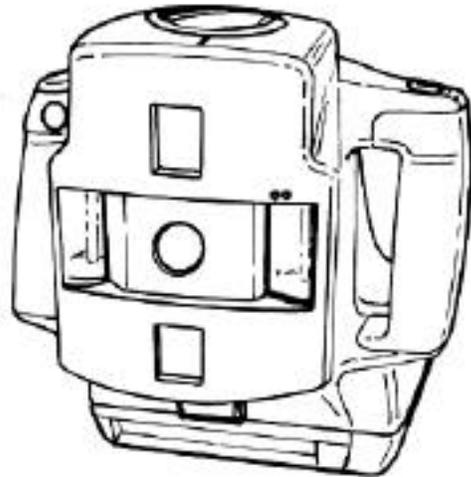




Polaroid

Repair Manual



Macro 5 SLR Camera

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Purpose of this Manual

This service manual is intended as a reference guide for Polaroid and Polaroid authorized service personnel.

Organization of this Manual

Camera Description. General information about camera capabilities and applications.

Theory of Operation. Detailed explanation of how the various camera components function during the picture-taking sequence.

Adjustments. Procedures for calibrating various camera components after replacement.

Troubleshooting. Tables to assist in identifying the cause of camera malfunctions and determining corrective action.

Parts Replacement. Step-by-step procedures for component replacement.

Schematic Diagrams. Electronic schematics to assist in troubleshooting component problems.

Other Documents Required for Service

The following documents should be available when servicing the Macro 5 SLR camera.

Polaroid Macro 5 SLR Parts Catalog
Polaroid ProCam (Camera Back) Parts Catalog

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Section 1. Camera Description

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IMPORTANT SAFETY INSTRUCTIONS

When servicing the Macro 5 SLR camera, always follow basic safety precautions.

CAUTION

THE FILM USED BY THE CAMERA CONTAINS A CAUSTIC JELLY THAT IS SAFELY PACKED INSIDE THE FILM PACK. IF YOU SHOULD ACCIDENTLY GET SOME OF THIS JELLY ON YOUR SKIN, WIPE IT OFF IMMEDIATELY AND WASH THE AREA WITH PLENTY OF WATER AS SOON AS POSSIBLE. UNDER ALL CIRCUMSTANCES, KEEP THE JELLY AWAY FROM THE MOUTH AND EYES. KEEP DISCARDED MATERIALS OUT OF REACH OF CHILDREN AND ANIMALS, AND OUT OF CONTACT WITH CLOTHING AND FURNITURE, AS DISCARDED MATERIALS STILL CONTAIN SOME OF THE CAUSTIC JELLY.

General

The Polaroid Macro 5 SLR (Figure 1-1) is a fully automatic, close-up portable camera. It is designed for medical and dental documentation, quality control, law enforcement, and other applications that requires close-up photographs.

The Macro 5 SLR has two built-in electronic flash units that provide even illumination. It also has a microprocessor-controlled exposure system that automatically sets the camera for correct exposure at all magnification settings.

The Macro 5 SLR produces automatic exposures at:

- 0.2x (20%)
- 0.4x (40%)
- 1x (100%)
- 2x (200%)
- 3x (300%)

The lens for each exposure setting is self-contained within the camera's manually rotating turret, so there is no need to attach any accessories when changing camera magnification.

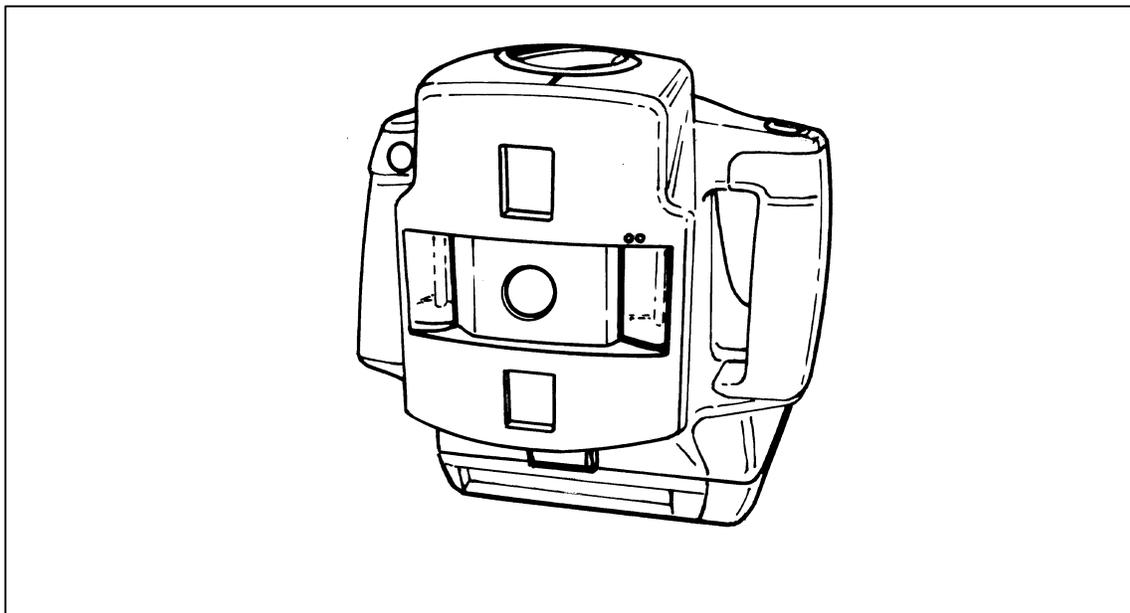


Figure 1-1 Macro 5 SLR Camera

Features

Camera

Basic Macro 5 SLR features include: (Figure 1-2)

- Camera Back (Film Holder)
- Film Door Release Button
- Two Built-In Electronic Flash Units
- Lens
- Dual Light Rangefinder (Ranging Lights)
- Viewfinder
- Grid Screen in Viewfinder
- Tripod or Copystand Socket (on bottom of camera)
- Battery Compartment Door
- Battery Compartment (inside hand grip)
- Right/Left Hand Grips
- Magnification Selector Knob
- Shutter (S1) Button

Table 1-1 describes the Macro 5 SLR features.

Table 1-1. Macro 5 SLR Camera Features

<i>Camera Feature</i>	<i>Description</i>
Camera Back	The camera back is a modified ProCam camera back.
Film Door Release Button	The film door release button opens the camera back film door.
Lens	The camera contains separate lens for each magnification setting. Each lens has the proper focal length for minimum perspective distortion and more working space between the camera and the subject, and a small aperture for better depth of field.

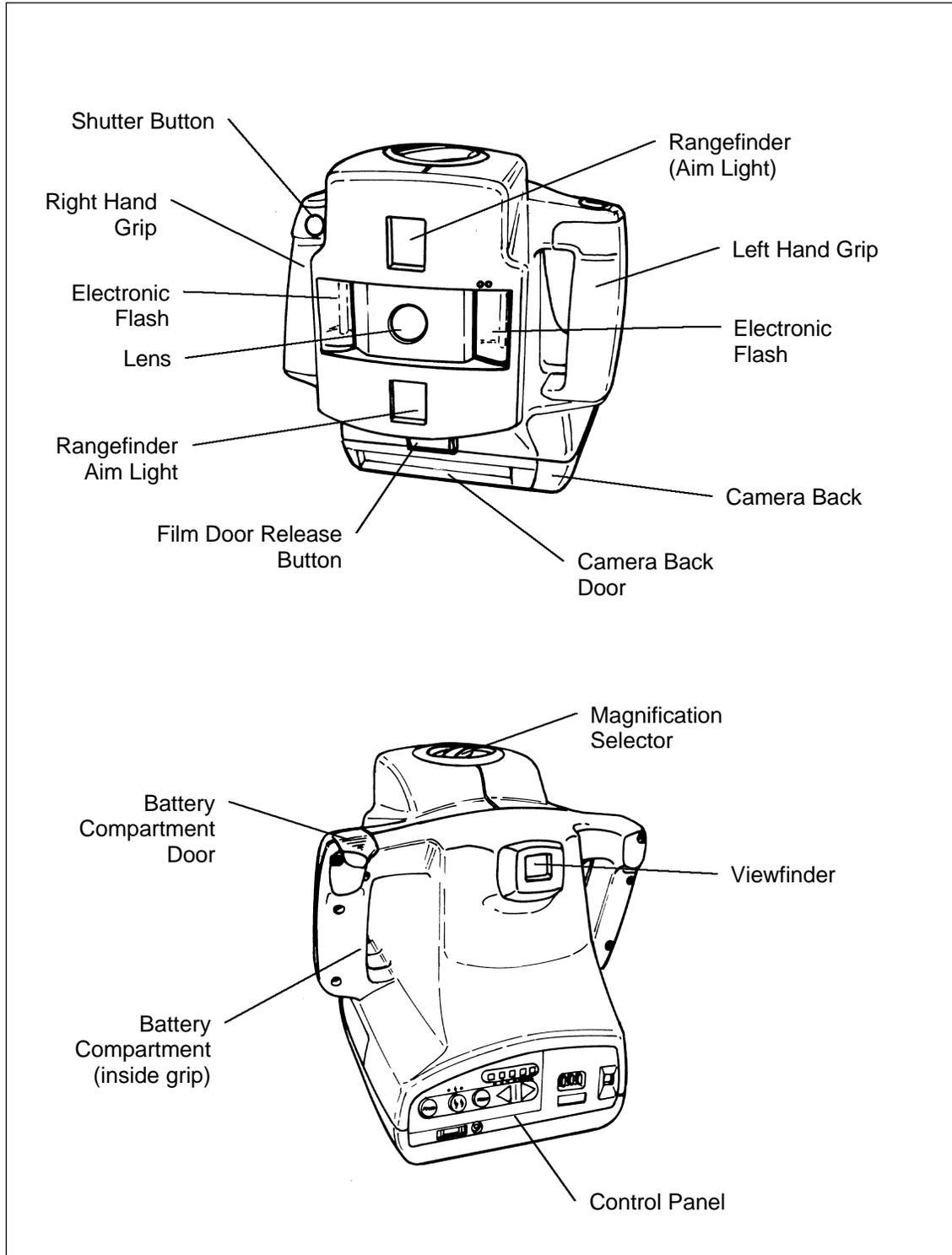


Figure 1-2 Macro 5 SLR Features

Table 1-1. Macro 5 SLR Camera Features (Cont'd)

Camera Feature	Description
Two Built-In Electronic Flash Units	<p>The two built-in electronic flash units provide even illumination at all magnification settings.</p> <p>Either flash unit can be turned off if side lighting is needed to show texture or elevation.</p> <p>Note: The light output from the remaining flash unit will be increased to produce the correct exposure.</p> <p>Both built-in electronic flash units can also be turned off and auxiliary lighting used. The auxiliary light is connected to the auxiliary receptacle on the control panel located on the back of the camera.</p>
Dual-Light Rangefinder (Ranging Lights)	<p>The dual-light rangefinder is used to focus the camera.</p> <p>To properly focus the camera, it should be moved nearer or farther from the subject until the two ranging lights merge.</p>
Viewfinder	<p>The viewfinder shows the area included in the picture.</p> <p>Use of the grid ensures consistent framing.</p>
Grid Screen in Viewfinder	<p>The grid screen in viewfinder aids in consistent framing of subject.</p>
Tripod Socket	<p>Standard tripod socket located on bottom of camera..</p>

Table 1-1. Macro 5 SLR Camera Features (Cont'd)

<i>Camera Feature</i>	<i>Description</i>
Battery Compartment Door	The battery compartment slides open to replace the four (4) Alkaline batteries in the Battery compartment.
Battery Compartment	<p>The battery compartment contains four (4) AA batteries that provides power for the dual-light rangefinder.</p> <p>Note: Alkaline batteries (Standard or rechargeable) are recommended. Rechargeable NiCad batteries can also be used.</p>
Right/Left Hand Grips	<p>The right/left hand grips allow the operator to hold the camera steady during subject framing and picture-taking.</p> <p>Note: The battery compartment is located in the right hand grip.</p>
Magnification Selector Knob	<p>The magnification selector knob selects the desired magnification setting for the camera. It clicks into position at each magnification setting.</p> <p>Note: If the magnification selector is improperly set (between settings), the camera will not function. The selector knob also shows the camera-to-subject distance and icons that represent the approximate area of a subject included in the picture.</p>

Table 1-1. Macro 5 SLR Camera Features (Cont'd)

<i>Camera Feature</i>	<i>Description</i>
Red Shutter (S1) Button	<p>The red shutter (S1) button turns on the ranging lights and actuates the shutter and the flash unit/s when pressed.</p> <p>Pressing the button lightly turns on the camera and the two ranging lights used to focus the camera.</p> <p>Note: The two ranging lights stay on as long as the button is lightly pressed. If the button is released, the two ranging lights go off in approximately fifteen (15) seconds. Pressing the shutter button all the way in takes the picture (actuates the shutter and flash units).</p> <p>Note: It will functional as a shutter button only if the camera is ready (focused properly and flash fully charged) to take a picture as indicated by the green status lights.</p>

Control Panel

Figure 1-3 shows the Macro 5 SLR control panel. Table 1-2 describes its features.

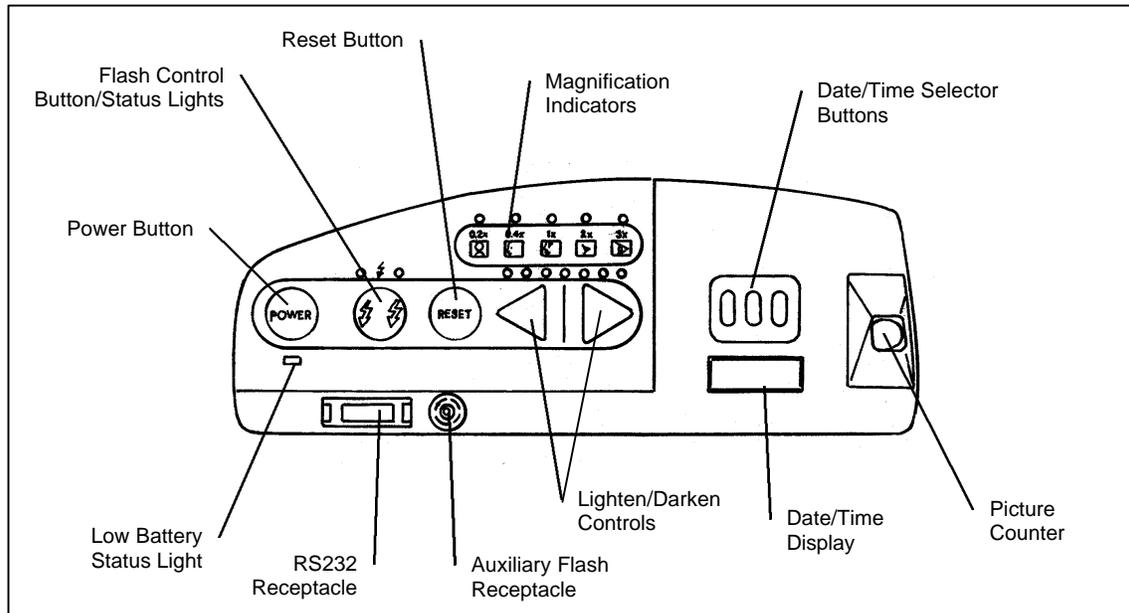


Figure 1-3 Control Panel

Table 1-2. Control Panel Features

Camera Feature	Description
POWER Button	<p>Turns the camera On. The flash units begin charging. The camera turns off if the power button is pressed again, or after 30 seconds of inactivity.</p> <p>Note: The camera can also be turned on by slightly pressing the shutter (S1) button.</p>
Low Battery Status Light	<p>Lights up when the batteries are low. The ranging lights also become dim.</p>
Flash Control Button/Status lights	<p>Selectively turns the flash units on or off. (Normally both flash units are turned on.)</p> <p>The red charging status light above the flash control button blinks while the flash units are charging. The green status lights comes on when the flash unit/s are fully charged (ready).</p> <p>Press the flash control button once to turn off the right flash unit; press it a second time to turn off the left flash unit; press it a third time to turn off both flash units.</p>
RESET Button	<p>Resets the camera to the nominal flash and lighten/darken settings for the current magnification.</p> <p>Note: The camera has a memory and returns to the custom settings for each magnification when it is turned on.</p>

Table 1-2. Control Panel Features (Cont'd)

<i>Camera Feature</i>	<i>Description</i>
Lighten/Darken Controls	<p>Makes the picture lighter or darker.</p> <p>Each setting increases or decreases exposure by 1/3 f-stop. The center light is the nominal setting.</p> <p>Pressing the white arrow lightens the picture (increases exposure); pressing the black arrow darkens the picture (decreases exposure).</p>
Magnification Status Lights	Lights up to indicate the selected magnification setting.
RS232 Receptacle	Standard computer receptacle used to connect a computer to the camera so that the diagnostic utility program can be used to troubleshoot camera failures. Refer to the troubleshooting section in this service manual for more details.
Picture Counter	<p>Shows how many picture remain in the film pack.</p> <p>Initially the picture counter reads ten (10). As pictures are taken, the counter automatically counts down to show how many pictures remain.</p>

Table 1-2. Control Panel Features (Cont'd)

<i>Camera Feature</i>	<i>Description</i>
Auxiliary Flash Receptacle	<p>Standard PC socket for an auxiliary flash.</p> <p>Notes:</p> <ul style="list-style-type: none"> • An electronic flash must be used for auxiliary lighting. Do Not use tungsten, halogen, or fluorescent lights. • The built-in flash can be combined with auxiliary lighting. • Test exposures may be needed to determine the proper lighten or darken setting for correct exposure.
Date/Time Display	Displays the selected date/time sequence.
Date/Time Selector Buttons	<p>Selects the desired date/time sequence to be printed on the picture.</p> <p>Note: Refer to the Macro 5 SLR User's Guide for information on how to select or set the current date/time desired.</p>

Specifications

Operating Power	<p>Ranging Lights: Four (4) AA Alkaline batteries (standard or rechargeable)</p> <p>Camera: Film pack battery.</p>
Flash Unit	Two built-in flash units.
Shutter Speed	Fixed (1/50 second).
Polaroid Film Types	<p>Polaroid High Definition.</p> <p>Type Film: 990 Grid Spectra/Image</p> <p>Note: These high-speed (ISO640/29°) film types are balanced for electronic flash and daylight (5500°K), and produce positive color prints.</p>
Camera Back	<p>Modified ProCam camera back.</p> <p>Note: Never substitute with standard ProCam camera back.</p>
Date Display	<p>Five printable type of date sequences:</p> <ul style="list-style-type: none"> • No Print Mode - - - • Month/date/year 8 7 '95 • Day/month/year 7 8 '95 • Year/month/day '95 8 7 • Day/time (24-hour clock) 7 13:30

Specifications (Cont'd)

Magnification:	Lens-to-subject distance	Lens focal length²	Effective lens aperture	Depth of field³
0.2x (20%)	52in./130cm	221mm	f/20	10.6in./27cm
0.4x (40%)	26in./66cm	188mm	f/34	3.8in./10cm
1x (100%)	9.9in./25cm	128mm	f/47	0.86in./2.2cm
2x (200%)	4.8in./13cm	85.4mm	f/67	0.31in./0.8cm
3x (300%)	3.1in./8cm	64mm	f/100	0.20in./0.5cm

Viewfinder Built-in grid screen for consistent framing of subjects.

Rangefinder Dual-lights for focusing.

Memory Internal electronic memory. Camera returns to custom settings for each magnification when it is turned on.

Weight 4 lbs. (1.8kg)

Dimensions Height- 9 inches (23cm)
Width - 9 inches (23cm)
Depth - 8.7 inches (22cm)

Accessories Polarizer Kit:
Reduces reflections from flash units when taking pictures of glossy or glass subjects.

Fluorescein Kit:
For external ophthalmic photography includes #2A yellow barrier filter and #47A blue exciter filters.

Section 2. Theory of Operation

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Operation

The following procedures sequentially detail the picture taking operation. For a simplified explanation of this picture taking operation refer to the flow diagrams in Figures 2-1 and 2-2.

Camera Setup

1. Set the camera to the desired magnification.

Note: If the magnification selector is improperly set (between settings), the camera will not function. For detailed information on how to select magnification, refer to the Macro 5 SLR User's Guide.

Magnification:	Lens-to-subject distance	Lens focal length²	Effective lens aperture	Depth of field³
0.2x (20%)	52in./130cm	221mm	f/20	10.6in./27cm
0.4x (40%)	26in./66cm	188mm	f/34	3.8in./10cm
1x (100%)	9.9in./25cm	128mm	f/47	0.86in./2.2cm
2x (200%)	4.8in./13cm	85.4mm	f/67	0.31in./0.8cm
3x (300%)	3.1in./8cm	64mm	f/100	0.20in./0.5cm

2. If applicable, plug in desired filter kit (Polarizer or Fluorescein).

Note: Use of specified filter kit is optional. For detailed information, refer to the provided Macro 5 SLR User's Guide.

Filter Kit:

Polarizer: Reduces reflections from flash units when taking pictures of glossy or glass subjects.

Fluorescein: For external ophthalmic photography includes #2A yellow barrier filter and #47A blue exciter filters.

3. Set the lighten/darken buttons to the desired exposure (trim).

- Notes:**
- Makes the picture lighter or darker to enhance the specific details of the subject.
 - Normally the camera provides the correct exposure for subjects of average brightness.
 - Each setting adjusts the flash output by 1/3 f-stop. The center light is the nominal setting.
 - **White** arrow lightens the picture (increases exposure).
 - **Black** arrow darkens the picture (decreases exposure).

4. Set date/time selector buttons to the desired date/time sequence to be printed on the picture.

Note: This function is optional. It can be shut off if desired. For detailed information on how to select, or set, the current date/time, refer to the Macro 5 SLR User's Guide.

Date Display: The five printable date sequences are as follows:

- No Print Mode - - -
- Month/date/year 8 7 '95
- Day/month/year 7 8 '95
- Year/month/day '95 8 7
- Day/time (24-hour clock) 7 13:30

5. Set the flash control buttons (left/right or both). The red charging status light above the flash control button blinks while the flash units are charging. The green status lights come on when the flash unit/s are fully charged (ready).

Note: Normally both flash units will be on. For detailed information on how to select either the left or right flash, refer to the Macro 5 SLR User's Guide.

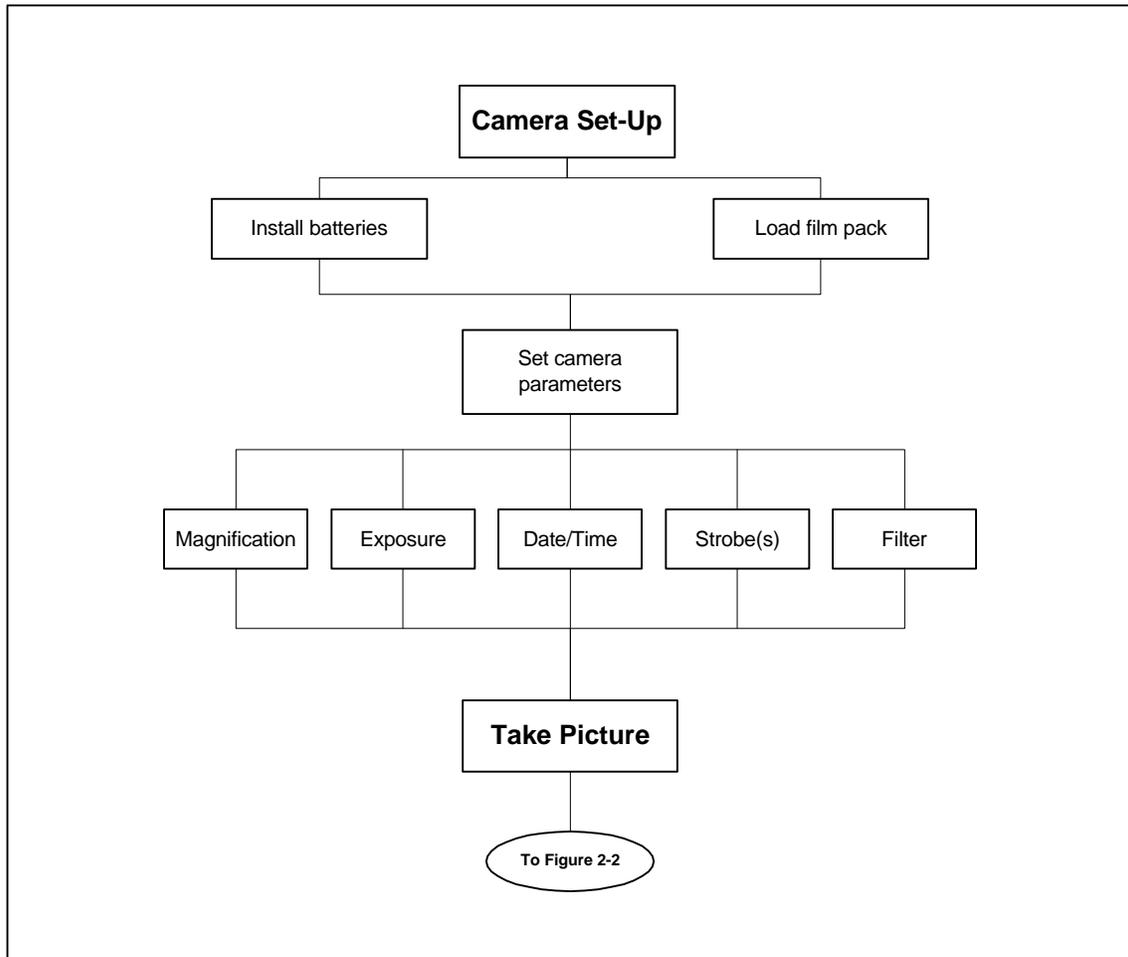


Figure 2-1 Camera Setup

Picture Taking

1. Turn on the camera by lightly pressing the shutter (S1/S2 switch) button. This closes the S1 switch.

Closing the S1 switch:

- Turns on the top and bottom range (aim) lights to focus the camera.
- Latches the camera's power on.
- Starts the strobe charge cycle (charged before self-check routine started).
- Starts the camera's self-check routine.

Notes: If the shutter button is pressed all the way in at this time, the camera's electronics inhibit it from taking a picture (camera beeps indicating strobes not charged). The strobes must be fully charged and the camera's status lights must be green indicating that the camera is ready before a picture can be taken.

The two range lights stay on as long as the button is lightly pressed. If the button is released, the two range lights go off in approximately fifteen (**15**) seconds. Press the shutter button lightly to turn them on again.

2. During this self-check routine, the microprocessor controller initializes (resets) the camera's electronics and checks the status of:

- Control panel settings
- Magnification setting - position of turret (remembers last magnification setting)
- Lighten/Darken (remembers last exposure setting)
- Film door (open/closed)
- RS232 receptacle (connected or not connected)
- Battery (low?)
- Picture count (0?)
- End-of-pack
- Auxiliary receptacle (connected or not connected)
- Internal timer (updated)
- Strobes (charged/not charged)

Note: This self-check routine starts a thirty (30) second continuous test loop that times out if no action is taken. It continually checks the status of the camera. If no action is taken during this thirty (30) second continuous test loop, the camera automatically powers down (shuts off). **It takes an action (button pressed, setting changed, picture taken, etc.) to keep it powered up.**

3. While this self-check routine is checking the camera's status, focus and frame the subject.

For detailed information on how to properly focus and frame the subject, refer to the Macro 5 SLR User's Guide.

4. Once the camera is properly focused and the status lights are green, press the shutter button (S1/S2) all the way in to take the picture. This action closes the S2 switch.

Closing the S2 switch:

- Fires the strobes.
- Actuates the shutter.

Note: The camera will take a picture only when it is properly focused, the strobes are fully charged, and the self-check routine is in progress.

5. The picture will automatically eject from the camera when the shutter button is released.

Note: The camera powers down (shuts off) when:

- Picture count reaches zero (0).
- Self-check continuous loop times out - no camera activity for thirty (30) seconds (**button pressed, setting changed, picture taken, etc.**).

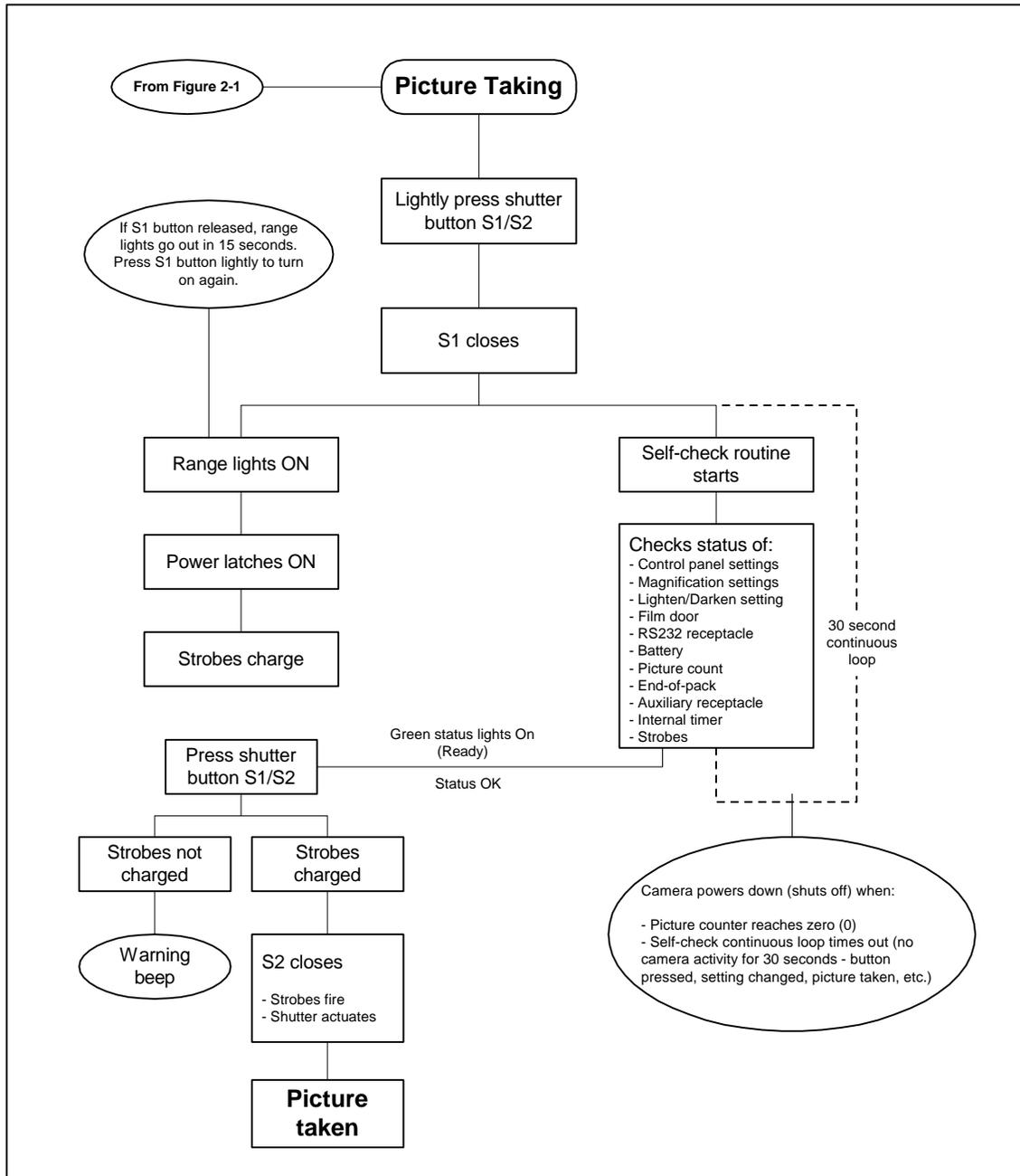


Figure 2-2 Picture Taking

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Ranging (Aim) Lights Adjustment

1. Place the camera onto the test fixture as shown in Figure 3-1.

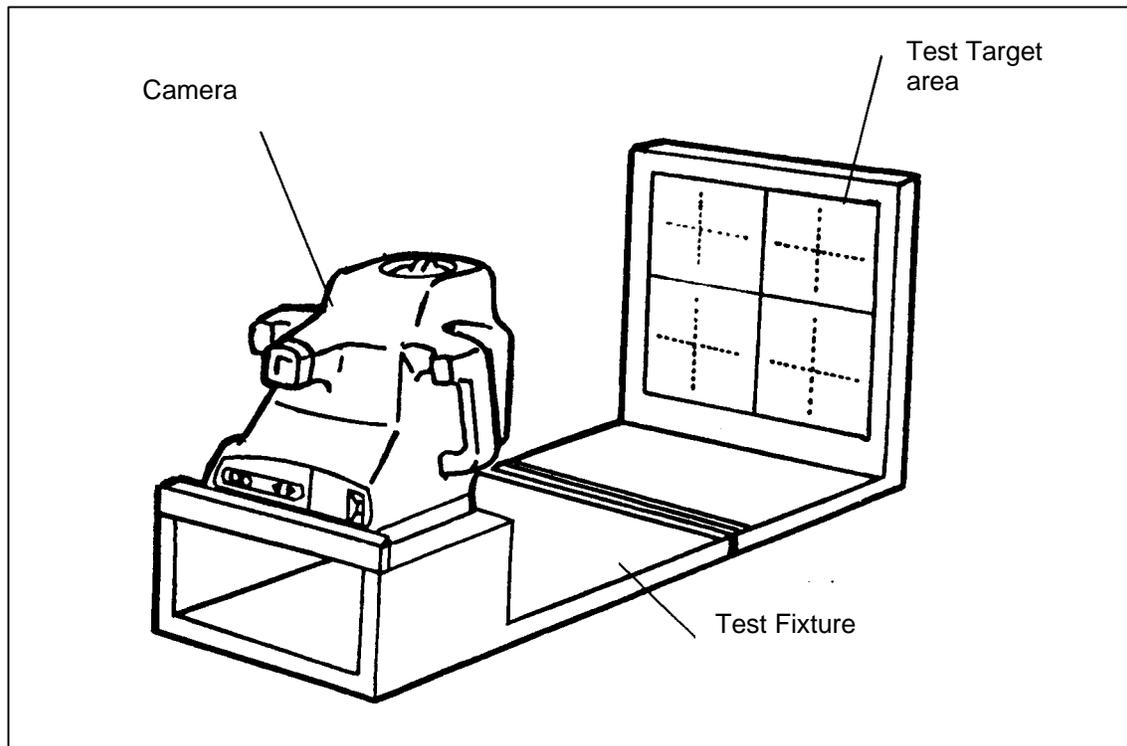


Figure 3-1 Camera Test Fixture

2. Set the magnification selector knob to its 1X position.
3. Turn on the camera.
4. Press the red shutter button lightly to turn on the range lights. The range lights should be merged together and centered in the test target (Figure 3-2).

Note: If the range lights are merged together and centered in the test target, no adjustment is necessary.

If the range lights are not merged together or centered in the test target, proceed to step 5 and adjust as needed.

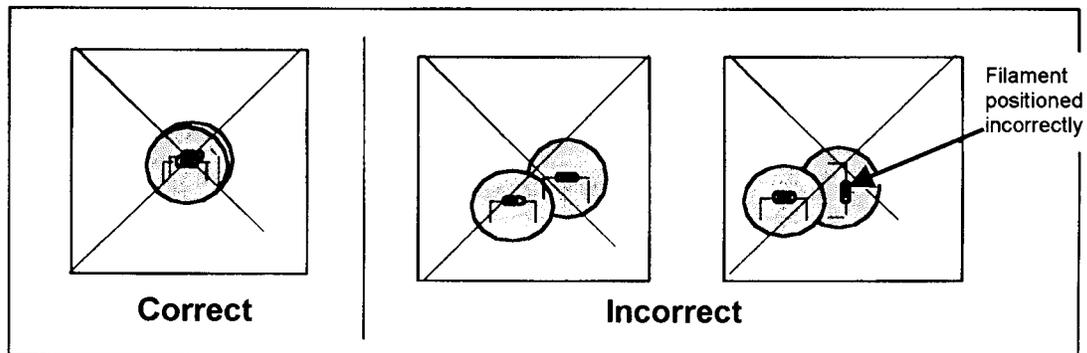


Figure 3-2 Range Light Adjustment

5. Adjust range lights as follows:

- Remove the front cover as explained in section 4 of this service manual.
- Determine which range light is out of adjustment.
- Loosen the applicable adjustment screw (Figure 3-3) and then manually adjust the range light until it merges with the other range light.

Note: If either range light filament is not horizontal (Figure 3-2), loosen the applicable range light clamp screw and then manually rotate the lamp until its filament is correctly positioned.

6. Once both range lights are merged together and properly centered in the test target, tighten the range light adjustment screws being careful not to disturb the adjustment.
7. Recheck the position of the range lights by lightly pressing the red shutter button. The range lights should be merged together and centered in the test target. If necessary, repeat steps 5 through 7 until the range lights are properly merged and centered.

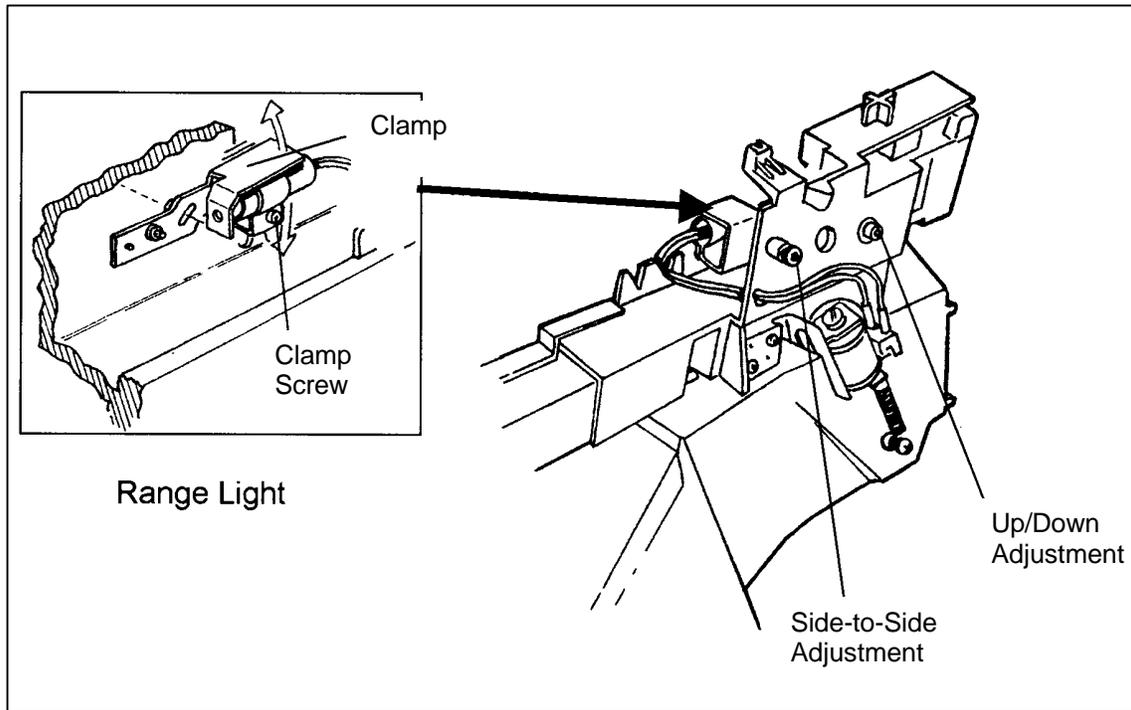


Figure 3-3 Range Light Adjustments

Grid Adjustment

Note: Make sure the range lights are properly adjusted before adjusting the camera grid.

1. Take a picture of the test target.
2. Using a felt tip pen, draw diagonal lines from corner-to- corner on the picture of the test target (Figure 3-4).

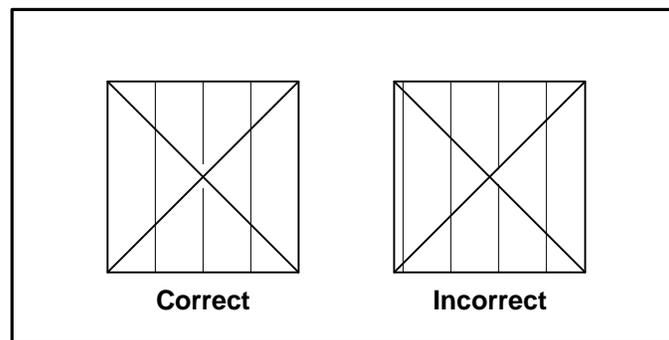


Figure 3-4 Grid Position

- Notes:**
- If the diagonal lines intersect in the center of the grid pattern, no adjustment is needed.
 - If the diagonal lines do not intersect in the center of the grid pattern, proceed to step 3 and adjust the position of the grid as needed.
3. Manually adjust the position of the grid as follows:
 - If applicable, remove the front cover as explained in section 5 of this service manual.
 - Turn the applicable adjustment screw (Figure 3-5) until the grid is properly centered.
 4. Repeat steps 1 through 4 until the grid is properly centered.

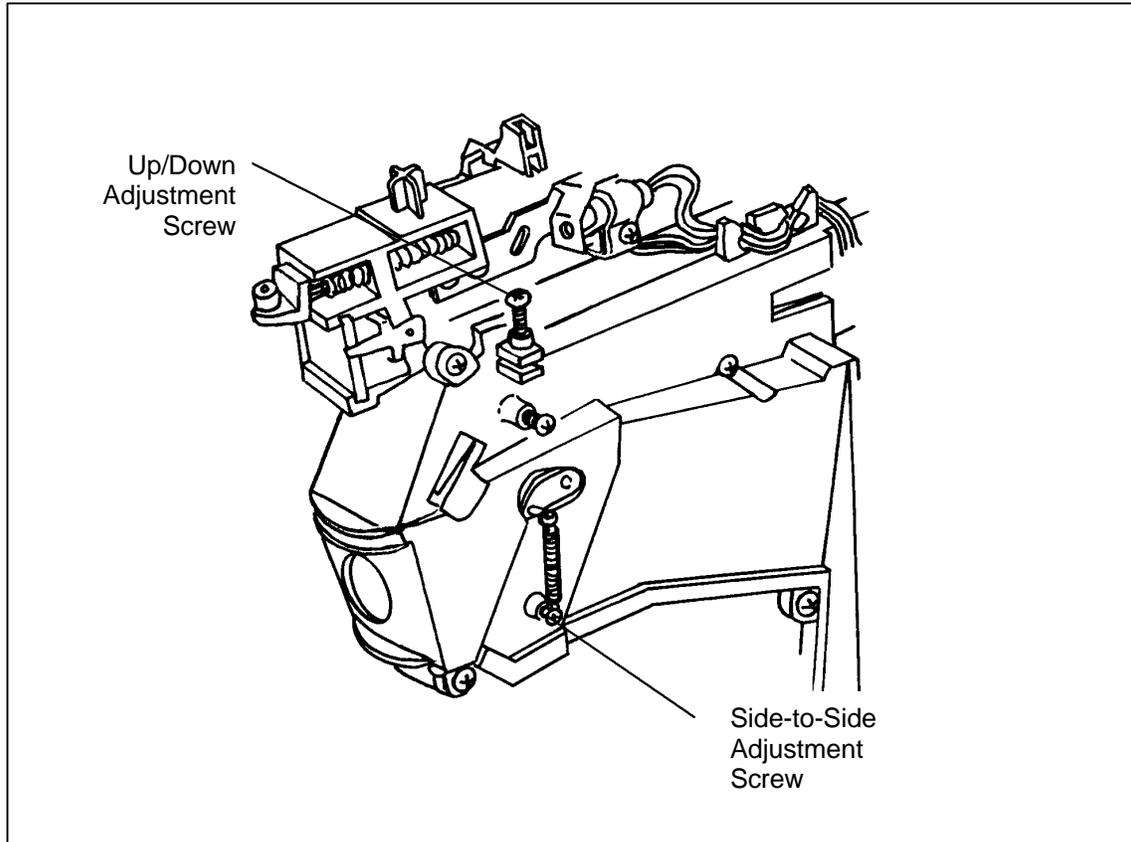


Figure 3-5 Grid Adjustments

Section 4. Troubleshooting

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Diagnostics Module

A diagnostics module is currently being created. This module is a CD, titled Module 5 Star, that will assist in diagnosing camera malfunctions. It will be available shortly. For ordering, the part number is CPS506.

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Required Tools and Equipment

- Pencil Soldering Iron
- Solder Sucker
- Anti-Static Mat and Wrist Strap
- Standard Tool Kit
- Torx Driver (6" Apex Torx T-10 Tip)
- Small Pair of Diagonal Cutters
- Cleaning Tissue or Soft Clean Rags
- Universal PLCC Extraction Tool (fits 20-84 pin Micro Controller)

Electrostatic Discharge Warning

The camera circuitry can easily be damaged by static discharges. Always use an anti-static mat and a wrist-strap when servicing the camera's PC Boards.

Inspection and Cleaning

Whenever disassembling the camera for parts replacement, always inspect the following assemblies for dust and debris (reagent developer).

Note: If necessary, clean the replaced parts with a water dampened tissue or soft clean rag to assure that dust and debris (reagent developer) do not interfere with camera performance.

- Front Cover Assembly
- Camera Back Rollers
- Turret Assembly
- Cone Assembly
- Shutter Assembly
- Viewfinder Assembly

Disassembly/Assembly of Camera

This section of the Service Manual describes disassembly/reassembly procedures. Before performing any of these procedures, always make sure that the camera is turned off and the film pack is removed.

CAUTION

To prevent any chance of electric shock, the camera should be opened only by a qualified service person, and only after it has been disconnected from its power source (film pack battery); make sure the strobe capacitors are fully discharged (dumped). Also, take care not to damage (bend or distort) any of the camera components during disassembly and reassembly.

Left/Right Cover (Includes Front Cover)

1. Removal (Figure 5-1, 5-2 and 5-2a)

- a. Turn off power by pressing the **POWER** button on the camera's control panel.
- b. Disconnect the camera's power source as follows: Slide the battery cover open, unsnap the battery cable clip, and lift out the battery holder.
- c. If applicable, remove the film pack from the camera back.
- d. Using a torx driver, remove the single screw securing the turret knob to the top of the turret assembly. Lift off the turret knob.
- e. Using a torx driver, remove the single screw securing the left/right covers to the top of the turret assembly.
- f. Using a torx driver, remove the three (3) screws securing the left hand grip to the left cover. Lift off the left hand grip.
- g. Using a torx driver, remove the three (3) screws securing the right hand grip to the right cover. Lift off the right hand grip.
- h. Unsnap the film door button adapter and lift it out.
- i. Remove the adhesive vinyl pad from the bottom of the camera back.

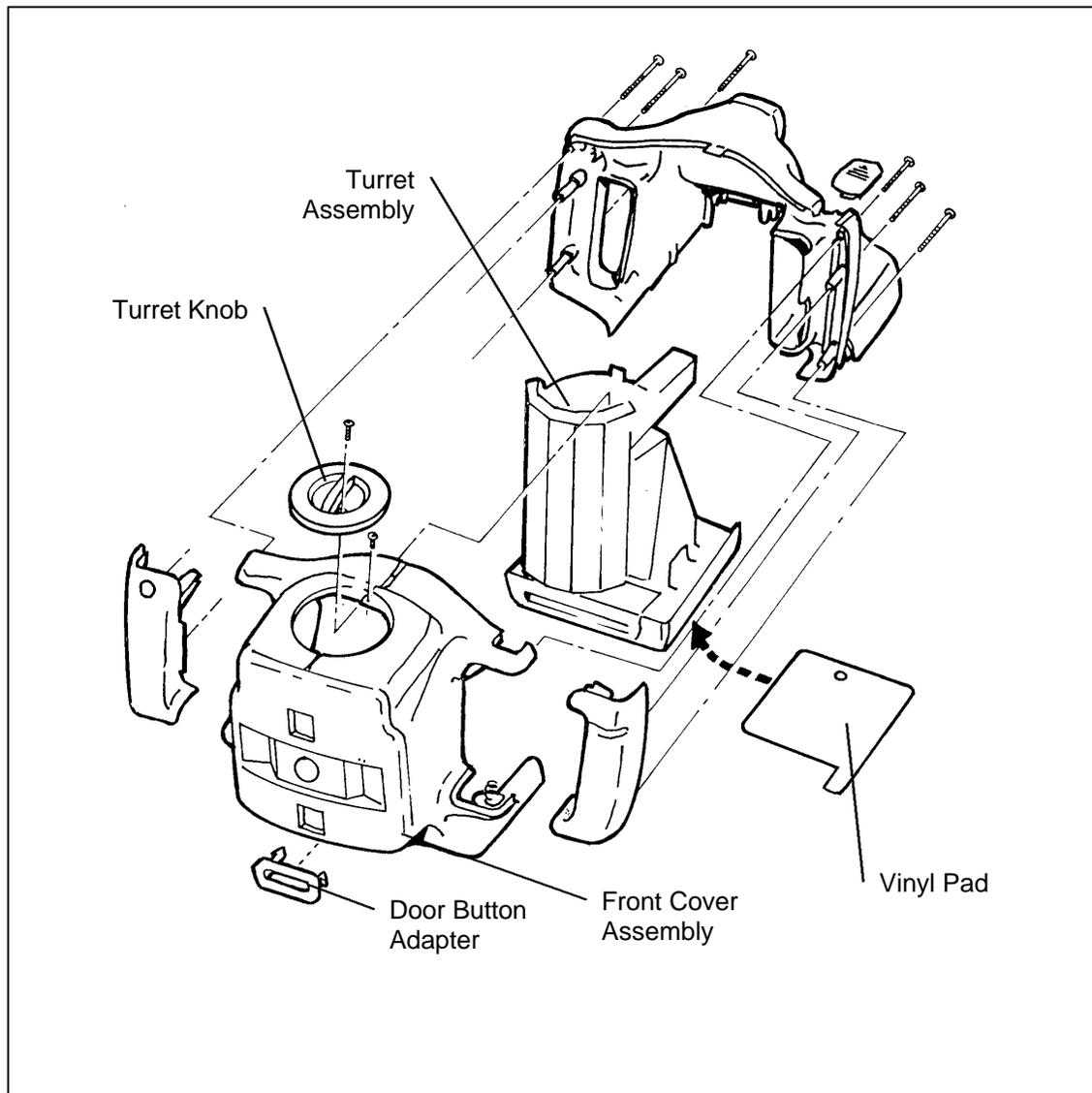


Figure 5-1 Camera Disassembly

- j. Using a torx driver, remove the screw securing the bottom of the right cover to the camera back (Figure 5-2).
- k. Using a torx driver, remove the screw securing the bottom of the left cover to the camera back (Figure 5-2).
- l. Disconnect the battery cable from the left cover tie post.
- m. Using both hands, gently pry open and then left out the left/right cover assembly.

Note: Front cover assembly is still attached to the left/right cover assembly.

- n Disconnect both trigger cables (J31) from the trigger PC boards (Figure 5-2a).

Note: This should free the left/right - front cover assembly from the rear cover and camera back.

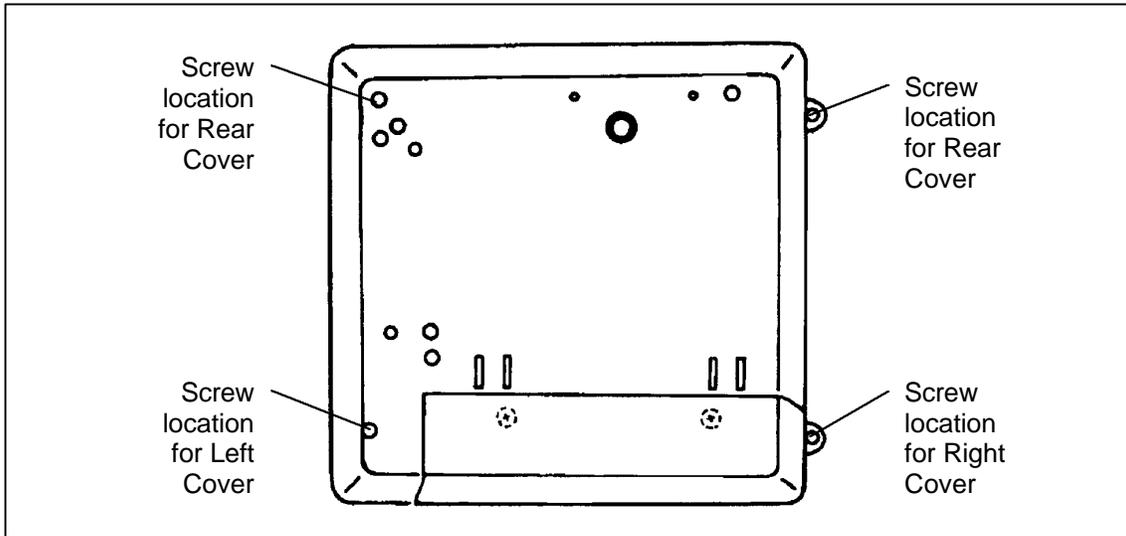


Figure 5-2 Left/Right Bottom Screw Location

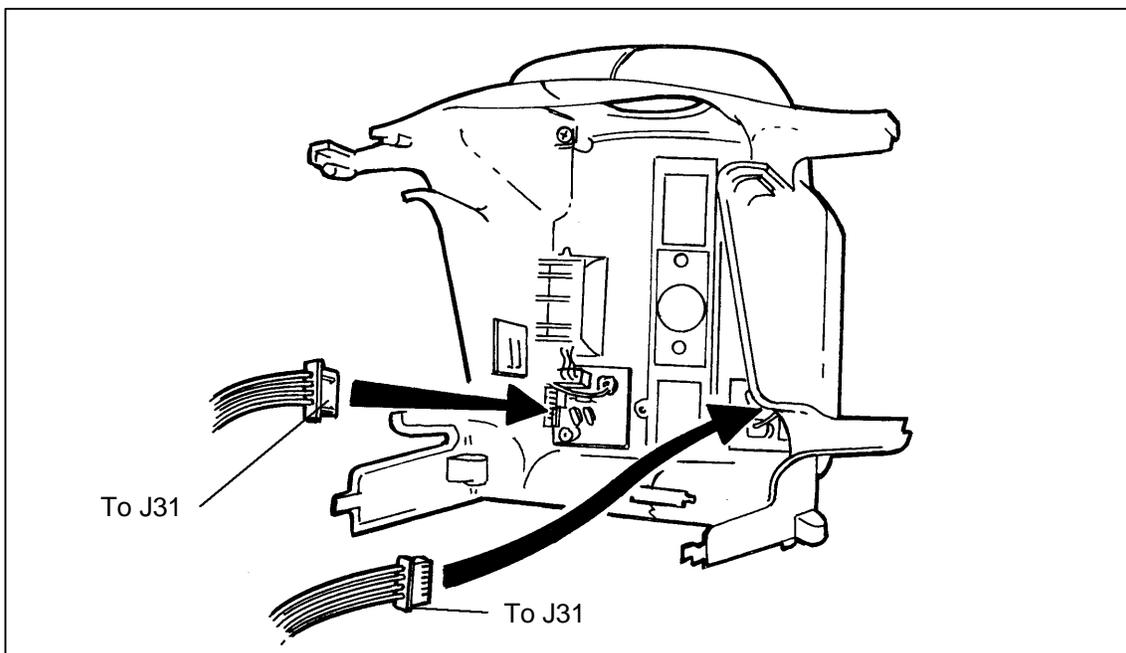


Figure 5-2a Trigger Cables

2. Reassembly

- a. Connect the trigger cables (J31) to its applicable trigger PC boards.

Note: Make sure each cable is properly dressed and secured by the white cable clamps attached to the side of the left/right cover.

- b. Using both hands, gently install the left/right cover assembly (includes the front cover) onto the camera back making sure that it properly aligns with each bottom screw hole and that it properly fits around the turret assembly.
- c. Connect the battery cable to its left cover tie post.
- d. Using a torx driver, install and tighten the screw that secures the bottom of the right cover to the camera back (Figure 5-2).
- e. Using a torx driver, install and tighten the screw that secures the bottom of the left cover to the camera back (Figure 5-2).
- f. Install the film door button adapter. It should snap into place.
- g. Using a torx driver, install and tighten the three (3) screws that secure the right hand grip to the right cover.
Note: Be careful not to pinch the battery cable between the right hand grip and its cover.
- h. Using a torx driver, install and tighten the three (3) screws that secures the left hand grip to the left cover.
Note: Be careful not to pinch the S1/S2 cable between the left hand grip and its cover.
- i. Using a torx driver, install and tighten the single screw that secures the left/right covers to the top of the turret assembly.
- j. Using a torx driver, install and tighten the single screw that secures the turret knob to the top of the turret assembly.
- k. Install a new adhesive vinyl pad (Part Number 1B6614A) to the bottom of the camera back.
- l. Connect the camera's power source: Install the battery holder, snap battery cable clip onto holder connection, slide battery cover closed.

Front Cover

1. Removal (Figure 5-3)

- a. Remove the left/right cover assembly as explained on page 39.
- b. Using a torx driver, remove the four (4) screws securing the front cover to the left/right covers.
- c. Lift off the front cover.

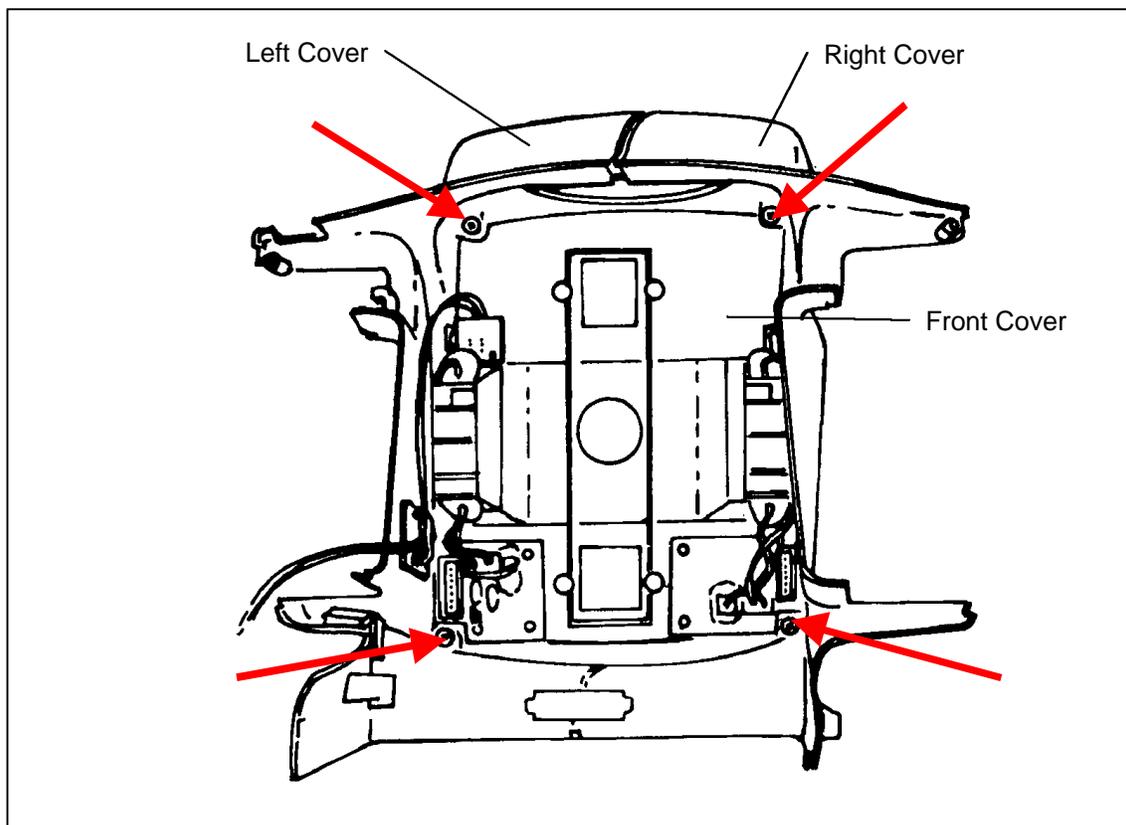


Figure 5-3 Front Cover

2. Reassembly

- a. Using a torx driver, install and tighten the four (4) screws that secure the front cover to the left/right covers.
- b. Install the left/right cover assembly as explained on page 42.

Rear Cover

1. Removal (Figures 5-2 and 5-4)

- a. Remove the left/right cover assembly as explained on page 39.
- b. Using a torx driver, remove the screw securing the bottom of the rear (right side) cover to the camera back (Figure 5-4).
- c. Using a torx driver, remove the screw securing the bottom of the rear (left side) cover to the camera back (Figure 5-4).
- d. Gently lift off the rear cover from the camera back.

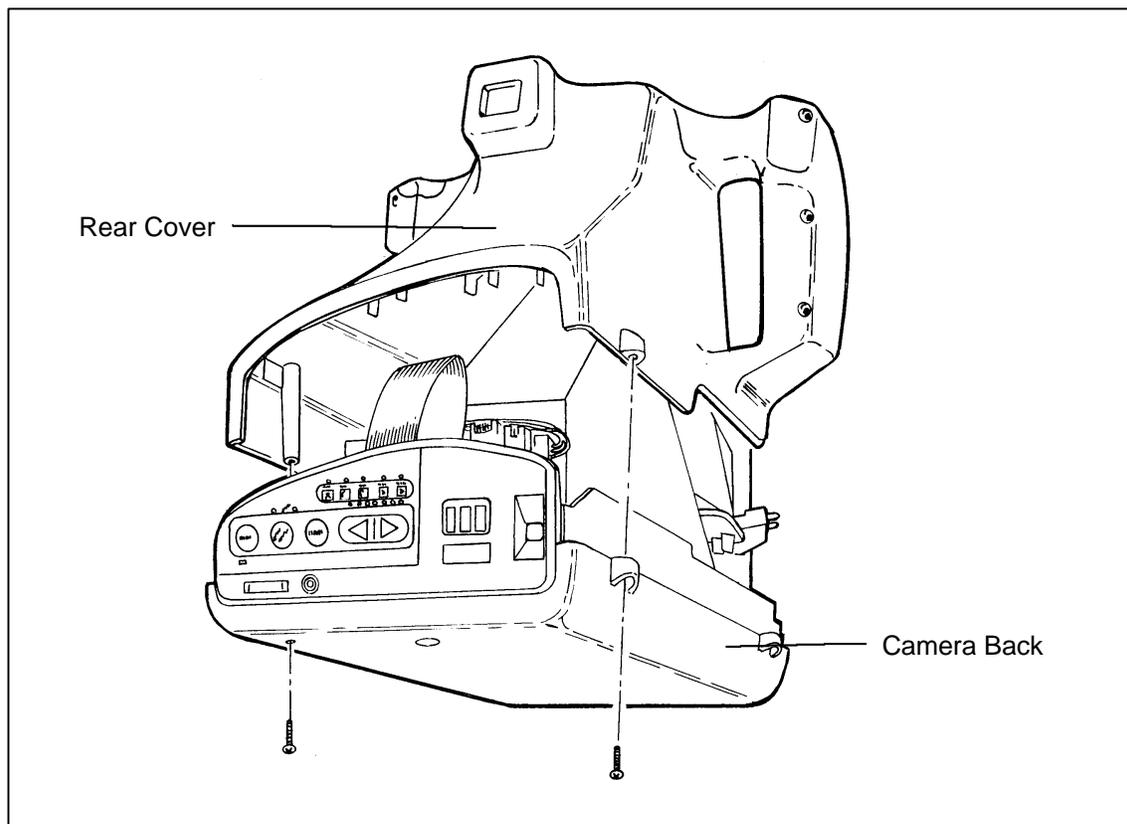


Figure 5-4 Rear Cover

2. Reassembly

- a. Install the rear cover to the camera back.
- b. Using a torx driver, install and tighten the screw that secures the bottom of the rear (left side) cover to the camera back.
- c. Using a torx driver, install and tighten remove the screw that secures the bottom of the rear (right side) cover to the camera back.
- d. Install the left/right cover assembly as explained on page 42.

Bottom Cover

1. Removal (Figure 5-5)

- a. Remove the left/right cover assembly as explained on page 39.

Note: This assembly includes the front cover.

- b. Remove the rear cover as explained on page 45.
- c. Remove the camera back door.

Note: Refer to the user's guide for instructions on how to remove the camera back door.

- d. Using a torx driver, remove the three (3) remaining screws securing the bottom cover to the camera back.
- e. Gently lift the bottom cover from the camera back.

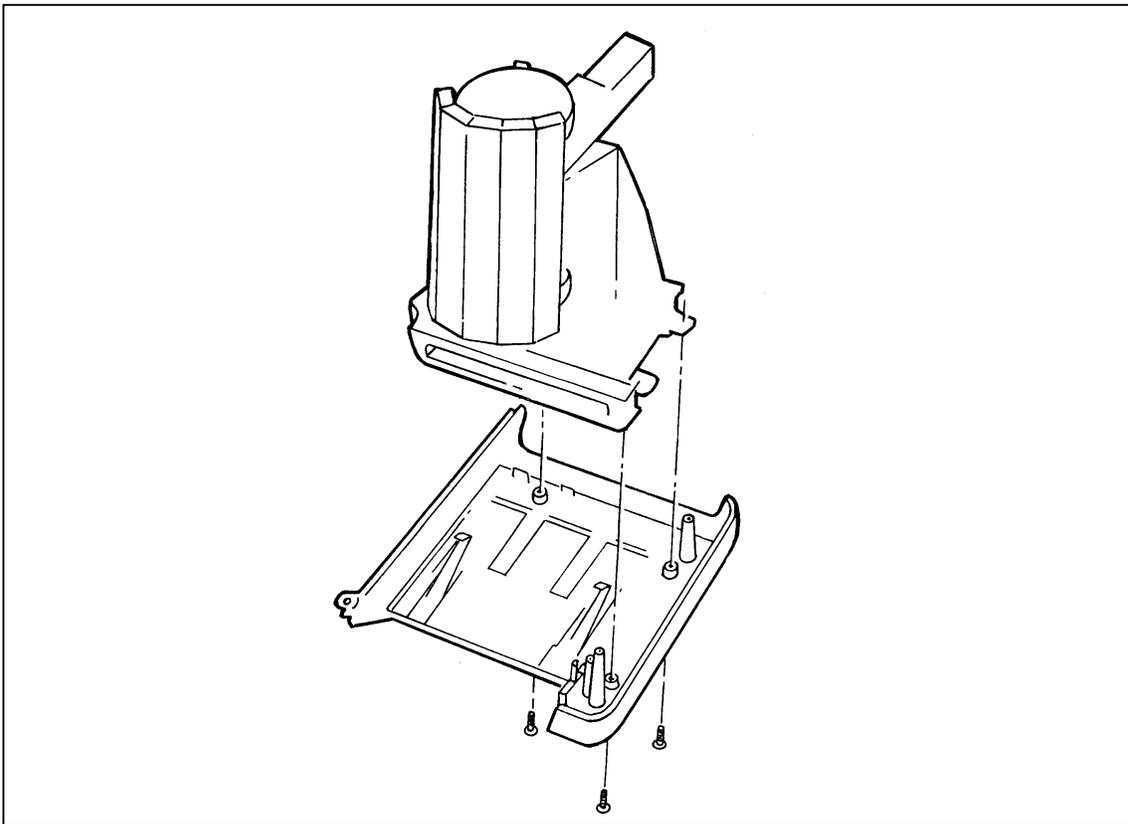


Figure 5-5 Bottom cover

2. Reassembly

- a. Place the bottom cover onto the camera back making sure that its two (2) alignment holes properly align with the support posts on the camera back..
- b. Using a torx driver, install and tighten the three (3) screws securing the bottom cover to the camera back.
- c. Install the camera back door.

Note: Refer to the user's guide for instructions on how to install the camera back door.

- d. Install the rear cover as explained on page 46.
- e. Install the left/right cover assembly as explained on page 42.

Strobe PC Board

Caution: Shock Hazard - High Voltage

Note: Use a dump stick to fully discharge the strobe capacitors before attempting to remove or replace the strobe PC board.

1. Removal (Figure 5-6)

- a. Remove the left/right cover assembly as explained on page 39.
- b. Remove the rear cover as explained on page 45.
- c. Disconnect the following electrical cables from the Strobe PC board:
 - J41 (Goes to the left trigger PC board)
 - J42 (Goes to the right trigger PC board)
 - J43 (Goes to the Logic PC board)
 - J44 (Goes to the Logic PC board)
- d. Lift out the strobe PC board.

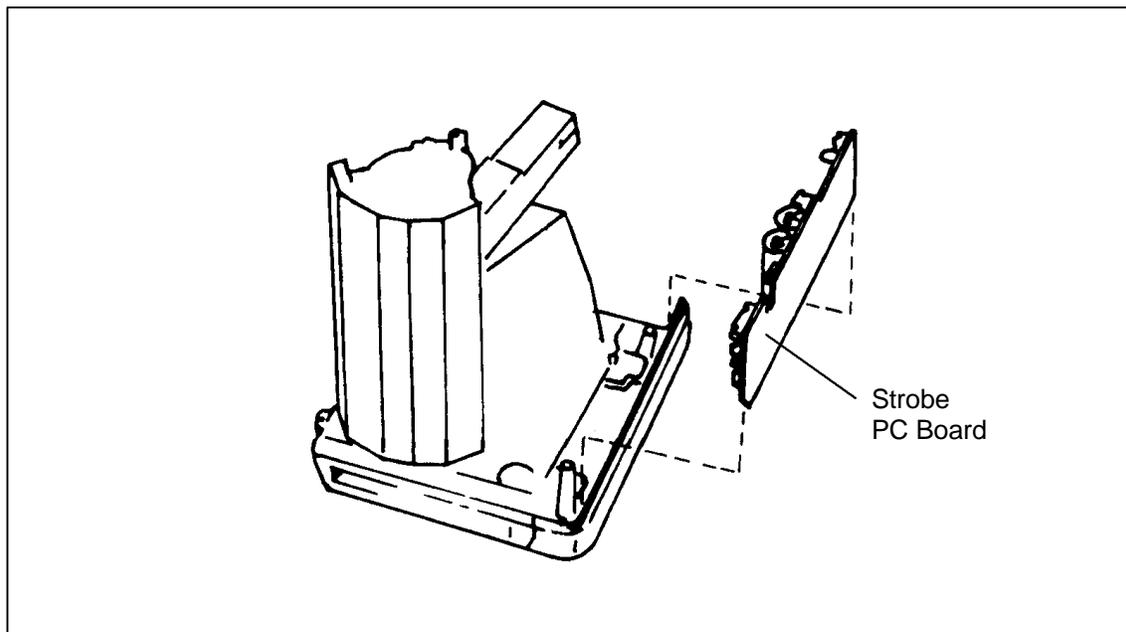


Figure 5-6 Strobe PC Board

2. Reassembly

- a. Connect the following electrical cables:
 - J41
 - J42
 - J43
 - J44
- b. Install the strobe PC board making sure that it is properly positioned in its slotted bracket on the rear cover.
- c. Install the rear cover as explained on page 46.
- d. Install the left/right cover assembly as explained on page 42.

Trigger PC Boards

Caution: Shock Hazard - High Voltage

Note: Use a dump stick to fully discharge the strobe capacitors before attempting to remove or replace the trigger PC board.

1. Removal (Figure 5-7)

- a. Remove the left/right cover assembly as explained on page 39.
- b. Remove the front cover assembly as explained on page 43.
- c. Disconnect electrical cable J32 from the applicable trigger PC board.
- d. Using a soldering iron and a solder sucker, unsolder the white trigger wire from the trigger coil.

Note: Be careful not to damage the trigger coil.

- e. Using a torx driver, remove the two (2) screws securing the trigger PC board to the front cover support mounts.
- f. Lift out the trigger PC board.

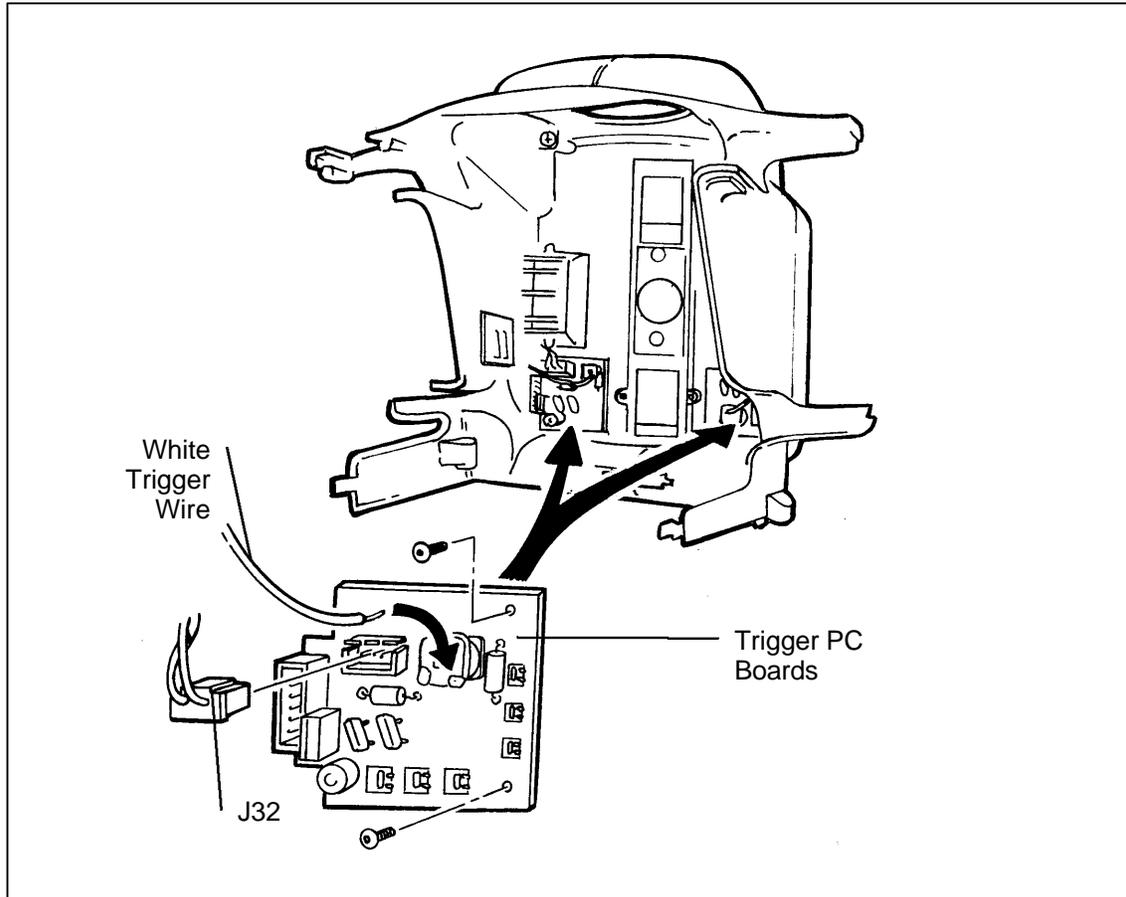


Figure 5-7 Trigger PC Boards

2. Reassembly

- a. Place the new the trigger PC board onto its front cover support mounts.
- b. Using a torx driver, install and tighten the two (2) screws that secure the trigger PC board to its front cover support mounts.
- c. Connect electrical cable J32 to the trigger PC board.
- d. Using a soldering iron, solder the white trigger wire to the trigger coil.

Note: Be careful not to damage the trigger coil.

- e. Install the front cover assembly as explained on page 44.
- f. Install the left/right cover assembly as explained on page 42.

S1/S2 PC Board

1. Removal (Figure 5-8)

- a. Remove the left/right cover assembly as explained on page 39.
- b. Using a small pair of diagonal pliers, cut the ty-wrap securing the S1/S2 electrical cable to the right strobe cable.
- c. Disconnect electrical cable J19 from the logic PC board at rear of camera.
- d. Using a torx driver, remove the four (4) screws securing the S1/S2 PC board to the right hand grip support mounts.
- e. Lift out the S1/S2 PC board.

Note: Be careful not to lose the S1/S2 button spring.

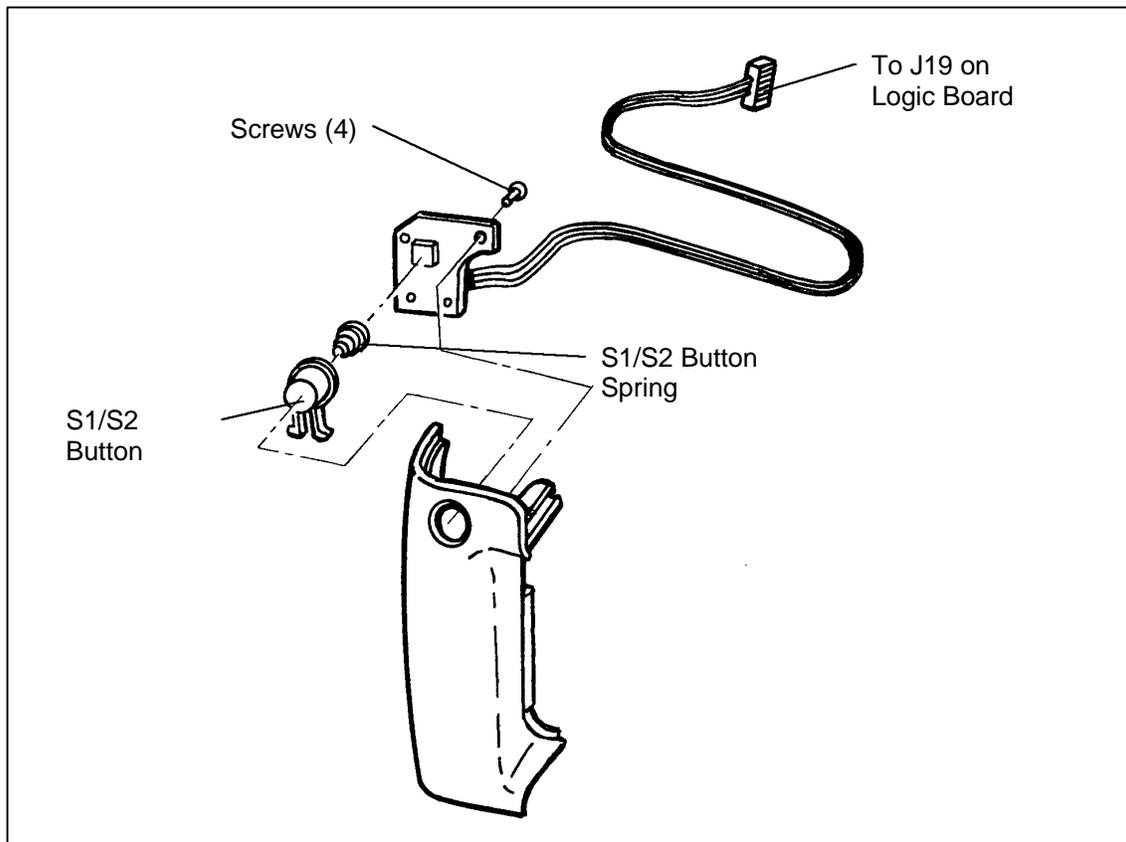


Figure 5-8 S1/S2 PC Board

2. Reassembly

- a. Place the new the S1/S2 PC board onto its right hand grip support mounts.

Note: Make sure the large end of the S1 button spring is inserted into the S1 button before the S1/S2 PC board is placed onto its support mounts.

- b. Using a torx driver, install and tighten the four (4) screws that secure the S1/S2 PC board to its right hand grip support mounts.
- c. Connect electrical cable J19 to the logic PC board.
- d. Using a small ty-wrap, secure the S1/S2 electrical cable to the right strobe cable.
- e. Install the left/right cover assembly as explained on page 42.

Control Panel

Caution: Shock Hazard - High Voltage

Note: Use a dump stick to fully discharge the strobe capacitors before attempting to remove or replace the control panel.

1. Removal (Figure 5-9)

- a. Remove the left/right cover assembly as explained on page 39.
- b. Remove the rear cover assembly as explained on page 45.
- c. Remove the bottom cover as explained on page 47.
- d. Disconnect the white ribbon cable from the logic PC board.
- e. Gently pull out the control panel. (This disconnects the control panel from male connector J27 on the logic PC board).
- f. Disconnect electrical cable J11 (X-Sync IN/OUT) from the logic PC board.

Note: Be careful not to break the two black wires soldered to the X-Sync receptacle on the control panel.

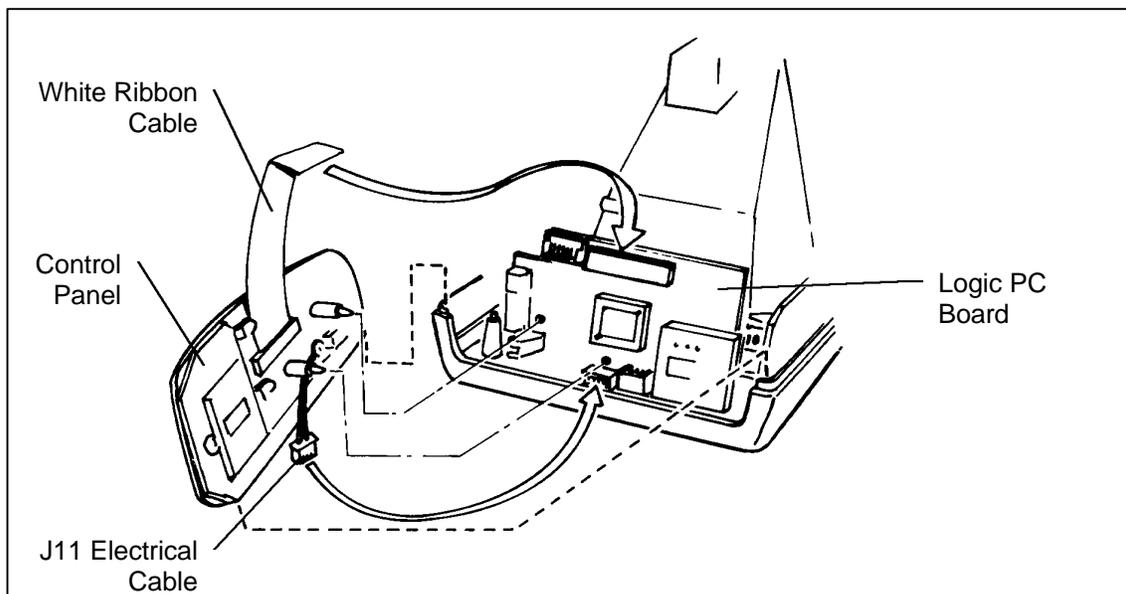


Figure 5-9 Control Panel

2. Reassembly

- a. Connect electrical cable J11 (X-Sync IN/OUT) to the logic PC board.

Note: Be careful not to break the two black wires soldered to the X-Sync receptacle on the control panel.

- b. Align the two (2) posts on the control panel with the holes on the logic PC board and then gently push in the control panel. (This connects male connector J27 on the logic PC board with the control panel).

Note: When pushing the control panel onto male connector J27 on the logic PC board be careful not to damage (bend or distort) the connectors pins.

- c. Connect the white ribbon cable to the logic PC board.
- d. Install the bottom cover as explained on page 48.
- e. Install the rear cover assembly as explained on page 46.
- f. Install the left/right cover assembly as explained on page 42.

Logic PC Board

Caution: Shock Hazard - High Voltage

- Notes:**
- Use a dump stick to fully discharge the strobe capacitors before attempting to remove or replace the control panel.
 - The logic PC board firmware (CPU chip) can easily be damaged by static discharges. Always use an anti-static mat and a wrist-strap when removing or replacing it.

1. Removal (Figure 5-10)

- a. Remove the left/right cover assembly as explained on page 39.
- b. Remove the rear cover assembly as explained on page 45.
- c. Remove the bottom cover as explained on page 47.
- d. Remove the control panel as explained on page 55.
- e. Disconnect the following electrical cables from the logic PC board:
 - J13 (Shutter Solenoid)
 - J14 (Aim Lights)
 - J15 (Piezo)
 - J17 (Strobe Control)
 - J18 (Strobe Data)
 - J21 (VBat - Film Pack Battery)
 - J23 (Film Door Switch)
 - J24 (Encoder PC Board)
 - J25 (Camera Back Flex)
- f. Gently slide out the logic PC board.

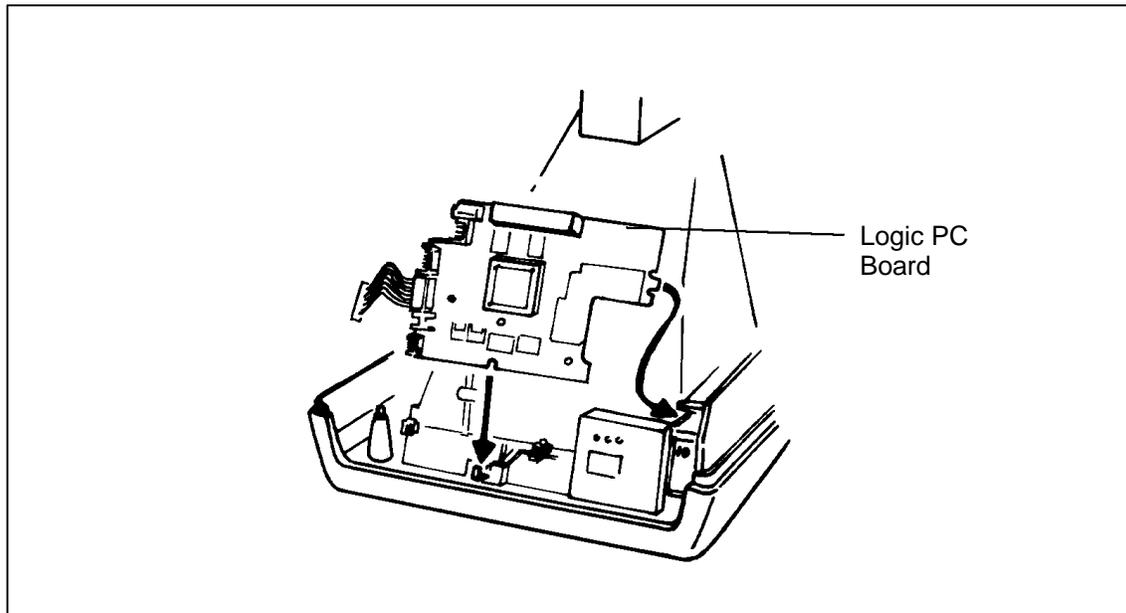


Figure 5-10 Logic PC Board

2. Reassembly

- a. Gently slide in the logic PC board making sure that its slot aligns with the support hook on the camera back..
- b. Connect the following electrical cables to the logic PC board:
 - J13 (Shutter Solenoid)
 - J14 (Aim Lights)
 - J15 (Piezo)
 - J17 (Strobe Control)
 - J18 (Strobe Data)
 - J21 (VBat - Film Pack Battery)
 - J23 (Film Door Switch)
 - J24 (Encoder PC Board)
 - J25 (Camera Back Flex)
- c. Install the control panel as explained on page 56.
- d. Install the bottom cover as explained on page 48.
- e. Install the rear cover assembly as explained on page 46.
- f. Install the left/right cover assembly as explained on page 42.

Camera Back

Caution: Shock Hazard - High Voltage

Note: Use a dump stick to fully discharge the strobe capacitors before attempting to remove or replace the camera back.

1. Removal (Figure 5-11)

- a. Remove the left/right cover assembly as explained on page 39.
- b. Remove the rear cover assembly as explained on page 45.
- c. Remove the bottom cover as explained on page 47.
- d. If applicable, remove the strobe, control, or logic PC boards.

Note: Usually it is not necessary to remove the strobe and logic PC boards and control panel when removing the camera back - just let them dangle by their electrical cables. However, if these components need to be removed during the removal of the camera back, refer to the applicable disassembly procedures in this section of the manual.

- e. Disconnect the following electrical cables from the logic PC board:
 - J15 (Piezo)
 - J16 (Date Code Module)
 - J23 (Film Door Switch)
 - J25 (Camera Back Flex)
- f. Using a torx driver, remove the six (6) screws securing the camera back to the cone assembly.
- g. Lift off the camera back.

Note: Be careful not to loose the plastic support plate (provides the necessary screw holes that secure the left side of the cone to the gear side of the camera back).

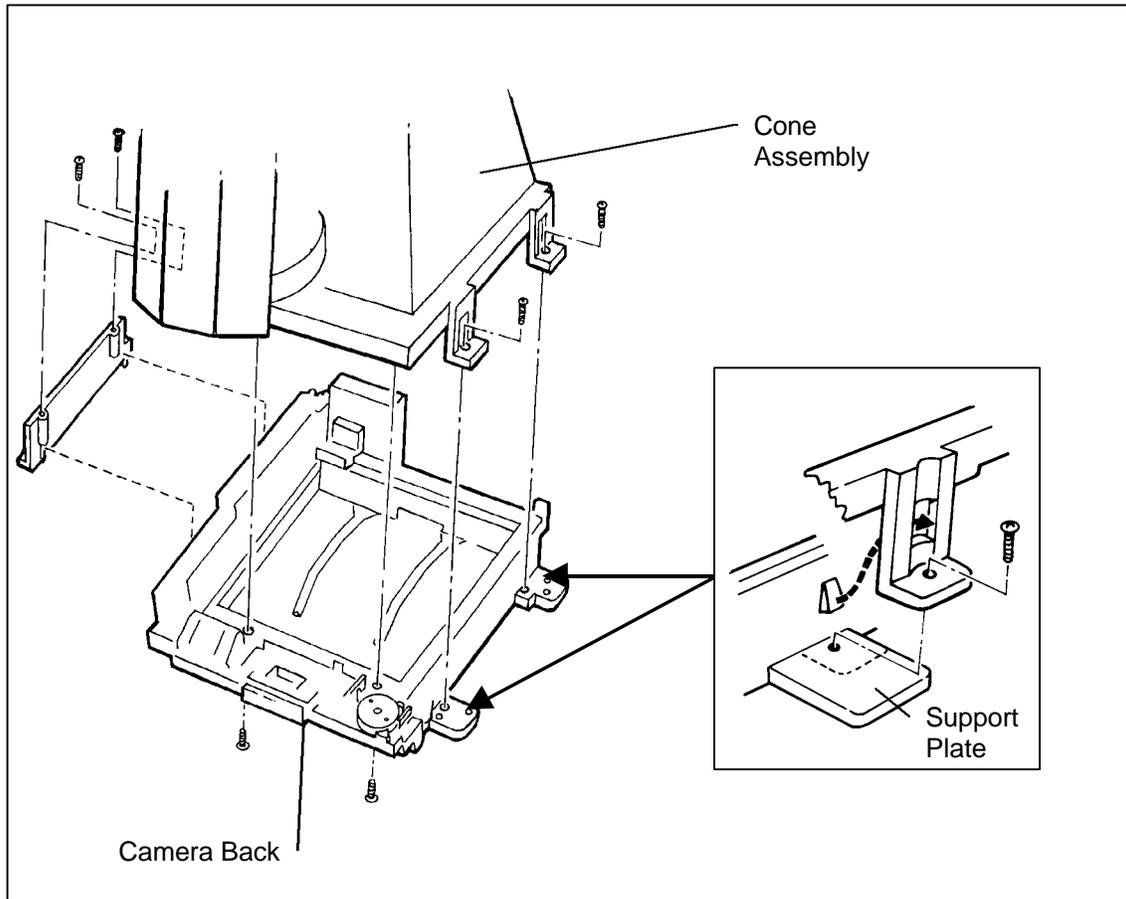


Figure 5-11 Camera Back

2. Reassembly

- a. Place cone/turret assembly onto the camera back.

Notes: Make sure the:

- Cone alignment holes are properly located over the camera back pins.
 - Plastic support plate is properly positioned on the on the gear side of the camera back; for proper screw hole alignment.
 - Strobe and logic PC boards, and control panel are properly positioned on the camera back.
- b. Using a torx driver, install and tighten the six (6) screws that secure the camera back to the cone assembly.

c. Connect the following electrical cables from the logic PC board:

- J15 (Piezo)
- J16 (Date Code Module)
- J23 (Film Door Switch)
- J25 (Camera Back Flex)

Note: If it was necessary to remove the strobe and logic PC boards and control panel during the removal of the camera back, make sure that these components are properly reassembled. For reassembly, refer to the appropriate assembly procedures in this section of the manual.

d. Install the bottom cover as explained on page 48.

e. Install the rear cover assembly as explained on page 46.

f. Install the left/right cover assembly as explained on page 42.

Encoder Plate and PC Board

1. Removal (Figure 5-12 and 5-12a)

- a. Remove the left/right cover assembly as explained on page 39.
- b. Rotate the turret assembly to its 3x position to expose one of the screws that secures the encoder plate to the lower turret plate.
- c. Using a torx driver, remove the screw.
- d. Rotate the turret assembly to its 1x position to expose the other screw that secures the encoder plate to the lower turret plate.
- e. Using a torx driver, remove the screw.
- f. Gently slide out the encoder plate being careful not to break any of its plastic sensor fingers.
- g. Disconnect electrical cable from J24 on the logic PC board at rear of camera.
- h. Using a small flat screwdriver, gently pry up the front end of the encoder PC board to release it from its support pins and then slide it out from its support rails (Figure 5-12a).

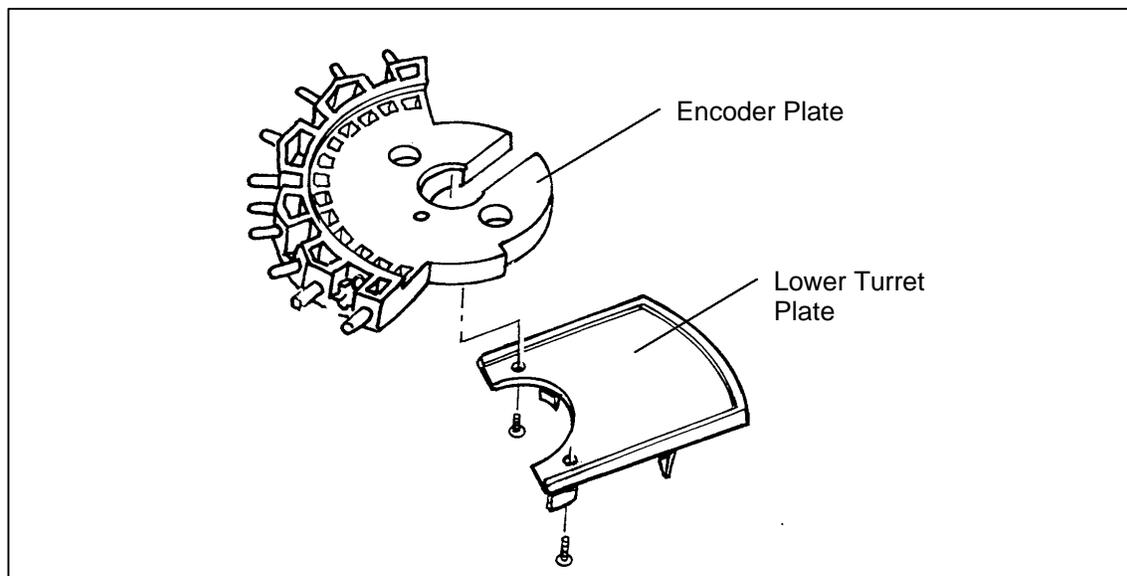


Figure 5-12 Encoder Plate and Lower Turret Plate

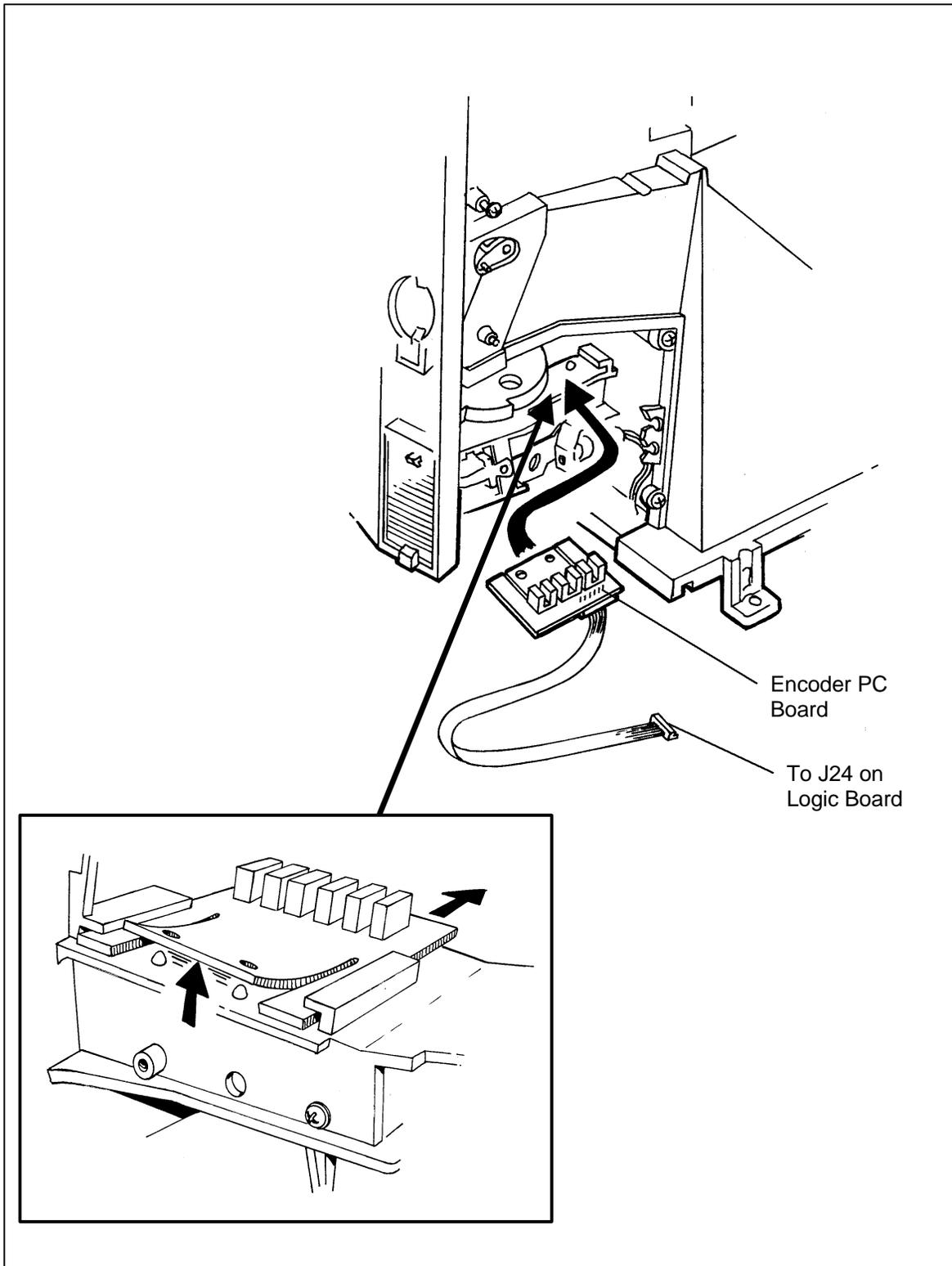


Figure 5-12a Encoder PC Board

2. Reassembly

- a. Rotate the turret assembly to its 1x position.
- b. Gently slide in the encoder plate making sure its mounting holes align with the screw holes on the lower turret plate.

Note: Be careful not to break any of its plastic sensor fingers.

- c. Using a torx driver, install and tighten the two (2) screws that secure the encoder plate to the lower turret plate.
- d. Rotate the turret assembly to its 3x position.
- e. Align the front end of the encoder PC board with its support rails and then gently push it in until it hits the support locking pins.
- f. Using a small flat screwdriver, gently pry up the front end of the encoder PC board and then push it in until it snaps onto its support locking pins.
- g. Connect electrical cable J24 to the logic PC board.
- h. Install the left/right cover assembly as explained on page 42.

Turret Assembly

1. Removal (Figure 5-13)

- a. Remove the left/right cover assembly as explained on page 39.
- b. Remove the encoder plate and PC board as explained on page 62.
- c. Using a pair of C-ring pliers, remove the top and lower pivot plate C-rings.
- d. Pull out the top and lower turret bushings and then lift out the turret assembly.

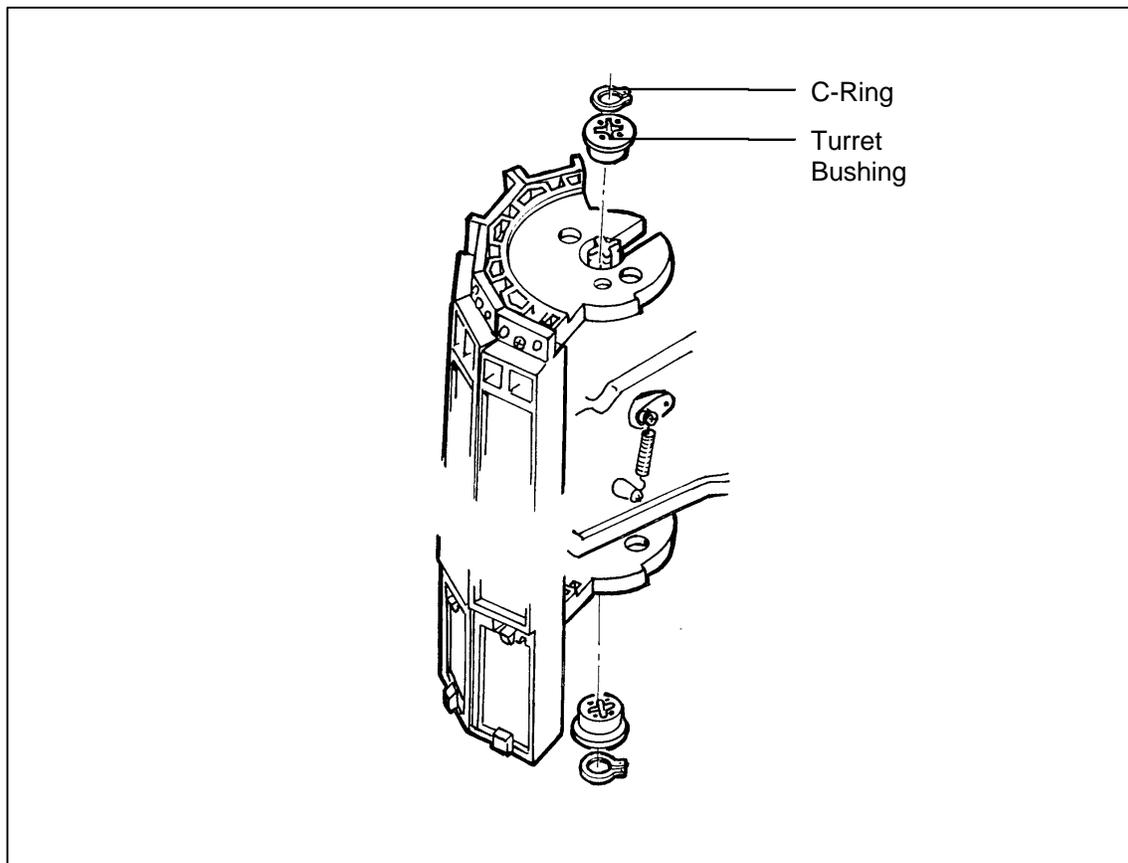


Figure 5-13 Turret Assembly

2. Reassembly

- a. Slide the turret assembly onto its pivot pins and then insert the top and lower turret bushings onto their respective pivot pins.
- b. Using a pair of C-ring pliers, install the top and lower pivot plate C-rings to secure the turret assembly to its pivot pins.
- c. Install the encoder plate and PC board as explained on page 64.
- d. Install the left/right cover assembly as explained on page 42.

Shutter Solenoid Assembly

1. Removal (Figure 5-14)

- a. Remove the left/right cover assembly as explained on page 39.
- b. Disconnect the solenoid cable wires from the solenoid pins.
- c. Using tweezers, disconnect the shutter extension spring from the shutter pivot post.
- d. Using a torx driver, remove the two (2) screws securing the solenoid assembly to the viewfinder housing.
- e. Lift out the solenoid assembly being careful not to lose the solenoid plunger.

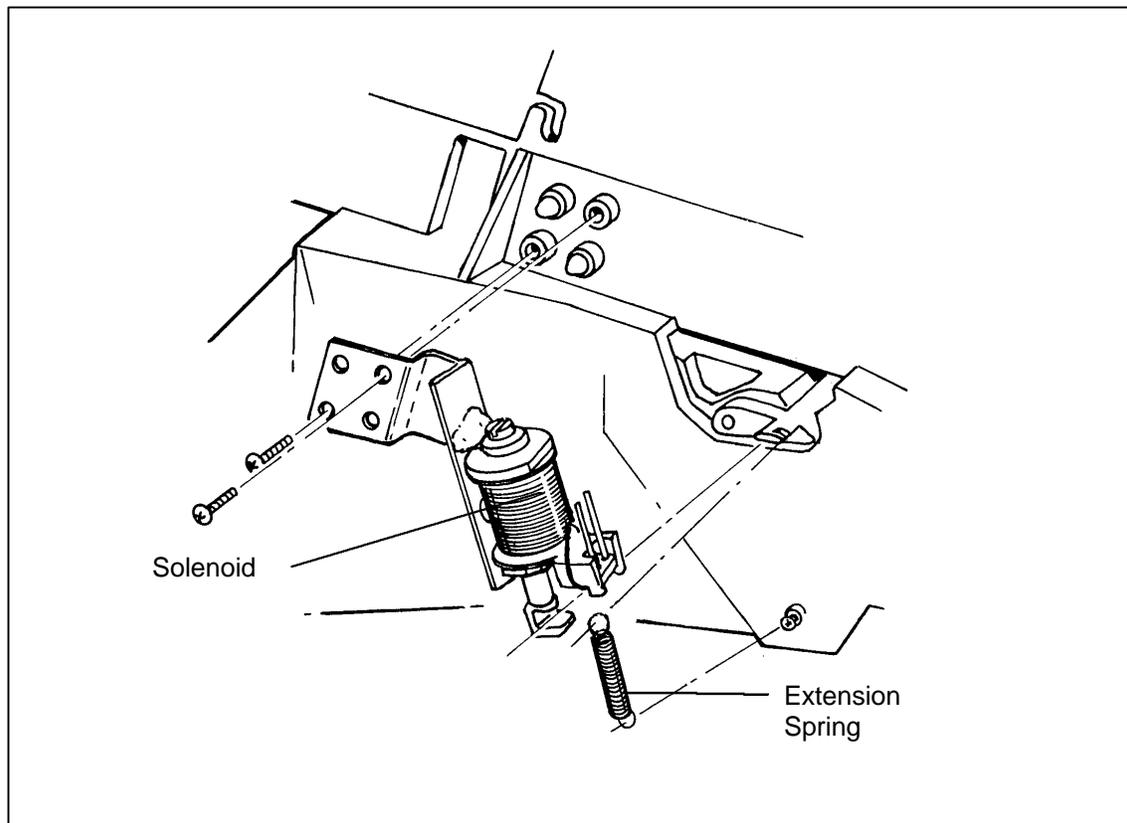


Figure 5-14 Shutter Solenoid Assembly

2. Reassembly

- a. Place the solenoid assembly onto the viewfinder support posts.
- b. Using a torx driver, install and tighten the two (2) screws that secure the solenoid assembly to the viewfinder housing.
- c. Using tweezers, connect the shutter extension spring to the shutter pivot post.
- d. Connect the solenoid cable wires to the solenoid pins.
- e. Install the left/right cover assembly as explained on page 42.

Bulb (Aim Light) Bracket Assembly

1. Removal (Figure 5-15)

- a. Remove the left/right cover assembly as explained on page 39.
- b. Remove the rear cover assembly as explained on page 45.
- c. Disconnect electrical cable J14 from the logic PC board.
- d. Using a torx driver, remove the screws securing the aim lights.
- e. Pull out the aim light cable assembly - includes both aim lights.

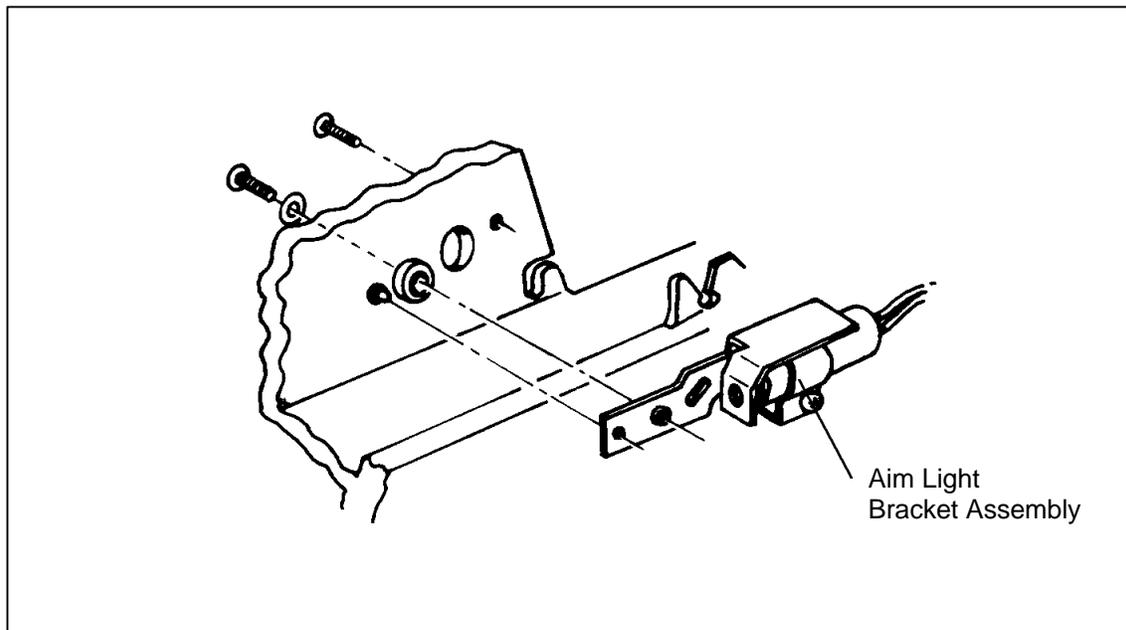


Figure 5-15 Aim Light Cable Assembly

2. Reassembly

- a. Install the aim light cable assembly - includes both aim lights.

Note: Make sure the aim light cable is properly dressed - around the viewfinder and cone cable claps.

- b. Using a torx driver, install and tighten the screws that secure the aim lights to their respective bracket assemblies.
- c. Connect electrical cable J14 to the logic PC board.
- d. Install the rear cover assembly as explained on page 46.
- e. Readjust the aim lights as explained in section 3 of this manual.
- e. Install the left/right cover assembly as explained on page 42.

Date Code Module

1. Removal (Figure 5-16)

- a. Remove the left/right cover assembly as explained on page 39.
- b. Remove the rear cover assembly as explained on page 45.
- c. Remove the bottom cover as explained on page 47.
- d. Disconnect electrical cable J16 from the logic PC board.
- e. Using a torx driver, loosen the six (6) screws securing the camera back to the cone assembly.
- f. Gently lift up the right side of the cone/turret assembly to allow the date code module to be lifted off and out of its camera back rail slot.

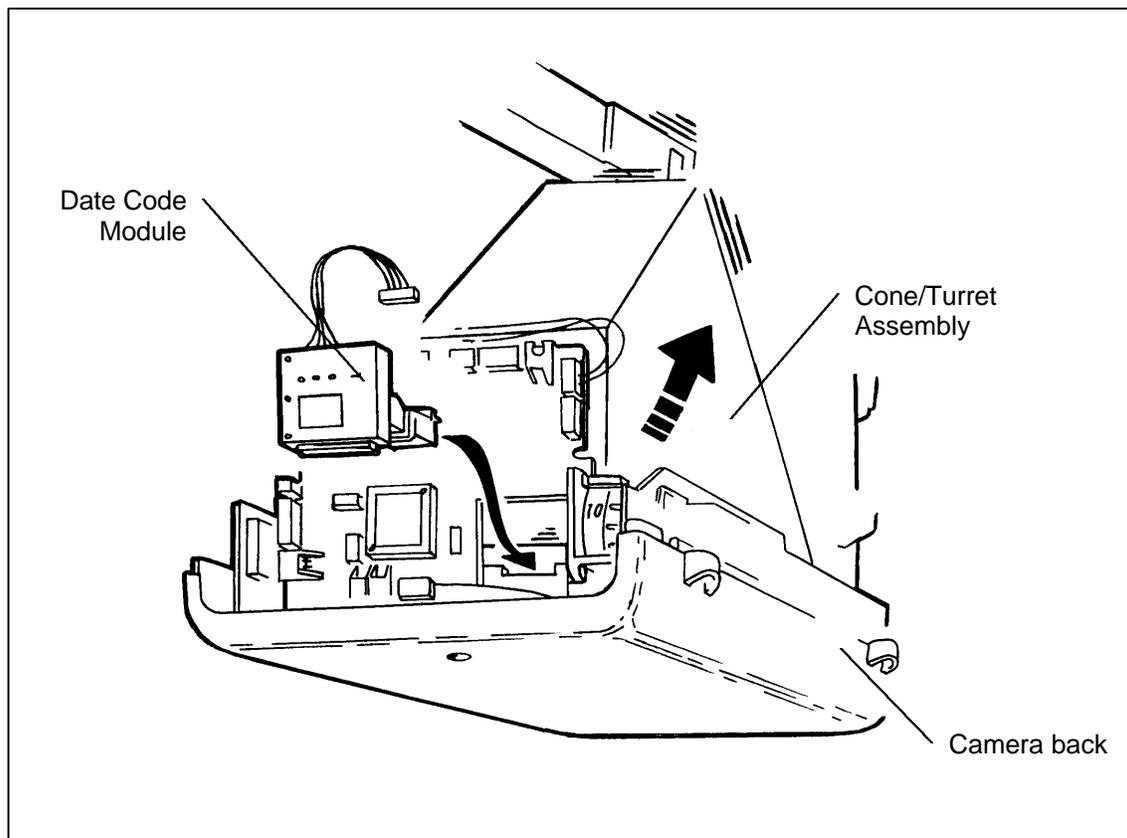


Figure 5-16 Date Code Module

2. Reassembly

- a. Install the date code module onto its camera back rail slot.
- b. Using a torx driver, tighten the six (6) screws that secures the camera back to the cone assembly.
- c. Connect electrical cable J16 to the logic PC board.
- d. Install the bottom cover as explained on page 48.
- e. Install the rear cover assembly as explained on page 46.
- f. Install the left/right cover assembly as explained on page 42.

Firmware (Logic PC Board)

Caution: Shock Hazard - High Voltage

- Notes:**
- Use a dump stick to fully discharge the strobe capacitors before attempting to remove or replace the system firmware (CPU chip).
 - The CPU chip can easily be damaged by static discharges. Always use an anti-static mat and a wrist-strap when removing or replacing it.

1. Removal (Figure 5-17)

- a. Remove the left/right cover assembly as explained on page 39.
- b. Remove the rear cover assembly as explained on page 45.
- c. Remove the control panel as explained on page 55.
- d. Locate the **CPU** on the logic PC board. Observe its orientation in its socket - dot and beveled corner faces top of logic PC board.
- e. Insert the fingers of the chip puller into the provided slots at the top right and bottom left corners of the socket.
- f. Remove the **CPU** by gently but firmly squeezing the handles of the chip puller together.

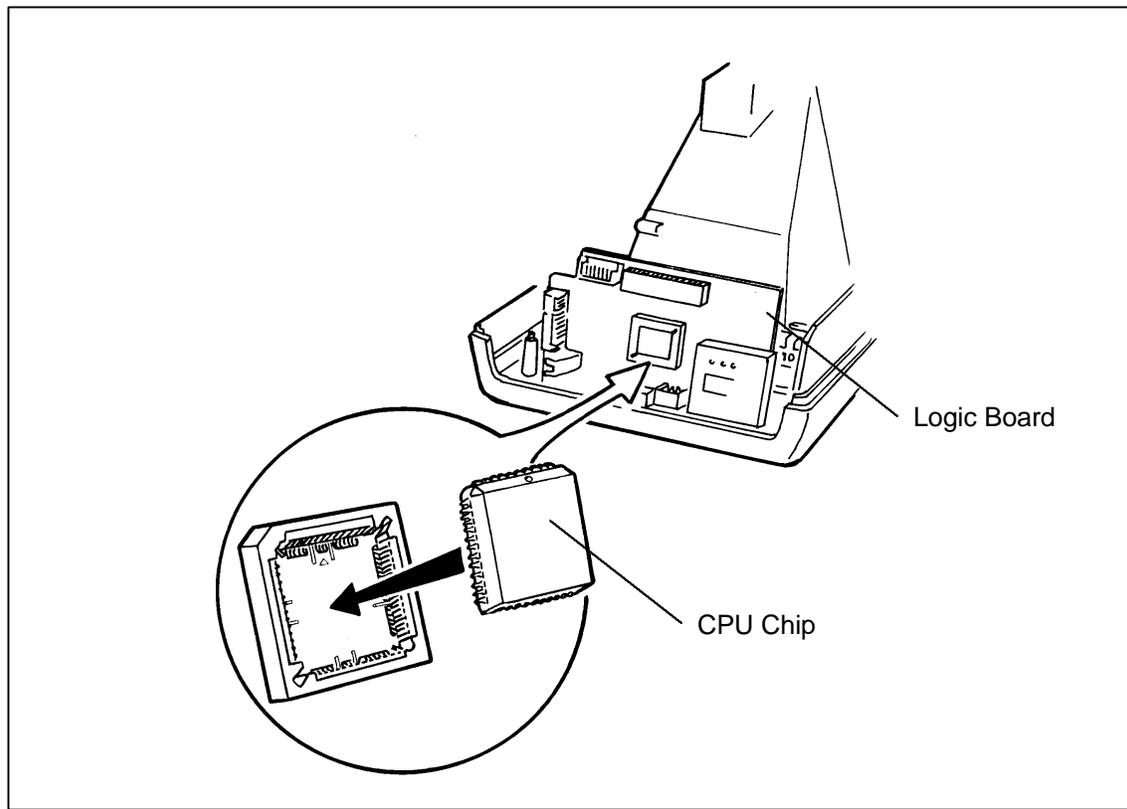


Figure 5-17 Firmware CPU

2. Reassembly

- a. Properly position the replacement **CPU** squarely into its socket making sure that its beveled corner goes to the beveled corner of the socket.
- b. Place a thumb in the middle of the **CPU** and then evenly squeeze the replacement **CPU** into place.

Note: The replacement **CPU** should be close to flush and parallel with the top of its socket when it is properly seated.

- c. Install the control panel as explained on page 56.
- d. Install the rear cover assembly as explained on page 46.
- e. Install the left/right cover assembly as explained on page 42.

Section 6. Schematics

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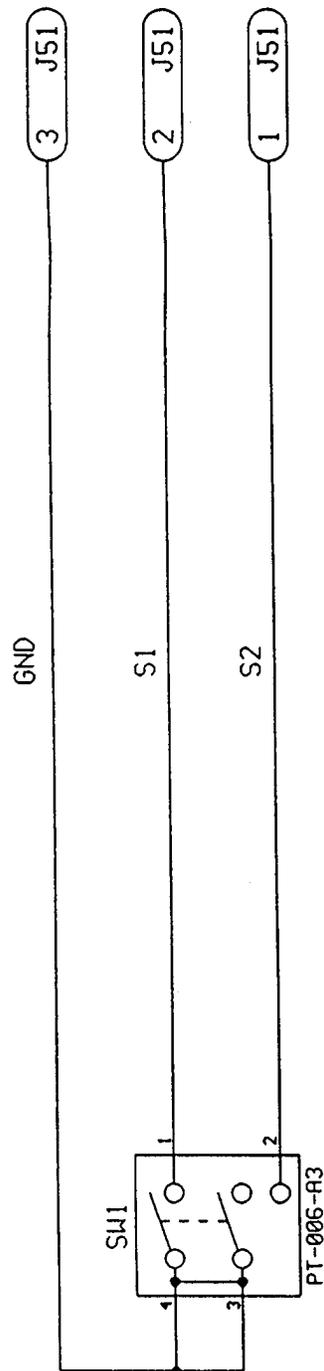


Figure 6-1 S1/S2 PC Board

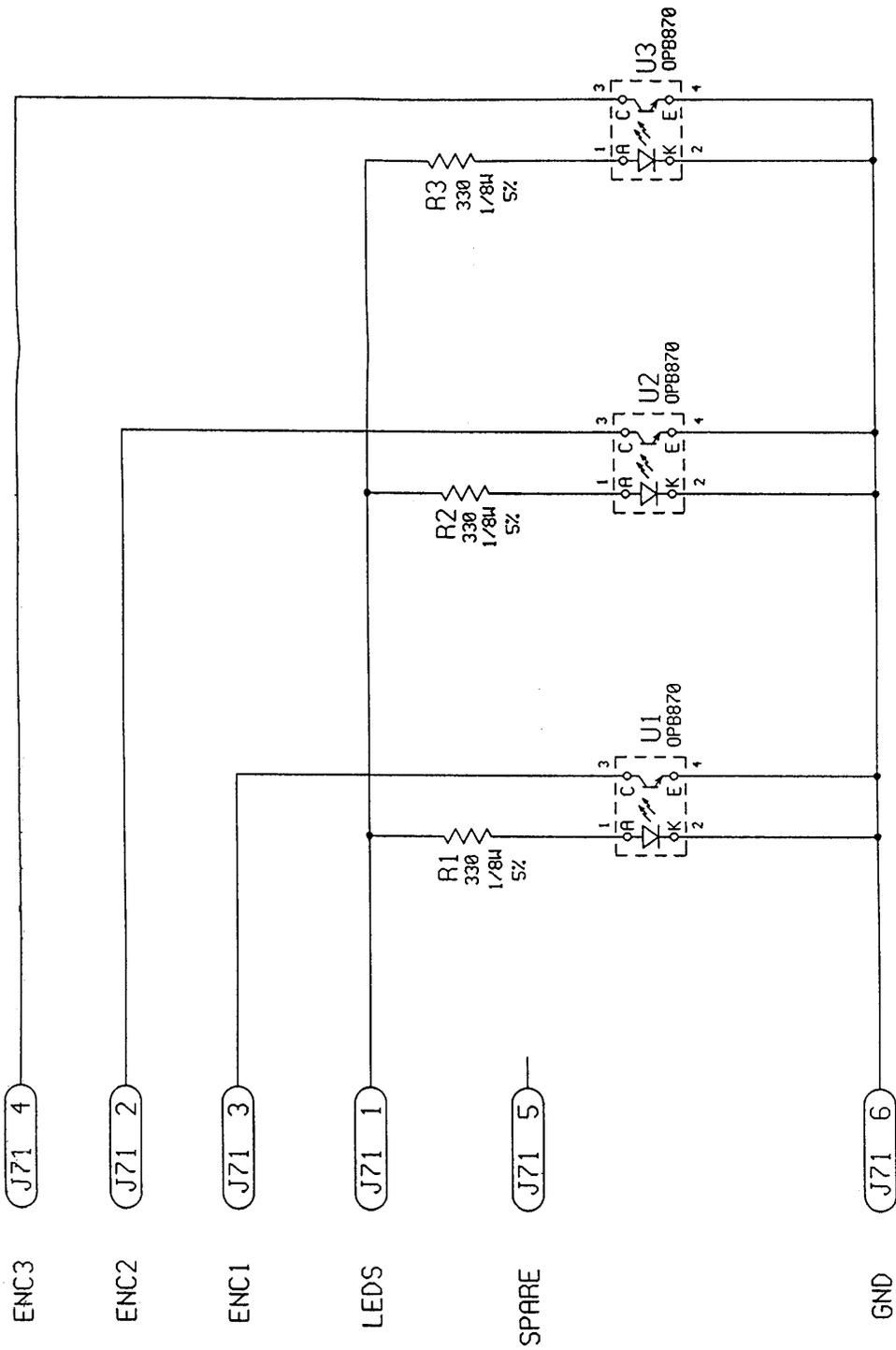


Figure 6-2 Encoder PC Board

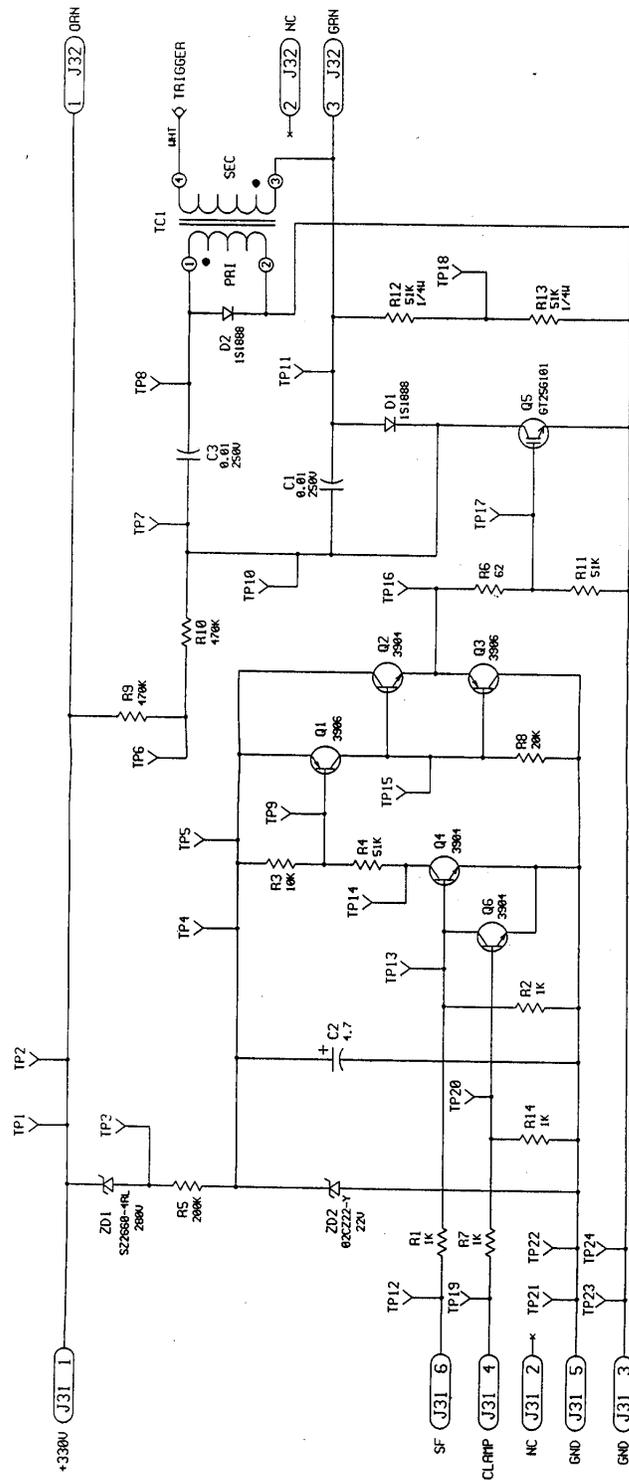


Figure 6-3 Trigger PC Board

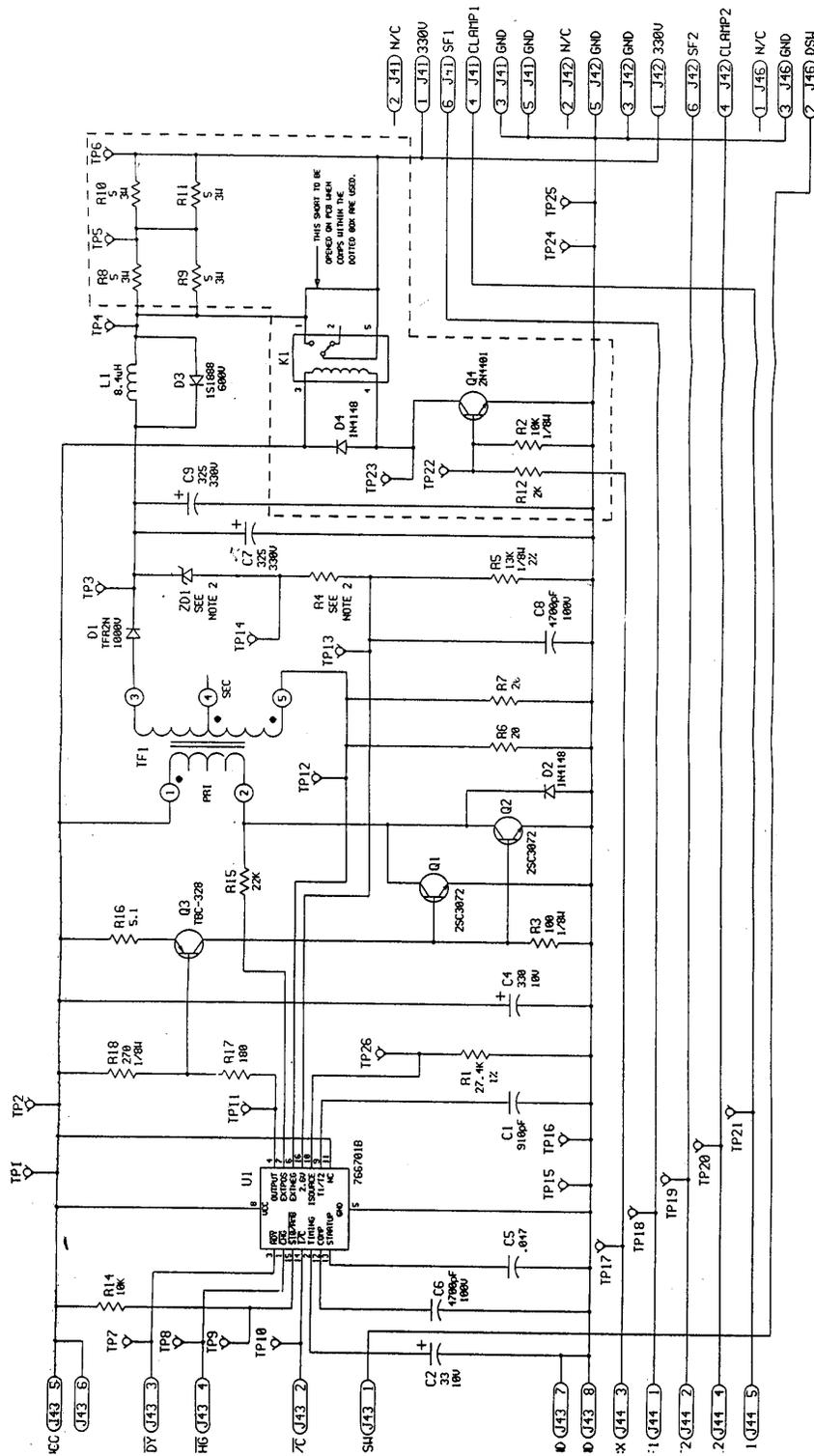


Figure 6-4 Strobe PC Board (1 of 1)

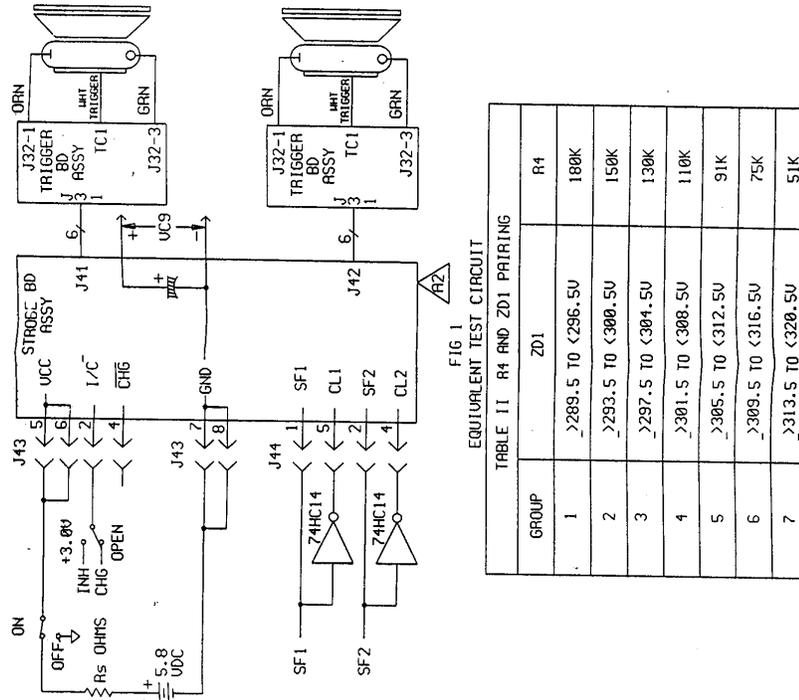


FIG. 1

EQUIVALENT TEST CIRCUIT

GROUP	R4	ZD1
1	>289.5 TO <296.5U	180K
2	>293.5 TO <300.5U	150K
3	>297.5 TO <304.5U	130K
4	>301.5 TO <308.5U	110K
5	>305.5 TO <312.5U	91K
6	>309.5 TO <316.5U	75K
7	>313.5 TO <320.5U	51K

PRR	DESCRIPTION	MIN	TYP	MAX	UNITS	TEST CONDITIONS
1	INITIAL INPUT ENERGY	53	66	80	WATT-SECS	TEST-CIRCUIT PER FIG. 1 UC9=0 VOLTS FOR FIRST CHARGE CYCLE OF C7 & C9
2	INITIAL CHARGE TIME	6.9	8.4	10.0	SEC	
3	INPUT ENERGY (RECHARGE)	50	56	62	WATT-SEC	
4	RECHARGE TIME	5.7	6.7	7.4	SECS.	NO QUENCH
5	OUTPUT VOLTAGE (VOLTAGE ACROSS C9)	320	330	340	UDC	NO QUENCH
6	REGULATION ENERGY	31	35	40	WATT-SECS.	
7	REGULATION TIME	20	35	50	SECS.	
8	T1 TIME (Q1/Q2 ON TIME)	15.0	17.5	21.0	USEC	IC1-PIN 4 UC9=0U
9	RECYCLE TIME	.35	.50	.65	SECS.	RECHARGE AFTER QUENCH
10	QUENCH TURN OFF TIME		10	15	USEC	QUENCH COMMAND 100US AFTER SF
11	INHIBIT (1/C)	3.0			VOLTS	J43-PIN 2
12	STROBE FIRE PULSES	3.0			VOLTS	J44-PINS 1,2 P.H=1.5mSEC

Figure 6-5 Strobe PC Board (2 of 2)

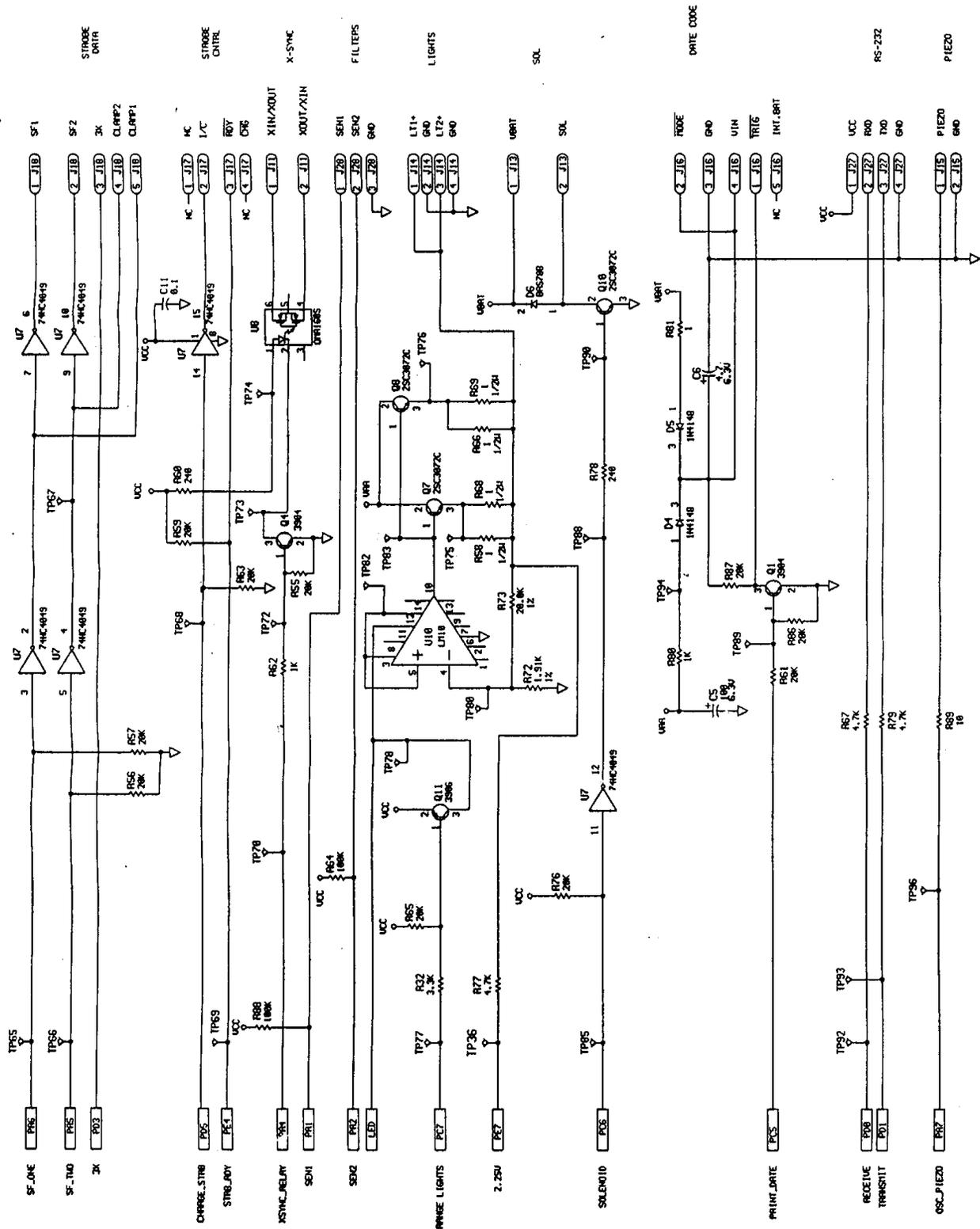


Figure 6-7 Logic PC Board (2 of 2)

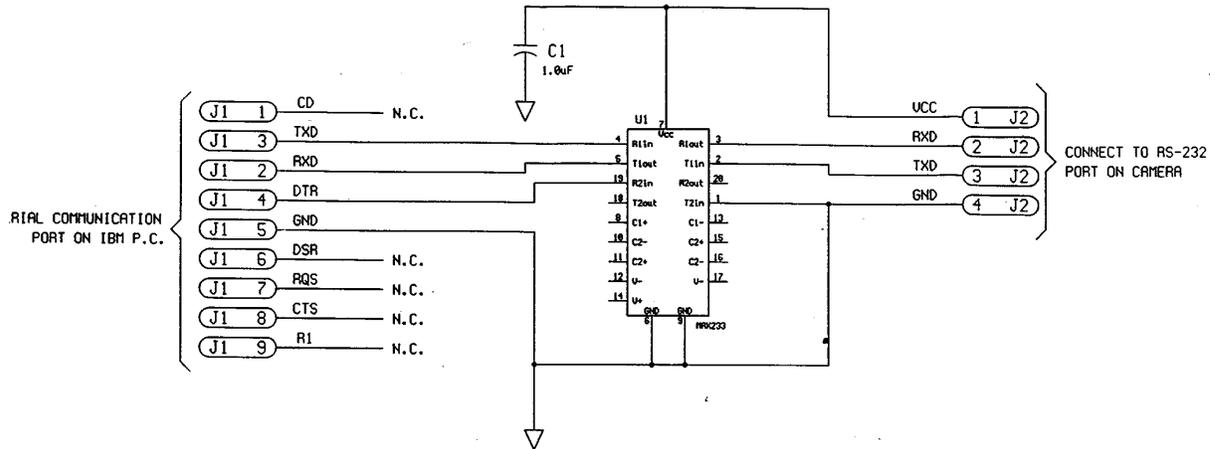


Figure 6-8 Communication PC Board