator and its power cord.

Spurious Responses or Harmonics: At least 20 decibels below the signal generator fundamental frequency power level.

Temperature Range: -40°C. to $+55^\circ\text{C.}$, operating; -65°C. to $+85^\circ\text{C.}$, storage.

Humidity Range: Up to 90% relative, operating or storage. (The combination case is rainproof.)

Altitude Range: Up to 10,000 feet, operating; up to 50,000 feet, storage.

MANUFACTURERS' OR CONTRACTORS' DATA:

Polarad Electronics Corporation, 43-20 34th Street, Long Island City 1, New York; Contract No. AF 33(604)5758; Approximate Cost per Unit, \$1,800.00.

SIGNAL GENERATOR AN/URM-34

TUBE COMPLEMENT:

3 JAN-6X4W, 1 JAN-6005/6AQ5W, 1 JAN-6AU6, 2 JAN-OB2, 4 JAN-12AT7,
1 JAN-5836, 1 JAN-5R4WGY, 3 JAN-5651, 1 JAN-5Y3WGT-A, 1 JAN-6098/CT,
1 JAN-1N69.

REFERENCE DATA AND LITERATURE:

TO 16-30URM34-1 (Operating Instructions).
TO 16-30URM34-2 (Service Instructions).
TO 16-30URM34-4 (Illustrated Parts Breakdown).

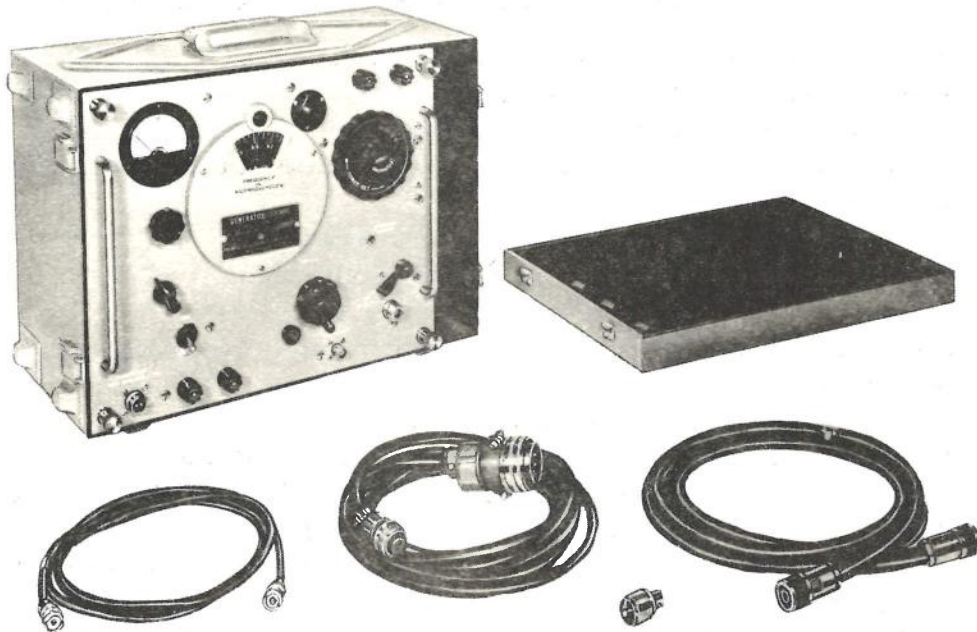
SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Signal Generator AN/URM-34	1.5	15-1/2	17-1/2	11-1/2	45

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Signal Generator AN/URM-34	Aluminum	7CAC-363974-7	11-1/4	15-1/4	8-7/8	36
	Including:						
1	Signal Generator SG-55/URM-34						
1	Cord CG-409C/U			72 long			
1	Cable Assembly CX-2470/U			120 long			
1	Adapter UG-273/U		8850-102000				
1	Cord CG-92B/U		7CAC-170265-6	72 long			
1	Combination Case	Aluminum		11-1/4	15-1/4	8-7/8	
1	Handbook of Operating Instructions						

SIGNAL GENERATOR AN/URM-35



FUNCTIONAL DESCRIPTION:

A portable, field type radio frequency signal generator used for pre-flight operational check of broadband radar receivers, antenna, transmission lines, and indicators used with search and direction finding equipment. Radio frequency output is available at either a panel jack or a horizontally or vertically polarized antenna. The equipment also furnishes a video signal having characteristics similar to the RF pulse which is used to check various types of pulse equipment. Indication is provided on a power level indicating meter showing 1 milliwatt power level at a midscale mark. At 0 dbm output this power level indication is adjusted by a control knob through a bridge balance control. Frequency indication is provided in megacycles per second on a calibrated dial, and a knob adjusts the internal radio frequency oscillator tuning. A dial calibrated in minus dbm indicates the power output level. This dial operates in conjunction with a control for varying the attenuation of the output attenuator. Circuit test point terminals are available on the chassis to facilitate the location of the most probable circuit malfunctions likely to occur within the equipment. All indicators, controls, and connections are on the front panel.

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Alternate Standard		
STOCK NOS.	7CAC-363979-2		
PROCUREMENT INFO.: USAF Exhibit WCE-303 dtd 12 May 52; USAF Spec. ML-E-15090			
PROCUREMENT COG.: USAF		DESIGN COG.: USAF, ARL	
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 4.1.2	
- Electronics Test Equipment -			AN/URM-35

SIGNAL GENERATOR AN/URM-35

RELATIONSHIP TO OTHER EQUIPMENT:

This equipment is functionally interchangeable with Signal Generator AN/URM-35 (XA), but is built to more rigid electrical and mechanical specifications.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The signal generator is basically a klystron oscillator with associated power supplies and pulse circuitry.

Power Supply: 115 volts, $\pm 10\%$, AC, 380 to 1000 cycles per second, single phase, 270 watts maximum.

Frequency Range: 4450 to 8000 megacycles per second.

Type of Transmission: Continuous Wave, Pulse Modulated.

Power Output: 0 to -100 dbm continuously variable.

Peak Power of Radio Frequency Pulses: Within ± 1 decibel of the power level of corresponding continuous wave signals.

Amplitude of Video Pulses: 1.25 volts ± 0.5 volt.

Characteristics Common to Radio Frequency and Video Pulses:

Pulse Width: 3.5 ± 0.5 microseconds, measured at 50% peak amplitude points.

Pulse Repetition Rate: 1000 ± 100 pulses per second.

Pulse Rise and Decay Time: 0.35 microsecond measured between the 10% and 90% amplitude points.

Pulse Variation: Not over 10% of the peak pulse amplitude (pulses are essentially flat topped).

Direct Radio Frequency Output Impedance: 50 ohms, nominal.

Video Output Terminating Impedance: 50 ohms, resistive.

Antenna Voltage Standing Wave Ratio: Less than 3:1.

Antenna Beam Width: 15° , at half power points.

Frequency Stability: CW: 0.025% incidental frequency modulation or less.

Pulse: 0.2% frequency shift or less, at operating frequencies.

Accuracy: Frequency: $\pm 1.0\%$ at ambient room conditions; $\pm 0.5\%$ under all required conditions.

Power Output: ± 3 decibels at ambient room conditions; ± 5 decibels under all required conditions.

Radio Frequency Leakage: At least 20 decibels below the calibrated direct output signal, as measured at a distance of one foot from each face of the signal generator and its power cord.

Spurious Responses or Harmonics: At least 20 decibels below the signal generator fundamental frequency power level.

Temperature Range: -40°C. , to $+55^\circ\text{C.}$, operating; -65°C. to $+85^\circ\text{C.}$, storage.

Humidity Range: Up to 90% relative, operating or storage. (The combination case is rainproof.)

Altitude Range: Up to 10,000 feet, operating; up to 50,000 feet, storage.

MANUFACTURERS' OR CONTRACTORS' DATA:

Polarad Electronics Corporation, 43-20 34th Street, Long Island City 1, New York; Contract No. AF 33(604)5758; Approximate Cost per Unit, \$1,800.00.

SIGNAL GENERATOR AN/URM-35

TUBE COMPLEMENT:

3 JAN-6X4W, 1 JAN-6005/6AQ5W, 1 JAN-6AU6, 2 JAN-OB2, 5 JAN-12AT7,
1 JAN-5721, 3 JAN-5R4WGY, 5 JAN-5651, 1 JAN-6098/CT, 1 JAN-1N69.

REFERENCE DATA AND LITERATURE:

TO 16-30URM35-1 (Operating Instructions).
TO 16-30URM35-2 (Service Instructions).
TO 16-30URM35-4 (Illustrated Parts Breakdown).

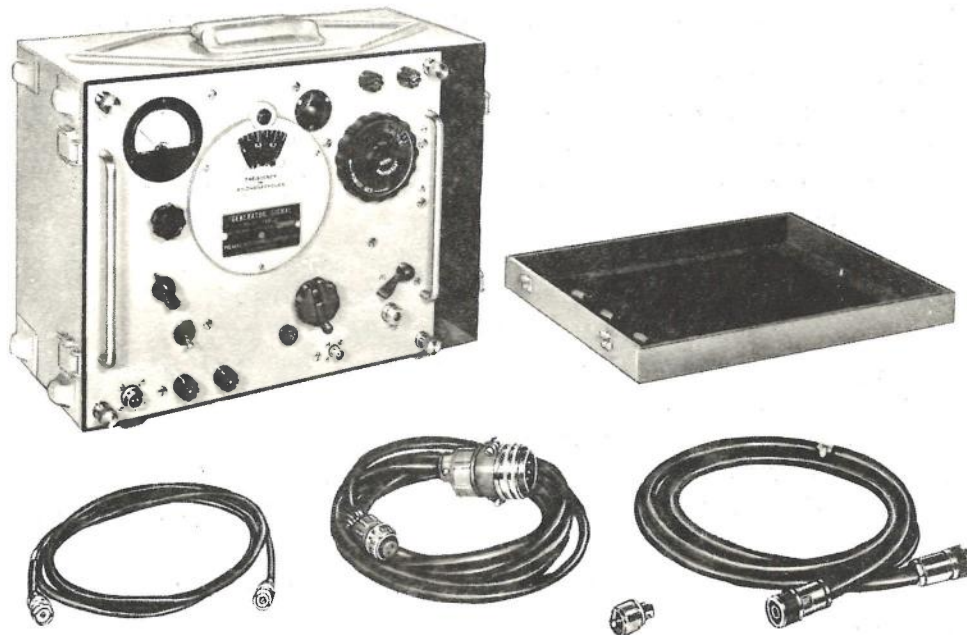
SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Signal Generator AN/URM-35	1.5	15-1/2	17-1/2	11-1/2	45

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Signal Generator AN/URM-35 Including:	Aluminum	7CAC-363979-2	11-1/4	15-1/4	8-7/8	36
1	Signal Generator SG-56/URM-35						
1	Cord CG-409C/U			72 long			
1	Cable Assembly CX-2470/U			120 long			
1	Adapter UG-273/U		8850-102000				
1	Cord CG-92B/U		7CAC-170265-6	72 long			
1	Combination Case	Aluminum		11-1/4	15-1/4	8-7/8	
1	Handbook of Operating Instructions						

SIGNAL GENERATOR AN/URM-36



FUNCTIONAL DESCRIPTION:

A portable, field type radio frequency signal generator used for pre-flight operational check of broadband radar receivers, antenna, transmission lines, and indicators used with search and direction finding equipment. Radio frequency output is available at either a panel jack or a horizontally or vertically polarized antenna. The equipment also furnishes a video signal having characteristics similar to the RF pulse which is used to check various types of pulse equipment. Indication is provided on a power level indicating meter showing 1 milliwatt power level at a mid-scale mark. At 0 dbm output this power level indication is adjusted by a control knob through a bridge balance control. Frequency indication is provided in megacycles per second on a calibrated dial, and a knob adjusts the internal radio frequency oscillator tuning. A dial calibrated in minus dbm indicates the power output level. This dial operates in conjunction with a control for varying the attenuation of the output attenuator. Circuit test point terminals are available on the chassis to facilitate the location of the most probable circuit malfunctions likely to occur within the equipment. All indicators, controls, and connections are on the front panel.

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Alternate Standard		
STOCK NOS.	7CAC-363979-5		
PROCUREMENT INFO.: USAF Exhibit WCE-304 dtd 13 May 52; USAF Spec. ML-E-15090			
PROCUREMENT COG.: USAF		DESIGN COG.: USAF, ARL	
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 4, 1, 2	
- Electronics Test Equipment -			AN/URM-36

SIGNAL GENERATOR AN/URM-36

RELATIONSHIP TO OTHER EQUIPMENT:

This equipment is functionally interchangeable with Signal Generator AN/URM-36(XA) but is built to more rigid electrical and mechanical specifications.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The signal generator is basically a klystron oscillator with associated power supplies and pulse circuits.

Power Supply: 115 volts $\pm 10\%$, AC, 380 to 1000 cycles per second, single phase, 270 watts maximum.

Frequency Range: 7850 to 10,750 megacycles per second.

Type of Transmission: Continuous Wave, Pulse Modulated.

Power Output: 0 to -100 dbm continuously variable.

Peak Power of Radio Frequency Pulses: Within ± 1 decibel of the power level of corresponding continuous wave signals.

Amplitude of Video Pulses: 1.25 volts ± 0.5 volt.

Characteristics Common to Radio Frequency and Video Pulses:

Pulse Width: 3.5 ± 0.5 microseconds, measured at 50% peak amplitude points.

Pulse Repetition Rate: 1000 ± 100 pulses per second.

Pulse Rise and Decay Time: 0.35 microsecond measured between the 10% and 90% amplitude points.

Pulse Variation: Not over 10% of the peak pulse amplitude (pulses are essentially flat topped).

Direct Radio Frequency Output Impedance: 50 ohms, nominal.

Video Output Terminating Impedance: 50 ohms, resistive.

Antenna Voltage Standing Wave Ratio: Less than 3:1.

Antenna Beam Width: 15°, at half power points.

Frequency Stability: CW: 0.025% incidental frequency modulation or less.

Pulse: 0.2% frequency shift or less, at operating frequencies.

Accuracy: Frequency: $\pm 1.0\%$ at ambient room conditions; $\pm 1.5\%$ under all required conditions.

Power Output: ± 3 decibels at ambient room conditions; ± 5 decibels under all required conditions.

Radio Frequency Leakage: At least 20 decibels below the calibrated direct output signal, as measured at a distance of one foot from each face of the signal generator and its power cord.

Spurious Responses or Harmonics: At least 20 decibels below the signal generator fundamental frequency power level.

Temperature Range: -40°C. to +55°C., operating; -65°C. to +85°C., storage.

Humidity Range: Up to 90% relative, operating or storage. (The combination case is rainproof.)

Altitude Range: Up to 10,000 feet, operating; up to 50,000 feet, storage.

MANUFACTURERS' OR CONTRACTORS' DATA:

Polarad Electronics Corporation, 43-20 34th Street, Long Island City 1, New York; Contract No. AF 33(604)5758; Approximate Cost per Unit, \$1,800.00.

SIGNAL GENERATOR AN/URM-36

TUBE COMPLEMENT:

3 JAN-6X4W, 1 JAN-6005/6AQ5W, 1 JAN-6AU6, 2 JAN-OB2, 5 JAN-12AT7,
1 JAN-6390, 3 JAN-5R4WGY, 5 JAN-5651, 1 JAN-6098/CT, 1 JAN-1N69.

REFERENCE DATA AND LITERATURE:

TO 16-30URM36-1 (Operating Instructions).
TO 16-30URM36-2 (Service Instructions).
TO-16-30URM36-4 (Illustrated Parts Breakdown).

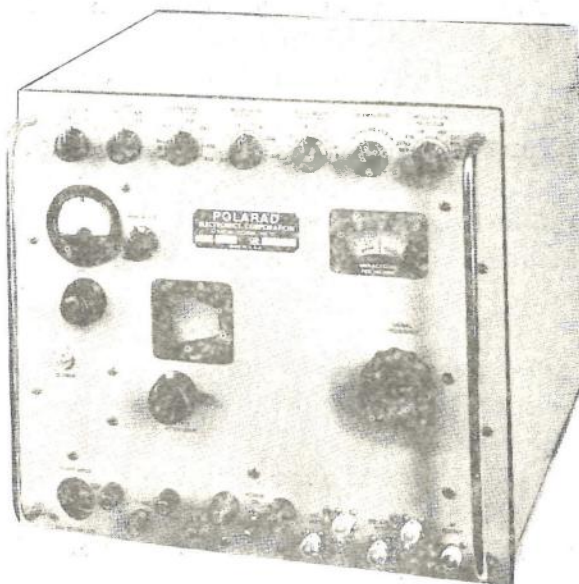
SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Signal Generator AN/URM-36	1.5	15-1/2	17-1/2	11-1/2	45

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Signal Generator AN/URM-36 including:	Aluminum	7CAC-363979-5	11-1/4	15-1/4	8-7/8	36
1	Signal Generator SG-57/URM-36						
1	Cord CG-409C/U			72 long			
1	Cable Assembly CX-2470/U			120 long			
1	Adapter UG-273/U		8850-102000				
1	Cord CG-92B/U		7CAC-170265-6	72 long			
1	Combination Case	Aluminum		11-1/4	15-1/4	8-7/8	
1	Handbook of Operating Instructions						

RADIO TEST SET AN/URM-44



FUNCTIONAL DESCRIPTION:

A portable, general purpose, self-contained signal generator for use in the testing and maintaining of aircraft radio and radar receivers and other electronic equipment. Frequency and output power are indicated on direct reading dials.

RELATIONSHIP TO OTHER EQUIPMENT:

Similar to Polarad Model MSG-4 Microwave Signal Generator.
Overall nomenclature for TS-622/U.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: Contains a reflex klystron (velocity modulated) tube operating with an external resonant coaxial type cavity serving as the radio frequency oscillator. The frequency of oscillation is determined by the resonant frequency of the cavity and the magnitude of the repeller voltage. The power output system
(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.	7CAC-801319-25426		
PROCUREMENT INFO.:	Spec. MIL-G-7142A(Aer), 30 July 1952.		
PROCUREMENT COG.:	Navy	DESIGN COG.: Navy, BuAer	
F.I.I.N.:	FUNCTIONAL CLASS NO.: 4.1.2		
	- Electronics Test Equipment -		AN/URM-44

RADIO TEST SET AN/URM-44

ELECTROMECHANICAL DESCRIPTION: (Continued)

includes an RF monitor (to insure proper setting of output attenuator). The modulator section generates a positive video pulse of desired characteristics and applies that pulse to the grid of the reflex so that the klystron will oscillate for the duration of the pulse. The video pulse can be synchronized with external pulse or sine-wave voltages.

Power Supply: 115 volts, $\pm 10\%$, AC, 50 to 1000 cycles per second, single phase, approximately 2 amperes.

Frequency Range: 7000 to 10,750 megacycles per second, one band.

Type of Transmission: Pulse and Frequency Modulated Carrier, Continuous Wave.

Output Voltage: 0.1 to 100,000 microvolts.

Power Output: 0.1 milliwatts maximum, -10 to -127 dbm.

Output Impedance: 52 ohms.

Internal Pulse Modulation:

Repetition Rate: 40 to 4000 pulses per second.

Width: 0.5 to 10 microseconds between the points that are 50% of the maximum amplitude of the initial rise.

Initial Rise Time: Less than 0.5 microseconds between 10% and 90% of the maximum amplitude of the initial rise.

Final Decay Time: Less than 0.5 microseconds between 10% and 90% of the maximum amplitude of the initial rise.

Timing: 3 to 300 microseconds, but not greater than 75% of the pulse period.

External Pulse Modulation:

Polarity: Either positive or negative.

Rate: 40 to 4000 pulses per second.

Amplitude: 15 to 70 volts.

Width: 0.5 to 2500 microseconds.

Pulse Separation: 1.0 to 2500 microseconds.

Rise: 0.1 to 1.0 microseconds.

Decay: 0.1 to 1.0 microseconds.

Internal Frequency Modulation:

Rate: 40 to 4000 sawtooths per second.

Deviation: 0 to ± 3 megacycles per second.

Peak Amplitude: Equal to the continuous wave amplitude ± 1.0 decibel and vary no more than 3 decibels during the deviation.

Output Synchronizing Signal:

Polarity: Positive only.

Rate: 40 to 4000 pulses per second.

Amplitude: 25 to 100 volts.

Width: 0.5 to 5 microseconds.

Rise: Less than 1 microsecond.

Decay: Less than 1 microsecond.

Timing: 1 microsecond before to 1 microsecond after the pulse modulated RF test signal.

Rated Load: 500 to 100,000 ohms, 500 micromicrofarads.

RADIO TEST SET AN/URM-44

ELECTROMECHANICAL DESCRIPTION: (Continued)

External Synchronization:

Sine Waves:

Frequency Range: 40 to 4000 cycles per second.

Amplitude: 5 to 50 volts, rms.

Pulse Signals:

Repetition Rate: 40 to 4000 cycles per second.

Peak Amplitude: 5 to 50 volts.

Width: 0.5 to 5.0 microseconds.

Rise: 0.1 to 1.0 microsecond.

Accuracies: $\pm 1\%$ of dial indication in frequency.

± 2 decibels from -10 to -127 dbm.

MANUFACTURERS' OR CONTRACTORS' DATA:

Polarad Electronics Corporation, 100 Metropolitan Avenue, Brooklyn 11, New York; Contract No. NOa(s)-51-1179.

TUBE COMPLEMENT:

2 JAN-6X4W, 2 JAN-0B2, 3 JAN-6AK6, 4 JAN-5R4WGY, 5 JAN-6AU6, 5 JAN-5651, 1 JAN-5721, 1 JAN-6AS7G, 13 JAN-12AT7, 3 JAN-807.

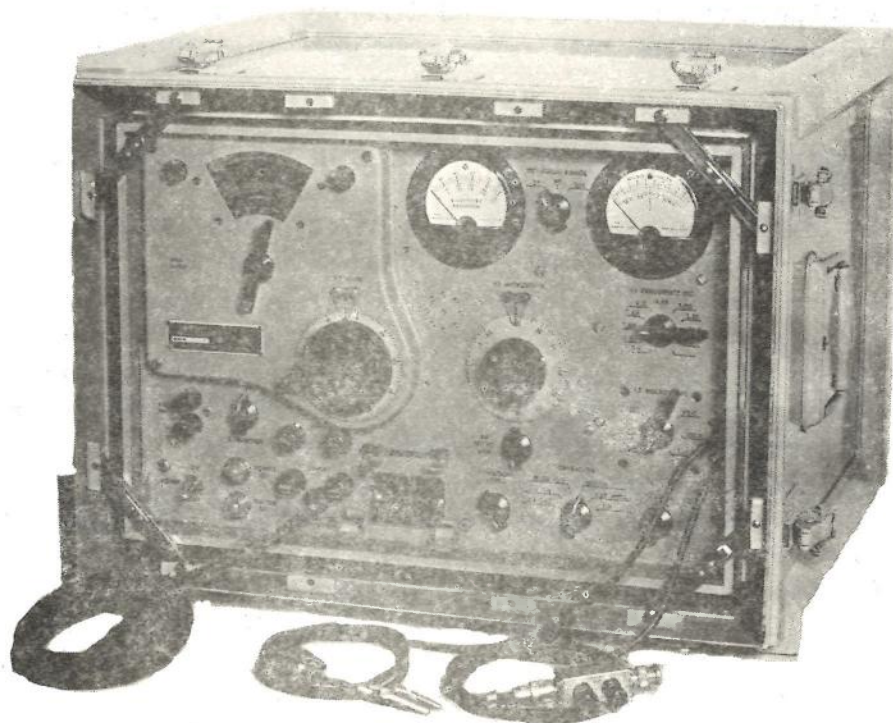
REFERENCE DATA AND LITERATURE:

TO 16-30URM44-4 (Illustrated Parts Breakdown).

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	

SIGNAL GENERATOR AN/URM-48



FUNCTIONAL DESCRIPTION:

A portable field instrument used for servicing FM receivers by providing calibrated signals required in performing the following operations and other functions of a similar nature: alignment of RF circuits, alignment of IF circuits, measurements of operating sensitivity, measurement of stage gain, and measurement of receiver fidelity (with external audio oscillator).

RELATIONSHIP TO OTHER EQUIPMENT:

Overall nomenclature for SG-12/U.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The circuit consists of an RF section, crystal controlled IF section, crystal calibrator, attenuator, and output system. Nine discrete crystal frequencies are supplied, with provisions to accommodate two additional crystal frequencies. Internal modulation and provision for external modulation are
(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.	7CAC-363915-5		
PROCUREMENT INFO.:	Spec. MIL-S-10484 (SigC) dated 21 September 1950.		
PROCUREMENT COG.:	Army	DESIGN COG.: Army, CSL	
F.I.I.N.:	FUNCTIONAL CLASS NO.: 4.1.2		
	- Electronics Test Equipment -		AN/URM-48

SIGNAL GENERATOR AN/URM-48

ELECTROMECHANICAL DESCRIPTION: (Continued)

provided. The output meter is calibrated directly in microvolts.

Power Supply: 115 or 230 volts, AC, single phase, 50 to 1000 cycles per second, 75 watts.

Frequency Range:

RF: 20 to 100 megacycles per second in 5 bands: 19.5 to 29, 26.5 to 39.5, 37 to 56, 46 to 70, 66 to 102 megacycles per second.

IF: 9 crystals, 1.4, 2.515, 2.65, 2.88, 4.3, 4.45, 5.00, 5.35, 15.0 megacycles per second (plus two spare positions for future use).

Type of Transmission: Frequency Modulated, Continuous Wave.

RF Modulation: 1000 cycles per second $\pm 5\%$, internal frequency modulation.

100 to 20,000 cycles per second, external frequency modulation.

Deviation Ranges for Internal RF Modulation: 0 to 25 kilocycles per second, 0 to 50 kilocycles per second, 0 to 100 kilocycles per second.

Type of Calibration: Every 1 megacycle per second in the 20 to 50 megacycles per second range, every 2 megacycles per second in the 50 to 100 megacycle per second range, crystal markers.

External Modulation Input: 8 volts, sine wave, approximately.

Signal Output: 0.05 to 10,000 microvolts, RF; 0.5 to 1,000,000 microvolts, IF, calibrated, in multiples of 10.

External Modulation Input Impedance: 600 ohms.

Signal Output Impedance: 10 ohms, $\pm 10\%$, RF; 25 ohms, IF.

Generator Load Impedance:

Minimum 80 ohms RF loading without panel "output volts" meter corrections.

Minimum 250 ohms IF loading without panel "output volts" meter corrections.

Accuracy: $\pm 0.5\%$, direct reading, RF indication.

$\pm 0.03\%$, indirect reading, RF indication.

$\pm 0.005\%$, IF crystal indication.

± 1 decibel ($\pm 12.5\%$), RF deviation indication.

± 2 decibels, output voltage indication.

MANUFACTURERS' OR CONTRACTORS' DATA:

A. R. F. Products, River Forest, Illinois; Army Order No. 14210-PH-51-93; Approximate Cost per Unit, 473 units at \$2600.00 each, additional 1304 units at \$1950.00 each.

TUBE COMPLEMENT:

6 JAN-6AH6, 1 JAN-6J6, 1 JAN-12AU7, 3 JAN-6C4, 1 JAN-5Y3GT, 1 JAN-0A2, 1 JAN-6AK6.

REFERENCE DATA AND LITERATURE:

TO 16-30URM48-5 (TM 11-1257) (Instruction Book).

SIGNAL GENERATOR AN/URM-48

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Signal Generator AN/URM-48 Including:	Aluminum	7CAC-363915-5				
1	Signal Generator SG-12/U	Aluminum	7CAC-363911	12	18	12	72
1	Transit Case CY-1217/U	Aluminum		16-5/8	21-5/8	15-5/8	34
1	Electrical Dummy Load DA-69/URM-48			3/4	3/4	3-1/4	
1	Set of Calibration Charts						
1	Set of Running Spares						
1	Instruction Book						

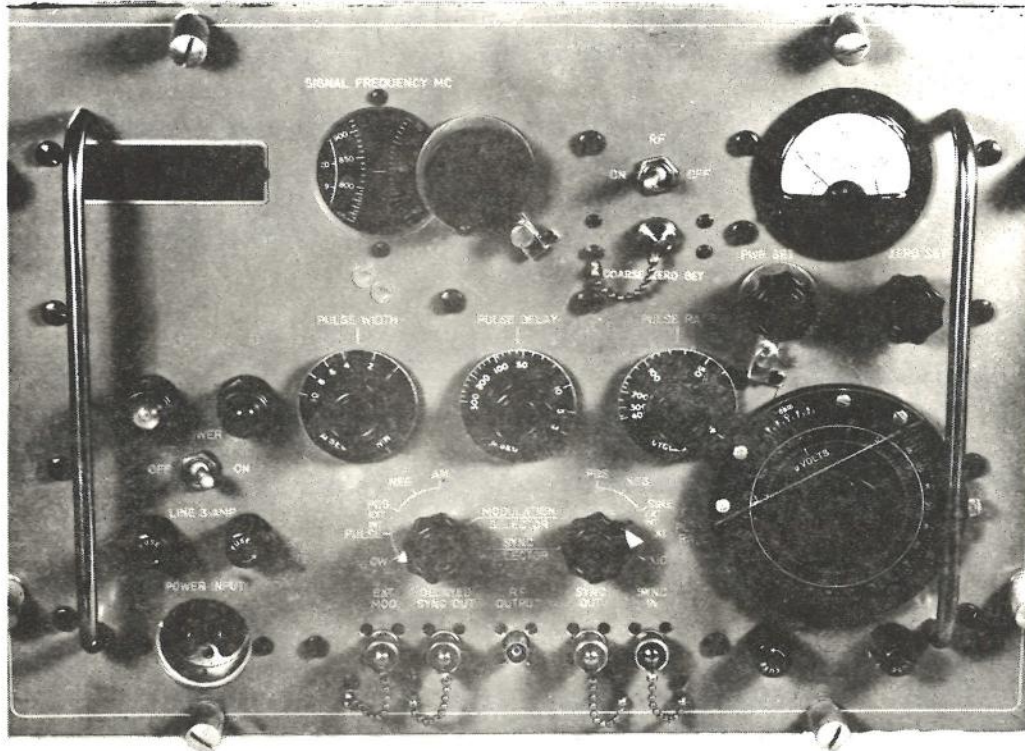
SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Signal Generator AN/URM-48 plus running Spares and Accessories (Export Packed)	9.5	24-3/4	28-7/8	23	180

- Electronics Test Equipment -

AN/URM-48

**SIGNAL GENERATOR AN/URM-49
(GENERATOR, SIGNAL, AN/URM-49)**



FUNCTIONAL DESCRIPTION:

A portable, self-contained test equipment for use with radio and radar receivers and for other applications requiring small amounts of radio frequency power, such as measuring standing wave ratios, antenna characteristics, transmission line characteristics, conversion gain, receiver sensitivity, etc. The generator is directly calibrated in output frequency as well as in output power.

RELATIONSHIP TO OTHER EQUIPMENT:

Overall nomenclature for TS-418/U, TS-418A/U, and TS-418B/U.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: Contains a radio frequency oscillator, power supply, radio frequency power monitor, modulation section and output section. Radio frequency signals may be amplitude-modulated by external signals or pulse-modulated by externally applied positive or negative pulses. A pulse generator is contained in

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.	7CAC-363965-3		
PROCUREMENT INFO.: Spec. 16G6(Aer) dated 1 April 1947.			
PROCUREMENT COG.: Navy		DESIGN COG.: Navy, BuAer	
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 4.1.2	
- Electronics Test Equipment -			AN/URM-49

SIGNAL GENERATOR AN/URM-49
(GENERATOR, SIGNAL, AN/URM-49)

ELECTROMECHANICAL DESCRIPTION:

the modulator section to provide pulse modulation internally. These internally generated pulses may also be synchronized with external positive or negative pulses or sine waves.

Power Supply: 115 volts, $\pm 10\%$, AC, 50 to 1600 cycles per second, single phase, 130 watts at a power factor of 0.9.

Frequency Range: 400 to 1000 megacycles per second in a single band.

Type of Transmission: Continuous Wave, Pulsed Carrier, Amplitude Modulated Carrier.

Power Range: 0 to -120 dbm.

Voltage Output: 0.2 to 200,000 microvolts into 50 ohms.

Output Impedance: 50 ohms.

Input Impedance: 10,000 ohms shunted by 115 micromicrofarads.

Accuracy:

Pulse Width: ± 0.25 microseconds or $\pm 25\%$ whichever is greater.

Pulse Repetition Rate: $\pm 25\%$.

Pulse Delay: 3 microseconds or $\pm 25\%$ whichever is greater.

Frequency: $\pm 1\%$.

RF Output: ± 2 decibels.

Internal Modulation Data:

Pulse Delay Time: 3 to 300 microseconds after synchronizing pulse.

Pulse Width: 0.5 to 10 microseconds.

Pulse Repetition Rate: 40 to 4000 pulses per second.

Pulse Rise Time: Less than 0.5 microseconds between 10% and 90% of maximum amplitude.

Pulse Decay Time: Less than 0.5 microseconds between 10% and 90% of maximum amplitude.

External Modulation Data:

Peak Pulse Amplitude: 40 to 70 volts.

Pulse Repetition Rate: 40 to 4000 pulses per second.

Pulse Width: 0.5 to 20 microseconds.

Sine Wave: 3 volts peak between 100 cycles per second and 100 kilocycles per second produces at least 30% modulation.

External Synchronization: Positive or negative pulses or sine waves.

MANUFACTURERS' OR CONTRACTORS' DATA:

Lavoie Laboratories, Inc., Morganville, New Jersey; Navy Contract No. N383S-60282; Approximate Cost per Unit, \$1200.00.

TUBE COMPLEMENT:

1 JAN-5Y3GT, 1 JAN-5R4GY, 4 JAN-6J6, 2 JAN-6AG7, 1 JAN-6AK5, 2 JAN-OB2, 1 JAN-2C36, 1 JAN-12AX7, 2 JAN-12AT7.

REFERENCE DATA AND LITERATURE:

TO 16-30URM49-3 (Maintenance Instructions).

SIGNAL GENERATOR AN/URM-49
(GENERATOR, SIGNAL, AN/URM-49)

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Signal Generator AN/URM-49 (Waterproof Container, Complete, Export Packed)	5.90	20	24	21	153

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Signal Generator AN/URM-49 Including:		7CAC-363965-3				
1	Signal Generator TS-418B/U		7CAC-363965-5 3F4325-418B	12-3/8	17-5/8	13-1/2	53.5
1	Transit Case CY-741/U		7CAC-176572-59 F16-T-20139-5901 3H772-741	16	21-7/8	18-5/8	24.0
1	Power Cord CX-337/U		7CAC-170264-86 R16-AN-CX337/U 3E6000-337-72	72 long			0.6
1	Radio Frequency Cord CG-546/U		7CAC-170265-217 3E6015-546.3	72 long			0.3
2	Video Cord CG-546/U		7CAC-170265-54 3E6015-546.4	96 long			0.4
3	Adapter UG-201/U		8850-108745 2Z308-201	1-9/16	3/4 OD		0.1
3	Adapter UG-255/U		8850-108880 2Z308-255	1-3/8	5/8 OD		0.1
3	Adapter UG-273/U		8850-102000 2Z308-273				0.1

- Electronics Test Equipment -

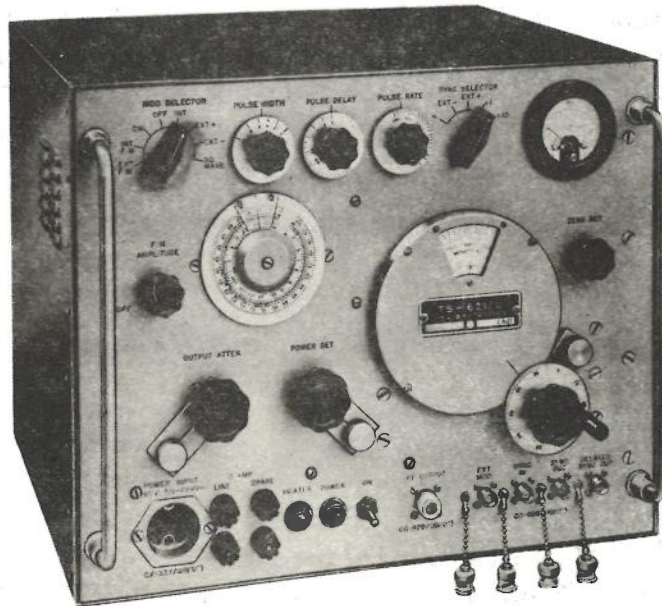
AN/URM-49

SIGNAL GENERATOR AN/URM-49
(GENERATOR, SIGNAL, AN/URM-49)

EQUIPMENT SUPPLIED: (Continued)

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
2	Fuse			1-1/4	1/4 OD		
3	Pilot Lamp			1-1/8	3/8 OD		
1	Bead Thermistor			1/2	1/8 OD		
2	Disc Thermistor			1-1/4	7/8	5/16	

SIGNAL GENERATOR AN/URM-52



FUNCTIONAL DESCRIPTION:

A portable, general purpose, self-contained test equipment designed for applications requiring stable and accurate RF output such as measuring standing wave ratios, antenna and transmission line characteristics, aligning and calibrating receivers, conversion gain and similar uses. The instrument has direct reading dials for indicating frequency and output voltage.

Provisions are made for internal or external pulse modulation, internal square wave modulation, and FM. Pulse repetition rate and pulse width are variable and the Sync Out signals can be obtained simultaneously with RF pulse or can be advanced ahead of the RF pulse. Synchronization can be obtained with external sine wave or with positive or negative pulse signals.

RELATIONSHIP TO OTHER EQUIPMENT:

Overall nomenclature for TS-621/U Signal Generator. Similar to Hewlett-Packard Model 618B.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: Contains a reflex klystron (velocity modulated) tube operating with an external resonant coaxial type cavity serving as the radio frequency os-

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Tentative Standard		
STOCK NOS.	7CAC-363979-15		
PROCUREMENT INFO.: Spec. MIL-G-7141, dated 15 February 1951			
PROCUREMENT COG.: USN		DESIGN COG.: USN, BuAer	
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 4.1.2	
- Electronics Test Equipment -			AN/URM-52

SIGNAL GENERATOR AN/URM-52

ELECTROMECHANICAL DESCRIPTION: (Continued)

cillator. The frequency of oscillation is determined by the resonant frequency of the cavity and the magnitude of the repeller voltage. The power output system includes an RF monitor (to insure proper setting of output attenuator). The modulator section generates a positive video pulse with characteristics listed below, and applies that pulse to the grid of the reflex klystron. The video pulse can be synchronized with external pulse or sine wave voltages.

Power Supply: 115 volts, $\pm 10\%$, AC, 50 to 1000 cycles per second, single-phase, approximately 2 amperes.

Frequency Range: 3800 to 7500 megacycles per second, one band.

Type of Transmission: Pulse, Square Wave, and Frequency Modulated Carrier, Continuous Wave.

Output Voltage: 0.1 to 72,000 microvolts.

Power Output: 1.0 milliwatt (0 to -127 dbm).

Output Impedance: 52 ohms.

Internal Pulse Modulation:

Repetition Rate: 40 to 4000 pulses per second.

Width: 0.5 to 10 microseconds between the points that are 50% of the maximum amplitude of the initial rise.

Initial Rise Time: Less than 0.5 microsecond between 10% and 90% of the maximum amplitude of the initial rise.

Final Decay Time: Less than 0.5 microsecond between 10% and 90% of the maximum amplitude of the initial rise.

Timing: 3 to 300 microseconds, but not greater than 75% of the pulse period.

External Pulse Modulation:

Polarity: Either positive or negative.

Repetition Rate: 40 to 4000 pulses per second.

Amplitude: 15 to 70 volts.

Width: 0.5 to 2500 microseconds.

Pulse Separation: 1.0 to 2500 microseconds.

Rise: 0.1 to 1.0 microsecond.

Decay: 0.1 to 1.0 microsecond.

Internal Square Wave: Repetition Rate: 40 to 4000 pulses per second.

Internal Frequency Modulation:

Repetition Rate: 40 to 4000 saw teeth per second.

Deviation: 0 to ± 3 megacycles per second.

Peak Amplitude: Equal to the continuous wave amplitude ± 1.0 decibel and vary no more than 3 decibels during the deviation.

Output Synchronizing Signal:

Polarity: Positive only.

Repetition Rate: 40 to 4000 pulses per second.

Amplitude: 25 to 100 volts.

Width: 0.5 to 5 microseconds.

(Continued)

SIGNAL GENERATOR AN/URM-52

ELECTROMECHANICAL DESCRIPTION: (Continued)

Rise: Less than 1 microsecond.

Decay: Less than 1 microsecond.

Timing: 1 microsecond before to 1 microsecond after the pulse modulated RF test signal.

Rated Load: 500 to 100,000 ohms, shunted by 400 micromicrofarads.

External Synchronization:

Sine Waves:

Frequency Range: 400 to 4000 cycles per second.

Amplitude: 5 to 50 volts, rms.

Pulse Signals:

Repetition Rate: 40 to 4000 cycles per second.

Peak Amplitude: 5 to 50 volts.

Width: 0.5 to 5.0 microseconds.

Rise Time: 0.1 to 1.0 microsecond.

Accuracies: $\pm 1\%$ of dial indication in frequency.

± 2 decibels from -7 to -127 dbm.

MANUFACTURERS' OR CONTRACTORS' DATA:

Hewlett-Packard Company, 275 Page Mill Road, Palo Alto, California; USN Contract No. NOa(s)51-1167.

TUBE COMPLEMENT:

2 JAN-12AT7, 3 JAN-5726, 7 JAN-5814, 1 JAN-2D21, 1 JAN-5763, 1 JAN-6236, 3 JAN-5R4GWY, 3 JAN-6AU6, 2 JAN-6AS7, 5 JAN-OA2, 1 JAN-OA3.

REFERENCE DATA AND LITERATURE:

33A1-8-10-1 (Operation Instructions).

33A1-8-20-2 (Service Instructions).

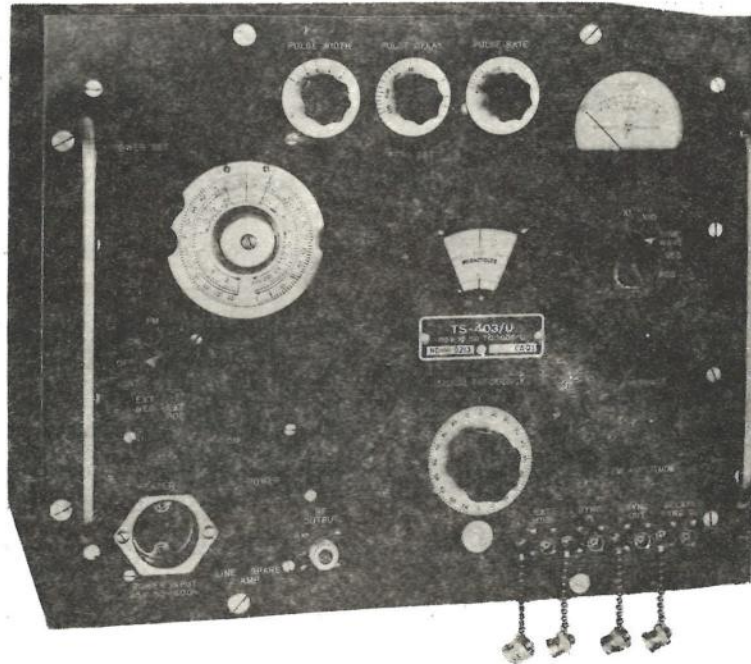
33A1-8-20-3 (Overhaul Instructions).

33A1-8-20-4 (Illustrated Parts Breakdown).

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Signal Generator AN/URM-52	9.6	26	27-1/2	22-1/2	190
- Electronics Test Equipment -						AN/URM-52

SIGNAL GENERATOR AN/URM-61



FUNCTIONAL DESCRIPTION:

A portable self-contained general purpose test equipment designed for use with radio and radar receivers and for other applications requiring small amounts of radio frequency power such as measuring standing wave ratios, antenna characteristics, transmission line characteristics, conversion gain, etc. Both the output frequency and output power are indicated on direct-reading dials.

RELATIONSHIP TO OTHER EQUIPMENT:

Overall nomenclature for TS-403/U Signal Generator. Similar to Hewlett-Packard Model 616A.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: Ultra high frequencies are generated in a circuit containing a reflex klystron oscillator operating with an external resonant cavity whose electrical length is adjusted by movable shorting bars. The repeller voltage for the klystron is automatically tracked with the setting of the cavity shorting bars so
(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Standard		
STOCK NOS.	7CAC-363974-6	R16-SN-TS-403A/U	3F325-403
PROCUREMENT INFO.:	Spec. MIL-T-18197(AER), dated 15 September 1954		
PROCUREMENT COG.:	USN	DESIGN COG.:	USN, BuAer
F.I.I.N.:	FUNCTIONAL CLASS. NO.:		4, 1, 2
- Electronics Test Equipment. -			AN/URM-61

SIGNAL GENERATOR AN/URM-61

ELECTROMECHANICAL DESCRIPTION: (Continued)

that a single control determines the position of the shorting bar and the magnitude of the repeller voltage. This system makes possible the calibration of the tuning dial directly in frequency.

The oscillator tank circuit is coupled to a radio frequency monitor, which monitors the amplitude of oscillation, and to the output terminal through an attenuator system. The modulator generates a positive video pulse which is applied to the accelerator grid of the klystron to cause oscillation for the duration of the pulse. The video pulse can, if desired, be synchronized with the external pulse or sine-wave voltages. This modulator section includes a pulse rate multivibrator, limiter and delay multivibrator. A stand-by heater is provided to maintain the instrument case temperature higher than the ambient temperature.

Power Supply: 115 volts $\pm 10\%$, AC, 50 to 1600 cycles per second, single-phase, approximately 150 watts at a power factor of 0.9.

Frequency Range: 1800 to 4000 megacycles per second.

Type of Transmission: Continuous Wave, Frequency Modulated, Pulse Modulated.

Pulse Repetition Rate: 40 to 4000 pulses per second.

Pulse Width: 0.5 to 10 microseconds.

Frequency Modulation: Phase variable approximately 180 electrical degrees at power supply frequency.

Timing: Undelayed or delayed from 3 to 300 microseconds from external or internal pulse.

External Pulse Modulation: Pulse Requirements: Amplitude from 40 to 70 volts, Positive or Negative; Width from 1.0 microsecond to square wave.

Power Output: 1 milliwatt maximum, 0 to -127 dbm, continuously variable.

Voltage Output: 0.1 to 224,000 microvolts.

Output Impedance: 50 ohms, resistive.

Accuracies: Frequency, better than $\pm 1\%$.

Attenuation Dial, better than ± 2 decibels from -7 to -127 dbm.

Voltage Standing Wave Ratio: Less than 1.8.

MANUFACTURERS' OR CONTRACTORS' DATA:

Hewlett-Packard Company, 3000 Page Mill Road, Palo Alto, California; USN Contract Nos. N383s-74507, N383s-74917, and N383s-91867(P), dated 30 June 1953; Approximate Cost per Unit, \$2000.00.

TUBE COMPLEMENT:

1 JAN-6SL7GT, 1 JAN-2K28, 3 JAN-OA2, 4 JAN-6C4, 1 JAN-5R4GY, 3 JAN-6J6, 2 JAN-6Y6G, 2 JAN-6X5GT.

REFERENCE DATA AND LITERATURE:

TO 16-30URM61-3 (Maintenance Instructions).

SIGNAL GENERATOR AN/URM-61

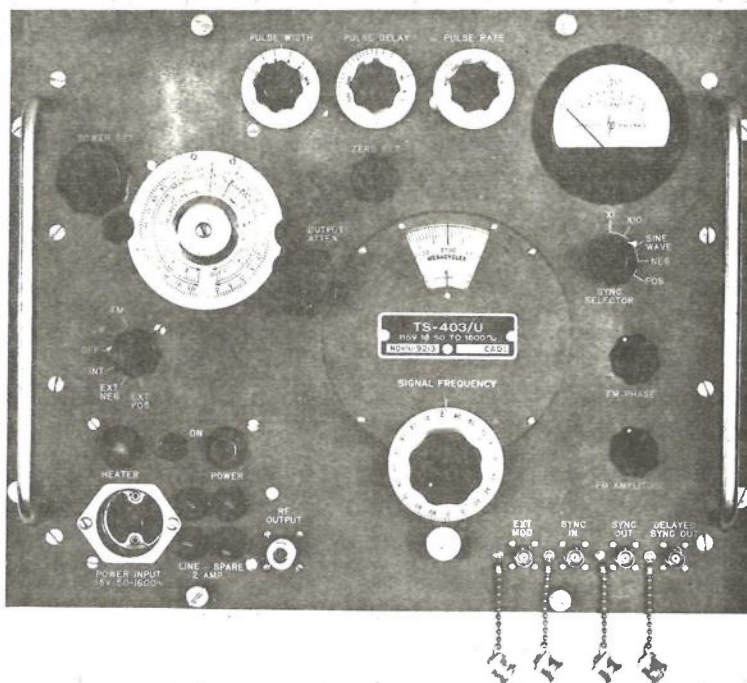
SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Signal Generator AN/URM-61	8.6	26-1/2	22-1/4	23-1/2	160

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Signal Generator AN/URM-61		7CAC-363974-6				
	Including:						
1	Signal Generator TS-403A/U		7CAC-363974-5 F16-Q-304483-100 3F4325-403A	13-1/2	14	17-1/2	64.000
1	Transit Case CY-669A/U		7CAC-176572-58 3F2529-669A	17-3/8	17	19-1/2	26.000
1	Power Cord CX-337/U		7CAC-670264-86 R16-AN-CX-337/U 3E6000-337-72	72 long			0.620
1	RF Cord CG-92B/U		7CAC-170265-6 R16-C-3738-600 1F430-92B.72	72 long			1.000
2	Video Cord CG-409/U		7CAC-170265-395 R16-C-3761-50 1F430-409.98	98 long			0.500
3	Adapter UG-273/U		8850-102000 2Z308-273	1-5/16	1/4 dia.		0.180
3	Fuse		3300-308417845 N16-C-69001-1003 3C1084.258	1-1/4	1/4 dia.		0.012
3	Pilot Lamp		8800-444163	1-1/8	3/8 dia.		0.012
1	RF Probe		3300-298362047 2Z6820.154	2-29/32	7/8 O. D.		0.250
- Electronics Test Equipment -							AN/URM-61

SIGNAL GENERATOR AN/URM-61A



FUNCTIONAL DESCRIPTION:

A portable, self-contained, general purpose test equipment designed for use with radio and radar receivers and for other applications requiring small amounts of RF power such as measuring standing-wave ratios, antenna characteristics, transmission line characteristics, conversion gain, etc. Both the output frequency and output power are indicated on direct-reading dials.

RELATIONSHIP TO OTHER EQUIPMENT:

The AN/URM-61A is similar to the AN/URM-61 except for changes in power cord and power input connector. The AN/URM-61A is the overall nomenclature for the Signal Generator TS-403B/U which is similar to the Hewlett-Packard Model 616A.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: Ultra high frequencies are generated in a circuit containing a reflex klystron oscillator operating with an external resonant cavity whose

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREMENT INFO.:			
PROCUREMENT COG.:	Navy	DESIGN COG.:	Navy BuAer
F. I. L. N.:	FUNCTIONAL CLASS. NO.:		4.1.2
- Electronics Test Equipment -			AN/URM-61A

SIGNAL GENERATOR AN/URM-61A

ELECTROMECHANICAL DESCRIPTION: (Continued)

electrical length is adjusted by moveable shorting bars. The repeller voltage for the klystron is automatically tracked with the setting of the cavity shorting bars so that a single control determines the position of the shorting bar and the magnitude of the repeller voltage. This system makes it possible to calibrate the tuning dial directly in frequency. The oscillator tank circuit is coupled to an RF monitor, which monitors the amplitude of oscillation, and to the output terminal through an attenuator system. The modulator generates a positive video pulse which is applied to the accelerator grid of the klystron to cause oscillation for the duration of the pulse. The video pulse can, if desired, be synchronized with the external pulse or sine-wave voltages. This modulator section includes a pulse rate multivibrator and a limiter and delay multivibrator. A standby heater is provided to maintain the instrument case temperature when the ambient temperature is low.

Power Supply: 115 volts $\pm 10\%$, AC, 50 to 1000 cycles per second, single-phase, approximately 150 watts at a power factor of 0.9.

Frequency Range: 1800 to 4000 megacycles per second.

Type of Transmission: Continuous wave, frequency modulated, pulse modulated.

Pulse Repetition Rate: 40 to 4000 pulses per second.

Pulse Width: 0.5 to 10 microseconds.

Frequency Modulation: Phase variable approximately 180 electrical degrees at power supply frequency.

Timing: Undelayed or delayed from 3 to 300 microseconds from external or internal pulse.

External Pulse Modulation Requirements: Amplitude from 40 to 70 volts, positive or negative, width from 1.0 microsecond to square wave.

Power Output: 1 milliwatt maximum, 0 to -127 decibels below a milliwatt (dbm), continuously variable.

Voltage Output: 0.1 to 224,000 microvolts.

Output Impedance: 50 ohms, resistive.

Accuracies:

Frequency: Better than $\pm 1\%$.

Attenuation Dial: Better than ± 2 decibels from -7 to -127 decibels below a milliwatt (dbm).

Voltage Standing-Wave Ratio: Less than 1.8.

MANUFACTURERS' OR CONTRACTORS' DATA:

Transitron, Inc., 154 Spring Street, New York 12, New York; Contract Nos. N383s-74507, N383s-74917, N383s-91867(P) dated 30 June 53; approximate cost per unit, \$2,000.00.

TUBE COMPLEMENT:

1 6SL7GT, 1 2K28, 3 OA2, 4 6C4, 1 5R4GY, 3 6J6, 2 6Y6G, 2 6X5GT.

SIGNAL GENERATOR AN/URM-61A

REFERENCE DATA AND LITERATURE:

SC Form 567.

EQUIPMENT SUPPLIED:

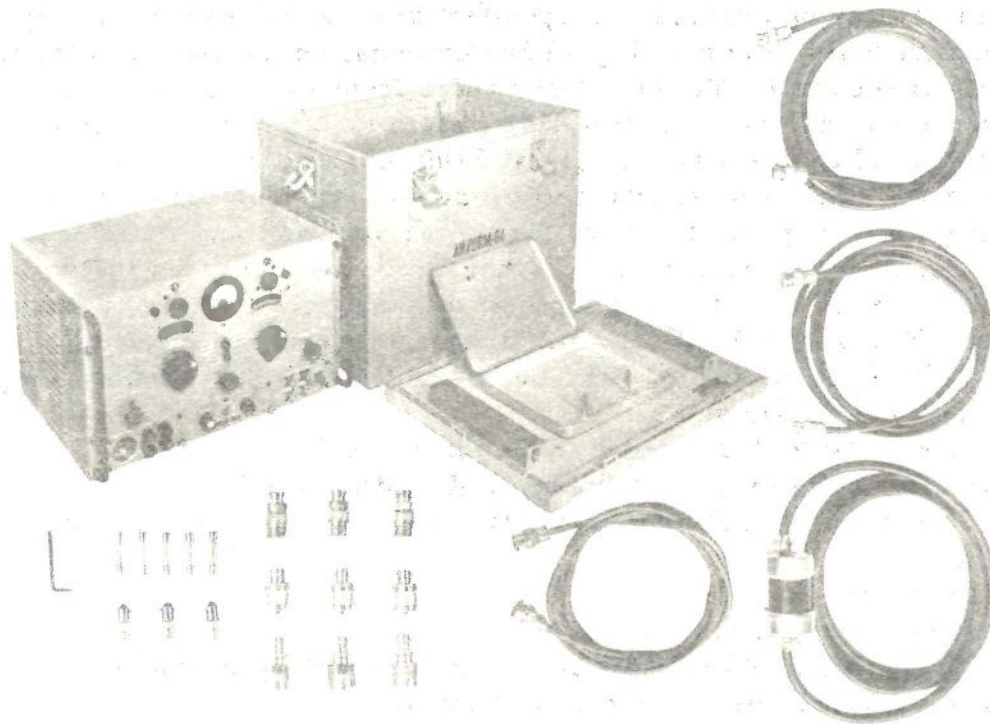
Quant. Per Eq't	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Signal Generator AN/URM-61A			21	17-5/8	17-1/8	
1	Signal Generator TS-403B/U			13-1/2	14	17-1/2	64
3	Adapter UG-273/U		8850-102000(USAF); 2Z308-273(USA)	1-5/16 x 1/4 dia.			0.18
3	Fuse		3300-308417845 (USAF); N16-C-69001-1003(USN); 3C1084.258(USA)	1-1/4 x 1/4 dia.			0.012
3	Pilot Lamp		8800-444163 (USAF)	1-1/8 x 3/8 dia.			0.012
1	RF Probe		3300-298362047 (USAF); 2Z6820.154(USA)				0.25
1	Transit Case CY-669A/U		7CAC-176572-58 (USAF) 3F2529-669A (USA)	17-3/8	17	19-1/2	26
1	RF Cord CG-92B/U		7CAC-170265-6 (USAF) R16-C-3738-600 (USN) 1F430-92B.72(USA)	72 long			1
2	Video Cord CG-409A/U	metal	7CAC-170265-395 (USAF) R16-C-3761-50 (USN) 1F430-409.98(USA)	98 long			0.5

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Signal Generator AN/URM-61A	8.6	26-1/2	22-1/4	23-1/2	160

- Electronic Test Equipment - AN/URM-61A

**SIGNAL GENERATOR AN/URM-64
(GENERATOR, SIGNAL, AN/URM-64)**



FUNCTIONAL DESCRIPTION:

A general purpose, self-contained, directly calibrated generator of continuous wave or pulse modulated radio frequency signals. It provides an accurate signal source used in testing the operation of radio and radar equipment and for receiver measurements and other applications that require less than one milliwatt of continuous wave or pulsed type radio frequency signals. It has provisions for external modulation.

RELATIONSHIP TO OTHER EQUIPMENT:

Similar to Hewlett-Packard Model 614A and Aircraft Radio Corporation Model H-12.

New overall nomenclature for TS-419/U Signal Generator.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: A radio frequency oscillator employing a 6BM6 reflex Klystron tube in a coaxial cavity resonator is keyed by the modulator and synchronizer.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Standard		
STOCK NOS.	7CAC-363971		
PROCUREMENT INFO.:	Navy Spec. No. CS-322, 16G5 (Aer); Dwg. No. 1060		
PROCUREMENT COG.:	Navy	DESIGN COG.:	Navy, BuAer
F.I.I.N.:	FUNCTIONAL CLASS. NO.: 4.1.2		
	- Electronics Test Equipment -		AN/URM-64

SIGNAL GENERATOR AN/URM-64
(GENERATOR, SIGNAL, AN/URM-64)

ELECTROMECHANICAL DESCRIPTION: (Continued)

The modulator may be operated independent of external synchronizing signals or may be synchronized either with positive or negative pulses, or with sine waves from an external source. The oscillator radio frequency output is extracted from the Klystron by means of a coaxial line (which is $1/4$ wave length at 900 megacycles per second or $3/4$ wave length at 2100 megacycles per second). The signal is delivered into two symmetrically located apertures feeding two sections of tubing acting as waveguide feeds to the power monitor and radio frequency output section. The power monitor is a temperature compensated thermistor bridge circuit which serves to indicate the power output level. The radio frequency output tube length is varied by a calibrated dial to indicate attenuation.

Power Supply: 115 volts, $\pm 10\%$, AC, 50 to 1600 cycles per second, single phase; 300 volts amperes maximum.

Frequency Range: 900 to 2100 megacycles per second.

Type of Transmission: Continuous Wave, Pulse Modulated.

Power Output: 0 dbm to -120 dbm (decibels below one milliwatt) to 0.2 microvolts into 50 ohms.

Output Impedance: 50 ohms.

Pulse Modulation: Internal or External.

Pulse Repetition Rate: 40 to 4000 pulses per second, maximum.

Pulse Width: 0.5 to 10 microseconds, maximum.

Pulse Delay (relative to fixed sync out): 3 to 300 microseconds (maximum of 75% of interval between pulses, 187 microseconds maximum at 400 pulses per second).

Peak Amplitude, External Modulation: 40 to 70 volts, positive or negative polarity.

Voltage Standing Wave Ratio looking into output terminals: Less than 5 decibels.

Accuracy: Frequency: $\pm 1\%$.

Power Output: ± 2 decibels.

MANUFACTURERS' OR CONTRACTORS' DATA:

Aircraft Radio Corporation, Boonton, New Jersey; Contract No. NOa(s)9748.

Technicraft Corporation, Kansas City, Missouri; Contract No. NOa(s)-12279; Approximate Cost per Unit, \$900.00, June 1950.

Northeastern Engineering Incorporated, Manchester, New Hampshire; Contract N383s-75748 and N383s-77651.

TUBE COMPLEMENT:

5 JAN-0A2, 2 JAN-5R4GY, 1 JAN-6BM6A, 8 JAN-6V6GTY, 6 JAN-7F8.

REFERENCE DATA AND LITERATURE:

AN 16-35TS419-3 (Maintenance Instructions).

SIGNAL GENERATOR AN/URM-64
(GENERATOR, SIGNAL, AN/URM-64)

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Signal Generator AN/URM-64 with accessories.	8	24	24	24	80.00

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Signal Generator AN/URM-64 Including:		7CAC-363971				
1	Signal Generator TS-419/U		7CAC-363969	10-7/8	17-3/8	14	43.00
1	Transit Case CY-686/U			12-1/2	18-3/4	16-1/2	18.00
1	Power Cable CX-337/U		7CAC-170264-86 R16-C-3824 3E6000-337-72	72	1-1/2		0.75
1	Radio Frequency Cable CG-546/U		7CAC-170265-217 R16-C-3738-700 3E6015-546-3	72	27/64		0.25
2	Video Cable CG-409/U		7CAC-170265-395 R16-C-3761 1F430-409.96	98	27/64		0.50
3	Adapter UG-255/U		8850-108880 2Z308-255	3/4	1-5/8		0.18
3	Adapter UG-201/U		8850-101950 2Z308-201	3/4	1-9/16		0.18
3	Adapter UG-273/U		8850-102000 R16-A-478 2Z308-273	3/4	1-5/8		0.18

- Electronics Test Equipment -

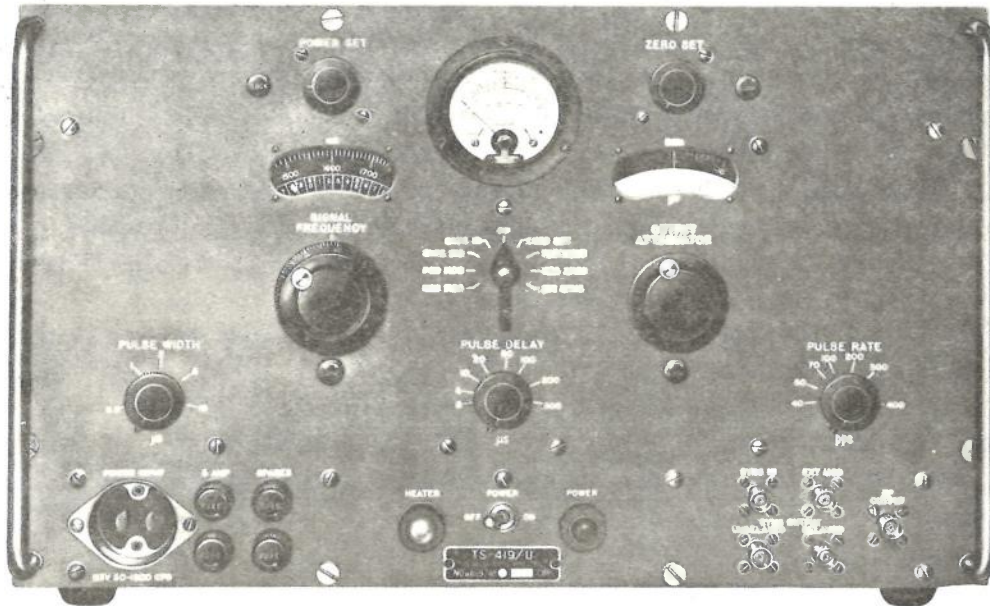
AN/URM-64

SIGNAL GENERATOR AN/URM-64
(GENERATOR, SIGNAL, AN/URM-64)

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
3	Lamp GE-47		17-L-6297	3/8	1-3/32		0.60
5	Fuse 3AG		8800-361212 17-F-16310	1/4	1-1/4		0.10
1	Thermistor Bead		3300-394186079 R16-T2268 3F6926-12.4	5/32	1-1/8		0.02
						Total:	63.22

SIGNAL GENERATOR AN/URM-64A



FUNCTIONAL DESCRIPTION:

A general purpose, self-contained, directly calibrated generator of continuous wave or pulse modulated RF signals. The instrument provides an accurate signal source used in testing the operation of radio and radar equipment and for receiver measurements and other applications that require less than one milliwatt of continuous wave or pulsed type RF signals. The generator has provisions for external modulations.

RELATIONSHIP TO OTHER EQUIPMENT:

The Signal Generator AN/URM-64A is similar to Hewlett-Packard 614A, Aircraft Radio Corporation H-12, and AN/URM-64 except for a new three-wire power cord. AN/URM-64A is the overall nomenclature for TS-419A/U Signal Generator.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: An RF oscillator employing a reflex klystron tube in a coaxial cavity resonator is keyed by the modulator and synchronizer. The mod-

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREMENT INFO.:			
PROCUREMENT COG.: Navy		DESIGN COG.: Navy, BuAer	
F. I. I. N.:		FUNCTIONAL CLASS. NO.: 4 1. 2	
- Electronics Test Equipment -			AN/URM-64A

SIGNAL GENERATOR AN/URM-64A

ELECTROMECHANICAL DESCRIPTION: (Continued)

ulator may be operated independently of external synchronizing signals or may be synchronized either with positive or negative pulses, or with sine-waves from an external source. The oscillator RF output is extracted from the klystron by means of a coaxial line (which is $1/4$ wave length at 900 megacycles per second or $3/4$ wave length at 2100 megacycles per second). The signal is delivered into two symmetrically located apertures feeding two sections of tubing acting as waveguide feeds to the power monitor and RF output section. The power monitor is a temperature compensated thermistor bridge circuit which serves to indicate the power output level. The RF output tube length is varied by a calibrated dial to indicate attenuation.

Power Supply: 115 volts, $\pm 10\%$, AC, 50 to 1000 cycles per second, single-phase; 300 volt-amps maximum.

Frequency Range: 900 to 2100 megacycles per second.

Type of Transmission: Continuous wave, pulse modulated.

Power Output: 0 dbm to -120 dbm (decibels below a milliwatt) to 0.2 microvolts into 50 ohms.

Output Impedance: 50 ohms.

Pulse Modulation: Internal or External.

Pulse Repetition Rate: 40 to 4000 pulses per second, maximum.

Pulse Width: 0.5 to 10 microseconds, maximum.

Pulse Delay (relative to fixed sync output): 3 to 300 microseconds (maximum of 75% of interval between pulses, 187 microseconds maximum at 4000 pulses per second).

Peak Amplitude, External Modulation: 40 to 70 volts, positive or negative polarity.

Voltage Standing-Wave Ratio (looking into output terminals): Less than 5 decibels.

Accuracy:

Frequency: $\pm 1\%$.

Power Output: ± 2 decibels.

MANUFACTURERS' OR CONTRACTORS' DATA:

Transitron, Inc., 154 Spring Street, New York 12, New York; Contract No. N383s-16939A.

TUBE COMPLEMENT:

5 OA2, 2 5R4GY, 1 6BM6A, 8 6V6GTY, 6 7F8.

REFERENCE DATA AND LITERATURE:

AN 16-35TS419-3.

SIGNAL GENERATOR AN/URM-64A

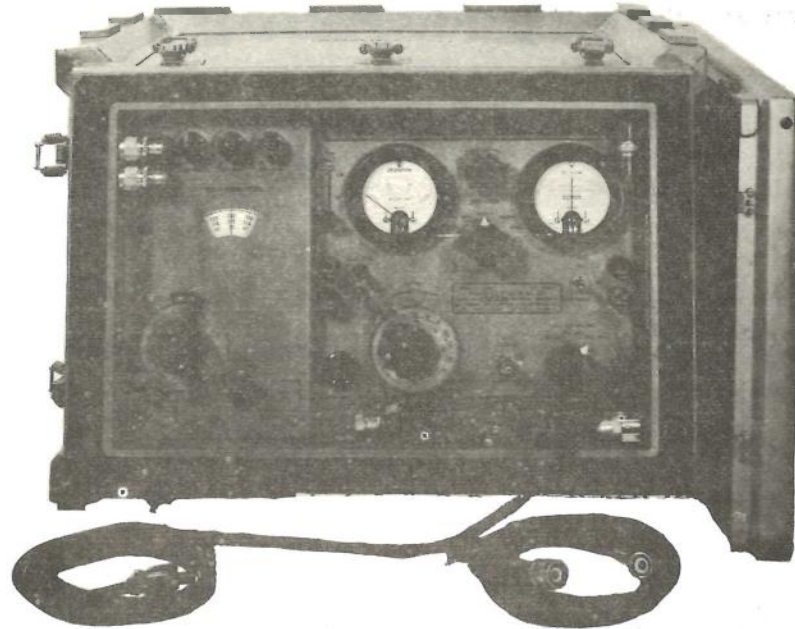
EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Signal Generator AN/URM-64A	metal					
1	Signal Generator TS-419A/U						
1	Case CY-686C/U			21	14	16-1/2	
1	Assembly, Cable CX-3277/U						
2	Cord CG-409A/U						
1	Assembly, Cable CG-546/U						
3	Adapter CG-273/U						
3	Adapter UG-201/U						
3	Adapter UG-255/U						

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Signal Generator AN/URM- 64A.	8	24	24	24	80
- Electronic Test Equipment -						AN/URM-64A

SIGNAL GENERATOR AN/URM-70



FUNCTIONAL DESCRIPTION:

A portable general purpose frequency modulated signal generator, providing a test signal used in testing and servicing frequency modulated radio receivers. There is also provision for external modulation.

RELATIONSHIP TO OTHER EQUIPMENT:

ELECTROMECHANICAL DESCRIPTION:

Power Supply: 115 volts, AC, 50 to 60 cycles per second, single-phase, 125 watts.

Frequency Range: 50 to 400 megacycles per second.

Signal Output: Calibrated attenuator with a range of 0.1 to 100,000 microvolts.

Impedance: 50 ohms.

Internal Modulation: 1000 to 68,000 cycles per second.

External Modulation: 250 to 70,000 cycles per second.

Frequency Deviations: 75 kilocycles per second at 50 to 100 megacycles per second;

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			Standard
STOCK NOS.			3F3901, 2-70
PROCUREMENT INFO.:			
PROCUREMENT COG.:	USA	DESIGN COG.:	USA, SCEL
F.I.I.N.:			FUNCTIONAL CLASS. NO.: 4.1.2
- Electronics Test Equipment -			AN/URM-70

SIGNAL GENERATOR AN/URM-70

ELECTROMECHANICAL DESCRIPTION: (Continued)

150 kilocycles per second at 100 to 200 megacycles per second; and 300 kilocycles per second at 200 to 400 megacycles per second.

MANUFACTURERS' OR CONTRACTORS' DATA:

Measurements Corporation, 116 Monroe Street, Boonton, New Jersey; Order No. 6895-PH-51-61; Approximate Cost per Unit, \$2497.56.

TUBE COMPLEMENT:

1 JAN-OA2, 1 JAN-5R4, 1 JAN-6AQ5, 12 JAN-5654, 1 JAN-5751, 1 JAN-6080.

REFERENCE DATA AND LITERATURE:

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Signal Generator AN/URM-70					125

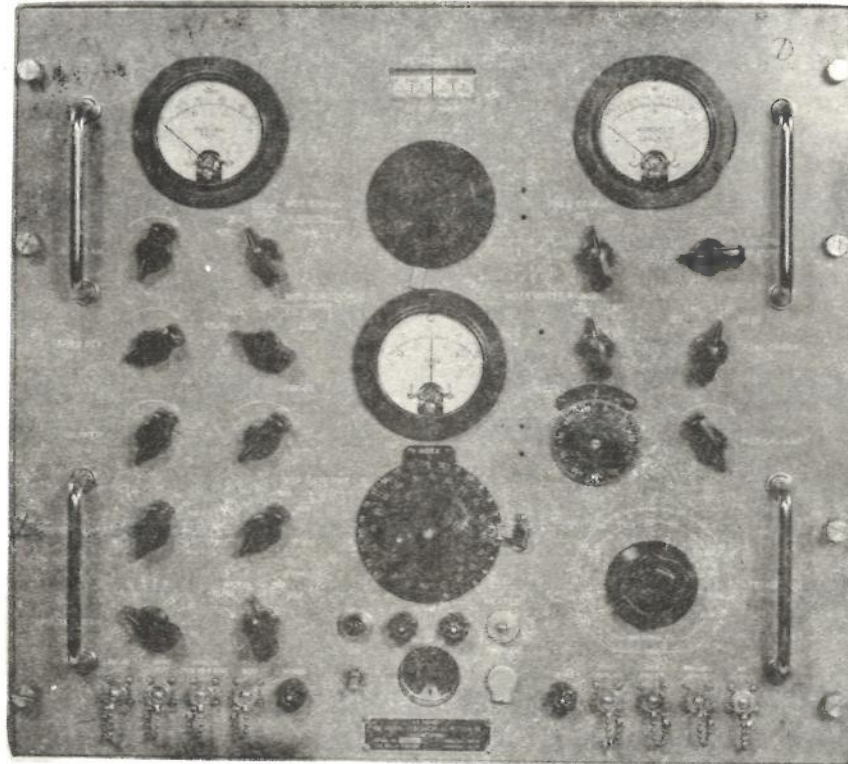
EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Signal Generator AN/URM-70		3F3901.2-70	18	20-5/8	15	
2	Cable Assembly CG-718/U		3E4001.151				
1	Case CY-1504/URM-70		6F300-1504				34
1	Signal Generator SG-3/U		3F3901.1-3	14-7/8	17-1/4	11-3/16	70

AN/URM-70

- Electronics Test Equipment -

**SIGNAL GENERATOR SET AN/USM-16
(GENERATOR, SIGNAL, AN/USM-16)**



FUNCTIONAL DESCRIPTION:

A portable, general purpose, field type signal generator used to determine the characteristics of radio and radar receivers. Provision is made for external modulation. Three meters provide output, frequency, and deviation or percent modulation indications. Connection is provided for an external oscilloscope for the visual presentation of the band-pass characteristics of receivers under test.

RELATIONSHIP TO OTHER EQUIPMENT:

Developed as TS-437(XA-A)/U Signal Generator.

ELECTROMECHANICAL DESCRIPTION:

Power Supply: 110 volts, AC, single phase, 50 to 450 cycles per second.

Frequency Range: 10 to 440 megacycles per second.

Type of Transmission: Amplitude, Frequency, and Pulse Modulated.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Standard		
STOCK NOS.	7CAC-363957		3F3948-16
PROCUREMENT INFO.:	USAF Spec. NO. MIL-S-4071		
PROCUREMENT COG.:	USAF	DESIGN COG.:	USAF, C&N
F.I.I.N.:	FUNCTIONAL CLASS NO.:		4.1.2
	- Electronics Test Equipment -		AN/USM-16

SIGNAL GENERATOR SET AN/USM-16
(GENERATOR, SIGNAL, AN/USM-16)

ELECTROMECHANICAL DESCRIPTION: (Continued)

Output Voltage: 0.25 to 100,000 microvolts calibrated, 1 volt uncalibrated.

Output Impedance: 50 ohms.

Power Output: -6 to -120 dbm calibrated.

Modulation Data:

Amplitude Modulated at 400 and 1000 cycles per second internal, 20 to 20,000 cycles per second external.

Frequency Swing: ± 0.0125 to ± 7.5 megacycles per second in two ranges.
 ± 12.5 to ± 75 kilocycles per second.

± 0.075 to ± 7.5 megacycles per second.

Pulse Repetition Rate: 50 to 5000 pulses per second.

Pulse Width: 1 to 30 microseconds.

Pulse Delay: 1 to 100 microseconds.

Accuracies:

Frequency: $\pm 0.5\%$ of indicated value, $\pm 0.002\%$ with internal crystal calibrator.

Power Output: ± 1 decibel.

Frequency Swing: $\pm 5\%$.

Pulse Repetition Rate: $\pm 10\%$.

MANUFACTURERS' OR CONTRACTORS' DATA:

Rollin Company, Pasadena, California; Contract No. AF 33(038)30078; Approximate Cost per Unit, \$4600.00.

TUBE COMPLEMENT:

1 JAN-0A2, 2 JAN-0B2, 19 JAN-6BH6, 5 JAN-6BN6, 3 JAN-6D4, 10 JAN-12AT7, 1 JAN-5687, 8 JAN-5814, 1 Type-6WS6DC, 1 NE2, 12 JAN-1N69, 6 JAN-1N70, 3 JAN-2C39A, 2 JAN-5675, 2 JAN-1N72, 2 Type G7B (Crystal Rectifier), 1 JAN-6BF7, 2 JAN-5R4GY, 1 JAN-5651, 2 JAN-6080WA, 4 JAN-1N81, 1 Type-5HA20.

REFERENCE DATA AND LITERATURE:

TO 16-30USM16-1 (Operating Instructions).

TO 16-30USM16-2 (Service Instructions).

TO 16-30USM16-3 (Operating Instructions).

TO 16-30USM16-4 (Parts Catalog).

SHIPPING DATA:

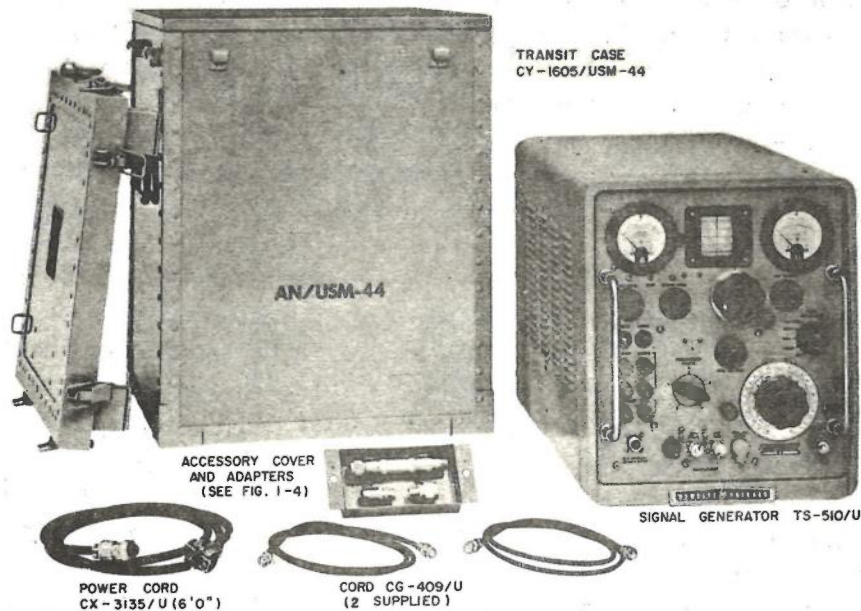
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
AN/USM-16 - Electronics Test Equipment -						

SIGNAL GENERATOR SET AN/USM-16
(GENERATOR, SIGNAL, AN/USM-16)

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Signal Generator Set AN/USM-16 Including:	Alum- inum	7CAC-363957 3F3948-16	25-1/2	23	20-1/2	155
3	Adapter UG-255/U		8850-108880				
2	Adapter UG-201/U		8850-101950				
5	Cord CG-409A/U		7CAC-170265-67	72 long			
1	Cord CX-337/U		7CAC-170264465	120 long			
1	Case CY-852/USM-16			25-1/2	23	20-1/2	60 incl. acc.
1	RF Signal Generator SG-47/USM-16			17-1/2	19	18-1/4	95
1	Test Prod (with cable) MX-1544/USM-16			51	5/8 dia.		

SIGNAL GENERATOR AN/USM-44



FUNCTIONAL DESCRIPTION:

A portable general purpose signal generator designed to furnish signals with very low spurious energy content suitable for alignment of narrow-band amplitude modulated receivers. It is used for testing, calibrating, and troubleshooting VHF radio equipment and circuits and for measuring standing wave ratios, antenna and transmission line characteristics, receiver sensitivity, etc. It is for test bench use and not for permanent installation. It may be amplitude modulated by internally generated sine waves or by externally applied sine waves or pulses.

RELATIONSHIP TO OTHER EQUIPMENT:

AN/USM-44 is the overall nomenclature for Signal Generator TS-510/U and accessories. Similar to Hewlett-Packard Models 608C and 608D.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: A Colpitts type RF oscillator generates the RF signal which is fed through a buffer amplifier and power amplifier to the output jack of the signal

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Standard		
STOCK NOS.	7CAC-363903-25	F16-6-63151-2401	
PROCUREMENT INFO.: Spec. MIL-G-7702A, dated 15 March 1955			
PROCUREMENT COG.: USN		DESIGN COG.: USN, BuAer	
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 4.1.2	
- Electronics Test Equipment -			AN/USM-44

SIGNAL GENERATOR AN/USM-44

ELECTROMECHANICAL DESCRIPTION: (Continued)

generator. The buffer isolates the oscillator from the power amplifier and minimizes interaction between the two circuits. The RF power amplifier receives both the RF and modulation signals and amplifies the RF energy for application to the output attenuator. The RF amplifier also receives variable bias from the modulator which permits adjustment of the power level fed to the output attenuator. The output power monitor samples the RF energy fed to the output attenuator and indicates the power and voltage level on a front panel meter. The output attenuator obtains monitored RF energy from the power amplifier, applies the selected degree of attenuation, and conducts the energy to the front panel output jack. The beat frequency calibrator generates harmonics of the 5-megacycle signal from the crystal and mixes the harmonics with RF energy coupled to the RF amplifier. The resultant beat frequency signal is amplified and fed to the front panel earphone jack. The internal modulation oscillator generates a fixed sine wave for application to the modulation system. The modulator receives all variable bias to the RF amplifier for control of the RF power level. The modulation measuring circuits receive detected modulation from the RF power monitor, amplify and rectify it, and indicate the modulation percentage directly on a front panel meter.

Power Supply: 105 to 125 volts, AC, single-phase, 50 to 420 cycles per second, 180 watts.

Frequency Range: 10 to 420 megacycles per second in 5 bands.

Type of Transmission: Amplitude Modulated, Pulse Modulated, Continuous Wave.

Crystal Calibrator: 5-megacycle oscillator accurate to $\pm 0.01\%$ providing check points at each 5 megacycles over full frequency range. Provides 0.1 milliwatt or better to 600-ohm earphone set.

Accuracy of Frequency Calibration: With crystal calibrator, $\pm 0.015\%$ at check points. Without calibrator, $\pm 0.5\%$ overall.

Output Voltage: Continuously adjustable from 0.1 microvolt minimum to 0.5 volt maximum when operated into rated load of 50 ohms (+7 to -127 dbm).

Output Level Meter: Monitors RF power level fed to output attenuator; calibrated 0 to 7 dbm and 0.1 to 0.5 volt.

Output Level Calibration Accuracy: For all conditions of operation the accuracy of the attenuator dial is within ± 2 decibels.

Rated Load: Nominally 50 ohms resistive.

Output Circuit Standing Wave Ratio: The voltage standing wave ratio measured at the output connector is less than 1.2 (standing wave ratio 1.6 decibel).

Internal Modulation: Sine waves at frequencies of 400 and 1000 cycles per second $\pm 5\%$. Percent modulation continuously adjustable from 0 to 95% at output levels up to 0 dbm.

External Sine Wave Modulation: 100 to above 20,000 cycles per second. Percent modulation continuously adjustable from 1% to 95% at RF output levels up to 0 dbm with modulating voltages from 4 to 25 volts rms.

Percent Modulation: Indicated by direct reading panel meter accurate to $\pm 10\%$.

(Continued)

SIGNAL GENERATOR AN/USM-44

ELECTROMECHANICAL DESCRIPTION: (Continued)

Envelope Distortion for Sine Wave Modulation: Less than 5% at 30% modulation for frequencies from 100 to 5000 cycles per second. Less than 10% at 50% modulation.

Input Impedance for External Sine Modulation: 20,000 ohms shunted by 50 micro-microfarads.

External Pulse Modulation: RF pulses as short as 1 microsecond obtainable at frequencies above 100 megacycles per second. Residual RF between pulses is 25 decibels below maximum pulse amplitude for RF frequencies below 300 megacycles (22 decibels for frequencies above 300 megacycles).

Input Impedance for External Pulse Modulation: 50,000 ohms shunted by 40 micro-microfarads.

MANUFACTURERS' OR CONTRACTORS' DATA:

Hewlett-Packard Company, 3000 Page Mill Road, Palo Alto, California; USN Contract No. NOas 53-853, dated 1953; Drawing 608C-E-802; Approximate Cost per Unit, \$1,040.00.

TUBE COMPLEMENT:

2 JAN-6AH6, 1 JAN-6AL5W/5726, 3 JAN-6AU6WA, 1 RETMA-6BC4, 3 RETMA-6CL6, 2 JAN-12AT7WA, 2 JAN-5814/12AU7, 1 JAN-5651, 1 JAN-5670, 1 JAN-5675, 1 JAN-5687, 1 JAN-5876, 2 JAN-6080, (2 JAN-1N82, 2 JAN-G11A Crystal Diodes).

REFERENCE DATA AND LITERATURE:

NAVAER 16-30USM44-501 (Operating Instructions).
 NAVAER 16-30USM44-502 (Service Instructions).
 NAVAER 16-30USM44-503 (Overhaul Instructions).
 NAVAER 16-30USM44-504 (Illustrated Parts Breakdown).
 Hewlett-Packard Instruction and Operating Manual.

SHIPPING DATA:

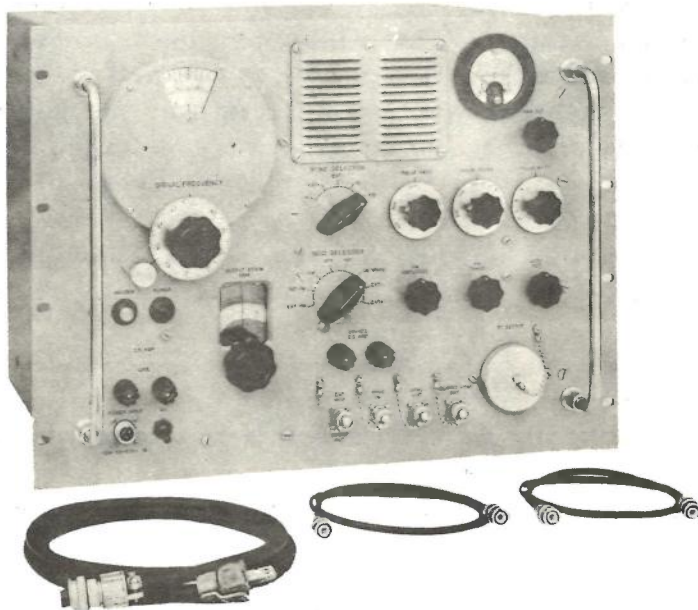
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Signal Generator AN/USM-44	9.6	26	27-1/2	22-1/2	180
- Electronics Test Equipment -						AN/USM-44

SIGNAL GENERATOR AN/USM-44

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Signal Gen- erator AN/USM-44		7CAC-363903-25	24	20	17-5/8	99
	Including:						
1	Signal Generator TS-510/U	Alumi- num	7CAC-363853 F16-G-63151-2401	16	13-1/4	20-1/8	62
1	Transit Case CY-1605/USM- 44	Alumi- num faced ply- wood		24	20	17-5/8	32
1	Cord CX-3135/U			72 long			0.6
1	Connector Adapter UG-349A/U						
2	Cord CG-409/U			48 long			0.2
1	RF Output Fuse Mount MX-1730/U			4-5/8	3/4 dia.		0.4
1	Connector Adapter UG-201A/U						

**SIGNAL GENERATOR AN/USM-47
(GENERATOR, SIGNAL AN/USM-47)**



FUNCTIONAL DESCRIPTION:

A portable general purpose self-contained signal generator with direct reading frequency and output level control. It includes provisions for internal or external frequency and pulse modulation and internal square wave modulation. The instrument may be synchronized with external sine waves or positive or negative pulse signals. The equipment is designed for applications requiring accurately controlled amounts of RF power such as measuring standing wave ratios, microwave receiver sensitivity, measurements in determining selectivity or rejection of signal to noise ratio and antenna gain.

RELATIONSHIP TO OTHER EQUIPMENT:

Similar to Hewlett-Packard Company Model 626A.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The RF generator is a reflex klystron tube with an external resonant type cavity. The frequency of oscillation is determined by the resonant frequency of the cavity and the repeller voltage. The power output feeds into a power monitoring directional coupler through a rotary vane type power set attenuator. This attenuator is adjusted to obtain a reference level reading on the power

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREMENT INFO.:			
PROCUREMENT COG.: USN		DESIGN COG.: USN, BuAer	
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 4.1.2	
- Electronics Test Equipment -			AN/USM-47

SIGNAL GENERATOR AN/USM-47
(GENERATOR, SIGNAL AN/USM-47)

ELECTROMECHANICAL DESCRIPTION: (Continued)

monitoring meter which is on the panel. The directional coupler is followed by a rotary precision attenuator. The modulator section generates a positive video pulse of specified characteristics which is applied to the repeller of the reflex klystron so that the klystron will be modulated by the pulse. The video pulse can be modulated with external pulse or sine wave voltages.

Power Supply: 115 volts \pm 10%, AC, 50 to 420 cycles per second, single-phase, approximately 200 watts.

Frequency Range: 10,000 to 15,500 megacycles per second.

Accuracy of Frequency Dial: Within 1%. Dial is direct reading in megacycles per second.

Maximum Power Output: 10 milliwatts.

Range of Output Attenuator: +10 to -90 dbm.

Accuracy of Attenuator Dial: Better than \pm 2% of attenuation in decibels.

Output Monitor Accuracy: Better than 1%.

Type of Output Power: Unmodulated or Modulated.

Pulse Modulation:

Internal Pulse Modulation:

Pulse Repetition Rate: Adjustable from 40 to 4000 pulses per second.

Pulse Width: Adjustable from 0.5 to 10 microseconds.

Pulse Rise Time: Not more than 0.3 microsecond between points that are 10% and 90% of maximum amplitude of initial rise.

Delay: Start of RF pulse delayable over a range from 3 to 300 microseconds.

Synchronization: Internal pulse modulation can be synchronized with external pulses or external sine waves.

External Synchronizing Pulses:

Required Peak Amplitude: Between 5 and 50 volts.

Polarity: Positive or negative.

Required Duration: From 0.5 to 5.0 microseconds between points that are 50% of maximum amplitude of initial rise.

Required Rise Time: 0.1 to 1.0 microsecond between points that are 10% and 90% of maximum amplitude of initial rise.

Repetition Rate: Between 40 and 4000 pulses per second.

External Sine Wave Synchronization:

Required Amplitude: Between 5 and 50 volts peak.

Frequency: Between 40 and 4000 cycles per second.

External Modulation: Pulse or square wave of either positive or negative polarity.

Required Peak Amplitude: Between 20 and 70 volts.

Internal FM Modulation: At power line frequency; phase and deviation adjustable.

External FM Modulation: Maximum deviation, approximately \pm 5 megacycles per second.

Video Output: Two different video pulses provided. One is delayable and one is undelayable. Delayable pulse is coincident with start of RF pulse, undelayed pulse is coincident with start of external synchronizing pulse.

SIGNAL GENERATOR AN/USM-47
(GENERATOR, SIGNAL AN/USM-47)

ELECTROMECHANICAL DESCRIPTION: (Continued)

Amplitude of Video Pulses: At least 25 volts into 1000 ohm load.

Rise Time of Video Pulses: 0.5 microsecond or less between 10% and 90% of maximum amplitude of initial rise.

Polarity of Video Pulses: Positive.

MANUFACTURERS' OR CONTRACTORS' DATA:

Hewlett-Packard Company, 275 Page Mill Road, Palo Alto, California; Navy Contract No. NOas 51-117.

TUBE COMPLEMENT:

3 JAN-6080WA, 3 JAN-6AU6WA, 1 JAN-5651, 4 JAN-12AT7, 1 JAN-5687, 2 JAN-5696, 2 JAN-5726/6AL5W, 1 JAN-6X4W, 1 JAN-OA2, 1 Special V39A.

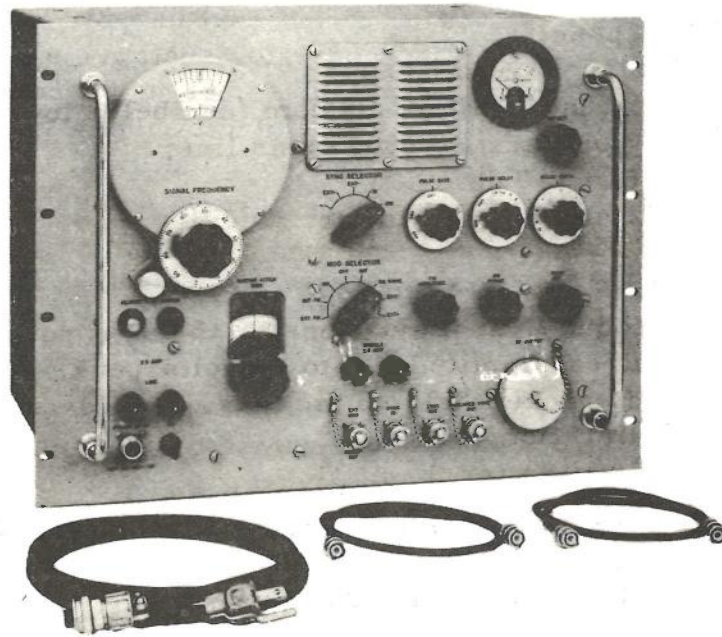
SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Signal Generator AN/USM-47	9.6	27-1/2	26	22-1/2	200

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Signal Generator AN/USM-47						
	Including:						
1	Signal Generator Unit 1 of AN/USM-47	Aluminum		16-3/4	13-1/2	12	65
1	Transit Case Unit 2 of AN/USM-47	Aluminum					
1	Power Cord			72 long			
1	Video Cable			72 long			
- Electronics Test Equipment -							AN/USM-47

SIGNAL GENERATOR AN/USM-48



FUNCTIONAL DESCRIPTION:

A portable self-contained general purpose test equipment which is used for all types of microwave measurements such as measuring standing wave ratios, antenna gain, selectivity, receiver sensitivity, and signal-to-noise ratio. The generator is directly calibrated and no interpretation charts are required.

RELATIONSHIP TO OTHER EQUIPMENT:

Similar to Hewlett-Packard Model 628A Signal Generator.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The RF generator is a reflex klystron tube with an external resonant type cavity. The frequency of oscillation is determined by the resonant
(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREMENT INFO.:			
PROCUREMENT COG.:	USN	DESIGN COG.:	USN, BuAer
F.I.I.N.:		FUNCTIONAL CLASS. NO.:	4.1.2
- Electronics Test Equipment -			AN/USM-48

SIGNAL GENERATOR AN/USM-48

ELECTROMECHANICAL DESCRIPTION: (Continued)

frequency of the cavity and the repeller voltage. The power output feeds into a power monitoring directional coupler through a rotary vane type power set attenuator. This attenuator is adjusted to obtain a reference level reading on a panel power monitoring meter. From the directional coupler the power is directed to a rotary precision attenuator. The modulator section generates a positive video pulse of specified characteristics which is applied to the repeller of the reflex klystron so that the klystron will be modulated by the pulse. The video pulse can be modulated with external pulse or sine wave voltages.

Power Supply: 115 volts $\pm 10\%$, AC, 50 to 420 cycles per second, single-phase; 200 watts.

Frequency Range: 15,000 to 21,000 megacycles per second; one-band automatic repeller voltage tracking and mode section.

Type of Transmission: Continuous Wave, Frequency Modulated, Pulse Modulated.

Pulse Width:

Internal: 0.5 to 10 microseconds.

External: 0.5 to 2,500 microseconds.

Timing: Undelayed or delayed, 3 to 300 microseconds.

Output Power: (10 milliwatts to 1 micromicrowatt) +10 to -90 dbm (decibel below one milliwatt).

Output Voltage: 20 to 50 volts across 1000 ohms line.

Standing Wave Ratio: 1.5 at +10 decibels.

1.2 at +7 decibels and lower.

Modulation Data:

Internal Square Wave: Variable 40 to 4,000 cycles per second.

Internal Frequency Modulation: Deviations to ± 5 megacycles per second at power line frequencies.

External Pulse: Requires amplitude 15 to 70 volts peak, positive or negative.

External Frequency: Approximately ± 5 megacycles per second maximum deviation.

Accuracy: Frequency calibration, $\pm 1\%$.

Attenuation Dial: Better than $\pm 2\%$.

MANUFACTURERS' OR CONTRACTORS' DATA:

Hewlett-Packard Company, 3000 Page Mill Road, Palo Alto, California; Contract No. NOas 51-117; Approximate Cost per Unit, \$3000.00.

TUBE COMPLEMENT:

3 JAN-6080WA, 3 JAN-6AU6WA, 1 JAN-5651, 4 JAN-12AT7, 1 JAN-5687, 2 JAN-5696, 2 JAN-5726/6AL5W, 1 JAN-6X4W, 1 JAN-OA2, 1 Special V40B.

REFERENCE DATA AND LITERATURE:

SIGNAL GENERATOR I-137-B
(GENERATOR, SIGNAL, I-137-B)

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: Consists of six basic subassemblies: a power line filter unit, and AC operated power supply and modulator unit, an RF oscillator, a vacuum tube voltmeter, and indicating meter and an attenuator.

Power Supply: 115 volts, ± 10 volts, AC, 50 to 60 cycles per second, single phase, 40 watts.

Frequency Range: 5 to 175 megacycles per second in seven bands: 5 to 8.5, 8 to 15, 14 to 26, 25 to 42, 40 to 75, 70 to 130, and 125 to 175 megacycles per second.

Type of Transmission: Continuous Wave and Amplitude Modulated.

Voltage Output:

RF: 1 microvolt to 0.1 volt, continuously variable.

High Voltage Receptacle: 0.7 volt.

Attenuator Range: The total attenuation is 100,000/1 divided into five decade steps of 20 decibels each (10/1 voltage ratio).

Impedance: As measured at the terminal box is approximately 15 ohms for all attenuator steps.

Modulation Frequencies: 400 and 1000 cycles per second.

Average Performance Data:

Frequency Calibration: $\pm 0.4\%$ (from calibration chart).

RF Voltage Output: 5 to 100 megacycles per second: $\pm 5\%$.

100 to 175 megacycles per second: -5 to +10%.

Audio Frequencies: 400 cycles per second: $\pm 10\%$.

1000 cycles per second: $\pm 10\%$.

Minimum Performance Data:

Frequency Calibration: $\pm 0.6\%$ (from calibration chart).

RF Voltage Output: 5 to 100 megacycles per second: $\pm 10\%$.

100 to 175 megacycles per second: -10 to +15%.

Audio Frequencies: 400 cycles per second: $\pm 15\%$.

1000 cycles per second: $\pm 15\%$.

MANUFACTURERS' OR CONTRACTORS' DATA:

Transmitter Equipment Corporation, New York, New York; Order No. 1875-MPD-44.

Washington Institute of Technology, Washington 1, D. C.

TUBE COMPLEMENT:

2 JAN-955, 1 JAN-5Y3GT, 2 JAN-0B3, 1 JAN-6J5GT.

REFERENCE DATA AND LITERATURE:

TM 11-2641 (Instruction Book).

TM 11-1260 (Instruction Book).

SIGNAL GENERATOR I-137-B
(GENERATOR, SIGNAL, I-137-B)

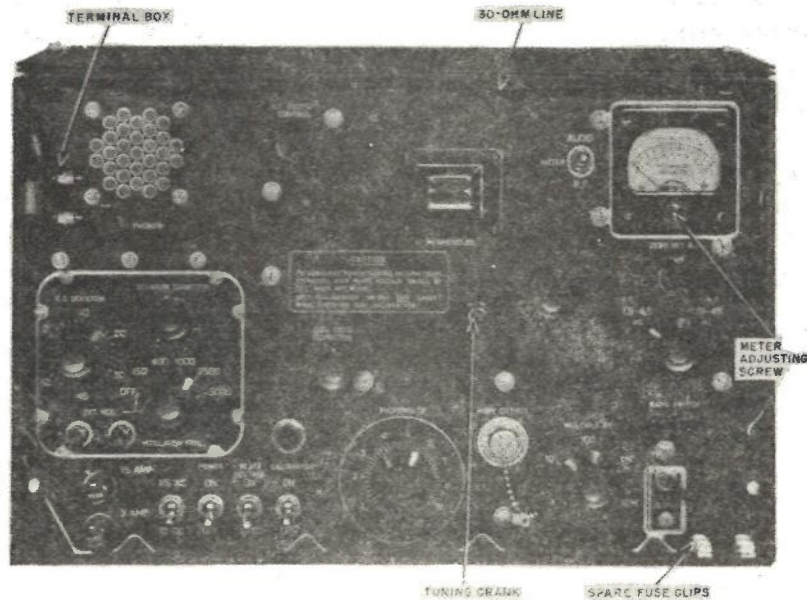
EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Signal Generator I-137-B	Alum- inum	NI6-G-62662-3856 3F3900-137B	12	15-3/8	8-1/4	20.6
2	Plug Contact Male		8850-460381 2Z7111.51	1-1/4 long	11/16 dia.		0.2 oz.
2	Calibration Chart			8-1/8	6-1/8	3/32	0.6
7	Calibration Curve			11-1/2	9-1/4	1/8	0.3

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	

SIGNAL GENERATOR I-208
(GENERATOR, SIGNAL, I-208)



FUNCTIONAL DESCRIPTION:

A general purpose, portable unit used as a frequency and voltage standard for testing frequency modulation radio equipment. It is used in the calibration, alignment and determination of sensitivity of frequency modulation radio receivers.

The signal generator output is controlled and measured by a calibrated attenuator, multiplier and vacuum tube voltmeter. All controls and indicators are located on the front panel.

RELATIONSHIP TO OTHER EQUIPMENT:

Used to test target control receiving equipment such as AN/ARW-40.

I-208-A has a "zero set audio" Potentiometer located on the front panel as a screw-driver adjustment, whereas I-208 does not have such.

In I-208 the reactance tube frequency modulator is push-pull with a center tapped choke for phase inversion, while the I-208-A uses a single-ended modulator.

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Standard		
STOCK NOS.	7CAC - 363855	R16-AYS-I-208	3F3900-208
PROCUREMENT INFO.:	Army Spec. No. 71-1616		
PROCUREMENT COG.:	Army	DESIGN COG.: Army, CSL	
F.I.I.N.:	FUNCTIONAL CLASS. NO.:		4.1.2
- Electronics Test Equipment -			I-208

SIGNAL GENERATOR I-208
(GENERATOR, SIGNAL, I-208)

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: An audio oscillator, contained within the signal generator, generates any one of five fixed frequencies. This signal is fed into a reactance circuit, which controls the frequency of the radio frequency oscillator. The radio frequency signal is fed into a buffer limiter. The output from this stage is applied directly to the final amplifier on the high range position.

Calibrator Unit: A frequency reference is provided by a 500 kilocycle per second crystal oscillator in the calibration unit. The output voltages of the radio frequency unit and this crystal oscillator are combined in the converter, resulting in an audio beat frequency signal for each multiple of 0.5 megacycle per second of its radio frequency output frequency. This audio beat frequency is amplified and transformer coupled to a permanent magnet dynamic loudspeaker located on the front panel.

Power Supply: 12 volts DC (11 to 14 volts) or 115 volts AC (105 to 130 volts), 60 cycles per second, single phase.

Frequency Range: 1.9 to 4.5 megacycles per second; 19 to 45 megacycles per second.

Frequency Modulation: 150, 400, 1000, 2500, 5000 cycles per second.

Frequency Deviation: 0 to 5 kilocycles per second for 1.9 to 4.5 megacycles per second range. 0 to 50 kilocycles per second for 19 to 45 megacycles per second range.

Type of Transmission: Frequency Modulated Carrier.

Power Output: 0.333 milliwatts at 30 ohm line; 7.030 milliwatts at high output terminal.

Voltage Output: 0.10 volts across 30 ohm line; 0.84 volts across high output terminal.

Accuracy: $\pm 0.03\%$ of dial indication over temperature range 0 to 60° C.
 $\pm 30\%$ voltage.

Mounting: FT-237 for use in mobile units.

MANUFACTURERS' OR CONTRACTORS' DATA:

Detrola Corporation, Detroit 9, Michigan; Contract Nos. W-2124-SC-10516, W-2124-SC-16081, W-36-039-SC-350; Model 513.

TUBE COMPLEMENT:

2 JAN-12SN7, 3 JAN-12SA7, 2 JAN-12A6, 4 JAN-12SH7, 1 JAN-6AG7, 1 JAN-955, 1 JAN-5U4G, 1 JAN-6SQ7, 1 JAN-OD3/VR150, 1 JAN-1H20.

REFERENCE DATA AND LITERATURE:

TM 11-317 (Instruction Book).

TM 11-4012 (Repair Instructions for I-208, I-208-A).

ASF Cat. Sig 8-I-208 (Higher Echelon Spare Parts List).

SIGNAL GENERATOR I-208
(GENERATOR, SIGNAL, I-208)

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Signal Generator I-208 including equipment supplied (Export Packed)	6.3	19-1/4	29-1/8	19-3/8	160

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Signal Generator I-208	Metal	7CAC-363855 R16-AYS-I-208 3F3900-208	11-1/2	19	12-1/8	105.00
1	Power Cord CD-778		3E1778	96 long			8.00
1	Cable, high output CD-749		3E1749	40 long			0.25
1	Cord, service extension CD-984		3E1984	36 long			0.37
2	Crystal Unit CR-2/U (1 spare)		2100-2X105 2X105-500	7/16	1-1/8	1-1/8	0.03
1	Dynamotor DM-64-A		3H1664	3-3/8	6-9/16	4-1/4	5.50
10	Fuse FU-53 (9 spare)		3300-387745200 3Z1953	1-1/4 long	1/4 dia.		0.10
9	Lamp LM-27 (6 spare)		3300-292403000 2Z5927	1-1/8 long	7/16 dia.		0.06
10	Fuse FU-54 (9 spare)		3300-387745600 3Z1954	1-1/4 long	1/4 dia.		0.10

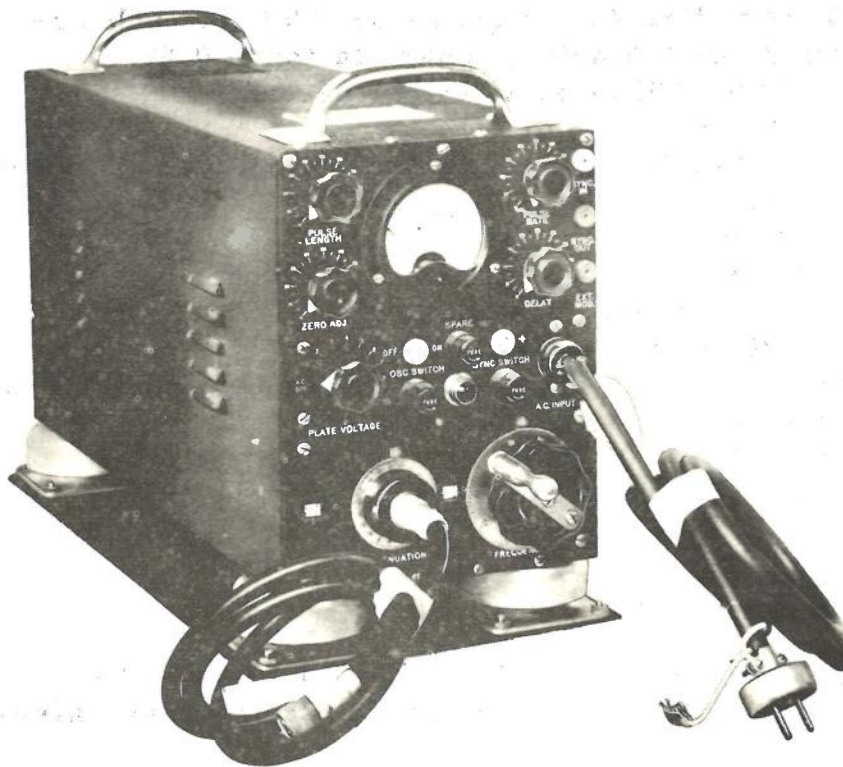
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SIGNAL GENERATOR I-208
(GENERATOR, SIGNAL, I-208)

EQUIPMENT SUPPLIED: (Continued)

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Spare Dial Film F/I-208		3F3900-208/F1	1-3/8 long	1-7/8 dia.		0.01
2	Sets of 3 Tubes (Two sets in a carton)			12-3/4	5-3/4	9	2.00
2	Technical Manuals TM 11-317						0.25
						Total:	121.67

SIGNAL GENERATOR LAE
(GENERATOR, SIGNAL, LAE)



FUNCTIONAL DESCRIPTION:

A portable, general purpose unit designed for use in aligning ultra-high-frequency receivers and for measurement work where an accurate, adjustable and known radio frequency voltage is required, unmodulated, amplitude modulated, or pulsed. The equipment is housed in a single cabinet provided with handles and supported on a shock-absorbing mount. Composed of the following elements: A variable-frequency cavity oscillator, an attenuator, a pulser, a power supply, and a power level monitor. Fan ventilation is provided.

All controls and indicators are located on the front panel. Frequency and output level are obtained by reference to calibration charts supplied with the signal generator.

RELATIONSHIP TO OTHER EQUIPMENT:

All signal generators in LAE series are similar in general arrangement and the-ory of operation. Navy Model LAE is superseded by TS-418/U and TS-419/U.

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.	7CAC-363965	F16-Q-166816-200	3F4325-418
PROCUREMENT INFO.:	Navy Spec. No. RE9179		
PROCUREMENT COG.:	Navy	DESIGN COG.: Navy, BuShips	
F.I.I.N.:	FUNCTIONAL CLASS. NO.:		4.1.2
- Electronics Test Equipment -			LAE

SIGNAL GENERATOR LAE
(GENERATOR, SIGNAL, LAE)

ELECTROMECHANICAL DESCRIPTION:

Power Supply: 115 volts, 10%, AC, single phase, 50 to 60 cycles per second, 1.25 amperes at 110 volts or 120 watts at power factor of 0.87.
 Frequency Range: 520 to 1300 megacycles per second.
 Output Impedance: 50 ohms.
 Type of Transmission: Continuous Wave, Pulsed, Amplitude Modulated Carrier with external modulation.
 Internal Modulation Data:
 Pulse Repetition Rate: 60 to 2500 pulses per second.
 Pulse Duration: 2.2 to 30 microseconds.
 Pulse Delay: 3 to 300 microseconds.
 External Modulation Data: 10 to 35 volts for 10% to 30% amplitude modulation.
 Synchronization: Internal or external pulses.
 Power Output Range: -7 to -107 dbm.
 Output Voltage Range: 1 to 100,000 microvolts.
 Accuracy: $\pm 1\%$ of calibration curve.
 1 decibel $\pm 1\%$ of attenuator reading.
 Temperature Limits: -10 to +50° C.

MANUFACTURERS' OR CONTRACTORS' DATA:

Airadio Incorporated, Stamford, Connecticut; Contract No. NXsr-37598, 19 September 1943.

TUBE COMPLEMENT:

1 JAN-6J5, 1 JAN-884, 1 JAN-6SN7, 1 JAN-6AG7, 2 JAN-6AC7, 1 JAN-5Z4, 2 JAN-0D3/VR-150, 1 GL-446A.

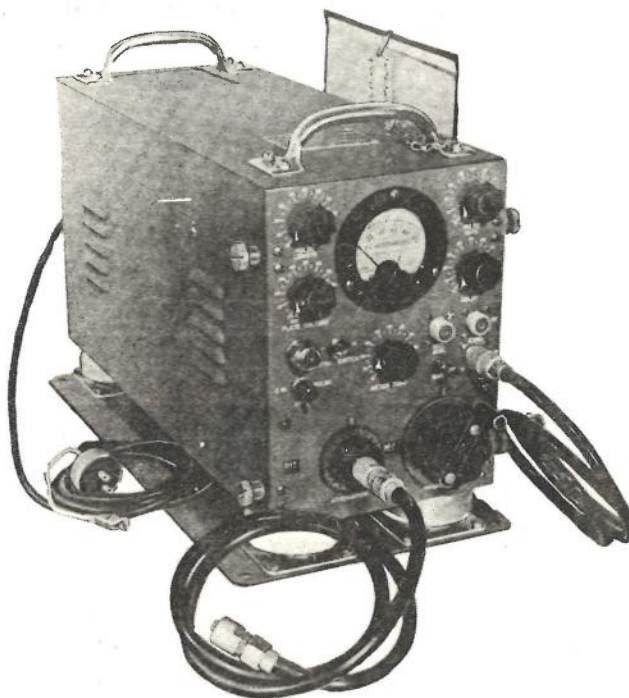
REFERENCE DATA AND LITERATURE:

NAVSHIPS 900, 311 (Instruction Book).

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Signal Generator, LAE, with spare parts and accessories (Crated)	6.88	25-7/8	25-7/8	17-3/4	183.0
LAE - Electronics Test Equipment -						

**RF SIGNAL GENERATOR EQUIPMENT LAE-3
(GENERATOR, SIGNAL, LAE-3)**



FUNCTIONAL DESCRIPTION:

A portable, general purpose unit designed for use in aligning ultra-high frequency receivers and for usual measurement work where an accurate, adjustable and known radio frequency voltage is required. The equipment is housed in a single cabinet provided with handles and supported on a shock absorbing mount. It consists of the following elements: A variable-frequency cavity oscillator, a power-level monitor, an output attenuator continuously adjustable, a pulser for generating adjustable square waves, and a power supply. Fan ventilation is provided.

All controls and indicators are located on the front panel. Frequency and power level are obtained by reference to calibration charts supplied with the equipment.

RELATIONSHIP TO OTHER EQUIPMENT:

All signal generators in the LAE series are similar in general arrangements and theory of operation. LAE-3 closely resembles LAE-4 in construction and operation except for minor differences in circuits parameters.

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.		F16-Q-166857-200	
PROCUREMENT INFO.:			
PROCUREMENT COG.: Navy		DESIGN COG.: Navy, BuShips	
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 4.1.2	
- Electronics Test Equipment -			LAE-3

RF SIGNAL GENERATOR EQUIPMENT LAE-3
(GENERATOR, SIGNAL, LAE-3)

ELECTROMECHANICAL DESCRIPTION:

Power Supply: 115 volts, $\pm 10\%$, AC, single phase, 50 to 60 cycles per second, 1.25 amperes at 110 volts or 120 watts at a power factor of 0.87.

Frequency Range: 520 to 1300 megacycles per second.

Type of Transmission: Continuous Wave, Pulsed, Amplitude Modulated Carrier with external modulation.

Power Output Range: -7 to -107 dbm.

Output Voltage Range: 1 to 100,000 microvolts.

Output Impedance: 50 ohms characteristic impedance.

Internal Modulation:

Pulse Repetition Rate: 60 to 2500 pulses per second.

Pulse Duration: 2 to 30 microseconds.

Pulse Delay: 3 to 300 microseconds.

External Modulation: 10 to 35 volts for 10% to 30% amplitude modulation in plate circuit.

Synchronization: Internal or external pulses.

Accuracy: $\pm 1\%$ of calibration curve.

1 decibel $\pm 1\%$ of attenuator reading.

Temperature Limits: -15° to $+50^{\circ}$ C.

MANUFACTURERS' OR CONTRACTORS' DATA:

Airadio Incorporated, Stamford, Connecticut; Contract No. N5sr-5946, 12 June 1945.

TUBE COMPLEMENT:

1 JAN-6J5, 1 JAN-884, 1 JAN-6SN7W, 2 JAN-6AC7, 1 JAN-6AG7, 1 JAN-5Y3GT, 2 JAN-0D3/VR-150, 1 JAN-2C40.

REFERENCE DATA AND LITERATURE:

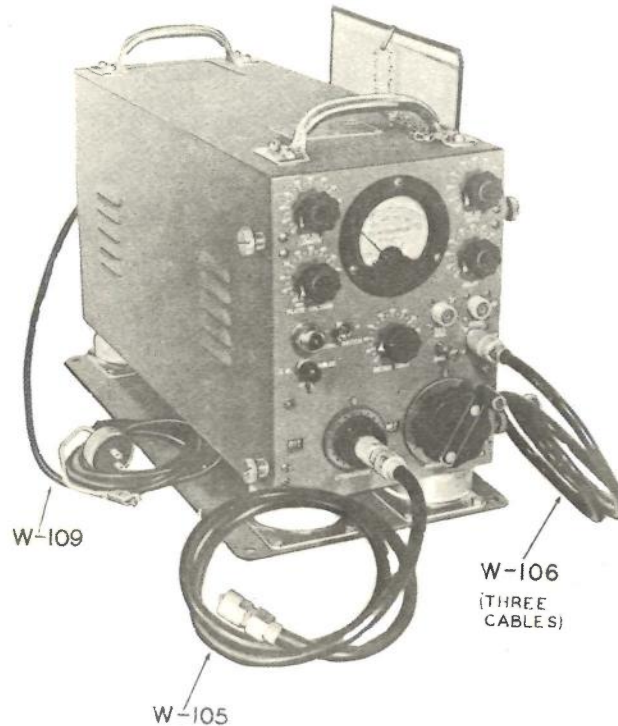
NavShips 900, 806 (Instruction Book).

TO 16-45-100 (Instruction Book).

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	RF Signal Generator Equipment LAE-3 with spare parts and accessories (Crated)	5.35	29-5/8	12-1/8	25-3/4	198
LAE-3 - Electronics Test Equipment -						

RF SIGNAL GENERATOR EQUIPMENT LAE-4
(GENERATOR, SIGNAL, LAE-4)



FUNCTIONAL DESCRIPTION:

A portable, general purpose unit designed for use in aligning ultra-high frequency receivers and for usual measurement work where an accurate, adjustable and known radio frequency voltage is required. The equipment is housed in a single cabinet, provided with handles and supported on a shock absorbing mount. It consists of the following elements: A variable-frequency cavity oscillator, a power-level monitor, an output attenuator continuously adjustable, a pulser for generating adjustable square waves, and a power supply. Fan ventilation is provided.

All controls and indicators are located on the front panel. Frequency and power level are obtained by reference to calibration charts supplied with the equipment.

RELATIONSHIP TO OTHER EQUIPMENT:

All signal generators in the LAE series are similar in general arrangements and theory of operation. LAE-3 closely resembles LAE-4 in construction and operation except for minor differences in circuits parameters.

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.	7CAC-363967	F16-Q-166858-200	
PROCUREMENT INFO.:			
PROCUREMENT COG.: Navy	DESIGN COG.: Navy, BuShips		
F.I.I.N.:	FUNCTIONAL CLASS. NO.: 4.1.2		
	- Electronics Test Equipment -		LAE-4

RF SIGNAL GENERATOR EQUIPMENT LAE-4
(GENERATOR, SIGNAL, LAE-4)

ELECTROMECHANICAL DESCRIPTION:

Power Supply: 115 volts, $\pm 10\%$, AC, single phase, 50 to 60 cycles per second, 1.25 amperes at 110 volts or 120 watts at a power factor of 0.87.

Frequency Range: 520 to 1300 megacycles per second.

Type of Transmission: Continuous Wave, Pulsed, Amplitude Modulated Carrier with external modulation.

Power Output Range: -7 to -107 dbm.

Output Voltage Range: 1 to 100,000 microvolts.

Output Impedance: 50 ohms characteristic impedance.

Internal Modulation:

Pulse Repetition Rate: 60 to 2500 pulses per second.

Pulse Duration: 2 to 30 microseconds.

Pulse Delay: 3 to 300 microseconds.

External Modulation: 10 to 35 volts for 10% to 30% amplitude modulation in plate circuit.

Synchronization: Internal or external pulses.

Accuracy: $\pm 1\%$ of calibration curve.

1 decibel $\pm 1\%$ of attenuator reading.

Temperature Limits: -15° to $+50^{\circ}$ C.

MANUFACTURERS' OR CONTRACTORS' DATA:

Airadio Incorporated, Stamford, Connecticut; Contract No. NObsr-39270, 24 June 1947.

TUBE COMPLEMENT:

1 JAN-6J5, 1 JAN-884, 1 JAN-6SN7W, 2 JAN-6AC7, 1 JAN-6AG7, 1 JAN-5Y3GT, 2 JAN-0D3/VR-150, 1 JAN-2C40.

REFERENCE DATA AND LITERATURE:

NavShips 900, 806 (Instruction Book).

TO 16-45-100 (Instruction Book).

SHIPPING DATA:

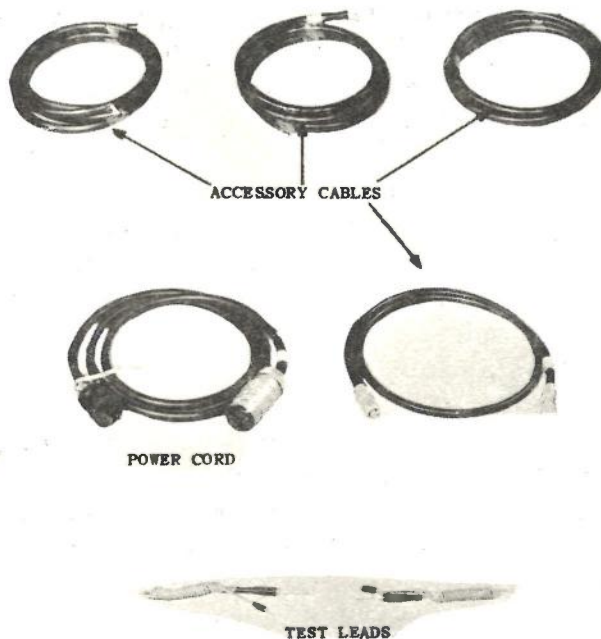
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	RF Signal Generator Equipment LAE-4 with spare parts and accessories (Crated)	5.35	29-5/8	12-1/8	25-3/4	198
LAE-4 - Electronics Test Equipment -						

RF SIGNAL GENERATOR EQUIPMENT LAE-4
(GENERATOR, SIGNAL, LAE-4)

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	RF Signal Gen- erator Equip- ment LAE-4	Metal	7CAC-363967 F16-Q-166858-200	13-1/4	9-1/2	22-3/4	75.00
1	Output Cable Coaxial W-105		3300-111114000 1B105	49±3 long			0.63
1	Power Cord W-107		3300-106370000 1A107	80±3 long			0.70
3	Connector Cable W-106		8850-460433 1A106	49 long			1.31
1	Set Calibration Charts						
2	Instruction Book						
1	Set Spare Parts	Metal		10-1/4	9-1/2	19-1/8	50.00
						Total:	127.64
- Electronics Test Equipment -							
							LAE-4

SIGNAL GENERATOR LAF
(GENERATOR, SIGNAL, LAF)



FUNCTIONAL DESCRIPTION:

A portable, general purpose instrument used for aligning radio and radar receivers and in usual signal generator measurement work where an accurate, adjustable and known radio frequency voltage is required. Consists of a built-in power supply, a pulse generating circuit and synchronizing circuits, a radio frequency level indicating meter and a bolometer protective circuit contained in the upper chassis; a radio frequency oscillator, attenuator and filter box contained in the lower chassis. It has provision for external modulation.

RELATIONSHIP TO OTHER EQUIPMENT:

Superseded by RF Signal Generator Set AN/URM-26 (4 to 408 megacycles) and Signal Generator AN/URM-49 (400 to 1000 megacycles).

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: Frequency indication is by means of a geared revolution counter; the readings may be interpreted as frequency by reference to the calibration

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.	7CAC-363944	F16-G-63899-4451	3F3821-1
PROCUREMENT INFO.:	BuShips Spec. No. RE-9187		
PROCUREMENT COG.:	Navy	DESIGN COG.: Navy, BuShips	
F.I.I.N.:	FUNCTIONAL CLASS. NO.: 4.1.2		
- Electronics Test Equipment -			LAF

SIGNAL GENERATOR LAF
(GENERATOR, SIGNAL, LAF)

ELECTROMECHANICAL DESCRIPTION: (Continued)
data supplied with the equipment.

A bolometer element in a Wheatstone bridge is used to monitor the radio frequency output. Bridge balance is indicated by a microammeter mounted on the front panel. The attenuator assembly regulates and measures the output voltage. Power Supply: 115 volts $\pm 10\%$, AC, single phase, 50 to 60 cycles per second, 120 watts.

Type of Transmission: Pulsed.

Frequency Range: 90 to 600 megacycles per second.

Output Voltage: 0 to 100,000 microvolts.

Attenuation: 0 to -10 decibels from 0.1 volt at 200 megacycles per second.

Output Impedance: 50 ohms.

Internal Modulation:

Pulse Modulation: 100% square wave.

Pulse Repetition Rate: 60 to 2500 pulses per second.

Pulse Width: 2 to 30 microseconds.

Pulse Delay: 3 to 300 microseconds from leading rate pulse.

External Modulation: 30% maximum by sine waves or by signal source having components from 0.1 to 100 kilocycles per second.

Input Impedance: 5000 ohms.

External Synchronization:

Amplitude: ± 10 volts minimum.

Pulse Repetition Rate: 60 to 2500 pulses per second.

Pulse Width: Up to 30 microseconds below 150 megacycles per second.

Input Impedance: 10,000 ohms.

Accuracy: $\pm 1\%$ overall.

Frequency Stability: $\pm 17^\circ$, 0.05% per $^\circ\text{C}$. (-10°C . to $+50^\circ\text{C}$.) maximum.

MANUFACTURERS' OR CONTRACTORS' DATA:

Frank Rieber, Incorporated, Los Angeles, California; Contract No. NXsr39273, 3 November 1943; Approximate Cost per Unit, \$1600.00.

TUBE COMPLEMENT:

1 JAN-6J5, 1 JAN-884, 2 JAN-6SN7, 2 JAN-6AG7, 2 JAN-6AC7, 1 JAN-446, 1 JAN-5Y3GT, 1 JAN-0D3/VR150, 1 JAN-6SA7GT.

REFERENCE DATA AND LITERATURE:

NavShips 900,516 (Instruction Book).

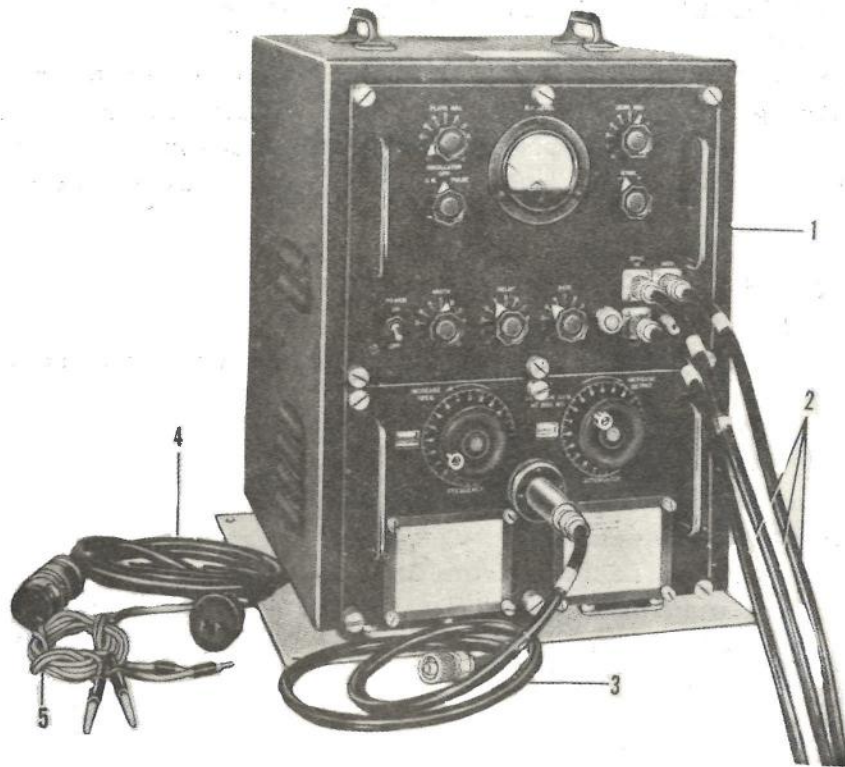
SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Signal Generator LAF Equipment Spare Parts.	7	25-3/4	19-1/2	24	142
		4.7				100

LAF

- Electronics Test Equipment -

**RF SIGNAL GENERATOR EQUIPMENT LAF-3
(GENERATOR, SIGNAL, LAF-3)**



FUNCTIONAL DESCRIPTION:

A portable, general purpose instrument used for aligning radio and radar receivers and in usual signal generator measurement work where an accurate, adjustable and known radio frequency voltage is required. Consists of a built-in power supply, a pulse generating circuit and synchronizing circuits, a radio frequency level indicating meter and a bolometer protective circuit contained in the upper chassis; a radio frequency oscillator, attenuator and filter box contained in the lower chassis. Has provision for external modulation.

RELATIONSHIP TO OTHER EQUIPMENT:

Superseded by RF Signal Generator Set AN/URM-26 (4 to 408 megacycles) and Signal Generator AN/URM-49 (400 to 1000 megacycles).

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: Frequency indication is by means of a geared revolution counter; the readings may be interpreted as frequency by reference to the calibration data

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.		F16-G-63899-4481	
PROCUREMENT INFO.:	BuShips Spec. No. RE-9187		
PROCUREMENT COG.:	Navy	DESIGN COG.: Navy, BuShips	
F.I.I.N.:	FUNCTIONAL CLASS. NO.: 4.1.2		
	- Electronics Test Equipment -		LAF-3

RF SIGNAL GENERATOR EQUIPMENT LAF-3
(GENERATOR, SIGNAL, LAF-3)

ELECTROMECHANICAL DESCRIPTION: (Continued)
supplied with the equipment.

A bolometer element in a Wheatstone bridge is used to monitor the radio frequency output. Bridge balance is indicated by a milliammeter mounted on the front panel. The attenuator assembly regulates and measures the output voltage. Power Supply: 115 volts $\pm 10\%$, AC, single phase, 50 to 1600 cycles per second, 120 watts.

Type of Transmission: Pulsed.

Frequency Range: 90 to 600 megacycles per second.

Output Voltage: 0 to 100,000 microvolts.

Attenuation: 0 to -10 decibels from 0.1 volt at 200 megacycles per second.

Output Impedance: 50 ohms.

Internal Modulation:

Pulse Modulation: 100% square wave.

Pulse Repetition Rate: 60 to 2500 pulses per second.

Pulse Width: 2 to 30 microseconds.

Pulse Delay: 3 to 300 microseconds from leading rate pulse.

External Modulation: 30% maximum by sine waves or by signal source having components from 0.1 to 100 kilocycles per second.

Input Impedance: 5000 ohms.

External Synchronization:

Amplitude: ± 10 volts minimum.

Pulse Repetition Rate: 60 to 2500 pulses per second.

Pulse Width: Up to 30 microseconds below 150 megacycles per second.

Input Impedance: 10,000 ohms.

Accuracy: $\pm 1\%$ overall.

Frequency Stability: $\pm 17^\circ$, 0.05% per $^\circ\text{C}$. (-10°C . to $+50^\circ\text{C}$.) maximum.

MANUFACTURERS' OR CONTRACTORS' DATA:

Frank Rieber, Incorporated, Los Angeles, California; Contract No. NXsr86333, 4 December 1944; Contract No. NXsr65319, 30 June 1944.

TUBE COMPLEMENT:

1 JAN-5Y3GT, 1 JAN-0D3/VR-150, 2 JAN-6AG7, 1 JAN-6AC7, 1 JAN-6SN7, 1 JAN-884, 1 JAN-6J5, 1 JAN-2C40.

REFERENCE DATA AND LITERATURE:

NavShips 900, 516 (Instruction Book).

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Signal Generator LAF-3. Equipment Spare Parts.	7 4.7	25-3/4	19-1/2	24	151 95
LAF-3 - Electronics Test Equipment -						

SIGNAL GENERATOR LAG



FUNCTIONAL DESCRIPTION:

A portable, general purpose, radio frequency signal generator designed to align the radio frequency sections of ultra high frequency receivers. It is used for field and depot maintenance. The frequency (megacycles per second) and the output (microvolts) are indicated by meters on the front panel.

RELATIONSHIP TO OTHER EQUIPMENT:

Identical to Navy Type 60083 RF Signal Generator.

Superseded by Signal Generator AN/URM-64 (900 to 2100 megacycles) and Signal Generator AN/URM-61 (1800 to 4000 megacycles).

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The oscillator providing the carrier wave is a velocity variation reflex type with an adjustable cavity. Circuits are provided to pulse modulate or frequency modulate this wave. A selector switch permits either Pulse Modulated,

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.		R16-NAV-LAG	
PROCUREMENT INFO.:	Navy Spec. R-16G-2(RE); Dwg. RE9268		
PROCUREMENT COG.:	Navy	DESIGN COG.: Navy, BuShips	
F.I.I.N.:	FUNCTIONAL CLASS. NO.: 4.1.2		
- Electronics Test Equipment -			LAG

SIGNAL GENERATOR LAG

ELECTROMECHANICAL DESCRIPTION: (Continued)

Frequency Modulated, or Continuous Wave operation. A bolometer and microammeter provide continuous output indication. An absorption type wavemeter, a crystal detector and level indicating microammeter provide accurate determination of the frequency. Provision is made for extracting a synchronizing pulse for use with an oscilloscope. The output is connected to the RF stage of the equipment to be tested.

Power Supply: 105 to 125 volts, AC, 50 to 60 cycles per second, single phase, 250 watts.

Frequency Range: 1200 to 4000 megacycles per second in two bands, calibrated.

Type of Transmission: Frequency Modulated, Pulse Modulated, Continuous Wave.

Modulation Frequency: 60 cycles per second, frequency modulated.

Deviation Rate: 20 megacycles per second, frequency modulated.

Pulse Repetition Rate: 60 to 2500 cycles per second.

Pulse Width: 2 to 30 microseconds.

Pulse Delay: 3 to 300 microseconds.

"Synch" Input (External Pulse): ± 3 volts.

Output Range: +6 to -100 dbm, calibrated.

"Synch" Output: ± 150 volts.

Output Voltage: 1 to 100,000 microvolts, calibrated.

Output Impedance: 50 ohms resistive.

Input Impedance: 10,000 ohms shunted by 30 micromicrofarads.

Accuracies: $\pm 1.0\%$ of indicated frequency. $\pm 1.0\%$ of attenuator scale reading.

Temperature Range: -17° F. to $+122^{\circ}$ F.

MANUFACTURERS' OR CONTRACTORS' DATA:

General Communications Company, 681 Beacon Street, Boston, Massachusetts;
Navy Contract No. NXsr-55642, dated 7 April 1944.

TUBE COMPLEMENT:

1 JAN-707B, 1 JAN-6J5, 1 JAN-884, 1 JAN-6SN7, 1 JAN-6AG7, 4 JAN-6AC7,
3 JAN-5U4G, 1 JAN-6Y6G, 5 JAN-0D3/VR-150.

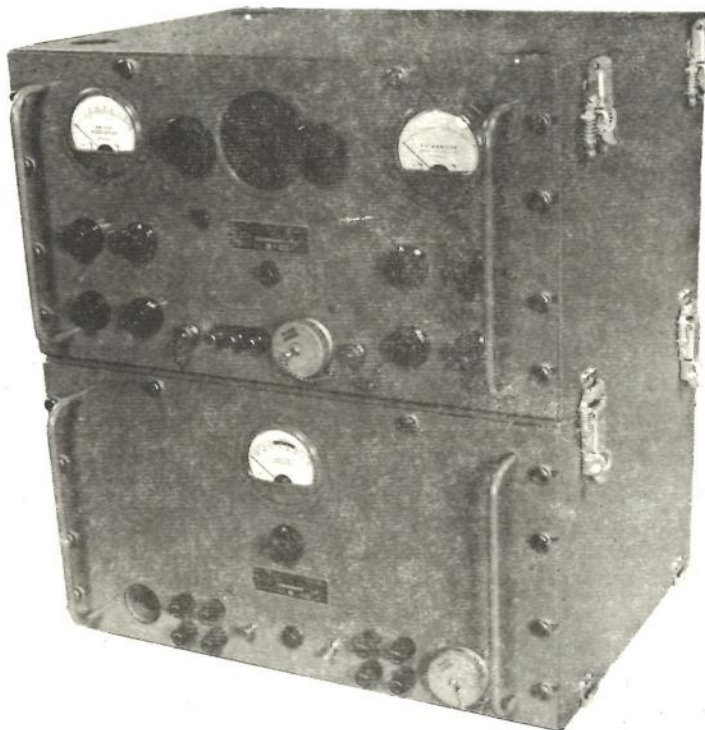
REFERENCE DATA AND LITERATURE:

CO NavAer 16-5Q-518 (Instruction Book).

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
LAG - Electronics Test Equipment -						

**SIGNAL GENERATOR SG-1/ARN
(GENERATOR, SIGNAL, SG-1/ARN)**



FUNCTIONAL DESCRIPTION:

A depot type signal generator for measuring radio-frequency sensitivity, phase, etc., of Radio Receiver Set AN/ARN-14. Consists of a continuous range master oscillator and two crystal-controlled oscillators with provisions for mixing master oscillator and the crystal oscillator for dial calibration. The output attenuator is read directly in microvolts output when the generator is terminated in a 53 ohm load and output meter is adjusted to red line.

RELATIONSHIP TO OTHER EQUIPMENT:

Used with Modulator MD-83/ARN to test Radio Receiving Sets such as AN/ARN-14. Similar to Boonton Model 210A.

ELECTROMECHANICAL DESCRIPTION:

Power Supply: 115 volts, AC, 50 to 60 cycles per second, single phase, 180 watts.
Frequency Range: 88 to 140 megacycles per second; 110.1 megacycles per second and 114.9 megacycles per second fixed.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Limited Standard		
STOCK NOS.	7CAC-363948		3F3902.1-1
PROCUREMENT INFO.:	MIL-H-5570 & 7B; USAF Spec. 40152A & 7B, 40156 & 7B		
PROCUREMENT COG.:	USAF	DESIGN COG.: USAF, C&N	
F.I.I.N.:	FUNCTIONAL CLASS. NO.:		4.1.2
- Electronics Test Equipment -			SG-1/ARN

SIGNAL GENERATOR SG-1/ARN
(GENERATOR, SIGNAL, SG-1/ARN)

ELECTROMECHANICAL DESCRIPTION: (Continued)

Type of Transmission: Continuous Wave, Amplitude Modulated.

Radio Frequency Output Level: 0.1 to 200,000 microvolts.

Output Impedance: 53 ohms.

Modulation Data: 0 to 100%. 400 and 1000 cycles per second internal modulation.

Accuracy: $\pm 0.25\%$ of indicated frequency, $\pm 8\%$ of indicated output.

$\pm 0.0035\%$ of fixed frequency.

Temperature Range: 10° C. to 50° C.

MANUFACTURERS' OR CONTRACTORS' DATA:

Bendix Aviation Corporation, East Joppa Road, Towson, Baltimore 4, Maryland;
Contract No. W33-038-ac-21113; Approximate Cost per Unit, \$2500.71; May 1948.

Boonton Radio Corporation, Boonton, New Jersey; Contract AF 33(038)27871.

TUBE COMPLEMENT:

SG-1/ARN contains: 5 JAN-6AK5W, 2 JAN-12AX7, 2 JAN-2C51, 1 JAN-6V6GT.

PP-348/ARN contains: 1 JAN-5R4WGY, 1 JAN-5Y3GT, 4 JAN-6B4G, 2 JAN-0A3,
2 JAN-6AU6.

REFERENCE DATA AND LITERATURE:

TO 16-35SG1-3 (Maintenance Instructions).

TO 16-35SG1-4 (Parts Catalog).

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Signal Generator SG-1/ARN (Export Packed)	10.40	25	31	23	143
1	Power Supply PP-348/ARN	10.40	25	31	23	170

SG-1/ARN

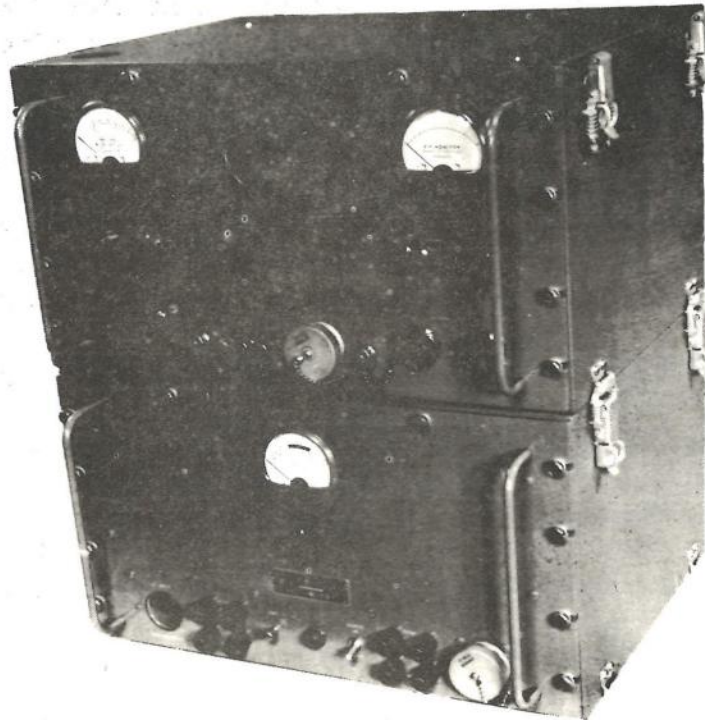
- Electronics Test Equipment -

SIGNAL GENERATOR SG-1/ARN
(GENERATOR, SIGNAL, SG-1/ARN)

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Signal Generator SG-1/ARN	Metal	7CAC-363948 3F3902.1-1	11	19-1/2	14-1/2	36.5
1	Case CY-661/ARN or Case CY-1068/U		7CAC-176572-56 3F2529-661	18-1/4	24	16-1/4	34.0
1	Adapter UG-201/U		8850-101950 2Z308-201				
1	Cord CX-237/U		7CAC-170264875 3E6000-237-60				
1	Power Supply PP-348/ARN		7CAC-652865 3H4497-348	11	19-1/2	14-1/4	60.0
1	Case CY-664/ARN or Case CY-1069/U		7CAC-176572-57 3H772-664	18-1/4	24	16-1/4	34.0
1	Adapter UG-529/U		8850-110100				
1	Adapter UG-528/U		8850-109900				
1	Cable Assembly CG-409/U		7CAC-170265-637 1F430-409.74.12	74-1/2 long			
1	Cable Assembly CX-1290/ARN						
- Electronics Test Equipment -							SG-1/ARN

SIGNAL GENERATOR SG-1A/ARN



FUNCTIONAL DESCRIPTION:

A general purpose signal generator designed for testing and aligning VHF communication receivers within its frequency range. It provides modulated RF signals that simulate those transmitted by VHF omnidirectional range systems, tone or phase localizer systems, VHF two-course range systems, and amplitude-modulated tone intelligence. It also may be used to provide an unmodulated carrier.

RELATIONSHIP TO OTHER EQUIPMENT:

Used with MD-83/ARN to provide navigational intelligence.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: Consists of an RF unit, an AF oscillator assembly, a panel and meter assembly, and a power supply. RF signals are provided by a continuous range, tuned-plate, master oscillator. The output from the master oscillator is fed through two doubler stages and through a mutual-inductance, piston-

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.	7CAC-363924-28		
PROCUREMENT INFO.: USAF Spec. MIL-S-4296A			
PROCUREMENT COG.: USAF		DESIGN COG.: USAF, C&N	
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 4.1.2	
- Electronics Test Equipment -			SG-1A/ARN

SIGNAL GENERATOR SG-1A/ARN

ELECTROMECHANICAL DESCRIPTION: (Continued)

type attenuator to a panel jack. An oscillator, controlled by either of two crystals, produces a fixed output frequency. The crystal controlled frequency may be mixed with the signal from the master oscillator for calibration purposes. An internal audio oscillator generates a fixed sine wave signal for application to the modulation system. A modulation meter indicates the degree of modulation present on the carrier. An output power monitor samples the RF energy and indicates the voltage level on a front panel meter. The power supply furnishes all filament, plate, and screen power required by the signal generator.

Power Supply: 115 volts, $\pm 10\%$, AC, 50 to 1600 cycles per second, single phase, 180 watts.

Frequency Range: 88 to 140 megacycles per second; 110.1 megacycles per second and 114.9 megacycles per second fixed.

Type of Transmission: Continuous Wave, Amplitude Modulated.

Radio Frequency Output Level: 0.1 to 200,000 microvolts.

Output Impedance: 53 ohms.

Modulation Data: 0 to 100%; 400 and 1000 cycles per second internal modulation.

Accuracy: $\pm 0.15\%$ of indicated frequency, $\pm 8\%$ of indicated output.

$\pm 0.0065\%$ of fixed frequency.

Temperature Range: -40°C. (-40°F.) to $+55^{\circ}\text{C.}$ ($+131^{\circ}\text{F.}$).

MANUFACTURERS' OR CONTRACTORS' DATA:

Boonton Radio Corporation, Boonton, New Jersey; Contract AF 33(038)27871; Boonton Part No. 211563; Approximate Cost per Unit, \$816.00.

TUBE COMPLEMENT:

SG-1A/ARN contains: 5 JAN-6AK5W, 2 JAN-12AX7, 2 JAN-2C51, 1 JAN-6V6GT.

PP-348/ARN contains: 1 JAN-5R4WGY, 1 JAN-5Y3GT, 4 JAN-6B4G, 2 JAN-OA3, 2 JAN-6AU6.

REFERENCE DATA AND LITERATURE:

TO 33A1-8-47-22 (Service Instructions).

TO 33A1-8-47-24 (Illustrated Parts Breakdown).

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Signal Generator SG-1A/ARN (Export Packed)	10.40	25	31	23	143
1	Power Supply PP-348/ARN	10.40	25	31	23	170

SG-1A/ARN

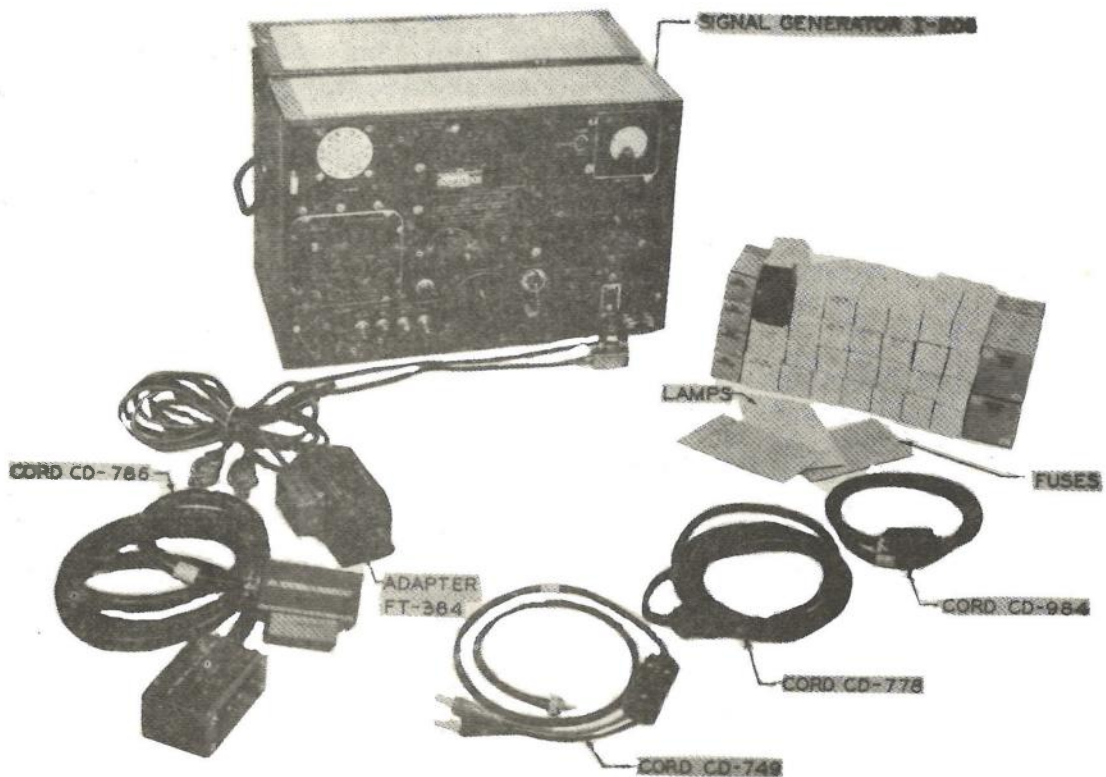
- Electronics Test Equipment -

SIGNAL GENERATOR SG-1A/ARN

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Signal Generator SG-1A/ARN	Metal	7CAC-363924-28	11	19-1/2	14-1/4	36.5
1	Case CY-1068/U			18-1/4	24	16-1/4	34.0
1	Adapter UG-201/U		8850-101950 2Z308-201				
1	Cord CX-237/U		7CAC-170264-875 3E6000-237-60				
1	Power Supply PP-348/ARN		7CAC-652865 3H4497-348	11	19-1/2	14-1/4	60.0
1	Case CY-1069/U			18-1/4	24	16-1/4	34.0
1	Adapter UG-529/U		8850-110100				
1	Adapter UG-528/U		8850-109900				
1	Cable Assembly CG-409/U		7CAC-170265-637 1F430-409.74.12	74-1/2 long			
1	Cable Assembly CX-1290/ARN						

SIGNAL GENERATOR SG-6/U
(GENERATOR, SIGNAL, SG-6/U)



FUNCTIONAL DESCRIPTION:

A general purpose, portable unit used as a frequency and voltage standard for testing frequency modulation radio equipment. It is used in the calibration, alignment, and determination of sensitivity of frequency modulation radio receivers. The signal generator output is controlled and measured by a calibrated attenuator, multiplier, and vacuum tube voltmeter. All controls and indicators are located on the front panel.

RELATIONSHIP TO OTHER EQUIPMENT:

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: An audio oscillator, contained within the signal generator, generates any one of five fixed frequencies. This signal is fed into a reactance circuit, which controls the frequency of the radio frequency oscillator. The radio

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			3F3900-208A.1
PROCUREMENT INFO.:			
PROCUREMENT COG.:	Army	DESIGN COG.:	Army, CSL
F.I.I.N.:		FUNCTIONAL CLASS. NO.:	4.1.2
- Electronics Test Equipment -			SG-6/U

SIGNAL GENERATOR SG-6/U
(GENERATOR, SIGNAL, SG-6/U)

ELECTROMECHANICAL DESCRIPTION: (Continued)

frequency signal is fed into a buffer limiter. The output from this stage is applied directly to the final amplifier on the high range position. A frequency reference is provided by a 500 kilocycle per second crystal oscillator in the calibration unit. The output voltages of the radio frequency unit and this crystal oscillator are combined in the converter, resulting in an audio beat frequency signal for each multiple of 0.5 megacycles per second of its radio frequency output frequency. This audio beat frequency is amplified and transformer coupled to a permanent magnet dynamic loudspeaker located on the front panel.

Power Supply: 115 volts $\pm 10\%$, AC, single phase, 60 cycles per second, or 12 volts $\pm 10\%$, DC.

Frequency Range: 1.9 to 4.5 megacycles per second; 19 to 45 megacycles per second.

Modulation Frequency: 150, 400, 1000, 2500, 5000 cycles per second.

Frequency Deviation: 0 to 5 kilocycles per second for 1.9 to 4.5 megacycles per second range. 0 to 50 kilocycles per second for 19 to 45 megacycles per second range.

Type of Transmission: Frequency Modulated Carrier.

Power Output: 0.333 milliwatts at 30 ohm line; 7.030 milliwatts at high output terminal.

Voltage Output: 0.10 volts across 30 ohm line; 0.84 volts across high output terminal.

Accuracy: $\pm 0.03\%$ of dial indication over temperature range 0 to 60° C. $\pm 30\%$ voltage.

Mounting: FT-237 for use in mobile units.

MANUFACTURERS' OR CONTRACTORS' DATA:

I-208: Detrola Corporation, Detroit 9, Michigan; Contract Nos. W-2124-sc-10516, W-2124-sc-16081, W-36-039-sc-350.

TUBE COMPLEMENT:

2 JAN-12SN7, 3 JAN-12SA7, 2 JAN-12A6, 4 JAN-12SH7, 1 JAN-6AG7, 1 JAN-955, 1 JAN-5U4G, 1 JAN-6SQ7, 1 JAN-0D3/VR-150, 1 Amperite 1H20 (Ballast).

REFERENCE DATA AND LITERATURE:

TM 11-2508 (Adapter FT-384-A).

TM 11-317 (Signal Generator I-208).

SHIPPING DATA:

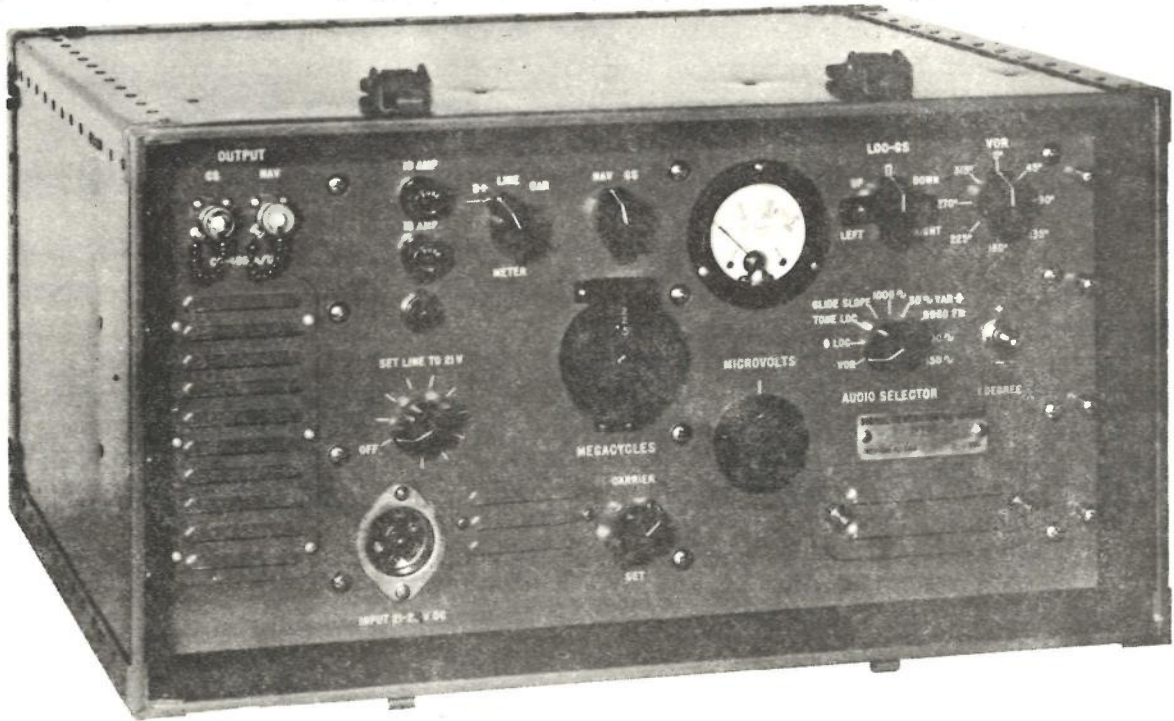
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Signal Generator SG-6/U (Domestic Packed)	6.1	19	31-3/4	17-1/2	170
SG-6/U - Electronics Test Equipment -						

SIGNAL GENERATOR SG-6/U
(GENERATOR, SIGNAL, SG-6/U)

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Signal Generator SG-6/U Including:	Wood	3F3900-208A. 1				
1	Signal Generator I-208 (Inc. Access.)		7CAC-363855 R16-AYS-I-208 3F3900-208	12-1/4	17-1/2	11-1/2	118
1	Adapter FT-384-A		3F1-384	5	2-1/4	2	2
1	Cord CD-786		3E1786	72 long			
1	Case CY-293/GR	Ply- wood	2Z2499-293	14	26	13	17
- Electronics Test Equipment -							
							SG-6/U

SIGNAL GENERATOR SG-13/ARN
(GENERATOR, SIGNAL, SG-13/ARN)



FUNCTIONAL DESCRIPTION:

A portable test instrument for use in the field to determine the overall operation of aircraft navigation and localizer receivers. It supplies all signals necessary to test and align receivers. The output is calibrated in microvolts and frequency is directly indicated in megacycles.

RELATIONSHIP TO OTHER EQUIPMENT:

Used to test Radio Receiving Sets such as AN/ARN-14, AN/ARN-18, etc.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: Consists of a 30 cycles per second R-C oscillator which produces a variable phase output and also supplies a constant phase reference voltage to modulate a 9960 cycles per second signal generated by another oscillator. A 1 degree phase shifting network shifts the reference voltage for testing the sensitivity of omni-bearing indicators to small angular increments. The R-C oscillator is switched to generate 1000 cycles per second for aural testing. The 90

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Substitute Standard		
STOCK NOS.	7CAC-363949		3F3902.1-13
PROCUREMENT INFO.:	Exhibit MCREE-330 dated 25 February 1948		
PROCUREMENT COG.:	USAF	DESIGN COG.:	USAF, C&N
F.I.I.N.:	FUNCTIONAL CLASS. NO.:		4.1.2
- Electronics Test Equipment -			SG-13/ARN

SIGNAL GENERATOR SG-13/ARN
(GENERATOR, SIGNAL, SG-13/ARN)

ELECTROMECHANICAL DESCRIPTION: (Continued)

and 150 cycles per second signals for tone localizer and glide slope testing are generated by distorting the output of the 30 cycles per second oscillator, filtering the third and fifth harmonics, limiting the signal and filtering again. An audio selector switch is used to select the type of modulation desired.

A piston type attenuator enables the RF output to be varied from 5 to 200,000 microvolts. This output may be fed directly into the receiver or radiated by Antenna AT-170/ARN.

A univertter has been incorporated to provide glide slope test facilities. Signals from the univertter may be fed into the receiver directly or radiated with Antenna AT-170/ARN.

Power Supply: 21 to 29 volts DC; 5.4 amperes.

Frequency Range: 30 cycles per second, 90 cycles per second, 150 cycles per second, 1000 cycles per second, 9960 cycles per second; 108.0 to 135.9 megacycles and 329.6 to 335.0 megacycles.

Type of Transmission: Amplitude Modulation and Frequency Modulation.

Voltage Output: 4 to 200,000 microvolts calibrated.

Phase Range of 30 cycles per second variable phase with respect to 30 cycles per second fixed phase: In phase, 45° out, 90° out, 135° out, 180° out, 225° out, 270° out, and 315° out.

Internal Modulation: 90 cycles per second or 150 cycles per second Amplitude Modulation signals at 40%. Amplitude Modulation 9960 ±480 cycles per second signal being frequency modulated by 30 cycles per second fixed phase signal.

Accuracy: ±0.0065% of crystal frequency.

±0.1% of oscillator frequency.

±2% for Audio Frequency.

±25% for RF voltage output calibration.

Output Impedance: 52 ohms.

Field Strength: 100 microvolts per meter at a distance of 100 feet from antenna.

MANUFACTURERS' OR CONTRACTORS' DATA:

Bendix Aviation Corporation, Baltimore 4, Maryland; Contract No. W-33-038-ac-21113, 15 June 1949; Approximate Cost per Unit, \$3110.00.

Collins Radio Company, 855 35th Street, N.E., Cedar Rapids, Iowa, Contract No. AF 33(038)14566, 23 June 1950, and AF 33(038)27683; Approximate Cost per Unit, \$1300.00.

TUBE COMPLEMENT:

1 JAN-5751, 1 JAN-12AT7, 9 JAN-6AK5W, 1 JAN-6AQ5, 3 JAN-12AX7, 1 JAN-6AG5, 1 JAN-6AL5W, 4 JAN-5814, 3 JAN-OA2, 1 JAN-5670.

REFERENCE DATA AND LITERATURE:

AN 16-35SG13-1 (Operation, Service, and Overhaul Instructions).

TO 16-35SG13-4 (Illustrated Parts Breakdown).

SIGNAL GENERATOR SG-13/ARN
(GENERATOR, SIGNAL, SG-13/ARN)

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	

EQUIPMENT SUPPLIED:

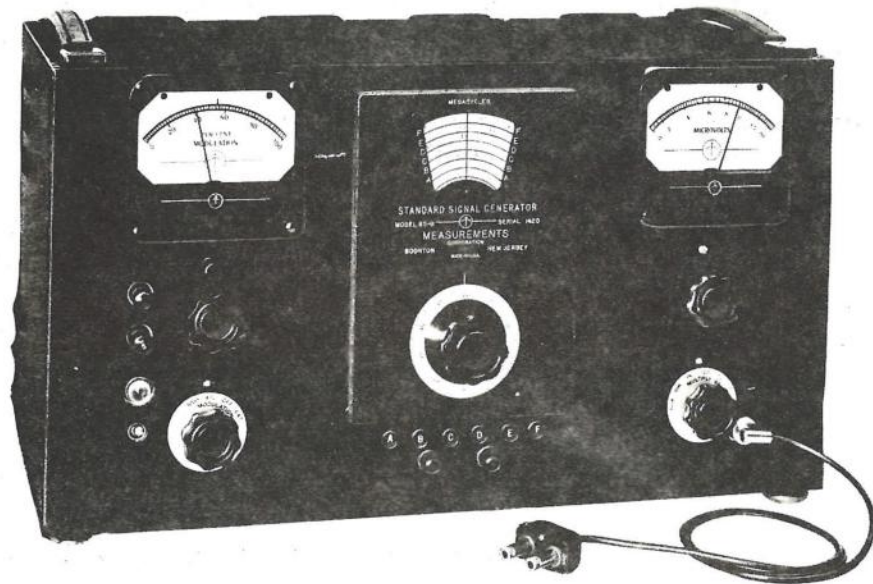
Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Signal Generator, SG-13/ARN in Case 1 Including:	Aluminum	7CAC-363949 3F3902.1-13	18-1/4	19-1/4	10-1/2	45
1	Power Cord CX-1095/U			120 long			
1	RF Cord CG-409A/U		7CAC-170265-2655	120 long			
1	Adapter UG-529/U		8850-110100				
1	Adapter UG-201/U		8850-108950 2Z308-201				
2	Adapter UG-29/U		8850-108732 2Z7390-29				
1	Antenna AT-170/ARN		7CAC-045170 2A203-170				
2	Fuse (10 amp) 3 AG		8800-360988				
1	Accessory Case 2, CY-868/U Including:			14	12-5/8	7	15
(Continued)							
- Electronics Test Equipment -							SG-13/ARN

SIGNAL GENERATOR SG-13/ARN
(GENERATOR, SIGNAL, SG-13/ARN)

EQUIPMENT SUPPLIED: (Continued)

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Power Cord CX-1506/U		7CAC-170264-336	300 long			
1	Power Cord CX-1506/U		7CAC-170264-3355	600 long			
1	Adapter UG-29/U		8850-108732 2Z7390-29				
4	Adapter UG-201/U		8850-108950 2Z308-201				
1	RF Cord CG-409A/U			300 long			
1	RF Cord CG-409A/U			600 long			

RF SIGNAL GENERATOR SG-20/U



FUNCTIONAL DESCRIPTION:

A portable, general purpose, laboratory instrument used for the measurement of sensitivity, selectivity, fidelity overload, distortion, automatic gain control, image and intermediate frequency rejection ratios, and noise and stage gain characteristics. Test results are indicated on a motor-driven direct-reading linear scale.

RELATIONSHIP TO OTHER EQUIPMENT:

The SG-20/U is the military designation for the Standard Signal Generator Measurements 65-B.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The instrument consists basically of an AF oscillator and modulator, an RF oscillator, an RF amplifier, two meters, a variable attenuator and a step attenuator. The circuitry is of the master oscillator, tuned-power amplifier type. The audio oscillator provides modulating frequencies of 400 to 1000 cycles. A vacuum tube voltmeter is used as an output monitor.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREMENT INFO.:			
PROCUREMENT COG.:	DESIGN COG.:		Commercial
F. I. L. N.:	FUNCTIONAL CLASS. NO.:		4.1.2
- Electronics Test Equipment -			SG-20/U

RF SIGNAL GENERATOR SG-20/U

ELECTROMECHANICAL DESCRIPTION: (Continued)

Power Supply: 117 volts, AC, 50 to 60 cycles per second, 115 watts.

Frequency Range: 75 kilocycles per second to 30 megacycles per second, in 6 ranges.

Frequency Accuracy: $\pm 0.5\%$, backlash less than 1 part in 2300.

Output Voltage: 0.1 microvolt to 2.2 volts.

Output Voltage Accuracy: $\pm 4\%$ at 1 volt between 1 and 25 megacycles per second.

Output Impedance: 6 ohms plus internal lead and contact resistance, without cable connected at jack panel; 5 ohms at 0.2 volt rising to 15 ohms at 2.2 volts; with a 30-ohm cable connected.

Accuracy of Step Attenuator: $\pm 5\%$ per step except for the 1 to 0.1 step which is -9% to $+2\%$; cumulative step error is less than 20%.

Modulation:

External: 50 to 10,000 cycles per second depending on carrier frequency.

Internal: 400 or 1000 cycles per second, variable from 0 to 100%.

Envelope Distortion: 4% at 100% modulation at 1 megacycle per second, 8% at 100% modulation at 15 megacycles per second, 1% at 30% modulation over entire frequency range.

Frequency Modulation: Less than 0.02% for 30% amplitude modulation.

Leakage: Less than 0.1 microvolt with attenuator set for zero output.

MANUFACTURERS' OR CONTRACTORS' DATA:

Measurements Corporation, Boonton, New Jersey, approximate cost per unit, \$875.00.

TUBE COMPLEMENT:

2 6SJ7, 1 6L6, 1 6SK7, 1 6V6, 1 5T4, 2 6H6, 1 6AG7, 2 OD3/VR-150.

REFERENCE DATA AND LITERATURE:

Manufacturer's Catalog.

SHIPPING DATA:

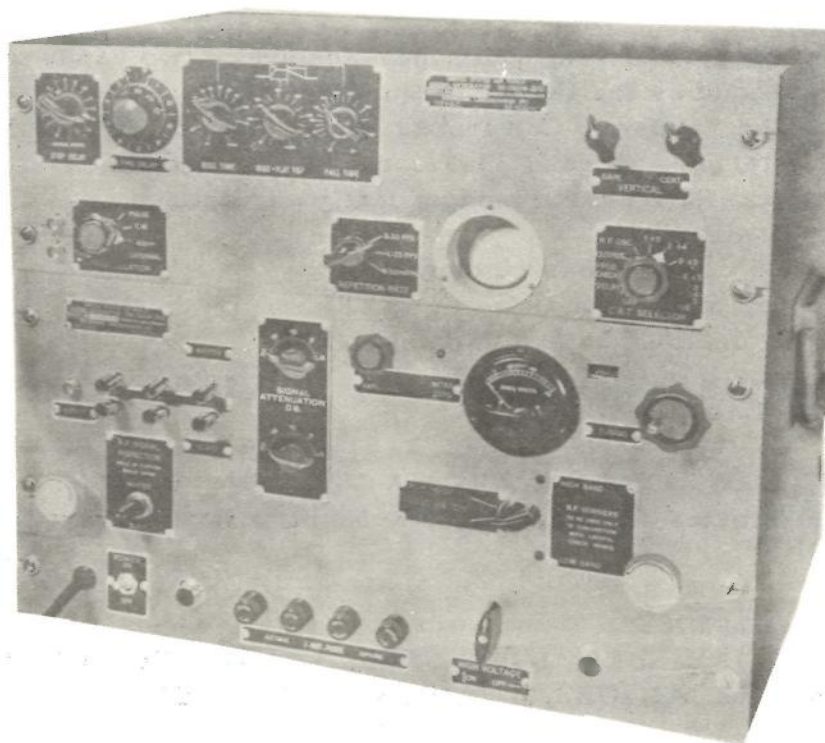
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
	RF Signal Generator SG-20/U					
SG-20/U - Electronic Test Equipment -						

RF SIGNAL GENERATOR SG-20/U

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	RF Signal Gener- ator SG-20/U	metal		11-7/8	20-5/16	10-1/2	55
- Electronics Test Equipment -				SG-20/U			

RF SIGNAL GENERATOR SG-28(XW)/U



FUNCTIONAL DESCRIPTION:

A rack-panel mounted unit suitable for use as a conventional signal generator but designed specifically for Loran application. Internally and externally modulated pulse and continuous signals are available. Master and slave pulses may be independently controlled in amplitude and the slave may be delayed by variable amounts from the master pulse. Primary application is to Loran maintenance and repair work.

A calibrated pulse may be obtained by first determining the oscilloscope deflection for required amplitude, using continuous wave and vacuum tube voltmeter. The oscilloscope is then used to match the pulse amplitude to the same deflection.

RELATIONSHIP TO OTHER EQUIPMENT:

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Development		
STOCK NOS.		F16-G-63105-1521	
PROCUREMENT INFO.:	USAF Exhibit No. WLENG-1073, 18 Nov. 1947		
PROCUREMENT COG.:	USAF	DESIGN COG.:	USAF, Rome
F.I.I.N.:	FUNCTIONAL CLASS. NO.:		4.1.2
- Electronics Test Equipment -			SG-28(XW)/U

RF SIGNAL GENERATOR SG-28(XW)/U

ELECTROMECHANICAL DESCRIPTION:

Power Supply: 110 volts, AC, single phase, 50 to 1600 cycles per second, 3 amperes approximately.

Frequency Range: 50 to 220 kilocycles per second in two bands with 100 and 180 kilocycles per second as the center frequencies.

Type of Transmission: Pulsed, Continuous Wave, Amplitude Modulated.

Pulse Repetition Rate: 20, 25, and 33-1/3 cycles per second.

Pulse Rise, Width and Fall Time: Independently variable.

Power Output: 1.25 milliwatts.

Voltage Output: 0.25 volts across 50 ohms.

Output Impedance: 50 ohms.

Attenuator: 0 to 120 decibels in one decibel steps.

Stability: 0.1% over a temperature range -55° C. to +60° C.

Harmonic Content: Less than 5%.

MANUFACTURERS' OR CONTRACTORS' DATA:

Browning Laboratories, Winchester, Massachusetts; Contract No. W28-099-ac-411; March, 1948.

TUBE COMPLEMENT:

23 JAN-12AU7, 1 JAN-6BE6, 1 JAN-6AL5, 3 JAN-6AU6, 6 JAN-6A25, 1 JAN-6A57, 1 JAN-5R4GY, 2 JAN-OB2, 1 JAN-6X4, 1 JAN-2BP1.

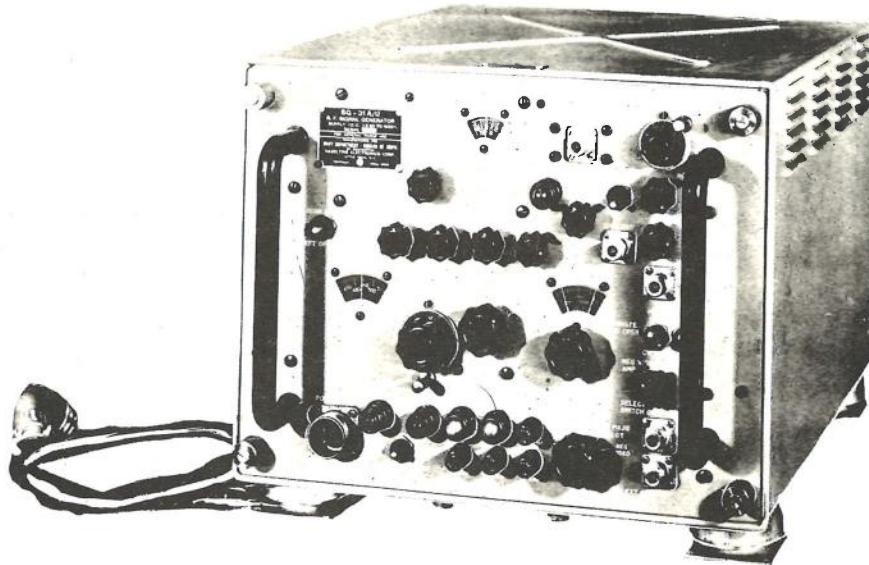
REFERENCE DATA AND LITERATURE:

Browning Laboratories, Handbook of Maintenance Instructions for SG-28/U.

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
SG-28(XW)/U - Electronics Test Equipment -						

RF SIGNAL GENERATOR SG-31/U



FUNCTIONAL DESCRIPTION:

A general purpose equipment specifically designed to perform measurements on Shipboard Aircraft Early Warning systems. The equipment is used for receiver bandwidth and sensitivity measurements, relay receiver frequency response, relay receiver saturation level, decoder sensitivity measurements, accuracy of data transmission, Go/No-Go operation of PPI and A scope sweeps, and for checking antijamming capability of relay receivers and decoders. Test results are indicated on calibrated dials located on the front panel of the equipment, on the equipment under test and on associated test equipment.

RELATIONSHIP TO OTHER EQUIPMENT:

RF Signal Generator SG-31/U is essentially a combination of Video Generator CHZ-60 ACY-1 and RF Signal Generator SG-25/U combined in one unit. The RF Signal Generator SG-31/U has improved pulse forming and coding circuits and additional types of video output signal. Equipment required but not supplied includes:

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Standard	Standard	
STOCK NOS.	7CAC-363964-6	F16-G-2707-1301	
PROCUREMENT INFO.:	Spec CS-826		
PROCUREMENT COG.:	Navy	DESIGN COG.: Navy, BuShips	
F. I. I. N.:	FUNCTIONAL CLASS. NO.: 4. 1. 2		
	- Electronics Test Equipment -		SG-31/U

RF SIGNAL GENERATOR SG-31/U

RELATIONSHIP TO OTHER EQUIPMENT: (Continued)

one cable RG-8/U; one Cable DHFA-3; Oscilloscope OS-5/U; and Multimeter ME-25/U.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The equipment consists of a video generator, a modulator section, RF generator section, and a power supply. The circuits of the video generator simulate all elements of an Aircraft Early Warning relay link transmission. This data consists of azimuth and timing synchronization signals followed by either radar or IFF video. The RF generator section contains a variable oscillator whose RF output is adjusted by a calibrated vertical inductance attenuator. The monitoring demodulator circuits are used during initial calibration of the equipment. The monitoring circuits compare the peak RF output with a controllable DC voltage to cause a panel lamp to flicker when the RF voltage exceeds the DC voltage. A full wave rectifier supplies all the DC voltages and currents required for operation of the equipment. Regulated heater current is supplied to the RF oscillator and two tubes in the monitoring circuit.

Power Supply: 115 volts, AC, 60 to 1600 cycles per second, single-phase, 375 watts at a power factor of 0.9.

Frequency Range: Variable 345 to 525 megacycles per second.

Accuracy: 0.5% of indicated frequency.

Type of Emission: Continuous wave or pulse modulated.

Type of Internal Pulse Modulation: Aircraft Early Warning system coding (four groups of sync pulses and simulated block of video).

Envelope Rise Time: Less than 0.04 microseconds.

Envelope Decay Time: Less than 0.7 microseconds.

Nominal Output: Variable -112 to +12 decibels below 1 milliwatt (dbm) for pulse operation, -112 to -2 dbm for continuous wave operation.

Frequency Stability: Less than 0.5 megacycles per second drift in 15 minutes after 10 minute warmup period; undesired frequency modulation less than 0.5 megacycle per second at full modulation; undesired amplitude modulation less than 1 decibel of indicated output.

Input Impedance: 50 ohms.

Standing Wave Ratio: 2 decibels or less.

Video Output: Full modulating signal, positive; full modulating signal, negative; uncoded sync pulses; four separated sync pulses.

External Sync Requirements: Positive pulse 5 volts, minimum.

MANUFACTURERS' OR CONTRACTORS' DATA:

Hazeltine Electronics Corporation, Little Neck, Long Island, New York; Contract Nos. NObsr 42140, 13 April 1948; NObsr 49043, 12 January 1950; NObsr 49260, 16 August 1950; NObsr 52073, 7 November 1950; NObsr 52500; approximate cost per unit, \$5,000.00, including equipment spares.

RF SIGNAL GENERATOR SG-31/U

TUBE COMPLEMENT:

2 5R4G, 7 6AL5, 1 6AQ5, 2 6AU6, 6 6D4, 1 6F4, 1 6X4, 1 6AS7, 4 12AT7, 7 12AU7, 6 12AX7, 2 5687, 1 9005, 2 OB2/VR105.

REFERENCE DATA AND LITERATURE:

NavShips 91381 Instruction Book.

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	RF Signal Generator SG-31/U	metal		14-3/4	18	24-3/16	165
1	Video Cable Assembly HECA8051			60 long by 7/8 max. dia.			0.35
4	Radio Frequency Plug UG-21B/U			1-7/8 by 13/16 dia.			0.123
1	Power Cable Connector AN-3108-22-105			3	1-5/8	2-1/8	0.202
1	Cable Clamp AN-3057-12			1-3/6 x 1-3/8 dia.			0.061
1	Set, Equipment Spares						
2	Instruction Book NavShips 91381			11	8-1/2	3/4	1-1/2

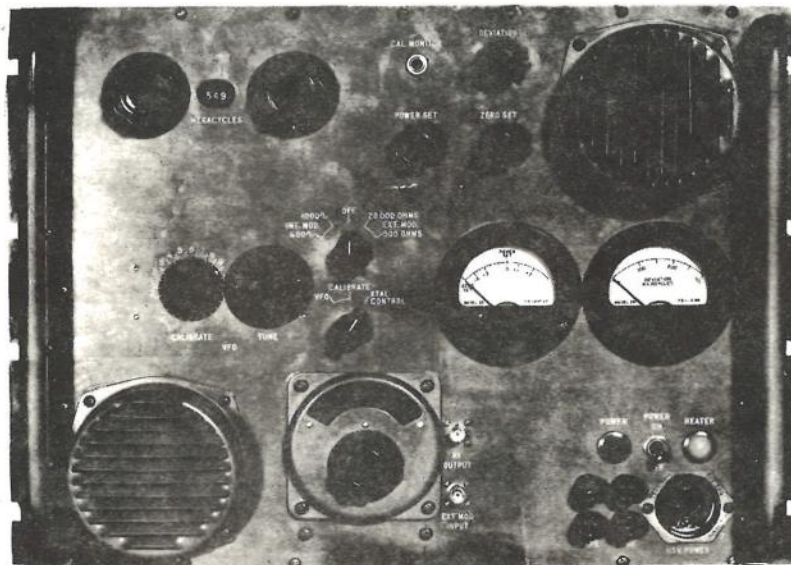
SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	RF Signal Generator SG-31/U including spares	13.8	20-1/2	23-3/4	31-3/4	200

- Electronic Test Equipment -

SG-31/U

RF SIGNAL GENERATOR SG-50(XN-1)/ARN



FUNCTIONAL DESCRIPTION:

A portable, special purpose equipment designed to furnish RF test signals at an accurately adjustable frequency and power level. This equipment is used in testing AN/ARW-56. The generator includes provisions for both external and internal frequency modulation. Indication is in decibels by means of a thermistor bridge circuit, and in megacycles per second on a calibrated tuning control.

RELATIONSHIP TO OTHER EQUIPMENT:

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: This equipment contains a variable frequency oscillator, a special tuning condenser, an RF attenuator, a thermistor bridge, and a power supply.

Power Supply: 115 volts, AC, $\pm 10\%$, single-phase, 50 to 1000 cycles per second.

Frequency Range: 406 to 550 megacycles per second.

Type of Transmission: Frequency modulated.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREMENT INFO.:			
PROCUREMENT COG.:	DESIGN COG.: USN, BuAer		
F. I. I. N.:	FUNCTIONAL CLASS. NO.: 4.1.2		
- Electronics Test Equipment - SG-50(XN-1)/ARN			

RF SIGNAL GENERATOR SG-50(XN-1)/ARN

ELECTROMECHANICAL DESCRIPTION: (Continued)

Signal Output: 0 to -126 decibels below a milliwatt (dbm), calibrated.

Output Impedance: 50 ohms.

Accuracy: $\pm 0.01\%$ of indicated frequency; ± 2 decibels of indicated output signal.

MANUFACTURERS' OR CONTRACTORS' DATA:

Collins Radio Company, Cedar Rapids, Iowa, Contract No. NOa(s)51-392-C.

TUBE COMPLEMENT:

REFERENCE DATA AND LITERATURE:

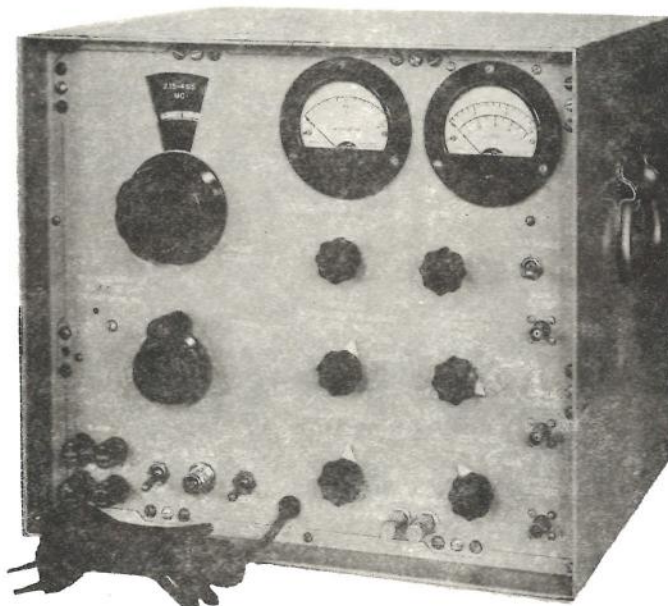
EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	RF Signal Generator SG-50(XN-1)/ARN	metal					

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
	RF Signal Generator SG-50(XN-1)/ARN					
SG-50(XN-1)/ARN - Electronic Test Equipment -						

SIGNAL GENERATOR SG-77(XC-1)/U



FUNCTIONAL DESCRIPTION:

A portable, general purpose, signal generator used in testing radio and television receivers. Amplitude modulation and frequency modulation are provided internally; provision is also made for external modulation. The test set contains an internal crystal controlled calibrator unit.

RELATIONSHIP TO OTHER EQUIPMENT:

ELECTROMECHANICAL DESCRIPTION:

Power Supply: 115 volts $\pm 10\%$ AC, 60 to 400 cycles per second, single phase.

Frequency Range: 100 kilocycles per second to 170 megacycles per second.

Crystal Oscillator: 100 kilocycles per second, 1 megacycle per second, 10 megacycles per second.

Type of Transmission: Frequency modulation and amplitude modulation.

Voltage Output Range:

Low Output: 1 microvolt to 0.1 volt.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREMENT INFO.:			
PROCUREMENT COG.:	Army	DESIGN COG.:	Army, CSL
F.I.I.N.:	FUNCTIONAL CLASS. NO.:		4.1.2
- Electronics Test Equipment -			SG-77(XC-1)/U

SIGNAL GENERATOR SG-77(XC-1)/U

ELECTROMECHANICAL DESCRIPTION: (Continued)

High Output: 0.15 to 1.5 volts up to 75 megacycles per second.
 1.0 volt up to 160 megacycles per second.

Impedance:

Low Output: 50 ohms.
 High Output: Less than 200 ohms.

Modulation Frequencies:(Internal): 100, 400, 1000, 2000, 5000, 8000 cycles per second.

Modulation Data:

Amplitude Modulation: 0 to 100% from 0.1 to 105 megacycles per second.
 Frequency Modulation: 0 to 2% of carrier deviation from 0.1 to 4.8 megacycles per second.
 0 to 100 kilocycles deviation from 4.7 to 170 megacycles per second.

Accuracy: ±1% directly calibrated.
 ±0.1% with crystal calibrator unit.
 ±0.02% for crystal calibrator.

MANUFACTURERS' OR CONTRACTORS' DATA:

Wave Forms, Inc., 333 Avenue of the Americas, New York, New York.

TUBE COMPLEMENT:

1 JAN-6SJ7, 1 JAN-0A2, 1 JAN-6X4W, 1 JAN-5Y3GT, 1 JAN-6AK5, 1 JAN-1N34A,
 1 JAN-12AX7, 2 JAN-6AH6, 2 JAN-5670, 4 JAN-5686.

REFERENCE DATA AND LITERATURE:

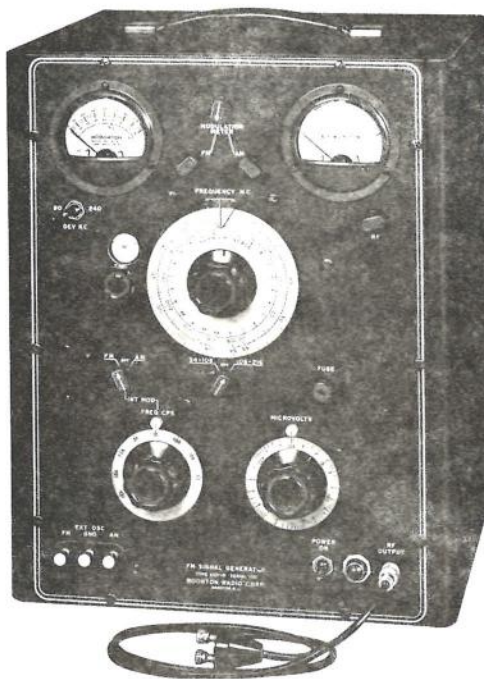
EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Generator, Signal SG-77(XC-1)/U	Metal		13	15	11	60

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	

SIGNAL GENERATOR SG-91/U



FUNCTIONAL DESCRIPTION:

A portable general purpose test equipment designed for use in testing, aligning, and calibrating FM radio receivers and sound channel equipment. It can be used alone to provide amplitude modulated signals, and in conjunction with an external audio oscillator to provide simultaneous frequency and amplitude modulated RF signals.

RELATIONSHIP TO OTHER EQUIPMENT:

SG-91/U is the military nomenclature for the Boonton Type 202-B FM Signal Generator.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: This equipment consists of the following four major assemblies: a panel assembly, an RF assembly, a audio oscillator, and a regulated power supply. The audio oscillator is a Wien bridge type RC oscillator; the RF oscillator is a tuned plate oscillator which is completely shielded.

Power Supply: 105 to 125 volts, AC, 50 to 60 cycles per second, single phase, 65 watts.

Radio Frequency Range: 54 to 216 megacycles per second in two ranges; 54 to 108 megacycles per second and 108 to 216 megacycles per second.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREMENT INFO.:			
PROCUREMENT COG.:	Navy	DESIGN COG.: Navy, BuAer	
F.I.I.N.:	FUNCTIONAL CLASS. NO.: 4.1.2		
- Electronics Test Equipment -			SG-91/U

SIGNAL GENERATOR SG-91/U

ELECTROMECHANICAL DESCRIPTION: (Continued)

Type of Transmission: Frequency Modulated and Amplitude Modulated.

Frequency Modulation (Deviation): Continuously variable from 0 to 240 kilocycles in three ranges: 0 to 24 kilocycles per second, 0 to 80 kilocycles per second, 0 to 240 kilocycles per second.

Amplitude Modulation: The modulation meter is calibrated at 30%, and 50% modulation. Continuously variable from 0 to 50%.

Modulating Oscillator (Internal): 8 fixed frequencies: 50, 100, 400 cycles per second and 1, 5, 7.5, 10, and 15 kilocycles per second (accurate within 5%).

Radio Frequency Output Voltage: 0.1 microvolt to 0.2 volt.

Output Impedance: (With cable attached) 26.5 ohms.

Frequency Modulation Distortion: Less than 2% at 75 kilocycles deviation.

Spurious Radio Frequency Output: All spurious radio frequency output voltages are at least 30 decibels below the desired fundamental.

Fidelity Characteristics: The deviation sensitivity of the frequency modulation system as a function of frequency is constant from DC to over 10 kilocycles per second. At 15 kilocycles per second the deviation as indicated on the modulation meter is 0.5 decibel higher than the true value. The amplitude modulation system is also flat from DC to 10 kilocycles per second and departs from nominal by 1.0 decibel at 15 kilocycles per second.

MANUFACTURERS' OR CONTRACTORS' DATA:

Boonton Radio Corporation, Intervale Road, Boonton, New Jersey; Approximate Cost per Unit, \$975.00, 1 January 1955.

TUBE COMPLEMENT:

1 JAN-6AU6, 1 JAN-6V6GT/G, 1 JAN-6C4, 3 JAN-6AK5, 1 JAN-5Y3GT/G, 1 JAN-6H6, 1 JAN-OD3/VR150.

REFERENCE DATA AND LITERATURE:

AN 16-45-125 (Handbook of Operation and Maintenance Instructions).

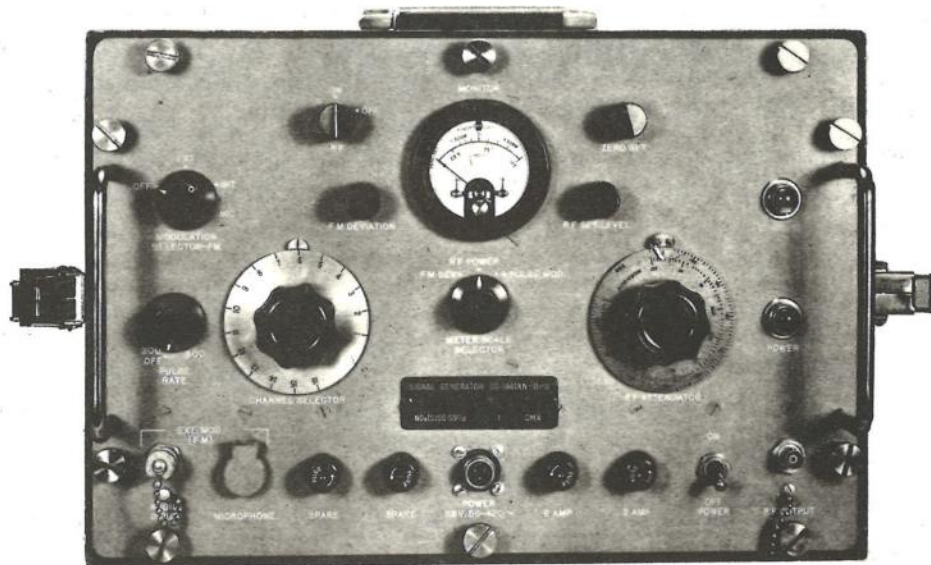
SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Signal Generator SG-91/U	3.0	20-1/4	16-1/2	15-5/8	47

EQUIPMENT SUPPLIED:

Quant. Per Eq't	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Signal Generator SG-91/U			17	13-1/2	11-1/2	35
1	Output Cable Type 501-A						
SG-91/U - Electronics Test Equipment -							

SIGNAL GENERATOR SG-146/U



FUNCTIONAL DESCRIPTION:

A portable, special purpose equipment used to supply radio frequency signals to Radio Receiving Set AN/ARR-26 and AN/ARR-26A during test and alignment procedures. Output of the equipment is indicated by a meter, calibrated controls, and selector switches.

RELATIONSHIP TO OTHER EQUIPMENT:

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The test set consists essentially of a Colpitts oscillator, a Wein-bridge oscillator, a buffer amplifier, a balanced modulator, a Butler oscillator, doubler and tripler circuits, a thermistor bolometer, a piston attenuator and a power supply. The Colpitts oscillator is modulated by signals received from the microphone input, an external audio source, or from the internal Wein-bridge oscillator. The output of the Colpitts oscillator is applied to

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.		Standard	
STOCK NOS.			
PROCUREMENT INFO.: BuAer Spec Mil-G-19660			
PROCUREMENT COG.: Navy		DESIGN COG.: Navy, BuAer	
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 4.1.2	
- Electronics Test Equipment -			SG-146/U

SIGNAL GENERATOR SG-146/U

ELECTROMECHANICAL DESCRIPTION: (Continued)

a buffer amplifier which feeds the balanced modulator. The modulator also receives a signal from a crystal controlled Butler oscillator which is heterodyned with the signal from the Colpitts oscillator. This difference frequency is fed to a tripler amplifier and then to a doubler circuit. The output of the doubler circuit is fed to a piston attenuator which controls the power output of the equipment. Provision is incorporated for pulse modulating the frequency doubler stage with the output of an unsymmetrical multivibrator. A thermistor bolometer circuit utilizing a meter as an indicating device monitors the RF power output. A bridge circuit provides the high voltage power required for operation of the equipment. A relay delays closure of voltage regulator tube circuits for thirty seconds.

Power Supply: 102.5 to 126.5 volts, AC, 50 to 420 cycles per second, 144 watts (approximately).

Frequency Range: 162.25 to 173.5 megacycles per second in steps of 0.75 megacycles per second steps.

RF Power Output: 0.1 to 10,000 microvolts.

Internal Modulation: 1000 cycles per second, deviation adjustable from 0 to ± 125 kilocycles per second.

External Modulation: 50 cycles per second to 35 kilocycles per second, deviation adjustable from 0 to ± 125 kilocycles per second.

MANUFACTURERS' OR CONTRACTORS' DATA:

Jowil Electronics, Belfield Avenue and Webster Street, Philadelphia, Pennsylvania; Order No. N600A-46311, 23 September 1957; approximate cost per unit, \$581.00.

TUBE COMPLEMENT:

5 5AK5W, 2 6HS6W, 3 12AT7WA, 1 5670, 3 5654, 1 47, 5 1N255, 6 1N281

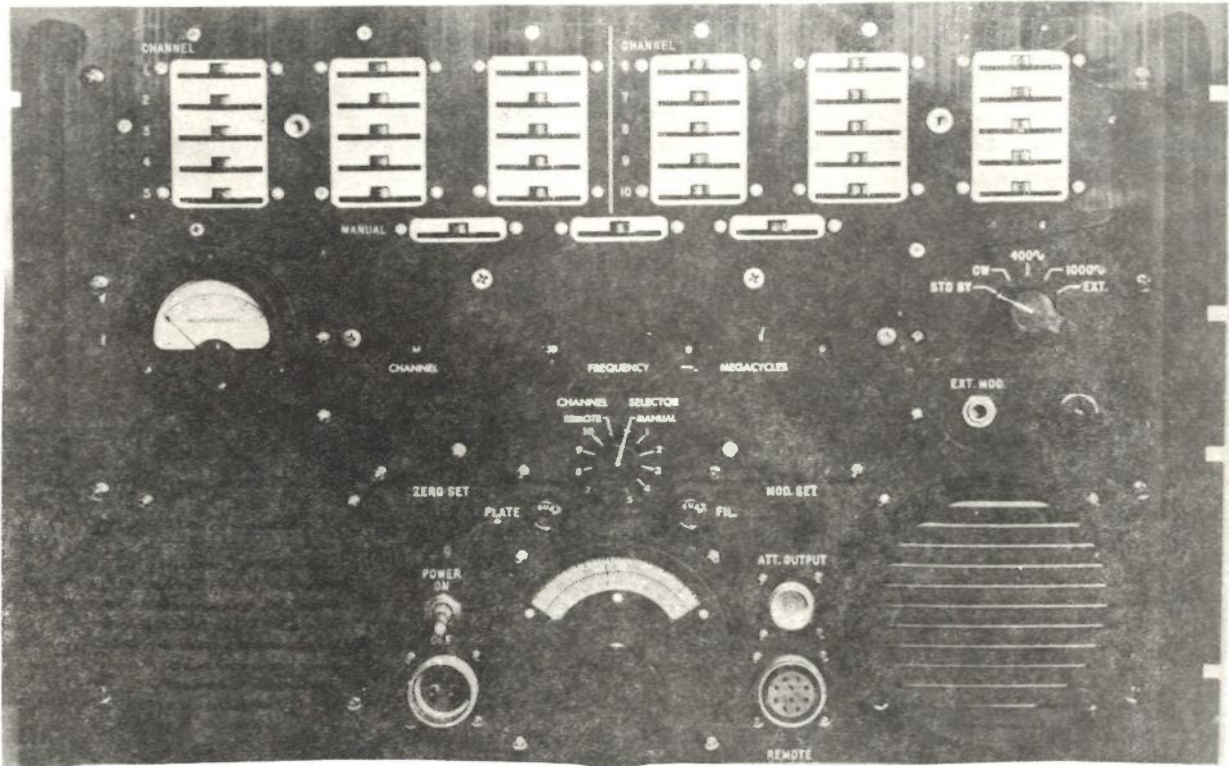
REFERENCE DATA AND LITERATURE:

Handbook for Signal Generator SG-146/U

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Signal Generator SG-146/U					
SG-146/U - Electronic Test Equipment -						

RADIO TRANSMITTER T-216/GR



FUNCTIONAL DESCRIPTION:

A portable, general purpose, low power transmitter which may be used either as a target transmitter in Radio Direction Finder AN/CRD-6 installations or as a laboratory signal generator.

RELATIONSHIP TO OTHER EQUIPMENT:

Part of Transmitter Group OA-229/GR.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: Automatic tuning to any channel within the entire frequency range, frequency synthesizer using 38 crystals to obtain 1750 channels. An internal tone oscillator is provided to amplitude modulate the carrier frequency.

Power Supply: 115 volts or 230 volts, AC, single phase, 50 to 60 cycles per second.

Frequency Range: 225 to 399.9 megacycles per second in multiples of 100 kilocycles.

Type of Transmission: Continuous Wave, Amplitude Modulation.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREMENT INFO.:	USAF Exhibit WLENG-215-A; Dwg. No. 1019		
PROCUREMENT COG.:	USAF	DESIGN COG.:	USAF, Rome
F.I.I.N.:	FUNCTIONAL CLASS. NO.:		4.1.2
- Electronics Test Equipment -			T-216/GR

RADIO TRANSMITTER T-216/GR

ELECTROMECHANICAL DESCRIPTION: (Continued)

Output Voltage: 0.5 to 500,000 microvolts calibrated.

Output Impedance: 52 ohms, resistive.

Modulation Frequency: 400 or 1000 cycles per second (Internal).

20 to 20,000 cycles per second (External).

Modulation Capability: 90% from 0.02 to 16 kilocycles; 50% from 16 to 20 kilocycles.

Frequency Stability: ±10 kilocycles.

MANUFACTURERS' OR CONTRACTORS' DATA:

Collins Radio Corporation, Cedar Rapids, Iowa; Contract No. AF 33(038)-6135, and AF 33(038)13895.

TUBE COMPLEMENT:

2 JAN-3B22, 1 JAN-6AL5W, 5 JAN-6J4, 6 JAN-6AK5W, 2 JAN-6AQ5, 3 JAN-12AT7, 1 JAN-2C39A, 1 JAN-6AS7G, 2 JAN-6AU6, 1 JAN-0A3, 2 JAN-12AU7.

REFERENCE DATA AND LITERATURE:

TO 16-350A229-1 (Operation and Service Instructions).

TO 16-350A229-3 (Maintenance Instructions).

TO 16-350A229-4 (Illustrated Parts Breakdown).

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Radio Transmitter T-216/GR			12-1/4	19	23	134

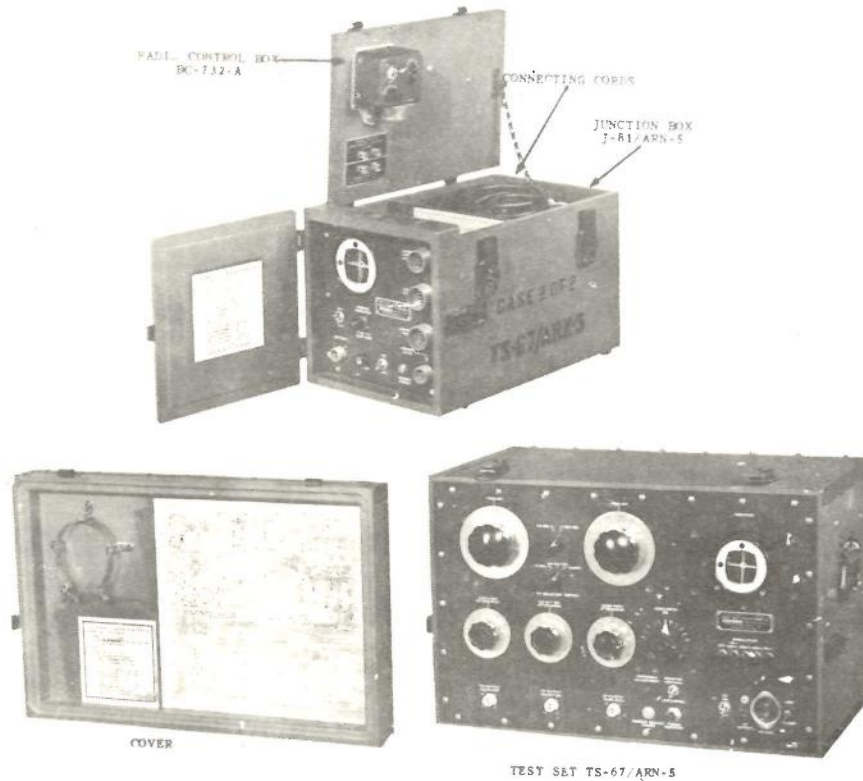
SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Case CY-894/GR, Radio Transmitter T-216/GR, Power Cable Assembly CX-1174/U, RF Cable Assembly CG-553/U	6.5	17	23	29	180

T-216/GR

- Electronics Test Equipment -

TEST SET TS-67/ARN-5
(TEST SET, RADIO, TS-67/ARN-5)



FUNCTIONAL DESCRIPTION:

A portable signal generator designed for depot aligning and testing of localizer and glide path receivers. Provides means for alignment of radio frequency and intermediate frequency, indicator sensitivity and course balance by simulating the frequency and radiation characteristics of the transmitters associated with USAF Instrument Approach System. It may be used to supply power to marker beacon receivers. The radio frequency oscillator frequencies are set by directly calibrated dials; 106 to 114 megacycles per second for the 110 megacycle localizer oscillator and 325 to 340 megacycles per second for the 330 megacycles per second glidepath oscillator. A radio frequency selector switch selects the desired oscillator. A "Localizer R-F Attenuator" attenuates the 110 megacycles per second oscillator output, (a "Glide Path Attenuator" attenuates the 330 megacycles per second oscillator output), and a 6.9 to 20.7 megacycles per second attenuator attenuates the crystal oscillator output. Calibration of attenuators is 1 to 100,000 microvolts. An Indicator I-101, calibrated 0 to 150 microamperes above and below center vertically

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Limited Standard		
STOCK NOS.	7CAC-801319-2554	R16-AN-TS-67/ARN-5	3F4325-67
PROCUREMENT INFO.:	Spec. No. 71-5027		
PROCUREMENT COG.:	USAF	DESIGN COG.: USAF, C&N	
F.I.I.N.:	FUNCTIONAL CLASS. NO.: 4.1.2		
	- Electronics Test Equipment -		TS-67/ARN-5

TEST SET TS-67/ARN-5
(TEST SET, RADIO, TS-67/ARN-5)

FUNCTIONAL DESCRIPTION: (Continued)

and 0 to 150 microamperes left and right of center horizontally, is provided on the front panel. All controls and switches are mounted on the front panel.

RELATIONSHIP TO OTHER EQUIPMENT:

Replaced by TS-67A/ARN-5 which is TS-67/ARN-5 modified per TO 16-35J81-21.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: Consists of eight principal assemblies contained within carrying case and one separate assembly in Junction Box J-81/ARN-5; Audio Oscillator-AVC Amplifier-Monitor, Power Supply, A-C line filter, Audio DB Control, 6.9 to 20.7 megacycles per second Oscillator, 110 megacycles per second Oscillator, 330 megacycles per second Oscillator and a 90 and 150 cycles per second Audio Filter.

Power Supply: 115 volts, $\pm 10\%$, A. C., 50 or 60 cycles per second, single phase, 77.5 to 118 watts, 0.738 to 0.907 amperes.

Frequency Range: 325 to 340 megacycles per second, 106 to 114 megacycles per second, variable. 6.9 megacycles per second, 20.7 megacycles per second, 30 cycles per second, 90 cycles per second, 150 cycles per second and 1000 cycles per second, all fixed.

Output Impedance: 95 ohms.

Voltage Output: 1 to 100,000 microvolts for all frequencies.

Power Output: 0 to 105 microwatts.

Type of Transmission: Amplitude Modulated Carrier.

Temperature Range: -10° to $+60^{\circ}$ C. operating.
 -55° to $+71^{\circ}$ C. non-operating.

Modulation Data: 90 and 150 cycles per second -70%.
90 cycles per second -35%.
150 cycles per second -35%.
1000 cycles per second -30%.

Accuracy: $\pm 0.02\%$ (6.9 or 20.7 megacycles per second).
 $\pm 0.1\%$ (106 to 114 megacycles per second).

MANUFACTURERS' OR CONTRACTORS' DATA:

Packard-Bell Company, Chicago, Illinois; Order No. 602-DAY-44; 4 January 1944; Approximate Cost per Unit, \$1414.82.

TUBE COMPLEMENT:

1 JAN-6SJ7GT, 5 JAN-6G6G, 2 JAN-6SQ7GT/G, 2 JAN-6SN7GT, 3 JAN-6AK5, 2 JAN-955, 1 JAN-6X5GT/G, 1 JAN-5Y3GT/G, 2 JAN-OD3/VR150, 1 JAN-OA3/VR75.

REFERENCE DATA AND LITERATURE:

AN 16-35TS67-2 (Maintenance Instructions).
TO 16-55-116 (Spare Parts List).

TEST SET TS-67/ARN-5
(TEST SET, RADIO, TS-67/ARN-5)

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Test Set TS-67/ARN-5 with tubes in- stalled and Indicator I-101-C mount- ed on panel.	Wood	7CAC-801319-2554 R16-AN-TS-67/ARN-5 3F4325-67	14-1/4	22	15	107
1	Junction Box J-81/ARN-5	Wood	7CAC-801319-2554 2Z5600-81	9-15/16	15-11/16	10-5/8	20
JUNCTION BOX J-81/ARN-5 includes the following:							
2	Cords CG-59/ARN-5		7CAC-170265-662 3E6015-59	42 long			0.5
1	Cord CG-142/ARN-5		7CBP-S45-25 1F430-142	42 long			0.5
1	Cord CX-237/U		7CAC-170264-495 3E6000-237-120	120 long			
1	Tuning Shunt MX-234/ARN-5		7CPB-S127-1A 3F3989-234				
1	Indicator I-101-C or D permanently mounted		1600-326285900 3F2876-101				
1	Mounting FT-292-A permanently mounted		1600-293160000 6Z6721-292A	9/32	4-1/32	3-3/32	
1	Control Box BC-732-A		1600-214796000 2C3452-732	2-5/8	4-1/32	3-9/32	
1	Cord CX-277/ARN-5		7CPB-S40-29 3E6000-277	36 long			
							(Continued)
- Electronics Test Equipment -							TS-67/ARN-5

TEST SET TS-67/ARN-5
(TEST SET, RADIO, TS-67/ARN-5)

EQUIPMENT SUPPLIED: (Continued)

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Cord CX-278/ARN-5		7CPB-S40-28 3E6000-278	36 long			
1	Cord CX-279/ARN-5		7CPB-S40-24 3E6000-279-12	12 long			
1	Cord CX-279/ARN-5		7CPB-S40-26 3E6000-279-36	36 long			
1	Cord CX-280/ARN-5		7CPB-S40-23 3E6000-280	36 long			
1	Cord CX-281/ARN-5		7CPB-S40-20 3E6000-281	72 long			
1	Cord CD-316-A		1600-321110000 3E1316A-3	36 long			
							Total: 127.0

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Test Set, TS-67/ARN-5 (Shelf Package)	2.60	15-1/16	23-5/8	15-1/2	129

TS-67/ARN-5 - Electronics Test Equipment -

TEST SET TS-67A/ARN-5



COVER

FUNCTIONAL DESCRIPTION:

A portable signal generator designed for depot aligning and testing of localizer and glide path receivers. Provides means for alignment of radio frequency and intermediate frequency, indicator sensitivity and course balance by simulating the frequency and radiation characteristics of the transmitters associated with USAF Instrument Approach System. It may be used to supply power to marker beacon receivers. The radio frequency oscillator frequencies are set by directly calibrated dials; 106 to 114 megacycles per second for the 110 megacycle localizer oscillator and 325 to 340 megacycles per second for the 330 megacycles per second glide path oscillator. A radio frequency selector switch selects the desired oscillator. A "Localizer RF Attenuator" attenuates the 110 megacycles per second oscillator output; a "Glide Path Attenuator" attenuates the 330 megacycles per second oscillator output; and a 6.9 to 20.7 megacycles per second attenuator attenuates the crystal oscillator output. Calibration of attenuators is 1 to 100,000 microvolts. An Indicator I-101, calibrated 0 to 150 microamperes above and below center vertically and 0 to 150 micro-

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Limited Standard		
STOCK NOS.	7CAC-801319-2653		3F4325-67A
PROCUREMENT INFO.:	USAF Spec. No. 71-5027		
PROCUREMENT COG.:	USAF	DESIGN COG.: USAF, C&N	
F.I.I.N.:	FUNCTIONAL CLASS. NO.:		4.1.2
- Electronics Test Equipment -			TS-67A/ARN-5

TEST SET TS-67A/ARN-5

FUNCTIONAL DESCRIPTION: (Continued)

amperes left and right of center horizontally, is provided on the front panel. All controls and switches are mounted on the front panel.

RELATIONSHIP TO OTHER EQUIPMENT:

TS-67A/ARN-5 is the TS-67/ARN-5 modified per TO 16-35J81-21.

Electrically and mechanically interchangeable with TS-67/ARN-5 except for the substitution of Junction Box J-81A/ARN-5 in place of J-81/ARN-5. Functionally, TS-67A/ARN-5 is different in that it is used to align equipment such as BC-733-F, R-268/ARN-5B, etc. in addition to performing the test functions of TS-67/ARN-5.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: Consists of eight principal assemblies contained within carrying case and one separate assembly in Junction Box J-81A/ARN-5; Audio Oscillator-AVC Amplifier-Monitor, Power Supply, AC line Filter, Audio DB Control, 6.9 to 20.7 megacycles per second Oscillator, 110 megacycles per second Oscillator, 330 megacycles per second Oscillator and a 90 and 150 cycles per second Audio Filter.

Power Supply: 115 volts, $\pm 10\%$ AC, 50 to 60 cycles per second, single phase, 77.5 to 118 watts, 0.738 to 0.907 amperes.

Frequency Range: 325 to 340 megacycles per second, 106 to 114 megacycles per second, variable. 6.9 megacycles per second, 20.7 megacycles per second, 30 cycles per second, 90 cycles per second, 150 cycles per second and 1000 cycles per second, all fixed.

Output Impedance: 95 ohms.

Voltage Output: 1 to 100,000 microvolts for all frequencies.

Power Output: 0 to 105 microwatts.

Type of Transmission: Amplitude Modulated Carrier.

Temperature Range: -10° to $+60^{\circ}$ C. operating.

-55° to $+71^{\circ}$ C. non-operating.

Modulation Data: 90 and 150 cycles per second -70%.

90 cycles per second -35%.

150 cycles per second -35%.

1000 cycles per second -30%.

Accuracy: $\pm 0.02\%$, Frequency. (6.9 or 20.7 megacycles per second).

$\pm 0.1\%$, Frequency (106 to 114 megacycles per second).

$\pm 30\%$, Voltage.

MANUFACTURERS' OR CONTRACTORS' DATA:

Packard-Bell Company; Chicago, Illinois.

TUBE COMPLEMENT:

2 JAN-6SN7GT, 2 JAN-6SQ7GT/G, 1 JAN-6X5GT/G, 1 JAN-6SJ7GT, 3 JAN-6AK5, 1 JAN-5Y3GT/G, 5 JAN-6G6G, 2 JAN-955, 1 JAN-0A3/VR75, 2 JAN-0D3/VR150.

REFERENCE DATA AND LITERATURE:

TO 16-35J81-21 (Modification of J-81/ARN-5).

TEST SET TS-67A/ARN-5

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Test Set TS-67A/ARN-5 with accessories. (Shelf Package-Water Resistant Carton)	2.60	15-1/16	23-5/8	15-1/2	129.0

EQUIPMENT SUPPLIED:

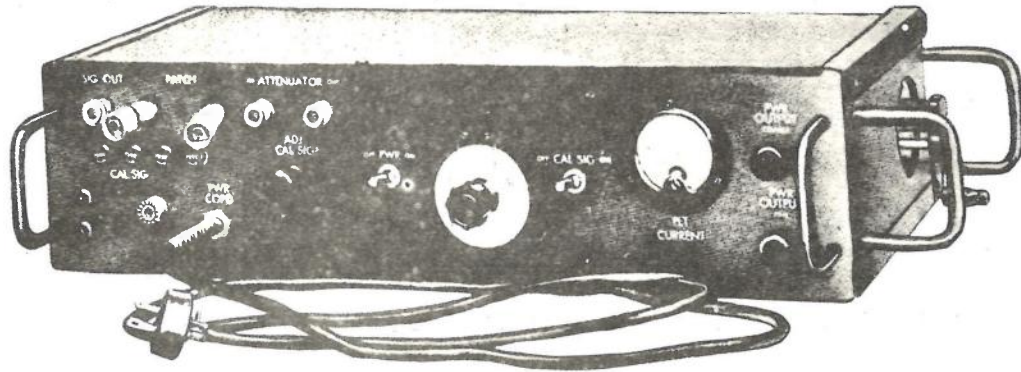
Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Test Set TS-67A/ARN-5 Including:		7CAC-801319-2653 3F4325-67A	10-1/2	15-4/5	10-1/2	107.0
1	Junction Box J-81A/ARN-5 Including:	Wood	7CAC-801319-2554 2Z5600-81	9-1/4	9	15-9/16	20.0
1	Radio Control Box BC-732-A		1600-214796000 2C3452A	2-5/8	4-1/32	3-9/32	
1	Tuning Shunt MX-234/ARN-5		7CPB-S127-1A 3F3989-234				
2	Cord CG-59/ARN-5		7CAC-170265-662 3E6015-59	40 long			
1	Cord CG-142/ARN-5		7CBP-S45-25 1F430-142	42 long			
1	Cord CX-237/U		7CAC-170264-495 3E6000-237.120	120 long			
1	Cord CX-277/ARN-5		7CPB-S40-29 3E6000-277	36 long			
1	Cord CX-278/ARN-5		7CPB-S40-28 3E6000-278	36 long			
- Electronics Test Equipment -							TS-67A/ARN-5

TEST SET TS-67A/ARN-5

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Cord CX-279/ARN-5		7CPB-S40-24 3E6000-279-12	12 long			
1	Cord CX-279/ARN-5		7CPB-S40-26 3E6000-279-36	36 long			
1	Cord CX-280/ARN-5		7CPB-S40-23 3E6000-280	36 long			
1	Cord CX-281/ARN-5		7CPB-S40-20 3E6000-281	72 long			
1	Cord CD-316-A		1600-321110000 3E1316A	36 long			
1	Cable CX-1149/U		8860-112211124 1B1318.24				
1	Mounting FT-292-A Permanently Mounted		1600-293160000 6Z6721-292A	9/32	4-1/32	3-3/32	

SIGNAL GENERATOR TS-128/UP



FUNCTIONAL DESCRIPTION:

A general purpose instrument used to test and maintain radar equipment. It generates electrical test signals which may be varied in frequency and power, provides an adjustable square wave voltage, and furnishes a calibrated attenuator for reducing RF power.

RELATIONSHIP TO OTHER EQUIPMENT:

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: Signal Generator TS-128/UP is a resonant cavity type generator composed of the following circuits: RF oscillator, oscilloscope calibrating circuit, power supply, and attenuator circuit. The RF oscillator contains a frequency determining cavity assembly. The oscillator circuit is a tuned-plate tuned-grid type which is tuned by means of two resonant cavities. Three feedback loops couple the inner and outer cavities. This permits oscillation to be induced by adjustment of the phase and magnitude of the feedback. A moveable

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREMENT INFO.:			
PROCUREMENT COG.:	Navy	DESIGN COG.:	Navy
F. I. I. N.:	FUNCTIONAL CLASS. NO.:		4.1.2
- Electronics Test Equipment -			TS-128/UP

SIGNAL GENERATOR TS-128/UP

ELECTROMECHANICAL DESCRIPTION: (Continued)

pickup loop permits output power to be taken from the inner cavity. The oscilloscope calibrating circuit consists of two double triode tubes with one tube operating as a multivibrator. The other tube is used to square up the wave of the multivibrator. The power supply circuit contains a full wave rectifier and RC filtering network. The attenuator circuit contains small metallic discs which terminate the two coaxial leads entering the attenuator. The distance between the discs may be varied by rotating the attenuator dial. Fifty-ohm pads are included in the attenuator assembly to improve the impedance presented to the ATTENUATOR IN and ATTENUATOR OUT jacks.

Power Supply: 115 ±10 volts, AC, 50 to 400 cycles per second, 75 watts.

Frequency Range: 1000 to 1400 megacycles per second.

Oscillator Power Output: 2 to 10 milliwatts.

MANUFACTURERS' OR CONTRACTORS' DATA:

Contract No. NOrd 3456.

TUBE COMPLEMENT:

1 GL 446A, 2 6SN7GT, 1 6X5GT, 1 OD3-VR150/30, 1 OC3-VR105/30.

REFERENCE DATA AND LITERATURE:

NAVSHIPS 900,455A; 900,155.

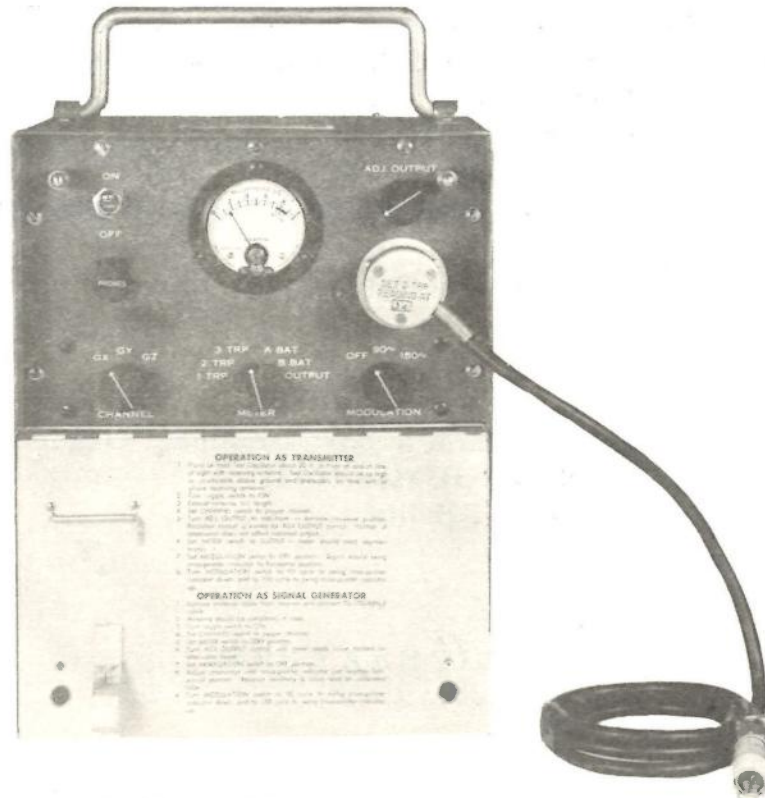
EQUIPMENT SUPPLIED:

Quant. Per Eq't	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Signal Generator TS-128/UP	metal		23-15/16	11-9/16	5-5/8	31-1/2

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
	Signal Generator TS-128/UP					
TS-128/UP - Electronic Test Equipment -						

**TEST OSCILLATOR TS-170/ARN-5
(GENERATOR, SIGNAL, TS-170/ARN-5)**



FUNCTIONAL DESCRIPTION:

A special purpose, battery operated, portable, crystal controlled oscillator used to check receiver sensitivity and to check the audio channels. It provides either a radiated or cable transmitted signal for pre-flight checking of radio receivers used in glide path equipment.

RELATIONSHIP TO OTHER EQUIPMENT:

Used with Glide Path Equipment such as AN/ARN-5.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The first stage serves both as a crystal oscillator and frequency doubler, providing an output which is the second harmonic of the crystal frequency. The second, third and fourth stages are all triplers, providing a signal at the antenna which is the 54th harmonic of the crystal frequency. The fifth stage is a modulator which may be used when desired.

Power Supply: 1.5 volts supplied by two Batteries BA-35, (1.5 volts); 90 volts supplied by two Batteries BA-36, (45 volts).

Frequency Range: 332.6, 333.8, 335.0 megacycles per second.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Standard		
STOCK NOS.	7CAC-363964	ASO-R16-ANT-TS-170/ARN-5	3F4325-170
PROCUREMENT INFO.:	USAF Spec. No. 271-5060 dated 28 April 1944		
PROCUREMENT COG.:	USAF	DESIGN COG.:	USAF, C&N
F.I.I.N.:	FUNCTIONAL CLASS NO.: 4.1.2		
	- Electronics Test Equipment -		TS-170/ARN-5

TEST OSCILLATOR TS-170/ARN-5
(GENERATOR, SIGNAL, TS-170/ARN-5)

ELECTROMECHANICAL DESCRIPTION: (Continued)

Type of Transmission: Continuous Wave, Amplitude Modulated Carrier.

Voltage Output: 10 to 1000 microvolts.

Power Output: 0 to 0.02 microwatts.

Output Impedance: 50 ohms.

Modulation Data: Amplitude Modulated at 90 and 150 cycles per second.

Accuracy: $\pm 0.02\%$ of output frequency.

Temperature Range: -10° C. to $+60^{\circ}$ C. operating. -55° C. to $+71^{\circ}$ C. non-operating.

Crystals: 1 Type 1N21A.

MANUFACTURERS' OR CONTRACTORS' DATA:

Argus, Inc., 405 South 4th Street, Ann Arbor, Michigan; Order No. 1127-DAY-44;
Approximate Cost per Unit, \$190.00; 31 May 1944.

Packard Bell Company, Chicago, Illinois.

TUBE COMPLEMENT:

4 JAN-3Q4, 1 JAN-959.

REFERENCE DATA AND LITERATURE:

AN 16-35TS170-2 (Maintenance Instructions).

TO 16-55-145 (Spare Parts List).

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Test Oscillator TS-170/ARN-5 with accessories (Shelf Package)	1.33	12	16	12	29

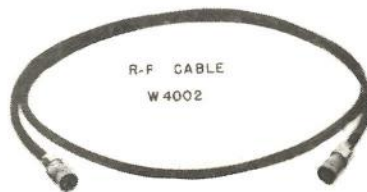
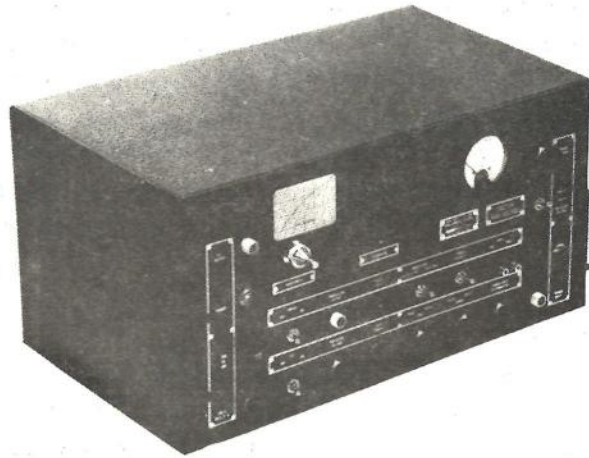
EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Test Oscillator TS-170/ARN-5 with case, plug, cable, and attenuator	Metal	7CAC-363964 R16-AN-TS-170/ARN-5 3F4325-170	9	11	9	21
1	Instruction Book		6D9810-170				
							Total: 25

TS-170/ARN-5

- Electronics Test Equipment -

SIGNAL GENERATOR TS-197/CPM-4
(GENERATOR, SIGNAL, TS-197/CPM-4)



FUNCTIONAL DESCRIPTION:

A portable, signal generator used for testing and maintenance work such as the alignment of receivers, sensitivity measurements, and any other purpose where a frequency modulated, amplitude pulse modulated, or unmodulated signal of known magnitude and frequency is needed. Output signal strength is indicated by the power monitor meter which indicates power changes as a linear function of its scale reading. The attenuator is calibrated in decibels. A chart on the front panel carries a rough wavelength vs. tuning control setting calibration curve.

RELATIONSHIP TO OTHER EQUIPMNET:

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: Consists of four major divisions: the RF oscillator section, modulation circuits, pulse generating circuits and power supply sections. The

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Limited Standard		
STOCK NOS.	7CAC-363975		3F4325-197
PROCUREMENT INFO.:			
PROCUREMENT COG.:	USAF	DESIGN COG.:	USAF, Rome
F.I.I.N.:		FUNCTIONAL CLASS. NO.:	4.1.2
	- Electronics Test Equipment -		TS-197/CPM-4

SIGNAL GENERATOR TS-197/CPM-4
(GENERATOR, SIGNAL, TS-197/CPM-4)

ELECTROMECHANICAL DESCRIPTION: (Continued)

RF oscillator is a reflex type of klystron tube. The exact frequency output is controlled by the "WAVELENGTH" adjustment on the front panel. The output signal can be pulse modulated by the internal modulator or frequency modulated by the 60 cycle AC supply. The pulse generating circuits consist of the trigger polarity discriminator circuit, the delay multivibrator circuit, the pulse generating circuit, and the modulator circuit. Three separate rectifier-filter systems produce output voltages for the pulse generating circuits and the oscillator tube.

Power Supply: 120 volts \pm 6 volts, AC, single phase, 60 cycle power, 110 watts.

Frequency Range: 2655 to 3000 megacycles per second (10 to 11.3 centimeters).

Power Output: 100 microwatts maximum, 0 to -110 dbm.

Type of Transmission: Frequency modulated by the 60 cycle power source at the same rate sweeping \pm 7 megacycles per second from the center frequency. Pulse modulated by external trigger. Continuous Wave.

Pulse Characteristics: Width 0.5 to 8 microseconds; delay of 5 to 2600 microseconds; pulse repetition frequency less than 2000 pulses per second.

Duty Cycle: Continuous operation.

Ambient Temperature: -40^o C. to +57^o C.

Relative Humidity: To 95%.

Elevation: Sea level to 5000 feet.

Protected against salt air and insects and fungi.

MANUFACTURERS' OR CONTRACTORS' DATA:

General Electric Company, Schenectady 5, New York; Order No. 473-MPD-43, 30 January 1945; Approximate Cost per Unit, \$1659.00.

TUBE COMPLEMENT:

1 JAN-6AC7, 2 JAN-6AG7, 3 JAN-6SN7GT, 4 JAN-6X5GT/G, 2 JAN-OC3/VR-105, 2 JAN-OD3/VR-150, 2 JAN-2K28.

REFERENCE DATA AND LITERATURE:

TO 16-35TS197-3 (Maintenance Instructions).

TM 11-1207 (Technical Manual).

TO 16-55-324 (Spare Parts List).

SHIPPING DATA:

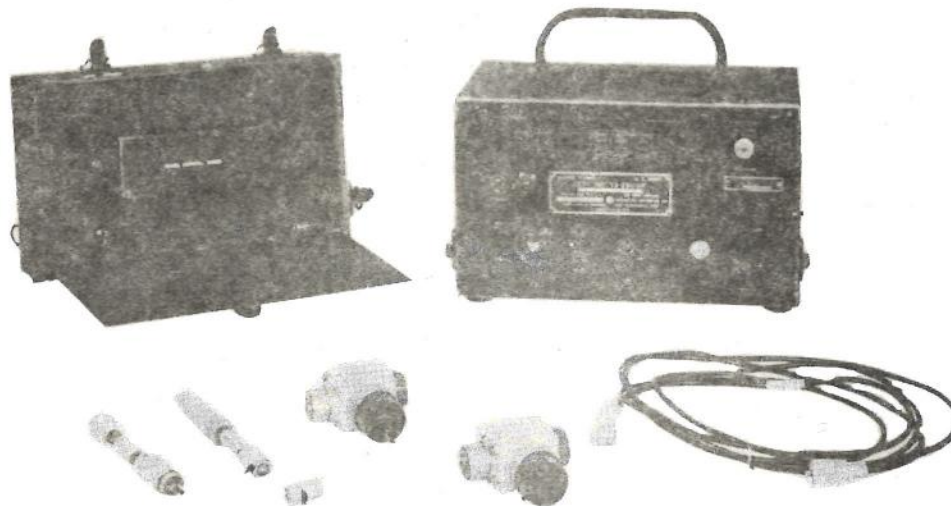
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
TS-197/CPM-4 - Electronics Test Equipment -						

SIGNAL GENERATOR TS-197/CPM-4
(GENERATOR, SIGNAL, TS-197/CPM-4)

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Signal Generator TS-197/CPM-4		7CAC-363975 3F4325-197	16	24	12	100
1	Portable Container			21-1/8	28-1/2	15-31/64	81
1	Cord CG-299/U		7CGE-P42J641 1F425-21.72	72 long			1
						Total:	182
- Electronics Test Equipment - TS-197/CPM-4							

TEST SET TS-251/UP
(GENERATOR, SIGNAL, TS-251/UP)



FUNCTIONAL DESCRIPTION:

A small, portable, special purpose signal generator for use in pre-flight and shipboard checking of all long range Loran receivers. The desired radio frequency channel and output voltage is selected by rotary switches on the front panel. All visual indications appear on the receiver oscilloscope. A table of delay readings is posted on the front panel for comparison.

RELATIONSHIP TO OTHER EQUIPMENT:

Used with equipments such as AN/APN-4, AN/APN-9.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: A crystal oscillator operating at a frequency of 1818.18 cycles per second supplies a signal to a blocking oscillator. The blocking oscillator output, which is a succession of sharp pulses (1818.18 pulses per second) triggers

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Limited Standard		
STOCK NOS.	7CAC-801319-2345	R16-AN-TS-251-UP F16-G-63940-5861	3F4325-251
PROCUREM'T INFO.:	USAF Spec. No. 371-5091		
PROCUREM'T COG.:	USAF	DESIGN COG.: USAF, C&N	
F.I.I.N.:	FUNCTIONAL CLASS. NO.:		4.1.2
	- Electronics Test Equipment -		TS-251/UP

TEST SET TS-251/UP
(GENERATOR, SIGNAL, TS-251/UP)

ELECTROMECHANICAL DESCRIPTION: (Continued)

a multivibrator acting as a 6:1 counter circuit. The 303.03 cycles per second square wave output of this stage is fed into a differentiating and clipping circuit to produce a series of positive pulses. These pulses are used to pulse the output of a radio frequency oscillator at 303.03 pulses per second.

Power Supply: 80, 115, or 230 volts, AC, single phase 50 to 1600 cycles per second.

Type of Transmission: Pulses radio frequency.

Frequency Range: 1700 to 2010 kilocycles per second in four channels.

Pulses Repetition Rate: 303.03 pulses per second.

Output Voltage: 15 microvolts, 1 millivolt and 1 volt.

Output Impedance: 50 ohms for 15 microvolt and 1 millivolt position. 150 ohms for 1 volt position.

Accuracies: ± 10 kilocycles over temperature range (-65° C. to $+85^{\circ}$ C.). ± 5 kilocycles over temperature range (0° C. to $+55^{\circ}$ C.).

MANUFACTURERS' OR CONTRACTORS' DATA:

Developed by RCA. Produced by Airplane and Marine Instruments, Inc., Clearfield, Pennsylvania; Order No. 454-DAY-45; Approximate Cost per Unit, \$281.00; 16 December 1944; Order No. 2266-DAY-45; 31 May 1945; Approximate Cost per Unit, \$151.00.

Packard Bell Company, 1115 South Hope Street, Los Angeles 15, California; Order No. 2028-DAY-45, 16 February 1945; Approximate Cost per Unit, \$121.29. Order No. 962-DAY-45, 5 January 1945; Approximate Cost per Unit, \$116.90.

TUBE COMPLEMENT:

1 JAN-6SJ7, 1 JAN-6J5, 1 JAN-6SN7GT, 1 JAN-6SL7GT, 1 JAN-6SK7, 1 JAN-6X5GT/G.

REFERENCE DATA AND LITERATURE:

TO 16-35TS251-2 (Maintenance Instructions).

TO 16-55-156 (Spare Parts List).

SHIPPING DATA:

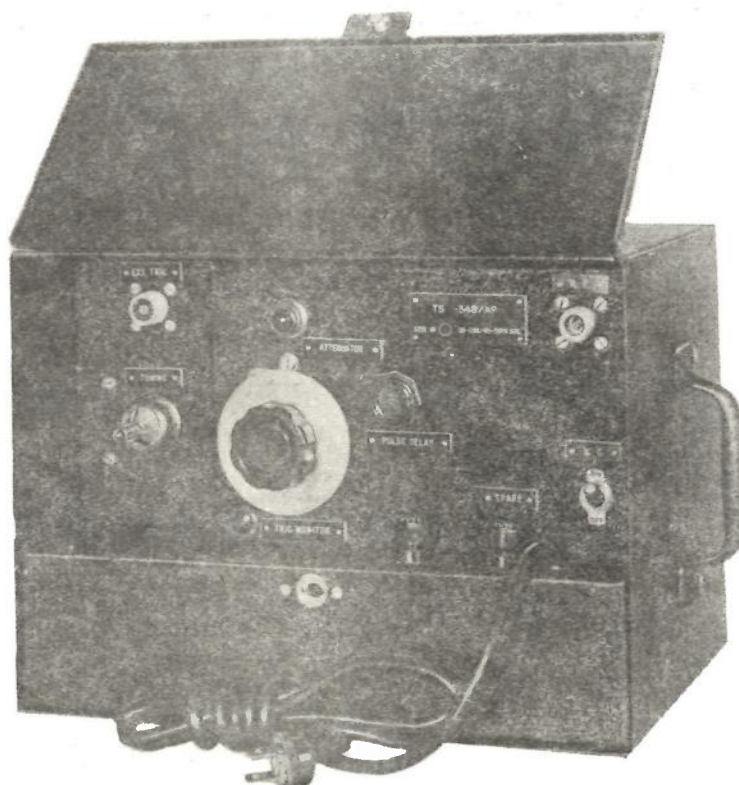
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Test Set, TS-251/UP, with accessories (Shelf Package-Water Resistant)	1.56	12	16	14	22
TS-251/UP - Electronics Test Equipment -						

TEST SET TS-251/UP
(GENERATOR, SIGNAL, TS-251/UP)

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Test Set TS-251/UP		7CAC-801319- 2345 F16-G-63940-5861 3F4325-251	7-3/4	11-3/4	10-1/2	18.1
1	Cord CG-221/UP		7CAC-170265-58 1F430-221.120	120 long			
1	Cord CG-222/UP		7CAC-170265-365 1F430-222	6			
1	Cord CG-223/UP		7CAC-170270-1397 1F430-223	6			
1	Crystal Unit CR-11/U		2100-2X163 3F2693-11	3-7/8 long	1-1/4		0.19
1	Adapter U-45/U		3300-286050302 2Z302-45	6			
1	Adapter U-46/U		3300-286050303 2Z302-46	6			
1	Adapter Navy Type 49544		3300-287350366 2Z3062-57				
1	Plug PL-258		3300-294052500 2Z7226-258				
1	Cord CX-404/UP		1690-322975394 3E6000-404	120 long			
1	Plug PL-259		8850-460402 2Z7226-259				

SIGNAL GENERATOR TS-348/AP
(GENERATOR, SIGNAL, TS-348/AP)



FUNCTIONAL DESCRIPTION:

A portable unit designed for ground use in testing certain types of radars. This set transmits a delayed pulse, of adjustable time delay, after receiving a radio frequency signal from a radar transmitter. A neon bulb, located on front panel, indicates when the set has received an RF pulse and in turn is transmitting an RF pulse.

RELATIONSHIP TO OTHER EQUIPMENT:

Equipment required but not supplied: One Dipole antenna AS-23/AP (high frequency type, 50 ohm impedance), one antenna cable CG-92/U15 (low loss type, 50 ohm impedance), one tripod M-320-A.

ELECTROMECHANICAL DESCRIPTION:

Power Supply: 115 volts $\pm 5\%$, AC, single phase, 60 to 800 cycles per second, 100 watts approximately.

Type of Reception: Pulsed Carrier.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.	7CAC-801319-22		3F4325-348
PROCUREMENT INFO.:			
PROCUREMENT COG.: USAF		DESIGN COG.: USAF, Arm	
F.I.I.N.:		FUNCTIONAL CLASS NO.: 4.1.2	
- Electronics Test Equipment -			TS-348/AP

SIGNAL GENERATOR TS-348/AP
(GENERATOR, SIGNAL, TS-348/AP)

ELECTROMECHANICAL DESCRIPTION: (Continued)

Type of Transmission: Pulsed Carrier.
 Frequency Range: 2400 to 3150 megacycles per second.
 Power Output: 5 milliwatts peak.
 Power Input: 20 milliwatts peak.
 Time Delay: Equivalent to 550 to 2000 yard range.
 Output Impedance: 50 ohms.
 Input Impedance: 50 ohms.
 Pulse Width: 1 microsecond.

MANUFACTURERS' OR CONTRACTORS' DATA:

Sylvania Electric Products, Inc., 1740 Broadway, New York 19, New York; Order No. 2045-DAY-45, 8 June 1945; Approximate Cost per Unit, \$905.00.

Dane Electronics Laboratories, Inc., 316 Stuart Street, Boston, Massachusetts; Order No. 45-5919-ARL.

TUBE COMPLEMENT:

1 JAN-5U4G, 1 JAN-OC3/VR-105, 1 JAN-OD3/VR-150, 1 JAN-707B, 2 JAN-6AC7, 1 JAN-6SN7GT, 1 JAN-6SL7GT.

REFERENCE DATA AND LITERATURE:

AN 16-35TS348-2-M (Maintenance Instructions).

TO 16-55-234 (Spare Parts List).

SHIPPING DATA:

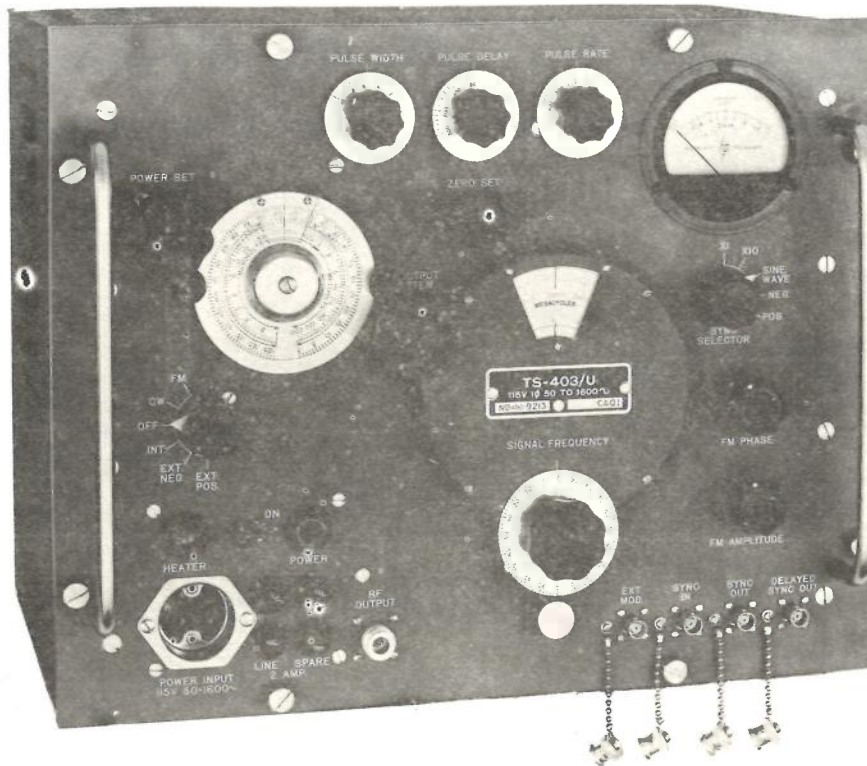
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Signal Generator TS-348/AP with accessories (Shelf Package)	4.44	19	28	18	58

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Signal Generator Test Set TS-348/AP		7CAC-801319-22 3F4325-348	10	15	9	30
1	Set Spare Tubes						
1	Cord CX-237A/U		7CAC-170264-83				
1	Case CY-405/AP						
1	Instruction Book AN 16-35TS348-2						

TS-348/AP - Electronics Test Equipment -

SIGNAL GENERATOR TS-403/U
(GENERATOR, SIGNAL, TS-403/U)



FUNCTIONAL DESCRIPTION:

A portable, self-contained, general purpose test equipment designed for use with radio and radar receivers and for other applications requiring small amounts of radio frequency power such as measuring standing wave ratios, antenna characteristics, transmission line characteristics, conversion gain, etc.

RELATIONSHIP TO OTHER EQUIPMENT:

AN/URM-61 is the overall nomenclature for this Signal Generator and accessories.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: Ultra high frequencies are generated in a circuit containing a reflex klystron oscillator operating with an external resonant cavity whose electrical length is adjusted by movable shorting bars. The repeller voltage for the klystron is automatically tracked with the setting of the cavity shorting bars so

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Standard		
STOCK NOS.	7CAC-363974	ASO-R16-AN-TS-403/U SNSN F16-Q-304483-200	3F4325-403
PROCUREMENT INFO.:	Navy, BuAer, Spec. No. 16G4 dtd 1 Mar. 47 revised 24 Jan. 51		
PROCUREMENT COG.:	Navy	DESIGN COG.: Navy, BuAer	
F. I. I. N.:	FUNCTIONAL CLASS. NO.: 4.1.2		
- Electronics Test Equipment -			TS-403/U

SIGNAL GENERATOR TS-403/U
(GENERATOR, SIGNAL, TS-403/U)

ELECTROMECHANICAL DESCRIPTION: (Continued)

that a single control determines the position of the shorting bar and the magnitude of the repeller voltage. This system makes possible the calibration of the tuning dial directly in frequency.

The oscillator tank circuit is coupled to a radio frequency monitor, which monitors the amplitude of oscillation, and to the output terminal through an attenuator system. The modulator generates a positive video pulse which is applied to the accelerator grid of the klystron to cause oscillation for the duration of the pulse. The video pulse can, if desired, be synchronized with external pulse or sine-wave voltages. This modulator section includes a pulse rate multivibrator, limiter and delay multivibrator.

A stand-by heater is provided to maintain the instrument case temperature higher than the ambient temperature.

Power Supply: 115 volts $\pm 10\%$, AC, 50 to 1600 cycles per second, single phase, approximately 150 watts at a power factor of 0.9.

Frequency Range: 1800 to 4000 megacycles per second.

Type of Transmission: Continuous Wave, Frequency Modulated, Pulse Modulated.

Pulse Repetition Rate: 40 to 4000 pulses per second.

Pulse Width: 0.5 to 10 microseconds.

Frequency Modulation: Phase variable approximately 180° , power supply frequency.

Timing: Undelayed or delayable from 3 to 300 microseconds from external or internal pulse.

Modulation Pulses: External or internal square wave, 40 to 70 volt peak amplitude producing 100% modulation; not adjustable.

Power Output: 1 milliwatt maximum, 0 to -127 dbm continuously variable.

Voltage Output: 0.1 to 224,000 microvolts.

Output Impedance: 50 ohms, resistive.

Accuracies: Frequency, $\pm 1\%$. Amplitude, ± 2 decibels.

Voltage Standing Wave Ratio: Less than 5 decibels, looking into output terminals.

MANUFACTURERS' OR CONTRACTORS' DATA:

Hewlett-Packard Company, 3000 Page Mill Road, Palo Alto, California; Development Contract No. N5sa-9543; Production Contract No. NOa(s)-9213; Mfg. Ident. No. 616A; Approximate Cost per Unit, \$1693.00; June, 1947.

Federal Manufacturing and Engineering Corporation, 199-217 Steuben Street, Brooklyn 5, New York; Production Contract No. NOa(s)-12297; Approximate Cost per Equipment, \$900.00; June 1950.

TUBE COMPLEMENT:

1 JAN-6SL7GT, 4 JAN-6C4, 2 JAN-6Y6G, 1 JAN-2K28, 1 JAN-5R4GY, 2 JAN-6X5GT, 3 JAN-0A2, 3 JAN-6J6.

REFERENCE DATA AND LITERATURE:

TO 16-30URM61-3 (Maintenance Instructions).

SIGNAL GENERATOR TS-403/U
(GENERATOR, SIGNAL, TS-403/U)

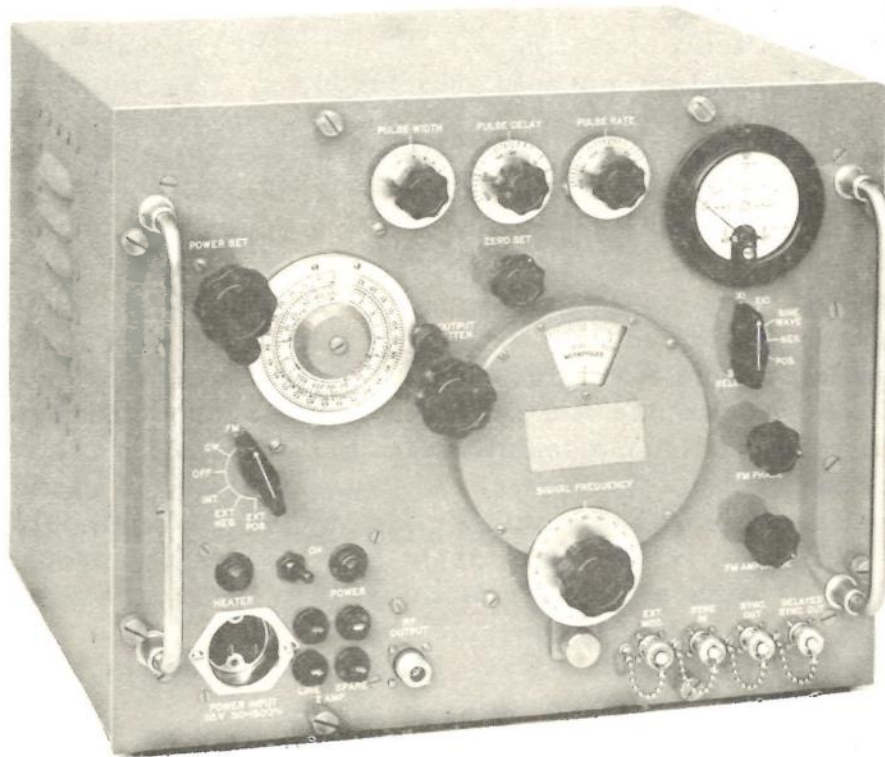
SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Signal Generator TS-403/U	5.6	20-1/4	21-1/4	23-1/2	116

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Signal Generator TS-403/U		7CAC-363974 R16-AN-TS-403/U F16-Q-304483-200 3F4325-403	13-1/2	14	17-1/2	64
1	Transit Case CY-669/U		7CAC-176572-58 3F2529-669	17-3/8	17	19-1/2	26
1	Power Cord CX-337/U		7CAC-17026486 R16-AN-CX-337/U 3E6000-337-72	72 long			0.620
1	RF Cord CG-92B/U		7CAC-1702656 R16-C-3738-600 1F430-92B.72	72 long			1.000
2	Video Cord CG-409/U		7CAC-170265-395 R16-C-3761-50 1F430-409.96	98 long			0.500
3	Adapter UG-273/U		8850-102000	1-5/16	1/4 dia.		0.180
3	Fuse		3300-308417845 R16-F-1988-750 3C1084.258	1-1/4	1/4 dia.		0.012
3	Pilot Lamp		8800-444163	1-1/8	3/8 dia.		0.012
1	Probe, RF		3300-298362047 2Z6820.154	2-29/32	7/8 OD		0.250
- Electronics Test Equipment -							TS-403/U

SIGNAL GENERATOR TS-403A/U
(GENERATOR, SIGNAL, TS-403A/U)



FUNCTIONAL DESCRIPTION:

A portable, self-contained, general purpose test equipment designed for use with radio and radar receivers and for other applications requiring small amounts of radio frequency power such as measuring standing wave ratios, antenna characteristics, transmission line characteristics, conversion gain, etc.

RELATIONSHIP TO OTHER EQUIPMENT:

This equipment is similar to Signal Generator TS-403/U except for some internal component improvements, and addition of double value power supply voltage input requirement. Similar to Hewlett-Packard Company Model 616A.

AN/URM-61 is the overall nomenclature for this Signal Generator and accessories.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: Ultra high frequencies are generated in a circuit containing a

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.	7CAC-363974-5	F16-Q-304483-100	3F4325-403A
PROCUREMENT INFO.:	Navy Spec. 16G4(Aer) dtd 1 Mar. 47 revised 24 Jan. 51		
PROCUREMENT COG.:	Navy	DESIGN COG.:	Navy, BuAer
F.I.I.N.:	FUNCTIONAL CLASS. NO.:		4.1.2
- Electronics Test Equipment -			TS-403A/U

SIGNAL GENERATOR TS-403A/U
(GENERATOR, SIGNAL, TS-403A/U)

ELECTROMECHANICAL DESCRIPTION: (Continued)

reflex klystron oscillator operating with an external resonant cavity whose electrical length is adjusted by movable shorting bars. The repeller voltage for the klystron is automatically tracked with the setting of the cavity shorting bars so that a single control determines the position of the shorting bar and the magnitude of the repeller voltage. This system makes possible the calibration of the tuning dial directly in frequency.

The oscillator tank circuit is coupled to a radio frequency monitor, which monitors the amplitude of oscillation, and to the output terminal through an attenuator system. The modulator generates a positive video pulse which is applied to the accelerator grid of the klystron to cause oscillation for the duration of the pulse. The video pulse can, if desired, be synchronized with external pulse or sine-wave voltages. This modulator section includes a pulse rate multivibrator, limiter and delay multivibrator. A stand-by heater is provided to maintain the instrument case temperature higher than the ambient temperature.

Power Supply: 115 volts, $\pm 10\%$, AC, 50 to 1600 cycles per second, single phase, approximately 150 watts at a power factor of 0.9.

Frequency Range: 1800 to 4000 megacycles per second.

Type of Transmission: Continuous Wave, Frequency Modulated, Pulse Modulated.

Pulse Repetition Rate: 40 to 4000 pulses per second.

Pulse Width: 0.5 to 10 microseconds.

Frequency Modulation: Phase variable approximately 180 electrical degrees at power supply frequency.

Timing: Undelayed or delayed from 3 to 300 microseconds from external or internal pulse.

Modulation Pulses: External or internal square wave, 40 to 70 volts peak, producing 100% modulation; not adjustable.

Power Output: 1 milliwatt maximum, 0 to -127 dbm, continuously variable.

Voltage Output: 0.1 to 224,000 microvolts.

Output Impedance: 50 ohms, resistive.

Accuracies: Frequency, better than $\pm 1\%$.

Amplitude: better than ± 2 decibels.

Voltage Standing Wave Ratio: Less than 5 decibels, looking into output terminals.

MANUFACTURERS' OR CONTRACTORS' DATA:

Hewlett-Packard Company, Palo Alto, California; Navy Contract N383S-45739 dated 24 January 1951; Approximate Cost per Unit, \$1100.00.

TUBE COMPLEMENT:

1 JAN-6SL7GT, 1 JAN-2K28, 3 JAN-0A2, 4 JAN-6C4, 1 JAN-5R4GY, 3 JAN-6J6, 2 JAN-6Y6G, 2 JAN-6X5GT.

REFERENCE DATA AND LITERATURE:

TO 16-30URM61-3 (Maintenance Instructions).

SIGNAL GENERATOR TS-403A/U
(GENERATOR, SIGNAL, TS-403A/U)

EQUIPMENT SUPPLIED:

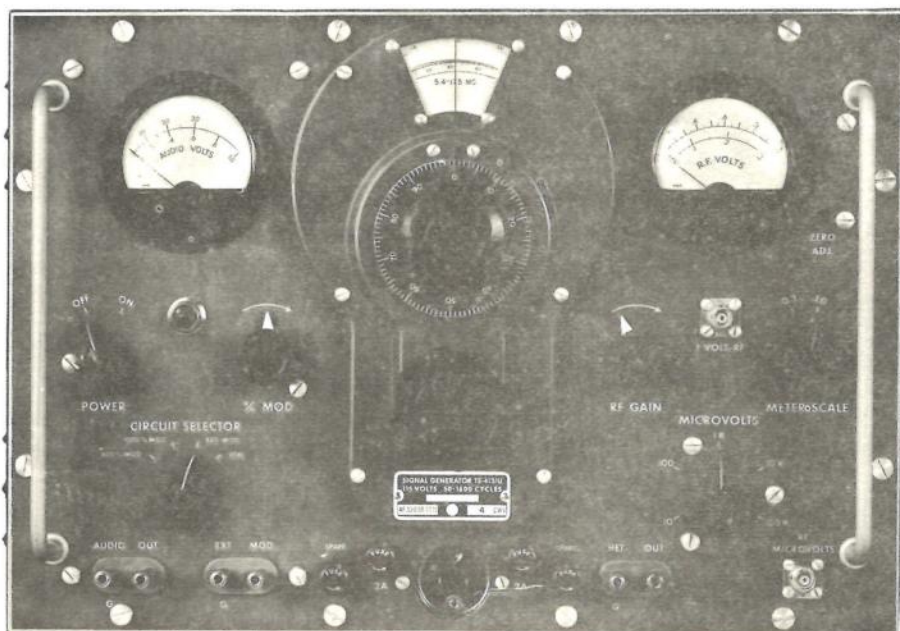
Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Signal Generator TS-403A/U		7CAC-363974-5 F16-Q-304483-100 3F4325-403A	13-1/2	14	17-1/2	64
1	Transit Case CY-669/U		7CAC-176572-58 3F2529-669	17-3/8	17	19-1/2	26
1	Power Cord CX-337/U		7CAC-170264-86 R16-AN-CX-337/U 3E6000-337-72	72 long			0.600
1	RF Cord CG-92B/U		7CAC-170265-6 R16-C-3738-600 1F430-92B. 72	72 long			1.000
2	Video Cord CG-409/U		7CAC-170265-395 R16-C-3761-50 1F430-409. 98	98 long			0.550
3	Adapter UG-273/U		8850-102000 2Z308-273	1-5/16	1/4 dia.		0.180
3	Fuse		3300-308417845 N16-C-69001-1003 3C1084. 258	1-1/4	1/4 dia.		0.012
3	Pilot Lamp		8800-444163	1-1/8	3/8 dia.		0.012
1	RF Probe		3300-298362047 2Z6820. 154	2-29/32	7/8 OD		0.250

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Signal Generator TS-403A/U	5.6	20-1/4	21-1/4	23-1/2	117

- Electronics Test Equipment - TS-403A/U

**SIGNAL GENERATOR TS-413/U
(GENERATOR, SIGNAL, TS-413/U)**



FUNCTIONAL DESCRIPTION:

A general purpose, portable unit used to test and align radio receivers, transmitters and other apparatus that requires the use of standard output voltages and frequencies. The radio frequency output can be internally amplitude modulated by a self-contained oscillator or externally with an external oscillator.

The carrier frequency is controlled by a turret-type coil assembly with a band selector switch and a tuning capacitor connected to a direct reading dial with a vernier control divided in 100 equal parts to provide a total of 500 divisions per band. Precise calibrations at a number of spot frequencies over most of the test set's range can be obtained from the self-contained one megacycle crystal oscillator.

RELATIONSHIP TO OTHER EQUIPMENT:

Replaces Ferris Model 22A Signal Generator.
Superseded by AN/URM-25B Signal Generator Set.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The radio frequency oscillator is a shunt-fed Hartley oscillator with its plate at radio frequency ground. From the oscillator section the

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Limited Standard		
STOCK NOS.	7CAC-363926		3F4325-413
PROCUREMENT INFO.: USAF Spec. No. 7156B, 2 November 1948			
PROCUREMENT COG.: USAF		DESIGN COG.: USAF, C&N	
F.I.I.N.:		FUNCTIONAL CLASS NO.: 4.1.2	
- Electronics Test Equipment -			TS-413/U

SIGNAL GENERATOR TS-413/U
(GENERATOR, SIGNAL, TS-413/U)

ELECTROMECHANICAL DESCRIPTION:

signal is fed to the modulated radio frequency amplifier and the crystal oscillator and mixer. The modulator section has a vacuum-tube voltmeter monitor, a cathode follower, a diode detector, and a modulator indicator. The voltmeter is calibrated to read directly the percent modulation of output wave.

The signal output from the modulated radio frequency amplifier is fed through an attenuator to the radio frequency output terminal and to the radio frequency indicator (vacuum tube voltmeter).

The crystal oscillator and mixer section provides a fundamental signal and its harmonics to beat against the generated signal for calibration purposes.

Power Supply: 115 volts $\pm 10\%$, AC, 50 to 1600 cycles per second, single phase.

Frequency Range: 75 kilocycles to 40 megacycles per second in six bands.

Type of Transmission: Continuous Wave, Amplitude Modulated Carrier.

Modulation Frequency: 400 or 1000 cycles per second, 0 to 50% internal.
50 to 15,000 cycles per second external.

Voltage Output:

0 to 0.1 volts radio frequency.

0.1 to 1 volt radio frequency.

0 to 1 volt audio frequency, 400 or 1000 cycles per second.

Output Impedance:

5 ohms up to 0.01 volt output radio frequency.

50 ohms from 0.01 to 0.1 volt output radio frequency.

150 ohms from 0.1 to 0.3 volt output radio frequency.

500 ohms from 0.3 to 1 volt output radio frequency.

1000 ohms from 0 to 1 volt output audio frequency.

Audio Frequency Leakage: Less than 0.1 microvolt 18 inches from case at 40 megacycles per second.

Radio Frequency Harmonic Distortion: Less than 5% of total signal strength.

Accuracy:

$\pm 10\%$ over range 100 microvolts to 1 volt.

± 3 microvolts over range 0 to 10 microvolts.

$\pm 10\%$ of stated frequency for internal modulation.

$\pm 6\%$ over range 0 to 30 for percent modulation.

$\pm 1\%$ of indicated radio frequency for temperature 23° to 25° C., pressure 14.7 inches of mercury and relative humidity not exceeding 50%.

$\pm 5\%$ of indicated radio frequency for temperature -40° C. to $+55^{\circ}$ C., pressure 13.7 to 29.9 inches of mercury and relative humidity 0 to 100%.

$\pm 0.1\%$ of fundamental frequency for crystal calibrator.

MANUFACTURERS' OR CONTRACTORS' DATA:

Harvey-Wells Electronics Inc., North Street, Southbridge, Massachusetts; Contract No. AF 33(038)7771, Approximate Cost per Unit, \$400.00; Contract AF 33(038)13162, 9 June 1950, Approximate Cost per Unit, \$272.00; Contract AF 33(038)15465, 28 September 1950, Approximate Cost per Unit, \$299.20; Contract AF 33(038)15634, and Contract AF 33(038)20488. (Continued)

SIGNAL GENERATOR TS-413/U
(GENERATOR, SIGNAL, TS-413/U)

MANUFACTURERS' OR CONTRACTORS' DATA: (Continued)

Cole Instrument Company, 1320 South Grand Avenue, Los Angeles 15, California; Contract No. AF 33(038)10441, 8 February 1950, Approximate Cost per Unit, \$242.50

TUBE COMPLEMENT:

1 JAN-9002, 1 JAN-6AG7, 1 JAN-6AL5, 1 JAN-6J6, 1 JAN-6SA7, 1 JAN-5Y3/GT, 1 JAN-OA3/VR75, 1 JAN-OD3/VR150, 1 JAN-6SN7/GT, 2 JAN-6C4.

REFERENCE DATA AND LITERATURE:

- TO 16-35TS413-2 (Operation and Service Instructions).
- TO 16-35TS413-3 (Maintenance Instructions).
- TO 16-35TS413-4 (Parts Catalog).
- TO 16-55-432 (Spare Parts List).

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Signal Generator, TS-413/U (Domestic Packed)	4.1	25-3/4	14	16	68

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Signal Generator TS-413/U		7CAC-363926 3F4325-413	13	20	12	40
1	Cord CG-409/U		7CAC-170265-26 3E6015-409-60	60 long			
1	Cord CX-237/U		7CAC-170264-875 3E6000-237-60	60 long			
1	Adapter UG-83/U		8850-108745 2Z308-83				
1	Adapter UG-201/U		8850-101950 2Z308-201				

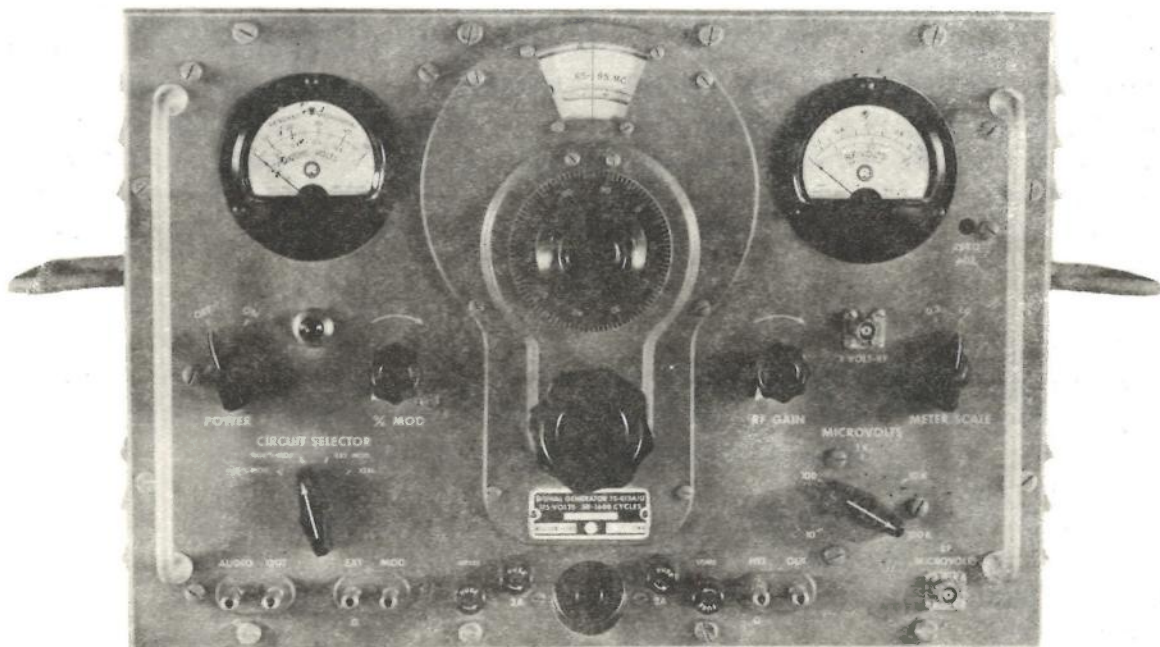
(Continued)

SIGNAL GENERATOR TS-413/U
(GENERATOR, SIGNAL, TS-413/U)

EQUIPMENT SUPPLIED: (Continued)

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Adapter UG-255/U		8850-108880 2Z308-255				
1	Case CY-598/U		7CAC-176669-3 2Z1891-598	15-3/8	24	12-1/2	19.5
1	Calibration Chart						
TS-413/U - Electronics Test Equipment -							

**SIGNAL GENERATOR TS-413A/U
(GENERATOR, SIGNAL, TS-413A/U)**



FUNCTIONAL DESCRIPTION:

A general purpose, portable unit used to test and align radio receivers, transmitters and other apparatus that require the use of standard output voltages and frequencies. The radio frequency output can be internally amplitude modulated by a self-contained oscillator or externally with an external oscillator.

The carrier frequency is controlled by a turret-type coil assembly with a band selector switch and a tuning capacitor connected to a direct reading dial with a vernier control divided in 100 equal parts to provide a total of 500 divisions per band. Precise calibrations at a number of spot frequencies over most of the test set's range can be obtained from the self-contained one megacycle crystal oscillator.

RELATIONSHIP TO OTHER EQUIPMENT:

Similar to TS-413/U Signal Generator, except for some changes in circuit and components.

Superseded by AN/URM-25B Signal Generator Set.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The radio frequency oscillator is a shunt-fed Hartley oscillator; with its plate at radio frequency ground. From the oscillator section, the signal

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Substitute Standard		
STOCK NOS.	7CAC-363927		
PROCUREMENT INFO.: USAF Spec. No. 7156B dated 2 November 1948			
PROCUREMENT COG.: USAF		DESIGN COG.: USAF, C&N	
F.I.I.N.:		FUNCTIONAL CLASS NO.: 4.1.2	
- Electronics Test Equipment -			TS-413A/U

SIGNAL GENERATOR TS-413A/U
(GENERATOR, SIGNAL, TS-413A/U)

ELECTROMECHANICAL DESCRIPTION: (Continued)

is fed to the modulated radio frequency amplifier and the crystal oscillator and mixer. The modulator section has a vacuum-tube voltmeter monitor, a cathode follower, a diode detector, and a modulator indicator. The voltmeter monitor is calibrated to read directly the percent modulation of output wave. The signal output from the modulated radio frequency amplifier is fed through an attenuator to the radio frequency output terminal and to the radio frequency indicator (vacuum voltmeter). The crystal oscillator and mixer section provide a fundamental signal and its harmonics to beat against the generated signal for calibration purposes.

Power Supply: 115 volts $\pm 10\%$, AC, 50 to 1600 cycles per second, single phase.

Frequency Range: 75 kilocycles to 40 megacycles per second in six bands.

Type of Transmission: Continuous Wave, Amplitude Modulated Carrier.

Modulation Frequency: 400 or 1000 cycles per second, 0 to 50% internal.
50 to 15,000 cycles per second external.

Voltage Output:

0 to 0.1 volt radio frequency.

0.1 to 1 volt radio frequency.

0 to 1 volt audio frequency, 400 or 1000 cycles per second.

Output Impedance:

5 ohms up to 0.01 volt output radio frequency.

50 ohms from 0.01 to 0.1 volts output radio frequency.

150 ohms from 0.1 to 0.3 volts output radio frequency.

500 ohms from 0.3 to 1 volt output radio frequency.

1000 ohms from 0 to 1 volt output audio frequency.

Audio Frequency Leakage: Less than 0.1 microvolt 18 inches from case at 40 megacycles per second.

Radio Frequency Harmonic Distortion: Less than 5% of total signal strength.

Accuracy:

$\pm 10\%$ over range 100 microvolts to 1 volt.

± 3 microvolts over range 0 to 10 microvolts.

$\pm 10\%$ of stated frequency for internal modulation.

$\pm 6\%$ over range 0 to 30% for percent modulation.

$\pm 1\%$ of indicated radio frequency for temperature range 23° to 25° C., pressure 14.7 inches of mercury and relative humidity not exceeding 50%.

$\pm 5\%$ of indicated radio frequency for temperature range -40° to $+55^{\circ}$ C., pressure 13.7 to 29.9 inches of mercury and relative humidity 0 to 100%.

$\pm 0.1\%$ of fundamental frequency for crystal calibrator.

MANUFACTURERS' OR CONTRACTORS' DATA:

Harvey-Wells Electronics Inc., North Street, Southbridge, Massachusetts; Contract No. AF 33(038)13162, 9 June 1950.

TUBE COMPLEMENT:

1 JAN-9002, 1 JAN-6AG7, 1 JAN-6AL5, 1 JAN-6J6, 1 JAN-6SA7, 2 JAN-6C4, 1 JAN-OA3/VR-75, 1 JAN-OD3/VR-150, 1 JAN-5Y3GT, 1 JAN-6SN7GT.

SIGNAL GENERATOR TS-413A/U
(GENERATOR, SIGNAL, TS-413A/U)

REFERENCE DATA AND LITERATURE:

TO 16-35TS413-2 (Operation and Service Instructions).

TO 16-35TS413-3 (Maintenance Instructions).

TO 16-35TS413-4 (Parts Catalog).

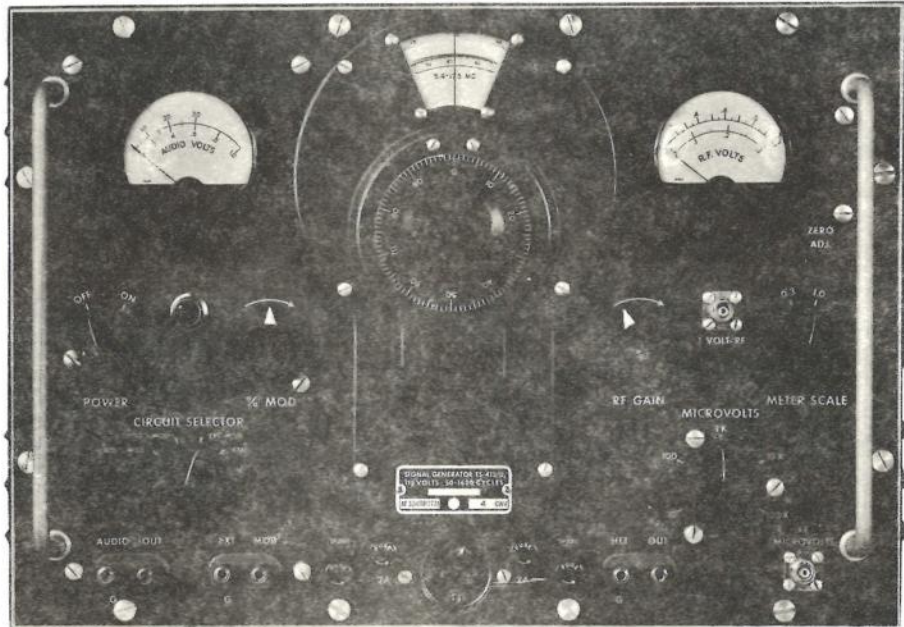
SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Signal Generator TS-413A/U with equipment supplied (Domestic Packed)	3.65	17	26-1/2	14	80

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Signal Generator TS-413A/U	Aluminum	7CAC-363927	12-3/8	18-1/2	10-3/4	40
1	Cord CG-409/U		7CAC-170265-26 3E6015-409-60	60 long			
1	Cord CX-337/U		7CAC-170264-86	72 long			
1	Adapter UG-83/U		8850-108745 2Z308-83				
1	Adapter UG-201/U		8850-101950 2Z308-201				
1	Adapter UG-255/U		8850-108880 2Z308-255				
1	Case CY-598/U	Aluminum	7CAC-176669-3 2Z1891-598	15-3/8	24	12-1/2	19.5
1	Calibration Chart						
1	Instruction Book						

**SIGNAL GENERATOR TS-413B/U
(GENERATOR, SIGNAL, TS-413B/U)**



FUNCTIONAL DESCRIPTION:

A general purpose, portable unit used to test and align radio receivers, transmitters and other apparatus that require the use of standard output voltages and frequencies. The radio frequency output can be internally amplitude modulated by a self-contained oscillator or externally with an external oscillator.

The carrier frequency is controlled by a turret-type coil assembly with a band selector switch and a tuning capacitor connected to a direct reading dial with a vernier control divided in 100 equal parts to provide a total of 500 divisions per band. Precise calibrations at a number of spot frequencies over most of the test set's range can be obtained from the self-contained one megacycle crystal oscillator.

RELATIONSHIP TO OTHER EQUIPMENT:

Electrically and mechanically interchangeable with Signal Generator TS-413/U with changes in the circuit and components.

Superseded by AN/URM-25B Signal Generator Set.

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Substitute Standard		
STOCK NOS.	7CAC-363927-5		
PROCUREMENT INFO.: USAF Spec. No. 7156-B 2 November 1948.			
PROCUREMENT COG.: USAF		DESIGN COG.: USAF, C&N	
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 4.1.2	
- Electronics Test Equipment -			TS-413B/U

SIGNAL GENERATOR TS-413B/U
(GENERATOR, SIGNAL, TS-413B/U)

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The radio frequency oscillator is a shunt-fed Hartley oscillator with its plate at radio frequency ground. From the oscillator section the signal is fed to the modulated radio frequency amplifier and the crystal oscillator and mixer. The modulator section has a vacuum-tube voltmeter monitor, a cathode follower, a diode detector, and a modulator indicator. The voltmeter monitor is calibrated to read directly the per cent modulation of output wave.

The signal output from the modulated radio frequency amplifier is fed through an attenuator to the radio frequency output terminal and to the radio frequency indicator (vacuum tube voltmeter).

The crystal oscillator and mixer section provide a fundamental signal and its harmonics to beat against the generated signal for calibration purposes.

Power Supply: 115 volts $\pm 10\%$, AC, 50 to 1600 cycles per second, single phase.

Frequency Range: 75 kilocycles to 40 megacycles per second in six bands.

Type of Transmission: Continuous Wave, Amplitude Modulated Carrier.

Modulation Frequency: 400 to 1000 cycles per second, 0 to 50% internal.
50 to 15,000 cycles per second external.

Voltage Output:

1 to 100,000 microvolt radio frequency.

0.1 to 1 volt radio frequency.

0 to 1 volt audio frequency, 400 or 1000 cycles per second.

Output Impedance:

5 ohms up to .01 volt output radio frequency.

50 ohms from .01 to 0.1 volt output radio frequency.

150 ohms from 0.1 to 0.3 volt output radio frequency.

500 ohms from 0.3 to 1 volt output radio frequency.

1000 ohms from 0 to 1 volt output audio frequency.

Audio Frequency Leakage: Less than 1 microvolt per meter 18 inches from case at 40 megacycles per second.

Radio Frequency Harmonic Distortion: Less than 5% of total signal strength.

Accuracy:

$\pm 10\%$ over range 100 microvolts to 1 volt.

± 3 microvolts over range 0 to 10 microvolts.

$\pm 10\%$ of stated frequency for internal modulation.

$\pm 6\%$ over range 0 to 30% for per cent modulation.

$\pm 1\%$ of indicated radio frequency for temperature 23° to 25° C., pressure 14.7 inches of mercury and relative humidity not exceeding 50%.

$\pm 5\%$ of indicated radio frequency for temperature -40° C. to $+55^{\circ}$ C., pressure 13.7 to 29.9 inches of mercury and relative humidity 0 to 100%.

$\pm 0.1\%$ of fundamental frequency for crystal calibrator.

MANUFACTURERS' OR CONTRACTORS' DATA:

Cole Instrument Company, Los Angeles, California; Contract No. 33(038)10441.

SIGNAL GENERATOR TS-413B/U
(GENERATOR, SIGNAL, TS-413B/U)

TUBE COMPLEMENT:

1 JAN-9002, 1 JAN-6AG7, 1 JAN-6AL5, 1 JAN-6J6, 1 JAN-6SA7, 2 JAN-6C4,
1 JAN-OA3/VR-75, 1 JAN-OD3/VR-150, 1 JAN-5Y3GT, 1 JAN-6SN7GT.

REFERENCE DATA AND LITERATURE:

TO 16-35TS413-6 (Operation and Service Instructions).

TO 16-35TS413-7 (Maintenance Instructions).

TO 16-35TS413-8 (Parts Catalog).

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Signal Generator TS-413B/U with accessories (Domestic Packed)	3.65	17	26-1/2	14	80

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Signal Generator TS-413B/U	Aluminum	7CAC-363927-5	12-3/8	18-1/2	10-1/2	40
1	Cord CX-237/U		7CAC-170264-875 3E6000-237-60	60 long			
1	Cord CG-409/U		7CAC-170265-26 3E6015-409-60	60 long			
1	Adapter UG-83/U		8850-108745 2Z308-83				
1	Adapter UG-201/U		8850-101950 2Z308-201				
1	Adapter UG-255/U		8850-108880 2Z308-255				
1	Case CY-598/U		7CAC 176669-3 2Z1891-598	15-3/8	24	12-1/2	19.5
1	Instruction Book						

- Electronics Test Equipment -

TS-413B/U

SIGNAL GENERATOR TS-413C/U



FUNCTIONAL DESCRIPTION:

A general purpose, portable unit used in depots to test and align radio receivers, transmitters, and other apparatus that require the use of standard output voltages and frequencies. The radio frequency output carrier can be amplitude modulated either by an internal, self-contained oscillator or by an external oscillator.

The carrier frequency is controlled by a turret-type coil assembly with a band selector switch and a tuning capacitor connected to a direct reading dial with a vernier control divided in 100 equal parts to provide a total of 500 divisions per band. Precise calibrations at a number of spot frequencies over most of the output frequency range can be obtained from the self-contained one megacycle per second crystal oscillator.

RELATIONSHIP TO OTHER EQUIPMENT:

This unit is similar to Signal Generator TS-413/U with the following changes:
 (1) Crystal Unit is CR-18/U in place of DC-9-AJ.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.	7CAC-363927-3		
PROCUREMENT INFO.:	Spec. MIL-S-4475 (USAF) dtd. 28 March 1952		
PROCUREMENT COG.:	USAF	DESIGN COG.: USAF, C&N	
F.I.I.N.:	FUNCTIONAL CLASS. NO.:		4.1.2
	- Electronics Test Equipment -		TS-413C/U

SIGNAL GENERATOR TS-413C/U

RELATIONSHIP TO OTHER EQUIPMENT: (Continued)

- (2) BNC panel connectors are used in place of binding posts at Audio Output, and External Modulation panel terminals.
- (3) Warm-up time is decreased.
- (4) Output voltage is in terms of 50 ohms load conditions.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The radio frequency oscillator is a shunt-fed Hartley oscillator with its plate at radio frequency ground. From the oscillator section the signal is fed into the modulated radio frequency amplifier and the crystal oscillator mixer stage. The modulator section has a vacuum-tube voltmeter monitor which is calibrated to read directly the percent modulation of the output wave. The signal output from the modulated radio frequency amplifier is fed through an attenuator to the radio frequency output terminal. The crystal oscillator-mixer section provides a fundamental signal and harmonics to beat against the generated signal for calibration purposes.

Power Supply: 105 to 125 volts, AC, 50 to 1600 cycles per second, single phase, 90 volt-amperes.

Frequency Range: 75 kilocycles to 40 megacycles per second in 6 bands:

- (1) 75 kilocycles per second to 230 kilocycles per second.
- (2) 230 kilocycles per second to 660 kilocycles per second.
- (3) 0.65 megacycles per second to 1.95 megacycles per second.
- (4) 1.85 megacycles per second to 5.5 megacycles per second.
- (5) 5.4 megacycles per second to 17.5 megacycles per second.
- (6) 17 megacycles per second to 40 megacycles per second.

Type of Transmission: Continuous Wave, Amplitude Modulated Carrier.

Modulation Frequency: 400 cycles per second and 1000 cycles per second, internal, variable by front panel control from 0 to 50%; 100 to 15,000 cycles per second, external.

Voltage Output: 0 to 1 volt, 0 to 100,000 microvolts, 0 to 10,000 microvolts, 0 to 1,000 microvolts, 0 to 100 microvolts, 0 to 10 microvolts, rms, radio frequency; 0 to 1 volt, rms, audio frequency.

Impedance: 500 ohms at "1VOLT MAX" connector.

50 ohms at "RF OUT" connector.

10,000 ohms at "AUDIO OUT" connector.

Radio Frequency Leakage: Less than 5 microvolts per meter 12 inches from case at 40 megacycles per second.

Radio Frequency Harmonic Distortion: Less than 5% of total signal strength.

Accuracy:

±10% over the range of 100 microvolts to 1 volt.

±3 microvolts over the range of 0 to 10 microvolts.

±10% of indicated frequency for internal modulation.

±6% for audio output.

±1% of indicated radio frequency for temperatures of 23°C. to 27°C., pressure of 14.9 inches of mercury, and relative humidity not exceeding 50%.

(Continued)

SIGNAL GENERATOR TS-413C/U

ELECTROMECHANICAL DESCRIPTION: (Continued)

±5% of indicated radio frequency for temperatures of -40°C. to +55°C., pressure of 13.7 to 29.9 inches of mercury and relative humidity of 0 to 100%.

±0.1% of fundamental frequency for the crystal calibrator.

Temperature Limits: -40°C. to +55°C., operating -65°C. to +85°C., storage.

MANUFACTURERS' OR CONTRACTORS' DATA:

Stamford Electronics Company, Stamford, Connecticut; AF Contract 33(038)27604 dated 12 September 1951; Approximate Cost per Unit, \$305.00.

TUBE COMPLEMENT:

1 JAN-9002, 1 JAN-6SA7, 1 JAN-6AG7, 1 JAN-6AL5, 1 JAN-6J6, 1 JAN-5Y3GT, 1 JAN-OB2, 1 JAN-OA2, 2 JAN-12AU7, 1 JAN-CR-18/U (Crystal).

REFERENCE DATA AND LITERATURE:

33A1-8-85-1 (Operation Instructions).

33A1-8-85-2 (Service Instructions).

33A1-8-83-13 (Overhaul Instructions).

33A1-8-83-14 (Illustrated Parts Breakdown).

SHIPPING DATA:

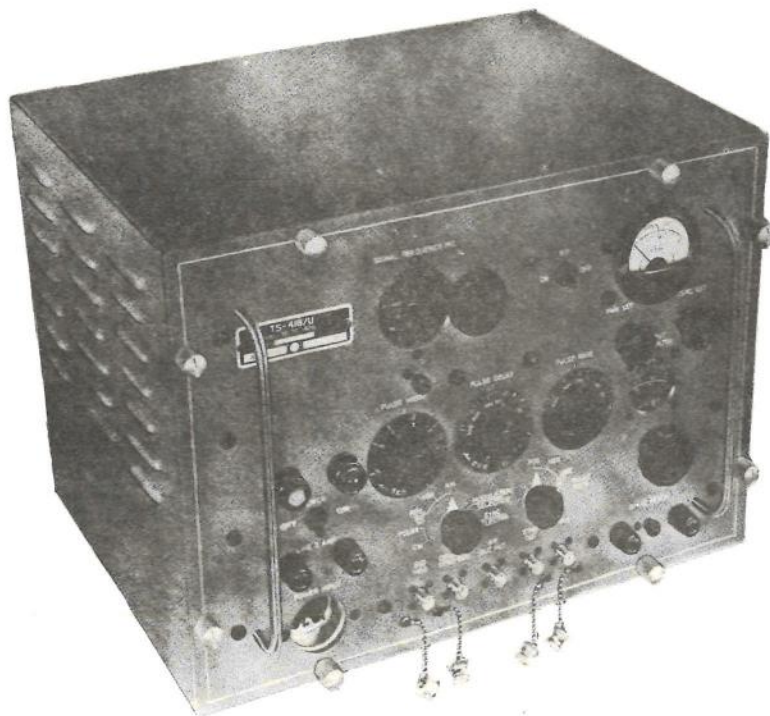
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Signal Generator TS-413C/U with accessories (Domestic Packed)	3.65	17	26-1/2	14	80
- Electronics Test Equipment -						TS-413C/U

SIGNAL GENERATOR TS-413C/U

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Signal Generator TS-413C/U Including:	Alum- inum	7CAC-363927-3	12-1/2	18-1/8	10-7/8	40
1	Cord CX-337/U		7CAC-170264-86 3E6000-337-72	72 long			0.50
1	Cord CG-409/U		7CAC-170265-26 3E6015-409.60	60 long			0.25
1	Adapter UG-83/U		8850-108745 2Z308-83	1-3/4			0.07
1	Adapter UG-201/U		8850-101950 2Z308-201	1-1/2			0.07
1	Adapter UG-255/U		8850-108880 2Z308-255	1-3/8			0.07
1	Calibration Card			1/16	6	6	0.10
1	Transit Case CY-598/U	Alum- inum	7CAC-176669-3 2Z1891-598	15-3/8	24-1/4	12-1/8	17.50

SIGNAL GENERATOR TS-418/U
(GENERATOR, SIGNAL, TS-418/U)



FUNCTIONAL DESCRIPTION:

A portable, self-contained test equipment for use with radio and radar receivers and for other applications requiring small amounts of radio frequency power, such as measuring standing wave ratios, antenna characteristics, transmission line characteristics, conversion gain, receiver sensitivity, etc. The generator is directly calibrated in output frequency as well as in output power.

RELATIONSHIP TO OTHER EQUIPMENT:

AN/URM-49 is the overall nomenclature for this signal generator.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: Contains a radio frequency oscillator, power supply, radio frequency power monitor, modulation section and output section. Radio frequency

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Limited Standard		
STOCK NOS.	7CAC-363965	SNSN F16-Q-304512-200 ASO R16-ANTS-418/U	3F4325-418
PROCUREMENT INFO.:	Navy 16G6(AER) Production, BuShips CS-295 Development		
PROCUREMENT COG.:	Navy	DESIGN COG.:	Navy, BuAer
F. I. I. N.:	FUNCTIONAL CLASS, NO.:		4.1.2
	- Electronics Test Equipment -		TS-418/U

SIGNAL GENERATOR TS-418/U
(GENERATOR, SIGNAL, TS-418/U)

ELECTROMECHANICAL DESCRIPTION: (Continued)

signals may be amplitude-modulated by external signals or pulse-modulated by externally supplied positive or negative pulses. A pulse generator is contained in the modulator section to provide pulse modulation internally. These internally generated pulses may also be synchronized with external positive or negative pulses or sine waves.

Power Supply: 115 volts, $\pm 10\%$, AC, 50 to 1600 cycles per second, single phase, 130 watts at a power factor of 0.9.

Frequency Range: 400 to 1000 megacycles per second in a single band.

Type of Transmission: Continuous Wave, Pulsed Carrier, Amplitude Modulated Carrier.

Power Range: 0 to -120 dbm.

Voltage Output: 0.2 to 200,000 microvolts into 50 ohms.

Output Impedance: 50 ohms.

Input Impedance: 10,000 ohms shunted by 115 micromicrofarads.

Accuracy:

Pulse Width: ± 0.25 microseconds or $\pm 25\%$ whichever is greater.

Pulse Repetition Rate: $\pm 25\%$.

Pulse Delay: 3 microseconds or $\pm 25\%$ whichever is greater.

Frequency: $\pm 1\%$.

RF Output: ± 2 decibels.

Internal Modulation Data:

Pulse Delay Time: 3 to 300 microseconds after synchronizing pulse.

Pulse Width: 0.5 to 10 microseconds.

Pulse Repetition Rate: 40 to 4000 pulses per second.

Pulse Rise Time: Less than 0.5 microseconds between 10% and 90% of maximum amplitude.

Pulse Decay Time: Less than 0.5 microseconds between 10% and 90% of maximum amplitude.

External Modulation Data:

Peak Pulse Amplitude: 40 to 70 volts.

Pulse Repetition Rate: 40 to 4000 pulses per second.

Pulse Width: 0.5 to 20 microseconds.

Sine Wave: 3 volts peak between 100 cycles per second and 100 kilocycles per second produces at least 30% modulation.

External Synchronization: Positive or negative pulses or sine waves.

MANUFACTURERS' OR CONTRACTORS' DATA:

Lavoie Laboratories, Inc., Matawan-Freehold Road, Morganville, New Jersey; Contract No. NOa(s)-9766; Approximate Cost per Unit, \$1800.00.

Boonton Radio Corporation, Intervale Road, Boonton, New Jersey; Contract No. N5sa-8669.

Lewyt Corporation, 60 Broadway, Brooklyn 11, New York; Order No. R49-181N; Approximate Cost per Unit, \$468.00.

SIGNAL GENERATOR TS-418/U
(GENERATOR, SIGNAL, TS-418/U)

TUBE COMPLEMENT:

1 JAN-5Y3GT, 1 JAN-5R4GY, 5 JAN-6J6, 2 JAN-6AG7, 1 JAN-6AK5, 2 JAN-OB2,
1 JAN-2C36, 1 JAN-12AX7, 1 JAN-12AT7.

REFERENCE DATA AND LITERATURE:

AN 16-30URM49-3 (Maintenance Instructions).

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Signal Generator TS-418/U (Waterproof Container, Complete, Export Packed).	5.90	20	24	21	154

EQUIPMENT SUPPLIED:

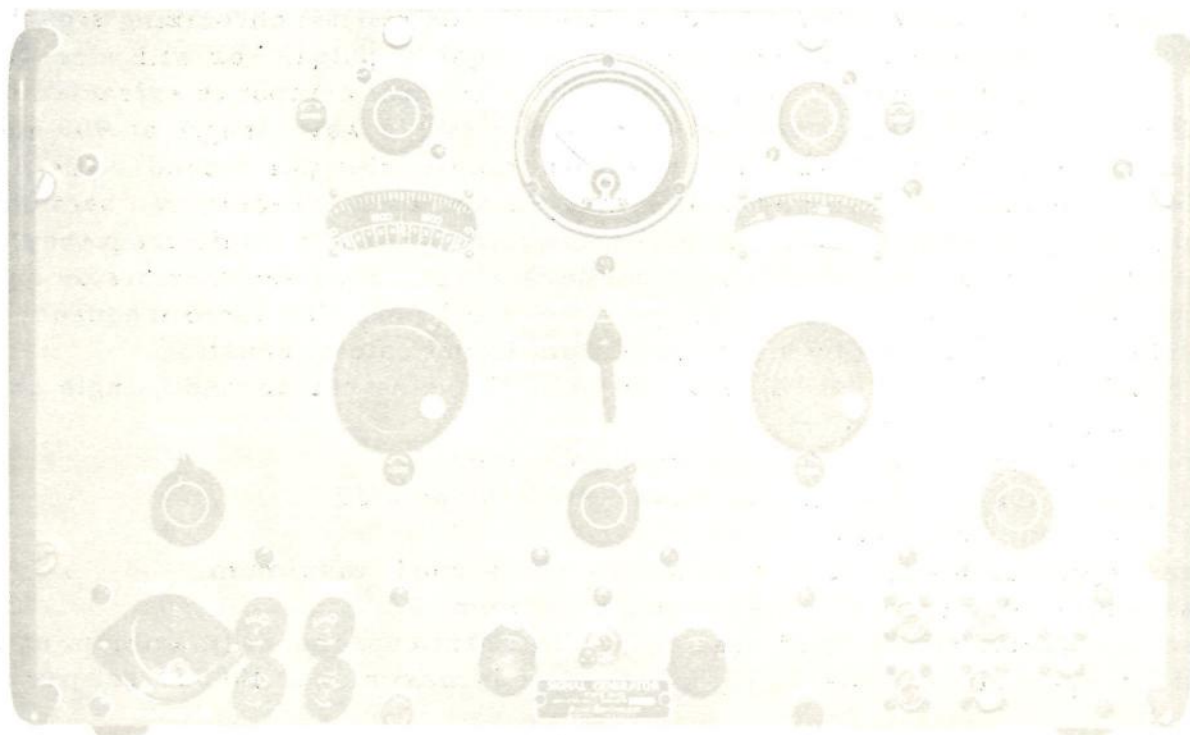
Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Signal Generator TS-418/U		7CAC-363965 R16-AN-TS-418/U F16-Q-304512-200 3F4325-418	12-3/8	17-5/8	13-1/2	54.5
1	Transit Case CY-741/U		7CAC-176572-59 F16-T-20139-5901 3H772-741	16	21-7/8	18-5/8	24.0
1	Power Cord CX-337/U		7CAC-170264-86 R16-AN-CX337/U 3E6000-337-72	72 long			0.6
							(Continued)
- Electronics Test Equipment -							TS-418/U

SIGNAL GENERATOR TS-418/U
(GENERATOR, SIGNAL, TS-418/U)

EQUIPMENT SUPPLIED: (Continued)

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Radio Frequency Cord CG-546/U		7CAC-170265-217 3E6015-546.3	72 long			0.3
2	Video Cord CG-546/U		7CAC-170265-54 3E6015-546.4	96 long			0.4
3	Adapter UG-201/U		8850-108745 2Z308-201	1-9/16	3/4 OD		0.1
3	Adapter UG-255/U		8850-108880 2Z308-255	1-3/8	5/8 OD		0.1
3	Adapter UG-273/U		8850-102000 2Z308-273				0.1
2	Fuse			1-1/4	1/4 OD		
3	Pilot Lamp			1-1/8	3/8 OD		
1	Bead Thermistor			1/2	1/8 OD		
2	Disc Thermistor			1-1/4	7/8	5/16	

SIGNAL GENERATOR TS-419/U
(GENERATOR, SIGNAL, TS-419/U)



FUNCTIONAL DESCRIPTION:

A portable, general purpose, self-contained, directly calibrated generator of continuous wave or pulse modulated radio frequency signals. It provides an accurate signal source used in testing the operation of radio and radar equipment and for receiver measurements and other applications that require less than one milliwatt of continuous wave or pulsed type radio frequency signals. It has provisions for external modulation.

RELATIONSHIP TO OTHER EQUIPMENT:

Hewlett-Packard Model 614A and Aircraft Radio Corporation Model H-12 are similar to TS-419/U.

Overall nomenclature for this signal generator is AN/URM-64.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: A radio frequency oscillator employing a 6BM6 reflex Klystron tube in a coaxial cavity resonator is keyed by the modulator and synchronizer.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.	7CAC-363969	R16-AN-TS-419/U	3F4325-419
PROCUREMENT INFO.:	Navy Spec. No. CS-322, 16G5 (Aer); Dwg. No. 1060		
PROCUREMENT COG.:	Navy	DESIGN COG.: Navy, BuAer	
F.I.I.N.:	FUNCTIONAL CLASS. NO.:		4.1.2
	- Electronics Test Equipment -		TS-419/U

SIGNAL GENERATOR TS-419/U
(GENERATOR, SIGNAL, TS-419/U)

ELECTROMECHANICAL DESCRIPTION: (Continued)

The modulator may be operated independent of external synchronizing signals or may be synchronized either with positive or negative pulses, or with sine waves from an external source. The oscillator radio frequency output is extracted from the Klystron by means of a coaxial line (which is $1/4$ wave length at 900 megacycles per second or $3/4$ wave length at 2100 megacycles per second). The signal is delivered into two symmetrically located apertures feeding two sections of tubing acting as wave guide feeds to the power monitor and radio frequency output section. The power monitor is a temperature compensated thermistor bridge circuit which serves to indicate the power output level. The radio frequency output tube length is varied by a calibrated dial to indicate attenuation.

Power Supply: 115 volts, $\pm 10\%$, AC, 50 to 1600 cycles per second, single phase; 300 volts amperes maximum.

Frequency Range: 900 to 2100 megacycles per second.

Type of Transmission: Continuous Wave, Pulse Modulated.

Pulse Modulation: Internal or External.

Pulse Repetition Rate: 40 to 4000 pulses per second, maximum.

Pulse Width: 0.5 to 10 microseconds, maximum.

Pulse Delay (relative to fixed sync out): 3 to 300 microseconds (maximum of 75% of interval between pulses, 187 microseconds maximum at 4000 pulses per second).

Peak Amplitude, External Modulation: 40 to 70 volts, positive or negative polarity.

Power Output: 0 dbm to -120 dbm (decibels below one milliwatt) to 0.2 microvolts into 50 ohms.

Voltage Standing Wave Ratio looking into output terminals: Less than 5 decibels.

Output Impedance: 50 ohms.

Accuracy: Frequency: $\pm 1\%$; Power Output: ± 2 decibels.

MANUFACTURERS' OR CONTRACTORS' DATA:

Aircraft Radio Corporation, Boonton, New Jersey; Development Contract No. N5SA-13617; Approximate Cost per Equipment, \$1064.00, April 4, 1948; Production Contract No. NOa(s)9748.

Technicraft Corporation, Kansas City, Missouri; Production Contract No. NOa(s)-12279; Approximate Cost per Equipment, \$900.00, June 1950.

TUBE COMPLEMENT:

5 JAN-0A2, 2 JAN-5R4GY, 1 JAN-6BM6A, 8 JAN-6V6GTY, 6 JAN-7F8.

REFERENCE DATA AND LITERATURE:

AN 16-35TS419-3 (Maintenance Instructions).

TO 16-35TS419-101 (Modification of Signal Generator for Double Phase Modulation).

SIGNAL GENERATOR TS-419/U
(GENERATOR, SIGNAL, TS-419/U)

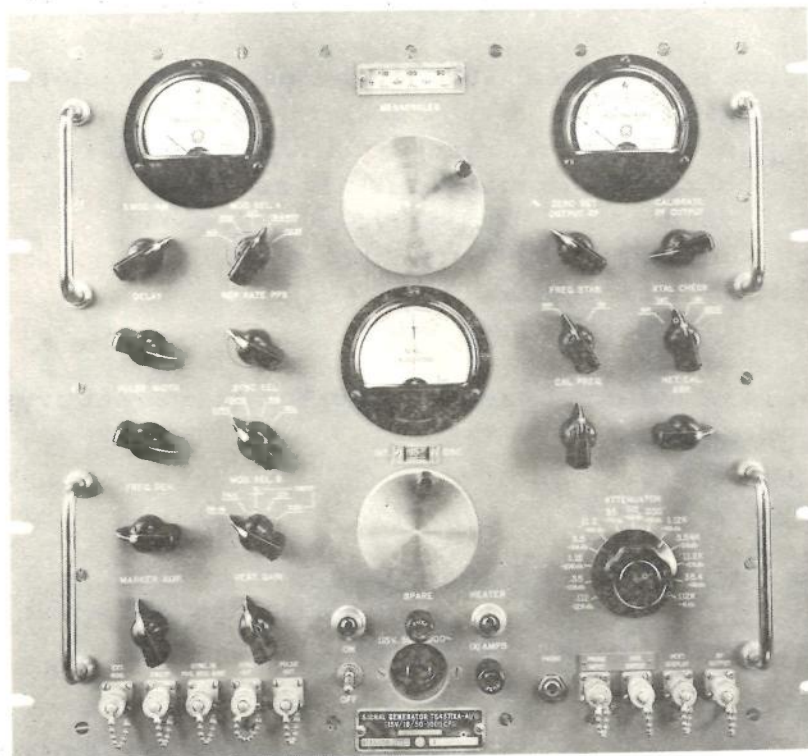
SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Signal Generator TS-419/U with accessories	8	24	24	24	80.00

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Signal Generator TS-419/U		7CAC-363969 R16-AN-TS-419/U 3F4325-419	10-7/8	17-3/8	14	43.00
1	Transit Case CY-686/U			16-1/2	18-3/4	12-1/2	18.00
1	Power Cable CY-337/U		7CAC-170264-86 R16-C-3824 3E6000-337-72	72	1-1/2		0.75
1	Radio Frequency Cable CG-546/U		7CAC-170265-217 R16-C-3738-700 3E6015-546-3	72	27/64		0.25
2	Video Cable CG-409/U		7CAC-170265-395 R16-C-3761 1F430-409.96	98	27/64		0.50
3	Adapter UG-255/U		8850-108880 2Z308-255	3/4	1-5/8		0.18
3	Adapter UG-201/U		8850-101950 2Z308-201	3/4	1-9/16		0.18
3	Adapter UG-273/U		8850-102000 R16-A-478 2Z308-273	3/4	1-5/8		0.18
3	Lamp		17-L-6297	3/8	1-3/32		0.60
							(Continued)

SIGNAL GENERATOR TS-437(XA-A)/U
(GENERATOR, SIGNAL, TS-437(XA-A)/U)



FUNCTIONAL DESCRIPTION:

A portable, general purpose, field type signal generator used to determine the characteristics of radio and radar receivers.

RELATIONSHIP TO OTHER EQUIPMENT:

Similar to TS-437(XA)/U, but with improved parts and closer tolerances.
Overall nomenclature for this signal generator is AN/USM-16.

ELECTROMECHANICAL DESCRIPTION:

Power Supply: 110 volts, AC, 50 to 1000 cycles per second, single phase.
Frequency Range: 10 to 440 megacycles per second, 1 band.
Output Voltage: 0.25 to 100,000 microvolts calibrated, 1 volt uncalibrated.
Output Impedance: 50 ohms.
Power Output: -6 to -120 dbm calibrated.
Type of Transmission: Amplitude Modulation, Frequency Modulation, Pulse.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Development		
STOCK NOS.	7CAC-363918		
PROCUREMENT INFO.: USAF Spec. No. X-7277			
PROCUREMENT COG.: USAF		DESIGN COG.: USAF, C&N	
F.I.I.N.:		FUNCTIONAL CLASS NO.: 4.1.2	
- Electronics Test Equipment -			TS-437(XA-A)/U

SIGNAL GENERATOR TS-437(XA-A)/U
(GENERATOR, SIGNAL, TS-437(XA-A)/U)

ELECTROMECHANICAL DESCRIPTION: (Continued)

Modulation Data:

Amplitude Modulated at 400 and 1000 cycles per second internal, 20 to 20,000 cycles per second external.

Frequency Swing: ± 0.0125 to ± 7.5 megacycles per second in two ranges.

± 12.5 to ± 75 kilocycles per second.

± 0.075 to ± 7.5 megacycles per second.

Pulse Repetition Rate: 50 to 5000 pulses per second.

Pulse Width: 1 to 30 microseconds.

Pulse Delay: 1 to 100 microseconds.

Accuracies:

Frequency: $\pm 0.5\%$ of indicated value, $\pm 0.002\%$ with internal crystal calibrator.

Power Output: ± 1 decibel.

Frequency Swing: $\pm 5\%$.

Pulse Repetition Rate: $\pm 10\%$.

MANUFACTURERS' OR CONTRACTORS' DATA:

Rollin Company, 2010 Lincoln Avenue, Pasadena 3, California; E. O. No. 110-60, Addendum 1, Contract No. AF 33(038)14321.

TUBE COMPLEMENT:

8 JAN-12AU7, 7 JAN-6BN6, 4 JAN-6BH6, 1 JAN-OA2, 2 JAN-6D4, 1 JAN-6AQ5,
7 JAN-6AU6, 2 JAN-OB2, 2 JAN-6AL5, 17 JAN-12AT7, 3 JAN-2C39, 1 JAN-5675,
1 JAN-5H20, 2 JAN-6BF7, 2 JAN-5U4G, 1 JAN-5651, 4 JAN-6AS7G, 5 JAN-6AH6.

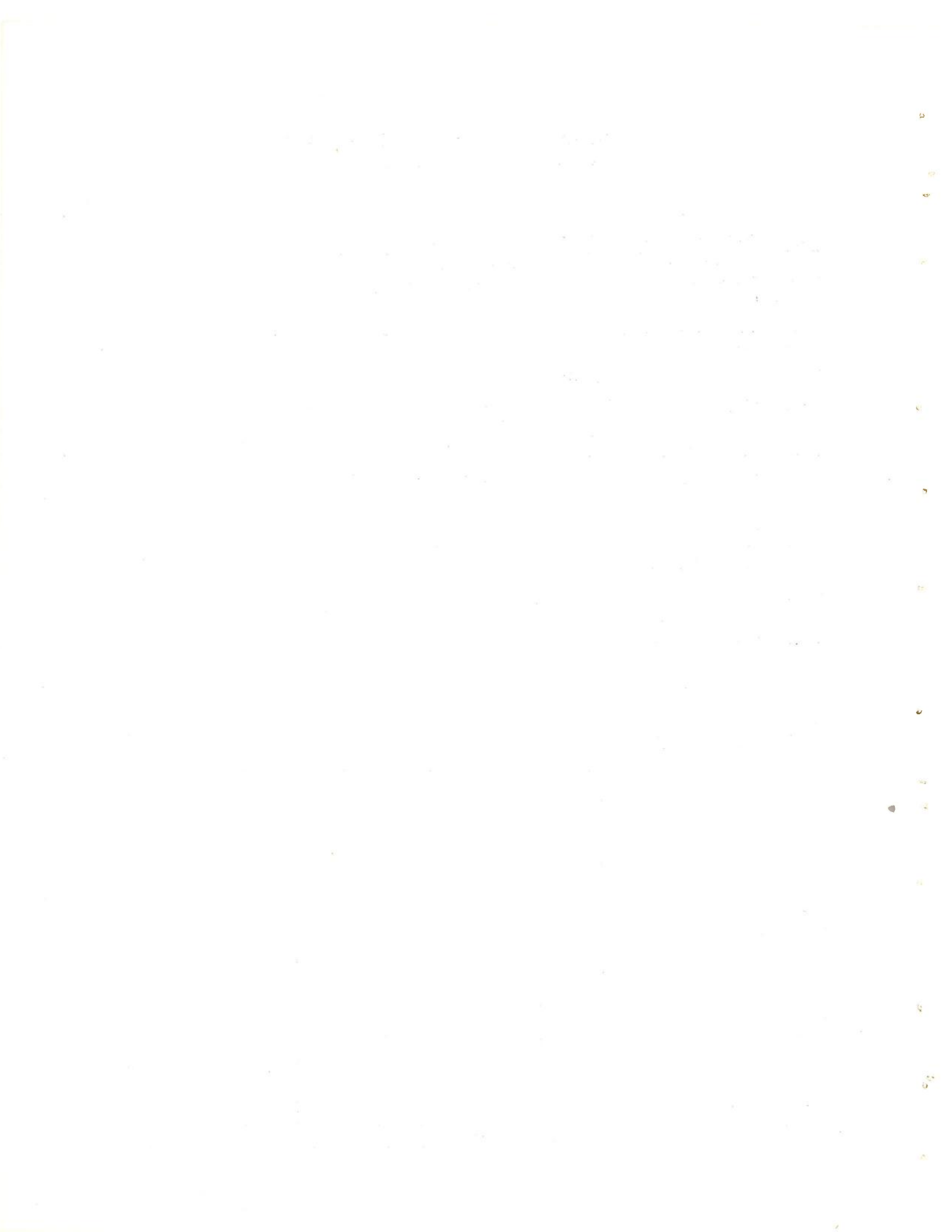
REFERENCE DATA AND LITERATURE:

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	

TS-437(XA-A)/U

- Electronics Test Equipment -



SIGNAL GENERATOR TS-465/U
(GENERATOR, SIGNAL, TS-465/U)



FUNCTIONAL DESCRIPTION:

A portable, general purpose, crystal controlled signal generator used in the calibration and alignment of amplitude and frequency modulated radio and television equipment. Its extremely high voltage output makes possible visual, stage by stage alignment of IF stages, limiter and discriminator. A self-contained decibel meter provides a convenient means of measuring power and voltage and determining resonance in alignment work.

RELATIONSHIP TO OTHER EQUIPMENT:

Similar to Hickok Model 288X.

ELECTROMECHANICAL DESCRIPTION:

Power Supply: 105 to 125 volts, AC, single phase, 55 to 65 cycles per second, 20 watts.

Amplitude Modulated Pure RF Frequency Ranges: 100 kilocycles per second to 110 megacycles per second in 7 ranges.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Standard		
STOCK NOS.	7CAC-363950		3F3868
PROCUREMENT INFO.:			
PROCUREMENT COG.:	Army	DESIGN COG.:	Army, CSL
F.I.I.N.:		FUNCTIONAL CLASS. NO.:	4.1.2
- Electronics Test Equipment -			TS-465/U

SIGNAL GENERATOR TS-465/U
(GENERATOR, SIGNAL, TS-465/U)

ELECTROMECHANICAL DESCRIPTION: (Continued)

Frequency Modulated RF Frequency Ranges:

Narrow Band (0 to 30 kilocycles per second Sweep): 100 kilocycles per second to 110 megacycles per second in 7 ranges.

Wide Band (0 to 150, 450 kilocycles per second Sweep): 1 to 160 megacycles per second in 7 ranges.

Modulation:

Amplitude Modulation: 400 cycles per second.

Frequency Modulation:

0 to 450 kilocycles per second variable sweep, 50 megacycles per second, modulating frequency, 60 cycles per second.

0 to 150 kilocycles per second variable sweep, 50 megacycles per second, modulating frequency, 400 cycles per second.

0 to 30 kilocycles per second variable sweep, 1000 kilocycles per second, modulating frequency, 60 cycles per second.

External Modulation:

Amplitude or Frequency Modulation, variable 0 to 15,000 cycles per second.

Audio Frequency Range: Fixed at 400 cycles per second; variable from 0 to 15,000 cycles per second.

Crystal Controlled Output:

100 kilocycles per second, unmodulated: harmonics to 15 megacycles per second.

100 kilocycles per second, 400 cycle per second amplitude modulation: harmonics to 15 megacycles per second.

1000 kilocycles per second, unmodulated: harmonics to 125 megacycles per second.

1000 kilocycles per second, 400 cycle per second amplitude modulation; harmonics to 125 megacycles per second.

Output:

Radio Frequency: Continuously variable with steps x 1, x 10, and x 100.

Audio Frequency: Continuously variable, 400 cycles per second and 0 to 15 kilocycles per second.

Synchronized Sweep Voltage: 67 volts, 60 cycles per second.

Decibel Meter Range: -10 to +6, +6 to +22, +22 to +38.

MANUFACTURERS' OR CONTRACTORS' DATA:

Hickok Electrical Instrument Company, 10514 Dupont Avenue, Cleveland 8, Ohio; Approximate Cost per Unit, \$186.00.

TUBE COMPLEMENT:

1 JAN-6J5, 1 JAN-6K8, 1 JAN-7N7, 1 JAN-6SJ7, 1 JAN-6X5WGT, 1 JAN-6AB7, 1 JAN-0D3.

REFERENCE DATA AND LITERATURE:

TO 16-35TS465-5 (TM 11-2642) (Installation, Operation, and Maintenance Instructions).

**SIGNAL GENERATOR TS-465/U
(GENERATOR, SIGNAL, TS-465/U)**

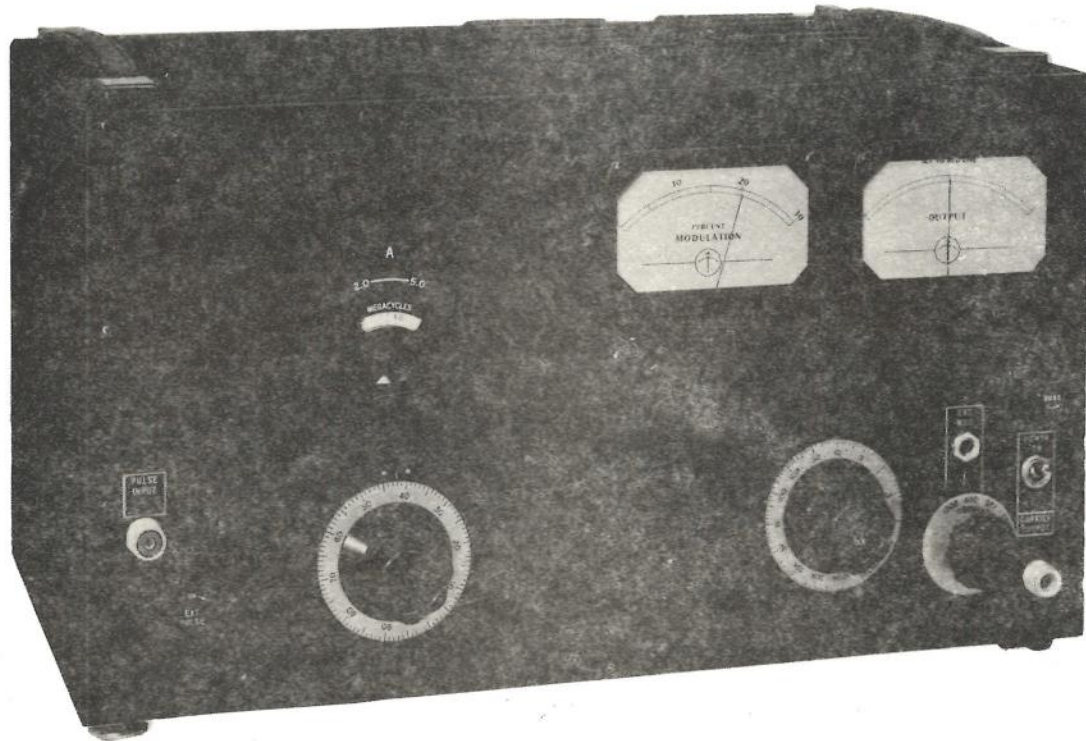
SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Signal Generator TS-465/U (Export Packed) (Domestic Packed)	5.0				75 36

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Signal Generator TS-465/U	Steel	7CAC-363950 3F3868	13-1/4	13-1/4	8-3/16	33
1	Output Cable			36 long			0.85
2	Test Lead			36 long			0.5

**SIGNAL GENERATOR TS-497/URR
(GENERATOR, SIGNAL, TS-497/URR)**



FUNCTIONAL DESCRIPTION:

A portable, general purpose, amplitude modulated signal generator used for testing radar and radio sets. It can be externally pulsed or amplitude modulated.

RELATIONSHIP TO OTHER EQUIPMENT:

Similar to Measurements Model 80 Signal Generator.

ELECTROMECHANICAL DESCRIPTION:

Power Supply: 110 volts, $\pm 10\%$, 50 to 60 cycles per second, AC, single phase.

Frequency Range: 2 to 400 megacycles per second in six bands.

Type of Transmission: Amplitude Modulated.

Accuracy: Better than 0.5% of full scale.

Calibration: No crystal calibrator.

Internal Modulation Frequency: 400 and 1000 cycles per second, amplitude modulated, variable 0 to 30%.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.	7CAC-363891	R16-G-3165	3F4325-497
PROCUREMENT INFO.:	Spec. MIL-S-10262 (Sig. Corps), Sig. Corps 71-3255		
PROCUREMENT COG.:	Army	DESIGN COG.:	Army, CSL
F.I.I.N.:	FUNCTIONAL CLASS. NO.: 4.1.2		
	- Electronics Test Equipment -		TS-497/URR

SIGNAL GENERATOR TS-497/URR
(GENERATOR, SIGNAL, TS-497/URR)

ELECTROMECHANICAL DESCRIPTION: (Continued)

External Modulation: External pulse modulator connection provided, 50 to 10,000 cycles per second; amplitude modulator connection provided.

Voltage Output: 0.1 to 100,000 microvolts, calibrated.

Output Impedance: 50 ohms.

Attenuator Leakage: Less than 0.1 microvolt.

MANUFACTURERS' OR CONTRACTORS' DATA:

Measurements Corporation, Boonton, New Jersey; Sig. Corps Order No. 2429-MPD-45. E.O. 781-24; Approximate Cost per Unit, \$400.00.

TUBE COMPLEMENT:

1 JAN-955, 1 JAN-5Y3GT, 2 JAN-6V6GT/G, 1 JAN-6SJ7GT, 2 JAN-6SN7GT, 1 JAN-0C3/VR-105, 1 JAN-0A3/VR-75, 1 JAN-6SL7GT.

REFERENCE DATA AND LITERATURE:

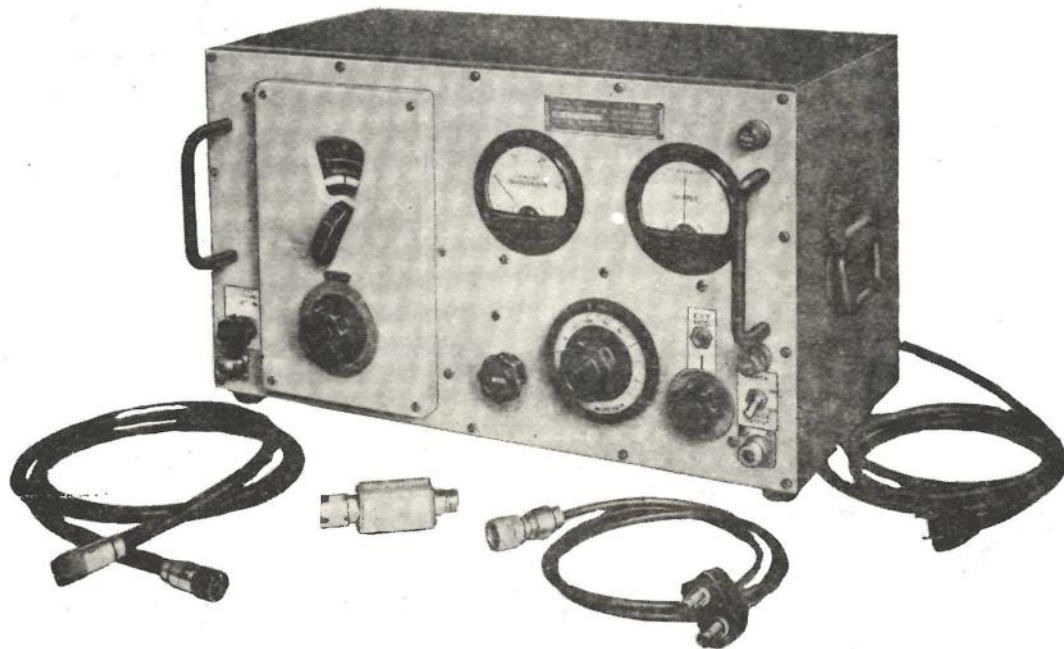
SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Signal Generator TS-497/URR	Steel	7CAC-363891 3F4325-497	10-3/4	19	9-1/2	35
1	Transit Case	Ply-wood		13	24	13	

SIGNAL GENERATOR TS-497A/URR
(GENERATOR, SIGNAL, TS-497A/URR)



FUNCTIONAL DESCRIPTION:

A portable, general purpose, signal generator designed primarily for laboratory and field use in making precise measurements in the development and maintenance of radio and video equipment. Internal and external amplitude modulation may be used. An input jack is provided for pulse modulation from an external source. All controls, meters, and assemblies are mounted on the front panel.

RELATIONSHIP TO OTHER EQUIPMENT:

Similar to Federal Model No. 6041X-1.

Similar to TS-497/URR except for maintenance parts.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: Radio frequency signals are provided by a carrier frequency oscillator. This oscillator output is fed to a carrier output jack through a piston attenuator, and to an output metering system consisting of a barretter bridge and

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Limited Standard		
STOCK NOS.	7CAC-365320	R16-G-3165	3F4325-497A
PROCUREMENT INFO.:	Army, Signal Corps Spec. No. 71-3255, Dwg. No. 1060		
PROCUREMENT COG.:	Army	DESIGN COG.:	Army, CSL
F.I.I.N.:	FUNCTIONAL CLASS. NO.: 4.1.2		
- Electronics Test Equipment -			TS-497A/URR

**SIGNAL GENERATOR TS-497A/URR
(GENERATOR, SIGNAL, TS-497A/URR)**

ELECTROMECHANICAL DESCRIPTION: (Continued)

output meter. Proper setting of output meter causes the microvolt calibration of the microvolts dial to be a true indication of the carrier output voltage. An internal audio oscillator provides sine wave signals for amplitude modulation. An internal audio amplifier, called a modulator, amplifies either the internal audio oscillator output or an external audio oscillator output and uses the amplified signal to plate modulate the carrier oscillator.

Power Supply: 117 volts $\pm 10\%$, AC, single phase, 50 to 60 cycles per second, 65 watts approximately.

Frequency Range: 2 to 400 megacycles per second in six bands.

Internal Modulation Frequency: 400 or 1000 cycles per second.

External Modulation Frequency: 50 to 10,000 cycles per second.

External Pulse Modulation: Pulse generator should provide a minimum of 150 volts peak and have an output impedance of 1000 ohms or less.

Modulation: 0 to 30% for sine waves.

Type of Transmission: Amplitude Modulated Carrier, Pulsed Carrier.

Output Impedance: 50 ohms.

Output Voltage: 0.1 to 100,000 microvolts continuously variable.

Attenuator Leakage: Less than 0.1 microvolt.

Stray Field: Less than 0.2 microvolt at any point outside the case.

Accuracy: $\pm 0.5\%$ of full scale.

MANUFACTURERS' OR CONTRACTORS' DATA:

Electronic Measurements Company, 423 Broome Street, New York 13, New York;
Order No. 11968-Phila-49; Signal Corps Order No. 2429-MFD-45.

TUBE COMPLEMENT:

1 JAN-0A3/VR-75, 2 JAN-6AQ5, 1 JAN-5Y3GT, 1 JAN-0C3/VR-105, 1 JAN-6AU6, 2 JAN-12AU7, 1 JAN-12AX7, 1 JAN-955.

REFERENCE DATA AND LITERATURE:

TO 16-35TS497-5 (TM 11-5030) (Instruction Book).

SHIPPING DATA:

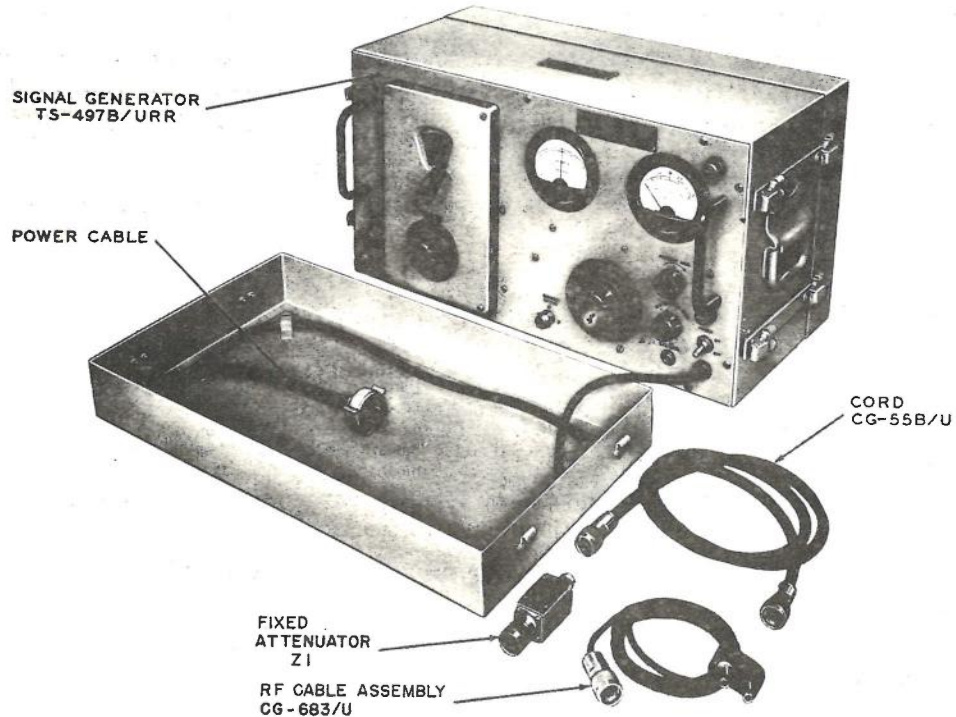
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Signal Generator TS-497A/URR, with accessories (Shelf Package-Water Resistant Carton)	3.5	17	23-3/4	15	75.0
TS-497A/URR - Electronics Test Equipment -						

SIGNAL GENERATOR TS-497A/URR
(GENERATOR, SIGNAL, TS-497A/URR)

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Signal Generator TS-497A/URR	Metal	7CAC-365320 3F4325-497A	9-1/2	19	10-5/8	48.00
1	Cord CG-55B/U		1800-322849101 1F430-55B	50 long			0.75
1	RF Cable Assembly CG-683/U			50 long			0.25
1	Impedance Matching Pad			1	3-1/2	1	0.30
2	Set of Spares						1.00
1	Instruction Book			11	8-1/2		
						Total:	50.30
- Electronics Test Equipment - TS-497A/URR							

**SIGNAL GENERATOR TS-497B/URR
(GENERATOR, SIGNAL, TS-497B/URR)**



FUNCTIONAL DESCRIPTION:

A portable, general purpose, signal generator designed primarily for laboratory and field use in making precise measurements in the development and maintenance of radio and video equipment. Internal and external amplitude modulation may be used. An input jack is provided for pulse modulation from an external source. All controls, meters, and assemblies are mounted on the front panel.

RELATIONSHIP TO OTHER EQUIPMENT:

Functionally interchangeable with previous models.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: Radio frequency signals are provided by a carrier frequency oscillator. This oscillator output is fed to a carrier output jack through a piston attenuator, and to an output metering system consisting of a barreter bridge and

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Standard		
STOCK NOS.	7CAC-363892-3		3F4325-497B
PROCUREMENT INFO.: MIL-Spec. 10262			
PROCUREMENT COG.: Army		DESIGN COG.: Army, CSL	
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 4.1.2	
- Electronics Test Equipment -			TS-497B/URR

SIGNAL GENERATOR TS-497B/URR
(GENERATOR, SIGNAL, TS-497B/URR)

ELECTROMECHANICAL DESCRIPTION: (Continued)

output meter. Proper setting of output meter causes the microvolt calibration of the microvolts dial to be a true indication of the carrier output voltage. An internal audio oscillator provides sine wave signals for amplitude modulation. An internal audio amplifier, called a modulator, amplifies either the internal audio oscillator output or an external audio oscillator output and uses the amplified signal to plate modulate the carrier oscillator.

Power Supply: 117 volts, $\pm 10\%$, AC, single phase, 50 to 60 cycles per second, 65 watts approximately.

Frequency Range: 2 to 400 megacycles per second in six bands.

Internal Modulation Frequency: 400 or 1000 cycles per second.

External Modulation Frequency: 50 to 10,000 cycles per second.

External Pulse Modulation: Pulse generator should provide a minimum of 150 volts peak and have an output impedance of 1000 ohms or less.

Percent Modulation: 0 to 30 for sine waves.

Type of Transmission: Amplitude Modulated Carrier, Pulsed Carrier.

Output Impedance: 50 ohms.

Output Voltage: 0.1 to 100,000 microvolts continuously variable.

Attenuator Leakage: Less than 0.1 microvolt.

Stray Field: Less than 0.2 microvolts at any point outside the case.

Accuracy: $\pm 0.5\%$ of indicated frequency on all ranges.

MANUFACTURERS' OR CONTRACTORS' DATA:

The Daven Company, 195 Central Avenue, Newark, New Jersey.

TUBE COMPLEMENT:

1 JAN-OA3/VR-75, 2 JAN-6AQ5, 1 JAN-5Y3GT, 1 JAN-OC3/VR-105, 1 JAN-6AU6, 1 JAN-12AU7, 1 JAN-955.

REFERENCE DATA AND LITERATURE:

TO 16-35TS497-7 (TM 11-5030A) (Instruction Book).

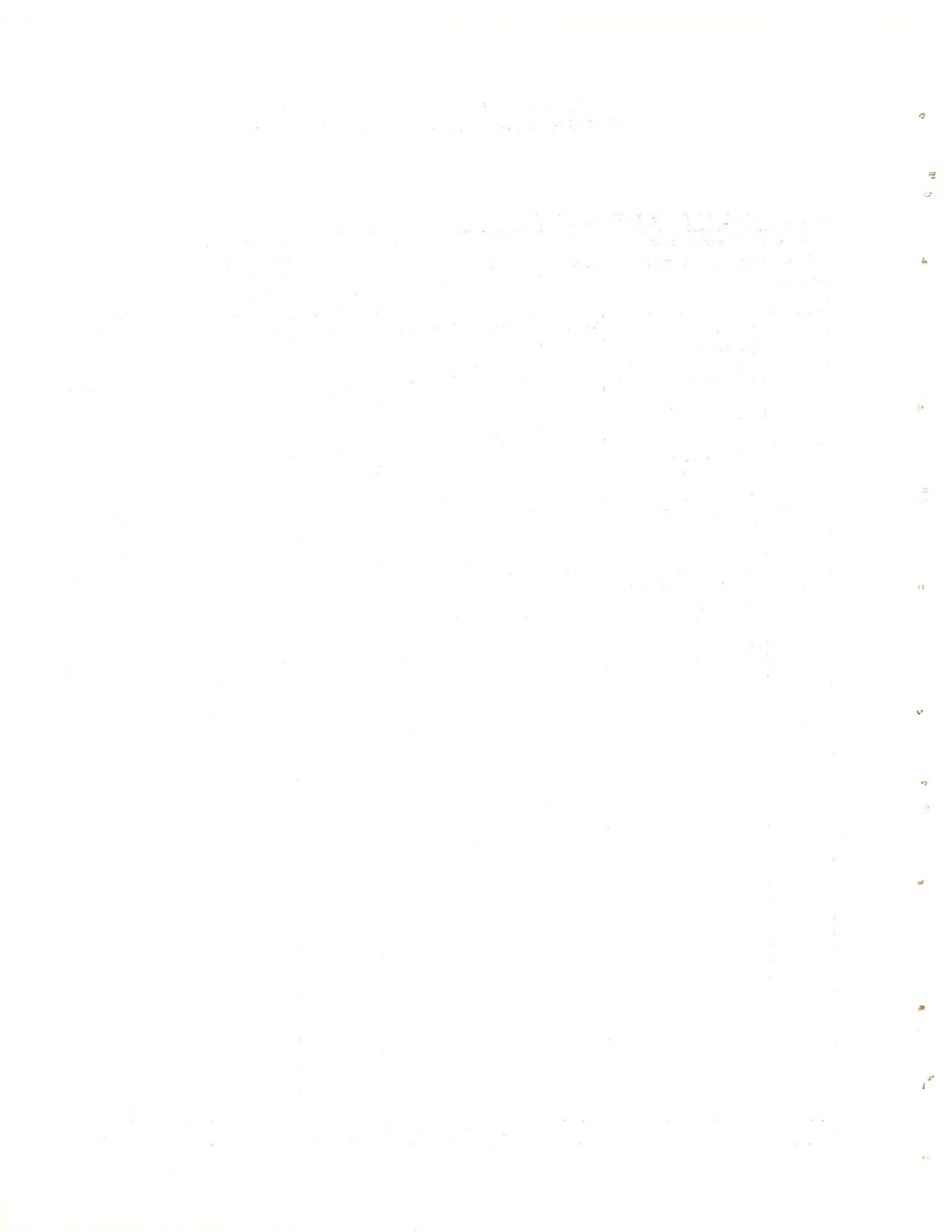
SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Signal Generator TS-497B/URR, with accessories (Shelf Package, Water-Resistant Carton)	3.5				75.00
TS-497B/URR - Electronics Test Equipment -						

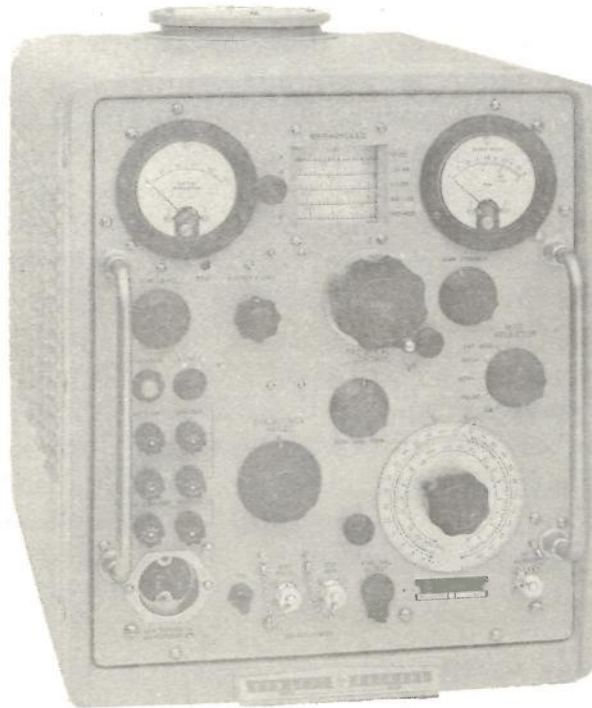
SIGNAL GENERATOR TS-497B/URR
(GENERATOR, SIGNAL, TS-497B/URR)

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Signal Generator TS-497B/URR	Metal	7CAC-363892-3 3F4325-497B	11-5/8	20-1/8	11-1/8	54.7
1	Cord CG-55B/U		 3E5999A-1	50 long			0.75
1	RF Cable Assembly CG-683/U		 3E6015-683.1	50 long			0.25
1	Fixed Attenuator		 2Z394.85	1	3-1/2	1	0.30
1	Set of Running Spares						1.00
2	Instruction Book						
						Total:	57.00
- Electronics Test Equipment - TS-497B/URR							



SIGNAL GENERATOR TS-510/U



FUNCTIONAL DESCRIPTION:

A portable, general purpose signal generator designed to furnish signals with very low spurious energy content, suitable for alignment of narrow-band amplitude modulated receivers. It is used for testing, calibrating, and troubleshooting VHF radio equipment and circuits and for measuring standing wave ratios, antenna and transmission line characteristics, receiver sensitivity, etc. It is for test bench use and not for permanent installation. It may be amplitude modulated by internally generated sine waves or by externally applied sine waves or pulses.

RELATIONSHIP TO OTHER EQUIPMENT:

The overall nomenclature for TS-510/U and accessories is Signal Generator AN/USM-44.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: A Colpitts type RF oscillator generates the RF signal which is fed through a buffer amplifier and power amplifier to the output jack of the signal generator. The buffer isolates the oscillator from the power amplifier

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Standard		
STOCK NOS.	7CAC-363853	F16-G-63151-2401	
PROCUREMENT INFO.:	Spec. MIL-G-7702 (Aer)		
PROCUREMENT COG.:	Navy	DESIGN COG.:	Navy, BuAer
F.I.I.N.:	FUNCTIONAL CLASS. NO.: 4.1.2		
	- Electronics Test Equipment -		TS-510/U

SIGNAL GENERATOR TS-510/U

ELECTROMECHANICAL DESCRIPTION: (Continued)

and minimizes interaction between the two circuits. The RF power amplifier receives both the RF and modulation signals and amplifies the RF energy for application to the output attenuator. The RF amplifier also receives variable bias from the modulator which permits adjustment of the power level fed to the output attenuator. The output power monitor samples the RF energy fed to the output attenuator and indicates the power and voltage level on a front panel meter. The output attenuator obtains monitored RF energy from the power amplifier, applies the selected degree of attenuation, and conducts the energy to the front panel output jack. The beat frequency calibrator generates harmonics of the 5 megacycle signal from the crystal and mixes these harmonics with RF energy coupled to the RF amplifier. The resultant beat frequency signal is amplified and fed to the front panel earphone jack. The internal modulation oscillator generates a fixed sine wave for application to the modulation system. The modulator receives all variable bias to the RF amplifier for control of the RF power level. The modulation measuring circuits receive detected modulation from the RF power monitor, amplify and rectify it, and indicate the modulation percentage directly on a front panel meter.

Power Supply: 105 to 125 volts, AC, single phase, 50 to 1000 cycles per second, 180 watts.

Frequency Range: 10 to 420 megacycles per second in five bands.

Type of Transmission: Amplitude Modulated, Pulse Modulated, Continuous Wave.

Crystal Calibrator: 5 megacycle oscillator accurate to $\pm 0.01\%$ providing check points at each 5 megacycles over full frequency range. Provides 0.1 milliwatt or better to 600 ohm earphone set.

Accuracy of Frequency Calibration: With crystal calibrator, $\pm 0.05\%$ at check points. Without calibrator, $\pm 0.5\%$ overall.

Output Voltage: Continuously adjustable from 0.1 microvolt minimum to 0.5 volt maximum when operated into rated load of 50 ohms (+4 to -127 dbm).

Output Level Meter: Monitors RF power level fed to output attenuator; calibrated 0 to 7 dbm and 0.1 to 0.5 volt.

Output Level Calibration Accuracy: For all conditions of operation the accuracy of the attenuator dial is within ± 2 decibels.

Rated Load: Nominally 50 ohms resistive.

Output Circuit Standing Wave Ratio: The voltage standing wave ratio measured at the output connector is less than 1.2 (standing wave ratio 1.6 decibels).

Internal Modulation: Sine waves at frequencies of 400 and 1000 cycles per second $\pm 5\%$. Percent modulation continuously adjustable from 0 to 95% at output levels up to 0 dbm.

External Sine Wave Modulation: 100 to above 20,000 cycles per second. Percent modulation continuously adjustable from 0 to 95% at RF output levels up to 0 dbm with modulating voltages from 4 to 25 volts rms.

Percent Modulation: Indicated by direct reading panel meter accurate to $\pm 10\%$.

Envelope Distortion for Sine Wave Modulation: Less than 5% at 30% modulation for frequencies from 100 to 5000 cycles per second. Less than 10% at 50% modulation.

(Continued)

SIGNAL GENERATOR TS-510/U

ELECTROMECHANICAL DESCRIPTION: (Continued)

Input Impedance for External Sine Modulation: 20,000 ohms shunted by 50 micro-microfarads.

External Pulse Modulation: RF pulses as short as 1 microsecond obtainable at frequencies above 100 megacycles per second. Residual RF between pulses is 25 decibels below maximum pulse amplitude for RF frequencies below 300 megacycles (22 decibels for frequencies above 300 megacycles).

Input Impedance for External Pulse Modulation: 50,000 ohms shunted by 40 micro-microfarads.

MANUFACTURERS' OR CONTRACTORS' DATA:

Hewlett-Packard Company, 395 Page Mill Road, Palo Alto, California; BuAer Contract NOas 53-8531; Drawing 608C-E-802.

TUBE COMPLEMENT:

2 JAN-6AH6, 2 JAN-6AL5W/5726, 3 JAN-6AU6WA, 1 RETMA-6BC4, 3 RETMA-6CL6, 2 JAN-12AT7WA, 2 JAN-5814/12AU7, 1 JAN-5651, 1 JAN-5670, 1 JAN-5675, 1 JAN-5687, 1 JAN-5876, 2 JAN-6080, (2 JAN-1N82, 2 JAN-G11A crystal diodes).

REFERENCE DATA AND LITERATURE:

- NAVAER 16-30USM44-501 (Operating Instructions).
- NAVAER 16-30USM44-502 (Service Instructions).
- NAVAER 16-30USM44-503 (Overhaul Instructions).
- NAVAER 16-30USM44-504 (Illustrated Parts Breakdown).
- Hewlett-Packard Instruction and Operating Manual.

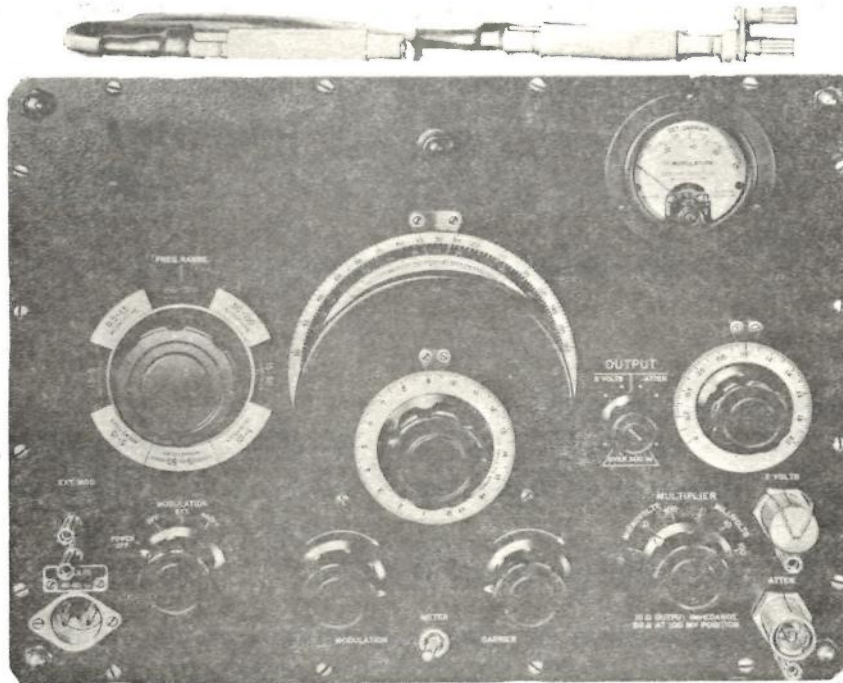
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No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
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EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Signal Generator TS-510/U	Aluminum	7CAC-363853 F16-G-63151-2401	16	13-1/4	20-1/8	62

SIGNAL GENERATOR TS-588/U



FUNCTIONAL DESCRIPTION:

A portable, general purpose signal generator for use in determining the performance of receivers at radio and supersonic frequencies. It can also be used as an RF voltage standard in field intensity measurements. Its wide carrier-frequency range makes it suitable for use as a power source in bridge measurements on supersonic equipment.

RELATIONSHIP TO OTHER EQUIPMENT:

Similar to General Radio Model 1001-A.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The carrier-frequency oscillator uses a Hartley circuit. The plates of the main tuning capacitor are shaped to give a logarithmic variation of frequency with angular rotation. A modulated buffer amplifier is used between the oscillator and the low-impedance output circuits. The attenuator system and the output meter are coupled to the amplifier through a high-pass filter.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.	7CAC-363903	FIG-C-62501-2418	3F3820.2
PROCUREMENT INFO.:	Army Spec. 71-3353		
PROCUREMENT COG.:	Army	DESIGN COG.: Army, CSL	
F.I.I.N.:	FUNCTIONAL CLASS. NO.:		4.1.2
- Electronics Test Equipment -			TS-588/U

SIGNAL GENERATOR TS-588/U

ELECTROMECHANICAL DESCRIPTION: (Continued)

Power Supply: 105 to 125 (or 210 to 250) volts, AC, single phase, 40 to 60 cycles per second; 65 watts at 115 volts.

Frequency Range: 5 kilocycles per second to 50 megacycles per second in eight bands: 5 to 15, 15 to 50, 50 to 150, 150 to 500 kilocycles per second; 0.5 to 1.5, 1.5 to 5, 5 to 15, 15 to 50 megacycles per second.

Type of Transmission: Amplitude Modulated, Frequency Modulated.

Output Voltage:

0.1 to 200,000 microvolts continuously adjustable at attenuator jack, with open circuit.

0.05 to 100,000 microvolts continuously adjustable with output cable terminated at both ends.

2 volts at panel jack with open circuit.

Output Impedance: 10 ohms at attenuator jack; 50 ohms at highest output position of the attenuator; 25 ohms at end of terminated cable; 300 ohms at the 2 volts panel jack.

Modulation Frequency: 400 cycles per second.

Percentage Modulation: 0 to 80%.

Incidental Frequency Modulation: At 80% AM it varies from about 10 to 100 parts per million over 5 kilocycles per second to 15 megacycles per second ranges and is three times as great over 15 to 50 megacycles per second range. At lower modulation percentages it is approximately proportional to the modulation percentage.

Carrier Distortion: Approximately 5% on 15 kilocycles per second to 50 megacycles per second ranges; increases rapidly on 5 to 15 kilocycles per second range, reaching 12% at 5 kilocycles per second.

Envelope Distortion: About 6% at 80% AM.

Noise Level: Corresponds to about 0.1% modulation.

Leakage: Less than one microvolt per meter two feet from the generator.

Accuracies: $\pm 1\%$ of indicated frequency. $\pm 6\%$ ± 0.1 microvolt of indicated voltage at frequencies under 10 megacycles per second with output dial set at about full scale. $\pm 10\%$ ± 0.3 microvolt of indicated voltage at frequencies above 10 megacycles per second with output dial set at about full scale. $\pm 3\%$ of open circuit output voltage at 2 volts jack up to 15 megacycles per second. $\pm 10\%$ of indicated modulation.

MANUFACTURERS' OR CONTRACTORS' DATA:

General Radio Company, 275 Massachusetts Avenue, Cambridge 39, Massachusetts; Approximate Cost per Unit, \$535.00.

TUBE COMPLEMENT:

1 JAN-6C4, 1 JAN-6L6, 1 JAN-6AL5, 1 JAN-5Y3GT, 2 JAN-OC3/VR-105, 1 JAN-6SN7GT.

REFERENCE DATA AND LITERATURE:

SIGNAL GENERATOR TS-588/U

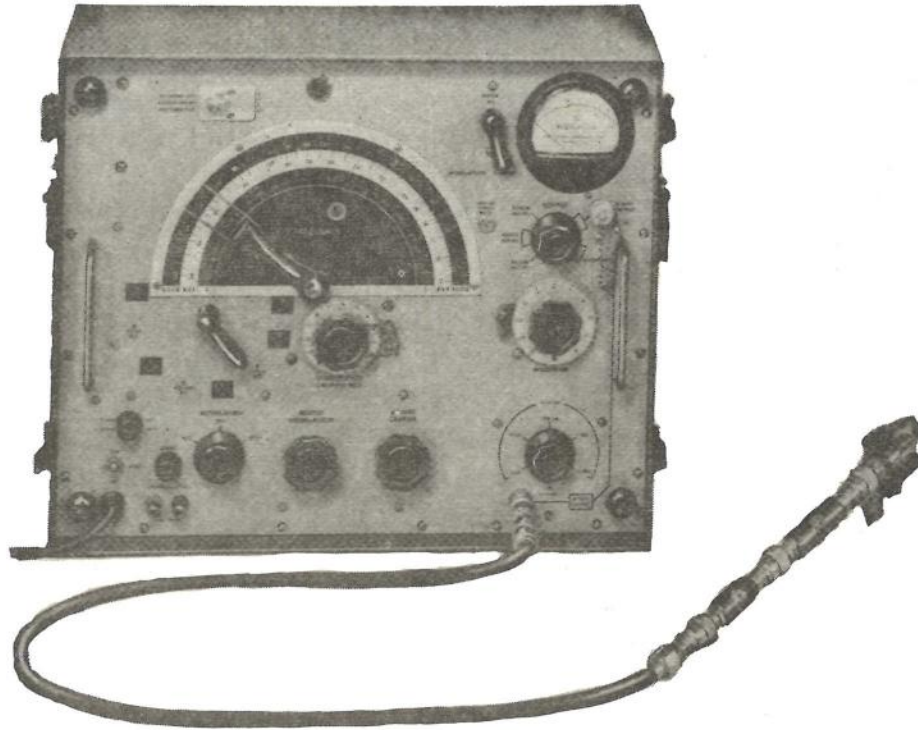
SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Signal Generator TS-588/U	Aluminum	7CAC-363903 FIG-C-62501-2418 3F3820.2	14-3/8	20-1/4	10-9/16	52
1	Coaxial Cable GR type 874-R10			36 long			
1	Termination Unit, GR type 1001 P 1						
1	Series Unit GR type 1001 P 2						
1	Adapter GR type 874-Q2						
1	Adjustment Tool, GR type 1001-215						
1	Power Cord						

SIGNAL GENERATOR TS-588A/U



FUNCTIONAL DESCRIPTION:

A portable, general purpose equipment that provides accurately calibrated test signals at radio and supersonic frequencies. It is used primarily to align and test the RF and IF circuits of radio receivers. Because of its calibrated output, it may be used for measuring the sensitivity and selectivity of receivers, as well as for making routine alignment adjustments. With an external audio oscillator the signal generator also may be used to measure the AF response of a receiver. This equipment can also be used as a secondary RF voltage standard for field intensity measurements, as a voltage source for many bridge measurements, and as a source of test signals for testing supersonic equipment. Indication is provided on a frequency dial, a percent modulation dial, and on step attenuator and multiplier control dials. When this equipment is used to align and test radio receivers, an output indicator is required, which must be supplied in addition to the equipment included with the signal generator.

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			3F3901-588A
PROCUREMENT INFO.:	Army Spec. 71-3353		
PROCUREMENT COG.:	Army	DESIGN COG.: Army, CSL	
F.I.I.N.:	FUNCTIONAL CLASS. NO.:		4.1.2
- Electronics Test Equipment -			TS-588A/U

SIGNAL GENERATOR TS-588A/U

RELATIONSHIP TO OTHER EQUIPMENT:

This signal generator is similar to Clough-Brengle Type No. 905.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The carrier frequency oscillator uses a Hartley circuit. A modulated buffer amplifier is used between the oscillator and the low-impedance output circuits. The attenuator system and the output meter are coupled to the amplifier through a high pass filter.

Power Supply: 105 to 125 or 210 to 250 volts, AC, 40 to 60 cycles per second, single phase, 65 watts at 115 volts.

Frequency Range: 5 kilocycles per second to 50 megacycles per second in eight bands: Band A - 5 to 15, Band B - 15 to 50, Band C - 50 to 150, Band D - 150 to 500 kilocycles per second, Band E - 0.5 to 1.5, Band F - 1.5 to 5.0, Band G - 5.0 to 15.0, Band H - 15.0 to 50.0 megacycles per second.

Type of Transmission: Amplitude Modulated, Continuous Wave.

Output Voltage:

0.1 microvolt to 0.2 volt continuously adjustable open-circuit voltage at the attenuator output jack.

0.5 microvolt to 0.1 volt continuously adjustable with output cable and terminating units at the attenuator output jack.

Up to 2 volts at frequencies up to 15 megacycles per second at the 2 volt output jack.

Output Impedance:

Approximately 15 ohms at attenuator output, except with attenuator in 0.1 volt position.

50 ohms at attenuator output with attenuator in 0.1 volt position.

25 ohms at the terminated cable.

1 ohm at the terminated cable with 100:1 voltage dividers.

Approximately 300 ohms at the 2 volt output jack.

Percent Modulation: 0 to 80% internal or external.

Modulation Frequency Range:

Internal: 400 cycles per second, fixed.

External: 20 cycles per second to 15 kilocycles per second.

External Modulation Input Impedance: 4000 ohms.

External Modulation Input Voltage: Up to 12 volts, maximum.

Frequency Modulation (Spurious): Less than 100 cycles per second per megacycle at 80% AM; up to 300 cycles per second per megacycle on Band H.

Noise Level: Carrier noise less than 0.1% modulation.

Envelope Distortion: Less than 6% at 80% AM.

Radiation: Stray fields less than 1 microvolt/meter 2 feet from case.

Accuracy: $\pm 1\%$ of indicated frequency.

MANUFACTURERS' OR CONTRACTORS' DATA:

Clough-Brengle Company, 6014 Broadway, Chicago 40, Illinois; Order No. 21755-PHILA-49 (Sig C).

SIGNAL GENERATOR TS-588A/U

TUBE COMPLEMENT:

1 JAN-5Y3GT, 1 JAN-OC3W, 1 JAN-6AQ5, 1 JAN-6AL5, 1 JAN-OD3, 2 JAN-6C4,
1 JAN-6AK6.

REFERENCE DATA AND LITERATURE:

TO 16-35TS588-5 (TM 11-5018 and C1) (Instruction Book).

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Signal Generator TS-588A/U including spares and accessories (Export Packed)	2.5	17-1/2	20-1/2	12	75

EQUIPMENT SUPPLIED:

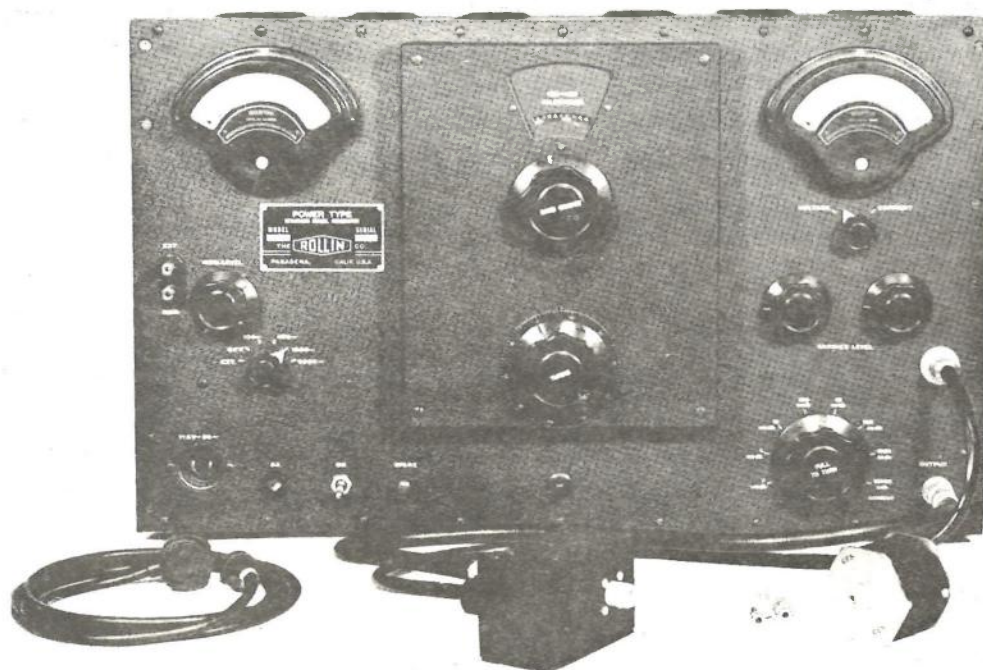
Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Signal Generator TS-588A/U Including:	Aluminum	3F3901-588A	14-1/2	17-1/2	9-3/4	55 (Complete)
1	Coaxial Output Cable			36 long	3/4	3/4	
1	50-ohm Termination Unit		3Z12501-1	3-1/2 long	3/4	3/4	
							(Continued)

SIGNAL GENERATOR TS-588A/U

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	40-ohm Series Unit		3Z12501-1.1	2-7/8 long	3/4	3/4	
1	100:1 Voltage Divider		3Z12501-1.3	4 long	3/4	3/4	
1	Dummy Antenna		3Z12501-1.4	4-1/8 long	3/4	3/4	
1	Binding Post Adapter		3Z12501-1.2	2-5/8 long	7/8	1-1/2	
1	BNC Adapter			3 long	3/4	3/4	
1	Wrench		7900-859500 6R55496-1	3-1/2 long	5/32	5/8	
2	Instruction Book			10-1/4	7-7/8	1/4	
8	Spare Fuse (1a/&1/2a/)			1-1/4 long	9/32	9/32	
1	Set of Spare Tubes						

SIGNAL GENERATOR TS-606/U



FUNCTIONAL DESCRIPTION:

A general purpose laboratory instrument designed to function as a stable, shielded, low impedance source of radio frequency power and as a calibrated generator of microvolt signals. It is capable of checking receiver frequency calibration, modulation characteristics, alignment. It is capable of measuring sensitivity, selectivity, and stage gain.

Carrier level and percent modulation are indicated by two VTVM mounted on the operating panel. Frequency is indicated by a calibrated dial which is also located on the front panel along with all controls, switches and adjustment knobs.

RELATIONSHIP TO OTHER EQUIPMENT:

Similar to Rollin Model 20 Standard Signal Generator.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: A Colpitts oscillator driving a push-pull class "C" amplifier
(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Substitute Standard		
STOCK NOS.			3F3868-606
PROCUREMENT INFO.:	USAF Exhibit MCREE-482		
PROCUREMENT COG.:	USAF	DESIGN COG.: USAF, C&N	
F.I.I.N.:	FUNCTIONAL CLASS. NO.:		4.1.2
- Electronics Test Equipment -			TS-606/U

SIGNAL GENERATOR TS-606/U

ELECTROMECHANICAL DESCRIPTION: (Continued)

is employed in the radio frequency section. The eight frequency ranges are obtained by band switching the tank coils and by automatic selection of the proper portions of the multiple section split-stator tuning condensers through the use of rotatable turrets which are controlled by a mechanism from the front panel.

The output of the amplifier is coupled to a carrier level control "L" pad which in turn supplies the step attenuator. Full output is not utilized in order to maintain harmonics content at a low value and to provide stable output independent of load impedance.

Tracking of the amplifier is accomplished by slug tuning at low frequency ends and by capacity trimming at high frequency ends of the individual tuning ranges.

Amplitude modulation is accomplished with a push-pull amplifier and modulator incorporating a high amount of negative feedback to reduce distortion.

Power Supply: 115 volts $\pm 10\%$, AC, single phase, 60 cycles per second.

Frequency Range: 85 kilocycles to 40 megacycles per second in eight bands.

Type of Transmission: Continuous Wave, Amplitude Modulated Carrier.

Voltage Output Range: 0.10 microvolts (160 decibels) to 10 volts, calibrated.

15 volts maximum, uncalibrated.

Power Output: 0 to 10 watts uncalibrated.

Output Impedance: 10 ohms.

Modulation Frequencies: 100, 400, 1000, or 3000 cycles per second.

Percentage Modulation: 0 to 80% (30% is normal).

Distortion: Less than 2% amplitude distortion for modulated carrier wave.

Frequency Drift: Less than $\pm 0.25\%$ after two-hour warm-up.

Accuracies:

$\pm 0.25\%$ of indicated frequency for carrier.

$\pm 2\%$ of indicated frequency for modulator.

$\pm 3\%$ of indicated percent modulation.

MANUFACTURERS' OR CONTRACTORS' DATA:

Rollin Company, 2010 Lincoln Avenue, Pasadena 3, California; Contract No. AF 33(038)6365; 6 June 1949; Approximate Cost per Unit, \$2,650.00.

TUBE COMPLEMENT:

2 JAN-5U4G, 1 JAN-6C4, 2 JAN-6L6, 1 JAN-6SN7, 1 JAN-6SK7, 4 JAN-6B4G, 2 JAN-6SF5, 1 JAN-829B, 3 JAN-9005, 3 JAN-OD3/VR-150.

REFERENCE DATA AND LITERATURE:

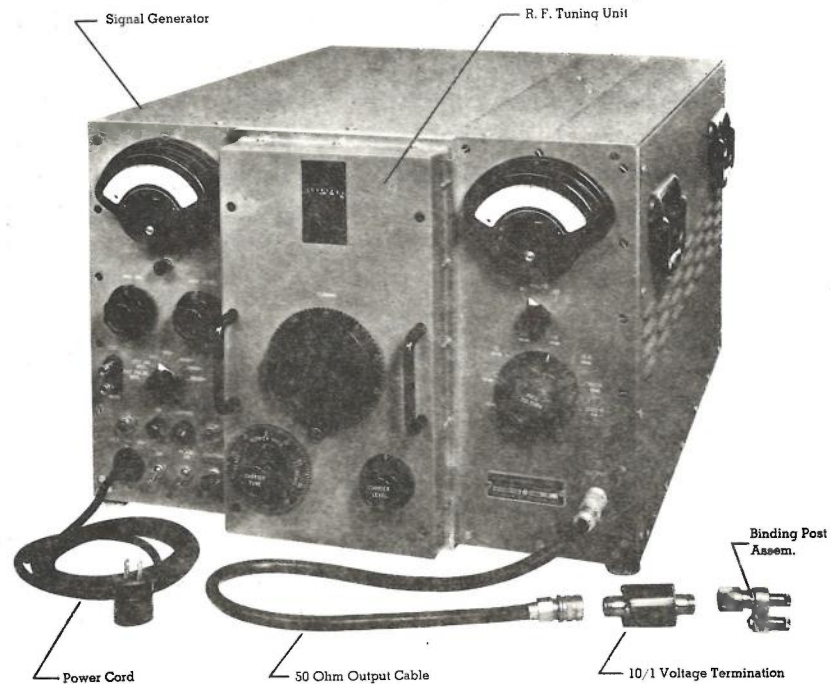
Rollin Company Signal Generator Model 20 (Instruction Manual).

SHIPPING DATA:

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SIGNAL GENERATOR TS-608/U



FUNCTIONAL DESCRIPTION:

A general purpose laboratory instrument designed to function both as a stable shielded source of radio frequency power and as a calibrated generator of micro-volt signals. Used to measure the performance of VHF-UHF filters and for making impedance measurements using slotted line techniques. Sufficient radio frequency power is available for performing actual antenna pattern measurements using normal methods of field intensity indication. Provision for indicating high values of output current permits measurement of leakage fields, etc.

The frequency, carrier level, and percent modulation of the output signal are all read directly from indicators located on the front panel. All operating controls are also mounted on the front panel.

RELATIONSHIP TO OTHER EQUIPMENT:

Similar to Rollin Company Model 30A Standard Signal Generator.

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREMENT INFO.: MCREE-483 Exhibit; USAF Spec. No. 71-5056-A			
PROCUREMENT COG.: USAF		DESIGN COG.: USAF, C&N	
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 4.1.2	
- Electronics Test Equipment -			TS-608/U

SIGNAL GENERATOR TS-608/U

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The radio frequency tuning unit comprises a master oscillator tuned power amplifier employing triodes in grid separation type circuits (grounded plate). Variable tuning over frequency range is accomplished by means of coaxial lines with movable end loading condensers in grid-plate and grid-cathode circuits of both the oscillator and power amplifier. All elements are ganged together to provide proper tracking for single dial control. The amplifier output passes through an attenuator to the output terminal. A vacuum tube voltmeter monitor is provided across the input to the attenuator to indicate carrier level.

A push-pull modulator plate modulating the power amplifier provides amplitude modulation of the output carrier. Pulse modulation must be obtained externally. Negative feedback is employed in the modulator to increase linearity and reduce distortion of the modulated wave. Percent modulation is indicated by a VTVM calibrated in percent.

Power Supply: 115 volts $\pm 10\%$, AC, single phase, 60 cycles per second.

Frequency Range: 40 to 400 megacycles per second.

Type of Transmission: Continuous Wave, Amplitude Modulated Carrier, Pulsed.

Output Voltage Range: (160 decibels) 0.1 microvolt to 10.0 volts, and 15 volts maximum across 50 ohms; 0.01 microvolt to 1.0 volt supplied from a 5 ohm source impedance at end of output cable.

Power Output Range: 5 watts nominal.

Output Impedance: 50 ohms; 5 ohms is provided for by means of a termination which comprises a 50 to 5 ohm "L" pad.

Amplitude Modulation: 100, 400, 1000, and 3000 cycles per second (0 to 80% internal); 40 to 16,000 cycles per second externally modulated.

Pulse Modulation: Pulse Amplitude: 25 volts or more, peak.

Pulse Repetition Rate: 50 to 5000 pulses per second.

Pulse Width: 2 to 100 microseconds.

External Modulation only.

Leakage: Less than 0.1 microvolt per meter.

Frequency Drift: Less than 0.1% in 8-hour period.

Accuracies: $\pm 1\%$ for carrier frequency.

$\pm 2\%$ for carrier level.

$\pm 2\%$ for percent modulation.

$\pm 2\%$ for modulator frequency.

$\pm 20\%$ for voltage.

MANUFACTURERS' OR CONTRACTORS' DATA:

Rollin Company, Division of Byron Jackson Company, 2010 Lincoln Avenue, Pasadena 3, California; Contract No. AF 33(038)6356, 6 June 1949; Approximate Cost per Unit, \$3,250.00.

TUBE COMPLEMENT:

Signal Generator: 2 JAN-2C39A, 1 JAN-201-C, 1 JAN-6H6, 3 JAN-6L6, 1 JAN-6SN7, 1 JAN-6SK7, 1 JAN-5H20, 1 type S-6.

Power Supply: 2 JAN-6AS7G, 2 JAN-6SF5, 2 JAN-5U4G, 3 JAN-OD3/VR-150.

SIGNAL GENERATOR TS-608/U

REFERENCE DATA AND LITERATURE:

Rollin Company Signal Generator Model 30A (Instruction Manual).

SHIPPING DATA:

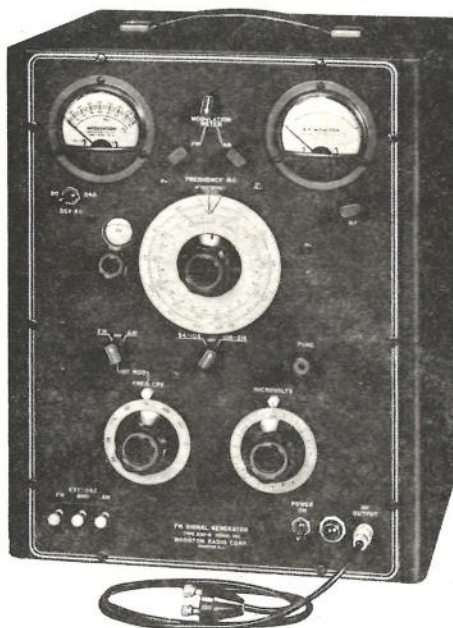
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Signal Generator TS-608/U					400

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Signal Generator TS-608/U less accessories	Metal		15-1/2	22	29	205
1	Triple Shielded Cable, Output			30 long			0.5
1	Termination 10/1, 50 to 5 ohms			3 long	1-1/2 dia.		2
1	Power Cord			10 long			0.5
1	Instruction Manual			8-1/2	11		0.5
- Electronics Test Equipment -							TS-608/U



SIGNAL GENERATOR
MODEL 202-B
(Boonton Radio Corporation)



FUNCTIONAL DESCRIPTION:

A portable, general purpose, test instrument used in the alignment of frequency modulated, amplitude modulated, and television receivers in the VHF range. The main frequency dial is calibrated in megacycles per second; for internal modulation, an eight position switch is calibrated in cycles per second; the modulation meter is calibrated in kilocycles per second for frequency modulation and in percentage modulation for amplitude modulation (switch controlled). Provision is made for external modulation.

RELATIONSHIP TO OTHER EQUIPMENT:

Used to test Aircraft Radio Corporation, Radio Set, Type 12. Similar to Signal Generator Model 202-D, Boonton Radio Corporation, except the "B" model does not have provision for external pulse and square wave modulation and has a lower frequency range.

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREMENT INFO.:			
PROCUREMENT COG.:	DESIGN COG.: Commercial		
F.I.I.N.:	FUNCTIONAL CLASS. NO.: 4.1.2		
- Electronics Test Equipment -			Model 202-B

SIGNAL GENERATOR
MODEL 202-B
(Boonton Radio Corporation)

ELECTROMECHANICAL DESCRIPTION:

Power Supply: 105 to 125 volts, AC, 50 to 60 cycles per second, single phase, 65 watts.
 Radio Frequency Range: 54 to 216 megacycles per second in two ranges. 54 to 108 megacycles per second and 108 to 216 megacycles per second.
 Type of Transmission: Frequency Modulation and Amplitude Modulation.
 Frequency Modulation (Deviation): Continuously variable from 0 to 240 kilocycles in three ranges: 0 to 24 kilocycles per second, 0 to 80 kilocycles per second, 0 to 240 kilocycles per second.
 Amplitude Modulation: The modulation meter is calibrated at 30%, and 50% modulation. Continuously variable from 0 to 50%.
 Modulating Oscillator (Internal): 8 fixed frequencies: 50, 100, 400 cycles per second and 1, 5, 7.5, 10, and 15 kilocycles per second (accurate within 5%).
 Radio Frequency Output Voltage: 0.1 microvolt to 0.2 volt.
 Output Impedance: (With cable attached) 26.5 ohms.
 Frequency Modulation Distortion: Less than 2% at 75 kilocycles deviation.
 Spurious Radio Frequency Output: All spurious radio frequency output voltages are at least 30 decibels below the desired fundamental. The radio frequency leakage is very low.
 Fidelity Characteristics: The deviation sensitivity of the frequency modulation system as a function of frequency is constant from DC to over 10 kilocycles per second. At 15 kilocycles per second the deviation as indicated on the modulation meter is 0.5 decibels higher than the true value. The amplitude modulation system is also flat from DC to 10 kilocycles per second and departs from nominal by 1.0 decibels at 15 kilocycles per second.

MANUFACTURERS' OR CONTRACTORS' DATA:

Boonton Radio Corporation, Intervale Road, Boonton, New Jersey; Approximate Cost per Unit, \$975.00, 1 January 1955.

TUBE COMPLEMENT:

1 RETMA-6AU6, 1 RETMA-6V6GT/G, 1 RETMA-6C4, 3 RETMA-6AK5, 1 RETMA-5Y3GT/G, 1 RETMA-Amperite-6H6, 1 RETMA-OD3/VR150.

REFERENCE DATA AND LITERATURE:

Manufacturer's Catalog "J1".

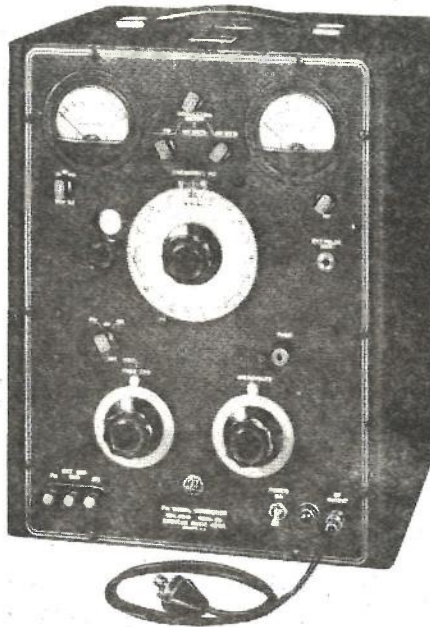
SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Signal Generator Model 202-B	3.0	20-1/4	16-1/2	15-5/8	47

Model 202-B - Electronics Test Equipment -



SIGNAL GENERATOR
MODEL 202-D
(Boonton Radio Corporation)



FUNCTIONAL DESCRIPTION:

A portable, general purpose, test instrument used in the calibration, alignment, and determination of sensitivity of frequency modulated and amplitude modulated receivers in the VHF range. The main frequency dial is calibrated in megacycles per second; for internal modulation; an eight position switch is calibrated in cycles per second; the modulation meter is calibrated in kilocycles per second for frequency modulation and in percentage modulation for amplitude modulation (switch controlled). Provision is made for external frequency modulation and amplitude modulation; a jack is provided which permits direct connection of an external modulating voltage source to the final stage for pulse and square wave modulation.

RELATIONSHIP TO OTHER EQUIPMENT:

Similar to Signal Generator Model 202-B, Boonton Radio Corporation, except the D model has provision for external pulse and square wave modulation and a higher radio frequency range. Used to test Radio Terminal Set AN/TRC-11.

ELECTROMECHANICAL DESCRIPTION:

Power Supply: 105 to 125 volts, AC, 50 to 60 cycles per second, single phase, 65 watts.
Radio Frequency Range: 175 to 250 megacycles per second, accurate to $\pm 0.5\%$.
Type of Transmission: Frequency and Amplitude Modulation (internal and external); Pulsed and Square Wave (external only).

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREMENT INFO.:			
PROCUREMENT COG.:	DESIGN COG.: Commercial		
F.I.I.N.:	FUNCTIONAL CLASS. NO.: 4.1.2		
- Electronics Test Equipment -			Boonton 202-D

SIGNAL GENERATOR
MODEL 202-D
 (Boonton Radio Corporation)

ELECTROMECHANICAL DESCRIPTION: (Continued)

Frequency Modulation (Deviation): Continuously variable from 0 to 240 kilocycles per second in three ranges: 0 to 24 kilocycles per second. 0 to 80 kilocycles per second, 0 to 240 kilocycles deviation.

Amplitude Modulation: The modulation meter is calibrated at 30%, 50%, and 100% modulation. Continuously variable from 0 to 100%. Modulation capabilities of internal oscillator maximum 50%. Modulation capabilities with external oscillator up to and including 100%.

Modulating Oscillator (Internal): 8 fixed frequencies: 50, 100, 400 cycles per second and 1, 5, 7.5, 10, and 15 kilocycles per second.

Radio Frequency Output Voltage: 0.1 microvolt to 0.2 volt.

Output Impedance: (With cable attached): 26.5 ohms.

Distortion:

Frequency Modulated: At 75 kilocycles per second less than 2%.

At 240 kilocycles per second less than 10%.

Amplitude Modulated: For 30% amplitude modulation less than 3%.

For 50% amplitude modulation less than 6.5%.

For 100% amplitude modulation, the distortion is 12 to 15% depending on the modulating frequency.

MANUFACTURERS' OR CONTRACTORS' DATA:

Boonton Radio Corporation, Intervale Road, Boonton, New Jersey; Approximate Cost per Unit, \$980.00.

TUBE COMPLEMENT:

1 RETMA-6J5, 1 RETMA-6V6GT/G, 1 RETMA-6C4, 3 RETMA-6AK5, 1 RETMA-5Y3GT/G, 1 RETMA-6H6, 1 RETMA-OD3/VR150.

REFERENCE DATA AND LITERATURE:

Manufacturer's Pamphlet F-78 "Precision Instruments for the Radio and Electronic Industry".

SHIPPING DATA:

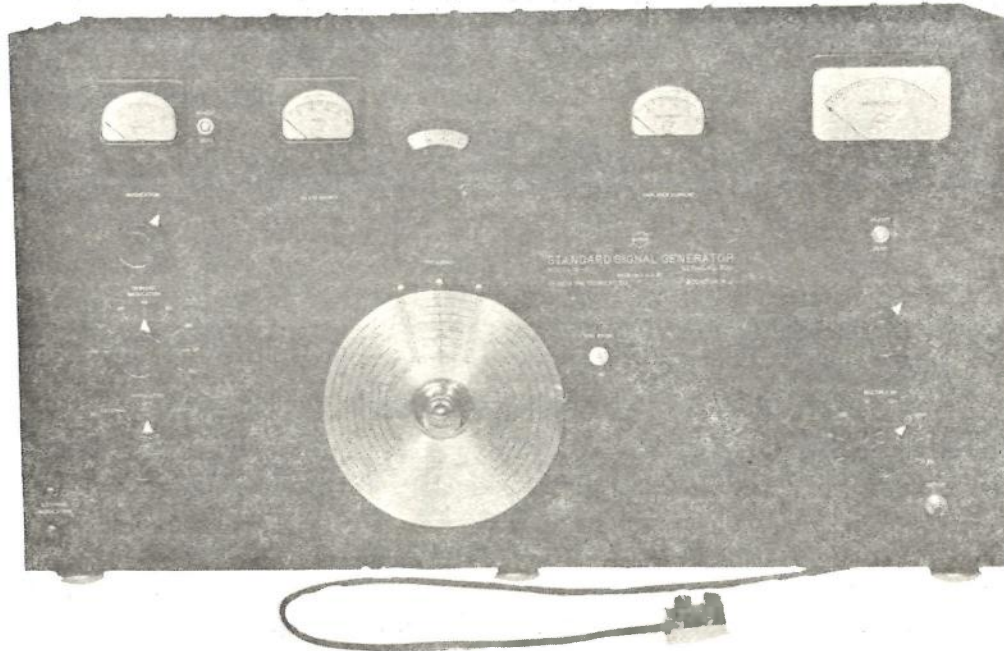
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Signal Generator Model 202-D	3.0	20-1/4	16-1/2	15-5/8	47

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Signal Generator Type 202-D			17	13-1/2	11-1/2	35
1	Output Cable Type 501-A						

Boonton 202-D - Electronics Test Equipment -

**STANDARD SIGNAL GENERATOR
MODEL 16C
(Ferris Instrument Company)**



FUNCTIONAL DESCRIPTION:

A special purpose, precision laboratory standard signal generator, designed for the highest type of development laboratory work. It is used in making performance tests and alignment checks on a radio set. Among its outstanding characteristics are the following: (1) complete modulation with very low distortion and very small modulation input required, (2) fairly high RF output across a low resistance, (3) terminated transmission line output, (4) direct reading frequency dial, (5) extra long scale length for accurate frequency settings, (6) built-in coils selected by front panel control, (7) extended frequency range, (8) complete operation from a power line (9) direct reading modulation for all most used modulation depths. All controls and indicators are on the front panel. External modulation input jacks and an RF output jack, are also on the front panel. A specially terminated output cord must be used. Connection to the separate power supply is provided at the rear of the equipment case.

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			3F3866
PROCUREMENT INFO.:			
PROCUREMENT COG.:	DESIGN COG.: Commercial		
F.I.I.N.:	FUNCTIONAL CLASS. NO.: 4.1.2		
- Electronics Test Equipment -			Ferris 16C

STANDARD SIGNAL GENERATOR
MODEL 16C
(Ferris Instrument Company)

RELATIONSHIP TO OTHER EQUIPMENT:

This signal generator is used in testing Aircraft Radio Corporation Radio Set Type 12. The Ferris Model 16C has several improvements over the 16B, both physical and electrical.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The circuitry involved is not conventional. It includes a master oscillator, buffer amplifier, and final amplifier, with modulation applied only to the final amplifier, an internal audio oscillator with filtered output for modulation, a built-in audio amplifier operating from the audio oscillator or an external source, an attenuator employing a special transmission line output, a power supply unit, and a separate line voltage regulator.

Power Supply: 115 volts, AC, 60 cycles per second, single phase.

Frequency Range: 50 kilocycles per second to 28 megacycles per second.

Type of Transmission: Continuous Wave, Amplitude Modulated.

Output Voltage (RF): 0.1 microvolt to 2.4 volts, continuously variable.

Modulation Voltage Input (External): 3 to 4 volts across 500 ohms.

Modulation Frequency: 400 cycles per second, internal. 1000 cycles per second, internal (by special order only. Any audio frequency up to 12,000 cycles per second, external.

Percent Modulation: 0 to 100% in steps of 5%. By using a fractional meter reading scheme, any value of modulation from 2% to 100% can be put on the output signal.

Output Impedance: Approximately 15 ohms, resistive.

Accuracy of Frequency Calibration: $\pm 0.5\%$, direct reading. $\pm 0.1\%$ using calibration charts.

Harmonic Content of Filtered Modulation: $\pm 0.2\%$.

Envelope Distortion in Broadcast Band: 1.5%.

Envelope Distortion Between 350 and 10,000 kilocycles per second: 2.0%.

Envelope Distortion Over Remainder of Range: 4.0%.

Calibrated Scale Length: 30 feet.

MANUFACTURERS' OR CONTRACTORS' DATA:

Ferris Instrument Company, Boonton, New Jersey.

TUBE COMPLEMENT:

2 JAN-6L6, 1 JAN-802, 1 JAN-6H6, 2 JAN-6K7GT, 2 JAN-6C5.

REFERENCE DATA AND LITERATURE:

Manufacturer's Descriptive Booklet and Catalog.

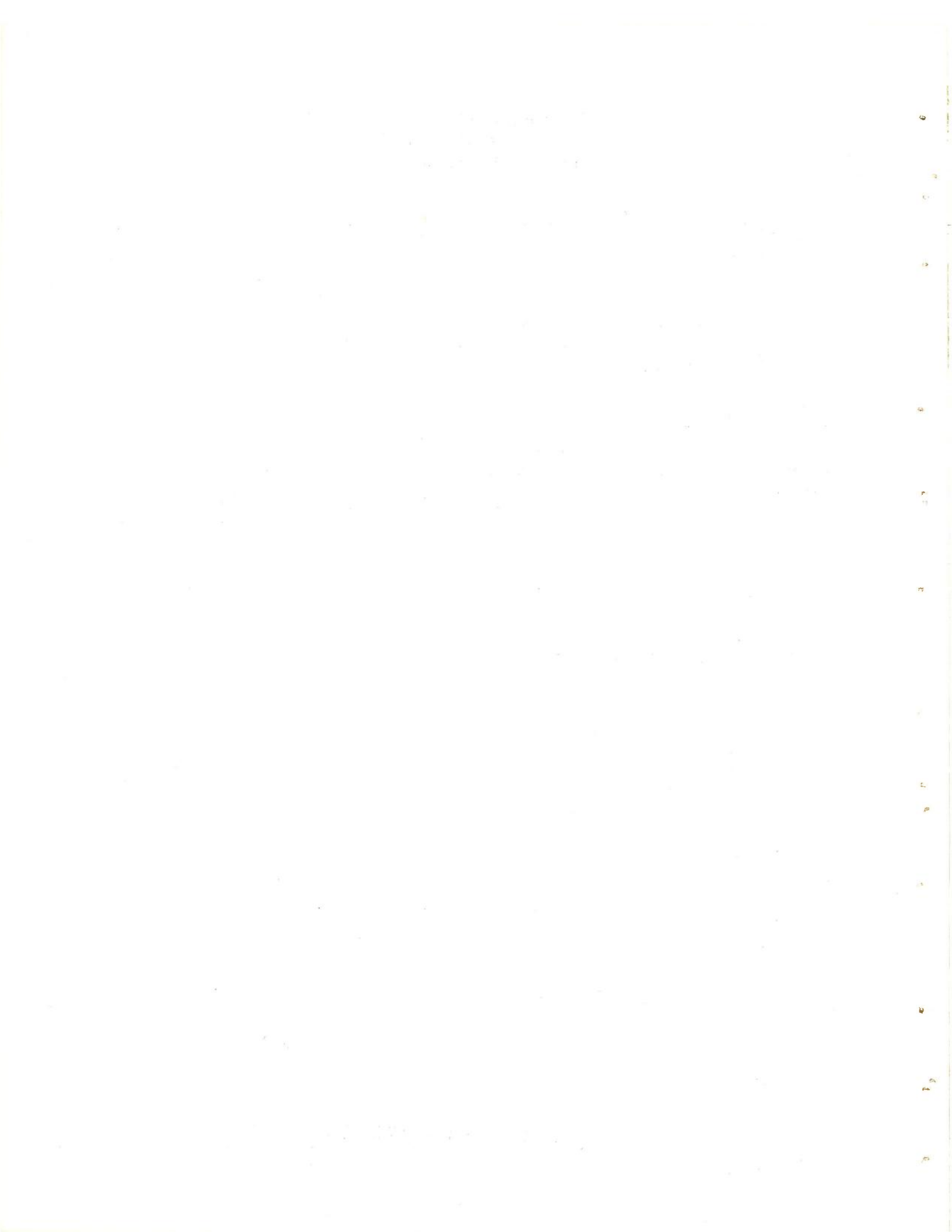
STANDARD SIGNAL GENERATOR
MODEL 16C
(Ferris Instrument Company)

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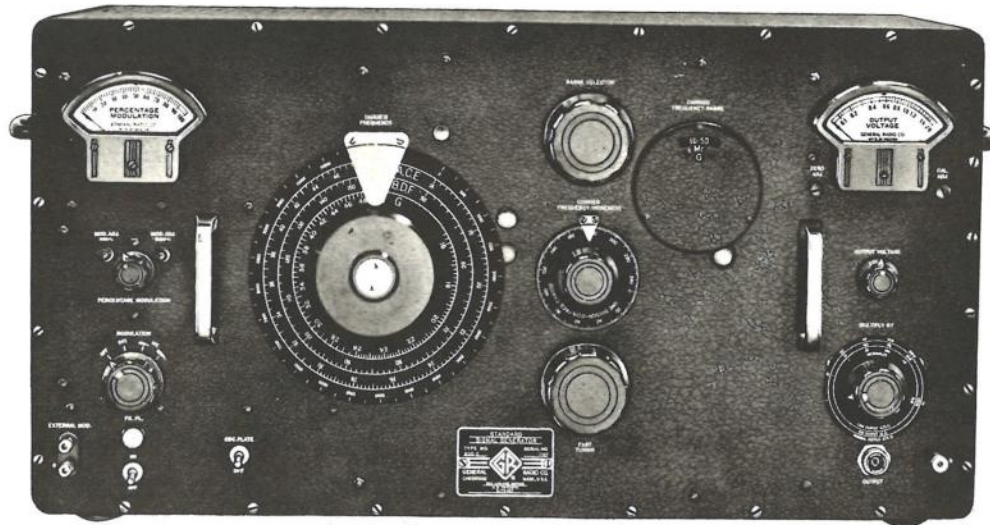
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
2	Standard Signal Generator Model 16C, Power Supply and Regulator	23				345

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Standard Signal Generator Model 16C	Metal	3F3866	17-1/2	31	13-1/2	115
1	Power Supply and Regulator						54
1	Set of Mounted Calibration Charts						
1	Terminated Transmission Line						
1	Spare VTVM Tube						
1	Set Inter-connecting and Power Line Cables						



STANDARD SIGNAL GENERATOR
TYPE 805-C
(General Radio Company)



FUNCTIONAL DESCRIPTION:

A portable, general purpose instrument used for rapid and accurate production-line testing of radio receivers and similar apparatus by means of a variable modulated signal. The equipment may be used for testing IF circuits or for testing above 20 megacycles per second for applications where incidental FM must be negligible. For wideband (video) modulation, Crystal Diode Modulator General Radio 1000-P6 or its equivalent is used. Test results are indicated by the performance of the receiver under test.

RELATIONSHIP TO OTHER EQUIPMENT:

The signal generator may be used with Crystal Diode Modulator General Radio 1000-P6.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The basic parts of the signal generator are a carrier frequency (RF) oscillator, a tuned RF amplifier, a resistive-output attenuator, a

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREMENT INFO.:			
PROCUREMENT COG.:	DESIGN COG.: Commercial		
F. I. I. N.:	FUNCTIONAL CLASS. NO.: 4.1.2		
- Electronics Test Equipment - General Radio 805-C			

STANDARD SIGNAL GENERATOR
TYPE 805-C
(General Radio Company)

ELECTROMECHANICAL DESCRIPTION: (Continued)

panel-mounted voltmeter to read the output level, a modulating oscillator with a panel-mounted vacuum tube voltmeter for reading percentage modulation, and a regulated power supply. The RF oscillator and amplifier assemblies are of almost identical construction and have ganged controls for both tuning capacitors and tuning-coil selectors. Subranges of frequency are obtained by fixed coils, selected by means of panel controls, and used in conjunction with low-loss variable capacitors also controlled from the panel. The capacitor control knob also drives a direct-reading frequency dial through a gear train. Frequency increments of 0.01% may be obtained on a slow-motion vernier-drive dial. A spare range position is provided for the addition of any special set of coils within the frequency range of the instrument (usually used for spanning two ranges, i. e. , 120 to 200 kilocycles per second, etc. , or bandspread). Modulation signals continuously variable from 0 to 100% are provided by the internal modulating oscillator. Modulation can also be introduced from an external source. The output system consists of a vacuum tube voltmeter, a resistive attenuator network, a 3-foot 75-ohm output cable, and a terminating unit. A standard broadcast band dummy antenna is also provided. The power supply is electronically regulated with compensation for any line voltage from 105 to 125 or 210 to 250 volts. Radiation fields are negligible due to effective shielding.

Power Supply: 115 or 230 volts, AC, 40 to 60 cycles per second, single-phase, 150 watts.

Carrier Frequency:

Ranges: 16 to 50, 50 to 160, 160 to 500 kilocycles per second, 0.5 to 1.6, 1.6 to 5.0, 5.0 to 16, 16 to 50 megacycles per second.
cycles per second.

Calibration Accuracy: $\pm 1\%$.

Drift: Not greater than 1% in 5 hours.

Output Voltage: 0.1 microvolt to 2 volts, continuously adjustable.

Output Impedance at the Panel Jack: 75 ohms, resistive at termination unit; 37.5, 7.1, or 0.75 ohms constant.

Amplitude Modulation:

Internal: 400 and 1000 cycles per second $\pm 5\%$.

External: 10 volts across 500,000 ohms for 80% modulation.

Overall Modulation Characteristics:

Carrier Frequency	Audio Range	Level
0.5 to 50 mc	50 to 15,000 cps	± 1 decibel
0.1 to 0.5 mc	50 to 10,000 cps	± 1.5 decibels
16 to 100 kc	50 cps to 10% of carrier frequency	± 1.5 decibels

STANDARD SIGNAL GENERATOR
TYPE 805-C
(General Radio Company)

ELECTROMECHANICAL DESCRIPTION: (Continued)

Frequency Modulation: 0.05% for 100% modulation at 16 to 50 megacycles per second range; less for lower carrier frequency or less amplitude modulation.

Attenuator Error:

Carrier Frequency	Maximum Attenuator Error
Below 3 mc	±3% +0.1 microvolt
3 to 10 mc	±5% +0.2 microvolt
10 to 30 mc	±10% +0.4 microvolt
30 to 50 mc	±15% +0.8 microvolt

Voltmeter Error (Meter):

Maximum ±5% of indicated reading up to 25 megacycles per second.

Maximum ±7% of indicated reading up to 50 megacycles per second.

Vacuum Tube Error: -5% at 1/10 full scale and 50 megacycles per second.

Distortion: Maximum 5% at 1-megacycle per second carrier at 80% modulation.

Noise Level (Carrier): Minimum 40 decibels below 80% modulation.

Magnetic Induction Leakage: Maximum 5 microvolts per meter at 2 feet from generator.

MANUFACTURERS' OR CONTRACTORS' DATA:

General Radio Company, 275 Massachusetts Avenue, Cambridge 39, Massachusetts; approximate cost per unit, \$1,750.00.

TUBE COMPLEMENT:

1 6C8G, 3 6L6, 1 5U4G, 2 2A3, 1 6SF5, 1 OD3, 1 6AL5, 1 6H6, 1 Amperite 3-4.

REFERENCE DATA AND LITERATURE:

Manufacturer's Catalog.

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
	Standard Signal Generator Type 805-C					

- Electronic Test Equipment - General Radio 805-C

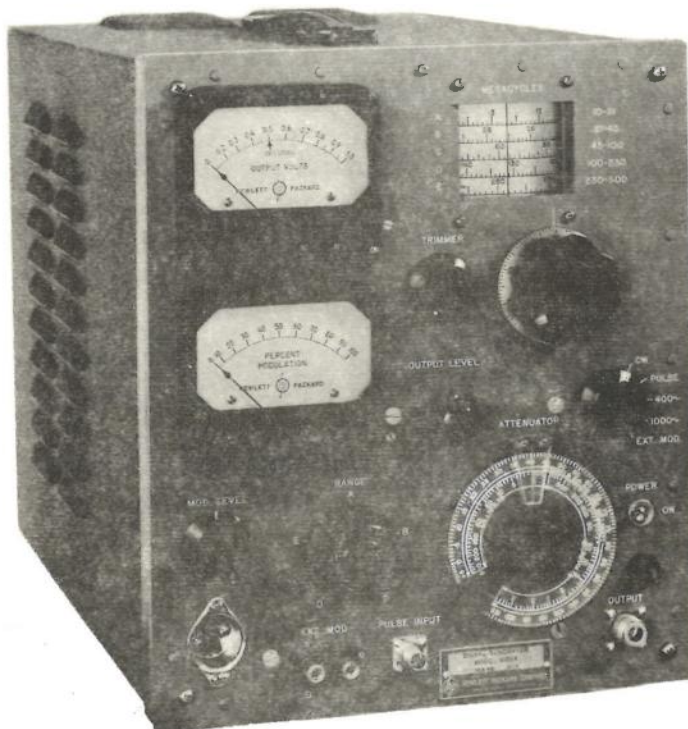
STANDARD SIGNAL GENERATOR
 TYPE 805-C
 (General Radio Company)

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Standard Signal Generator General Radio 805-C	metal		16	33	12	117-1/2
1	Power Cable CAP-35						
1	Shielded Output Cable and Termination Unit						

General Radio 805-C - Electronics Test Equipment -

VHF SIGNAL GENERATOR
 MODEL 608A
 (Hewlett-Packard Company)



FUNCTIONAL DESCRIPTION:

A portable, general purpose, test instrument used for measurements of gain, selectivity, sensitivity, or image rejection of receivers, IF amplifiers, broad band amplifiers and other VHF equipment. Also provides an output suitable for driving bridges, slotted lines, transmission lines, antennas, filter networks, etc. The output circuit is calibrated in both volts and dbm. Frequency is calibrated in megacycles.

RELATIONSHIP TO OTHER EQUIPMENT:

Used to test Radio Sets AN/ARC-27 and AN/ARC-34.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The master oscillator and power amplifier circuits employ a combination of transmission line and lumped constant techniques. The amplifier is of the grounded grid variety and provides isolation of the output circuitry
 (Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.	7CAC-363903-5		
PROCUREMENT INFO.:			
PROCUREMENT COG.:	DESIGN COG.: Commercial		
F.I.I.N.:	FUNCTIONAL CLASS. NO.: 4.1.2		
- Electronics Test Equipment -			Model 608A

VHF SIGNAL GENERATOR
MODEL 608A
(Hewlett-Packard Company)

ELECTROMECHANICAL DESCRIPTION: (Continued)

from the master oscillator. The output level is adjusted by varying the bias voltage on the final amplifier. Radio frequency voltages ahead of the piston-type attenuator are continuously monitored. A 400 and 1000 cycle audio oscillator is provided to give modulation at these frequencies without auxiliary equipment. Facilities are included for connecting an external sine wave source or an external pulse source to modulate the generator.

Power Supply: 115 or 230 volts $\pm 10\%$, AC, 50 to 60 cycles per second, single phase, 150 watts.

Frequency Range: 10 to 500 megacycles per second in five bands: 10 to 20, 20 to 45, 45 to 95, 95 to 220, 220 to 500 megacycles per second.

Type of Transmission: Frequency Modulated, Amplitude Modulated, Continuous Wave or Pulsed.

Output Voltage: 0.1 microvolt to 1.0 volt continuously variable.

Rated Load Impedance: 50 ohms resistive.

Internal Impedance: 50 ohms.

Voltage Standing Wave Ratio: 1.2 maximum.

Amplitude Modulation: Internal or external, continuously variable from 0 to 90%.

Internal Modulation: Two fixed frequencies, 400 and 1000 cycles per second.

External Modulation: By any modulating frequency from 50 cycles per second to 1 megacycle per second, 4 volts input across 100,000 ohms required.

Pulse Modulation: External positive or negative pulses of 4 volts peak amplitude produce a pulse shape at 1 microsecond length.

Envelope Distortion: 2.5 at 30% modulation.

Leakage: Negligible, permits receiver measurement down to at least 0.1 microvolt.

Residual Frequency Modulation: Not over 0.0025% at 30% modulation.

Accuracies: (Calibration), $\pm 1\%$. Frequency ranges can be duplicated within $\pm 0.2\%$ (1 megacycle per second at 500 megacycles per second). ± 1 decibel, output.

MANUFACTURERS' OR CONTRACTORS' DATA:

Hewlett-Packard Company, 395 Page Mill Road, Palo Alto, California; Approximate Cost per Unit, \$850.00, August 1952.

TUBE COMPLEMENT:

1 RETMA-5893, 1 RETMA-5876, 2 RETMA-6L6, 2 RETMA-6AC7, 1 RETMA-5U4G, 1 RETMA-6AS7G, 1 RETMA-6H6, 1 RETMA-6SJ7, 1 RETMA-OA3, 1 RETMA-6SN7.

REFERENCE DATA AND LITERATURE:

Hewlett-Packard Journal, Volume 1, No. 7, March 1950. "Manufacturer's Instructions".

Hewlett-Packard Catalogue No. 21A, 1952.

**VHF SIGNAL GENERATOR
MODEL 608A
(Hewlett-Packard Company)**

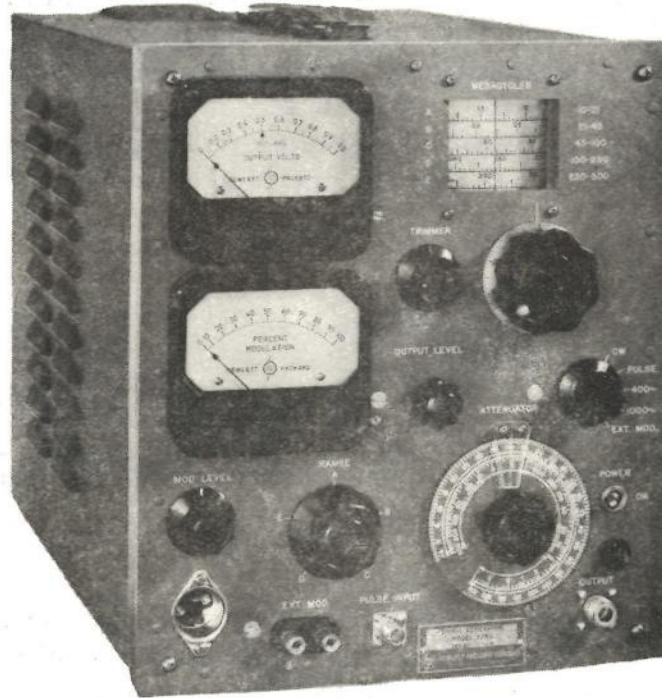
SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	VHF Signal Generator Model 608A					85

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	VHF Signal Generator Model 608A		7CAC-363903-5	14	12	18	55
1	Detachable Power Cord			84 long			

SIGNAL GENERATOR
MODEL 608B
(Hewlett-Packard Company)



FUNCTIONAL DESCRIPTION:

A portable, general purpose, test instrument used for measurements of gain, selectivity, or image rejection of receivers, IF amplifiers, broadband amplifiers, and other VHF equipment. Also provides an output suitable for driving bridges, slotted lines, transmission lines, antennas, filter networks, etc. The output circuit is calibrated in both volts and dbm. Frequency is calibrated in megacycles.

RELATIONSHIP TO OTHER EQUIPMENT:

Used to test Radio Set AN/ARC-33. Similar to Hewlett-Packard Signal Generator Model 608A except the B model provides for less residual frequency modulation through improved shielding and has less frequency range.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The master oscillator and power amplifier circuits employ a combination of transmission line and lumped constant techniques. The amplifier
(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREMENT INFO.:			
PROCUREMENT COG.:	DESIGN COG.: Commercial		
F.I.I.N.:	FUNCTIONAL CLASS. NO.: 4.1.2		
- Electronics Test Equipment - Hewlett-Packard 608B			

SIGNAL GENERATOR
MODEL 608B
(Hewlett-Packard Company)

ELECTROMECHANICAL DESCRIPTION: (Continued)

is of the grounded grid variety and provides isolation of the output circuitry from the master oscillator. The output level is adjusted by varying the bias voltage on the final amplifier. Radio Frequency Voltages ahead of the piston type attenuator are continuously monitored. A 400 and 1000 cycle audio oscillator is provided to give modulation at these frequencies without auxiliary equipment. Facilities are included for connecting an external sine wave source or an external pulse source to modulate the generator.

Power Supply: 115 volts or 230 volts, AC, 50 to 60 cycles per second, single phase, 150 watts.

Frequency Range: 10 to 410 megacycles per second in 5 bands; 10 to 20, 20 to 45, 45 to 95, 95 to 220, 220 to 410 megacycles per second.

Type of Transmission: Frequency modulated, amplitude modulated, continuous wave, or pulsed.

Output Voltage: 0.1 microvolt to 0.8 volt, continuously variable.

Rated Load Impedance: 50 ohms resistive.

Internal Impedance: 50 ohms.

Voltage Standing Wave Ratio: 1.2 maximum.

Amplitude Modulation: Internal or external, continuously variable from 0 to 90%.

Internal Modulation: Two fixed frequencies, 400 to 1000 cycles per second.

External Modulation: By any modulating frequency from 50 cycles per second to one megacycle per second, 4 volts input across 100,000 ohms required.

Pulse Modulation: External positive or negative pulses of 4 volts peak amplitude produce a pulse shape of 1 microsecond length.

Envelope Distortion: 2.5% at 30% modulation.

Leakage: Negligible, permits receiver measurements down to at least 0.1 microvolt.

Residual Frequency Modulation: Too small to measure.

Calibration Accuracy: Within 1%. Frequency ranges can be duplicated within 0.2%.

Output Voltage: ± 1 decibel.

MANUFACTURERS' OR CONTRACTORS' DATA:

Hewlett-Packard Company, 395 Page Mill Road, Palo Alto, California; Approximate Cost per Unit, \$850.00; August 1952.

TUBE COMPLEMENT:

1 RETMA-5893, 1 RETMA-5876, 2 RETMA-6L6, 2 RETMA-6AC7, 1 RETMA-5U4G, 1 RETMA-6AS7G, 1 RETMA-6H6, 1 RETMA-6SJ7, 1 RETMA-6SN7, 1 RETMA-OA3.

REFERENCE DATA AND LITERATURE:

Hewlett-Packard Catalog 21A, 1952.

Hewlett-Packard Journal, Volume 1, No. 7, March 1950.

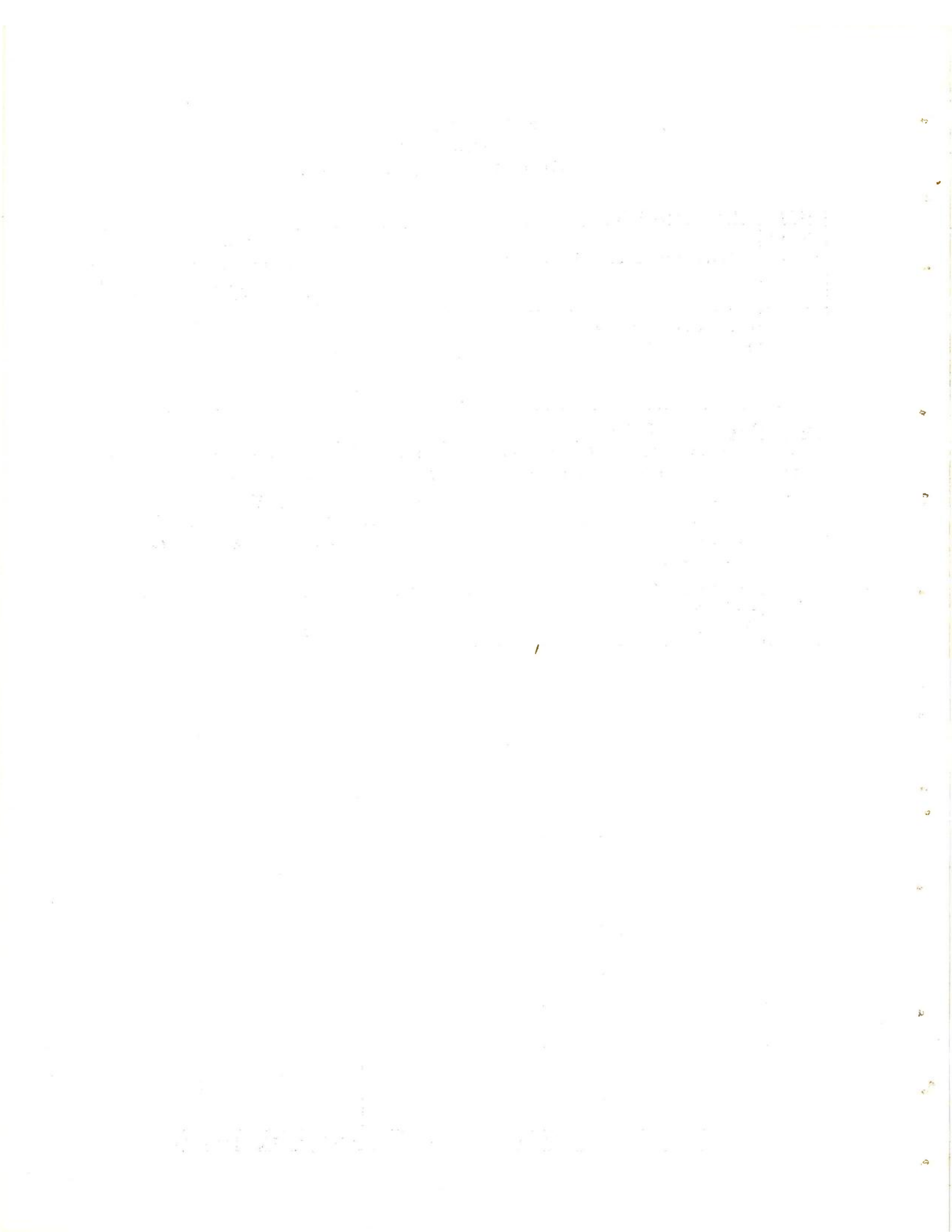
SIGNAL GENERATOR
 MODEL 608B
 (Hewlett-Packard Company)

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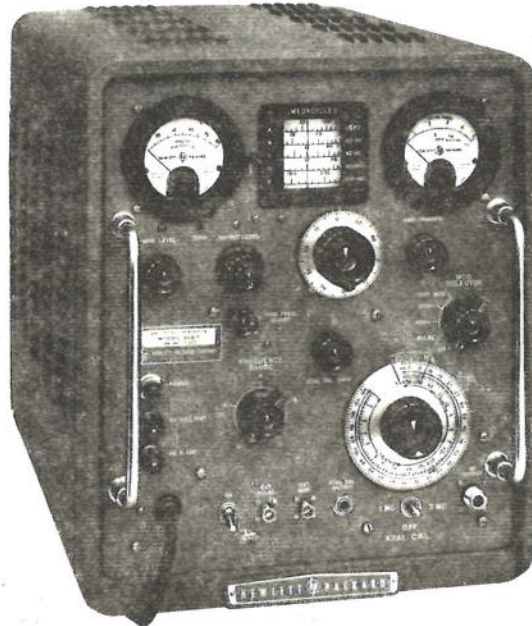
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Signal Generator Model 608B					88

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Signal Generator Model 608B			14	12	18	55
1	Detachable Power Cord			84 long			
- Electronics Test Equipment - Hewlett-Packard 608B							



SIGNAL GENERATOR
MODEL 608D
(Hewlett-Packard Company)



FUNCTIONAL DESCRIPTION:

A portable, general purpose equipment designed to furnish signals with very low spurious energy content. The equipment is suitable for alignment of narrow-band amplitude-modulated receivers. The generator is used for testing, calibrating, and trouble shooting IF receivers, broadband amplifiers, and VHF equipment and circuits; and for measuring gain, standing-wave ratios, antenna and transmission line characteristics, and receiver sensitivity. The signal generator may be amplitude modulated by internally generated sine waves or by externally applied sine waves or pulses.

RELATIONSHIP TO OTHER EQUIPMENT:

The Signal Generator Hewlett-Packard 608D is similar to Hewlett-Packard 608C and Signal Generator TS-510/U except for differences in input power requirements and panel arrangement. Model 608D is also similar to the other models in the series except for the following frequency ranges: Model 608A, 10 to 500 mega-

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREMENT INFO.:			
PROCUREMENT COG.:			Commercial
F. I. I. N.:	FUNCTIONAL CLASS. NO.: 4.1.2		
- Electronics Test Equipment - Hewlett-Packard 608D			

SIGNAL GENERATOR
MODEL 608D
(Hewlett-Packard Company)

RELATIONSHIP TO OTHER EQUIPMENT: (Continued)

cycles per second; Model 608B, 10 to 410 megacycles per second; Model 608C, 10 to 480 megacycles per second; Model 608D, 10 to 420 megacycles per second.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The generator circuitry consists of an RF oscillator which generates a signal that is fed through a buffer amplifier and power amplifier to the output jack of the signal generator. The RF power amplifier receives both the RF and modulation signals and amplifies the RF energy for application to the output power monitoring meter and the output attenuator. The meter indicates the output power and voltage level of the generator. From the output attenuator the energy is conducted to a panel jack. A beat-frequency calibrator generates harmonics of the 5-megacycles per second signal from the crystal and mixes the harmonics with RF energy coupled to the RF amplifier. The resultant beat-frequency signal is amplified and fed to the front-panel earphone jack. The internal modulation oscillator generates a fixed sine wave for variable bias to the RF amplifier for control of the RF power level. The modulation-measuring circuits receive detected modulation from the RF power monitor, amplify and rectify it, and indicate the modulation percentage directly on a front-panel meter.

Power Supply: 115 or 230 volts, $\pm 10\%$, AC, 50 to 1000 cycles per second, single-phase, 150 watts.

Frequency Range: 10 to 420 megacycles per second, in 5 bands.

Type of Transmission: Amplitude modulated, continuous wave and pulsed modulated.

Crystal Calibrator: 5-megacycles per second oscillator accurate to $\pm 0.01\%$ provides check points at each 5 megacycles per second over full frequency range; provides 0.1 milliwatt or better to 600-ohm earphone set.

Output Voltage: Continuously adjustable from 0.1 microvolt minimum, to 0.5 volt maximum, when operated into 50-ohm rated load.

Output Voltage Accuracy: ± 1 decibel full range.

Frequency Drift: Less than 0.005% over 10-minute interval after warmup.

Frequency Calibration Accuracy: $\pm 0.5\%$ full range.

Generator Impedance: 50 ohms; SWR, 1.2 maximum.

Amplitude Modulation: Continuously variable, 0 to 95%.

Internal Modulation: 400 cycles per second $\pm 10\%$, and 1000 cycles per second $\pm 10\%$.

External Modulation: 0 to 95%, 20 cycles per second to 20 kilocycles per second.

For RF output above 100 megacycles per second, modulation frequencies up to

SIGNAL GENERATOR
MODEL 608D
(Hewlett-Packard Company)

ELECTROMECHANICAL DESCRIPTION: (Continued)

1 megacycle per second produce at least 30% modulation.
 Pulse Modulation: 5-volt peak pulse required.
 Leakage: Negligible; permits sensitivity measurements to 1.0 microvolt.
 Residual FM: Less than 1000 cycles per second at 50% AM for RF output frequencies above 100 megacycles per second; less than 0.001% below 100 megacycles per second.
 Envelope Distortion: Less than 5% at 30% sine-wave modulation; less than 10% at 50% sine-wave modulation.

MANUFACTURERS' OR CONTRACTORS' DATA:

Hewlett-Packard Company, 275 Page Mill Road, Palo Alto, California, approximate cost per unit, \$1,050.00.

TUBE COMPLEMENT:

2 6AH6, 1 6AL5W/5726, 3 6AU6WA, 1 6BC4, 3 6CL6, 2 12AT7WA, 2 5814/12AU7, 1 5651, 1 5670, 1 5675, 1 5687, 1 5876, 2 6080, 2 1N82, 2 G11A.

REFERENCE DATA AND LITERATURE:

Manufacturer's Catalog 22-A, 1955.

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
	Signal Generator Hewlett-Packard 608D					96

SIGNAL GENERATOR
 MODEL 608D
 (Hewlett-Packard Company)

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Signal Generator Hewlett-Packard 608D	alum- inum		13-3/4	16-1/8	20-3/8	61
1	Power Cord M-72						
1	Cable Assembly 608A-16D						
1	Video Cable Assembly AC-16K						
1	R-F Cable Assembly AC-16F						
1	Low-Pass Filter 360A						
1	Fuseholder 608A-95A						

TEST OSCILLATOR
MODEL 650A
(HEWLETT-PACKARD COMPANY)



FUNCTIONAL DESCRIPTION:

A portable, general purpose equipment used to facilitate testing wideband amplifiers, filter networks, tuned circuits, telephonic and telegraphic carrier equipment, and also as a power supply for AF and RF bridge measurements. The oscillator output is indicated on a meter and calibrated dials.

RELATIONSHIP TO OTHER EQUIPMENT:

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The unit utilizes a resistance-capacitance oscillator which is essentially a 2-stage amplifier with both positive and negative feedback loops. The positive loop, which includes the frequency selective network, causes the circuit to oscillate. The negative loop employs a nonlinear ballast resistance which automatically adjusts its resistance to compensate for variations in the output amplitude. The output voltage is monitored by a vacuum tube voltmeter

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREMENT INFO.:			
PROCUREMENT COG.:	DESIGN COG.: Commercial		
F. I. I. N.:	FUNCTIONAL CLASS. NO.: 4, 1. 2		
- Electronics Test Equipment - Hewlett-Packard 650A			

TEST OSCILLATOR
MODEL 650A
(HEWLETT-PACKARD COMPANY)

ELECTROMECHANICAL DESCRIPTION: (Continued)

which measures the voltage at the input to the attenuator system. A voltage divider provides small test signals or a low source impedance. The voltage divider consists of a cable and terminating connector. Two sets of voltages are obtainable from this network. One voltage is 1/100 of the normal output from the test set delivered from a 6-ohm source impedance. The second voltage is the actual output from the test set delivered from a 300-ohm source impedance. True voltage readings can be obtained at these terminals when a load resistance is connected across them which is large compared to that of the source impedance.

- Power Supply: 115 or 230 volts $\pm 10\%$, AC, 50 or 1000 cycles per second, 165 watts.
Frequency Range: 10 cycles per second to 10 megacycles per second, 6 bands.
Frequency Calibration: 1 to 10.
Multiplying Factors: X10, X100 cycles per second; X1, X10, X100 kilocycles per second; X1 megacycles per second.
Output: 15 milliwatts or 3 volts into a 600-ohm resistive load; open circuit voltage 6 volts with 600-ohm source impedance.
Frequency Response: Flat within ± 1 decibel; 10 cycles per second to 10 megacycles per second into a 600-ohm resistive load.
Stability: $\pm 2\%$, 10 cycles per second to 100 kilocycles per second; $\pm 3\%$, 100 kilocycles per second to 10 megacycles per second including warmup and $\pm 10\%$ line voltage variations.
Distortion: Less than 1% from 20 cycles per second to 100 kilocycles per second; 5% from 100 kilocycles per second to 10 megacycles per second.
Output Monitor Accuracy: In decibels or volts $\pm 5\%$ of full scale.
Output Attenuator: Output level attenuated 50 decibels in 10-decibel steps; provides variable output voltage from +12 to -50 decibels below one milliwatt, 3 volts to 3 millivolts, or down to 30 microvolts with voltage divider; accuracy ± 1 decibel into 600-ohm resistive load.
Hum Voltage: Less than 0.5% of maximum attenuated signal level.

MANUFACTURERS' OR CONTRACTORS' DATA

Hewlett-Packard Company, 275 Page Mill Road, Palo Alto, California; Approximate Cost per Unit, \$490.00.

TUBE COMPLEMENT:

REFERENCE DATA AND LITERATURE:

Manufacturer's Catalog 23A, 1957.

TEST OSCILLATOR
MODEL 650A
(HEWLETT-PACKARD COMPANY)

EQUIPMENT SUPPLIED:

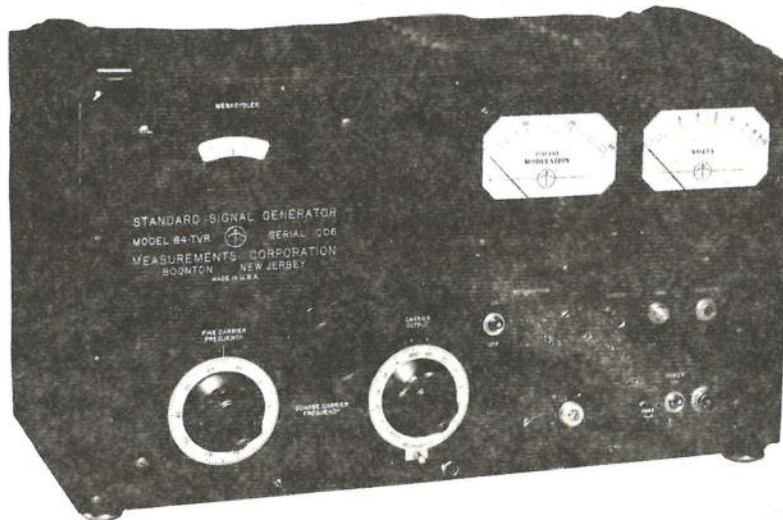
Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Test Oscillator Hewlett-Packard 650A			20-1/2	12-1/2	14-3/4	46
1	Voltage Divider 65A-16D						

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Test Oscillator Hewlett-Packard 650A	6.9	27	21	21	66

- Electronic Test Equipment - Hewlett-Packard 650A

STANDARD SIGNAL GENERATOR
MODEL 84-TV
(Measurements Corporation)



FUNCTIONAL DESCRIPTION:

A portable, general purpose instrument used to determine the characteristics of UHF equipment. The instrument is used for the alignment and tracking of UHF equipment. The instrument is used for the alignment and tracking of UHF receivers; to measure receiver sensitivity, signal-to-noise ratio, conversion gain, selectivity, overload, image and IF rejection ratios, quieting, stage gain; and as a driving source for slotted lines and RF bridges. The equipment is used at depot and laboratory level. The frequency output is indicated on a calibrated dial. Percent of modulation and output voltage are indicated by calibrated meters.

RELATIONSHIP TO OTHER EQUIPMENT:

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The unit consists essentially of an AF oscillator and modulator, an RF oscillator, two meters, an attenuator, and a power supply.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREMENT INFO.:			
PROCUREMENT COG.:	DESIGN COG.: Commercial		
F.L.L.N.:	FUNCTIONAL CLASS. NO.: 4.1.2		
- Electronics Test Equipment - Measurements 84-TV			

STANDARD SIGNAL GENERATOR
MODEL 84-TVR
(Measurements Corporation)

ELECTROMECHANICAL DESCRIPTION: (Continued)

Power Supply: 117 volts, AC, 60 cycles per second, 60 watts.

Frequency Range: 400 to 1000 megacycles per second in one band.

Frequency Accuracy: $\pm 0.5\%$.

Output Voltage: Continuously variable 0.1 microvolt to 0.3 volt with mutual inductance attenuator; output from 0.3 to 0.5 volt indicated directly on output meter.

Output Accuracy: At 0.3 volt, $\pm 10\%$ from 400 to 750 megacycles per second, $\pm 20\%$ from 750 to 1000 megacycles per second.

Output Impedance: 50 ohms.

Output Voltage Standing-Wave Ratio: Less than 1.2.

Amplitude Modulation:

Internal: Continuously variable from 0 to 30% from 1000-cycles per second oscillator.

External: 50 to 20,000 cycles per second; approximately 5 volts rms across 100,000 ohms required for 30% modulation.

Residual Frequency Modulation: Less than 300 cycles per second (spurious).

MANUFACTURERS' OR CONTRACTORS' DATA:

Measurements Corporation, Boonton, New Jersey.

TUBE COMPLEMENT:

1 6X5GT, 2 12AX7, 1 6V6GT, 1 RT-434.

REFERENCE DATA AND LITERATURE:

Manufacturer's Form 179-9-56.

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
	Standard Signal Generator Measurements 84-TVR					
Measurements 84-TVR - Electronic Test Equipment -						

STANDARD SIGNAL GENERATOR
 MODEL 84-TVR
 (Measurements Corporation)

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Standard Signal Generator Measurements 84-TVR	metal		11-5/8	19-1/8	10-3/4	40

- Electronics Test Equipment - Measurements 84-TVR

MOBILINER
MODEL NO. 5005
(Philco Corporation)



FUNCTIONAL DESCRIPTION:

A portable, general purpose, crystal controlled, signal generator that will provide fundamental and harmonic output frequencies for precision alignment of high frequency radio equipment. The design of this equipment insures high uniform output over the mobile service frequency ranges. For alignment of FM receivers adjustable deviation is provided. When used in conjunction with an oscilloscope this adjustable deviation is valuable in checking receiver IF band-pass characteristics. Panel connections and controls include deviation control, RF attenuation control, power on-off switch, power change-over switch for AC or DC, power-on indicator lamp, crystal jacks, test voltage jacks, DC external power input jacks, and a special shielded "UHF" connector for shielded RF output.

RELATIONSHIP TO OTHER EQUIPMENT:

This item will be replaced by the IF/FM Test Set, Philco Part No. 463-1942-1.

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREMENT INFO.:			
PROCUREMENT COG.:	DESIGN COG.: Commercial		
F.I.I.N.:	FUNCTIONAL CLASS. NO.: 4.1.2		
- Electronics Test Equipment -			Philco 5005

MOBILINER
MODEL NO. 5005
(Philco Corporation)

ELECTROMECHANICAL DESCRIPTION:

Power Supply: 110 volts, AC, 60 cycles per second, single phase, 40 watts, or 6 volts, DC, and 180 volts, DC.

Frequency Range: 1 to 175 megacycles per second, each value fixed by the frequency of the crystal used, and 1000 cycles per second, fixed.

Type of Transmission: Continuous Wave, Frequency Modulated.

RF Output: 1 microvolt to 500 microvolts in the mobile service frequency ranges of 25 to 50, 72 to 76, and 152 to 174 megacycles per second. Greater outputs are possible depending on the frequency and harmonic used.

AF Output: Variable output at 1000 cycles per second.

Sweep Voltage: 6.3 volts, 60 cycles per second.

FM Deviation Range: 0 to 20 kilocycles per second for the 25 to 50 megacycles per second band, and 0 to 40 kilocycles per second for the 152 to 174 megacycles per second band.

Frequency Stability: Better than 0.005%.

MANUFACTURERS' OR CONTRACTORS' DATA:

Philco Corporation, Philadelphia, Pennsylvania; Approximate Cost per Unit, \$175.00; Philco Part No. 756-11410.

TUBE COMPLEMENT:

1 JAN-6CB6, 1 JAN-12AT7, 1 JAN-6AG5, 1 JAN-6AQ5, 1 JAN-5Y3.

REFERENCE DATA AND LITERATURE:

Manufacturer's Bulletin.

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Mobiliner Model 5005	1.06	14-1/4	11-5/8	11	18

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Mobiliner Model 5005	Metal		10	8	6	8

Philco 5005 - Electronics Test Equipment -

SIGNAL GENERATOR
 MODEL MSG-1
 (Polarad Electronics Corporation)



FUNCTIONAL DESCRIPTION:

A portable, general purpose instrument designed for testing and adjusting radio and radar systems operating in the frequency range of 950 to 2400 megacycles. The instrument generates microwave signals of known frequency and power output level which can be internally pulsed or frequency modulated, or externally modulated. The MSG-1 is suitable for measuring attenuation, bandwidth, frequency, image rejection, power gain, sensitivity, selectivity, signal to noise ratio, SWR, antenna gain, transmission line characteristics, conversion gain, and antenna patterns.

RELATIONSHIP TO OTHER EQUIPMENT:

The MSG-1 is similar to the MSG-2 except for frequency range.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The generator circuitry consists of a modulator, keyer, RF
 (Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREMENT INFO.:			
PROCUREMENT COG.:	DESIGN COG.: Commercial		
F.I.L.N.:	FUNCTIONAL CLASS. NO.: 4.1.2		
- Electronics Test Equipment - Model MSG-1			

SIGNAL GENERATOR
MODEL MSG-1
(Polarad Electronics Corporation)

ELECTROMECHANICAL DESCRIPTION: (Continued)

oscillator with a calibrated attenuator, thermistor bridge with power monitoring meters, and two electronically regulated power supply circuits. All controls are located on the front panel. Frequency and power are indicated by direct-reading dials.

Power Supply: 115 or 230 volts $\pm 10\%$, AC, 50 to 60 cycles per second, 270 watts.

Frequency Range: 950 to 2400 megacycles per second.

Frequency Accuracy: $\pm 1\%$.

Frequency Stability: 0.01% per degree centigrade change in ambient temperature; 0.007% per volt change in line voltage over the range from 105 to 125 volts.

Power Output: 1.0 milliwatt (0 decibel below a milliwatt).

Attenuator Range: 0 to -127 decibels below a milliwatt.

Attenuator Output Accuracy: ± 2 decibels.

Output Impedance: 5 ohms nominal.

Type of Transmission: Continuous wave, square wave, pulse modulated and frequency modulated.

Internal Pulse Modulation:

Repetition Rate: 40 to 4000 pulses per second.

Pulse Width: 0.5 to 10 microseconds.

Delay Range: 2.5 to 300 microseconds.

Internal Square Wave Modulation:

Repetition Rate: 40 to 4000 pulses per second.

Internal Frequency Modulation:

Sweep Rate: 40 to 4000 pulses per second.

Deviation: Adjustable from 0 to ± 2.5 megacycles per second of center frequency, minimum.

External Single or Multipulse Modulation:

Repetition Rate: 40 to 4000 pulses per second.

Polarity: Positive or negative.

Amplitude: 15 volts peak minimum.

Pulse Width: 0.5 to 2500 microseconds.

Sync Input Requirements:

Type: Sine-wave or pulse.

Polarity: Positive or negative pulse.

Amplitude: 5 to 50 volts.

Sync Output Pulses:

Type: Delayed and undelayed.

Polarity: Positive

Amplitude: Greater than 20 volts.

Pulse Rate: 40 to 4000 pulses per second.

Pulse Rise and Decay Times: Less than 1.0 microsecond.

SIGNAL GENERATOR
MODEL MSG-1
(Polarad Electronics Corporation)

MANUFACTURERS' OR CONTRACTORS' DATA:

Polarad Electronics Corporation, 4320 34th Street, Long Island City 1, New York; approximate cost per unit, \$1,700.00.

TUBE OR SEMICONDUCTOR COMPLEMENT:

10 12AT7, 2 6AK6, 3 6AU6, 1 6X4, 1 5837, 2 5R4GY, 1 6AR6, 2 OA2, 4 OB2, 1 5651, 1 6AS7G.

REFERENCE DATA AND LITERATURE:

Manufacturer's Instruction Manual.

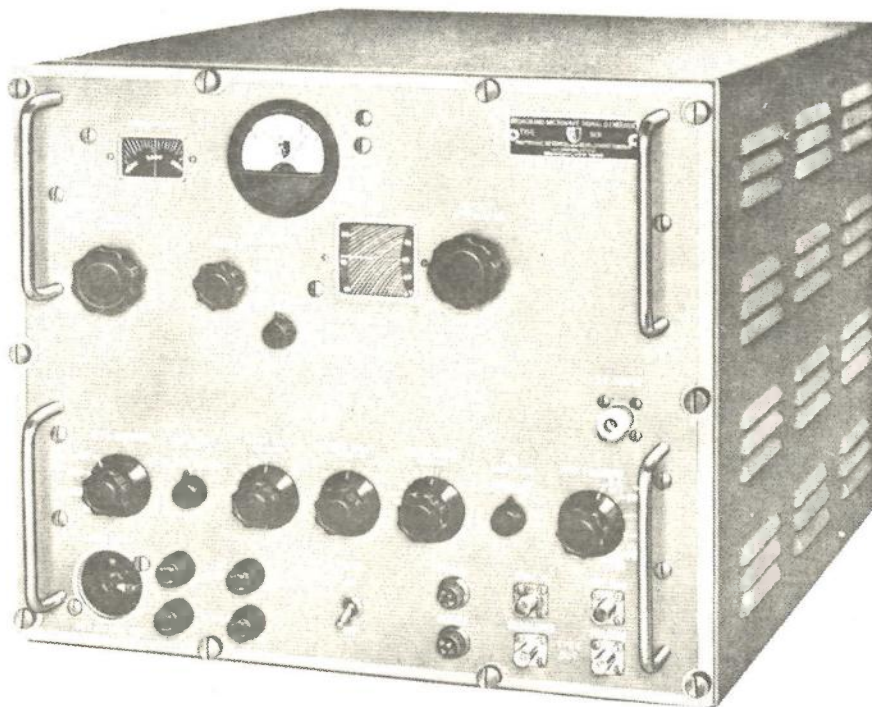
EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Signal Generator Polarad MSG-1	alum- inum		15-1/2	17	13-1/4	60
1	Wrench Kit No. A25109						
1	Line Power Cord No. B24358-15						
1	Video Cable Assembly BNC to BNC No. BP12553						
1	RF Cable Assembly No. BP12551						

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Signal Generator Polarad MSG-1					135
- Electronic Test Equipment - Model MSG-1						

SIGNAL GENERATOR
MODEL NO. 902
(Polytechnic Research and Development Company)



FUNCTIONAL DESCRIPTION:

A portable, general purpose, broadband, microwave signal generator designed for testing and maintenance of aircraft radio and radar receivers in the SHF band. The RF output level is regulated by a variable attenuator calibrated in dbm. The frequency dial is calibrated in megacycles. Provision is made for external modulation.

RELATIONSHIP TO OTHER EQUIPMENT:

Used to test Radar Sets AN/FPS-5, AN/MPS-4, and AN/TPS-14.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: Consists of a modulator, RF oscillator, output system and power supply. The modulator, by means of a keyer, applies a positive pulse of the desired characteristics to the control grid of the RF oscillator causing the

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.	7CAC-363979		
PROCUREMENT INFO.:			
PROCUREMENT COG.:	DESIGN COG.: Commercial		
F.I.I.N.:	FUNCTIONAL CLASS. NO.: 4.1.2		
- Electronics Test Equipment -			Model No. 902

SIGNAL GENERATOR
MODEL NO. 902
(Polytechnic Research and Development Company)

ELECTROMECHANICAL DESCRIPTION: (Continued)

latter to oscillate for the duration of the pulse. It also provides a sawtooth voltage sweep for the repeller electrode of the RF oscillator, thus frequency modulating the RF output. The output system determines the amount of RF power available to the load. It is provided with an RF monitor for setting the reference level of RF power and with a direct-reading power output control calibrated with respect to this reference level. The power supply provides plate and filament power for the modulator, RF oscillator, and RF monitor circuits.

Power Supply: 115 volts, $\pm 10\%$, AC, 50 to 1600 cycles per second, single phase, 300 watts.

Frequency Range: 3650 to 7300 megacycles per second.

Type of Transmission: Internal: Continuous Wave, Pulse, Frequency Modulated;
External: Square Wave, Pulse.

Maximum Power Output: 0.2 milliwatts.

Range of Output Attenuator: -7 to -127 dbm.

Rated Load: 50 ohms resistive.

Pulse Modulation:

Internal:

Pulse Repetition Rate: Adjustable from 40 to 4000 pulses per second.

Pulse Width: Adjustable from 0.5 to 10 microseconds.

Pulse Rise Time: Less than 0.5 microseconds between points that are 10% and 90% of maximum amplitude on the initial rise.

Pulse Decay Time: Less than 0.5 microseconds between points that are 10% and 90% of maximum amplitude on the final decay.

Delay: Start of Radio Frequency pulse delayable over a range from 3 to 300 microseconds.

Synchronization: External Synchronizing.

Pulses: Required Peak Amplitude: Between 10 and 50 volts.

Polarity: Positive or negative.

Required Duration: From 0.5 to 20 microseconds between points that are 50% of maximum amplitude of initial rise.

Required Rise Time: 0.5 microseconds or less between points that are 10% and 90% at maximum amplitude of initial rise.

Required Flatness: Between 90% point of initial rise and 90% point on final decay, amplitude must remain between 90% and 100% of maximum amplitude of initial rise.

DC Level: Between +10 volts and -10 volts.

Repetition Rate: Between 40 and 4000 pulses per second.

External Sine Wave:

Synchronization:

Required Amplitude: Between 5 and 50 volts peak.

Frequency: Between 40 and 4000 cycles per second.

SIGNAL GENERATOR
MODEL NO. 902
(Polytechnic Research and Development Company)

ELECTROMECHANICAL DESCRIPTION: (Continued)

External:

Types: Pulse or Square Wave.

Polarity: Positive or Negative.

Repetition Rate:

Positive Square Wave: Between 200 and 5000 cycles per second.

Negative Square Wave: Between 100 and 5000 cycles per second.

Pulse: Between 40 and 5000 cycles per second.

Required Amplitude: Between 40 and 70 volts peak.

Minimum Pulse Width: Approximately 0.5 microseconds.

Frequency Modulation:

Synchronization: Internal or External.

External: Sine Wave or pulse of positive or negative polarity.

Frequency Deviation: Adjustable from zero to at least ± 3 megacycles per second.

Repetition Rate: Between 40 to 4000 cycles per second.

Video Output: Two different video pulses are provided. One is delayed and one is undelayed. The delayed pulse occurs less than 2 microseconds before the start of the output RF pulse. The undelayed pulse occurs not more than 0.1 microsecond after the start of an internal trigger pulse, and less than 1 microsecond after the start of an external synchronizing trigger pulse.

Pulse Characteristics:

Amplitude: At least 10 volts.

Rise Time: Less than 1 microsecond between 10% and 90% of maximum amplitude of initial rise.

Polarity: Positive.

DC Level: Zero volts.

Output Impedance: Between 500 and 100,000 ohms with no more than 1500 micromicrofarads in parallel.

Accuracies: $\pm 1\%$ of frequency calibration.

± 2 decibels of attenuator calibration.

MANUFACTURERS' OR CONTRACTORS' DATA:

Polytechnic Research and Development Company, 202 Tillary Street, Brooklyn 1, New York; Approximate Cost per Unit, \$3310.00, 1 September 1950.

TUBE COMPLEMENT:

1 JAN-5U4-G, 2 JAN-6L6-GA, 1 JAN-6SH7, 6 JAN-OA2, 2 JAN-6X4, 1 JAN-OB2, 1 JAN-6AG5, 1 JAN-6AK5, 2 JAN-5R4-GY, 1 JAN-6AR6, 1 JAN-2C53, 2 JAN-5651, 7 JAN-6J6, 1 JAN-2D21, 1 JAN-5721.

REFERENCE DATA AND LITERATURE:

Manufacturers' "Handbook of Maintenance Instructions".

Manufacturer's Catalog "Precision Test Equipment".

SIGNAL GENERATOR
 MODEL NO. 902
 (Polytechnic Research and Development Company)

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Signal Generator, Model No. 902		7CAC-363979	14-1/16	17	19	85
1	Power Cord			72 long			
5	3 amp 3 AG 250 V. fuse						
3	Pilot Lamps						

ELECTRONIC FREQUENCY CONVERTER CV-301/U



FUNCTIONAL DESCRIPTION:

A portable, frequency converter designed to extend the lower frequency range limits of signal generators such as SG-91/U. It also enables the frequency and amplitude modulation features as well as the attenuator calibration feature of the signal generator to be utilized at these lower frequencies without causing any appreciable distortion. A frequency increment dial is calibrated in kilocycles per second.

RELATIONSHIP TO OTHER EQUIPMENT:

Similar to Boonton type 207-A Univerter.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The frequency converter consists of a semifixed frequency 150 megacycles heterodyne oscillator, a wide band amplifier, and a self-contained regulated power supply. In operation, the internal heterodyne oscillator beats with the output signal of the signal generator, and the difference frequency is passed through the wide band amplifier to the output system.

Power Supply: 110 ±20 volts, AC, single-phase, 60 cycles per second, 45 watts.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREMENT INFO.:			
PROCUREMENT COG.:	USN	DESIGN COG.:	USN, BuAer
F.I.I.N.:		FUNCTIONAL CLASS. NO.:	4.1.3
- Electronics Test Equipment -			CV-301/U

ELECTRONIC FREQUENCY CONVERTER CV-301/U

ELECTROMECHANICAL DESCRIPTION: (Continued)

Frequency Range: 100 kilocycles per second to 55 megacycles per second (0.3 to 55 megacycles per second with 200 kilocycles carrier deviation).

Type of Transmission: Frequency Modulated and Amplitude Modulated.

X-1 Output Voltage: Continuously variable from 0.1 microvolt to 0.1 volt across a 53-ohm load by means of the SG-91/U Signal Generator attenuator. The gain is constant within ±1 decibel over the entire frequency range.

High Output Voltage: Uncalibrated high voltage output of approximately 1.5 volts available at a front panel pin jack.

Output Impedance:

At X1 Jack: 53 ohms.

At High Output Pin Jack: 330 ohms.

Frequency Increment Dial: Calibrated in increments of 5 kilocycles per second from +300 kilocycles per second through 0 to -300 kilocycles per second.

MANUFACTURERS' OR CONTRACTORS' DATA:

Boonton Radio Corporation, Boonton, New Jersey; Approximate Cost per Unit, \$345.00.

TUBE COMPLEMENT:

1 JAN-6C4, 1 JAN-6AB4, 2 JAN-6AK5, 1 JAN-6AH6.

REFERENCE DATA AND LITERATURE:

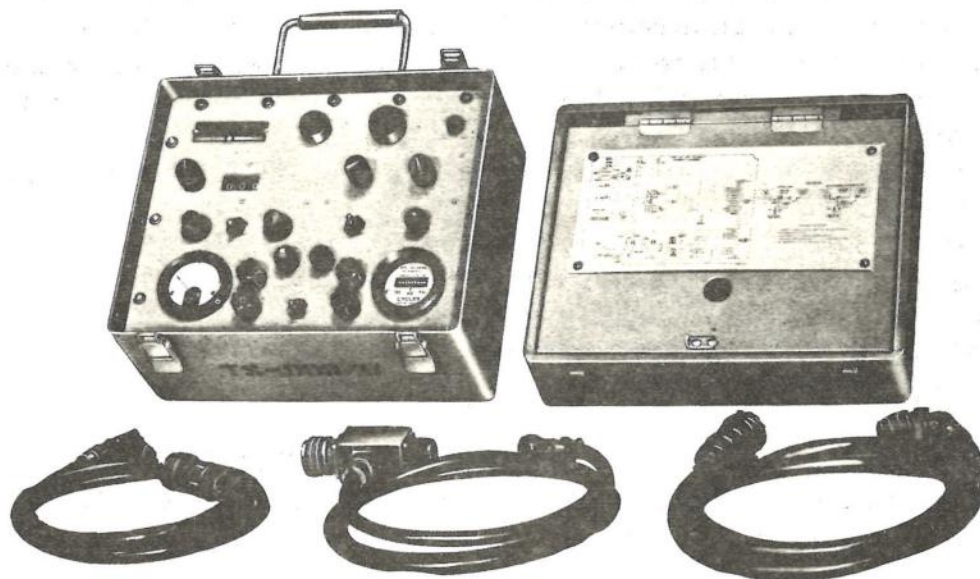
SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Electronic Frequency Converter CV-301/U	1.28	15	10-1/2	14	25

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Electronic Frequency Converter CV-301/U	Steel		11-1/2	7-3/8	10-1/2	20
CV-301/U - Electronics Test Equipment -							

DRT TEST SET TS-999/U



FUNCTIONAL DESCRIPTION:

A portable, special purpose equipment used to bench test Dead Reckoning Tracer AN/ASA-14 and Tactical Display Plotting Board PT-393/ASA-14. The test set simulates signals from a ground-position indicator representing miles traveled east-west and miles traveled north-south. In addition, the test set simulates the navigational computer of the AN/ASA-14 system, supplying information for testing the tactical display plotting board. Test results are indicated by digital counter, meters, and a panel lamp located on the front panel of the equipment.

RELATIONSHIP TO OTHER EQUIPMENT:

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The test set consists basically of a timing motor and synchro system, a vibrating reed type frequency meter, an AC voltmeter, a digital counter, and associated circuitry. The timing motor drives the synchro system

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.		Standard	
STOCK NOS.		(ASO)R88SAFH-A4603.006	
PROCUREMENT INFO.:			
PROCUREMENT COG.:	Navy	DESIGN COG.:	Navy, BuAer
F.I.L.N.:	6625-562-5840	FUNCTIONAL CLASS. NO.:	4 1 3
- Electronics Test Equipment -			TS-999/U

DRT TEST SET TS-999/U

ELECTROMECHANICAL DESCRIPTION: (Continued)

at a constant speed. A transformer supplies voltage to the rotor of the synchro whose output is used as both N-S and E-W signals. A polarity switch permits selection of the desired direction. The digital counter which is geared to the motor indicates the distance traveled in nautical miles. A vibrating reed-type frequency meter and an AC voltmeter monitor frequency and amplitude of the input voltage.

Power Supply: 115 ±5 volts, AC, 400 ±20 cycles per second at 1.5 amps; 28 volts DC at 2.5 amps.

Power Output: 115 volts, AC, 400 cycles per second; 28 volts DC.

Output Coordinate Signals: 0 to 250 ±10 volts AC.

N-S or E-W Synchro Output: 1 revolution equals 2 miles.

Line Volts Meter Range: 0 to 150 volts AC.

Line Frequency Meter: 360 to 440 cycles per second.

MANUFACTURERS' OR CONTRACTORS' DATA:

Servo Corporation of America, 20-12 Jericho Turnpike, New Hyde Park, Long Island, New York; Contract No. NOas 57491; approximate cost per unit, \$1197.49.

TUBE COMPLEMENT:

REFERENCE DATA AND LITERATURE:

NavAer 17-15C-517 Handbook of Operations, Service and Overhaul Instructions with Illustrated Parts Breakdown.

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
	DRT Test Set TS-999/U					
TS-999/U - Electronic Test Equipment -						

**FREQUENCY CONVERTER ACCESSORY (UNIVERTER)
TYPE 207-A
(Boonton Radio Corporation)**



FUNCTIONAL DESCRIPTION:

A portable, general purpose, frequency converter designed to extend the lower frequency range limits of Boonton Types 202-B and 202-C Signal Generators. A frequency increment dial is calibrated in kilocycles per second.

RELATIONSHIP TO OTHER EQUIPMENT:

ELECTROMECHANICAL DESCRIPTION:

Power Supply: 110 ±20 volts, AC, single phase, 60 cycles per second, 45 watts.

Frequency Range:

Univerter: 100 kilocycles per second to 55 megacycles per second when used with either the Boonton Types 202-B or 202-C Signal Generators (300 kilocycles per second to 55 megacycles per second with 200 kilocycle carrier deviation).

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREMENT INFO.:			
PROCUREMENT COG.:	DESIGN COG.: Commercial		
F.I.I.N.:	FUNCTIONAL CLASS. NO.: 4.1.3		
- Electronics Test Equipment -		Boonton 207-A	

FREQUENCY CONVERTER ACCESSORY (UNIVERTER)
 TYPE 207-A
 (Boonton Radio Corporation)

ELECTROMECHANICAL DESCRIPTION: (Continued)

Signal Generator 202-B or 202-C: 54 megacycles per second to 216 megacycles per second.

Univerter and Signal Generator: 100 kilocycles per second to 216 megacycles per second.

Type of Transmission: Frequency Modulation and Amplitude Modulation.

X-1 Output Voltage: Continuously variable from 0.1 microvolt to 0.1 volt across a 53 ohm load by means of the 202-B or 202-C Signal Generator attenuator. The gain is constant within ± 1 decibel over the entire frequency range.

High Output Voltage: Uncalibrated high voltage output available at a front panel pin jack. Voltage gain approximately 7.5.

Output Impedance:

At X1 Jack: 53 ohms.

At High Output Pin Jack: 330 ohms.

Frequency Increment Dial: Calibrated in increments of 5 kilocycles per second from +300 kilocycles per second through 0 to -300 kilocycles per second.

MANUFACTURERS' OR CONTRACTORS' DATA:

Boonton Radio Corporation, Boonton, New Jersey; Approximate Cost per Unit, \$345.00.

TUBE COMPLEMENT:

1 RETMA-6C4, 1 RETMA-6AB4, 2 RETMA-6AK5, 1 RETMA-6AH6.

REFERENCE DATA AND LITERATURE:

Manufacturer's Catalog, "8 Precision Instruments for Radio and Electronics."

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Univerter Type 207-A	1.28	15	10-1/2	14	25

EQUIPMENT SUPPLIED:

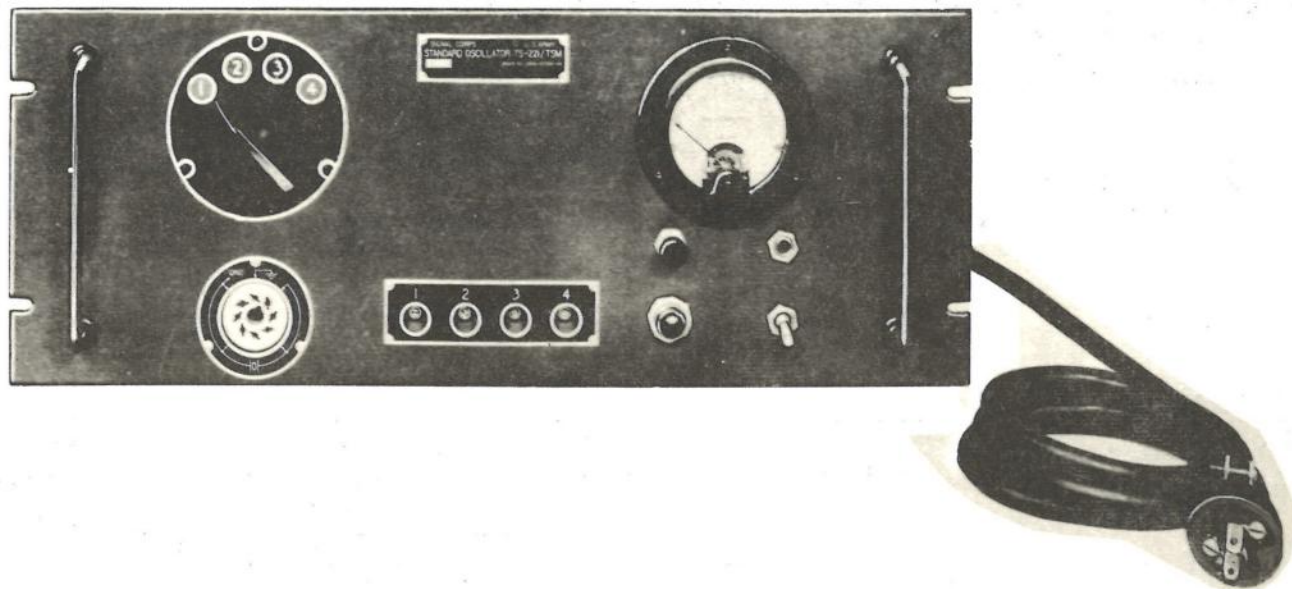
Quant. Per Eq't	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Univerter Type 207-A	Steel		11-1/2	7-3/8	10-1/2	20
1	Instruction Book						

Boonton 207-A

- Electronics Test Equipment -

4.2 TEST OSCILLATORS

STANDARD OSCILLATOR TS-221/TSM



FUNCTIONAL DESCRIPTION:

This is a special purpose crystal test oscillator which uses a special circuit developed for testing low-frequency crystals. It serves as a reference standard to test the frequency and activity of Crystal Units CR-2/U, CR-3/U, and CR-4/U. An RF cord and crystal holder are included with the equipment.

This equipment is not intended for use in production testing but as a reference standard against which production test sets are checked.

RELATIONSHIP TO OTHER EQUIPMENT:

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The test unit consists of a standard relay rack which contains an oscillator circuit. The front panel includes power switch, selector switch, coil receptacle, and a milliammeter.

Power Supply: 110 to 120 volts, AC, 50 to 1,000 cycles per second, single-phase, 52 watts.

Frequency Range: 200 to 1200 kilocycles per second in 4 bands, $\pm 2\%$.

Milliammeter Range: 10 milliamperes DC.

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Standard		Standard
STOCK NOS.	7CAC-801318-554		3F4325-221
PROCUREMENT INFO.:	Spec. MIL-T-71-3393; Sig. C. Dwgs. SC-D-14571, 25890		
PROCUREMENT COG.:	USA	DESIGN COG.: USA, SCEL, SSL	
F.I.I.N.:	FUNCTIONAL CLASS. NO.: 4.2.1		
	- Electronics Test Equipment -		TS-221/TSM

STANDARD OSCILLATOR TS-221/TSM

MANUFACTURERS' OR CONTRACTORS' DATA:

Western Electric Company, 120 Broadway, New York, New York; Western Electric Company No. ES-0-597201; Approximate Cost per Unit, \$300.00.

TUBE COMPLEMENT:

1 JAN-OC3, 1 JAN-OD3, 1 JAN-5U4G, 1 JAN-6H6, 1 JAN-6V6GT.

REFERENCE DATA AND LITERATURE:

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Standard Oscillator TS-221/TSM (Export Packed)	3				80

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Standard Oscillator TS-221/TSM		7CAC-801318-554 3F4325-221	7	19	7-1/2	
	Including:						
1	Cable Assy. RG-8A/U		3E7350-2.52.2	58 long			
1	Tool, Alignment TL-207		6Q349	6-3/8 long			
1	Calibration Coil TN-82/TSM-2		3F2443-82	3-7/8 long	1-3/4 dia.		
1	Calibration Coil TN-83/TSM-2		3F2443-83	3-7/8 long	1-3/4 dia.		
1	Calibration Coil TN-84/TSM-2		3F2443-84	3-7/8 long	1-3/4 dia.		

TS-221/TSM

- Electronics Test Equipment -

TEST OSCILLATOR TS-237/TRC-8



FUNCTIONAL DESCRIPTION:

A general purpose, crystal-controlled, unmodulated test oscillator designed for use in calibrating radio receivers. The equipment furnishes the necessary signals for the alignment of the RF and IF stages of radio sets. RF cable and couplings are permanently fixed to the instrument.

RELATIONSHIP TO OTHER EQUIPMENT:

ELECTROMECHANICAL DESCRIPTION:

Power Supply: Filament and plate supply furnished by equipment under test.
 Frequency Range: 30 megacycles and 230 to 250 megacycles in 5 megacycle steps.
 Impedance: 50 ohms.
 Accuracy: Better than 1%.

MANUFACTURERS' OR CONTRACTORS' DATA:

Espey Manufacturing Company, Inc., 528 East 72nd Street, New York, New York.

TUBE COMPLEMENT:

1 JAN-6AG5.

REFERENCE DATA AND LITERATURE:

TM-11-618.

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			Substitute Standard
STOCK NOS.			3F4325-237.1
PROCUREMENT INFO.:	Spec. 71-3244(Sig. C.);Spec. MIL-R-12887		
PROCUREMENT COG.:	USA	DESIGN COG.: USA, SCEL	
F.I.I.N.:	FUNCTIONAL CLASS. NO.:		4.2.1
- Electronics Test Equipment -			TS-237/TRC-8

TEST OSCILLATOR TS-237/TRC-8

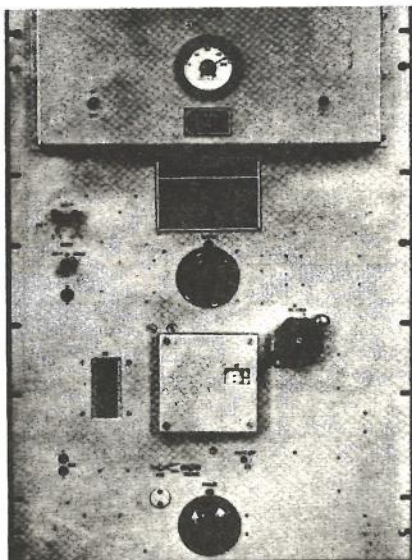
SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Test Oscillator TS-237/TRC-8 (Export Packed)	0.15				6

EQUIPMENT SUPPLIED:

Quant. Per Eq't	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Test Oscillator TS-237/TRC-8		3F4325-237.1	5-3/8	3-3/8	2-1/8	
1	Crystal Unit CR-10/U		2X15-5000				

AUDIO OSCILLATOR TS-560()/FT



FUNCTIONAL DESCRIPTION:

A semiportable, general purpose, heterodyne, vacuum tube oscillator used to provide a signal source for transmission measurements of telephone lines, amplifiers, telephone terminals, and radio receiving and transmitting equipment. The unit generates an alternating signal at any single frequency within its operating range. Frequency calibration appears on a 300-inch length of motion picture film and is direct reading.

RELATIONSHIP TO OTHER EQUIPMENT:

The TS-560()/FT is the military designation for Western Electric 17B. Vacuum tubes, a power cord, and a patching cord are required but not supplied.

ELECTROMECHANICAL DESCRIPTION:

Power Supply: 105 to 125 volts, AC, 50 to 60 cycles per second.

Frequency Range: 50 cycles per second to 150 kilocycles per second in 50-cycles per second increments.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREMENT INFO.:			
PROCUREMENT COG.: Navy		DESIGN COG.: Navy	
F. I. I. N.:		FUNCTIONAL CLASS. NO.: 4.2.1	
- Electronics Test Equipment - TS-560()/FT			

AUDIO OSCILLATOR TS-560()/FT

ELECTROMECHANICAL DESCRIPTION: (Continued)

Output (Variable): 1 milliwatt to 1 watt, constant with frequency except in the range below 1000 cycles per second.

Output Impedance: 135 or 600 ohms.

MANUFACTURERS' OR CONTRACTORS' DATA:

Western Electric Company, 195 Broadway, New York 7, New York.

TUBE COMPLEMENT:

1 274A, 1 300B, 5 310A, 2 311A, 1 313C.

REFERENCE DATA AND LITERATURE:

Manufacturer's Catalog 11, 1950.

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Audio Oscillator TS-560()/FT	metal	3F3570-3(USA)	28	19	19	80
1	Ballast Lamp 3-watt 120-volt Mazda Lamp (Candelabra Base)						
1	Lamp						
2	Bryant 3-amp Plug Fuse						
1	Lamp Cap						

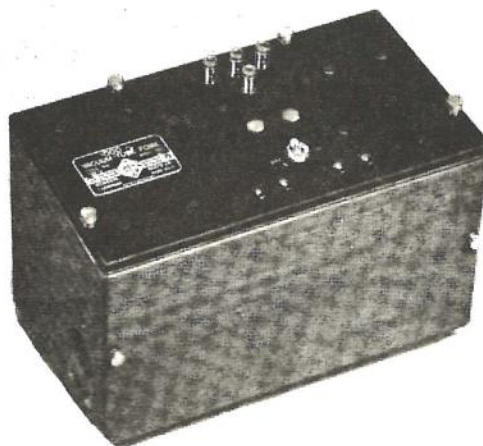
SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Audio Oscillator TS-560 ()/FT					200

TS-560()/FT

- Electronic Test Equipment -

VACUUM TUBE FORK TEST KIT
 MODEL NO. 723
 (General Radio Company)



FUNCTIONAL DESCRIPTION:

A portable, general purpose, fixed frequency, oscillator used to check the input power frequency of the computer for the A-3 Fire Control System at the airplane. Can be used as a modulating source for standard-signal generators and beacon transmitters, as a power source for impedance bridges, for transmission measurements on lines and cables, and as a test tone generator for communication systems. It may also be used as a test signal source for distortion measurements, and as a source of timing pulses for oscillograms.

RELATIONSHIP TO OTHER EQUIPMENT:

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The frequency is determined by a vacuum-tube driven tuning fork. A filter minimizes harmonic content and an output transformer provides three output impedances.

Power Supply: One 1-1/2 volt Burgess 4FH and two 45 volt Burgess Z30NX Batteries, for 105 to 125 volts, 40 to 60 cycles per second. Normally supplied with AC power supply unless otherwise specified.

Frequency:

Model No. 723: 400 cycles per second.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREMENT INFO.:			
PROCUREMENT COG.:	DESIGN COG.: Commercial		
F.I.I.N.:	FUNCTIONAL CLASS. NO.: 4.2.1		
- Electronics Test Equipment -			Gen. Radio 723

VACUUM TUBE FORK TEST KIT
MODEL NO. 723
(General Radio Company)

ELECTROMECHANICAL DESCRIPTION: (Continued)

Frequency: Type 723-D: 400 cycles per second.

Type 723-C: 1000 cycles per second.

Output: Approximately 50 milliwatts to a matched load.

Internal Output Impedance Terminals: 50, 500, and 5000 ohms.

Waveform and Hum Level: The total harmonic content is less than 0.5%. The hum is negligible.

Frequency Stability: Total frequency drift is about 0.15% to 0.2%.

Accuracy: $\pm 0.05\%$ at 77° F.

MANUFACTURERS; OR CONTRACTORS' DATA:

General Radio Company, 275 Massachusetts Avenue, Cambridge 39, Massachusetts; Approximate Cost per Unit, \$165.00, AC operated, January 1953.

TUBE COMPLEMENT:

1 RETMA-1A5-GT/G, 1 RETMA-OC3.

REFERENCE DATA AND LITERATURE:

Manufacturer's Catalog "M", 1951.

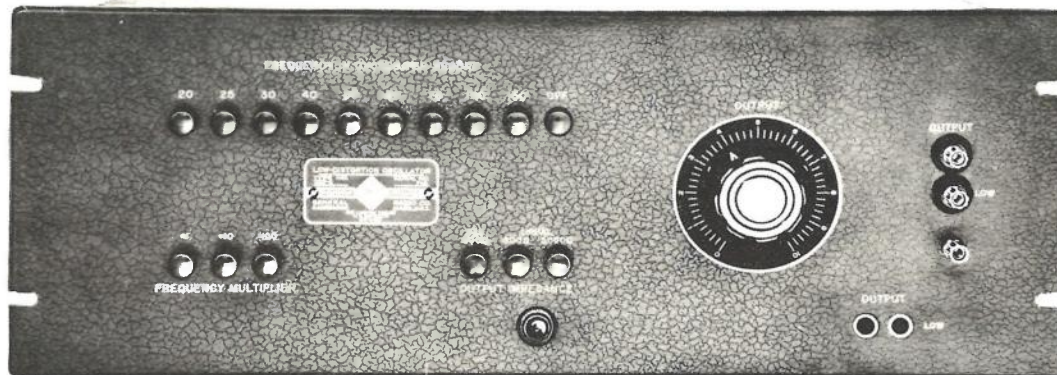
SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Vacuum Tube Fork Test Kit Model No. 723	1.8	12-1/4	10-3/4	19-1/2	15

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Vacuum Tube Fork Test Kit Model No. 723 or	Wood		7-3/4	6-1/4	10-5/8	9.25
1	Vacuum Tube Fork Test Kit Type 723-D, or	Wood		7-3/4	6-1/4	10-5/8	9.25
1	Vacuum Tube Fork Test Kit Type 723-C	Wood	7CAC-606300 3F2705	7-3/4	6-1/4	10-5/8	9.25

OSCILLATOR, LOW DISTORTION
Type 1301-A
(General Radio Company)



FUNCTIONAL DESCRIPTION:

A general purpose oscillator designed for use in making distortion measurements on audio-frequency equipment and on radio transmitters. The oscillator supplies an audio-frequency signal of extremely pure waveform at any of twenty-seven fixed frequencies. Push button switches on the front panel provide for selection of signal frequencies and of output impedances.

RELATIONSHIP TO OTHER EQUIPMENT:

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The oscillator has a resistance-tuned type circuit. Separate feedback networks control the frequency and amplitude independently. An internal voltage regulator eliminates frequency changes resulting from changes in the plate supply. Three output circuits provide a selection of output impedances as follows: 600-ohm balanced to ground, 600-ohm unbalanced and 5000-ohm unbalanced. A potentiometer in the 5000-ohm circuit provides volume control for the output signal.

Power Supply: 105 to 125 or 210 to 250 volts, AC, 25 to 60 cycles per second, single-phase, 45 watts.

Frequency Range: 20 to 15,000 cycles per second with fixed frequency settings at 20, 25, 30, 40, 50, 60, 75, 100 and 150 cycles per second; multiplier provides fixed frequencies at 1, 10, and 100 times these intervals.

Frequency Calibration Accuracy: 1.5%, ± 0.1 cycle per second.

Frequency Stability: Less than 0.02% per hour frequency drift.

Output Power: 18 milliwatts into 600-ohm load or 6.6 volts open circuit.
100 milliwatts into 5000-ohm load or 30 volts open circuit.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREMENT INFO.:			
PROCUREMENT COG.:	DESIGN COG.: Commercial		
F.I.I.N.:	FUNCTIONAL CLASS. NO.: 4.2.1		
- Electronics Test Equipment - General Radio 1301-A			

OSCILLATOR, LOW DISTORTION
Type 1301-A
(General Radio Company)

ELECTROMECHANICAL DESCRIPTION: (Continued)

Waveform Distortion:

5000-ohm Output: Not more than 0.1% at 40 to 7500 cycles per second.
Not more than 0.15% at other frequencies.

600-ohm Output: Not more than 0.1% at 40 to 7500 cycles per second.
Not more than 0.25% at 20 to 40 cycles per second.
Not more than 0.15% above 7500 cycles per second.

RELATIONSHIP TO OTHER EQUIPMENT:

MANUFACTURERS' OR CONTRACTORS' DATA:

General Radio Company, 275 Massachusetts Avenue, Cambridge 39, Massachusetts; Approximate Cost per Unit, \$495.00.

TUBE COMPLEMENT:

1 JAN-6Y6-G, 1 JAN-6SJ7-GT, 1 JAN-6SK7-GT, 1 JAN-6SQ7, 1 JAN-6X5-GT,
1 JAN-6B4-G, 1 JAN-6SL7-GT, 1 JAN-OD3/VR150, 1-NE-17.

REFERENCE DATA AND LITERATURE:

Manufacturers' Instruction Manual.

SHIPPING DATA:

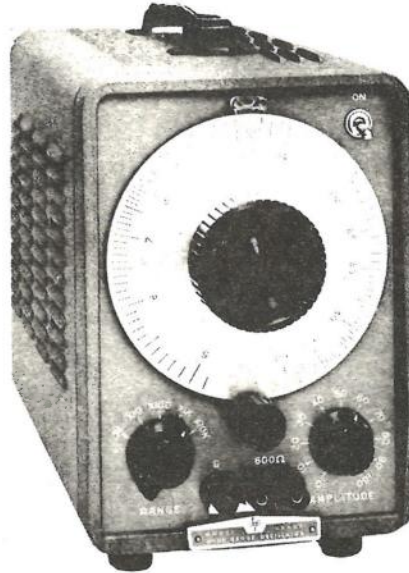
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Oscillator, Low Distortion (General Radio 1301-A)	3.5	13	25	19	36

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Oscillator, Low Distortion (General Radio 1301-A)			7	19	12	32-1/2
1	Power Cord (General Radio CAP-35)		1690-322845940 N17-C-48233-9251 3E-7350.1-81.3	84 long			1/2

General Radio 1301-A - Electronics Test Equipment -

OSCILLATOR
MODEL 200 CD
(Hewlett-Packard Company)



FUNCTIONAL DESCRIPTION:

A portable, general purpose instrument that uses a resistance-tuned circuit to generate AC test voltages. The oscillator is used to test amplifiers, check the audio response of transmitters, perform loudspeaker resonance tests, and provide a voltage source for bridge measurements and equipment operating in the audio and ultrasonic range. The output frequency is indicated by means of calibrated dials.

RELATIONSHIP TO OTHER EQUIPMENT:

The Hewlett-Packard 200CD is similar to the 200C but has been electrically and mechanically redesigned for greater frequency range, increased power output, and operation on 115 or 230 volts AC.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The unit consists basically of oscillator and amplifier sections and a power supply. The oscillator section is essentially a 2-stage re-
(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREMENT INFO.:			
PROCUREMENT COG.:	DESIGN COG.: Commercial		
F. I. L. N.:	FUNCTIONAL CLASS. NO.: 4. 2. 1		
- Electronics Test Equipment - Hewlett-Packard 200CD			

OSCILLATOR
MODEL 200 CD
(Hewlett-Packard Company)

ELECTROMECHANICAL DESCRIPTION: (Continued)

istance-coupled amplifier utilizing regenerative feedback to maintain oscillation and degenerative feedback to maintain the amplitude of oscillation constant. Cathode followers preceding the output transformer provide effective isolation for the oscillator. The output of the transformer is controlled by means of a single-bridged T-attenuator which follows the transformer.

Power Supply: 115 volts, $\pm 10\%$, AC, 50 to 60 cycles per second, single-phase, 75 watts.

Frequency Range: 5 cycles per second to 600 kilocycles per second in 5 ranges.

Frequency Response: ± 1 decibel using 1 kilocycle per second reference.

Power Output: 160 milliwatts into 600 ohms or 20 volts open circuit.

Distortion: Less than 0.5%.

Frequency Stability: Drift is less than $\pm 2\%$ under normal temperature conditions.

Hum Voltage: Less than 0.1% of rated output.

MANUFACTURERS' OR CONTRACTORS' DATA:

Hewlett-Packard Company, 275 Page Mill Road, Palo Alto, California; approximate cost per unit, \$150.00.

TUBE COMPLEMENT:

1 6F6, 2 6J7, 1 6V6, 1 5Y3GT.

REFERENCE DATA AND LITERATURE:

Manufacturer's Catalog 22-A, 1955.

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Oscillator Hewlett-Packard 200CD					36

Hewlett-Packard 200CD - Electronic Test Equipment -

GENERATOR, SWEEP
LIGNA-SWEEP MODEL CP 932-B
(Kay Electric Company)



FUNCTIONAL DESCRIPTION:

A portable, general purpose laboratory sweep oscillator with variable center frequency and sweep width. The generator can be provided with up to 18 crystal-controlled, pulse-type markers at any frequency within the range of the instrument.

RELATIONSHIP TO OTHER EQUIPMENT:

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The generator has a high voltage output automatically held constant over each band of the entire frequency range. Crystal markers are provided in six groups of three controlled by a rotary switch. The sweep oscillator range is covered in six switched bands. By decreasing the sweep width to a minimum the equipment may be used as a CW signal generator. The instrument is provided with a direct-reading frequency dial.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREMENT INFO.:			
PROCUREMENT COG.:	DESIGN COG.:		Commercial
F. I. I. N.:	FUNCTIONAL CLASS. NO.: 4.2.1		
- Electronics Test Equipment -			Kay CP 932-B

GENERATOR, SWEEP
LIGNA-SWEEP MODEL CP 932-B
(Kay Electric Company)

ELECTROMECHANICAL DESCRIPTION: (Continued)

Power Supply: 117 volts $\pm 10\%$, AC, 50 to 60 cycles per second.

Frequency Range: Band A, 100 kilocycles per second to 150 megacycles per second; Band B, 12 to 20 megacycles per second; Band C, 20 to 32 megacycles per second; Band D, 32 to 52 megacycles per second; Band E, 52 to 150 megacycles per second.

Method of Obtaining Output: Band A, beat frequency output; Bands B, C, D, and E, fundamental output.

Center Frequency: Continuously variable center frequency on Bands A, C, and D.

Sweep Width: Band A, continuously variable, 100 kilocycles per second to 12 megacycles per second; Band B, continuously variable, 60% of the center frequency; Band C, sweep width, 60% of the center frequency; Band D, at least 15 megacycles per second; Band E, at least 20 megacycles per second.

RF Output:

Band A: 0.25 volt rms into nominal 70 ohms.

Bands B, C, D, and E: 1.0 volts rms into nominal 70 ohms. (50 ohms output impedance available upon request).

Response: Flat within ± 0.4 decibel over widest sweep width.

Sweep Rate: Variable around 60 cycles per second; locks to line frequency.

Attenuators: 20, 20, 10, and 6 decibel steps in any combination plus 6 decibels continuously variable.

Markers: Up to 18, crystal-controlled, pulse-type markers, provided at any specified frequency within the range of the instrument.

Marker Amplitude: Positive pulse, 0 to 10 volts peak continuously variable.

Sweep Output: 7-volt sawtooth, synchronized with sweeping oscillator.

MANUFACTURERS' OR CONTRACTORS' DATA:

Kay Electric Company, Maple Avenue, Pine Brook, New Jersey; approximate cost per unit, \$625.00 plus \$15.00 per marker.

TUBE COMPLEMENT:

REFERENCE DATA AND LITERATURE:

Manufacturer's Catalog.

SHIPPING DATA:

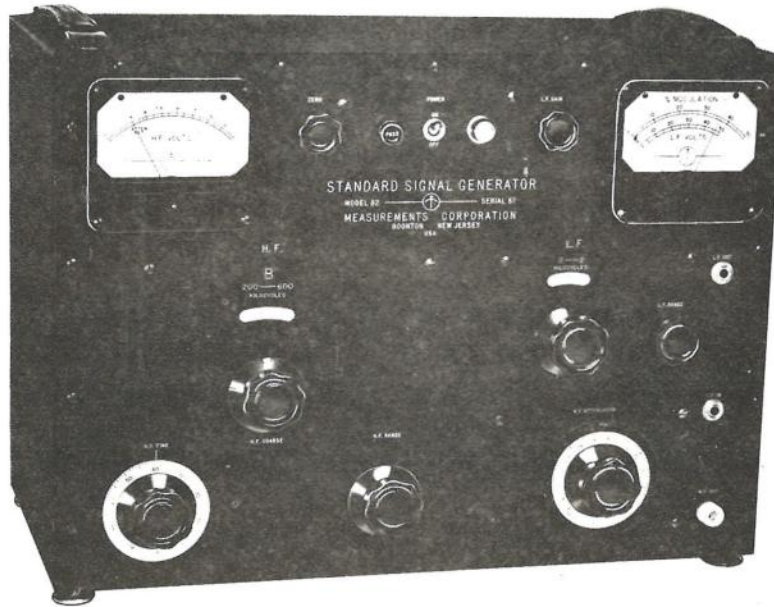
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
	Generator, Sweep Ligna-Sweep Model CP 932-B					
Kay CP 932-B - Electronic Test Equipment -						

GENERATOR, SWEEP
LIGNA-SWEEP MODEL CP 932-B
(Kay Electric Company)

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Generator, Sweep Ligna-Sweep Kay CP 932-B	metal		8-1/2	19-1/2	12-1/2	30

STANDARD SIGNAL GENERATOR
MODEL 82
(Measurements Corporation)



FUNCTIONAL DESCRIPTION:

A portable, general purpose equipment used for audio- and radio-frequency measurements, for testing and checking the frequency response of audio systems, and as a driving source for AF and RF bridges. Frequency is indicated by means of calibrated dials. Meters are used to indicate carrier level, percent of modulation, and AF output.

RELATIONSHIP TO OTHER EQUIPMENT:

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The unit is comprised basically of an AF oscillator and modulator, an RF oscillator, an attenuator, two meters, and a power supply. The AF oscillator covers the frequency range from 20 cycles per second to 200 kilocycles per second, provides an output from 0 to 50 volts, and is used to amplitude modulate the RF oscillator. The RF oscillator covers the frequency

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREMENT INFO.:			
PROCUREMENT COG.:	DESIGN COG.: Commercial		
F. I. I. N.:	FUNCTIONAL CLASS. NO.: 4.2.1		
- Electronics Test Equipment - Measurements 82			

STANDARD SIGNAL GENERATOR
MODEL 82
(Measurements Corporation)

ELECTROMECHANICAL DESCRIPTION: (Continued)

range from 80 kilocycles per second to 50 megacycles per second. A mutual-inductance attenuator is used.

Power Supply: 117 volts, AC, 50 to 60 cycles per second, 75 watts.

Frequency Range: 20 cycles per second to 200 kilocycles per second in 4 ranges; 80 kilocycles per second to 50 megacycles per second in 7 ranges; one blank range.

Frequency Calibration: Each range individually calibrated; 20 cycles per second to 200 kilocycles per second $\pm 5\%$; 80 kilocycles per second to 50 megacycles per second $\pm 1\%$.

Output Voltage and Impedance: 0 to 50 volts across 7500 ohms from 20 cycles per second to 200 kilocycles per second; 0.1 microvolt to 1 volt across 50 ohms from 80 kilocycles per second to 50 megacycles per second.

Modulation: Continuously variable from 0 to 50% from 20 cycles per second to 20 kilocycles per second from internal oscillator or external source.

Harmonic Output: Less than 1% from 20 cycles per second to 20 kilocycles per second; 3% from 20 kilocycles per second to 50 megacycles per second.

Leakage and Stray Field: Less than 1 microvolt from 80 kilocycles per second to 50 megacycles per second.

MANUFACTURERS' OR CONTRACTORS' DATA:

Measurements Corporation, Boonton, New Jersey.

TUBE COMPLEMENT:

1 5Y3GT, 1 6Y6G, 1 6AG7, 3 6SJ7, 1 OC3, 1 6J7, 1 6V6GT, 2 6AL5, 1 6C4.

REFERENCE DATA AND LITERATURE:

Manufacturer's Catalog.

SHIPPING DATA:

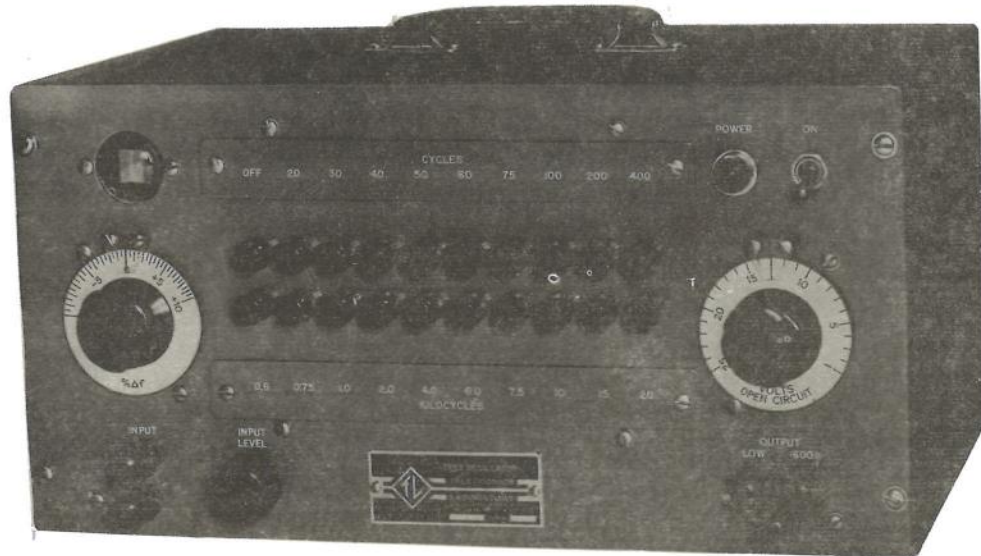
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
	Standard Signal Generator Measurements 82					
Measurements 82 - Electronic Test Equipment -						

STANDARD SIGNAL GENERATOR
 MODEL 82
 (Measurements Corporation)

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Standard Signal Generator Measurements 82	metal		15	19	12	50

OSCILLATOR, TEST
Model TO-100
(Teletronics Laboratory Incorporated)



FUNCTIONAL DESCRIPTION:

A portable general purpose test instrument used to generate sine wave voltages of known frequencies and amplitudes. This instrument supplies preset frequencies within the audio and supersonic range, which may be used to calibrate the sub-carrier units of FM/FM telemetering systems.

RELATIONSHIP TO OTHER EQUIPMENT:

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The circuit consists of a two-tube resistance-capacitance tuned oscillator amplifier followed by a two-stage DC coupled amplifier. The output of the DC coupled amplifier is controlled by a continuously variable potentiometer. A frequency converter and an electron ray tube indicate frequency synchronism with external signals. A manually operated deviation control allows a ± 0 to 15% variation in lock preset frequency.

Power Supply: 105 to 130 volts, AC, single-phase, 60 cycles per second, 0.75 ampere.

Frequency Range: 400 to 70,000 cycles per second selected by 20 push-buttons marked "OFF," 400, 560, 730 and 960 cycles per second; 1.3, 1.7, 2.3, 3.0, 3.9, 5.4, 7.35, 10.5, 12.3, 14.5, 22.0, 30.0, 40.0, 52.5, and 70 kilocycles per second.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.	7CAC-363964-9		
PROCUREMENT INFO.:			
PROCUREMENT COG.:	DESIGN COG.: Commercial		
F.I.I.N.:	FUNCTIONAL CLASS. NO.: 4.2.1		
- Electronics Test Equipment - Teletronics TO-100			

OSCILLATOR, TEST
Model TO-100
 (Teletronics Laboratory Incorporated)

ELECTROMECHANICAL DESCRIPTION: (Continued)

Type of Transmission: Continuous Wave.

Output Voltage: 1 to 25 volts (rms open circuit) continuously variable.

Output Impedance: 18 or 600 ohms.

Waveform Distortion: Less than 1% up to maximum rated load of 21 milliamperes rms. At 18 milliwatts into 600 ohms the distortion is less than 0.5%.

Noise Level: Less than 5 millivolts at zero signal output.

Accuracies: Voltage Output, ± 1 decibel. Frequency Stability, $\pm 1\%$.

MANUFACTURERS' OR CONTRACTORS' DATA:

Teletronics Laboratory Incorporated, 54 Kinkel Street, Westbury, Long Island, New York; Contract AF 33(604)56-2936; January 1956; Approximate Cost per Unit, \$325.00.

TUBE COMPLEMENT:

1 JAN-6AU6, 1 JAN-6CL6, 1 JAN-5Z4, 1 JAN-6AQ5, 1 JAN-6BE6, 1 JAN-12AT7, 1 JAN-OB2, 1 JAN-6AL7.

REFERENCE DATA AND LITERATURE:

Manufacturer's Data Sheet.

SHIPPING DATA:

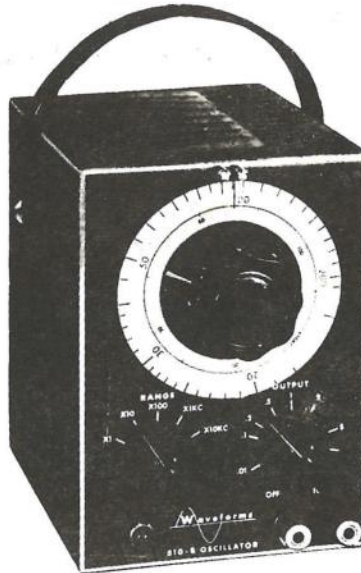
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Oscillator, Test (Teletronics TO-100)	1.64	10	21	13-1/2	32

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Oscillator, Test (Teletronics TO-100)	Metal	7CAC-363964-9	8	16	11	25

Teletronics TO-100 - Electronics Test Equipment -

**AUDIO OSCILLATOR
MODEL 510-B
(Waveforms, Incorporated)**



FUNCTIONAL DESCRIPTION:

A portable, general purpose equipment used to measure frequency response and distortion, and also as a frequency control for pulse generators. Frequency is indicated on a calibrated dial.

RELATIONSHIP TO OTHER EQUIPMENT:

The 510-B is used in conjunction with Matching Transformer Waveforms T-10 for applications requiring a balanced output.

ELECTROMECHANICAL DESCRIPTION:

Power Supply: 115 volts $\pm 10\%$, AC, 60 to 400 cycles per second, 40 volt-amps.

Frequency Range: 18 cycles per second to 1.2 megacycles per second in 5 overlapping ranges.

Output Voltage: Constant within ± 0.5 decibels from 18 cycles per second to 100 kilocycles per second and within ± 2 decibels from 100 kilocycles per second to

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREMENT INFO.:			
PROCUREMENT COG.:	DESIGN COG.: Commercial		
F. I. I. N.:	FUNCTIONAL CLASS. NO.: 4.2.1		
- Electronics Test Equipment - Waveforms 510-B			

AUDIO OSCILLATOR
MODEL 510-B
(Waveforms, Incorporated)

ELECTROMECHANICAL DESCRIPTION: (Continued)

1.2 megacycles per second for any setting of the output control above 0.1 volt.
 Harmonic Distortion: Less than 2%.
 Distortion for Rated-Load Current of 4 milliamps: Less than 1%.
 Output Level: 10 volts open circuit.
 Maximum Output: +15 decibels into 2000-ohm load.
 Internal Impedance: 400 ohms.
 Accuracy: $\pm 2\%$, ± 1 cycle per second for all conditions of line voltage variation (± 10 volts) from 18 cycles per second to 180 kilocycles per second; $\pm 10\%$ from 180 kilocycles per second to 1.2 megacycles per second.
 Hum and Noise Level: 0.5 millivolt or 60 decibels below the signal, whichever is greater.

MANUFACTURERS' OR CONTRACTORS' DATA:

Waveforms, Incorporated, 333 Avenue of the Americas, New York 14, New York; approximate cost per unit, \$150.00.

TUBE COMPLEMENT:

1 6SJ7 2 6AK6 1 6X4W

REFERENCE DATA AND LITERATURE:

Manufacturer's Catalog.

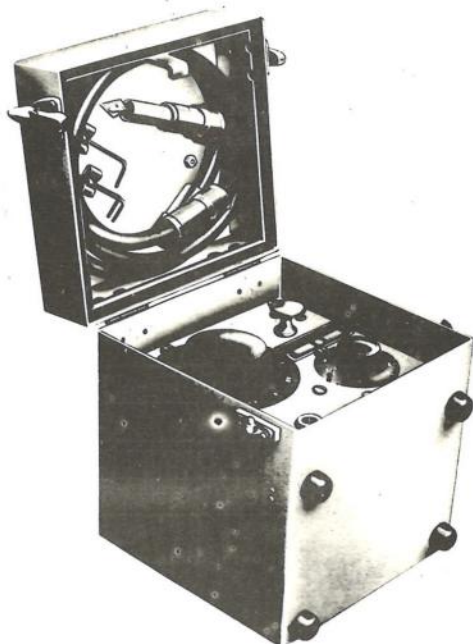
EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Audio Oscillator Waveforms 510-B	metal		6	4-1/4	5-1/4	

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Audio Oscillator Waveforms 510-B					
Waveforms 510-B - Electronic Test Equipment -						

TEST OSCILLATOR AN/UPM-46



FUNCTIONAL DESCRIPTION:

A portable, general purpose, RF signal generator used to check frequency calibration and relative sensitivity of radio countermeasures receivers and other receivers operating in its frequency range. It is designed primarily for field use.

RELATIONSHIP TO OTHER EQUIPMENT:

Overall nomenclature for TS-508/UP.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: A buzzer produces damped oscillations in a tunable concentric line resonator which is essentially a high-Q resonant circuit. The resonator selects the RF components of the buzzer output.

Power Supply: 3 volts, DC, from four 3 volt Batteries BA-205/U connected in parallel.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.		F16-Q-304625-200	
PROCUREMENT INFO.:	Spec. MIL-T-7144(Aer)		
PROCUREMENT COG.:	Navy	DESIGN COG.: Navy, BuAer	
F.I.I.N.:	FUNCTIONAL CLASS. NO.: 4.2.2		
	- Electronics Test Equipment -		AN/UPM - 46

TEST OSCILLATOR AN/UPM-46

ELECTROMECHANICAL DESCRIPTION: (Continued)

Frequency Range: 3000 to 11,000 megacycles per second.

Type of Transmission: Amplitude Modulated.

Modulation: 1000 to 2000 pulses per second.

Relative Attenuation: 0 to 100 decibels.

Power Output: Uncalibrated.

Output Impedance: 50 ohms.

Accuracy: ±2% of indicated frequency; 2 decibels.

MANUFACTURERS' OR CONTRACTORS' DATA:

Seaboard Electric Company, 417 Canal Street, New York, New York; Contract No. NOa(s)-51-1113.

TUBE COMPLEMENT:

None.

REFERENCE DATA AND LITERATURE:

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Test Oscillator AN/UPM-46		F16-Q-304625-200				
	Including:						
1	Test Oscillator TS-508/UP	Aluminum	F16-G-43943-4321	6-1/2	6-1/2	6-1/2	15
1	Cord CG-55B/U		1800-322849101 N16-C-11583-7486	51 long			
1	Antenna AT-408/UPM-46						
3	Allen Wrench						
1	Cover CW-304/UPM-46						
AN/UPM-46 - Electronics Test Equipment -							

GENERATOR, SWEEP AN/URM-75



FUNCTIONAL DESCRIPTION:

A portable, general purpose instrument designed to provide the signals required for aligning and checking Radio Receiving Set R-316/ARR-26. The unit may also be used to perform similar service for other receivers which have band-pass characteristics that lie within the generator's frequency range. The instrument supplies signals for observing frequency response, relative gain, and band-pass characteristics of RF, IF, and video stages; for aligning RF and IF circuits; for checking and adjusting discriminators; and for determining relative receiver sensitivity. The output of the equipment is indicated by switch positions located on the front panel of the equipment. Results of the tests are displayed on associated test equipment.

RELATIONSHIP TO OTHER EQUIPMENT:

A general purpose oscilloscope and signal generator are used in conjunction with the AN/URM-75 when performing the alignment and checkout of a receiver.

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREMENT INFO.:			
PROCUREMENT COG.: Navy		DESIGN COG.: Navy BuAer	
F. I. L. N.: 6625-323-0274		FUNCTIONAL CLASS. NO.: 4.2.2	
- Electronics Test Equipment - AN/URM-75			

GENERATOR, SWEEP AN/URM-75

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The unit is comprised of an FM sweep oscillator, a marker oscillator, a crystal oscillator and an audio oscillator. The frequency modulated sweep oscillator produces an RF signal which is continuously variable between 50 and 220 megacycles per second. This signal may be modulated at a 60 cycle rate to produce a frequency modulated signal having an adjustable sweep deviation from 0 to 10 megacycles per second. To extend the range of the frequency modulated signal from 50 down to 5 megacycles per second, the output of the sweep oscillator is heterodyned with the output of a fixed frequency oscillator operating at 116.5 megacycles per second. The marker oscillator generates a single-frequency signal between 4 and 220 megacycles per second; this signal is available separately or it may be mixed with the frequency modulated signal. The crystal oscillator operates on a fundamental frequency of 10 megacycles per second and functions as a calibration oscillator. The output of the crystal oscillator may be combined with the signal from the marker or sweep oscillator for calibration purposes. The audio oscillator operates at 600 cycles per second and provides a signal to amplitude modulate the marker or crystal oscillator.

Power Supply: 105 to 125 volts, AC, 60 cycles per second.

Sweep Oscillator Frequency Range:

Band A: 5 to 50 megacycles per second.

Band B: 50 to 220 megacycles per second.

Sweep Oscillator Output Level:

Band A: 10,000 microvolts.

Band B: 50,000 microvolts.

Sweep Oscillator Frequency Deviation:

Band A: Up to 10 megacycles per second.

Band B: Up to 10% of center frequency.

Marker Oscillator Frequency Ranges:

Band A: 4 to 8 megacycles per second.

Band B: 8 to 16 megacycles per second.

Band C: 15 to 32 megacycles per second.

Band D: 30 to 60 megacycles per second.

Band E: 52 to 105 megacycles per second.

Band F: 96 to 220 megacycles per second.

Marker Oscillator Output Level: 5000 microvolts on Bands A through D, 3000 microvolts Band E, 1500 microvolts Band F.

Marker Oscillator Modulation Frequency: 600 cycles per second.

MANUFACTURERS' OR CONTRACTORS' DATA:

Philco Corporation, Government Industrial Division, 4700 Wissahickon Avenue, Philadelphia, Pennsylvania; Contract No. NOas 52-854.

GENERATOR, SWEEP AN/URM-75

TUBE COMPLEMENT:

5 6BQ7, 1 12AU7, 1 6B16, 1 7Z4, 2 1N34.

REFERENCE DATA AND LITERATURE:

NavAer 16-30URM75-501 Handbook of Operating Instructions.

NavAer 16-30URM75-502 Handbook of Operating Instructions.

NavAer 16-30URM75-503 Handbook of Operating Instructions.

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Generator, Sweep AN/URM-75	metal		10	15	10	30
1	Cord CG-490/U			49 long			
1	Cable Assembly CX-2718/U			51 long			
1	Cable Assembly CX-2726/U			52 long			
1	Cover, Sweep Generator CW-340/URM- 75						

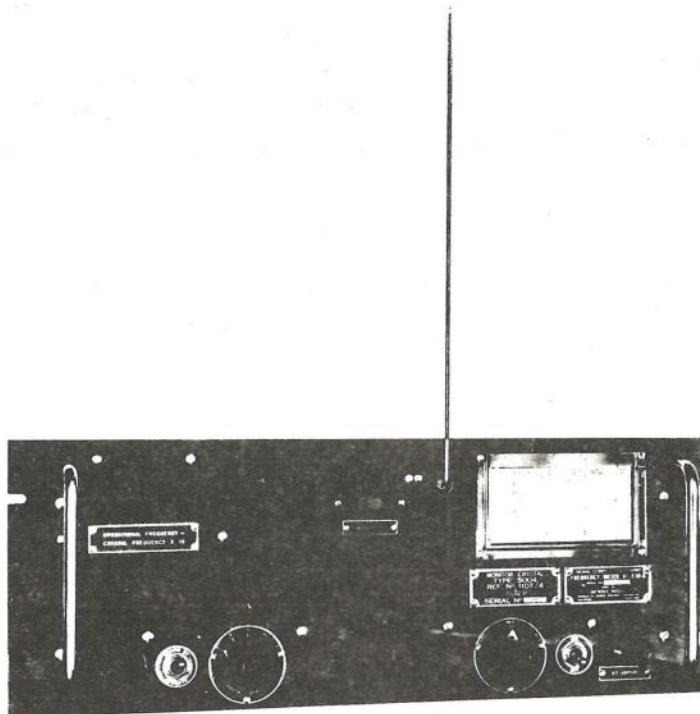
SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
	Generator, Sweep AN/URM-75					

- Electronic Test Equipment -

AN/URM-75

FREQUENCY METER BC-638-A



FUNCTIONAL DESCRIPTION:

A portable, general purpose, crystal-controlled, signal generator which is used to pre-set, test, and align radio receivers. Any one of five crystals can be introduced into the signal generator circuit by means of a five-position "CRYSTAL SELECTOR" switch. An electron ray indicator tube provides an accurate visual means of tuning the unit. The tuning control scale is calibrated directly in megacycles per second. The output signal can be tuned in on a receiver such as Radio Receiver BC-639-A.

RELATIONSHIP TO OTHER EQUIPMENT:

ELECTROMECHANICAL DESCRIPTION:

Power Supply: 110 to 120 volts or 200 to 250 volts, AC, 50 to 60 cycles per second, single phase, 30 watts. It may be operated from a 6 volt storage battery in conjunction with Dynamotor Unit PE-100-A.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.	7CAC-801318-347		2C1540-638A
PROCUREMENT INFO.:	Army Spec. 271-1067.		
PROCUREMENT COG.:	Army	DESIGN COG.:	Army, SigC.
F.I.I.N.:	FUNCTIONAL CLASS. NO.:		4.2.2
	- Electronics Test Equipment -		BC-638-A

FREQUENCY METER BC-638-A

ELECTROMECHANICAL DESCRIPTION: (Continued)

Frequency Range: 100 to 156 megacycles per second.
 Fundamental Crystal Range: 5555.55 to 8666.6 kilocycles per second.
 Type of Reception: Continuous Wave or Modulated Carrier Wave.
 Type of Transmission: Continuous Wave or Modulated Carrier Wave.
 Tone Modulation: 30% at 1000 cycles per second.
 Signal Output: Minimum, medium, or maximum.

MANUFACTURERS' OR CONTRACTORS' DATA:

Bendix Radio Division of Bendix Aviation Corporation, Towson, Maryland; Army Order No. 1082-SCL-42; Order No. 88MPD-44 dated 8 March 1944; Order No. 820 MPD-43 dated 26 November 1944; Approximate Cost per Unit, \$238.00.

TUBE COMPLEMENT:

1 JAN-6SK7, 2 JAN-9003, 1 JAN-9002, 1 JAN-6E5, 1 JAN-6L5G, 1 JAN-6V4G.

REFERENCE DATA AND LITERATURE:

AN 16-40BC638-2 (Maintenance Instructions).
 TO 16-55-283 (Spare Parts List).

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	

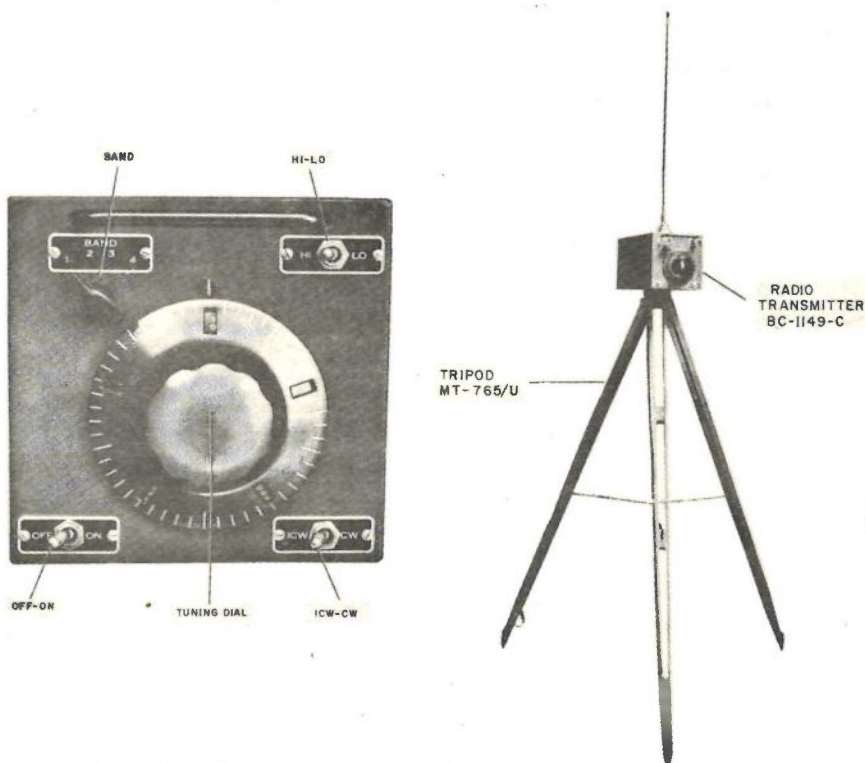
EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Frequency Meter BC-638-A		7CAC-801318-347 2C1540-638A	7	19	11-1/2	35
1	Rod Antenna			12-1/2			

BC-638-A

- Electronics Test Equipment -

RADIO TRANSMITTER BC-1149-C



FUNCTIONAL DESCRIPTION:

A complete low-power transmitter with a self-contained power supply. It can be mounted on a tripod and easily moved around an antenna array to provide test signals from any azimuth point. The set is used with high frequency radio direction finding equipment for checking the overall operation of the system. It delivers either a tone modulated or a CW signal in any one of four preset frequency bands. The vertical dipole transmitting antenna is made up of two rod sections which fit connectors at the top of the cabinet. All controls are on the front panel. These include a power ON-OFF toggle switch, a selecting low or high voltage to plate circuits, a four-position triple-ganged rotary detent type band change switch, and a calibrated tuning dial. The dial scale has 500 divisions, and the micrometer scale reads one part in 500. Dial readings must be referred to a transmitter frequency chart for readings in megacycles per second.

RELATIONSHIP TO OTHER EQUIPMENT:

This equipment is used in testing Radio Set SCR-291-A and Direction Finder Group AN/GRA-7. The C model utilizes one telescopic antenna on top of the cabinet instead of an antenna on top and bottom of the cabinet as in the A model and the B model.

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			2C6596-1149C
PROCUREMENT INFO.:	Army Spec. 71-1612 (SigC)		
PROCUREMENT COG.:	Army	DESIGN COG.:	Army, CSL
F.I.I.N.:			FUNCTIONAL CLASS. NO.: 4.2.2
- Electronics Test Equipment -			BC-1149-C

RADIO TRANSMITTER BC-1149-C

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The circuitry consists of a push-pull oscillator with cross-connected positive feedback oscillation, an interrupter electron-coupled oscillator which intermittently varies the push-pull bias voltage of the oscillator, and a battery pack power supply. Switching circuits are included to provide for function controls. Tuning is accomplished in the push-pull oscillator by varying inductance and capacitance in the tuned-plate tank circuit, and in the interrupter by varying the resistance in the screen grid coupling circuit.

Power Supply: 67.5 or 135 volts, DC, supplied by three 45 volt "B" batteries and 1.5 volts, DC, supplied by one 1.5 volt "A" battery.

Frequency Range: 1.5 to 30.0 megacycles per second, in four bands. 1.5 to 3.25, 3.5 to 6.5, 6.75 to 14.5, and 15.0 to 30.0 megacycles per second.

Type of Transmission: Continuous Wave, Interrupted Continuous Wave.

Power Output: In "HI" position the power output is approximately 0.1 watt; in "LO" position the power output is approximately 0.01 watt.

MANUFACTURERS' OR CONTRACTORS' DATA:

Federal Telephone and Radio Corporation, 100 Kingsland Road, Clifton, New Jersey; Army Order No. 990-SCGDL-43, DP43-G-490; Approximate Cost per Unit, \$400.00.

TUBE COMPLEMENT:

1 JAN-3A5, 1 JAN-1R5.

REFERENCE DATA AND LITERATURE:

TM 11-243 (TO 16-40SCR291-5) (Operating and Maintenance Instructions for SCR-291-A).

TO 16-40BC1149-12 (Service Instructions).

TO 16-40BC1149-13 (Overhaul Instructions).

TO 16-40BC1149-14 (Parts Catalog).

SHIPPING DATA:

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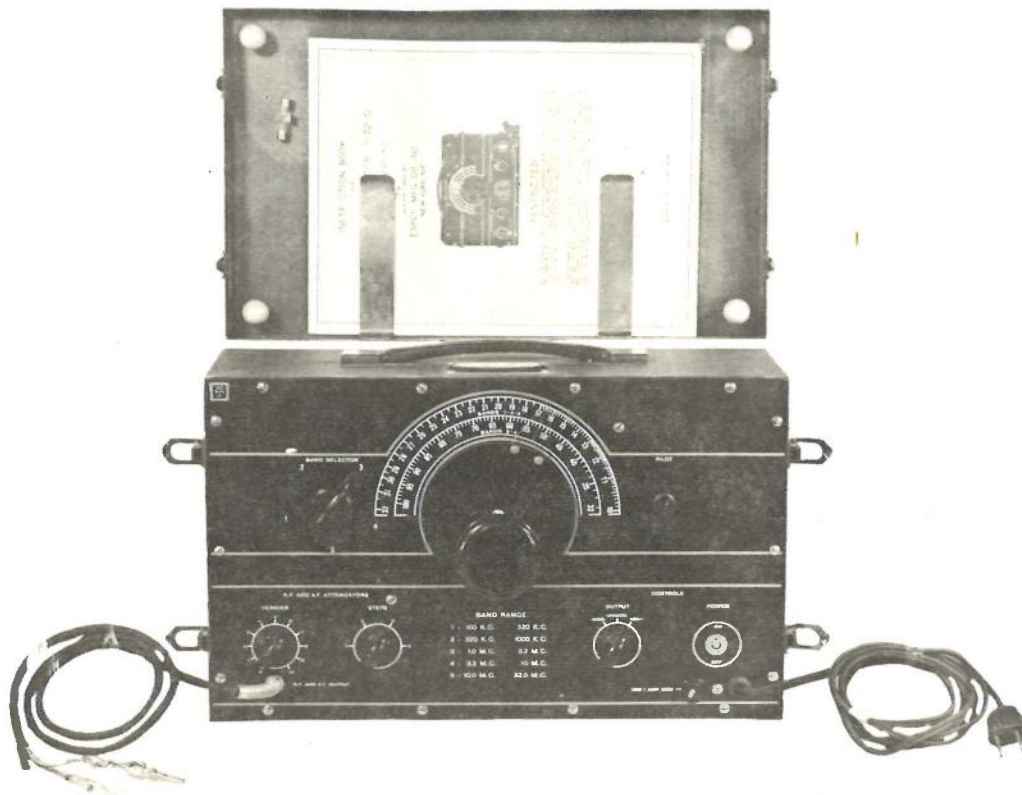
EQUIPMENT SUPPLIED:

Quant. Per Eq't	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Radio Transmitter BC-1149-C	Steel	2C6596-1149-C	7-1/4	12-1/4	7-1/4	15.48
1	Transit Case	Steel		16	17-3/4	7-1/2	20.20

BC-1149-C

- Electronics Test Equipment -

SIGNAL GENERATOR I-72-G
(GENERATOR, SIGNAL, I-72-G)



FUNCTIONAL DESCRIPTION:

A portable, general purpose, self-contained unit used mainly to align RF and IF stages of radio receivers and for rough frequency checks.

RELATIONSHIP TO OTHER EQUIPMENT:

Being replaced by TS-413/U.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: A tuned plate RF oscillator is utilized. The carrier may be either unmodulated or amplitude modulated. A 400 cycle per second tone, produced by a tuned plate audio oscillator, provides approximately 30% modulation. This 400 cycle per second signal may also be delivered to the output cord for use in RF alignment purposes. Step attenuators are provided to vary either the RF or AF signal outputs.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.	1600-326889970		3F3852G
PROCUREMENT INFO.:			
PROCUREMENT COG.:	Army	DESIGN COG.:	Army, CSL
F.I.I.N.:		RDB IDENT. NO.:	4.2.2
- Electronics Test Equipment -			I-72-G

SIGNAL GENERATOR I-72-G
(GENERATOR, SIGNAL, I-72-G)

ELECTROMECHANICAL DESCRIPTION: (Continued)

Power Supply: 115 volts $\pm 10\%$, AC, single phase, 60 cycles per second, 25 watts approximately.

Type of Transmission: Continuous Wave, Amplitude Modulated Carrier, Audio Frequency.

Frequency Range: 400 cycles per second, 100 to 32,000 kilocycles per second, in five bands.

Power Output: 0 to 9,000 microwatts RF, 0 to 22.5 milliwatts AF.

Voltage Output: 10 to 30,000 microvolts for RF, 0 to 1.5 volts rms for AF, uncalibrated.

Accuracies: $\pm 1\%$ of indicated frequency.

Output Impedance: 100 ohms.

MANUFACTURERS' OR CONTRACTORS' DATA:

Espey Manufacturing Company, 528 East 72nd Street, New York 21, New York.

TUBE COMPLEMENT:

1 JAN-80, 1 JAN-76, 1 JAN-6J5GT/G.

REFERENCE DATA AND LITERATURE:

TM 11-307 (Signal Generators I-72-G, H, J, K).

TO 16-40I72-6 (TM 11-4052) (Repair Instructions I-72-A, B, C, D, E, F, G, H, J, K).

SB 11-100-7 (Serviceability Standards).

ASF Cat. Sig. 8-I-72 (Higher Echelon Spare Parts List).

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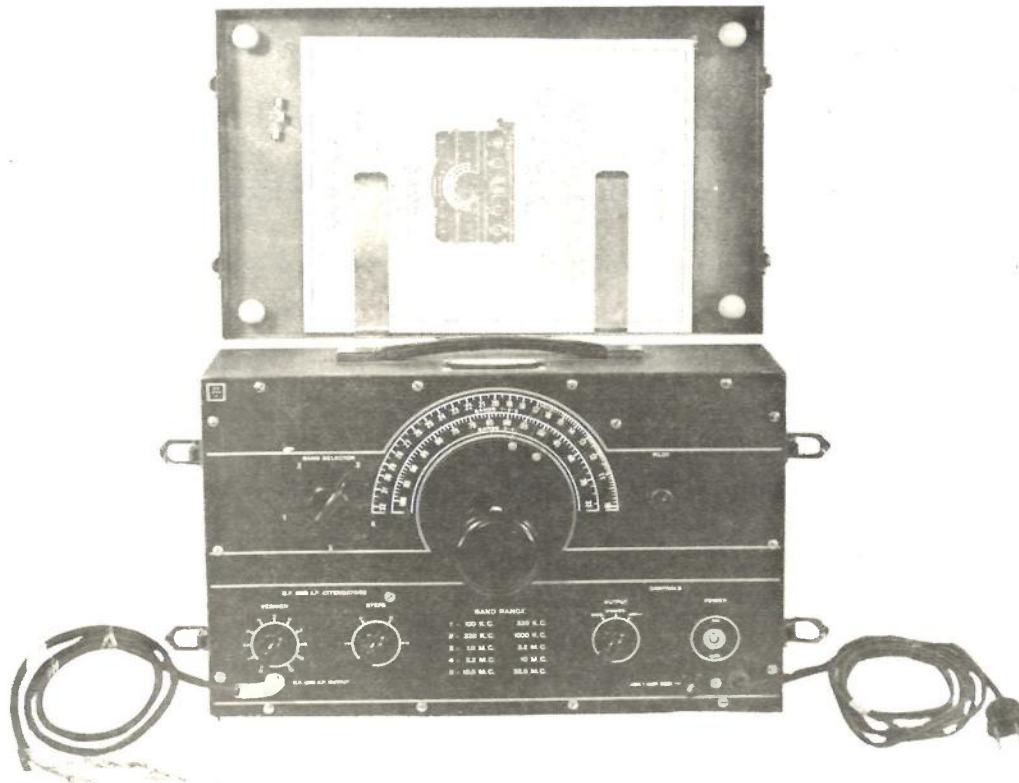
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Signal Generator I-72-G (in Carton)	1	12	17-1/4	8-1/2	24.5

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Signal Generator I-72-G (with cover on)		1600-326889970 3F3852G.1	9-7/16	15-1/4	6-3/4	22.2
1	Cable Assembly, Power		7CEY-10007 3F3852H-C3	30 long			

I-72-G - Electronics Test Equipment -

**SIGNAL GENERATOR I-72-H
(GENERATOR, SIGNAL, I-72-H)**



FUNCTIONAL DESCRIPTION:

A portable, general purpose, self-contained unit used mainly to align RF and IF stages of radio receivers and for rough frequency checks.

RELATIONSHIP TO OTHER EQUIPMENT:

Being replaced by TS-413/U.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: A tuned plate RF oscillator is utilized. The carrier may be either unmodulated or amplitude modulated. A 400 cycle per second tone, produced by a tuned plate audio oscillator, provides approximately 30% modulation. This 400 cycle per second signal may also be delivered to the output cord for use in RF alignment purposes. Step attenuators are provided to vary either the RF or AF signal outputs.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.	1600-326932000		3F3852H
PROCUREMENT INFO.:			
PROCUREMENT COG.:	Army	DESIGN COG.: Army, CSL	
F.I.I.N.:	FUNCTIONAL CLASS. NO.: 4.2.2		
- Electronics Test Equipment -			I-72-H

SIGNAL GENERATOR I-72-H
(GENERATOR, SIGNAL, I-72-H)

ELECTROMECHANICAL DESCRIPTION: (Continued)

Power Supply: 115 volts $\pm 10\%$, AC, single phase, 60 cycles per second, 25 watts approximately.

Type of Transmission: Continuous Wave, Amplitude Modulated Carrier, Audio Frequency.

Frequency Range: 400 cycles per second, 100 to 32,000 kilocycles per second in 5 five bands.

Voltage Output: 10 to 30,000 microvolts for RF, 0 to 1.5 volts rms for AF, uncalibrated.

Accuracies: $\pm 1\%$ of indicated frequency.

Output Impedance: 100 ohms.

MANUFACTURERS' OR CONTRACTORS' DATA:

Espey Manufacturing Company, Inc., 528 E. 72nd Street, New York 21, New York.

TUBE COMPLEMENT:

1 JAN-80, 1 JAN-76, 1 JAN-6J5GT/G.

REFERENCE DATA AND LITERATURE:

TM 11-307 (Signal Generators I-72-G, H, J, K).

TO 16-40I72-6 (TM 11-4052) (Repair Instructions I-72-A, B, C, D, E, F, G, H, J, K).

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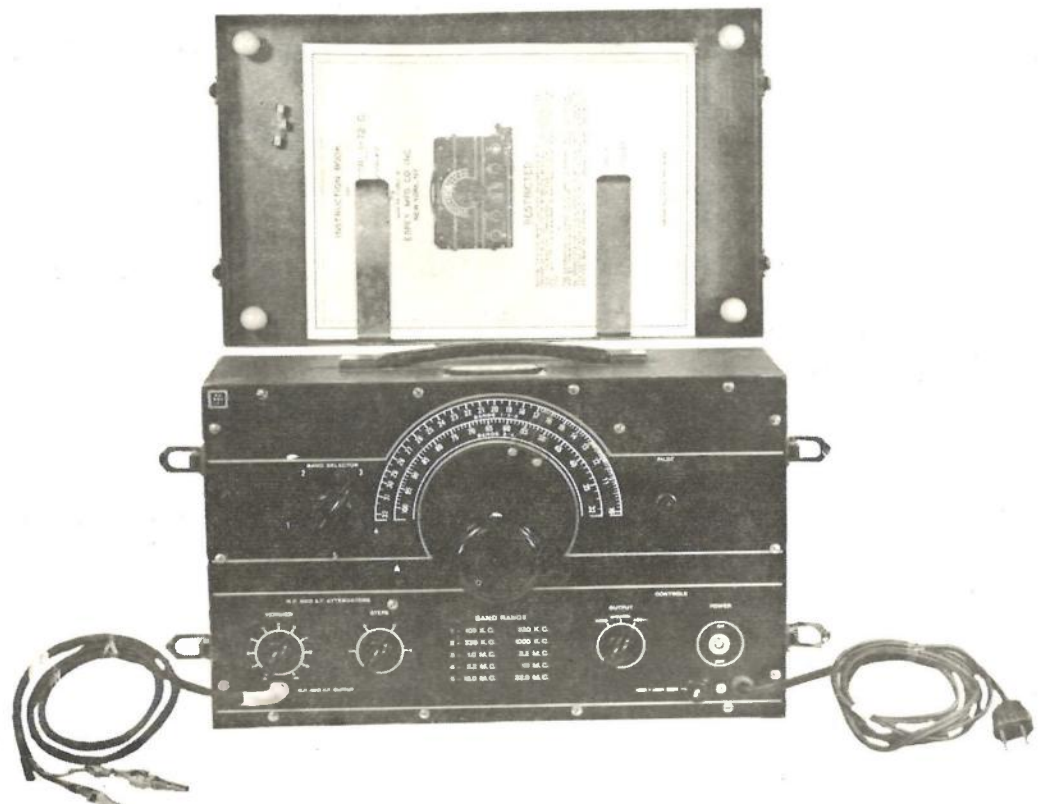
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Signal Generator I-72-H (in Carton)	1	12	17-1/4	8-1/2	24.5

EQUIPMENT SUPPLIED:

Quant. Per Eq't	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Signal Generator I-72-H (With cover on)		1600-326932000 3F3852	9-7/16	15-1/2	6-3/4	22.2
1	Cable Assembly, Power		7CEY-10007 3F3852H-C3	30 long			

I-72-H - Electronics Test Equipment -

**SIGNAL GENERATOR I-72-J
(GENERATOR, SIGNAL, I-72-J)**



FUNCTIONAL DESCRIPTION:

A portable, general purpose, self-contained unit used mainly to align RF and IF stages of radio receivers and for rough frequency checks.

RELATIONSHIP TO OTHER EQUIPMENT:

Being replaced by TS-413/U.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: A tuned plate RF oscillator is utilized. The carrier may be either unmodulated or amplitude modulated. A 400 cycle per second tone, produced by a tuned plate audio oscillator, provides approximately 30% modulation. This 400 cycle per second signal may also be delivered to the output cord for use in RF alignment purposes. Step attenuators are provided to vary either the RF or AF signal outputs.

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.	1600-326946000		3F3852J
PROCUREMENT INFO.:			
PROCUREMENT COG.:	Army	DESIGN COG.:	Army, CSL
F.I.I.N.:		FUNCTIONAL CLASS. NO.:	4.2.2
- Electronics Test Equipment -			I-72-J

SIGNAL GENERATOR I-72-J
(GENERATOR, SIGNAL, I-72-J)

ELECTROMECHANICAL DESCRIPTION: (Continued)

Power Supply: 115 volts $\pm 10\%$, AC, single phase, 60 cycles per second, 25 watts approximately.

Type of Transmission: Continuous Wave, Amplitude Modulated Carrier, Audio Frequency.

Frequency Range: 400 cycles per second, 100 to 32,000 kilocycles per second in five bands.

Voltage Output: 10 to 30,000 microvolts for RF, 0 to 1.5 volts rms for AF, uncalibrated.

Accuracies: $\pm 1\%$ of indicated frequency.

Output Impedance: 100 ohms.

Power Output: 0 to 9,000 microwatts RF, 0 to 22.5 milliwatts AF.

MANUFACTURERS' OR CONTRACTORS' DATA:

Espey Manufacturing Company, Inc., 528 E. 72nd Street, New York 21, New York.

TUBE COMPLEMENT:

1 JAN-80, 1 JAN-76, 1 JAN-6J5GT/G.

REFERENCE DATA AND LITERATURE:

TM 11-307 (Signal Generators I-72-G, H, J, K).

TO 16-40I72-6 (TM 11-4052) (Repair Instructions I-72-A, B, C, D, E, F, G, H, J, K).

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Signal Generator I-72-J (in Carton)	1	12	17-1/4	8-1/2	24.5

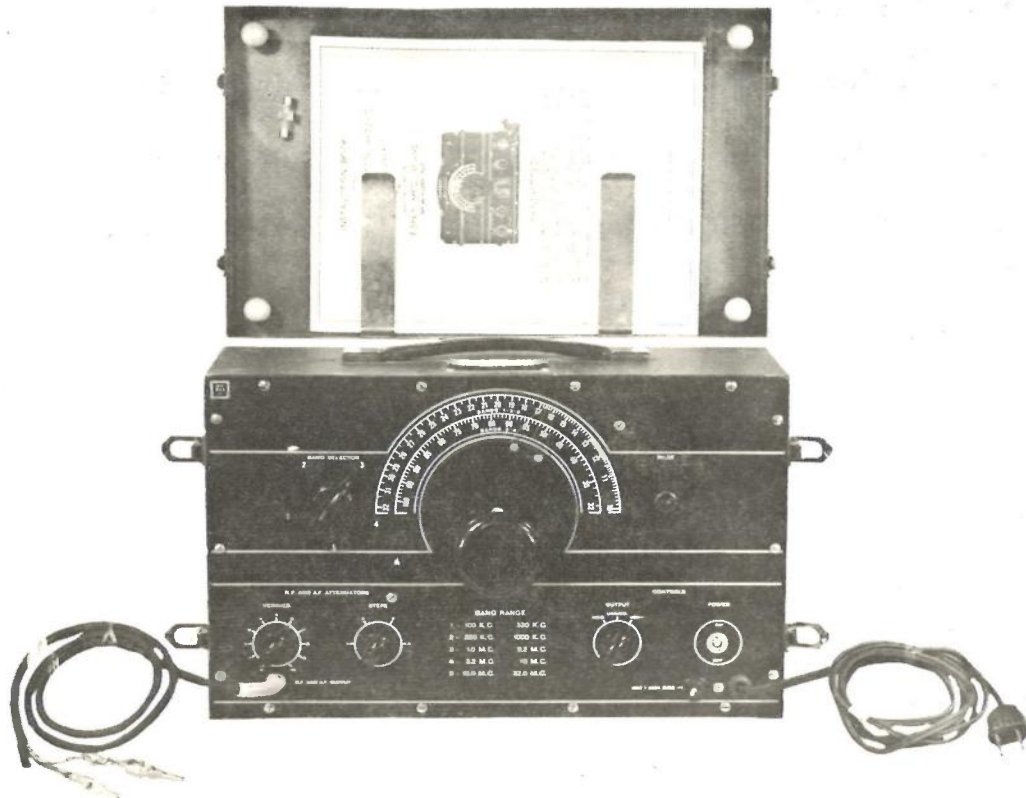
EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Signal Generator I-72-J (with cover on)		1600-326946000 3F3852J	9-7/16	15-1/2	6-3/4	22.2
1	Cable Assembly, Power		7CEY-10007 3F3852H-C3	30 long			

I-72-J

- Electronics Test Equipment -

**SIGNAL GENERATOR I-72-K
(GENERATOR, SIGNAL, I-72-K)**



FUNCTIONAL DESCRIPTION:

A portable, general purpose, self-contained unit used mainly to align RF and IF stages of radio receivers and for rough frequency checks.

RELATIONSHIP TO OTHER EQUIPMENT:

Being replaced by TS-413/U.

ELECTROMECHANICAL DECCRIPTION:

Circuit Information: A tuned plate RF oscillator is utilized. The carrier may be either unmodulated or amplitude modulated. A 400 cycle per second tone, produced by a tuned plate audio oscillator, provides approximately 30% modulation. This 400 cycle per second signal may also be delivered to the output cord for use in RF alignment purposes. Step attenuators are provided to vary either the RF or AF signal outputs.

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.	1600-326948040		3F3852K
PROCUREM'T INFO.:	Spec. No. 71-968		
PROCUREM'T COG.:	Army	DESIGN COG.: Army, CSL	
F.I.I.N.:	FUNCTIONAL CLASS. NO.: 4.2.2		
	- Electronics Test Equipment -		I-72-K

SIGNAL GENERATOR I-72-K
(GENERATOR, SIGNAL, I-72-K)

ELECTROMECHANICAL DESCRIPTION: (Continued)

Power Supply: 115 volts $\pm 10\%$, AC, single phase, 60 cycles per second, 25 watts approximately.

Type of Transmission: Continuous Wave, Amplitude Modulated Carrier, Audio Frequency.

Frequency Range: 400 cycles per second, 100 to 32,000 kilocycles per second in five bands.

Voltage Output: 10 to 30,000 microvolts for RF, 0 to 1.5 volts rms for AF, uncalibrated.

Accuracies: $\pm 1\%$ of indicated frequency.

Output Impedance: 100 ohms.

MANUFACTURERS' OR CONTRACTORS' DATA:

Espey Manufacturing Company, Inc., 528 E. 72nd Street, New York 21, New York.

TUBE COMPLEMENT:

1 JAN-5Y3GT/G, 2 JAN-6J5GT/G.

REFERENCE DATA AND LITERATURE:

TM 11-307 (Signal Generators I-72-G, H, J, K).

TO 16-40I72-6 (TM 11-4052) (Repair Instructions I-72-A, B, C, D, E, F, G, H, J, K).

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Signal Generator I-72-K (in Carton)	1	12	17-1/4	8-1/2	24.5

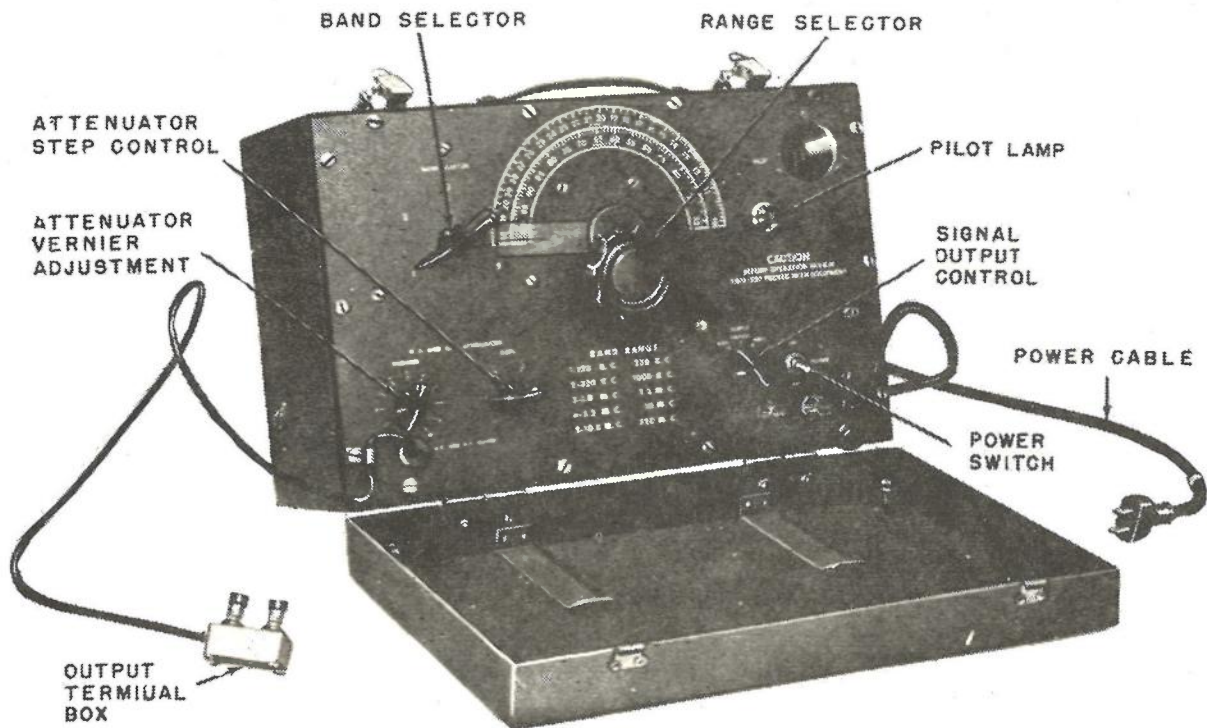
EQUIPMENT SUPPLIED:

Quant. Per Eq't	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Signal Generator I-72-K (with cover on)		1600-326948040 3F3852K	9-7/16	15-1/2	6-3/4	22.2
1	Cable Assembly, Power		7CEY-10007 3F3852H-C3	30 long			
1	Technical Manual TM11-307						

I-72-K

- Electronics Test Equipment -

**SIGNAL GENERATOR I-72-L
(GENERATOR, SIGNAL, I-72-L)**



FUNCTIONAL DESCRIPTION:

A portable, general purpose, self-contained unit used mainly to align RF and IF stages of radio receivers and for rough frequency checks.

RELATIONSHIP TO OTHER EQUIPMENT:

Similar to and interchangeable with all previous I-72 models.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: A tuned plate RF oscillator is utilized. The carrier may be either unmodulated or amplitude modulated. A 400 cycle per second tone, produced by a tuned plate audio oscillator, provides approximately 30% modulation. This 400 cycle per second signal may also be delivered to the output cord for use in RF alignment purposes. Step attenuators are provided to vary either the RF or AF signal outputs.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.	1690-326894000	F16-C-62530-7856	3F3852L
PROCUREMENT INFO.:			
PROCUREMENT COG.:	Army	DESIGN COG.: Army, CSL	
F.I.I.N.:	FUNCTIONAL CLASS. NO.: 4.2.2		
- Electronics Test Equipment -			I-72-L

SIGNAL GENERATOR I-72-L
(GENERATOR, SIGNAL, I-72-L)

ELECTROMECHANICAL DESCRIPTION: (Continued)

Power Supply: 115 volts $\pm 10\%$, AC, single phase, 60 cycles per second, 25 watts approximately.

Type of Transmission: Continuous Wave, Amplitude Modulated Carrier, Audio Frequency.

Frequency Range: 400 cycles per second, 100 to 32,000 kilocycles per second in five bands.

Voltage Output: 10 to 30,000 microvolts for RF, 0 to 1.5 volts rms for AF uncalibrated.

Accuracy: $\pm 0.1\%$ of indicated frequency.

Output Impedance: 100 ohms.

MANUFACTURERS' OR CONTRACTORS' DATA:

Espey Manufacturing Company, Inc., 528 E. 72nd Street, New York 21, New York;
Signal Corps Order No. 13504-PH-48.

TUBE COMPLEMENT:

1 JAN-5Y3GT/G, 2 JAN-6J5GT/G.

REFERENCE DATA AND LITERATURE:

EQUIPMENT SUPPLIED:

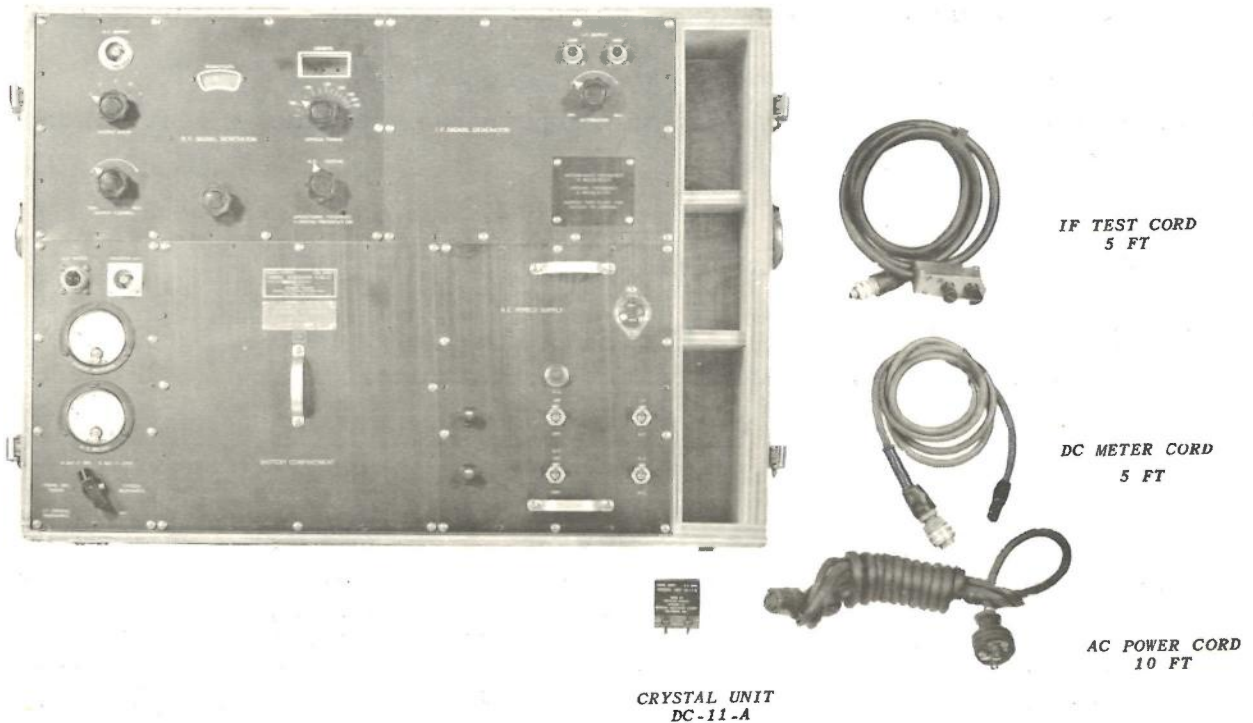
Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Signal Generator I-72-L	Metal	1690-326894000 F16-C-62530-7856 3F3852-L	9-7/16	15-1/8	6-3/4	22
1	Cable Assembly		7CEY-10007 3F3852H-C3	30 long			

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Signal Generator I-72-L (Domestic Packed)	1	12	17-1/4	8-1/2	24.5

I-72-L - Electronics Test Equipment -

SIGNAL GENERATOR I-96-A



FUNCTIONAL DESCRIPTION:

A portable Amplitude Modulated signal generator, used for alignment, adjustment, and tuning, of radio receivers and transmitters.

RELATIONSHIP TO OTHER EQUIPMENT:

Part of Test Equipment IE-12-A.

ELECTROMECHANICAL DESCRIPTION:

Power Supply: 110 to 115 volts, AC, 50 to 60 cycles per second, single phase; or four Batteries BA-23 (1.5 volts) and six Batteries BA-2 (22.5 volts).

Frequency Range: 12 megacycles per second fixed Intermediate Frequency, 100 to 156 megacycles per second variable Radio Frequency signal.

Type of Transmission: Amplitude Modulated.

Accuracy: $\pm 0.002\%$ of indicated frequency.

Modulation: Internal, 100 cycles per second, modulated 30% (Amplitude Modulated).
(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.	7CAC-801319-2662		3F3896A
PROCUREMENT INFO.:			
PROCUREMENT COG.:	USAF	DESIGN COG.:	USAF, C&N
F.I.I.N.:	FUNCTIONAL CLASS. NO.: 4.2.2		
- Electronics Test Equipment -			I-96-A

SIGNAL GENERATOR I-96-A

ELECTROMECHANICAL DESCRIPTION: (Continued)

Output: Radio Frequency, uncalibrated, 0 to 5000 microvolts. Crystal-controlled.

MANUFACTURERS' OR CONTRACTORS' DATA:

Bendix, Radio Division, Bendix Aviation Corporation, Baltimore, Maryland; Approximate Cost per Unit, \$571.29.

TUBE COMPLEMENT:

2 JAN-9002, 4 JAN-9003, 1 JAN-0D3/VR-150, 1 JAN-5Y3GT/G.

REFERENCE DATA AND LITERATURE:

AN 16-40IE12-3 (Handbook of Maintenance Instructions).

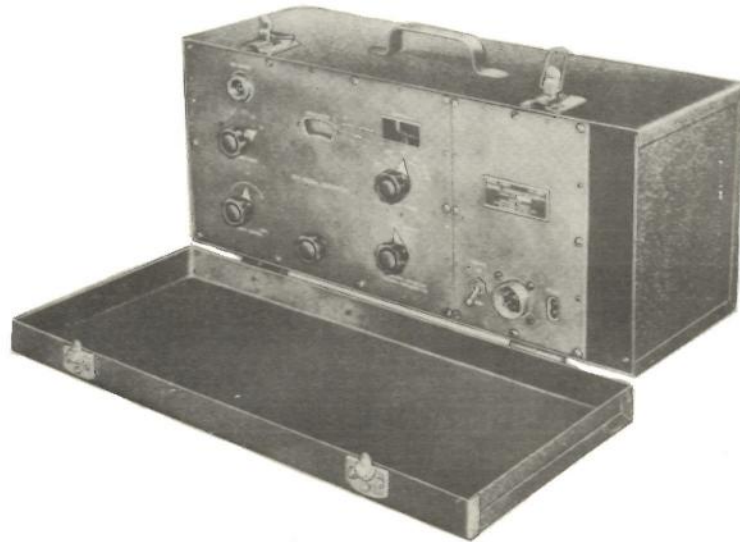
EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Signal Generator I-96-A	Wood	7CAC-801319-2662 3F3896A	26-1/2	19	19-1/2	82
1	Crystal Unit DC-11-A						0.12
1	IF Test Cord			60 long			0.6
1	DC Meter Cord			60 long			0.3
1	AC Power Cord			120 long			0.8

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
I-96-A	- Electronics Test Equipment -					

SIGNAL GENERATOR I-130-A
(GENERATOR, SIGNAL, I-130-A)



FUNCTIONAL DESCRIPTION:

A portable signal generator used primarily for alignment of Radio Set SCR-522-A. The front panel contains all controls, meters, and jacks. There is a compartment in the case for cords and accessories.

RELATIONSHIP TO OTHER EQUIPMENT:

Part of IE-19-A Test Equipment.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: A master oscillator, connected in a Hartley circuit, is coupled to the power amplifier. The power amplifier plate circuit is tuned to the third harmonic (100 to 156 megacycles per second) of the master oscillator output frequency.

An alternative crystal oscillator circuit may be chosen by means of the "M.O.-Crystal" switch. The crystal oscillator tube is connected in a Colpitt's circuit,

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.	7CAC-363947		3F3900-130
PROCUREMENT INFO.:			
PROCUREMENT COG.:	USAF	DESIGN COG.:	USAF, C&N
F.I.I.N.:		FUNCTIONAL CLASS. NO.:	4.2.2
- Electronics Test Equipment -			I-130-A

SIGNAL GENERATOR I-130-A
(GENERATOR, SIGNAL, I-130-A)

ELECTROMECHANICAL DESCRIPTION: (Continued)

the plate circuit of which is tuned to the second crystal harmonic. The crystal oscillator output is coupled to a distortion amplifier, the plate circuit of which is tuned to the third harmonic (33.3 to 52 megacycles per second) of the crystal oscillator output. This distortion amplifier is then coupled to the power amplifier through the same circuit elements that would otherwise couple the master oscillator tube. The power amplifier output frequency (100 to 156 megacycles per second) is then the third multiple of the output frequency of the distortion amplifier. Since the overall frequency-multiplication factor is 18, the crystal oscillator circuit may employ the same crystals as Radio Transmitter BC-615-A.

The modulator stage supplies an audio tone of approximately 1000 cycles per second to amplitude modulate the power amplifier.

Power Supply: 135 volts supplied by 6 Batteries BA-2 (22.5 volts). Six volts supplied by 4 Batteries BA-23 (1.5 volts). Power consumption 4.4 watts when using master oscillator, 5.8 watts when using crystal oscillator.

Frequency Range: 100 to 156 megacycles per second.

Modulation Frequency: 1000 cycles per second.

Type of Transmission: Continuous Wave, Amplitude Modulated Carrier Wave.

Voltage Output: 0 to 5000 microvolts, uncalibrated.

MANUFACTURERS' OR CONTRACTORS' DATA:

Freed Radio Corporation, 200 Hudson Street, New York 13, New York; Contract No. 12021-43, 12 May 1943; Approximate Cost per Unit, \$203.36; Contract No. 12072-43, 20 July 1943; Approximate Cost per Unit, \$203.36.

Hudson American Corporation, 25 West 43rd Street, New York, New York; Contract No. 165-44, 13 October 1943; Approximate Cost per Unit, \$238.00; Contract No. 359-45-S-E, 28 August 1944; Approximate Cost per Unit, \$192.50; Contract No. 610-45-S-E, 9 October 1944; Approximate Cost per Unit, \$192.50; Contract No. 4068-45-CN, 8 March 1945; Approximate Cost per Unit, \$209.40; Contract No. 794-44, 28 August 1944; Approximate Cost per Unit, \$222.58.

Electronic Corporation of America, 45 West 18th Street, New York, New York; Contract No. 997-45, 3 February 1945; Approximate Cost per Unit, \$197.00.

TUBE COMPLEMENT:

2 JAN-9002, 3 JAN-9003.

REFERENCE DATA AND LITERATURE:

TO 16-10-111 (Handbook - Operation and Maintenance for IE-19-A).

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Signal Generator with accessories I-130-A (Domestic Packed)	3.2				60
I-130-A - Electronics Test Equipment -						