DEPARTMENT OF THE ARMY TECHNICAL MANUAL

OPERATOR AND

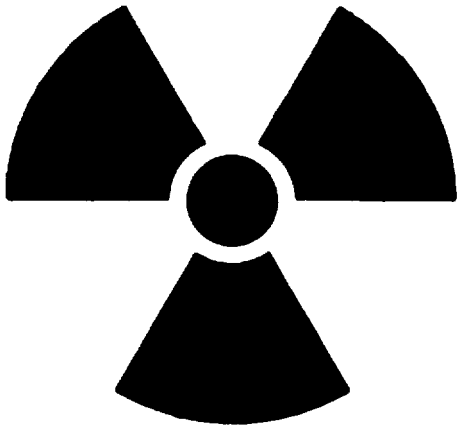
ORGANIZATIONAL MAINTENANCE MANUAL

SIGNAL GENERATOR SG-321B/U

This copy is a reprint which includes current pages from Changes 1 and 2.

HEADQUARTERS, DEPARTMENT OF THE ARMY

DECEMBER 1968



STD-RW-2

Tubes OA2 and OA3 used in-this equipment contain radioactive material (para 3-13). These tubes are potentially hazardous when broken; see qualified medical personnel and the Safety Director if you are exposed to or cut by broken tubes. Be extremely careful in replacing these tubes (para 3-13) and follow safe procedures in their handling, storage, and disposal (para 4-1).

Never place radioactive tubes in your pocket.

Be extremely careful not to break radioactive tubes while handling them.

Do not remove radioactive tubes from cartons until ready to use them.

Refer to paragraph 4-1 on handling, storage, and disposal of radioactive material.

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HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC, *5 December 1968*

OPERATOR AND ORGANIZATIONAL MAINTENANCE MANUAL
SIGNAL GENERATOR SG-321B/U

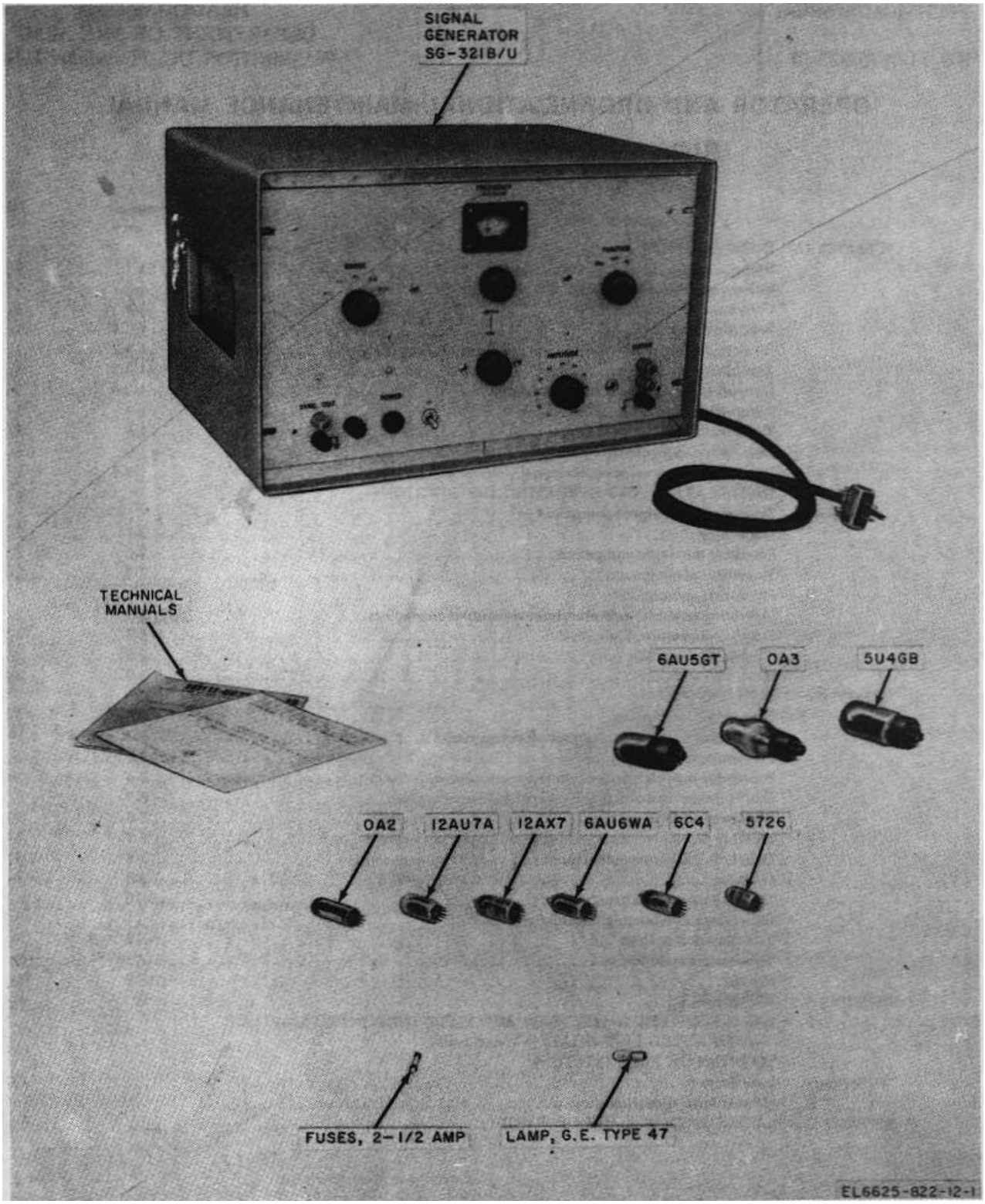

Figure 1-1. Signal Generator SC-321 B/U and running spares.

CHAPTER 1
INTRODUCTION

1-1. Scope

a. This manual describes Signal Generator SG-321B/U (fig. 1-1) and provides instructions for operation and operator and organizational maintenance. It includes instructions for cleaning and inspection of the equipment and replacement of parts available to the operator and organizational technician.

b. The maintenance allocation chart appears in appendix C.

c. Deleted.

1-2. Indexes of Publications

a. DA Pam 310-4. Refer to the latest issue of DA Pam 310-4 to determine whether there are new editions, changes, or additional publications pertaining to the equipment.

b. DA Pam 310-7. Refer to DA Pam 310-7 to determine whether there are modification work orders (MWO's) pertaining to the equipment.

1-3. Forms and Records

a. Reports of Maintenance and Unsatisfactory Equipment. Maintenance forms, records, and reports which are to be used by maintenance personnel at all maintenance levels are listed in and prescribed by TM 38-750.

b. Report of Packaging and Handling Deficiencies. Fill out and forward DD Form 6 (Packaging Improvement Report) as prescribed in AR 70058/NAVSUPINST 4030.29/AFR 71-13/MCO P4030.29A, and DSAR 4145.8.

c. Discrepancy in Shipment Report (DISREP) (SF 361). Fill out and forward Discrepancy in Shipment Report (DISREP) (SF 361) as prescribed in AR 5538/NA 4610.33A/AFR 75-18/MCO P4610.19B and DSAR 4500.15.

1-3.1. Reporting of Errors

Reporting of errors, omissions, and recommendations for improving this publication by the individual user is encouraged. Reports should be submitted on DA Form 2028 (Recommended Changes to Publications and Blank Forms) and forwarded direct to Commander, US Army Electronics Command, DRSEL-MA-Q, Fort Monmouth, NJ 07703.

1-3.2. Reporting Equipment Improvement Recommendations (EIR)

EIR's will be prepared using DA Form 2407, Maintenance Request. Instructions for preparing EIR's are provided in TM 38-750, the Army Maintenance Management System. EIR's should be mailed directly to Command, US Army Electronics (Command, ATTN: DRSEL-MA-Q, Fort Monmouth, NJ 07703. A reply will be furnished directly to you.

1-3.3. Administrative Storage

For procedures, forms, and records, and inspections required during administrative storage of this equipment, refer to TM 740-90-1.

1-3.4. Destruction of Army Electronics Materiel

Destruction of Army Electronics materiel to prevent enemy use shall be as prescribed in TM 750-244-2.

1-4. Purpose and Use

a. Signal Generator SG-32 B/U is a precision, low frequency signal generator. It provides square, triangular, and sinusoidal waveforms in the frequency range of 0.008 to 1.200 cycles per second (cps). A synchronizing (sync) output pulse is also provided.

b. The SG-321/U is useful for any general purpose, low frequency testing application. It is particularly valuable in the testing of servosystems, geophysical equipment, vibration and stability characteristics of mechanical systems, electromedical equipment, and for the electrical simulation of mechanical phenomena.

c. The frequency range from 0.008 to 1.200 cycles per second is covered in five bands. The frequency dial is linear.

d. The SG-321B/U is rated to deliver at least 30 volts peak-to-peak to a 4,000-ohm load. The sync pulse is negative 10 volts minimum into a 2,500-ohm load and has a pulse width of less than 5 micro-seconds.

1-5. Technical Characteristics

Frequency range:

X.01.....0.008 to 0.12 cps.
X.1.....0.08 to 1.2 cps.
X1.....0.8 to 12cps.
X.10.....8 to 120cps.
X.100.....80 to 1,200 cps.

Output waveforms.....Square, triangular, and sinusoidal.

Maximum output voltage..33 volts peak-to-peak across rated load (4,000 ohms) at 0.008 to 0.12 cps; 35 volts peak-to-peak at frequencies above 0.12 cps.

Frequency stability .....Within ± 1%, including warm up drift and line voltage variations of ± 10%.

Frequency response .....Constant within ± 0.2 db over entire frequency range at rated output and load.

Dial accuracy .....Within ± 2% from 1.2 to 12 on dial; ± 3% from .8 to 1.2 on dial.

Internal Impedance .....Approximately 40 ohms over entire range.

Distortion .....Less than 1% on all ranges, except X100. Less than 2% rms on X100.

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

Hum level .....Less than 0.05% at rated output.

Sync pulse .....22.5 volts peak negative, less than 5-microsecond duration. Sync pulse occurs at crest of sine wave and with corresponding positions on other waveforms.

Power .....Operates from 115- or 230-volt, ±, 10-percent, 50- to 440-cps source. Requires 175 watts.

1-6. Description of Signal Generator SG-321 B/U

This equipment consists of Signal Generator SG321B/U only. The SG-321B/U is 19 1/4 inches wide, 12 3/4 inches high, and 14 1/4 inches deep and weighs 42 pounds. All connectors and operating controls are on the front panel.

1-6.1 Items Comprising an Operable Signal Generator SG-321 B/U

Signal Generator SG-321B/U (FSN 6625-674-7097) comprises an operable equipment. The SG-321B/U is illustrated in figure 1-1.

CHAPTER 2
INSTALLATION AND OPERATING INSTRUCTIONS
Section I. SERVICE UPON RECEIPT OF EQUIPMENT

2-1. Unpacking

a. Packaging Data. When packed for shipment, Signal Generator SG-321B/U is placed in a carton and packed in a wooden shipping box. A typical shipping box and its contents are shown in figure 2-1.

b. Removing Contents.

(1) Cut and fold back the metal straps.

CAUTION

Do not attempt to pry off the top and side; equipment damage may result.

(2) Remove the nails from the top and one side of the box with a nailpuller. Remove the top and side.

(3) Remove the envelope that contains the technical manuals.

(4) Remove the outer carton that is wrapped in the waterproof barrier.

(5) Open the outer carton and remove the carton that contains the spare parts and the tools.

(6) Remove the inner carton that is wrapped in a moisture-vapor proof barrier.

(7) Open the moisture-vapor proof barrier and open the inner carton.

(8) Remove the equipment.

2-2. Checking Unpacked Equipment

a. Inspect the equipment for damage incurred during shipment.

b. Check to see that the equipment is complete as listed on the packing slip. Report all discrepancies in accordance with TM 38-750. Shortage of a minor assembly or part that does not affect proper functioning of the equipment should not prevent use of the equipment.

c. If the equipment has been used or reconditioned, see whether it has been changed by a modification work order (MWO). If the equipment has been modified, the MWO number will appear on the front panel near the nomenclature plate. If modified, check to see that any operational instruction changes resulting from the modification have been entered in the equipment manual.

Note

Current MWO's applicable to the equipment are listed in DA Pam 310-7.

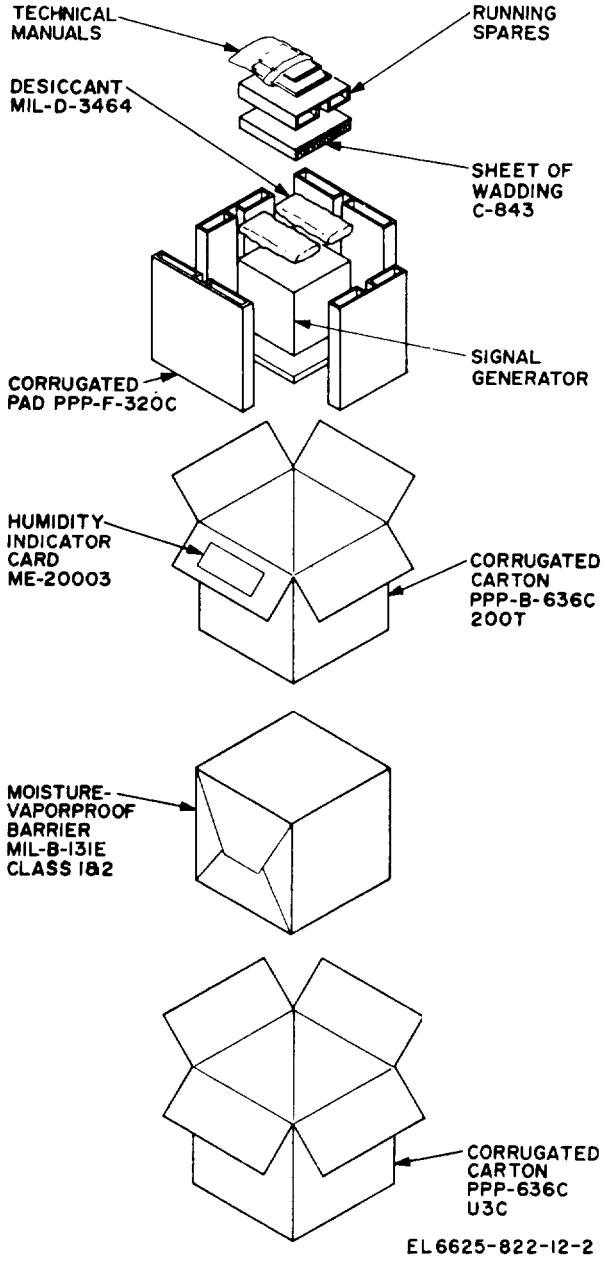

Figure 2-1. Packaging of Signal Generator SG-321B/U.

2-3. Placement of Equipment

Place the SG-321B/U at any convenient location near an appropriate power source. The location should not expose the SG321B/U to moisture or excessive vibration.

Section II. OPERATING INSTRUCTIONS

2-4. Operating Controls, Indicator, Fuse, and Output Connectors

(fig. 2-2).

Control, indicator, fuse, or connector	*Function*
RANGE switch	Selects one of five frequency bands to be covered by tuning dial: *Position* — *Band* X.01 — 0.08 to 0.12 cps. X.1 — 0.8 to 1.2 cps. X1 — 8 to 12 cps. X10 — 80 to 120 cps. X100 — 800 to 1,200 cps.
FREQUENCY tuning dial	Calibrated in cycles per second. Indicates frequency in accordance with frequency band set by RANGE switch.
COARSE control	Turns FREQUENCY tuning dial.
FINE control	Mechanical vernier for fine adjustment of frequency.
FUNCTION switch	Selects one of the three types of output waveform: (sine), (triangular), or (square).
AMPLITUDE control	Adjusts amplitude of signal at OUTPUT terminals.
DC balance adjust	Adjusts dc balance at OUTPUT terminals.
POWER switch	In ON position, turns on SG321B/U. In OFF position, turns off SG-321B/U.
POWER pilot lamp	Lights when SG-321B/U is on.
2.5-ampere fuse (F1)	Powerline fuse. Protects equipment from damage caused by line surges, application of wrong voltage, or internal short circuit due to part malfunction.
OUTPUT terminals	Consists of three terminals: two (E3 and E5) are output terminals, and bottom (ground, E4) terminal is connected directly to instrument chassis. OUTPUT terminals (E3 and ES) provide a balanced output.
SYNC, OUT terminals	Output terminals for negative pulse of less than 5-µ sec duration and at least 10-volts peak amplitude.

2-5. Starting Procedure

a. Preliminary. Perform the operations listed below before starting the equipment.

(1) Set the POWER switch to off (down).

(2) Set the AMPLITUDE control to 0.

(3) Connect the power cable from the SG-321B/U to appropriate power source.

b. Starting.

(1) Set the POWER switch to ON; POWER indicator should light.

(2) Allow the equipment to warm up for 30 minutes.

2-6. Operating Procedure

Start the equipment as instructed in paragraph 2-5, and proceed as follows:

a. Set the RANGE switch and the FREQUENCY dial for desired frequency.

Notes

1. To determine the output frequency, the FREQUENCY dial scale must be multiplied by the factor set by the RANGE switch; for example, with the FREQUENCY dial set to 4 and the RANGE switch set to X.1, the output frequency is 0.4 cycle per second.

2. To minimize distortion in the output waveform, use the lowest range when the overlap of the frequency permits a choice.

3. Press and hole the FINE control while turning the COARSE control.

b. Set the FUNCTION switch to the position of desired output waveform.

c. Using single-ended output connections or balanced output connections as required (fig. 2-3), couple the output signal to the equipment under test.

d. Adjust the AMPLITUDE control for the Desired output voltage.

Note

When small output voltages are required, use an external attenuator.

e. If required, connect SYNC. OUT terminals to external equipment.

2-7. Stopping Procedure

To stop the SG-321B/U, set the POWER switch to the off (down) position.

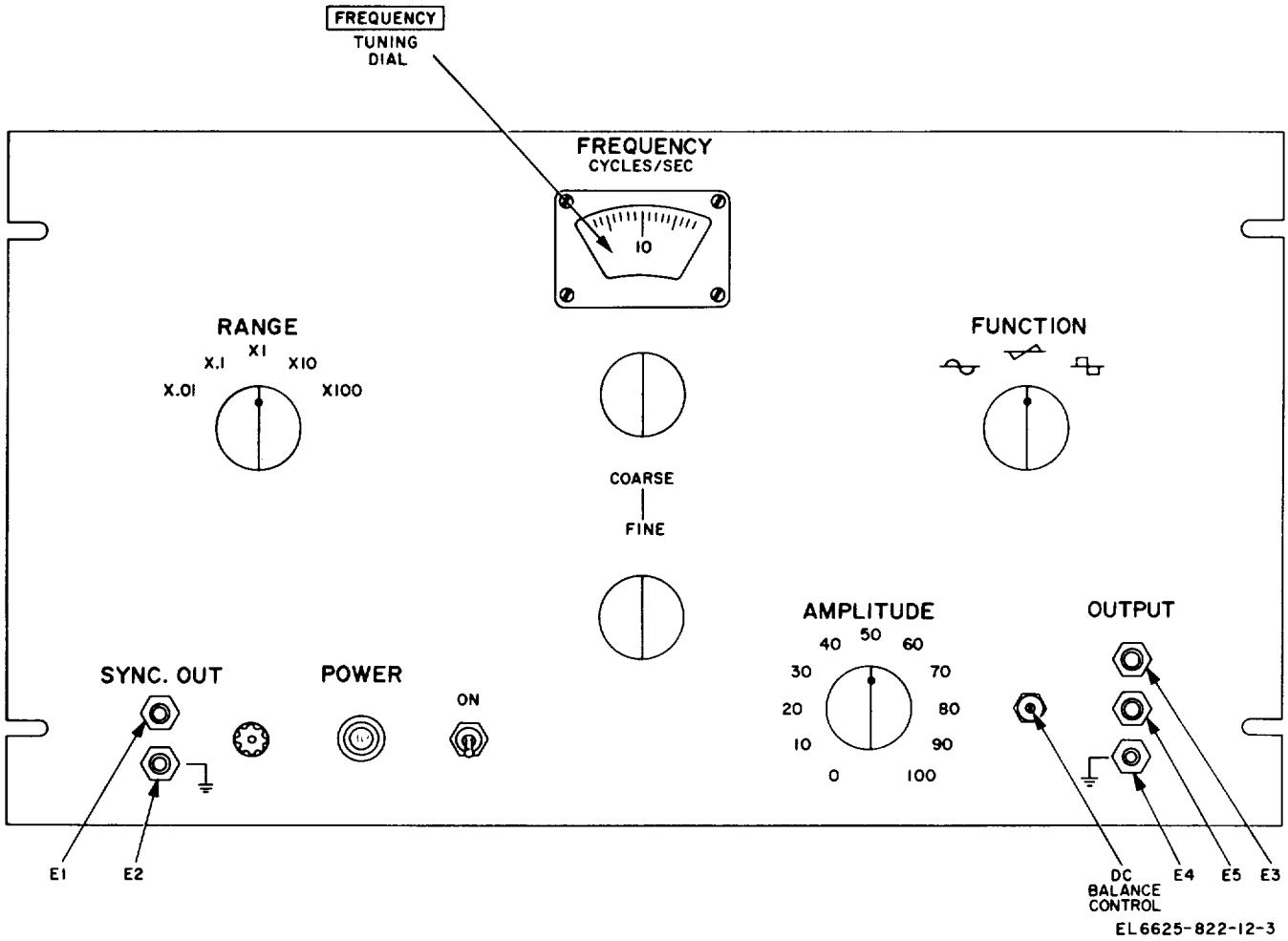

Figure 2-2. Signal Generator SG-321B/U, front panel.

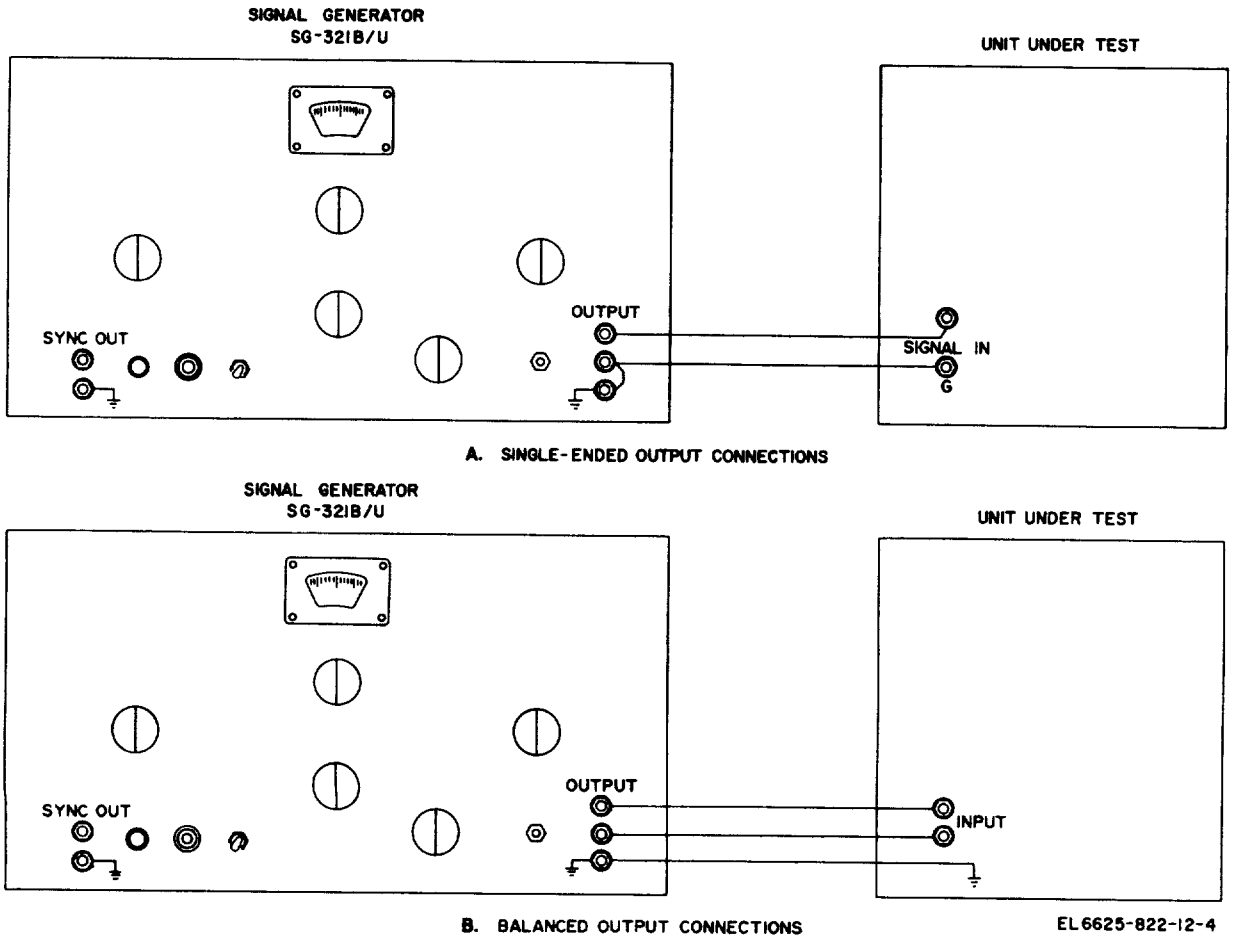

Figure 2-3. Output connections.

CHAPTER 3
MAINTENANCE

3-1. Scope of Maintenance

The maintenance duties assigned to the operator and organizational repairman of Signal Generator SC321B/U are listed below together with a reference to the paragraphs covering the specific maintenance function. These duties do not require special tools or test equipment.

a. Daily preventive maintenance checks and services chart (para 3-5).

b. Weekly preventive maintenance checks and services chart (para 3-6).

c. Monthly preventive maintenance checks and services chart (para 3-7).

d. Quarterly preventive maintenance checks and services chart (para 3-8).

e. Cleaning (para 3-9).

f. Troubleshooting (para 3-11 and 3-12).

g. Repairs.

(1) Replacement of POWER indicator lamp (para 3-14*a*).

(2) Replacement of fuse (para 3-14*b*).

3-2. Special Tools, Materials, and Equipment Required

Special tools and equipment supplied for use with Signal Generator SG-321B/U are listed in appendix C. Materials required for maintenance are listed below:

a. Trichloroethane.

b. Lint-free cloth.

3-3. Preventive Maintenance

Preventive maintenance is the systematic care, servicing, and inspection of equipment to prevent the occurrence of trouble, reduce downtime, and assure that the equipment is serviceable.

a. Systematic Care. The procedures given in paragraphs 3-5 through 3-9 cover routine systematic care and cleaning essential to proper upkeep of the equipment when it is used separately. When this equipment is used as part of a set or system, follow the procedures established in the set or system manual.

b. Preventive Maintenance Checks and Services. The preventive maintenance checks and services charts (paras 3-5 through 3-8) outline functions to be performed at specific intervals; however, if the equipment is used as part of a set or system, follow the procedures established in the set or system manual. These checks and services are to maintain Army electronic equipment in a combat serviceable condition; that is, in good general (physical) condition and in good operating condition. To assist in maintaining combat serviceability, the chart indicates what to check, how to check, and what the normal conditions are; the *References* column lists the illustrations, paragraphs, or manuals that contain detailed repair or replacement procedures. If the defect cannot be remedied by performing the corrective actions indicated, a higher category of maintenance or repair is required. Records and reports of these checks and services must be made in accordance with the requirements set forth in TM 38-750.

3-4. Preventive Maintenance Checks and Services Periods.

Preventive maintenance checks and services of the SG-321B/U are required daily, weekly, monthly, and quarterly.

a. Paragraph 3-5 specifies checks and services that must be accomplished daily and under the special conditions listed below.

(1) Before the vehicle starts on a mission.

(2) When the equipment is initially installed.

(3) When the equipment is reinstalled after removal for any reason.

(4) At least once each week if the equipment is maintained in standby condition.

b. Paragraphs 3-6, 3-7, and 3-8 specify additional checks and services that must be performed on a weekly, monthly, and quarterly basis, respectively.

3-5. Daily Preventive Maintenance Checks and Services Chart

Sequence No.	Item to be inspected	Procedure	References
1	Completeness	Check to see that the equipment is complete	
2	Exposed items	Clean exposed surfaces of case, control panet, cable, dial window, etc.	Para 3-9.
3	Controls	Check to see that mechanical action of each knob, switch, and control is smooth and free of binding, and no excessive looseness is apparent.	
4	Preliminary	Set POWER switch to off (down) Set AMPLITUDE control to 0 Connect power cord to appropriate power source receptacle. Connect oscilloscope and 4,000-ohm load to OUTPUT terminals. Set FUNCTION switch to sine wave	
5	POWER switch	Set POWER switch to ON. Note that POWER indicator lamp lights and sine wave appears on oscilloscope.	Para 3-12.
6	AMPLITUDE control.	Turn AMPLITUDE control from fully counterclockwise (0) to fully clockwise (100). Observe that output signal increases in amplitude to 30 volts minimum.	Para 3-12.
7	FREQUENCY control	Vary FREQUENCY dial through entire range using COARSE or FINE control. On oscilloscope, frequency change should be apparent without major change in amplitude.	Higher category maint-enance repair is required of operation is abnormal.
8	FUNCTION switch	Set FUNCTION switch to: *a.* (square wave) and repeat procedures given in 6 and 7 above. *b.* (triangular wave) and repeat procedures given in 6 and 7 above.	

3-6. Weekly Preventive Maintenance Checks and Services Chart

Sequence No.	Item to be inspected	Procedure	References
1	Power cord	Inspect cord for chafed, cracked, or frayed insulation. Replace cord that is stripped or worn excessively.	
2	Handles and latches.	Inspect handles and latches for looseness. Replace or tighten as necessary.	
3	Metal surfaces	Inspect exposed metal surfaces for rust and corrosion. Clean and touch up with paint as required.	Para 3-10

3-7. Monthly Preventive Maintenance Checks and Services Chart

Sequence No.	Item to be inspected	Procedure	References
1	Pluckout items	Inspect seating of pluckout items. Make certain that tube clamps grip tube bases tightly. Do not remove, rock or twist to inspect; use only direct pressure to insure item is fully seated.	Para 3-13.
2	Connectors	Inspect connectors for snug fit and good contact	
3	Transformer	Inspect terminals on power transformer. No dirt or corrosion should be evident.	Para 3-9.
4	Terminal blocks and component boards.	Inspect for loose connections and cracked or broken insulation.	

3-8. Quarterly Preventive Maintenance Checks and Services Chart

Sequence No.	*Item to be inspected*	*Procedure*	*References*
1	Publications	Check to see all publications are complete, serviceable, and current.	DA Pam 310-4.
2	Modifications	Check DA Pam 310-7 to determine if new applicable MWO's have been published. All URGENT MWO's must be applied immediately. All NORMAL MWO's must be scheduled.	TM 38-750 and DA Pam 310-7.
3	Spare parts	Check all spare parts (operator and organizational) for general condition and method of storage. No overstock should be evident and all shortages must be on valid requisitions.	

3-9. Cleaning

Inspect the exterior surfaces of the SG-321B/U. The exterior surfaces should be free of dust, dirt, grease, and fungus.

a. Remove dust and dirt with a clean soft cloth.

WARNING

The fumes of trichloroethane are toxic. Provide thorough ventilation whenever used. DO NOT USE NEAR AN OPEN FLAME. Trichloroethane is not flammable, but exposure of the fumes to an open flame or hot metal surface forms highly toxic phosgene gas.

b. Remove grease, fungus, and ground-in dirt from the case; use a cloth dampened (not wet) with trichloroethane.

c. Remove dust or dirt from jacks and connectors with a brush.

d. Clean the front panel, meters, and control knobs; use a soft clean cloth. If necessary, dampen the cloth with water and use a mild soap.

3-10. Touchup Painting Instructions

Remove rust and corrosion from metal surfaces by lightly sanding them with fine sandpaper. Brush two thin coats of paint on the bare metal to protect it from further corrosion. Refer to applicable cleaning and refinishing practices specified in TB 43-0118.

3-11. General Troubleshooting Information

Troubleshooting the equipment is based on the operational checks contained in the daily preventive maintenance checks and services chart (para 3-5). To troubleshoot the equipment, perform all functions in the daily preventive maintenance checks and services chart and proceed through the items until an abnormal condition or result is observed. When an abnormal condition or result is observed, refer to the troubleshooting chart (para 3-12). Perform the checks and corrective actions indicated in the troubleshooting chart. If the corrective measures indicated do not result in correction of the trouble, higher category maintenance is required.

3-12. Troubleshooting Chart

Item No.	*Trouble symptom*	*Probable trouble*	*Checks and corrective measures*
1	POWER indicator lamp does not light .	Defective lamp DS1,or blown fuse F1. .	Replace lamp DS1 or fuse F1 (para. 3-14).
2	No output signal (power indicator lamp lights.	Defective tube	Check tubes (para 3-13).
3	With AMPLITUDE control fully clockwise, output signal amplitude low (less than 30 volts).	Defective tube	Check tubes (para 3-13).

3-13. Tube-Testing Techniques

WARNING

Tubes OA2 and OA3 used in this equipment contain radioactive material. Handle them carefully to avoid breaking. *Do not put them in your pocket.* When trouble occurs try to isolate the trouble to an assembly or stage before removing any tube. If tube failure is suspected, use the applicable procedure given below to check the tubes. To reach the tubes, remove the screws around the front panel and slide the panel-chassis assembly from the case. Figure 3-1 shows tube locations.

CAUTION

Do not rock or rotate a tube when removing it from a socket; pull it straight out with a tube puller.

a. Use of Tube Tester. Remove and test one tube at a time. Discard a tube only if its defect is obvious, or if the tube tester shows it to be defective. Do not discard a tube that tests at or near its minimum test limit on the tube tester.

b. Tube Substitution Method. Replace a suspected tube with a new tube. If the equipment still does not work, remove the new tube and put back the original tube. Repeat this procedure with each suspected tube until the defective tube is located.

3-14. Repairs

a. Replacement of Pilot Lamp.

(1) Pull out the indicator jewel to expose the defective lamp.

(2) Press in and turn the lamp counterclockwise to unlock it.

(3) Pull the defective lamp out and replace it with new one. Push and twist the lamp clockwise to lock in.

b. Replacement of Fuse.

(1) Turn the fuseholder cap counterclockwise until it is free from the fuseholder.

(2) Remove the defective fuse and replace it with a good fuse which has the same voltage and current ratings.

(3) Replace the fuseholder cap in the fuseholder; push in and turn the cap clockwise to secure it.

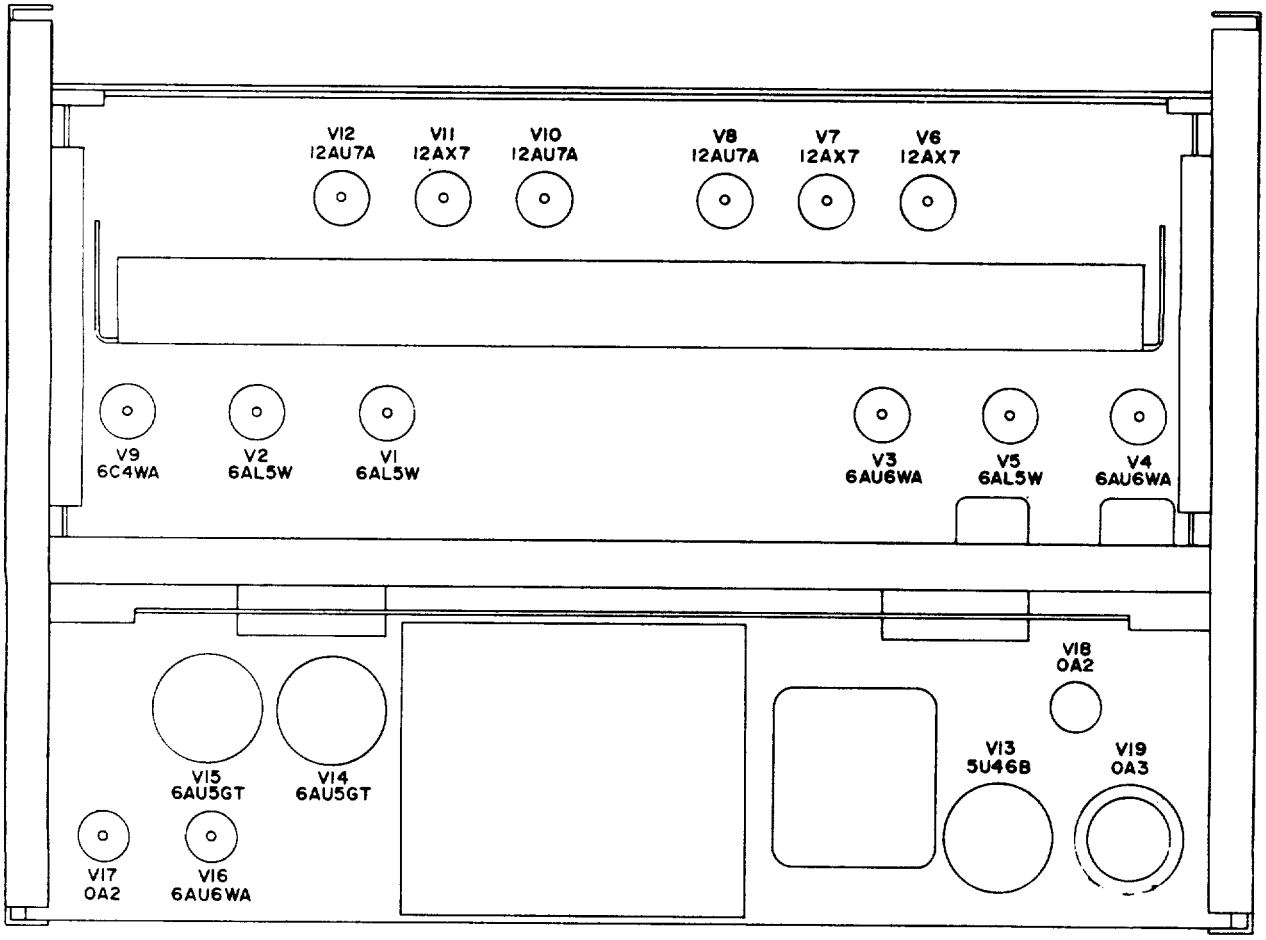

Figure 3-1. Tube locations.

CHAPTER 4
SHIPMENT AND LIMITED STORAGE, AND DEMOLITION TO PREVENT ENEMY USE

Section I. SHIPMENT AND LIMITED STORAGE

4-1. Handling, Storage, and Disposal of Radioactive Material

Warning:
Follow the procedures for safe handling, storage, and disposal of radioactive materials as directed by TB 750-237, AR 70052, and AR 755-15.

4-2. Preparation for Shipment and Storage

Prepare the SG-321B/U for shipment or storage as follows:

a. Disconnect all leads and the power cord.

b. Coil the power cord and secure it to either the top or the rear of the unit with gummed tape.

4-3. Repackaging for Shipment or Limited Storage

The exact procedure for repackaging depends on the material available and the conditions under which the equipment is to be shipped or stored. Adapt the procedures outlined below whenever circumstances permit. The information concerning the original packaging (para 2-1) will also be helpful.

a. Material Requirements. The materials listed below are required for packaging the SG-321B/U. For stock numbers of materials, refer to SB 38-100.

Material	*Quantity*
Cushioning material	16 sq ft.
Fiberboard, corrugated	60 sq ft.
Barrier material, waterproof	20 sq ft.
Tape, pressure-sensitive	14 ft.
Tape, gummed, paper	100 ft.
Box, wooden 19 by 26 by 29 inches	1 ea.
Box, fiberboard 11 by 18 by 21 inches	1 ea.
Box, fiberboard 15 by 22 by 25 inches	1 ea.
Desiccant	6 bags.
Indicator, humidity	1 card.
Strapping, steel	20 ft.

b. Packaging.

(1) Place pads of cushioning material on all surfaces of the unit. Wrap the cushioned unit with corrugated fiberboard and secure it with gummed tape.

(2) Wrap the two technical manuals in the waterproof barrier material and seal it with gummed tape.

(3) Wrap the running spares ill the cushioning material and secure them ill one package with gummed tape.

c. Packing.

(1) Place the filler at the bottom of the inner corrugated fiberboard box.

(2) Place the SG-321B/U in the inner box and place the filler on all four sides and on the top of the unit.

(3) Place the desiccant bags and the humidity indicator card in the top of the inner box.

(4) Close the inner box lid and seal it with gummed tape.

(5) Line the inside of the outer box with a layer of waterproof barrier material.

(6) Place the inner box in the outer box and seal it with waterproof barrier material gummed tape.

(7) Place the technical manuals in the outer box and seal the outer box with gummed tape.

(8) Place the outer box in the wooden box.

(9) Place the running spares in the wooden box.

(10) Place the cover on the wooden box and nail it securely.

(11) Place steel strapping around the box and fasten it securely.

Section II. DEMOLITION OF MATERIEL TO PREVENT ENEMY USE

4-4. Authority for Demolition

The demolition procedures given in paragraph 4-5 will be used to prevent the enemy from using or salvaging this equipment. Demolition of the equipment will be accomplished only upon the order of the commander.

4-5. Methods of Destruction

Any or all of the methods of destruction given below may be used. The tactical situation and time available will be the major factors for determining the methods to be used when destruction of the equipment is ordered. It is preferable to completely demolish some portions of the equipment rather than to partially destroy the entire equipment.

Warning:

Follow the procedures for disposal of radioactive material, as directed by TB 750-237, AR 700-52, and AR 755-15, for tubes OA2 and OA3.

a. Smash. Smash the controls, tubes, switches, dial, transformers, and spare parts; use sledges, axes, hammers, or any other heavy tools available.

b. Cut. Cut the power cord and the wiring in several places; use an axe, machete, or similar tool.

Warning

Be extremely careful with explosives and incendiary devices. Use these items only when the need is urgent.

c. Explode. Use explosives to complete demolition, or to cause maximum damage when time does not permit complete demolition by other means. Place an incendiary or fragmentation grenade inside the SG321B/U. Clear the area before the explosion takes place.

d. Dispose. Bury or scatter the destroyed parts in slit trenches, or throw them into nearby waterways.

APPENDIX A
REFERENCES

AR 700-52	Licensing and Control of Sources of Ionizing Radiation.
AR 755-15	Disposal of Unwanted Radioactive Material.
DA Pam 310-4	Index of Technical Manuals, Technical Bulletins, Supply Manuals (types 7, 8, and 9), Supply Bulletins, and Lubrication Orders.
DA Pam 310-7	US Army Index of Current Modification Work Orders.
TB 43-0118	Field Instructions for Painting and Preserving Electronic Command Equipment Including Camouflage Pattern Painting of Electrical Equipment shelters.
TB 750-237	Identification and Handling of Radioactive Items in the Army Supply System.
TM 38-750	The Army Maintenance Management System (TAMMS).
TM 740-90-1	Administrative Storage of Equipment.
TM 750-244-2	Procedures for Destruction of Electronics Materiel to Prevent Enemy Use (Electronics Command).

APPENDIX B
BASIC ISSUE ITEMS

Section I. INTRODUCTION

B-1. Scope

This appendix lists items comprising an operable equipment and those required for installation, operation, or operator's maintenance for Generator, Signal SG-321B/U.

B-2. Explanation of Columns

The following is a list of explanations of columns in section II.

a. Source, Maintenance, and Recoverability Codes (SMR) Column.

(1) *Source code (S).* The selection status and source for the listed item is the first code indicated in this column. The source codes used and their explanations are as follows:

Code *Explanation*

P- Applies to repair parts that are stocked in or supplied from GSA/DSA, or Army supply system, and authorized for use at indicated maintenance categories.

G- Applies to major assemblies that are procured with PEMA funds for initial issue only to be used as exchange assemblies at DSU and GSU category. These assemblies will not be stocked above DSU and GSU category or returned to depot supply category.

(2) Maintenance code (M). The lowest category of maintenance authorized to install the item is indicated by the second code in the column. The maintenance category code and its explanation is as follows:

Code *Explanation*

C..... Operator/crew.

(3) *Recoverability code (R).* The recoverability code is the third code in the column. It indicates whether unserviceable items should be returned for recovery or salvage. Recoverability code and its explanation is as follows:

Note

When no code is indicated in the recoverability column, the part will be considered expendable.

Code *Explanation*

R- Applies to repair parts and assemblies that are economically repairable at DSU and GSU activities and are normally furnished by supply on an exchange basis.

b. Federal Stock Number Column. This column indicates the Federal stock number for the item.

c. Description Column. This column includes the Federal item name and any additional description of the item which may be required. A part number or other reference number is followed by the applicable five-digit Federal Supply Code for Manufacturers. Usable on code column is not used.

d. Unit of Measure Column. The unit used as a basis of measure (e.g., ea., pr, ft, yd, etc.) is given in this column.

e. Quantity Incorporated in Unit Column. The total quantity of the item used in the equipment is given in this column.

f. Quantity Furnished With Equipment Column. This column lists the quantity of the item supplied for initial operation of the equipment and/or the quantities authorized .to be kept on hand by the operator for maintenance of the equipment.

g. *Illustrations Column.*

(1) *Figure number (a.)*. The number of the illustration in which the item is shown is indicated ill this column.

(2) *Item No. or reference designation.* Not used.

SECTION II. BASIC ISSUE ITEMS

(1) SMR Code	(2) Federal Stock Number	(3) Description Reference Number & Mfr Code	USABLE ON CODE	(4) Unit OF MEAS	(5) Qty INC IN UNIT	(6) Qty FURN WITH EQUIP	(7) ILLUSTRATIONS (a) FIG. NO.	(b) ITEM NO.
G-C-R	6625-674-7097	GENERATOR SIGNAL, SG-321B/U: 5 bands, not crystal controlled, 4000 ohms rated output impedance; AC: 115/230V ±10 pet. 50/1000 hz single phase (This item is nonexpendable)						
		TECHNICAL MANUAL TM 11-6625-822-12		ea	1	1		
		A quantity of one technical manual is packed with each equipment. Where a valid need exists, additional copies may be requisitioned and kept on hand.						
P-C	5960-503-4880	ELECTRON TUBE:	OA2; 81349	ea	2	2	1-1	
P-C	5960-188-3565	ELECTRON TUBE:	OA3; 81349	ea	1	1	1-1	
P-C	5960-642-8341	ELECTRON TUBE:	5U4GB; 81349	ea	1	1	1-1	
P-C	5960-262-0815	ELECTRON TUBE:	6AL5W; 81349	ea	3	3	1-1	
P-C	5960-262-0151	ELECTRON TUBE:	6AU5GT; 81349	ea	2	2	1-1	
P-C	5960-262-0152	ELECTRON TUBE:	6AU6WA; 81349	ea	1	1	1-1	
P-C	5960-557-6780	ELECTRON TUBE:	6C4WA; 81349	ea	1	1	1-1	
P-C	5960-166-7663	ELECTRON TUBE:	12AU7A; 81349	ea	3	3	1-1	
P-C	5960-827-8782	ELECTRON TUBE:	12AX7WA; 81349	ea	3	3	1-1	
P-C	5920-060-2424	FUSE, CARTRIDGE:	F02G5ROOA; 81349	ea	1	1	1-1	
P-C	6240-155-8706	LAMP, INCANDESCENT:	47; 08806	ea	1	1	1-1	
P-C		LIGHT, INDICATOR:	423012; 24635	ea	1	1	1-1	
		NO ACCESSORIES, TOOLS, OR TEST EQUIPMENT ARE TO BE ISSUED WITH THIS EQUIPMENT.						
		NO BASIC ISSUE ITEM ARE MOUNTED IN OR ON THIS EQUIPMENT						

APPENDIX C
MAINTENANCE ALLOCATION

Section I. INTRODUCTION

C.1. General

This appendix provides a summary of the maintenance operations for the SG-321B/U. It authorizes categories of maintenance for specific maintenance functions on repairable items and components and the tools and equipment required to perform each function. This appendix may be used as an aid in planning maintenance operations.

C-2. Maintenance Function

Maintenance functions will be limited to and defined as follows:

a. Inspect. To determine the serviceability of an item by comparing its physical, mechanical, and/or electrical characteristics with established standards through examination.

b. Test. To verify serviceability and to detect incipient failure by measuring the mechanical or electrical characteristics of an item and comparing those characteristics with prescribed standards.

c. Service. Operations required periodically to keep an item in proper operating condition, i.e., to clean (decontaminate), to preserve, to drain, to paint, or to replenish fuel, lubricants, hydraulic fluids, or compressed air supplies.

d. Adjust. To maintain, within prescribed limits, by bringing into proper or exact position, or by setting the operating characteristics to the specified parameters.

e. Align. To adjust specified variable elements of an item to bring about optimum or desired performance.

f. Calibrate. To determine and cause corrections to be made or to be adjusted on instruments or test measuring and diagnostic equipments used in precision measurement. Consists of comparisons of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared.

g. Install. The act of emplacing, seating, or fixing into position an item, part, module (component or assembly) in a manner to allow the proper functioning of the equipment or system.

h. Replace. The act of substituting a serviceable like type part, subassembly, or module (component or assembly) for an unserviceable counterpart.

i. Repair. The application of maintenance services (inspect, test, service, adjust, align, calibrate, replace) or other maintenance actions (welding, grinding, riveting, straightening, facing, remachining, or resurfacing) to restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly), end item, or system. This function does not include the trial and error replacement of running spare type items such as fuses, lamps, or electron tubes.

j. Overhaul. That maintenance effort (service/ action) necessary to restore an item to a completely serviceable/operational condition as prescribed by maintenance standards (i.e., DMWR) in appropriate technical publications. Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to like new condition.

k. Rebuild. Consists of those services/actions necessary for the restoration of unserviceable equipment to a like new condition in accordance with original manufacturing standards. Rebuild is the highest degree of materiel maintenance applied to Army equipment. The rebuild operation includes the act of returning to zero those age measurements (hours, miles, etc.) considered in classifying Army equipments/components.

C-3. Column Entries

a. Column 1, Group Number. Column 1 lists group numbers, the purpose of which is to identify components, assemblies, subassemblies, and modules with the next higher assembly.

b. Column 2, Component/Assembly. Column 2 contains the noun names of components, assemblies, subassemblies, and modules for which maintenance is authorized.

c. Column 3, Maintenance Functions. Column 3 lists the functions to be performed on the item listed in column 2. When items are listed without maintenance functions, it is solely for purpose of having the group numbers in the MAC and RPSTL coincide.

d. Column 4, Maintenance Category. Column 4 specifies, by the listing of a "work time" figure in the appropriate subcolumn(s), the lowest level of maintenance authorized to perform the function listed in column 3. This figure represents the active time required to perform that maintenance function at the indicated category of maintenance. If the number or complexity of the tasks within the listed maintenance function vary at different maintenance categories, appropriate "work time" figures will be shown for each category. The number of task-hours specified by the "work time" figure represents the average time required to restore an item (assembly, subassembly, component, module, end item or system) to a serviceable condition under typical field operating conditions. This time includes preparation time, troubleshooting time, and quality assurance/quality control time in addition to the time required to perform the specific tasks identified for the maintenance functions authorized in the maintenance allocation chart.

Subcolumns of column 4 are as follows:

C - Operator/Crew
O - Organizational
F - Direct Support
H - General Support
D - Depot

e. Column 5, Tools and Equipment. Column 5 specifies by code, those common tool sets (not individual tools) and special tools, test, and support equipment required to perform the designated function.

C-4. Tool and Test Equipment Requirements (Table 1)

a. Tool or Test Equipment Reference Code. The numbers in this column coincide with the numbers used in the tools and equipment column of the MAC. The numbers indicate the applicable tool or test equipment for the maintenance functions.

b. Maintenance Category. The codes in this column indicate the maintenance category allocated the tool or test equipment.

c. Nomenclature. This column lists the noun name and nomenclature of the tools and test equipment required to perform the maintenance functions.

d. National/NATO Stock Number. This column lists the National/NATO stock number of the specific tool or test equipment.

e. Tool Number. This column lists the manufacturer's part number of the tool followed by the Federal Supply Code for manufacturers (5-digit) in parentheses.

(Next printed page is C-3)

SECTION II MAINTENANCE ALLOCATION CHART FOR GENERATOR, SIGNAL SG-321B/U

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQUIPMENT
			C	O	F	H	D	
00	GENERATOR, SIGNAL SG-321B/U	Inspect		0.2				
		Test		0.3				10
		Test				0.8		1 thru 9
		Service		0.4				10
		Adjust				0.5		1 thru 9
		Repair		0.2				10
		Repair				0.7		1 thru 9
		Overhaul					2.0	1 thru9

TABLE 1. TOOL AND TEST EQUIPMENT REQUIREMENTS FOR GENERATOR, SIGNAL, SG-321B/U

Tool or Test Equipment Ref Code	Maintenance Category	Nomenclature	National/NATO Stock Number	Tool Number
1	H, D	ANALYZER, SPECTRUM TE-723/U	6625-00-668-9418	
2	H, D	COUNTER, ELECTRONIC, DIGITAL READOUT AN/USM-207	6625-00-911-6368	
3	H, D	MULTIMETER ME-26/U	6625-00-360-2493	
4	H, D	MULTIMETER TS-352B,/U	6625-00-242-5023	
5	H, D	OSCILLOSCOPE AN/USM-281	6625-00-053-3112	
6	D	TEST SET, ELECTRON TUBE TV-2/U	6625-00-392-6929	
7	H	TEST SET, ELECTRON TUBE TV-7/U	6625-00-820-0064	
8	H, D	TOOL KIT, ELECTRONIC EQUIPMENT TK-105/G	5180-00-605-0079	
9	H, D	VOLTMETER, ELECTRONIC ME-30/U	6625-00-643-1670	
10	O	Tools .and test equipment available to organizational technician because assigned mission.		

APPENDIX D

ORGANIZATIONAL REPAIR PARTS

Section I. INTRODUCTION

D-1. Scope

This appendix contains a list of repair parts required for the performance of organizational maintenance for Generator, Signal SG-321B/U.

Note

No special tools, test, and support equipment are required.

D-2. General

The repair parts list is divided into the following sections.

a. Prescribed Load Allowance (PLA), Section II. The PLA is a consolidated listing of repair parts allocated for initial stockage at the organizational maintenance category. This is a mandatory minimum stockage allowance.

b. Repair Parts for Organizational Maintenance, Section III. Repair parts authorized for organizational maintenance are included in this section.

Note

All indexes noted below are cross-referenced to index numbers. The index numbers appear in ascending sequence in column 1 of the repair parts list (para D-*3a*). The index number for the particular item will be the same for the item in all sections of this appendix.

c. Federal Stock Number Cross-Reference to Index Number, Section IV. This is a cross-reference index of Federal stock numbers to index numbers.

d. Figure and Item Number Cross-Reference to Index Number Section V. This is a cross-reference index of figure and item number (or reference designation) to index number. The figure numbers are listed in numerical sequence; item numbers and/or reference designations are listed for each figure.

e. Reference Designation Cross-Reference to Index Number, Section VI. This is a cross-reference index of reference and/or item numbers to index numbers.

D-3. Explanation of Columns

An explanation of the columns is given below.

a. Source, Maintenance, and Recoverability Codes (SMR) and Index Numbers Column. The first line in this column lists the applicable SMR codes for the part. Listed in ascending order directly below the SMR codes is the index number assigned to the repair part.

(1) *Source code (S).* The selection status and source for the listed item is noted here. Source code and its explanation is as follows:

Code	*Explanation*
P-	Applies to repair parts that are stocked in or supplied from the GSA/DSA, or Army supply system, and authorized for use at indicated maintenance categories.

(2) *Maintenance code (M).* The lowest category of maintenance authorized to install the listed item is noted here.

Code	*Explanation*
O	Organizational maintenance.

(3) Recoverability code (R). The information in this column indicates whether unserviceable items should be returned for recovery or salvage. Recoverability code and its explanation is as follows:

Note

When no code is indicated in the recoverability column, the part will be considered expendable.

Code	*Explanation*
R-	Applies to repair parts and assemblies which are economically repairable at DSU and GSU activities and normally are furnished by supply on an exchange basis.

b. Federal Stock Number Column. The Federal stock number for the item is listed in this column.

c. Description Column.. This column includes the Federal item name and any additional description of the item required, the manufacturer's part number (reference number), and the applicable five-digit Federal Supply Code for Manufacturer's (para D-5). Usable on code column is not used.

d. Unit of Measure Column. The unit used as a basis of measure (e.g., ea., pr, ft, yd, etc.) is indicated in this column.

e. Quantity Incorporated in Unit Column. The quantity of repair parts in an assembly is given in this column.

f. Maintenance Allowances Column.

(1) The maintenance allowance column is divided into subcolumns. Indicated in each subcolumn is the total quantity of items authorized for the number of equipments supported. Items authorized for use as required, but not for initial stockage, are identified with an asterisk (*) in the allowance column.

(2) The quantitative allowances for organizational category of maintenance represents one initial prescribed load for a 15-day period for the number of equipments supported. Units and organizations authorized additional prescribed loads will multiply the number of prescribed loads authorized by the quantity of repair parts reflected ill the appropriate density column to obtain the total quantity of repair parts authorized.

(3) Subsequent changes to organizational allowances will be limited as follows: No change in the range of items is authorized. If additional items are considered necessary, recommendations should be forwarded to Commanding General, U.S. Army Electronics Command, ATTN: AMSELME-NMP-TB, Fort Monmouth, N.J. 07703, for exception or revision to the allowance list. Revisions to the range of items authorized will be made by the USA ECOM National Maintenance Point based upon engineering experience, demand data, or TAERS information.

g. Illustrations Column.

(1) *Figure number (a).* The number of the illustration in which the item is shown is indicated in this column.

(2) *Item No. or reference designation (b).* The callout number or reference designation used to reference the item in the illustration appears in this column.

D-4. Location of Repair Parts

a. This appendix contains three cross-reference indexes (sec. IV, V, and VI), to be used to locate a repair part when either the Federal stock number, reference number (manufacturer's part number), figure number, or reference designation is known. The first column in each cross-reference index is prepared, as applicable, in numerical or alphanumerical sequence. The last column of each cross reference index lists the index number assigned to the part.

b. Refer to the appropriate cross-reference index (para D-2*c, d, e*), and note the index number in the last column; then refer to the repair parts list to locate the index number which is listed in ascending order in column 1 of the repair parts list.

D-5. Federal Supply Codes

This paragraph lists the Federal supply code and the associated manufacturer's name.

Code	*Manufacturer's name*
08806	General Electric Co. Miniature Lamp Dept.
24635	Trilon Research Corp.
81349	Military Specifications.

SECTION II. PRESCRIBED LOAD ALLOWANCE

(1) FEDERAL STOCK NUMBER	(2) DESCRIPTION	USABLE ON CODE	(3) 15-DAY ORG MAINT. ALLOWANCE (A) 1-5	(B) 6-20	(C) 21-50	(D) 51-100
5920-060-2424	FUSE, CARTRIDGE:	F02G5ROOA; 81349	*	2	2	3
5960-166-7663	ELECTRON TUBE:	12AU7A; 81349	*	*	2	2
5960-188-3565	ELECTRON TUBE:	OA3; 81349	*	*	2	2
5960-262-0151	ELECTRON TUBE:	6AU5GT; 81349	*	*	2	2
5960-262-0152	ELECTRON TUBE:	6AU6WA; 81349	*	*	2	2
5960-262-0815	ELECTRON TUBE:	6AL5W; 81349	*	2	2	3
5960-503-4880	ELECTRON TUBE:	OA2; 81349	*	*	2	2
5960-557-6780	ELECTRON TUBE:	6C4WA; 81349	*	*	2	2
5960-642-8341	ELECTRON TUBE:	5U4GB; 81349	*	*	2	2
5960-827-8782	ELECTRON TUBE:	12AX7; 81349	*	*	2	2
6240-155-8706	LAMP, INCANDESCANT:	47; 08806	*	2	2	3
	LIGHT INDICATOR:	423012; 24635	*	*	2	2

SECTION III. REPAIR PARTS FOR ORGANIZATIONAL MAINTENANCE

(1) SMR CODE INDEX NO.	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION REF NUMBER & MFR CODE	USABLE ON CODE	(4) UNIT OF MEAS	(5) QTY INC IN UNIT	(6) 15-DAY ORGANIZATIONAL MAINTENANCE ALW (a) 1-5	(b) 6-20	(c) 21-50	(d) 51-100	(7) ILLUSTRATIONS (a) FIG NO.	(b) ITEM NO. OR REF. DESIG
G-C-R A001	6625-674-7097	GENERATOR SIGNAL, SG-321B/U: 5 bands, not crystal controlled, 4000 ohms rated output impedance; AC: 115/230V ±10 pet. 50/1000 hz single phase (This item is nonexpendable)									
P-O A028	5920-060-2424	FUSE, CARTRIDGE: F02G5ROOA; 81349		ea	1	*	2	2	3	1-1	F1
P-0 A033	6240-155-8706	LAMP, INCANDESCENT: 47; 08806		ea	1	*	2	2	3	1-1	DS1
P-O A034		LIGHT INDICATOR: 423012; 24635		ea	1	*	*	2	2	1-1	XDS1
P-O A139	5960-503-4880	ELECTRON TUBE: OA2; 81349		ea	2	*	*	2	2	1-1	V17, V18
P-O A140	5960-188-3565	ELECTRON TUBE: OA3; 81349		ea	1	*	*	2	2	1-1	V19
P-O A141	5960-262-0151	ELECTRON TUBE: 6AU5GT; 81349		ea	2	*	*	2	2	1-1	V14, V15
P-O A142	5960-262-0152	ELECTRON TUBE: 6AU6WA; 81349		ea	3	*	*	2	2	1-1	V16
P-O A143	5960-642-8341	ELECTRON TUBE: 5U4GB; 81349		ea	1	*	*	2	2	1-1	V13
P-O A207	5960-827-8782	ELECTRON TUBE: 12AX7; 81349		ea	3	*	*	2	2	1-1	V6, V7, V11
P-O A208	5960-166-7663	ELECTRON TUBE: 12AU7A; 81349		ea	3	*	*	2	2	1-1	V8, V10, V12
P-O A210	5960-262-0815	ELECTRON TUBE: 6AL5W; 81349		ea	3	*	2	2	3	1-1	V1, V2, V5
P-O A211	5960-557-6780	ELECTRON TUBE: 6C4WA; 81349		ea	1	*	*	2	2	1-1	V9

SECTION IV. INDEX-FEDERAL STOCK NUMBER CROSS REFERENCE TO INDEX NUMBER

FEDERAL STOCK NUMBER	INDEX NO.	FEDERAL STOCK NUMBER	INDEX NO.	FEDERAL STOCK NUMBER	INDEX NO.
5920-060-2424	A028				
5960-166-7663	A208				
5960-188-3565	A140				
5960-262-0151	A141				
5960-262-0152	A142				
5960-262-0815	A210				
5960-503-4880	A139				
5960-557-6780	A211				
5960-642-8341	A143				
5960-827-8782	A207				
6240-155-8706	A033				

REF NUMBER	INDEX NUMBER
423012	A034

SECTION V INDEX-FIGURE AND ITEM NUMBER CROSS REFERENCE TO INDEX NUMBER

FIG. NO.	ITEM NO. OR REFERENCE DESIGNATION	INDEX N0.	FIG. NO.	ITEM NO. OR REFERENCE DESIGNATION	INDEX NO.
1-1	DS1	A033			
	F1	A028			
	V1,	A210			
	V2				
	V5	A210			
	V6,	A207			
	V7				
	V8	A208			
	V9	A211			
	V10	A208			
	V11	A207			
	V12	A208			
	V13	A143			
	V14,	A141			
	V15				
	V16	A142			
	V17,	A139			
	V18				
	V19	A140			
	XDS1	A034			

SECTION IV. INDEX-FEDERAL STOCK NUMBER CROSS REFERENCE TO INDEX NUMBER

FEDERAL STOCK NUMBER	INDEX NO.	FEDERAL STOCK NUMBER	INDEX NO.	FEDERAL STOCK NUMBER	INDEX NO.
DS1	A033				
F1	A028				
V1, V2	A210				
V5	A210				
V6, V7	A207				
V8	A208				
V9	A211				
V10	A208				
V11	A207				
V12	A208				
V13	A143				
V14, V15	A141				
V16	A142				
V17, V18	A139				
V19	A140				
XDS1	A034				

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USARADBD (5)
USACDCEC (10)
USACDC Agcy (1)
USAMC (5)
USAMICOM (4)
USASTRATCOM (4)
USATECOM (2)
USCONARC (5)
ARADCOM (5)
ARADCOM Rgn (2)
OS Maj Comd (4)
LOGCOMD (2)
MDW (1)
USAESC (70)
Armies (2)
Corps (2)
Instl (2) except
Ft Gordon (10)
Ft Huachuca (10)
WVSMR (5)
Ft Carson (25)
Ft Knox (12)
DPG (5)
USAEPG (5)
Svc Colleges (2)
USASESS (5)
USAADS (8)
USAAMS (8)
USAARIMS (2)
USAIS (2)
USAES (2)
USAOC&S (5)
USATC Armor (2)
USATC Inf (2)
USASTC (2)
Army Dep (2) except
LBAD (14)
SAAD (30)
TOAD (14)
LEAD (7)
SHAD (3)
NAAD (5)
SVAD (5)
CHAD (3)
ATAD (10)
Gen Dep (2)
Sig Sec, Gen Dep (5)
Sig Dep (12)
AMS (1)
VRAMC (1)
Army Pic Cen (2)
ARADMAC (5)
AAF (2)
MAAG (2)
NLABS (5)
USARMIS (2)
USACRREL (2)
USABIOLABS (5)
USAERDAA (2)
USAERDAW (13)
Edgewood Arsenal (5)
Sig ,FLDMS (2)
Units organized under following TOE's (2 each):

11-57	11-592
11-97	11-597
11-98	20-41
11-117	29-134
11-127	29-500
11-155	55-405
11-157	55-406
11-158	55-458
11-500 (AA-AC, RV)	
11-587	

ARNG & USAR: None.

For explanation of abbreviations used, see AR 320-50.

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The Metric System and Equivalents

Linear Measure

1 centimeter = 10 millimeters = .39 inch
1 decimeter = 10 centimeters = 3.94 inches
1 meter = 10 decimeters = 39.37 inches
1 dekameter = 10 meters = 32.8 feet
1 hectometer = 10 dekameters = 328.08 feet
1 kilometer = 10 hectometers = 3,280.8 feet

Weights

1 centigram = 10 milligrams = .15 grain
1 decigram = 10 centigrams = 1.54 grains
1 gram = 10 decigram = .035 ounce
1 decagram = 10 grams = .35 ounce
1 hectogram = 10 decagrams = 3.52 ounces
1 kilogram = 10 hectograms = 2.2 pounds
1 quintal = 100 kilograms = 220.46 pounds
1 metric ton = 10 quintals = 1.1 short tons

Liquid Measure

1 centiliter = 10 milliters = .34 fl. ounce
1 deciliter = 10 centiliters = 3.38 fl. ounces
1 liter = 10 deciliters = 33.81 fl. ounces
1 dekaliter = 10 liters = 2.64 gallons
1 hectoliter = 10 dekaliters = 26.42 gallons
1 kiloliter = 10 hectoliters = 264.18 gallons

Square Measure

1 sq. centimeter = 100 sq. millimeters = .155 sq. inch
1 sq. decimeter = 100 sq. centimeters = 15.5 sq. inches
1 sq. meter (centare) = 100 sq. decimeters = 10.76 sq. feet
1 sq. dekameter (are) = 100 sq. meters = 1,076.4 sq. feet
1 sq. hectometer (hectare) = 100 sq. dekameters = 2.47 acres
1 sq. kilometer = 100 sq. hectometers = .386 sq. mile

Cubic Measure

1 cu. centimeter = 1000 cu. millimeters = .06 cu. inch
1 cu. decimeter = 1000 cu. centimeters = 61.02 cu. inches
1 cu. meter = 1000 cu. decimeters = 35.31 cu. feet

Approximate Conversion Factors

To change	*To*	*Multiply by*	*To change*	*To*	*Multiply by*
inches	centimeters	2.540	ounce-inches	Newton-meters	.007062
feet	meters	.305	centimeters	inches	.394
yards	meters	.914	meters	feet	3.280
miles	kilometers	1.609	meters	yards	1.094
square inches	square centimeters	6.451	kilometers	miles	.621
square feet	square meters	.093	square centimeters	square inches	.155
square yards	square meters	.836	square meters	square feet	10.764
square miles	square kilometers	2.590	square meters	square yards	1.196
acres	square hectometers	.405	square kilometers	square miles	.386
cubic feet	cubic meters	.028	square hectometers	acres	2.471
cubic yards	cubic meters	.765	cubic meters	cubic feet	35.315
fluid ounces	milliliters	29,573	cubic meters	cubic yards	1.308
pints	liters	.473	milliliters	fluid ounces	.034
quarts	liters	.946	liters	pints	2.113
gallons	liters	3.785	liters	quarts	1.057
ounces	grams	28.349	liters	gallons	.264
pounds	kilograms	.454	grams	ounces	.035
short tons	metric tons	.907	kilograms	pounds	2.205
pound-feet	Newton-meters	1.356	metric tons	short tons	1.102
pound-inches	Newton-meters	.11296			

Temperature (Exact)

°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C

PIN: 013572-000