DEPARTMENT OF THE ARMY TECHNICAL MANUAL

OPERATOR AND ORGANIZATIONAL MAINTENANCE MANUAL

CALIBRATOR, CRYSTAL TS-810/U

Headquarters, Department of the Army, Washington 25, D.C.

21 August 1961

WARNING

Be careful not to contact high-voltage connections or the 115-volt ac input connections when replacing tubes in the test set. Voltages up to 205 volts dc may be encountered in this equipment. Serious injury or death may result from contact with these connections.

RADIATION HAZARDS

The OA2WA voltage regulator to be used in this equipment is radioactive. Dangers of poisoning from radioactive materials contained in the tube exist when the tube is broken. For detailed instructions on handling, storing, and disposing of radioactive tubes, see TB SIG 225.

DON'T TAKE CHANCES!

* This manual supersedes so much of TM-11-1261,14 June 1957, including C3, 26 July 1960, is applicable to operational and organizational maintenance, and so much of TM 11-6625-269-20P, 17 March 1959, as pertaining to maintenance allocation.

CHANGE

No. 2

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., *19 February 1974*

Operator and Organizational Maintenance Manual
CALIBRATOR, CRYSTAL TS-810/U

TM 11-6625-269-12, 21 August 1961, is changed as follows:

Page 5. Paragraph 1.1 is superseded as follows:

1.1. 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.

Paragraph 2 is superseded as follows:

2. 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 (Report of Packaging and Handling Deficiencies) as prescribed in AR 700-58 (Army)/NAVSUP PUB 378 (Navy)/AFR 71-4 (Air Force)/MCO P4030.29 (Marine Corps), 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 55-38 (Army)/NAVSUPINST 4610.33/AFM 75-18 MCO P4610.19A (Marine Corps), and DSAR 4500.5.

2.1. Reporting of Errors

The 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 forwarded direct to Commander, US Army Electronics Command, ATTN: AMSEL-MA-C, Fort Monmouth, NJ 07703.

Page 6. Paragraph 5 is superseded as follows:

5. Components and Running Spares

The components and running spares of Calibrator, Crystal TS-810/U are shown in figures 1 and 2.

5.1. Items Comprising an Operable Calibrator, Crystal TS-810/U

FSN	*QTY*	*Nomenclature, part No. and mfr code*
6625-542-611		Calibrator Crystal TS-810/U which includes:
6625-503-6897	1	Cable Assembly, Power Electrical CX-3135/U: 6 ft lg o/a.
5995-251-3S45	1	Cable Assembly, Radio Frequency: RF cable assembly CG-530A/U; 6 ft lg o/a.

Page 8, *paragraph 10.* Delete the second sentence.
Page 30. Appendix III is rescinded.

By Order of the Secretary of the Army:

CREIGHTON W. ABRAMS
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VERNE L. BOWERS
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SAAD (30)
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Units org under fol TOE:
(1 copy each)
11-16
11-97
11-117
11-158
11-500(AA-AC)
29-134
29-136
32-57
32-78

NG: State AG (3)
USAR: None
For explanation of abbreviations used, see AR 310-50.

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TECHNICAL MANUAL
OPERATOR AND ORGANIZATIONAL MANUAL
CALIBRATOR, CRYSTAL TS-810/U

TM 11-6625-269-12

CHANGE NO. 1

HEADQUARTERS,
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., *27 September 1963*

TM 11-6625-269-12, 21 August 1961, is changed as follows:

Page 5, paragraph 1. Add paragraph 1.1 after paragraph 1.

1.1. Index of Publications

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. DA Pam 310-4 is an index of current technical manuals, technical bulletins, supply bulletins, lubrication orders, and modification work orders available through publications supply channels. The index lists the individual parts (-10, -20, -35P, etc) and the latest changes to and revisions of each equipment publication.

Delete paragraph 2 and substitute:

2. Forms and Records

a. Reports of Maintenance and Unsatisfactory. Equipment. Use equipment forms and records in accordance with instructions in TM 38-750.

b. Report of Damaged or Improper Shipment. Fill out and forward DD Form 6 (Report of Damaged or Improper Shipment) as prescribed in AR 700-58 (Army), NAVSANDA Publication 378 (Navy), and AFR 714 (Air Force).

c. *Reporting of Equipment Manual Improvements*. The direct reporting by the individual user of errors, omissions, and recommendations for improving this manual is authorized and encouraged. DA Form 2028 (Recommended changes to DA technical manual parts lists or supply manual 7, 8, or 9) will be used for reporting these improvements. This form will be completed in triplicate using pencil, pen or typewriter. The original and one copy will be forwarded direct to: Commanding Officer, U.S. Army Electronics Materiel Support Agency, ATTN: SELMS-MP, Fort Monmouth, New Jersey, 07703. One information copy will be furnished to the individual's immediate supervisor (e.g., officer, noncommissioned officer, supervisor, etc.)

Page 12, section I, heading. Change "OPERATOR'S MAINTENANCE" to: ORGANIZATIONAL MAINTENANCE.

Delete paragraph 15, 16, and 17 and substitute :

15. Scope of Maintenance

The maintenance duties assigned to the operator and organizational repairman of Calibrator, Crystal TS-810/U are listed below, together with a reference to the paragraphs covering the specific maintenance functions.

a. Daily preventive maintenance checks and services (par. 17.1).

b. Weekly preventive maintenance checks and services (par. 17.2).

c. Monthly preventive maintenance checks and services (par. 17.3).

d. Quarterly preventive maintenance checks and services (par. 17.4)

e. Cleaning (par. 17.5).

f. Touchup painting (par. 17.6).

g. Removal of panel-chassis assembly (par.19).

h. Tube replacement (par. 20).

i. Visual inspection (par. 24).

j. Equipment performance check (par. 25).

k. Repairs.

(1) Replacement of C120 (par. 26*a*).

(2) Replacement of heater regulator (par. 26*b*).

16. Preventive Maintenance

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

a. Systematic Care. The procedures given in paragraphs 17.1 through 17.5 cover routine systematic care and cleaning essential to proper upkeep and operation of the equipment.

b. Preventive Maintenance Checks and Services. The preventive maintenance checks and services charts (pars. 17.1 through 17.4) outline functions to be performed at specific intervals. 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 operators 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 the corrective actions listed, higher echelon 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.

17. Preventive Maintenance Checks and Services Periods

Preventive maintenance checks and services of Calibrator, Crystal TS-810/U are required daily, weekly, monthly, and quarterly.

a. Paragraph 17.1 specifies the checks and services that must be accomplished daily (or at least once each week if the equipment is maintained in standby condition).

b. Paragraphs 17.2, 17.3, and 17.4 specify *additional* checks and services that must be performed on a weekly, monthly, and quarterly basis, respectively.

17.1. Daily Preventive Maintenance Checks and Services Chart

Sequence No.	Item	Procedure	References
1	Completeness	See that the equipment is complete (app. III).	None.
2	Exterior surfaces	Clean the exterior surfaces, including the panel (par. 17.5). Check indicator lens for cracks.	None.
3	Connectors	Check the tightness of all connectors.	None.
4	Controls and indicators	While making the operating checks (see None. quence No. 5) observe that the mechanical action of the knob and switch is smooth and free of external or internal binding and that there is no excessive looseness.	
5	Operation	Operate the equipment according to paragraph 18.	Pars. 18 and 25, step 7, corrective measures column.-

17.2. Weekly Preventive Maintenance Checks and Services Chart

Sequence No.	Item	Procedure	References
1	Cables	Inspect cords, cables, and wires for chafed, cracked, or frayed insulation. Replace connectors that are broken, arced, stripped, or worn excessively	None

17.2. Weekly Preventive Maintenance Checks and Services Chart-Continued

Sequence No.	Item	Procedure	References
2	Handle	Inspect handle for looseness. Replace or tighten as necessary	None.
3	Metal surfaces	Inspect exposed metal surfaces for rust and corrosion. Touch up paint as required (par. 17.6).	None

17.3. Monthly Preventive Maintenance Checks and Services Chart

Sequence No.	Item	Procedure	References
1	Pluckout items	Inspect seating of pluckout items. Make certain that tube clamps grip tube bases tightly.	None.
2	Transformer terminals	Inspect terminals on power transformer. There should be no evidence of dirt or. corrossion.	None.
3	Terminal blocks	Inspect terminal blocks for loose connections and cracked or broken insulation.	None.
4	Resistors and capacitors	Inspect resistors and capacitors for cracks, blistering, or- other detrimental defects.	None.
5	Gaskets and insulators	Inspect gaskets, insulators, bushings, and sleeves for cracks, chipping, and excessive wear.	None.
6	Interior	Clean interior of chassis and cabinet.	None.

17.4. Quarterly Preventive Maintenance Checks and Services Chart

Sequence No.	Item	Procedure	References
1	Publications	See that all publications are complete, serviceable, and current.	DA Pam 310-4.
2	Modifications	Check DA Pam 310-4 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 310-4.
3	Spare parts	Check all spare parts (operator and organizational) for general condition and method of storage. There should be no evidence of overstock, and all shortages must be on valid requisitions.	App. III, and TM-11-6625-269-20P

17.5. Cleaning

Inspect the exterior of the equipment. The exterior surfaces should be clean, and free of dust, dirt, grease, and fungus.

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

Warning

Cleaning compound is flammable and its fumes are toxic. Provide adequate ventilation. Do not use near a flame.

b. Remove grease, fungus, and ground-in dirt from the cases; use a cloth dampened (not wet) with Cleaning Compound (Federal Stock No. 7930-395-9542). After cleaning, wipe dry with a cloth.

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

d. Clean the front panel and control knobs; use a soft clean cloth. If necessary, dampen the cloth with water; mild soap may be used for more effective cleaning. Wipe dirty with a cloth.

17.6. 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 the applicable cleaning and refinishing practices specified in TM 9-213.

Page 14. Delete figure 5.

Page 15. Delete figure 6.

Page 17. section II. Delete the section heading and paragraphs 21, 22, and 23.

Page 18. Delete figure 8.

Page 24, appendix I. Add the following items:

DA Pam 310-4	Index of Technical Manuals, Technical Bulletins, Supply Bulletins, Lubrication Orders, and Modification Work Orders.
TM 9-213	Painting Instructions for Field Use.
TM 11-6625-269-20P	Organizational Maintenance Repair Parts and Special Tools List and Maintenance Allocation Chart for Calibrator, Crystal TS-810/U.
TM 38-750	The Army Equipment Record System and Procedures.

Page 27, section II, Maintenance Allocation Chart. Delete and substitute:

SECTION II. MAINTENANCE ALLOCATION CHART

PART OR COMPONENT	MAINT. FUNCTION	1ST ECH.	2ND ECH.	3RD ECH.	4TH ECH.	5TH ECH.	TOOLS REQUIRED	REMARKS
CALIBRATOR CRYSTAL TS-810/U	service	X						
	inspect	X						
	test				X		2,3,4	
						X	5	Tubes requiring the use of TV-2/U
	repair				X		6	
	calibrate				X		1,3	
	rebuild					X	6	

Page 29, section III, Allocation of Tools for Maintenance Functions. Delete and substitute:

SECTION III. ALLOCATION OF TOOLS FOR MAINTENANCE FUNCTIONS

TOOLS REQUIRED FOR MAINTENANCE FUNCTIONS	1ST ECH.	2ND ECH.	3RD ECH.	4TH ECH.	5TH ECH.	TOOL CODE	REMARKS
TS-810/U (continued)							
FREQUENCY METER AN/USM-26				†	†	1	
MULTIMETER TS-352/U				†	†	2	
OSCILLOSCOPE AN/USM-24				†	†	3	
TEST SET, ELECTRON TUBE TV-7/U				†		4	
TEST SET, ELECTRON TUBE TV-2/U					†	5	
TOOL EQUIPMENT TK-21/G				†	†	6	

By Order of the Secretary of the Army:

EARLE G. WHEELER,
General, United States Army,
Chief of Staff.

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USATC Inf (2)
USATC Armor (2)
USASTC (5)
Instl (2) except
Ft Monmouth (65)
Svc Colleges (2)
Br Svc Sch (2)
GENDEP (OS) (2)
Sig Dep (OS) (12)
Sig Sec, GENDEP (5)
Army Dep (2) except
Ft Worth (8)
Lexington (12)
Sacramento (28)
Tabyhanna (12)
USA Elct RD Actv, White Sands (13)
USA Elct RD Actv, Ft Huachuca (2)
USA Trans Tml Comd (1)
Army Tml (1)
POE (1)
USAOSA (1)
AMS (1)
WRAMC (1)
AFIP (1)
Army Pic Cen (2)
USA Mbl Spt Cen (1)
USA Elct Mat Agcy (12)
Chicago Proc Dist (1)
USARCARIB Sig Agcy (1)
Sig Fld Maint Shop (3)
Units org under fol TOE (2 cy ea UNOINDC)
11-7
11-16
11-57
11-97
11-98
11-117
11-155
11-157
11-500 AA-AE (4)
11-557
11-587
11-592
11-597
32-57
32-68
32-78

NG: State AG (3).
USAR: None.
For explanation of abbreviations used, see AR 320-50.

GPO 817-463

GPO 826

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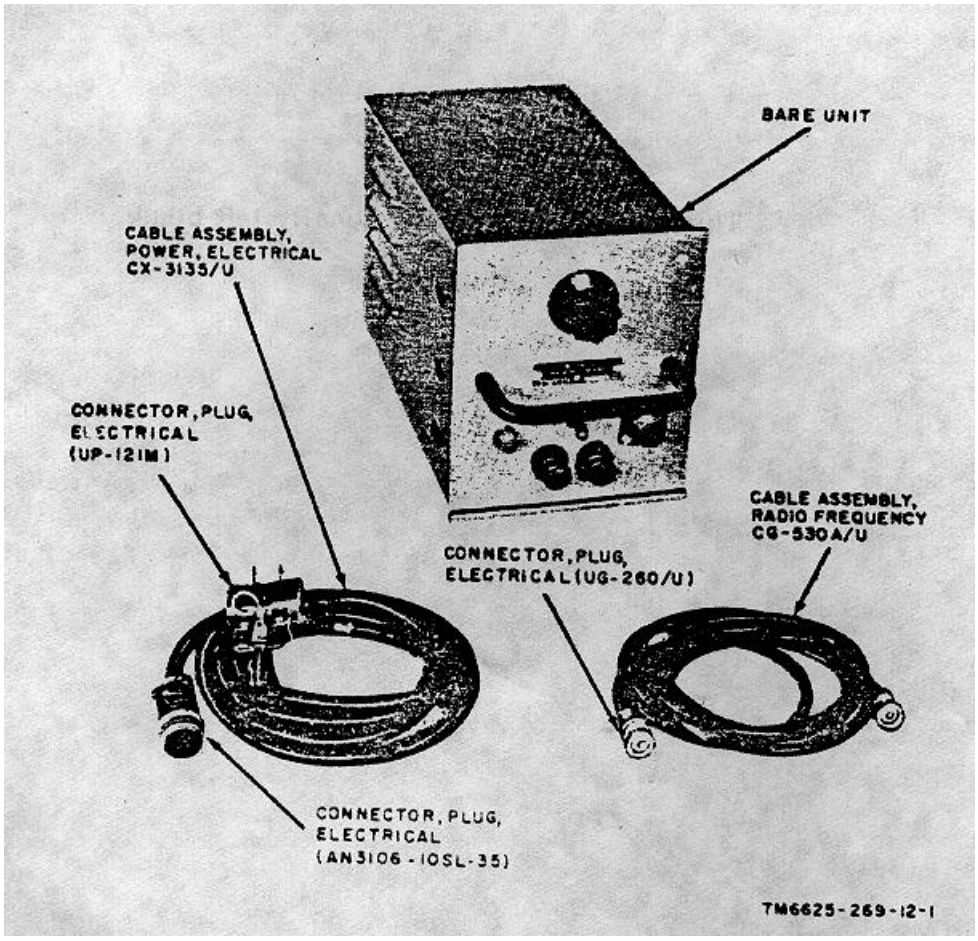


Figure 1. Calibrator, Crystal TS-810/U, bare unit and cable assemblies.

CHAPTER 1

INTRODUCTION

Section I. GENERAL

1. Scope

This manual describes Calibrator, Crystal TS-810/U (fig. 1) and covers installation, operation, and first and second echelon maintenance. It includes instructions for operation under usual conditions, cleaning and inspection of the equipment, and replacement of parts available to first and second echelon maintenance personnel.

2. Forms and Records

a. Unsatisfactory Equipment Report.

(1) Fill out and forward DA Form 468 (Unsatisfactory Equipment Report) to the Commanding Officer, U.S. Army Signal Materiel Support Agency, ATTN: SIGMS-ML, Fort Monmouth, N.J., as prescribed in AR 700-38.

(2) Fill out and forward AF TO Form 29 (Unsatisfactory Report) to the Commander, Air Materiel Command, Wright-Patterson Air Force Base, Ohio, as prescribed in AF TO 00-35D-54.

b. Report of Damaged or Improper Shipment. Fill out and forward DD Form 6 (Report of Damaged or Improper Shipment) as prescribed in AR 700-58 (Army), Navy Shipping Guide, Article 1850-4 (Navy), and AFR 71-4 (Air Force).

c. Preventive Maintenance Forms. Prepare DA Form 11-266 (fig. 5, 6, and 8) (Maintenance Check List for Signal Equipment (Test Equipment)) in accordance with instructions on the form.

d. Parts List Form. Forward DA Form 2028 (Recommended Changes to DA Technical Manual Parts Lists or Supply Manual 7, 8, or 9) direct to the Commanding Officer, U.S. Army Signal Materiel Support Agency, ATTN: SIGMS-ML, Fort Monmouth, N.J., with comments on parts listings.

e. Comments on Manual. Forward all other comments on this manual direct to the Commanding Officer, U.S. Army Signal Materiel Support Agency, ATTN: SIGMS-PA2d, Fort Monmouth, N.J.

Section II. DESCRIPTION AND DATA

3. Purpose and Use

a. Purpose. Calibrator, Crystal TS-810/U (fig. 1) is a portable source of stable, positive pulses for use as accurate calibration markers. The repetition frequency of the output pulse is variable in steps between 1 megacycle (mc) and 100 cycles per second (cps). The corresponding periods in microseconds (usec) are variable in steps between 1 and 10,000 μsec.

b. Use. Calibrator, Crystal TS-810/U can be used for superposition of timing markers on an oscilloscope sweep trace or to check the following:

(1) Cathode-ray oscilloscope sweep linearity.
(2) Calibration of oscilloscope sweep.
(3) Proper operation of pulse analyzer groups.
(4) Calibration of signal generators.
(5) Decade-frequency-range switches.

4. Technical Characteristics

Number of tubes	7.
Output pulse:	
Amplitude	3 volts peak, without pulse stretching.
Polarity	Positive.
Repetition frequency	1 mc (1 µsec), 100 kc (10 µsec), 10 kc (100 µsec), 1 kc (1,000 µsec), and 100 cps (10,000 µsec).
Pulse duration plus risetime (normal)	0.1 µsec, ±20 percent (measured from 10 percent up on the leading edge to 10 percent down on the trailing edge).
Pulse duration (stretched)	Approximately 1 µsec (measured from 50 percent up on the leading edge to 50 percent down on the trailing edge).
Accuracy	0.01 percent.
Output impedence	93 ohms.
Power supply:	
Input voltage	103.5 to 126.5 volts ac, single phase.
Frequency	50 to 420 cps.
Power consumption	50 watts maximum at 115 volts, 60 cps.
Weight (bare unit)	6-1/2 lbs.

5. Table of Components

The components and running spares (fig. 1 and 2) of Calibrator, Crystal TS-810/U are listed in appendix III.

6. Common Names

Common names are assigned to nomenclatured items as follows:

Nomenclature	Common name
Calibrator, Crystal TS-810/U..	Test set
Cable Assembly, Power, Electrical CX-3135/U	Power cable
Cable Assembly, Radio Frequency CG-530A/U	Rf cable assembly
Adapter, Connector OG-201/U.	Adapter

7. Description of Test Set
(fig. 1)

The test set consists of a panel-chassis assembly contained in a removable louvered cover. A carrying handle is fastened to the front panel. The front panel contains the operating controls, fuseholders, and connectors for the power cable and rf cable assembly. The power cable consists of a three-conductor cable terminated by a Connector Plug, Electrical (AN3106A-10SL-3S) and a Connector Plug, Electrical (type UP-121M). The rf cable assembly consists of a shielded cable terminated by two Connector Plugs, Electrical (UG-260/U). The adapter is used to connect the rf cable assembly to a series N female connector. The side of the cover provide access to other controls used for operating and adjusting the test set. The rear-inside section of the cover contains clamps for storing the adapter.

8. Differences in Models

Calibrators, Crystal TS-810/U, procured on Orders No. N383-31971A, No. N383-468,9A, No. N383-52450A, and No. N383-(11-383-MIS)60539A, are similar in purpose, operation, and appearance. The capacitor retainers (two 13/16-inch inside diameter by 5/8- by 5/16-inch, and one 11/16-inch inside diameter by 5/8- by 5/16-inch spring clamps inside the case) are not supplied on No. N383-60539A.

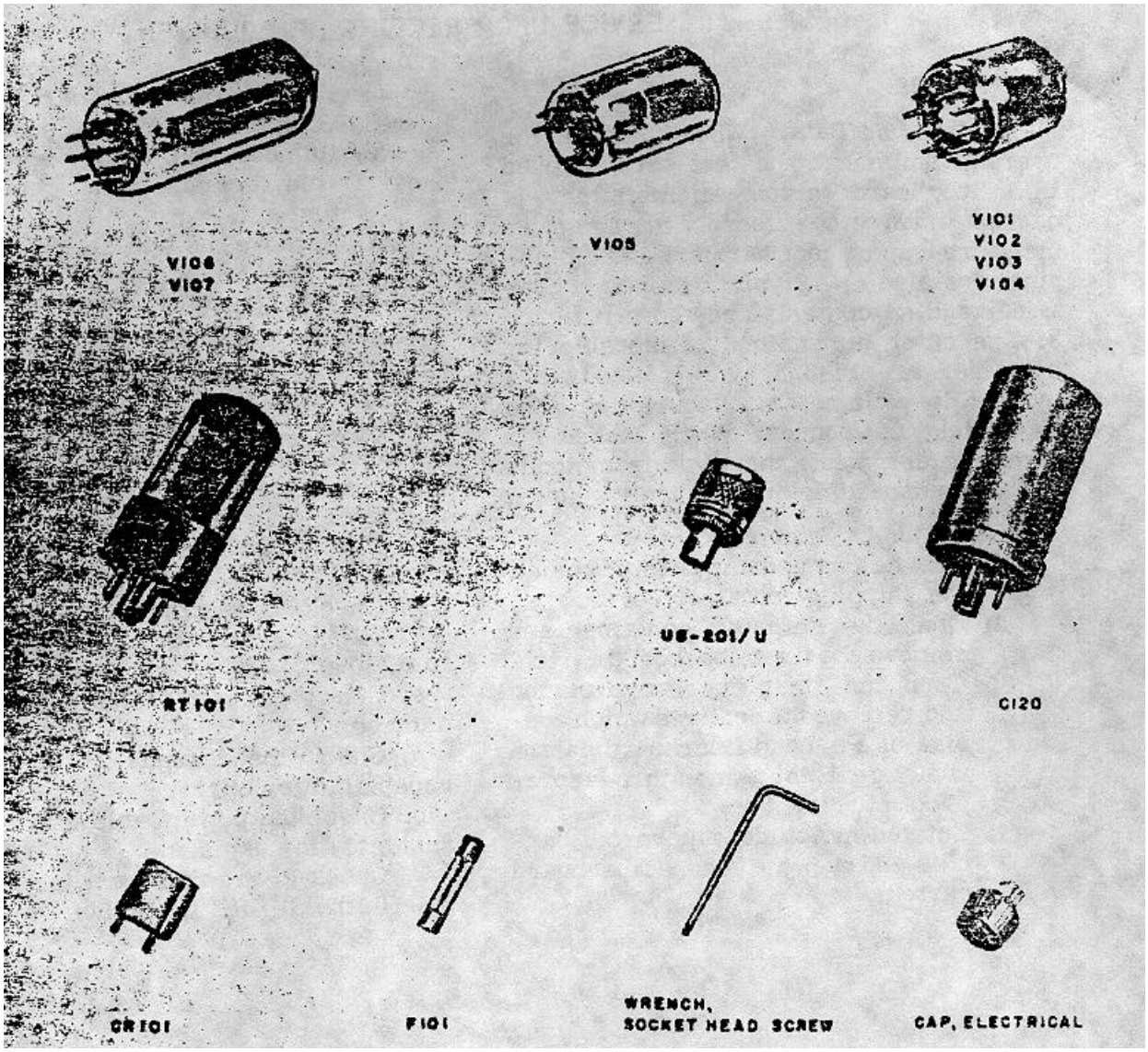


Figure 2. Running spares and minor components.

CHAPTER 2

OPERATION

Section I. SERVICE UPON RECEIPT OF EQUIPMENT

9. Unpacking

a. packaging Data. When packed for oversea shipment, the test set is packed in a fiberboard carton which, in turn, is packed in two other fiberboard cartons, a moisture-vaporproof barrier, and a shipping container. A typical shipping container and its contents are shown in figure 3. The outer dimensions of the shipping container are 15-3/8 by 8-7/8 by 13-3/4 inches; its volume is 1.2 cubic feet, and its weight 21 pounds. When packed for domestic shipment, the packing methods may vary depending on the supply source.

b. Removing Contents.

(1) Cut the filament tape banding below the shipping container cover.

(2) Open the shipping container and remove the first fiberboard carton.

(3) Open the first fiberboard carton and remove the contents which consist of a second fiberboard carton wrapped in a moisture-vaporproof barrier.

(4) Cut the moisture-vaporproof barrier and open the second fiberboard carton.

(5) Remove the spare parts carton, all components, and the padding.

(6) Remove and open the third fiberboard carton which contains the test set.

(7) Remove the test set.

10. Checking Unpacked Equipment

Check the equipment against the packing list. When no packing list accompanies the equipment, use the components in appendix III as a general check. If the equipment is damaged, refer to paragraph 2. After the test set is removed from its fiberboard container, proceed as follows:

a. Check for broken or missing fuse caps.

b. Check to see that the FREQUENCY PERIOD-µsec switch knob is tightly secured to its shaft.

c. Check the OUTPUT connector for damage.

d. Check the threads on the POWER receptacle for burrs.

e. Check the power cable and the rf cable assembly for damage.

f. Check to see that there is a 1-ampere fuse in the SPARE fuseholder.

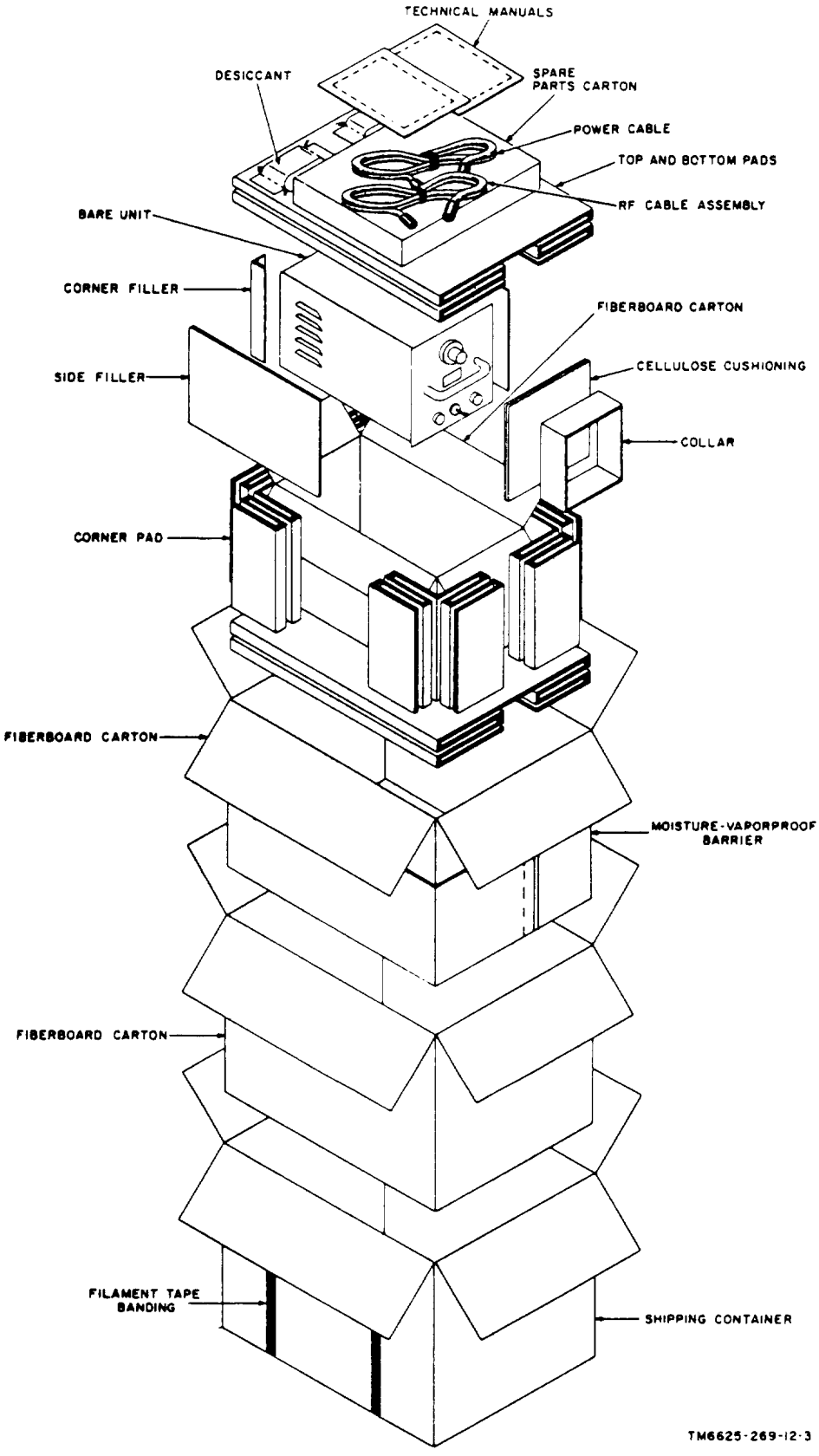


Figure 3. Typical packaging.

Section II. OPERATING INSTRUCTIONS

11. Operator's Controls and Connectors

(fig. 4)

Note.
This paragraph covers only items used by the *operator*.

Control or connector	Function
FREQUENCY PERIOD- µs switch	Selects singly, in decade steps, pulse-repetition frequencies and simultaneously indicates the pulse-repetition periods in µsec.
PWR-OFF switch	Applies power to, or removes power from, the test set. *Switch position* — *Action* PWR — Applies power to test set OFF — Removes power from test set
PULSE STRETCH switch	Increases the width of the output pulse. *Switch position* — *Pulse width* IN — 1 µsec OUT — 0.1 µsec.
POWER receptacle	Provides terminals for connection to a power source of 115 volts ac at 50 to 420 cps.
OUTPUT connector	Coaxial terminal jack; supplies 3 volts peak positive pulses for external use.

12. Starting Procedure

a. Preliminary.

(1) Set the PWR-OFF switch to the OFF position.
(2) Connect the female end of the power cable to the POWER receptacle on the test set.
(3) Connect the other end of the power cable to the alternating current (ac) power source.
(4) Connect either end of the rf cable assembly to the OUTPUT connector.

b. Starting.

Note
If an abnormal indication is obtained during the starting procedure, refer to the operational checklist (para 18) for corrective measures.

(1) Set the PWR-OFF switch to PWR.
(2) Set the PULSE STRETCH switch to the desired position.

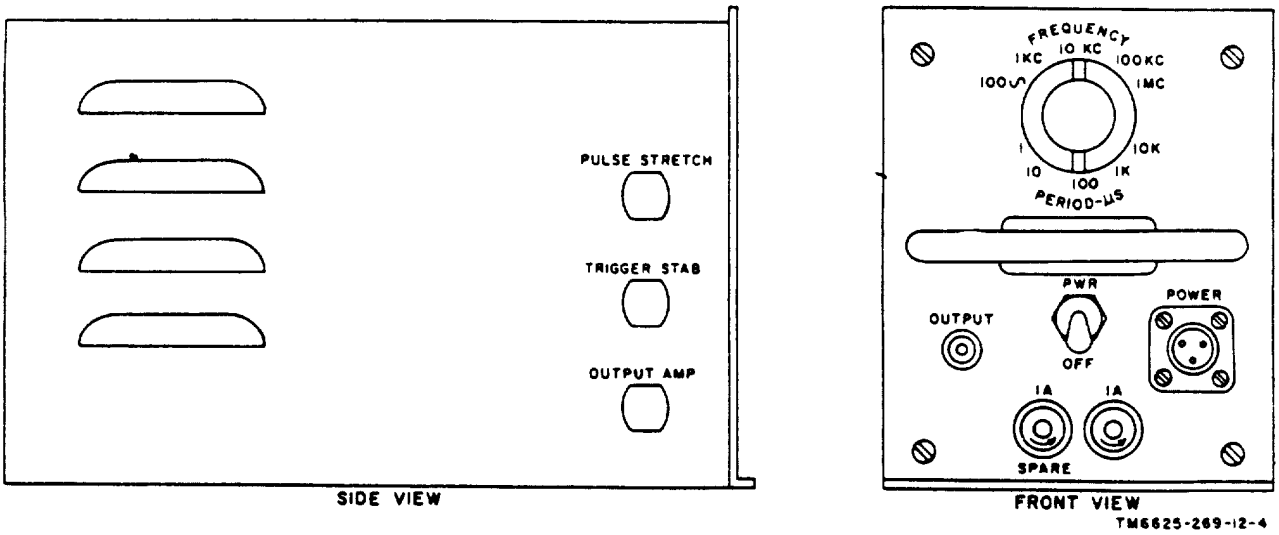


Figure 4. Calibrator, Crystal TS-810/U, controls and connectors.

13. Operating Procedure

Perform the starting procedure (para 12) before operating the test set.

a. Set the FREQUENCY PERIOD-µs switch to the desired position.

b. Connect the unattached end of the rf cable assembly to the equipment under test (use the adapter if necessary).

14. Stopping Procedure

a. Set the PWR-OFF switch to OFF.

b. Disconnect the rf cable assembly from the equipment under test.

c. Disconnect the power cable from the ac power source.

d. Disconnect the power cable and the rf cable assembly from the test set.

e. If the adapter has been used, leave it connected to the rf cable assembly. If the adapter has not been used, connect it to one end of the rf cable assembly so that it will not be misplaced.

CHAPTER 3

MAINTENANCE INSTRUCTIONS

Section I. OPERATOR'S MAINTENANCE

15. Scope of Operator's Maintenance

a. A list of maintenance duties normally performed by the operator of Calibrator, Crystal TS-810/U is given in *b* below. The duties do not require special tools or test equipment.

b. Operator's maintenance for the test set consists of the following:

(1) Preventive maintenance (para 16).
(2) Visual inspection (para 17).
(3) Operational check (para 18).
(4) Replacement of electron tubes (para 20) and the fuse.

16. Preventive Maintenance

a. DA Form 11-266. DA Form 11-266 (fig. 5 and 6) is a preventive maintenance checklist to be used by the operator. Items that are not applicable to the equipment are lined out. References in the ITEM block are to paragraphs that contain additional maintenance information pertaining to the item. Instructions for the use of the form appear on page 1 of the form.

b. Items. The information below supplements DA Form 11-266. The item numbers (correspond to the ITEM numbers on the form.

Item	Maintenance procedure
	Warning **Cleaning compound is flammable and its fumes are toxic. Do not use near a flame; provide adequate ventilation.**
1	Use a clean cloth to remove dust, dirt, moisture, or grease from the case, the front panel, and the adapter. If necessary, wet the cloth with Cleaning Compound (Federal stock No. 7930 395-9542) and then wipe parts with a dry, clean cloth.
2	Check to see that the fuseholders are not loose or cracked.

17. Visual Inspection

a. Inspection by sight will often determine the general condition of the test set and the amount of repair required. When the equipment fails to perform properly, check the items listed below.

(1) Power cable poorly connect to the test set or ac power source.
(2) Rf cable assembly poorly connected to the test set or equipment under test.
(3) Improper setting of the FREQUENCY PERIOD-µs switch.

b. If the above checks do not locate the trouble, proceed to the operational checklist (para 18).

18. Operational Checklist

a. General. The operational checklist will help the operator to locate trouble quickly. All corrective measures that can be performed by the operator are given in the *Corrective measures* column. If the measures suggested do not restore normal equipment performance, troubleshooting is required by higher echelon maintenance personnel. Note on the repair tag what corrective measures were taken and how the equipment performed at the time of failure.

b. Observing Test Set Output. The TS-810/U cannot be checked for proper operation without the use of other equipment, because there is no way to determine if there is an output pulse. It is assumed that the equipment under test will contain a cathode-ray tube (crt) to observe the output pulses of the test set.

c. Procedure. Place the test set in operation (para 13). After the equipment has had time to warm up, operate the test set as described in the checklist below and perform the steps in the order given. Observe the equipment operation and perform any corrective measures necessary.

Action	Normal indication	Corrective measures
Set FREQUENCY PERIOD-µs switch to 1MC. .	Output waveform of equipment under test and test set pulses visible on crt	Check power cable and rf cable assembly connections. Check fuse; replace if necessary. **Warning** **Disconnect all power before performing the following operation. After the power is disconnected, some capacitors may still retain dangerous voltages. Before touching exposed electrical parts, short-circuit the parts to ground.** Remove the panel-chassis assembly from its cover (para 19a).and observe all tube filaments; replace any burned-out tube (para 20). Replace tube V101, V104, V105, V106 or V107 if necessary (fig. 7). Higher echelon repair required.
Set FREQUENCY PERIOD-µs switch to 100KC.	Same as above.	Higher echelon repair required.
Set FREQUENCY PERIOD-µs switch to 10KC.	Same as above.	Replace V102 (fig. 7). Higher echelon repair required.
Set FREQUENCY PERIOD-µs switch to 1KC.	Same as above. .	Replace V102 (fig. 7). Higher echelon repair required
Set FREQUENCY PERIOD-µs switch to 100KC.	Same as above. .	Replace V103 (fig. 7). Higher echelon repair required
Set PULSE STRETCH switch to IN (counterclockwise position (fig. 4)). Set PWR-OFF switch to OFF and replace panel-chassis assembly in cover (para 19*b*).	Output waveform of equipment under test and stretched pulses visible on crt.	Higher echelon repair required.

Note

The test set may require calibration if tube V101, V102, or V103 to replaced. The test set is calibrated by higher echelon maintenance personnel.

19. Removal of Panel-Chassis Assembly

Warning

Disconnect power cable before removing panel-chassis assembly.

a. Removal.

(1) Remove the screws from the rear of the cover.

(2) Hold the cover and slide the panel-chassis assembly forward, out of the cover.

b. Replacement.

(1) Slide the panel-chassis assembly into the cover.

(2) Align the holes in the panel-chassis assembly with the holes at the rear of the cover and replace the screws.

20. Tube Replacement

Caution

Do not rock or rotate a tube when removing it from a socket; pull it straight out. Be careful not to hit one of the tubes on the printed circuit board on the opposite aide of the chassis.

When trouble occurs, check the power cable connections and the fuse before removing any tubes. If tube failure is suspected or is indicated by the operational checklist, use the tube substitution method (a below) to check the tubes. Tube location is shown in figure 7.

a. Tube Substitution Method. Replace a suspected tube (*b* below) 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 the other tubes as indicated in the operational checklist (para 18*c*).

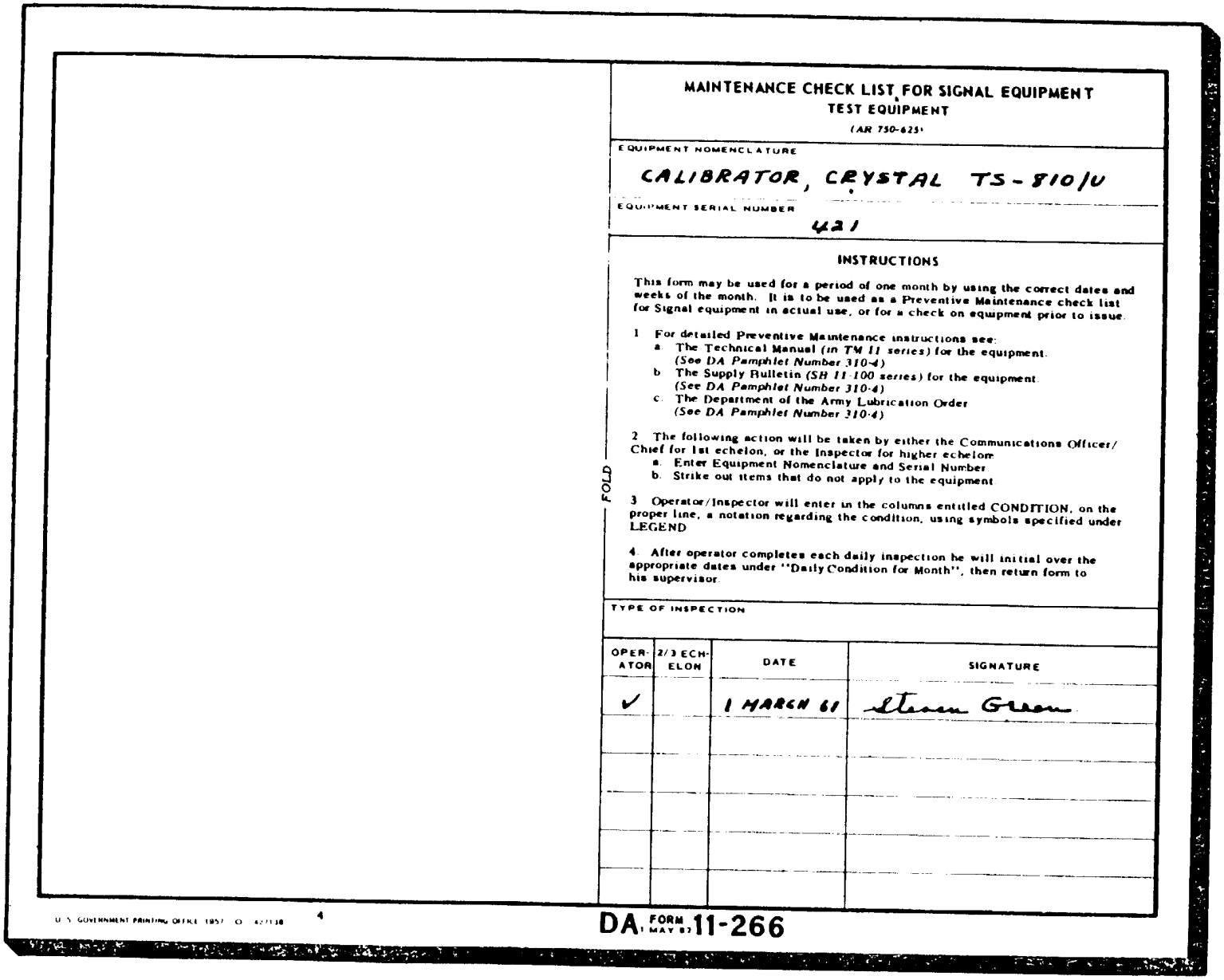
b. Replacing Tubes. Replace the tubes in the test set as follows:

(1) Remove the panel-chassis assembly (para 19*a*) from the cover.

(2) Remove the tube from the socket.

(3) Replace the tube with one of the running spares.

(4) Replace the panel-chassis assembly (para 19*b*) in the cover.



MAINTENANCE CHECK LIST FOR SIGNAL EQUIPMENT
TEST EQUIPMENT
(AR 750-625)

EQUIPMENT NOMENCLATURE
CALIBRATOR, CRYSTAL TS-810/U

EQUIPMENT SERIAL NUMBER
421

INSTRUCTIONS

This form may be used for a period of one month by using the correct dates and weeks of the month. It is to be used as a Preventive Maintenance check list for Signal equipment in actual use, or for a check on equipment prior to issue.

1 For detailed Preventive Maintenance instructions see:
a. The Technical Manual *(in TM 11 series)* for the equipment. *(See DA Pamphlet Number 310-4)*
b. The Supply Bulletin *(SB 11-100 series)* for the equipment. *(See DA Pamphlet Number 310-4)*
c. The Department of the Army Lubrication Order *(See DA Pamphlet Number 310-4)*

2 The following action will be taken by either the Communications Officer/ Chief for 1st echelon, or the Inspector for higher echelon:
a. Enter Equipment Nomenclature and Serial Number.
b. Strike out items that do not apply to the equipment.

3 Operator/Inspector will enter in the columns entitled CONDITION, on the proper line, a notation regarding the condition, using symbols specified under LEGEND.

4 After operator completes each daily inspection he will initial over the appropriate dates under "Daily Condition for Month", then return form to his supervisor.

FOLD

TYPE OF INSPECTION

OPER-ATOR	2/3 ECH-ELON	DATE	SIGNATURE
✓		1 MARCH 61	Steven Green

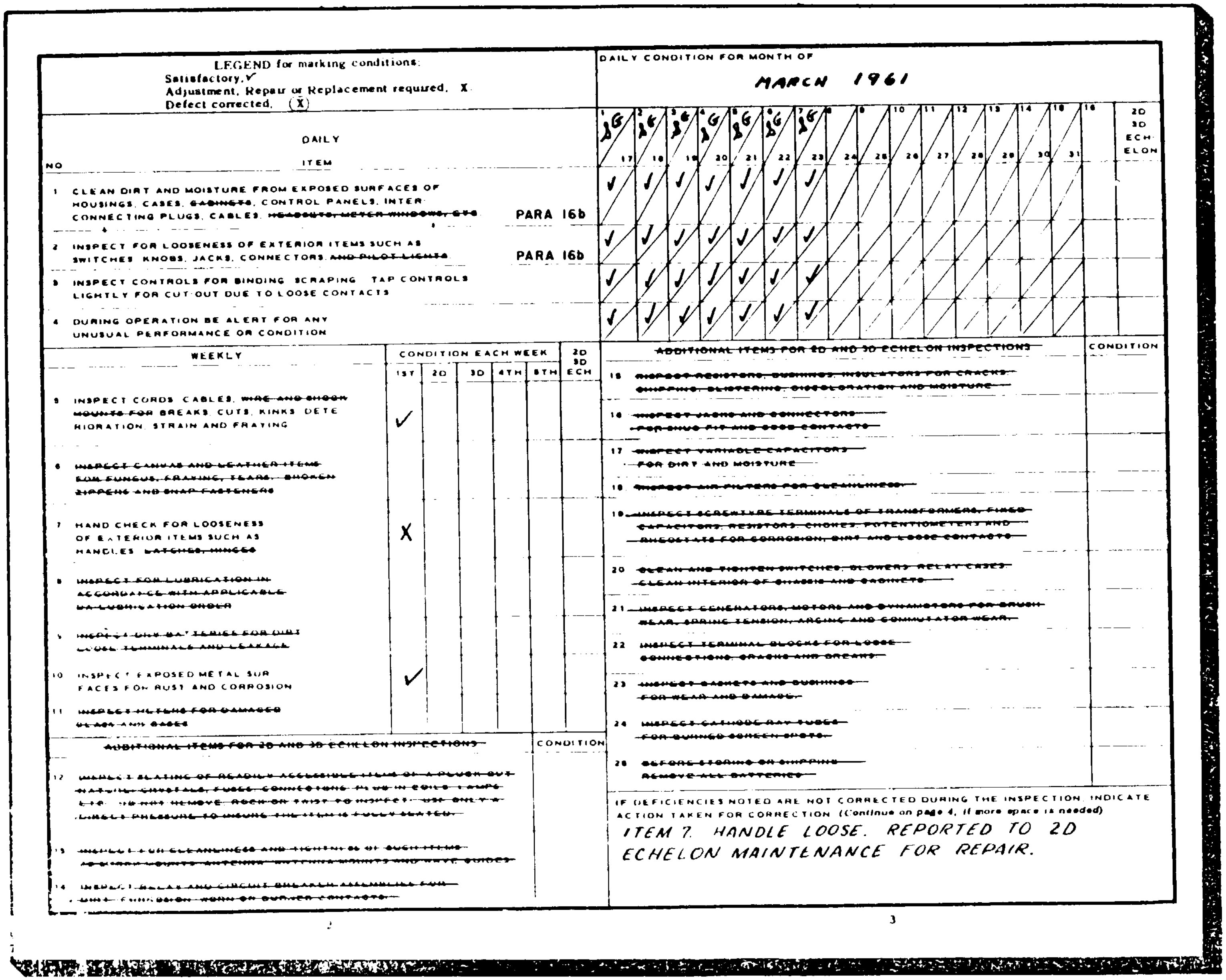
U. S. GOVERNMENT PRINTING OFFICE 1957 O 427138

4

DA FORM 1 MAY 57 11-266

TM6625-269-12-5

Figure 5. DA Form 11-266, pages 1 and 4.



LEGEND for marking conditions:
Satisfactory. ✓
Adjustment, Repair or Replacement required. X
Defect corrected. (X)

DAILY CONDITION FOR MONTH OF *MARCH 1961*

NO	DAILY ITEM		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	2D 3D ECH-ELON
1	CLEAN DIRT AND MOISTURE FROM EXPOSED SURFACES OF HOUSINGS, CASES, ~~CABINETS~~, CONTROL PANELS, INTER-CONNECTING PLUGS, CABLES ~~HEADSETS, METER WINDOWS, ETC~~	PARA 16b	✓	✓	✓	✓	✓	✓	✓										
2	INSPECT FOR LOOSENESS OF EXTERIOR ITEMS SUCH AS SWITCHES KNOBS, JACKS, CONNECTORS ~~AND PILOT LIGHTS~~	PARA 16b	✓	✓	✓	✓	✓	✓	✓										
3	INSPECT CONTROLS FOR BINDING SCRAPING TAP CONTROLS LIGHTLY FOR CUT-OUT DUE TO LOOSE CONTACTS		✓	✓	✓	✓	✓	✓	✓										
4	DURING OPERATION BE ALERT FOR ANY UNUSUAL PERFORMANCE OR CONDITION		✓	✓	✓	✓	✓	✓	✓										

(Lower day numbers in the daily columns: 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31; days 1–7 marked "16".)

NO	WEEKLY	1ST	2D	3D	4TH	5TH	2D 3D ECH
5	INSPECT CORDS CABLES, ~~WIRE AND SHOCK MOUNTS FOR~~ BREAKS, CUTS, KINKS DETERIORATION, STRAIN AND FRAYING	✓					
6	~~INSPECT CANVAS AND LEATHER ITEMS FOR FUNGUS, FRAYING, TEARS, BROKEN ZIPPERS AND SNAP FASTENERS~~						
7	HAND CHECK FOR LOOSENESS OF EXTERIOR ITEMS SUCH AS HANDLES ~~LATCHES, HINGES~~	X					
8	~~INSPECT FOR LUBRICATION IN ACCORDANCE WITH APPLICABLE DA LUBRICATION ORDER~~						
9	~~INSPECT DRY BATTERIES FOR DIRT LOOSE TERMINALS AND LEAKAGE~~						
10	INSPECT EXPOSED METAL SURFACES FOR RUST AND CORROSION	✓					
11	~~INSPECT METERS FOR DAMAGED GLASS AND CASES~~						

NO	~~ADDITIONAL ITEMS FOR 2D AND 3D ECHELON INSPECTIONS~~	CONDITION
12	~~INSPECT SEATING OF READILY ACCESSIBLE ITEMS OF A PLUCK-OUT NATURE: CRYSTALS, FUSES, CONNECTORS, PLUG-IN COILS, LAMPS ETC. DO NOT REMOVE, ROCK OR TWIST TO INSPECT. USE ONLY A DIRECT PRESSURE TO INSURE THE ITEM IS FULLY SEATED~~	
13	~~INSPECT FOR CLEANLINESS AND TIGHTNESS OF SUCH ITEMS AS SHOCK MOUNTS, ANTENNAS, ANTENNA MOUNTS AND WAVE GUIDES~~	
14	~~INSPECT RELAY AND CIRCUIT BREAKER ASSEMBLIES FOR UNIT FUNCTION, WORN OR BURNED CONTACTS~~	
15	~~INSPECT RESISTORS, BUSHINGS, INSULATORS FOR CRACKS, CHIPPING, BLISTERING, DISCOLORATION AND MOISTURE~~	
16	~~INSPECT JACKS AND CONNECTORS FOR SNUG FIT AND GOOD CONTACTS~~	
17	~~INSPECT VARIABLE CAPACITORS FOR DIRT AND MOISTURE~~	
18	~~INSPECT AIR FILTERS FOR CLEANLINESS~~	
19	~~INSPECT SCREW-TYPE TERMINALS OF TRANSFORMERS, FIXED CAPACITORS, RESISTORS, CHOKES, POTENTIOMETERS AND RHEOSTATS FOR CORROSION, DIRT AND LOOSE CONTACTS~~	
20	~~CLEAN AND TIGHTEN SWITCHES, BLOWERS, RELAY CASES. CLEAN INTERIOR OF CHASSIS AND CABINETS~~	
21	~~INSPECT GENERATORS, MOTORS AND DYNAMOTORS FOR BRUSH WEAR, SPRING TENSION, ARCING AND COMMUTATOR WEAR~~	
22	~~INSPECT TERMINAL BLOCKS FOR LOOSE CONNECTIONS, CRACKS AND BREAKS~~	
23	~~INSPECT GASKETS AND BUSHINGS FOR WEAR AND DAMAGE~~	
24	~~INSPECT CATHODE RAY TUBES FOR BURNED SCREEN SPOTS~~	
25	~~BEFORE STORING OR SHIPPING REMOVE ALL BATTERIES~~	

IF DEFICIENCIES NOTED ARE NOT CORRECTED DURING THE INSPECTION, INDICATE ACTION TAKEN FOR CORRECTION (Continue on page 4, if more space is needed)

ITEM 7. HANDLE LOOSE. REPORTED TO 2D ECHELON MAINTENANCE FOR REPAIR.

2 3

TM6625-269-12 6

Figure 6. DA Form 11-266, pages 2 and 3 as used by operator.

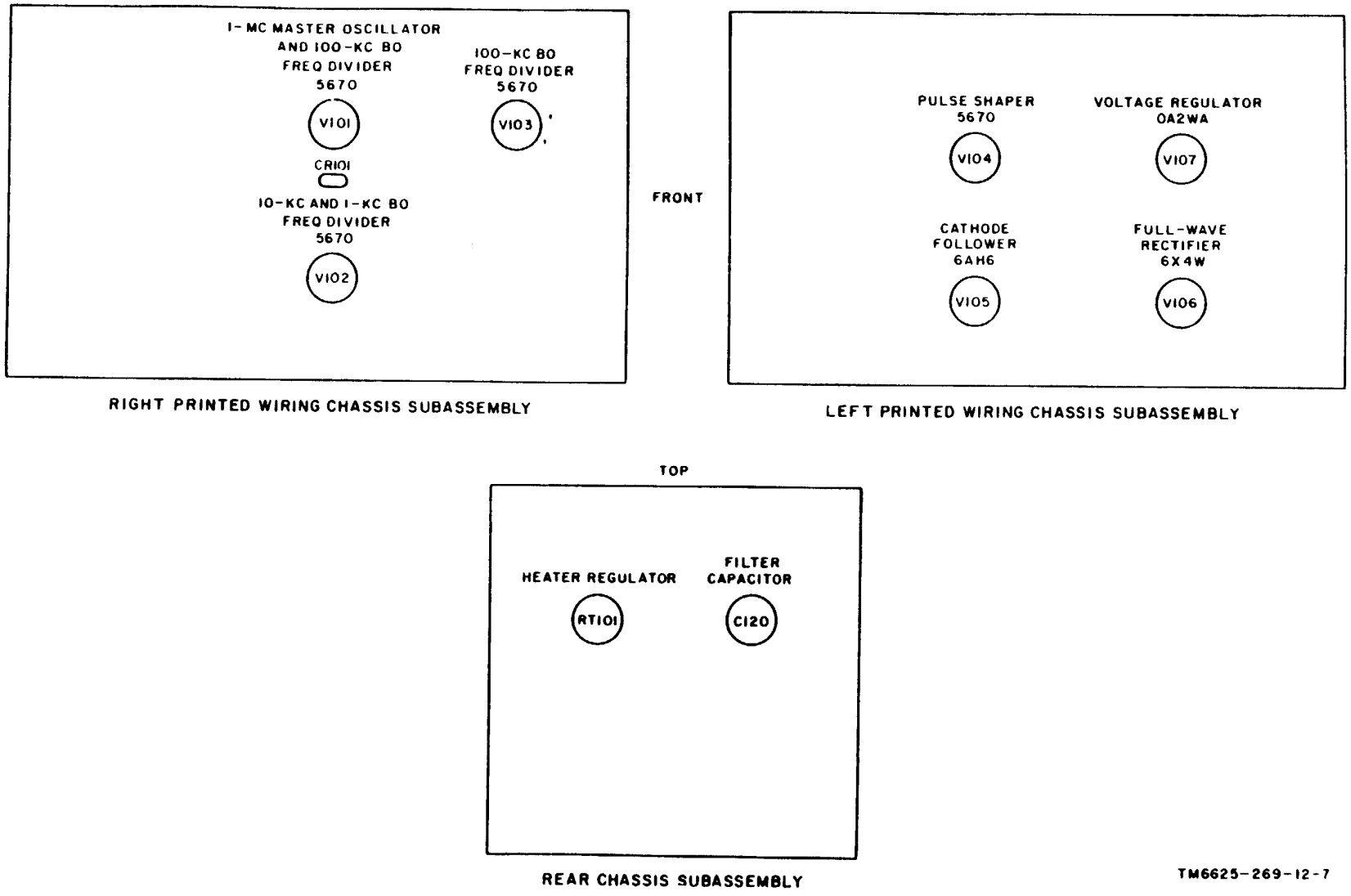


Figure 7. Tube and filter capacitor locations.

Section II. ORGANIZATIONAL MAINTENANCE

21. Scope of Organizational Maintenance

a. Second echelon maintenance duties are listed in *b* below. The scope is determined by the available tools, materials, test equipment, and spare parts available.

b. Second echelon maintenance of the test set consists of the following:

(1) Organizational preventive maintenance (para 23).
(2) Organizational visual inspection (para 24).
(3) Equipment performance check (para 25).
(4) Replacement of the following items:
(a) Capacitor C120 (para 26).
(b) Heater regulator RT101 (para 26).
(c) Adapter (UG-201/U) and adapter cable to connector, (type AN-3057-4).
(d) Connector plug, electrical (UP-121M).
(e) Crystal unit, quartz CR101 (fig, 7).
(f) Cap, electrical (fig. 2).
(g) Wrench, socket-head screw (fig. 9).
(h) Capacitor, crystalholder, and electron tube retainers.
(i) Knob, screws, nuts, and washers.

Note
No lubrication is required.

22. Tools and Materials Required

A list of parts normally stocked for second echelon maintenance is contained in TM 11-6625-269-20P. The materials required for second echelon maintenance are listed below.

Warning
Cleaning compound is flammable and its fumes are toxic. Do not use near a flame; provide adequate ventilation.

a. Cleaning compound.
b. Cleaning cloth.

23. Organizational Preventive Maintenance

a. DA Form 11-266. DA Form 11-266 (fig. 8) is a preventive maintenance check list used by the second echelon maintenance personnel. Items not applicable to the equipment are lined out. Additional preventive maintenance information concerning items 1 and 2 on DA Form 11-266 is in paragraph 16*b*. instructions for the use of the form are on page 1 of the form.

b. Items. The information below supplements DA Form 11-266. The item numbers correspond to the ITEM numbers on the form.

Warning
Disconnect all power before performing the following operations. After the power is disconnected, some capacitors may still retain dangerous voltages. Before touching exposed electrical parts, short-circuit the parts to ground. When maintenance is completed, replace the panel-chassis assembly (para 19*b*) in its cover and check for satisfactory operation (para 18).

Item	Maintenance procedure
15.	Do not change the setting of any variable resistor while checking the equipment
16	Check for damaged connectors and adapters, and for bent prongs on the power cable plug.
17.	Do not change the setting of any variable capacitor while checking the equipment

24. Organizational Visual Inspection

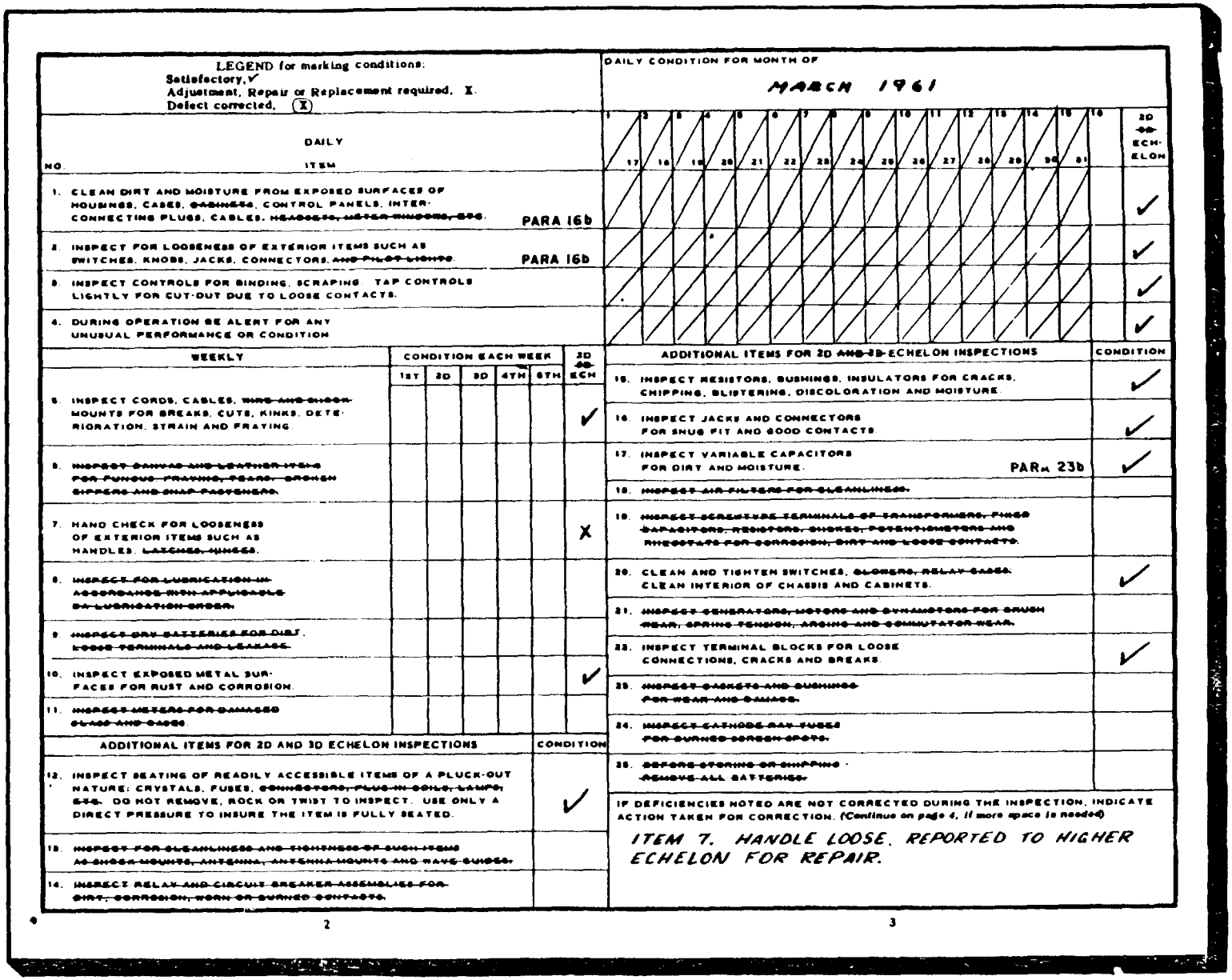
Before operating the test set, inspect it. Inspection will save repair time and also avoid further damage. Do not check any items with the power on. Inspect the following for obvious defects:

a. The seating of all tubes, heater regulator RT101, and filter capacitor C120 (fig. 9).

b. Crystal unit loose in the crystal holder (fig. 7).

c. Loose solder connections to the switches and power receptacle.

d. Switch contacts for signs of wear and corrosion.



LEGEND for marking conditions:
Satisfactory, ✓
Adjustment, Repair or Replacement required, X.
Defect corrected, (X)

DAILY CONDITION FOR MONTH OF MARCH 1961

NO.	DAILY ITEM	1 17	2 18	3 19	4 20	5 21	6 22	7 23	8 24	9 25	10 26	11 27	12 28	13 29	14 30	15 31	16	2D ECHELON
1.	CLEAN DIRT AND MOISTURE FROM EXPOSED SURFACES OF HOUSINGS, CASES, ~~CABINETS~~, CONTROL PANELS, INTERCONNECTING PLUGS, CABLES, ~~HEADSETS, METER SHUNTS, ETC~~. PARA 16b																	✓
2.	INSPECT FOR LOOSENESS OF EXTERIOR ITEMS SUCH AS SWITCHES, KNOBS, JACKS, CONNECTORS, ~~AND PILOT LIGHTS~~. PARA 16b																	✓
3.	INSPECT CONTROLS FOR BINDING, SCRAPING. TAP CONTROLS LIGHTLY FOR CUT-OUT DUE TO LOOSE CONTACTS.																	✓
4.	DURING OPERATION BE ALERT FOR ANY UNUSUAL PERFORMANCE OR CONDITION																	✓

WEEKLY	CONDITION EACH WEEK 1ST	2D	3D	4TH	5TH	2D ECH
5. INSPECT CORDS, CABLES, ~~WIRE AND SHOCK~~ MOUNTS FOR BREAKS, CUTS, KINKS, DETERIORATION, STRAIN AND FRAYING						✓
6. ~~INSPECT CANVAS AND LEATHER ITEMS FOR FUNGUS GROWTH, MOLD, BROKEN ZIPPERS AND SNAP FASTENERS.~~						
7. HAND CHECK FOR LOOSENESS OF EXTERIOR ITEMS SUCH AS HANDLES. ~~LATCHES, HINGES~~.						X
8. ~~INSPECT FOR LUBRICATION IN ACCORDANCE WITH APPLICABLE LUBRICATION ORDER.~~						
9. ~~INSPECT DRY BATTERIES FOR DIRT, LOOSE TERMINALS AND LEAKAGE.~~						
10. INSPECT EXPOSED METAL SURFACES FOR RUST AND CORROSION.						✓
11. ~~INSPECT METERS FOR DAMAGED GLASS AND CASES.~~						

ADDITIONAL ITEMS FOR 2D AND 3D ECHELON INSPECTIONS	CONDITION
12. INSPECT SEATING OF READILY ACCESSIBLE ITEMS OF A PLUCK-OUT NATURE: CRYSTALS, FUSES, ~~CONNECTORS, PLUG-IN COILS, LAMPS, ETC~~. DO NOT REMOVE, ROCK OR TWIST TO INSPECT. USE ONLY A DIRECT PRESSURE TO INSURE THE ITEM IS FULLY SEATED.	✓
13. ~~INSPECT FOR CLEANLINESS AND TIGHTNESS OF SUCH ITEMS AS SHOCK MOUNTS, ANTENNA, ANTENNA MOUNTS AND WAVE GUIDES.~~	
14. ~~INSPECT RELAY AND CIRCUIT BREAKER ASSEMBLIES FOR DIRT, CORROSION, WORN OR BURNED CONTACTS.~~	

ADDITIONAL ITEMS FOR 2D ~~AND 3D~~ ECHELON INSPECTIONS	CONDITION
15. INSPECT RESISTORS, BUSHINGS, INSULATORS FOR CRACKS, CHIPPING, BLISTERING, DISCOLORATION AND MOISTURE.	✓
16. INSPECT JACKS AND CONNECTORS FOR SNUG FIT AND GOOD CONTACTS.	✓
17. INSPECT VARIABLE CAPACITORS FOR DIRT AND MOISTURE. PARA 23b	✓
18. ~~INSPECT AIR FILTERS FOR CLEANLINESS.~~	
19. ~~INSPECT SCREWTYPE TERMINALS OF TRANSFORMERS, FIXED CAPACITORS, RESISTORS, CHOKES, POTENTIOMETERS AND RHEOSTATS FOR CORROSION, DIRT AND LOOSE CONTACTS.~~	
20. CLEAN AND TIGHTEN SWITCHES, ~~BLOWERS, RELAY CASES~~. CLEAN INTERIOR OF CHASSIS AND CABINETS.	✓
21. ~~INSPECT GENERATORS, MOTORS AND DYNAMOTORS FOR BRUSH WEAR, SPRING TENSION, ARCING AND COMMUTATOR WEAR.~~	
22. INSPECT TERMINAL BLOCKS FOR LOOSE CONNECTIONS, CRACKS AND BREAKS.	✓
23. ~~INSPECT GASKETS AND BUSHINGS FOR WEAR AND DAMAGE.~~	
24. ~~INSPECT CATHODE RAY TUBES FOR BURNED SCREEN SPOTS.~~	
25. ~~BEFORE STORING OR SHIPPING REMOVE ALL BATTERIES.~~	

IF DEFICIENCIES NOTED ARE NOT CORRECTED DURING THE INSPECTION, INDICATE ACTION TAKEN FOR CORRECTION. (Continue on page 4, if more space is needed)

ITEM 7. HANDLE LOOSE. REPORTED TO HIGHER ECHELON FOR REPAIR.

2 3

TM66: 5-269-12-8

Figure 8. DA Form 11-266, pages 2 and 3 as used by operator.

e. Printed circuit boards for cracks or loose solder terminals (fig. 9).

f. Resistors for indications of excessive heat and capacitors for bulges or splitting.

25. Equipment Performance Checklist

a. General. The equipment performance checklist provides a procedure for systematically checking equipment performance. Corrective measures that the second echelon repairman can perform are given in the *Corrective measures* column. When using the checklist, start at the beginning and follow each step in order. If the corrective measures indicated do not fix the equipment, troubleshooting is required by higher echelon. Note on the repair tag how the equipment performed and the corrective measures that were taken.

b. *Procedure*. Perform the procedures in the operational checklist (para 18) before performing the equipment performance checks below. Place the test set in operation as shown in the checklist below.

	Step	Action	Normal Indication	Corrective measures
PREPARATORY	1	Set the PWR-OFF switch to OFF position.		
	2	Connect the power cable to the test set POWER receptacle and to the ac power source.		
	3	Connect one end of the rf cable assembly to the OUTPUT connector.		
	4	Connect the other end of the rf cable assembly to the equipment under test.		
START	5	Set the PWR-OFF switch to PWR.		
	6	Set the PULSE STRETCH switch to the desired position.		
EQUIP PERFORMANCE	7	Set the FREQUENCY PERIOD-µs switch to 1MC.	Output waveform of equipment under test and test set pulses visible on crt (para 18*b*).	Remove the test a et panel-chassis assembly from its cover (para 19*a*); check and replace beater regulator RT101 (para 26). Replace capacitor C120 if the line fuse is open (para 26). Replace the crystal unit CR101 (fig. 7). Higher echelon rep air required.
	8	Set the FREQUENCY PERIOD-µs switch to 1OOKC.	Same as above.	Higher echelon rep air required.
	9	Set the FREQUENCY PERIOD-µs switch to 1OKC.	Same as above.	Higher echelon repair required.
	10	Set the FREQUENCY PERIOD-µs switch to IKC.	Same as above.	Higher echelon repair required.
	11	Set the FREQUENCY PERIOD-As switch to 100 .	Same as above.	Higher echelon repair required.
STOP	12	Set the PWR-OFF switch to OFF.		
	13	Disconnect the power cable and the rf cable assembly.		
	14	Replace the panel-chassis assembly In the cover.		

26. Repairs

(fig. 9)

a. Replacement of C120 (Plug-In Type Capacitor).

(1) Release the capacitor retainer.

(2) Remove the capacitor by pulling straight out.

(3) Replace the capacitor (index it and push it straight in) .

(4) Tighten the capacitor retainer.

b. Replacement of Heater Regulator RT101.

(1) Depress the tube retainer at the base of the tube.

(2) Remove the heater regulator by pulling straight out.

(3) Replace the heater regulator.

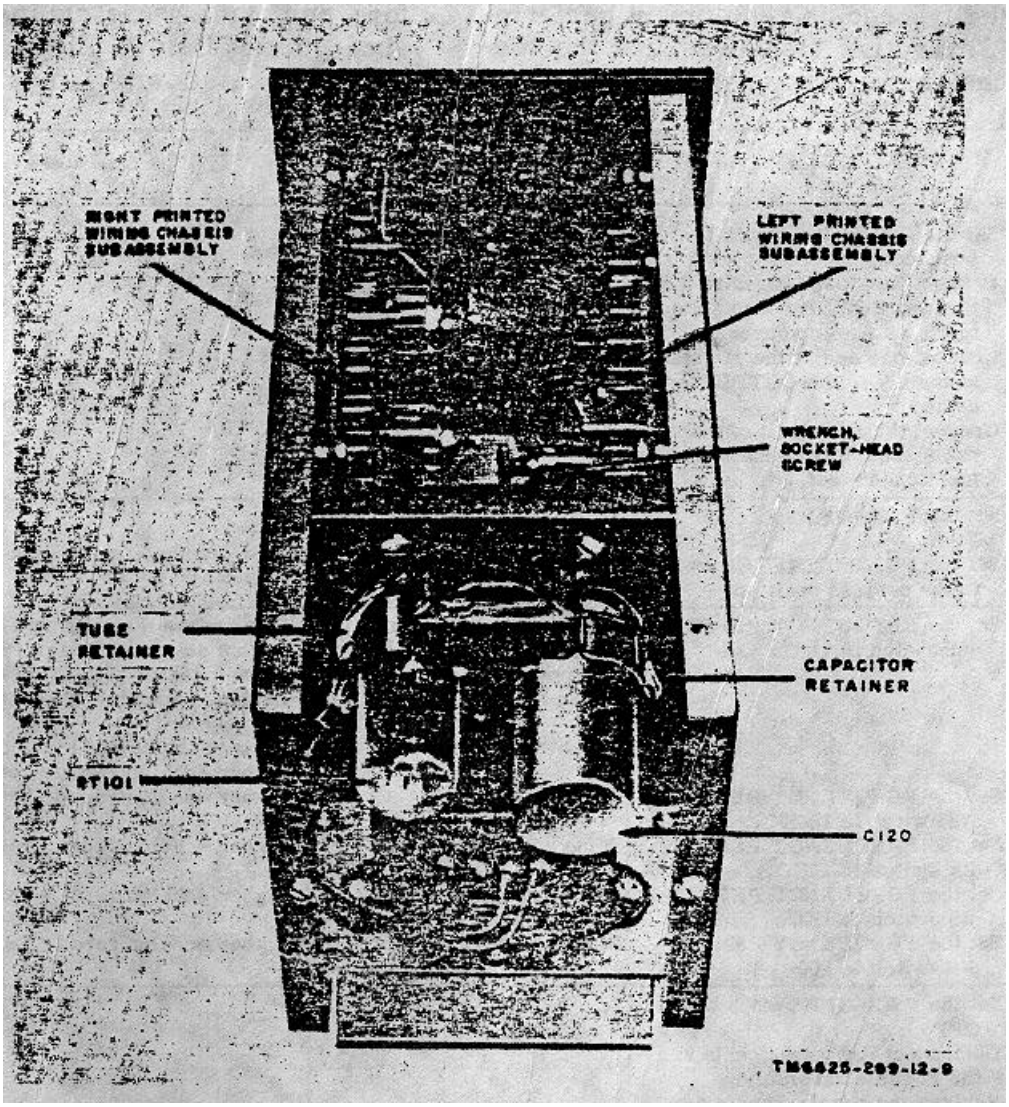


Figure 9. Rear, top view, panel-chassis assembly.

CHAPTER 4

SHIPMENT, LIMITED STORAGE, AND DEMOLITION TO PREVENT ENEMY USE

Section I. SHIPMENT AND LIMITED STORAGE

27. Disassembly of Equipment

To prepare the test set for shipment or limited storage, proceed as follows:

a. Disconnect and coil the power cable.

b. Disconnect and coil the rf cable assembly.

c. Store the adapter in the spring clamps provided inside the test set cover. (On Order No. N383-(11-383-MIS) 60539A, leave the adapter connected to the rf cable assembly.)

28. Repackaging for Shipment or Limited Storage (fig. 10)

The exact procedure for repackaging depends on the material available and the conditions under which the equipment is to shipped or stored. Adapt the procedures outlined below whenever possible.

a. Material Requirements. The following materials are required for packaging the test set. For stock numbers of materials. consult SB 38-100.

Material	Quantity (estimated)
Corrugated fiberboard	5 sq ft
Waterproof paper	6 sq ft
Gummed tape	2-1/2 ft
Waterproof tape	3 ft
Steel strapping (5/8 x 0.020 in.) *Note*. Strapping seals required.	9 ft
Wooden shipping box (Inside dimensions 14-5/8 x 7-1/8 x 12-1/8 in.).	1 ea

b. Packaging. Package the items of the test set as outlined below.

(1) *Bare unit*. Cushion the bare unit by wrapping it with corrugated fiberboard. Secure the cushioning material with gummed tape. Place the cushioned test set within a wrap of waterproof paper. Secure the waterproof paper with waterproof tape.

(2) *Technical manuals*. Package each technical manual within a close fitting bag fabricated of waterproof paper. Seal each bag securely with waterproof tape.

(3) *Running spares*. Cushion the running spares by wrapping them with corrugated fiberboard. Secure the cushioning material with gummed tape. Place the cushioned running spares within a wrap of waterproof paper. Secure the waterproof paper with waterproof tape.

(4) *Power cable and rf cable assembly*. Secure the coiled power cable and the rf cable assembly with gummed tape. Wrap all cable connectors and plugs with waterproof tape.

c. Packing. Pack the items of the test set as follows:

(1) Place the bare unit into the wooden shipping box.

(2) Place the running spares, technical manuals, and the power cable and the rf cable assembly on top of the bare unit.

(3) Place the cover on the box and secure it with the steel strapping.

(4) Mark the boxes as prescribed in MIL-STD-129B and pertinent instructions contained in the movement directive.

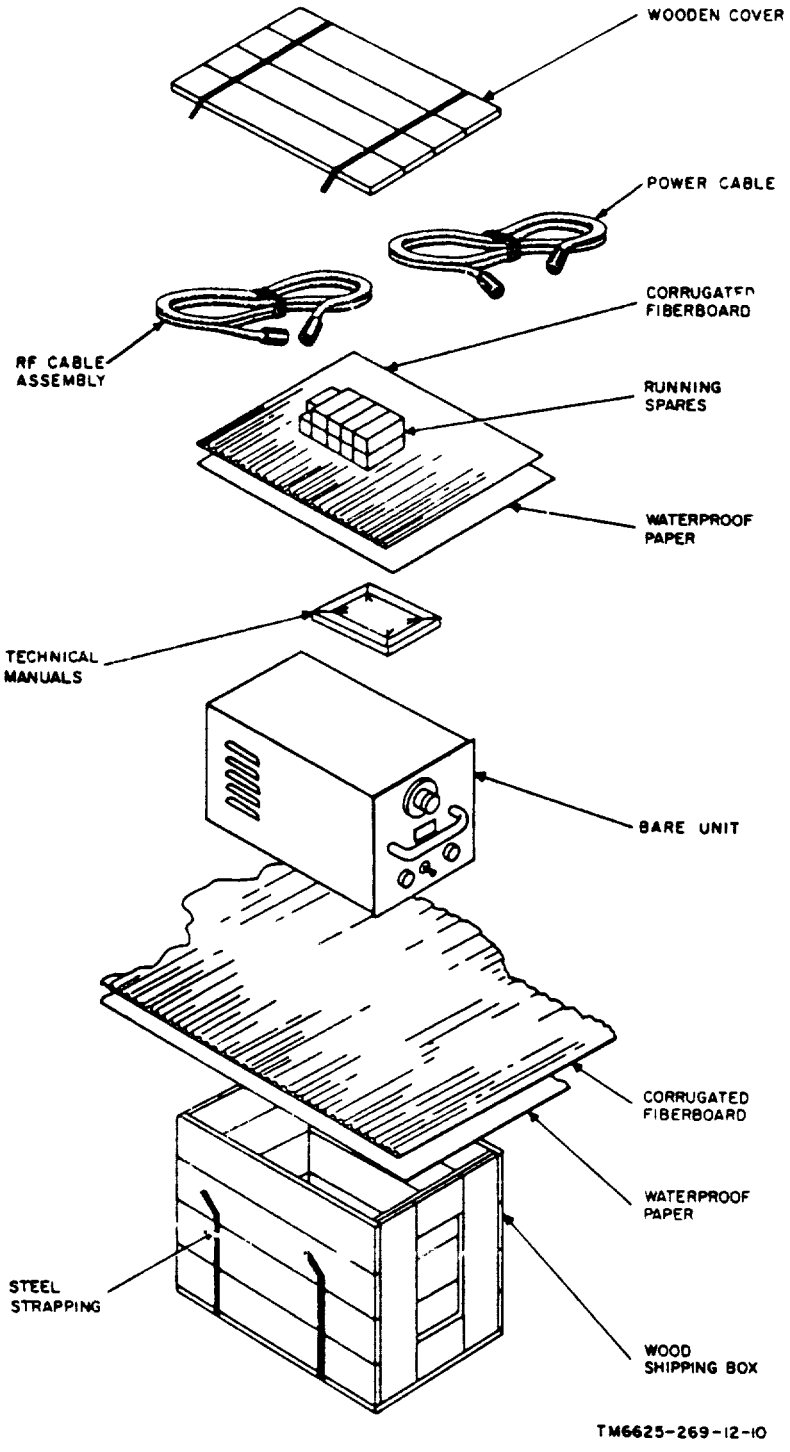


Figure 10. Repacking for shipment or limited storage.

Section II. DEMOLITION OF MATERIEL TO PREVENT ENEMY USE

29. Authority for Demolition

Demolition of the equipment will be accomplished only upon the order of the commander. The destruction procedures given in paragraph 30 will be used to prevent the enemy from using or salvaging the equipment.

30. Methods of Destruction

Any or all methods of destruction given below may be used. The time available will be the major determining factor for the methods to be used in most instances when destruction of the equipment is undertaken. The tactical situation also will determine in what manner the destruction order will be carried out. In most cases, it is preferable to demolish completely some portions of the equipment rather than to destroy partially all the equipment units.

a. Smash. Smash the cover and panel-chassis assembly; use sledges, axes, hammers, crowbars, or any other heavy tools available.

b. Cut. Cut the power cable and the rf cable assembly; use axes, handaxes, machetes, or similar tools.

c. Burn. Burn the technical manuals. Burn as much of the equipment as is flammable; use gasoline, oil, flamethrowers, or incendiary grenades.

Warning

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

d. Explode. If explosives are necessary, use firearms, grenades or TNT.

e. Dispose. Bury or scatter destroyed parts in slit trenches or throw them into nearby waterways.

APPENDIX I

REFERENCES

Following is a list of applicable references available to the operator or unit repairman of Calibrator, Crystal TS-810/U.

MIL-STD-129B	Marking for shipment and storage.
SB 38-100	Preservation, Packaging, and Packing Materials, Supplies and Equipment used by the Army.
TB SIG 225	Radioactive Electron Tube Handling.
TM 11-6625-269-20P	Organizational Maintenance Repair Parts and Special Tools List and Maintenance Allocation Chart For Calibrator, Crystal TS-810/U.

APPENDIX II

MAINTENANCE ALLOCATION

Section I. INTRODUCTION

1. General

a. This appendix assigns maintenance functions and repair operations to be performed by the lowest appropriate maintenance echelon.

b. Columns in the maintenance allocation chart are as follows:

(1) *Part or component*. This column shows only the nomenclature or standard item name. Additional descriptive data are included only where clarification is necessary to identify the part. Components and parts comprising a major end item are listed alphabetically. Assemblies and subassemblies are in alphabetical sequence with their components listed alphabetically immediately below the assembly listing.

(2) *Maintenance function*. This column indicates the variouts maintenance functions allocated to the echelon capable of performing the operations.

(a) *Service*. To clean, to preserve, and to replenish fuel and lubricants.

(b) *Inspect*. To verify serviceability and to detect incipient electrical or mechanical failure by scrutiny.

(c) *Test*. To verify serviceability and to detect incipient electrical or mechanical failure by use of special equipment such as gages, meters, etc.

(d) *Replace*. To substitute service assemblies, subassemblies, and parts for unserviceable components.

(e) *Repair*. To restore an item to serviceable condition through correction of a specific failure or unserviceable condition. This function includes but is not limited to, inspecting, cleaning, preserving, adjusting, replacing, welding, riveting, and straightening.

(f) *Calibrate*. To determine, check, or rectify the graduation of an instrument, weapon, or weapons system, or components of a weapons system.

(g) *Rebuild*. To restore an item to a standard as near as possible to original or new condition in appearance, performance, and life expectancy. This is accomplished through the maintenance technique of complete disassembly of the item, inspection of all parts or components, rep air or replacement of worn or unserviceable elements using original manufacturing tolerances and or specifications and subsequent reassembly of the item.

(3) *1st, 2d, 3d, 4th, 5th echelon*. The symbol X indicates the echelon responsible for performing that particular maintenance operation. but does not necessarily indicate that repair parts will be stocked at that level. Echelons higher than the echelons marked by X are authorized to perform the indicated operation.

(4) *Tools required*. This column indicates codes assigned to each individual tool equipment, test equipment, and maintenance equipment referenced. The grouping of codes in this column of the maintenance allocation chart indicates the tool, test, and maintenance equipment required to perform the maintenance function.

(5) *Remarks*. Entries in this column will be utilized when necessary to clarify any of the data cited in the preceding columns.

c. Columns in the allocation of tools for maintenance functions are as follows:

(1) Tools required for maintenance functions. This column lists tools, test, and maintenance equipment required to perform the maintenance functions.

(2) *1st, 2d, 3d, 4th, 5th echelon*. The dagger (**†**) symbol indicates the echelons allocated the facility.

(3) *Tool code*. This column lists the tool code assigned.

2. Maintenance by Using Organizations

When this equipment is used by signal service organizations organic to theater headquarters or communication zones to provide theater communications, those maintenance functions allocated up to and including fourth echelon are authorized to the organization operating this equipment

SECTION II. MAINTENANCE ALLOCATION CHART

PART OR COMPONENT (1)	MAINT. FUNCTION (2)	1ST ECH. (3)	2ND ECH. (4)	3RD ECH. (5)	4TH ECH. (6)	5TH ECH. (7)	TOOLS REQUIRED (8)	REMARKS (9)
CALIBRATOR CRYSTAL TS-810/U	repair				X		1,2,3,4,5,6	
	rebuild					X	1,2,3,4,5,6	
	service	X				X		
	inspect	X						Visual only
	test				X		2,3,4	
	calibrate				X		1,3	
ADAPTER, CABLE TO CONNECTOR ANA Std type AN-3057-4	repair		X					
ADAPTER, IF CABLE LG-201/U	replace		X					
CABLE ASSEMBLIES	repair			X				
CABLES	replace			X				
CLIP, SPRING TENSION	replace			X				
CONNECTOR, PLUG, ELECTRICAL	replace		X					For one end of Power Cable
CONNECTOR, PLUG, ELECTRICAL AN3106-10SL-3S	replace			X				For one end of Power Cable
CONNECTOR, PLUG, ELECTRICAL UG-260/U	replace			X				For both ends of RF Cable
CAPACITOR, FIXED, ELECTROLYTIC	rep]ace		X					Ref C120
CAPACITORS	replace				X			Except C120
CHASSIS, PRINTED WIRING, BARE UNIT (LEFT AND RIGHT)	replace					X		Fabricate if required
SOCKET, ELECTRON TUBE	replace					X		
TERMINAL, DIPSOLDER	replace					X		
CLIP. DIPSOLDER TERMINAL	replace				X			
CLIP, ELECTRICAL	replace				X			Fabricate it required
COIL, RF	replace				X			
CONNECTOR, RECEPTACLE, ELECTRICAL	replace				X			
CRYSTAL UNIT, QUARTZ	replace		X					
DUST COVER	replace					X		Fabricate if required
ELECTRON TUBE	replace	X						
FUSE, CARTRIDGE	replace	X						
FUSEHOLER	replace			X				
CAP, ELECTRICAL	replace		X					
INSULATION SLEEVING, ELECTRICAL	replace				X			Fabricate if required
INSULATOR, WASHER	replace				X			Fabricate it required
KEY, SOCKET HEAD SCREW	replace		X					Avail in Tool Equip TE-113
KNOB	replace		X					
SETSCREW	replace		X					

PART OR COMPONENT (1)	MAINT. FUNCTION (2)	1ST ECH. (3)	2ND ECH. (4)	3RD ECH. (5)	4TH ECH. (6)	5TH ECH. (7)	TOOLS REQUIRED (8)	REMARKS (9)
TS-810/U (continued)								
LOCKWASHER	replace		X					Avail in Maint Equip ME-9 and Hardware Kit MK-11/U
NUT, PLAIN, HEXAGON	replace		X					Avail in Maint Equip ME-9 and Hardware Kit MK-11/U
NUT, SELF LOCKING, CLINCH	replace		X					Avail
PANEL-CHASSIS ASSEMBLY	repair				X			
	rebuild					X		
CHASSIS (rear)	replace					X		Fabricate if required
EYELET, METALLIC	replace					X		Avail from Maint support shop stock
FRAME	replace				X			Fabricate if required
HANDLE, BOW	replace				X			Fabricate if required
PANEL, BLANK (front)	replace				X			Fabricate if required
PLATE, IDENTIFICATION	replace					X		Fabricate it required
REACTOR	replace				X			
RESISTOR, CURRENT REGULATING	replace		X					Ref MT-101
RESISTORS	replace				X			Except RT-101 Ref
RETAINER, CAPACITOR	replace			X				
RETAINER, CRYSTAL HOLDER	replace		X					
RETAINER, ELECTRON TUBE	replace			X				
RIVET, TUBULAR	replace				X			Avail from Maint support shop stock
SCREW, MACHINE	replace		X					Avail in Maint Equip ME-9 and, Hardware Kit MK-11/U
SEMI-CONDUCTOR DEVICE, DIODE	replace				X			
SOCKET, CRYSTAL UNIT	replace				X			
SOCKET, ELECTRON TUBE	replace				X			
SWITCH, ROTARY	replace				X			
SWITCH, TOGGLE	replace				X			
TERMINAL, LUG	replace			X				Avail in Maint Equip ME-9
TRANSFORMERS	replace				X			
WASHER, FLAT	replace		X					Avail in Maint Equip ME-9 and Hardware MK-11/U
WASHER, NON-METALLIC	replace				X			Fabricate if required
WRENCH, SOCKET HEAD SCREW	replace		X					Avail in Tool Equipment TE-113

SECTION III. ALLOCATION OF TOOLS FOR MAINTENANCE FUNCTIONS

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
TOOLS REQUIRED FOR MAINTENANCE FUNCTIONS	**1ST ECH.**	**2ND ECH.**	**3RD ECH.**	**4TH ECH.**	**5TH ECH.**	**TOOL REQUIRED**	**REMARKS**
TS-810/U (continued)							
FREQUENCY METER AN/URM -105				†	†	1	
MULTIMETER AN/URM-105				†	†	2	
OSCILLOSCOPE AN/USM-24				†	†	3	
TEST SET, ELECTRON TUBE TV-7/U				†		4	
TEST SET, ELECTRON TUBE TV-2/U					†	5	
TOOL EQUIPMENT TK-21/G				†	†	6	

APPENDIX III

BASIC ISSUE ITEMS LIST

Section I. INTRODUCTION

1. General

a. This appendix lists items supplied for initial operation and for running spares. The list includes tools, accessories, parts, and material issued as part of the major end item. The list includes all items authorized for basic operator maintenance of the equipment. End items of equipment are issued on the basis of allowances prescribed in equipment authorization tables and other documents that are a basis for requisitioning.

b. Columns are as follows:

(1) *Source, maintenance, and recoverability code*. Not used.

(2) *Federal stock number*. This column lists the 11-digit Federal stock number.

(3) *Designation by model*. Not used.

(4) *Description*. Nomenclature or the standard item name and brief identifying data for each item are listed in this column. When requisitioning, enter the nomenclature and description.

(5) *Unit of Issue*. The unit of issue is the supply term by which the individual item is counted for procurement, storage, requisitioning, allowances, and issue purposes.

(6) *Expendability*. Expendable items are indicated by the letter X; nonexpendable items are indicated by NX.

(7) *Quantity authorized*. Under "Items Comprising an Operable Equipment," the column lists the quantity of items supplied for the initial operation of the equipment. Under "Running Spares and Accessory Items," the quantities listed are those issued initially with the equipment as spare parts. The quantities are authorized to be kept on hand by the operator for maintenance of the equipment.

(8) *Illustrations*. The "Item No." column lists the reference symbols used for identification of the items in the illustration or text of the manual.

2. Critical Items

A zero slash (Ø) in the "Description" column indicates items that are expected to fail during the first year or items that will make the equipment inoperative if they fail.

SECTION II. FUNCTIONAL PARTS LIST

(1) SOURCE MAINTENANCE AND RECOVERABILTY CODE	(2) FEDERAL STOCK NUMBER	(3) DESIGNATION BY MODEL	(4) DESCRIPTION	(5) UNIT OF ISSUE	(6) EXPENDABILITY	(7) QUANTITY AUTHORIZED	(8) ILLUSTRATIONS FIGURE NO.	(9) ILLUSTRATIONS ITEM NO.
			ITEMS COMPRISING AN OPERABLE EQUIPMENT					
			CRYSTAL CALIBRATOR TS-810/U					
	6625-524-6111		CALIBRATOR CRYSTAL TS-810/U	ea	NX			
	Order thru AGC		TECHNICAL MANUAL TM-11-6625-269-10P-12	ea	X	2		
			BARE UNIT FOR CRYSTAL CALIBRATOR TS-810/U	ea	X	1		
	5935-201-3090		Ø ADAPTER, CONNECTOR UG-201/U	ea	X	1		
	6625-503-6897		CABLE ASSEMBLY, POWER, ELECTRICAL CX-3135/U: 6 ft lg o/a	ea	X	1		
	5995-251-3815		CABLE ASSEMBLY RADIO FREQUENCY: RF cable assembly CG-530A/U: 6 ft lg o/a	ea	X	1		
	5920-244-5150		Ø CAP, ELECTRICAL : for fuseholder XF101: Buss type 9135-1/2	ea	X	1		
	5910-578-1105		Ø CAPACITOR, FIXED, ELECTROLYTIC: JAN type CE53C120Q	ea	X	1		C120A C120B C120C
	5955-267-5087		Ø CRYSTAL UNIT QUARTZ: MIL type CR-18/U	ea	X	1		CR101
	5960-262-0964		Ø ELECTRON TUBE: JAN type OA2WA	ea	X	1		V107
	5960-166-7667		Ø ELECTRON TUBE : JAN type 6A116	ea	X	1		V105

SECTION II. FUNCTIONAL PARTS LIST

(1) SOURCE MAINTENANCE AND RECOVERABILTY CODE	(2) FEDERAL STOCK NUMBER	(3) DESIGNATION BY MODEL	(4) DESCRIPTION	(5) UNIT OF ISSUE	(6) EXPENDABLILITY	(7) QUANTITY AUTHORIZED	(8) ILLUSTRATIONS FIGURE NO.	(9) ILLUSTRATIONS ITEM NO.
			TS-810/U (continued)					
	5960-188-0880		Ø ELECTRON TUBE: JAN type 6X4W	ea	X	1		V106
	5960-188-6584		Ø ELECTRCN TUBE: JAN type 5670	ea	X	1		V101, V102 V103, V104
	5920-142-7383		Ø FUSE, CARTRIDGE: MIL type F02G1R00A	ea	X	1		F101
	5905-577-0862		Ø RESISTOR, CURRENT REGULATING: Amperite part No. 10-4C	ea	X	1		RT101
	5120-224-2497		WRENCH, SOCKET READ SCREW: MIL type XVII class 1, style A, size No. 10	ea	X	1		
			RUNNING SPARES AND ACCESSORY ITEMS					
			CRYSTAL CALIBRATOR TS-810/U					
	5960-262-0964		Ø ELECTRON TUBE: JAN type OA2WA	ea	X	1		V107
	5960-166-7667		Ø ELECTRON TUBE: JAN type 6AH6	ea	X	1		V105
	5960-188-0880		Ø ELECTRON TUBE: JAN type 6X4W	ea	X	1		V106
	5960-188-6584		Ø ELECTRON TUBE: JAN type 5670	ea	X	1		V101, V102 V103, V104
	5920-142-7383		Ø FUSE, CARTRIDGE: MIL type F02G1R00A	ea	X	5		F101

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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

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