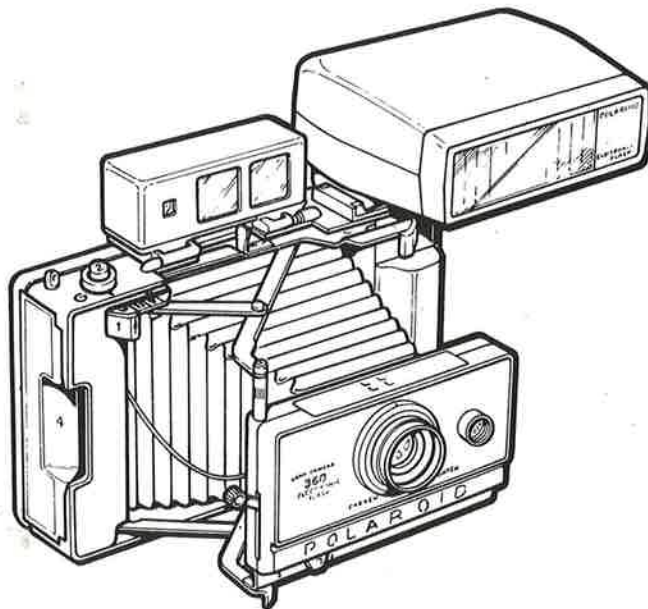


# REPAIR MANUAL

## POLAROID LAND CAMERA

### MODEL 360

REVISION I — SEPTEMBER 1970



#### IMPORTANT:

The Guarantee does not cover cameras which have been tampered with, modified for special purposes, or repaired by any person or shop other than an approved Polaroid repair station.

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POLAROID CORPORATION / CAMERA PRODUCT SERVICES / WALTHAM, MASSACHUSETTS

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# WARNING

The Model 360 Polaroid Land Camera system presents repair personnel with dangerous voltages. Before any camera repairs are attempted, read the safety statement which appears at the beginning of Section 3. Be thoroughly familiar with all safety requirements before disassembling any part of the camera, electronic flash or battery charger.

EXERCISE EXTREME CAUTION WHEN WORKING ON THE MODEL 360 SYSTEM

## INTRODUCTION

This revised manual should provide repair personnel with all the information needed to repair the Model 360 camera. The manual is primarily devoted to those areas where the Model 360 differs from earlier pack cameras. Accordingly, the emphasis is on the new Model 385 automatic shutter, the electronic flash, electronic timer, and the battery charger. (To gain a thorough understanding of the Model 385 automatic shutter, it is suggested that reference be made to the "Repair Manual on Automatic Shutters" published in May, 1968.)

This manual is divided into five sections:

Section I contains the principles of operation for the battery charger, the automatic shutter, the electronic timer, and the electronic flash. Also included in the section are wiring diagrams which should be consulted when electrical repairs are made.

Section II describes the procedure to be employed in checking the Model 360 system, including camera, flash, and charger. A new piece of test equipment, the 360 analyzer, has been built to help perform this checkout.

Section III contains detailed assembly checkout procedures which cannot be done with the 360 analyzer. Also included in this section is a group of troubleshooting charts which prescribe solutions for isolated faults.

Section IV presents detailed instructions for the disassembly and reassembly of Model 360 components. Included in this section are adjustments for the electronic timer, converter circuit, and flash louvers.

Section V is the parts identification section, containing parts lists and exploded view drawings.

When a Model 360 camera is brought in for repair, a visual inspection of the entire system (camera, flash, and charger) should first be made. Next, the three assemblies should be subjected to the system checkout described in Section II. If the fault is still not isolated, perform the tests in Section III. (Be thoroughly familiar with the safety precautions listed in Section III before opening any of the 360 assemblies.) After the fault is isolated, refer to Section IV for the method of repairing the defective part.

The material which has been revised or added since the first printing of this manual is identified by the bar which appears in the left-hand margin.

## SECTION 1 - PRINCIPLES OF OPERATION

### A. BATTERY CHARGER

Figure 1-1 presents the electrical schematic for the battery charger used in the model 360 system. Actual current paths through the various components are shown in Figure 1-2. With the battery charger plugged into an electrical outlet, 110 vac is brought to a combination step-up/step-down transformer. The 110 vac is converted to 360 vdc and to 3 vdc. The higher voltage "forms" capacitor C5 in the electronic flash while the lower voltage is used to charge the nickel cadmium flash battery.

As the flash becomes fully charged, the rise in terminal voltage is sensed by the transistor circuit which turns off the silicon controlled rectifier (SCR) thus ending the high charging rate. The battery continues to trickle charge through the  $\frac{1}{2}$  watt resistor shown in parallel to the SCR in the schematic.

The lamp connected to the transformer primary is lit as long as the batteries charge at the high current rate. When the SCR shuts off the high current, the lamp goes out, giving an indication that the flash battery is fully charged.

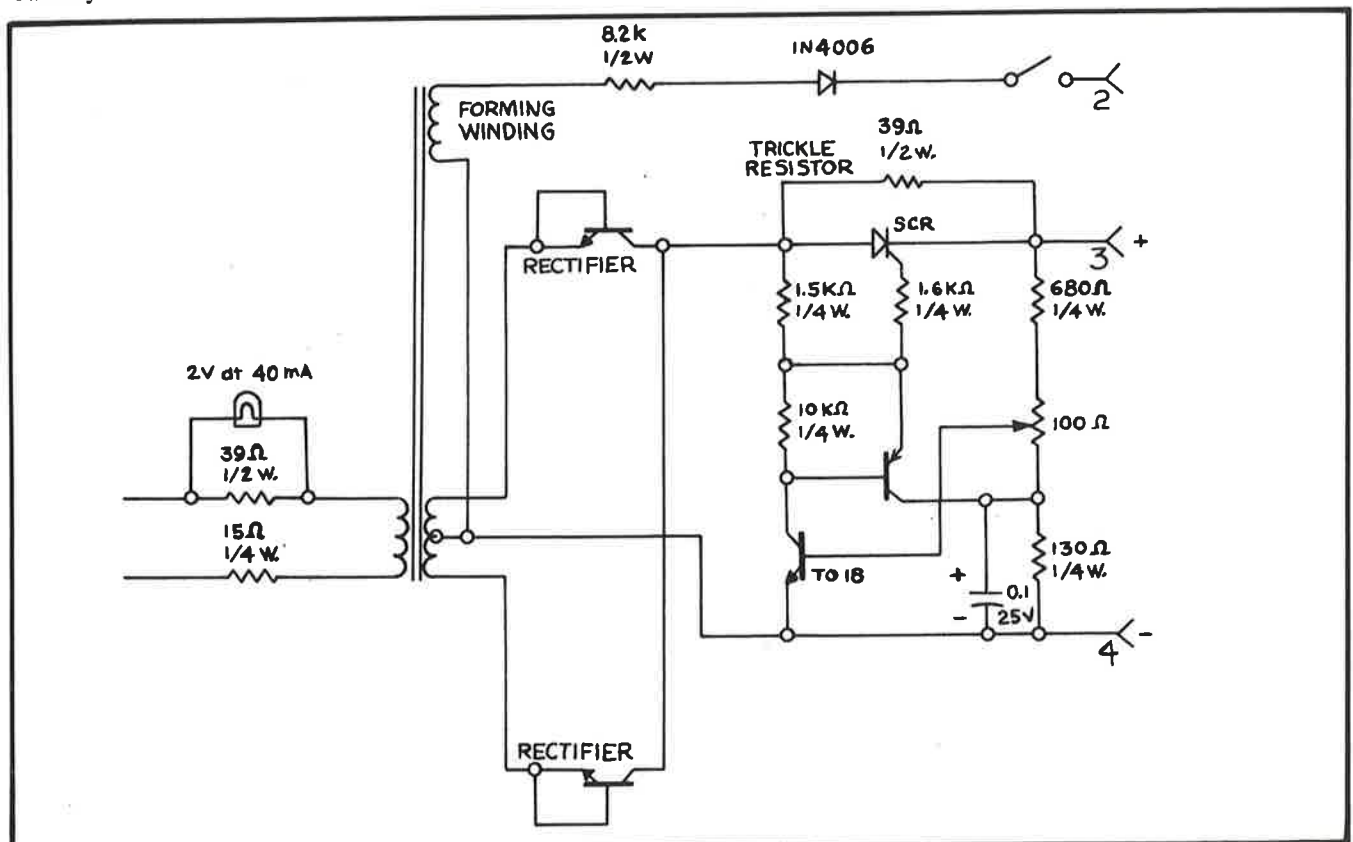


FIG. 1-1 BATTERY CHARGER SCHEMATIC

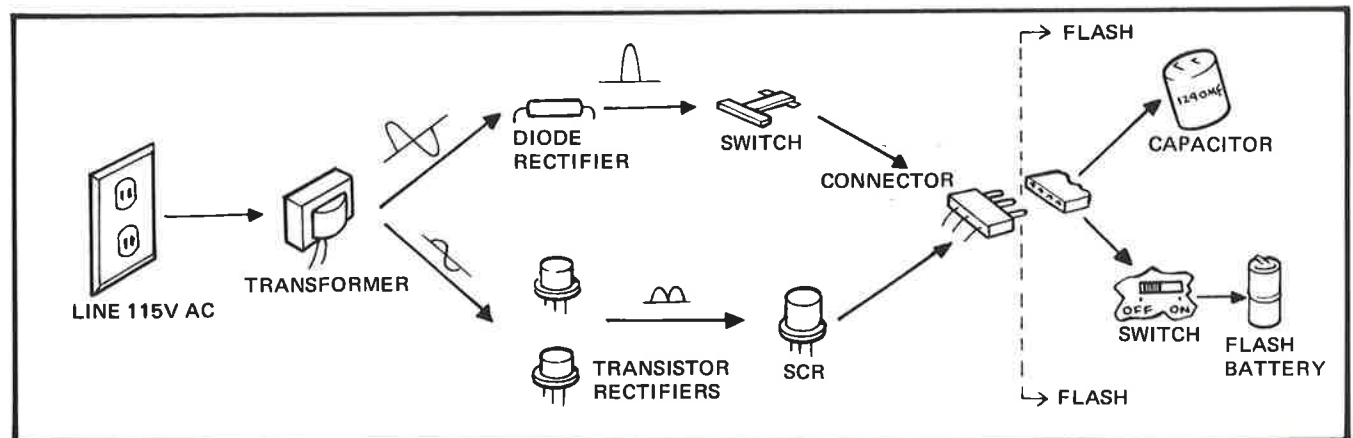


FIG. 1-2 CURRENT FLOW THROUGH THE CHARGER CIRCUIT

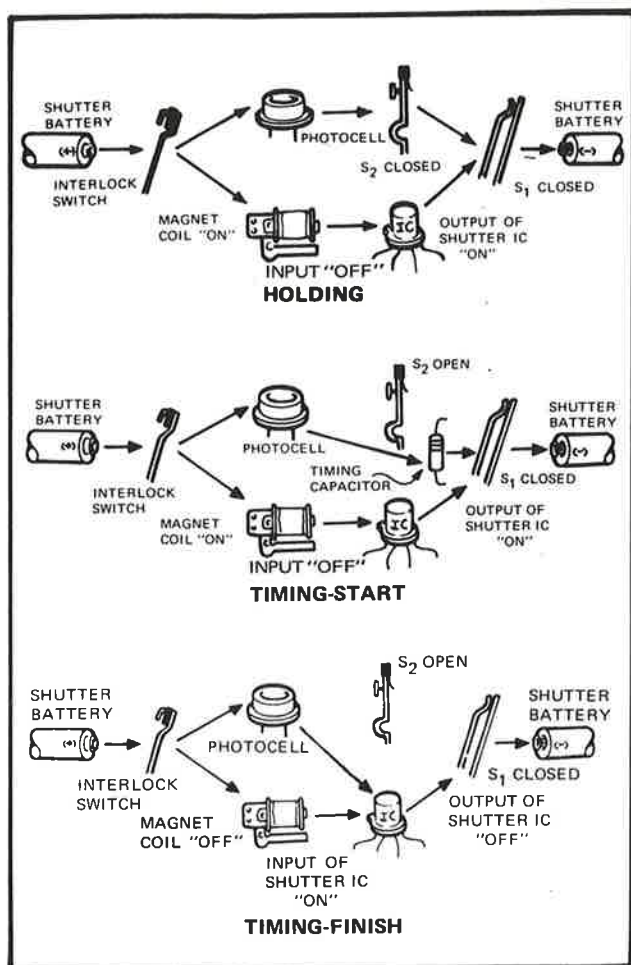


FIG. 1-4 CURRENT FLOW THROUGH THE SHUTTER CIRCUIT(WITHOUT FLASH)

opens practically coincident with the closing of S1 by the mechanical action illustrated in Figure 1-6. The roller, riding on the cocking slide, rides over the blade latch forcing it down. This opens S2,

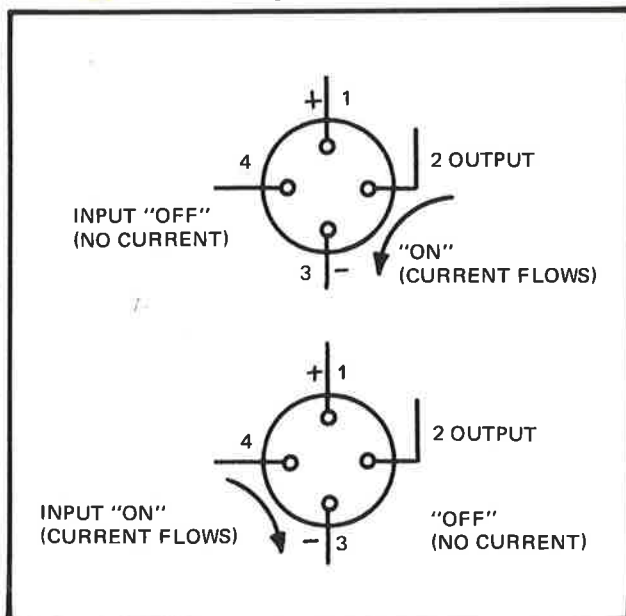


FIG. 1-5 SHUTTER IC OPERATION

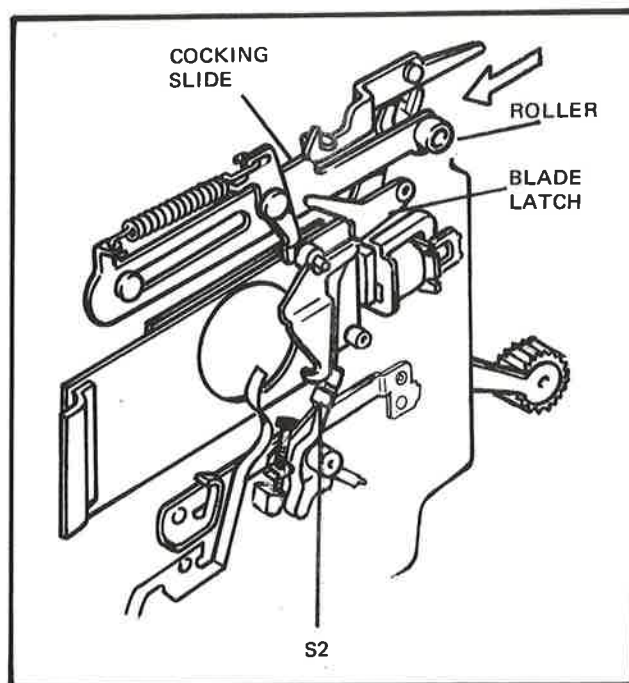


FIG. 1-6 SHUTTER MECHANISM

breaking the circuit. Current is then diverted to the timing capacitors which charge at a rate determined by the resistance of the photocell. When the capacitors become fully charged, the current then flows into pin 4 of the IC. When the voltage reaches a certain point, the input side of the IC is turned on resulting in the output side turning off. This then breaks the holding circuit and de-energizes the electromagnet. The second shutter blade is released and the exposure is completed.

When the shutter button is released, S1 opens again and current from the battery is completely cut off. Recocking the shutter closes S2 again and allows the timing capacitors to fully discharge.

## 2. Shutter Operation with the Electronic Flash

As is the case without the flash, before electrical action can start, the shutter must be cocked so that the keeper on the closing blade is set firmly against the electromagnet and the S2 timing switch is closed. Pressing the release knob closes battery switch S1, completing the circuit from the positive to the negative side of the battery. Current then flows through the various legs of the circuit. Refer again to Figure 1-3 for the schematic of the circuit. Figure 1-7 shows current flow through the components.

In the holding leg of the circuit, current flows from the positive side of the 3-volt battery, through the interlock, to pin 1 of the integrated circuit (IC). (Refer to Figure 1-5). This causes the output of the IC (pin 2) to turn on. With the output on, current flows through the magnet coil and pins 2 and 3 to the negative side of the bat-

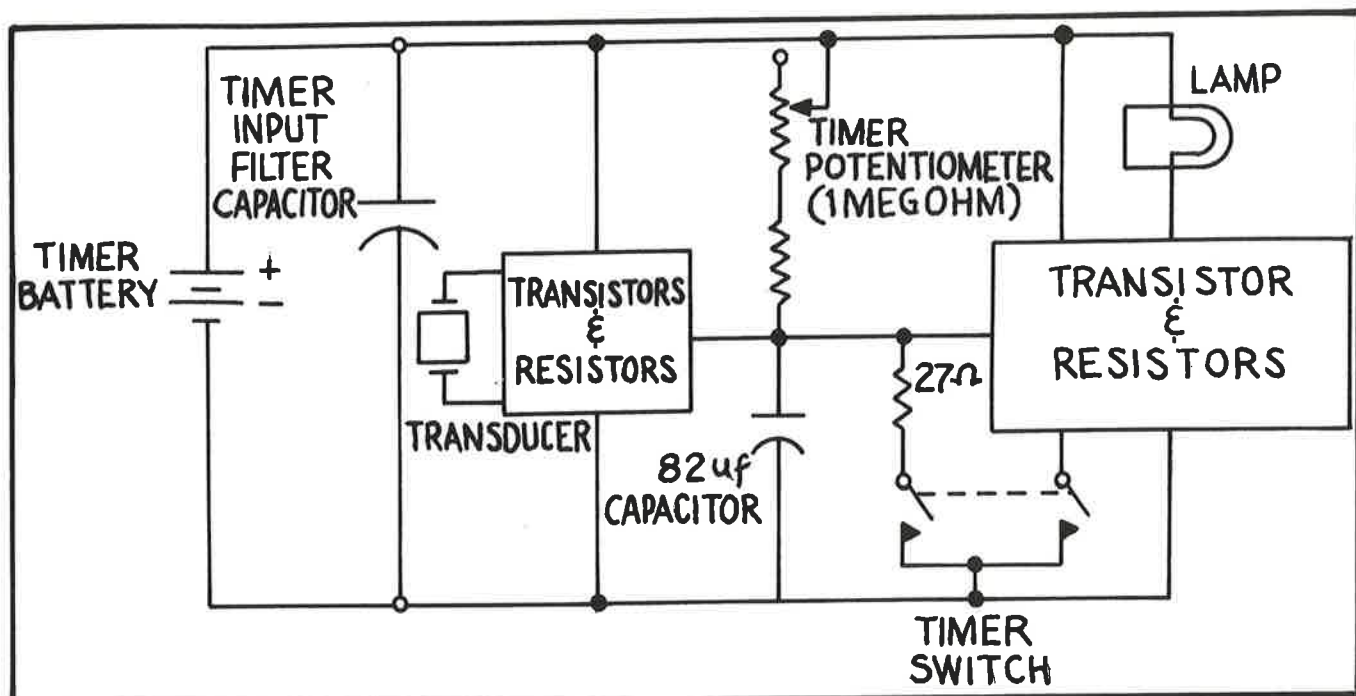


FIG. 1-8 ELECTRONIC TIMER SIMPLIFIED SCHEMATIC

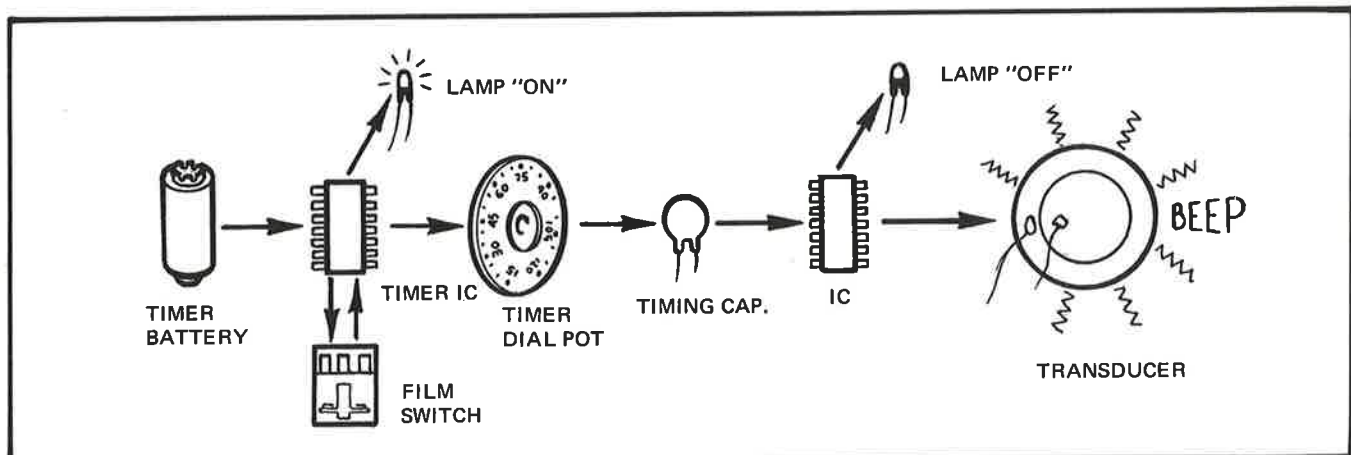


FIG. 1-9 CURRENT FLOW THROUGH THE TIMER CIRCUIT

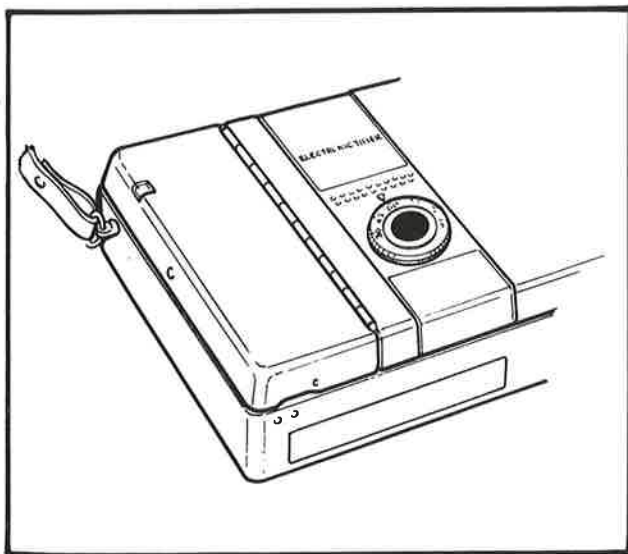


FIG. 1-10 ELECTRONIC TIMER DIAL

The closing of one pole allows the capacitor to fully discharge through the 27 ohm resistor, insuring that it has no residual voltage from a previous timing cycle. The closing of the second pole turns the IC transistor/resistor circuit on and lights the lamp. When the switch opens, the 82 microfarad capacitor begins charging again. While the capacitor is charging, the lamp remains illuminated. Once the capacitor has fully charged, a difference in potential in the other IC transistor/resistor circuit excites the transducer which emits a high frequency "beep." At the same time, the lamp goes out. The high frequency "beep" coupled with the extinguishing of the lamp indicates that the timing cycle has been completed.

The louvers can be moved in two ways. The first is by turning the "Darken-Lighten" wheel at the back of the flash head and the second is by simply focusing the camera.

Turning the wheel toward "Darken" results in a movement of the linkage as indicated by the arrows in Figure 1-12. The trim link follows the rise on the trim wheel. This forces the cam link back and pivots one end of the link around a post on the pickup link. The other end deflects the pivot link and results in the sliding of the actuator bar to the right, closing the louvers. Turning the wheel toward "Lighten" reverses this action and opens the louvers.

The foregoing description of linkage action presupposes that the focus bar is set at the close-up position as shown in Figure 1-12. However, as the focus bar is moved toward the infinity setting, the relationship of the cam link to the pickup link changes (Figure 1-13). The cam link will follow the post on the pickup link for about half of its length of travel. Starting at that point, the post moves away from the cam link and the louvers are moved to the wide open position. With the cam link deprived of its pivot point, the louvers cannot be adjusted by the "Lighten-Darken" wheel.

## E. WIRING DIAGRAMS

Figure 1-14 is a wiring diagram showing the wiring connections between the automatic shutter, the converter circuit, and the connector for the electronic flash. The electronic timer wiring diagram is presented in Figure 1-15, while Figure 1-16 shows the electronic flash wiring diagram.

These diagrams should be consulted whenever electrical repairs are undertaken.

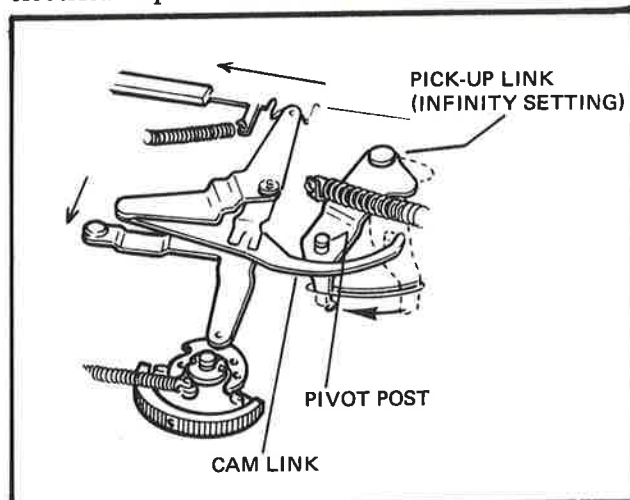


FIG. 1-13 FLASH LINKAGE AT INFINITY SETTING

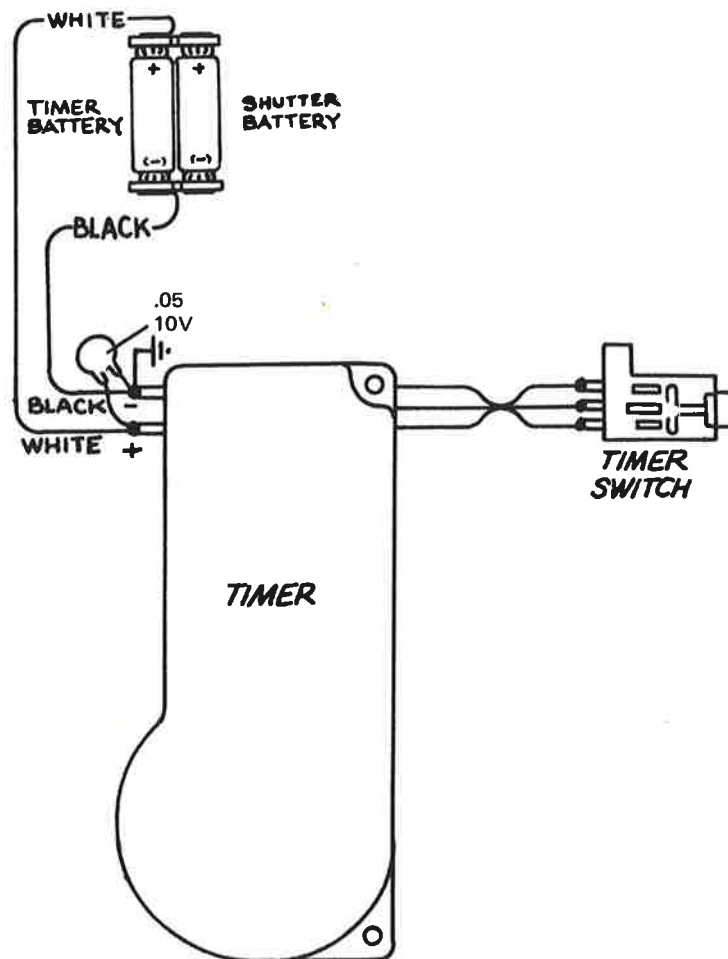


FIG. 1-15 ELECTRONIC TIMER WIRING DIAGRAM

## SECTION 2 - SYSTEM CHECKOUT

This section of the manual contains a checkout procedure which is designed to isolate problems in the Model 360 system. Two pieces of test equipment are referred to in the procedure. The first is the 360 Analyzer, a sophisticated piece of test equipment which measures camera, flash and charger outputs. The second is the 360 Meter Connector Block which, when coupled with a VOM, is also capable of measuring system outputs. Perform the applicable steps in this section depending on which piece of test equipment you have. (If you have the 360 Analyzer, there is no need to perform those steps which utilize the connector block. Conversely, if you have the 360 Meter Connector Block, do not perform those steps calling for the use of the analyzer.)

### A. CHECKING THE BATTERY CHARGER USING THE 360 ANALYZER

Check out the battery charger on the 360 analyzer as follows (Figure 2-1):

1. Set the selector switch on the analyzer to "Charger".
2. Set the ON/OFF switch of the electronic flash to "On" and clip the flash onto the male connector of the analyzer. The "BATTERY" meter should rise to about 2.5 volts.
3. Hold down the "BATTERY DISCHARGE" switch on the analyzer for a minute or two. This drains the flash battery and insures that the charger will operate at the fast charge level for the following steps.
4. Plug the battery charger into a 110 vac outlet and then attach the test plug on the analyzer to the charger. The meters should read as follows:
  - a. The "INPUT CURRENT" meter should indicate at least 0.80 amps (while the fast charge light in the charger is on).
  - b. The "CAPACITOR" meter should rise slowly. The voltage shall not exceed 340 volts.
5. If the meters do not indicate as specified, refer to the Problem Analysis section of this manual.
6. Unplug the charger and the flash from the analyzer.

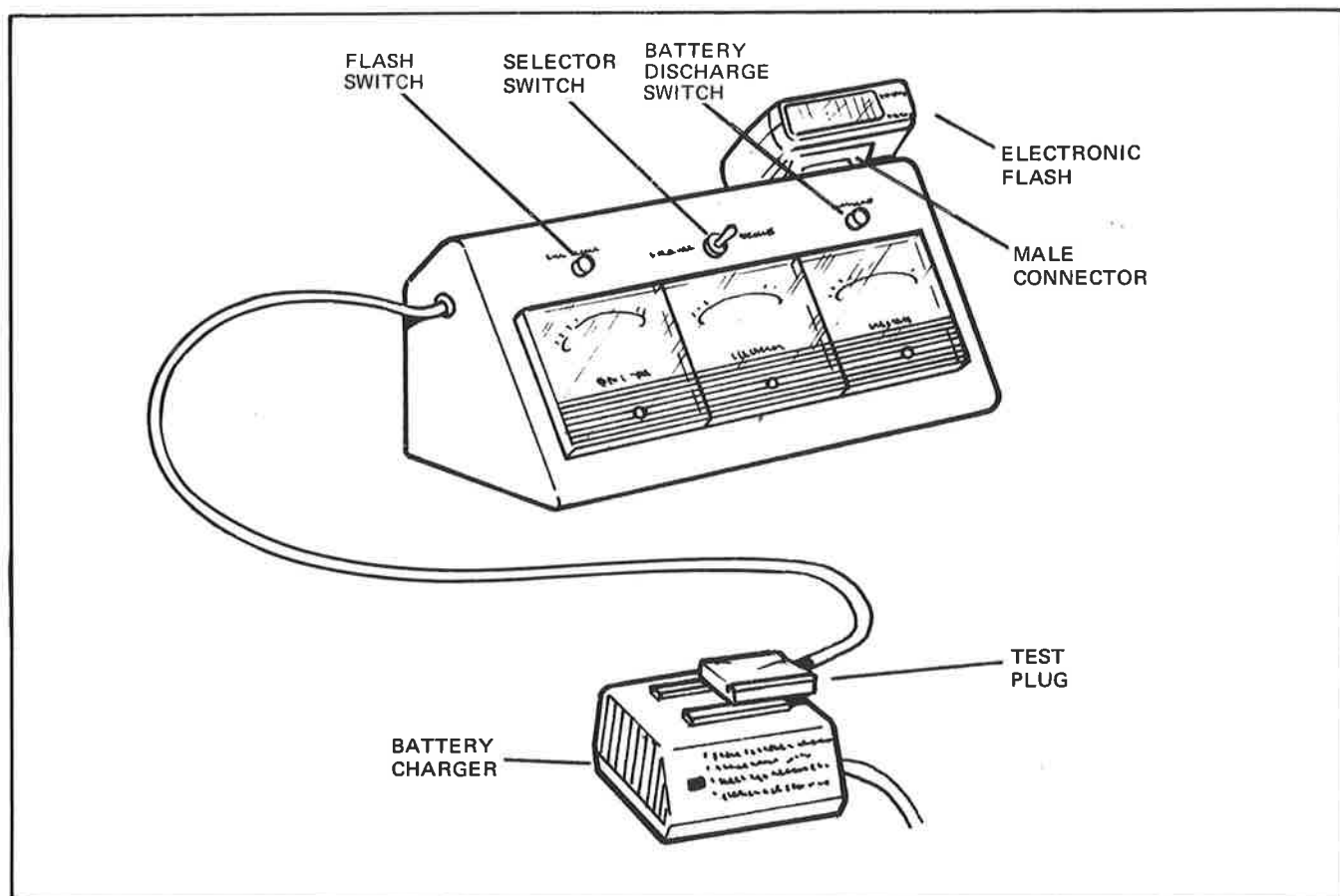


FIG. 2-1 ANALYZER SETUP FOR THE BATTERY CHARGER

2. Extend the camera bellows and cock the shutter. (Be sure that the shutter battery is properly installed in the battery nest.) Cover the photocell with your finger and trip the shutter. If both blades close together, the interlock switch is probably not operating properly. It can be repaired according to the instructions in Section IV of this manual.

## E. CHECKING SHUTTER SPEEDS

Check shutter speeds using either the Model D or Model C Tester. When performing these tests, record all readings. Also record the settings of the light level selector and the scene selector. If any of the readings differ from those specified below, consult Section III of this manual (Problem Analysis).

### Model D Tester

#### 1. 75/50 DULL

- a. Set the aperture wheel to 75 and the scene selector to "Bright Sun or Dull Day also Flash." Cock the shutter and place the camera onto the exposure tester. Swing it into position for testing.
- b. Set the selector switch on the tester to 101 and the light level wheel to 150/50. Set the Colorpack II switch to "NORMAL".
- c. Depress the footswitch and trip the shutter. The reading on the F-stop meter should be between +0.2 and -0.4.

#### 2. 75/50 BRIGHT

- a. Set the scene selector on the camera to "Bright Sun Only" and cock the shutter.
- b. Depress the footswitch and trip the shutter. The reading on the F-stop meter should be between +0.2 and -0.4 relative to the reading obtained in step 1c above.

#### 3. 75/800 BRIGHT

- a. Set the light level to "150/800" and cock the shutter.
- b. Depress the footswitch and trip the shutter. The reading on the F-stop meter should be between +0.6 and 0.0 relative to the reading obtained in step 2b above.

#### 4. 75/800 DULL

- a. Set the scene selector to "Bright Sun or Dull Day also Flash" and cock the shutter.
- b. Depress the footswitch and trip the shutter. The reading on the F-stop meter should be between +0.4 and -0.4 relative to the read-

ing obtained in step 3b above.

## 5. 3000 DULL

- a. Set the aperture wheel to 3000 and the scene selector to "Bright Sun or Dull Day also Flash." Cock the shutter.
- b. Set the light level wheel to "3000 INDOORS."
- c. Depress the footswitch and trip the shutter. The reading on the F-stop meter should be between +0.5 and -0.4 relative to the reading obtained in step 1c above.

### Model C Tester

#### 1. 75/50 DULL

- a. Set the aperture wheel to 75 and the scene selector to "Bright Sun or Dull Day also Flash." Cock the shutter and place the camera onto the exposure tester. Swing it into position for testing.
- b. Set the lever on the tester to 50 and position the Colorpack II switch to "NORMAL."
- c. Depress the footswitch and trip the shutter. The reading on the F-stop meter should be between +0.2 and -0.4.

#### 2. 75/50 BRIGHT

- a. Set the scene selector on the camera to "Bright Sun Only" and cock the shutter.
- b. Depress the footswitch and trip the shutter. The reading on the F-stop meter should be between +0.2 and -0.4 relative to the reading obtained in step 1c above.

#### 3. 75/800 BRIGHT

- a. Set the lever on the tester to 800 and cock the shutter.
- b. Depress the footswitch and trip the shutter. The reading on the F-stop meter should be between +0.6 and 0.0 relative to the reading obtained in step 2b above.

#### 4. 75/800 DULL

- a. Set the scene selector to "Bright Sun or Dull Day also Flash" and cock the shutter.
- b. Depress the footswitch and trip the shutter. The reading on the F-stop meter should be between +0.4 and -0.4 relative to the reading obtained in step 3b above.

## F. CHECKING THE ELECTRONIC TIMER

While the electronic flash is being charged, perform the following electronic timer tests. If the readings are not as specified, consult Section III of this

1. Set the selector switch on the analyzer to "Converter."
2. Set the ON-OFF switch of the electronic flash to "ON" and clip the flash onto the analyzer's foot assembly. The "Battery" meter should rise to approximately 2.5 vdc.
3. Extend the camera bellows and cock the shutter. Clip the test plug on the analyzer onto the camera's foot assembly. Observe the action of the meters on the analyzer **WHILE THE CAPACITOR IS CHARGING**.
  - a. The "Capacitor" meter should slowly rise to between 350 and 365 volts.
  - b. The "Battery" meter should drop back slightly.
4. When the capacitor is **FULLY CHARGED** (the converter light blinking), the meters should read as follows:
  - a. The "Capacitor" meter should drop very slightly while the light is out. When the light comes on and the converter "beeps", the meter reading should rise to the value recorded in step 3a above.
  - b. The "Battery" meter should rise to the value noted in step 2 above. When the light comes on and the converter "beeps", the meter should drop 0.2 or 0.3 volts.
5. Cover the photocell with your finger and trip the shutter of the camera. The flash should fire, and you should hear a distinct second "click" as the second blade closes. If the flash doesn't fire, or if there is no second "click," perform the following steps:
  - a. If the flash fails to fire, press the "Flash" switch on the analyzer. If the flash fires, there is a defect in the camera's flash circuit which must be repaired. If there is still no flash, the flash assembly is defective and must be repaired.
  - b. If the second blade stays open (no second "click") until the photocell is uncovered or until the shutter button is released, there is a malfunction in the shutter circuit. The malfunction is called "no strobe mode".

Steps 1 through 5 may be repeated to observe the operation of the meters. However, the "no strobe mode" check in step 5 cannot be done after the flash has fired five or more times. The flash battery may have discharged sufficiently to cause a "no strobe mode" even though there is no circuit malfunction.

## H. CHECKING THE ELECTRONIC FLASH AND CAMERA WITH THE 360 METER CONNECTOR BLOCK

1. Connect the electronic flash (with the switch in the "OFF" position) to the 360 Meter Connector Block and then slide the block onto the camera (Figure 2-8).

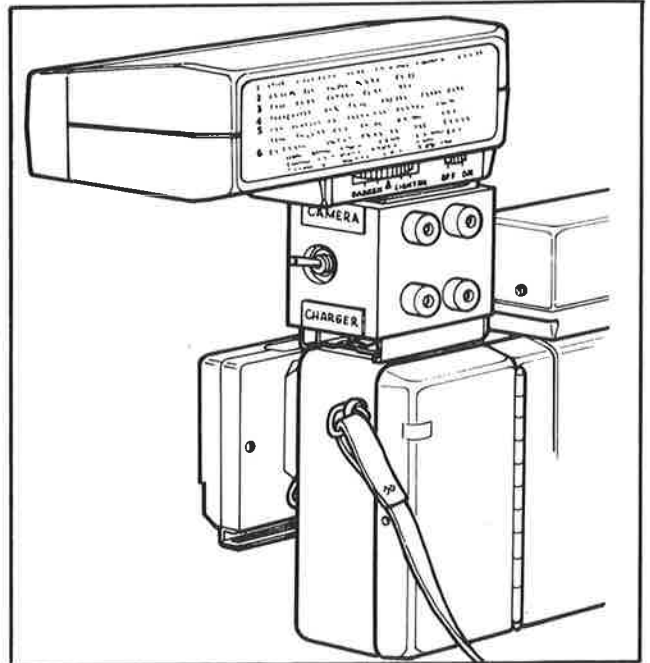


FIG. 2-8 TEST SETUP

2. Set the selector switch on the block to "Camera".
3. Set a VOM to the 3-vdc scale. Insert the positive probe into the top green jack and the negative probe into the black jack.
4. Turn the flash switch to the "ON" position and **allow the capacitor to charge**. Once charged, the meter should indicate a voltage between 2.2 and 2.5-vdc.
5. If the meter indicates half battery voltage or no battery voltage, the battery is defective and should be replaced.
6. Turn the flash switch "OFF".
7. Remove the probes from the meter block and set the VOM on a scale that will indicate a voltage of 400-vdc or higher.
8. Insert the positive probe into the red jack and the negative probe into the black jack.
9. Turn the flash switch "ON" and observe the meter. The voltage should rise to between 350 to 365 volts. Adjust the converter to gain this reading (see Section 4).

## SECTION 3 - PROBLEM ANALYSIS

Presented in this section of the Repair Manual are expanded testing procedures. These expanded procedures supplement the system checkout (Section II) by detailing methods of checking assemblies which cannot be tested with the 360 Analyzer. The correction action is included in these procedures.

Since this testing requires that assemblies be opened, a special section on safety precedes the special procedures. It is strongly recommended that all repair personnel thoroughly acquaint themselves with the information provided and that they follow the instructions exactly.

### A. SAFETY

Dangerous voltages are present in the Model 360 Polaroid Land Camera. Repair personnel are urged to use extreme caution when handling Model 360 assemblies which have been opened. Danger areas include the following:

1. The terminals of the 1240 uf flash capacitor in the flash assembly: The capacitor could be charged to 360 volts if it is on the camera or on the charger and the flash switch is on. In the case of a faulty dump switch, the capacitor could retain the 360 volts even after it has been removed from the camera or the charger. It is best to assume that the capacitor is "hot". Dump the charge using a 25 watt, 250 ohm resistor. NEVER ATTEMPT TO SHORT THE CAPACITOR WITHOUT USING A 250 OHM RESISTOR.
2. The converter circuit: If the converter circuit compartment is open and the converter is on, a dangerous condition exists. DO NOT TOUCH THE TERMINALS OF THE CONVERTER CIRCUIT OR ANY OF THE LEADS ON THE CIRCUIT BOARD ITSELF.
3. The battery charger: If the charger is plugged into a 110 vac outlet and the bottom of the unit is open, be extremely careful. AVOID ANY OF THE LEADS ON THE CHARGER CIRCUIT BOARD.

**REMEMBER — 360 VOLTS IS DANGEROUS. USE CAUTION!**

### B. SPECIAL PROCEDURES

The following special procedures may be considered to be an extension of the system checkout described in Section II. The procedures expand camera and flash testing to those areas which can-

not be examined with the 360 analyzer. They should be performed when camera/flash malfunctions are not isolated by the system checkout.

#### 1. Checking the Flash Battery Cells Under Load

- a. Slide a camera connector which has a one ohm, 25 watt resistor soldered to the battery terminal leads onto the flash connector (see Figure 3-1).

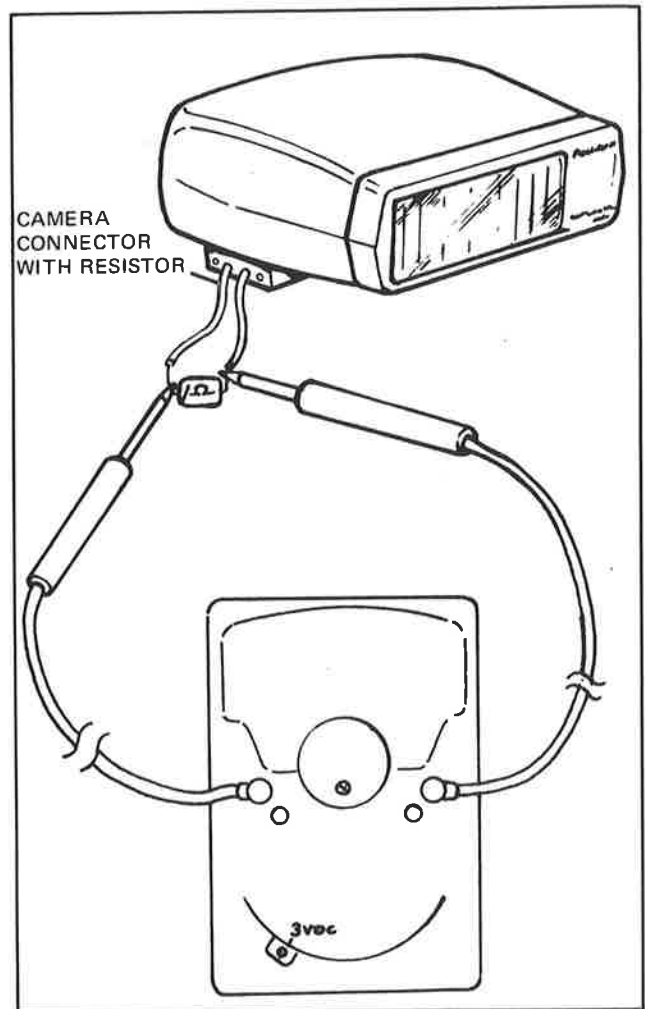


FIG. 3-1 TESTING THE FLASH BATTERY UNDER LOAD

- b. Set a VOM (or comparable meter) to the 3-vdc scale and place the probes on the resistor leads. The meter should read a minimum of 2.5 volts. If there is no reading, the battery might be dead, the flash connector defective, or the ON-OFF switch defective.
- c. If the reading is low, open the flash assembly in accordance with instructions given in Section IV. (As a precautionary measure, drain the 1240 uf capacitor using a 250 ohm resistor.)

- f. Cock the shutter - The meter should rise to a voltage range of 180 vdc to 300 vdc, depending on the meter's internal resistance. If no arc is observed in step d, but the meter reads 180-300 vdc, the trigger coil is defective and should be replaced. If there is no meter reading, there is a fault in the trigger circuit other than the trigger coil. Inspect the circuit board for breaks, cold-soldered components, etc., and make the necessary repairs.
- g. Remove the flash assembly from the camera and assemble it according to instructions in Section IV.

### 3. Checking the Operation of the Flash Circuit

- a. Clip a flash connector onto the camera foot assembly.
- b. Set a VOM (or comparable meter) to the RX1 scale and clip the probes to the violet and white leads of the flash connector.
- c. With the shutter uncocked, the meter should read zero ohms.
- d. Cock the shutter - The meter should indicate infinity.
- e. If either indication is not obtained, the flash switch on the shutter is defective and must be repaired. (See the "Automatic Shutter" portion of this section.)
- f. Remove the flash connector from the camera.

### 4. Checking Converter Input Voltage

- a. Open the converter compartment according to the instructions provided in Section IV of this manual.
- b. Clip the flash onto the camera and turn the ON-OFF switch ON.
- c. Set a VOM (or comparable meter) at 3 vdc and place the probes on the converter terminals which hold the black and brown wires (Figure 3-6).
- d. The VOM should indicate between 2.2 and 2.7 vdc. If there is no reading and the flash battery has been found to be OK, the foot assembly on the camera is faulty and must be repaired or replaced.
- e. Reassemble the converter compartment in accordance with instructions in Section IV.

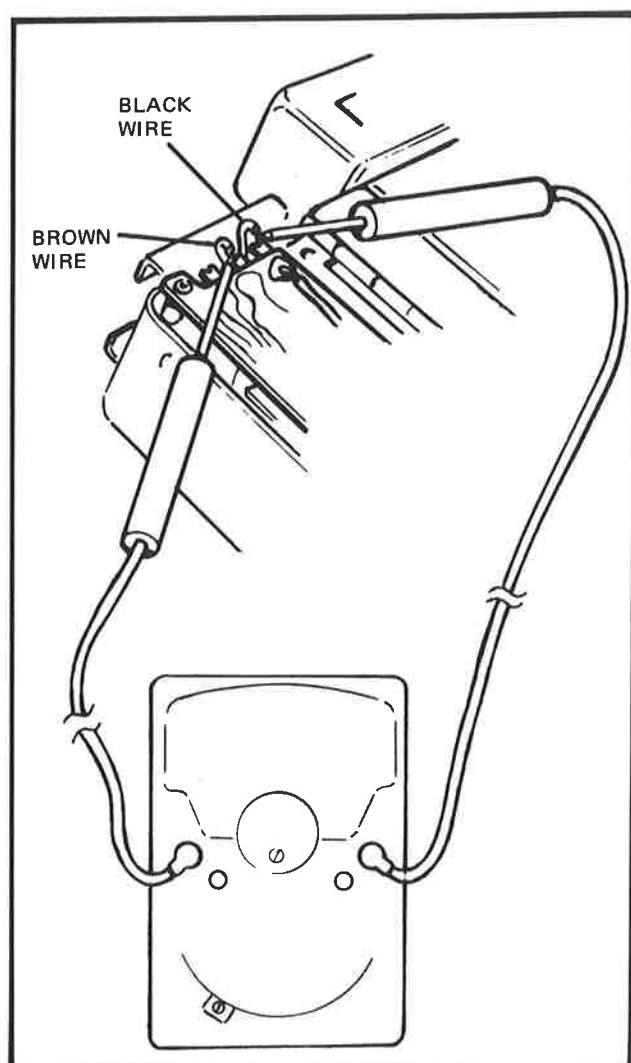


FIG. 3-6 CHECKING CONVERTER INPUT VOLTAGE

### 5. Testing Electronic Components

In the course of checking the model 360 camera, it will be necessary to test electronic components. This paragraph explains how the components should be tested. (The base block assembly must first be released from the camera according to the instructions in Section IV.)

#### Resistors

- a. Unsolder one of the leads from the circuit board.
- b. Consult the shutter schematic to determine the value of the resistor and set a VOM to the corresponding scale.
- c. Place the probes of the VOM on each of the resistor leads. The meter should register the resistance of the component. If the VOM does not register at all, the resistor is open and should be replaced.

e. If the "Input Current" meter indicates approximately half a full charge and the lamp is dim, one of the rectifiers in the charger is burned out and the battery charger must be replaced.

5. If in the system checkout the fast charger lamp stayed on for more than 120 minutes:

a. Check for a defective flash battery as instructed in the "Electronic Flash" portion of this section.

b. Either the charger is improperly adjusted, or there is a defective component in the charger. In either case, the battery charger must be replaced.

| PROBLEM ANALYSIS CHART                                                            |                                                                                                                                                                                             |                                                                                                                                       |
|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| BATTERY CHARGER                                                                   |                                                                                                                                                                                             |                                                                                                                                       |
| PROBLEM                                                                           | PROBABLE CAUSE                                                                                                                                                                              | CORRECTIVE ACTION                                                                                                                     |
| 360 Analyzer "INPUT CURRENT" meter or VOM does not indicate minimum of 0.80 amps. | Battery charger defective.                                                                                                                                                                  | Replace battery charger.                                                                                                              |
| 360 Analyzer "CAPACITOR" meter or VOM does not rise to maximum of 340 volts.      | High voltage diodes or switch in charger defective.                                                                                                                                         | Replace battery charger.                                                                                                              |
| Fast charge light will not go on.                                                 | 1. Flash battery is already charged.<br>2. Flash ON-OFF switch not "ON."<br>3. Defective flash ON-OFF switch.<br>4. Charger lamp burned out.<br>5. Defective connector on charger or flash. | 1. None.<br>2. Turn switch "ON."<br>3. Replace flash assembly.<br>4. Replace charger lamp.<br>5. Replace charger or flash assemblies. |
| Fast charge light stays on for more than 120 minutes.                             | 1. Defective flash battery.<br>2. Incorrectly adjusted battery charger.<br>3. Defective battery charger.                                                                                    | 1. Replace flash battery.<br>2. Replace battery charger.<br>3. Replace battery charger.                                               |
| Charger will not charge flash to fire a minimum of 20 shots.                      | Charger potentiometer not adjusted properly.                                                                                                                                                | Adjust battery charger.                                                                                                               |

- h. Check the post on the opening blade. The post on the opening blade (Figure 3-11) should have a rubber collar which insulates it from the Sx switch contact. A second insulator should also be at the base of the post to hold the contact off the blade.

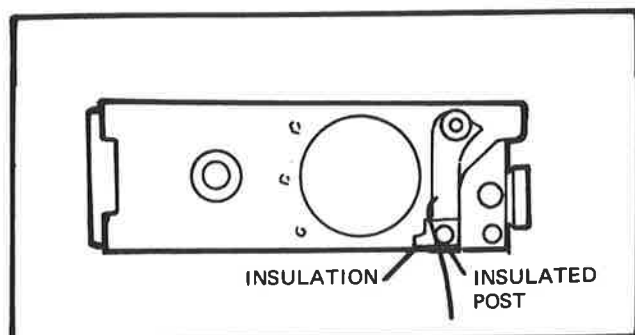


FIG. 3-11 OPENING BLADE INSULATION

3. If the shutter readings were a constant half stop fast (at all speed settings) during the System Checkout, replace the integrated circuit. If the shutter readings were slow (at all speed settings), replace the photocell.

If it is necessary to replace a photocell, a photocell of the same color grouping as the one replaced will normally resolve the problem. However, if a photocell of the same color coding does not improve shutter operation, consult the following chart. Go up in the color grouping to obtain a slower reading. Go down in the color grouping to obtain a faster reading.

|        |   |   |   |
|--------|---|---|---|
| BLUE   |   |   |   |
| BLACK  |   |   |   |
| RED    |   |   |   |
| YELLOW |   |   |   |
| GREEN  |   |   |   |
| WHITE  |   |   |   |
| ORANGE |   |   |   |
|        | ↓ | F | ↑ |
|        |   | A |   |
|        |   | S |   |
|        |   | T |   |
|        |   | E |   |
|        |   | R |   |
|        |   |   | S |
|        |   |   | L |
|        |   |   | O |
|        |   |   | W |
|        |   |   | E |
|        |   |   | R |

4. If the blades close together on all speeds:
- Adjust the battery interlock switch as instructed in Section IV of this manual.
  - Check for rust or foreign matter on the magnet keeper or the blades. If they are dirty, clean them with a dry Q-tip. If rust is present, replace both the magnet and the closing (second) blade.
  - Check the alignment of the magnet and the keeper on the closing blade. Slowly cock the shutter, allowing the keeper to "kiss-contact" the poles of the magnet. Release the shutter knob before the cocking slide latches, but after the blades latch (Figure

3-12). Observe the keeper. It should parallel with the edge of the blade and with the poles of the magnet. If it isn't, adjust the magnet.

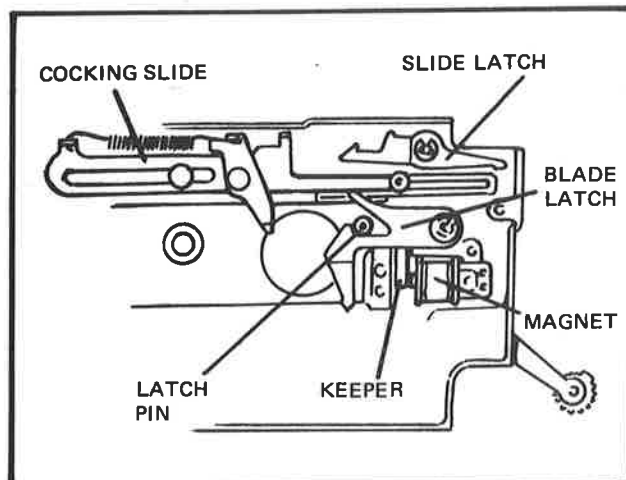


FIG. 3-12 CHECKING THE ALIGNMENT OF THE KEEPER AND MAGNET

- d. Check the cocking slide latch pin. Examine the latch pin (Figure 3-13). If it is bent, the cocking slide will be released before S1 is closed. Straighten the pin if necessary.

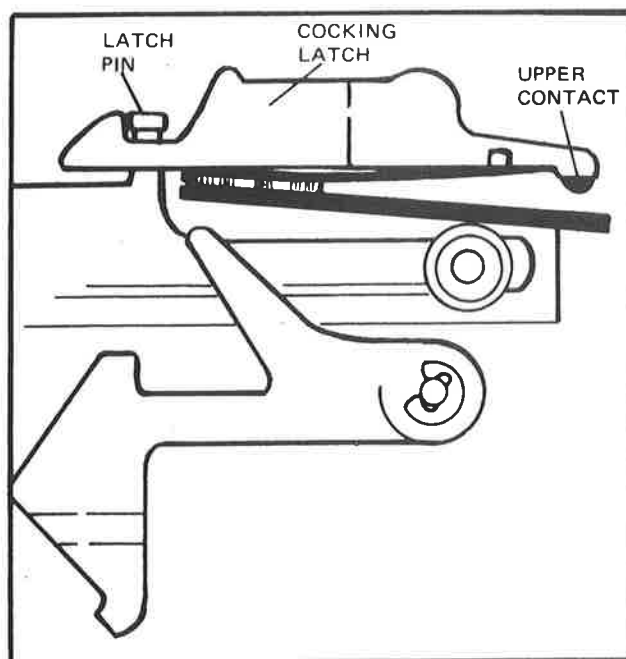


FIG. 3-13 CHECKING THE S1 SWITCH

- e. Check the adjustment of the S1 switch. The upper contact of the S1 switch should be visible below the cocking latch when the shutter is cocked (Figure 3-13). If it is not, bend down the cocking slide latch pin so that the cocking latch will be moved enough to expose the contact. (Do not bend the pin too far, or a mechanical bind may occur.)

| FROM                    | TO                            |
|-------------------------|-------------------------------|
| Negative contact of C1  | Adjustable side of S2         |
| Breaker of S2           | Resistor R2                   |
| Positive side of magnet | Positive side of photocell    |
| Negative side of magnet | Pin 2 of the IC               |
| Bottom contact of S1    | Black battery wire            |
| Top contact of S1       | Negative side of capacitor C1 |

- j. Check the continuity of S1. Place the probes of a VOM across the S1 contacts and manually close the switch. If no reading is obtained on the VOM, clean the switch contacts with a fine file and recheck. If there is still no reading, replace the switch.
  - k. Check the photocell. Use a VOM as instructed in a preceding paragraph.
  - l. If none of steps a through k above SOLVE THE SHUTTER PROBLEMS, REPLACE THE INTEGRATED CIRCUIT AND RE-TEST. IF THE SHUTTER IS STILL DEFECTIVE, REPLACE THE ENTIRE BASE BLOCK ASSEMBLY.
5. If the second (closing) blade stays open on all speeds:
- a. Check the adjustment of the S2 switch. Follow the procedure outlined in Section III of the "Repair Manual on Model 363, 366, and 374 Automatic Shutters."
  - b. Check the spring on the second (closing) blade. If the spring has slipped out of position (Figure 3-15), remove the scene selector, aperture wheel and light baffle and return the spring to its proper position.
- c. Check for a shorted C1. Test the capacitor (with the shutter uncocked) using a VOM. If the capacitor is shorted, replace it.
  - d. Check the photocell. Use a VOM as instructed in a preceding paragraph.
  - e. If none of steps a through d above SOLVE THE SHUTTER PROBLEMS, REPLACE THE INTEGRATED CIRCUIT AND RE-TEST. IF THE SHUTTER IS STILL DEFECTIVE, REPLACE THE ENTIRE ASSEMBLY.
6. If the second (closing) blade stays open on all speeds except 3000-dull:
- Check capacitor C2. If the capacitor is shorted, replace it.
7. If the blades close together only on 3000-dull:
- a. Check capacitor C1. If the capacitor is open, replace it.
  - b. Check for cold-soldering. Inspect the points where C1 is soldered to the flexible circuit. Resolder the junctions as necessary.
8. If the shutter speed was too slow at 75-dull-50:
- Replace capacitor C2.
9. If the shutter speed was very fast or if there was no reading at all at 75-dull:
- a. Check capacitor C2. If the capacitor is open, replace it.
  - b. Continuity check (refer to Figure 3-14). Check the continuity between the positive contact of C2 and the C2 contact of switch S3. Add a jumper if necessary.
10. If at 75-bright the shutter speed was very fast, while at 75-dull it was OK:
- a. Check capacitor C3. If open, replace the capacitor.
  - b. Continuity check (refer to Figure 3-14). Check the continuity between the positive

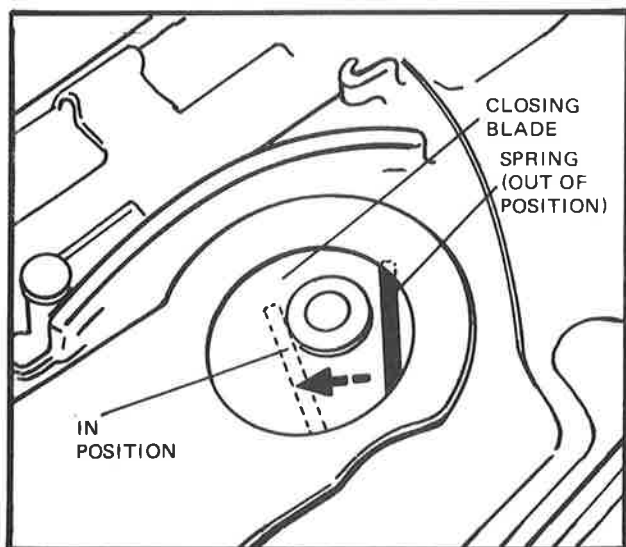


FIG. 3-15 SECOND BLADE SPRING

**PROBLEM ANALYSIS CHART**  
**MODEL 385 AUTOMATIC SHUTTER**

| PROBLEM                                       | PROBABLE CAUSE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | CORRECTIVE ACTION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Shutter reads a half stop fast on all speeds. | Defective IC.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Replace the IC.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Shutter reads slow on all speeds.             | Defective photocell.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Replace the photocell.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Both blades close together-<br>all speeds.    | <ol style="list-style-type: none"> <li>1. Rust or foreign matter on magnet, keeper or blades.</li> <li>2. Magnet and keeper misaligned.</li> <li>3. Bent cocking latch pin.</li> <li>4. S1 switch out of adjustment.</li> <li>5. S2 switch out of adjustment.</li> <li>6. Photocell misaligned.</li> <li>7. Open S1 switch.</li> <li>8. Defective magnet coil.</li> <li>9. Defective photocell.</li> <li>10. Defective IC.</li> <li>11. Open between negative contact of C1 and adjustable side of S2.</li> <li>12. Open between breaker side of S2 and resistor R2.</li> <li>13. Open between positive side of magnet and positive side of photocell.</li> <li>14. Open between negative side of magnet and pin 2 of the IC.</li> <li>15. Open between the bottom S1 contact and the black battery wire contact.</li> <li>16. Open between the top S1 contact and the negative side of C1.</li> <li>17. Cold solder at junction of brown and black wires at center terminal of converter.</li> </ol> | <ol style="list-style-type: none"> <li>1. Clean dirty components or replace rusted components.</li> <li>2. Adjust magnet to realign it with the keeper.</li> <li>3. Straighten pin or replace cocking latch.</li> <li>4. Adjust S1 switch.</li> <li>5. Adjust S2 switch.</li> <li>6. Realign photocell in its socket.</li> <li>7. Clean switch contacts.</li> <li>8. Replace magnet coil.</li> <li>9. Replace photocell.</li> <li>10. Replace the IC.</li> <li>11. Add a jumper wire between the affected points.</li> <li>12. Add a jumper wire between the affected points.</li> <li>13. Add a jumper wire between the affected points.</li> <li>14. Add a jumper wire between the affected points.</li> <li>15. Add a jumper wire between the affected points.</li> <li>16. Add a jumper wire between the affected points.</li> <li>17. Resolder wires.</li> </ol> |

| <b>PROBLEM ANALYSIS CHART</b><br><b>MODEL 385 AUTOMATIC SHUTTER</b>      |                                                                                                                                                  |                                                                                                                     |
|--------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|
| <b>PROBLEM</b>                                                           | <b>PROBABLE CAUSE</b>                                                                                                                            | <b>CORRECTIVE ACTION</b>                                                                                            |
| Blades stay open after flash fires.                                      | 1. R9 defective.<br>2. Closing diode defective.<br>3. Open between yellow wire and pin 12 of the converter circuit IC.<br>4. Yellow wire broken. | 1. Replace R9.<br>2. Replace diode.<br>3. Add a jumper wire between the affected points.<br>4. Replace yellow wire. |
| Customer complaint: Pictures too light or too dark at high light levels. | S2 out of adjustment.                                                                                                                            | Adjust S2.                                                                                                          |

### E. ELECTRONIC TIMER

The following procedures outline the steps to take if the electronic timer does not meet the requirements listed in Section II. If the requirements were not met, or if any other timer fault is suspected, complete these procedures. The information provided is summarized in the problem analysis chart at the end of the section.

1. If the timer battery did not meet the minimum 2.6 vdc requirement of the system checkout:  
Replace the timer battery.
2. If the battery drain measured in the system checkout exceeded 10 microamps:  
The timer filter capacitor is adversely affecting the battery and must be removed. Follow the instructions in Section IV.
3. If the timer is completely dead:
  - a. Check the timer battery and replace it if necessary.
  - b. Examine the timer switch. Be sure that it is "making" properly. If necessary, adjust or replace it according to the procedures in Section IV.
  - c. Check for an open in the timer battery leads and the leads from the switch to the timer.
  - d. If none of the above steps rectify the problem, replace the entire timer assembly.
4. If the timer is erratic in its timing cycles:  
This is caused by a defective component and

requires that the entire timer assembly be replaced.

5. If the timer lamp doesn't light:
  - a. Check the timer battery. If the battery is low or dead, replace it.
  - b. Check the timer switch. Make certain that it "makes" properly. Perform the continuity check and adjustment procedure detailed in Section IV.
  - c. Examine the circuit between the timer battery and the timer and between the switch and the timer for an open.
  - d. If none of the steps above solves the problem, replace the entire timer assembly.
6. If there is no "beep" at the end of the timing cycle (after the lamp has lit):  
The brass transducer plate may have slipped out of position. It must be repositioned in the manner noted in Section IV.
7. If the timer lamp will not go out after the timing cycle has been completed:
  - a. Examine the timer switch. Be certain it has not "bridged" closed. Adjust the switch as noted in Section IV.
  - b. If the switch is OK, there may be an internal short circuit in the timer assembly. Examine the unit for possible repair. If necessary, replace the entire timer assembly.
8. If the timer continues "beeping" after the timing cycle has been completed:  
Replace the timer lamp.

- a. Check the flash battery as instructed in the Special Procedures section. If necessary, replace the battery.
  - b. If the battery is OK, examine the flash for an open circuit. Repair the open with a jumper.
  - c. If the meter still does not rise to 2.5 vdc, check the ON-OFF switch. If it is faulty, the entire flash assembly must be replaced.
3. If the "Capacitor" meter did not rise to the 350 to 365 vdc range:
    - a. If the reading was low, adjust the converter circuit as detailed in Section IV. If the reading is still low, continue below.
    - b. Be certain the dump switch is working properly.
    - c. Be sure the 1240 uf capacitor has been fully "formed" by fast charging the unit using the battery charger. If the flash has been fully charged and the reading is still low, check the battery charger.
  4. If the electronic flash is dead and will not accept a charge from the converter (converter completely dead with no light and no sound):
    - a. Check the flash battery as instructed in the Special Procedures section. If necessary, replace the battery.
    - b. Examine the circuit for an open. Repair the open with a jumper if possible.
    - c. Check the converter output voltage as previously instructed. Adjust the converter if the reading is low. If the reading cannot be brought within specification, replace the entire converter circuit.
    - d. Examine the connectors on the flash and on the camera. If the connector on the flash is faulty, the entire flash assembly must be replaced. If the camera foot assembly is defective, replace it according to instructions in Section IV.
  5. If the flash is dead and will not accept a full charge from the converter (converter light dim and low buzzing or squealing sound):
    - a. Check the dump switch. Be sure it is open. Reposition or tweak the contacts to assure the proper opening of the switch. Be certain that the yellow switch wire is not interfering with the opening of the switch. Also examine the mounting rivets on the switch. If there is excessive play, attempt to tap them down to hold the switch tightly. If this cannot be done, replace the flash assembly.
    - b. Examine the leads in the flash assembly. Be sure the leads to the 1240 uf capacitor are intact. Replace or splice them as necessary. Check the white wire between the negative end of the flash tube and the negative end of the battery. If necessary, splice this lead. Be sure the trigger capacitor lead is not touching the dump resistor lead.
  6. If the flash is dead and will not take a charge from the converter (while the converter light is bright but there is no sound):
 

The converter circuit is defective and must be replaced.
  7. If the flash will not fire after accepting a charge from the converter (converter light blinking):
    - a. Check the trigger circuit as specified in the Special Procedures section. If there is no arc, replace the trigger coil. Also examine the high voltage leads between the coil and flashtube and between the coil and circuit board. Be sure the trigger capacitor is properly soldered to the circuit board.
    - b. Check the flashtube. If it is cracked or broken, replace it. Be sure the ends of the flashtube are properly soldered.
    - c. Trace the lead between the negative end of the battery and negative end of the flashtube. Resplice it or replace it as necessary.
    - d. If all of the above check out OK, the flash connector may be defective. If so, replace the flash assembly.
  8. If the flash fires intermittently after the converter has charged the capacitor (converter light blinking properly):
    - a. Check the trigger circuit as specified in the Special Procedure section. If there is an intermittent arc, replace the trigger coil. Also examine the high voltage leads between the coil and flashtube and between the coil and circuit board. Be sure the trigger capacitor is properly soldered to the circuit board.
    - b. Check the flashtube. If it is cracked, broken or burned, replace it. Be sure the ends of the flashtube are properly soldered.
    - c. Check that the leads of the trigger capacitor are properly soldered to the board.
  9. If after receiving a full charge the flash will

## PROBLEM ANALYSIS CHART

### ELECTRONIC FLASH

| PROBLEM                                                                                                                              | PROBABLE CAUSE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | CORRECTIVE ACTION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|--------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Flash is dead and will not accept full charge from converter circuit. (Converter light dim and low buzzing or high squealing sound.) | <ol style="list-style-type: none"> <li>1. Dump switch not open.</li> <li>2. Yellow dump switch wire out of position holding switch closed.</li> <li>3. Stationary dump switch contact out of position.</li> <li>4. Mounting rivet on dump switch loose.</li> <li>5. Broken lead or defective solder connection to 1240 uf capacitor.</li> <li>6. Broken lead (white wire) or defective connection between negative end of battery and negative end of flashtube.</li> <li>7. Trigger capacitor lead touching dump resistor lead.</li> </ol> | <ol style="list-style-type: none"> <li>1. Tweak the switch if possible or replace the flash assembly.</li> <li>2. Reposition wire and resolder if necessary.</li> <li>3. Reposition the contact if possible or replace the flash assembly.</li> <li>4. Tap rivet down tightly if possible or replace flash assembly.</li> <li>5. Replace or splice lead and/or resolder as necessary.</li> <li>6. Replace or splice lead and/or resolder as necessary.</li> <li>7. Separate component leads.</li> </ol> |
| Flash is dead and will not accept charge from converter circuit. (Converter light bright with no sound.)                             | Defective converter.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Replace converter.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Flash will not fire after converter has charged the capacitor. (Converter light blinking.)                                           | <ol style="list-style-type: none"> <li>1. Defective trigger coil.</li> <li>2. Defective high voltage winding.</li> <li>3. Faulty high voltage lead between coil and flashtube.</li> <li>4. Faulty high voltage lead between coil and circuit board.</li> <li>5. Arcing at end of trigger coil.</li> <li>6. Defective flashtube (cracked, broken, or burned).</li> <li>7. Ends of flashtube not soldered properly.</li> </ol>                                                                                                                | <ol style="list-style-type: none"> <li>1. } Replace trigger coil.</li> <li>2. }</li> <li>3. }</li> <li>4. }</li> <li>5. }</li> <li>6. Replace flashtube.</li> <li>7. Resolder as necessary.</li> </ol>                                                                                                                                                                                                                                                                                                  |

## PROBLEM ANALYSIS CHART

### ELECTRONIC FLASH

| PROBLEM                                                    | PROBABLE CAUSE                                                                                                                                                                                                                                                                                                                   | CORRECTIVE ACTION                                                                                                                                                                                                                                                                                                                                                                 |
|------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Flash fires when it is clipped onto the camera.            | Faulty dump switch.                                                                                                                                                                                                                                                                                                              | Repair or replace entire flash assembly.                                                                                                                                                                                                                                                                                                                                          |
| Flash smokes (not on camera) when ON-OFF switch turned ON. | Short circuit in the flash assembly.                                                                                                                                                                                                                                                                                             | Inspect all wiring and solder connections. Repair if possible or replace entire flash assembly.                                                                                                                                                                                                                                                                                   |
| Louvers do not move freely.                                | <ol style="list-style-type: none"> <li>1. Circuit board and reflector out of position.</li> <li>2. Foreign object in louvers or linkage.</li> <li>3. Flashtube out of position.</li> <li>4. Spring missing from linkage.</li> </ol>                                                                                              | <ol style="list-style-type: none"> <li>1. Adjust board and reflector.</li> <li>2. Clean flash assembly and position wires properly.</li> <li>3. Reposition flashtube.</li> <li>4. Replace spring.</li> </ol>                                                                                                                                                                      |
| Strobe will not turn off.                                  | <ol style="list-style-type: none"> <li>1. ON-OFF switch bridged by solder.</li> <li>2. Defective ON-OFF switch.</li> </ol>                                                                                                                                                                                                       | <ol style="list-style-type: none"> <li>1. Clean and resolder.</li> <li>2. Replace flash assembly.</li> </ol>                                                                                                                                                                                                                                                                      |
| Flash light output too high.                               | Converter voltage adjustment too high.                                                                                                                                                                                                                                                                                           | Adjust converter.                                                                                                                                                                                                                                                                                                                                                                 |
| Flash light output too low.                                | <ol style="list-style-type: none"> <li>1. Converter voltage adjustment too low.</li> <li>2. Flash reflector dirty.</li> <li>3. Louvers dirty or sticking.</li> <li>4. Lighten-Darken knob not adjusted properly.</li> <li>5. Circuit board and reflector out of position.</li> <li>6. Low value photoflash capacitor.</li> </ol> | <ol style="list-style-type: none"> <li>1. Adjust converter to 350-365 volts.</li> <li>2. Clean flash reflector.</li> <li>3. Clean louvers and mechanical linkage.</li> <li>4. Adjust Lighten-Darken knob as instructed in Section IV.</li> <li>5. Adjust board and reflector.</li> <li>6. a) Change capacitor (use a Sprague capacitor).<br/>b) Install a clear bezel.</li> </ol> |
| "No strobe mode."                                          | <ol style="list-style-type: none"> <li>1. Closing diode reversed.</li> <li>2. Leads of closing diode or resistor R9 not properly soldered.</li> <li>3. Flash battery discharged.</li> </ol>                                                                                                                                      | <ol style="list-style-type: none"> <li>1. Install diode in proper position.</li> <li>2. Resolder components to circuit board.</li> <li>3. Recharge flash assembly on fast charger.</li> </ol>                                                                                                                                                                                     |

## SECTION 4 - REPAIR AND ADJUSTMENT PROCEDURES

This section of the repair manual contains instructions for the repair and adjustment of Model 360 assemblies. CONSULT THE SAFETY PORTION OF SECTION III BEFORE ATTEMPTING ANY REPAIRS.

### A. BATTERY CHARGER

#### Replacing the Charger Lamp

##### Removal

- Peel the two foam rubber pads off the bottom of the charger (Figure 4-1).

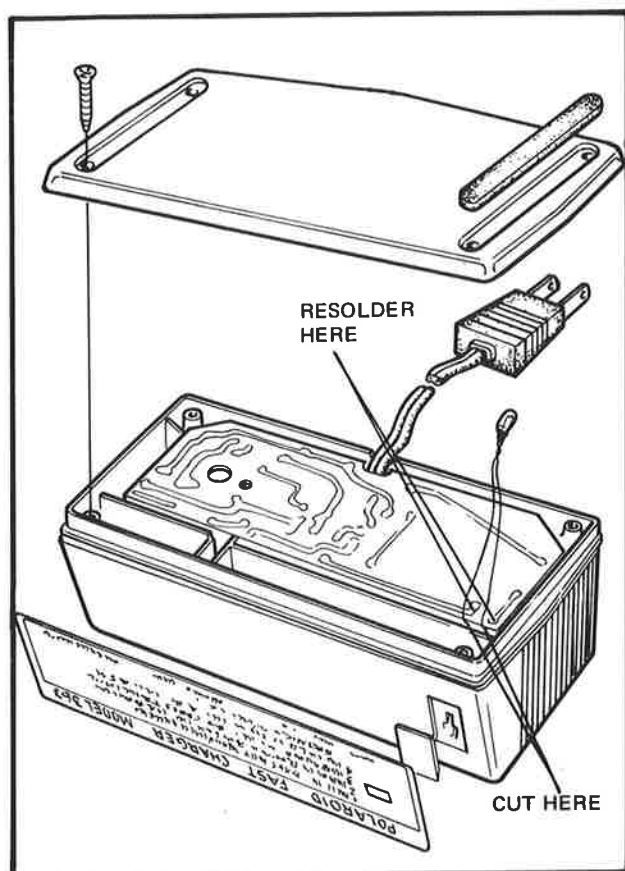


FIG. 4-1 REPLACING THE CHARGER LAMP

- Remove the four Phillips head screws and lift off the bottom cover.
- Carefully remove the lamp from its holder and extend the leads to their full length.
- Cut the leads at the points shown in Figure 4-1.

##### Replacement

- Solder the leads of a new lamp to the solder connections shown in Figure 4-1.
- Place the lamp into its holder.

- Position the bottom cover on the battery charger and secure it using the four Phillips head screws.

- Adhere the two foam rubber pads in place.

### B. MODEL 385 AUTOMATIC SHUTTER

#### Replacement of the Base Block and Electronic Mounting Board Assembly

##### Removal

- Extend the bellows until the detent lock snaps into place. Cock the shutter.
- Remove and discard the top etch plate from the shutter housing using a pair of tweezers.
- Remove the three shutter fastening screws from the bellows side of the shutter housing (two short screws and a longer screw at the top of the cable release cover). Separate the shutter casting.
- Remove the two screws holding the base block and the two screws holding the electronic mounting block. Carefully lift the entire assembly out of the shutter casting.
- Using an Unger solder gobbler (or equivalent), unsolder the four leads from the printed circuit. Remove and discard the old base block and electronic mounting block assembly.

##### Replacement

- Solder the four leads to the printed circuit board of a new base block and electronic mounting board assembly. Use Figure 4-2 as a guide for the solder locations of the four leads.

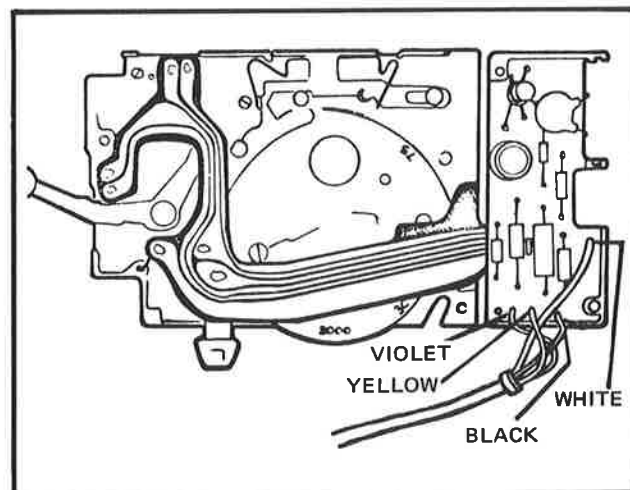


FIG. 4-2 LOCATION OF WIRES ON ELECTRONIC MODULE

as shown in Figure 4-7 and solder the three leads to the timer switch.

- b. Secure the rear door to the spider by replacing the four rivets. Use a De-Staco tool with anvil B11357 pt. 3 and head B11357 pt. 4.
- c. Solder the black and white leads to the timer (see Figure 4-6).
- d. Activate the cement on the electrical name-

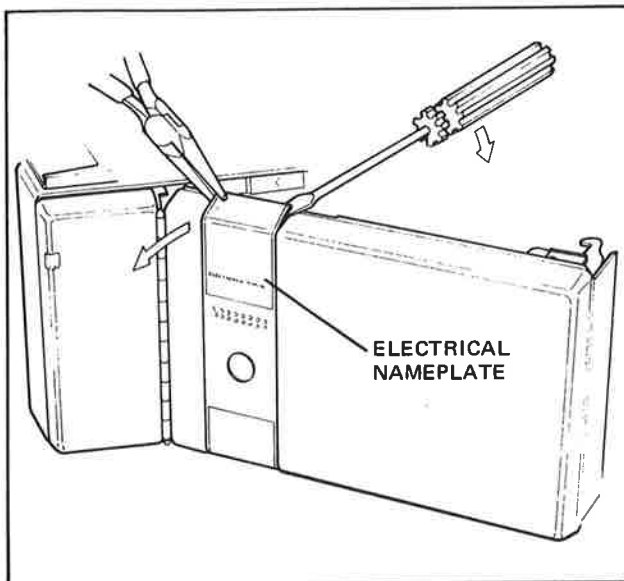


FIG. 4-5 FREEING THE ELECTRICAL NAMEPLATE

plate using M.E.K. (methyl-ethyl-ketone) and secure the nameplate in place on the rear door.

- e. Adhere the driving knob to the timer potentiometer as follows:

First, if necessary, scrape away any accumulation of cement or melted plastic from the potentiometer using an X-acto knife. Next, place the driving knob over the potentiometer, lining up the tang on the knob with the slot on the potentiometer. Hold the knob in place and open the back door of the camera. Use a #535, 23½w Ungar Soldering Iron (without a tip) to

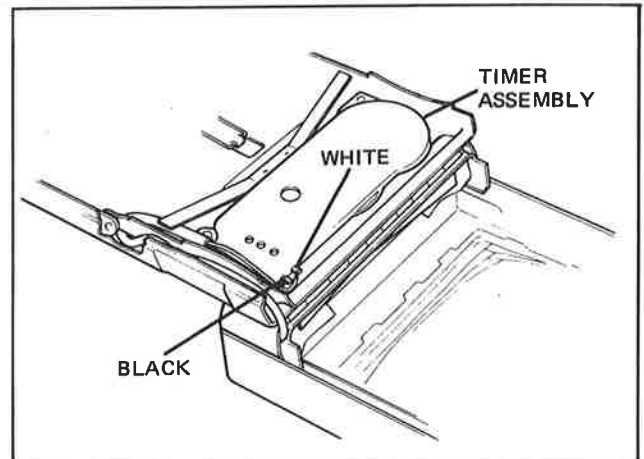


FIG. 4-6 UNSOLDERING THE TIMER LEADS

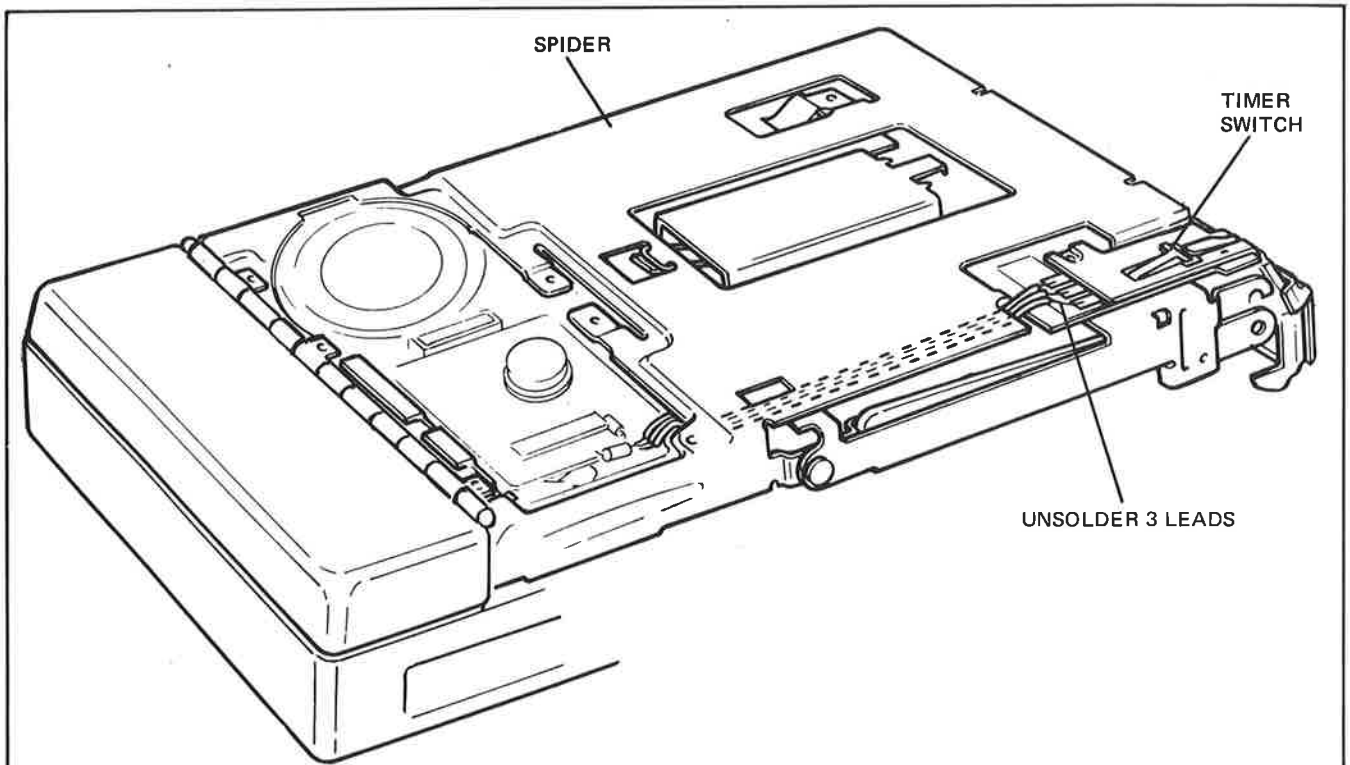


FIG. 4-7 UNSOLDERING THE SWITCH LEADS

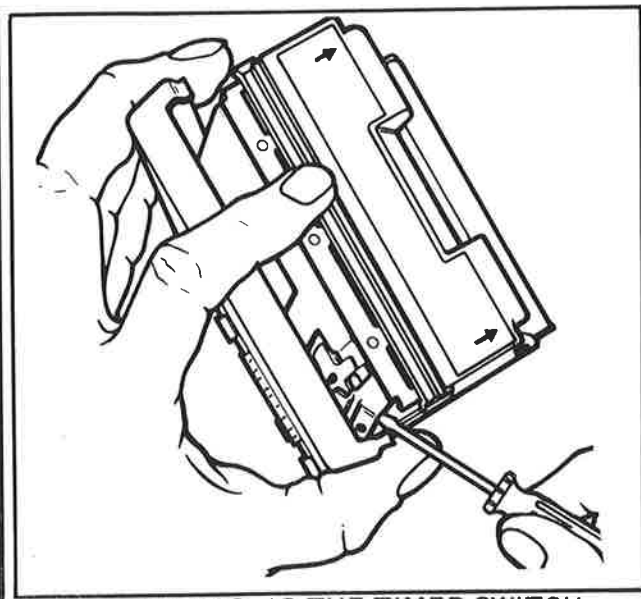


FIG. 4-9 RELEASING THE TIMER SWITCH

the spider away from the door. DO NOT BEND THE SPIDER TOO FAR. Pry the timer switch out of its place in the spider and allow it to hang free.

c. Check the timer switch continuity:

1. Set a VOM at the Rx1 scale and place probes on the contacts shown in Figure 4-10. The reading should be INFINITY.

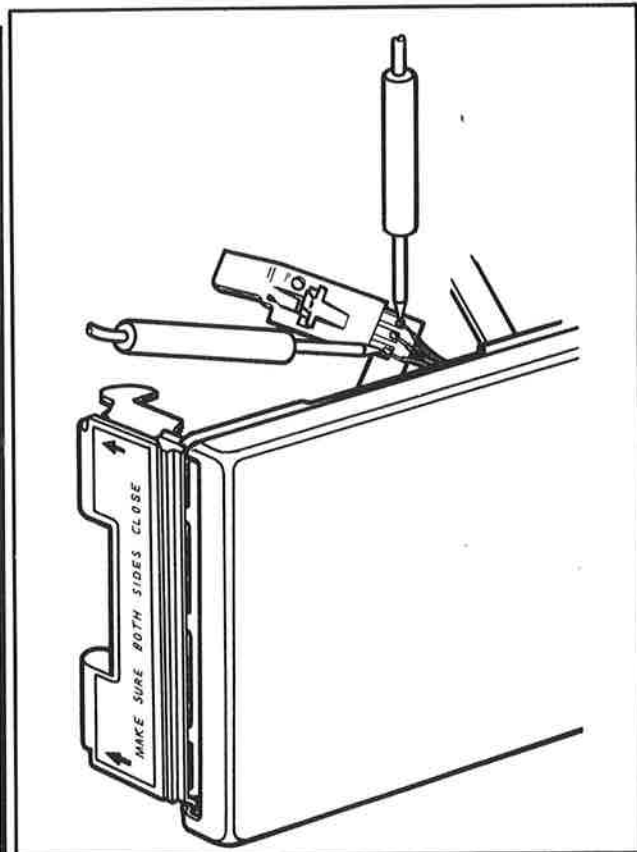


FIG. 4-10 CHECKING THE TIMER SWITCH

If the meter shows a continuity reading, check for bridging of the solder connections between the switch contacts. If none, replace the switch (refer to step d, below).

2. If the reading in step 1 is INFINITY, depress the switch tab. The reading should be zero. If not, check the "T" contact to be sure that both arms are touching the contacts. If either arm is not touching, tweak that arm until it does touch the contact. If the arms are touching the contact and the reading is still INFINITY, spray the arms and contacts with "Hush" (red can) contact cleaner and re-check the reading. If the reading is still not correct, replace the timer switch as follows:

d. Timer Switch Replacement:

**Removal**

Unsolder the three leads from the timer switch contacts.

**Replacement**

Solder the three timer leads to the switch contacts using an Unger "Princess" solder iron (or equivalent). Refer to Figure 4-10 for solder points.

- e. Carefully position the timer switch back into the spider, aligning the rivet hole in the switch with the rivet holes in the spider and door. Also be sure that the three plastic ridges on the switch are properly aligned with the three holes in the spider. Manually push back the tab to observe the operation of the switch before securing it.
- f. Position the red roll latch in place and secure the spider to the door with rivets using De-Staco tool with anvil B11257 (part 3) and head B11357 (part 4).

**3. Electronic Timer Transducer and Lamp Replacement**

- a. Disassemble the timer from the rear door. (Refer to procedure: "Replacing the Electronic Timer" – do not unsolder the two timer leads or remove the two rear door rivets.)

b. Transducer Replacement:

**Removal**

1. Unsolder the two transducer leads (Figure 4-11).

- c. With battery drain in excess of 10 microamps, the timer filter capacitor (Figure 4-14) must be replaced. The manner in

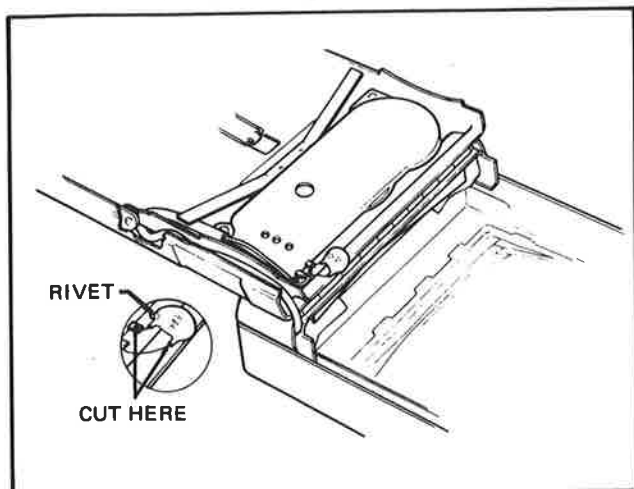


FIG. 4-14 REMOVING THE TIMER FILTER CAPACITOR

which it is removed depends on the following steps:

- Lift the filter capacitor up and **very carefully** examine the timer contacts. On some cameras, these contacts are internally grounded with a very fine wire running under the spider. If you find that the camera is internally grounded to the positive contact (Figure 4-15 for identification of positive and negative contacts),

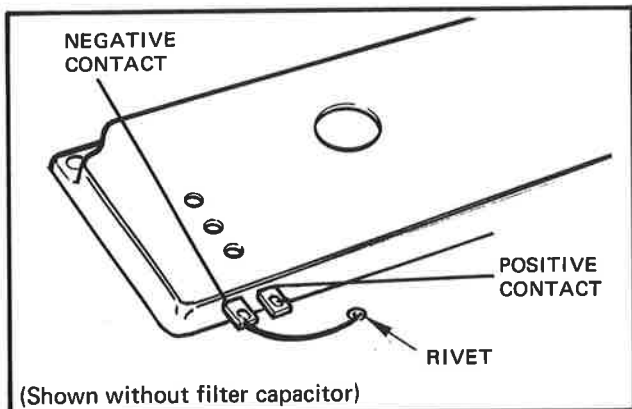


FIG. 4-15 RELOCATING THE LEAD

you must cut the filter capacitor leads flush to the contacts and transfer the internal ground from the positive to the negative contact. If the ground is to the negative contact, also cut the capacitor leads flush to the contacts. **In either case, with an internal ground in place on the negative contact, install a new .05 uf, 10 V capacitor and reassemble the camera. If there was no internal ground, cut the capa-**

**tor leads as shown in Figure 4-14 and continue below.**

- f. Scrape the paint off the rivet (which was covered by the capacitor) and clean it thoroughly.
- g. Solder the long lead to the rivet.
- h. Install a new .05 uf, 10V capacitor and re-check the battery drain.
- i. Repaint the affected area using Kodak Brushing Lacquer No. 4 Dull Black.

## D. ELECTRONIC FLASH SYSTEM

### 1. Replacing the Converter Circuit Board

#### Removal

- a. Remove the rear cover:
  1. Carefully pry one of the hinge plugs free using a jeweler's screwdriver.
  2. Drive the hinge pin and remaining hinge plug free of the hinge using a 1/16" drive
- b. Release the foot assembly from the body (Figure 4-16):

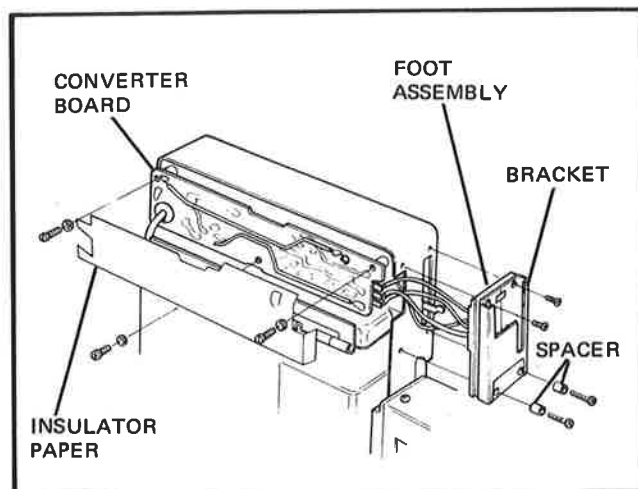


FIG. 4-16 REMOVING THE FOOT ASSEMBLY

1. Remove the four Phillips head retaining screws and the two spacers.
2. Slide the bracket off the foot assembly.
- c. Remove the Phillips head and two pan head retaining screws securing the converter circuit to the body.
- d. Free the timer cable (Figure 4-17) from the converter circuit board by cutting away a corner of the board using a pair of heavy-duty cutters.
- e. Remove the foot assembly from the converter circuit board by unsoldering the violet, brown, black and red leads from the board.

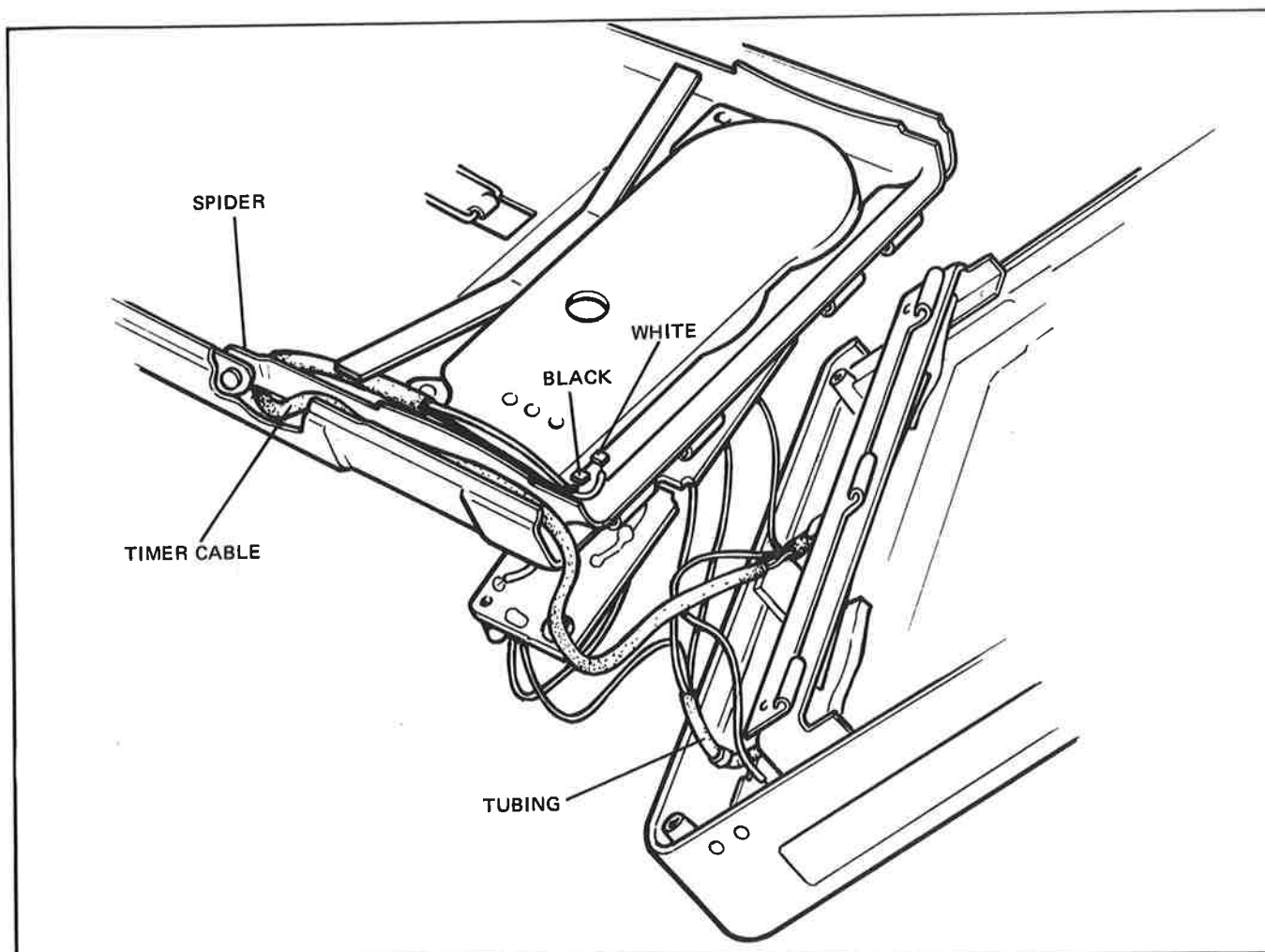


FIG. 4-18 REASSEMBLING THE CONVERTER CIRCUIT

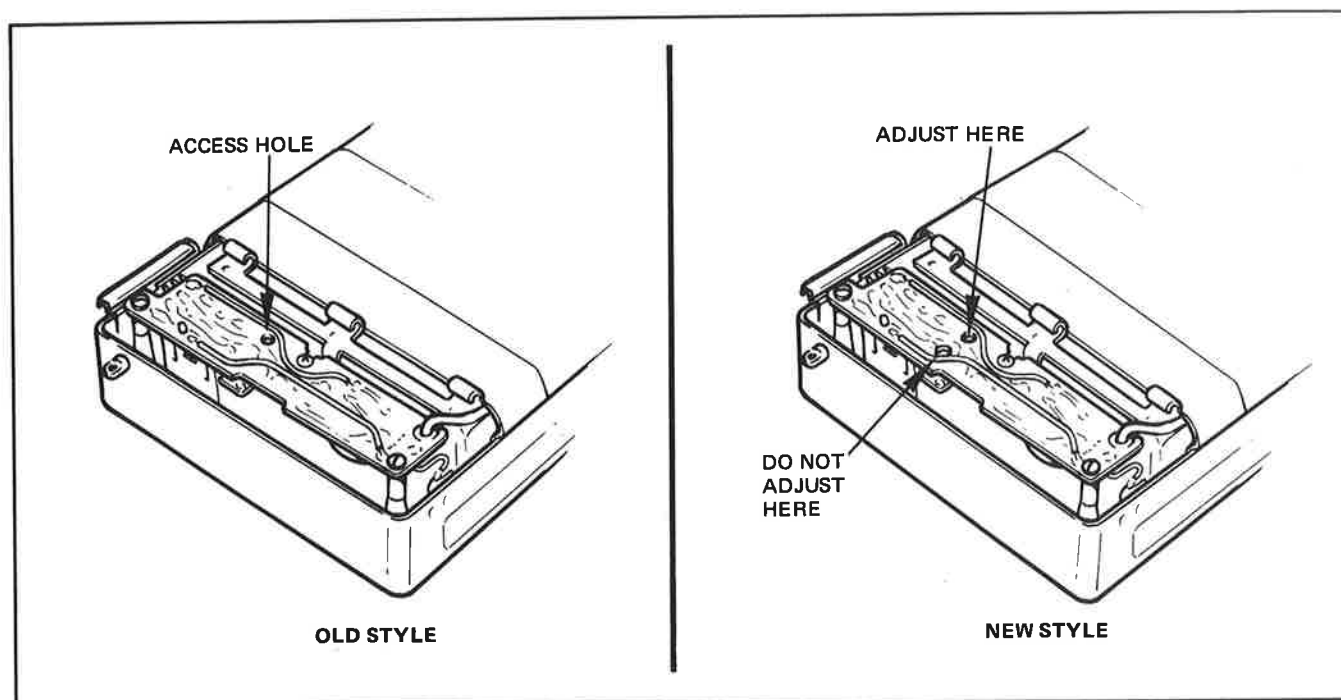


FIG. 4-19 ADJUSTMENT OF OLD AND NEW STYLE CONVERTER

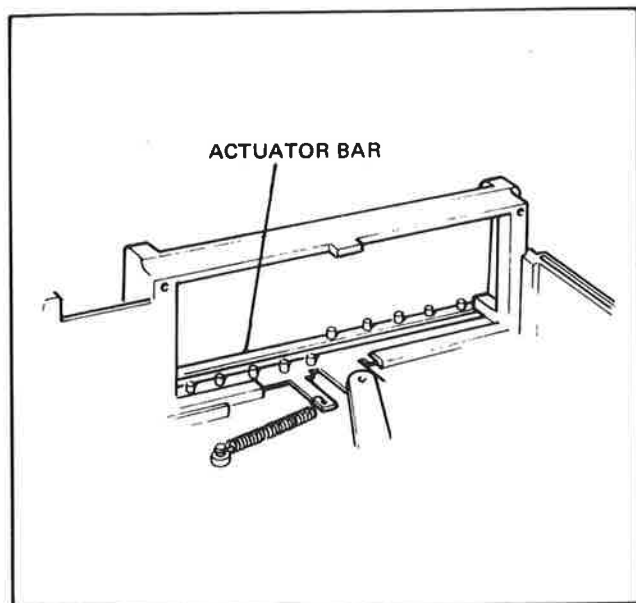


FIG. 4-23 REMOVING THE ACTUATOR BAR

louvers (Figure 4-24). If the louvers do not function properly, adjust as follows:

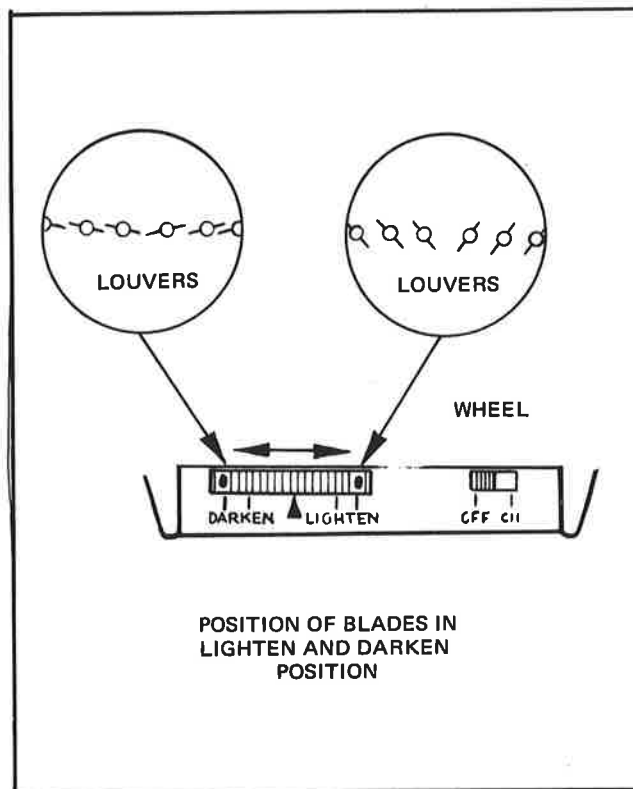


FIG. 4-24 REINSTALLING THE LOUVERS

#### Louver Adjustment

1. Turn the "Darken-Lighten" wheel to full **LIGHTEN**. Fit the tabs of tool CR11343 in the slots of the locknut and rotate the tool **counterclockwise** until the locknut is loose (Figure 4-25).

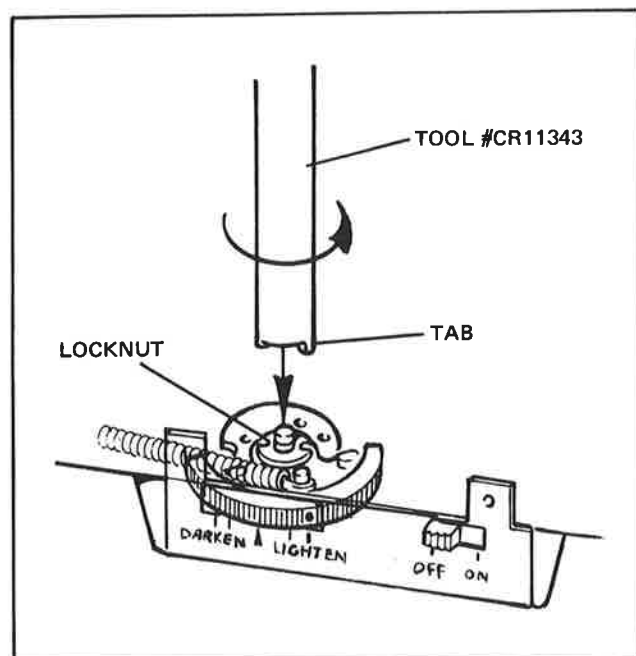


FIG. 4-25 LOOSENING THE ADJUSTMENT NUT

2. Insert a 1/16" drive pin punch (or equivalent) in a zero adjust cam slot and rotate the cam **clockwise** until the louvers are almost fully closed (Figure 4-26). Remove the punch.

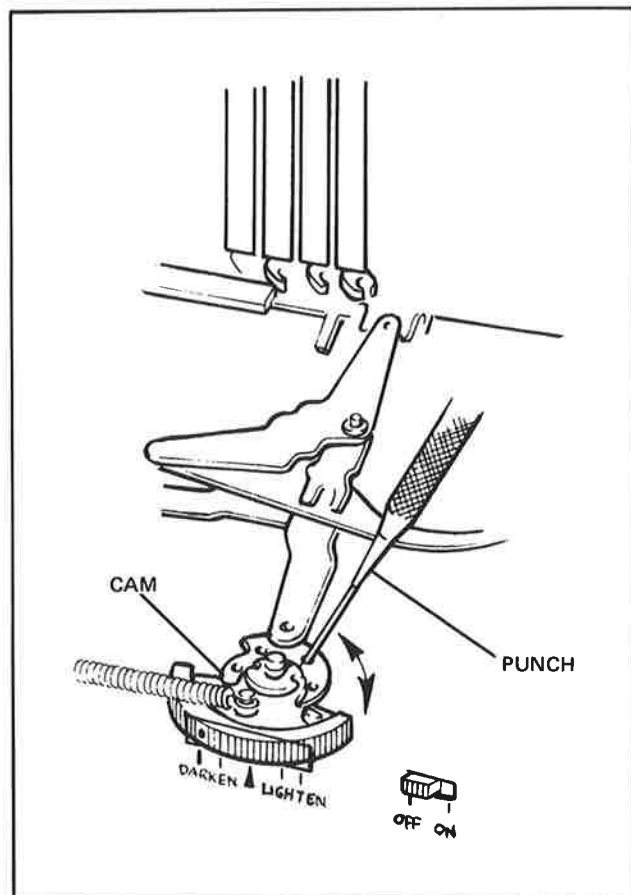


FIG. 4-26 ADJUSTING THE LOUVERS

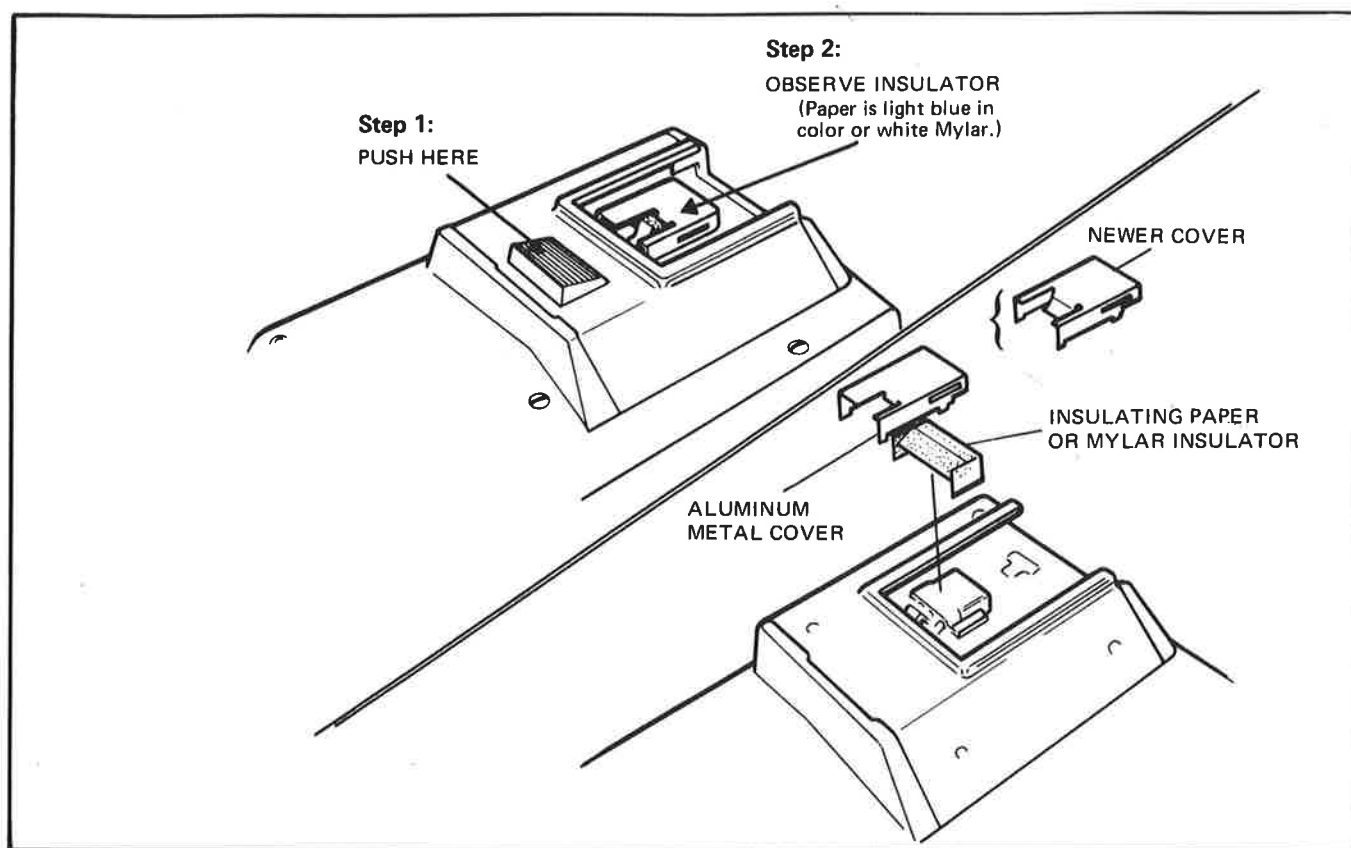


FIG. 4-27A

- b. Position the insulator in the connector with the original bent section pointed down, toward the flash (Figure 27-C).
- c. Using the insertion tool, push the insulator into the connector. Push in all the way, until the step in the tool hits the aluminum cover.
- d. Push down the red button and check to see that the mylar insulator is positioned over the wires as shown in Figure 27D. On the newer covers, you will be able to see the two ends of the insulator without pushing down the red button.

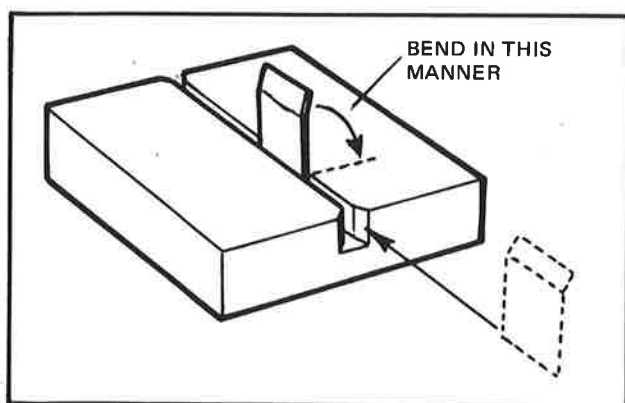


FIG. 4-27B BENDING THE INSULATOR

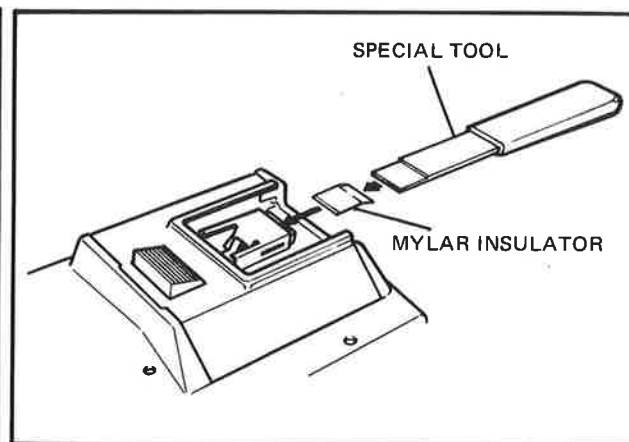


FIG. 4-27C INSTALLING THE INSULATOR

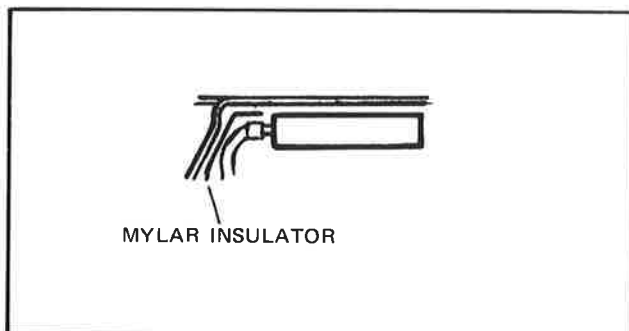


FIG. 4-27D FINAL CONFIGURATION

- e. Remove the two pan head retaining screws and washers from the converter board (Figure 4-30), releasing the battery compartment.

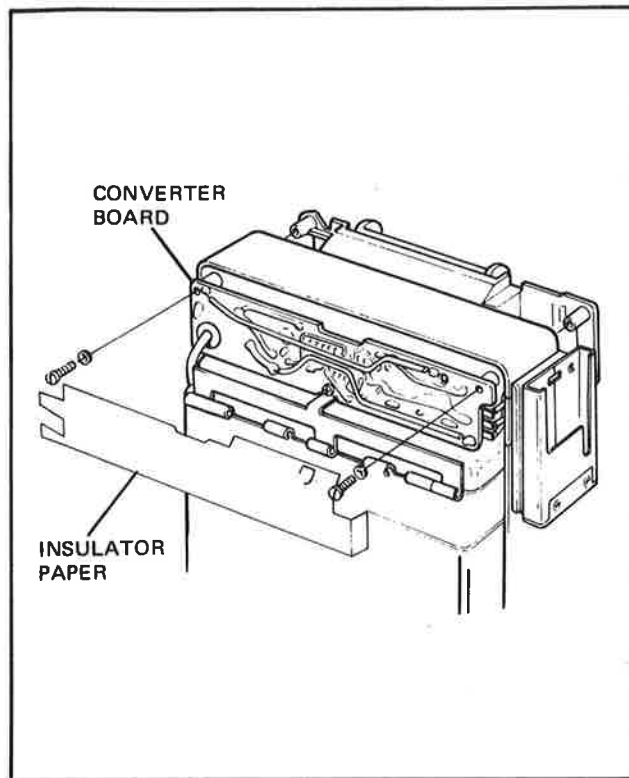


FIG. 4-30 LOCATION OF RETAINING SCREWS

- f. Cut the white lead (at the eyelet) running to the battery interlock contact (Figure 4-31).
- g. Release the shutter cable and battery cable from the battery compartment feed-thru holes by carefully snipping the plastic using cutters (see Figure 4-31). Slide the battery cradle through the opening in the battery compartment and remove the battery compartment.

#### Replacement

- a. Carefully snip away the plastic from the cable feed-thru holes in the new battery compartment so that the cables can be inserted (see Figure 4-31).
- b. Slide the battery cradle through the opening in the battery compartment and solder the white lead to the battery interlock contact eyelet. Insert the shutter cable and battery cable in the battery compartment.
- c. Secure the battery compartment to the converter board using the two pan head retaining screws and washers.

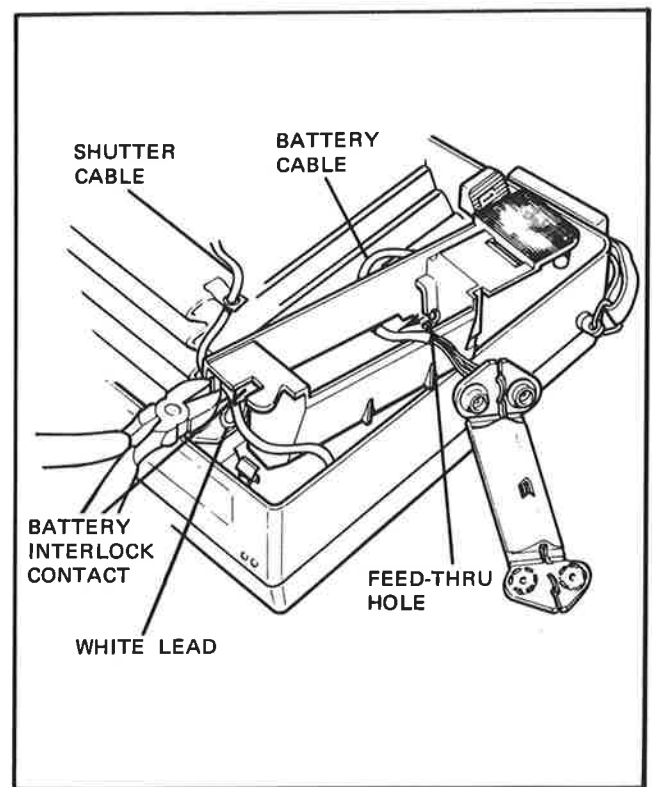


FIG. 4-31 CUTTING THE BATTERY COMPARTMENT

- d. Secure the rear cover to the rear door:
  1. Position the insulator paper over the converter board and install the rear cover so that the latch catches in the body slot and the hinge is aligned with the rear door hinge.
  2. Insert the hinge pin in the hinges and replace the two hinge plugs.
- e. Secure the battery compartment to the body using the two Phillips head screws.
- f. Replace the batteries.
- g. Replace the left hand guard.

### 3. Replacing the Battery Cradle

#### Removal

- a. Remove the left hand guard.
- b. Remove the batteries.
- c. Remove the rear cover:
  1. Carefully pry one of the hinge plugs free using a jeweler's screwdriver.
  2. Drive the hinge pin and remaining plug free of the hinge using a 1/16th inch drive pin punch. Remove the rear cover and insulator paper.

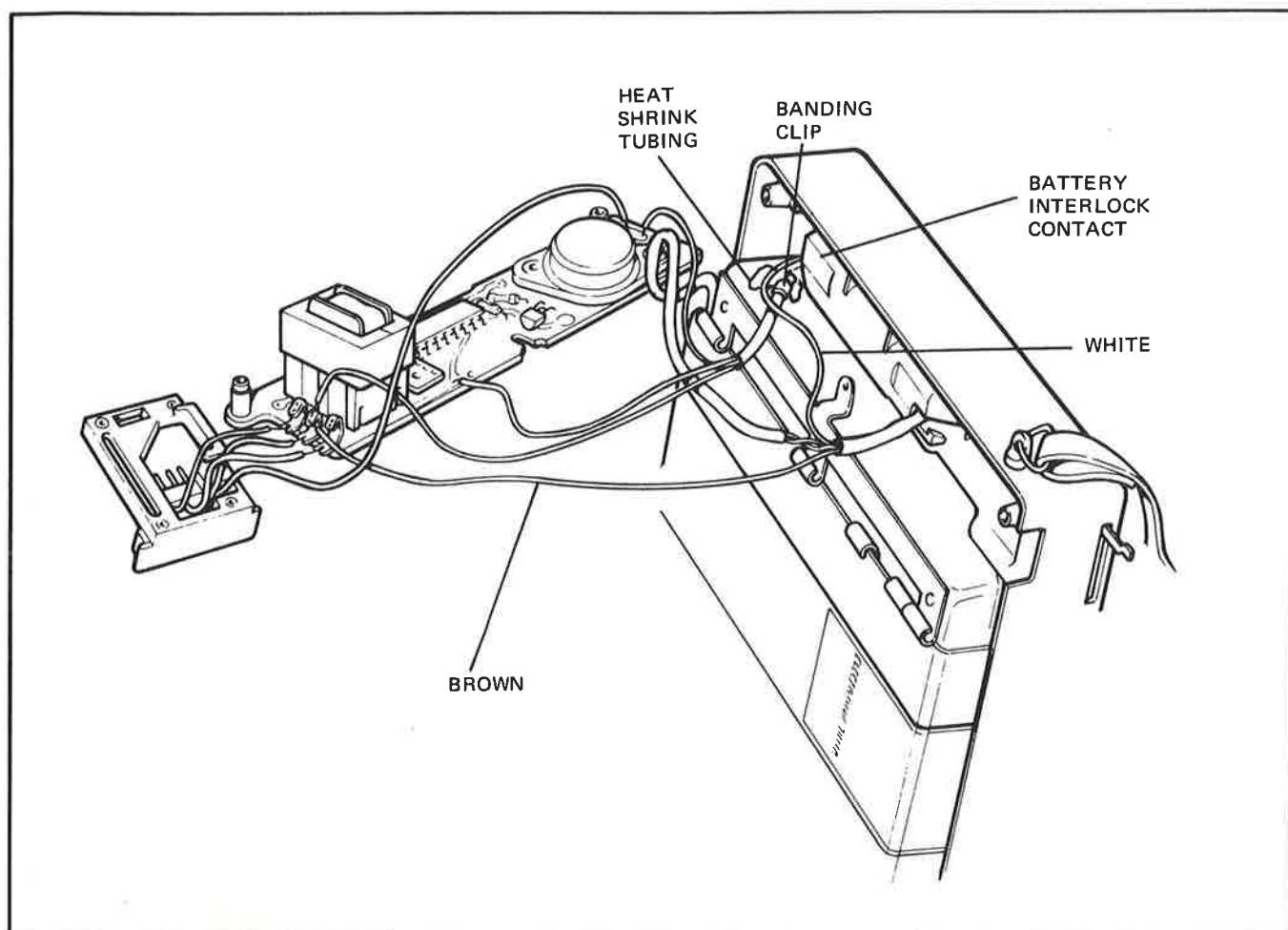


FIG. 4-34 RELEASING THE BATTERY INTERLOCK LEAD

- the four Phillips head screws.
- f. Position the converter board in the body and secure it in place using the three screws and washers.
  - g. Secure the rear cover to the rear door:
    1. Position the insulator paper over the converter board and install the rear cover so that the latch catches in the body slot and the hinge is aligned with the rear door hinge.
    2. Insert the hinge pin in the hinges and replace the two hinge plugs.
  - h. Replace the batteries.
  - i. Replace the left hand guard.

## SECTION 5 - PARTS IDENTIFICATION

The exploded views in this section are used to identify those parts which are available for replacement. To find a particular part number, turn to the appropriate illustration and locate the key number of the part. The proper name and number of that part can then be found beside the key number in the parts list.

Component parts of an assembly (which are individually available) are indented immediately below the assembly in the parts list. For example:

| KEY NO. | PART NAME                      | PART NUMBER | SUGG. LIST PRICE |
|---------|--------------------------------|-------------|------------------|
| 1       | Shutter Front Casting Assembly | 223823      | 14.00            |
| 2       | Front Decorative Plate         | 250729      | .20              |
| 3       | Bezel Assembly                 | 204408      | 1.10             |
| 4       | Center Ring                    | 149809      | .13              |
| 5       | Outer Ring                     | 149810      | .35              |

To order parts:

Give PART NUMBER, Full PART NAME, and QUANTITY desired.

Give exact shipping instructions and your complete shipping address.

Address all parts orders to:

Polaroid Corporation  
Camera Parts Department  
89 Second Avenue  
Waltham, Massachusetts 02154

Prices F.O.B. Waltham, Massachusetts

Terms (to accredited accounts): Net 30 days.

Merchandise returns accepted only upon written authorization by Polaroid Corporation.

This price schedule supersedes all previous price schedules.

Prices are subject to change without notice.

## PICTORIAL INDEX

| Key<br>No. | Part Name                 | Plate |
|------------|---------------------------|-------|
| 1          | Shutter Assembly          | B     |
| 2          | Body/Bellows Assembly     | C & D |
| 3          | Rear Door Assembly        | E     |
| 4          | Rear Cover Assembly       | E     |
| 5          | Electronic Flash Assembly | F     |
| 6          | Fast Charger Assembly     | G     |
| 7          | Front Cover Assembly      | H     |

## PARTS LIST A COMMON HARDWARE

| Key<br>No. | Part Name                       | Part<br>Number |
|------------|---------------------------------|----------------|
| 8          | Screw, Shutter Shaft            | 149570         |
| 9          | Bowed Washer                    | 160442         |
| 10         | Screw, Bellows (4)              | 220968         |
| 11         | Bellows Front Frame Light Seal  | 179731         |
| 12         | Shutter Shaft                   | 168098         |
| 13         | Shutter Shaft Sleeve            | 168099         |
| 14         | Detent Stud                     | 160473         |
| 15         | Detent                          | 157949         |
| 16         | Neck Strap Assembly             | 163016         |
| 17         | Band                            | 160573         |
| 18         | Tension Slide                   | 157824         |
| 19         | Keeper                          | 157821         |
| 20         | "D" Ring (2)                    | 160455         |
| 21         | Spring, R. F. Body              | 149528         |
| 22         | Rangefinder-Viewfinder Assembly | 181540         |
| 23         | Hinge Pin (right)               | 149542         |
| 24         | Hinge Pin (left)                | 149543         |
| 25         | Hinge Pin, Rear Door            | 149526         |
| 26         | Hinge Plug (2)                  | 157887         |

## PARTS LIST B

| Key<br>No. | Part Name                                                                  | Part<br>Number |
|------------|----------------------------------------------------------------------------|----------------|
|            | Shutter Assembly-complete (includes<br>Base Block & Electronic Mtg. Block) | 223906         |
| 1          | Shutter Front Casting Assembly                                             | 223823         |
| 2          | Front Decorative Plate                                                     | 250729         |
| 3          | Bezel Assembly                                                             | 204408         |
| 4          | Center Ring                                                                | 149809         |
| 5          | Outer Ring                                                                 | 149810         |
| 6          | Bezel Spring                                                               | 149813         |
| 7          | Front Lens Mount Assembly                                                  | 155235         |
| 8          | Bezel Friction Spring                                                      | 152525         |
| 9          | Wave Washer                                                                | 155179         |
| 10         | Cell Lens Mount                                                            | 154856         |
| 11         | Cell Lens                                                                  | 154071         |
| 12         | Cell Lens Retainer                                                         | 154857         |
| 13         | Rivet, Cell Wedge (2)                                                      | 149838         |
| 14         | Cell Wedge                                                                 | 220796         |
| 15         | Shutter Rear Casting Assembly                                              | 223824         |
| 16         | Release Block Retainer                                                     | 152521         |
| 17         | Shutter Gasket                                                             | 155331         |
| 18         | "C" Lens Retainer                                                          | 154046         |
| 19         | Lens, Rear Positive                                                        | 155242         |
| 20         | Shutter Release Block                                                      | 146722         |
| 21         | Elec. Mtg. Board Insulator                                                 | 157939         |
| 22         | Dowel Pin (2)                                                              | 149821         |
| 23         | Screw, Module Mounting (2)                                                 | 149817         |
| 24         | Spring, Shutter Mount                                                      | 172320         |
| 25         | Shutter Mount                                                              | 252403         |
| 26         | Screw, Shutter Mount                                                       | 149538         |
| 27         | Battery Wire Assembly                                                      | 222448         |
| 28         | Banding Clip                                                               | 130501         |
| 29         | Top Etch Plate                                                             | 250552         |
| 30         | Front Casting Light Seal                                                   | 163301         |
| 31         | Screw, Base Block Mtg. (long)                                              | 149865         |
| 32         | Screw, Base Block Mtg. (short)                                             | 157866         |
| 33         | Cable Release Cover                                                        | 149740         |
| 34         | Screw, Shutter Fstg. (long)                                                | 149822         |
| 35         | Screw, Release Cover (2)                                                   | 154870         |
| 36         | Screw, Shutter Fstg. (short) (2)                                           | 149828         |

## PARTS LIST C (cont'd.)

| Key<br>No. | Part Name                        | Part<br>Number |
|------------|----------------------------------|----------------|
| 10         | Shutter Release Bushing Assembly | 155117         |
| *11        | Return Spring                    | 149551         |
| *12        | Shutter Release Knob             | 146689         |
| 13         | Latch Pivot                      | 157899         |
| 14         | Bezel, Shutter Release           | 153234         |
| 15         | Strap Lug (2)                    | 157804         |
| 16         | Spring, Release Latch            | 160416         |
| 17         | Magnet                           | 188090         |
| 18         | Pole Piece (2)                   | 188089         |
| 19         | Magnet Spring                    | 195194         |
| 20         | R. F. -V. F. Pivot Pad (2)       | 149710         |
| 21         | Magnet Pivot (eccentric)         | 185640         |
| 22         | Tab Strip Bar                    | 163085         |
| 23         | Screw, Tab Strip Bar (2)         | 160465         |
| *24        | Screw, Foot (2) - Rear           | 224434         |
| *25        | Spacer, Foot Screw (2)           | 251698         |
| *26        | Foot Assembly                    | 223832         |
| *27        |                                  |                |
| *28        | Foot Body                        | 220179         |
| *29        | Screw, Foot (2) - Front          | 250173         |
| 30         | Filler (left)                    | 157915         |
| 31         | Light Seal Assembly              | 223907         |
| 32         | Stationary Hinge                 | 222549         |
| 33         | Rivet, Stationary Hinge (3)      | 121741         |
| 34         | Rivet, Spring Stop (2)           | 76121          |
| 35         | Spring Stop                      | 149520         |
| 36         | Rivet, Light Seal (4)            | 76175          |
| 37         | Filler (right)                   | 157916         |
| *38        | Insulator Paper                  | 252961         |
| *39        | Screw, Mounting (Phillips head)  | 250182         |
| *40        | Washer (3)                       | 250183         |
| *41        | Screw, Mounting (2) (slot head)  | 223905         |
| *42        | Converter Circuit Board Assembly | 222953         |
| 43         | Rivet, Handguard Latch (2)       | 103191         |
| 44         | Handguard Latch                  | 252962         |
| *45        | Slot Cover                       | 149556         |
| 46         | Battery Interlock Assembly       | 255105         |
| 47         | Rivet, Spring Contact            | 157877         |
| *48        | Shutter Release Tip              | 155106         |
| 49         | Mounting Plate Spring            | 157923         |
| 50         | Rivet, Mounting Plate (2)        | 121741         |
| 51         | Release Arm                      | 149610         |
| 52         | Release Latch                    | 146674         |
| 53         | Screw, Release Arm               | 121180         |
| 54         | Spacer, Outer Frame (bottom)     | 153235         |
| 55         | Spacer, Outer Frame (top)        | 149554         |
| 56         | Pivot Pin, Outer Frame (bottom)  | 149553         |

\*Not shipped with Body/Bellows Assembly

## PARTS LIST D

| Key<br>No. | Part Name                                                                                    | Part<br>Number |
|------------|----------------------------------------------------------------------------------------------|----------------|
|            | Body/Bellows Assembly-cont'd.<br>(includes Key No's. 1 to 91<br>except those with asterisks) | 223830         |
| 57         | Focus Bar Assembly                                                                           | 223717         |
| 58         | Focus Button (right)                                                                         | 196438         |
| 59         | Rivet, Focus Button (2)                                                                      | 157860         |
| 60         | Inner Frame (top)                                                                            | 149567         |
| 61         | Zone Focus Plate                                                                             | 146684         |
| 62         | Sleeve, Focus Bar (right)                                                                    | 154561         |
| 63         | Washer, Focus Bar                                                                            | 154558         |
| 64         | Focus Bar Bracket                                                                            | 154559         |
| 65         | Rivet, Focus Bar Bracket (2)                                                                 | 82760          |
| 66         | Rivet, Detent Slide                                                                          | 149516         |
| 67         | Detent Slide                                                                                 | 149566         |
| 68         | Spring, Detent Slide                                                                         | 157869         |
| 69         | Focus Bar Plate                                                                              | 157919         |
| 70         | Sleeve, Focus Bar (left)                                                                     | 154563         |
| 71         | Rivet, Pick-Up Bracket (2)                                                                   | 223095         |
| 72         | Pick-Up Bracket                                                                              | 220183         |
| 73         | Bushing, Focus Bar                                                                           | 155121         |
| 74         | Focus Button (left)                                                                          | 196439         |
| 75         | Bellows Light Seal                                                                           | 179732         |
| 76         | Bellows Assembly                                                                             | 196378         |
| 77         | Flash Wire Tab Assembly (2)                                                                  | 204010         |
| 78         | Cable Release Wire Tab                                                                       | 204008         |
| 79         | Inner Frame Bottom Assembly                                                                  | 154575         |
| 80         | Track Guide                                                                                  | 149550         |
| 81         | Rivet, Track Guide                                                                           | 157876         |
| 82         | Brake Rivet                                                                                  | 154565         |
| 83         | Brake Washer                                                                                 | 154562         |
| 84         | Brake Sleeve                                                                                 | 154560         |
| 85         | Brake Spring                                                                                 | 155120         |
| 86         | Rivet, Focus Bar (2)                                                                         | 154564         |
| 87         | "U" Frame Assembly                                                                           | 149545         |
| 88         | Link Pivot (2)                                                                               | 149581         |
| 89         | Spacer, Link Pivot (2)                                                                       | 149552         |
| 90         | Rivet, Shutter Mount Spring                                                                  | 162912         |
| 91         | Bushing, Shutter Mount                                                                       | 157857         |

## PARTS LIST E (cont'd.)

| Key<br>No. | Part Name                          | Part<br>Number |
|------------|------------------------------------|----------------|
| 7          | Exit Cover Frame Assembly          | 250556         |
| 8          | Pivot Spring, Exit Door            | 157894         |
| 9          | Pivot Stud, Exit Door (2)          | 157895         |
| 10         | Exit Door Assembly                 | 157932         |
| 11         | Exit Cover Plate                   | 146678         |
| 12         | Rivet, Exit Cover Frame (3)        | 121741         |
| 13         | Slide Block Assembly               | 155330         |
| 14         | Locating Spring, Edge Control (2)  | 149574         |
| 15         | Shaft                              | 157838         |
| 16         | Link, Slide Block                  | 157839         |
| 17         | Spring, Slide Block                | 157841         |
| 18         | Rivet, Slide Plate (4)             | 121741         |
| 19         | Slide Plate (2)                    | 157842         |
| 20         | Latch Pin                          | 160532         |
| 21         | Frame Roller Support               | 149755         |
| 22         | Front Roll Support (left)          | 155322         |
| 23         | Door Spring                        | 157904         |
| 24         | Rivet, Door Spring (2)             | 121741         |
| 25         | Spider, Rear Door                  | 224271         |
| 26         | Rivet, Roll Frame Spring (bottom)  | 121741         |
| 27         | Pivot, Spread Roll (2)             | 157809         |
| 28         | Rivet, Roll Frame Spring (top)     | 76121          |
| 29         | Roll Latch                         | 161121         |
| 30         | Spring, Spread Roll (2)            | 155287         |
| 31         | Front Roll Support (right)         | 155321         |
| 32         | Spring, Roll Frame (2)             | 157992         |
| 33         | Rivet, Spider                      | 157830         |
| 34         | Rivet, Rear Door                   | 157896         |
| 35         | Spider Decal                       | 220329         |
| 36         | Door Hinge                         | 224462         |
| 37         | Rivet, Door Hinge (3)              | 121741         |
| 38         | Rear Door                          | 223672         |
| 39         | Electronic Timer & Switch Assembly | 252449         |
| 40         | Switch Sub-Assembly                | 252450         |
| 41         | Insulator                          | 251776         |
| 42         | Electrical Timer Assembly          | 250436         |
| 43         | Transducer Assembly                | 250347         |
| 44         | Bulb                               | 251616         |
| 45         | Capacitor, Timer                   | 255052         |
| 46         | Sleeve, Capacitor                  | 252780         |
| 47         | Rivet, Electrical Timer (2)        | 250155         |
| 48         | Electrical Nameplate               | 250309         |
| 49         | Bulb Cover                         | 250346         |
| 50         | Potentiometer Driving Knob         | 224248         |
| 51         | Index Plate                        | 250716         |
| 52         | Instruction Label                  | 252938         |
| 53         | Timer Wiring Tubing                | 224825         |
| 54         | Rear Cover Assembly                | 223718         |
| 55         | Indicator Window                   | 222558         |
| 56         | Rivet, Rear Cover (side)           | 157897         |
| 57         | Rivet, Rear Cover                  | 157830         |

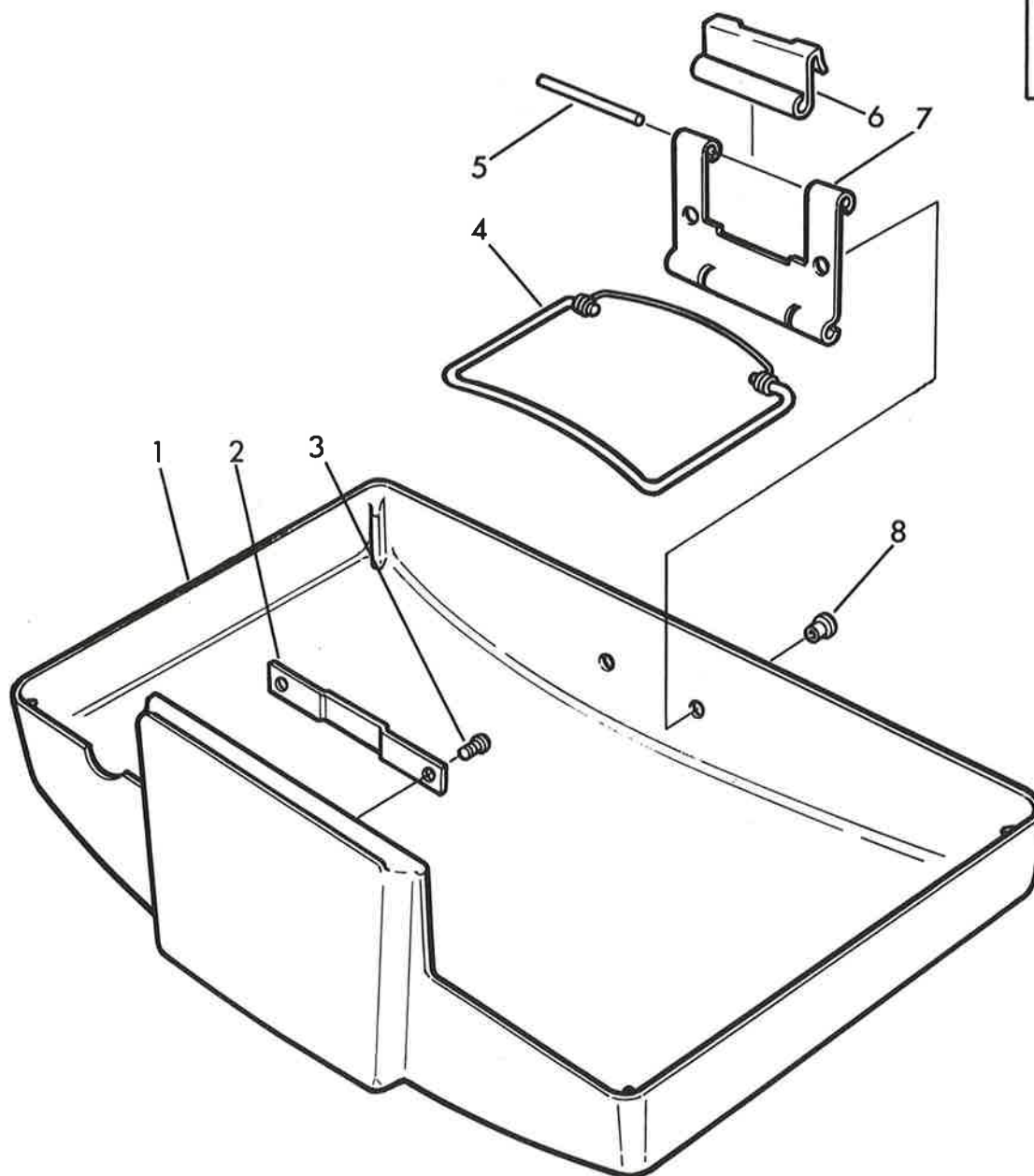
## PARTS LIST F

| Key<br>No. | Part Name                        | Part<br>Number |
|------------|----------------------------------|----------------|
|            | Electronic Flash Assembly        | 223819         |
| 1          | Battery Assembly                 | 222019         |
| 2          | Filler Pad                       | 168177         |
| 3          | Photo Flash Condenser Assembly   | 250735         |
| 4          | Pad, Capacitor                   | 251454         |
| 5          | Insulator Paper                  | 252512         |
| 6          | Trigger Board Assembly           | 223714         |
| 7          | Insert                           | 224424         |
| 8          | Flash Tube                       | 222522         |
| 9          | Reflector                        | 223809         |
| 10         | Wire (brown)                     | 251606         |
| 11         | Wire (white)                     | 252590         |
| 12         | Coil, Trigger                    | 222523         |
| 13         | Capacitor, Trigger               | 223937         |
| 14         | Resistor                         | 255051         |
| 15         | Resistor                         | 223935         |
| 16         | Circuit Board                    | 223614         |
| 17         | Wire (orange)                    | 251610         |
| 18         | Grommet                          | 270741         |
| 19         |                                  |                |
| 20         | Resistor                         | 223936         |
| 21         | Strobe Cover                     | 252163         |
| 22         | Screw, Cover (2)                 | 224390         |
| 23         | Instruction Plate Head           | 224426         |
| 24         | Louver Assembly (left-hand) (5)  | 224428         |
| 25         |                                  |                |
| 26         |                                  |                |
| 27         | Louver Assembly (right-hand) (5) | 224431         |
| 28         | Screw, Bezel (2)                 | 224391         |
| 29         | Spring, Actuating Bar            | 251685         |
| 30         | Spring, Pick-Up Link             | 223098         |
| 31         | Retaining Ring                   | 224393         |
| 32         | Spring, Pivot Stud               | 224503         |
| 33         | Spring, Trim Link                | 223097         |
| 34         | Insulator Paper                  | 252513         |
| 35         | Trim Wheel Assembly              | 252340         |
| 36         | Nut, Zero Adjust                 | 224330         |
| 37         | Spring, Zero Adjust              | 222622         |
| 38         | Screw, Strobe Body               | 252517         |
| 39         | Bar, Louver Actuating            | 223650         |
| 40         | Bezel Assembly                   | 223715         |
| 41         | Decal, Bezel                     | 224509         |

# FRONT COVER ASSEMBLY

PLATE

H



## PARTS LIST H

| Key No. | Part Name                   | Part Number |
|---------|-----------------------------|-------------|
| 1       | Front Cover Assembly        | 223611      |
| 2       | Latch Plate                 | 160439      |
| 3       | Screw, Latch Plate (2)      | 160550      |
| 4       | Clip Spring Assembly        | 160549      |
| 5       | Mounting Plate Hinge Pin    | 160450      |
| 6       | Mounting Clip Hinge         | 157933      |
| 7       | Mounting Plate Hinge        | 157934      |
| 8       | Rivet, Mtg. Plate Hinge (2) | 160449      |

# PARTS LIST I

| Key<br>No. | Part No.            | Part Name                                                |
|------------|---------------------|----------------------------------------------------------|
| —          | 223822              | BASE BLOCK AND ELECTRONIC MOUNTING BLOCK ASSEMBLY        |
| —          | 223825              | BASE BLOCK ASSEMBLY (Includes key numbers 1 through 37). |
| 1          | 252966              | OPENING BLADE ASSEMBLY                                   |
| 2          | 146714              | CLOSING BLADE ASSEMBLY                                   |
| 3          | 149782              | CLOSING BLADE STOP BRACKET ASSEMBLY                      |
| 4          | 155133              | Shock Pad                                                |
| 5          | 149844              | Rivet                                                    |
| 6          | 155376              | Stop Bracket Cap                                         |
| 7          | 161113              | COCKING SLIDE ASSEMBLY                                   |
| 8          | 168169              | Retaining Pin                                            |
| 9          | 155175              | Retaining Ring                                           |
| 10         | 152501              | Spring                                                   |
| 11         | 149649              | COCKING SLIDE LATCH ASSEMBLY                             |
| 12         | 155175              | Retaining Ring                                           |
| 13         | 149645              | BLADE LATCH ASSEMBLY                                     |
| 14         | 152513              | Spring                                                   |
| 15         | 222915              | X Contact                                                |
| 16         | 155292              | X Connector Strip Insulator                              |
| 17         | 250319              | X Connector Strip                                        |
| 18         | 160545              | Magnet Screw                                             |
| 19         | 149640              | MAGNET ASSEMBLY                                          |
| 20         | 149846              | Magnet                                                   |
| 21         | 152509              | MAGNET BOBBIN ASSEMBLY                                   |
| 22         | 160546              | Magnet Nut                                               |
| 23         | 220332              | COCKING ARM ASSEMBLY                                     |
| 24         | 149864              | Cocking Arm Spring                                       |
| 25         | 155161              | Retaining Ring                                           |
| 26         | 157928              | Indicator Spring                                         |
| 27         | 195916              | Readout Indicator                                        |
| 28         | 153259              | Indicator Pin                                            |
| 29         | 155382              | Rear Light Baffle                                        |
| 30         | 146862              | Front Light Baffle                                       |
| 31         | 160464              | Front Light Baffle Screw                                 |
| 32         | 155160              | Retaining Ring                                           |
| 33         | 178472              | READOUT ACTUATOR ASSEMBLY                                |
| 34         | 155161              | Retaining Ring                                           |
| 35         | 196248              | Scene Selector Slider Button                             |
| 36         | 154062              | Aperture Detent                                          |
| 37         | 223716              | APERTURE WHEEL ASSEMBLY                                  |
| 38         | 223826              | ELECTRONIC MOUNTING BLOCK ASSEMBLY                       |
| 39         | 155249              | Photocell                                                |
| 40         | 251452              | Integrated Circuit                                       |
| 41         | 255050              | Capacitor (C5)                                           |
| 42         | 250107 or<br>250169 | Resistor (R9)                                            |
| 43         | 250104 or<br>250168 | Resistor (R2)                                            |
| 44         | 252518              | Closing Diode                                            |
| 45         | 250167              | Capacitor (C3)                                           |
| 46         | 250108              | Capacitor (C1)                                           |
| 47         | 250109              | Capacitor (C2)                                           |
| 48         | 250103 or<br>250191 | Resistor (R1)                                            |
| 49         | 271993              | Insulator                                                |
| 50         | 271992              | Resistor (R13)                                           |

# NUMERICAL PARTS / PRICE LIST

| Part No. | Part Name                           | Suggested<br>List Price |
|----------|-------------------------------------|-------------------------|
| 76121    | Rivet, Spring Stop (2)              | .04                     |
| 76175    | Rivet, Light Seal (4)               | .04                     |
| 82760    | Rivet, Focus Bracket                | .04                     |
| 103191   | Rivet, Handguard Latch (2)          | .04                     |
| 121741   | Rivet                               | .04                     |
| 130501   | Banding Clip                        | .04                     |
| 146674   | Release Latch                       | .39                     |
| 146678   | Exit Cover Plate                    | .22                     |
| 146684   | Zone Focus Plate                    | .09                     |
| 146689   | Shutter Release Knob                | .44                     |
| 146714   | CLOSING BLADE ASSEMBLY              | 1.23                    |
| 146722   | Shutter Release Block               | .09                     |
| 146750   | Right Hand Guard                    | .18                     |
| 146862   | Front Light Baffle                  | .09                     |
| 149516   | Rivet, Detent Slide                 | .04                     |
| 149517   | Roll Bushing (4)                    | .04                     |
| 149520   | Spring Stop                         | .04                     |
| 149526   | Hinge Pin, Rear Door                | .04                     |
| 149528   | Spring, R. F. Body                  | .04                     |
| 149538   | Screw, Shutter Mount                | .04                     |
| 149542   | Hinge Pin (right)                   | .04                     |
| 149543   | Hinge Pin (left)                    | .04                     |
| 149545   | "U" FRAME ASSEMBLY                  | .79                     |
| 149550   | Track Guide                         | .04                     |
| 149551   | Return Spring                       | .04                     |
| 149552   | Spacer, Link Pivot (2)              | .04                     |
| 149553   | Pivot Pin, Outer Frame (bottom)     | .04                     |
| 149554   | Spacer, Outer Frame (top)           | .04                     |
| 149556   | Slot Cover                          | .13                     |
| 149566   | Detent Slide                        | .04                     |
| 149567   | Inner Frame (top)                   | .31                     |
| 149570   | Screw, Shutter Shaft                | .09                     |
| 149574   | Locating Spring, Edge Control (2)   | .04                     |
| 149581   | Link Pivot (2)                      | .09                     |
| 149610   | Release Arm                         | .18                     |
| 149612   | Rear Roll                           | 1.00                    |
| 149613   | Front Roll                          | 1.36                    |
| 149640   | MAGNET ASSEMBLY                     | 1.18                    |
| 149645   | BLADE LATCH ASSEMBLY                | .13                     |
| 149649   | COCKING SLIDE LATCH ASSEMBLY        | .13                     |
| 149710   | R.F. - V.F. Pivot Pad (2)           | .09                     |
| 149740   | Cable Release Cover                 | .13                     |
| 149755   | Frame Roller Support                | .61                     |
| 149782   | CLOSING BLADE STOP BRACKET ASSEMBLY | .26                     |
| 149809   | Center Ring                         | .13                     |
| 149810   | Outer Ring                          | .39                     |

# NUMERICAL PARTS / PRICE LIST

| Part No. | Part Name                         | Suggested<br>List Price |
|----------|-----------------------------------|-------------------------|
| 155321   | Front Roll Support (right)        | .13                     |
| 155322   | Front Roll Support                | .13                     |
| 155330   | SIDE BLOCK ASSEMBLY               | .26                     |
| 155331   | Shutter Gasket                    | .09                     |
| 155376   | Stop Bracket Cap                  | .04                     |
| 155382   | Rear Light Baffle                 |                         |
| 157804   | Strap Lug (2)                     | .22                     |
| 157809   | Pivot Spread Roll                 | .04                     |
| 157821   | Keeper                            | .04                     |
| 157824   | Tension Slide                     | .04                     |
| 157830   | Rivet                             | .04                     |
| 157837   | Screw, Slide Block (3)            | .04                     |
| 157838   | Shaft                             | .04                     |
| 157839   | Link Side Block                   | .04                     |
| 157841   | Spring Side Block                 | .09                     |
| 157842   | Side Plate (2)                    | .09                     |
| 157857   | Bushing, Shutter Mount            | .04                     |
| 157860   | Rivet, Focus Button (2)           | .04                     |
| 157866   | Screw, Base Block Mtg. (short)    | .04                     |
| 157869   | Spring, Detent Slide              | .04                     |
| 157876   | Rivet, Track Guide                | .04                     |
| 157877   | Rivet, Spring Contact             | .04                     |
| 157887   | Hinge Plug (2)                    | .04                     |
| 157894   | Pivot Spring, Exit Door           | .04                     |
| 157895   | Pivot Stud, Exit Door             | .04                     |
| 157896   | Rivet Rear Door                   | .04                     |
| 157897   | Rivet Rear Cover (side)           | .04                     |
| 157899   | Latch Pivot                       | .04                     |
| 157904   | Door Spring                       | .04                     |
| 157915   | Filler (left)                     | .04                     |
| 157916   | Filler (right)                    | .04                     |
| 157919   | Focus Bar Plate                   | .04                     |
| 157923   | Mounting Plate Spring             | .31                     |
| 157928   | Indicator Spring                  | .18                     |
| 157932   | EXIT DOOR ASSEMBLY                | .70                     |
| 157933   | Mounting Clip Hinge               | .22                     |
| 157934   | Mounting Clip Hinge               | .22                     |
| 157939   | Electric Mounting Board Insulator | .04                     |
| 157949   | Detent                            | .04                     |
| 157992   | Spring, Roll Frame (2)            | .04                     |
| 160416   | Spring, Release Latch             | .04                     |
| 160439   | Latch Plate                       | .04                     |
| 160442   | Bowed Washer                      | .04                     |
| 160449   | CLIP SPRING ASSEMBLY              | .04                     |
| 160450   | Mounting Plate Hinge Pin          | .04                     |
| 160455   | "D" Ring (2)                      | .04                     |
| 160464   | Front Light Baffle Spring         | .04                     |

# NUMERICAL PARTS / PRICE LIST

| Part No. | Part Name                                | Suggested List Price |
|----------|------------------------------------------|----------------------|
| 222953   | CONVERTER CIRCUIT BOARD ASSEMBLY         | 29.18                |
| 223095   | Rivet Pick-up Bracket (2)                | .04                  |
| 223097   | Spring, Trim Link                        | .04                  |
| 223098   | Spring Pick-up Link                      | .09                  |
| 223611   | FRONT COVER ASSEMBLY                     | 2.36                 |
| 223614   | Circuit Board                            | .39                  |
| 223650   | Bar, Louver Actuating                    | .09                  |
| 223672   | Rear Door                                | 1.44                 |
| 223714   | TRIGGER BOARD ASSEMBLY                   | 10.41                |
| 223715   | BEZEL ASSEMBLY                           | .92                  |
| 223716   | APERTURE WHEEL ASSEMBLY                  | .75                  |
| 223717   | FOCUS BAR ASSEMBLY                       | 2.41                 |
| 223718   | REAR COVER ASSEMBLY                      | 2.10                 |
| 223719   | REAR DOOR ASSEMBLY                       | 34.03                |
| 223809   | Reflector                                | .61                  |
| 223819   | STROBE HEAD ASSEMBLY                     | 44.95                |
| 223822   | BASE BLOCK & ELECTRONIC MTG. BLOCK ASSY. | 33.11                |
| 223823   | SHUTTER FRONT CASTING ASSEMBLY           | 14.79                |
| 223824   | SHUTTER REAR CASTING ASSY.               | 8.05                 |
| 223825   | BASE BLOCK ASSEMBLY                      |                      |
| 223826   | ELECTRONIC MOUNTING BLOCK ASSEMBLY       | 17.50                |
| 223830   | BODY/BELLOWS ASSEMBLY                    | 23.41                |
| 223832   | FOOT ASSEMBLY                            | 2.75                 |
| 223905   | Screw, Mounting (2) (Slot Head)          | .04                  |
| 223907   | LIGHT SEAL ASSEMBLY                      | 1.71                 |
| 223935   | Resistor                                 | .61                  |
| 223936   | Resistor                                 | .09                  |
| 223937   | Capacitor, Trigger                       | .31                  |
| 224248   | Potentiometer Driving Knob               | .35                  |
| 224271   | Spider, Rear Door                        | .92                  |
| 224330   | Nut, Zero Adjust                         | .04                  |
| 224390   | Screw, Cover (2)                         | .04                  |
| 224391   | Screw Bezel (2)                          | .04                  |
| 224393   | Retaining Ring                           | .04                  |
| 224424   | Insert                                   | .18                  |
| 224426   | Instruction Plate Head                   | .13                  |
| 224428   | LOUVER ASSEMBLY (LEFT-HAND) (5)          | .18                  |
| 224431   | LOUVER ASSEMBLY                          | .18                  |
| 224434   | Screw, Foot (2) - Rear                   | .04                  |
| 224462   | Door Hinge                               | .35                  |
| 224503   | Spring Pivot Stud                        | .04                  |
| 224508   | Battery Pad                              | .04                  |
| 224509   | Decal Bezel                              | .13                  |
| 224825   | Timing Wiring Tubing                     | .04                  |
| 250103   | Resistor R1                              | .13                  |
| 250104   | Resistor R2                              | .13                  |
| 250107   | Resistor R9                              | .13                  |
| 250108   | Capacitor C1                             | .65                  |
| 250109   | Capacitor C2                             | .65                  |

# NUMERICAL PARTS / PRICE LIST

| Part No. | Part Name                  | Suggested<br>List Price |
|----------|----------------------------|-------------------------|
| 255052   | Capacitor, Timer           | .26                     |
| 255105   | BATTERY INTERLOCK ASSEMBLY | .39                     |
| 270741   | Grommet                    | .09                     |
| 271992   | Resistor, R13              | .13                     |
| 271993   | Insulator                  | .04                     |