DEPARTMENT OF THE ARMY TECHNICAL MANUAL

OPERATOR'S, ORGANIZATIONAL,

DIRECT SUPPORT, AND GENERAL SUPPORT

MAINTENANCE MANUAL

FOR

TEST SET,

LASER RANGE FINDER

TS-3375/VVG-1

(4931-00-150-1558)

HEADQUARTERS, DEPARTMENT OF THE ARMY
JUNE 1975

WARNING

The R/T tester is used to test the receiver-transmitter unit of the laser range finder. The laser beam emitted from the receiver-transmitter unit is dangerous and can cause blindness if it enters the eye either directly or reflected from a shiny surface. When using the R/T tester in a checkout area, ensure that the gasket on the R/T tester is making contact with the front of the receiver-transmitter unit before setting the RESET-FIRE switch on the R/T tester to FIRE. Laser light leakage due to improper mounting may cause injury to eyes. Ensure that the light seal on the tester adapter and R/T tester are correctly mated and that the screws are secured. This procedure will prevent light leakage between the interface of the R/T tester, the receiver-transmitter unit, and the tester adapter. Post warning signs "WARNING - LASER LIGHT" and use a countdown procedure if the laser is fired without being covered by the tester as in optical alinement.

The pulse forming network (PFN) may retain high-voltage charges from the 1200 volts developed in the PFN charge power supply if the dump relay fails.

Before working within the transmitter area of the receiver-transmitter unit, allow 20 seconds after turn-off, then momentarily ground the terminal of the high voltage lead to the housing with a shorting bar having an insulated handle. If the PFN charge POWER supply extender cable is used, ground the COIL terminal of the PFN.

Personnel routinely performing maintenance at the GS and depot level are required to receive eye examinations in accordance with AR 40-46.

WARNING

DANGEROUS CHEMICALS

Toluol solvent is toxic and flammable. Use only in a well-ventilated area. Avoid prolonged or repeated breathing of the vapor. Avoid prolonged or repeated contact with the skin.

Isopropyl alcohol is flammable. Keep all flammable cleaning material away from open flames. Failure to do so could result in injury or death.

Paints and primers are toxic and flammable. Keep all flammable material away from open flames. Use only in a well-ventilated area. Avoid prolonged or repeated contact with the skin.

Methyl ethyl ketone is toxic and flammable. Use only in a well-ventilated area. Avoid prolonged or repeated breathing of vapor. Avoid prolonged or repeated contact with the skin. Keep away from heat or open flames.

TECHNICAL MANUAL

No. 9-4931-355-14

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D. C., 13 June 1975

OPERATOR'S, ORGANIZATIONAL, DIRECT SUPPORT, AND GENERAL SUPPORT MAINTENANCE MANUAL FOR TEST SET, LASER RANGE FINDER TS-3375/VVG-1

(4931-00-150-1558)

LIST OF ILLUSTRATIONS

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CHAPTER 1
INTRODUCTION

Section I. GENERAL

1-1. Scope

a. This manual is for use in operating and maintaining the Laser Range Finder Test Sets and the Alinement Kit.

b. Instructions for operating and maintaining the Laser Range Finder Units, which are issued as test equipment, are in the TM 9-2350-230-10-23 and TM 9-1240-369-34.

1-2. Equipment Maintenance Forms.

Equipment maintenance forms and procedures for their use are prescribed in TM 38-750.

1-3. Reporting of Errors.

Report 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 directly to Commander, Frankford Arsenal, ATTN: SARFA-MA, Philadelphia, PA 19137. A reply will be furnished to you.

Section II. DESCRIPTION AND DATA

1-4. Description.

a. The TS-3375/VVG-1 laser range finder test set consists of special tools and equipment for performing direct support (DS) and general support (GS) maintenance of the AN/VVG-1 laser range finder. The test set provides a means for limited system testing of the AN/VVG-1 laser range finder and for testing and replacement of unit modules or parts. The special tools and test equipment, with the exception of the R/T holding fixture, are contained in three carrying cases. The first carrying case 10559658 is for direct support common special tools and test equipment (fig. 1-1), with parts are listed in table 1-1. The second carrying case 11738864 is for direct support unique special tools and test equipment (fig. 1-2) with parts are listed in table 1-2. The third carrying case 11738863 is for general support alinement special tools and test equipment (fig. 14) with parts are listed in table 1-3. The holding fixture assembly 11738862 (fig. 1-3) provides protective support for the AN/VVG-1 laser range finder units during handling, transport, and bench maintenance. The five units of the AN/VVG-1 laser range finder complete the items comprising the laser test set (fig. 1-5) and are needed for DS/GS level maintenance with a prime power source to form a complete system hot mark-up for testing and troubleshooting faulty units of the laser range finder as well as aligning the R/T unit. Paragraph b below provides a functional description of the receiver-transmitter tester.

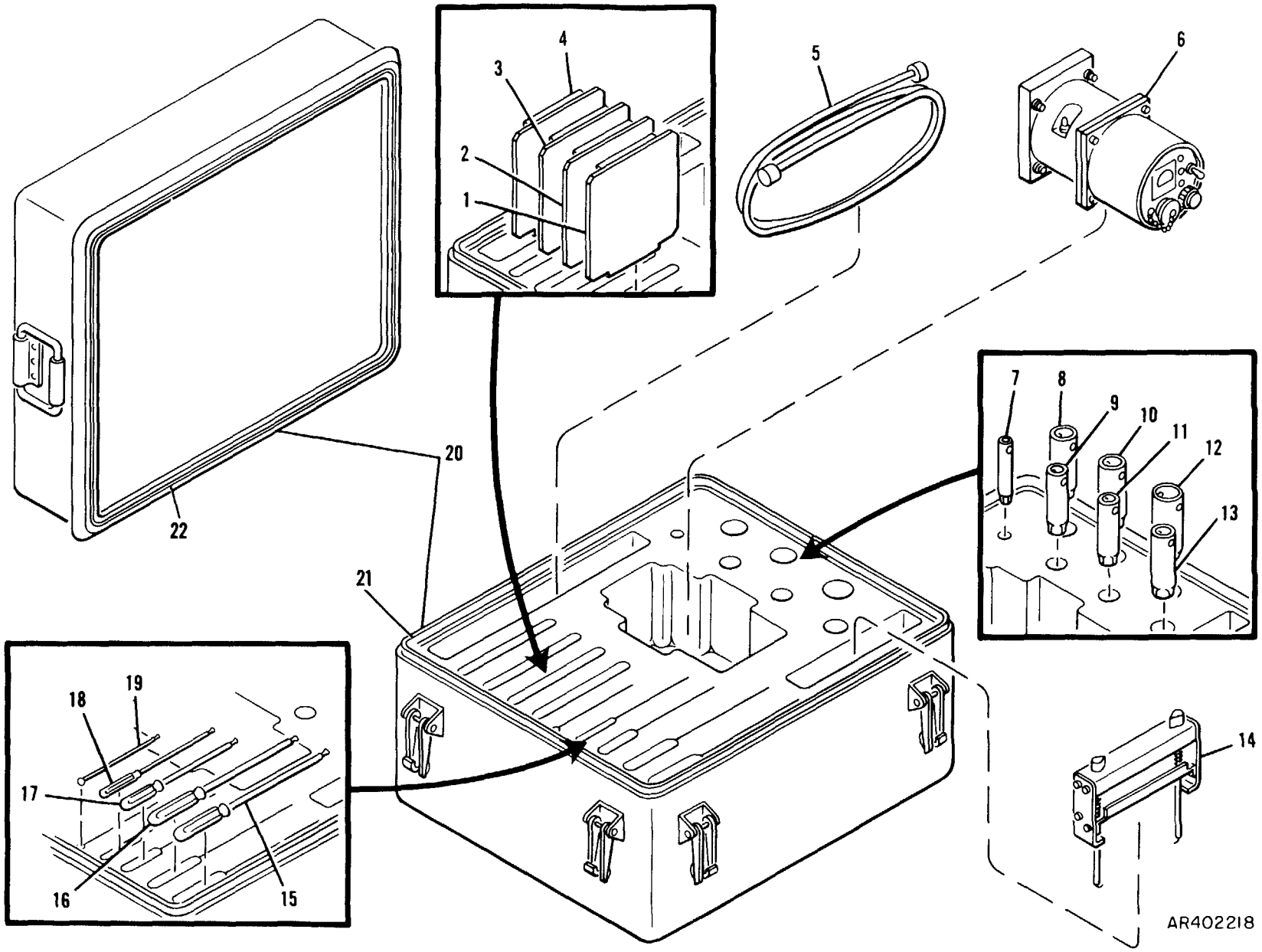


Figure 1-1. Direct support common special tools and test equipment (10559658).

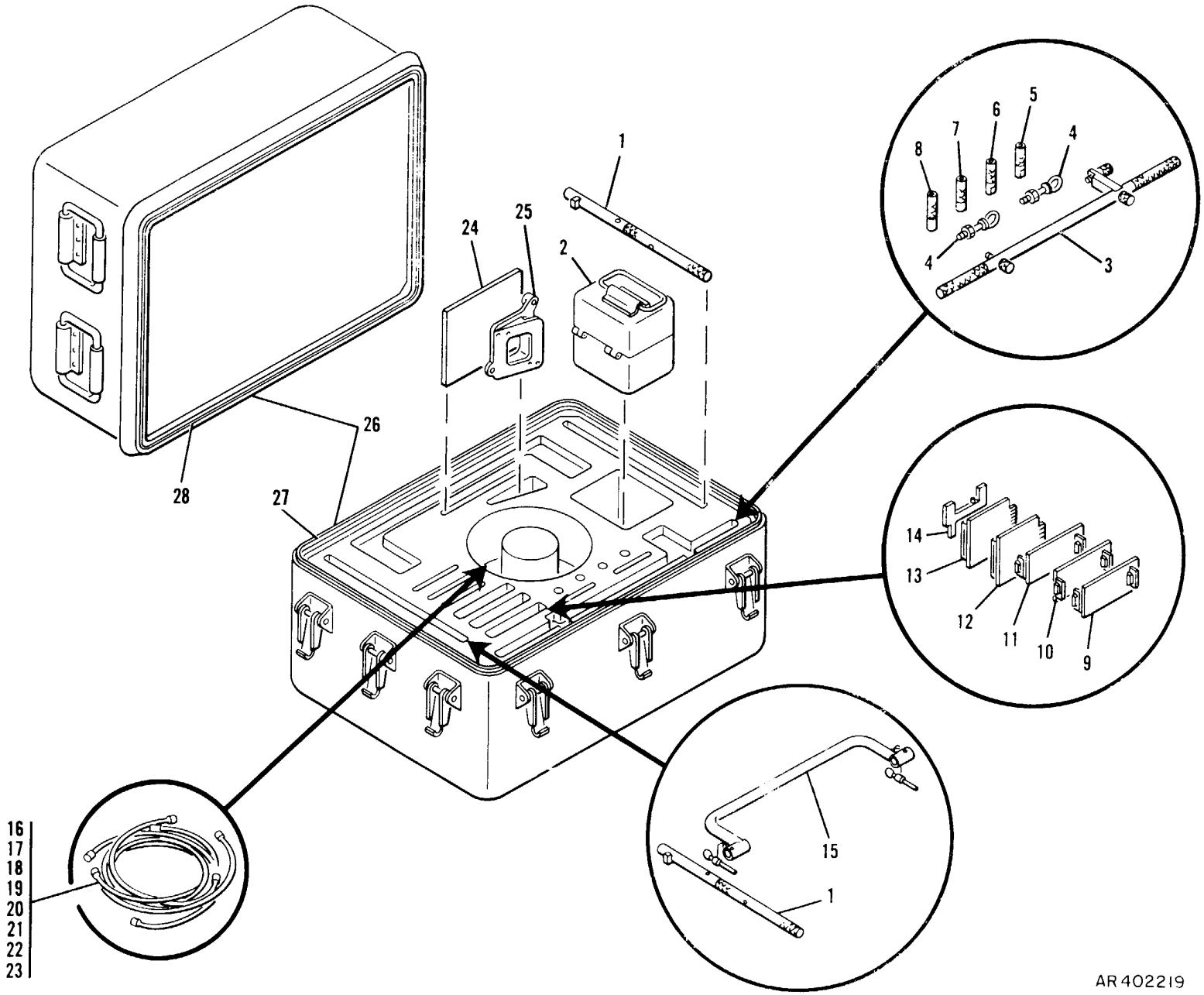


Figure 1-2. Direct support unique special tool and test equipment (11738864).

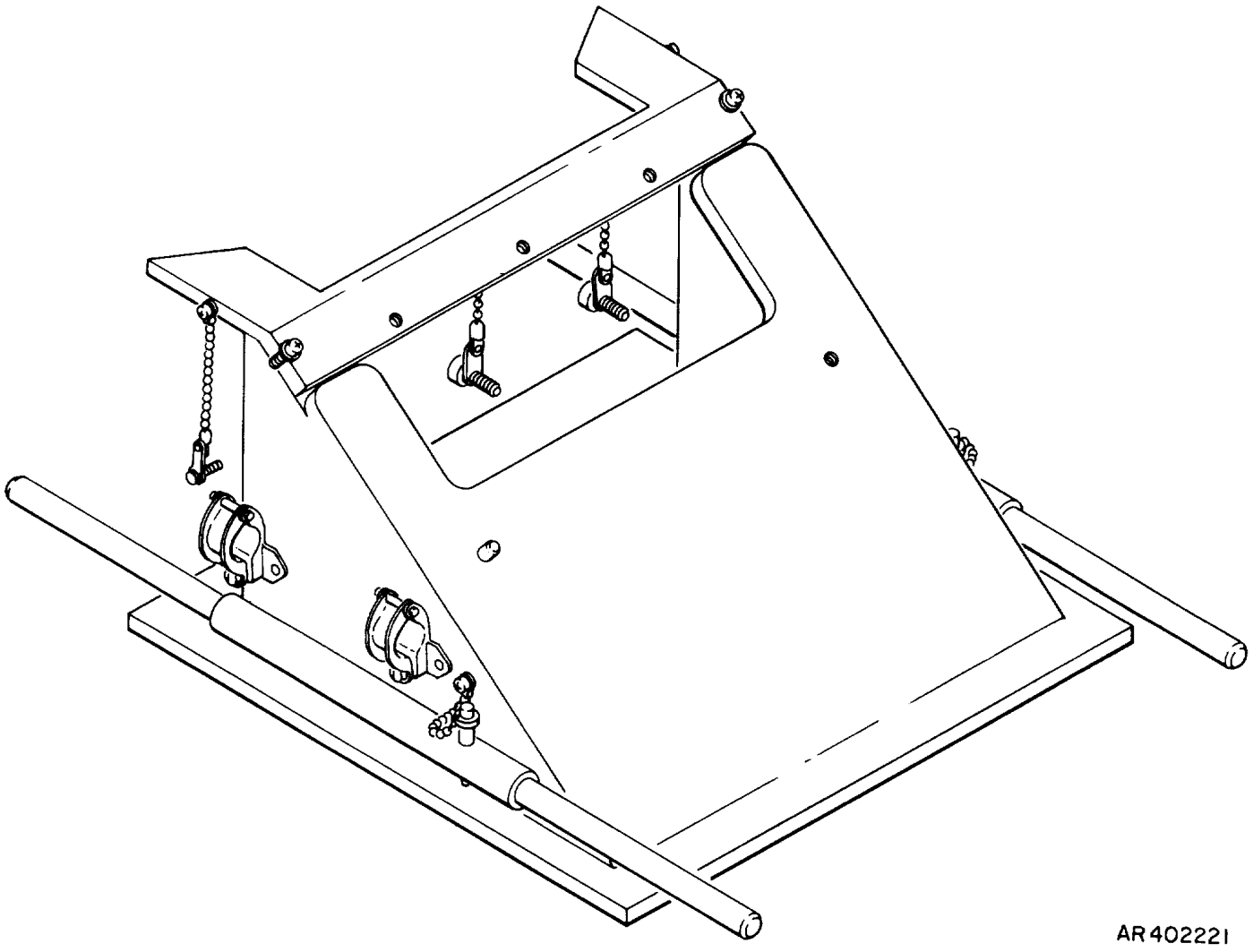


Figure 1-3. R/T holding fixture (11738862).

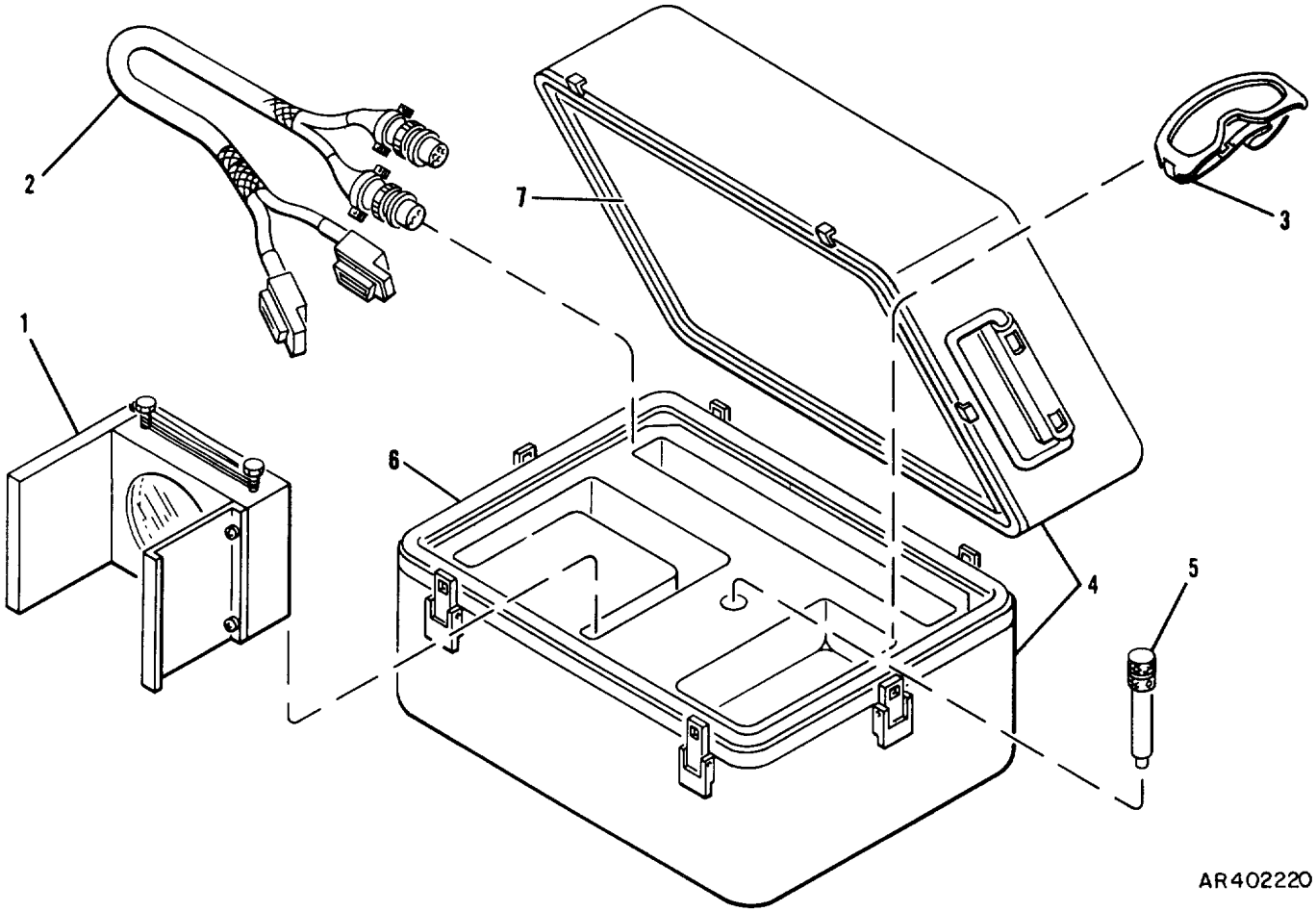


Figure 1-4. General support special tools and test equipment-alinement kit (11738863).

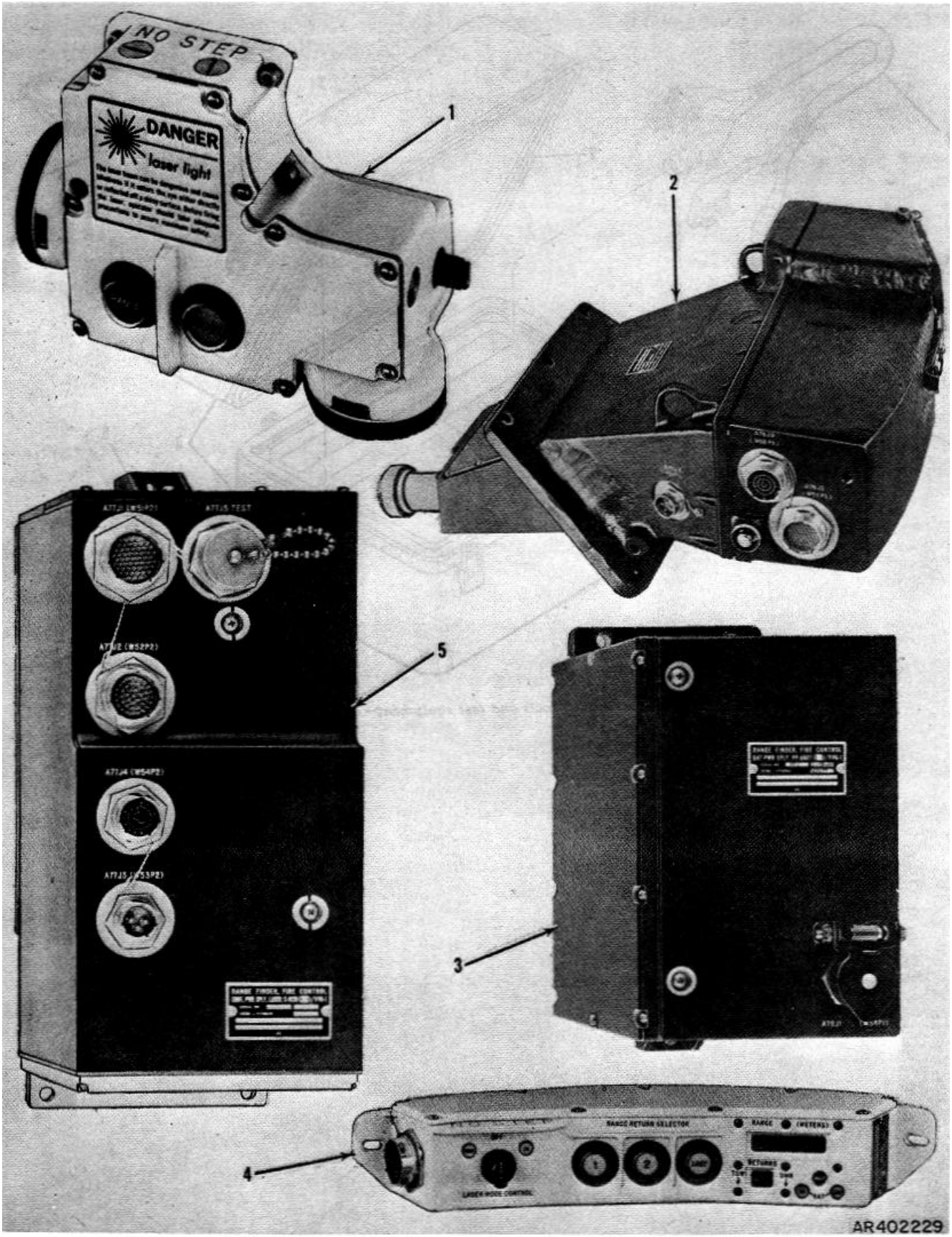


Figure 1-5. Fire control laser range finder AN/VVG-1 units.

Key to fig. 1-5:
1. R/T Control C-8728/VVG-1 (A75)
2. Laser Receiver-Transmitter RT-1021/VVG-1 (A76)
3. Battery Power Supply PP-6607/VVG-1 (A78)
4. Laser Ranging Commander's Control C-9134/VVG-1 (A79)
5. Laser Power Supply Control C-9135/VVG-1 (A77)

Table 1-1. Direct Support Common Special Tools and Test Equipment (10559658)

Item No.	Item	NSN or reference No.	Reference Fig. No.	Reference Item No.	Function
1	Tester, R/T	4931-00-169-0114 (10559600)	1-1	6	To measure receiver sensitivity and transmitter output energy of the receiver-transmitter unit ZA76).
2	Cable, extender-PFN charge power supply	4931-00-234-3322 (10559664)	1-1	5	
3	Extender card, counters	4931-00-491-6998 (10559508)	1-1	4	To provide test points for designated circuit card assemblies located in the power supply control unit (A77) and battery power supply unit (A78) during troubleshooting.
4	Extender card, reply gating	4931-00-191-1384 (10559516)	1-1	3	
5	Extender card, select logic	4931-00-493-9239 (10559518)	1-1	1	
6	Extender card, -1600 power supply	4931-00-493-9237 (10559517)	1-1	2	
7	Puller, circuit card	4931-00-628-1336 (11737838)	1-1	14	To remove circuit card assemblies from power supply control unit (A77) housing.
8	Key, Socket Head Screw	5120-00-628-1454 (11737812-1)	1-1	19	
9	Key, Socket Head Screw	5120-00-628-1759 (11737812-2)	1-1	18	Used to loosen and tighten various socket head capscrews during repair of unit.
10	Key, Socket Head Screw	5120-00-628-1457 (11737812-3)	1-1	17	
11	Key, Socket Head Screw	5120-00-628-1762 (11737812-4)	1-1	16	
12	Key, Socket Head Screw	5120-00-628-1781 (11737812-5)	1-1	15	
13	Wrench, socket (0.875)	5120-00-628-1784 (11737480-5)	1-1	7	
14	Wrench, socket (1.062)	5120-00-851-8683 (11737480-8)	1-1	9	
15	Wrench, socket (1.187)	5120-00-901-1573 (11737480-10)	1-1	11	
16	Wrench, socket (1.312)	5120-00-967-3058 (11737480-12)	1-1	13	Used to loosen and tighten various connector nuts during repair of units.
17	Wrench, socket (1.437)	11737480-14	1-1	8	
18	Wrench, socket (1.562)	5120-00-967-3059 (11737480-16)	1-1	10	
19	Wrench, socket (1.687)	5120-00-926-7123 (11737480-18)	1-1	12	
20	Case, carrying	11745643	1-1	20	To carry and store special tools and test equipment for the laser range finder.
21	Insert, lower	11745642	1-1	21	
22	Insert, upper	11745640-1	1-1	22	To retain items within the case.

Table 1-2. Direct Support Unique Special Tools and Test Equipment (11738864)

Item No.	Item	NSN or reference No.	Reference Fig. No.	Reference Item No.	Function
1	Adapter, assembly	11737814	1-2	25	To mount R/T tester to receiver-transmitter unit (A76).
2	Ammeter, PFN charge	4931-00-628-1820 (11737824)	1-2	2	To determine the PFN current setting after adjustment using the R/T tester.
3	Cable, ammeter PFN charge	4931-00-628-1808 (11745327)	1-2	16	To interconnect PFN charge ammeter to power supply control unit (A77).
4	Cable, tester A7/A77	4931-00-628-1341 (11737815)	1-2	17	To interconnect the R/T tester to the power supply control unit (A77).
5	Cable, test A75/A79 (W50)	4931-00-628-1692 (11737821)	1-2	18	
6	Cable, test A76/A77 (W51)	4931-00-628-1343 (11737817)	1-2	19	
7	Cable, test A76/A77 (W52)	4931-00-628-1580 (11737818)	1-2	20	To interconnect the designated units during troubleshooting.
8	Cable, test A76/A77 (W53)	4931-00-628-1671 (11737819)	1-2	21	
9	Cable, test A77/A78 (W54)	4931-00-628-1342 (11737816)	1-2	22	
10	Cable, test A75/A76	11737820	1-2	23 J	To interconnect the designated units during troubleshooting.
11	Extender card, interface	4931-00-628-1340 (11737822)	1-2	12	
12	Extender card, low voltage power supply	4931-00-493-9236 (10559515)	1-2	13	
13	Extender card, battery charge sensor	4931-00-628-1544 (11737823)	1-2	9	To provide test points for designated circuit card assemblies located in the power supply control unit (A77)
14	Extender card, charge control	4931-00-628-1542 (11737845)	1-2	10	and battery power supply unit (A781 during troubleshooting.
15	Extender card, power control	4931-00-628-1519 (11737851)	1-2	11	
16	Eyebolt (2 each)	5305-00-113-3767 (NAS1053-05-17)	1-2	4	To facilitate use of receiver-transmitter handles with a mechanical hoist or similar device.
17	Gage. depth-connector, cover/housing	4931-00-628-1520 (11737471)	1-2	14	To determine clearance on connectors W1J3 and WIJ5 of receiver-transmitter unit A7C6.
18	Handle assembly, ballistic cover	4931-00-628-1541 (11741606)	1-2	3	To facilitate handling of the ballistic cover.
19	Handle, receiver-transmitter (2 each)	11737942	1-2	1	
20	Tie rod assembly, handle-receiver-transmitter	11737945	1-2	15	To facilitate handling of the receiver-transmitter unit (A76).
21	Tool, removal-boot	11737451	1-2	7	To remove switch boots (switch lens seals) from R/T control unit (A75) and commander's control unit (A79).
22	Wrench, spanner nut	11745619-1	1-2	5	To remove spanner nuts from
23	Wrench, spanner nut	11745619-2	1-2	6	switches on the R/T control unit
24	Wrench, spanner switch	11737810	1-2	8	(A75) and commander's control unit (A79).
25	Manual, technical	TM 9-4931-355-14	1-2	24	To inform operator, organizational. direct support and general support maintenance personnel how to maintain the laser range finder special tools and test equipment.
26	Case, carrying	11737835	1-2	26	To carry and store special tools and test equipment for the laser range finder.
27	Insert, lower	11737837	1-2	27	To retain items within the case.
28	Insert, upper	11745640-3	1-2	28	

Table 1-3. General Support Special Tools and Test Equipment-Alinement Kit (11738863)

Item No.	Item	NSN or reference No.	Reference Fig. No.	Reference Item No.	Function
1	Cable, assembly	4931-00-628-1750 (11741597)	1-4	2	To provide power to receiver-transmitter unit (A76) when the ballistic cover is removed.
2	Case, carrying	11737981	1-4	4	To carry and store all items of the alinement kit special tools and test equipment.
3	Goggles, laser safety (industrial)	4244-00-258-2054 (10554508)	1-4	3	To provide eye protection during receiver-transmitter unit (A76) alinement.
4	lens assembly alinement	4931-00-628-1987 (11741599)	1-4	1	To permit alinement of eyepiece reticle with transmitter laser beam.
5	Tool, boresight-adjustment	4931-00-628-1334 (11741598)	1-4	5	To adjust screws which aline transfer prism.
6	Insert, lower	11745641	1-4	6	To retain items within the case.
7	Insert, upper	11745640-1	1-4	7 .	

b. The receiver-transmitter tester (referred to as R/T tester) mounts on the face of the receiver-transmitter to measure and provide an indication of transmitter output energy and receiver sensitivity of the laser range finder. The laser energy detector consists of optical devices and electronic circuitry that measures transmitter output energy. Refer to figure 1-6 for block diagram of the R/T tester. The receiver test lamp driver contains a regulator circuit that enables a test lamp to produce a constant calibrated light intensity to measure go-no-go receiver sensitivity.

c. Operating voltages are supplied by the hot mock-up.

Figure 1-6. R/T tester block diagram.
(Located in back of manual)

1-5. Functional Description.

a. To measure transmitter output energy, MODE SELECT switch on the R/T tester is set to the position that lights XMTR lamp. The signal that lights the XMTR lamp is also applied to RESET-FIRE switch on the R/T tester. The RESET-FIRE switch on the R/T tester is set to RESET, which generates a manual reset signal. The manual reset signal is used to reset the laser range finder, and also to trigger a one-shot multivibrator. The output of the one-shot multivibrator enables the sample and hold circuit which senses the output of the light-sensitive photodiode. The sensitivity of the photodiode is such that it will have no output when no laser pulse is present and the output of the sample and hold circuit is reset to zero.

b. The RESET-FIRE switch is then set to FIRE, which causes the input signal from the MODE SELECT switch to generate a remote range signal. The remote range signal, which is applied to the power supply control unit, fires the transmitter and causes it to generate an A-trigger signal and a burst of laser light. The A-trigger signal triggers the one-shot multivibrator. The output of the one-shot multivibrator again enables the sample and hold circuit which samples the output of the light-sensitive photodiode.

c. The laser light is diffused by a set of diffusers and attenuated by filters before reaching the photodiode. A portion of the filtered light is then applied to the photodiode which generates a signal current proportional to the intensity of laser light. This signal current is integrated by a capacitor in the integrator for the entire duration of the laser pulse to provide a voltage which is proportional to the energy of the laser pulse. The sample and hold circuit uses this voltage and produces a deflection on the RCVR-XMTR STATUS meter, which provides an indication of transmitter output energy.

d. To measure receiver sensitivity, MODE SELECT switch is set to the position that lights RCVR lamp. When the R/T tester is operated in the receiver test mode, the switching regulator power supply is turned on to provide constant power to the receiver test lamp. The constant intensity light from the receiver test lamp is collimated by the collimating lens and directed into the receiver optics of the receiver-transmitter

unit. The receiver responds to the light from the test lamp as if it were background light from a target. The receiver than develops an automatic gain control (agc) voltage which is used by the receiver to maintain the noise count rate at a constant value. The video signal is used to trigger a one-shot multivibrator which develops an output voltage in conjunction with the agc voltage. This voltage is applied to the RCVR-XMTR STATUS meter, which provides an indication of go-no-go receiver sensitivity.

e. The face of RCVR-XMTR STATUS meter has two scales: one for the transmitter mode and one for the receiver mode. Each scale consists of a color-coded band bracketed by a black region. During the transmitter mode of test, a deflection of the meter needle into the red band indicates that the transmitter output energy is within tolerance. During the receiver mode of test, an acceptable receiver sensitivity is indicated by a deflection in the white band. In each case, the color of the acceptable band corresponds to the color of the mode indicator lamp that is illuminated. In either test, a deflection into either of the black regions indicates an out-of-tolerance condition.

1-6. Tabulated Data.

a. Shipping Information and Physical Characteristics. The physical characteristics of the carrying cases for the test *sets and alinement kit are listed in table 1-4.*

b. R/T Tester Performance Characteristics. Performance characteristics of the R/T tester are summarized in table 1-5. Refer to TM 9-1240-36934 for data on the laser range finder units.

Table 1-4. Test Sets and Alinement Kit Shipping Data

Item	Length (in.) approx	Width (in.) approx	Height (in.) approx	Volume (cu. ft.) approx
Test set (10559658)	19	23	15	3.8
Test set (11738864)	29	40	18	12.1
Alinement kit (11738863)	13	17	15	1.9
R/T holding fixture (11738862)	29	19.75	12	

Table 1-5. R/T Tester Performance Characteristics

Power Requirements		
Voltage (supplied by hot mock-up)		
Current	Receiver test mode:	2 amperes (maximum)
	Transmitter test mode:	150 milliamperes (maximum)
Operation		
Optimum operating temperature	75±10° F	
Operating temperature	70±30° F	
Altitude	10,000 feet	
Other		
Storage temperature:	-65 to +160°F	

CHAPTER 2

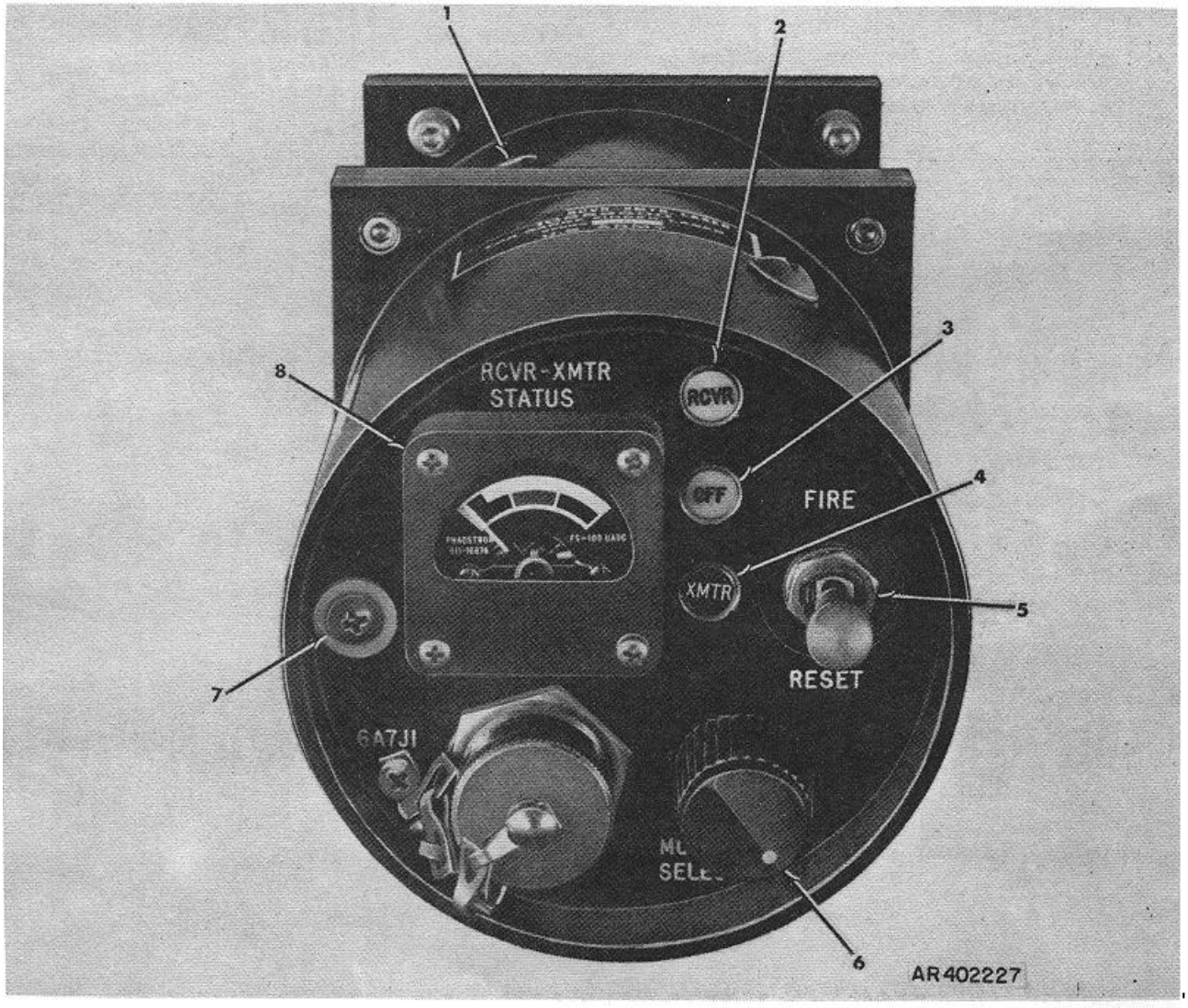
OPERATING INSTRUCTIONS

2-1. General.

This chapter describes the various controls and indicators of the R/T tester and PFN charge ammeter.

2-2. Controls and Indicators.

The controls and indicators for the R/T tester are shown in figure 2-1. A functional description of the controls and indicators for the R/T tester are listed in table 2-1. The control and indicator for the PFN charge ammeter are shown in figure 2-2. A functional description for the control and indicator for the PFN charge ammeter are listed in table 2-2.

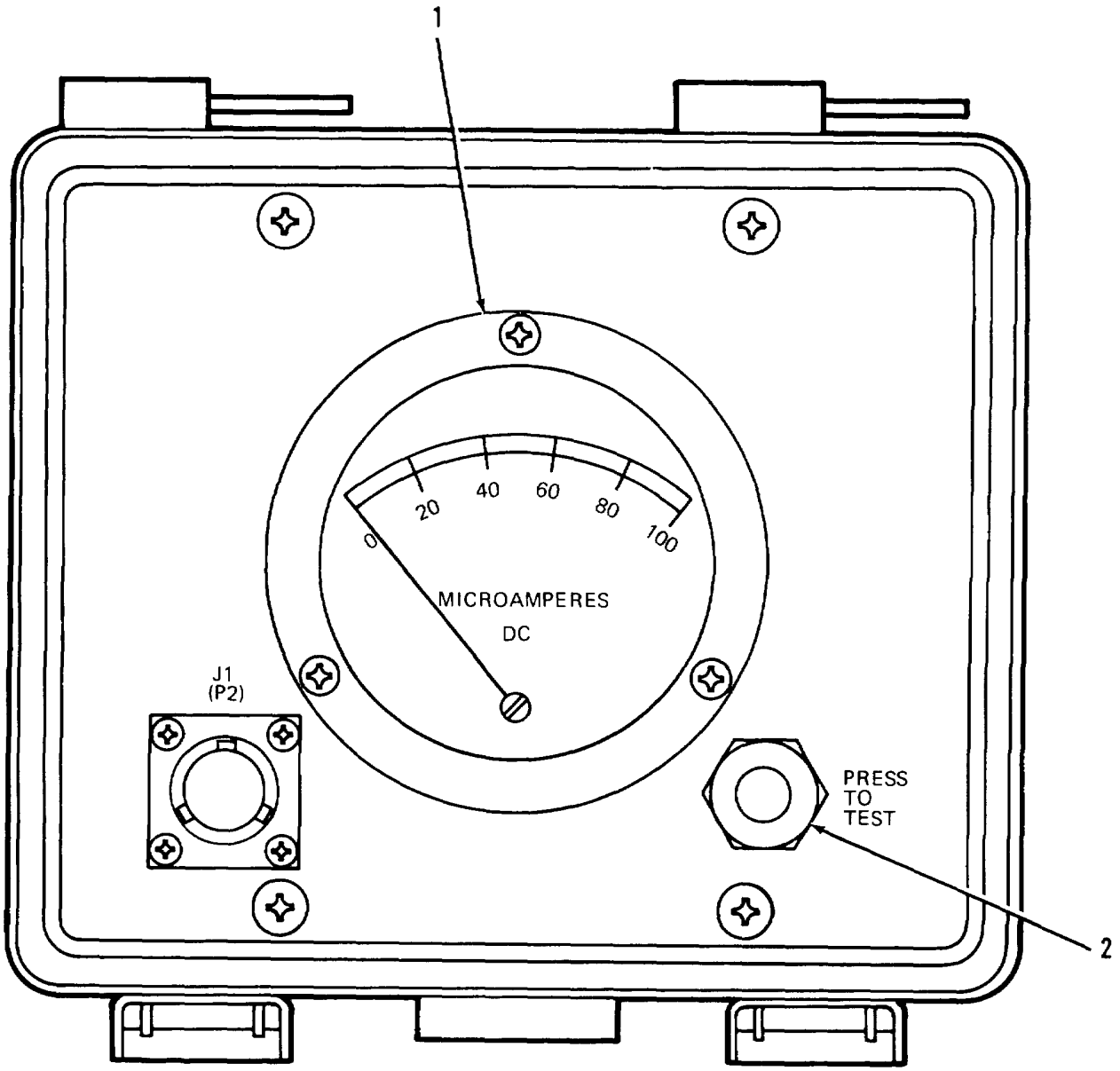


1. Nitrogen charging valve 11739027
2. RCVR lamp 11737364-10
3. OFF lamp 11737364-11
4. XMTH lamp 11737364-9
5. RESET-FIRE switch MS24659-27N
6. MODE SELECT switch 11738999
7. Nitrogen exhaust port 11737540-1
8. RCVR-XMTR STATUS meter 10559645

Figure 2-1. R/T tester controls and indicators.

Table 2-1. R/T Tester Controls and Indicators

KEY NO.	Control or Indicator	Type	Function
1	Nitrogen charging valve		Provides connection for purging and charging tester.
2	RCVR lamp	Lamp	Lights when receiver test mode is selected with MODE SELECT switch.
3	OFF lamp	Lamp	Lights when the MODE SELECT switch is set to the off position.
4	XMTR lamp	Lamp	Lights when transmitter test mode is selected with MODE SELECT switch.
5	RESET-FIRE switch	Spring-loaded toggle, pulls out and up to FIRE	
	RESET position		Resets laser range finder and R/T tester.
	FIRE position		Fires receiver-transmitter unit.
6	MODE SELECT switch	Three-position rotary	Selects the mode of test.
7	Nitrogen exhaust port		Exhaust for nitrogen while purging.
8	RCVR-XMTR STATUS meter	Indicating	Indicates receiver-transmitter unit test status.



1. Current meter 420-G (Triplett)
2. PRESS TO TEST switch M8805/99-02

Figure 2-2. PFN charge ammeter control and indicator.

Table 2-2. PFN Charge Ammeter controls and Indicators

KEY NO.	Control or Indicator	Type	Function
1	Current meter	Micro amps	Indicates PFN current.
2	PRESS TO TEST switch	Pushbuttorn switch	Provides meter indication when pressed.

2-3. Operation Procedures.

Refer to TM 9-1240-369-34 for operation and hot mock-up interconnection diagram.

CHAPTER 3

DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE INSTRUCTIONS

Section I. SERVICE UPON RECEIPT OF MATERIEL

3-1. General.

a. When new or reconditioned Laser Test Sets or Alignment Kit are received by the using organization, check that all items are present, in good condition, clean, and properly stored. Purge and charge the tester, if necessary.

3-2. Modification Work Orders.

All pertinent modification work orders must have been applied. Check DA Pamphlet 310-7. If applicable, check on the application of all authorized modifications to see that no unauthorized alteration has been made, or that no work beyond the authorized scope of the unit is being attempted.

3-3. Receiving Inspection.

a. General Requirements.

(1) The external case and cover must be clean and in good condition.

(2) All switches, lamps, and connectors on applicable test equipment must be intact.

(3) All switches must function normally.

(4) All panel markings, and other essential markings must be legible.

(5) Cables and extender card connectors and other accessory equipment must be in good condition. There must be no brittle or frayed insulation.

(6) The special tools and test equipment must be examined for evidence of abuse.

b. Specific Requirement. Test Sets and Alignment Kit components should conform to the configuration depicted in figures 1-1 through 1-4.

The R/T tester and PFN charge ammeter should be in good operating condition.

3-4. Services for Deficiencies on Receipt.

Any deficiencies discovered by the inspection described in paragraph 3-3 will be corrected.

Section II. REPAIR PARTS, SPECIAL TOOLS, AND EQUIPMENT

3-5. Repair Parts.

Repair parts, special tools, and equipment for the test set at direct and general support maintenance levels are contained in TM 9-4931355-24P.

3-6. Special Tools and Equipment.

Refer to table 3-1.

Table 3-1. Special Tools and Equipment

Item	NSN or reference No.	Reference Fig. No.	Reference Para No.	Use
Kit. Purging Fire Control Nitrogen, Technical Tank	4931-00-065-1110 6830-00-782-2641 (BB-N-411}		3-11 3-11	To purge and charge tester. Used with Kit, Purging 4931-00-065-1110.

Section III. PREVENTIVE MAINTENANCE CHECKS AND SERVICES

3-7. General.

Preventive maintenance services include cleaning, inspection, and paint touch-up procedures. Such maintenance is performed at regular or unscheduled intervals to detect and correct conditions which might cause the equipment to deteriorate and degrade field performance or cause a field failure. The following subparagraph and table 3-2 contains procedures and instructions necessary to perform organizational preventive maintenance checks and services.

3-8. General Cleaning Instructions.

The test set should always be kept clean. Otherwise performance may be degraded and obvious defect that would be noticed in a visual inspection may be hidden by dust or other foreign matter.

WARNING

Toluol solvent is toxic and flammable. Use only in a well-ventilated area. Avoid prolonged or repeated breathing of vapor. Avoid prolonged or repeated contact with the skin.

Isopropyl alcohol is flammable. Keep all flammable cleaning materials away from open flames. Failure to do so could result in injury or death.

a. Metal Parts. Use dry, cotton wiping cloths to remove dust, dirt, grease, moisture, or other foreign matter. If the foreign matter cannot be removed using dry wiping cloths, dampen a cloth with isopropyl alcohol or solvent and gently wipe the area.

b. Rubber Parts. Clean rubber parts using a mild detergent and warm water. Dry the parts using a clean, absorbent wiping cloth.

c. Glass.

CAUTION

Do not clean the glass surfaces on front of the R/T tester or alinement lens assembly with cloths or other materials that might scratch the surface.

Use a camel hair brush to remove loose particles of dust and lint from the glass surface. Then wipe the surface in a circular motion using lens tissue (either dry or moistened with isopropyl alcohol).

If dirt, lint, or smears remain on the glass, wrap a piece of lens tissue around the end of an orange stick (or equivalent) to form a swab. Beginning at the center of the surface, swab with a circular motion while applying a light downward pressure.

Gradually increase the radius of the area being cleaned until the entire surface has been covered.

If necessary, use a rubber syringe to remove any remaining dust or lint.

3-9. Inspection.

Conduct a visual inspection of the test set as indicated in table 3-2 to make sure that all items are in good condition. Replacement items should be substituted for those found to be damaged or worn near or beyond serviceable limits. Dirt, grease, and foreign matter should be removed from all inspected surfaces. Preservatives and foreign matter should be removed from electrical connectors. Areas where the paint is scratched, chipped, or worn should be repainted.

Table 3-2. Preventive Maintenance Checks and Services

Sequence NO.	Item to be inspected	Procedure	Corrective action and/or paragraph reference
1	General Appearance	Check for accumulations of dirt, oil, grease, or other foreign matter.	Clean.
		Check for breaks, cracks, distortions, or other evidence of damage.	Replace item.
		Check interfaces for serviceability and for evidence of damage or wear. bent or broken connector pins.	Replace item.
		Check for rust or corrosion and missing, chipped or blistered paint (check for missing parts.	Clean and spot (para 3-10. table 3-3). Replace item.
2	Equipment markings	Inspect for legibility.	Replace item.
3	Adapter, test	Check adapter for cleanliness and damage.	Clean (table 3-31 and replace if damaged.
		Check for damaged inserts.	Replace inserts (para 4-6a)
		Check for missing. chipped or blistered paint.	Clean and spot paint (para 3-10, table 3-3).

Table 3-2. Preventive Maintenance Checks and Services -Continued

Sequence NO.	Item to be inspected	Procedure	Corrective action and/or paragraph reference
3	Adapter test-Continued	Check light seal for cleanliness and damage.	Clean (para 3-8b, table 3-3) and replaced if damaged
4	Tool, removal-boot	Check tool for cleanliness and damage.	Clean (para 3-8a, table 3-3) and replace if damaged
5	Cables	Check connectors. and cables for cleanliness and damage.	Clean (table 3-3) and replace if damaged
		Check connectors for bent or broken pins.	Replace cable
6	Extender cards	Check for worn or damaged surfaces, or broken -copper paths and bent or broken connectors and,/or pins.	Replace extender card.
		Check pins for cleanliness.	Clean as required (table 3-3)
		Check for- broken or loose wires.	Replace or resolder wires.
		Check connector for missing polarizing keys.	Replace as required (para 4-8).
7	Handles, and tie rod assembly receiver- transmitter	Check handles for cleanliness and excessive wear and/or damage.	Clean (para 3-8a) and replace if damaged.
		Check tie rod assembly for damaged cables.	Replace assembly
		Check tie rod assembly, for damaged or missing pins.	Replace assembly
8	Handle assembly, ballistic cover	Check handles for cleanliness and excessive wear and/or damage.	Clean (para 3-8a, table 3-3) and replaced if damaged
		Check screws for excessive binding.	Replace handle assembly.
9	Ammeter, PFN charge	Check ammeter for cleanliness and damage.	Clean (para 3-8, table 3-3) and replace if damaged.
		Check for missing, chipped or blistered paint.	Clean and spot paint (para 3-10, table 3-3).
10	Gage, depth connector cover/housing	Check gage for cleanliness and damage.	Clean (para 3-8a, table 3-3) and replace if damaged.
11	Eyebolt	Check eyebolt for cleanliness and damage	Clean (para 3-8a, table 3-3) and replace if damaged
12	Cases, carrying	Check for cleanliness and damage.	Clean (para 3-8 a table 3-3) and replace if damaged.
		Check for missing, chipped or blistered paint.	Clean and spot paint (para 3-10, table 3-3).
13	Wrenches	Check for damage.	Replace if damaged.
14	Tester, R/T	Check glass surface for cleanliness and damage.	Clean (para 3-8c, table 3-3) and Replace if damaged..
		Check for missing, chipped, or blistered paint.	Clean and spot paint (para 3-10, table 3-3).
		Check for damage.	Replace if damaged.
		Check for cracked or missing MODE SELECT switch knob.	Replace knob (para 4-3).
		Check for damaged or missing connector cover.	Replace connector cover (para 4-3).
15	Puller, circuit card	Check puller fir damaged knobs.	Replace puller.
		Check puller for damage.	Replace Puller
16	Lens, assembly, alinement	Check glass surfaces for cleanliness and damage.	Clean (para 3-8c, table 3-3) and Replace if damaged.
		Check for damaged or missing cord assembly.	Replace cord assembly (para 4-14).
17	Tool boresight-adjustment	Check tool Cleanliness.	Clean para 3-8a, table 3-3
		Check for missing setscrews.	Replace setscrews.
		Check for damage	Replace tool.

3-10. General Painting Instructions.

Visually inspect the special tools and test equipment items for rust or corrosion and missing, chipped or blistered paint. Small areas of damaged paint are touched up as part of user maintenance. Apply paint as issued or with not more than 5 percent by volume of thinner. See table 3-3 for requirements and materials needed for cleaning and touch-up painting.

a. Smooth surface and feather edges of affected areas with fine abrasive paper.

WARNING

Toluol solvent is toxic and flammable. Use only in a well-ventilated area. Avoid prolonged or repeated breathing of the vapor. Avoid prolonged or repeated contact with the skin.

b. Clean area with a wiping cloth dampened with toluol solvent.

c. Apply primer and paint to the affected area per table 3-3 and instructions cited on the paint containers. Air dry primer for a minimum of 1/2 hour. Within two hours after application of primer, apply one coat of paint per table 3-3.

3-11. R/T Tester Purging and Charging Procedure .

The R/T tester is a sealed unit which is purged with dry nitrogen at 90-day intervals. The unit is purged to prevent condensation of moisture which may hinder the operation of the unit. A purging adapter kit which is supplied for organizational maintenance of the Sheridan vehicle is connected to a nitrogen cylinder and to the fill valve of the R/T tester. The fill valve is color coded gray and the escape port is color coded yellow. The following procedure shall be used to purge the R/T tester.

a. Remove fill valve cap from the R/T tester fill valve (1, fig. 2-1).

b. Remove screw plug from the R/T tester exhaust port (7, fig. 2-1).

c. Attach one end of the purging adapter kit to the nitrogen cylinder and the other end to the R/T tester fill valve.

Table 3-3. Materials Needed For Cleaning and Touch-up Painting

Item Name	Specification	FSC
WARNING **Isopropyl alcohol is flammable. When using it for cleaning, keep it and all flammable cleaning materials away from open flames.** **Toluol solvent is toxic and flammable. Use only in well-ventilated area. Avoid prolonged or repeated breathing of the vapor. Avoid prolonged or repeated contact with the skin.**		
Adhesive	RTV-8262 (General Electric Co.)	8030
Cotton, Flannel, (wiping rag)	CCC-C-458	8305
Filler, Engraving	TT-F-325, type II	8010
Flux, Soldering, Liquid (Rosin Base)	MIL-F-14256	3439
Identification Marking of U. S. Military Property	MIL-STD-130	MISC
Isopropyl Alcohol Grade I	TT-I-735	6810
Methyl Ethyl Ketone Technical)	TT-M-261	6810
Paint, Olive, Drab X240)87	FED-STD-595	8010
Paper, Lens Tissue	NNN-P-40	6640
Primer Coating, Zinc Chromate	MIL-P-6808	8010
Primer, Fluorescent, Pink	SS4004 (General Electric Co.)	8030
Solder, Tin Allov Sn 60	QQ-S-571 type WRMAP-2	3439
Toluol. ('leaning, Solvent	T324	6810
Waxed Cord	11737916	

d. Turn the tank valve on the nitrogen cylinder counterclockwise to open the valve.

e. Set the pressure regulator for 14±1.0 psig.

f. Turn the control valve on the purging adapter kit counterclockwise to open the valve.

g. Allow the R/T tester to purge for a minimum of one minute.

h. Turn the control valve on the purging adapter kit clockwise to close the valve.

i. Allow the R/T tester to depressurize to ambient pressure.

j. Repeat f through i above four times and continue with paragraph k below.

k. Turn the control valve on the purging adapter kit counterclockwise to open the valve.

l. Allow the R/T tester to purge for at least 20 minutes at the 14±1.0 psig pressure.

m. Reduce the pressure to less than three psig.

n. Install the plug screw in the R/T tester exhaust port.

o. Repressurize to a pressure of 10±1.0 psig.

p. Turn the control valve on the purging adapter kit clockwise to close the valve.

q. Remove the purging adapter kit from the R/T tester fill valve.

r. Install the fill valve cap on the R/T tester fill valve.

s. Close the valve on the nitrogen tank and relieve the pressure in the purging adapter kit.

3-12. R/T Tester Calibration.
Calibration of the R/T tester must be performed at depot.

Section IV. TROUBLESHOOTING

3-13. Troubleshooting the Test Set.

Troubleshooting of the test set is limited to continuity checks of the test cables and extender cards and to visual inspection of the special tools and test equipment. If continual faulty indications are observed on the RCVR-XMTR STATUS meter of the R/T tester or on the PFN charge ammeter, a known good R/T tester or PFN charge ammeter, receiver-transmitter unit, power supply control unit or test cable should be substituted to localize the trouble to one of the four items. Table 3-4 summarizes the troubleshooting required for the test set. Figure 3-1 provides the schematic diagrams of the test cables and table 3-5 provides the wire list for the extender cards. Table 3-6 provides the wire list for the branched cable. Refer to TM 9-1240-369-34 for troubleshooting of laser range finder units.

Figure 3-1. Cables schematic diagram.
(Located in back of manual)

Table 3-4. Test Set Troubleshooting

Sequence NO.	Item to be inspected	Procedure	Corrective action and/or paragraph reference
1	All of the mode lamps do not light on R/T tester.	Tester cable, or R/T tester.	Check continuity of tester cable. If proper continuity exists, return R/T tester to depot for repair. If proper- continuity does not exist, repair tester cable (para 4-11).
2	One or more or more of the mode lamps not light on R/T tester.	R/T tester.	Return R/T tester to depot do for repair.
3	No indication on the R/T tester RCVR-XMTR STATUS meter during receiver sensitivity check or transmitter output energy check.	R/T tester.	Return R/T tester to. depot for repair.
4	PFN charge ammeter does not indicate during transmitter output energy check.	PFN charge ammeter or PRESS TO TEST switch.	Return PFN charge, ammeter depot for repair.
5	Various circuit card assemblies or modules do not function properly when installed in extender card connectors or extender cable connectors.	Extender card/extender cable.	Perform maintenance checks as described in table 3-1 and repair extender card (para 4-8) or extender cable (para 4-11).
6	Laser range finder does not function properly during receiver to transmitter alinement.	Branched cable.	Perform maintenance checks as described in table 3-1 and repair (para 4-11).

Table 3-5. Extender Cards Wire Lists

Interface Card Wire List		Low Voltage Power Supply Card Wire List		-1600V Power Supply Card Wire List		Counters Card Wire List		Reply Gating Card Wire List		Select Logic Card Wire List		Power Control Card Wire list		Battery Charge Sensor Card Wire List		Battery Charge Control Card Wire List	
From	To	From	To	From	To	From	To	From	To	From	To	From	To	From	To	From	To
J1-A1	Pad-A1	J1-A1	Pad-A1	J1-A1	Pad-A1	J1-A1	Pad-A1	J1-A1	Pad-A1	J1-A1	Pad-A1	P1-7	Pad-A7	P1-1	Pad-A1	P1-4	Pad-A4
J1-B2	Pad-B2	J1 B2	Pad-B2	J1-B2	Pad-B2	J1-B2	Pad-B2	J1-B2	Pad-B2	J1-B2	Pad-B2	P1-8	Pad-A8	P1-2	Pad-A2	P1-5	Pad-A5
J1-A3	Pad-A3	J1-A3	Pad-A3	J1-A3	Pad-A3	J1-A3	Pad-A3	J1-A3	Pad-A3	J1-A3	Pad-A3	P1-9	Pad-A9	P1-4	Pad-A4	P1-6	Pad-A6
J1-B4	Pad-B4	J1-B4	Pad-B4	J1-B4	Pad-B4	J1-B4	Pad-B4	J1-B4	Pad-B4	J1-B4	Pad-B4	P1-10	Pad-A10	P1-5	Pad-A5	P1-7	Pad-A7
J1-A5	Pad-A5	J1-A5	Pad-A5	J1-A5	Pad-A5	J1-A5	Pad-A5	J1-A5	Pad-A5	J1-A5	Pad-A5	P1-11	Pad-A11	P1-6	Pad-A6	P1-8	Pad-AS
J1-B6	Pad-B6	J1-B6	Pad-B6	J1-B6	Pad-B6	J1-B6	Pad-B6	J1-B6	Pad-B6	J1-B6	Pad-B6	P1-12	Pad-A12	P1-7	Pad-A7	P1-10	Pad-A10
J1-A7	Pad-A7	J1-A7	Pad-A7	J1-A7	Pad-A7	J1-A7	Pad-A7	J1-A7	Pad-A7	J1-A7	Pad-A7	P1-13	Pad-A13	P1-8	Pad-A8	P1-11	Pad-A11
J1-B8	Pad-B8	J1-B8	Pad-B8	J1-B8	Pad-B8	J1-B8	Pad-B8	J1-B8	Pad-B8	J1-B8	Pad-B8	P1-14	Pad-A14	P1-10	Pad-A10	P1-12	Pad-A12
J1-A9	Pad-A9	J1-A9	Pad-A9	J1-A9	Pad-A9	J1-A9	Pad-A9	J1-A9	Pad-A9	J1-A9	Pad-A9	P1-15	Pad-A15	P1-11	Pad-A11	P1-15	Pad-A15
J1-B10	Pad-B10	J1-B10	Pad-B10	J1-B10	Pad-B10	J1-B10	Pad-B10	J1-B10	Pad-B10	J1-B10	Pad-B10	P1-16	Pad-A16	P1-12	Pad-A12	P1-16	Pad-A16
J1-A11	Pad-A11	J1-A11	Pad-A11	J1-A11	Pad-A11	J11-A11	Pad-A11	J1-A11	Pad-A11	J1-A11	Pad-A11	P1-17	Pad-A17	P1-14	Pad-A14	P1-24	P1-A24
J1-B12	Pad-B12	J1-B12	Pad-B12	J1-B12	Pad-B12	J1-B12	Pad-B12	J1-B12	Pad-B12	J1-B12	Pad-B12	P1-18	Pad-A18	P1-15	Pad-A15	P2-4	Pad-B24
J1-A13	Pad-A13	J1-A13	Pad-A13	J1-A13	Pad-A13	J1-A13	Pad-A13	J1-A13	Pad-A13	J1-B14	Pad-B14	P1-20	Pad-A20	P1-17	Pad-A17	P2-5	Pad-B5
J1-B14	Pad-B14	J1-B14	Pad-B14	J1-B14	Pad-B14	J1-B14	Pad-B14	J1-B14	Pad-B14	J1-A15	Pad-A15	P1-21	Pad-A21	P1-18	Pad-A18	P2-6	Pad-B6
J1-A15	Pad-A15	J1-A15	Pad-A15	J1-A15	Pad-A15	J1-A15	Pad-A15	J1-A15	Pad-A15	J1-B16	Pad-B16	P1-22	Pad-A22	P1-20	Pad-A20	P2-7	Pad-B7
J1-B16	Pad-B16	J1-B16	Pad-B16	J1-B16	Pad-B16	J1-B16	Pad-B16	J1-B16	Pad-B16	J1-A17	Pad-A17	P1-24	Pad-A24	P1-22	Pad-A22	P2-8	Pad-B8
J1-A17	Pad-A17	J1-A17	Pad-A17	J1-A17	Pad-A17	J1-A17	Pad-A17	J1-A17	Pad-A17	J1-B18	Pad-B18	P1-25	Pad-A25	P2-1	Pad-B1	P2-10	Pad-B10
J1-A19	Pad-A19	J1-B18	Pad-B18	J1-B18	Pad-B18	J1-B18	Pad-B18	J1-B18	Pad-B18	J1-A19	Pad-A19	P2-7	Pad-B7	P2-2	Pad-B2	P2-11	Pad-B11
J1-B20	Pad-B20	J1-A19	Pad-A19	J1-A19	Pad-A19	J1-A19	Pad-A19	J1-A19	Pad-A19	J1-B20	Pad-B20	P2-8	Pad-B8	P2-4	Pad-B4	P2-12	Pad-B12
J1-A21	Pad-A21	J1-B20	Pad-B20	J1-B20	Pad-B20	J1-B20	Pad-B20	J1-A21	Pad-A21	J1-A21	Pad-A21	P2-9	Pad-B9	P2-5	Pad-B5	P2-15	Pad-B15
J1-B22	Pad-B22	J1-A21	Pad-A21	J1-A21	Pad-A21	J1-A21	Pad-A21	J1-B22	Pad-B22	J1-B22	Pad-B22	P2-10	Pad-B10	P2-6	Pad-B6	P2-16	Pad-B16
J1-A23	Pad-A23	J1-B22	Pad-B22	J1-A23	Pad-A23	J1-B22	Pad-B22	J1-A23	Pad-A23	J1-A23	Pad-A23	P2-11	Pad-B11	P2-7	Pad-B7	P2-24	Pad-B24
J1-B24	Pad-B24	J1-A23	Pad-A23	J1-B24	Pad-B24	J1-A23	Pad-A23	J1-B24	Pad-B24	J1-B24	Pad-B24	P2-12	Pad-B12	P2-8	Pad-B8		
J1-A25	Pad-A25	J1-B24	Pad-B24	J1-A25	Pad-A25	J1-B24	Pad-B24	J1-A25	Pad-A25	J1-A25	Pad-A25	P2-13	Pad-B13	P2-10	Pad-B10		
J1-B26	Pad-B26	J1-A25	Pad-A25	J1-B26	Pad-B26	J1-A25	Pad-A25	J1-B26	Pad-B26	J1-B26	Pad-B26	P2-14	Pad-B14	P2-11	Pad-B11		
J1-A27	Pad-A27	J1-A27	Pad-A27	J1-A29	Pad-A29	J1-B26	Pad-B26	J1-A27	Pad-A27	J1-A27	Pad-A27	P2-15	Pad-B15	P2-12	Pad-B12		
J1-B28	Pad-B28	J1-B28	Pad-B28	J1-B32	Pad-B32	J1-A27	Pad-A27	J1-B28	Pad-B28	J1-B28	Pad-B28	P2-16	Pad-B16	P2-14	Pad-B14		
J1-A29	Pad-A29	J1-A29	Pad-A29	J1-A33	Pad-A33	J1-B28	Pad-B28	J1-A29	Pad-A29	J1-A29	Pad-A29	P2-17	Pad-B17	P2-15	Pad-B15		
J1-B30	Pad-B30	J1-B30	Pad-B30	J1-B34	Pad-B34	J1-A29	Pad-A29	J1-B30	Pad-B30	J1-B30	Pad-B30	P2-18	Pad-B18	P2-17	Pad-B17		
J1-A31	Pad-A31	J1-A31	Pad-A31	J1-A35	Pad-A35	J1-B30	Pad-B30	J1-A31	Pad-A31	J1-A31	Pad-A31	P2-20	Pad-B20	P2-18	Pad-B18		
J1-B32	Pad-B32	J1-B32	Pad-B32	J1-B36	Pad-B36	J1-A31	Pad-A31	J1-B32	Pad-B32	J1-B32	Pad-B32	P2-21	Pad-B21	P2-20	Pad-B20		
J1-A33	Pad-A33	J1-A33	Pad-A33			J1-B32	Pad-B32	J1-A33	Pad-A33	J1-A33	Pad-A33	P2-22	Pad-B22	P2-22	Pad-B22		
J1-B34	Pad-B34	J1-B34	Pad-B34			J1-A33	Pad-A33	J1-B34	Pad-B34	J1-B34	Pad-B34	P2-24	Pad-B24				
J1-A35	Pad-A35	J1-A35	Pad-A35			J1-B34	Pad-B34	J1-A35	Pad-A35	J1-A35	Pad-A35	P2-25	Pad-B25				
J1-B36	Pad-B36	J1-B36	Pad-B36			J1-B36	Pad-B36	J1-B36	Pad-B36	J1-B36	Pad-B36						

Table 3-6. Branched Cable Wire List

From	To	From	To	From	To
P1-A1	Not used	P1-46	J2-k	P2-44	Not used
P1-1	J1-e	P2-A1	J2-Z	P2-45	Not used
P1-2	J1-f	P2-1	J2-J	P2-46	Not used
P1-2 SHLD	P1-3 SHLD	P2-2	J2-K	J2-A	Not used
P1-3	J1-g	P2-16	J2-1	J2-B	Not used
P1-4	J1-h	P2-17	J2-M	J2-C	Not used
P1-4 SHLD	P1-16	P2-17 SHLD	P2-3	J2-D	Not used
P1-5	J1-H	P2-4	Not used	J2-F	Not used
P1-6	J1-J	P2-5	J2-e	J2-F	Not used
P1-7	J1-K	P2-5 SHLD	P2-7 SHLD	J2-G	Not used
P1-8	J1-L	P2-6	J2-i	J2-H	Not used
P1-9	J1-M	P2-7	J2-f	J2-x	Not used
P1-10	J1-N	P2-7 SHLD	P2-11	J2-y	Not used
P1-11	J1-P	P2-8	J2-h	J2-a	Not used
P1-12	J1-R	P2-9	J2-d	J2-M SHLD	J2-N
P1-13	J1-S	P2-9 SHLD	P2-5 SHLD	J2-d SHLD	J2-8 SHLD
P1-14	J1-T	P2-10	J2-j	J2-e SHLD	J2-f SHLD
P1-15	J1-E	P2-12	J2-n	J2-f SHLD	J2-g
P1-17	J1-j	P2-13	Not used	J2-b SHLD	J2-d SHLD
P1-18	J1-k	P2-14	Not used	J2-m	Not used
P1-18 SHLD	P1-19 SHLD	P2-15	Not used	J1-A	Not used
P1-19	J1-z	P2-18	J2-T	J1-B	Not used
P1-20	J1-AA	P2-19	J2-V	J1-C	Not used
P1-20 SHLD	P1-33	P2-30	J2-P	J1-D	Not used
P1-21	J1-U	P2-31	J2-R	J1-f SHLD	J1-g SHLD
P1-22	J1-V	P2-32	J2-S	J1-h SHLD	J1-i
P1-23	J1-W	P2-33	J2-U	J1-k SHLD	J1-z SHLD
P1-24	J1-X	P2-34	J2-W	J1-AA SHLD	J1-y
P1-25	J1-Y	P2-20	J1-8		
P1-26	J1-Z	P2-21	J1-r		
P1-27	J1-a	P2-22	J1-s		
P1-28	J1-b	P2-23	J1-u		
P1-29	J1-c	P2-24	J2-p		
P1-30	J1-d	P2-25	J2-q		
P1-31	J1-BB	P2-26	J2-r		
P1-32	J1-CC	P2-27	Not used		
P1-34	J1-m	P2-28	Not used		
P1-35	J1-n	P2-29	Not used		
P1-36	J1-p	P2-35	J2-b		
P1-37	J1-t	P2-36	J2-c		
P1-38	J1-F	P2-35 SHLD	P2-9 SHLD		
P1-39	J1-G	P2-37	J1-v		
P1-40	J1-DD	P2-38	J1-w		
P1-41	J1-EE	P2-39	J1-x		
P1-42	J1-FF	P2-40	J2-s		
P1-43	J1-GG	P2-41	J2-t		
P1-44	J1-HH	P2-42	Not used		
P1-45	Not used	P2-43	Not used		

CHAPTER 4
REPAIR INSTRUCTIONS

Section I. GENERAL

4-1. Scope

This chapter contains instructions for the repair of the test set. Also any inspection or test required during the process of repair will be discussed or referenced to the applicable section. Refer to TM 9-1240-369-34 for repair instructions for laser range finder units.

Section II. REPAIR OF RECEIVER-TRANSMITTER TESTER

4-2. General.

Repair of the R/T tester is limited to replacement of MODE SELECT switch knob, connector cover for connector 6A7J1, and touch up or replacement of illegible equipment markings.

4-3. Repair.

No special instructions are necessary for replacement of the knob or connector cover. Touch up or replace illegible equipment markings in accordance with MIL Standard 130 using white paste engraving filler.

4-4. Inspection.

Refer to chapter 5 for final inspection criteria.

Section III. REPAIR OF TESTER ADAPTER

4-5. General.

Repair of the tester adapter is limited to replacement of four inserts, the outer window gaskets, and touch-up painting of illegible markings.

4-6. Repair.

a. Replacement of Inserts. Replace damaged inserts with four inserts MS124695. No special instructions are necessary for replacement.

b. Replacement of Outer Window Gasket.

(1) Remove damaged outer window gasket from tester adapter.

WARNING

Methyl ethyl ketone used in the following step is toxic and flammable. Use only in a well-ventilated area. Avoid prolonged or repeated breathing of the vapor. Avoid prolonged or repeated contact with the skin. Keep away from heat and open flames.

(2) Clean mating surface of tester adapter with a wiping rag, CCC-C-458, dampened with methyl ethyl ketone, TT-M-261.

(3) Coat mating surface of tester adapter with primer SS4004 Allow to dry at room temperature for a minimum of 30 minutes.

(4) Prepare replacement outer window gasket by rubbing adhesive RTV-8262, catalyzed with four times the amount of catalyst normally used, into mating surface Remove excess adhesive with a dry tissue.

(5) Prepare adhesive by mixing adhesive with catalyst in a clean, nonabsorbent container. Coat the mating surfaces of both the outer window gasket and the adapter with adhesive.

(6) Install the outer window gasket to the tester adapter.

c. Repair of Markings Touch up or replace illegible markings in accordance with MIL Standard 130 using white paste engraving filler.

Section IV. REPAIR OF EXTENDER CARDS

4-7. General.

The repair of the extender cards is limited to replacement of defective or missing polarizing keys 11738976 and replacement of loose or broken wires.

4-8. Repair.

No special instructions are required for replacing the polarizing keys in the extender cards. The replacement polarizing key 11738976, is inserted into connector at pin location as indicated below.

Extender card assembly	*Connector location*
Counters	35
Low voltage power supply	26
Reply gating	20
- 1600V power supply	22
Select logic	13
Interface circuit	18

Soldered all wires using solder Sn 60, QQ-S-571. Refer to table 3-5 for the wire list of each extender card.

4-9. Inspection.

Refer to chapter 5 for final inspection criteria.

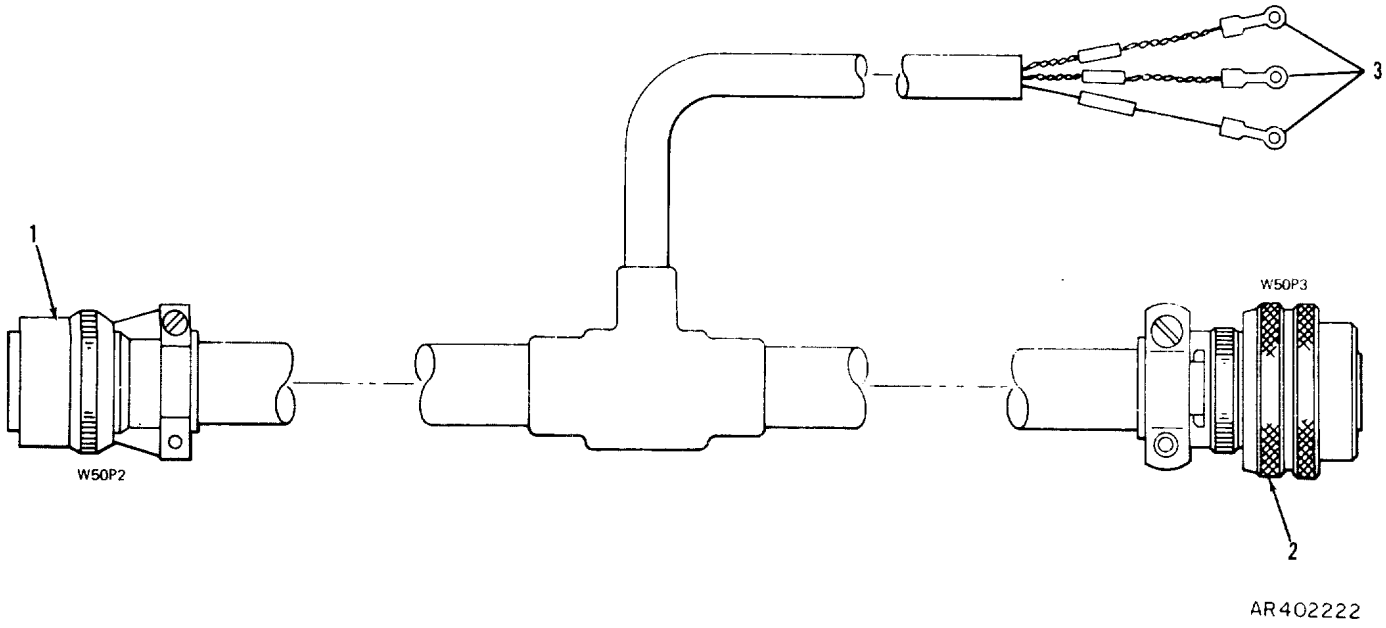
Section V. REPAIR OF CABLES

4-10. General.

The repair of the test, extender, and branched cables is limited to the replacement of defective connector at DS/GS level maintenance.

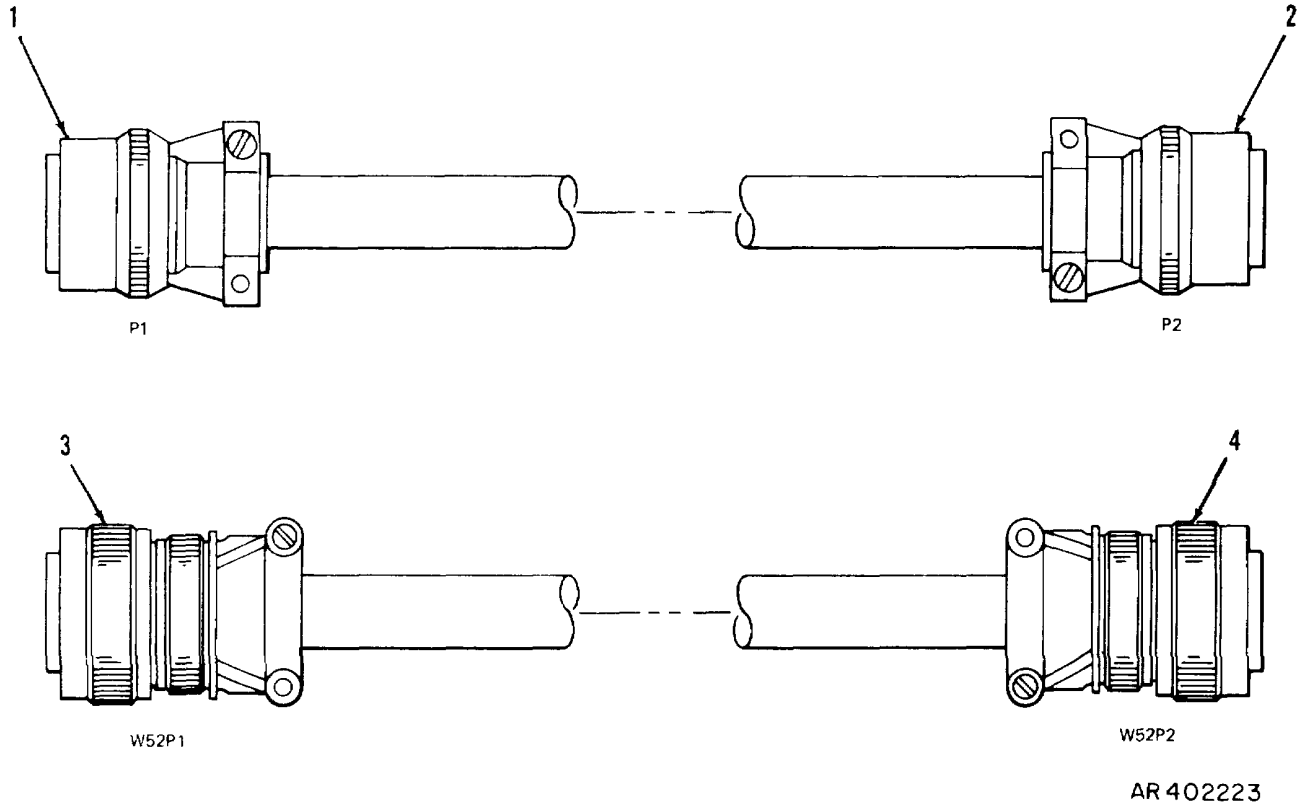
4-11. Repair.

Figures 4-1 through 4-7 show the exploded-view of the various cables. Refer to figure 3-1 for the schematic of the cable. No special instructions are required when removing the connectors from the cables. When reassembling, follow the applicable instructions given below.



1. Connector W50OP2-MS3126-F-22-55S
2. Connector W50P3- 11738035
3. Terminal lug MS25036-108

Figure 4-1. Repair of test cable W50.



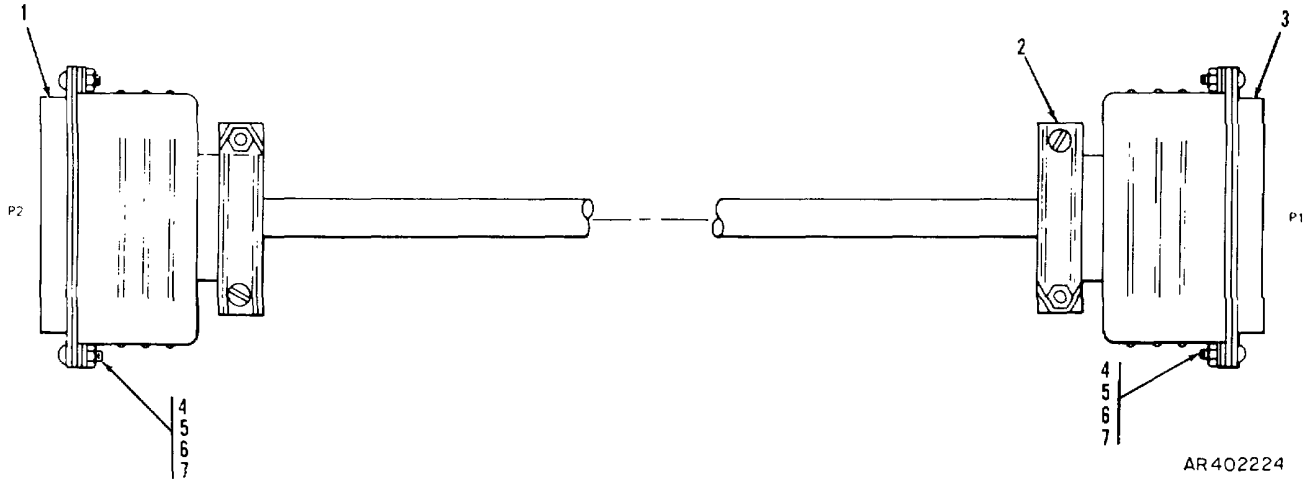
Test cable W51
1. Connector W51P1-MS3126F-22-55SW
2. Connector W51P2-MS3126F-55SX

Test cable W54
1. Connector W54P1-MS3126F-16-26SY
2. Connector W54P2-MS3126F-16-26PW

Tester cable A7/A77
1. Connector P1-MS3126F-14-19-SW
2. Connector P2-MS3126F-20-41P

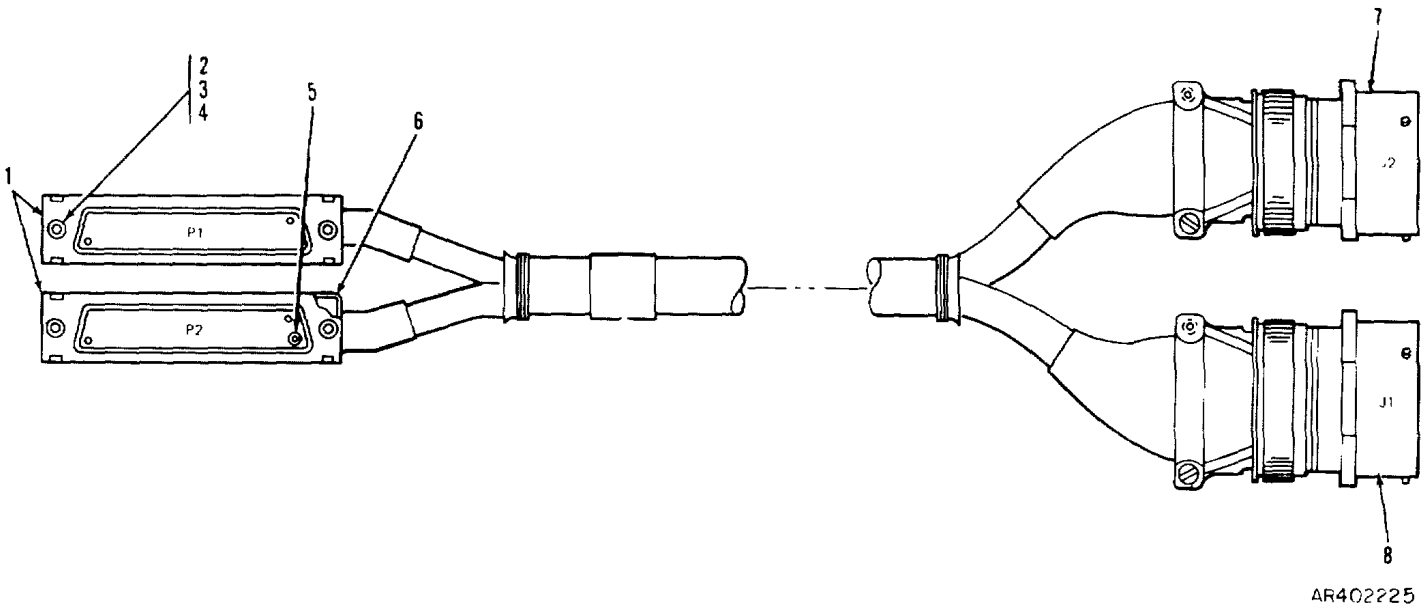
Test cable W52
3. Connector W52P1-11738034
4. Connector W5P2-11738033

Figure 4-2. Repair of test cables W51, W52, W54, and tester cable A7/A77.



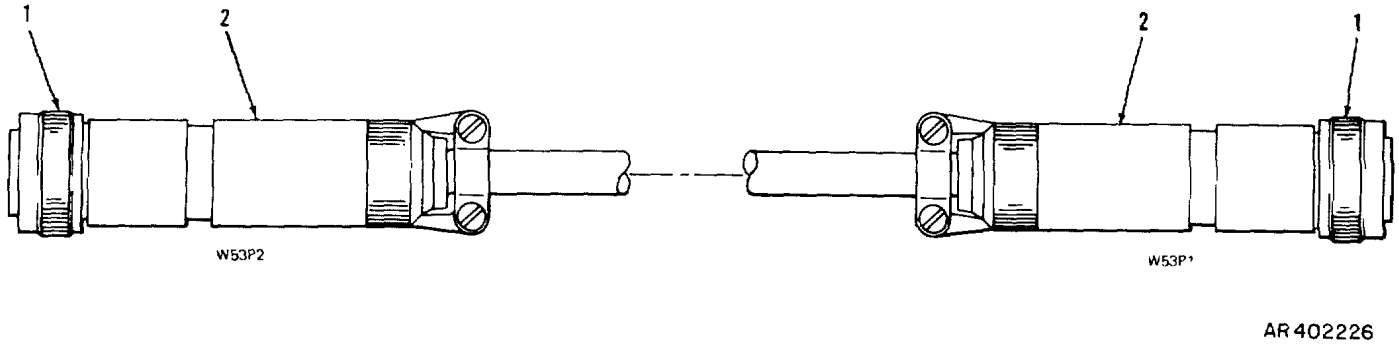
1. Connector P2-M24308/3-5
2. Clamp 11738042
3. Connector P1-M24308/1-5
4. Screw, NAS1635-04-4
5 Washer NAS620C4
6. Lockwasher MS35338-135
7. Nut NAS671C4

Figure 4-3. Repair of test cable A75/A76.



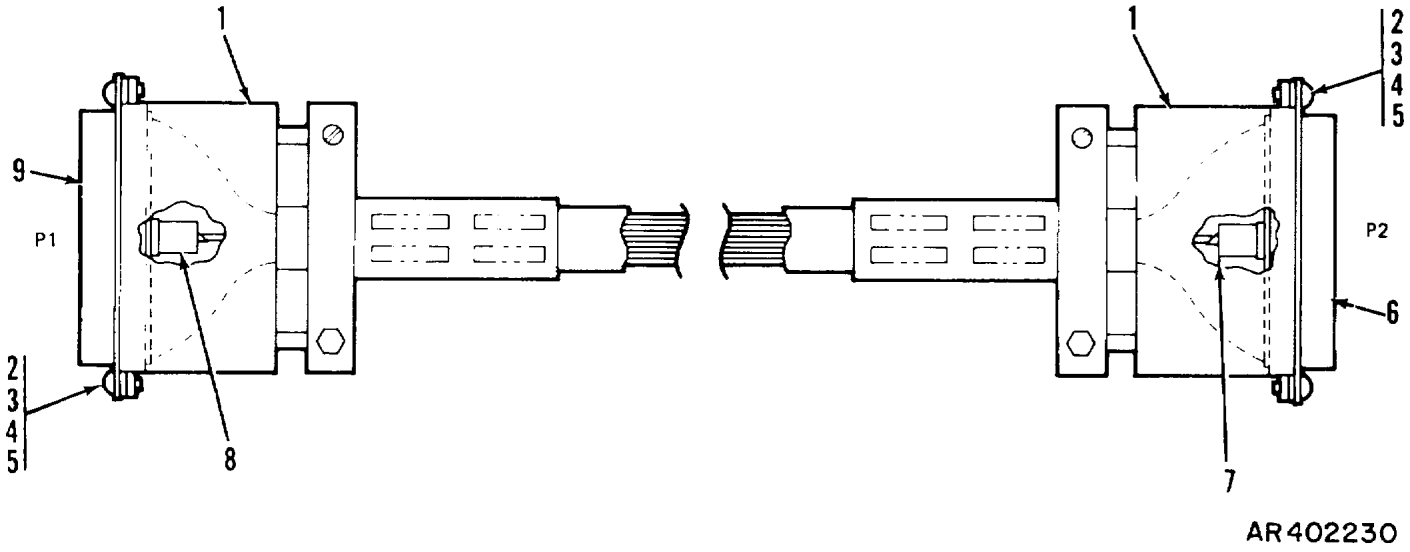
1. Connector P1 and P2--11745616
2. Screw NAS1635-04-6
3. Washer NAS620C4
4. Lockwasher MS35338-135
5. Contact 11738920
6. Shell 11745617
7. Connector J2-11745550-1
8. Connector I1-11745551

Figure 4-4. Repair of branched cable.



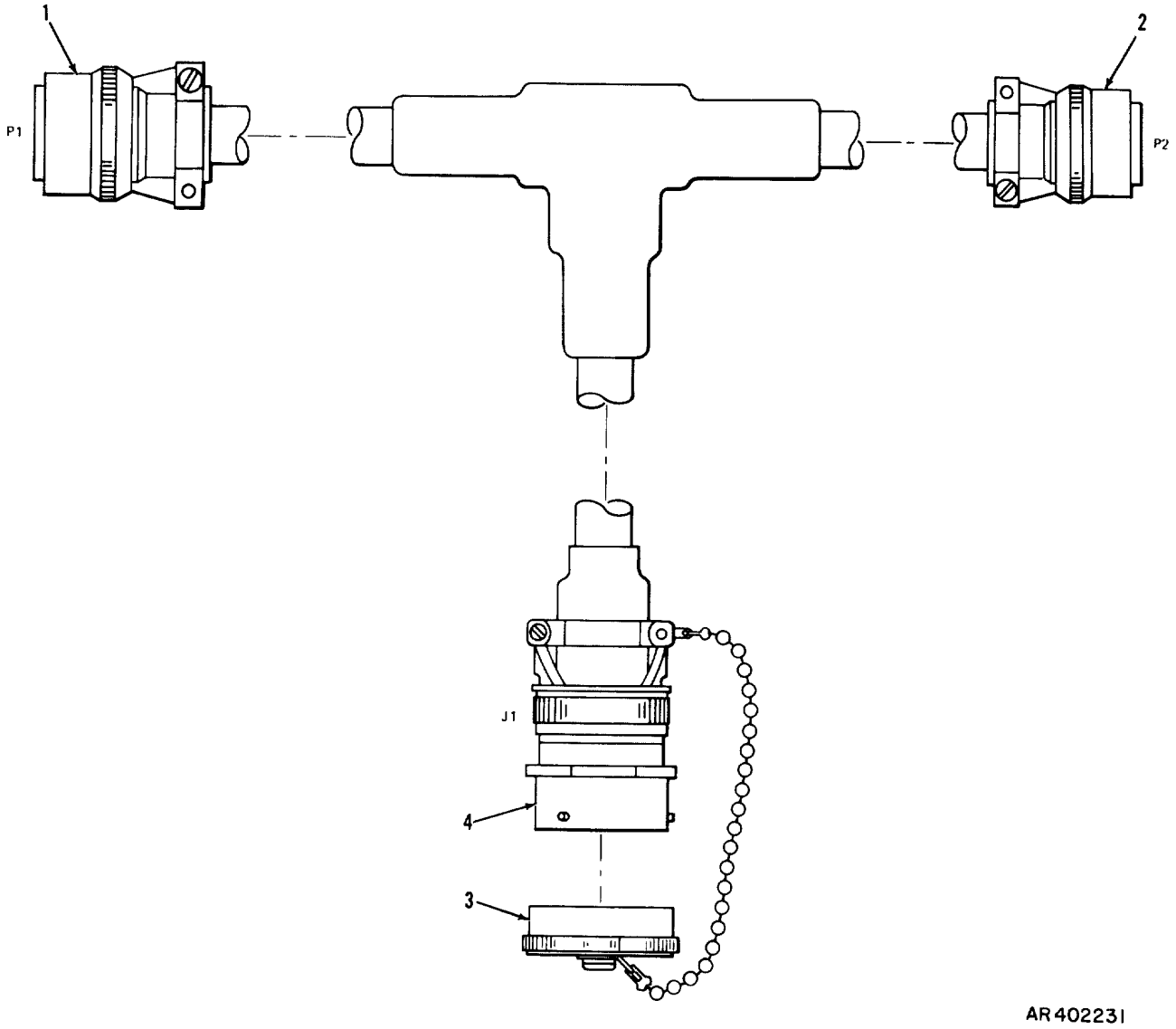
1. Connector W53P1 and W53P2--11738006
2. Adapter 11738032

Figure 4-5. Repair of test cable W53.



1. Shell 11738951
2. Screw NAS1635-04-4
3. Washer NAS620C4
4. lockwasher MS35338-135
5. Nut NAS671C4
6. Connector P2- 11738914
7. Contact 11738921
8. Contact 11738920
9. Connector P1-11738915

Figure 4-6. Repair of PFN charge power supply extender cable.



1. Connector P1-MS3126F-20-41-PN
2. Connector P2-MS3126F-12-10-SN
3. Cover 11737513
4. Connector J1-11745550-2

Figure 4-7. Repair of PFN charge ammeter cable

(1) Terminate wires on tester cable, test cables W50 through W54, A75/A76 extension cable, branched cable, or PFN charge power supply extender cable per specification MIL-F14256.

(2) Solder contacts on cable using solder Sn 60, QQ-S-571.

(3) After the termination of all wires and the completion of all soldering, assemble the connector. Assemble connectors, shells, clamps, etc as illustrated on applicable figure.

4-12. Inspection

Refer to chapter 5 for final inspection criteria.

Section VI. REPAIR OF ALINEMENT LENS ASSEMBLY

4-13. General

The repair of the alinement lens assembly is limited to replacement of the cord assembly at GS level maintenance.

4-14. Repair

a. Replacement of Cord Assembly.

(1) Remove screw holding terminal lug to alinement lens assembly.

(2) Remove cord tip and retain.

(3) Cut waxed cord 11737916 to a length such that the overall length of the cord assembly from the cord tip to the center of the terminal lug hole is 71 inches.

(4) Insert one end of waxed cord into terminal lug MS25036-108 and crimp.

(5) Insert other end of waxed cord through cord tip and make a one-knot tie.

(6) Secure terminal lug to alinement lens assembly.

CHAPTER 5
FINAL INSPECTION

5-1. General.

This chapter provides visual inspection and final inspection standards to ensure the serviceability of the complete test set. The items requiring final inspection are the R/T tester, the cables, and the extender cards. Final inspection is performed after repair has been completed to ensure serviceability of the test set according to established standards. Any items containing defects disclosed by the final inspection will be returned to the maintenance shop for repair. Refer to TM 9-1240-369-34 for final inspection procedures of the laser range finder units.

5-2. Visual Inspection.

The following procedure provides visual inspection techniques for the test set.

a. Inspect each item to ensure that it is complete.

b. Inspect each item for appearance and quality of workmanship. Check workmanship for soldering, wiring, riveting, painting, and mechanical assemblies. Ensure that all corners and edges are smooth.

5-3. Final Inspection Standards.

a. R/T Tester The following procedures establishes inspection criteria for the R/T tester.

(1) Connect laser range finder units in the hot mock-up configuration as described in TM 91240-369-34.

(2) Perform receiver sensitivity and transmitter output energy checks as described in PFN adjustment procedure in TM 9-1240-369-34.

b. Cables. Cables should be inspected for bent or broken pins, broken insulation, and frayed or broken wires. All connectors should be checked for faulty solder connections. The only test required for the cable assemblies is a continuity check. Before making a continuity check perform visual inspection described above.

c. Extender Cards. Extender cards should be visually inspected for broken or cracked board and damaged printed circuit wiring. The extender card connector should be checked for faulty solder connections. The only test required for the extender cards is a continuity check. Before making a continuity check perform the visual inspection described above.

CHAPTER 6
ADMINISTRATIVE STORAGE

6-1. General.

Refer to TM 740-90-1 for administrative storage procedures for the special tools and test equipment.

APPENDIX A
REFERENCES

A-1. Safety.

Control of Hazards from Laser Radiation	TB MED 279
Control of Health Hazards from Lasers and Other High Intensity Optical Sources	AR 40-46

A-2. Supply Catalogs.

The following Department of the Army Supply Catalogs pertain to repair of this materiel:

Brushes, Paints, Sealers, and Adhesives	C8000-IL-A
Fire Control Maintenance and Repair Shop Specialized Equipment Tool Set, DS, GS, and Depot Maintenance: General Purpose Tools (4931-574-6433)	SC 4931-95-CL-J51
Fire Control Maintenance and Repair Shop Specialized Equipment Wrench Set, Spanner DS, GS, and Depot Maintenance: Tuba, Dble-End Concave Inserted Blade: Set of 76 Wrenches (4931-580-0012)	SC 4931-95-CL-J52
Miscellaneous Hardware	C5340-IL-A vols 123
Oils and Greases: Cutting, Lubricating, and Hydraulic	C9100-IL
Sets, Kits, and Outfits Component List Purging Kit, Fire Control Organization, Direct and General Support Maintenance (NSN 4931-00-065-1110)	SC 4931-95-CL-J54
Shop Set, Instrument and Fire Control, Field Maintenance: Basic (4931-754-0740)	SC 4931-95-CL-A07
Tool Kit, Fire Control Instrument Repairman (4931-947-8243)	SC 4931-95-CL-A09

A-3. Other Publications.

a. General.

Accident Reporting and Records	AR 385-40
First Aid for Soldiers	FM 21-11
Recommended Changes to Publications	DAFORM 2028
The Army Maintenance Management Systems (TAMMS)	TM 38-750

b. Maintenance.

Direct Support and General Support Maintenance Manual for Range Finder, Fire Control (Laser) AN/VVG-1 (1240-00-470-2156)	TM 9-1240-369-34
General Maintenance Procedures for Fire Control Material	TM 9-254
Operator and Organizational Maintenance Manual Armored Reconnaissance/Airborne Assault Vehicle Full-Tracked, 152-MM, M551 (2350-873-5408) and M551A1 (2350-140-5151)	TM 9-2350-230-12
Operator's Manual (Turret Operation) AR/AAV M551A1 (Sheridian) (w/Laser Range Finder) (2350-140-5151)	TM 9-2350-230-10/2-3

c. Operations.

Northern Operations	FM 31-71
Operation and Maintenance of Army Materiel in Extreme Cold Weather 0° to -65°F	TM 9-207

d. Shipment and Storage.

Administrative Storage of Equipment	TM 740-90-1
Paper Lens Tissue Anti-Tarnish Wrapping	MIL-P-13988
Part Equipment and Tools for Army Material, Packaging of	MIL-P-14232
Preservation Methods of	MIL-P-116
Preservation Packaging and Packing	AR 700-15

Not applicable

APPENDIX B
BASIC ISSUE ITEMS LIST, ITEMS TROOP INSTALLED OR AUTHORIZED LIST, AND REPAIR PARTS AND SPECIAL TOOLS LIST

Not applicable.

APPENDIX C
MAINTENANCE ALLOCATION CHART

Section I. INTRODUCTION

C-1. General.

This appendix contains the maintenance allocation chart which indicates the lowest level of maintenance authorized to perform particular maintenance operations.

C-2. Maintenance Functions.

Maintenance functions will be limited to and defined as follows:

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

b. Test. To verify serviceability and to detect electrical or mechanical failure by use of test equipment.

c. Service. To clean, to preserve, to charge, and to add fuel, lubricants, cooling agents, and air If it is desired that elements, such as painting and lubricating, be defined separately, they may be so listed.

d. Adjust. To rectify to the extent necessary to bring into proper operating range.

e. Aline. To adjust specified variable elements of an item to bring to optimum performance.

f. Calibrate. To determine the corrections to be made in the readings of instruments or test equipment used in precise measurement. Consists of the comparison 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 with the certified standard.

g. Install. To set up for use in an operational environment such as an emplacement, site, or vehicle.

h. Replace. To replace unserviceable items with serviceable like items.

i. Repair. Those maintenance operations necessary to restore an item to serviceable condition through correction of material damage or a specific failure. Repair may be accomplished at each category of maintenance.

j. Overhaul. Normally, the highest degree of maintenance performed by the Army in order to minimize time work in process is consistent with quality and economy of operation. It consists of that maintenance necessary to restore an item to completely serviceable condition as prescribed by maintenance standards in technical publications for each item of equipment. Overhaul normally does not return an item to like new, zero mileage or zero hour condition.

k. Rebuild. The highest degree of materiel maintenance. It consists of restoring equipment as nearly as possible to new condition in accordance with original manufacturing standards. Rebuild is performed only when required by operational considerations or other paramount factors and then only at the depot maintenance category. Rebuild reduces to zero the hours or miles the equipment, or component thereof, has been in use.

C-3. Explanation of Format.

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

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

c. Column 3, Maintenance Functions. Column 3 lists the functions to be performed on the item listed in Column 2.

d. Column 4, Maintenance Category. Column 4 specifies, by the listing of a "work time" figure in the appropriate subcolumn(s), the lowest level of maintenance authorized to perform the function listed in Column 3. This figure represents the active time required to perform that maintenance function at the indicated category of maintenance. If the number or complexity of the tasks within the listed maintenance function vary at different maintenance categories, appropriate "work time" figure will be shown for each category. The number of man-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.

e. Column 5, Tools and Equipment. Column 5 specifies by code, those common tool sets and special tools, test, and support equipment required to perform the designated function.

Section II. MAINTENANCE ALLOCATION CHART

(1) Group Number	(2) Component/ Assembly	(3) Maintenance Function	(4) Maintenance Category* C	O	F	H	D	(5) Tools and Equipment
	Kit, Alinement	Inspect				0.1		
		Service				0.2		
		Replace				0.1		
		Repair				0.2		
	Ammeter, PFN Charge	Inspect			0.1			
		Test			0.3			
		Service			0.1			
		Replace			0.1			
		Repair					1.0	1
	Cables	Inspect			0.1			
		Test			0.5			
		Service			0.2			
		Replace			0.1			
		Repair			10.			1
	Cases, Carrying	Inspect			0.1			
		Replace			0.1			
		Repair				1.0		
	Extender Cards	Inspect			0.1			
		Test			0.3			
		Service			0.1			
		Replace			0.1			
		Repair			0.5			1
	Handle Assembly, Ballistic Cover	Inspect			0.1			
		Replace			0.1			
	Handle R/T	Inspect			0.1			
		Replace			0.1			
	Adapter, Tester	Inspect			0.1			
		Service			0.1			
		Replace			0.1			
		Repair			0.1			1
	Tester, R/T	Inspect			0.1			
		Test			0.5			
		Service			0.5			
		Calibrate					1.0	
		Replace			0.1			
		Repair					1.0	
		Overhaul					5.0	1,2,3
	Tie Rod Assembly, Handle R/T	Inspect			0.1			
		Replace			0.1			
	Tool, Removal-Boot	Inspect			0.1			
		Replace			0.1			
	Eyebolts	Inspect			0.1			
		Replace			0.1			
	Holding Fixture	Inspect			0.1			
		Replace			0.1			
	Puller, Circuit Card	Inspect			0.1			
		Replace			0.1			
	Gage, Depth	Inspect			0.1			
		Replace			0.1			

TOOLS AND TEST EQUIPMENT REQUIREMENTS

Tool or Test Equipment Reference Code	Maintenance Category	Nomenclature	National Stock Number,	Tool Number
1	F-H-D	Shop Set, Instrument and Fire Control: Field Maint, Basic	4931-00-754-0740	
2	D	Transmitter Module Test Set (Calibration of R/T Tester)	……	1046192
3	F-H-D	Purging Kit	4931-00-065-1110	

By Order of the Secretary of the Army:

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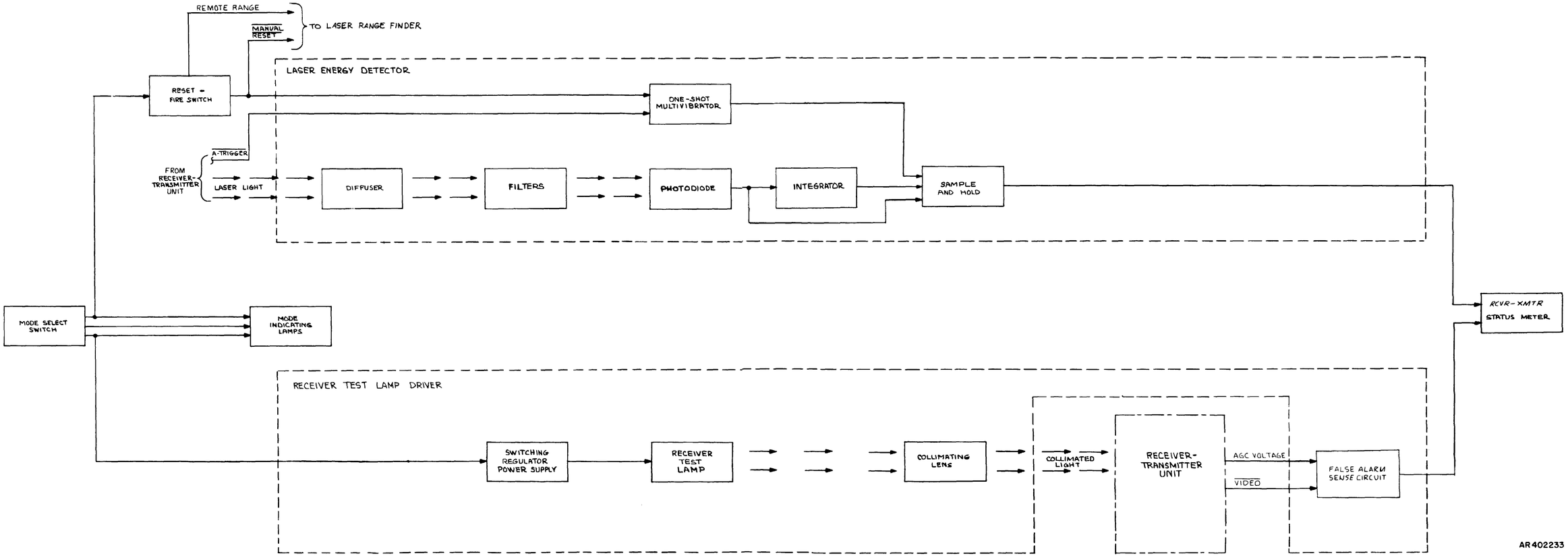

Figure 1-6. R/T tester block diagram.

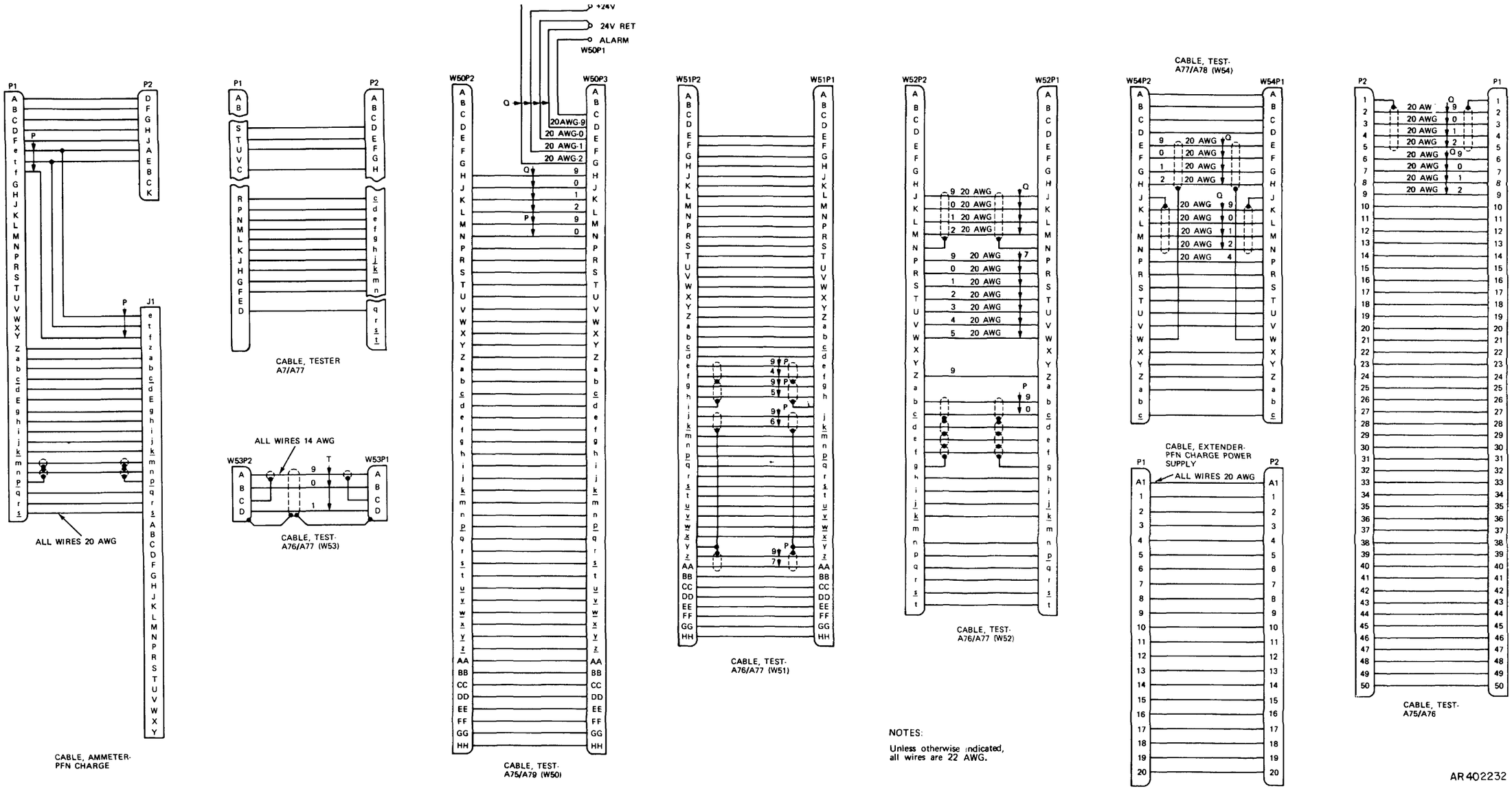

Figure 3-1. Cables schematic diagram.

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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 = 100sq. 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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