

TM 11-6720-234-15

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

**OPERATOR,
ORGANIZATIONAL, DS, GS, AND DEPOT
MAINTENANCE MANUAL**

**CAMERA SET
STILL PICTURE POLAROID
MODEL 100**



**HEADQUARTERS, DEPARTMENT OF THE ARMY
OCTOBER 1966**

TECHNICAL MANUAL

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CAMERA SET, STILL PICTURE POLAROID MODEL 100

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CHAPTER 1 INTRODUCTION

Section I. GENERAL

1-1. Scope

a. This is a first edition manual containing preliminary information. The manual describes Camera Set, Still Picture Polaroid Model 100 (fig. 1-1) and covers its installation, operation, and limited maintenance. It includes operation under usual and unusual conditions and cleaning and inspection of the equipment.

b. The basic issue items list (BILL) appears in appendix B; the maintenance allocation chart (MAC) appears in appendix C.

1-2. Index of Publications

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. DA Pam 310-4 is an index of current technical manuals, technical bulletins, supply manuals (types 7, 8, and 9), supply bulletins, lubrication orders, and modification work orders available through publications supply channels. The index lists the individual parts (-12, -35P, etc) and the latest changes to and revisions of each equipment publication.



Figure 1-1. Camera set, still picture Polaroid Model 100; components.

1-3. Forms and Records

a. *Reports of Maintenance and Unsatisfactory Equipment.* Use equipment forms and records in accordance with instructions in TM 38-750.

b. *Report of Damaged or Improper Shipment.* Fill out and forward DD Form 6 (Report of Damaged or Improper Shipment) as prescribed in AR 700-58 (Army), NAVSANDA Publication 378 (Navy), and AFR 71-4 (Air Force).

c. *Reporting of Equipment Manual Improvements.* The direct reporting of errors, omissions, and recommendations for improving this manual by the individual user, is authorized and encouraged. DA Form 2028 (Recommended Changes to DA Publications) will be used for reporting these improvements. This form may be completed using pencil, pen, or typewriter. DA Forms 2028 will be completed by the individual using the manual and forwarded direct to the Commanding General, U.S. Army Electronics Command, ATTN: AMSEL-MR-NMP-AD, Fort Monmouth, N.J. 07703.

Section II. DESCRIPTION AND DATA

1-4. Purpose and Use

a. *Purpose.* Camera Set, Still Picture Polaroid Model 100 (camera set) is a self-contained, portable, hand-operated camera set. The camera component is used to make still photographs using the 3¼- by 4¼-inch Polaroid film pack.

b. *Use.* The camera set is used in the field to make and process on the spot black-and-white or color photographs. The camera set can be used under extreme lighting conditions.

Range finder data:

Type ----- Double image, coupled, superimposed.

Focusing range ----- 3 feet to infinity.

Film accommodated:

Type ----- Polaroid film pack, eight-exposure, color or black-and-white.

Size ----- 3¼ by 4¼ inches.

Loading ----- Daylight.

Viewfinder, type ----- Optical, erect image.

Battery accommodated:

Voltage ----- 4.5.

Type ----- Eveready No. 531 or equal.

b. *Flashgun.*

Type ----- 1-cell, with hinged blue filter shield.

Reflector data:

Shape ----- Parabolic.

Size ----- 3-inch.

Reflecting surface ----- Highly polished, mirror finish.

Flashlamp accommodated ----- Type M3.

Flashlamp ejection ----- Seimautomatic, button actuated.

Battery

accommodated:

Voltage ----- 1.5.

Type ----- Eveready No. E-91 or equal.

Size ----- AA.

1-5. Technical Characteristics

a. *Camera.*

Type ----- Still picture, general purpose, purpose, folding.

Lens data:

Focal length ----- 114 mm (approximately 4.5 inches).

Type ----- Triplet lens, coated.

Speed ----- f/8.8.

Angle of view ----- 36° by 46°.

Shutter data:

Type ----- Between the lens.

Speed setting ----- Automatic, internally coupled to the electric eye circuit.

Diaphragm ----- Fixed water-house-type stops, internally coupled to the film speed dial.

1-6. Components of Camera Set

Note. For the current official listing of components, see the basic issue items list (appx B).

Quantity	Item	Dimensions (in.)			Weight (lb)
		Height	Width	Length	
1	Camera (closed) -----	5	7¾	2¾	2.75
1	Flashgun -----	4¼	3⅞		.4
1	Cold-clip -----		3⅞	4	.13
1	Carrying case -----	8½	13⅞	3⅞	1.75

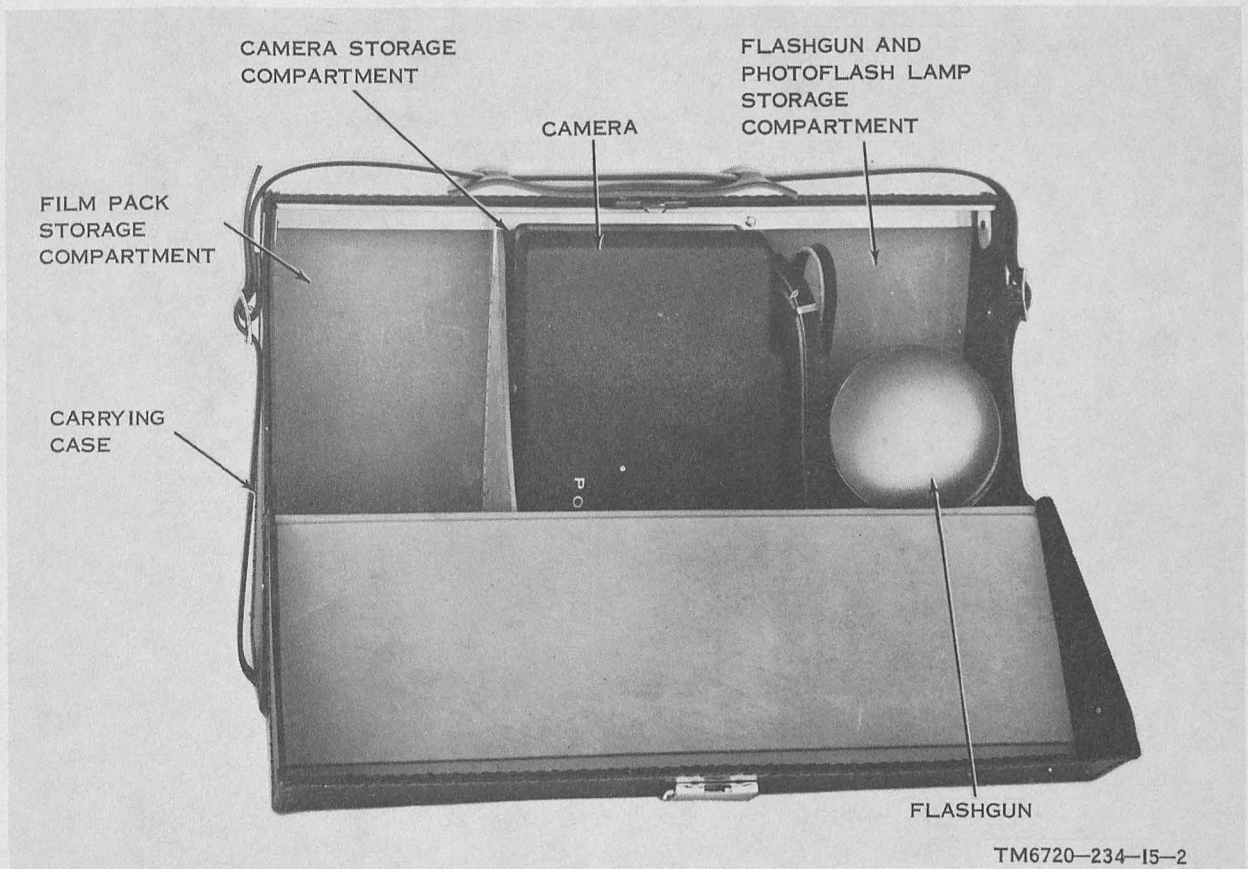
1-7. Description of Camera Set

The camera set (fig. 1-1) includes the camera, flashgun, cold-clip, and carrying case. When not in use, the camera (para 1-8) and the flashgun (para 1-9) are housed and stored in the padded-compartment carrying case (fig. 1-2) and the cold-clip is stored inside the camera cover. The carrying case is equipped with a strap handle and has provisions for two carrying straps.

1-8. Description of Camera

The camera (fig. 1-3), which takes and develops photographs on location, is a general purpose, handheld folding camera. Focusing is accomplished by means of a coupled, superimposed-type rangefinder that is part of the finder assembly. The finder assembly is hinged and, when *not* in use, fold into the camera. The finder assembly, when in use, lifts out and is

held in the operating position by a bar magnet mounted on top of the camera body. The finder assembly also houses the viewfinder. A hinged camera cover is provided to protect the front standard and finder assemblies when the camera is not being used. During use, the camera cover can be lowered and left attached to the camera body (fig. 1-4), or it can be removed. A tripod socket is provided on the lower right bottom portion of the camera body. A built-in, spring-loaded, nesting lens shade is mounted in front of the lens. The front standard assembly (fig. 1-5) houses the electric eye, the lens and shutter assemblies, and most of the operating controls and indicators. The front standard assembly is bellows-mounted to the camera body and is supported by a set of hinged upper and lower support braces. A neck strap is attached to the top of the camera body. Shutter release button 2 (fig. 1-6) and focusing pushbuttons



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Figure 1-2. Camera set stored for carrying.

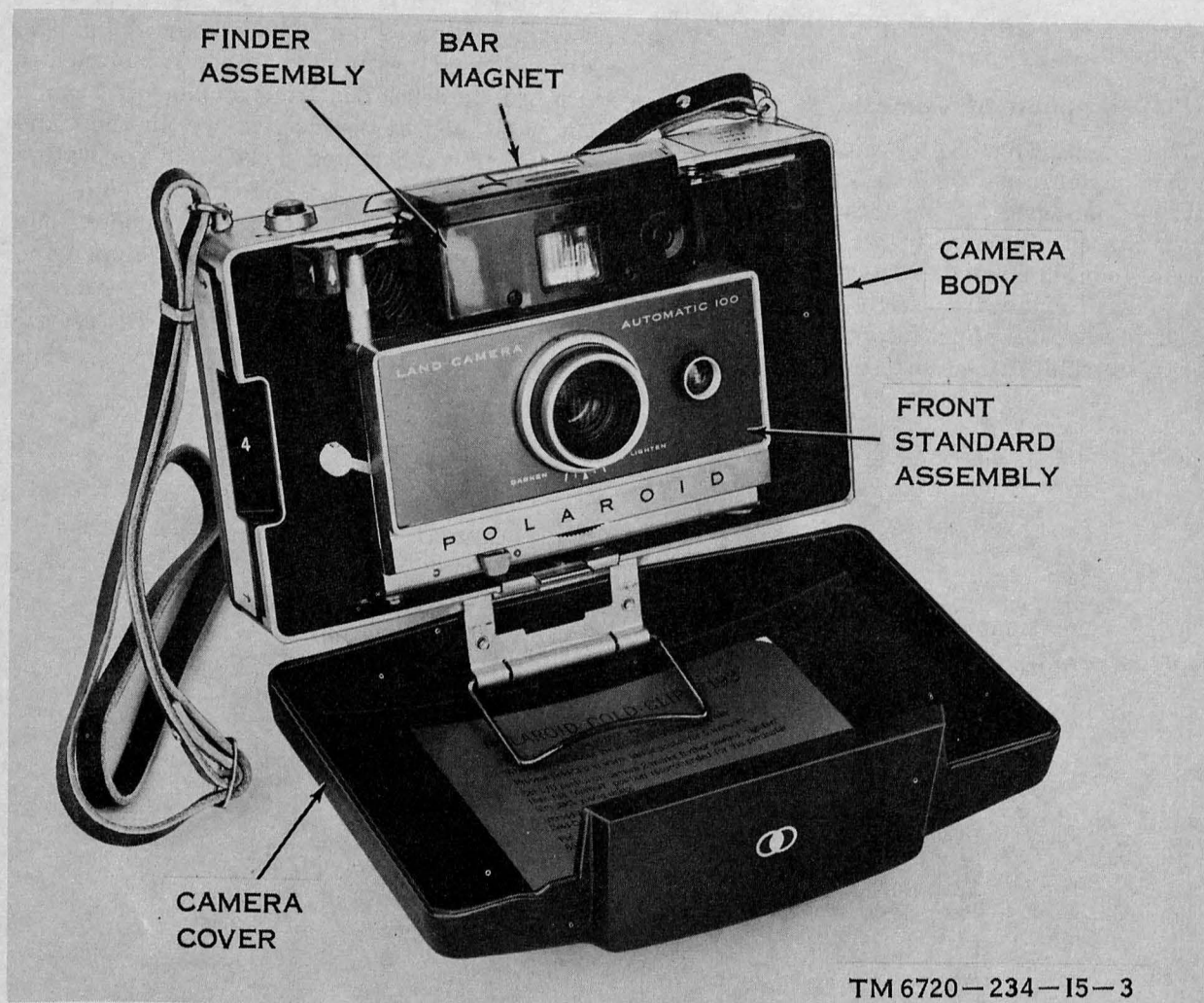


Figure 1-3. Camera, folded, with camera cover lowered.

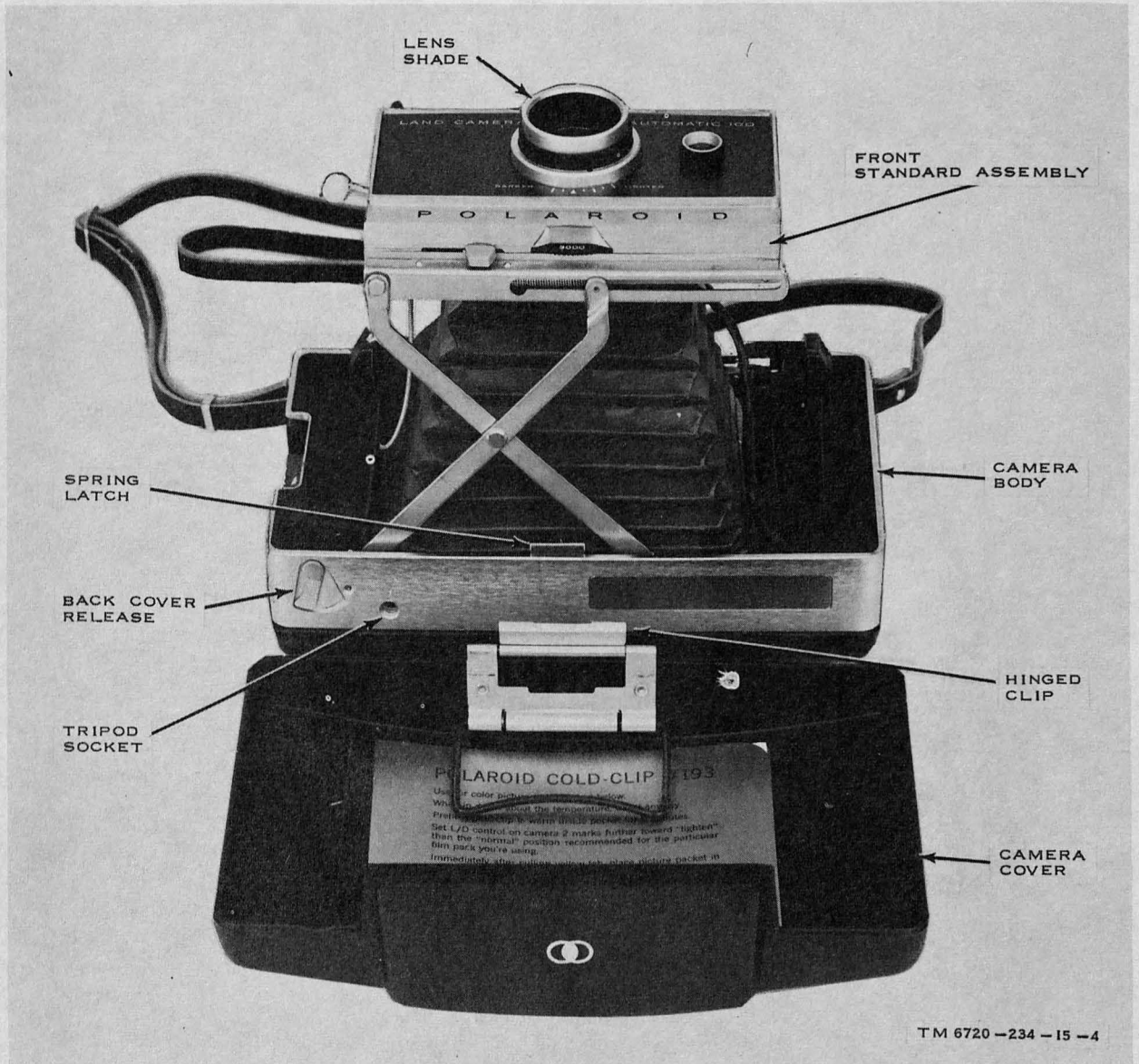


Figure 1-4. Camera, bottom view, opened with camera cover separated.

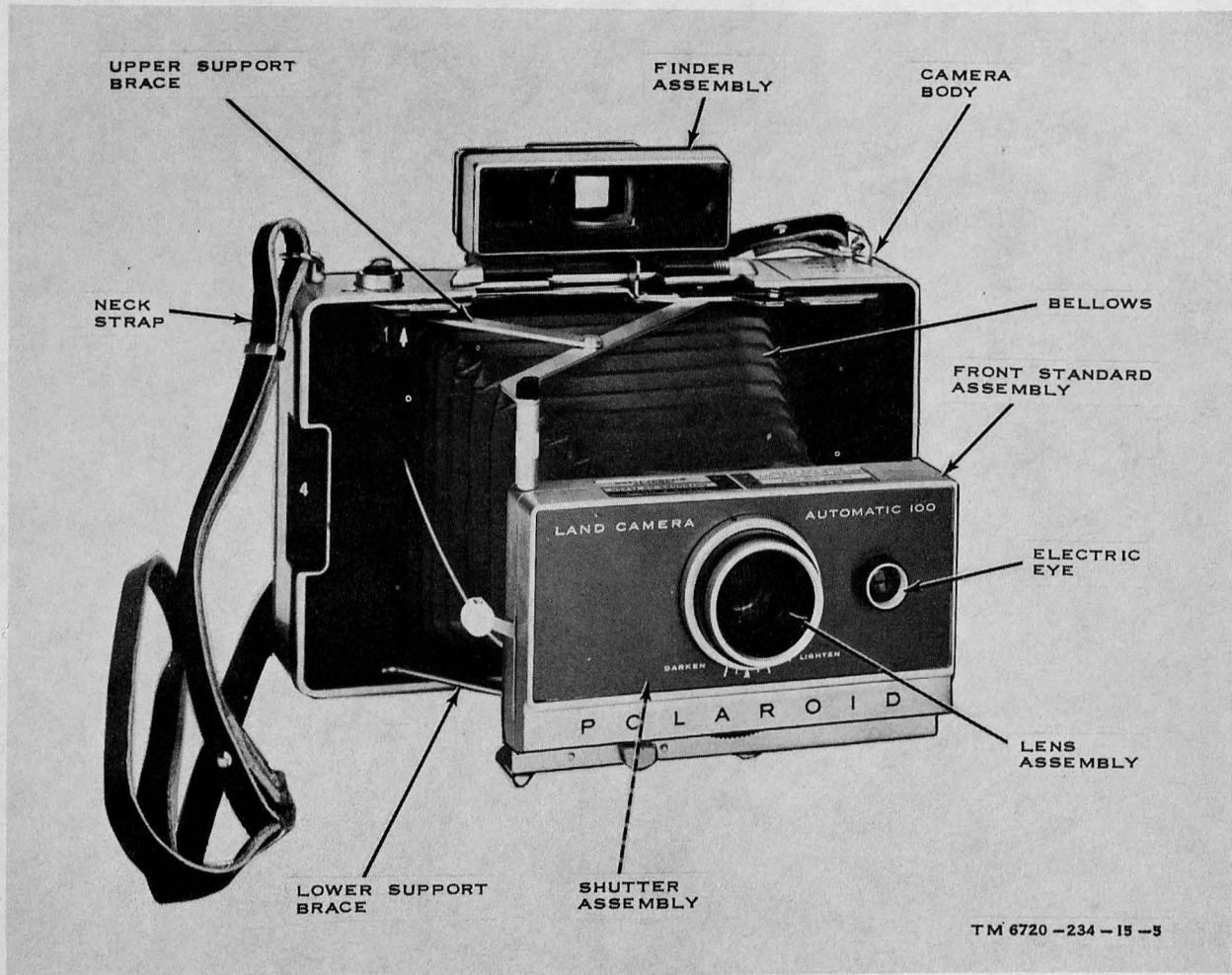


Figure 1-5. Camera, right front view.

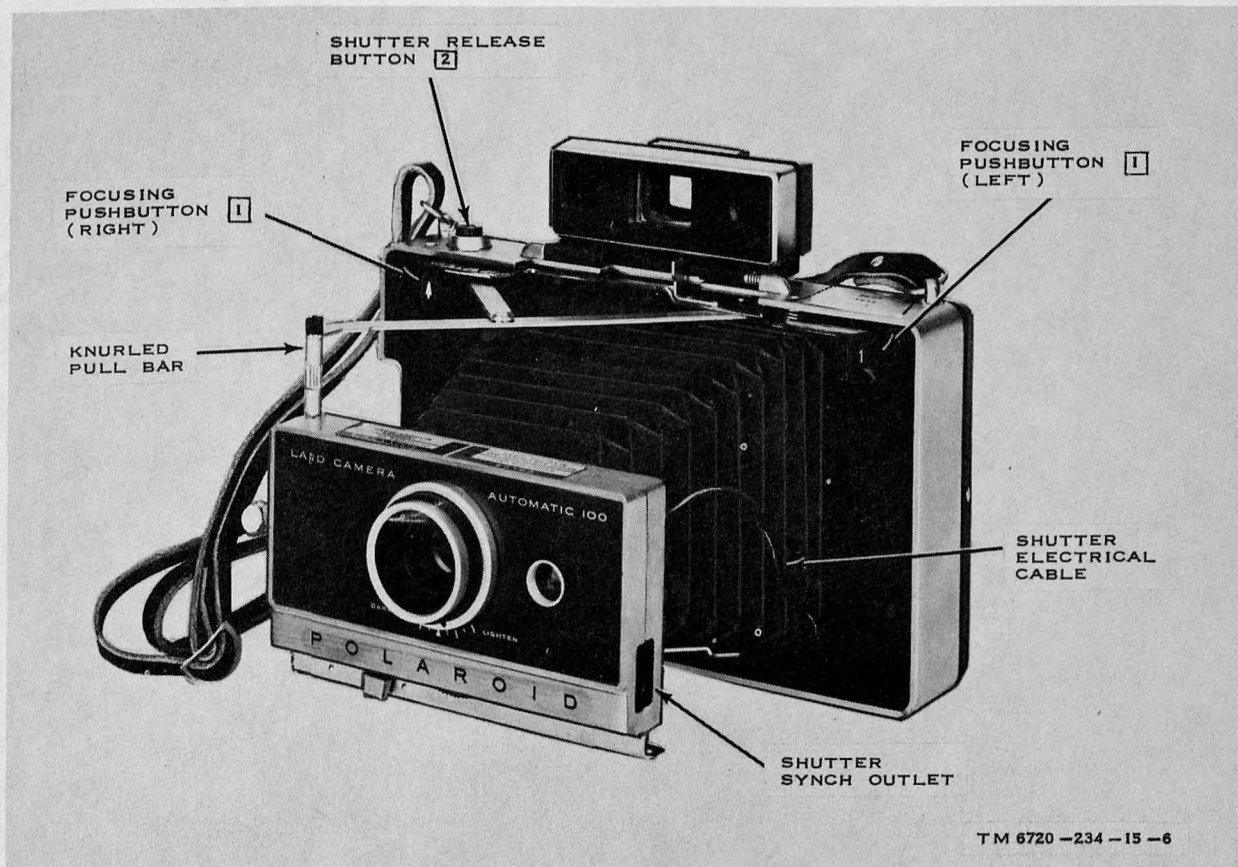


Figure 1-6. Camera, left front view.

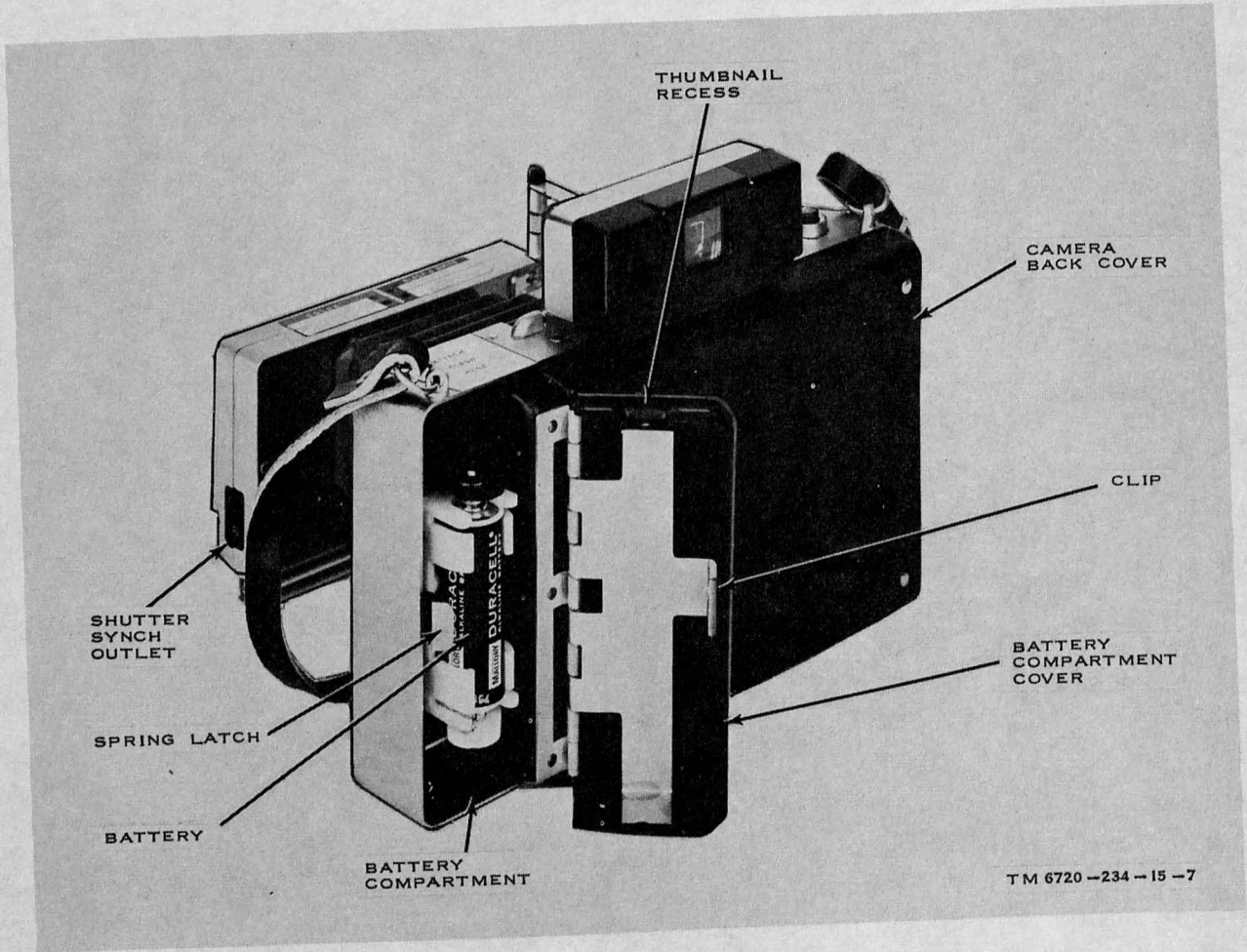


Figure 1-7. Camera, left rear view, with battery compartment cover open.

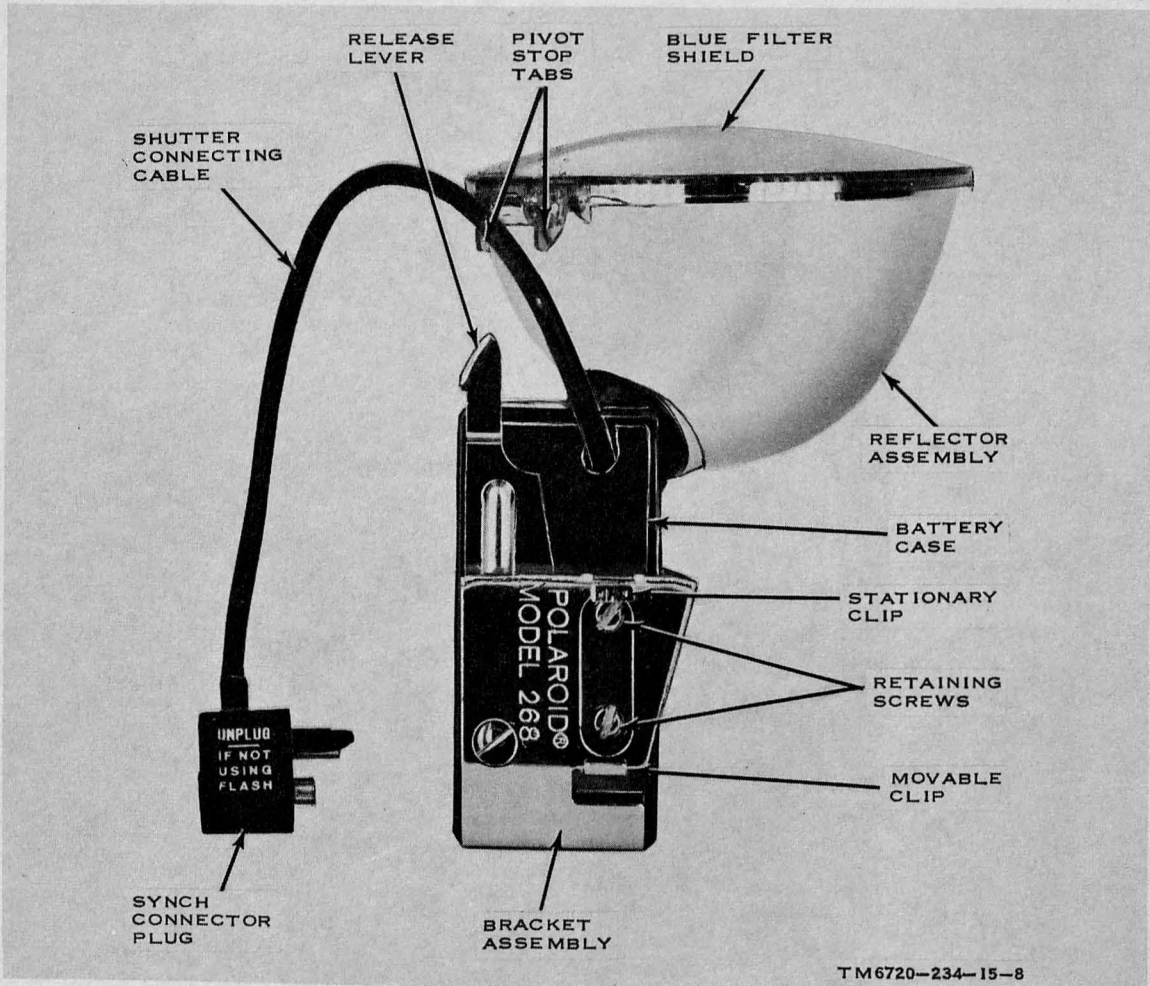


Figure 1-8. Flashgun, bottom view.

1 are mounted on top of the camera body. The camera has built-in photoflash synchronization (synch). The shutter synch outlet for the flashgun (para 1-9) is housed on the lower left side of the front standard assembly. Power for

automatic exposure control of the camera is supplied by an internal battery (fig. 1-7) housed in the left rear section of the camera body.

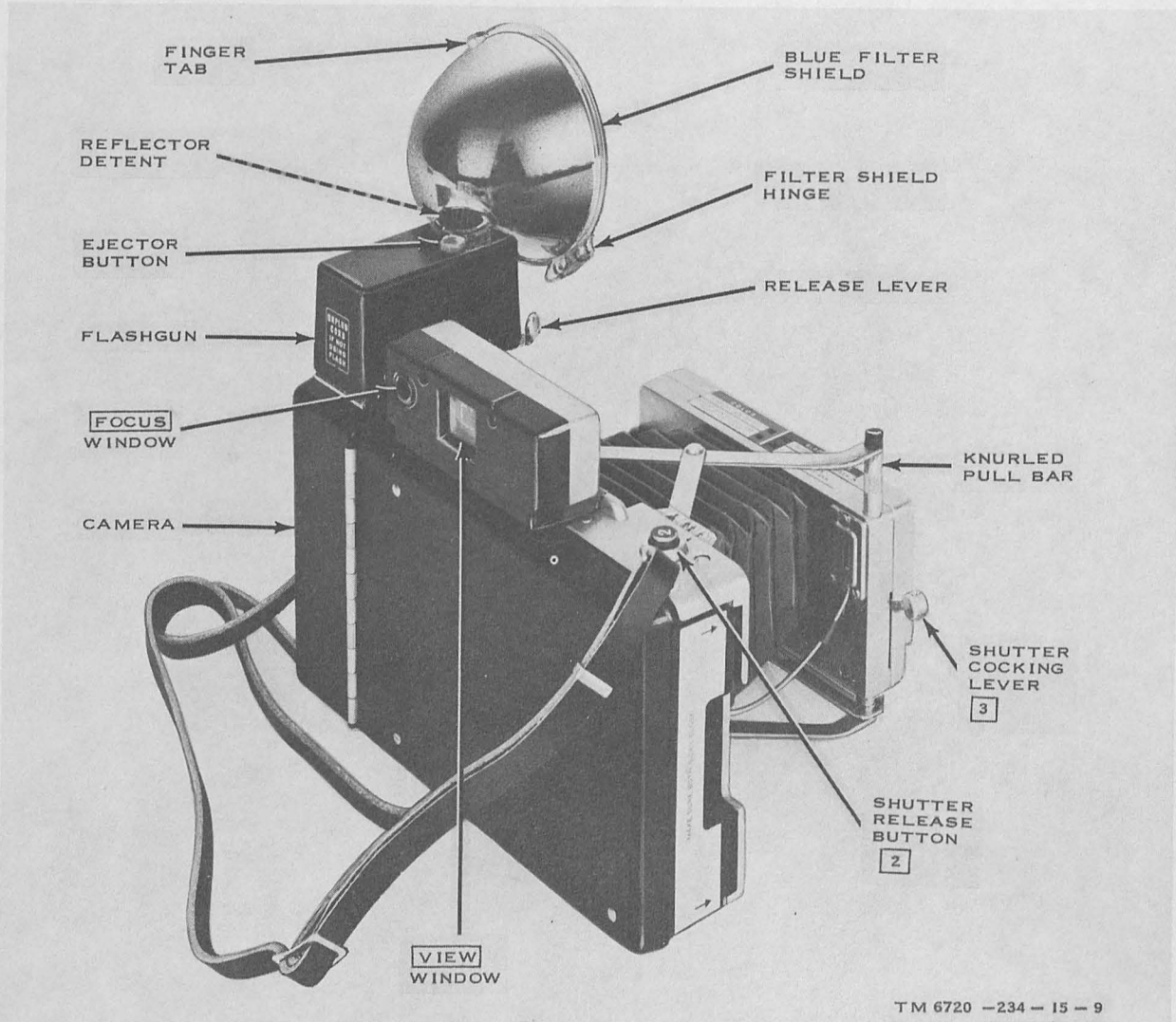


Figure 1-9. Camera, with flashgun mounted in place.

1-9. Description of Flashgun

The flashgun (fig. 1-8) consists of a self-contained, 3-inch reflector assembly, a battery case, and an attached shutter connecting cable. The shutter connecting cable is terminated with the synch connector plug that mates with the synch outlet on the camera (para 1-8). The battery case houses the battery that supplies the power to fire the photoflash lamps.

The reflector assembly is attached to the battery case and can be swiveled for bounce flash. A hinged blue filter shield is mounted at the front of the reflector assembly. A release lever facilitates mounting the flashgun on and removing it from the camera (fig. 1-9). The flashgun accepts Type M3 photoflash lamps and is equipped with an ejector button which permits expended photoflash lamps to be ejected automatically.

CHAPTER 2

SERVICE UPON RECEIPT OF EQUIPMENT

2-1. Unpacking

a. Packaging and Packing Data. For domestic shipment, the camera set is packed and shipped in two (nested) corrugated fiberboard cartons. The inner carton is wrapped and sealed in a moisture-vaporproof barrier. The outer carton is sealed with sealing tape.

b. Unpacking Camera Set. To unpack the camera set, proceed as follows:

Caution: Avoid thrusting sharp tools into the interior of the corrugated fiberboard cartons. Damage to the camera set could result.

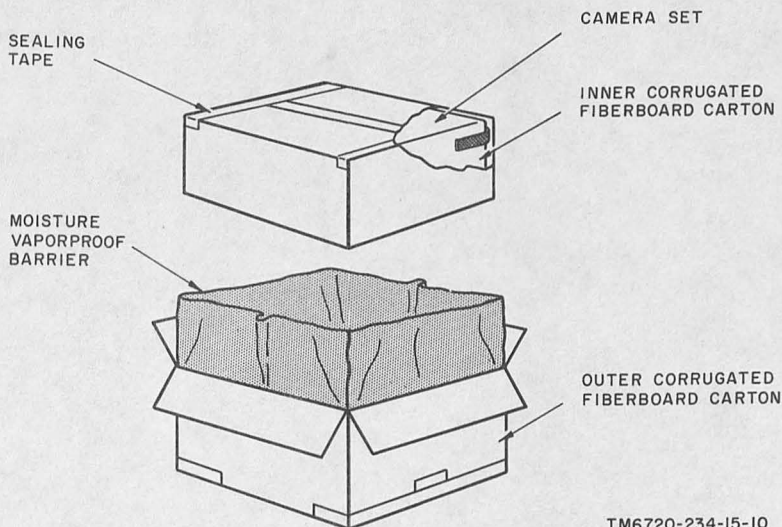
- (1) Slit the sealing tape that seals the seam of the outer corrugated fiberboard carton; lift out the camera set packed in the moisture-vaporproof barrier.
- (2) Slit the seam of the moisture-proof barrier; lift out the inner corrugated fiberboard carton.

- (3) Carefully slit the sealing tape on the inner corrugated fiberboard carton; open the flaps, and lift out the carrying case containing the camera and the flashgun.
- (4) Open the carrying case, and remove any packing material used to cushion the camera set components.

2-2. Checking Unpacked Equipment

a. General.

- (1) Inspect the camera set components (fig. 1-1) for damage incurred during shipment. If the equipment has been damaged, report the damage on DD Form 6 (para 1-3).
- (2) See that the equipment is complete as listed on the packaging slip. If a packaging slip is not available, check the equipment against the basic issue



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Figure 2-1. Camera set, typical packaging diagram.

items list (appx B). Report all discrepancies on DD Form 6.

Note. Shortage of a minor component that does not affect proper functioning of the equipment should not prevent use of the camera set.

- (3) If the camera 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 equipment. 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.

- (4) Check to see that the mechanical and optical parts of the camera set are clean. If necessary, clean the camera set (para 4-7).

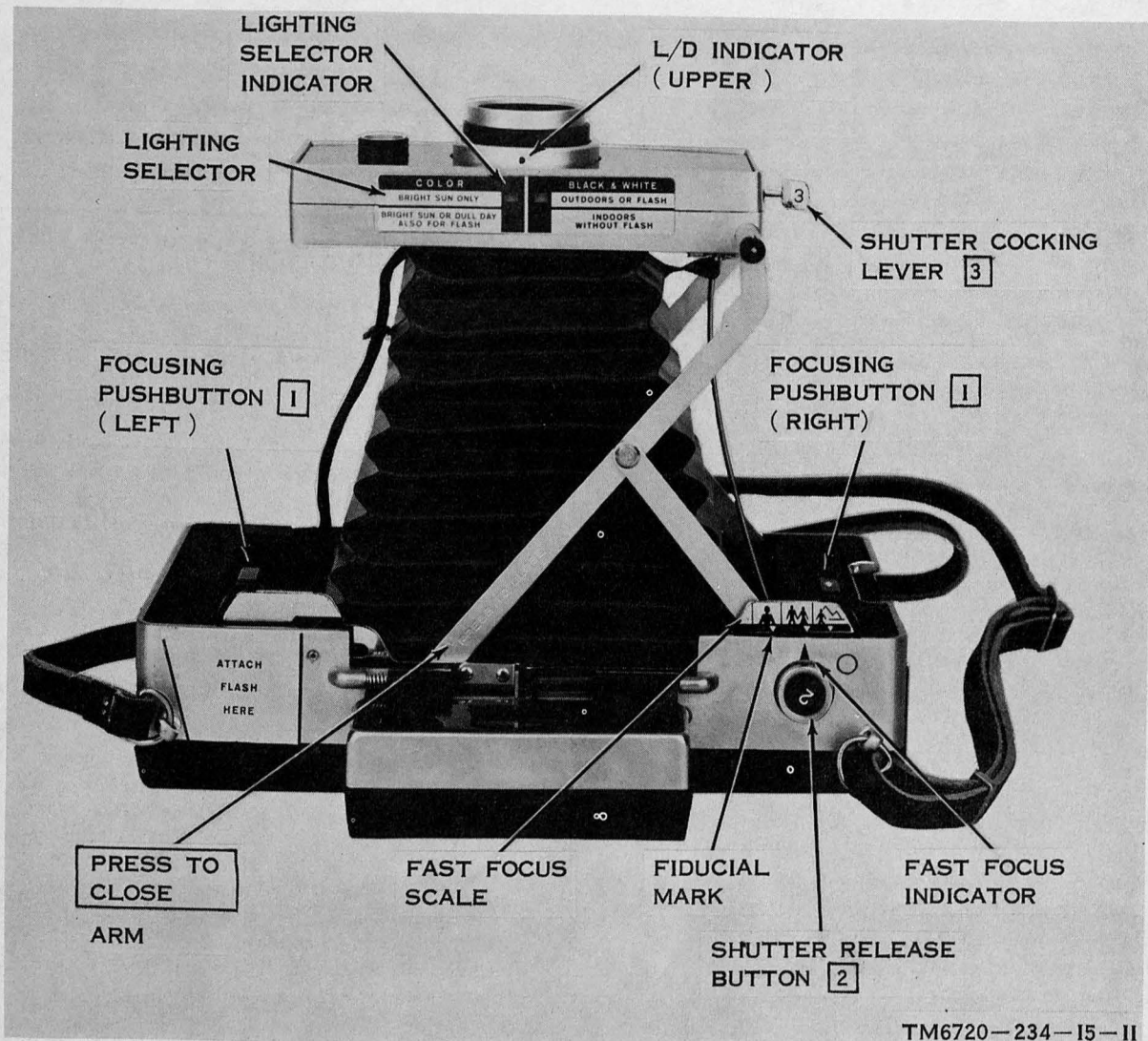
b. Camera.

- (1) Open the camera cover (fig. 1-3) by gently lifting the upper part free of the camera body; allow the camera cover to hang down.
- (2) Raise the finder assembly to its operating position; make sure that the bar magnet holds the finder assembly in place.
- (3) Gently lift up on right focusing push-button 1 (fig. 1-6) to release the front standard assembly.

- (4) Open the camera by pulling out on the knurled pull bar, and check it for bent, broken, or missing parts.
- (5) Check the camera cover, neck strap, and camera covering for wear, cuts, and abrasions.
- (6) Check the front standard assembly, upper and lower hinged support braces, and camera body to see that they are not loose, bent, or broken.
- (7) Check the optical parts of the camera (lens, finder assembly, and electric eye) for scratched, cracked, or broken parts.
- (8) Check the overall camera (fig. 1-3) for damaged controls and indicators.
- (9) Open the battery compartment cover (fig. 1-7), and inspect the battery compartment; see that the battery compartment is clean and that the battery is properly installed and connected.

c. Flashgun (fig. 1-8).

- (1) Check the reflector assembly and battery for broken or cracked parts.
- (2) Check the reflector and the blue filter shield for badly scratched surfaces.
- (3) Check the bracket assembly for bent or broken parts.
- (4) Check the shutter connecting cable for a damaged synch connector plug, and kinks, cuts, wear, and abrasions of the shutter connecting cable.



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Figure 3-1. Camera, controls and indicators, top view.

b. Camera Indicators. The following chart lists the camera indicators used by the operator and describes their function.

Indicator	Function
Fast focus indicator (fig. 3-1) -----	Indicates on fast focus scale relative camera-to-subject distance.
Fast focus scale -----	Used (for black-and-white film only) in conjunction with fast focus indicator to rapidly focus camera on desired subject matter.
Fiducial marks -----	Indicates optimum setting on fast focus scale for given camera-to-subject distance range.
FILM SPEED dial (fig. 3-2) -----	Indicates film speed that FILM SPEED control is set for.
L/D indicator (lower) -----	Indicates on L/D scale, relative setting of L/D control.

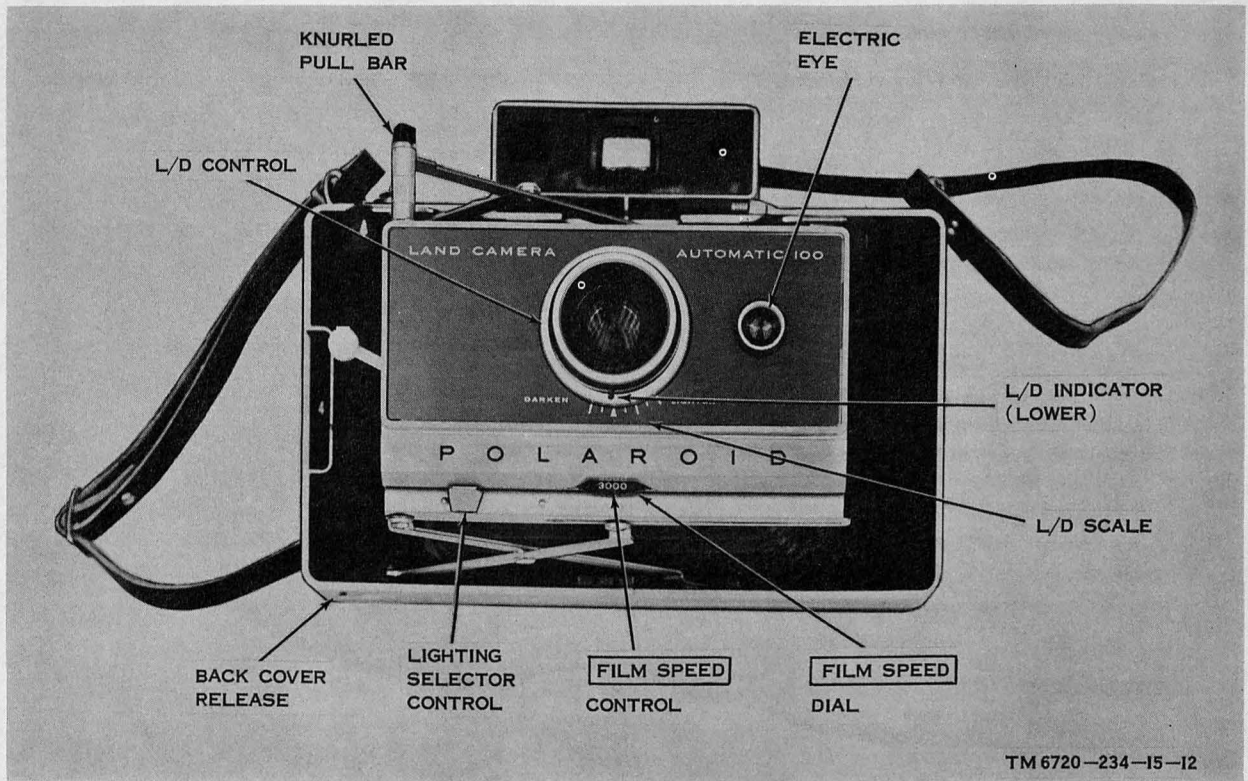


Figure 3-2. Camera, controls and indicators, lower front view.

Indicator	Function
Lighting selector indicator (fig. 3-1) -----	Indicates on lighting selector the lighting condition that lighting selector control is set for.
Lighting selector -----	Describes lighting condition that lighting selector indicator is set to.

3-2. Flashgun Controls

The following chart list the flashgun controls used by the operator and describes their function.

Control	Function
Ejector button -----	Automatically ejects expended photoflash lamp.
Finger tab -----	Used to raise and lower blue filter shield over reflector.
Reflector detent -----	Positions reflector assembly for normal or bounce flash position as desired.
Release lever -----	Operates movable clip on bracket assembly permitting installation and removal of flashgun.

Section II. PRELIMINARY PROCEDURES

3-3. Loading Film Pack in Camera

The film pack may be loaded in the camera in full daylight. However, do not expose the film pack to direct sunlight during the loading operation. Load the film pack into the camera as follows:

a. Open the top of the film pack box; remove the instruction sheet, the tube containing the coater, and the sealed foil package containing the film pack.

Note. If color film is used, no coater is supplied as it is *not* required. A set of mounts is supplied and should be returned to the box (after the film pack is removed) until needed.

b. Read the instruction sheet packed with the film pack, and note any special instructions as to camera settings and operation.

c. Release the camera back cover (fig. 3-3) by sliding back cover release (fig. 1-4) toward the center of the camera body.

d. Open the camera back cover (fig. 3-3), and check the rollers to see that they are clean; if necessary, clean the rollers (para 4-7).

e. Carefully open the foil package containing the film pack along the dotted lines as indicated.

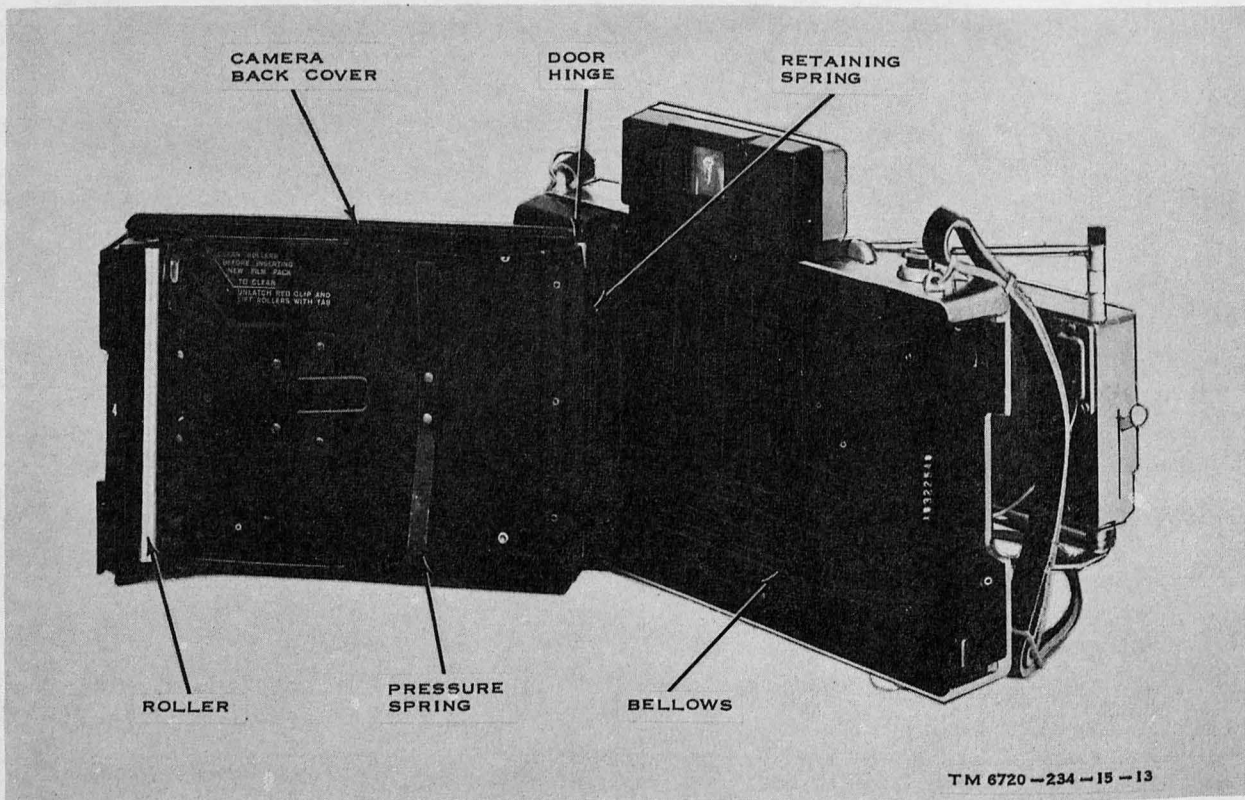


Figure 3-3. Camera, right rear view, with camera back cover open.

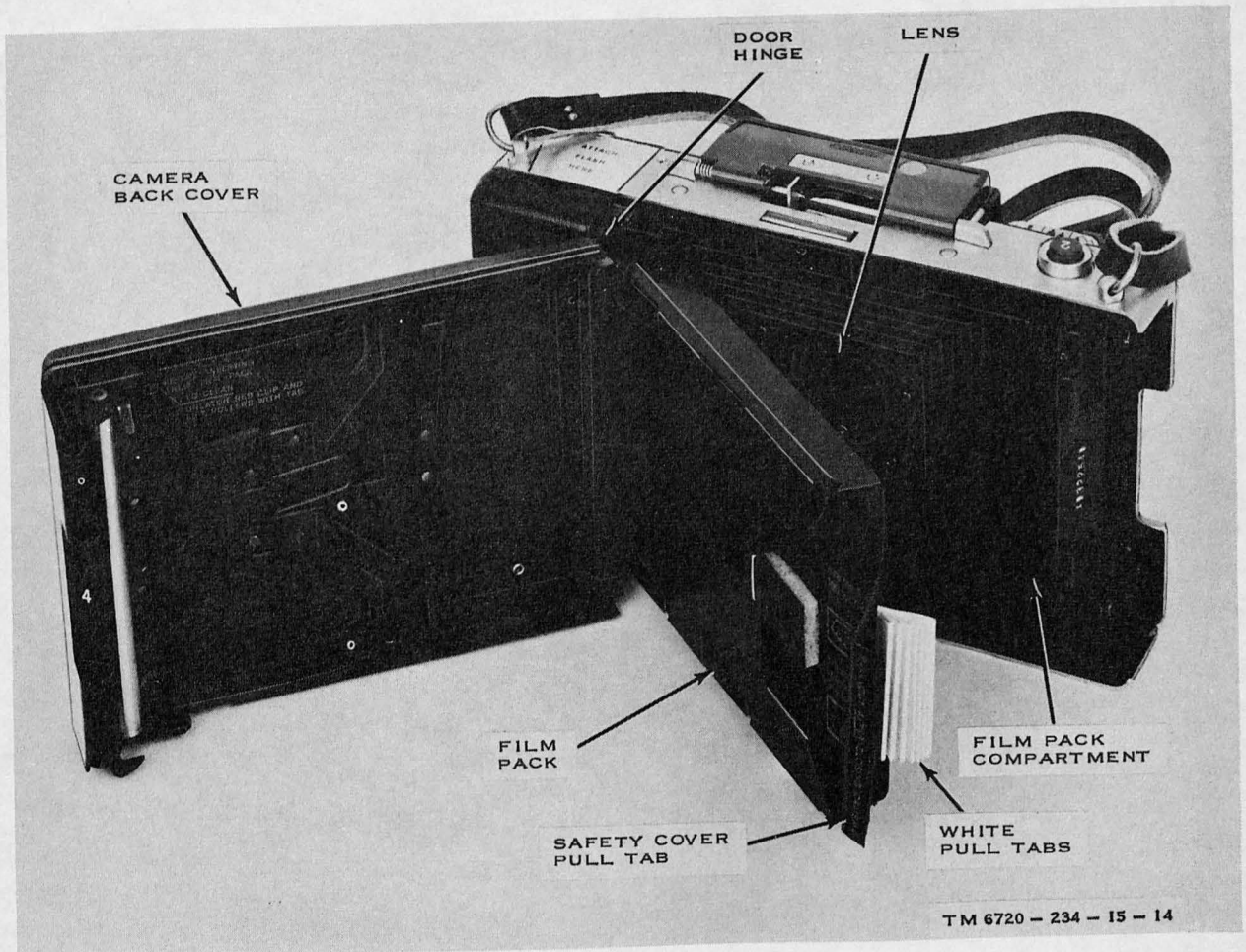


Figure 3-4. Camera with film pack partially inserted.

Caution: Handle the foil package containing the film pack and the film pack after removal near the edges only. Do not press or grasp the center of the film pack area as fogging or damage to the film pack could result.

f. Holding the film pack (fig. 3-4) by the edges, carefully insert it into the film pack compartment so that the printing on the safety cover faces the lens and the safety cover pull tab and white pull tabs face to the right as shown.

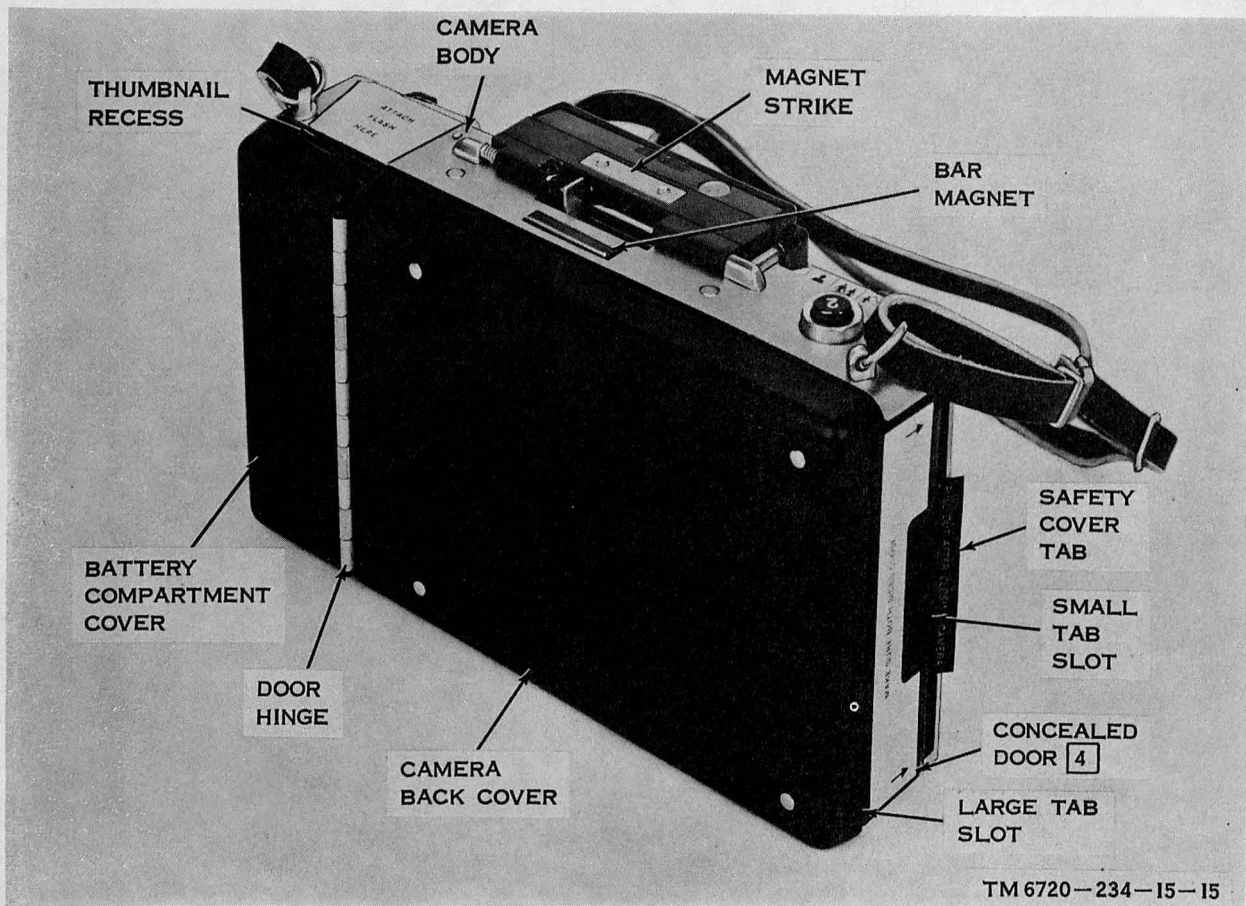


Figure 3-5. Camera, right rear view, with safety cover pull tab showing.

g. Gently push the bottom edge of the film pack under the door hinge, against the slight tension of the retaining spring (fig. 3-3). Seat the film pack (fig. 3-4) flush in the film pack

compartment; make sure that the safety cover pull tab and white pull tabs are not folded under the film pack and that they stay outside the film pack compartment.

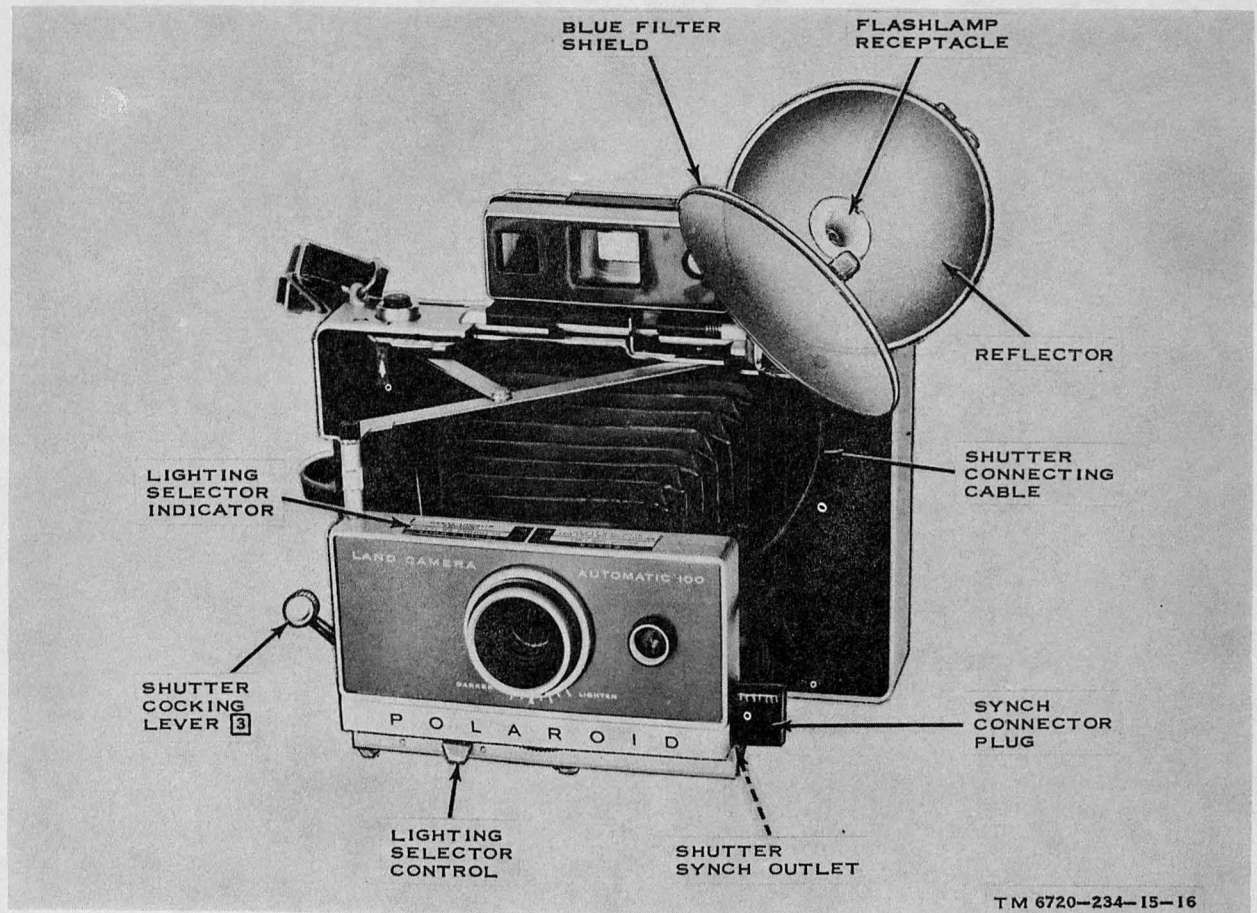


Figure 3-6. Camera with flashgun mounted and reflector assembly positioned for direct flash.

h. Close the camera back cover (fig. 3-5); make sure that both sides latch and that the safety cover pull tab sticks out of the small tab slot to the right of concealed door 4.

3-4. Attaching Flashgun to Camera

If it is determined that photoflash photography is to be used, attach the flashgun (fig. 1-9) to the camera as follows:

a. Position the stationary clip (fig. 1-8) so that it engages the top front edge of the camera body.

c. Press the release lever, and seat the flashgun on top of the camera body. Release the release lever, making sure that the movable clip engages the top rear edge of the camera body (fig. 3-5) just in front of the thumbnail recess.

d. Do not connect the polarized synch connector plug (fig. 3-6), on the end of the shutter cable, to the shutter synch outlet until such time as photoflash pictures are to be taken.

e. When bounce flash photography is desired, rotate the reflector assembly so that it is positioned on the flashgun as shown in figure 3-7.

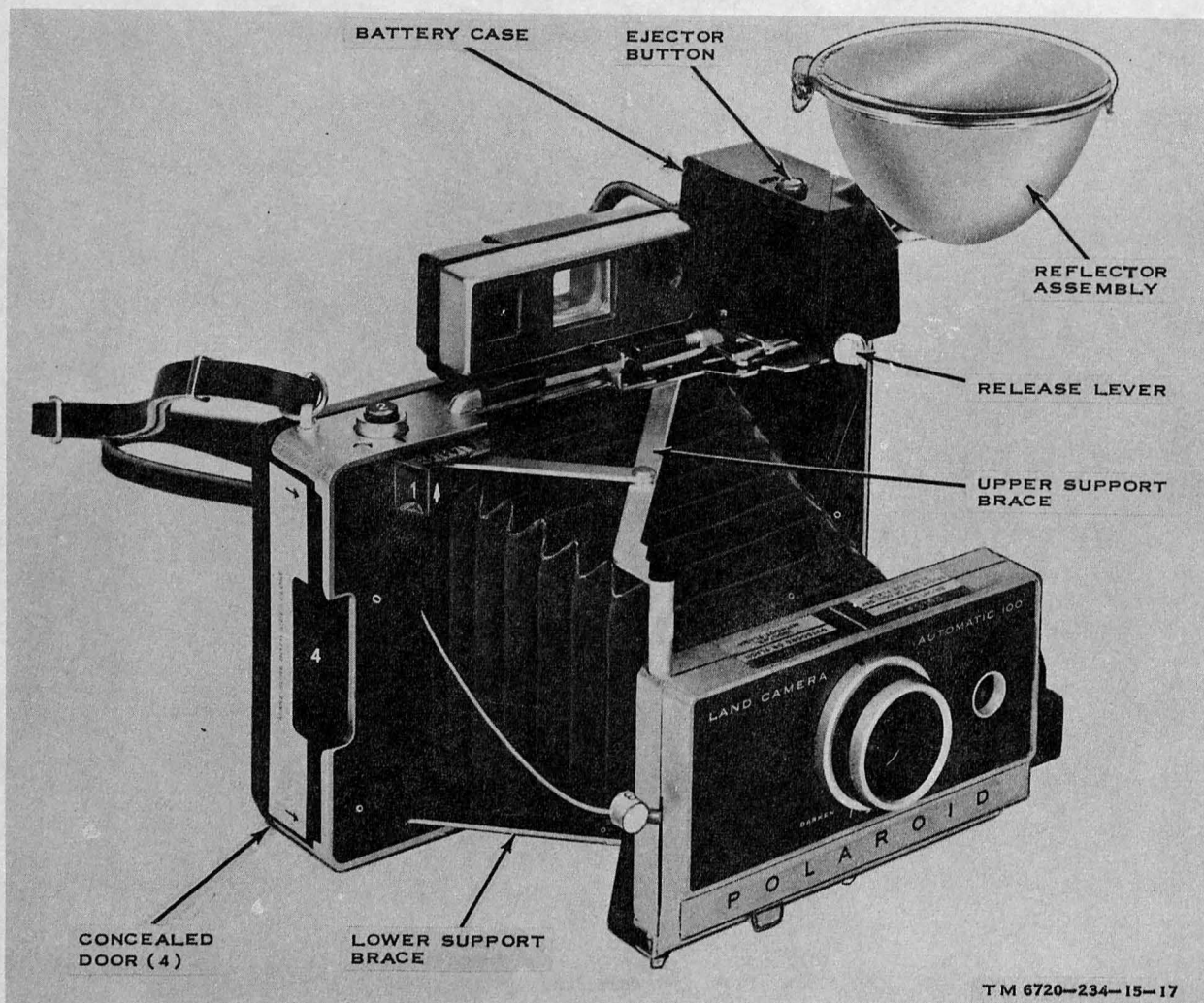


Figure 3-7. Camera with flashgun mounted and reflector assembly positioned for bounce flash.

Section III. OPERATION UNDER USUAL CONDITIONS

3-5. Focusing

The camera has provision for two means of focusing (coarse and fine) on a subject. For normal photography, use the rangefinder for fine focusing by following the procedures in *a* below. If fast action or rapid events are to be covered, and there is not enough time to permit normal fine focusing using the rangefinder, use the coarse (fast) focusing means by following the procedure in *b* below.

Note. The fast focusing means must be used with black-and-white film only, on outdoor subjects in bright sunlight or on indoor subjects with direct flash.

a. Focusing With Rangefinder. Focus the camera on the subject as follows:

- (1) Hold the camera horizontally, and sight the subject through the FOCUS window (fig. 1-9).
- (2) Center the bright spot (seen in the FOCUS window) on any vertical object in the center of the area of most interest.
- (3) Place the index fingers of the left and right hands on the left and right focusing pushbuttons 1 (fig. 3-8) respectively.

- (4) Move the focusing pushbuttons 1 from side to side until the images in the bright spot are superimposed.

b. Fast Focusing. To fast (coarse) focus the camera, proceed as follows:

- (1) Make sure that the camera is loaded only with black-and-white film pack and that the reflector assembly on the flashgun, if used, is set for direct flash operation.
- (2) Move the lighting selector control (fig. 3-8) to the right (away from the FILM SPEED control). This action will set a smaller lens opening in position, which, in turn, will increase the depth of field of the lens.
- (3) On the fast focus scale, find the illustration that most accurately describes

the subject distance (closeup, near, or distant) to the camera.

- (4) Move the focusing pushbuttons 1 from side to side until the fast focus indicator is opposite the applicable illustration found in (3) above.

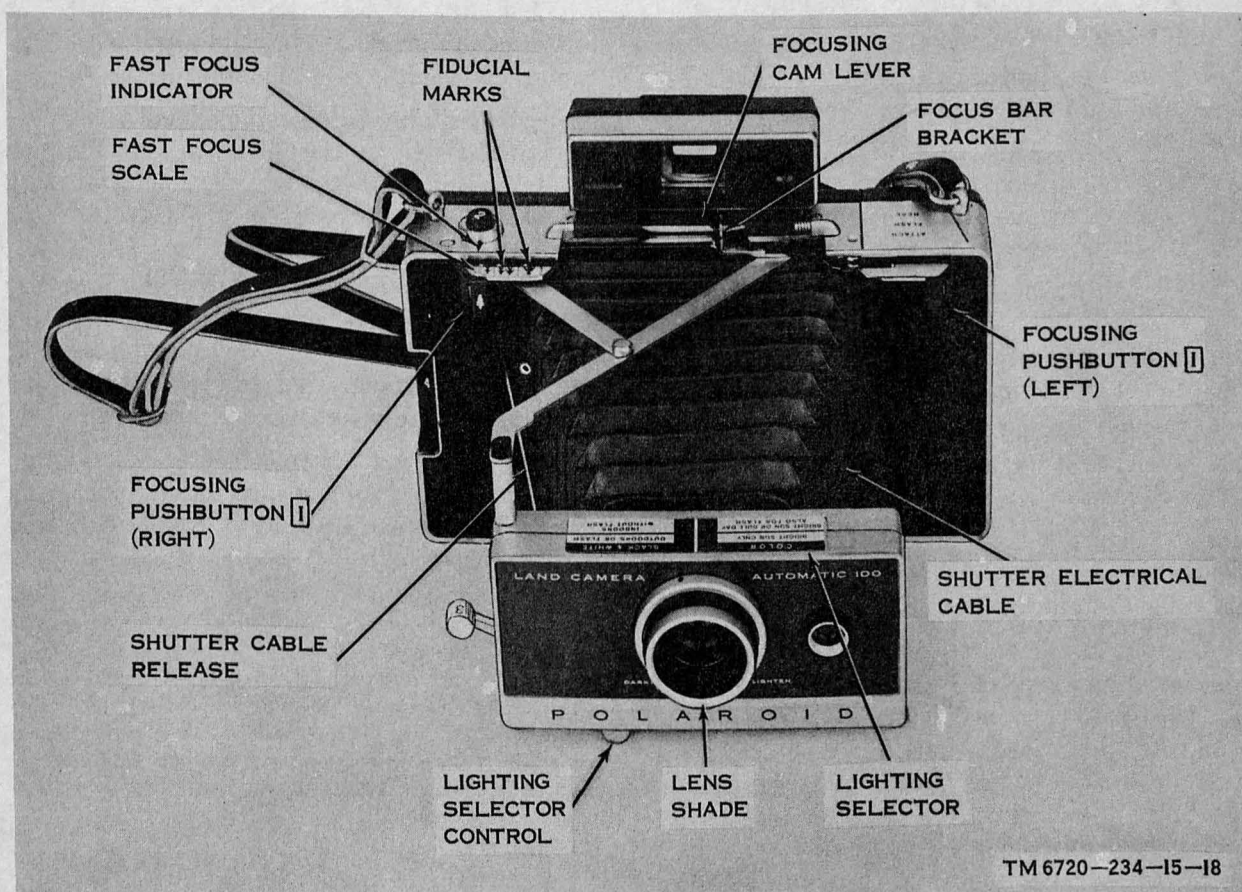
Note. Settings between the fiducial marks may be used for in-between subject distances.

3-6. Operation

a. Check to be sure that the battery (fig. 1-7) is properly installed in the camera battery compartment. If the battery is defective or more than a year old, replace the battery (para 4-10).

b. Load the film into the camera (para 3-3).

c. Rotate the FILM SPEED control (fig.



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Figure 3-8. Camera, top front view.

3-2) so that the FILM SPEED dial indication corresponds to the speed of the film being used.

d. Hold the camera level with the left hand; sharply pull the safety cover pull tab straight out to remove the film pack safety cover (fig. 3-9) from the film pack in the camera. Make sure that the end of a small white pull tab protrudes from the small tab slot.

e. If the camera is to be used for photoflash photography, install the flashgun on the camera (para 3-4).

Note. Disconnect the shutter connecting cable from the shutter synch outlet when photoflash lamps are not used to make an exposure. Failure to disconnect the shutter connecting cable will yield dark (underexposed), unusable prints.

f. Move the lighting selector control (fig. 3-6) in the direction that positions the indicator, in the lighting selector, opposite the lighting condition that applies.

g. Focus the camera on the subject to be photographed (para 3-5).

h. Cock the shutter by pressing shutter cocking lever 3 until it locks in the cocked (down) position.

i. If a photoflash lamp is to be used, carefully open the blue filter shield, and insert a No. M3 clear photoflash lamp in the flashlamp receptacle.

j. Close the blue filter shield; make sure that the shutter connecting cable is connected to the shutter synch outlet.

k. Frame the subject in the VIEW window (fig. 1-9), and make the exposure by pressing shutter release button 2.

l. Remove the expended photoflash lamp (if used) by opening the blue filter shield and pressing the ejector button on the flashgun.

m. Hold the camera, with the left hand, horizontal and level. Do not block the large tab slot (fig. 3-10) to the left of concealed door 4. Pull the protruding small white pull tab straight and out of the camera. A larger yellow pull tab will appear in the large tab slot to the left of concealed door 4, and another small white pull tab will appear in the small tab slot.

Caution: Do not store the equipment with the shutter in the cocked position. Omit the

following procedure after the last photograph is made and the photographic mission is completed.

n. Press shutter cocking lever 3 until it locks in the cocked position.

o. At this time, the camera is set to take another picture or to process the picture made in *k* above.

p. If it is necessary to take another picture immediately, follow the procedures in *i* through *l* and *n* above. If another picture is not needed immediately, proceed to *q* below.

Note. Before another picture can be taken, the first picture taken has to be processed, and the one taken in *p* above has to be moved to the processing position at the rear of the film pack. To process the first exposure and move the last exposure made into processing position, proceed as follows:

q. Hold the camera, with the left hand, horizontal and level. Pull the large yellow pull tab, which protrudes from the large tab slot to the left of concealed door 4, straight and out of the camera as rapidly and smoothly as possible.

r. Start timing the recommended developing time, indicated in the film pack instruction sheet, as soon as the large yellow pull tab with the attached picture assembly is free of the camera.

Warning: Avoid contact with the chemicals left on the negative assembly after the print is removed. Fold the negative assembly so that the moist side is inward; discard the folded negative assembly in a refuse container.

s. After the recommended development time has elapsed, raise one corner of the print, and quickly and smoothly lift the print off of the negative assembly.

Note. Handle prints by the edges only; do not touch the face of the prints. Coat black-and-white prints (para 3-7) as soon as possible to protect them from scratches, fingerprints, and fading. Color prints do not require coating. Follow the same handling technique outlined for black-and-white prints. Allow coated black-and-white prints and color prints approximately 5 minutes to air dry so that the surface can harden to a tough, glossy finish.

t. Perform the procedures in *m*, *q*, *r*, and *s* above. At this point, the second exposure, taken in *p* above, is removed from the camera and processed.

u. Repeat the procedures in *f* through *t* above until the photographic mission is completed or the film pack is expended. If the film pack is expended before the photographic mission is completed, reload the camera with a new film pack (para 3-3).

v. After the photographic mission is completed, perform the stopping procedures (para 3-8).

3-7. Coating Black-and-White Prints

Coat black-and-white prints as soon after they are processed as possible. Coating is necessary to preserve the image against fading and protect it from scratches and fingerprints. To coat the black-and-white prints, proceed as follows:

a. Lay the print face up on a clean, smooth work surface.

b. Carefully remove the coater from the plastic tube packed with the film pack.

c. Hold one corner of the print with the tip of the index finger of one hand, and grasp the plastic handle of the coater with the thumb and index finger of the other hand.

d. Spread some of the fluid, from the saturated absorbent wad of the coater, evenly across the entire face of the print, including the border. Apply the fluid with moderate pressure, using six to eight strokes in the same lengthwise direction.

Caution: Avoid contact between the face of the print and the edges of the coater's plastic handle. Contact with the edge of the plastic handle could scratch the print.

Note. After the coater has been used to coat several prints, the liquid on the face of the coater will be de-

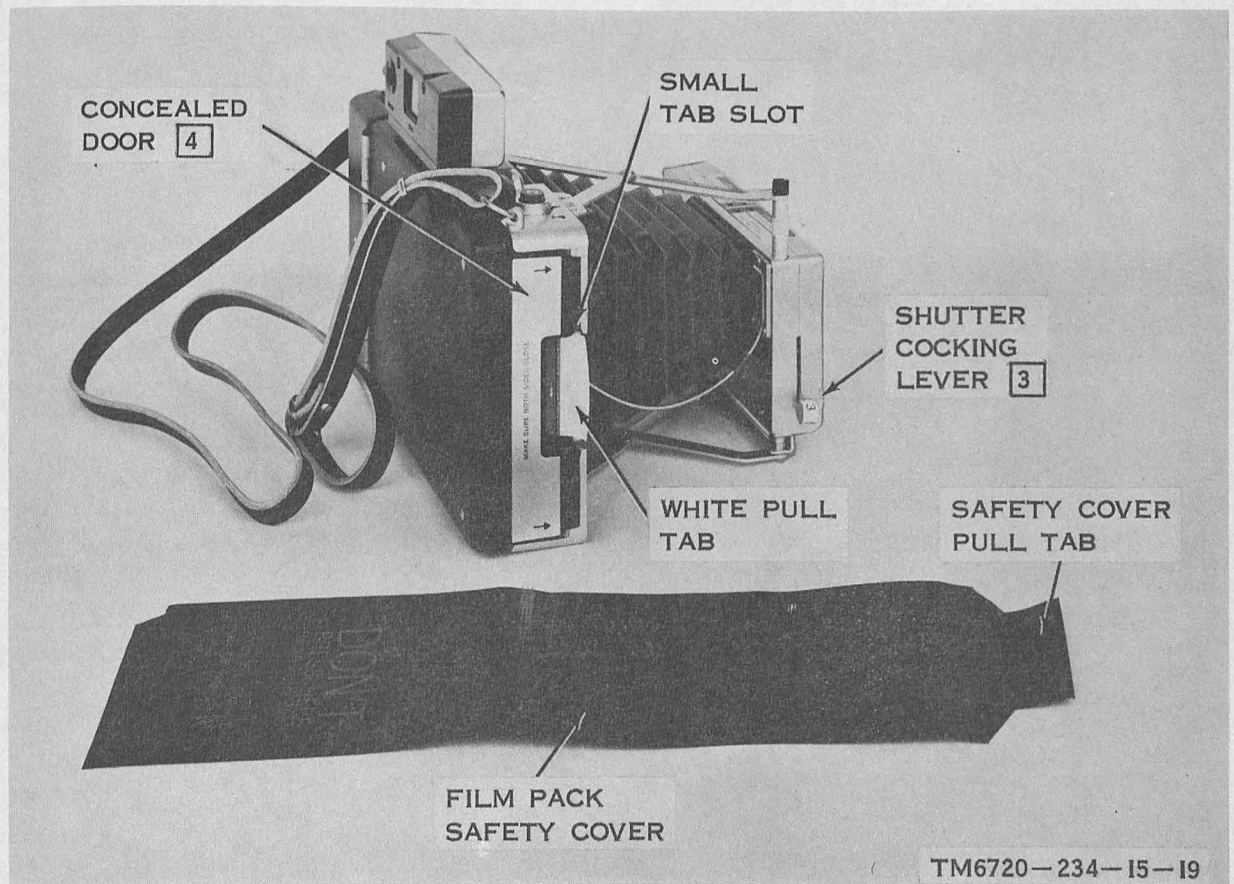
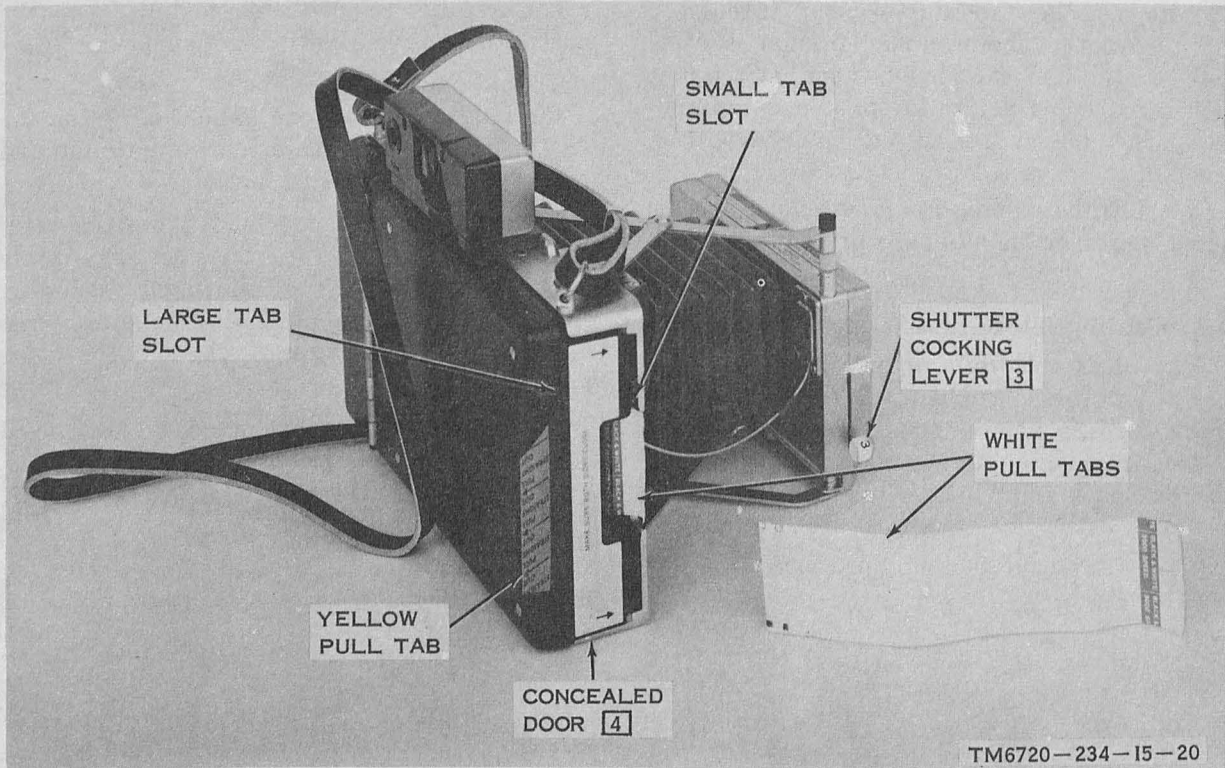


Figure 3-9. Camera, right side, with film pack safety cover removed.



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Figure 3-10. Camera, right side, with first white pull tab removed and yellow pull tab in position to start processing.

pleted, and the coater will feel dry. To replenish the supply of fluid on the face of the coater, press down on the plastic handle near the edge of the print. Spread the squeezed-out fluid evenly across the face of the print.

e. Set the coated prints aside to dry. Keep freshly coated prints separated from each other to avoid their sticking together.

3-8. Stopping Procedures

After the photographic mission is completed, stop the camera set as follows:

a. If the flashgun was used, disconnect the synch connector plug on the shutter connecting cable from the shutter synch outlet on the camera.

b. Press the release lever at the base of the flashgun, and remove the flashgun from the top of the camera.

c. Make sure that the flashgun is clean (para 4-7), and return the flashgun to the right-hand compartment in the carrying case.

d. Make sure that the last exposure made has been removed from the camera (paras 3-6m, q, r, and s) and that the camera is clean (para 4-7).

e. Gently apply pressure on the PRESS TO CLOSE arm, a part of the upper support brace assembly, to release the front standard assembly.

f. Fold the camera by pushing the knurled

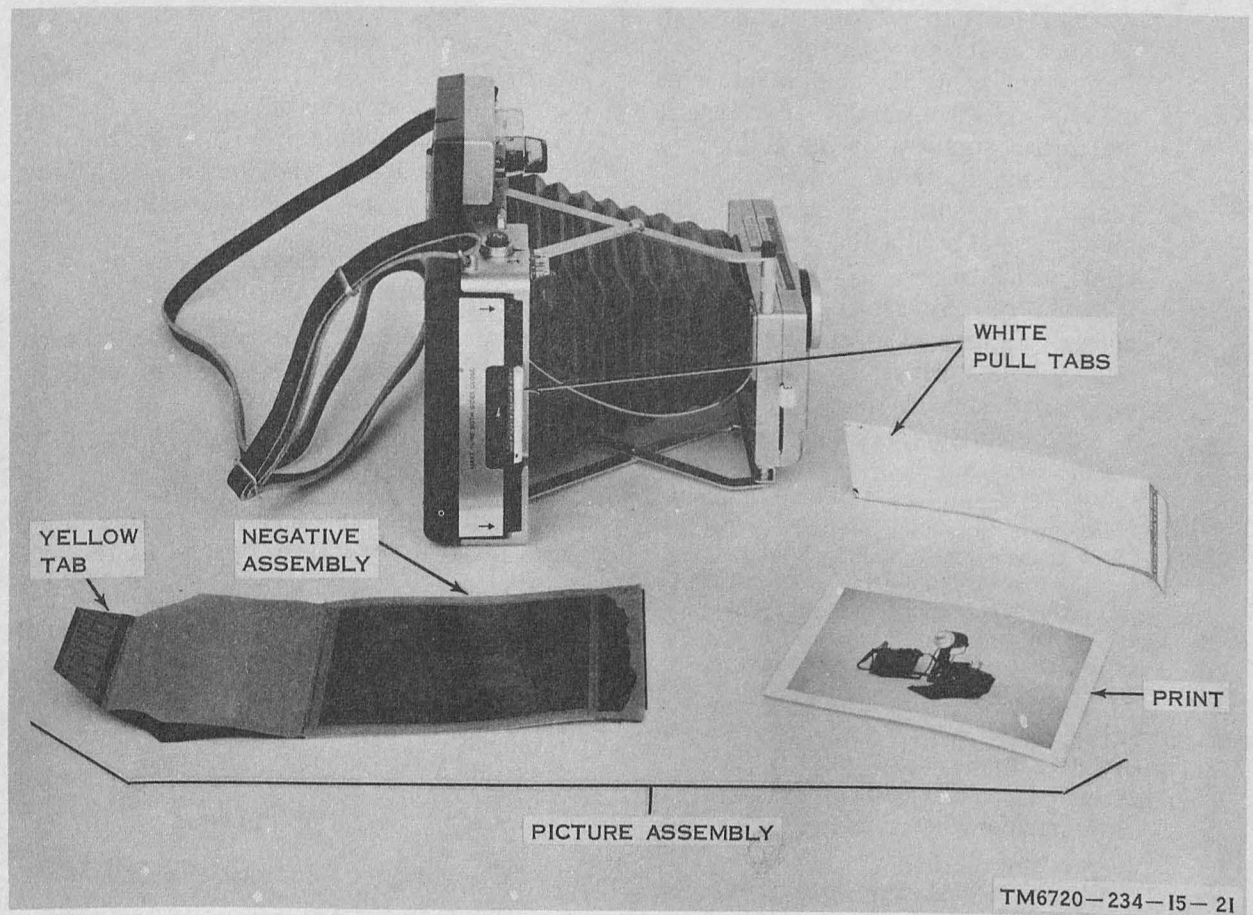


Figure 3-11. Camera with processed picture assembly.

pull bar toward the camera body until the front standard assembly locks in place.

g. Close the finder assembly by gently lift-

ing the rear of the finder assembly free of the bar magnet hold; fold the finder assembly into the camera and close the camera cover

Section IV. OPERATION UNDER UNUSUAL CONDITIONS

3-9. Operation at Low Temperatures

The camera set can be operated at near freezing temperatures providing the procedures in *a* and *b* below are observed.

a. Equipment to be operated at low temperatures should be stored at approximately

the same temperature as that in which it will be used. Avoid rapid changes in the equipment temperature. If the equipment is stored in a colder location than where it will be used, follow the procedures in (1), (2), and (3) below.

(1) Transfer the equipment from the low-temperature storage location to the

warmer location at least 6 hours in advance of its anticipated use.

- (2) Before operating the equipment, wipe off any moisture on the outer plastic and metal surfaces of the equipment with a soft, lint-free cloth.
- (3) Inspect the optical surfaces of the finder assembly and the lenses on the front standard assembly for moisture. If moisture is present on the exposed optical surfaces, clean the exposed optical surfaces with lens tissue dampened with lens cleaner. Dry the exposed optical surfaces with fresh lens tissue.

Note. If moisture has condensed on the inner surfaces of the optical components, allow the equipment to stand long enough for the moisture to evaporate. Moisture on the inner surfaces may be evaporated more rapidly by allowing the equipment to stand in a warm area. Temperature must not exceed +125° F.

b. When the camera set is to be operated at low temperatures, observe the following points:

- (1) Keep the equipment in low-temperature storage when it is not in use. Use precautions to prevent moisture from forming on the camera and flashgun parts, particularly on the optical assemblies.
- (2) Avoid breathing directly on the equipment while it is at low temperature.
- (3) Provide additional precautions and protection to the equipment while it is in storage to prevent exposure of the equipment to high humidity accompanied by freezing temperature.
- (4) Follow the cold weather directions in the instruction sheet (supplied by the manufacturer) packed with the film pack being used.

Note. Do not use the cold-clip to develop black-and-white pictures.

- (5) Use the cold-clip to develop color prints at near freezing temperatures (approximately 40° F). Keep the cold-clip warm by holding it in an inner clothing pocket, close to the body.

3-10. Operation in Desert Areas or in Dust-Laden Atmosphere

When the camera set is used in desert areas or other dust-laden atmosphere, observe the following precautions:

- a. Expose the equipment to dust-laden air for minimum lengths of time.
- b. Be sure that the flashgun is free of excessive dust before attaching it to the camera.
- c. Install the camera cover as soon as possible after each use of the equipment.
- d. Keep the camera and the flashgun in the carrying case at all times when the equipment is not in actual use.
- e. Check the equipment frequently to see if cleaning will be required.

3-11. Operation in Tropical Regions

When operating the camera set in tropical regions, observe the following precautions:

- a. Inspect the equipment daily for fungus, mites, and metal corrosion. Clean the equipment (para 4-7), and remove all fouling matter immediately.
- b. Keep the camera and flashgun in the carrying case when the equipment is not in use.
- c. When using the camera set, take additional precautions to prevent insects from entering the equipment. Do not leave the camera set exposed in insect-infested locations.

CHAPTER 4

OPERATOR'S MAINTENANCE INSTRUCTIONS

4-1. Scope of Operator's Maintenance

The maintenance duties assigned to the operator of the camera set are listed below, together with references to the paragraphs covering the specific maintenance functions. The duties assigned do not require materials other than those specified 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. Visual inspection and cleaning (para 4-7).
- d. Troubleshooting (para 4-8 and 4-9).

4-2. Materials Required for Operator's Maintenance

The following materials are required to perform the operator's preventive maintenance:

- a. Camel's-hair brush (FSN 8020-246-8806).
- b. Cleaning Compound (FSN 7930-395-9542).
- c. Lint-free cloth (FSN 8305-170-5062).
- d. Lens cleaner (FSN 6760-408-5175).
- e. Lens tissue (FSN 6640-393-2090).

4-3. Operator's Preventive Maintenance

Operator's 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 and operation of the equipment.

b. *Preventive Maintenance Checks and Serv-*

ices. The operator's preventive maintenance checks and services charts (paras 4-5 and 4-6) outline functions to be performed at specific intervals; however, if the equipment is used as part of a *set* or *system*, follow the procedures established in the *set* or *system* manual. These checks and services are to maintain Army equipment in a serviceable condition; that is, in good operating condition. To assist operators in maintaining serviceability, the charts indicate what to check, how to check, and the normal conditions; the *Reference* column lists the location of additional data on procedures. Records and reports of these checks must be made in accordance with the requirements set forth in TM 38-760.

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

Operator's preventive maintenance checks and services of the camera set are required daily and weekly.

a. Paragraph 4-5 specifies the checks and services that must be accomplished daily and under the following conditions:

- (1) When the equipment is initially installed.
- (2) When the equipment is reinstalled after removal for any reason.
- (3) At least once each week if the equipment is maintained in standby condition.

b. Paragraph 4-6 specifies checks and services that must be performed weekly. A week is defined as approximately 7 calendar days of 8-hour-per-day operation. If the equipment is operated more than 8 hours a day, the weekly maintenance interval should also be made to compensate for any unusual operating conditions. Equipment maintained in a *standby*

(ready for immediate operation) condition must have weekly maintenance. Equipment in limited storage (requires service before operation) does not require weekly maintenance.

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

Sequence No.	Item to be inspected	Procedure	Reference
1	Cleanliness -----	Check to see that equipment is clean-----	Para 4-7b.
2	Completeness -----	Check to see that equipment is complete-----	Para 1-6 and appx B.
3	Operation -----	During operation, be alert for any unusual operating conditions. Listen for unusual sounds from shutter assembly. Feel for binding or erratic operation of controls and rollers.	Para 3-6.

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

Sequence No.	Item to be inspected	Procedure	Reference
1	Camera cover (fig. 1-4) -----	Open camera cover by lifting upper part free of bar magnet's hold; allow camera cover to lay open. Gently press in on spring latch, and lift hinged clip free of camera body. Check to see that camera cover is not damaged and is easily removed from the camera body.	Para 4-7.
2	Finder assembly (viewfinder portion).	Raise finder assembly to its operating position. Sight nearby subject through VIEW window. Check to see that finder assembly raises easily, bar magnet holds finder assembly firmly in operating position, and subject imaged in VIEW window is sharp and clear.	
3	Front standard assembly ----	Gently lift up on right focusing pushbutton 1 to release front standard assembly. Pull out on the knurled pull knob until front standard assembly locks in extended position. Check to see that front standard assembly releases, pulls out smoothly, and locks in extended position.	
4	Focusing pushbuttons 1 (fig. 3-1).	Operate focusing pushbuttons. Check to see that focusing buttons move smoothly from side-to-side and front standard assembly moves in and out without binding.	
5	Finder assembly (rangefinder portion).	Sight nearby subject through FOCUS window; operate focusing pushbuttons 1. Image seen in FOCUS window has bright spot in center and is seen double. When focusing pushbuttons 1 are moved, multiple image in bright spot comes together and superimposes when point of focus is reached. Images in bright spot should come together smoothly, without jumping, and superimpose.	
6	Exterior surfaces (fig. 1-1)---	Inspect and clean camera, flashgun, cold-clip, and carrying case.	
7	Electrical wiring and connectors.	Check all exposed electrical wiring and connectors on the flashgun and camera for worn, cracked, broken, and frayed areas. Have defective electrical wiring and plugs repaired or replaced by higher category maintenance personnel.	

4-7. Visual Inspection and Cleaning

Visual inspection and cleaning will save time and may also avoid further damage to the camera set. When the equipment fails to perform properly, check for the possible defects in *a* below. If necessary, have defective parts repaired (or replaced) as soon as possible by appropriate maintenance personnel. Clean the camera set as directed in *b* below as often as it is necessary.

a. Visual Inspection. Make a general visual inspection of the camera set; check for obvious defects as follows:

- (1) Check the camera set controls for damaged or inoperative condition.
- (2) Check the condition of the bellows (fig. 4-1). Make sure it is free of foreign matter and not frayed, torn, or creased outside the normal folds.
- (3) Check the tension on the pressure and retaining springs.
- (4) Check the surfaces of the concealed door 4 and the rollers to see that they are not bent, dented, or worn.
- (5) Check the condition of the shutter connecting cable (on the flashgun) and the shutter cable release and shutter electrical cable (on the camera); check for signs of deterioration, breaks, and worn spots.
- (6) Check the optical surfaces for any chipped, cracked, scratched, or dirty condition.

b. Cleaning.

- (1) Remove loose dirt from metal surfaces with a clean, dry cloth.
- (2) Remove dirt from hard-to-reach surfaces with a brush.

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.

Caution: Do not allow cleaning compound to come in contact with the bellows optical surfaces or the plastic parts of the camera set. Use cleaning compound sparingly.

- (3) Remove grease, fungus, and ground-in dirt from the exterior metal surfaces; use a clean, lint-free cloth dampened with Cleaning Compound. Dry-wipe the cleaned areas.
- (4) Dust the bellows and plastic parts of the camera set.
- (5) Clean the bellows and plastic parts of the camera with a clean, lint-free cloth dampened with water, and wipe dry.

4-8. Operator's Troubleshooting Information

The troubleshooting chart (para 4-9) helps the operator to find and correct certain troubles. The troubles and corrective measures listed are those the operator can accomplish. If the corrective measures suggested do not restore normal equipment performance, do not attempt to disassemble the defective camera set component. Note on the repair tag what corrective measures were taken, how the equipment performed at the time of failure, and refer the equipment to the next higher category of maintenance for repair.

4-9. Operator's Troubleshooting Chart

The following chart lists the trouble symptom, probable trouble, and corrective measures that are common to both black-and-white and color prints.

Trouble symptom	Probable trouble	Checks and corrective measures
Print is white and has no perceptible image, or print is white and image very faint.	Print is lightstruck or severely overexposed; check for the following: <i>a.</i> Safety cover removed from film pack before film pack was installed.	<i>a.</i> Reload new film pack in camera properly (para 3-3).

Trouble symptom	Probable trouble	Checks and corrective measures
Print is black and has no perceptible image, or print is black and image very faint.	<ul style="list-style-type: none"> b. Incorrect setting of FILM SPEED control. c. Film pack removed from camera----- 	<ul style="list-style-type: none"> b. Reset FILM SPEED control (para 3-6c) to match speed of film pack in use. c. Do not remove film pack from camera once safety cover is pulled out.
Prints are all light (overexposed).	<ul style="list-style-type: none"> a. Shutter did not open; shutter cocking lever 3 not cocked. b. Front standard not pulled out to its limit. c. Battery in camera defective----- 	<ul style="list-style-type: none"> a. Make sure that shutter cocking lever 3 is cocked all the way. b. Pull out front standard until it locks in extended position. c. Replace camera battery (para 4-10).
Prints are all dark (underexposed).	<ul style="list-style-type: none"> a. Incorrect setting of L/D control----- 	<ul style="list-style-type: none"> a. Refer to film pack manufacturer's instruction sheet, and set L/D control as recommended. If already set to recommended setting adjust L/D control toward DARKEN until desired result is obtained.
Light or discolored areas show along the edges and/or corners of the print.	<ul style="list-style-type: none"> b. Incorrect setting of FILM SPEED control. a. Incorrect setting of L/D control----- 	<ul style="list-style-type: none"> b. Reset FILM SPEED control to match speed of film pack in use.
Rectangular light area runs through most of the center of the print.	<ul style="list-style-type: none"> a. Refer to film pack manufacturer's instruction sheet, and set L/D control as recommended setting, adjust L/D control toward LIGHTEN until desired result is obtained. b. Incorrect setting of FILM SPEED control. c. Shutter connecting cable from flashgun connected to shutter synch outlet while non-flash pictures were made. 	<ul style="list-style-type: none"> a. Refer to film pack manufacturer's instruction sheet, and set L/D control as recommended setting, adjust L/D control toward LIGHTEN until desired result is obtained. b. Reset FILM SPEED control to match speed of film pack in use. c. Disconnect flashgun shutter connecting synch outlet when non-flash pictures are made.
Repeated white spots show running evenly spaced through print.	<ul style="list-style-type: none"> Yellow pull tab not pulled out of the camera straight, causing uneven development. 	<ul style="list-style-type: none"> Pull yellow pull tab out of camera straight and swiftly.
Many white specks show on print.	<ul style="list-style-type: none"> White pull tab was not completely removed from the camera and is withdrawn back into the camera when the yellow pull tab is pulled. 	<ul style="list-style-type: none"> Pull white pull tab straight and completely out of camera.
Prints are muddy looking: black-and-white prints appear dull gray and lack contrast; color prints appear brownish-pink overall.	<ul style="list-style-type: none"> Dirt or foreign matter on rollers----- 	<ul style="list-style-type: none"> Inspect and clean (para 4-7) rollers each time new film pack is inserted in camera.
Light streamers from sources of light show in the picture area.	<ul style="list-style-type: none"> Yellow pull tab pulled excessively fast-- 	<ul style="list-style-type: none"> Pull yellow tab slightly slower.
	<ul style="list-style-type: none"> Print underdeveloped ----- 	<ul style="list-style-type: none"> Develop print for full time recommended in film pack manufacturer's instruction sheet. In case of color prints, use cold-clip when ambient temperature falls below 65° F (183° C).
	<ul style="list-style-type: none"> a. Lighting selector incorrectly set when photoflash lamp was used, causing camera to make secondary 	<ul style="list-style-type: none"> a. Reset lighting selector to reflect correct lighting condition.

Trouble symptom	Probable trouble	Checks and corrective measures
<p>Corners and/or edges of print are very dark. U-shaped white area appears on print.</p>	<p>time exposure, during which time camera or light source in picture area moved.</p> <p>b. Lighting correctly set for photoflash use, but lamp-to-subject distance excessive, causing camera to make secondary time exposure, during which time camera or light source in picture area moved.</p> <p>Lighting selector incorrectly set-----</p> <p>a. White pull tabs folded under when film pack was loaded in camera.</p> <p>b. Yellow pull tab pulled too slowly-----</p> <p>c. Dirt or foreign matter on ends of rollers.</p> <p>d. Right end of camera squeezed while yellow pull tab was being pulled out.</p>	<p>b. Move camera (with flashgun attached) in closer to subject, or arrange secondary lighting so that it is out of picture area, and make another exposure.</p> <p>Reset lighting selector to correctly to reflect lighting condition.</p> <p>a. Load film pack in camera correctly (para 3-3).</p> <p>b. Pull yellow pull tab swiftly and straight out of camera.</p> <p>c. Clean rollers (para 4-7).</p> <p>d. Do not obstruct large and small tab slots while pulling white or yellow pull tabs out of the camera. Pull tabs swiftly and straight out.</p>
<p>Photoflash lamp (when flash pictures are being taken) does not fire.</p>	<p>a. Defective photoflash lamp-----</p> <p>b. Shutter connecting cable from flashgun not connected to shutter synch outlet.</p> <p>c. Defective flashgun -----</p>	<p>a. Install new photoflash lamp.</p> <p>b. Connect shutter connecting cable to shutter synch outlet.</p> <p>c. Refer flashgun to higher category of maintenance.</p>

4-10. Replacing Camera Battery

To replace the battery in the camera proceed as follows:

a. Open the battery compartment cover (fig. 3-5) by placing the tip of the thumb in the

thumbnail recess; pull out on the battery compartment cover.

b. Carefully unsnap the black (—) and white (+) battery connectors (fig. 4-2) from the terminals on the ends of the battery, and move them to one side.

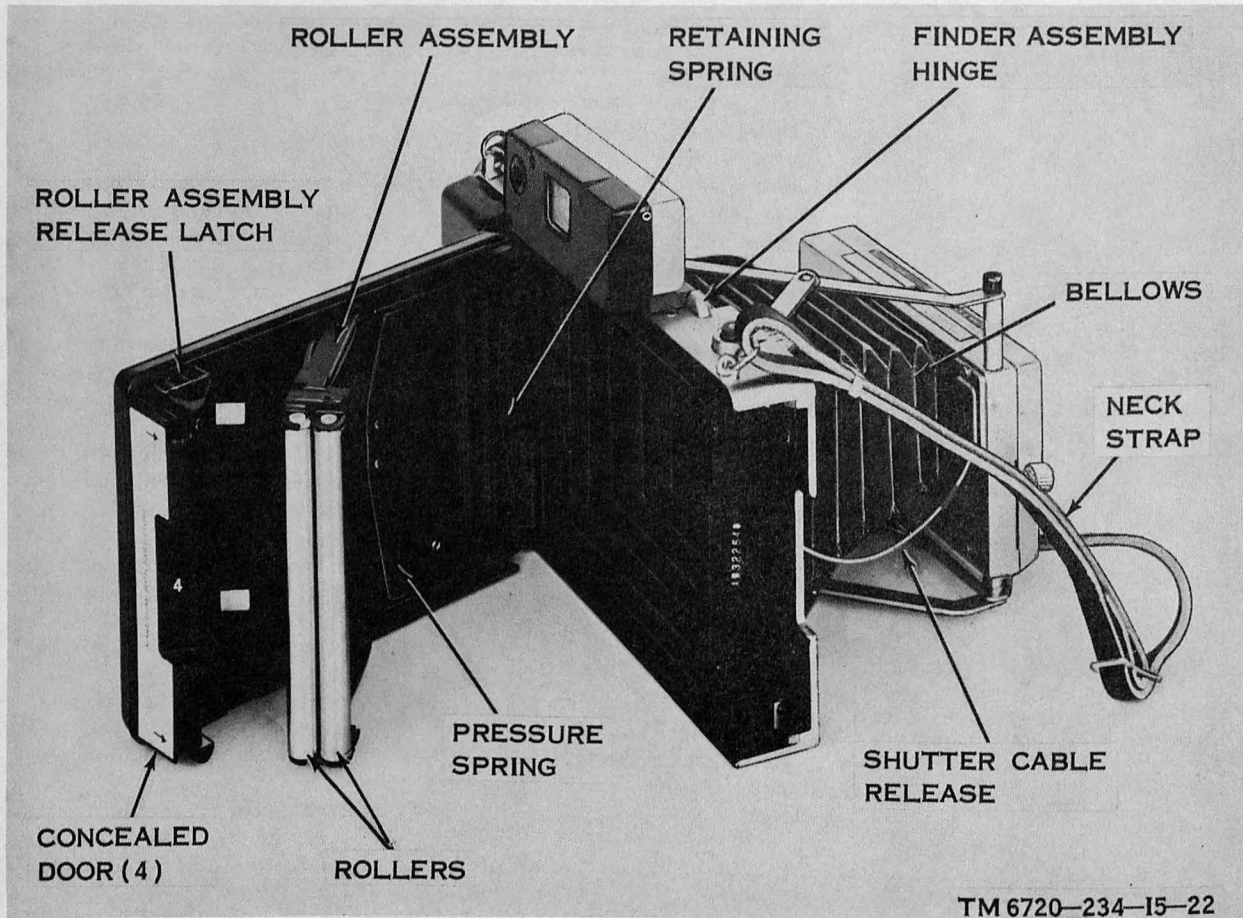


Figure 4-1. Camera, camera back cover open.

c. Note the position of the battery in the battery compartment; gently snap the battery out of the battery holder.

d. Install the new battery in the battery holder so that it rests in the position noted in c above.

e. Connect the white (+) battery connector to the positive terminal of the battery and the black (-) battery connector to the negative terminal of the battery.

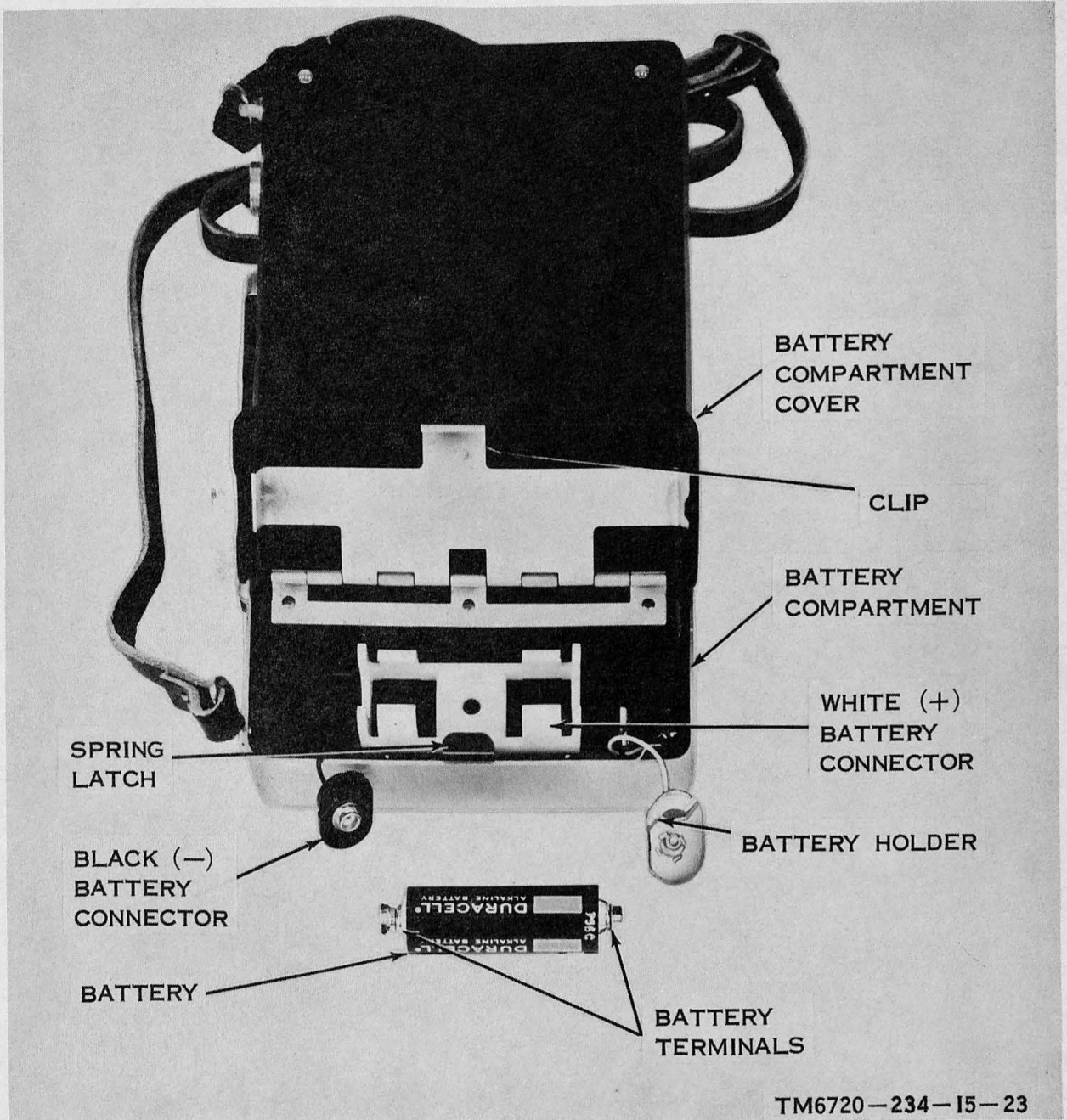


Figure 4-2. Battery removed from camera.

f. Dress the wires, attached to the battery connectors, inside the battery compartment so that they do not become pinched when the battery compartment cover is closed.

g. Close the battery compartment cover; make sure that the clip engages the spring latch and snaps into place.



CHAPTER 5

ORGANIZATIONAL MAINTENANCE INSTRUCTIONS

5-1. Scope of Organizational Maintenance

The maintenance duties assigned to the organizational repairman of the camera set are listed below, together with references to the paragraphs covering the specific maintenance functions. The tools and test equipment required are specified in paragraph 5-2.

- a. Monthly preventive maintenance checks and services (para 5-5).
- b. Organizational troubleshooting (para 5-6).
- c. Organizational repairs, adjustments, and replacement of parts (paras 5-7 through 5-9).

5-2. Tools, Materials, and Test Equipment Required for Organizational Maintenance

In addition to the materials required for operator's maintenance (para 4-2), the following items are required for organizational maintenance:

- a. Tool Kit, Photographic Repairman TK-77/GF.
- b. Multimeter AN/URM-105.
- c. Cable release tool, Polaroid CR169449.

5-3. Organizational Preventive Maintenance

a. Organizational preventive maintenance is the systematic care and servicing of equipment to maintain it in serviceable condition, prevent breakdowns, and assure maximum operational capability. Preventive maintenance is the re-

sponsibility of all personnel concerned with the equipment and includes the inspection, testing, and repair or replacement of parts that inspection and tests indicate would probably fail before the next scheduled periodic service. Preventive maintenance checks and services of the camera set at the organizational maintenance category are made at monthly intervals unless otherwise directed by the commanding officer. The preventive maintenance checks and services should be scheduled concurrently with the operator's daily (para 4-5) and weekly (para 4-6) preventive maintenance checks and services.

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

5-4. Organizational Monthly Preventive Maintenance

Perform the maintenance functions indicated in the monthly preventive maintenance checks and services chart (para 5-5) once each 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* condition must have monthly preventive maintenance checks and services performed on it. Equipment in *limited storage* does not require monthly preventive maintenance.

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

Sequence No.	Item to be inspected	Procedure	Reference
1	FILM SPEED control (fig. 4-2).	Rotate FILM SPEED control through its range of film speed stops. Check to see that FILM SPEED control rotates easily and comes to definite stop in each detent position. Aperture opening should be centered in lens and FILM SPEED dial marking centered and clearly visible below lens.	
2	Lighting selector control-----	With lighting selector control in left position (in the direction of the lens) to start, move lighting selector control to right (away from lens). Check to see that lighting selector control moves with minimum of resistance, aperture seen in lens is changed to smaller opening, and lighting selector indicator in lighting selector shifts to alternate position.	
3	Shutter cocking lever 3-----	Cock the shutter by pressing shutter cocking lever 3 down as far as it will go. Check to see that shutter cocks and shutter cocking lever 3 remains in down position.	
4	Concealed door 4-----	Operate concealed door 4. Check to see that concealed door moves easily on its pivots.	
5	Back cover release (fig. 1-4)---	Move back cover release in direction of tripod socket. Check to see that back cover release moves without binding and camera back cover (fig. 3-3) opens.	
6	Door hinge-----	Open camera back cover fully. Check to see that door hinge does not bind and is firmly attached to end of camera back cover.	
7	Pressure spring and retaining spring.	Press in on ends of pressure spring and retaining spring. Check to see that springs are firmly secured and spring back to original shape when pressure is released.	
8	Roller assembly (fig. 4-1)-----	Gently lift up on roller assembly release latch until roller assembly is freed. Check to see that roller assembly swings out and rollers are clean, move without binding, and are free of damage and foreign matter.	
9	Roller assembly release latch---	Move roller assembly into camera back and into operating position. Check to see that it is held securely by roller assembly release latch.	
10	Camera back cover-----	Close camera back cover. Check to see that camera back cover closes easily and both sides latch securely.	
11	Battery compartment cover (fig. 4-2).	Open battery compartment cover. Battery compartment cover should open against stiff resistance of clip against spring latch.	
12	Battery -----	Check condition of battery and its installation. Make sure that battery does not leak or bulge, that battery is securely held in battery holder, and that the black and the white battery connectors are connected to their respective battery terminals.	
13	Clip and spring latch-----	Close battery compartment cover. Check to see that battery compartment cover closes easily and is held securely by spring latch and clip.	
14	Flashgun -----	Install flashgun on camera, and connect synch connector plug to shutter synch outlet. Check to see that flashgun installs easily and synch connector plug fits firmly in shutter synch outlet.	Para 3-4.

Sequence No.	Item to be inspected	Procedure	Reference
15	Reflector assembly (fig. 1-8)---	Rotate reflector assembly through its range of rotation. Check to see that reflector assembly rotates easily and reflector detent (fig. 1-9) positions reflector assembly in each operating position.	
16	Blue filter shield (fig. 1-8)-----	Carefully open blue filter shield to its maximum open position. Check to see that blue filter shield operates easily and is firmly attached at its hinged pivot point and that pivot stop tabs are not broken or cracked.	
17	Flashlamp receptacle-----	Insert a photoflash lamp in flashlamp receptacle. Check to see that photoflash lamp installs easily and is held firmly in flashlamp receptacle.	
18	Ejector button (fig. 1-9)-----	Press in on ejector button. Check to see that ejector button operates easily and photoflash lamp ejects from flashlamp receptacle.	
19	Release lever (fig. 1-9)-----	Press release lever; remove flashgun and return it to carrying case. Check to see that release lever operates easily and frees flashgun from camera.	
20	PRESS TO CLOSE arm (fig. 3-1).	Gently press PRESS TO CLOSE arm, and close camera. Check to see that PRESS TO CLOSE arm operates easily and releases front standard assembly, allowing camera to be folded.	
21	Shutter release button 2 (fig. 3-1).	Press shutter release button 2. Shutter assembly operates; shutter blades seen through lens do not open, indicating normal break in shutter electrical circuit when camera is folded.	
22	Camera cover and finder assembly.	Install camera cover (fig. 1-4) on bottom edge of camera body; carefully rotate finder assembly to front of camera and close camera cover. Check to see that spring latch holds hinged clip on camera securely, finder assembly folds into camera after bar magnet hold is broken, and camera cover is held in closed position by same bar magnet (fig. 3-5) used to hold finder assembly in operating position.	

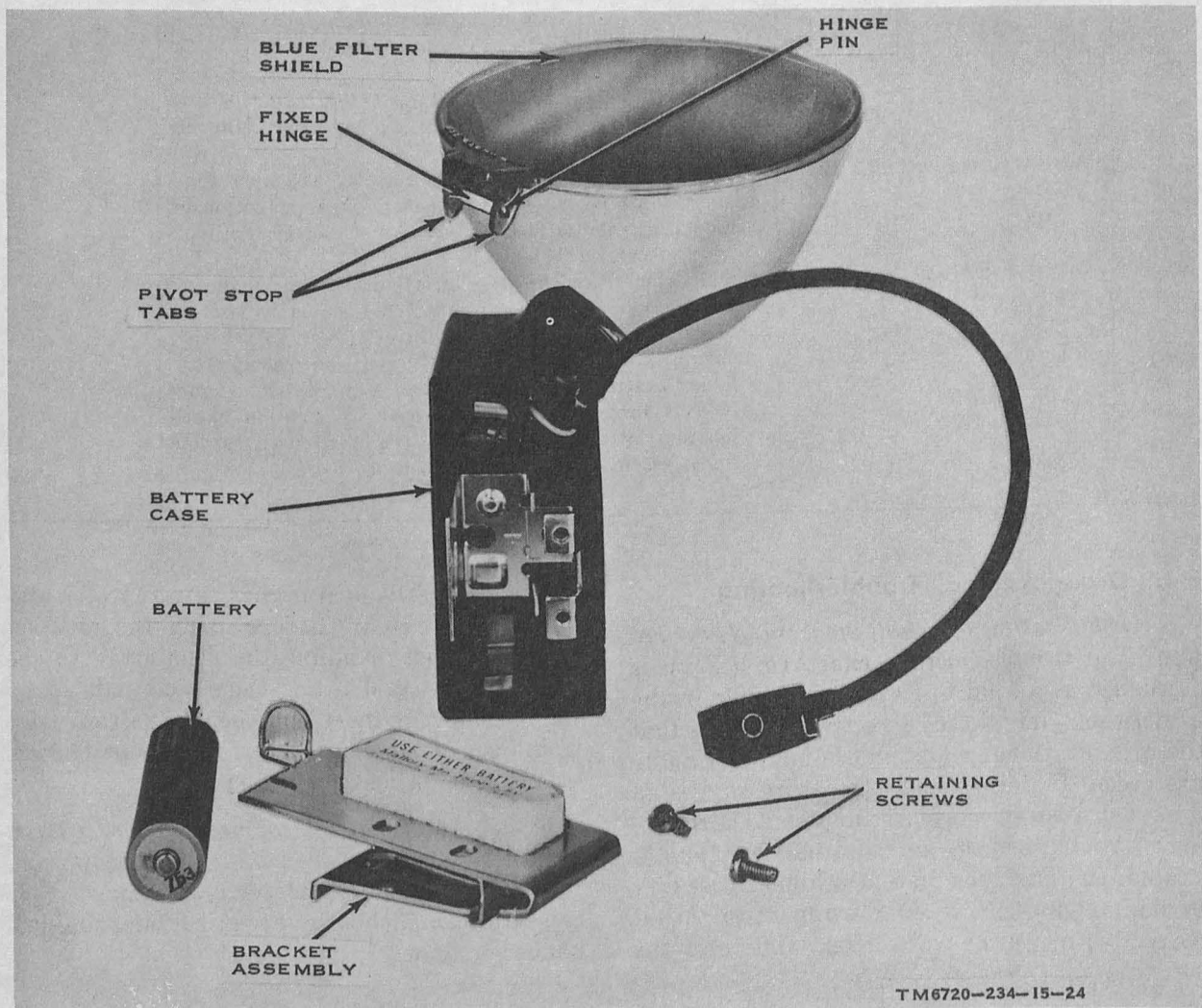
5-6. Organizational Troubleshooting

a. Organization Troubleshooting Information. The troubleshooting chart (*b* below) is furnished as an aid in localizing trouble in the camera set. Only those corrective measures that the organizational maintenance man can apply are given. If the corrective measure suggested does not restore normal equipment performance, troubleshooting is required by a photographic maintenance man at a higher category of maintenance. Note on the repair tag what corrective measures were taken, and refer the

equipment to the next higher category of maintenance for repair. Before using the troubleshooting chart, examine the repair tag to see whether the trouble has been sectionalized by the operator. If there has been no sectionalization, inspect the equipment for obvious defects before attempting to operate it.

b. Organizational Troubleshooting Chart. The following chart lists the trouble symptom, probable trouble, and corrective measures that can be accomplished by organizational maintenance personnel.

Item No.	Trouble symptom	Probable trouble	Checks and correction measures
1	Rangefinder portion of finder assembly is inoperative or inaccurate.	a. Obstruction between focusing cam lever (fig. 3-8) and focus bar bracket. b. Rangefinder mechanism of finder assembly defective.	a. Remove obstruction from focusing cam lever. b. Refer equipment to higher category of maintenance for repair.
2	Flashgun is inoperative or defective.	a. Defective flashgun battery. b. Break in electrical circuit continuity. c. Defective flashgun.	a. Replace flashgun battery (para 5-8). b. Remove flashgun battery, and check continuity of electrical circuit. Use low ohms scale of Multimeter AN/URM-105, and repair break in continuity. c. Refer equipment to higher category of maintenance for repair.



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Figure 5-1. Flashgun, partially disassembled.

5-7. Organizational Repairs, Adjustments, and Replacement of Parts

a. Organizational maintenance includes the repair, adjustment, or replacement of parts (listed in TM 11-6720-234-24P) for which the authorized tools, test equipment, and spare parts have been made available. All other items needing repair or replacement must be handled at a higher category of maintenance.

b. When replacing an electrical component or making electrical repairs, tag all disconnected leads; refer to the information on the tagged leads for connection information before reconnecting loose leads.

5-8. Replacing Flashgun Battery

(fig. 5-1)

Install a new battery in the flashgun (when required) as follows:

a. Make sure that the flashgun is removed and disconnected from the camera.

b. Remove the retaining screws that secure the battery compartment cover (bracket assembly) to the battery case.

c. Note the polarity position of the battery, and remove the battery from the battery compartment.

d. Install the new battery in the position noted in *c* above.

e. Install the bracket assembly on the battery case, and secure it with the retaining screws removed in *b* above.

5-9. Blue Filter Shield Replacement

(fig. 5-1)

To replace the blue filter shield on the flashgun proceed as follows:

a. Remove the flashgun from the camera, and close the blue filter shield.

b. Carefully drive out the hinge pin.

c. Remove the defective blue filter shield from the reflector assembly.

d. Position the new blue filter shield so that the fixed hinge is between the pivot stop tabs on the blue filter shield.

e. Line up the holes in the pivot stop tabs and the fixed hinge; carefully reinsert the hinge pin removed in *b* above.



CHAPTER 6

DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE

6-1. Mechanical Functioning

The shutter assembly is a between-the-lens guillotine-type shutter that includes two shutter blades (a closing blade and an opening blade) that control the light reaching the negative of the print assembly. The closing blade is shorter and is positioned behind the FILM SPEED control (aperture wheel). The opening blade has a circular cutout and is positioned directly behind the closing blade. The aperture wheel has four sets of two openings that correspond to four film speeds (3000, 300, 150, and 75). Positioning of the lighting selector control determines which of the two apertures will be in the light path for a given film speed

setting. Before the shutter is cocked, the closing blade is in front of the circular opening of the opening blade and prevents the light path from reaching the film plane. When the shutter is cocked, the cocking lever is manually moved downward. This action draws both shutter blades in the direction of an electromagnet where a latch holds both shutter blades in the cocked position. At this point, the longer opening blade prevents the light path from reaching the film plane. When the shutter button is depressed, two things happen: battery switch S1 (para 6-2) closes, and the latch holding the shutter blades releases both shutter blades. The opening blade moves forward, opening the shutter, to permit the light path to reach the film

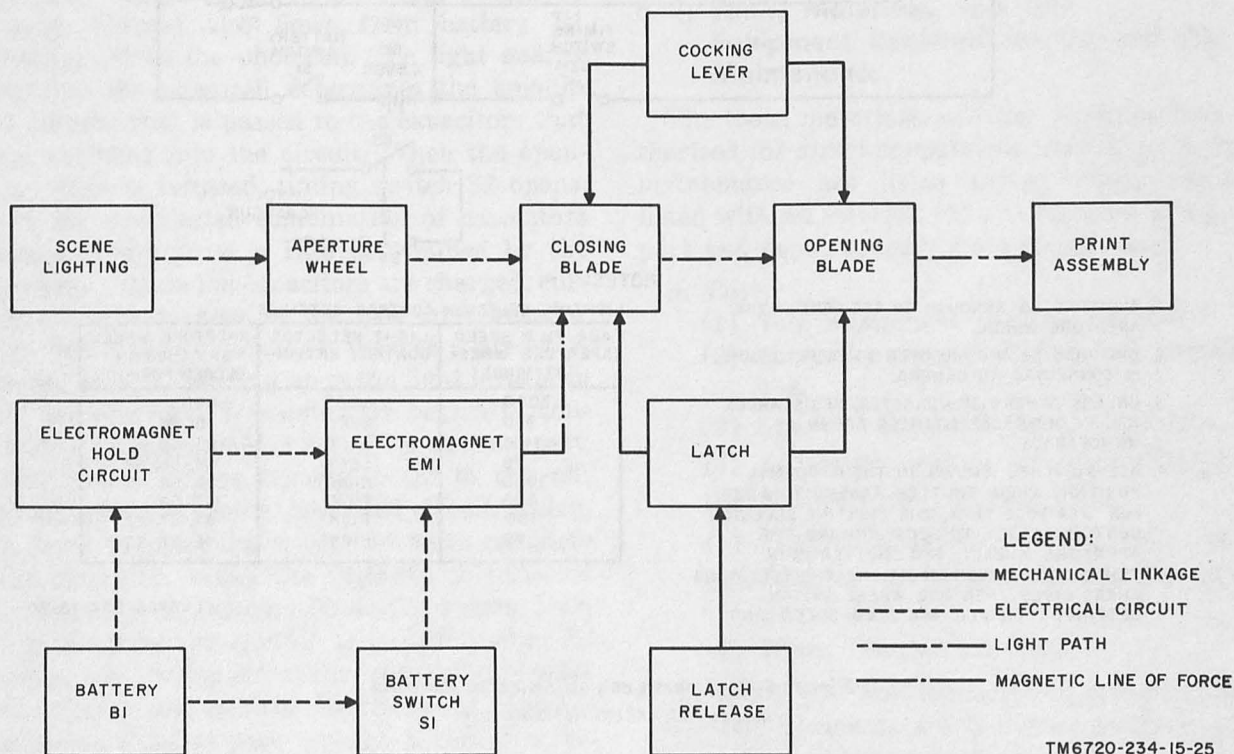
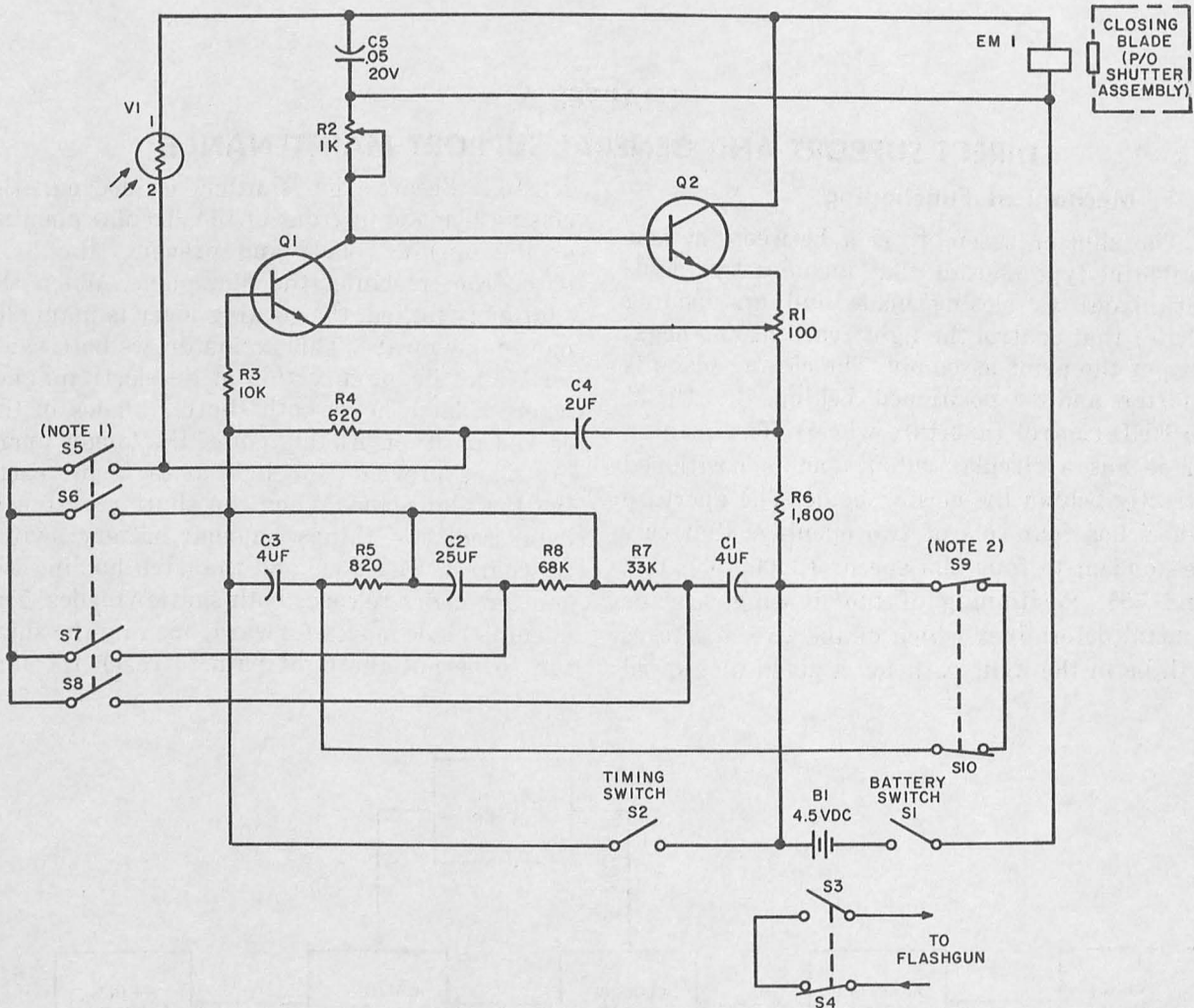


Figure 6-1. Shutter assembly, mechanical functioning block diagram.



NOTES:

1. SWITCHES S5 THROUGH S8 ARE PART OF THE APERTURE WHEEL.
2. SWITCHES S9 AND S10 OPEN WHEN FLASHGUN IS CONNECTED TO CAMERA.
3. UNLESS OTHERWISE INDICATED, RESISTANCES ARE IN OHMS; CAPACITANCES ARE IN MICROFARADS.
4. ALL SWITCHES SHOWN IN THEIR NORMAL POSITION WHEN SHUTTER ASSEMBLY IS SET FOR ASA 3000 FILM, THE LIGHTING SELECTOR CONTROL IS SET TO LEFT (TOWARD THE APERTURE WHEEL), AND SHUTTER IS IN TRIPPED (UNCOCKED POSITION). THE FOLLOWING CHART GIVES APERTURE WHEEL SWITCH SETTINGS FOR ALL ASA FILM SPEED AND

LIGHTING SELECTOR CONTROL SETTINGS:

ASA FILM SPEED (APERTURE WHEEL SETTING)	LIGHT SELECTOR CONTROL SETTING	APERTURE WHEEL SWITCHES IN CLOSED POSITION
3000	LEFT	NONE
300	LEFT	S5, S8
150	LEFT	S5, S8
75	LEFT	S5, S6, S8
3000	RIGHT	S5, S8
300	RIGHT	S7, S8
150	RIGHT	S5, S7, S8
75	RIGHT	S5, S7, S8

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Figure 6-2. Camera set, still picture Polaroid model 100, schematic diagram.

plane, and the closing blade remains behind, being held by an electromagnet, to close at a later time. How this length of time is deter-

mined is discussed in paragraph 6-2. After the electromagnet hold circuit is broken, the closing blade is driven forward by a spring to

its normally closed position. This action cuts off the light path to the film plane, completing the exposure.

6-2. Electrical Functioning

When the shutter is cocked, timing switch S2 closes, bypassing capacitors C1 through C4. Also, at this time, the timing circuit, made up of different combinations of capacitors C1 through C4 (selected by the rotary switching action of the aperture wheel) and the photocell, is set up. When the shutter release button is pressed, battery switch S1 closes, completing the circuit from the 4.5-volt battery B1 to electromagnet EM1. The electromagnet hold circuit (consisting of transistor Q2, battery switch S1, electromagnet EM1, and battery B1) energizes electromagnet EM1, which, in turn, holds the closing blade in the cocked position. The length of time the closing blade is held in the cocked position is determined by the combination of capacitors in the timing circuit and the average scene light level monitored by the photocell. With battery switch S1 closed, current also flows from battery B1 through S1 to the photocell. The light energy striking the photocell determines the amount of current that is passed to the capacitors that are switched into the circuit. When the opening blade is released, timing switch S2 opens, and the preselected combination of capacitors begin to charge at a rate determined by the photocell. After the capacitors are charged, current begins to flow in the base of transistor Q1. When the current flow reaches a predetermined level, depending upon the light level seen by the photocell, transistor Q1 begins to conduct, robbing transistor Q2 of its base current. This action causes transistor Q2 to cut off, breaking the electromagnet hold circuit, which, in turn, releases the closing blade to complete the exposure. When the flashgun is installed on the camera, switches S9 and S10 open. During the time the shutter is cocked switch S3 closes and switch S4 opens. After the shutter is tripped the opening blade moves forward allowing light to pass through the shutter assembly. At the same time switch S4 closes completing the flashgun circuit. After the closing blade is released the shutter closes and

switch S3 opens until the shutter is again cocked and the operation is repeated for the next exposure.

6-3. General Instructions

a. Troubleshooting, at the direct support (DS) and general support (GS) maintenance categories, includes all the techniques outlined for organizational maintenance and any special or additional techniques required to isolate a defective part. The direct support and general support maintenance procedures are not complete in themselves but supplement the procedures described in organizational maintenance. The systematic troubleshooting procedure, which begins with the operational and sectionalization checks performed at an organizational maintenance category, must be completed by further localizing and isolating techniques.

b. Troubleshooting may be performed while the camera set is in operation, if necessary, to trace faults that could not be seen or heard when the unit is idle.

6-4. Tools, Materials, and Test Equipment Required for DS and GS Maintenance

The tools, materials, and test equipment authorized for direct support and general support maintenance are listed below. Those items listed with an asterisk (*) are for general support and depot support maintenance only.

a. Tools.

- (1) Tool Equipment Kit TK-109/GF.
- (2) *Lens focusing tool, Polaroid CR169452.
- (3) Special wrench, Polaroid CR169456.
- (4) Adjusting wrench, Polaroid CR1004.
- (5) *Speed tester, Polaroid 100.
- (6) "Universal collimator, Polaroid 100.
- (7) *Cobbler soldering iron, Air Vac Mill Fort Conn.
- (8) Bipax Tra-Con BA-2122.

b. *Materials.* The necessary cleaning materials and lubricants are the same as those required for organizational maintenance (para 5-2).

c. *Test Equipment.* Multimeter TS-352/U.



CHAPTER 7 DEPOT MAINTENANCE

Section I. GENERAL

7-1. Depot Rebuild Operations

Complete rebuild of Camera Set, Still Picture Polaroid Model 100 and/or its individual components will be accomplished by depot maintenance facilities when authorized by Headquarters, Department of the Army. Rebuild action includes all repair, rebuild, and replacement operations necessary to make the equipment equivalent to new material and suitable for return to DA supply system stocks for reissue to using organizations. Detailed procedures for accomplishing the repairs and adjustments established in preceding portions of this manual, and such additional repair and rebuild operations as deemed necessary, will be

established by the facility performing the work. Paragraphs 7-3 and 7-4 establish the requirements that *must be met* by *rebuilt* or *repaired* equipment before it is returned to DA supply system stocks.

7-2. Depot Tools, Materials, and Test Equipment Required

The tools, materials, and test equipment authorized for depot maintenance and for use in performing the depot overhaul standards are the same as those listed in paragraph 6-4. In addition, a fresh black-and-white film pack is required to perform the operational check of the camera set.

Section II. DEPOT OVERHAUL STANDARDS

7-3. Applicability of Depot Standards

The test outlined in paragraph 7-4 is designed to measure the performance capability of a repaired equipment. Equipment that is to be returned to stock should meet the standards given in this test.

a. Repair Standards. Applicable procedures of the Army depots performing these tests and the general standards for repaired electronic equipment given in TB SIG 355-1, TB SIG

355-2, and TB SIG 355-3 form a part of the requirements for testing this equipment.

b. Modification Work Orders. Perform all modification work orders pertaining to this equipment before making the tests specified. DA Pam 310-4 lists all available MWO's.

7-4. Tests

Make a complete overall operational check of the camera set. Follow the procedures described in paragraphs 3-5, 3-6, and 3-7.



CHAPTER 8

SHIPMENT AND LIMITED STORAGE AND DEMOLITION TO PREVENT ENEMY USE

Section I. SHIPMENT AND LIMITED STORAGE

8-1. Preparation for Storage

Prepare the camera set for packaging as follows:

- a. Check to be sure that the camera set is clean (para 4-7).
- b. Perform the stopping procedures (para 3-8).

8-2. Repacking Camera Set for Shipment or Limited Storage (fig. 2-1)

Normally, equipment that is to be shipped for use by other personnel or activities is packaged by organizational personnel. Equipment to be shipped under this condition, therefore, should be referred to organizational personnel. However, if the equipment is to be transported over a short distance (under the control of the using unit) for immediate use, perform the procedures in *a* through *f* below.

a. Open the carrying case to reveal the stored components (fig. 1-2).

b. Check to insure that all components are secured by the spring clips, straps, and catches provided within the case.

c. Fill all spaces between the components in the carrying case with any material capable of absorbing the shock encountered in handling and transit (cloth, rolled-up paper, or pads fabricated from corrugated cardboard).

d. Close the lid of the carrying case, and snap the latch securely.

e. Cushion the outside of the carrying case with pads fabricated from corrugated cardboard or other material capable of absorbing shock.

f. Place the carrying case, cushioned as described in *e* above, into a close-fitting, corrugated fiberboard box (fig. 2-1), and seal all closures with gummed sealing tape.

Section II. DEMOLITION TO PREVENT ENEMY USE

8-3. Authority for Demolition

Demolition of the equipment will be accomplished only upon the order of the commander. Use the destruction procedures outlined in paragraph 8-4 below to prevent further use of the equipment.

8-4. Methods of Destruction

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

- (1) Camera.
- (2) Flashgun.
- (3) Carrying case.

(4) Cold-clip.

b. Use any of the following methods to destroy the equipment:

- (1) *Smash*. Smash all optical and metal components; use sledges, axes, hand-axes, pickaxes, hammers, or crowbars.
- (2) *Cut*. Cut the extension and connecting cords, leather strap, focusing cloth, and film; use axes, handaxes, or machetes.
- (3) *Bend*. Bend the tripod legs.

Warning: Be extremely careful with explosives and incendiary de-

vices. Use these items only when the need is urgent.

(4) *Burn*. Burn the film, cords, leather strap, and technical manuals; use gasoline, kerosene, oil, flamethrowers, or incendiary grenades.

(5) *Explode*. If explosives are necessary, use firearms, grenades, or TNT.

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

APPENDIX A REFERENCES

The following publications contain information applicable to the operation and maintenance of Camera Set, Still Picture Polaroid Model 100:

DA Pam 310-4	Index of Technical Manuals, Technical Bulletins, Supply Manuals (types 7, 8, and 9), Supply Bulletins, Lubrication Orders, and Modification Work Orders.	TB SIG 355-3	Depot Inspection Standard for Moisture and Fungus Resistant Treatment.
TB SIG 355-1	Depot Inspection Standard for Repaired Signal Equipment.	TM 11-401	Elements of Signal Photography.
TB SIG 355-2	Depot Inspection Standard for Refinishing Repaired Signal Equipment.	TM 11-5527	Multimeters TS-352/U, TS-352A/U, and TS-352/U.
		TM 11-6625-203-12	Operator and Organizational Maintenance: Multimeter AN/URM-105, Including Multimeter ME-77/U.
		TM 38-750	Army Equipment Record Procedures.



APPENDIX B

BASIC ISSUE ITEMS

Section I. INTRODUCTION

B-1. General

This appendix lists items for Camera Set, Still Picture, Polaroid Model 100, the component items comprising it, and the items which accompany it, or are required for installation, operation, or operator's maintenance.

B-2. Explanation of Columns

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

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

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 the 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. Not used.

B-3. Federal Supply Codes

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

<i>Code</i>	<i>Manufacturer</i>
47904	Polaroid Corp
83740	Eveready Division of National Carbon

B-4. Batteries

Dry batteries shown are used with the equipment but are not considered part of the equipment. They will not be preshipped automatically but are to be requisitioned in quantities necessary for the particular organization, in accordance with SB 11-6.

SECTION II. BASIC ISSUE ITEMS LIST

(1)			BASIC ISSUE ITEMS LIST						(4)	(5)	(6)	(7)	(8)		
SOURCE CD (A)	MAINT. CD (B)	REC. CODE (C)	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION						UNIT OF ISSUE	QTY INC IN UNIT PACK	QTY INC IN UNIT	QTY AUTH	(8)	
				MODEL										(A)	(B)
				1	2	3	4	5	6					FIGURE NUMBER	ITEM OR SYMBOL NUMBER
			ORD THRU AGC												
								CAMERA SET, STILL PICTURE, POLAROID MODEL 100: Consists of a camera, flashgun, coldclip and carrying case. The camera takes and develops color and black and white 3-1/4 X 4-1/4 photographs							
								TECHNICAL MANUAL TM 11-6720-234-12	ea		2	2			
								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 levels. Excess publications must be returned to publication supply center through AG channels							
								CAMERA STILL PICTURE MODEL 100	ea		1	1			
								BATTERY: 83740; 521	ea		1	1			
								BATTERY: 83740; E-91	ea		1	1			
								CASE CARRYING: 47904; 322	ea		1	1			
								FLASHGUN: 47904; model 268	ea		1	1			
								COLDCLIP: 47904; 193	ea		1	1			

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APPENDIX C

MAINTENANCE ALLOCATION

Section I. INTRODUCTION

C-1. General

This appendix provides a summary of the maintenance operations covered in the equipment literature for Camera Set, Still Picture Polaroid Model 100. 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. Explanation of Format for Maintenance Allocation Chart

a. Group Number. Group numbers correspond to the reference designation prefix assigned in accordance with ASA Y32.16, Electrical and Electronics Reference Designations. They indicate the relation of listed items to the next higher assembly.

b. Component Assembly Nomenclature. This column lists the item names of component units, assemblies, subassemblies, and modules on which maintenance is authorized.

c. Maintenance Function. This column indicates the maintenance category at which performance of the specific maintenance function is authorized. Authorization to perform a function at any category also includes authorization to perform that function at higher categories. The codes used represent the various maintenance categories as follows:

<i>Code</i>	<i>Maintenance Category</i>
C	Operator/Crew
O	Organizational Maintenance
F	Direct Support Maintenance
H	General Support Maintenance
D	Depot Maintenance

d. Tools and Equipment. The numbers appearing in this column refer to specific tools and equipment which are identified by these numbers in Section III.

e. Remarks. Self explanatory.

C-3. Explanation of Format for Test Equipment Requirements

The columns in the tool and test equipment requirements chart are as follows:

a. Tools and Equipment. 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 for the maintenance function.

b. Maintenance Category. The codes in this column indicate the maintenance category normally allocated the facility.

c. Nomenclature. This column lists tools, test, and maintenance equipment required to perform the maintenance functions.

d. Federal Stock Number. This column lists the Federal stock number.

e. Tool Number. Not used.

SECTION II. MAINTENANCE ALLOCATION CHART

MAINTENANCE ALLOCATION CHART														
GROUP NUMBER	COMPONENT ASSEMBLY NOMENCLATURE	MAINTENANCE FUNCTIONS										TOOLS AND EQUIPMENT	REMARKS	
		INSPECT	TEST	SERVICE	ADJUST	ALIGN	CALIBRATE	INSTALL	REPLACE	REPAIR	OVERHAUL			REBUILD
	CAMERA POLAROID 100	C		C									1,6,12	
	BATTERY		O										3	
	ELECTRONIC BLOCK AND SHUTTER		F						C				4	
	BASE PLATE ASSEMBLY		H										9	
	FLASHGUN		O						F		H		2,4	
	BATTERY												2,4,11	
	PACK								C		O		3	
	FINDER ASSEMBLY				F								1,3	
									O				1	
									F		C		7	
													2,8	
							H		F				2	
											H		2,5,10	
													2	

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SECTION III. TOOL AND TEST EQUIPMENT REQUIREMENTS

TOOL AND TEST EQUIPMENT REQUIREMENTS				
TOOLS AND EQUIPMENT	MAINTENANCE CATEGORY	NOMENCLATURE	FEDERAL STOCK NUMBER	TOOL NUMBER
		POLOROID MODEL 100 (continued)		
1	O	TOOL KIT TK-77/GF	5180-752-9068	
2	F	TOOL KIT TK-109/GF	5180-856-9653	
3	O	MULTIMETER AN/URM-105	6625-581-2036	
4	F	MULTIMETER TS-352/U	6625-242-5023	
5	H	LENS FOCUSING TOOL POLAROID CR169452		
6	O	CABLE RELEASE TOOL POLAROID CR169449		
7	F	SPECIAL WRENCH POLAROID CR169456		
8	F	ADJUSTING WRENCH POLAROID CR1004		
9	H	SPEED TESTER POLAROID 100		
10	H	UNIVERSAL COLLIMATOR POLAROID 100		
11	H	SOLDER COBBLER IRON AIR VAC MILL FORT CONN		
12	F	BIPAX TRA-CON BA-2122		



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USAARENBD (2)	Instl (2) except
USACDCEA (1)	Ft Hancock (4)
USACDCCBRA (1)	Ft Gordon (10)
USACDCCEA (1)	Ft Huachuca (10)
USACDCCEA, Ft Huachuca (1)	WSMR (5)
USACDCOA (1)	Ft Carson (25)
USACDCQMA (1)	Ft Knox (12)
USACDCTA (1)	Army Dep (2) except
USACDCADA (1)	LBAD (14)
USACDCARMA (1)	SAAD (30)
USACDCAVNA (1)	TOAD (14)
USACDCARTYA (1)	LEAD (7)
USACDCSWA (1)	SHAD (3)
USAMC (5)	NAAD (5)
USCONARC (5)	SVAD (5)
ARADCOM (5)	CHAD (3)
ARADCOM Rgn (2)	ATAD (10)
OS Maj Comd (4)	GENDEPS (2)
LOGCOMD (2)	Sig Sec GENDEPS (5)
USAMICOM (4)	Sig Dep (12)
USASTRATCOM (4)	Sig FLDMS (2)
USAESC (85)	AMS (1)
MDW (1)	USAERDAA (2)
Armies (2)	USAERDAW (13)
Corps (2)	USACRREL (2)
USAC (3)	USAPA (10)
1st Cav Div (50)	Units org under fol TOE:
Svc Colleges (2)	(2 cys each)
USASESCS (5)	11-155
USAADS (2)	11-57
USAAMS (2)	11-96
USAARMS (2)	11-97
USAIS (2)	11-98
USAES (2)	11-117
USATC Armor (2)	11-127
	11-158
	11-500 (AA-AC)
	11-587
	11-592
	11-597

NG: State AG (3).

USAR: None.

For explanation of abbreviations used, see AR 320-50.