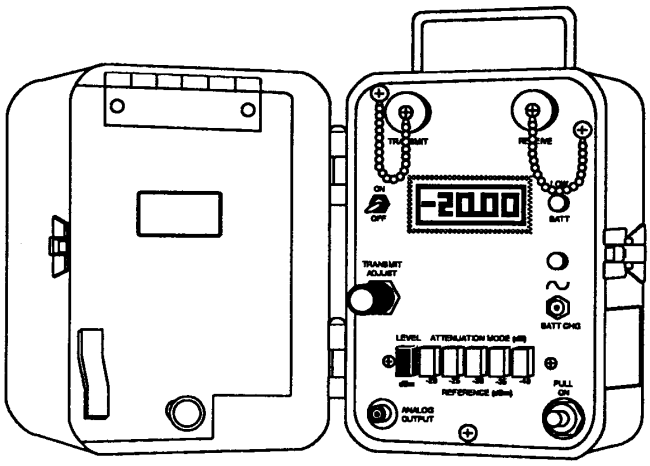
TECHNICAL MANUAL

OPERATOR'S AND UNIT MAINTENANCE MANUAL (INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST)



OPTICAL FIBER TEST SET TS-4335/G

(NSN 6625-01-316-2753)
(EIC: N/A)

HEADQUARTERS, DEPARTMENT OF THE ARMY

15 MAY 1993

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.**

TECHNICAL MANUAL
No. 11-6625-3252-12&P

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, DC, 15 May 1993

OPERATOR'S AND UNIT MAINTENANCE MANUAL (INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST) FOR OPTICAL FIBER TEST SET TS-4335/G (NSN 6625-01-316-2753)

Current as of 15 February 1993

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, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in the back of this manual direct to: Commander, U.S. Army Communications-Electronics Command and Fort Monmouth, ATTN: AMSEL-LCLM-LT, Fort Monmouth, New Jersey 07703-5007. A reply will be furnished directly to you.

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HOW TO USE THIS MANUAL

This manual provides a description of the Optical Fiber Test Set TS-4335/G. It also contains instructions on set up procedures for use in testing CX-13295/G fiber optic cable assemblies.

Become familiar with every part of the manual before operating the test set or attempting any maintenance.

The manual has an edge index that will help you find specific information in a hurry. Simply spread the pages on the right edge of the manual until the printed blocks can be seen. Open the manual where the block on the edge of the page lines up with your selected topic that is printed on the front cover block.

If the front cover Index does not help locate a topic, use the alphabetical index at the back of the manual to find it.

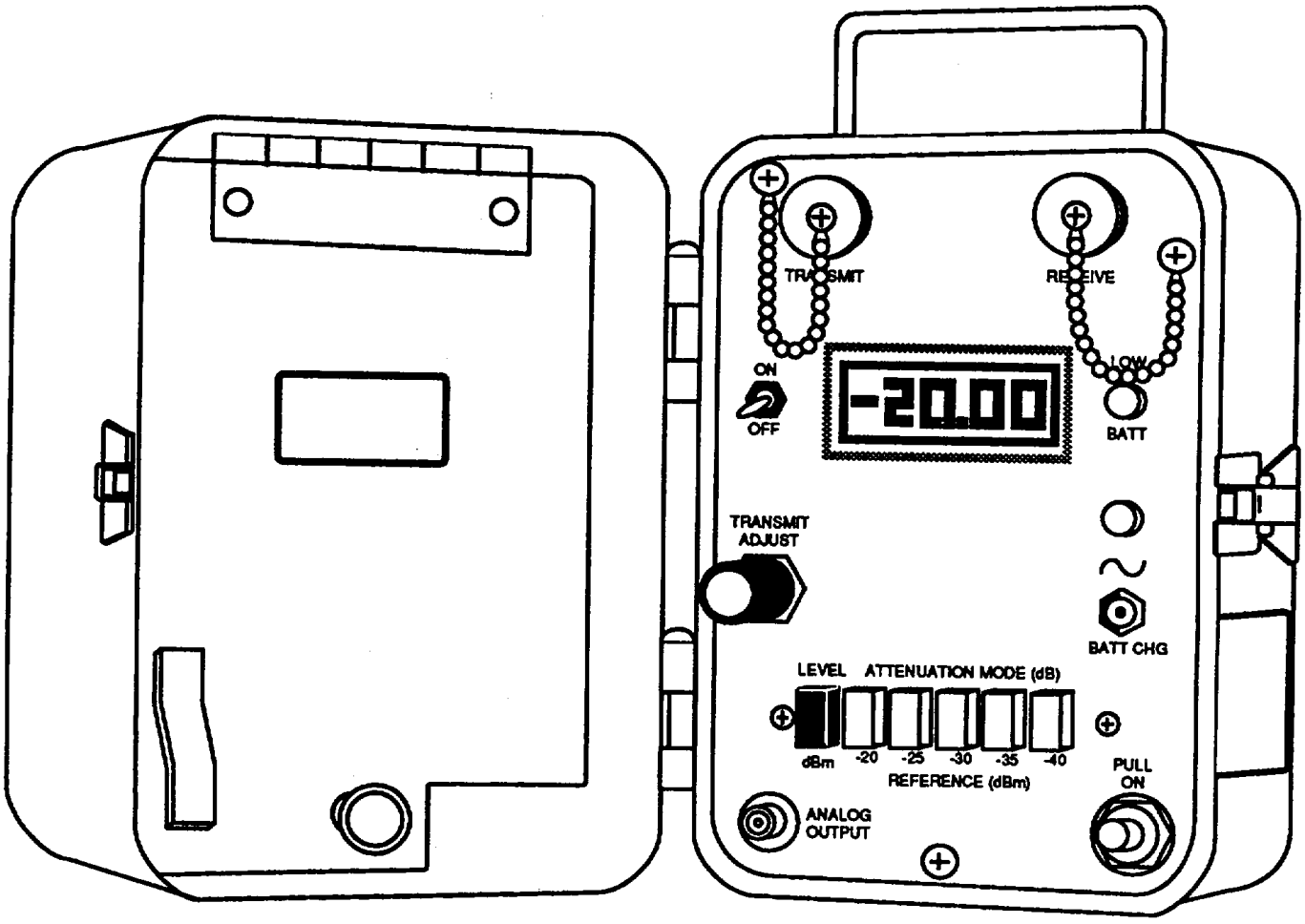


Figure 1-1. Optical Fiber Test Set TS-4335/G

CHAPTER 1
INTRODUCTION

Section I. GENERAL INFORMATION

1-1. SCOPE

This manual describes the Optical Fiber Test Set TS-4335/G (Fig. 1-1), which is used to measure attenuation in CX-1 3295/G fiber optic cable assemblies. The manual also provides instructions for operation, troubleshooting, maintenance, and repair of the test set at unit level.

1-2. CONSOLIDATED INDEX OF ARMY PUBLICATIONS AND BLANK FORMS

Refer to the latest issue of DA Pam 25-30 to determine whether there are new editions, changes, or additional publications pertaining to the equipment.

1-3. 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 DA Pam 738-750, as contained in Maintenance Management Update.

b. Reporting of Item and Packaging Discrepancies. Fill out and forward SF 364, Report of Discrepancy (ROD), as prescribed in AR 735-11-2/DLAR 4140.55/ SECNAVINST 4355.18/AFR 400-84/MCO 4440.3J.

c. Transportation Discrepancy Report (TDR) (SF 361). Fill out and forward Transportation Discrepancy Report (TDR) (SF 361) as prescribed in AR 55-38/NAVSUPINST 461 0.33C/AFR 75-18/MCO P4610.1 9D/DLAR 4500.15.

1-4. REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIRs)

If your test set needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you do not like about your equipment. Let us know why you do not like the design or performance. Put it on an SF-368 (Product Quality Deficiency Report). Mail it to Commander, U.S. Army Communications - Electronics Command and Fort Monmouth, ATTN: AMSEL-LC-ED-TC, Fort Monmouth, New Jersey 07703-5000. We will send you a reply.

1-5. ADMINISTRATIVE STORAGE

Equipment issued to and used by Army activities will have preventive maintenance checks and services (PMCS) performed in accordance with the PMCS charts before being placed in administrative storage. When equipment is removed from administrative storage, PMCS should be performed to ensure operational readiness. Preparation of equipment for shipment or limited storage is covered in paragraphs 3-12 and 3-13.

1-6. DESTRUCTION OF ARMY MATERIEL TO PREVENT ENEMY USE

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

1-7. WARRANTY INFORMATION

Warranty information for this equipment is covered in TB 11-6625-3252-12.

1-8. NOMENCLATURE CROSS-REFERENCE LIST

The following list gives common names used in this manual for equipment nomenclature. Official nomenclature must be used when completing report forms.

Common Name	Official Nomenclature
Test Set	Optical Fiber Test Set TS-4335/G

1-9. LIST OF ABBREVIATIONS

The following list defines abbreviations used in this manual.

Abbreviation	Definition
BATT CHG	battery charge
BNC	Bayonet "N" Connector
cm	centimeter
dB	decibel
dBm	decibel pertaining to milliwatts
g	g ram
Hz	hertz
kg	kilogram
LCD	liquid crystal display
LED	light emitting diode
LOW BATT	low battery
mV	millivolts
N.A.	numerical aperture
nm	nanometer
U/M	unit of measure
μm	micrometer

Section II. EQUIPMENT DESCRIPTION

1-10. EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES

The test set measures attenuation in fiber optic cable. It contains optical transmit and receive sections and a4-1/2 digit LCD readout. The test set measures an absolute optical power level from O to -60 dBm or the optical attenuation of a cable. Other characteristics, capabilities, and features include:

- Transmits and receives at 1300 nm
- Accuracy 0.5 dBm
- Range 0 to -60 dBm, 0.01 dB resolution
- Single mode attenuation range 30 dB typical
- Stable optical source with level control
- Operates from internal rechargeable Ni-Cad batteries, or from power supplied through a standard 1 20V AC (or European 220 V AC-DC regulated) battery charger
- Optical transmit and receive ports
- BNC analog output
- Hand-held portable

1-11. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS

TEST SET (1 and2, Fig. 1-2)	A portable instrument that measures attenuation in fiber optic cable. The cover assembly serves as a storage compartment for a battery charger and an optical cable.
BATTERY CHARGER (3)	A standard 1 20V AC plug-in battery charger which connects to the test set through a jack on the front panel.
BATTERY CHARGER (4)	A 220V AC-DC regulated plug-in battery charger for European use.
OPTICAL CABLE (5)	A multimode, 50/1 25 ,µm cable that can also be used for zeroing the digital display (not used in Army applications).
Y-ADAPTER CABLE (6)	Provides the interface between the test set and the fiber optic cable assemblies when measuring attenuation.

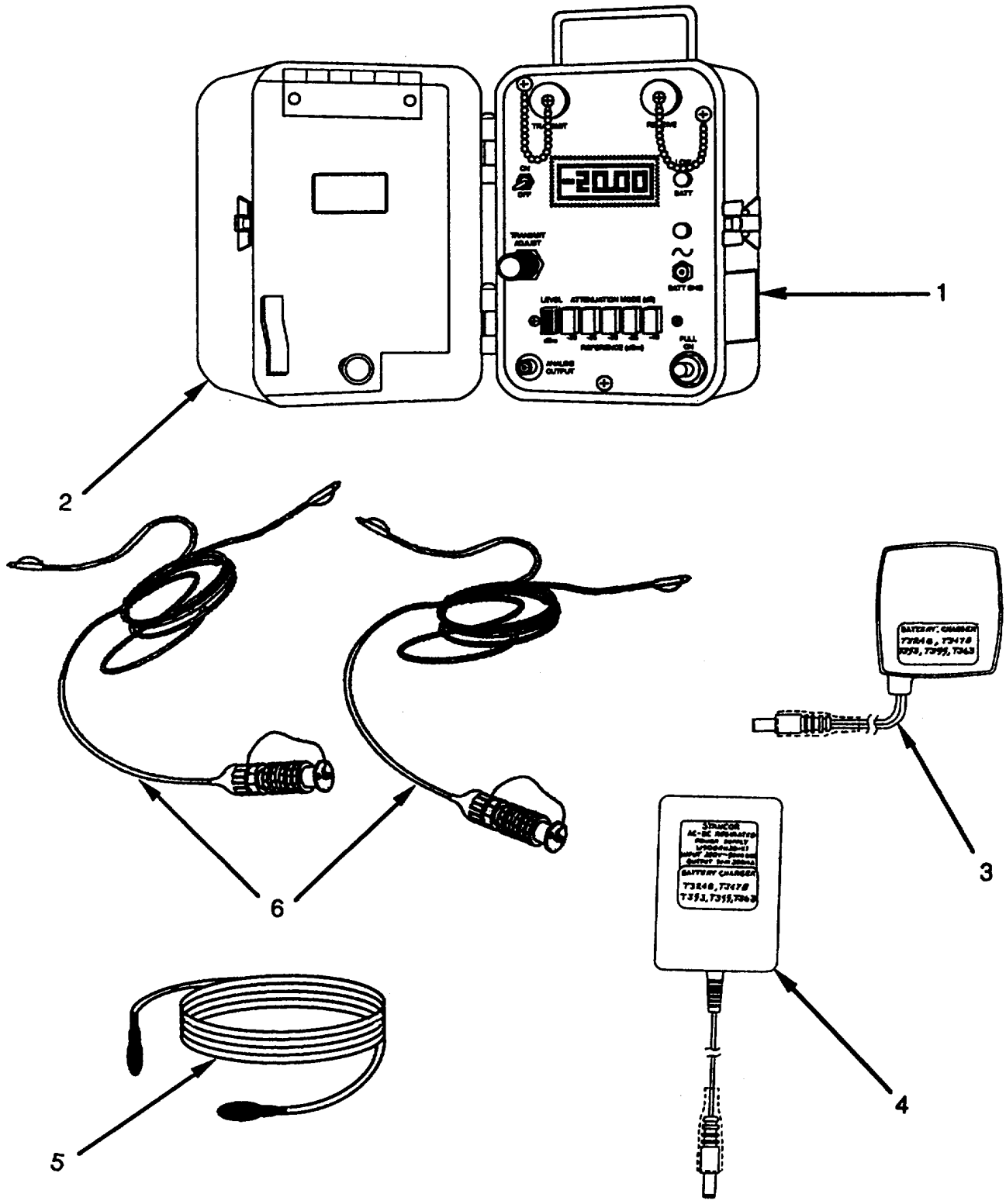


Figure 1-2. TS-4335/G Major Components

1-12. EQUIPMENT DATA

NOTE

Electrical characteristics are valid after a 5-minute operating warm-up.

TRANSMIT SECTION

Transmitter	LED, 1.3 μm ±20 nm (1300 nm)
Spectral Width	80 nm
Level	Adjustable from approximately -30 dBm to -20 dBm into 50 μm core with 0.21 N.A. (level output varies with fiber core diameter)

RECEIVE SECTION'

Receiver	InGaAsP photodiode
Spectral Response	800 nm to 1600 nm
Range (absolute optical power)	O dBm to -60 dBm
Absolute Accuracy	±0.5 dB at 25°C or 77°F (-20 dBm)
Linearity	2 percent
Resolution	0.01 dB
Display	4-1/2 digit LCD

ENVIRONMENTAL

Operating Temperature	-10° to 40°C (14° to 104°F)
Storage and Transit Temperature	-40° to 71°C (-40° to 160°F)
Humidity	95% at 35°C (95°F), 40% at 50°C (122°F)
Altitude (non-operating)	49,200 ft (15,000m)
Altitude (operating)	10,000 ft (3050m)
Vibration	Up to 2g
Shock Pulse	30g magnitude
Bench Handling	4 in. (10.2 cm) topple, 45°topple, or just below point of balance
Transit Drop	8 in. (20.3 cm) topple on each panel assembly face
Water Resistance	Drip-proof with front cover closed
Fungus Resistance	Materials used are fungus inert

ANALOG OUTPUT ..... 100 mV/decade

POWER

Batteries	Rechargeable 7.2V Ni-Cad battery pack, 30 hrs receive only; 8 hrs at -25 dBm with transmitter on level control center range
Battery Charger (Standard)	1 20V AC, 60 Hz
Battery Charger (European)	220V AC-DC regulated, 50 Hz

PHYSICAL CHARACTERISTICS

Height	6-1/2 in	(16.5 cm)
Width	4-1/2 in	(11.4 cm)
Depth	6 in	(15.2 cm)
Weight	3-1/2 lbs	(1.56 kg)

Y-ADAPTER CABLE ..... Multimode, 50/125 μm

SECTION III. TECHNICAL PRINCIPLES OF OPERATION

1-13. FUNCTIONAL DESCRIPTION

a. General. When the Y-adapter cables are attached to the test set TRANSMIT and RECEIVE ports and the PULL ON switch is activated, a set level of optical power is transmitted through the fiber at a wavelength of 1300 nm. The optical receive photodiode, which is a linear device, then outputs a current in direct proportion to the light incident on it. A logarithmic converter processes the analog logarithmic level and outputs a digital signal to a 4-1/2 digit LCD display that is read from left to right. When the TRANSMIT ON/OFF switch is set to ON and the LEVEL switch is engaged, an absolute power level in dBm is displayed. By pressing the ATTENUATION MODE switch which has a dBm value closest to the measured dBm level indicated on the display, the power level from the transmit source can be nulled to a 00.00 dB reference with the TRANSMIT ADJUST control.

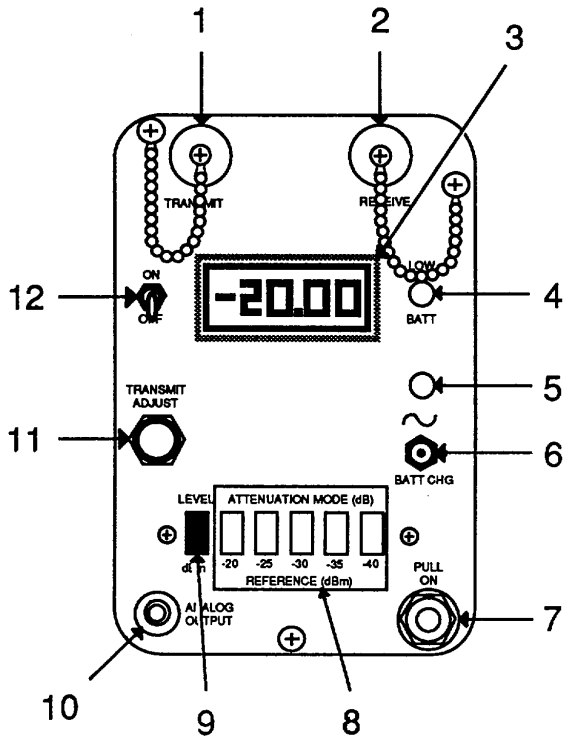
After the power level is nulled, the Y-adapter cables are disconnected from each other and attached to the fiber optic cable under test. The attenuation of the test cable is displayed on the LCD.

b. Power. The test set receives power from internal Ni-Cad rechargeable battery packs, which operate for up to eight hours when they are fully charged and the test set is operated at -25dBm with a 50/1 251cm fiber optic cable connected. When the battery voltage drops below 6.3 ±0.2V, the LOW BATT indicator on the front panel lights to indicate low battery power. If no AC power is supplied to the test set and the battery voltage drops to 5.7 ±0.2 V, power to the digital display is shut off and the test set automatically turns off.

The external battery charger, which operates at 120 V AC, 60 Hz (or 220V AC, 50 Hz, if the European version is used), may then be plugged into the BATT CHG connector on the front panel. If the test set is turned off, the battery charger provides up to 250 mA of current to the internal batteries. The test set can be operated while the battery charger is attached. If the test set is powered on and the TRANSMIT ON/OFF switch is set to ON, the charger provides additional current to ensure that the internal batteries do not discharge during transmit operation. The battery charge indicator on the front panel illuminates to indicate that the internal batteries are charging.

CHAPTER 2
OPERATING INSTRUCTIONS

Section I. DESCRIPTION AND USE OF OPERATOR'S CONTROLS, INDICATORS, AND CONNECTORS



KEY	CONTROL, INDICATOR, OR CONNECTOR	TYPE	FUNCTION
1	TRANSMIT Port	Optical	Allows connection of the Y-adapter cable.
2	RECEIVE Port	Optical	Allows connection of the Y-adapter cable.
3	Digital Display	LCD	Provides 4-1/2 digit display with a resolution of 0.01 dB. In LEVEL (dBm) mode, absolute optical power is indicated with reference to 0 dBm (1 mW). In any of the five ATTEN-UATION (dB) modes, attenuation is recorded after the display is zeroed.

KEY	CONTROL, INDICATOR, OR CONNECTOR	TYPE	FUNCTION
4	LOW BATT Indicator	LED	Lights when the battery voltage falls below a predetermined value. An automatic shut-off turns the test set off to prevent further battery drain.
5	Battery Charge ( ) Indicator	LED	Lights when the battery charger is in use, to indicate that the battery is charging. The test set can be operated while the battery is charging.
6	BATT CHG Connector	Mini Power	Allows for connection of a battery charger.
7	PULL ON Switch	Push/Pull	Applies power to the test set. When the cover is closed, a tab on the inside of the cover presses against the PULL ON switch, turning the set off.
8	ATTENUATION MODE Switches	Pushbutton (White)	Pushing the appropriate ATTENUATION MODE switch references the absolute level for the output.
9	LEVEL Switch	Pushbutton (Black)	Displays an absolute level (LEVEL mode) in dBm.
10	ANALOG OUTPUT Connector	BNC	Can receive a chart recorder or voltage meter (e.g., when looking for peak signals during fiber splicing).
11	TRANSMIT ADJUST Control	Potentiometer	Adjusts the transmit level in ATTENUATION MODE(dB)/ REFERENCE (dBm). The TRANSMIT ON/OFF switch is set in the ON position during adjustment.
12	TRANSMIT ON/OFF Switch	Toggle	In the ON position, optical power is transmitted continuously; in the OFF position the transmit power is off.

Section II. OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

2-1. GENERAL

To ensure that the test set is always mission ready, perform the scheduled preventive maintenance checks and services (PMCS) on a timely basis. The scheduled inspections allow defects to be discovered and corrected before they result in serious damage or failure. If defects are found, report defects on DA Form 2404 (Equipment Inspection and Maintenance Worksheet). Use the "ITEM NO." column in the PMCS table for the "TM Number" column on DA Form 2404. The heading and other columns of the form should be filled out according to instructions in DA Pam 738-750 (Maintenance Management Update) and any special instructions from your commander.

a. Before You Operate. Always keep in mind the CAUTIONS and WARNINGS. Perform your before-operation PMCS.

b. While You Operate. Always keep in mind the CAUTIONS and WARNINGS. Perform your during-operation PMCS.

c. After You Operate. Be sure to perform your after-operation PMCS.

d. If Your Equipment Fails to Operate. Troubleshoot with proper equipment. Report any deficiencies using proper forms. See DA Pam 738-750.

2-2. PMCS TABLE

The PMCS are shown in Table 2-1.

a. Item Number Column. The numbers appearing in this column are in the order the work should be performed. This column shall also be used as a source of item numbers for the TM Number column on DA Form 2404 (Equipment Inspection and Maintenance Worksheet) in recording results of PMCS.

b. Interval Column. This column indicates whether PMCS are performed before operation (B), during operation (D), after operation (A), or weekly (W).

c. Item to be Inspected Column. This column identifies the item to be inspected.

d. Procedures Column. This column contains a brief description of the check or service to be performed and step-by-step procedures.

e. Equipment Is Not Ready/Available IF Column. This column identifies the condition that prevents the equipment from being ready/available for operation.

Table 2-1. Operator Preventive Maintenance Checks and Services (PMCS)

B = Before **D** = During A = After W = Weekly

ITEM NO.	INTERVAL B	D	A	W	ITEM TO BE INSPECTED	PROCEDURE	Equipment is NOT READY/ AVAILABLE if:
1	•			•	Case and Cover Assemblies	Inspect case and cover assemblies for cracks or chipped paint, and loose or missing hardware, handle and gaskets.	Case and cover are damaged.
2	•	•	•	•	Front Panel Indicators and Controls	Inspect for missing, loose, or damaged knobs, switches, and LEDs, and damaged display.	Controls and indicators are damaged or missing.
3	•			•	Transmit and Receive Ports	Inspect for damage to port casings, clean ports with lint-free cloth.	Ports are damaged or dirty.
4	•			•	Battery Charger	Inspect for broken wires or wire insulation, or damage to casing.	Wire is damaged.
5	•			•	Y-Adapter Cable	Inspect for broken fiber or insulation, and damaged or missing connectors.	Cable is damaged.

Section III. OPERATION UNDER USUAL CONDITIONS

2-3. INITIAL CHECKS, ADJUSTMENTS, AND TESTS

a. **Checks**. Perform the operational check described in paragraph 2-4.
b. **Adjustments.** None.
c. **Tests**. None.

2-4. VERIFYING OPERATION

The following procedure checks the test set operating functions.

a. Open the case by releasing the latch. Activate the test set by pulling the PULL ON switch on the front panel to on position.

b. Close the cover and then reopen to verify that the tab on the divider cover pushed the PULL ON switch to the off position automatically.

c. Apply power to the test set by pulling the PULL ON switch on the front panel to on position. Allow a 5-minute operating warm-up.

d. If the LOW BATT indicator lights, remove the battery charger that is located in the cover compartment by lifting up the divider cover. Connect the battery charger to the BATT CHG connector on the front panel and then to a 11 5V AC outlet (or 220V AC/DC outlet if the European battery charger is used). Verify that the battery charge indicator lights.

CAUTION

Keep the protective caps on the TRANSMIT and RECEIVE ports when not in use to prevent dust and dirt from affecting the optical output power. Keep the dust covers on the Y-adapter cable connectors when not in use, and the dust covers mated when the Y-adapter cable is in use. Also, keep the captive contact protectors on the biconic ends when not in use.

e. Unscrew the dust caps from the TRANSMIT and RECEIVE ports, and clean the ports with a lint-free cloth.

f. Clean the leads of the Y-adapter cables using alcohol and a lint-free cloth.

NOTE

When mating fiber optic connectors or dust covers, always ensure that the sleeve nut of one fiber optic connector of dust cover is totally backed off to allow proper sealing.

g. Mate the two Y-adapter cables and connect the orange lead of one of the cables to the TRANSMIT port, and the blue lead from the other cable to the RECEIVE port (see Figure 2-1).

h. Press the LEVEL switch and set the TRANSMIT ON/OFF switch to ON.

i. Turn the TRANSMIT ADJUST control clockwise for about five turns until the maximum transmit level appears on the display. Verify that this level is greater than -20.00 dBm.

j. Using the TRANSMIT ADJUST control, set a level of -20.00 ±0.02 dBm.

k. Press the ATTENUATION MODE switches, one at a time, and verify the following readings:

-20 dB yields a level of 00.00 ±0.2
-25 dB yields a level of -05.00 ±0.2
-30 dB yields a level of -10.00 ±0.2
-35 dB yields a level of -15.00 ±0.2
-40 dB yields a level of -20.00 ±0.2

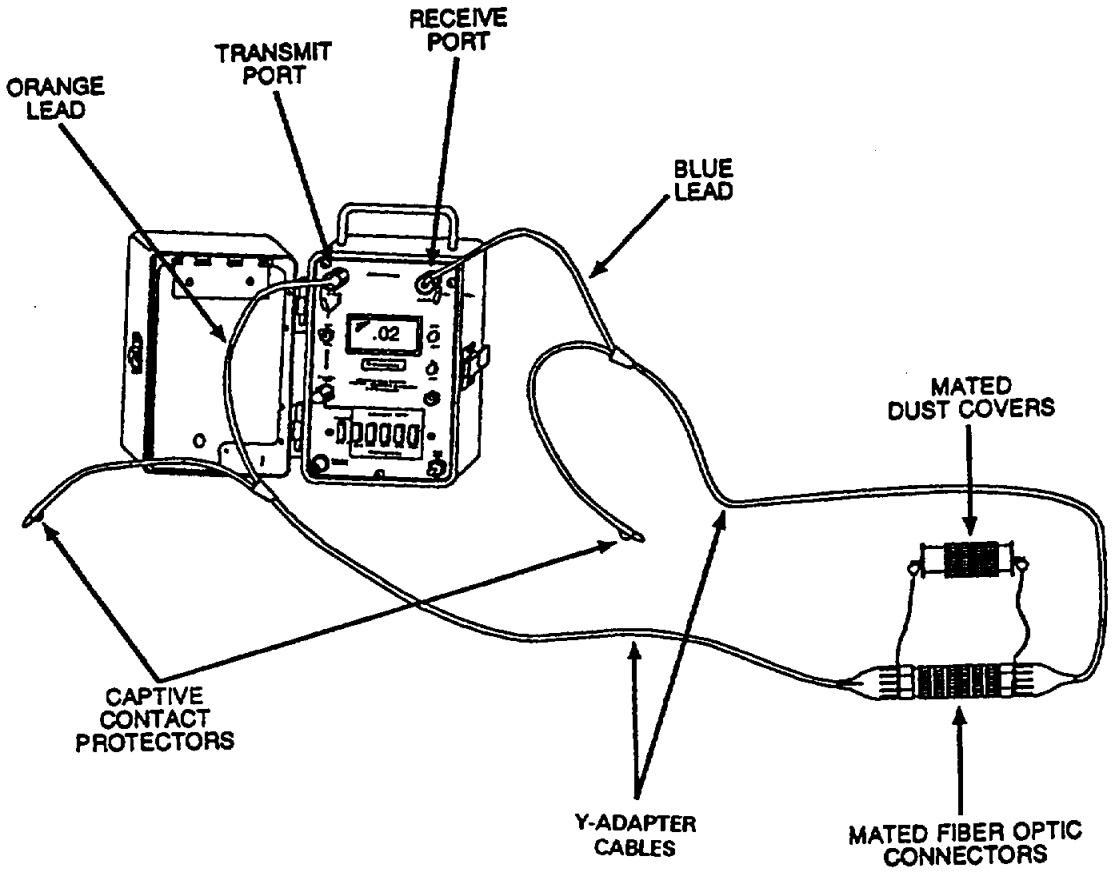


Figure 2-1. Connection of Y-Adapter Cables to the TS-4335/G Test Set

2-5. OPERATIONAL SETUP PROCEDURES

a. Press the LEVEL (dBm) switch.

b. Rotate the TRANSMIT ADJUST knob clockwise until the number in the digital display stops increasing.

c. If the number in the digital display is greater than -30, skip to step g.

d. Disconnect the leads of the adapter cables from the test set, clean using alcohol and lint-free cloths, and reconnect the leads.

e. Disconnect the Y-adapter cables from each other, clean connectors, and reconnect the leads.

f. If the number in the digital display on the test set is greater than -30, continue with the next step. If the number in the digital display is less than -30, a problem may exist with one or both of the Y-adapter cables. The Fiber Optic Cable Test Set TS-4336/G can be used to identify faults in the cables or connectors (refer to TM 1 -6625-3253-1 2& P).

g. Remove the orange lead from the test set TRANSMIT port and install the captive contact protector.

h. Remove the captive contact protector from the blue lead on the same Y-adapter cable and connect the lead to the TRANSMIT port.

i. Remove the blue lead from the test set RECEIVE port and install the captive contact protector.

j. Remove the captive contact protector from the orange lead on the same Y-adapter cable and connect the lead to the RECEIVE port.

k. Check the digital display for the optical power level available to the RECEIVE port.

l. If the number in the digital display is less than -30, continue with the next step. If the number in the digital display is greater than -30, then both Y-adapter cables are functioning properly.

m. Disconnect the leads of the Y-adapter cables from the test set and clean leads using alcohol and lint-free cloths.

n. Disconnect the Y-adapter cables from each other, clean connectors, and reconnect.

o. If the number in the digital display is greater than -30 then both Y-adapter cables are functioning properly. If the number in the digital display is less than -30, a problem may exist with one or more of the Y-adapter cables.

NOTE

The test set display must be zeroed at each test location prior to measuring attenuation so that test results are accurate.

p. Establish a reference point by engaging the ATTENUATION MODE pushbutton that is closest in value to the receive level.

q. Adjust the TRANSMIT ADJUST control until the display reads 00.00 +0.02 dB.

2-6. TESTING OF CX-13295/G FIBER OPTIC CABLE ASSEMBLIES

To measure the optical attenuation of a cable under test, refer to TM 11-6020-200-23&P.

Section IV. OPERATION UNDER UNUSUAL CONDITIONS

2-7. OPERATION IN UNUSUAL WEATHER

The test set is designed for use in a sheltered environment. It must be protected from water during operation, since the case is drip-proof only when the cover is closed. Refer to paragraph 1-12 for test set environmental specifications.

2-8. EMERGENCY PROCEDURES

In the event of an emergency, closing the cover automatically cuts off power to the test set.

CHAPTER 3
UNIT MAINTENANCE

SECTION I. REPAIR PARTS, SPECIAL TOOLS; TEST, MEASUREMENT, AND DIAGNOSTIC EQUIPMENT (TMDE); AND SUPPORT EQUIPMENT

3-1. COMMON TOOLS AND EQUIPMENT

For authorized common tools and equipment refer to the Modified Table of Organization and Equipment (MTOE) applicable to your unit.

3-2. SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT

All special tools, TMDE, and support equipment required for maintenance of the test set are listed in the maintenance allocation chart in Appendix B of this manual.

3-3. REPAIR PARTS

Repair parts are listed and illustrated in Appendix E of this manual.

SECTION II. SERVICE UPON RECEIPT

3-4. CHECKING UNPACKED EQUIPMENT

Inspect the test set and accessories for damage that may have occurred during shipment. Report any damage on Form SF 364, Report of Discrepancy (ROD).

Check the equipment against the packing list to verify that the shipment is complete. Report any discrepancies in accordance with DA Pam 738-750. Save the original packing material for possible reuse.

3-5. PRELIMINARY SERVICING AND ADJUSTMENT OF EQUIPMENT

Checks. Perform pre-operative PMCS.

Adjustments. None.

Tests. Perform the operational check described in paragraph 2-4.

SECTION III. TROUBLESHOOTING

3-6. TROUBLESHOOTING CHART

MALFUNCTION	TEST OR INSPECTION	CORRECTIVE ACTION
No power to the unit	Pull the PULL ON switch to on position.	If the LOW BATT indicator lights, connect the battery charger to the test set. Verify that the indicator lights. (The test set may be operated while the battery charger is connected.)
Battery charge indicator does not light	Using a multimeter, verify voltage output from the battery charger. (8.7 ±0.5V DC at 250 mA; European version 9 ±0.45V DC at 300 mA)	If the indicator still does not light, refer to higher level maintenance.
Inaccurate readings	Inspect the TRANSMIT and RECEIVE ports on the test set for dust or dirt. Inspect the ends of the Y-adapter cable or cable under test.	Clean the TRANSMIT and RECEIVE ports to remove any debris. Clean the cable ends with a lint-free cloth to remove any debris.
	Follow the procedure in paragraph 2-4 with a new Y-adapter cable.	If inaccurate readings still occur, refer to higher level maintenance.

SECTION IV. MAINTENANCE PROCEDURES

3-7. GENERAL

The following general maintenance procedures ensure that the test set is maintained at an acceptable quality level. Prior to performing any maintenance or repair, verify reported malfunctions.

3-8. INSPECTION

Operational checks and inspections verify that all maintenance procedures are performed to ensure minimum acceptable quality requirements. The operational checks also include testing of installed items and taking corrective actions to correct malfunctions.

3-9. CLEANING

Clean the test set TRANSMIT and RECEIVE ports with a lint-free cloth before and after use to prevent accumulation of dust and dirt, which can affect the optical power readings. The Y-adapter cable connectors should also be cleaned before and after use. Keep dust caps on ports, and dust covers on the Y-adapter connectors and captive contact protectors on the leads when the equipment is not in use.

The case exterior can be cleaned of dirt or mud with a damp cloth.

3-10. REPAIR

Repair of the test set at the unit level consists of replacement of the following components:

- Battery chargers (standard and European)
- Battery pack
- Dust caps and lanyards
- Front panel TRANSMIT ADJUST knob
- LEVEL and ATTENUATION MODE pushbutton caps
- Y-adapter cables

WARNING

To prevent possible injury from electric shock, confirm that power to the test set is off before replacing any front panel components.

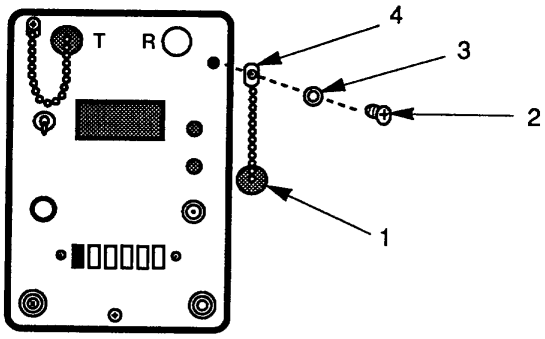
a. Dust Cap and Lanyard Replacement. Replace the TRANSMIT and/or RECEIVE port protective cap(s) and lanyard(s) as follows:

(1) Unscrew the dust cap (1) from the port.

(2) Using a cross-tip screwdriver, remove the screw (2) and plastic washer (3) that attaches the lanyard (4) to the front panel assembly.

(3) Insert the screw (2) and plastic washer (3) into replacement lanyard. Use cross-tip screwdriver to secure to front panel assembly.

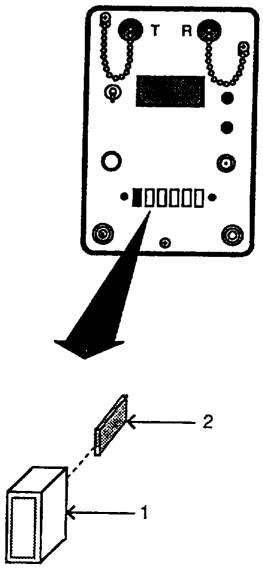
(4) Attach the new dust cap onto the port.



b. LEVEL/ATTENUATION MODE Pushbutton Replacement. Replace the LEVEL and ATTENUATION MODE pushbuttons as follows:

(1) Remove a pushbutton (1) by firmly gripping and pulling it away from the shaft (2) on the front panel.

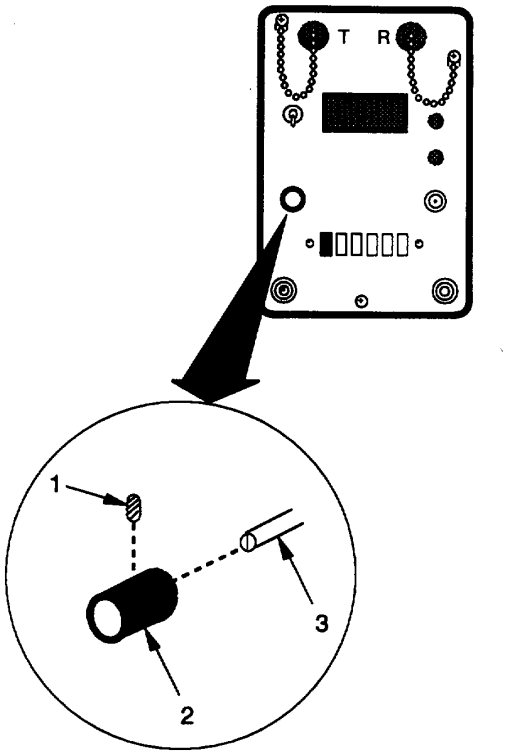
(2) Install replacement pushbutton onto the shaft, pushing gently toward front panel.



c. TRANSMIT ADJUST Knob Replacement. Replace the TRANSMIT ADJUST knob as follows:

(1) Using a hex key, loosen the set screw (1) that holds the TRANSMIT ADJUST knob (2) to the shaft (3). Slide the knob off the shaft.

(2) Slide a replacement knob onto the shaft and use the hex key to tighten the set screw until the knob fits snugly.



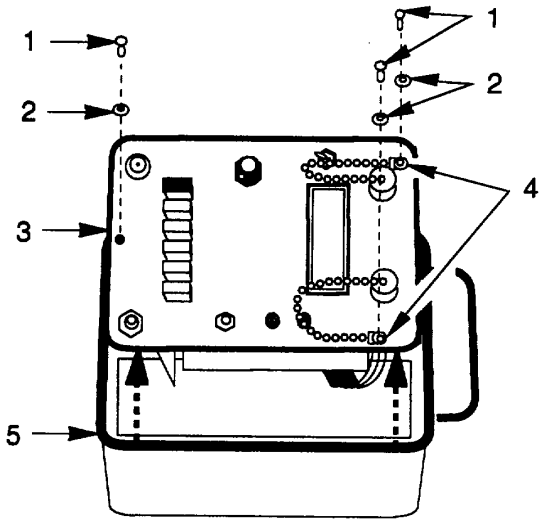
d. Battery Pack Removal. Remove the battery pack as follows:

NOTE

It is recommended that an ESD (Electrostatic Device) wrist strap be worn during battery replacement.

(1) Remove the cover assembly from the test set.

(2) Using a cross-tip screwdriver, remove three screws (1) and plastic washers (2) securing the front panel (3) assembly and lanyards (4) to the main assembly (5).

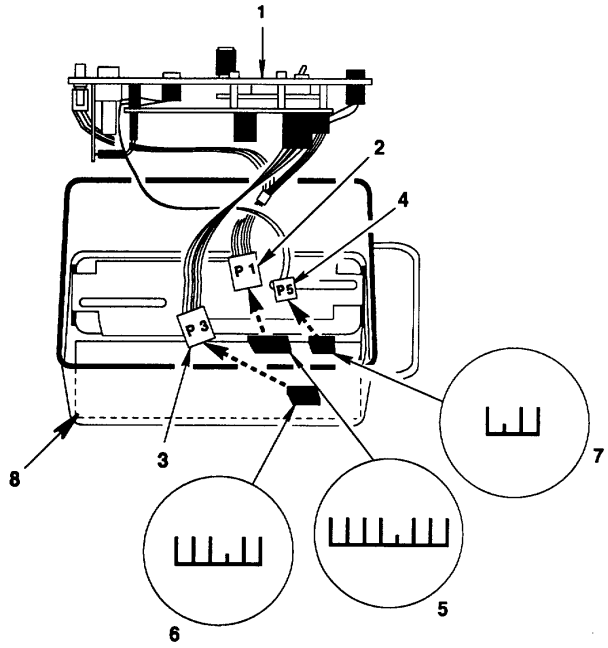


CAUTION

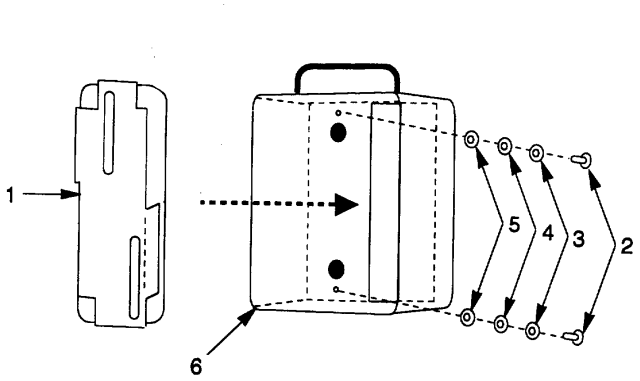
Care must be taken to avoid damaging wiring harness when performing the following steps.

(3) Grasp dust caps and gently pull to free front panel assembly (1).

(4) Disconnect P1 (2), P3 (3), and P5 (4) wiring harness plugs from harness connectors J1 (5), J3 (6), and J5 (7), respectively, of the power supply (8).

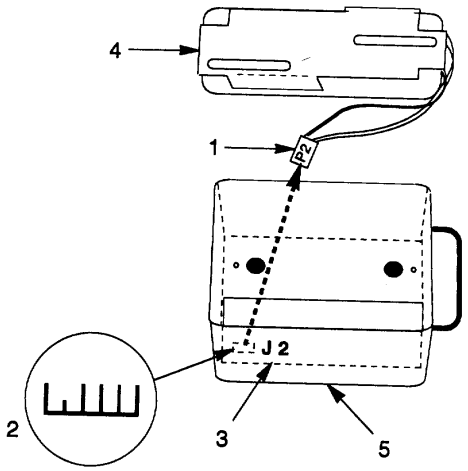


(5) Hold battery bracket assembly (1) in place and use cross-tip screwdriver to remove two screws (2), lock washers (3), flat washers (4), and rubber gaskets (5) securing bracket assembly to main assembly (6).



(6) Disconnect wiring harness plug P2 (1) from connector J2 (2) of power supply (3).

(7) Remove the bracket assembly (4) with the battery pack installed from the main assembly (5) by pulling straight up.

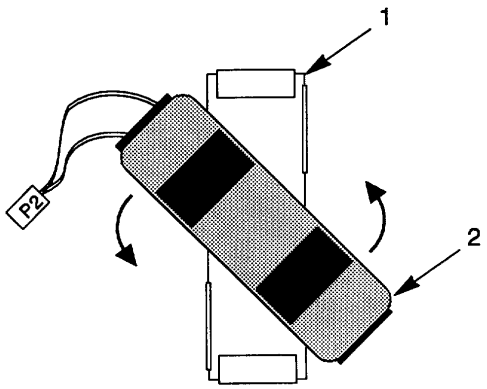


(8) Turn battery bracket assembly (1) so that open end of assembly is facing up.

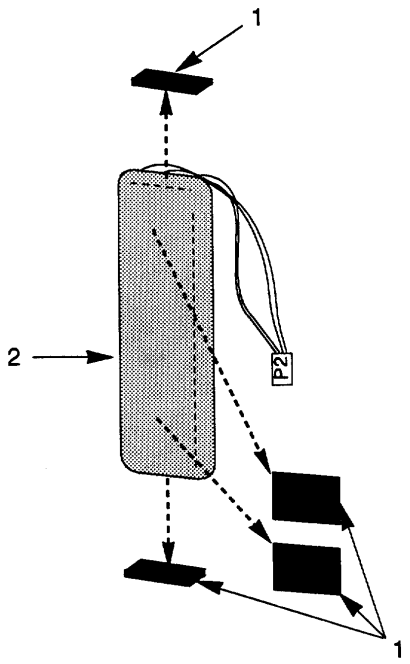
NOTE

Grasp the bracket assembly with one hand and use the second hand to free the battery pack.

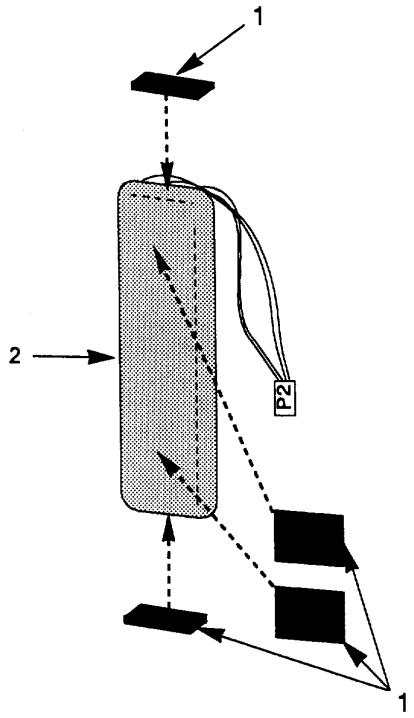
(9) Remove the battery pack (2) from the bracket assembly (1) by pivoting the battery pack 45 degrees to release from the bracket.



(10) Remove the four rubber cushions (1) from battery pack (2) and set aside for re-use.



e. Battery Pack Installation. Install the new battery pack as follows:

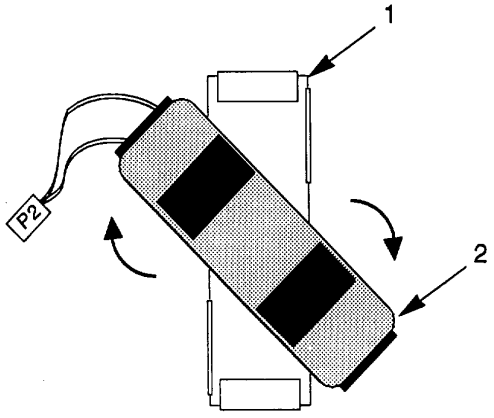


(1) Install the four rubber cushions (1) on battery pack (2).

(2) Place the battery pack (2) in the bracket assembly (1) by pivoting the battery pack at a 45-degree angle and sliding into place.

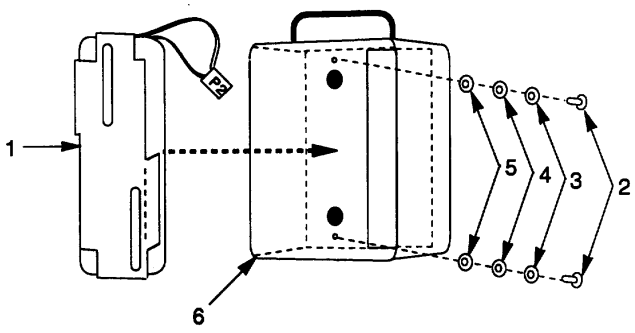
NOTE

Wiring harness attached to battery pack should be at top of main assembly.

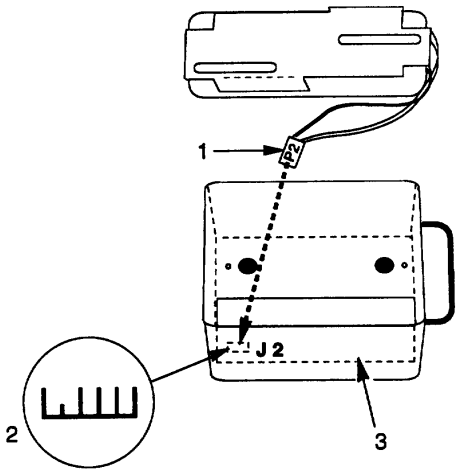


(3) Place the battery bracket assembly (1) in the main assembly (6), aligning the screw holes in the bracket with those in the main assembly.

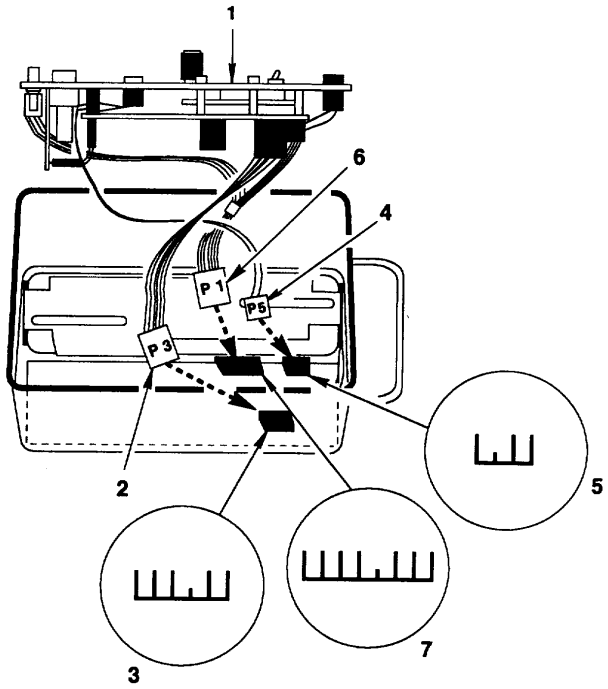
(4) Using a cross-tip screwdriver, install two screws (2), lock washers (3), flat washers (4), and rubber gaskets (5) securing the battery bracket assembly (1) to the main assembly (6).



(5) Reconnect the wiring harness connector P2 (1) to J2 (2) of the power supply (3).



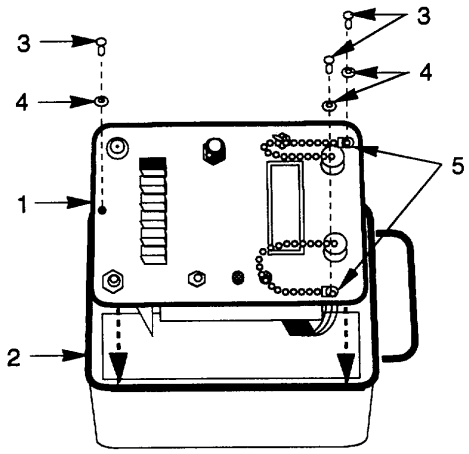
(6) Hold the front panel assembly (1) and reconnect the wiring harness connectors to the power supply in the following order:
P3 (2) to J3 (3),
P5 (4) to J5 (5), and
P1 (6) to J1 (7).



(7) Place the front panel assembly (1) on the main assembly (2), aligning the screw holes.

(8) Using a push-pull action, gently press the rubber gasket until the front panel assembly (1) is firmly seated.

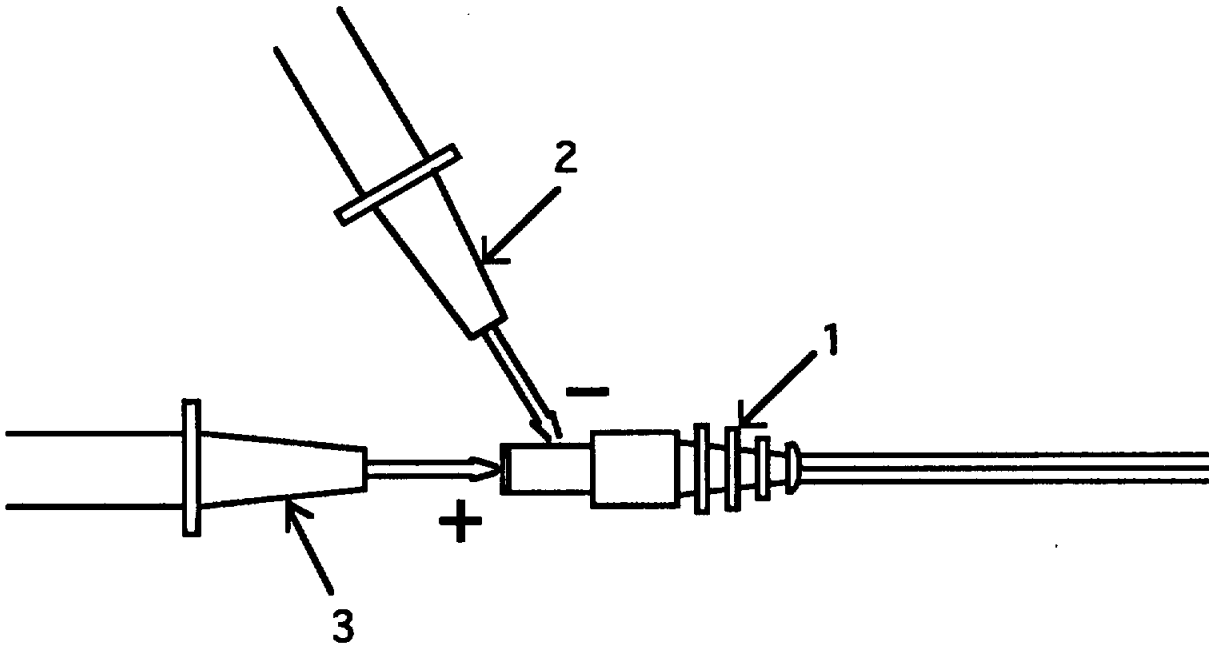
(9) Using the cross-tipped screwdriver, install the three screws (3) and plastic washers (4) securing the front panel assembly (1) and lanyards (5) to the main assembly (2).



e. Battery Charger. Test the battery charger as follows:

(1) Using a multimeter, place the negative lead (2) to the outside of the charger plug (1), and the positive lead (3) to the inside of the plug.

(2) Verify that the charger emits approximately 8.7 +0.5V DC. (European charger emits approximately 9 0i.45V DC.)



3-11. PERFORMANCE TESTS

After replacing the battery pack or any front panel controls, verify their correct operation by performing an operational check of the test set (refer to paragraph 2-4).

Section V. PREPARATION FOR SHIPMENT AND STORAGE

3-12. PREPARATION FOR SHIPMENT

Use the following procedure when preparing the test set for shipment (Figure 3-1).

a. Place the battery charger in the right-hand side of the cover receptacle, behind the divider cover.

b. Wrap the European battery charger in its original wrapping.

c. Wrap the Y-adapter cables in their original wrapping.

d. Wrap the test set unit in its original wrapping.

e. Place the test set in its original shipping container or place the test set in a sturdy, corrugated cardboard container that is at least two inches greater than the test set dimensions.

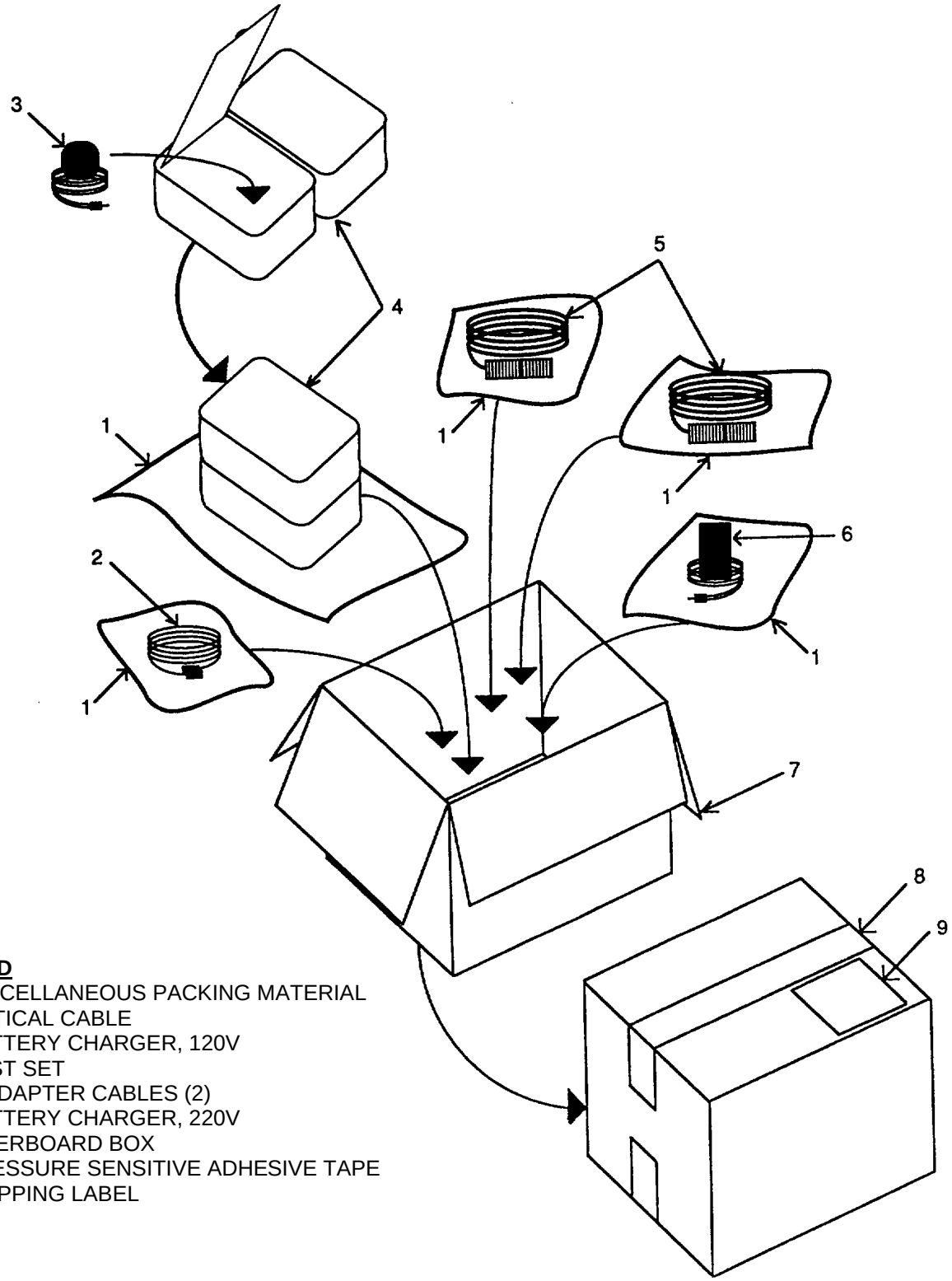
f. Seal the shipping container with the proper shipping tape.

3-13. TYPES OF STORAGE

a. **Short-term (administrative).** Short-term storage is 1 to 45 days. The test set must be prepared 24 hours prior to use. Verify that the next scheduled PMCS is performed, all deficiencies are corrected, and the accessories are located inside the cover assembly before the test set is placed in storage. The storage site should provide protection from extreme weather conditions and allow access to the equipment for inspections or exercises, if necessary.

b. Intermediate. Intermediate storage of the test set is 46 to 180 days.

c. Long-term. Long-term storage of the test set is over 180 days.



LEGEND

1 MISCELLANEOUS PACKING MATERIAL
2 OPTICAL CABLE
3 BATTERY CHARGER, 120V
4 TEST SET
5 Y-ADAPTER CABLES (2)
6 BATTERY CHARGER, 220V
7 FIBERBOARD BOX
8 PRESSURE SENSITIVE ADHESIVE TAPE
9 SHIPPING LABEL

Figure 3-1. TS-4335/G Test Set Packaging Diagram

APPENDIX A
REFERENCES

A-1. SCOPE

This appendix lists all forms, technical publications, and miscellaneous publications referenced in this manual.

A-2. FORMS

DA Form 2028	Recommended Changes to Publications and Blank Forms
DA Form 2028-2	Recommended Changes to Equipment Technical Publications
DA Form 2404	Equipment Inspection and Maintenance Worksheet
SF 361	Transportation Discrepancy Report
SF 364	Report of Discrepancy (ROD)
SF 368	Product Quality Deficiency Report

A-3. ARMY REGULATIONS

AR 55-38	Report of Transportation Discrepancies in Shipments
AR 735-11-2	Reporting of Item and Packaging Discrepancies

A-4. DEPARTMENT OF THE ARMY PAMPHLETS

DA Pam 25-30	Consolidated Index of Army Publications and Blank Forms
DA Pam 738-750	Maintenance Management Update

A-5. MISCELLANEOUS

TB 11-6625-3252-12	Warranty Program for Optical Fiber Test Set TS-4335/G
TM 750-244-2	Procedures for Destruction of Electronics Materiel to Prevent Enemy Use (Electronics Command)
TM 11-6020-200-23&P	Unit and Direct Support Maintenance Manual (Including Repair Parts and Special Tools List) for Fiber Optic Cable Assemblies CX-1 3295/G (300M) (NSN 6020-01-220-5435) and CX-1 3295/G (1 OOOM) (NSN 6020-01-208-1147)
TM 11-6625-3253-1 2&P	Operator's and Unit Maintenance Manual (Including Repair Parts and Special Tools List) for Fiber Optic Cable Test Set (NSN 6625-01-316-2752)

APPENDIX B
MAINTENANCE ALLOCATION

Section I. INTRODUCTION

B-1. General

This appendix provides a summary of the maintenance operations for the Optical Fiber Test Set TS-4335/G. It authorizes levels 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.

a. The Maintenance Allocation Chart (MAC) in Section II designates overall authority and responsibility for the performance of maintenance functions on the identified end item or components. The application of the maintenance functions to the end item or component will be consistent with the capacities and capabilities of the designated maintenance levels.

b. Section III lists the tools and test equipment (both special tools and common tools sets) required for each maintenance function as referenced from Section II.

c. Section IV contains supplemental instructions and explanatory notes for particular maintenance functions.

B-2. Maintenance Functions

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 the 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), preserve, drain, paint, or replenish fuel, lubricants, chemical fluids, or gases.

d. Adjust. To maintain or regulate, 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 me adjusted on instruments or test measuring and diagnostic equipment used in precision measurement. Consists of 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.

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

h. Replace. The act of substituting a serviceable like 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 complete serviceable/operational condition as prescribed by maintenance standards (i.e., Depot Maintenance Work Requirements [DMWRJ) 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 material maintenance applied to Army equipment. The rebuild operation includes the act of returning to zero those measurements (hours, miles, etc.) considered in classifying Army equipment/components.

B-3. Explanation of Columns In the MAC, Section II

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

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

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

d. Column 4, Maintenance Level. 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 level of maintenance. If the number or complexity of the tasks within the listed maintenance function vary at different maintenance levels, appropriate "work time" figures will be shown for each level. The number of task-hours specified by the "work time" figure represents the average time required to restore an item (assembly, sub-assembly, 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

Subcolumns of column 4 are as follows:

C - Operator/Crew (Unit Level Maintenance)
O - Organizational (Unit Level Maintenance)
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 alphabetical code that leads to the remark in Section IV, Remarks, which is pertinent to the item opposite the particular code.

B-4. Explanation of Columns In Tool and Test Equipment Requirements, Section III

a. Tool or Test Equipment Reference Code. The numbers in this column coincide with 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 Level. The codes in this column indicate the maintenance level 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 specified tool or test equipment.

e. Tool Number. This column lists the manufacturers' part number of the tool followed by the 5-digit Commercial and Government Entity Code (CAGEC).

B-5. Explanation of Columns In Remarks, Section 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.

Section II. MAINTENANCE ALLOCATION CHART FOR OPTICAL FIBER TEST SET TS-4335/G

(1) GROUP NUMBER	(2) COMPONENT ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL C	O	F	H	D	(5) TOOLS AND TEST EQUIPMENT	(6) REMARKS
00	Optical Fiber	Inspect		0.1					A
	Test Set	Service		0.1					B
	TS-4335/G	Repair		1.5				1, 2, 3	C, D
	P/N 30324110	Test				0.3		3, 4, 5, 6, 7	E
		Repair				1.5		1, 2	C, D, F
		Calibrate				0.4		7, 8, 9, 10	G
01	Main Assembly	Repair		1.5				1, 2, 3	H
	P/N 20024568	Test				0.3		3, 4, 5, 6, 7	E
		Repair		1.5				1, 2	C, D, F
0101	Panel Assembly	Repair		0.2				1, 2	C
	P/N 20024246	Test				0.3		3, 4, 5, 6, 7	E
		Repair				1.5		1, 2	C, D, F
02	Y-Adapter Cable	Replace		0.1					
		Repair			1.0				

Section III. TOOLS AND TEST EQUIPMENT REQUIREMENTS

TOOL OR TEST EQUIPMENT REF CODE	MAINTENANCE LEVEL	NOMENCLATURE	NATIONAL/NATO STOCK NUMBER	TOOL NUMBER
1	O, H	Tool Kit, Electronic Equipment TK-1 05/G	5180-00-610-8177	TK-105/G
2	0, H	Tool Kit, Electronic Equipment TK-1 01/G	5180-00-064-5178	TK-101/G
3	0, H	Multimeter, Digital AN/PSM-45	6625-01-139-2512	AN/PSM-45
4	H	T339-01 B Optical Power Meter		30339036 (80063)
5	H	Continuous Optical Attenuator		OD8511-DFB ( )
6	H	Triple Output Power Supply		6236B (58962)
7	H	Oscilloscope AN/USM-281 A	6625-00-228-2201	AN/USM-281A
8	H	Test Current Source		3116
9	H	T359-05 Optical Source		30359012 (80063)
10	H	Fiberscope		0801-9505 ( )

Section IV. REMARKS

REFERENCE CODE	REMARKS
A	Visual inspection.
B	Service by cleaning ports.
C	Repair by replacement of defective replaceable units, as determined by manual troubleshooting.
D	Recharge batteries.
E	Test manually to isolate defective component(s).
F	Repair by replacing defective electrical components (connectors, wire harnesses, switches, CCAs, LEDs), which are detected during visual inspection and/or manual trouble-shooting. All replacement actions are limited to those authorized items listed, and in the appropriate RPSTL.
G	Calibrate upon completion of unscheduled maintenance.
H	Repair by replacing defective Battery Pack, P/N 05021738.
I	Refer to TM 1 1-6020-200-23&P. Repair to the Y-adapter cable is limited to repair to or replacement of the biconic connector.

APPENDIX C
COMPONENTS OF END ITEM AND BASIC ISSUE ITEMS LISTS

Section I. INTRODUCTION

C-1. SCOPE

This appendix contains the components of end item and basic issue items for the Optical Fiber Test Set TS-4335/G, to help you inventory items for safe and efficient operation.

C-2. GENERAL

The components that are listed in this appendix are divided into the following:

a. Section II, Components of End Item (COEI). This listing is for information purposes only, and is not authority to requisition replacements. These items are part of the end item, but are removed and separately packaged for transportation or shipment. As part of the end item, these items must be with the end item when it is issued or transferred between property accounts. Illustrations are furnished to assist you in identifying the items.

b. Section III, Basic Issue Items (BII). These are the minimum essential items required to place the test set in operation and to perform emergency repairs. Although shipped separately packaged, BII must be with the test set during operation and whenever it is transferred between property accounts. The illustrations will assist you with in hard-to identify items. This manual is your authority to request/requisition replacement BII, based on TOE/MTOE authorization of the end item.

C-3. EXPLANATION OF COLUMNS

The following provides an explanation of columns that are found in the tabular listing:

a. Column 1, Illustration Number(Illus. No.). This column indicates the number of the illustration in which the end item is shown.

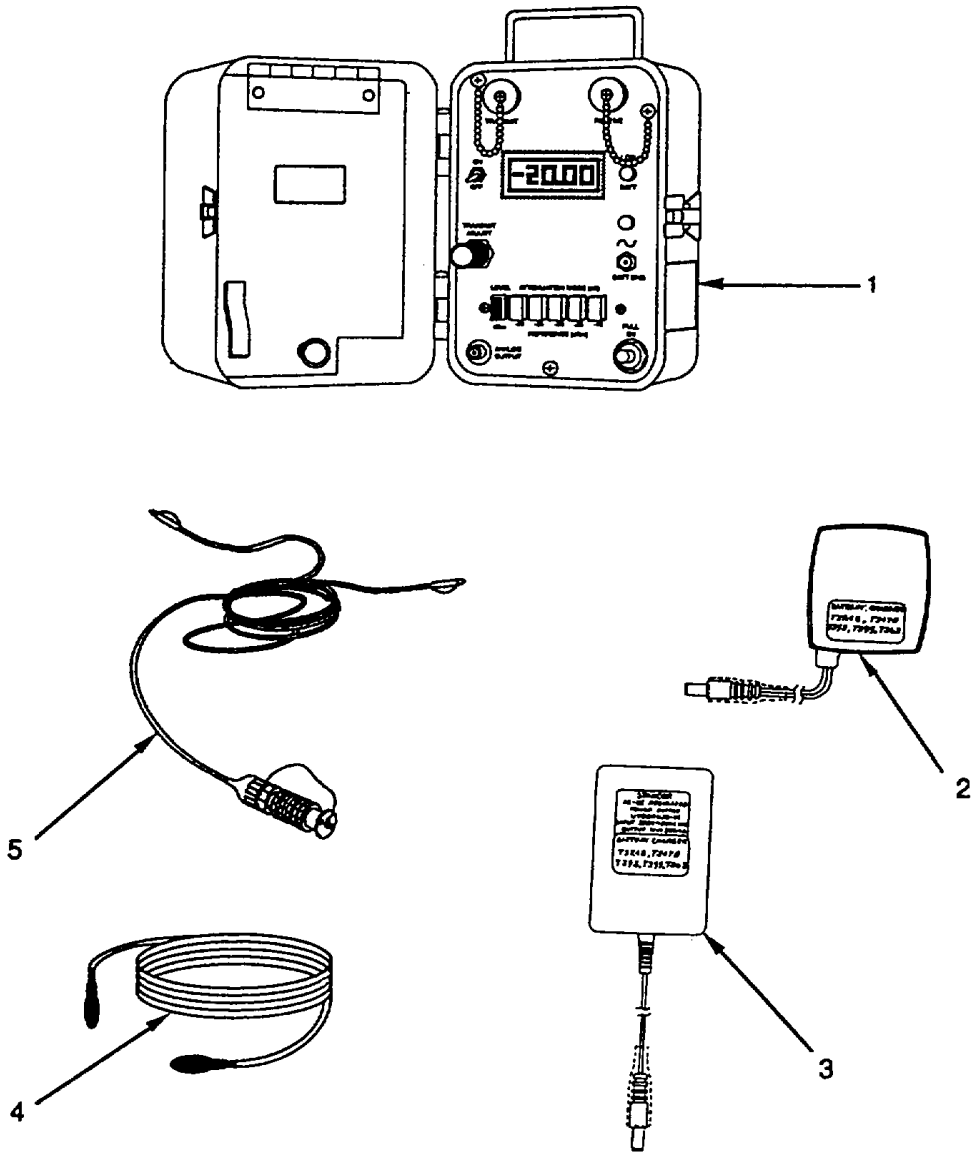
b. Column 2, National Stock Number. Indicates the National Stock Number assigned to each item and to be used for requisitioning purposes.

c. Column 3, Description. Indicates the Federal item name and, if required, a minimum description to identify and locate the item. The last line for each item indicates the Commercial and Government Entity Code (CAGEC) in parentheses, followed by the part number. If the item needed differs for various models of this equipment, the model is shown under the Usable On heading in this column.

d. Column 4, Unit of Measure (U/M). Indicates the measure used in performing the actual operational/ maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., EA, IN, PR).

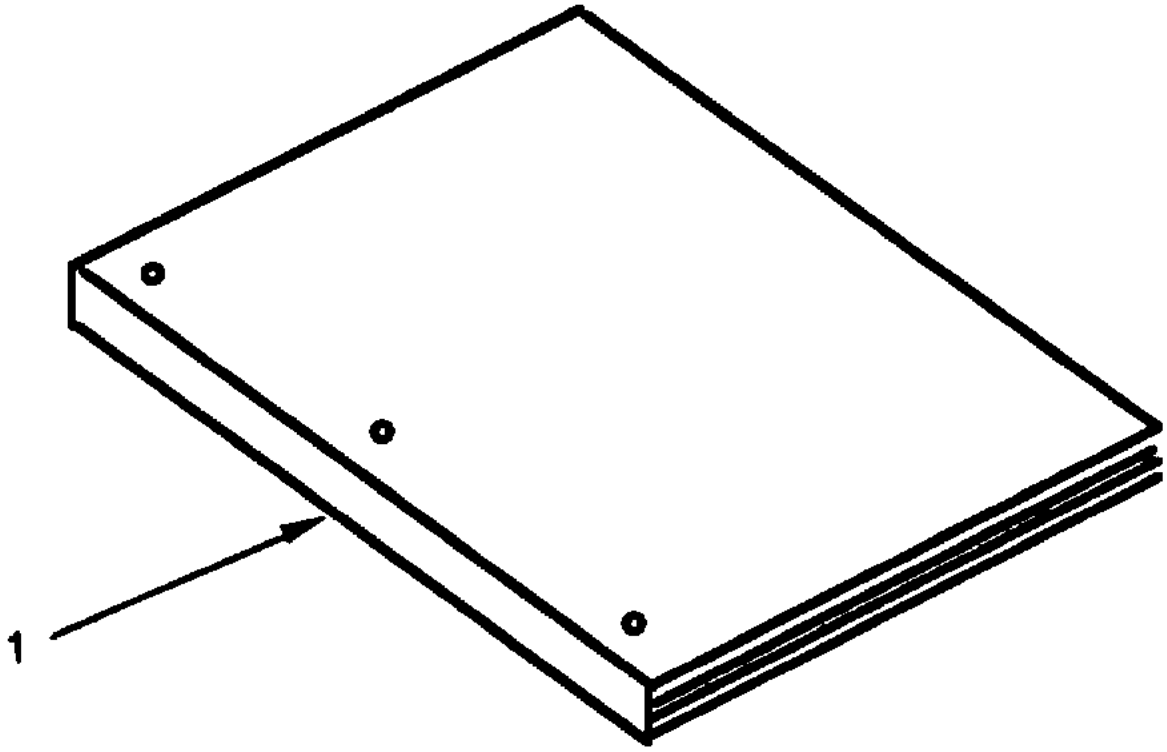
e. Column 5, Quantity Required (Qty Reqd). Indicates the quantity of the item authorized for use with the test set.

Section II. COMPONENTS OF END ITEM



(1) Illus Number	(2) NSN	(3) Description CAGEC AND PART NUMBER	(4) U/M	(5) Qty Rqr
1	6625-01-316-2753	Optical Fiber Test Set TS-4335/G	EA	1
2		Battery Charger, 120V	EA	1
3		Battery Charger, 220V	EA	1
4		Optical Cable, 50/125 Aim (Not Used)	EA	1
5		Y-Adapter Cable	EA	2

Section III. BASIC ISSUE ITEMS



(1) Illus Number	(2) NSN	(3) Description	(4) U/M	(5) Qty Rqr
1		Technical Manual, TM 11-6625-3252-12&P	EA	1

APPENDIX D
EXPENDABLE SUPPLIES AND MATERIALS LIST

Section I. INTRODUCTION

D-1. SCOPE

This appendix includes a list of the expendable supplies and materials you will need to operate and maintain the Optical Fiber Test Set TS-4335/G. These items are authorized to you by CTA 50-970, Expendable Items (Except Medical, Class V, Repair Parts, and Heraldic Items).

D-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.

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

C - Operator/Crew (Unit Level)
O - Organizational Maintenance (Unit Level)
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 indicates (in parentheses) the Commercial and Government Entity Code (CAGEC), followed by the part number.

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 the requirements.

Section II. EXPENDABLE SUPPLIES AND MATERIALS

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) U/M
1	C, 0	7920-00-862-6710	Lint-free Cloth	YD
2	C, O		Isopropyl Alcohol, USP-Reagent Grade, Compressed (80063) A3102617	OZ

APPENDIX E
REPAIR PARTS AND SPECIAL TOOLS LIST

Section I. INTRODUCTION

E-1. SCOPE

The Repair Parts and Special Tools List (RPSTL) includes a list of spare parts and authorized repair parts; special tools; special test, measurement, and diagnostic equipment (TMDE); and other special support equipment that is required for organizational maintenance of the Optical Fiber Test Set TS-4335/G. This RPSTL authorizes requisition and disposition of spare parts, repair parts, and special tools that are indicated by the Source, Maintenance, and Recoverability (SMR) codes.

E-2. GENERAL

In addition to Section I, Introduction, the RPSTL is divided into the following sections:

a. Section II, Repair Parts List includes a table that lists the spare and repair parts that are authorized by this RPSTL for maintenance purposes. The table also contains parts that must be removed before the authorized parts are replaced. Parts lists are divided into functional groups in ascending alphanumeric sequence; the parts in each group are listed in ascending figure and item number sequence. Bulk materials are listed in NSN sequence.

b. Section III, Special Tools List provides a list of special tools, special TMDE, and other special support equipment that are authorized by this RPSTL for maintenance purposes.

c. Section IV, National Stock Number and Part Number Index contains a table of all the National Stock Numbers (NSNs), in National Item Identification Number (NIIN) sequence, that appear in the listings. This table is followed by the part numbers that appear in the listings; the part numbers are listed alphanumerically. National stock numbers and part numbers are cross-referenced to each illustration figure and item number appearance.

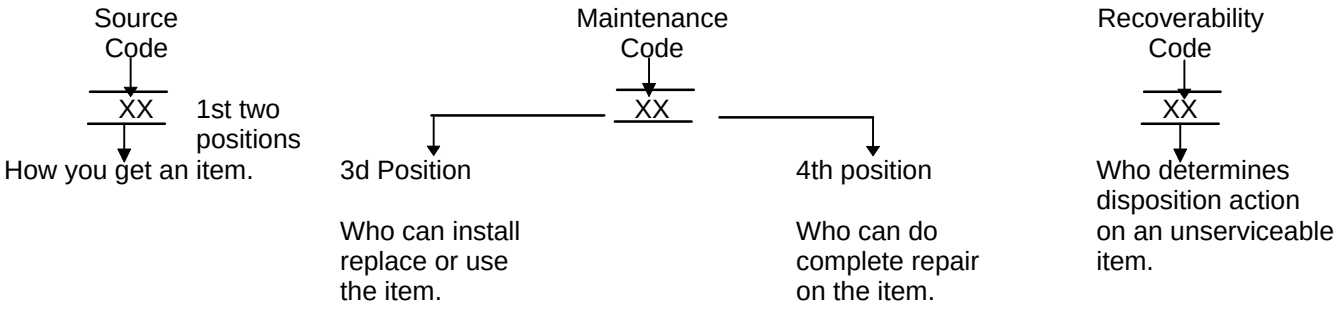
E-3. EXPLANATION OF TABLE CONTENT

The information that is contained in the tables in Sections II through IV is presented in numbered columns, as shown in the following format. A description of each column is provided.

a. Column I, Illustration includes the following sections:

(1) Figure Number (FIG. NO.) indicates the figure number that illustrates a functional group.
(2) Item Number (ITEM NO.) indicates the number that 'is used to identify callout items that appear in the illustration.

b. Column 2, Source, Maintenance, and Recoverability (SMR) Code is a 5-position code that contains supply and requisitioning information, maintenance category authorization criteria, and disposition instructions, as shown in the following breakout:



* Complete Repair: Maintenance capacity, capability, and authority to perform all the corrective maintenance tasks of the "Repair" function in a use/user environment in order to restore service ability to a failed item.

SMR Source Code indicates how an item that is required for maintenance, repair, or overhaul of an end item/equipment, is obtained. Source codes are always the first two positions of the SMR code. Explanations of source codes follow:

Code	Explanation
PA	Stocked items; use the applicable NSN to request or requisition items with these source codes. They are authorized to the category that is indicated by the code entered in the third position of the SMR code.
XB	If an XB item is not available from salvage, order it by using the Commercial and Government Entity Code (CAGEC) and assigned part number.

NOTE

Cannibalization or controlled exchange, when authorized, may be used as a source of supply for items with the above source codes.

SMR Mainte nance Code identifies the category of maintenance that is authorized to use and repair support items. The maintenance codes are entered in the third and fourth positions of the SMR Code as follows:

(1) The maintenance code that is entered in the third position indicates the lowest maintenance category that is authorized to remove, replace, and use an item. The maintenance code that is entered in the third position indicates authorization to the following categories of maintenance.

Code	Application/Explanation
0	Organizational or aviation unit category can remove, replace, and use the item.
F	Direct support or aviation intermediate level can remove, replace, and use the item.

(2) The maintenance code that is entered in the fourth position indicates whether the item is to be repaired and identifies the lowest maintenance category with the capability to do complete repair (i.e., perform all authorized repair functions). This position contains one of the following maintenance codes:

Code	Application/Explanation
D	Depot is the lowest level that can do complete repair of the item.
Z	Nonrepairable. No repair is authorized.

NOTE

Some limited repair may be done on the item at a lower category of maintenance, if authorized by the Maintenance Allocation Chart (MAC) and SMR codes.

(3) The recoverability code is assigned to items to indicate the disposition action on unserviceable items. The recoverability code appears in the fifth position of the SMR Code as follows:

Code	Application/Explanation
Z	Nonrepairable item. When unserviceable, condemn and dispose of the item at the level of maintenance that is shown in the third position of SMR code.
D	Repairable item. When beyond lower level repair capability, return to Depot. Condemnation and disposal are not authorized below depot level.
A	Item requires special handling or condemnation procedures because of specific reasons (e.g., precious metal content, high dollar value, critical material, or hazardous material). Refer to appropriate manuals/directives for specific instructions.
H	Repairable item. When uneconomically repairable, condemn and dispose at general support.

c. Column 3, National Stock Number lists the national stock number (NSN) that is assigned to the item. Use the NSN for requests/requisitions.

NOTE

When an NSN is used to requisition an item, the item that is received may have a different part number from the part ordered, but may be used as the replacement part.

***d. Column 4, Commercial and Government Entity (CAGEC*)** is a 5-digit numeric code that is used to identify the manufacturer, distributor, or government agency, etc., that supplies the item.

e. Column 5, Part Number indicates the primary number that is used by the manufacturer (individual), company, firm corporation, or government activity), which controls the design and characteristics of the item by means of its engineering drawings, specification standards, and inspection requirements to identify an item or range of items.

f. Column 6, Description includes the following information:

(1) The federal item name and, when required, a minimum description to identify the item.
(2) The physical security classification of the item is indicated by the parenthetical entry (insert applicable physical security classification abbreviation, e.., Phy Sec C1 (C)Confidential, Phy Sec C1 (S)-Secret, Phy Sec C1 (T)-Top Secret).
(3) Items that are included in kits and sets are listed below the name of the kit or set.
(4) Spare/repair parts that make up an assembled item are listed immediately following the assembled item line entry.
(5) NSNs for bulk materials are referenced in the description column in the line item entry for the item to be manufactured/fabricated.
(6) When the part to be used differs between serial numbers of the same model, the effective serial numbers are shown as the last line of the description.
(7) The USABLE ON CODE, when applicable (see paragraph E-4, Special Information).
(8) In the Special Tools List section, the Basis of Issue (BOI) appears as the last line(s) in the entry for each special tool, special TMDE, and other special support equipment. When density of equipment that is supported exceeds density spread indicated in the BOI, the total authorization is increased proportionately.

g. Column 7, Unit of Measure (U/M) indicates the measure (e.g., foot, gallon, pound) or count (each, dozen, gross) or a listed item. A two-character alpha code (e.g., FT, GL, LB, EA, DZ, GR) appears in this column to indicate the measure or count. If the U/M code that appears in this column differs from the Unit of Issue (U/I) code that is listed in the Army Master Data File (AMDF), request the lowest U/I that satisfies the requirement.

h. Column 8, Quantity Incorporated in Unit (QTY Inc In Unit) indicates the quantity of the item that is used in the breakout shown on the illustration figure, which is prepared for a functional group, subfunctional group, or an assembly. A "V" that appears in this column, in lieu of a quantity, indicates that no specific quantity is applicable (e.g., shims, spacers).

E-4. SPECIAL INFORMATION

a. Detailed Assembly Instructions for items that are source coded that are to be assembled from component spare/repair parts are found in TM 11-6625-3252-12&P. Items that make up the assembly are listed immediately following the assembly item entry or reference is made to an applicable figure.

b. National Stock Numbers that are missing from P source coded items have been applied for and will be added to this TM by future change/revision when they are entered in the Army Master Data File (AMDF). Until the NSNs are established and published, submit exception requisitions to: Commander, US Army Communications-Electronics Command and Fort Monmouth, ATTN: AMSEL-MM, Fort Monmouth, NJ 07703-5000 for the part that is required to support the equipment.

E-5. LOCATING REPAIR PARTS

a. Unknown National Stock Number or Part Number requires that the following steps are to be performed:

(1) Using the table of contents, determine the functional group or subfunctional group to which the item belongs. This is necessary since figures are prepared for functional groups and subfunctional groups, and listings are divided into the same groups.

(2) Find the figure covering the functional group or subfunctional group to which the item belongs.

(3) Identify the item on the figure and note the item number of the item.

(4) Refer to the Repair Parts List for the figure to find the line item entry for the item number noted on the figure.

b. Known National Stock Number or Part Number requires that the following steps are to be performed:

(1) Using the Index of National Stock Numbers and Part Numbers, find the pertinent national stock number or part number. The NSN index is in National Item Identification Number (NIIN) sequence. (The NIIN consists of the last digits of the NSN. For example, if an NSN is given as 5305-01-674-1467, the NIIN is 01-674-1467.) The part numbers in the Part Number index are listed in ascending alphanumeric sequence. Both indexes cross-reference to the illustration figure and item number of the item that is requested.

(2) After finding the figure and item number, verify that the item is that which is requested, then locate the item number in the repair parts list for the figure.

E-6. ABBREVIATIONS

Not applicable.

Section II. REPAIR PARTS LIST

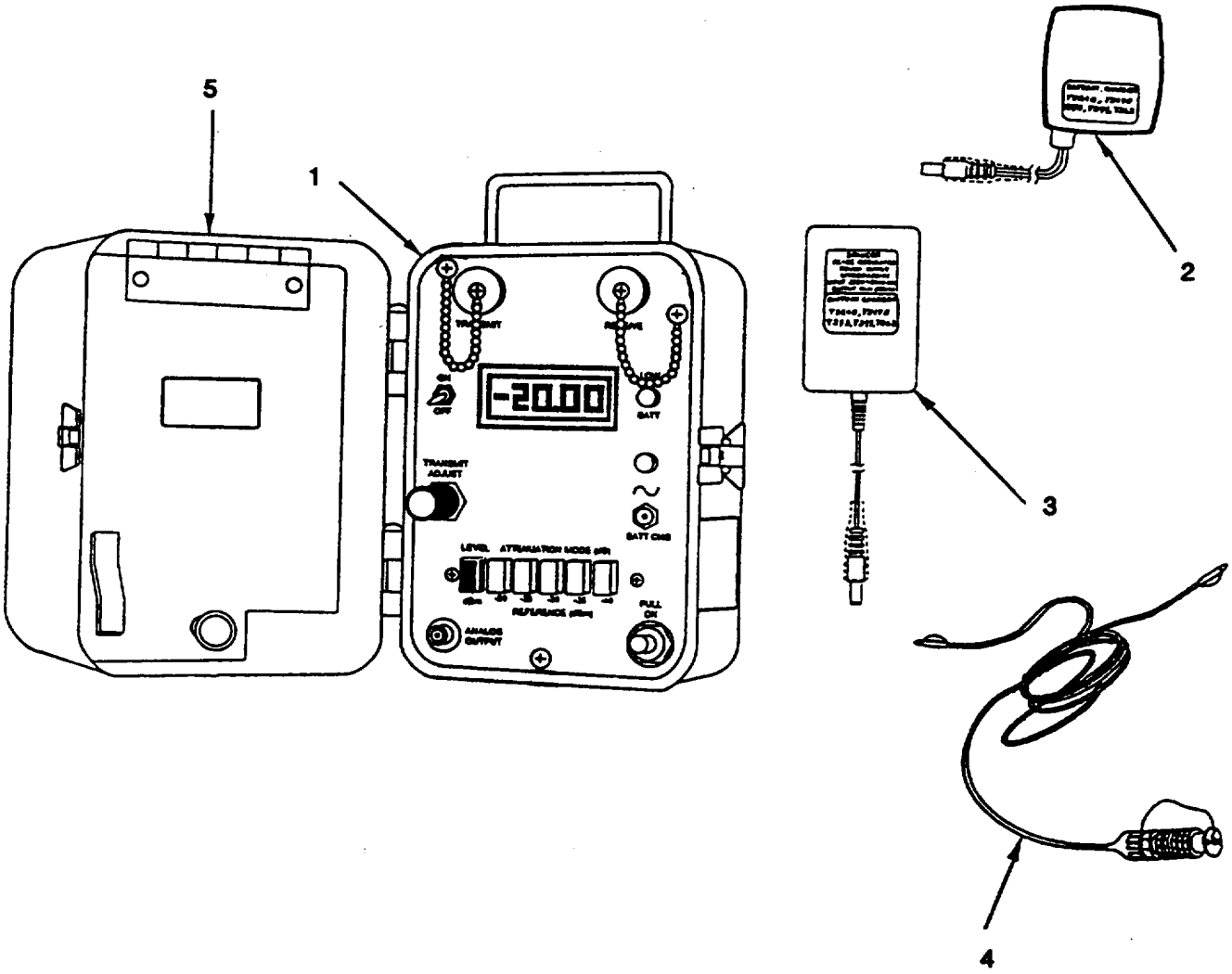


Figure E-1. Group 00 - Test Set

(1) ILLUSTRATION (a) FIG NO.	(1) ILLUSTRATION (b) ITEM NO.	(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) CAGEC	(5) PART NUMBER	(6) DESCRIPTION USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT
						GROUP: 00 FIG. 1 TEST SET. OPTICAL FIBER T 4335/G		
1	1	XBOHH		51778	20024588	ASSEMBLY, MAIN	ea	1
1	2	PAOZZ		51778	20026049	CHARGER, BATTERY 120V	ea	1
1	3	PAOZZ		51778	20026055	CHARGER, BATTERY 220V	ea	1
1	4	PAOFF		80063	A-3102658	CA ASSY, FO, BRANCHED	ea	2
1	5	XBOZZ		51778	20021903	COVER	ea	1

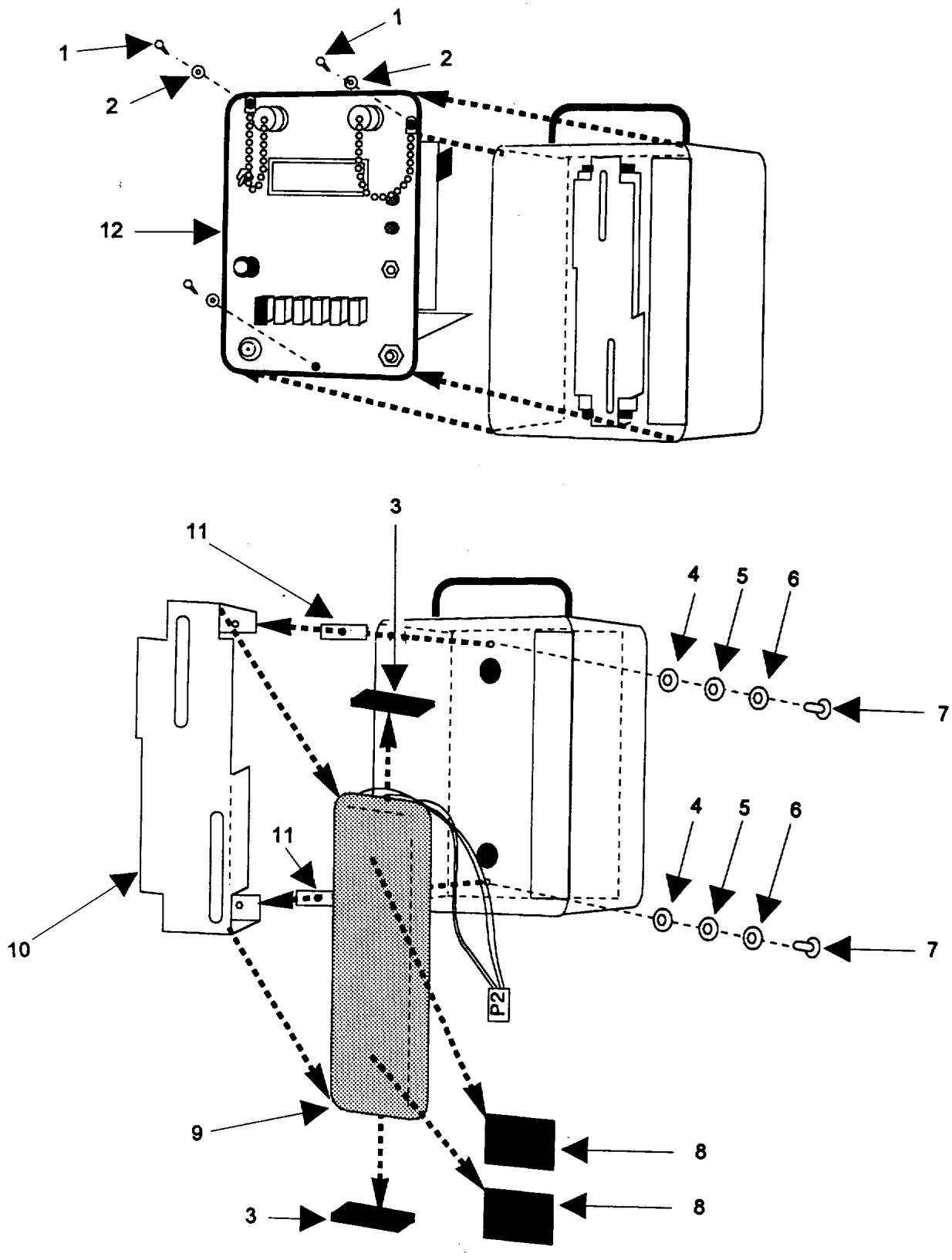


Figure E-2. Group 01 - Main Assembly

(1) ILLUSTRATION (a) FIG NO.	(1) ILLUSTRATION (b) ITEM NO.	(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) CAGEC	(5) PART NUMBER	(6) USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT
						GROUP: 01 FIG. 2 MAIN ASSEMBLY		
2	1	PAOZZ		51778	04602231	SCREW, PAN HEAD	ea	3
2	2	PAOZZ		51778	04600110	WASHER, FLAT	ea	3
2	3	PAOZZ		51778	04407094	PAD, BATTERY END	ea	2
2	4	PAOZZ		51778	04604141	WASHER, RUBBER LOCK	ea	2
2	5	PAOZZ		51778	04601027	WASHER, FLAT METAL	ea	2
2	6	PAOZZ		51778	04600599	WASHER, LOCK	ea	2
2	7	PAOZZ		51778	04602041	SCREW, PAN HEAD	ea	2
2	8	PAOZZ		51778	04416707	PAD, BATTERY CLAMP		
2	9	PAOZZ		51778	05021738	BATTERY PACK, NICAD	ea	1
2	10	PAOZZ		51778	04417388	BRACKET, BATTERY	ea	1
2	11	PAOZZ		51778	TBD	TAPE, RUBBER SEAL	ea	2
2	12	PAOHH		51778	20024246	ASSEMBLY, PANEL	ea	1

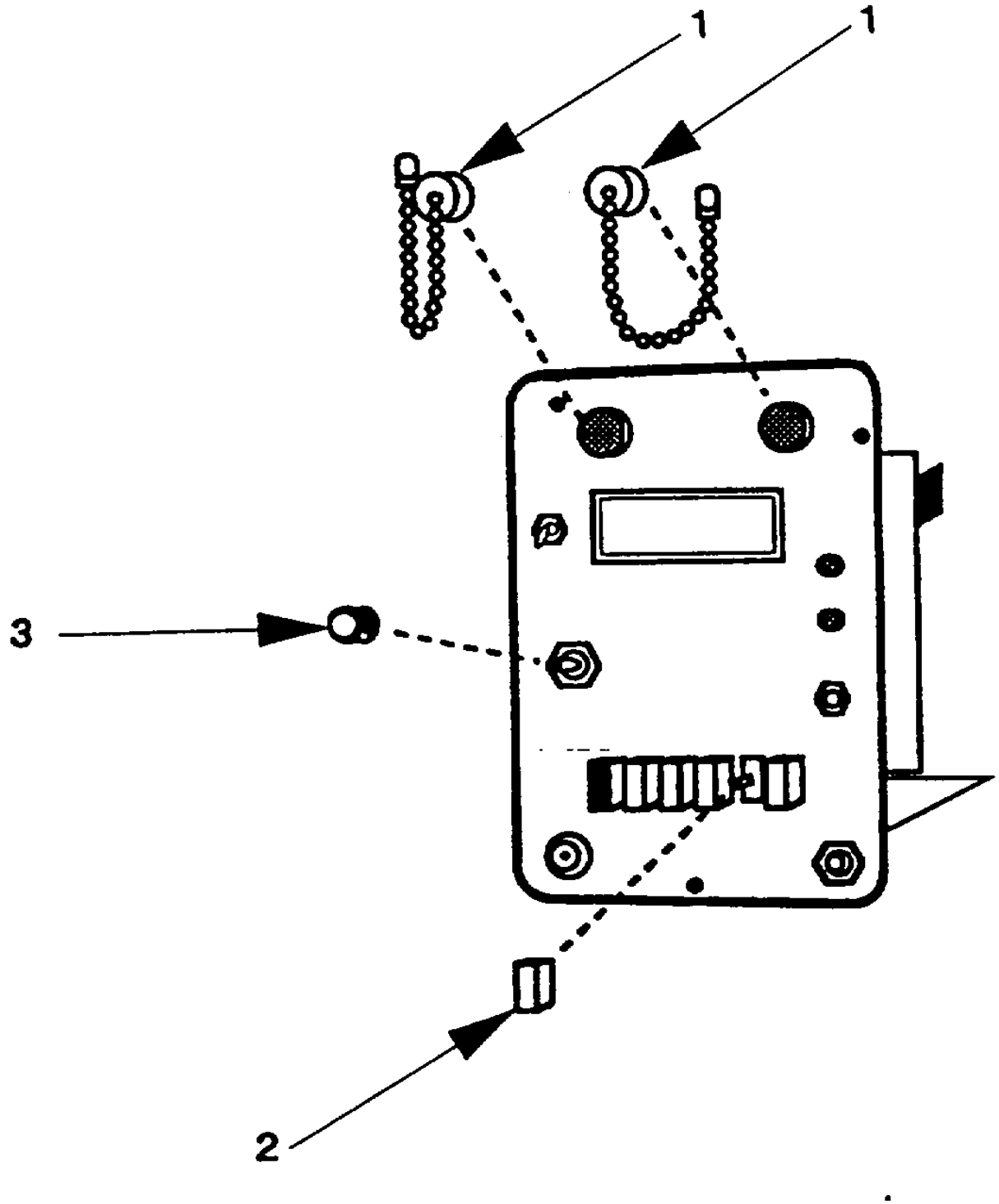


Figure E-3. Group 0101 - Panel Assembly

(1) ILLUSTRATION (a) FIG NO.	(1) ILLUSTRATION (b) ITEM NO.	(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) CAGEC	(5) PART NUMBER	(6) USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT
						GROUP: 0101 FIG. 3 PANEL ASSEMBLY		
3	1	PAOZZ		51778	05205081	CAP, PROTECTIVE	ea	2
3	2	PAOZZ		51778	01104124, B-303	PUSHBUTTONS	pk	6
3	3	PAOZZ		51778	05001631	ASSY, XMT ADJ KNOB	ea	1

Section III. SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT

No.	Nomenclature	National Stock Number	Manufacturer's Part No. and Mfr. Code
		Test Equipment	
1	Digital Multimeter	6625-01-139-2512	
2	Fiberscope		0801-9505
3	LED Laser Source		30359012
		Tools	
1	Tool Kit, Electronic Equipment, TK/105	5180-00-610-8177	

GLOSSARY

The following glossary identifies and defines the terms that are used in this manual.

ATTENUATION. Amount by which, or the result in which, the power of an optical signal is decreased; expressed in dB.

CALIBRATION. Determination of the deviation from a standard so as to ascertain the proper correction factors.

d B (Decibel). The standard unit for expressing optical gain or loss, and relative power ratios.

dBm. dB pertaining to one milliwatt; zero dBm equals one milliwatt.

FIBER, OPTICAL. Any filament or fiber that guides light, whether or not it is used to transmit signals.

FREQUENCY. The number of complete cycles per unit of time. When the unit of time is one second, the measurement unit is Hertz. Also see HERTZ.

HERTZ (Hz). A unit of frequency: 1 Hz equals one cycle per second.

LCD (Liquid Crystal Display). A display that consists of segments of a liquid crystal, the reflectivity of which varies according to the voltage applied to the segments.

LED (Light Emitting Diode). A semiconductor diode that emits light when subjected to an applied voltage, and is used in an electronic display.

LOSS. Attenuation.

PHOTODIODE. A semiconductor device that is used for detecting and measuring light by means of its conversion into an electric current.

ALPHABETICAL INDEX

ALPHABETICAL INDEX (Continued)

ALPHABETICAL INDEX (Continued)

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