DEPARTMENT OF THE ARMY TECHNICAL MANUAL

ORGANIZATIONAL MAINTENANCE MANUAL INCLUDING REPAIR PARTS AND SPIEOAL TOOL LIST

PRINTER, PROJECTION, PHOTOGRAPHIC EN-91B

This copy is a reprint which includes current pages from Changes 1 and 2.

HEADQUARTERS, DEPARTMENT OF THE ARMY

JULY 1967

WARNING

Be careful when working on the 115-volt ac or dc line connections. Serious injury or death may result from contact with these terminals.

CHANGE
No. 2

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON DC *28 October 1977*

**ORGANIZATIONAL MAINTENANCE MANUAL
INCLUDING REPAIR PARTS AND
SPECIAL TOOLS LISTS
PRINTER, PROJECTION, PHOTOGRAPHIC EN-91B
(NSN 6740-00-935-2938)**

Change No. 2 is current as of 27 May 1977

TM 11-6740-265121, 21 July 1967, is changed as follows:
1. The title is changed as shown above.
2. A vertical bar appears opposite changed material.
3. Remove and insert pages as indicated in the page list below:

Remove	*Insert*
i and 1-0	i and 1-0
1-1 through 1-4	1-1 through 1-4
A-1	A-1/(A-2 blank)
C-1 through C-3	C-1 through C-4

4. File this change sheet in front of the manual for reference purposes.

By Order of the Secretary of the Army:

BERNARD W. ROGERS
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Ft Gillem (10)	Sig FLDMS (1)
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Ft Huachuca (10)	5-52
HISA (Ft Monmouth) (33)	5112
Ft Carson (5)	8-650
Ft Richardson (ECOM Ofc) (2)	11-38
Svc Colleges (1)	11-95
USAICS (3)	11-96
USAADS (2)	11-117
USAFAS (2)	11-1
USAARMS (2)	11-500(AA AC)
USAIS (t	19-500
USAES (	29-134
AD (1) except	29- 136

ARNG & USAR: None.
For explanation of abbreviations, used see AR 310-50.

CHANGE

No. 1

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., *August 1973*

**Organizational Maintenance Manual
Including Repair Parts and
Special Tools Lid
PRINTER, PROJECTION, PHOTOGRAPHIC EN-91B**

TM 11-6740-265-12-1, 21 July 1967, is changed as follows:

1. A vertical bar appears opposite changed material.
2. Remove and insert pages as indicated in the page list below:

Remove	*Insert*
i through 1-2	i through 1.3
2-1 and 2-2	2-1 and 2-2
B-1 through B-3	None

3. File this change sheet in the front of the manual for reference purposes.

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USASA (2)
CNGB (1)
ASCS-E (2)
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USAARENBD (1)
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AMC (1)
CONARC (5)
ARADCOM (2)
ARADCOM Rgn (2)
OS Maj Comd (4)
LOGCOMDS (3)
MICOM (2)
TECOM (2)
USASTRATCOM (4)
MDW (1)
Armies (2)
Corps (2)
HISA (ECOM) (21)
Svc Colleges (1)
USASESS (5)
USAADS (2)
USAFAS (2)
USAARMS (2)
USAIS (2)
USAES (2)
USAINTS (3)
WRAMC (1)
USACDCEC (10)
ATS (1)
AV Comd Cen (1)
Instl (2) except
  Fort Gordon (10)
  Fort Huachuca (10)
  WSMR (1)
  Fort Carson (10)
  Ft Richardson (ECOM Ofc) (2)
Army Dep (2) except
  LBAD (14)
  SAAD (30)
  TOAD (14)
  LEAD (7)
  ATAD (10)
USA Dep (2)
Sig Sec USA Dep (5)
Sig Dep (5)
Sig FLDMS (2)
USAERDAA (1)
USAERDAW (1)
MAAG (1)
USARMIS (1)
Units org under fol TOE:
  (1 copy each unit)
  5-52
  5-112
  8-650
  11-95
  11-96
  11-117
  11-127
  11-158
  11-500 (AA-AC)
  19-500
  29-134

NG: None
USAR: None
For explanation of abbreviations used, see AR 310-50.

TECHNICAL MANUAL
No. 11-6740-265-12-1

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON. D.C. 21 July 1967

Organizational Maintenance Manual Including Repair Parts and Special Tool Lists PRINTER, PROJECTION, PHOTOGRAPHIC EN-91B (NSN 6740-00-935-2938)

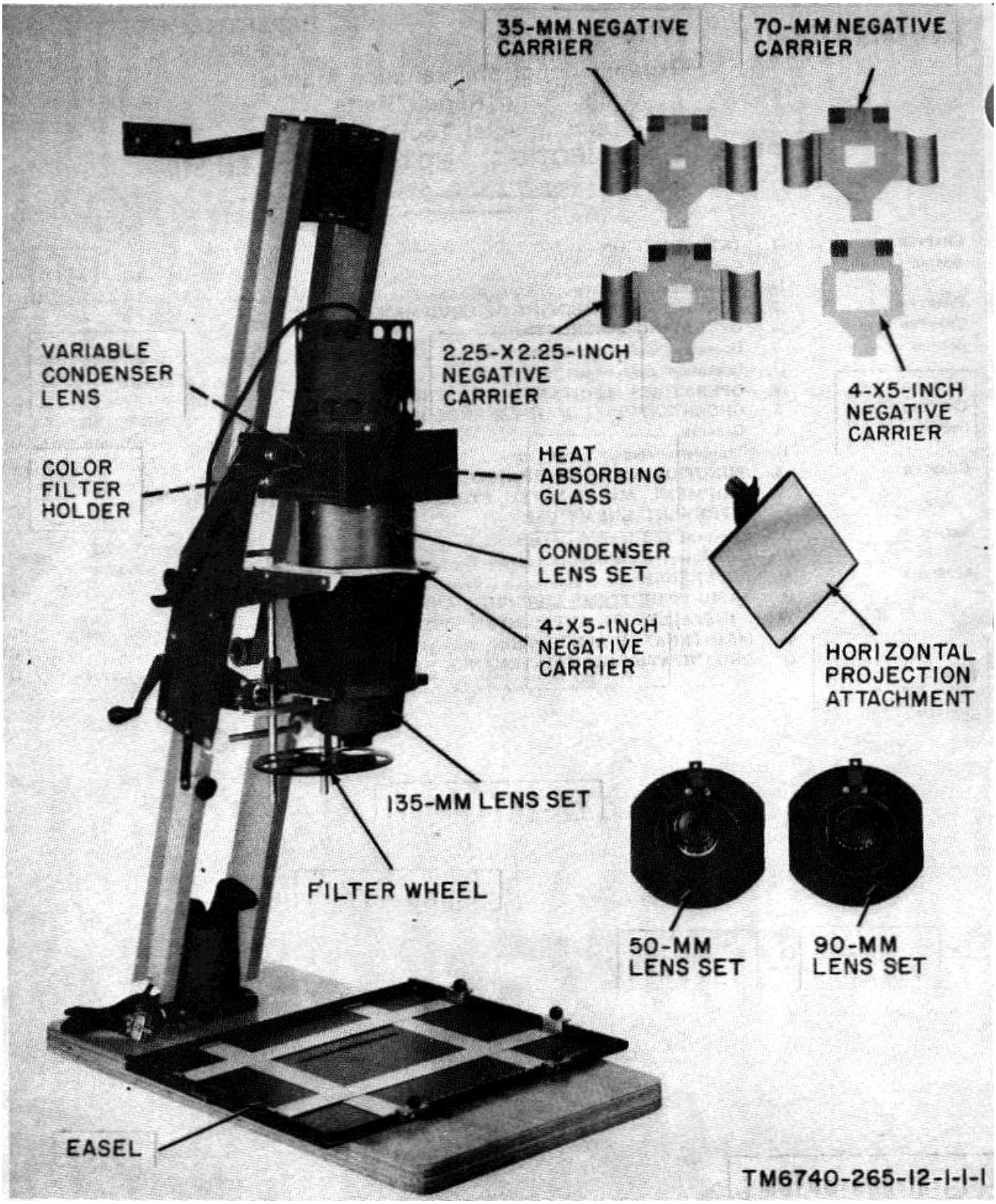

Figure 1-1. Printer Projection. Photographic EN-91B, less running spares and cases.

CHAPTER 1
INTRODUCTION

Section I. GENERAL

1-1. Scope

a. This manual describes Printer, Projection, Photographic EN-91B and covers its service upon receipt, operating instructions, and operator and organizational maintenance. It includes operation under usual and unusual conditions, cleaning and inspection of the equipment, and replacement of parts available to operator and organizational maintenance personnel.

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

c. Throughout this manual, the main component of Printer, Projection, Photographic EN91B is referred to as the printer; Easel, Projection Printing FN-10 (1) is referred to as the easel.

1-2. Indexes of Publications

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

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

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 37-750.

b. Report of Packaging and Handling Deficiencies. Fill out and forward DD Form 6 (Packaging Improvement Report) as prescribed in AR 70058/NAVSUPINST 4030.29/AFR 71-13/MCO P4030.29A, and DSAR 4145.8

c. Discrepancy in Shipment Report (DISREP) (SF 361). Fill out and forward Discrepancy in Shipment Report (DISREP) (SF 361) as prescribed in AR 5538/NAVSUPINST 4610.33A/AFR 7518/MCO P4610.19B and DSAR 4500.15.

1-3.1. Reporting of Errors

You can help improve this manual by calling attention to errors and by recommending improvements and stating your reasons for the recommendations. Your letter or DA Form 2028 (Recommended Changes to Publications and Blank Forms) should be mailed direct to Commander, US Army Electronics Command, ATTN: DRSELMA-Q, Fort Monmouth, NJ 07703. A reply will be furnished direct to you.

1-3.2. Reporting Equipment Improvement Recommendations (EIR)

EIR's will be prepared using DA Form 2407 (Maintenance Request). Instructions for preparing EIR's are provided in TM 38-750, The Army Maintenance Management System. EIR's should be mailed direct to Commander, US Army Electronics Command, ATTN: DRSEL-MA-Q, Fort Monmouth, NJ 07703 A reply will be furnished direct to you.

1-3.3. Administrative Storage

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

1-3.4. Destruction of Army Electronics Materiel

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

Section II. DESCRIPTION AND DATA

1-4. Purpose and Use

(fig. 1-1)

a. Purpose. Printer, Projection, Photographic EN-91B is a projection-type printer with accessories used for making enlarged prints from photographic negatives. The EN-91B is suitable for color printing.

b. Use. The EN-91B may be used under field conditions or in fixed installations and may be stored under extreme conditions of temperature.

1-5. Technical Characteristics

Type	Projection
Negative size	3-mm, 70-mm, 225-by 2-25 inch, and 4- by 5 inch.
Enlargements:	
35-mm negatives	23 magnifications maximum.
4-by 5-inch negatives	7 magnifications maximum.
Voltage requirements	115-volt dc or 115-volt, 50- to 50-cps ac.

Light source.....150-watt, 115-volt incandescent lamp.
Condenser lens set .....165-mm diameter.
Variable condenser lens .....118.5 mm diameter.
Projection lens sets:
Focal length .....50-mm; 90-mm; 135-mm.
Lens openings (all focal lengths) .....f/45 through f/32.
Negative carriers:
35-mm roll .....1- by 1-1V2inch aperture.
70-mm roll .....1/4 by 2-1/4 inch aperture.
2-1/4 by 3-1/4-inch roll .....2-1/4- by 3-1/4 inch aperture.
4 by 6-inch film .....4 by 6-inch aperture.
Easel, Projection Printing
FN-10(1) ..... Holds enlarging paper up to 11 by 14 inches in size with adjustments for margins up to 3/4 inch in width.

1-6. Components and Dimensions

NOTE
This listing is based on the original shipment by the contractor on Contract No. AF-33 (657)-16613.

Fig. No.	Quantity	Item	Dimensions (in) Width	Height	Depth	Weight (lb)
1-1	1	Basic unit of EN-91B	18	68-5/8	34	70
1-1	1	Filter wheel	7-3/4	1		1/4
1-1	1	Condenser lens set	6-11/16	3-3/4		5-1/4
1-1	1	Easel, Projection Printing FN-10(1).	17-3"8	7/8	14-7/16	6-1/2
1-1	I	50-mm lens set	6-1/2	2	5-5/8	3/4
1-1	1	90-mm lens set	6-1/2	2	5-5/8	3/4
1-1	1	135-mm lens set	6-1/2	4	5-3/4	1
1-1	1	35-mm negative carrier	14	3/4	10-3/4	1-8
1-1	1	70-mm negative carrier	13-4	1-3/4	10-34	1-18
1-1	1	225 x Z25-inch negative carrier	134	11-3/4	10-3/4	1-1/18
1-1	1	4- x 6-inch negative carrier	7	3/4	10-34	5/8
1-1	1	Horizontal projection attachment	3-9/16	3/4	5	3/8
3-1	1	Heat absorbing glass	6-3/8	3/8	7-5/8	1/2
3-1	1	Variable condenser lens	6-3/8	3/8	7-5/8	1-7/8
3-1	1	Color filter holder	6-3/8	3/8	7-5/8	3/4

1-6.1 Items Comprising an Operable Printer, Projection, Photographic EN-91B

NSN	QTY	Nomenclature, part No., and mfr code	Fig. No.
		NOTE **The part number is followed by the applicable digit Federal supply code for manufacturers (FSCM) identified in SB 708-42and used to identify manufacturer, distributor, or Government agency, etc.**	
6740-00-935-2938		Printer, Projection Photographic EN-911S 12700, 82205 (This item is nonexpendable), including:	
6740-00-937-4763	1	Carrier, Photographic Negative: 12635-3, 82205	1-5
6740-00-937-4764	1	Carrier, Photographic Negative: 12635-1, 82205	1-5
6740-00-937-4765	1	Carrier, Photographic Negative: 12835-4, 82205	1-5
6740-00-937-4766	1	Carrier, Photographic Negative: 12865-2, 82205	1-5
6740-00-937-4677	1	Glass Heat Absorbing: 12635-2, 82205	2-2
6740-00-937-4679	1	Holder Filter: 12897, 82205	3-1
6760-00-926-5302	1	Holder, Filter, Wheel: 12699, 82205	1-1
6760-00-089-7972	1	Lensboard: 12896, 82205	1-4
6740-00-926-5301	2	Lensboard: 12620, 82205	1-4
6760-00-089-7973	2	Lens Condenser Assy: 12697, 82205	2-2
6760-00-436-7794	1	Lens Condenser Assy: 12885, 82205	4-1
6760-00-926-5305	1	Lens, Projection Printing: 12692, 94381	1-4
6760-00-926-5304	1	Lens, Projection Printing: 12693, 94381	1-4
6760-00-937-7423	1	Lens, Projection Printing: 12694, 67144	1-4
6740-00-823-9815	1	Easel, Projection Printing: 12600, 82205	1-3
6740-00-937-4678	1	Horizontal, Projection Amy: 12772, 82205	1-6

1-7. Description and Printer

The printer consists of a lamphouse assembly, condenser lens set, a baseboard assembly, three projection lens sets, a filter wheel assembly an easel, four negative carriers, and a horizontal projection attachment.

a. Lamphouse Assembly (fig. 1-2). The complete lamphouse assembly consists of the upper lamphouse and the variable condenser lens housing. The variable condenser lens housing contains a door which provides access to the variable condenser lens, the color filter holder, and the heat absorbing glass. A knurled screw and pins attach the condenser lens set to the variable condenser lens housing. The upper lamphouse contains the lamp, the housing assembly, the inner housing, and the lamp socket.

b. Condenser Lens Set. The condenser lens set concentrates the light from the lamphouse and distributes it uniformly over the negative. The condenser lens set consists of a pair of 165millimeter (mm) diameter planoconvex lenses, each in a housing with a separator between them. The housing has three bayonet-type notches to permit assembly to the variable condenser lens housing pins where it is secured with a knurled screw.

c. Carriage Assembly. The carriage assembly mounts on the column assembly and supports the movable portion of the printer. The control lever and the lifting levers mounted on the carriage assembly support the lamphouse assembly and the condenser lens set.

d. Column Assembly. The column assembly forms a rigid support for the carriage assembly. A gear rack at the back provides for raising and lowering the carriage assembly. Two balance springs, attached to the top of the column assembly counterbalance the weight of the carriage assembly.

e. Baseboard Assembly. The baseboard assembly consists of a wooden baseboard and three tee nuts that form the mounting support for the column assembly. Three capscrews secure the column assembly to the baseboard.

f. Filter Wheel Assembly. The filter wheel is equipped with a red safe light filter, a clear position (no filter), and a set of filters to permit printing with variable contrast papers. The absorption of the red filter prevents fogging of sensitized paper when exposed for periods up to 1 minute.

g. Easel (fig. 1-3). The easel contains four adjustable masking blades. A support holds the easel open for paper insertion. Three paper slots are incorporated to accommodate various sizes of paper. Adjustment knobs are provided to facilitate adjusting the masking blades.

h. Projection Lens Sets (fig. 1-4). Three projection lens sets having focal lengths of 50-mm, 90-mm, and 135-mm, respectively, are supplied with the printer. Each lens board has been cut off at two diametrically opposed sides to permit bayonet-type mounting, and each is equipped with a bracket on which the filter wheel assembly can be mounted by a knurled screw. Lens caps are provided to protect the lens when not in use.

i. Negative Carriers (fig. 1-5). Four negative carriers are provided with the printer. Guides in each negative carrier are provided to center each carrier in the negative carrier bracket of the carriage assembly. Film supports are provided on all the negative carriers except the 4- by 5-inch one. Spring hinges are attached to each negative carrier to facilitate rapid negative handling.

j. Horizontal Projection Attachment (fig. 1-6). The horizontal projection attachment provides a method of making large size prints. The image is projected on the wall by the optical ground surface coated mirror which is angel-mounted 45° and glued to the mirror bracket, which protects it from damage. The mirror should always be returned to its protective cover when not in use.

CAUTION

Never wipe the mirror with anything but a soft lintfree cloth.

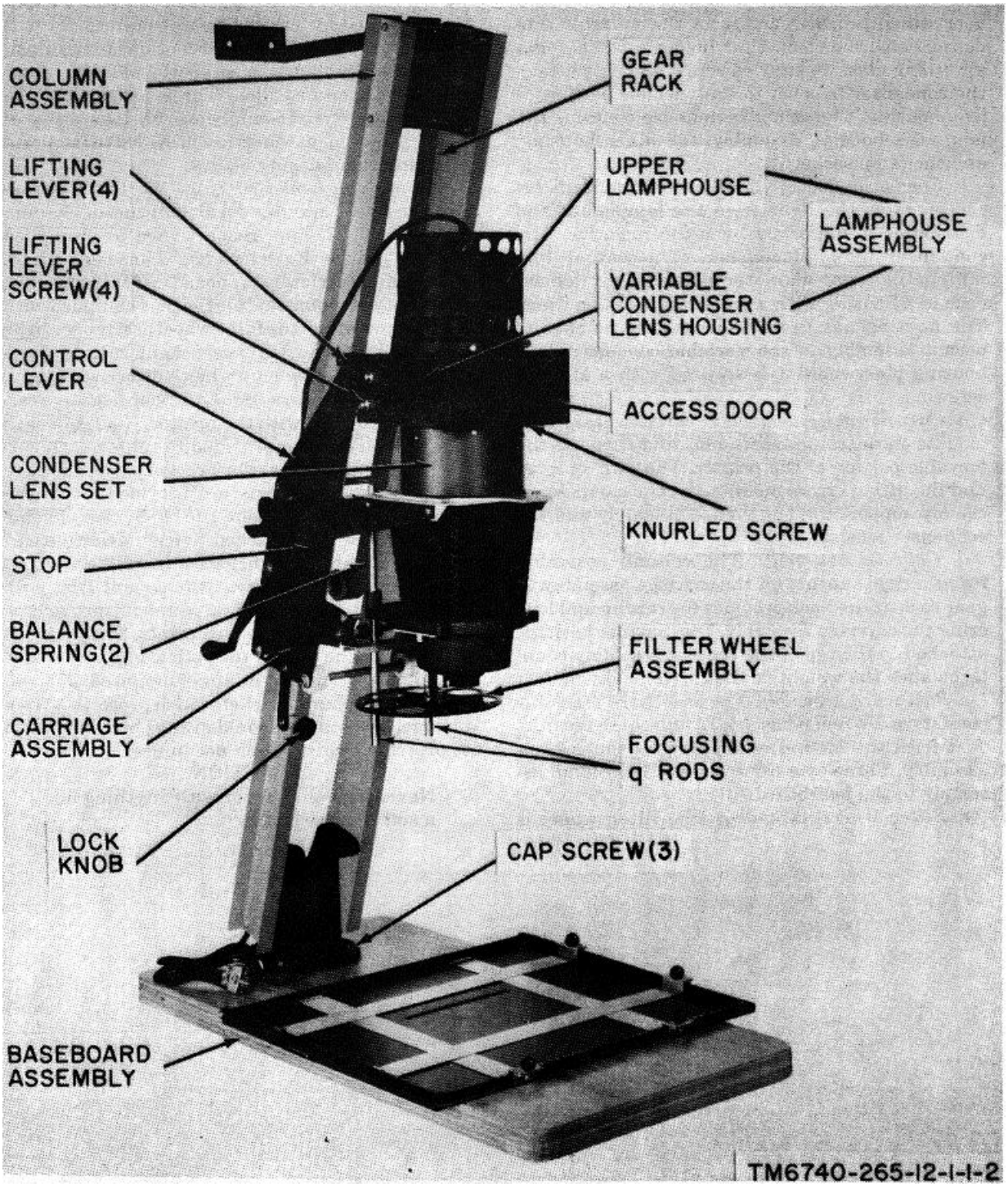

Figure 1-2. Printer and easel.

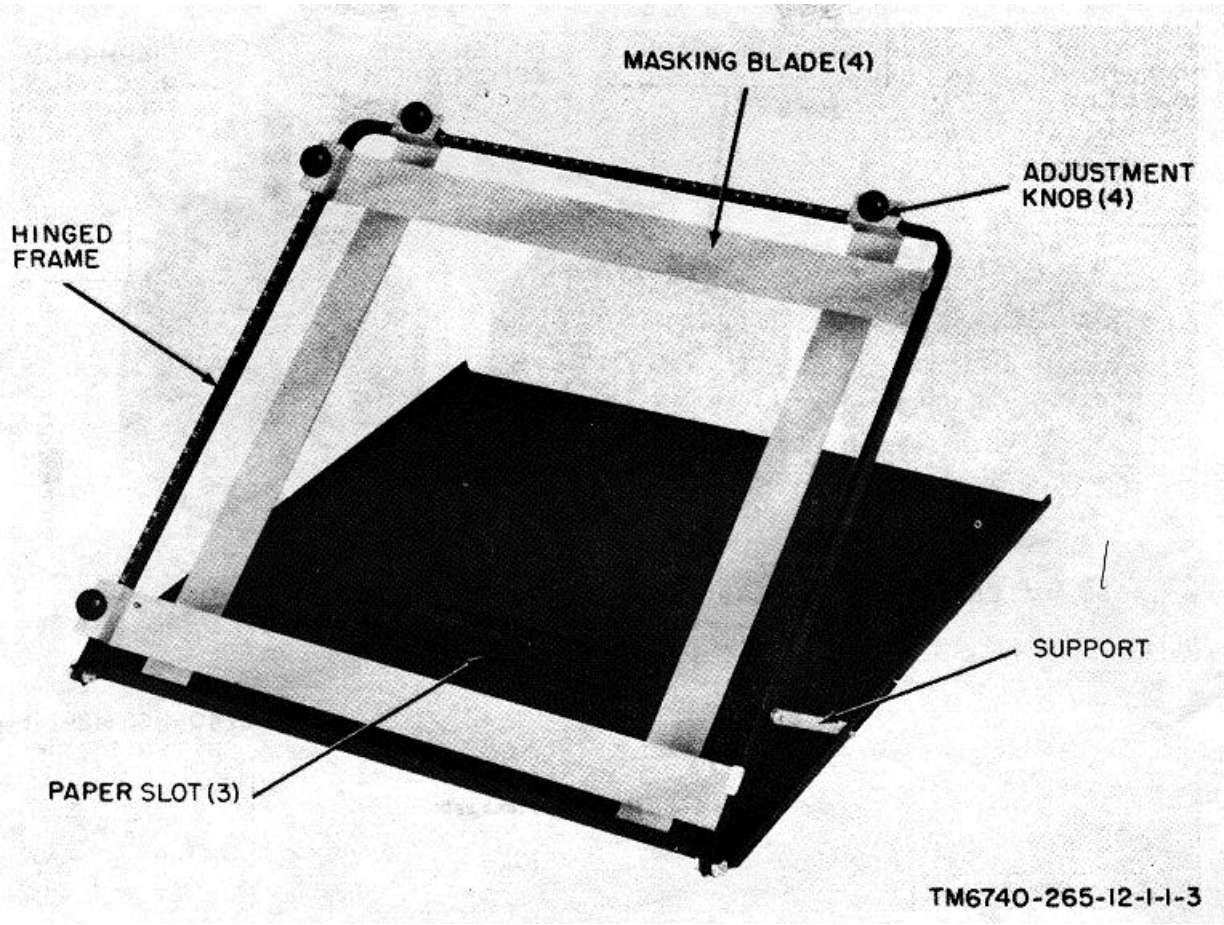

Figure 1-3. Easel

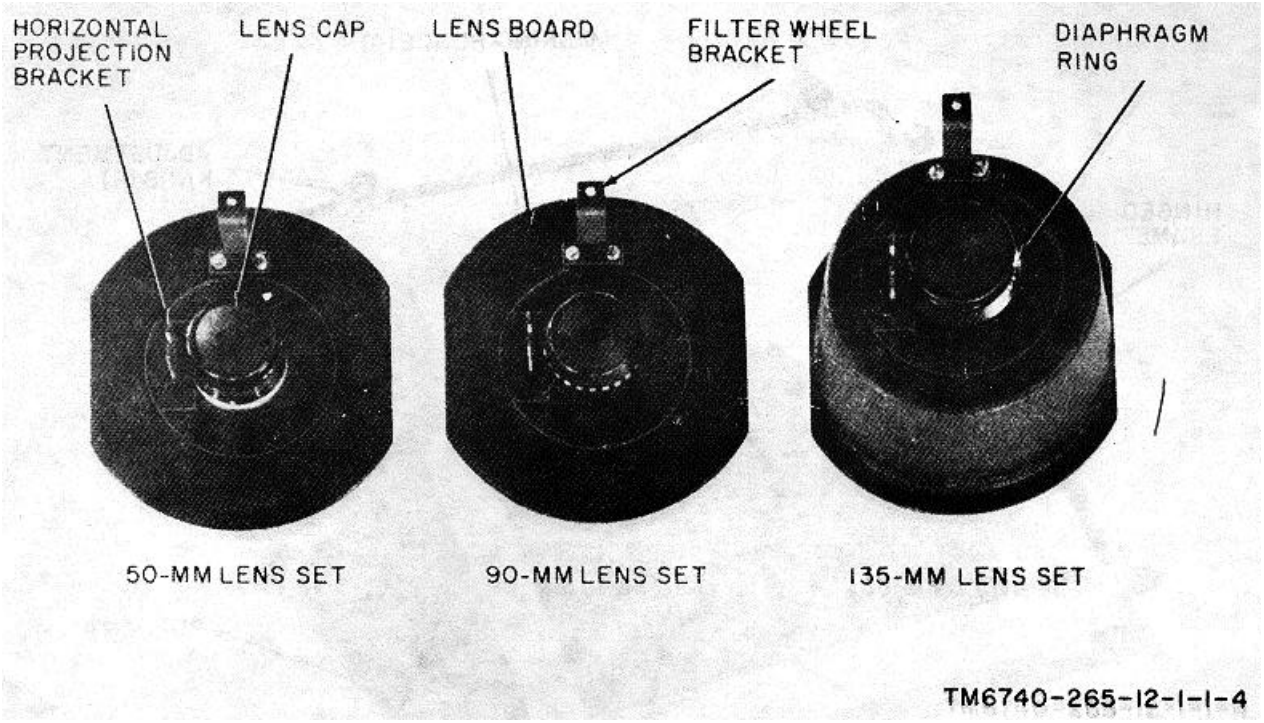

Figure 1-4. Projection lens sets.

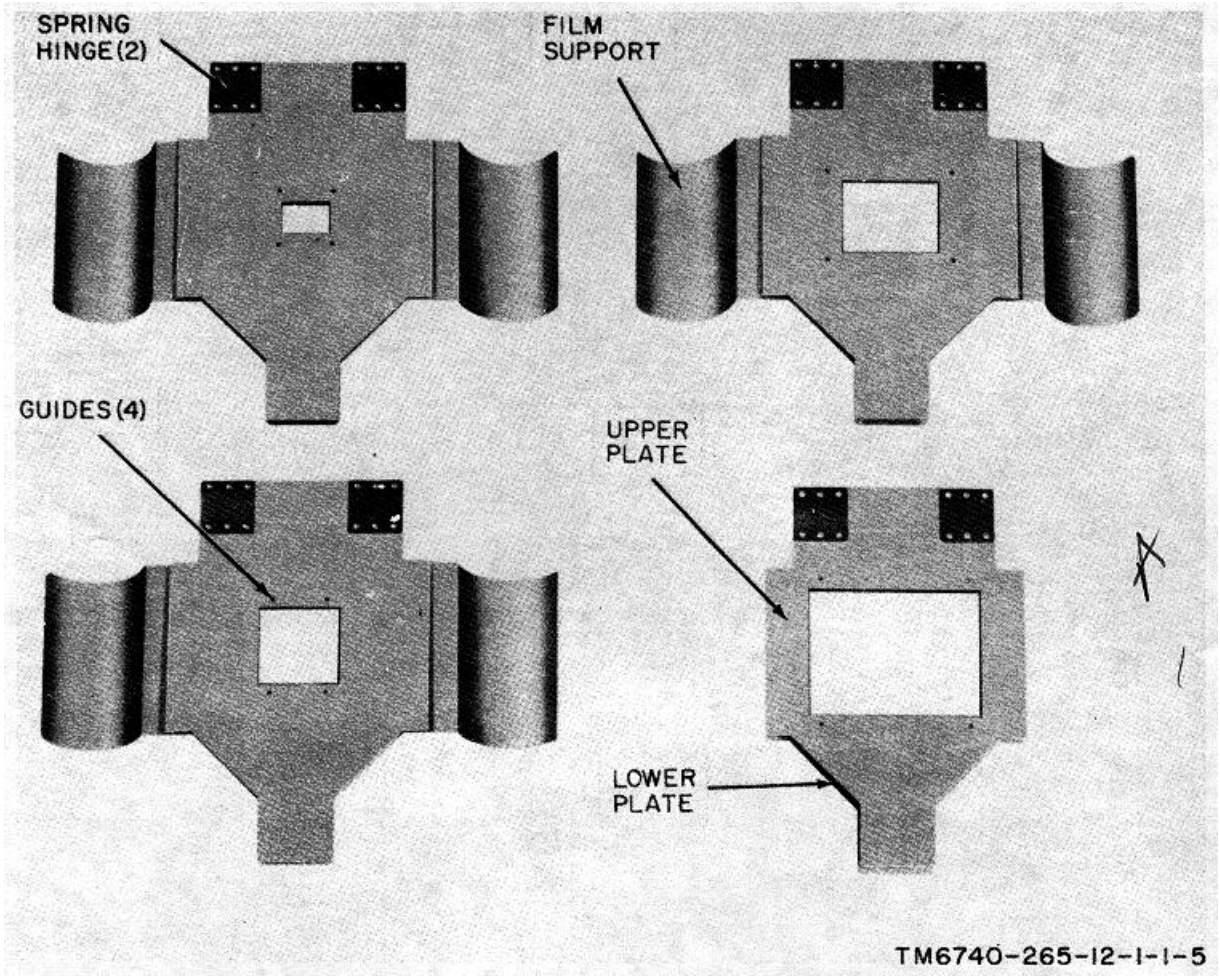

Figure 1-5. Negative carriers.

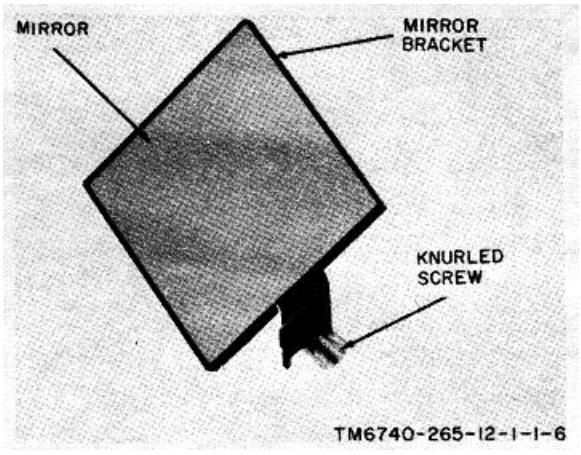

Figure 1-6. Horizontal projection attachment.

CHAPTER 2

SERVICE UPON RECEIPT OF EQUIPMENT

2-1. Uncrating and Unpacking

(fig. 2-1)

a. Packaging and Packing Data. When packaged for shipment, the printer is packed in a wooden packing case. The approximate dimensions of the wooden packing case are 83 by 20 by 20 inches. The total weight of the complete instrument, packaged for shipment, is 250 pounds.

b. Uncrating.

(1) Cut the steel straps that bind the wooden packing case.

CAUTION

Do not attempt to pry open the case; the contents may become damaged.

(2) Remove the nails from the wooden cover with a nailpuller; remove the cover.

(3) Open the individual waterproof metal barriers, and cut the sealing tape on the cartons.

(4) Retain the wooden packing case for future use.

c. Unpacking (figs. 2-1 and 2-2).

(1) Remove the various printer components from their cartons, and assemble the column assembly to the baseboard.

(2) Open the accessory case, and remove the desired components.

(3) Remove dust from all components with a soft, lint-free cloth.

2-2. Checking Unpacked Equipment

a. Inspect the equipment for damage incurred during shipment. If the equipment has been damaged, report the damage on DD Form 6.

b. Check to see that the equipment is complete as listed on the packing slip. Report all discrepancies in accordance with TM 38-750. Shortage of a minor assembly or part that does not affect proper functioning of equipment should not prevent use of the equipment.

c. If the equipment has been used or reconditioned, see whether it has been changed by a modification work order (MWO). If the equipment has been modified, the MWO number will appear on the front panel near the nomenclature plate. Check to see whether the MWO number (if any) and appropriate. notations concerning the modification have been entered in the equipment manual.

Note. **Current MWO's applicable to the equipment are listed in DA Pam 310-4.**

2-3. Siting

a. Exterior Requirements. The site where the printer will be located is governed by the tactical situation and by the type of shelter facilities available (tents, buildings, etc.) If possible, choose a location where a flat area is available for setting up the equipment. Be sure that drainage facilities exist.

b. Interior Requirements.

(1) *Shelter.* After locating the shelter in which the printer is to be placed, make the necessary arrangements for dark-room operations. Equip all windows with opaque material, and check the other areas of the shelter to be sure it is lighttight.

(2) *Space requirements.* Operating personnel must have sufficient ceiling.

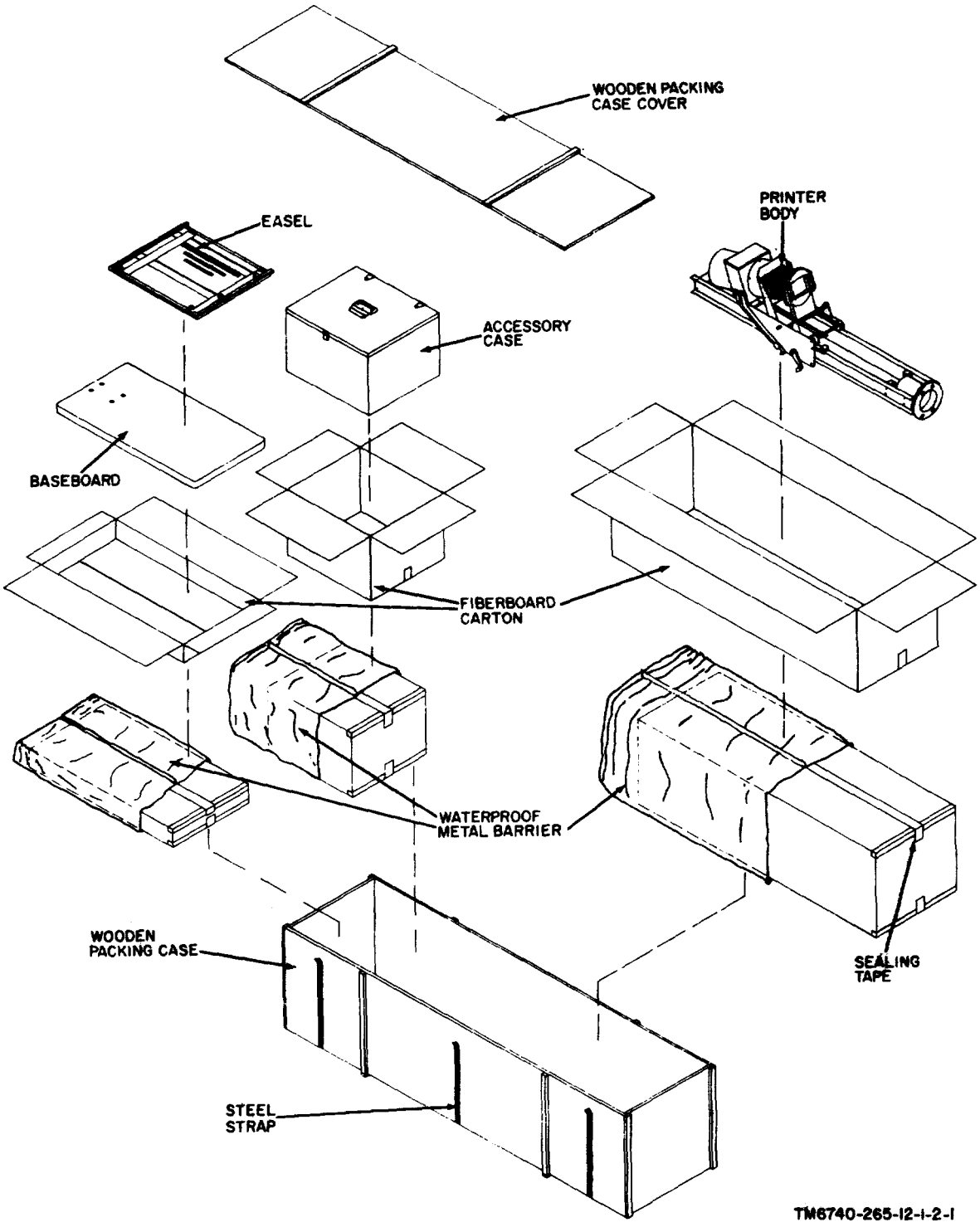

Figure 2-1. Packaging diagram.

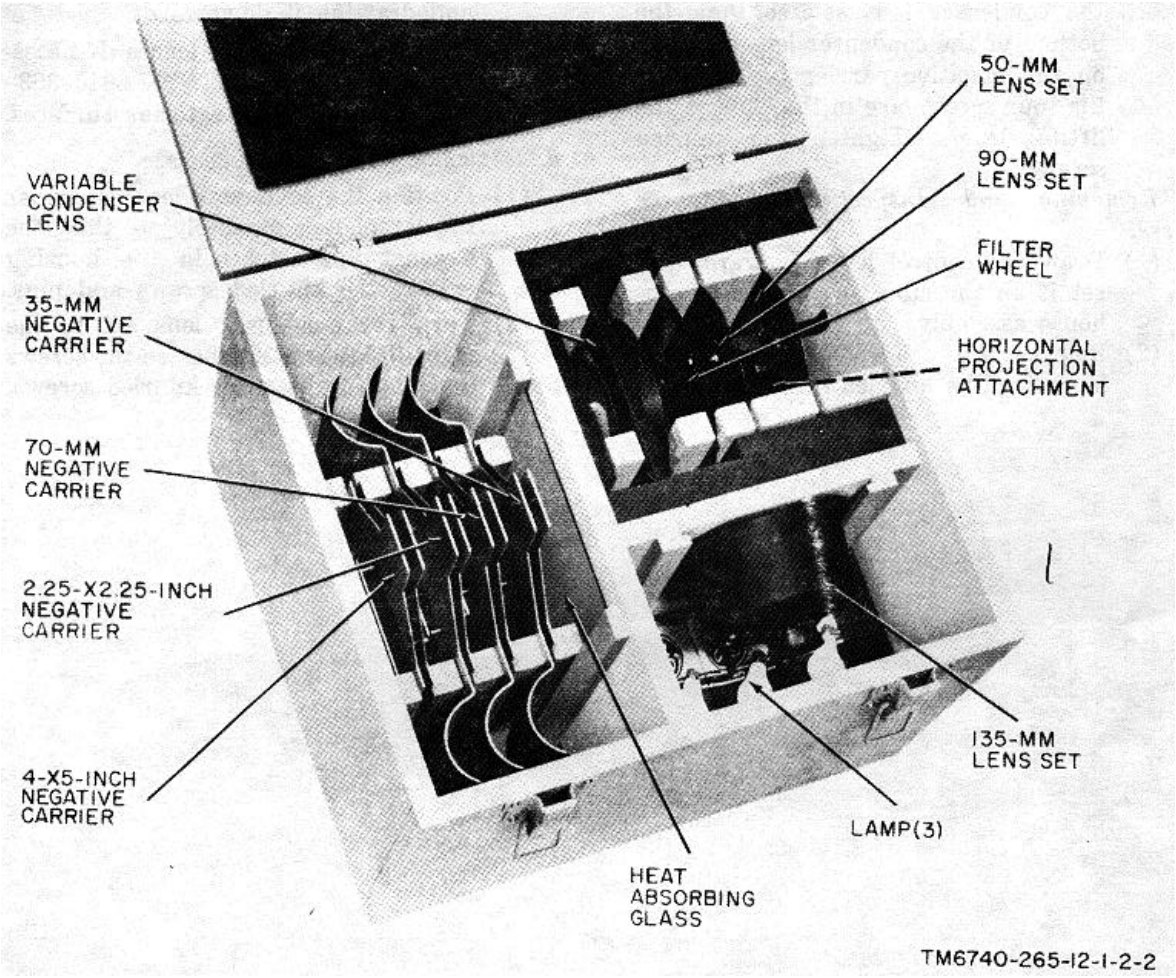

Figure 2-2. Printer components in accessory case.

height and table area to allow the work of printing and developing. The minimum space required is 8 by 8 feet.

(3) *Electrical requirements.* The power requirements of the printer are 115 volts, 50 to 60 cycles per second (cps) alternating current (ac), or 115 volts direct current (dc).

(4) *Water requirements*. A large quantity of fresh water is needed for washing prints and negatives. Running water sufficient for 8 to 12 changes of wash water in the tray or tank is required for each batch of prints or negatives processed.

2-4. Assembly of Printer

CAUTION

Do not loosen the carriage lock knob until the lamphouse assembly (fig. 1-2) has been installed; otherwise, the balance springs will cause the carriage assembly to move rapidly up to the stops and may damage the equipment.

a. Installing Column Assembly.

(1) Position the column assembly on the baseboard assembly so that the mounting holes line up.

(2) Insert and tighten the capscrews.

b. Installing Carriage Assembly.

(1) Loosen the lifting lever knurled screws on the lamphouse assembly.

(2) Install the lamphouse assembly with the condenser lens set so that the bottom of the condenser lens set rests on the negative carrier bracket and the four screws are in the slots of the lifting levers. Tighten the knurled screws.

c. Removing and Inspecting Condenser Lenses.

(1) Draw the control lever forward, and set it on the stop to raise the lamphouse assembly.

(2) Release the condenser lens set by loosening the knurled screws, turning the condenser lens housing to the left, and drawing it downwards.

(3) Inspect the condenser lenses. If necessary, use lens tissue (FSN 6640-393-2093) to clean the exterior surfaces.

d. Replacing Condenser Lenses.

(1) Position the condenser lens set under the lamphouse assembly so that the bayonet-type notches in the housing engage the knurled screws and pins.

(2) Turn the condenser lens set to the right to lock the notches on the screws and pins; tighten the knurled screws.

CHAPTER 3
OPERATING INSTRUCTIONS

Section I. OPERATION UNDER USUAL CONDITIONS

3-1. Controls (fig. 3-1)

Control	Function
Control lever	Forward position: Raises lamphouse assembly.
Crank	Varies distance of carriage assembly from sensitized paper to control size of enlargement.
Diaphragm ring .	Sets lens opening between f/4.5 and f/32.
Focusing knob...	Varies distance of projection lens from film to control focus.
Lock knob	Locks carriage assembly in position on column assembly.

3-2. Selecting Projection Lens Set and Determining Variable Condenser Lens Position

Use the chart (a below) to select the projection lens set and to determine the variable condenser lens position; if necessary, change the projection lens set (b below) and the variable condenser lens position (c below).

a. Chart.

Negative size	Projection lens set	Variable condenser lens position
4- x 5-inch	5-3/8-inch	1
2-1/4- x 2-1/4 inch or 2-1/4- x 3-1/4 inch.	3-1/2-inch	2
35-mm	2-inch	3

b. Changing Projection Lens Set.

(1) *Removal*. Rotate the projection lens set approximately one-quarter turn-until it is disengaged, and remove it from the printer.

NOTE

If the projection lens set does not turn easily, loosen the adjusting screw slightly (fig. 3-1).

(2) *Replacement.* Hold the replacement projection lens set so that its straight sides are parallel to the long sides of the baseboard, insert the projection lens set in the printer, and rotate it approximately one-quarter turn to lock it in position.

c. Changing Variable Condenser Lens Position.

(1) Open the access door.
(2) Slide out the variable condenser lens.
(3) Slide the variable condenser lens into the correct position (a above).
(4) Close the access door.

3-3. Using Negative Carriers (fig. 1-5)

a. Roll Film.

(1) Hold the carrier so that the film supports are facing upward, and place the roll of film in the left-hand support

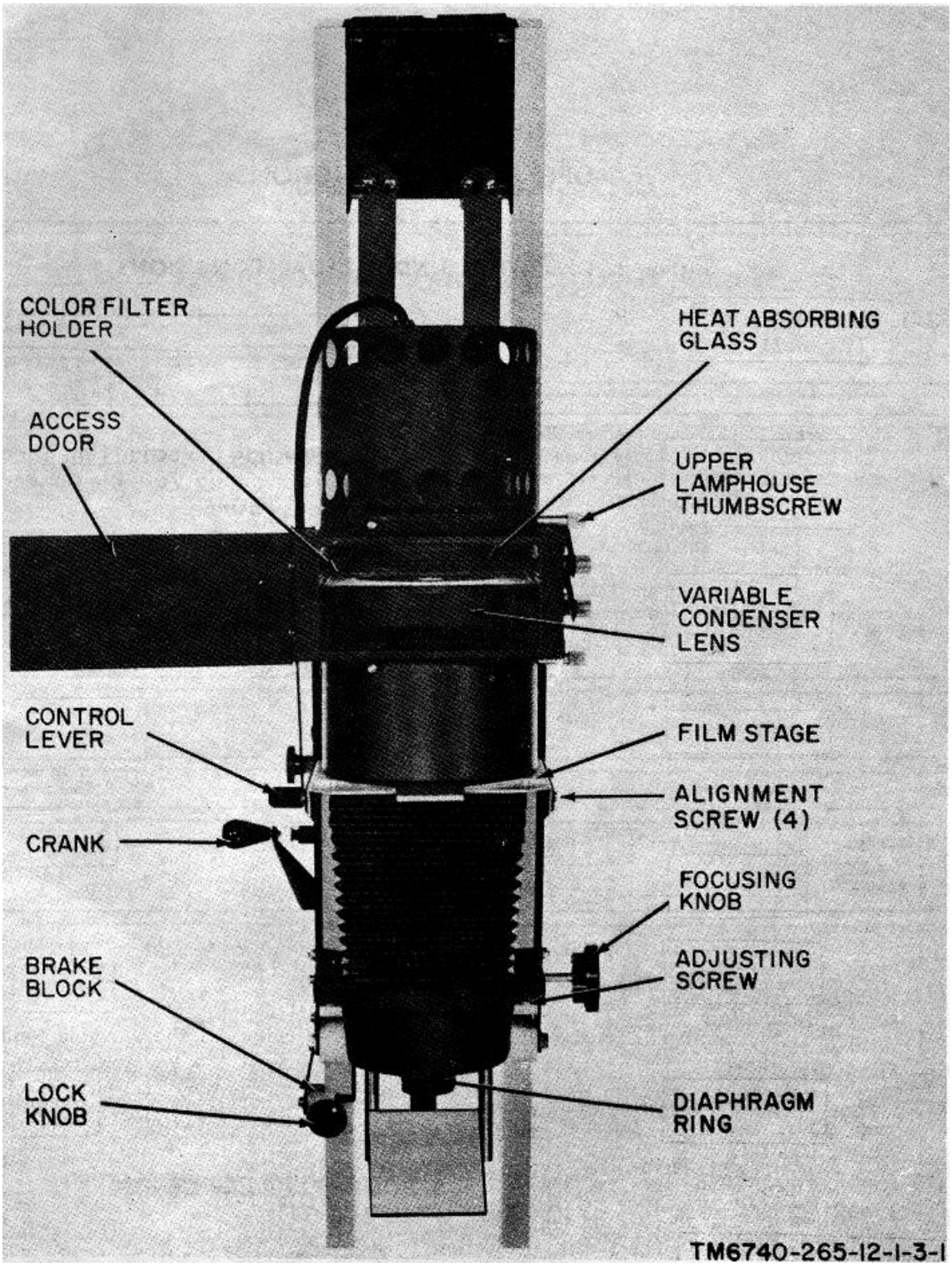

Figure 3-1. Controls.

(2) Pass the film, emulsion side down, between the upper and lower plates of the carrier until the frame to be enlarged is centered in the opening.

(3) Press the upper plate against the lower plate. Pull the control lever (fig. 3-1) forward, and place the negative carrier on the film stage; then return the control lever to the rear position.

b. 4- by 5-Inch Film.

(1) Place the film, emulsion side down, on the lower plate of the carrier.

(2) Proceed as indicated in a(3) above.

3-4. Using Easel (fig. 1-3)

a. Raise the hinged frame.

b. Adjust the masking blades for the size of enlargement to be made.

c. Place a piece of waste enlarging paper against the guide on the base of the easel to provide a white reflecting surface for focusing (para 3-5).

d. Lower the hinged frame to secure the paper in place.

3-5. Image Size and Focus

a. Be sure the correct projection lens set is in place and that the variable condenser lens is in the correct 'position (para 3-2).

b. If the printer is not being used for color, be sure the color filter has been removed. If the printer is being used for color, proceed as indicated in paragraph 3-8, and then perform the procedures given in c through k below.

c. Remove the lens cap from the projection lens, and turn the diaphragm ring clockwise to the largest aperture (f/4.5).

d. Load a negative carrier (para 3-3), and position it on the film stage.

NOTE

The printer is not equipped with an on-off switch. It may be used with a foot switch, an automatic timer, or the red filter. In use, the red filter is placed over the lens to prevent unwanted exposure while positioning the sensitized paper. The red filter is then shifted aside to allow exposure to occur, then replaced when exposure is complete. Throughout this manual, the terms *turn on the printer* or *turn off the printer* are used; the method by which this is done depends on which of the possible equipments is being used (foot switch, automatic timer, or red filter).

e. Turn the room lights off and the safe-light on.

f. Turn on the printer.

g. Loosen the carriage lock knob (fig. 3-1).

h. Using the crank, raise or lower the carriage assembly until the desired size of the projected image is obtained.

i. Tighten the carriage lock knob.

j. Turn the focusing knob until the projected image is in sharp focus.

NOTE

It may be necessary to adjust alternately the carriage assembly position and the focus several times before the desired projected image size and focus are obtained.

k. Turn off the printer.

3-6. Making Prints

a. Obtain the correct image size and focus (para 3-5).

b. Remove the waste enlarging paper (para 3-4), and replace it with a sheet of good enlarging paper.

c. Select the proper filter on the filter wheel.

d. Turn on the printer.

NOTE

The required exposure time depends on the brightness of the projected image and the speed (sensitivity) of the enlarging paper used.

e. Turn off the printer.

f. Remove the exposed enlarging paper from the easel, and slide it into the developer. Develop, fix, wash, and dry the print (TM 11-401).

g. If cut film negatives are being used, raise the lamphouse assembly by moving the control lever forward and remove the negative carrier. Remove the negative, and place the next negative to be printed in the negative carrier; replace the negative carrier in the printer.

h. If roll film negatives are being used, raise the lamphouse assembly to prevent scratching the film, and move the film to the next frame to be printed.

i. Repeat the procedures given in *a* through *f* above for each negative to be printed.

3-7. Horizontal Projection

If the degree of enlargement desired is greater than can be obtained using vertical pro-

jection, the horizontal projection attachment may be used. To install the horizontal projection attachment, proceed as follows:

a. Position the knurled screw of the horizontal projection attachment (fig. 1-4) on the horizontal projection bracket (fig. 1-4).

b. Tighten the knurled screw.

c. Remove the dust cover from the horizontal projection attachment mirror.

NOTE

Insert the negative to be enlarged in the negative carrier with the emulsion side up. This will compensate for the mirror reversal, and the projected image will be corrected left to right.

d. Turn on the printer.

e. Focus the image on the wall, raising or lowering the carriage assembly to bring the image into the desired area.

f. Move the printer closer to the wall or farther from the wall to make the projected image smaller or larger, respectively. Refocus each time the distance is changed. Make sure the printer faces the wall squarely to prevent image distortion.

g. Rotate the filter wheel to place the red filter over the lens.

h. Fasten the enlarging paper to the wall in position to receive the desired portion of the image.

i. Remove the red filter to make the exposure, replacing it when exposure is complete.

j. Perform the procedures outlined in paragraph 3-6d through f for each negative to be printed horizontally, then proceed as follows:

(1) Place the dust cover on the mirror of the horizontal projection attachment.

(2) Loosen the knurled screw securing the horizontal projection attachment, and remove the attachment.

3-8. Color Printing

The color filter controls the color of the printing light when making color prints. To prevent damage to the color filter, remove it when using the printer for work other than color printing.

a. Place a color filter in the color filter holder.

b. Place the color filter holder in the lower position in the variable condenser lens housing (fig. 3-1).

NOTE

If the variable condenser lens is in the lower position, place the color filter holder on top of the variable condenser lens.

c. Place the heat absorbing glass in the middle position.

NOTE

If the variable condenser lens is in the middle position, place the heat absorbing glass on top of the variable condenser lens.

d. Perform the color printing procedures for the type of color process used.

Section II. OPERATION UNDER UNUSUAL CONDITIONS

3-9. Operation in Arctic Areas

The printer is designed to be used indoors in a darkroom shelter. It operates at temperatures as low as 55° F. (12.6° C.) and may be stored in temperatures as low as -80° F. (-62° C.).

a. Transfer the equipment from the cold to the warm location, and allow it to remain in its case, covered with water-repellent material, at room temperature for approximately 6 hours.

b. Do not open the shipping case before the equipment has reached room temperature. Condensation on the equipment may cause permanent damage. Whenever possible, inclose the equipment in an airtight covering as closely as possible. Keep this covering on until the equipment has reached room temperature. This procedure will further eliminate the possibility of condensation on the equipment.

c. Before operating the equipment, remove water that has condensed on the parts with a clean, lint-free cloth. Clean each projection lens and condenser lens with the lens tissue. If moisture had condensed on the inside surface of the projection lens or condenser lenses, turn the projector lamp on until the moisture evaporates.

3-10. Operation in Tropical and Desert Areas

When the processing set is used under conditions of extreme heat and humidity, such as

in desert or tropical regions, observe the precautions in *a* and *b* below.

a. Desert Regions. Before using the equipment in desert regions, use a soft-bristled brush to remove sand and other foreign matter on the surfaces of the equipment. Dust the negative carriers before loading. Use a camel's-hair brush, and clean -all lens outer glass surfaces before using lens tissue. Lens tissue will scratch the glass elements if they have not been dusted previously.

b. Tropical Regions. In climates of high humidity, such as the tropics, inspect the equipment daily for traces of fungus, mold, mites, and metallic corrosion. Remove all fouling immediately (para 4-7). Lubricate the printer after cleaning (para 3-1).

3-11. Operation in Maritime, High Altitude, Low Temperature, or Rainy Areas

To prevent corrosion from salt-laden air or salt water spray and rusting from condensation or moisture when the printer is stored, wipe all exposed metal parts (except the lenses, negative carrier bracket, negative carriers, easel, and horizontal projection attachment mirror with a soft cloth moistened with Oil, Lubricating, Preservative, Special (PL Special) (FSN 9150-273-2389). To avoid condensation, transfer the equipment from the colder to the warmer temperature by gradual stages. When storing the equipment, cover it with water-repellent material.

CHAPTER 4

OPERATOR'S MAINTENANCE INSTRUCTIONS

4-1. Scope of Operator's Maintenance

The maintenance duties assigned to the operator of the printer are listed in a through f below, together with references to the paragraphs covering the specific maintenance function. The duties assigned do not require tools or test equipment. The materials required are listed in paragraph 4-2.

a. Daily preventive maintenance checks and services (para 4-5).

b. Weekly preventive maintenance checks and services (para 4-6).

c. Cleaning (para 4-7).

d. Troubleshooting (para 4-8).

e. Repairs (para 4-9).

f. Adjustments (para 4-10).

4-2. Operator's Materials Required

a. Cleaning Compound (FSN 7930-395-95421.

b. Lens cleaner (FSN 6750-408-5175).

c. Lens tissue (FSN 6640-393-2093).

d. Oil, Lubricating, Preservative, Special (PL Special) (FSN 9150-273-2389).

e. Textile cloth (FSN 8305-267-3015).

4-3. Operator's Preventive Maintenance

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 4-5, 4-6, and 4-7 cover routine systematic care and cleaning essential to proper upkeep of the equipment.

b. Preventive Maintenance Checks and Services. The preventive maintenance checks and services charts (paras 4-5 and 4-6) outline functions to be performed at specific intervals. These checks and services are to maintain Army photographic equipment in a combat serviceable condition; that is, in good general (physical) condition. To assist operators in maintaining combat serviceability, the charts indicate what to check, how to check, and what the normal conditions are; the References column lists the paragraphs or illustrations that contain detailed cleaning, repair, or replacement procedures. If the defect cannot be remedied by the operator, higher category maintenance or repair is required. Records and reports of these checks and services must be made in accordance with the requirements set forth in TM 38-750.

4-4. Operator's Preventive Maintenance Checks and Services Periods

Operator's preventive maintenance checks and services on the printer are required daily and weekly. Paragraphs 4-5 and 4-6 specify the items to be checked and serviced. In addition to the routine daily checks and services, the equipment should be rechecked and serviced immediately before going on a mission and as soon after completion of the mission as possible.

4-5. Operator's Daily Preventive Maintenance Checks and Services Chart

a. Physical Check,.

Seq. No.	Item to be inspected	Procedure	References
1	Exterior surfaces	Clean exterior surfaces of printer.	Para 4-7.
2	Lenses	Check condenser and projection lenses for dirt, scratches, or cracks. Clean dirty lenses.	Para 4-7.
3	Heat absorbing glass	Check for dirt, scratches, or cracks. Clean dirty glass.	Para 4-7.
4	Horizontal projection attachment.	Check mirror for dirt, scratches, or cracks; clean dirty mirror surface.	Para 4-7.
5	Condenser lens set	Check for secure engagement with knurled screws; tighten loose knurled screws.	Para 4-7.
6	Variable condenser lens housing.	Check to see that the upper lamp-house thumbscrew (securing variable condenser lens housing to upper lamphouses) is tight.	Fig. 3-1.

b. Operational Check.

Seq. No.	Item to be inspected	Procedure	References
7	Electrical	Turn or printer. Printer lamp should light and project light on easel.	
8	Negative carrier	Position loaded negative carrier on film stage bridge.	Para 3-3.
9	Easel	Load easel with plain white paper.	Para 3-4.
10	Crank	Raise or lower carriage assembly as required for correct enlargement size.	Fig. 3-1.
		a. Motion should be free	a. None.
		b. Image should be free of spots, streaks or lines.	b. None.
		c. Image should be of desired enlarge-ment size.	c. Para 3-5.
11	Focusing knob	Adjust for sharp focus (fig. 3-1)	Para 3-5.
		a. Image should be in sharp focus.	
		b. Check for light streaks from bellows.	
12	Diaphragm ring	Adjust f/stop opening. Image should darken and remain evenly illuminated.	Para 3-5.

4-6. Operator's Weekly Preventive Maintenance Checks and Services Chart

Seq. No.	Item to be inspected	Procedure	References
1	Power cable	Check power cable for cut or frayed insulation, defective plug, or lampholder.	
2	Mounting	Tighten all knurled screws. Replace missing hardware as required.	
3	Minor components	Check minor components for dirt and breakage. Clean dirty components.	Para 4-7.
4	Shipping case	Check shipping case for wear or breakage. Clean shipping case.	

4-7. Operator's Cleaning

Inspect the exterior surfaces of the printer components. The exterior surfaces should be free from dirt, grease, and fungus.

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

b. Clean each lens with lens tissue. If necessary, dampen the lens tissue with lens cleaner; after cleaning, wipe the lens dry with clean lens tissue.

c. Clean the mirror of the horizontal projection attachment (fig. 1-6) with lens tissue dampened with water.

WARNING

Prolonged breathing of cleaning compound is dangerous; make certain that adequate ventilation is provided. Cleaning compound is flammable; do not use near a flame. Avoid contact with the skin; wash off any that spills on your hands.

d. Remove dirt and excess grease from metal surfaces with cleaning compound.

4-8. Operator's Troubleshooting Chart

Troubleshooting at the operational category consists of the following procedures. If the checks and corrective measures do not correct the trouble, troubleshooting at a higher maintenance category is required.

Item No.	Trouble symptom	Probable trouble	Checks and corrective measures
1	Light is not projected on easel when printer circuit is energized.	*a.* Lens cap not removed from projection lens.	*a*. Remove lens cap.
		b. Loose or defective printer lamp.	*b*. Check lamp installation, or replace defective lamp (para 4-9).
		c. Defective lampholder	*c*. Higher category maintenance required.
		d. Defective plug	*d*. Higher category maintenance required.
		e. Defective power cable	*e*. Higher category maintenance required.
2	Carriage assembly does not move freely.	*a.* Carriage lock knob not loosened.	*a*. Loosen carriage lock knob.
		b. Nylon tip in lock knob excessively worn or damaged.	*b*. Replace lock knob.
		c. Printer out of alignment	*c*. Higher category maintenance required
3	Image contains spots, streaks, or lines.	*a.* Negative contains foreign matter or scratches.	*a*. Use negative that is in good condition.
		b. Dirty condenser lenses	*b*. Clean condenser lenses (para 4-9).
		c. Scratched or damaged condenser lenses.	*c*. Replace damaged condenser lenses (para 4-9).
4	Desired image size cannot be obtained.	Improper combination of variable condenser lens positioning and projection lens set selection.	Check to see that proper projection lens set is used for negative being enlarged and that variable condenser lens is properly positioned (para 3-2).
5	Projected image not evenly illuminated.	*a.* Variable condenser lens not properly positioned.	*a*. Check variable condenser lens position (para 3-2).
		b. Wrong projection lens set being used.	*b*. Use proper projection lens set for negative being enlarged (para 3-2).
6	Image not sharp and clear.	*a.* Printer improperly focused	*a* Check focus.
		b. Projection lens dirty	*b*. Clean lens (para 4-7).
		c. Defective projection lens required.	*c*. Higher category maintenance

4-9. Operator's Repairs

a. Printer Lamp Replacement.

(1) Loosen the upper lamphouse thumbscrew.

(2) Rotate the upper lamphouse counterclockwise to disengage it. Lift off the upper lamphouse.

(3) Reach inside the inner housing and unscrew the printer lamp.

(4) Check the condition of the inner housing, and remove any dust or other dirt that has accumulated with a clean, lint-free cloth.

(5) Replace the printer lamp and position the upper lamphouse on the variable condenser lens housing. Rotate the upper lamphouse clockwise to engage its pins.

(6) Tighten the thumbscrew.

b. Condenser Lens Replacement.

(1) Move the control lever (fig. 1-2) forward, and set it on the stop.

(2) Remove the condenser lens set by loosening the knurled screw and turning the condenser lens set slightly clockwise to release it.

(3) Remove the clamps (fig. 4-1), the lockwasher, and the screws from the condenser lens housing.

(4) Place a lens tissue on the upper condenser lens and, with the palm of one hand placed firmly over the lens tissue, tip the condenser lens set so that the upper condenser lens falls into the hand.

CAUTION

Do not allow the lower condenser lens to drop out.

(5) Turn the condenser lens housing right side up, and remove the lens separator and the lower condenser lens.

(6) Clean and inspect the condenser lenses. Replace defective lenses.

(7) Replace one condenser lens with the plano (flat) side out, then replace the lens separator and the other condenser lens in the housing. Be sure that the plan (flat) side of each lens is out. Handle the lenses by the edges only. Replace the clamps, lockwashers, and screw.

(8) Position the condenser lens set on the variable condenser lens. housing (fig. 1-2) so that the bayonet-type notches engage the knurled screw and pins. Tighten the screw.

(9) Lower the lamphouse assembly by releasing the control lever from the lever stop.

4-10. Operator's Adjustments

Operator's adjustments on the printer are limited to the adjusting screws (fig. 3-1) which control the tension of the springs that secure the projection lens set. Tightening the screws increases the spring tension; loosening the screws decreases the spring tension. All other adjustments are to be performed by higher maintenance categories.

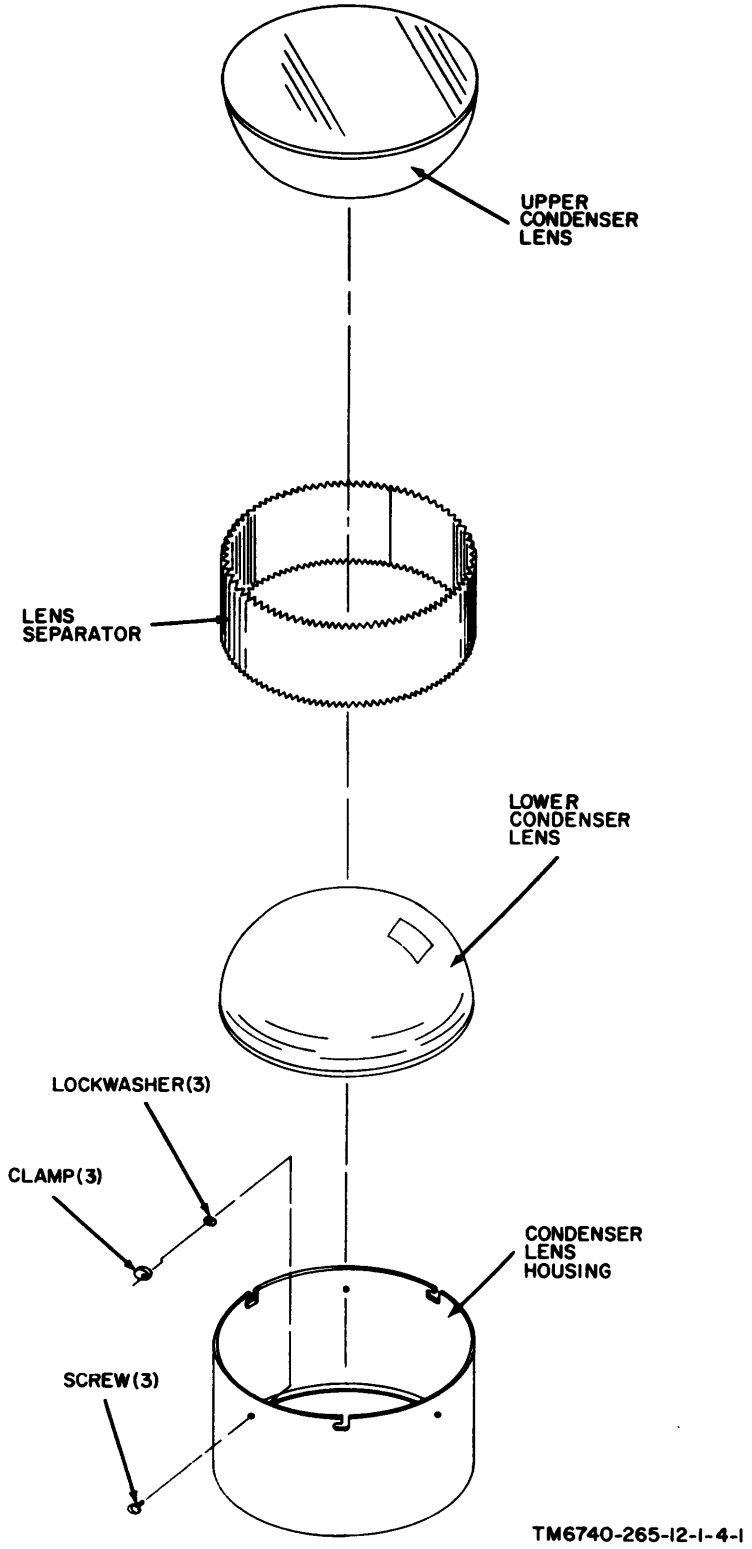

Figure 4-1. Condenser lens set, exploded view.

CHAPTER 5
ORGANIZATIONAL MAINTENANCE INSTRUCTIONS

Section I. GENERAL

5-1. Scope of Organizational Maintenance

a. This chapter contains instructions covering organizational maintenance of Printer, Projection, Photographic EN-91B. It includes instructions for performing preventive and periodic maintenance services and repair functions to be accomplished by organizational maintenance personnel.

b. Organizational maintenance of the printer includes:

(1) Monthly preventive maintenance checks and services (para 5-5).
(2) Lubrication (para 5-6).
(3) Troubleshooting (para 5-7 and 5-8).
(4) Replacement of defective parts (paras 5-11 and 5-12).
(5) Alignment (paras 5-9 and 5-10).

5-2. Organizational Tools and Materials Required

The tools and materials required for organizational maintenance are listed in a and b below.

a. Tools. The tools required for organizational maintenance are contained in Tool Kit, Photographic Repairman TK-77/GF (FSN 5180-752-9068).

b. Material. In addition to the same materials required for operator's maintenance (para 4-2), Grease, Aircraft and Instrument (GL) (FSN 9150-985-7244) is required for organizational maintenance.

5-3. Organizational Preventive Maintenance

a. Organizational preventive maintenance is the systematic care, inspection, and servicing of equipment to maintain it in serviceable condition, prevent breakdown, and insure maximum operational capability preventive maintenance is the responsibility of all categories concerned with the equipment and includes the inspection, testing, and repair or replacement of parts, subassemblies, or units that inspection and tests indicate would probably fail before the next scheduled periodic service. Preventive maintenance checks and services of the printer at organizational maintenance are made at monthly intervals at the same time that the operator's daily and weekly checks and services are made, 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.

5-4. Organizational Monthly Maintenance

Perform the organizational maintenance functions indicated in the monthly preventive maintenance checks and services chart (para 5-5) once a month. 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 operating conditions. Equipment maintained in a standby (ready for immediate operation) condition must have monthly preventive maintenance. Equipment maintained in limited storage (requires service before operation) does not require monthly maintenance.

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

Seq. No.	Item to be inspected	Procedure	References
1	Lubrication	Check printer; lubricate if required	Para 5-6.
2	Power cable	Check operation of printer lamp. Replace damaged or defective lamp, plug, or lampholder if required	Para 4-9.
3	Operation	Check carriage assembly for smoothness of operation. Check focusing action.	
4	Alignment	Check alignment of film stage. Check seating of condenser lens set.	Para 5-9.
5	Mounting	Tighten all loose screws and nuts.	
6	Preservation	*a.* Check all painted surfaces for bare spots and corrosion.	*a.* None.
		b. Remove rust and corrosion by lightly sanding with fine sandpaper. Brush two coats of paint on bare metal to protect it from further corrosion.	*b.* TB SIG 364.
7	Publications	Check to see that all pertinent publications are complete, serviceable, and current (appx A).	DA Pam 310-4.
8	Modifications	Check DA Pam 8104 to determine whether new applicable MWO's have been published. All URGENT MWO's must be applied immediately. All NORMAL MWO's must be scheduled.	DA Pam 810-4 and TM 88-750.
9	Spare parts	Check operator's and organizational spare parts for general condition and method of storage. There should be no overstockage, and all shortages must be on valid requisitions	Appx B.

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5-6. Organizational Lubrication (fig. 1-2)

CAUTION

When lubricating, make sure that no grease is applied to the lenses, the film stage, or the negative carriers.

a. The symbol q means quarterly (every 3 months), a month consists of 30 days of normal 8-hour-a-day operation. If the equipment is operated more than 8 hours a day, the lubrication intervals should be adjusted accordingly. For example, if the equipment is operated 24 hours a day instead of 8, the equipment should be lubricated monthly instead of quarterly.

b. Clean the focusing rods (fig. 1-2) with a clean, lint-free cloth or a brush dipped in cleaning compound. Thoroughly dry the cleaned areas, then apply Grease, Aircraft and Instrument (GL) sparingly.

c. After lubrication, operate the mechanism concerned in order to distribute the lubricant evenly on the mating parts.

NOTE

Carefully remove any excess lubricant to prevent it from spreading.

Section II. TROUBLESHOOTING

5-7. Organizational Troubleshooting, General

Troubleshooting of the equipment at the organizational category includes the operational check contained in the daily (para 4-5) and weekly (para 4-6) preventive main checks and services charts, and the organizational monthly (para 5-5) preventive maintenance checks and services chart. To troubleshoot the equipment, perform all functions

starting with the first item and proceed until an abnormal condition or result is observed. When an abnormal condition or result is observed, refer to the troubleshooting chart (para 5-8), and perform the corrective measures indicated. The paragraphs referenced in the troubleshooting chart include additional troubleshooting data. If the corrective measures indicated do not result in correction of the trouble, refer the equipment to the next category of maintenance.

5-8. Organizational Troubleshooting Chart

Item No.	Trouble symptom	Probable trouble	Checks and corrective measures
1	Printer lamp does not light.	*a*. Defective printer lamp	*a*. Replace defective printer lamp (para 4-9a).
		b. Defective electrical plug	*b*. Replace electrical plug.
		c. Defective lampholder	*c*. Replace lampholder.
		d. Defective cable	*d*. Repair or replace cable.
2	Focusing mechanism difficult to operate.	Lack of lubrication	Lubricate focusing mechanism (para 5-6).
3	Lines or other marks on projected image that become apparent when projection lens is stopped.	Scratched or broken condenser lenses.	Replace condenser lenses (para 4-9b).
4	Portion of projection image cut off.	Improper combination of projected lens set and position of variable condenser lens.	Use correct combination of projection lens set and proper positioning of variable condenser lens.
5	Uneven illumination of projected image.	Improper combination of projection lens set and position of variable condenser lens.	Use correct combination of projection lens set and proper positioning of variable condenser lens.
6	Excessive stray light coming from printer during operation.	*a*. Condenser lens set does not rest evenly on negative carrier bracket.	*a*. Align condenser lens set (para 5-10)/
		b. Hole in bellows required.	*b*. Higher category repair
7	Projected image fuzzy, cannot be focused properly.	*a*. Projection lens element partially unscrewed.	*a*. Handtighten projection lens element.
		b. Film stage out of alignment	*b*. Align film stage (para 5-9).
8	Projected image fuzzy on one side. Cannot focus entire image at one time.	*a*. Condenser lens set does not rest evenly on negative carrier bracket.	*a*. Align condenser lens set (para 5-10).
		b. Film stage out of alignment	*b*. Align film stage (para 5-9).

5-9. Aligning Film Stage (fig. 3-1)

a. Remove the negative carrier from the film stage.

b. Pull the control lever forward, and place it on the stop to raise the lamphouse assembly. Place a ruler on the film stage so that the ends of the ruler extend beyond the sides (right and left of the film stage).

c. Remove the control lever from the stop and allow it to return to the rear position to lower the lamphouse assembly on the ruler.

d. Hold a rod vertically at either end of the ruler.

e. Slowly raise or lower the carriage assembly until the rod touches both the ruler and the baseboard.

f. Lock the carriage assembly in this position.

g. Move the rod to the other end of the ruler.

h. If the rod does not touch both the ruler and the baseboard, proceed as follows:

(1) Loosen the alignment screws.

(2) Align the film stage so that both ends of the ruler are an equal distance from the baseboard.

(3) Tighten the alignment screws.

i. Raise the lamphouse assembly, and reposition the ruler so that the ends extend beyond the front and back of the film stage.

j. Lower the lamphouse assembly.

k. Place the rod between the front end of the ruler and the baseboard.

i. Loosen the carriage lock knob, and raise or lower the carriage assembly until the rod touches both the ruler and the baseboard.

m. Repeat the procedures given in g and h above.

n. Recheck the alignment by repeating the procedures given in *b* through g above. If necessary, repeat the procedures in h above.

5-10. Aligning Condenser Lens Set

a. Check the film stage alignment (para 5-9).

b. Check to determine if the condenser lens set seats evenly on the film stage, If it does not seat evenly, proceed as follows:

(1) Loosen the lifting lever screws (fig. 1-2) that secure the lifting levers to the variable condenser lens housing.

(2) Adjust the lifting levers until the condenser lens assembly seats evenly on the negative carrier bracket; then tighten the lifting lever screws.

c. Operate the control lever, and check to be sure that the condenser lens set seats evenly.

5-11. Replacement of Brake Block (fig. 3-1)

a. Removal.

(1) Remove the lock knob.

(2) Remove the screw and the lockwasher; remove the brake block.

b. Assembly.

(1) Position the brake block on the column assembly, and secure it, in place with the screw and the lockwasher.

(2) Screw the carriage lock knob into the brake block.

(3) Check the locking action of the lock knob and the brake block.

5-12. Replacement of Focusing Knob (fig. 1-1)

To remove the focusing knob, loosen the setscrew in the knob and slip the knob from the focusing shaft. Reverse the procedure to replace the knob.

CHAPTER 6

FUNCTIONING OF EQUIPMENT

6-1. Functioning of Printer (fig. 1-1)

The printer consists basically of a printer lamp, a condenser lens assembly, a variable condenser lens, a negative carrier, a projection lens, and a baseboard. The items are aligned so that the light from the lamp is projected through the condenser lenses, the negative, and the projection lens to the baseboard. A carriage assembly, which supports the lamp, the condenser lenses, the negative carrier, and the projection lens, may be moved up and down on the column to control the size of the projected image. The greater the distance between the negative and the baseboard, the larger the projected image will be. The image is brought into sharp focus by adjustment of a focusing knob that varies the distance between the lens and the negative. An easel is placed on the baseboard directly under the projection lens to hold the paper in a plane parallel to the negative. A filter wheel consisting of variable contrast filters is provided. The horizontal projection attachment is available for extra size enlargements.

6-2. Optical Functioning (fig. 6-1)

a. The primary function of the condenser lens set is to increase the efficiency of illumination by concentrating light from the printer lamp, distributing it uniformly over the negative, and concentrating it into the pupil of the projection lens. The variable condenser lens is positioned in the variable condenser lens housing to control the focusing of the concentrated light into the pupil of the projection lens.

b. When projection is accomplished, using a long focal length lens (such as 5 3/8-inch, the variable condenser lens is placed in the upper portion of the variable condenser lens housing (A, fig. 6-1). When projection is accomplished, using a short focal length lens (such as 2-inch), the variable condenser lens is repositioned to the lower position (B, fig. 6-1). In each position, maximum light will be concentrated into the pupil of the projection lens.

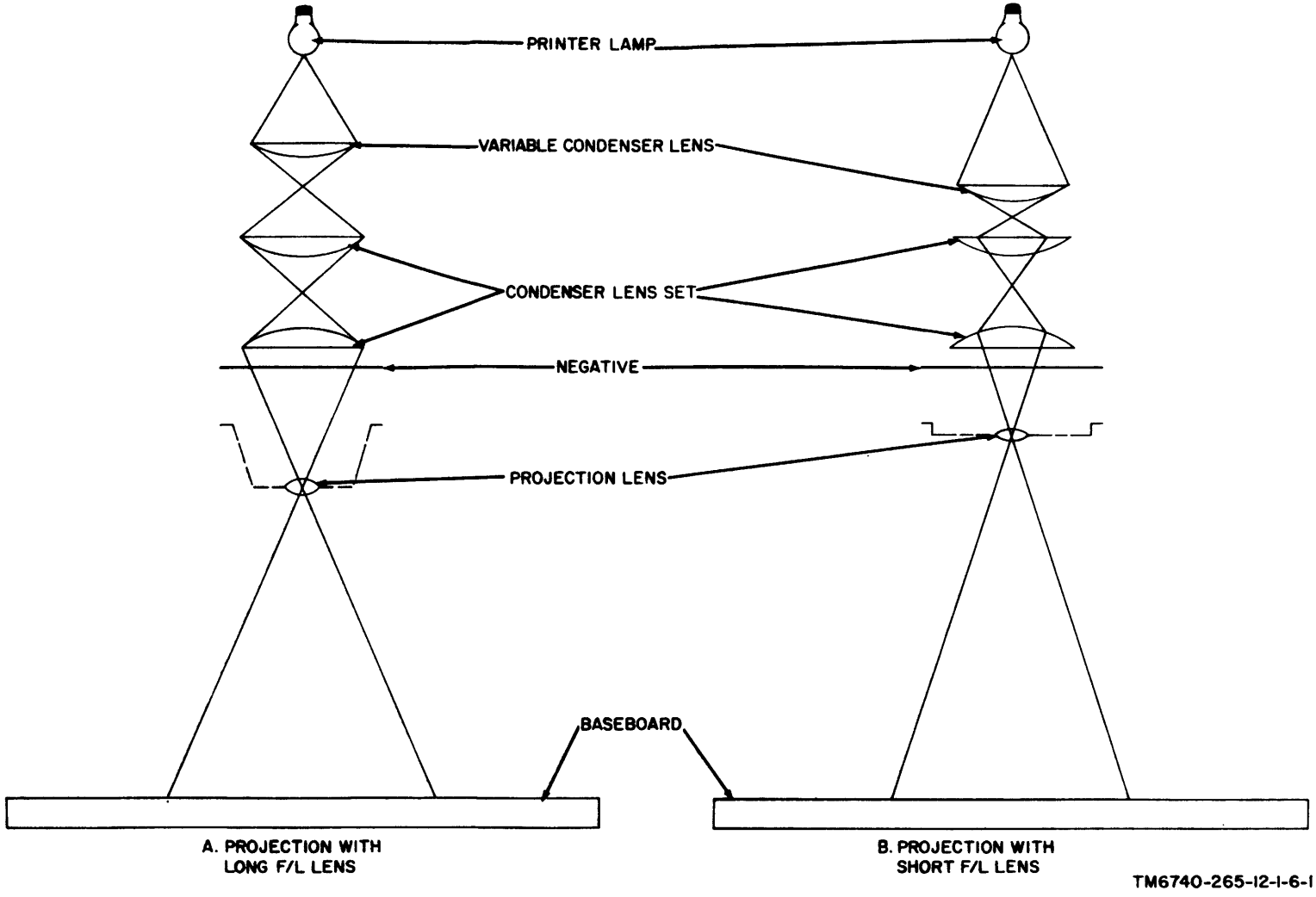

Figure 6-1. Optical system diagram.

CHAPTER 7

SHIPMENT AND LIMITED STORAGE AND DEMOLITION TO PREVENT ENEMY USE

Section I. SHIPMENT AND LIMITED STORAGE

7-1. Disassembling Printer

Disassemble the printer for packing as directed in a through i below:

a. Disconnect the power cable.

b. Loosen the lock knob, lower the carriage, and tighten the lock knob.

c. Remove the condenser lenses (para 4-9b (1) and (2.)) and reinstall the condenser lens housing on the lamphouse assembly.

d. Remove the heat absorbing glass, the color filter holder, and the variable condenser lens.

e. Loosen the upper lamphouse thumbscrew (fig. 3-1), and remove the lamphouse assembly from the carriage assembly.

f. Install the 5 3/8-inch projection lens set. Turn the focusing knob (fig. 3-1) to shorten the bellows.

g. Remove the column assembly from the baseboard.

h. Clean all components.

i. Package the components as directed in paragraph 7-2.

7-2. Repacking Printer for Shipment or Limited Storage

a. If this equipment is to be transported over a short distance under control of the using unit for immediate reuse, ship the equipment in any convenient container that will keep it relatively clean and protect it from damage.

b. Equipment that is to be removed from service for periods exceeding approximately 2 weeks, or equipment that is to be shipped for use by other personnel or activities, normally is repackaged by organizational personnel (*c* below).

c. The exact procedure for repackaging depends on the materials available and the conditions under which the equipment is to be shipped or stored. Adapt the procedures outlined in (1) through (3) below whenever possible. The information concerning the original packaging (para 2-1) will also be helpful.

(1) *Required materials*. The following materials are required for packaging the printer. For stock numbers of materials, consult SB 38-100.

Material	Quantity
Waterproof barrier material.	75 square feet.
Fiberboard material.....	75 square feet.
Steel strapping.....	32 feet.
Wooden packing case.....	1 case consisting of 64 board feet of 1/4-inch plywood.

(2) *Packaging*. Pack the components of the printer in fiberboard cartons.

(3) *Wrapping*. Wrap the fiberboard cartons in waterproof barrier material.

(4) *Packing.* Pack the fiberboard cartons in a wooden packing case.

(5) *Sealing.* Nail the cover on the wooden packing case and bind with steel straps.

Section II. DEMOLITION OF MATERIEL TO PREVENT ENEMY USE

7-3. Authority for Demolition

Demolition of the equipment will be accomplished only upon the order of the commander. Use the destruction procedures given in paragraph 7-4b.

7-4. Methods of Destruction

a. If complete destruction of the equipment cannot be accomplished in the time available, destroy the following components in the order given:

(1) Condenser lens sets.

(2) Projection lenses.

(3) Printer.

b. Use any of the following methods:

(1) *Smash.* Smash the lenses and all metal components; use sledges, axes, handaxes, pickaxe, hammers, or crowbars.

(2) *Cut.* Cut all cords, cables, and wiring; use axes, handaxes, or machetes.

(3) *Dispose.* Bury or scatter the destroyed parts in slit trenches, foxholes, or other holes, or throw them into streams.

APPENDIX A
REFERENCES

The following publications contain information applicable to the operation and organizational maintenance of Printer, Projection, Photographic EN-91B.

DA Pam 310-4	Index of Technical Manual, Technical Bulletins, Supply Manuals (Types 7, 8, and 9), Supply Bulletins and Lubrication Orders.
DA Pam 310-7	US Army Index of Modification Work Orders.
SB 11-573	Painting and Preservation Supplies Available for Field Use for Electronics Command Equipment.
SB 38-100	Preservation, Packaging, Packing and Marking Materials, Supplies, and Equipment Used By The Army.
TB 43-0118	Field Instructions for Painting and Preserving Electronics Command Equipment Including Camouflage Pattern Painting of Electrical Equipment Shelters.
TM 11-401-1	Elements of Signal Photography.
TM 11-405-10	Processing Equipment PH-406 and Photographic Film Processing Units ES-10(1), ES-20(2), and ES-20(3).
TM 38-750	The Army Maintenance Management System (TAMMS).
TM 740-90-1	Administrative Storage of Equipment.
TM 750-2442	Procedures for Destruction of Electronics Materiel to Prevent Enemy Use (Electronics Command).

APPENDIX B
BASIC ISSUE ITEMS

Section I. INTRODUCTION

B-1. General

This appendix lists items for Printer, Projection Photographic EN-91B, the component items comprising it, and the items which accompany it, or are required for installation, operation, or operator's maintenance.

B2. Explanation of Columns

An explanation of the columns in section II is given below.

a. Source, Maintenance, and Recoverability Codes, Column 1. Not used.

NOTE

When no code is indicated in the recoverability column, the part will be considered expendable.

b. Federal Stock Number, Column 2. The Federal stock number for the item is indicated in this column.

c. Description, Column 3. The Federal item name, a five-digit manufacturer's code, and a part number are included in this column.

d. Unit of Issue, Column 4. The unit used as a basis of issue (e.g. ea, pr, ft, yd, etc.) is noted in this column.

e. Quantity Incorporated in Unit Pack, Column 5. Not used.

f. Quantity Incorporated in Unit, Column 6. The total quantity of the item used in the equipment is given in this column.

g. Quantity Authorized, Column 7. The total quantity of an item required to be on hand and necessary for the operation and maintenance of the equipment is given in this column.

h. Illustration, Column 8.

(1) *Figure number, column 8a.* The number of the illustration in which the item is shown is indicated in this column.

(2) *Item or symbol number, column 8b.* The call out number used to reference the item in the illustration appears in this column.

B-3. Federal Supply Codes

This paragraph lists the Federal supply code with the associated manufacturer's name.

Code Number	*Manufacturer's Name*
24455	General Electric Co. Lamp Div of Consumer Products Group
75829	Libbey-Owens-Ford Glass Co.
82205	Belfort Instrument Co.
94381	Fuji Industries Co. Ltd.

(1) BASIC ISSUE ITEMS LIST																(4)	(5)	(6)	(7)	(8)	
(A) SOURCE CD	(B) MAINT DC	(C) REC CODE	(2) FEDERAL STOCK NUMBER	MODEL 1	2	3	4	5	6	(3) DESCRIPTION	UNIT OF ISSUE	QTY INC IN UNIT PACK	QTY INC IN UNIT	QTY. AUTH	ILLUSTRATIONS (A) FIGURE NUMBER	(B) ITEM OR SYMBOL NUMBER
			6740-935-2938							PRINTER, PROJECTION PHOTOGRAPHIC EN-91B: 82205; 12700 (This item is nonexpendable.)						
										TECHNICAL MANUAL TM 11-6740-265-12-1	ea			2		
										Requisition through pinpoint account number, if assigned; otherwise through nearest Adjutant General facility.						
										NOTE: For technical manuals the quantity indicates the maximum number of copies authorized for packing (or issue) with the equipment. Where a number of these equipments are concentrated in a small area, the quantity on hand may be reduced to practical level. Excess publications must be returned to publication supply. centers through AC channels.						
			6740-937-4763							CARRIER, PHOTOGRAPHIC NEGATIVE: 82205; 12635-3	ea		1	1	1-5	MP129
			6740-937-4764							CARRIER, PHOTOGRAPHIC NEGATIV E: 82205; 12635-1	ea		1	1	1-5	MP127
			6740-937-4765							CARRIER, PHOTOGRAPHIC NEGATIVE: 82205; 12635-4	ea		1	1	1-5	MP130
			6740-937-4766							CARRIER, PHOTOGRAPHIC NEGATIVE: 82205; 12635-2	ea		1	1	1-5	MP128
			6740-937-4677							GLASS HEAT ABSORBING: 75829; 12658	ea		1	1	2-2	MP107
			6740-937-4679							HOLDER FILTER: 82205; 12897	ea		1	1	3-1	MP108
			6760-926-5302							HOLDER, FILTER, WHEEL: 82205; 12699	ea		1	1	1-1	MP131
			6240-937-7167							LAMP INCANDESCENT: 24455; No. 212	ea		1	3	2-2	DS100
										LENSBOARD; 82205; 12896	ea		1	1	1-4	MP140
			6740-926-5301							LENSBOARD; 82205; 12620	ea		2	2	1-4	MP135
										LENS CONDENSER ASSY: 82205; 12697	ea		1	1	2-2	MP103
										LENS CONDENSER ASSY: 82205; 12885	ea		1	1	4-1	MP122

(1) BASIC ISSUE ITEMS LIST													(4)	(5)	(6)	(7)	(8)	
(A) SOURCE CD	(B) MAINT DC	(C) REC CODE	(2) FEDERAL STOCK NUMBER	MODEL 1	2	3	4	5	6	(3) DESCRIPTION	UNIT OF ISSUE	QTY INC IN UNIT PACK	QTY INC IN UNIT	QTY. AUTH	ILLUSTRATIONS (A) FIGURE NUMBER	(B) ITEM OR SYMBOL NUMBER
										EN-91B (continued)						
			6760-926-5305							LENS, PROJECTION PRINTING: 94381; Dwg No. 12692	ea		1	1	1-4	MP134
			6760-929-5304							LENS, PROJECTION PRINTING: 94381; 12693	ea		1	1	1-4	MP137
			6760-937-7423							LENS, PROJECTION PRINTING: Karl Zeiss; Dwg No. 12694	ea		1	1	1-4	MP139
			6740-823-9815							EASEL, PROJECTION PRINTING: 82205; 12600	ea		1	1	1-3	
			6740-937-4678							HORIZONTAL, PROJECTION ASSY: 82205; 12772	ea		1	1	1-6	MP-179
										NO ACCESSORIES, TOOLS OR TEST EQUIPMENT ARE TO BE ISSUED WITH THIS EQUIPMENT						
										NO BASIC ISSUE ITEMS ARE MOUNTED IN OR ON THIS EQUIPMENT						

APPENDIX C
MAINTENANCE ALLOCATION

Section I. INTRODUCTION

C-1. General.

This appendix provides a summary of the maintenance operations for Printer, Projection, Photographic EN-91B. 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 equipments used in precision measurement. Consists of comparisons of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared.

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

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

i. *Repair*. The application of maintenance services (inspect, test, service, adjust, align, calibrate, replace) or other maintenance actions (welding, grinding, riveting, straightening, facing, remachining, or resurfacing) to restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly), end item, or system. This function does not include the trial and error replacement of running spare type items such as fuses, lamps, or electron tubes.

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

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

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 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 "worktime" 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 “worktime” figures will be shown for each category. The number of task-hours specified by the “worktime” 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, 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. Not applicable.

C-4. Tool and Test Equipment Requires (Sec III).

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

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

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

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

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

Section II MAINTENANCE ALLOCATION CHART FOR PRINTER, PROJECTION, PHOTOGRAPHIC EN-91B

(1) GROUP NO.	(2) COMPONENT/ ASSEMBLY	(3) MAINT. FUNCTION	(4) MAINTENANCE CATEGORY C	O	F	H	D	(5) TOOLS & EQUIP	(6) REMARKS
00	PRINTER, PROJECTION PHOTOGRAPHIC EN-91B	Inspect	0.1						
		Test		0.5				1,3	
		Replace	0.1						
		Repair		0.5				1.3	
		Repair			1.0			2,3	
		Overhaul				2.0		3,4,5	

SECTION III. TOOL AND TEST EQUIPMENT REQUIREMENTS FOR PRINTER, PROJECTION PHOTOGRAPHIC EN-91B

Tool or Test Equipment Ref Code	Maintenance Category	Nomenclature	National/NATO Stock Number	Tool Number
1	0	TOOL KIT TK-77/GF	5180-00-752-9068	
2	F	TOOL KIT TK-109/GF	5180-00-856-9653	
3	O,F,H	MULTIMETER AN/URM-105	6625-00-581-2036	
4	H	METER, FOOT CANDLE, PHOTOELECTRIC	6695-00-641-5083	
5	H	RESOLUTION CHART USAF, 1951, PER MIL-STD-150		8007P (26612) 5TR702.112 (92208)

APPENDIX D

ORGANIZATIONAL REPAIR PARTS

Section I. INTRODUCTION

D-1. General

This manual contains a list of repair parts required for the performance of organizational maintenance for Printer Projection, Photos graphic EN-91B.

NOTE

No special tools, test, and support equipment are required

D-2. Explanation of Sections

This repair parts list is divided into sections.

a. Prescribed Load Allowance List (PLA), Section II. The PLA is a consolidated listing of repair parts allocated for initial stockage at / organizational maintenance. This is a mandatory minimum stockage allowance.

b. Repair Parts for Organizational Maintenance, Section III. Repair parts authorized for organizational maintenance is included in this section.

c. Federal Stock Number Index, Section IV. This is a cross reference index of Federal stock numbers to illustrations by figure and item number.

D-3. Explanation of Columns

An explanation of the columns in sections II and III is given below.

a. Source, Maintenance, and Recoverability Codes, Column 1, Section III.

(1) *Source code, column 1a*. The selection status and source for the listed item is noted here. Source code and its explanation is as follows:

Code	*Explanation*
P	Applies to repair parts that are stocked in or supplied from the GSA/DSA, or Army supply system, and authorized for use at indicated maintenance categories.

(2) *Maintenance code, column 1b*. The lowest category of maintenance authorized to install the listed item is noted here.

Code	*Explanation*
O	Organizational Maintenance

(3) *Recoverability code, column 1c.* The information in this column indicates whether unserviceable items should be returned for recovery or salvage. Recoverability code and its explanation is as follows:

NOTE

When no code is indicated in the recoverability column, the part will be considered expendable

Code	*Explanation*
R	Applies to repair parts and assemblies which are economically repairable at DSU and GSU activities and normally are furnished by supply on an exchange basis.

b. Federal Stock Number, Column 1, Section II, Column 2, Sections III. The Federal stock number for the item is indicated in this column.

c. Description, Column 2, Section II, Column 3, Section III. The Federal item name, a five digit manufacturer's code and a part number are included in this column.

d. Unit of Issue, Column 4, Section III. The unit used as a basis of issue, e.g., ea, pr, ft, yd, etc. is indicated in this column.

e. Quantity Incorporated in Unit Pack, Column 4, Section II; Column 5, Section III. Not used.

f. Quantity Incorporated in Unit, Column 6, Section III. The quantity of repair parts is given in this column.

g. Maintenance Allowances, Column 3, Section II; Column 7, Section III.

(1) The allowance columns are divided into subcolumns. Indicated in each subcolumn is the total quantity of items authorized for the number of equipments supported. Items authorized for use as required but not for initial stockage are identified with an asterisk (*) in the allowance column.

(2) The quantitative allowances for organizational category of maintenance represents one initial prescribed load for a 15-day period for the number of equipments supported. Units and organizations authorized additional prescribed loads will multiply the number of prescribed loads authorized by the quantity of repair parts reflected in the appropriate density column to obtain the total quantity of repair parts authorized.

(3) Subsequent changes to organizational allowances will be limited as follows: No change in the range of items is authorized. If additional items are considered necessary, recommendation should be forwarded to Commanding General, U.S. Army Electronics Command, ATTN: AMSEL-MR-NMP-RS Fort Monmouth, N.J. 07703, for exception or revision to the allowance list. Revisions to the range of items authorized will be made by the USA ECOM National Maintenance Point based upon engineering experience, demand data, or TAERS information.

h. Illustration, Column 8, Section II.

(1) *Figure number, column 8a*. The number of the illustration in which the item is shown, in this manual is indicated in this column.

(2) *Item or symbol number, column 8b*. The callout number used to reference the item in the illustration appears in this column.

D 4. Location of Repair Parts

a. When the Federal stock number is unknown follow the procedures given in (1) through (4) below:

(1) Use the table of contents to locate the appropriate appendix of the repair parts list.

(2) If the item or symbol number is available, locate the item by scrutiny of column 8b of the repair parts list.

(3) If the item, symbol, and figure number are not known check the description column (column 3) in the repair parts list to locate the part.

(4) Locate the applicable illustration in this manual and note the figure and item number. Use the repair parts listing to locate the figure number and item number as noted on the illustration.

b. When the Federal stock number is known, use the repair part listing to find the part and the figure and item numbers as noted in the Federal stock number index.

D-5. Federal Supply Codes

This paragraph lists the Federal supply code and the associated manufacturer's name.

Code	Manufacturer's name
24455	General Electric Co. Lamp Div. of Consumer Products Group
753876	Kurz-Kaseh Inc.
75582	Leviton Mfg. Co.
75829	Libbey-Owens-Ford Glass Co.
80818	Dimco Gray Co.
82205	Belfort Instrument Co.
94381	Fuji Industries Co. Ltd.
96536	D. C. Turner Inc.
97539	APM-Herseal Corp.
98468	A. Jaegers

SECTION II. PRESCRIBED LOAD ALLOWANCE LIST

PRESCRIBED LOAD ALLOWANCE

(1) FEDERAL STOCK NUMBER	(2) DESCRIPTION / USABLE ON CODE	(3) 15-DAY ORG. MAINT. ALLOWANCE (a) 1-5	(b) 6-20	(c) 21-50	(d) 51-100	(4) QTY INC IN UN PK
5935-636-7145	CONNECTOR PLUG: 97539; UP-121M	*	*	*	2	
6145-284-0579	CABLE POWER ELECTRICAL: U.S. Army Spec 71-4945; Type SJ; 18/3	1	1	2	4	
6240-937-7167	LAMP INCANDESCENT: 24455; No. 212	*	2	2	3	
6250-936-5458	LAMPHOLDER: 75582; 8871-5	*	*	*	2	
6740-937-4763	CARRIER, PHOTOGRAPHIC NEGATIVE: 82205; 12635-3	*	*	*	2	
6740-937-4764	CARRIER, PHOTOGRAPHIC NEGATIVE: 82205; 12635-1	*	*	*	2	
6740-937-4765	CARRIER, PHOTOGRAPHIC NEGATIVE: 82205; 12635-4	*	*	*	2	
6740-937-4766	CARRIER, PHOTOGRAPHIC NEGATIVE: 82205; 12635-2	*	*	*	2	
6740-937-4677	GLASS HEAT ABSORBING: 75829; 12658	*	*	*	2	
6740-937-4678	HORIZONTAL, PROJECTION, ASSY: 82205; 12772	*	*	*	2	
6740-937-4679	FILTER HOLDER: 82205; 12897	*	*	*	2	
6760-926-5302	HOLDER, FILTER, WHEEL: 82205; 12699	*	*	*	2	
6760-926-5304	LENS, PROJECTION PRINTING: 94381;12693	*	*	*	2	
6760-926-5305	LENS, PROJECTION PRINTING: 94381; Dwg No. 12692	*	*	*	2	
6760-937-7423	LENS PROJECTION PRINTING: Karl Zeiss; Dwg No. 12694	*	*	*	2	
	BELLOWS ASSY: 96536; 12604	*	*	*	2	
	BRAKE: 82205; 12717	*	*	*	2	
	KNOB: 80813; 260	*	*	*	2	
	KNOB: 82205; 12719	*	*	*	2	
	KNOB: 75376; S-310-3	*	*	*	2	
	KNOB: 82205; 12891	*	*	*	2	
	LENS CONDENSER ASSY: Variabl e; 82205; 12697	*	*	*	2	
	LENS CONDENSER ASSY: 82205; 12885	*	*	*	2	
	LEVER: 82205; 12708	*	*	*	2	
	LINK LH ASSY: 82205; 12713	*	*	*	2	
	LINE RH ASSY: 82205; 12714	*	*	*	2	
	MIRROR: 98463, 12769	*	*	*	2	
	SPRING POST ASSY: 82205; 12667	*	*	*	2	

SECTION III. REPAIR PARTS FOR ORGANIZATIONAL MAINTENANCE

(1)			REPAIR PARTS FOR ORGANIZATIONAL MAINTENANCE									(4)	(5)	(6)	(7)				(8)	
(A) SOURCE CD	(B) MAINT DC	(C) REC CODE	(2) FEDERAL STOCK NUMBER	MODEL 1	2	3	4	5	6	(3) DESCRIPTION		UNIT OF ISSUE	QTY INC IN UNIT PACK	QTY INC IN UNIT	15 DAY ORG. MAINT. ALW (A) 1-5	(B) 6-20	(C) 21-50	(D) 51-100	ILLUSTRATIONS (A) FIGURE NUMBER	(B) ITEM OR SYMBOL NUMBER
P	O	R	6740-935-2938							PRINTER, PROJECTION PHOTOGRAPHIC EN-91B: 82205; 1-2700 (This item is nonexpendable.)										
P	O									BELLOWS ASSY: 96536; 12604		ea		1	*	*	*	2	1-2	MP174
P	O									BRAKE: 82205; 12717		ea		1	*	*	*	2	3-1	MP158
P	O		6145-284-0579							CABLE POWER ELECTRICAL: U. S. Army Spec 71-4945; type SJ; 18/3		ft		8	1	1	2	4	1-2	W100
P	O		6740-937-4763							CARRIER, PHOTOGRAPHIC NEGATIVE: 82205; 12635-3		ea		1	*	*	*	2	1-5	MP129
P	O		6740-937-4764							CARRIER, PHOTOGRAPHIC NEGATIVE: 82205; 12635-1		ea		1	*	*	*	2	1-5	MP127
P	O		6740-937-4765							CARRIER, PHOTOGRAPHIC NEGATIVE: 82205; 12635-4		ea		1	*	*	*	2	1-5	MP130
P	O		6740-937-4766							CARRIER, PHOTOGRAPHIC NEGATIVE: 82205; 12635-2		ea		1	*	*	*	2	1-5	MP128
P	O		5935-636-7145							CONNECTOR PLUG: 97539; UP-121M		ea		1	*	*	*	2	1-2	P100
P	O		6740-823-9815							EASEL, PROJECTION PRINTING: 82205; 12600		ea		1	*	*	*	*	1-3	
P	O		6740-937-4679							FILTER HOLDER: 82205; 12897		ea		1	*	*	*	2	3-1	MP108
P	O		6740-937-4677							GLASS HEAT ABSORBING: 75829; 12658		ea		1	*	*	*	2	2-2	MP107
P	O		6760-926-5302							HOLDER, FILTER, WHEEL: 82205; 12699		ea		1	*	*	*	2	1-1	MP131
P	O		6740-937-4678							HORIZONTAL, PROJECTION, ASSY: 82205; 12772		ea		1	*	*	*	2	1-6	MP179
P	O									KNOB: 80813; 260		ea		1	*	*	*	2	3-1	MP149
P	O									KNOB: 82205; 12719		ea		1	*	*	*	2	1-2	MP157
P	O									KNOB: 75376; S-310-3		ea		1	*	*	*	2	3-1	MP161
P	O									KNOB: 82205; 12891		ea		1	*	*	*	2	1-2	MP169
P	O		6250-936-5458							LAMPHOLDER: 75582; 8871-5		ea		1	*	*	*	2	2-1	X100
P	O		6240-937-7167							LAMP INCANDESCENT: 24455; No. 212		ea		1	*	2	2	3	2-2	DS100

(1)			REPAIR PARTS FOR ORGANIZATIONAL MAINTENANCE								(4)	(5)	(6)	(7)				(8)	
(A) SOURCE CD	(B) MAINT DC	(C) REC CODE	(2) FEDERAL STOCK NUMBER	MODEL 1	2	3	4	5	6	(3) DESCRIPTION	UNIT OF ISSUE	QTY INC IN UNIT PACK	QTY INC IN UNIT	15 DAY ORG. MAINT. ALW (A) 1-5	(B) 6-20	(C) 21-50	(D) 51-100	ILLUSTRATIONS (A) FIGURE NUMBER	(B) ITEM OR SYMBOL NUMBER
										EN-91B (continued)									
P	O		6740-926-5301							LENSBOARD PHOTOGRAPHIC: 82205; 12620	ea		2	*	*	*	*	1-4	MP135
P	O									LENSBOARD PHOTOGRAPHIC: 82205; 12896	ea		1	*	*	*	*	1-4	MP140
P	O									LENS CONDENSER: 82205; 12696	ea		1	*	*	*	*	3-1	MP104
P	O									LENS CONDENSER: 82205; 12587	ea		2	*	*	*	*	4-1	MP123
P	O									LENS CONDENSER ASSY: Variable; 82205; 12697	ea		1	*	*	*	2	3-1	MP103
P	O									LENS CONDENSER ASSY: 82205; 12885	ea		1	*	*	*	2	4-1	MP121
P	O		6760-926-5305							LENS, PROJECTION PRINTING: 94381; Dwg No. 12692	ea		1	*	*	*	2	1-4	MP134
P	O		6760-926-5304							LENS, PROJECTION PRINTING: 94381; 12693	ea		1	*	*	*	2	1-4	MP137
P	O		6760-937-7423							LENS, PROJECTION PRINTING: Karl Zeiss; Dwg No. 12694	ea		1	*	*	*	2	1-4	MP-139
P	O									LEVER: 82205; 12708	ea		1	*	*	*	2	1-2	MP146
P	O									LINK LS ASSY: 82205; 12713	ea		1	*	*	*	2	1-2	MP143
P	O									LINK RH ASSY: 82205; 12714	ea		2	*	*	*	2	3-1	MP144
P	O									MIRROR: 98463; 12769	ea		1	*	*	*	2	1-1	MP182
P	O									SPRING POST ASSY: 82205; 12667	ea		2	*	*	*	2	1-2	MP166

SECTION IV. FEDERAL STOCK NUMBER INDEX

INDEX - FEDERAL STOCK NUMBER CROSS REFERENCE TO FIGURE AND ITEM NUMBER OR REFERENCE SYMBOL

STOCK NO.	FIGURE NO.	ITEM NO. REF. SYMBOL	STOCK NO.	FIGURE NO.	ITEM NO. REF. SYMBOL
5935-636-7145	1-2	P100			
6145-284-0579	1-2	W100			
6240-937-7167	2-2	DS100			
6250-936-5458	2-1	X100			
6740-926-5301	1-4	MP-135			
6740-937-4677	2-2	MP107			
6740-937-4678	1-6	MP-179			
6740-937-4679	3-1	MP108			
6740-937-4763	1-5	MP129			
6740-937-4764	1-5	MP127			
6740-937-4765	1-5	MP130			
6740-937-4766	1-5	MP128			
6760-926-5302	1-1	MP131			
6760-926-5304	1-4	MP137			
6760-926-5305	1-4	MP134			
6760-937-7423	1-4	MP139			

INDEX

By Order of the Secretary of the Army:

HAROLD K. JOHNSON,
General, United States Army,
Chief of Staff.

Official:

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

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USACDC Agcys (1)
USAMC (5)
USCONARC (5)
ARADCOM (5)
ARADCOM Rgn (2)
OS Maj Comd (4)
USARYIS (5)
LOGCOMD (2)
USAMICOM (4)
USASTRATCOM (4)
USAESC (70)
MDW (1)
Armies (2)
Corps (2)
USAC (3)
52nd USASA Sp Opn Cmd (5)
318th USASA Bn (5)
819th USASA Bn (5)
5th USASA Fld Sta (5)
Svc Colleges (2)
USASESS (5)
USAADS (2)
USAAMS (2)
USAARMS (2)
USAIS (2)
USAES (2)
USA Tng Cens (2)
WRAMC (1)
Army Pic Cen (2)
USACDCEC (10)
AV Comm Cen (10)
Instls (2) except
  Ft Hancock (4)
  Ft Gordon (10)
  Ft Huachuca (10)
  Ft Carson (25)
  Ft Knox (12)
WSMR (5)
Gen Dep (2)
Sig Sec Gen Dep (5)
Sig Dep (12)
A Dep (2) except
  LBAD (14)
  SAAD (30)
  TOAD (14)
  LEAD (7)
  NAAD (5)
  SVAD (5)
  ATAD (10)
Sig FLDMS (2)
AMS (1)
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  5-52
  5-112
  5-115
  8-650
  11-57
  11-97
  11-98
  11-117
  11-127
  11-155
  11-157
  11-158
  11-500 (AA-AC)
  11-587
  11-592
  11-597
  19-500

NG: State AG (3).
USAR: None.
For explanation of abbreviations used, see AR 320-60.

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The Metric System and Equivalents

Linear Measure

1 centimeter = 10 millimeters = .39 inch
1 decimeter = 10 centimeters = 3.94 inches
1 meter = 10 decimeters = 39.37 inches
1 dekameter = 10 meters = 32.8 feet
1 hectometer = 10 dekameters = 328.08 feet
1 kilometer = 10 hectometers = 3,280.8 feet

Weights

1 centigram = 10 milligrams = .15 grain
1 decigram = 10 centigrams = 1.54 grains
1 gram = 10 decigram = .035 ounce
1 decagram = 10 grams = .35 ounce
1 hectogram = 10 decagrams = 3.52 ounces
1 kilogram = 10 hectograms = 2.2 pounds
1 quintal = 100 kilograms = 220.46 pounds
1 metric ton = 10 quintals = 1.1 short tons

Liquid Measure

1 centiliter = 10 milliters = .34 fl. ounce
1 deciliter = 10 centiliters = 3.38 fl. ounces
1 liter = 10 deciliters = 33.81 fl. ounces
1 dekaliter = 10 liters = 2.64 gallons
1 hectoliter = 10 dekaliters = 26.42 gallons
1 kiloliter = 10 hectoliters = 264.18 gallons

Square Measure

1 sq. centimeter = 100 sq. millimeters = .155 sq. inch
1 sq. decimeter = 100 sq. centimeters = 15.5 sq. inches
1 sq. meter (centare) = 100 sq. decimeters = 10.76 sq. feet
1 sq. dekameter (are) = 100 sq. meters = 1,076.4 sq. feet
1 sq. hectometer (hectare) = 100 sq. dekameters = 2.47 acres
1 sq. kilometer = 100sq. hectometers = .386 sq. mile

Cubic Measure

1 cu. centimeter = 1000 cu. millimeters = .06 cu. inch
1 cu. decimeter = 1000 cu. centimeters = 61.02 cu. inches
1 cu. meter = 1000 cu. decimeters = 35.31 cu. feet

Approximate Conversion Factors

To change	*To*	*Multiply by*	*To change*	*To*	*Multiply by*
inches	centimeters	2.540	ounce-inches	Newton-meters	.007062
feet	meters	.305	centimeters	inches	.394
yards	meters	.914	meters	feet	3.280
miles	kilometers	1.609	meters	yards	1.094
square inches	square centimeters	6.451	kilometers	miles	.621
square feet	square meters	.093	square centimeters	square inches	.155
square yards	square meters	.836	square meters	square feet	10.764
square miles	square kilometers	2.590	square meters	square yards	1.196
acres	square hectometers	.405	square kilometers	square miles	.386
cubic feet	cubic meters	.028	square hectometers	acres	2.471
cubic yards	cubic meters	.765	cubic meters	cubic feet	35.315
fluid ounces	milliliters	29,573	cubic meters	cubic yards	1.308
pints	liters	.473	milliliters	fluid ounces	.034
quarts	liters	.946	liters	pints	2.113
gallons	liters	3.785	liters	quarts	1.057
ounces	grams	28.349	liters	gallons	.264
pounds	kilograms	.454	grams	ounces	.035
short tons	metric tons	.907	kilograms	pounds	2.205
pound-feet	Newton-meters	1.356	metric tons	short tons	1.102
pound-inches	Newton-meters	.11296			

Temperature (Exact)

°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C

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