

TECHNICAL MANUAL

**OPERATOR'S AND ORGANIZATIONAL
MAINTENANCE MANUAL**

**PROJECTOR, STILL PICTURE
PH-637D/PFP
(NSN 67300493-2984)**

This copy is a reprint which includes current pages from Changes 1 and 2. The title was changed by Change 2.

WARNING

DANGEROUS VOLTAGES are used in this equipment DEATH ON CONTACT MAY RESULT if safety precautions are not observed

DON'T TAKE CHANCES!

Be careful not to come in contact with any of the power connections to this equipment. Disconnect the plug on the line cord from the power source before doing any work inside of the equipment.

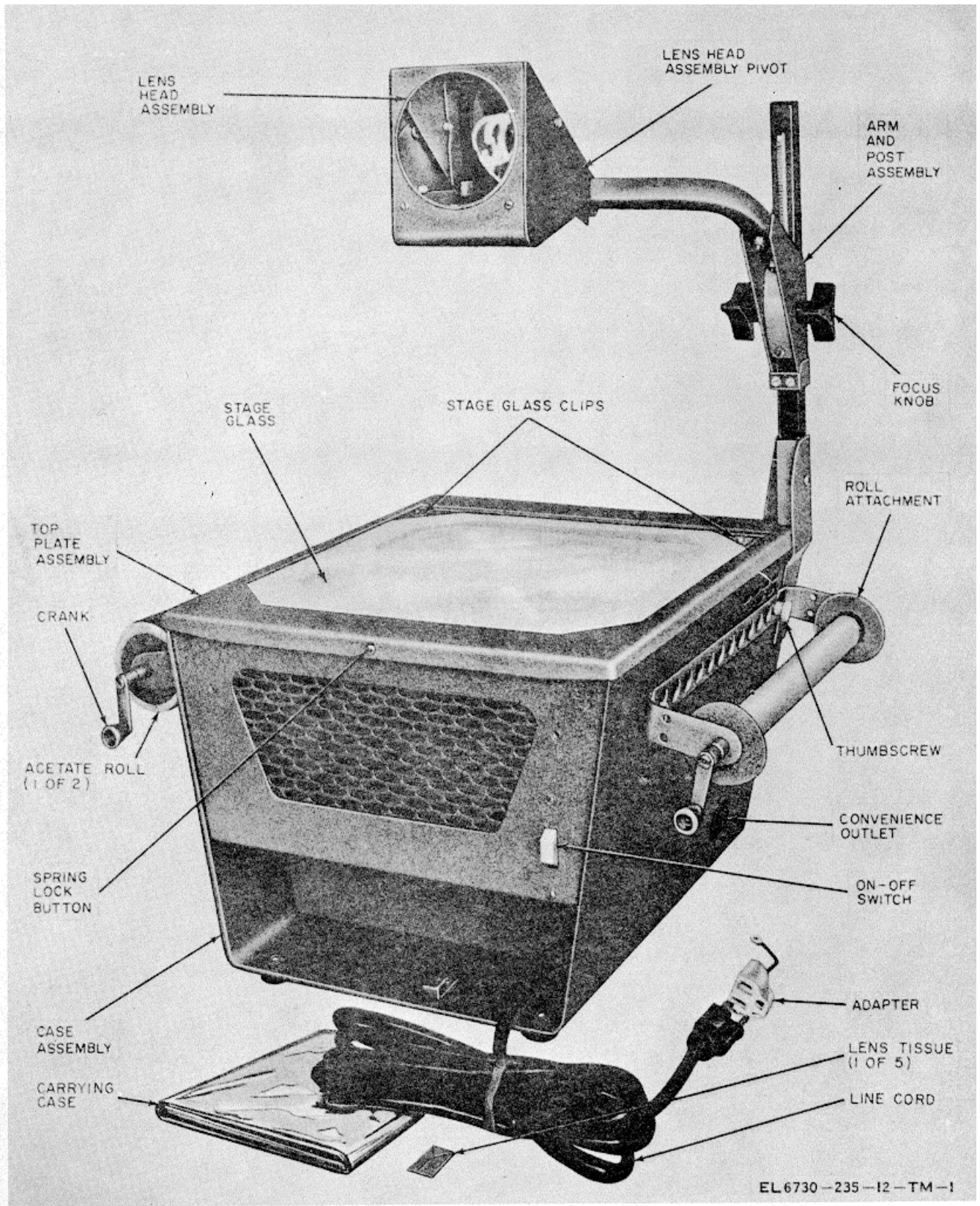
Be careful not to handle the projector lamp before it has had sufficient time to cool after operation. Painful burns may result from contact with a hot projector lamp.

**Operator's and Organizational Maintenance Manual
PROJECTOR, STILL PICTURE PH-637D/PFP
(NSN 6730-00-493-2984)**

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Figure 1-1. Projector, Still Picture P-637D/PFP.

CHAPTER 1 INTRODUCTION

Section I. GENERAL

1-1. Scope

a. This manual describes Projector, Still Picture PH-637D/PFP (projector set) (fig. 1-1) and covers its installation, operation, and operator and organizational maintenance. It includes operation under usual and unusual conditions and cleaning and inspection instructions.

b. The maintenance allocation chart (MAC) appears in appendix C.

c. Appendix B is current as of 12 April 1973. Appendix C is current as of 13 September 1978.

1-2. Indexes of Publications

a. *DA Pam \$104*. Refer to the latest issue of DA Pam 310-4 to determine whether there are new editions, changes, or additional publications pertaining to the equipment.

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

1-3. Forms and Records

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

b. *Report of Packaging and Handling Deficiencies*. Fill out and forward DD Form 6 (Packaging Improvement Report) as prescribed in AR 700-58/NAVSUPINST 4030.29/AFR 71-13/MCOP4030.29A, and DLAR 4145.8.

c. *Discrepancy in Shipment Report (DISREP)(SF 361)*. Fill out and forward Discrepancy in Shipment Report (DISREP) (SF 361) as prescribed in AR 55-38/NAVSUPINST 4610.33B/AFR 7518/MCO P4610.19C and DLAR 400.15.

1-3.1 Reporting of Errors

The reporting of errors, omissions, and recommendations for improving this publication by the be submitted on DA Form 2028 (Recommended Changes to Publications and Blank Forms) and

forwarded direct to Commander, US Army Communications and Electronic Materiel Readiness Command, ATTN: DRSEL-ME-MQ, Fort Monmouth, NJ 07703.

1-3.2 Reporting Equipment Improvement Recommendations (EIR)

EIR's will be prepared using SF 368 (Quality Deficiency Report). Instructions for preparing EIR's are provided in TM 38750 (The Army Maintenance Management System). EIR's should be mailed direct to Commander, US Army Communications and Electronics Materiel Readiness Command, ATTN: DRSEL-ME-MQ, Fort Monmouth, NJ 07703. A reply will be furnished direct to you.

1-3.3 Administrative Storage

a. *General*. Equipment that is placed in administrative storage should be capable of being ready for use within a 24-hour period. Select the best available site for storage. Separate stored equipment from equipment in use. Conspicuously mark the are "Administrative Storage."

b. *Maintenance Services*. Before the equipment is placed in administrative storage, perform the operational checks (para 2-8). Faulty equipment should not be placed in storage. If equipment fails to operate, troubleshoot using procedures in paragraph 3-8. Clean the equipment so that it is free of dirt, grease, and other contaminants.

c. *Removal From Storage*. When the projector is removed from storage, it must be tested to insure that it is operating satisfactorily. Test it by using procedures in paragraph 2-8 of this manual.

1-3.4 Destruction of Army Electronics Materiel

Destruction of Army electronics materiel to prevent enemy use shall be in accordance with TM750-244-2.

Section II. DESCRIPTION AND DATA

1-4. Purpose and Use

a. *Purpose*. Projector, Still Picture PH-637D/PFP (fig. 1-1) is a self-contained, portable overhead projector. The projector of the projector set magnifies and projects the opaque portions of

illustrations and text placed on transparent materials. The resulting projection appears as an enlarged image on a projection screen or other suitable projection surface.

b. *Use*. The projector set is used as an aid in

training, briefing, and entertaining troops. It projects relatively small text and illustrated material for simultaneous viewing by all members of a class or lecture audience. Projection materials for the projector can be prepared before, or as part of, a lecture demonstration. Overlay techniques, in which one or more transparencies are placed over another transparency and progressively removed, can be used with the projector to illustrate stages of an operation. Also, opaque masks can be placed over portions of the transparency being projected to provide partial or progressive presentation of material.

1-5. Technical Characteristics

Transparency type accommodated.	Overhead transparencies in prepared mounts of up to 10 by 10 in. Acetate rolls 100 R by 10/4 in.
Operation temperature range.	From -25F (32C) to 150°F (661C).
Lens data	Two wide-angle, 14 inch focal length f/3.5 lenses.
Lamp data	Quartz, bromine-halogen cycle, single-ended, 2200-lumen, projection lamp.
Ventilation.....	Forced air
Image elevation angle	Over 30%
Projection range	4 to 25 ft.
Power input	105 to 120 volts, 60 Hz.
Power consumption	600 watts
Projected image screen area.....	From 28 to 28 in. (for foot projection distance) to 175 x 175 in. (for 25-foot projection distance).

1-6. Components and Dimensions

Item	Height	Dimensions (in.)		Weight (lb)
		Width	Depth	
Projector	24	13 5/8	15 5/8	21
Roll attachment (2)	2 1/8	14	4	3 1/2
Adapter	1 1/8	7/8	7/8	1/32

1-6.1. Items Comprising and Operable Equipment

NSN	QTY	Nomenclature, part No. and mfg code
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NOTE

The part number is followed by the applicable 5-digit Federal supply (FSCW identified in SB 70842 and used to iden-

NSN	QTY	Nomenclature, part No. and mfg code
6730-00-493-2984		Projector, Still <i>Picture</i> , PH-63 PFP:80-00, 31535, consisting of: 1 Spool, Attachment, Roll: 65-82-1, 31535

1-6.2. Expendable Consumable Items

Expendable consumable items required for operation appear in table 1-1.

1-7. Description and Equipment (fig. 1-1)

a. Description of Major Components.

(1) Projector. The projector component of the projector set is an overhead projector consisting of five assemblies: a lens head assembly, arm and post assembly, top plate assembly, case assembly, and a lamp housing assembly. The lens head assembly contains a front lens, a bottom lens, and an internally located mirror. The assembly pivots as a unit around a support bracket that connects the assembly to the arm and post assembly. The focus arm of the arm and post assembly is supported by a holster that can be moved up and down on the post. Movement of the holster is accomplished by turning two focus adjust knobs. These knobs turn a pinion gear in the holster that meshes with a toothed rack on the post. Upper and lower stops on the post limit the movement of the holster. The top plate assembly is hinged to the case assembly. It is secured in the closed position by a spring lock button on the case assembly. The top plate assembly is supported and locked in the open position by an interlock arm connected to the case assembly. The top plate assembly contains a stage glass and fresnel lens for the projector. The fresnel lens is held by a fresnel lens holder that is secured to the top plate by a spring latch during overhead projection. The fresnel lens is released for cleaning or replacement only. The case assembly houses an interlock switch that is actuated by the interlock arm, a blower motor, a thermal switch, a convenience outlet, and a wiring harness as shown in figure 1-2. The case assembly also houses the lamp housing assembly. The lamp housing assembly consists of a projection lamp and reflector.

Table 1-1. Expendable Consumable Supplies and Material

The supplies and material listed in this table are required for operation of this equipment and are authorized to be requisitioned by SB 700-50. The FSN for the applicable unit of issue required can be found in appropriate supply catalogs. The FSCM is used as an element in item identification to designate manufacturer or distributor or Government agency, etc., and is identified in SB 708-42.

Item	Description	Ref. No. And FSCM	FSC
1	Roll, Acetate: 100 feet, 10.25 inches	615-6, 31535	6730

(2) *Roll attachments.* The roll attachments are mounted on either the left and right or front and back sides of the case assembly, and provide for storage and takeup of acetate rolls. These rolls move either from side-to-side or from front-to-back on the projector top plate assembly in accordance with the points of mounting.

(3) *Adapter.* The adapter is a line cord plug adapter that permits the polarized plug of the line cord to be used with a two hole power source convenience outlet. One end, therefore, contains three line plug pins; the other end, two convenience outlet-like sockets. A grounding wire extends from the plastic shell of the adapter. This wire is

terminated in a lug that is connected to the mounting screw of a convenience outlet switch plate in use.

b. *Description of Minor Components.* The minor component of the projector set consists of two acetate rolls, five packages of lens tissue, and a carrying case. The acetate rolls (fig. 1-1) are used with the roll attachments, one at a time. Each acetate roll is a 100-foot roll wound around a cardboard spool. The lens tissue packages each contain 100 sheets of 3- by inch lens tissue paper. The carrying case is a vinyl bag that holds the other items of the projector set when they are not in use.

Change 1 1-2.1

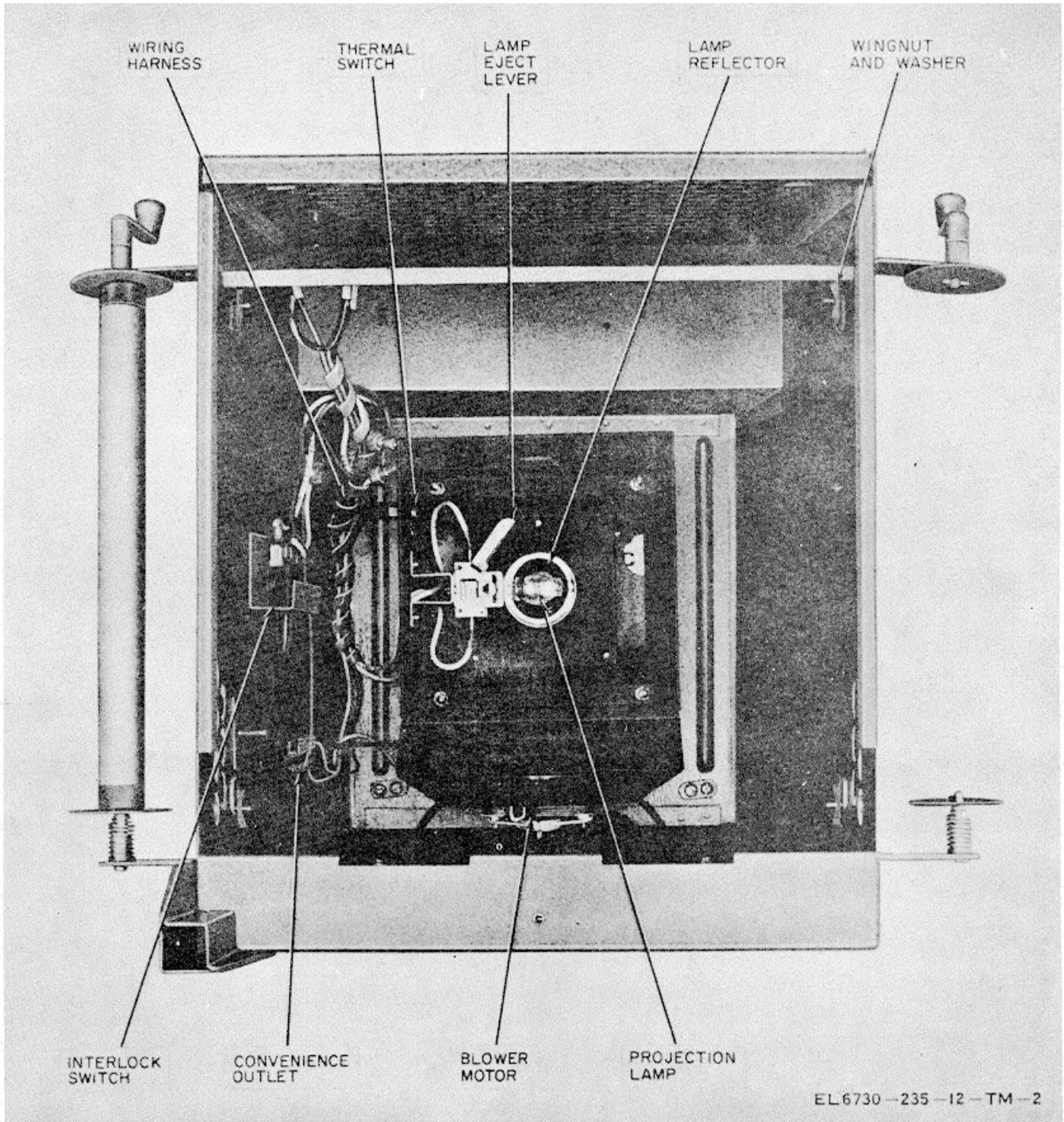


Figure 1-2. Case assembly, interior view.

CHAPTER 2 INSTALLATION AND OPERATION

Section I. SERVICE UPON RECEIPT OF MATERIAL

2-1. Unpacking

(fig. 2-1)

a. Packaging and Packing Data. The projector set components are packed and shipped in a single container. The container (corrugated carton) dimensions are 22 inches by 18 inches by 28 inches. When the projector set is packed for export shipment, one of these containers is enclosed within a wooden packing case with approximate dimensions of 24 inches by 20 inches by 30 inches. The volume of the corrugated carton is 6.4 cubic feet; the export wooden packing case is 8.2 cubic feet. The shipping weight of the projector set is 33 1 pounds when packed in the corrugated carton only, and 45 pounds when packed in the wooden packing case.

b. Unpacking Export Shipment. Unpack the wooden packing case used for export shipping as follows:

WARNING

Be careful when handling the metal straps that bind the wooden packing case used to ship the projector set. The edges of these metal straps are sharp and can cause deep and painful cuts. Use gloves when handling these metal straps. Also, be careful when cutting the metal straps. The sudden release from tension may cause the metal straps to spring outward with possible injury to eyes or other unprotected parts of the body.

- (1) Cut and remove the metal straps that bind the wooden packing case.
- (2) Remove the nails that secure the wooden cover.
- (3) Lift and remove the wooden cover of the wooden packing case.
- (4) Lift the corrugated carton out of the wooden packing case.

CAUTION

Be careful not to damage the contents of a corrugated carton when cutting the tape that seals the corrugated carton.

(5) Use a knife or cutting tool to cut the tape that seals the corrugated carton.

(6) Remove the corrugated filler that surrounds the top of the projector.

(7) Remove the carrying case, five packages of lens tissue, two acetate rolls, the adapter, and the plastic bag that contains the two roll attachments from the corrugated carton.

(8) Lift out the projector by grasping the corrugated filler that passes under the projector and pulling upward.

c. Unpacking Domestic Shipment. Unpack a domestic shipment by performing the procedures given in b5) through (8) above.

2-2. Checking Unpacked Equipment

a. Inspect the projector set for damage incurred during shipment. If such damage is detected, report the damage on DD Form 6.

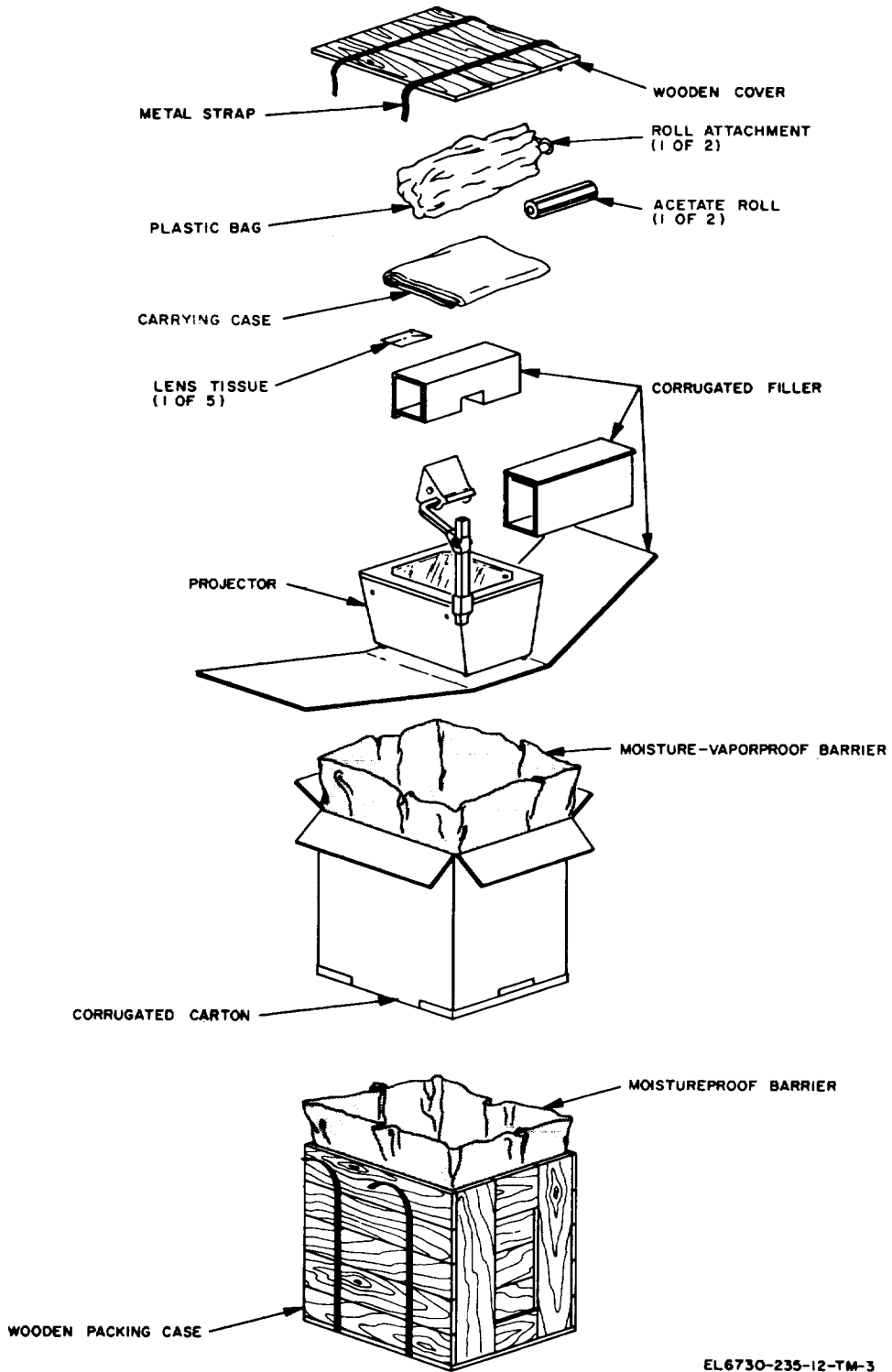
b. Check the projector set parts against the packing slip. Report all discrepancies in accordance with the instructions given in TM 38-750. Shortage of a minor assembly or part that does not affect proper functioning (for example, lens tissue or carrying case) should not prevent use of the projector set.

c. Check all major and minor components for bent, broken, or missing parts. Check the major components for loose screws, nuts, and wires.

d. Check the lenses of the lens head assembly and the stage glass of the top plate assembly (fig. 1-1) for broken, cracked, or scratched surfaces.

e. Check the fresnel lens (fig. 2-2) for scratches or separation of the lens elements.

f. If the projector set has been used or recondi-



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Figure 2-1. Projector set, packaging diagram

tioned, see if it has been changed by a modification work order (MWO). If modified, the MWO number is marked on the projector.

2-3. Installation

Installation of the projector set consists of setting it up for operation.

- a. Place the projector on a surface that is at least 24 inches wide and 30 inches deep.
- b. The line cord is 15 feet long; locate the projector close enough to a 110-volt, 60-Hertz (Hz) power convenience outlet to permit the line

cord to reach without applying any tension to the projector.

c. Locate the projector at a distance (from 4 to 25 feet) from the projection surface that produces a projected image large enough to be seen by the full class or audience.

d. Do not obstruct the louvers at the front and rear ends of the case assembly; a free flow of air must be maintained.

e. Make sure that no articles on the projector mounting surface obstruct the holes in the bottom

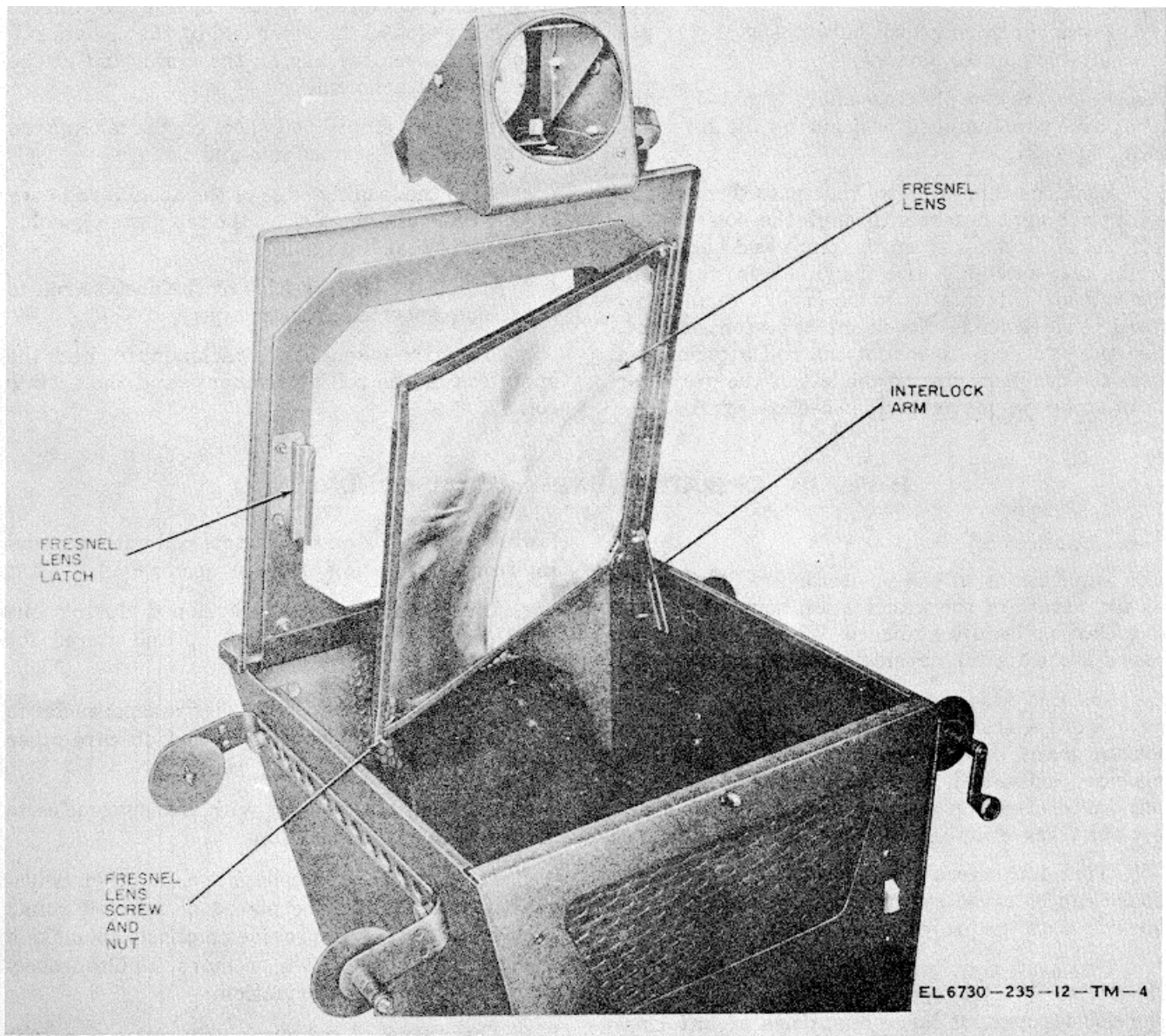


Figure 2-2. Top plate assembly locked in open position.

of the projector case and prevent proper cooling of the projector.

f. Adjust the feet of the projector to level the projector if the mounting surface is tilted.

2-4. Mounting Roll Attachments

a. Remove the wingnuts and washers shown in figure 1-2 from the thumb screws on the roll attachments (fig. 1-1).

b. Select a desired direction for the movement of the projected image when the roll attachment is cranked during operation. (The projected image can be moved from side-to-side or up and down.)

c. Press the spring lock button (fig. 1-1): use any suitable pointed object.

d. Raise the top plate assembly (fig. 1-1) until it is locked in the open position by the interlock arm (fig. 2-2).

e. Push the thumbscrews that pass through the roll attachment brackets through the holes on the left and right sides or on the front and back ends of the case assembly. Use the side holes to mount the roll attachments with the cranks facing forward if side-to-side movement has been selected. Use the end holes to mount the roll attachments with the cranks facing to the left of the projector if up-and-down movement has been selected.

f. Secure the thumbscrews with the wingnut and the washers (fig. 2-2).

2-5. Inserting Acetate Roll on Attachments

a. Determine the desired direction of projected image movement to establish which roll attachment will be the supply (storage) roll and which the takeup roll.

b. Place one slotted end of the acetate roll spool over the key of the spring-loaded end of the supply roll attachment.

c. Press the spring-loaded end of the supply roll attachment, compressing the spring enough to permit the slot of the other end of the acetate roll spool to fit over the key on the crank end of the supply roll attachment.

d. Install an empty roll spool on the takeup roll attachment as described in b and c above.

e. Guide the leading edge of the acetate roll over the top of the stage glass on the top plate assembly to the empty takeup spool.

f. Attach the leading edge of the acetate roll to the takeup spool: use plastic tape.

g. Crank the takeup roll attachment to check the operation of the roll attachment and the acetate roll.

Section II. OPERATION UNDER USUAL CONDITIONS

2-6. Application

The applications of the projector are determined by the nature of the information being described to a class or lecture audience. When planning the use of the projector, consider the following:

a. The projection of a transparency can provide a far more effective and economical means of presenting many types of information than is possible when individual copies of the material containing the information are distributed to each member of a class or audience.

b. Time and effort otherwise spent at a chalkboard can be saved by preparing information for viewing with the projector.

c. Preparation of information for viewing with the projector is less fatiguing to an audience than the development of large quantities of information on a chalkboard.

d. Information can be presented during class or

lecture by writing on the acetate roll without moving from the location of the projector.

e. Illustrative material developed during one class or lecture can be rolled up and stored for future reuse.

f. Masks can be used with the transparencies to emphasize certain information and obscure other information on a selective basis.

g. Overlays can be used with transparencies to show stages of an operation.

h. Strips of colored cellophane, or other transparent material, can be placed at selected points on a transparency to provide emphasis, or make a distinction, between two or more simultaneously projected items of information.

i. The shape of opaque objects placed on the stage glass can be projected in two dimensions at a time.

2-7. Operator Controls

(fig. 1-1)

Control or element	Function
On-off switch.....	Controls application and removal of projector power
Focus Knobs	Raise and lower lens head assembly to focus projected image.
Lens head assembly pivot	Varies elevation angle of projected image to insure that focusing does not
move image off projection	surface.
Stage glass	Supports transparencies containing images to be projected.
Cranks.....	Move acetate roll on roll attachment across stage glass. When installed on front and back ends of case assembly, cranks move projected image up and down on projection surface; when installed on sides, cranks move projected image from side-to-side on projection surface.
Convenience outlet	Provide interlock-controlled power source for auxiliary and test equipment.

2-8. Operation

a. Connect the line cord plug to the power source convenience outlet.

NOTE

The line cord plug is a three-prong polarized electrical connector. If the power source outlet is a two-pronged electrical connector, plug the adapter into the power source outlet. Loosen, but do not remove the screw that secures the power source outlet switchplate to the wall. Slip the terminal lug of the adapter under the screw and then tighten the screw. Plug

the projector line cord plug into the socket of the adapter.

b. Place the on-off *switch* in the on position. The projector lamp and fan should come on; if they do not, check to see that the top plate assembly is firmly secured to the case assembly (the spring lock button is engaging the hole in the top plate assembly).

c. Position the projector to center the projected light beam on the projection surface on the horizontal axis.

d. Turn the focus knobs to clearly focus the concentric ring pattern of the fresnel lens on the projection surface.

e. Pivot the lens head assembly to center the focused light beam on the vertical axis of the projection surface.

f. If necessary, readjust the setting of the focus knobs to produce a sharper image.

g. Place the material to be projected on the stage glass of the top plate assembly.

h. Examine the projected image of the transparency on the projection surface. If necessary, adjust the focus knobs again.

i. If the information to be projected is to be developed during the class or lecture, write on the transparency with a felt tip transparency pen, or an overhead projector pencil, or both.

j. If the acetate roll is being used with the roll attachments, move the acetate by turning the crank on the takeup roll attachment.

k. If auxiliary or test equipment is to be used with the projector, plug the line cord for that equipment into the projector convenience outlet.

Section III. OPERATION UNDER UNUSUAL CONDITIONS

2-9. Operation in Arctic- Regions

a. Warming Projector Set. If the projector set has not been unpacked, but has been stored at a low temperature, transfer it to a heated area and allow it to remain there for a minimum of 6 hours before unpacking it. If the projector set has been unpacked and stored at a low temperature, wrap it with a water-repellent material, transfer it to a heated area, and allow it to remain covered for a minimum of 6 hours before checking (b below) and setting it up for operation.

b. Checking Projector Set Before Use.

CAUTION

Do not operate the projector set until all moisture has been removed from it.

(1) Remove moisture from the exterior surfaces of the projector, except for the lenses, with a clean cloth.

(2) Remove moisture from the interior surfaces of the case assembly with a clean cloth.

(3) Clean the lenses on the lens head assembly with lens tissue.

2-10. Operation in Desert and Tropical Regions

a. Desert Regions. Before operating the projector set, remove dust and sand from the exterior surfaces of the projector, roll attachments, and adapter and the interior surfaces of the projector case assembly with a soft-bristled brush. Remove dust and sand from the lenses of the projector with a hand blower; then wipe them with a lens tissue moistened with lens cleaner. Cover the projector set components while they are not in use.

b. Tropical Regions.

CAUTION

Keep oil off the lenses, fresnel lens, stage glass, and electrical contacts.
Check the projector set daily; remove corrosion,

fungus, mites, and mold. Wipe all exposed metal parts with a cloth moistened with Lubricating Oil, General Purpose (FED VV-L-800) (FNS 9150-273-2389). Store the projector set in a well-ventilated area and air the carrying case daily.

2-11. Operation in Maritime, High Altitude, Low Temperature or Rainy Regions

To prevent corrosion from salt-laden air or salt water spray and rusting from moisture when the projector set is stored, wipe all exposed metal parts with a cloth moistened with oil (FED VV-L800). To remove condensation, allow the projector to warm up to room temperature (para 2-9) and then wipe with a clean, dry cloth before using it. When storing the projector set, cover it with water-repellent material and add desiccant, if available, to absorb moisture.

CHAPTER 3 OPERATOR MAINTENANCE

3-1. Scope of Operator Maintenance

The maintenance duties assigned to the operator of the projector set are listed below together with a reference to the paragraphs covering the specific maintenance functions. The duties assigned do not require any tools or materials other than those listed in paragraph 3-2.

- a. Daily preventive maintenance checks and services (para 3-5).
- b. Weekly preventive maintenance checks and services (para 3-6).
- c. Cleaning (para 3-7).
- d. Troubleshooting (para 3-8).

3-2. Tools and Materials Required

The following tools and materials are required for operator maintenance:

- a. Lint-free cloth (FNS 830170-5062).
- b. Hand blower (air syringe).
- c. Camel's-hair brush.
- d. Lens cleaner (FNS 6760-408-575).
- e. Trichloroethane.

3-3. Operator Preventive Maintenance

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

a. Systematic Care. The procedures given in paragraphs 3-5, 3-6, and 3-7 cover routine systematic care and cleaning essential to proper upkeep and operation of the projector set.

b. Preventive Maintenance Checks and Services. The preventive maintenance checks and services charts (para 3-5 and 3-6) outlined functions to be performed at specific intervals. These checks and services are to maintain the equipment in a serv

iceable condition; that is, in good general (physical) condition and in good operating condition. To assist operators in maintaining serviceability, the charts indicate what to check, how to check, and what the normal conditions are; the References column list. the paragraphs that contain supplementary information. If the defect cannot be remedied by the operator, higher category maintenance is required. Records and reports of these checks and services must be made in accordance with the requirements set forth in TM 38-750.

3-4. Operator Preventive Maintenance Checks and Services Periods

a. Daily. Preventive maintenance checks and services of the projector set are required on a daily basis while the projector set is in use. If the projector set is maintained in a standby (ready for immediate operation) condition, the daily checks and services should be performed once each week. Para 35 specifies the checks and services that must be performed daily and under the following special conditions:

- (1) When the equipment initially placed in service.
- (2) When the equipment or any of its components are removed from service for any reason.

b. Weekly. Perform the maintenance functions indicated in the weekly preventive maintenance checks and services chart (para 3-6) once each week. A week is defined as approximately 7 calendar days of 8-hour-per-day operation. If the equipment is operated for more than 8 hours a day, the weekly maintenance interval should be made to compensate for any unusual operating conditions. Equipment maintained in a standby condition must have weekly maintenance performed on it. Equipment in limited storage (requires service before operation) does not require weekly maintenance.

3-5. Operator Daily Preventive Maintenance Checks and Services Chart

Sequence No.	Item to be inspected	Procedure	References
1	Completeness.....	Check to see that all items required for operation are available	Para 1-6 and 1-7.
2	Cleanliness.....	Clean all exterior surfaces, except lenses in lens head assembly, and stage glass in case assembly.	Para 3-7.
3	Ventilation.....	Inspect ventilating louvers on ends and bottom of case assembly (fig. 1-1) to see that they are clean and free of any obstructions to free circulating air.	
4	Focus knobs.....	Operate focus knobs to check that holster of arm and post assembly move smoothly up and down post and is limited by top and bottom stops.	Para 3-8.
5	Convenience outlet.....	Check to see that power is available at convenience outlet when top plate assembly is in closed position.	Para 3-8.
6	On-off switch.....	Check to see that on-off switch operates smoothly and projection lamp light when switch is in on position	Para 3-8.
7	Projection lamp.....	Check to see that projection lamp lights and remains lighted throughout time on-off switch is in on position.	Para 3-8.
8	Thermal switch and blower motor.....	Check to see that blower motor star operation as soon as projection lamp comes on and remains on until projection lamp has cooled.	Para 3-8.

3-6. Operator Weekly Preventive Maintenance Checks and Services Chart

Sequence No.	Item to be inspected	Procedure	References
1	Projector.....	a. Clean lenses in lens head assembly..... b. Clean stage glass..... c. Clean fresnel lens in case assembly.....	a. Para 3-7. b. Para 3-7. c. Para 3-7
2	Spring lock button.....	Check to see that spring lock button secures top plate assembly in closed position.	
3	Lens head assembly pivot.....	Check to see that lens head assembly elevation angle can be changed by pivoting head assembly. Pivoting action shall be smooth without interruption.	

3-7. Cleaning

Cleaning the projector is essential to proper operation. Dirt on the lenses, stage glass, or fresnel lens can appear as a magnified image on the projection surface. Images of this type not only are a nuisance, but can obscure or alter the information that should be projected.

a. Lenses. Clean the exterior surfaces of the top and bottom lenses in the lens head assembly with the lens tissue supplied with the projector. If dirt particles have worked themselves into the rim of the lens frames, use a camel's-hair brush to work the dirt out.

b. Stage Glass and Fresnel Lens. Clean the top of the stage glass with a lint-free cloth that has been moistened in a soap and water solution and then wipe dry. If the underside of the stage glass or the fresnel lens is dirty, proceed as follows: (1) Press the spring lock button that secures the top plate assembly; use any suitable pointed object.

(2) Raise the top plate assembly until it is locked in

the open position by the interlock arm (fig. 2-2).

NOTE

If the projection lamp is lighted, raising the top plate assembly should cause it to extinguish.

(3) Press the fresnel lens latch to the side and snap the fresnel lens free.

(4) Wipe the underside of the stage glass with a clean, lint-free cloth moistened in a soap and water solution.

(5) Dry the stage glass with a dry, clean, lint-free cloth.

(6) Repeat (4) and (5) above for the fresnel lens.

(7) Press the fresnel lens latch to the side and press the fresnel lens into place

(8) Press the bottom of the interlock arm towards the front of the projector to release the top plate assembly.

(9) Lower the top plate assembly on the top lip of the case assembly.

CAUTION

If the spring lock button is not engaged, the top plate assembly can swing open during movement of the projector, breaking the stage glass.

(10) Press the top plate assembly down with enough force to engage the spring latch button.

(11) To make sure that the top plate assembly is actually locked by the spring latch button, try to lift the top plate assembly.

3-8. Operator Troubleshooting Chart

The troubleshooting chart given below is based primarily on trouble symptoms that may be observed while making the operational checks in the operator's preventive maintenance checks and services charts (pars 3-5 and 3-6). Symptoms of troubles that occur during normal operation of a defective projector are also included. In the Checks and corrective actions column, paragraph references are to procedures that are too lengthy or involved to include in the chart. When no entry is made in this column, refer the projector to a higher category of maintenance.

Item No.	Trouble symptom	Probable trouble	Checks and corrective actions
1	Spots that are not on transparencies appear on projected image.	a. Dirty lenses..... b. Dirty fresnel lens or stage glass	a. Clean lenses (par 3-7a). b. Clean fresnel lens, stage glass, or both (pars 3-7).
2	Focusing arm holster do not move up and down smoothly. Power is not available at projector convenience outlet.	Loose focus knob(s). b. Defective arm and post assembly. Defective electrical circuit.	
4	Projection lamp do not light when on-off switch is in on position.	a. Line cord plug not secure in power source convenience outlet. b. Defective projection lamp. c. Defective electrical circuit.	a. Secure line cord plug.
5	Blower motor always stops operating when on-off switch is placed in off position.	Defective thermal switch.	
6	Blower motor doe not operate when on-off switch is in on position.	a. Defective blower motor. b. Defective on-off switch.	
7	Spring lock button does not secure top plate assembly.	a. Defective spring lock button. b. Top plate assembly bent.	
8	Lens head assembly doe not pivot properly.	Defective lens head assembly.	

**CHAPTER 4
ORGANIZATIONAL MAINTENANCE**

4-1. Scope of Organizational Maintenance

The maintenance duties assigned to the organizational maintenance repairman for the projector set are listed below together with a reference to the paragraphs covering the specific maintenance functions.

- a. Monthly preventive maintenance checks and services chart (para 4-5).
- b. Quarterly preventive maintenance checks and services chart (para 4-7).
- c. Repainting and refinishing instructions (para 4-8).
- d. Troubleshooting (para 4-9).
- e. Focus knob tightening (para 4-10).
- f. Projection lamp replacement (para 4-11).
- g. Stage glass replacement (para 4-12).
- h. Fresnel lens replacement (para 4-13).

4-2. Tools, Materials, and Test Equipment Required

The tools, materials, and test equipment listed in paragraph 3-2 also required for organizational maintenance. Also, Tool Kit, Photographic Repair TK-77/GF is required. The repair parts and special tool lists (appx C) list repair parts and special tools required for organizational maintenance of the projector set.

4-3. Organizational Preventive Maintenance

a. Organizational preventive maintenance is the systematic care, inspection, and servicing of equipment to maintain it in serviceable condition,

prevent breakdowns, and assure maximum operational capability. Preventive maintenance includes the inspection, testing, and repair or replacement of parts, subassemblies, or parts that inspection and tests indicate would probably fail before the next scheduled periodic service. Preventive maintenance checks and services of the projector set at the organizational maintenance category are made at monthly and quarterly intervals, unless otherwise directed by the commanding officer.

b. Maintenance forms and records to be used and maintained on this equipment are specified in TM 38-750.

4-4. Organizational Monthly Maintenance

Perform the maintenance functions indicated in the monthly preventive maintenance checks and services chart (para 4-5) once each month at the same time that the daily (para 3-5) and weekly (para 3-6) preventive maintenance checks and services are performed. A month is defined as approximately 30 calendar days of 8-hour-per-day operation. If the equipment is operated 16 hours a day, the monthly preventive maintenance checks and services should be performed at 15-day intervals. Adjustment of the maintenance interval must be made to compensate for any unusual operation conditions. Equipment maintained in a *standby* condition must have monthly preventive maintenance checks and services performed on it. Equipment in *limited storage* does not require monthly preventive maintenance.

4-5. Organizational Monthly Preventive Maintenance Checks and Services Chart

Sequence No.	Item to be inspected	Procedure	References
1	Line cord.....	Inspect line cord for worn, cracked, and frayed areas. Check to see that line plug is attached securely.	
2	Line plug, adapter, and.. convenience outlet.	Check for worn, cracked, or broken shells, and broken or bent pins or sockets. Inspect adapter and convenience outlet green grounding wires for worn, cracked, or frayed areas, and broken, bent, or loose terminal lugs.	
3	Wiring.....	Inspect wiring to see that it is in good condition, and all connections are secured by their associated binding screws or electrical caps.	

4-5. Organizational Monthly Preventive Maintenance Checks and Services Chart (cont.).

Sequence No.	Item to be inspected	Procedure	References
4	Preservation.....	Inspect all painted surface for cracks, chipped paint, rust, corrosion, mildew, or fungi.	Para 4-8.
5	Operation	Operate projector to check operational capabilities of equipment ...	Para 2-8.

4-6. Organizational Quarterly Maintenance

Quarterly preventive maintenance checks and services on the projector set are required. Periodic daily (para 3-5), weekly (para 3-G). and monthly (para 4-5) preventive maintenance checks and services constitute a part of the quarterly preventive maintenance checks and services

and must be performed concurrently. All deficiencies or short-comings will be recorded in accordance with the requirements of TM 38750. Perform all checks and services listed in the quarterly preventive maintenance checks and services chart (para 4-7) in the sequence listed.

4-7. Organizational Quarterly Preventive Maintenance Checks and Services Chart

Sequence No.	Item to be inspected	Procedure	References
1	Publications.....	Check to see that all publications are complete, serviceable, and Current.	DA Pam 310-4.
2	Modifications and been published.	Check DA Pam 310-4 to determine if new applicable MWO's haveDA Pam 310-4 All URGENT MWO's must be applied immediately. All NORMAL MWO's must be scheduled.	TM 38-750.
3	Lens head assembly .. alignment	Check to see that projected image centered on projection surface when image source on transparency is centered on stage glass.	
4	Interlock switch	With on-off switch in on position, press in spring lock button, lift top plate assembly, and check to see that projection lamp extinguishes.	

4-8. Repainting and Refinishing Instructions

If inspection of the projector indicates that a painted surface is chipped, cracked, or peeling, repaint or refinish in accordance with 'the instructions in TB 746-10. Use paints or finishes listed in SB 11-573.

replace a projection lamp (item 4b), perform the procedure given in paragraph 4-11.

4-10. Focus Knob Tightening

If either focus knob slips on its shaft when operated, tighten the knob by placing a hexagonal (Allen) head wrench in the setscrew for the knob and turn the wrench clockwise.

4-9. Organizational Troubleshooting

Organizational troubleshooting is based on trouble symptom observed while making the operational checks listed in the daily (para 3-5), weekly (parn 3-6), monthly (para 4-5), and quarterly (para 47) preventive maintenance checks and services charts. The trouble symptoms observed and their probable causes are listed in the operator troubleshooting chart (par 3-8). The checks and corrective actions listed in the chart that apply to organizational maintenance are those in items No. 2a and 4b; refer all other checks and corrective action to a higher category of maintenance. To tighten a focus knob (item No. 2a, para 3-8), perform the procedure given in paragraph 4-10; to

4-11. Projection Lamp Replacement

CAUTION

Disconnect the line cord from the power source outlet.

- a. Raise the focusing arm holster to its top limit with the focus knobs.
- b. Press the spring lock button on the case assembly inward to release the top plate assembly.
- c. Swing the top plate assembly upward until it is locked in place by the interlock arm (fig. 2-2) of the case assembly.

WARNING

Be careful when handling the projection lamp. If a lamp is still hot from operation, touching the glass envelope can cause painful burns.

- d. Operate the lamp eject lever on the projection lampholder (fig. 1-2) to eject the projection lamp.
- e. When the projection lamp has cooled, remove it from the case assembly, or use gloves to handle it immediately if it is still hot.
- f. Locate the *THIS SIDE UP* marking on the replacement lamp.
- g. With the *THIS SIDE UP* marking facing upward, insert the replacement lamp in the lamp.
- h. Move the lamp gently from side to side if necessary to insure a firm seating for the lamp.
- i. Lower the top plate assembly onto the case assembly lid.

CAUTION

If the spring lock button is not engaged, the top plate assembly can swing open during movement of the projector, breaking the stage glass.

- j. Press the top plate assembly downward until the spring lock button is engaged.
- k. To make sure that the spring lock button is engaged, try to lift the lid of the top plate assembly.

4-12. Stage Glass Replacement (fig. 1-1)

- a. Raise the focusing arm holster to its top limit with the focus knobs.
- b. Loosen the screws that secure each of the two stage glass clips to the top plate assembly.
- c. Slip the stage glass clips out from under the stage glass clips.
- d. Slide the replacement stage glass under the stage glass clips.
- e. Tighten the screws that secure the stage glass clips.

4-13. Fresnel Lens Replacement

- a. Raise the focusing arm holster to its top limit with the focus knobs.
- b. Press the spring lock button on the case assembly inward to release the top plate assembly.
- c. Swing the top plate assembly upward until it is locked in place by the interlock arm of the case assembly as shown in figure 2-2.
- d. Press the fresnel lens latch to the side and swing the fresnel lens open.
- e. Remove the screw and nut that secure the side and front sections of the holder for the fresnel lens.
- f. While supporting the fresnel lens with one hand, swing the sections of the fresnel lens holder open.
- g. Lift the fresnel lens out of the fresnel lens holder.
- h. Insert the replacement fresnel lens on the rear section of the fresnel lens holder flush against the fixed section of the fresnel lens holder.
- i. Swing the fresnel lens holder front and open side sections so that they close over the fresnel lens.
- j. Secure the sections of the fresnel lens holder with the nut and screw removed in e above.
- k. Press the fresnel lens latch to the side and push the fresnel lens and holder into place.
- l. Press the bottom of the interlock arm towards the front of the projector to release the top plate assembly.
- m. Lower the top plate assembly on the lid of the case assembly.

CAUTION

If the spring lock button is not engaged, the top plate assembly can swing open during the movement of the projector, breaking the stage glass.

- n. Press the top plate assembly downward until the spring lock button is engaged.
- o. Check to see that the top plate assembly is secured in the closed position by the spring lock button.

**CHAPTER 5
SHIPMENT AND UNITED STORAGE**

5-1. Preparation for Shipment

- a. Check the components of the projector set against the basic issue hems list (app B).
- b. Insure that the top plate assembly is secured to the case assembly by the spring lock button (fig. 1-1).
- c. Lower the focusing arm holster to its lower limit stop with the focus knobs.
- d. Place the projector set components in the carrying case (fig. 1-1).

5-2. Shipment

The shipment instructions contained herein are limited to repackaging procedures. The exact procedure for repackaging depends on the materials available and the conditions under which the projection set is to be shipped or stored. Adapt the procedures listed below whenever possible. Refer to the original packaging information (para 2-1 and fig. 2-1) as a source of additional information.

- a. Required Material. The materials listed below are required for the repackaging of the projector set. Consult SB 38-100 for the National stock

numbers of these materials.

<i>Material</i>	<i>Quantity</i>
Waterproof paper	36 sq ft
Waterproof tape	15 ft
Corrugated cardboard	36 sq ft
Adhesive tape	15 ft
Filler material.....	6lb

b. *Packaging.* If the original packaging material is available, use it to repack the projector set. If the original packing material is not available, or has been damaged, proceed as follows.

(1) Wrap the projector set in waterproof paper and seal it with waterproof tape.

(2) Place the wrapped projector set within a wrap of corrugated cardboard and secure it with adhesive tape.

c. *Packing.* Place the packaged projector set in a wooden box. Fill any voids between the projector set and the sides of the box with filler material. Nail the wooden box closed.

5-3. Administrative Storage

Administrative storage of the projector set will be accomplished as specified in paragraph 1-3.3.

Change 2 5-1

APPENDIX A REFERENCES

The following publications contain information applicable to the operation and maintenance of the projector set.

DA Pam 310-4	Index of Technical Manuals, Technical Bulletins, Supply Manuals (Types 7, 8, and 9), Supply Bulletins, and Lubrication Orders.
DA Pam 310-7	U.S. Army Equipment Index of Modification Work Orders.
SB 11473	Painting and Preservation Supplies Available for Field Use of Electronics Command Equipment.
SB 38-100	Preservation, Packaging, Packing and Marking Materials, Supplies, and Equipment Used by the Army.
TB 746-10	Field Instructions for Painting and Preserving Electronics Command Equipment.
TM 38-750	The Army Maintenance Management System (TAMMS)
TM 750-244-2	Procedures for Destruction of Electronics Materiel to Prevent Enemy Use.

Change 2 A-1

**APPENDIX B
BASIC ISSUE ITEMS LIST (BIIL) AND ITEMS TROOP
INSTALLED OR AUTHORIZED LIST (ITIAL)**

Section I. INTRODUCTION

B-1. Scope

This appendix lists only basic issue items required by the crew/operator for installation, operation, and maintenance of Projector, Still Picture PH-637D/PFP.

B-2. General

This Basic Issue Items and Items Troop Installed or Authorized List is divided into the following sections:

- a. Basic Issue Items List - Section II. A list, in alphabetical sequence, of items which are furnished with, and which must be turned in with the end item.
- b. Items Troop Installed or Authorized List - Section III. Not applicable.

B-3. Explanation of Columns

The following provides an explanation of columns found in the tabular listings:

- a. Illustration Not applicable.
- b. Federal Stock Number. Indicates the Federal stock number assigned to the item and will be used for requisitioning purpose.
- c. Part Number. Indicates the primary number used by the manufacture (individual, company, firm, corporation, or Government activity), which controls

the design and characteristics of the item by means of its engineering drawings, specifications standards, and inspection requirements, to identify an item or range of items.

d. Federal Supply Code for Manufacturer (FSCM). The FSCM is a 5-digit numeric code used to identify the manufacturer, distributor, or Government agency, etc., and is identified in SB 708-42.

e. Description Indicates the Federal item name and a minimum description required to identify the item.

f. Unit of Measure (UM). Indicates the standard of basic quantity of the listed item as used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation, (e.g., ea., in., pr, etc.). When the unit of measure differs from the unit of issue, the lowest unit of issue that will satisfy the required unit of measure will be requisitioned.

g. Quality Furnished with Equipment (Basic Issue Items Only). Indicates the quantity of the basic issue item furnished with the equipment.

Section II. BASIC ISSUE ITEMS LIST

(1) Illustration		(2) Federal stock number	(3) Part number	(4) FSCM	(5) Description	(6) Unit of meas	(7) Qty furn with equip
(A) Fig. No.	(B) Item No.						
			B101	06517	CASE, CARRYING	EA	1

**APPENDIX C
MAINTENANCE ALLOCATION**

Section I. INTRODUCTION

C-1. General

This appendix provides a summary of the maintenance operations for PH-637D/PFP. It authorizes categories of maintenance for specific maintenance functions on repairable items and components and the tools and equipment required to perform each function. This appendix may be used as an aid in planning maintenance operations.

C-2. Maintenance Function

Maintenance functions will be limited to and defined as follows:

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

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

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

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

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

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

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

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

i. **Repair.** The application of maintenance services (inspect, test, service, adjust, align, calibrate, replace) or other maintenance actions (welding, grinding, riveting,

straightening, facing, remachining, or resurfacing) to restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly), end item, or system.

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

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

C-3. Column Entries

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

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

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

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

number of task-hours specified by the "work time" figure represents the average time required to restore an item (assembly, subassembly, component, module, end item or system) to a serviceable condition under typical field operating conditions. This time includes preparation time, troubleshooting time, and quality assurance/quality control time in addition to the time required to perform the specific tasks identified for the maintenance functions authorized in the maintenance allocation chart. Subcolumns of column 4 are as follows:

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

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

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

C-4. Tool and Test Equipment Requirements (sec III)

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

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

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

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

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

C-5. Remarks (sec 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.

Change 2 C-2

**SECTION II. MAINTENANCE ALLOCATION CHART
FOR
PROJECTOR, STILL PICTURE PH-637D/PFP**

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT	(6) REMARKS
			C	O	F	H	D		
00	PROJECTOR, STILL PICTURE PH-637D/PFP	INSPECT SERVICE	0.1	0.5					A B
		SERVICE			0.5				C
		TEST			0.3				
		ALIGN				1.0		1,2,3	
		REPAIR		0.2					D
		REPAIR			0.5			1,2	E
		REPAIR				2.0		12,3	F
OVERHAUL						15.0	1,2,3		

**SECTION III. TOOL AND TEST EQUIPMENT REQUIREMENTS
FOR
PROJECTOR, STILL PICTURE PH-637D/PFP**

TOOL OR TEST EQUIPMENT REF CODE	MAINTENANCE CATEGORY	NOMENCLATURE	NATIONAL/ NATO STOCK NUMBER	TOOL NUMBER
1	O,F,H, D	TOOL KIT, PHOTOGRAPHIC REPAIR TK-77/GF	5180-00-752-9068	
2	,H,DE X	MULTIMETER AN/URM-105	6625-00-581-2036	
3	H,D	THERMOMETER, SELF INDICATING, LIQUID IN GLASSML-439/PMQ-1		660-00-664738

Section IV. REMARKS

Reference Code	Remarks
A	VISUAL INSPECTION.
B	EXTENAL CLEANING AND MECHANICAL ADJUSTMENTS.
C	CLEANING INTERNAL OPTICS IN LENS HEAD ASSEMBLY.
D	REPLACEMENT OF KNOBS, STAGE GLASS, AND LAMPS.
E	REPLACEMENT OF SWITCHES, POWER CABLE, AND FRESNEL LENS.
F	REPLACEMENT OF LENS HEAD ASSEMBLY, ARM AND POST ASSEMBLY, TOP PLATE ASSEMBLY, LAMP HOUSING ASSEMBLY, THERMAL SWITCH, METER AND HARNESS ASSEMBLY, AND ROLL ATTACHMENT ASSEMBLY.

By Order of the Secretary of the Army:

W. C. WESTMORELAND,
General, United States Army,
Chief of Staff.

Official:

KENNETH G. WICKHAM,
Major General, United States Army,
The Adjutant General.

Distribution:

Active Army:

USASA (2)
CNGB (1)
ACSC-E (2)
Dir of Trans (1)
CofEngrs (1)
TSG (1)
CofSptS (1)
USAARENBD (2)
USACDC Agy (1)
USAMC (1)
USCONARC (5)
ARADCOM (5)
ARADCOM Rgn (2)
OS Maj Comd (4)
LOGCOMD (2) except
1st LOGCOMD (10)
Oh LOGCOMD (10)
USAMICOM (4)
USATECOM(2)
USASTRATCOM (4)
USAESC (70)
MDW (1)
Armies (2)
Corps (2)
1st Cav Div (5)
Svc Colleges (2)
USASCS (5)
USAADS (2)
USAFAS (2)
USAARMS (2)
USAIS (2)
USAES (2)
USAINTS (5)
USMA (5)
USAAVNS (5)
USATC Armor (2)
USATC Inf (2)
USAS/TC&FG (S)
WRAMC (1)
Army Pi Cen (5)
USACDCEC (10)
AV Spt Cen (5)
SI FLDMS (2)

USATOPOCOM (1)
Irs1 (2) except
Fort Gordon (10)
Fort Huachuca (10)
WSMR (5)
Fort Carson (26)
Fort Knox (12)
Army Dep (2) except
LBAD (14)
SAAD (80)
TOAD (14)
LEAD (7)
SHAD (3)
NAAD (5)
SVAD (5)
CHAD (3)
ATAD (10)
Gen Deps (2)
Sig Sec Gen Deps (5)
Sig Ds (12)
USAERDAA (2)
USAERDAW (18)
USACRREL (2)
USAPA (5)
MAAG (2)
USARMIS (2)
Units org under fol TOE:
(2 c each unit)
9-22
9-77
11-57
11-96
11-97
11-98
11-117
11-127
11-158
11-500 (AA-AC), (FJ, FK, FL)
19-256
19-316
44-102
44-112
44-568

NG: State AG (3): Units—Same as active Army except allowance is one (1) copy per unit

USAR: None.

For explanation of abbreviations used, see AR 310-50.

RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL PUBLICATIONS



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PARA-GRAPH

FIGURE NO.

TABLE NO.

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