

TECHNICAL MANUAL
OPERATOR'S AND ORGANIZATIONAL
MAINTENANCE MANUAL
TEST SET, CRYSTAL MODULE TS-3630/GRA-114
(NSN 5895-01-6265)

HEADQUARTERS, DEPARTMENT OF THE ARMY

30 JULY 1982



5

SAFETY STEPS TO FOLLOW IF SOMEONE IS THE VICTIM OF ELECTRICAL SHOCK

1

DO NOT TRY TO PULL OR GRAB THE INDIVIDUAL

2

IF POSSIBLE, TURN OFF THE ELECTRICAL POWER

3

IF YOU CANNOT TURN OFF THE ELECTRICAL POWER, PULL, PUSH OR LIFT THE PERSON TO SAFETY USING A DRY WOODEN POLE OR A DRY ROPE OR SOME OTHER INSULATING MATERIAL

4

SEND FOR HELP AS SOON AS POSSIBLE

5

AFTER THE INJURED PERSON IS FREE OF CONTACT WITH THE SOURCE OF ELECTRICAL SHOCK, MOVE THE PERSON A SHORT DISTANCE AWAY AND IMMEDIATELY START ARTIFICIAL RESUSCITATION

CHANGE
No. 1

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC, 20 October 1983

**Operator's and Organizational
Maintenance Manual
Test Set, Crystal Module
TS-3630/GRA-1 14
(NSN 5895-01-057-6265)**

TM 11-58951097-12, 30 July 1982, is changed as follows:

1. New or revised material is indicated by a vertical bar in the margin. Where an entire chapter, section, or illustration is added or revised, the vertical bar is placed opposite the identification number and title.

2. Remove and insert pages as indicated below:

	<i>Remove</i>	<i>Insert</i>
i and ii		i and ii
1-1 and 1-2		1-1 and 1-2
3-1 and 3-2		3-1/(3-2 blank)
D-3 and D-4		D-3 and D-4

3. File this change sheet in the front of the publication.

By Order of the Secretary of the Army:

JOHN A. WICKHAM JR.
General, United States Army
Chief of Staff

Official:

ROBERT M. JOYCE
Major General, United States Army
The Adjutant General

Distribution:

To be distributed in accordance with special list.

**OPERATOR'S AND ORGANIZATIONAL
MAINTENANCE MANUAL
TEST SET, CRYSTAL MODULE
TS-3630/GRA-114
(NSN 589501-057-6265)**

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter or DA Form 2028 (Recommended Changes to Publications and Blank Forms) direct to: Commander, US Army Communications-Electronics Command and Fort Monmouth, ATTN: DRSELME-MP, Fort Monmouth, New Jersey 07703.

In either case, a reply will be furnished direct to you.

Chapter Section		Paragraph	Page
	1. INTRODUCTION		
	I. General		
	Scope	1-1	1-1
	Maintenance Forms, Records, and Reports	1-2	1-1
	Destruction of Electronics Materiel	1-3	1-1
	Administrative Storage	1-4	1-1
	Consolidated Index of Army Publications and Blank Forms	1-5	1-1
	Reporting Equipment Improvement Recommendations (EIR)	1-6	1-1
	II. Description and Data		
	Purpose and Use	1-7	1-1
	Description	1-8	1-1
	Tabulated Data	1-9	1-3
Chapter Section	2. OPERATING INSTRUCTIONS		
	I. Controls and Instruments		
	Damage from Improper Settings	2-1	2-1
	Operation Crew Controls	2-2	2-1
	II. Operation Under Usual Conditions		
	Preliminary Starting Procedure	2-3	2-2
	Starting Procedure	2-4	2-2
	Operating Procedures for Testing Transmitter Crystal Module	2-5	2-2
	Operating Procedures for Testing Receiver Crystal Module	2-6	2-2
	Stopping Procedure	2-7	2-2
	III. Operation Under Unusual Conditions		
	Operation at Low Temperature	2-8	2-3
	Operation Under Tropical Conditions	2-9	2-3
	Operation in Desert Climates	2-10	2-3
Chapter Section	3. OPERATOR MAINTENANCE INSTRUCTIONS		
	I. Tools, Equipment and Lubrication Instructions Repair Parts, Special Tools, Special Test Equipment, and Accessories	3-1	3-1
	Lubrication	3-2	3-1
	II. Preventive Maintenance Checks and Services (PMCS)		
	General	3-3	3-1
	Cleaning	3-4	3-1
	III. Troubleshooting and Maintenance		
	Troubleshooting Procedure	3-5	3-1
	Operator Maintenance of TS-3630yGRA-114	3-6	3-1
Chapter Section	4. ORGANIZATIONAL MAINTENANCE INSTRUCTIONS		
	I. General Information, Troubleshooting and Refinishing Instructions		
	Repair Parts, Special Tools, Special Test Equipment and Accessories	4-1	4-1
	Painting	4-2	4-1
	Troubleshooting Procedures	4-3	4-1

	Paragraph	Page
II. Maintenance of Test Set Crystal Module TS-3630/GRA-114		
Replacement of POWER ON, NO GO and GO Indicators	4-4	4-1
Replacement of Fuse	4-5	4-1
Replacement of Indicator Lamp Lenses.....	4-6	4-1
Replacement of Pressure Relief Valve	4-7	4-1
Appendix A. REFERENCES.....		A-1
B. COMPONENTS OF END ITEM AND BASIC ISSUE ITEMS (Not Applicable)		
C. ADDITIONAL AUTHORIZATION LIST (Not Applicable)		
D. MAINTENANCE ALLOCATION		
Section I. Introduction.....		D-1
II. Maintenance Allocation Chart		D-3
III. Tool and Test Equipment Requirements.....		D-4
IV. Remarks		D-5
Appendix E. EXPENDABLE SUPPLIES AND MATERIALS LIST		
Section I. Introduction.....		E-1
II. Expendable Supplies and Materials List		E-2

CHAPTER 1 INTRODUCTION

Section I. GENERAL

1-1. Scope

This manual describes Test Set, Crystal Module TS-3630/GRA-114 (fig. 1-1), hereafter referred to as the TS-3630, and covers the operation and operator and organizational maintenance of the equipment. It includes instructions for operation under usual and unusual conditions, cleaning and inspection of the equipment, and replacement of parts available to the operator and organizational level of maintenance.

1-2. Maintenance Forms, Records, and Reports

a. Reports of Maintenance and Unsatisfactory Equipment. Department of the Army Forms and procedures used for equipment maintenance will be those prescribed by TM 38-750, The Army Maintenance Management System (TAMMS).

b. Report of Packaging and Handling Deficiencies. Fill out and forward SF 364 (Report of Discrepancy (ROD)) as prescribed in AR 735-11-2/ DLAR 4140.55/NAVMATINST 4355.73A/AFR 40054/MCO 4430.3F.

c. Discrepancy in Shipment Report (DISREP) (SF361). Fill out and forward Discrepancy in Shipment Report (DISREP) (SF 361) as prescribed in AR 55-38/NAVSUPINST 4610.33C/ AFR 75-18/MCO P4610.19D/DLAR 4500.15.

1-3. Destruction of Army Electronics Materiel

Destruction of Army electronics material to prevent enemy use shall be in accordance with TM 750-244-2.

1-4. Administrative Storage

Administrative storage of equipment issued to and used by Army activities shall be in accordance with TM 740-90-1.

1-5. Consolidated Index of Army Publications and Blank Forms

Refer to the latest issue of DA Pam 310-1 to determine whether there are new editions, changes or additional publications pertaining to the equipment.

1-6. Reporting Equipment Improvement Recommendations (EIR)

If your Test Set, Crystal Module TS-3630/GRA- 114 needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design. Tell us why a procedure is hard to perform. Put it on an SF 368 (Quality Deficiency Report). Mail it to Commander, US Army Communications-Electronic Command and Fort Monmouth, ATTN: DRSEL- ME-M P, Fort Monmouth, NJ 07703. We'll send you a reply.

Section II. DESCRIPTION AND DATA

1-7. Purpose and Use

The TS-3630 is a portable test set that provides power and impedance matching for testing crystal modules used in Radio Data Link, Sound Ranging AN/GRA-114. In addition, the test set provides voltage required for testing the receiver circuit board used in the AN/GRA-114.

1-8. Description

a. The TS-3630 (fig. 1-1) is contained in a portable case. The case consists of top and bottom sections attached together by two hinges that permit separation of the two sections. The top section is equipped with a handle. The top section is secured to the bottom section by two latches and is made watertight with a rubber gasket, mounted in a groove in the lower rim of the cover. A pressure

relief valve in the case wall enables equalization of inside to outside air pressure. The valve operates automatically in either direction when the pressure differential exceeds two pounds. The pressure differential can be manually relieved at any time by pressing a button at the center of the pressure relief valve; this must be accomplished before opening the case cover.

b. Two cable retainers are mounted inside the top cover and are used to store the power cable. The control panel (fig. 1-2) is mounted in the lower portion of the case and secured with four screws. Two handles are mounted on the panel to enable the panel to be lifted out of the case during maintenance. The front panel contains the controls for the alternating current (AC) input power, and the fuseholders, indicators and con-

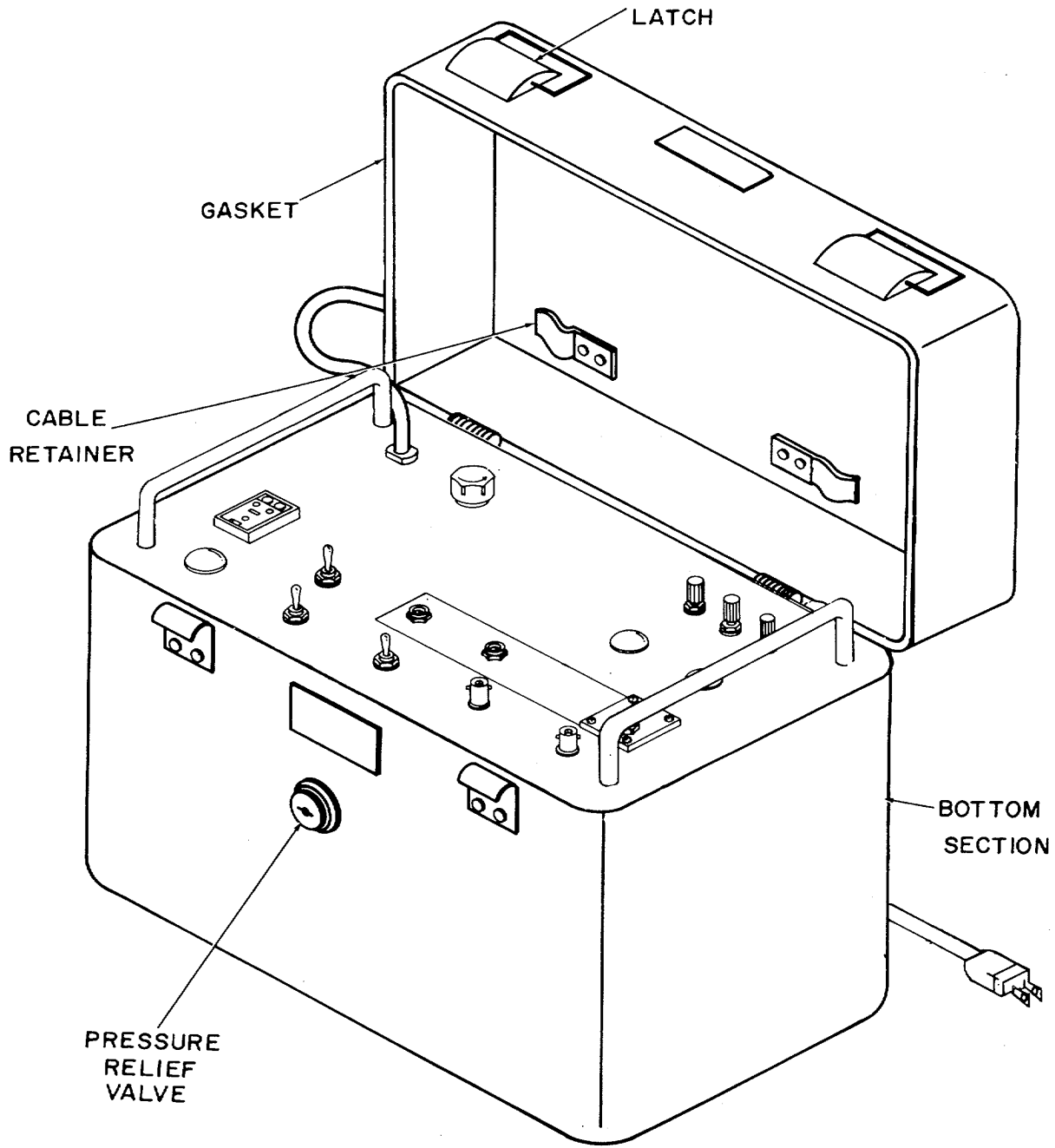


Figure 1-1. Test Set, Crystal Module TS-3630/GRA-114.

EL6RA001

nectors, for testing crystal modules and receiver boards of the AN/GRA-114.

1-9. Tabulated Data

a. Overall Dimensions:

- Length-11 inches (27.94 cm)
- Width-7 inches (17.78 cm)
- Height-8 inches (20.32 cm)
- Weight-approximately 7 pounds

b. Operating Parameters:

- Temperature Range-250F to 1250F (-30°C to + 500C)
- Input Voltage-1i 15 vac ± 10%, 60 Hz
- Supply Voltage 12 vdc
- Output (Rcvr Pwr Jacks) Voltages
 - 12.6 vdc ± 2 volts, 60 ma
 - 6.2 vdc ± .5 vdc, 30 ma
- Fuse Size--1/4 amp

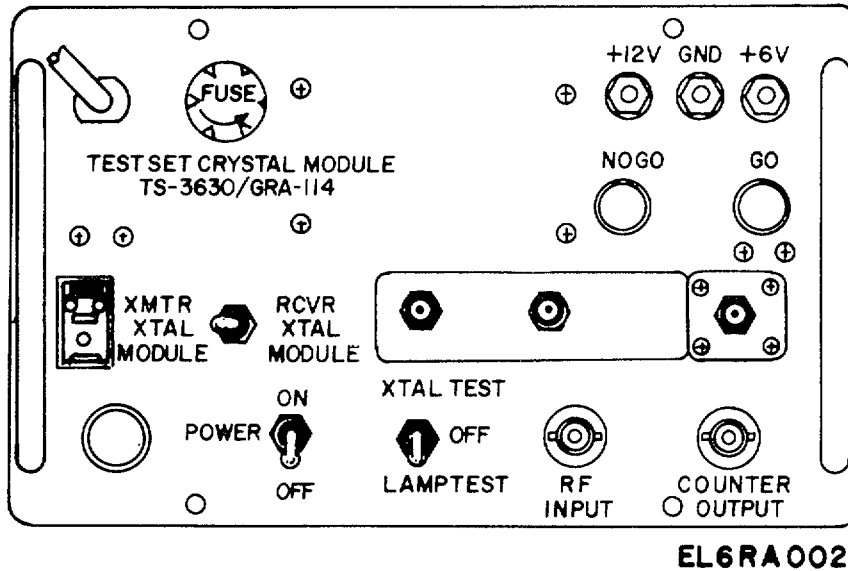


Figure 1-2. Control Panel.

CHAPTER 2
OPERATING INSTRUCTIONS

Section I. CONTROLS AND INSTRUMENTS

2-1. Damage from Improper Settings

POWER (ac) ON/OFF switch must be in the OFF position whenever external cabling is connected to or removed from front panel connectors.

2-2. Operator/Crew Controls

Operator's controls and functions are listed in table 2-1. The location of operator's controls is illustrated in figure 2-1.

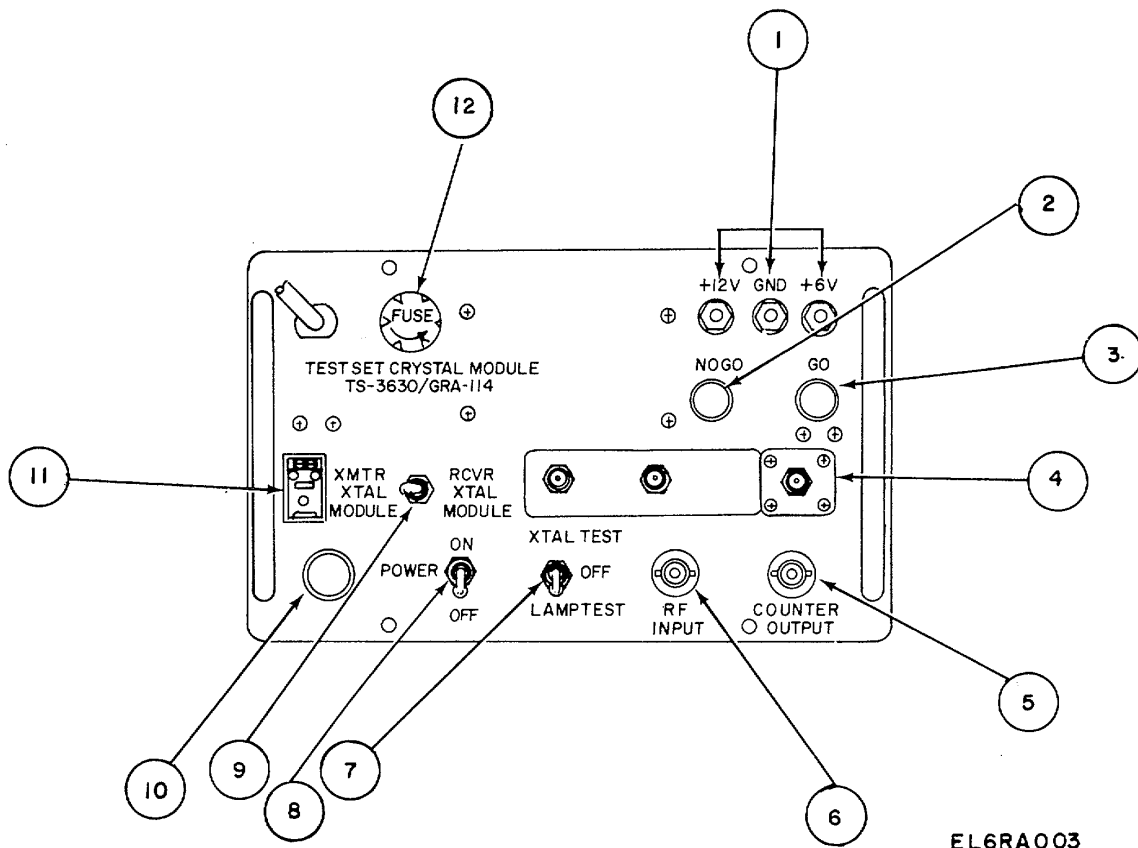


Figure 2-1. Location of Operator's Controls, Indicators, and Connectors.

Table 2-1. Operator's Controls, Indicators and Connectors

Item No.	Control, Indicator or Connector	Function
1	RCVR PWR jacks	Provides connection of supply voltages required to test and troubleshoot receiver board. + 12V-provides + 12 volts dc GND -provides ground connection + 6V -provides + 6 volts dc
2	NO GO indicator	Lights to indicate defective module under test.
3	GO indicator	Lights to indicate module under test is good.
4	RCVR XTAL module jack	Provides connection of receiver crystal module under test.
5	COUNTER OUTPUT jack	Provides connection to frequency counter to measure output of crystal module frequency under test.
6	RF INPUT jack	Provides connection of signal generator to test set.
7	XTAL TEST/OFF/ LAMP Test switch (spring-loaded to OFF position)	LAMP TEST-Applies voltage to NO GO/GO indicators for test. XTAL TEST-Connects NO GO/GO indicators to test circuit. OFF-Removes all input voltages to NO GO/GO indicators.
8	POWER ON/OFF switch	Connects test set to 115 vac power.
9	XMTR XTAL MODULE/RCVR XTAL MODULE switch	Controls circuitry for either XMTR XTAL or RCVR XTAL test. XMTR XTAL MODULE-Connects xmit xtal to applicable testing circuitry. RCVR XTAL MODULE-Connects rcvr xtal module to applicable testing circuitry.
10	Power indicator	Lights to indicate when input power is applied.
11	XMTR XTAL MODULE jack	Provides connection of transmitter crystal module under test.
12	Fuse	Power line fuse protects equipment circuitry from excessive current (1/4 amp).

Section II. OPERATING UNDER USUAL CONDITIONS

2-3. Preliminary Starting Procedure

- a. Place the TS-3630 on workbench.
- b. Press the pressure relief valve located on the front of the case.
- c. Release the two latches located on front of case and open the cover.
- d. Set the POWER ON/OFF switch to OFF position.

2-4. Starting Procedure

- a. Unwind ac power cord from brackets in top cover.
- b. Connect ac power cord to 115 volt ac power source.
- c. Place POWER ON/OFF switch to ON. Power indicator will light.
- d. Place XTAL TEST/OFF/LAMP TEST switch to LAMP TEST position. NO GO/GO indicators will light.
- e. Turn POWER ON/OFF switch to OFF.

2-5. Operating Procedures for Testing Transmitter Crystal Module

- a. Complete starting procedure (para 2-4).
- b. Place XMTR XTAL MODULE/RCVR XTAL MODULE switch in XMTR XTAL MODULE position.
- c. Place the transmitter crystal module in XMTR XTAL MODULE jack.
- d. Turn POWER ON/OFF switch to ON.
- e. Observe the NO GO/GO indicator. NO GO indicator will light if module under test is defective. GO indicator will light if module under test is operational.
- f. Remove the transmitter crystal module from jack.

2-6. Operating Procedure for Testing Receiver Crystal Module

- a. Complete starting procedure (para 2-4).
- b. Set XMTR XTAL MODULE/RCVR XTAL MODULE switch to RCVR XTAL MODULE position.
- c. Place the receiver crystal module in RCVR XTAL MODULE jack.
- d. Set RF signal generator to frequency marked on the receiver crystal module under test.
- e. Using Cable W1 in Maintenance Kit, Radio Data Link MK-1752/GRA-114, connect signal out jack of signal generator to RF input jack on test set.
- f. Set RF signal level output of signal generator to at least 10 microvolts.
- g. Observe the NO GO/GO indicators. NO GO indicator will light if module under test is defective. GO indicator will light if module under test is operational.
- h. Remove the receiver crystal module from jack.
- i. Disconnect RF signal cable from RF input jack.

2-7. Stopping Procedure

- a. Set the XTAL TEST/OFF/LAMP TEST switch to OFF.
- b. Set the POWER ON/OFF switch to OFF.
- c. Disconnect ac power cable from power source and return to proper storage in cover.
- d. Insure that protective caps are mounted on jacks.
- e. Close cover and fasten latches.

2-8. Operation at Low Temperature

The TS-3630 can be stored at - 250F without damage to the components. However, at such low temperature, both the electrical and mechanical parts are more easily damaged by shock and vibration. The TS-3630 should be protected during handling against shock or excessive vibration.

2-9. Operation Under Tropical Conditions

The high relative humidity in tropical areas causes moisture to condense on the equipment. This moisture

may combine with dirt to form a thin insulating film on pins of the connectors. Keep the TS-3630 as dry as possible. Clean the connectors before plugging in the modules under test.

2-10. Operation in Desert Climates

If the TS-3630 must be operated in desert climates, it should be set up in an enclosed area. Dirt or dust should be removed by gentle shaking and light brushing with a soft brush. Insure adequate circulation of air to prevent overheating.

**CHAPTER 3
OPERATOR MAINTENANCE INSTRUCTIONS**

Section I. TOOLS, EQUIPMENT AND LUBRICATION INSTRUCTIONS

3-1. Repair Parts, Special Tools, Special Test Equipment and Accessories

Items issued with or prescribed for use by the operator for the TS-3630 are listed in the Components of End Item and Basic Issue Items Lists,

Appendix B, of this manual. Repair Parts and Special Tools are listed in TM 11-5895-1097-20P.

3-2. Lubrication

No lubrication is required for the TS-3630.

Section II. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

3-3. General

Operator's and organizational preventive maintenance of the TS-3630 consists of performing routine checks. These routine checks include: checking for completeness, cleaning, dusting and washing the equipment, checking for worn cables, putting away items not being used and putting receptacle caps in place. These are things you should do anytime you see they must be done. Routine checks include, but are not limited to the following.

- a. Check all connecting cables, receptacles and plugs for cracks and breaks.
- b. Check to see that all cable receptacle or plug pins are straight.
- c. Check to see that lampholders, knobs, and switches are not broken.

- d. Remove dust, moisture and loose dirt from outside surfaces.

3-4. Cleaning

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

- a. Use a soft cloth or brush to remove dust or loose dirt. If dirt is difficult to remove, dampen the cloth with water, use mild soap, if necessary.
- b. Remove grease, fungus, and ground-in dirt from the case; use a cloth dampened (not wet) with soap and water. Wipe the parts with a clean dry cloth.
- c. Remove dust and dirt from plugs and jacks with a soft brush.

Section III. TROUBLESHOOTING AND MAINTENANCE

3-5. Troubleshooting Procedures

A chart listing most frequent malfunctions, their probable cause and corrective action required is provided in table 3-1 as an aid in troubleshooting. These malfunctions may be observed during preventive maintenance checks as well as during normal operation. Any malfunction that is beyond the scope of the operator to correct shall

be referred to the organizational level of maintenance.

3-6. Operator Maintenance of TS-3630/GRA-114

Operator maintenance is limited to performing preventive maintenance checks and services. No tools are required.

Table 3-1. Operator Troubleshooting Chart

Item No.	Trouble Symptom	Probable Trouble	Check and Corrective Measure
1	POWER ON indicator does not light.	<ul style="list-style-type: none"> a. Defective indicator lamp. b. Defective fuse. 	Refer to higher maintenance.
2	NO GO/GO indicator does not light.	<ul style="list-style-type: none"> a. Defective indicator lamp. b. Incorrect switch settings. 	<ul style="list-style-type: none"> a. Refer to higher maintenance. b. Check switch <i>settings</i>.

CHAPTER 4

ORGANIZATIONAL MAINTENANCE INSTRUCTIONS

Section I. GENERAL INFORMATION, AND TROUBLESHOOTING AND REFINISHING INSTRUCTIONS

4-1. Repair Parts, Special Tools, Special Test Equipment and Accessories

Items required for performing organizational maintenance are listed in the Maintenance Allocation Chart, Appendix D of this manual and in the Repair Parts and Special Tools List, TM 11-5895-1097-20P.

4-2. Painting

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 TB 43-0118.

4-3. Troubleshooting Procedures

Troubleshooting the TS-3630 is based on the operational check contained in the preventive maintenance charts. When an abnormal indication is observed, refer to troubleshooting chart. Perform the checks and corrective measures indicated. If the corrective measures indicated do not result in correction of the trouble, higher category maintenance is required.

Item No.	Trouble Symptom	Probable Trouble	Check and Corrective Measure
1	POWER ON indicator does not light.	<ul style="list-style-type: none"> a. POWER ON indicator defective. b. Line fuse defective. c. Powerline cable defective. d. No line voltage. 	<ul style="list-style-type: none"> a. Replace lamp (para 4-4). b. Replace fuse (para 4-5). c. Check attachment of wires to plug terminals; insure that they are plugged into source. d. Check voltage at outlet receptacles used.
2	NO GO indicator does not light with switch in LAMP TEST position.	NO GO indicator defective.	Replace lamp (para 4-4).
3	GO indicator does not light with switch in LAMP TEST position.	GO indicator defective.	Replace lamp (para 4-4).
4	Indicator lenses cracked or broken.		Replace with new lens (para 4-6).

Section II. MAINTENANCE OF TEST SET, CRYSTAL MODULE TS-3630/GRA-114

4-4. Replacement of POWER ON, NO GO and GO Indicators

- a. Turn the lens cover counterclockwise and remove it to expose defective lamp.
- b. Grasp lamps and pull straight out.
- c. Replace lamp with a new one by pushing the lamp into socket.
- d. Replace the lens cover by turning clockwise.

4-5. Replacement of Fuse

- a. Press the fuseholder cap in and turn it counterclockwise.
- b. Pull the cap out; this will withdraw the fuse from the fuseholder.
- c. Remove the fuse from the cap and replace it with a new one.

- d. Replace the cap; press in and turn clockwise to lock.

4-6. Replacement of Indicator Lamp Lenses

- a. Turn the indicator lamp lens counterclockwise and remove from its socket.
- b. Replace by screwing clockwise into the socket.

4-7. Replacement of Pressure Relief Valve

- a. Remove control panel from case.
- b. Remove defective pressure relief valve.
- c. Replace new valve.
- d. Replace control panel in case.

APPENDIX A

REFERENCES

DA Pam 310-4	Index of Technical Publications.		AN/GRA- 114 and Maintenance Kit, Radio Data Link MK-1752/ GRA-114 (To be published).
SB 11-573	Painting and Preservation of Supplies Available for Field Use for Electronics Command Equipment.	TM 11-5895-1097-20P	Organizational Maintenance Repair Parts and Special Tools List, Test Set, Crystal Module TS-3630/GRA-114 (NSN 5895-01-057-6265) (To be published).
SB 38-100	Preservation, Packaging, Packing and Marking Materials, Supplies, and Equipment Used by the Army.	TM 38-750	The Army Maintenance Management System (TAMMS).
TB 43-0118	Field Instructions for Painting and Preserving Electronics Command Equipment Including Camouflage Pattern Painting of Electrical Equipment Shelters.	TM 740-90-1	Administrative Storage of Equipment.
TM 11-5895-1095-12	Operator's and Organizational Maintenance Manual for Radio Data Link, Sound Ranging	TM 750-244-2	Procedures for Destruction of Electronics Materiel to Prevent Enemy Use (Electronics Command).

APPENDIX D

MAINTENANCE ALLOCATION

Section I. INTRODUCTION

D-1. General

This appendix provides a summary of the maintenance operations for TS-3630/GRA-114. 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.

D-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.

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.

D-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, sub-assemblies, 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 require, 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.

f. Column 6, Remarks. Column 6 contains an alphabetic code which leads to the remark in section IV, Remarks, which is pertinent to the item opposite the particular code.

D-4. Tool and Test Equipment Requirements (Sect. III)

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.

D-5. Remarks (Sect. IV)

a. Reference Code. This code refers to the appropriate item in section II, column 6.

b. Remarks. This column provides the required explanatory information necessary to clarify items appearing in section II.

(Next printed page is D-3)

**SECTION II MAINTENANCE ALLOCATION CHART
FOR
TEST SET, CRYSTAL MODULE, TS-3630/GRA-114**

(1) GROUP NUMBER	(2) COMPONENT ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQUIPMENT	(6) REMARKS
			C	O	F	H	D		
00	TEST SET, CRYSTAL TS-3630/GRA-114	Inspect		0.2					A
		Test		0.2				3	
		Test				0.5		3 thru 7	B
		Replace		0.2					
		Repair		0.2				2	
		Repair					0.2	1 thru 9	
01	CASE, TEST SET	Inspect		0.1					A
		Repair				0.5	1, 2, 9		
		Replace				0.2	1, 2, 9		
02	PANEL ASSEMBLY	Inspect		0.2					A
		Test				0.2	3 thru 7		
		Repair		0.2				2	8
		Repair				0.5	1 thru 7		
0201	CIRCUIT CARD ASSEMBLY	Replace				0.2	1, 2, 9	A	
		Inspect				0.2			
		Test				0.5	3 thru 7		
		Replace				0.4	1, 2, 9		
		Repair				1.0	1 thru 9		
		Change 1 D-3							

**SECTION III TOOL AND TEST EQUIPMENT REQUIREMENTS
FOR
TEST SET, CRYSTAL MODULE, TS-3630/GRA-114**

TOOL OR TEST EQUIPMENT REF CODE	MAINTENANCE CATEGORY	NOMENCLATURE	NATIONAL/NATO STOCK NUMBER	TOOL NUMBER
1	H, D	TOOL KIT, ELECTRONIC EQUIPMENT TK-100/G	5180-00-605-0079	
2	0	TOOL KIT, ELECTRONIC EQUIPMENT TK-101/G	5180-00-064-5178	
3	0, H	MULTIMETER AN/USM-223	6626-00-999-7465	
4	H	SIGNAL GENERATOR SG-1112(V)2/U	6625-00-500-6525	
5	H	VOLTMETER, RADIO FREQUENCY AN/URM-145	6625-00-973-3986	
6	H	FREQUENCY COUNTER AN/USM-207/A	6625-00-044-3228	
7	H	MAINTENANCE KIT, RADIO DATA LINK MK-1752/GRA-114	5895-01-057-6263	
8	H	REPAIR KIT, PRINTED WIRING BOARD MK-772/U	5999-00-757-7042	
9	H, D	TOOL KIT, ELECTRONIC EQUIPMENT TK-105/G	5180-00-610-8177	

SECTION IV. REMARKS

REFERENCE CODE	REMARKS
<p>A B</p>	<p>VISUAL INSPECTION. LIMITED TO REPLACING THROWAWAY FUSE, INDICATOR LAMP, LENS AND PRESSURE RELIEF VALVE.</p>

APPENDIX E

EXPENDABLE SUPPLIES AND MATERIALS LIST

Section I. INTRODUCTION

E-1. Scope

This appendix lists expendable supplies and materials you will need to operate and maintain the TS-3630/GRA-114. These items are authorized to you by CTA 50-970, Expendable Items (Except Medical, Class V, Repair Parts, and Heraldic Items).

E-2. Explanation of Columns

a. Column 1-Item Number. This number is assigned to the entry in the listing and is referenced in the narrative instructions to identify the material (e.g., "Use cleaning compound, item 5, App. D").

b. Column 2-Level. This column identifies the lowest level of maintenance that requires the listed item.

C-Operator/Crew

O-Organizational Maintenance

F-Direct Support Maintenance

H-General Support Maintenance

c. Column 3-National Stock Number. This is the National stock number assigned to the item; use it to request or requisition the item.

d. Column 4-Description. Indicates the Federal item name and, if required, a description to identify the item. The last line for each item indicates the part number followed by the Federal Supply Code for Manufacturer (FSCM) in parentheses, if applicable.

e. Column 5-Unit of Measure (U/M). Indicates the measure used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea, in, pr). If the unit of measure differs from the unit of issue, requisition the lowest unit of issue that will satisfy your requirements.

(Next printed page is E-2)

SECTION II. EXPENDABLE SUPPLIES AND MATERIALS LIST

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION PART NO. AND FSCM	(5) UNIT OF MEAS.
1	0	8020-00-205-6511	BRUSH, PAINT	EA
2	0	5350-00-221-0872	CLOTH, ABRASIVE	EA
3	C	7920-00-165-7195	CLOTH, CLEANING	PK
4	0	8010-00-081-0809	ENAMEL, OD	QT
5	0	5350-00-584-5795	PAPER, ABRASIVE	PK

*U.S. GOVERNMENT PRINTING OFFICE: 1983 0-381-302 (2739)

By Order of the Secretary of the Army

E. C. MEYER
General, United States Army
Chief of Staff

Official:

ROBERT M. JOYCE
Brigadier General, United States Army
The Adjutant General

DISTRIBUTION:

To be distributed in accordance with Special List.

* U.S. GOVERNMENT PRINTING OFFICE: 1983 0-381-302(2739)

RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL PUBLICATIONS



THEN... JOT DOWN THE DOPE ABOUT IT ON THIS FORM, CAREFULLY TEAR IT OUT, FOLD IT AND DROP IT IN THE MAIL!

SOMETHING WRONG WITH THIS PUBLICATION?

FROM: (PRINT YOUR UNIT'S COMPLETE ADDRESS)

DATE SENT

PUBLICATION NUMBER

PUBLICATION DATE

PUBLICATION TITLE

BE EXACT... PIN-POINT WHERE IT IS

PAGE NO.

PARA-GRAPH

FIGURE NO.

TABLE NO.

IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:

TEAR ALONG PERFORATED LINE

PRINTED NAME, GRADE OR TITLE, AND TELEPHONE NUMBER

SIGN HERE:

DA FORM 2028-2
1 JUL 79

PREVIOUS EDITIONS ARE OBSOLETE.

P.S.—IF YOUR OUTFIT WANTS TO KNOW ABOUT YOUR RECOMMENDATION MAKE A CARBON COPY OF THIS AND GIVE IT TO YOUR HEADQUARTERS.

