



HEWLETT
PACKARD

CE HANDBOOK

HP MODEL 7510A

FILM RECORDER

© 1985 by HEWLETT-PACKARD COMPANY 1985
SAN DIEGO DIVISION
SAN DIEGO CALIFORNIA U.S.A.

ALL RIGHTS RESERVED

Manual Part No. 07510-90904

PRINTED: OCTOBER 1985

TABLE OF CONTENTS

PRODUCT INFORMATION

1-1. Introduction	1-1
1-2. Printing History	1-1
1-3. Product Safety	1-1
1-4. Product Description	1-2
1-5. Operating Characteristics	1-3
1-6. Accessories Supplied	1-4
1-7. Accessories Available	1-4
1-8. HP 7510A Service Support Kit	1-5

TABLES

Table	Page
1-1. HP Model 7510A Operating Characteristics	1-3

HP Computer Museum
www.hpmuseum.net

For research and education purposes only.

1-1. INTRODUCTION

This Service Handbook contains information necessary to test, adjust and service the Hewlett-Packard Model 7510A Film Recorder. For ease of reference, this handbook is divided into eleven sections as follows:

- SECTION I ... PRODUCT INFORMATION
- SECTION II ... ENVIRONMENTAL/INSTALLATION/PM
- SECTION III .. CONFIGURATION
- SECTION IV .. TROUBLESHOOTING
- SECTION V ... DIAGNOSTICS
- SECTION VI .. ADJUSTMENTS
- SECTION VII . PERIPHERALS
- SECTION VIII . REPLACEMENT PARTS
- SECTION IX .. DIAGRAMS
- SECTION X ... REFERENCE
- SECTION XI .. SERVICE NOTES/ICOM's

1-2. PRINTING HISTORY

New editions are complete revisions of the manual. Update packages, which are issued between editions, contain additional and replacement pages to be merged into the manual by the Customer Engineer. The date on the title page changes only when a new edition is published. When an edition is revised, all the prior updates to the edition are incorporated.

First Edition October 1985

1-3. PRODUCT SAFETY.

WARNING

To prevent personal injury, observe all safety precautions and warnings stated on the instrument and in this manual.

This product is a Safety Class 1 instrument. Review the instrument and manual for safety markings and instructions before operation. Specific warnings, cautions and instructions are placed wherever applicable. These precautions must be observed during all phases of operation, service and repair of this instrument. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standard of design, manufacture and intended use of this instrument.

1-4. PRODUCT DESCRIPTION

The HP Model 7510A is a full color, digitally controlled vector film recorder. The primary application of the film recorder is the production of 35-mm slides for business and technical presentations. Producing instant prints for verification, story-boarding or distribution may be accomplished by installing a camera module with a Polaroid Autofilm® back. Other features of the Film Recorder include:

- * Automatic film advance with program or front panel control.
- * User definable colors and line widths.
- * Virtually unlimited color palettes available in any picture.
- * Complete control via HP-IB or RS-232-C.
- * HP-GL plotter language compatible.

Camera modules

Included with each HP 7510A is a 35-mm camera module for producing 35-mm slides and prints. An optional Polaroid® instant print camera module is also available. Instant prints can be used to preview/proofread slides, as hardcopies to include in reports, or as visuals for your script or storyboard.

Internal intelligence

Over 16 million possible colors. Advanced internal intelligence provides: color-coordinated palettes, film compensation curves, polygon fill, automatic film advance, exposure counter, and camera module sensing. Built-in HP-GL instruction set performs complex drawing tasks with minimal effort, while a powerful MC 68000 microprocessor speeds system communications.

1-5. OPERATING CHARACTERISTICS.

Instrument operating characteristics are listed in table 1-1. The table also includes environmental considerations. These characteristics are not specifications and are listed for user information only.

Table 1-1. HP Model 7510A Operating Characteristics

Addressable Resolution:

35 mm: 16345 x 10897 Addressable units on 35 x 24 mm film area.

Auto Film: 16345 x 12259 Addressable units on 4 x 3 in. film area.

Supported Films:

35 mm: Kodachrome 25 and 64, Ektachrome 100 and 200, Polachrome 40, Fujichrome 100 and 200, Agfachrome 100 and 200, Kodacolor VR 100, Fujicolor 100, AGFA color 100.

AutoFilm: Polaroid 331 and 339.

Interfacing:

HP-IB (IEEE-488): Implements the following HP-IB functions as defined in IEE-488: SH1, AH1, T6, L3, SR1, RL0, DC1, DT0,C0, PP2 for address of 7 or less, PP1 for address greater than 7, and PP0. Device address is front panel selectable.

RS-232-C/CCITT V.24: Asynchronous serial ASCII with front panel selectable baud rates of 75, 110, 150, 200, 300, 600, 1200, 2400, 4800, and 9600.

Input Buffer Size:

Default: 1024 bytes.

Programmable: Expandable to 8,000 bytes.

Power Requirements:

Source: 100, 120, 220, 240V ac, -10% — +5%.

Frequency: 48 to 66 Hz.

Power Consumption: 150 W maximum.

FCC/IEC/UL:

FCC certified to conform to limits set for radio frequency interference when used with a class B computing device. Meets or exceeds IEC-380, IEC-435, UL-478, and CSA A22.2 NO.154.

*Table 1-1. Operating Characteristics (Cont'd)***Internal Intelligence:**

Over 16 million colors available. Firmware features include: color-coordinated palettes, film compensation curves, polygon fill, automatic film advance, exposure counter, camera module sensing, and 20 character sets in two fonts.

Environmental:

Temperature: 0 to +55 degrees C (+32 to +131 degrees F) operating.
-20 to +75 degrees C (-4 to +167 degrees F) non-operating.

Humidity: Up to 95% relative humidity at +40 degrees C (+104 F).

Altitude: Up to 4600 m (15,000 ft) operating, up to 15,300 m (50,000 ft) non-operating.

Size:

215 mm (8.5 in.) high, 609 mm (24 in.) wide, 457 mm (18 in.) deep.

Weight:

Net: Approximately 20.8 kg (46 lb).

Shipping: Approximately 25 kg (55 lb).

1-6. ACCESSORIES SUPPLIED

The following accessories are supplied with the HP Model 7510A:

- One 35 mm camera module.
- One operating manual.
- One power cord.

An appropriate power cord is supplied based on the destination of the film recorder.

1-7. ACCESSORIES AVAILABLE

The following accessories are available for the HP Model 7510A:

Available Cables:

- Male to female RS-232-C/CCITT V.24 25-pin cable, wired straight through, HP Model 17355D.
- Female to female RS-232-C/CCITT V.24 25-pin cable, wired straight through, HP Model 17355F.

Female to female RS-232-C/CCITT V.24, wired pins: 1-1, 2-3, 3-2, 7-7, 5&6 -20, 20-5&6, HP Model No. 17255F.

Male to female RS-232-C/CCITT V.24, wired pins: 1-1, 2-3, 3-2, 7-7, 5&6-20, 20-5&6, HP Model No. 17255D.

RS-422-A adapter 5 meters long, 5 pin male (RS-422-A to 25 pin RS-232-C), HP Model No. 17855A.

HP-IB cable, 1 m long, RFI shielded, HP Model No. 10833A.

HP-IB cable, 2 m long, RFI shielded, HP Model No. 10833B.

Additional Camera Modules:

Polaroid instant print camera module, HP Model No. 17515A.

35 mm camera module (in addition to supplied module), HP Model No. 17510A.

Additional Manuals:

HP 7510A Service Manual (available late 1985).

HP 7510A Programming Manual.

HP 7510A Quick Reference Guide.

1-8. HP 7510A SERVICE SUPPORT KIT

The HP 7510A Service Support Kit consist of an inventory kit HP Model No. 07510-67801 and an expensed support kit HP Model No. 07510-67901. Refer to Section VIII, Replaceable Parts, for a detailed catalog of the Service Support Kit.

TABLE OF CONTENTS

ENVIRONMENTAL/INSTALLATION/PREVENTIVE MAINTENANCE

2-1. Introduction	2-1
2-2. Environmental Specifications	2-1
2-3. AC Power Requirements	2-1
2-4. Installation	2-4
2-5. Camera Installation	2-4
2-6. Confidence Test	2-4
2-7. Preventive Maintenance	2-4

ILLUSTRATIONS

Figure	Page
2-1. Available Power Cords and Options	2-1
2-2. AC Line Voltage Selection	2-3

2-1. INTRODUCTION

This Section contains environmental specifications and installation instructions for HP Model 7510A Film Recorder.

2-2. ENVIRONMENTAL SPECIFICATIONS

Operating Environment (Without Media):

Temperature: 0 to +55 degrees C (+32 to +131 degrees F).

Humidity: Up to 95% relative humidity at +40 degrees C (+104 F).

Altitude: Up to 4600 m (15,000 ft).

Non-operating Environment:

Temperature: -20 to +75 degrees C (-4 to +167 degrees F)
non-operating.

Humidity: Up to 95% relative humidity at +40 degrees C (+104 F).

Altitude: Up to 15,300 m (50,000 FT).

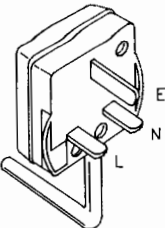
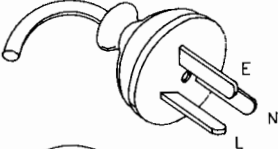
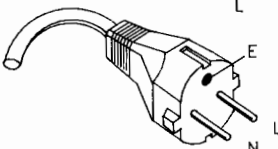
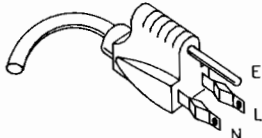
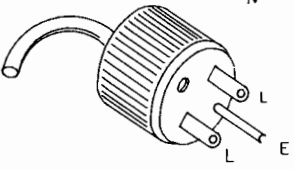
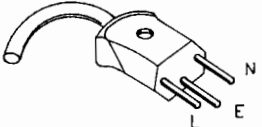
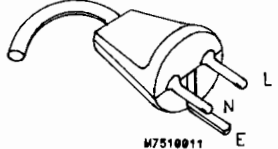
2-3. AC POWER REQUIREMENTS

The HP Model 7510A Film Recorder will operate from a power source of 100, 120, 220, or 240 Vac, ± 5 to 10%, 48 to 66 Hz single phase. Power consumption is 150 W maximum.

2-4. INSTALLATION

AC Power Cable

This instrument is equipped with a three-wire power cable. When connected to an appropriate ac power receptacle this grounds the instrument chassis. The type of power cable plug shipped with each instrument depends on the country of destination. The HP part numbers and associated option numbers for the different power plug configurations available are shown in figure 2-1.

	Option No.
	<p>HP Part Number 8120-1351; 250 V, 13 A, 1 ϕ plug rating. For use in United Kingdom, Cyprus, Nigeria, Zimbabwe, Singapore.</p> <p style="text-align: right;">900</p>
	<p>HP Part Number 8120-1369; 250 V, 10 A, 1 ϕ plug rating. For use in Australia, New Zealand.</p> <p style="text-align: right;">901</p>
	<p>HP Part Number 8120-1689; 250 V, 10/16 A, 1 ϕ plug rating. For use in East and West Europe, Saudi Arabia, Egypt, South Africa, India.</p> <p style="text-align: right;">902</p>
	<p>HP Part Number 8120-1378; 125 V, 15 A, 1 ϕ plug rating. For use in Canada, Japan, Mexico, Philippines, Taiwan, UL approved in United States.</p> <p style="text-align: right;">903</p>
	<p>HP Part Number 8120-0698; 250 V, 15 A, 1 ϕ plug rating. For use in Canada, UL approved in United States.</p> <p style="text-align: right;">904</p>
	<p>HP Part Number 8120-2104; 250 V, 10 A, 1 ϕ plug rating. For use in Switzerland.</p> <p style="text-align: right;">906</p>
 <p style="text-align: center; font-size: small;">M7510011</p>	<p>HP Part Number 8120-2956; 250 V, 10 A, 1 ϕ plug rating. For use in Denmark.</p> <p style="text-align: right;">912</p>

NOTE: All plugs are viewed from connector end.

L = Line or Active Conductor (also called "live" or "hot")
 N = Neutral or Identified Conductor
 E = Earth or Safety Ground

Figure 2-1. Available Power Cords and Options

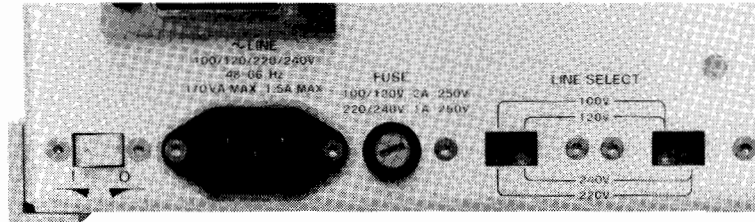
Line Voltage Selection



Applying line voltage of 220 or 240 volts while the line voltage selector is set for 100 or 120 volt operation will cause damage to the film recorder.

To operate the instrument from another power source proceed as follows:

1. Disconnect the power cord from the film recorder.
2. Using a blade screwdriver, position rear panel line voltage switches for the desired line voltage. The switches shown in figure 2-2 are set for 120 volt operation. HP part numbers for fuses required for 120 volt or 220 volt operation are listed in Section VIII, Replaceable Parts.



062585-13A

Figure 2-2. AC Line Voltage Selection

2-5. CAMERA INSTALLATION

To load the camera module, orient the camera end of the module away from the film recorder and insert it into the opening. The module is automatically aligned as it is pushed into the film recorder. A spring loaded latch locks the module into place. Once the module is installed, the HP 7510A will recognize the following module configurations:

1. The film selection last used in the camera is displayed on the STATUS screen. If the film type has been changed when the module was removed from the film recorder, then the new film type will have to be reported to the recorder.
2. The number of frames used is displayed by the STATUS screen.
3. The color wheel inside the module is initialized to its proper position.

If the camera module is removed while a picture is being taken, the recorder defaults to the PREVIEW mode and does a system reset to avoid inadvertent picture taking.

2-6. CONFIDENCE TEST

The HP Model 7510A confidence test is initiated at power on only. If test passes the STATUS screen is displayed.

If the confidence test fails, an error message will be displayed on the front display. For complete diagnostic information, refer to section 5 of this manual.

2-7. PREVENTIVE MAINTENANCE

Painted surfaces can be cleaned with a commercial, spray-type window cleaner or with a mild soap and water solution. Avoid the use of chemical cleaning agents that might damage the plastics used in the instrument. Corroded spots are best removed with soap and water. Stubborn residues can be removed with a fine abrasive. Protect such areas from further corrosion with an application of silicone resin such as GE DRIFILM 88.

TABLE OF CONTENTS

CONFIGURATION

3-1. Introduction	3-1
3-2. HP-IB Interfacing	3-1
3-3. HP-IB Address Selection	3-2
3-4. RS-232-C/CCITT V.24 Interface	3-3
3-5. RS-422-A	3-6
3-6. Camera Module Identification	3-7

TABLES

Table	Page
3-1. RS-232-C/CCITT V.24 Computer/Modem Port	3-4
3-2. RS-232-C/CCITT V.24 Terminal Port	3-5
3-3. RS-422-A Connections and Signal Levels	3-6
3-4. Switch Settings for Camera Module I/D	3-7

ILLUSTRATIONS

Figure	Page
3-1. HP-IB Interface Connector	3-2
3-2. Status Menu and I/O Menu	3-3
3-3. Camera Module ID Switch	3-7

3-1. INTRODUCTION

This section provides an overview of the HP 7510A Film Recorder interface capability. A pin-out diagram of the rear panel HP-IB connector, the Computer/Modem connector and the Terminal connector are also included.

3-2. HP-IB INTERFACING

The Hewlett-Packard Interface Bus (HP-IB) is Hewlett-Packard's implementation of IEEE Standard 488-1978, "Standard Digital Interface for Programmable Instrumentation." HP-IB is a carefully defined interface which simplifies the integration of various instruments and computers into systems. The interface provides for messages to be transferred between two or more HP-IB compatible devices. HP-IB is a parallel bus of 16 active signal lines grouped in three sets according to function.

Eight signal lines, termed DATA lines, are in the first function set. The DATA lines are used to transmit data in the form of coded messages. These messages are used to program the instrument function, transfer measurement data, and coordinate instrument operation. Input and Output of all messages, in bit parallel-byte serial form, are also transferred on the DATA lines. A 7-bit ASCII code normally represents each piece of data.

Data is transferred by means of an interlocking "handshake" technique which permits data transfer (asynchronously) at the rate of the slowest active device used in that transfer. The DATA BYTE CONTROL lines coordinate the handshaking and form the second functional group.

The remaining five GENERAL INTERFACE MANAGEMENT lines (third functional group) are used to manage the devices connected to the HP-IB. This includes activating all connected devices at once, clearing the interface and others. The connections to the HP-IB connector on the rear panel are shown in figure 3-1.

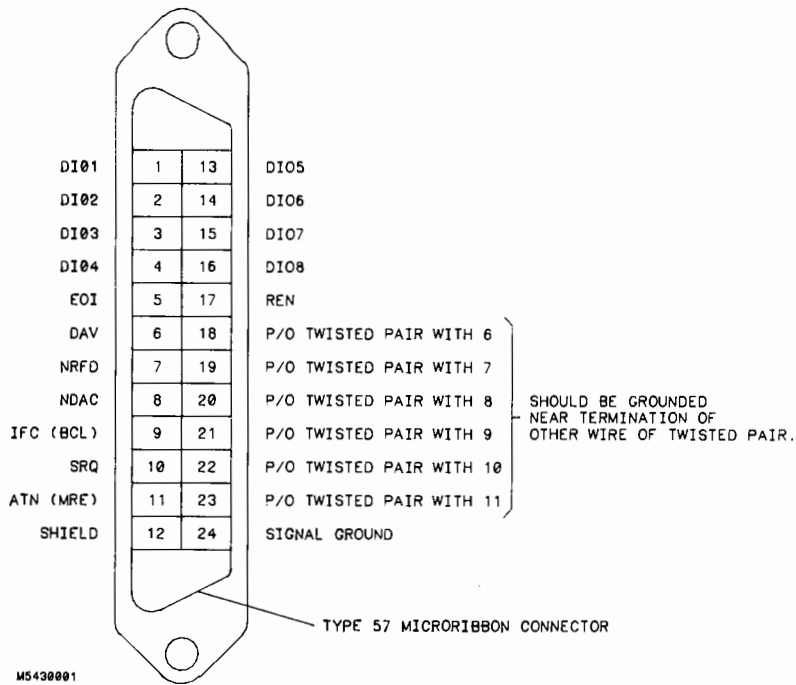
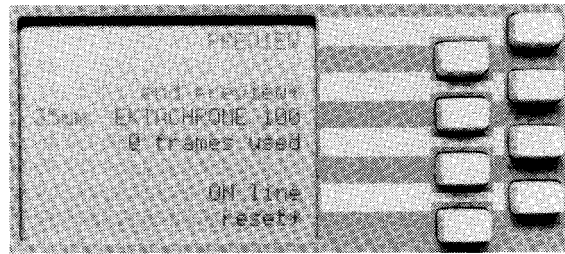


Figure 3-1. HP-IB Interface Connector.

3-3. HP-IB ADDRESS SELECTION

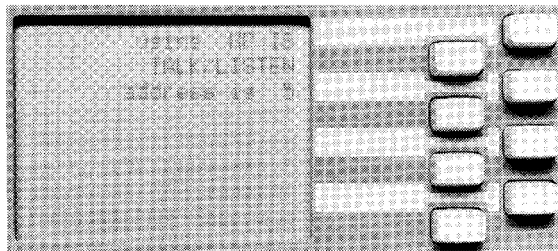
Each instrument connected to the HP-IB interface bus requires a unique address. The address provides a method for the system computer to select individual instruments for sending data to or receiving information from. The address of the HP 7510A is set at the factory to decimal "05". The corresponding ASCII code is a listen of "%" and a talk address of "E". To change the address of the HP 7510A proceed as follows:

- a. Select I/O Menu. The LCD is displaying the HP-IB Menu.
- b. Press "address is 5" key.
- c. Change HP-IB address by pushing desired number.
- d. Place new address in memory by pushing ENTER key. The new address will remain in memory until changed again. Refer to figure 3-2.



STATUS MENU

072285-5A



I/O MENU

072285-6A

Figure 3-2. Status Menu and I/O Menu.

The Status Menu comes up during power-up. The information of lines 2, 4 and 5 depends on whether a camera module is installed, or on any previous configurations.

3-4. RS-232-C/CCITT V.24 INTERFACE

The HP 7510A interfaces to RS-232-C communication lines through standard 25 pin connectors, one female labeled Terminal, and one male labeled Computer/Modem. The HP 7510A is compatible with RS-232-C and CCITT V.24 protocols. When a hardwire handshake method is used, the Data Terminal Ready (DTR) line (pin 20 on the Computer/Modem connector) is used to signal whether space is available in the logical I/O buffer for more data. Pin outs of the RS-232-C connectors are shown in tables 3-1 and 3-2.

Table 3-1. RS-232-C/CCITT V.24 Computer/Modem Port.

PIN NO.	FUNCTION	RS-232-C STANDARD	CCITT V.24 STANDARD	SIGNAL DIRECTION and LEVEL
1	Protective Ground	AA	(none)	Not applicable
2	Transmitted Data (TD)	BA	103	Data from Film Recorder High = Space = "0" = +12V Low = Mark = "1" = -12V
3	Received Data (RD)	BB	104	Data to Film Recorder High = Space = "0" = +3V to +25V Low = Mark = "1" = -3V to -25V
4	Request to Send (RTS)	CA	105	Signal from Film Recorder High = ON = +12V Low = OFF = -12V
5	Clear to Send (CTS)	CB	106	Signal to Film Recorder High = ON = +3V to +12V Low = OFF = -3V to -25V
6	Data Set Ready (DSR)	CC	107	Signal to Film Recorder High = ON = +3V to +25V Low = OFF = -3V to -25V
7	Signal Ground (SGND)	AB	102	Not applicable
8	Data Carrier Detect (DCD)	CF	109	Signal to Film Recorder High = ON = +3V to +25V Low = OFF = -3V to -25V
17	External Baud Rate Input NOTE 1	DD	115	Signal to Film Recorder High = ON = +3V to +25V Low = OFF = -3V to -25V
20	Data Terminal Ready (DTR)	CD	108.2	Signal from Film Recorder High = ON = +12V Low = OFF = -12V
23	Data Signal Rate Selector	CH/CI	--	Signal from Film Recorder Always High = ON = +12V

NOTE 1:

An external clock input to pin 17 of the connector allows operation of the film recorder at any intermediate baud rate up to 9600 baud. Both the receiver (RRC) and transmitter (TRC) clocks will operate at the same clock rate. Requirements for the clock signal are as follows:

1. The clock frequency must be 16 times the desired baud rate.
2. The baud rate must not exceed 9600.
3. The duty cycle of the clock pulse must be near 50%.
4. The clock pulse must be a logic "ON" of between +2V and +25V and a logic "OFF" of between -25V and +0.8V (3.5K ohm input impedance).
5. Care should be taken to keep the transmission lines as short as possible to minimize transmission line reflections.

Table 3-2. RS-232-C/CCITT V.24 Terminal Port.

PIN NO.	FUNCTION	RS-232-C STANDARD	CCITT V.24 STANDARD	SIGNAL DIRECTION and LEVEL
1	Protective Ground	AA	(none)	Not applicable
2	Transmitted Data (TD)	BA	103	Data to Film Recorder High = Space = "0" = +3V to +25V Low = Mark = "1" = -3V to -25V
3	Received Data (RD)	BB	104	Data from Film Recorder High = Space = "0" = +12V Low = Mark = "1" = -12V
4	Request to Send (RTS)	CA	105	Signal to Film Recorder High = ON = +3V to +25V Low = OFF = -3V to -25V
5	Clear to Send (CTS)	CB	106	Signal from Film Recorder High = ON = +12V Low = OFF = -12V
6	Data Set Ready (DSR)	CC	107	Signal from Film Recorder High = ON = +12V Low = OFF = -12V
7	Signal Ground (SGND)	AB	102	Not applicable
8	Data Carrier Detect (DCD)	CF	109	Signal from Film Recorder High = ON = +12V Low = OFF = -12V
17	External Baud Rate Input	DD	115	Signal to Film Recorder High = ON = +3V to +25V Low = OFF = -3V to -25V
20	Data Terminal Ready (DTR)	CD	108.2	Signal from Film Recorder High = ON = +3V to +25V Low = OFF = -3V to -25V

3-5. RS-422-A

The differential voltage (balanced) nature of this interface allows a much greater interconnecting cable distance compared to an unbalanced interface. Details of connector pin allocations, including pin numbers, signal direction and signal levels for RS-422-A are shown in table 3-3.

Table 3-3. RS-422-A Connections and Signal Levels

PIN NO. OF HP CABLE 17855	HP 7510A PIN NO.	MODEM CONNECTOR FUNCTION	RS-422-A	SIGNAL DIRECTION AND LEVEL
2	9	Send Data Neg.	SD.A	Signal from Film Recorder Space or "0" Mark or "1" +5V -5V
4	10	Send Data Pos	SD.B	Signal from Film Recorder Space or "0" Mark or "1" -5V +5V
5	18	Receive Data Pos	RD.B	Signal to Film Recorder Space or "0" Mark or "1" +5V -5V
3	3	Receive Data Neg	RD.A	Signal to Film Recorder Space or "0" Mark or "1" -5V +5V
1	7	Signal Common	S.G	Not Applicable

Presently the only computer system to which the film recorder can be interfaced with using the HP 17855 cable, is the HP 3000 series 39, 42, 48 and 64. The cable has a 25 pin RS-232-C female connector which connects to the recorder modem port and a 5 pin male connector to connect to the HP 3000 computer.

3-6. CAMERA MODULE IDENTIFICATION

Each camera module is uniquely identified by four switches on the camera PCA inside the camera module. Switches 1 and 2 are used to identify the type of camera, and switches 3 and 4 are used for module identification. The module identification is used to distinguish between multiple modules having the same camera type. A user may have two 35 mm modules, one of which has Polachrome instant slide film, the other Ektachrome 200. Since each module is identified differently, the HP 7510A can remember the film type in each one. The operator therefore doesn't have to reset the film type whenever the camera modules are switched.

Switches 1 and 2 are preset at the factory for the camera type and should never be changed. Switches 3 and 4 are preset to be module 1. Refer to table 3-3 module identification switch settings.

Table 3-4. Switch Settings for Camera Module ID

SWITCH 1	SWITCH 2	CAMERA TYPE
CLOSED	CLOSED	CONTAX CGCM 35 mm
OPEN	CLOSED	POLAROID AUTOFILM
CLOSED	OPEN	RESERVED
OPEN	OPEN	RESERVED

SWITCH 3	SWITCH 4	MODULE IDENTIFICATION
CLOSED	CLOSED	MODULE 1
OPEN	CLOSED	MODULE 2
CLOSED	OPEN	MODULE 3
OPEN	OPEN	MODULE 4

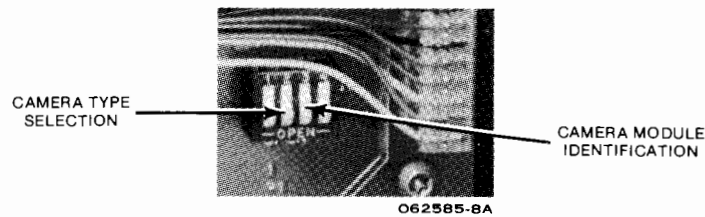


Figure 3-3. Camera Module ID Switch

TABLE OF CONTENTS

TROUBLESHOOTING

4-1. Introduction	4-1
4-2. Test Equipment Required	4-1
4-3. DC Voltages and Waveforms	4-1
4-4. Operators Checklist	4-2
4-5. Troubleshooting Removal Instructions	4-2
4-6. Assembly Removal Instructions	4-6

TABLES

Table	Page
4-1. Required Test Equipment for Troubleshooting	4-1
4-2. Operators Checks	4-2
4-3. Low Voltage Power Supply, Checks	4-4

ILLUSTRATIONS

Figure	Page
4-1. Digital and Stroke Generator Troubleshooting Flow Chart	4-3
4-2. Waveforms for Troubleshooting HP 7510A	4-4
4-3. Analog Troubleshooting Flow Chart	4-5
4-4. Low Voltage Power Supply, μ P, and Stroke Generator Removal	4-6
4-5. X-Y Amplifier Removal	4-7
4-6. Z-Axis and High Voltage Assembly Removal	4-8
4-7. Stepper Motor Replacement	4-11
4-8. Camera Module PCA Replacement	4-12
4-9. Polaroid Camera Removal	4-13
4-10. Polaroid Camera Removal	4-14
4-11. 35 mm Camera Removal	4-15
4-12. Camera Housing Removal	4-16

TROUBLESHOOTING**SECTION****IV****4-1. INTRODUCTION.**

This section contains information for troubleshooting the HP Model 7510A Film Recorder. Assembly removal procedures are also described in this section.

4-2. TEST EQUIPMENT REQUIRED.

Test equipment required for troubleshooting the film recorder is listed in Table 4-1. Other equipment may be substituted if it meets or exceeds the critical specifications listed in the table.

Table 4-1. Required Test Equipment For Troubleshooting

INSTRUMENT TYPE	CRITICAL SPECIFICATIONS	RECOMMENDED MODEL
Digital Multimeter	Voltage Range: -30V to +300V Accuracy: 0.3% Resolution: 2 mV	HP Model 3478A
2 Channel Oscilloscope with 10:1 Divider Probe	Bandwidth: 100MHz each channel Input Z: 1 Megohm \leq 20 pF Vertical Sensitivity: 5 mV	HP Model 1740A

4-3. DC VOLTAGES AND WAVEFORMS.

DC voltages, waveforms and conditions for making these measurements used in the troubleshooting procedures are shown in Table 4-3 and Figure 4-3.

4-4. OPERATOR'S CHECKLIST

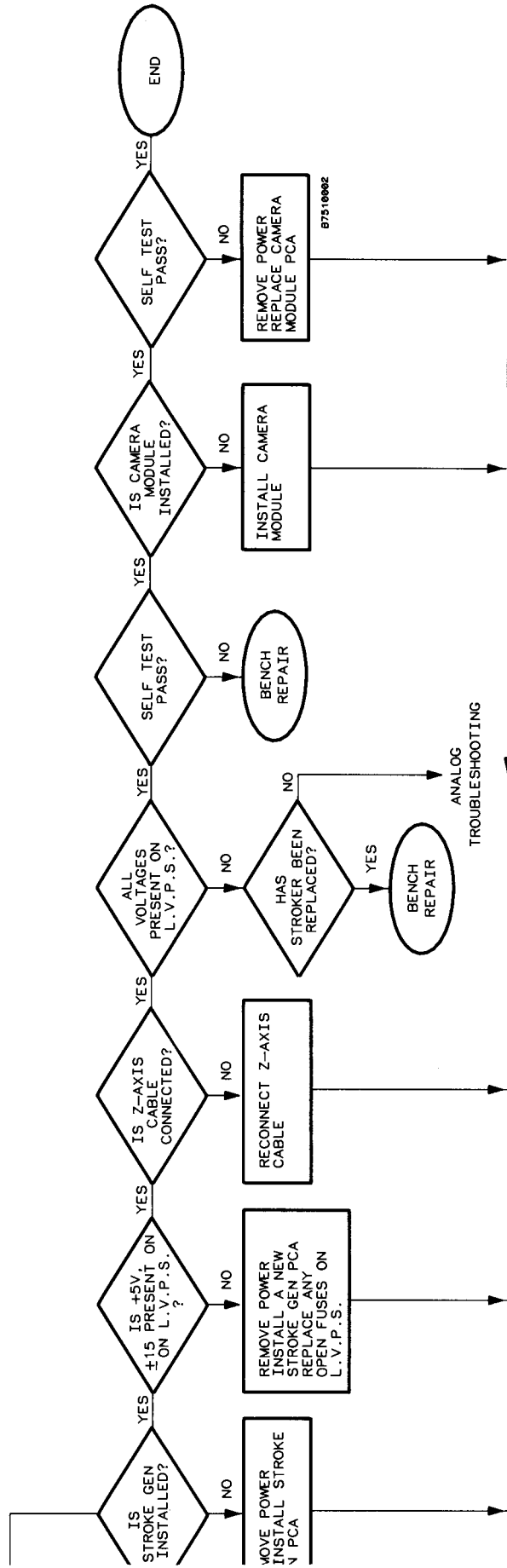
Before attempting to troubleshoot the HP 7510A use the Operators CheckList (Table 4-2). Some apparent malfunction may be corrected by these checks.

Table 4-2. Operator Checks

SYMPTOMS	POSSIBLE CAUSE	SOLUTIONS
Recorder doesn't respond when turned on.	Power not applied to the recorder.	Check power source, power cord and fuse.
35 mm film is blank.	The 35 mm camera is not turned on.	Turn camera on. "ON" indicator is located on top of the camera.
35 mm film or Polaroid prints are blank.	The module isn't inserted properly into the recorder.	Read the STATUS screen. Reseat the camera module if lines 4 and 5 of the menu are blank. Push into place until the screen displays the camera and film type.
Slides or prints are over-exposed or underexposed.	<p>The recorder is set for the wrong film type.</p> <p>The film selected hasn't been calibrated for use with the recorder.</p>	<p>Check that STATUS menu film setting matches the film type actually installed in the camera.</p> <p>Refer to the operating manual for calibrating different film types.</p>

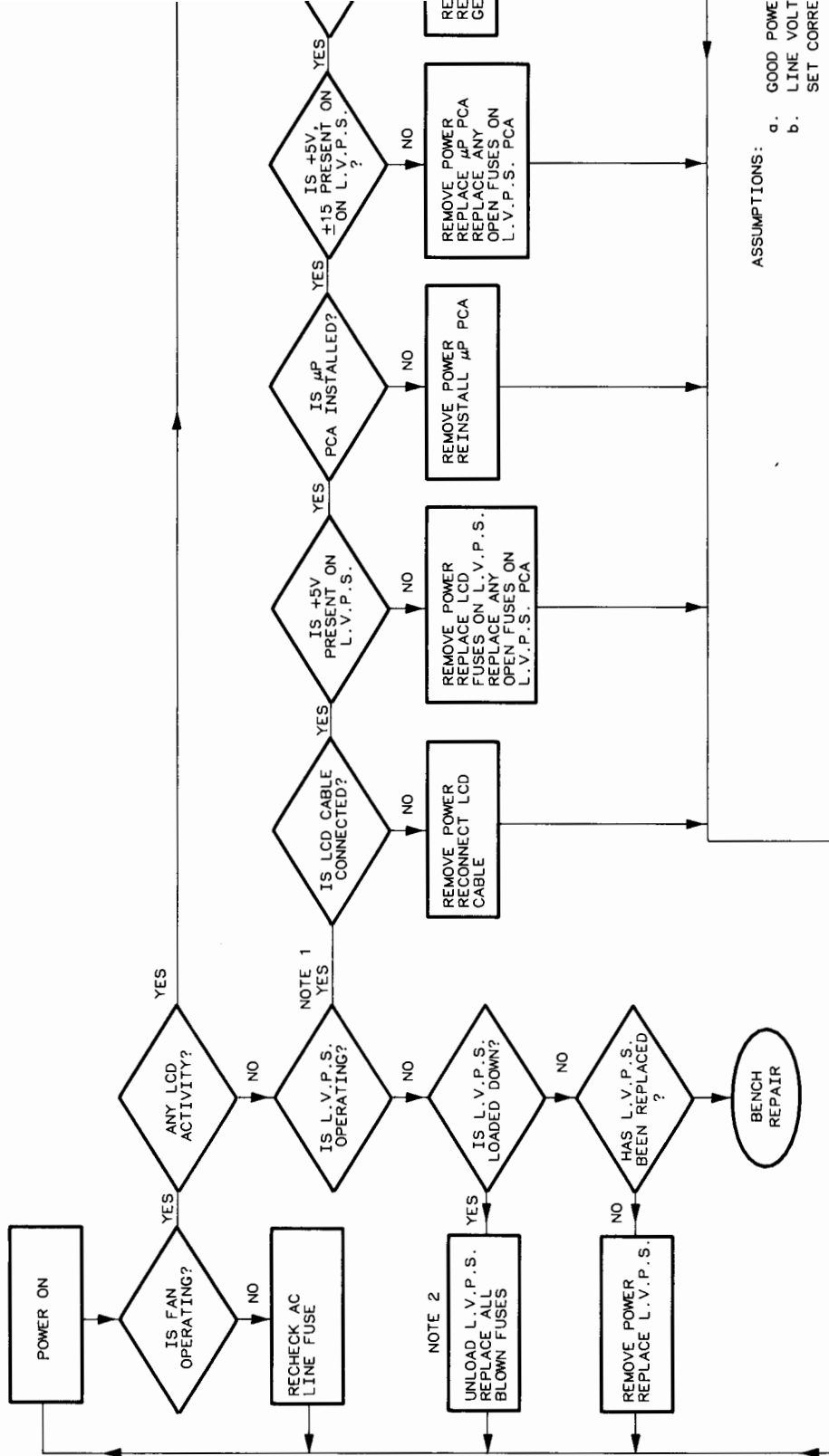
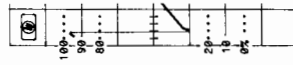
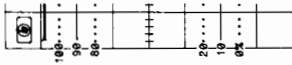
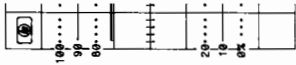
4-5. TROUBLESHOOTING FLOW CHARTS.

If after performing the Operator's Check list (Table 4-2), the film recorder does not operate, proceed to the Troubleshooting Flow Charts (Figures 4-1, 4-2, 4-3).



NOTE 1: CHECK A3DS1 THROUGH A3DS5 FOR PROPER POWER SUPPLY OPERATION
 NOTE 2: UNLOAD LOW VOLTAGE POWER SUPPLY BY DISCONNECTING MOTHER PCA TO Z-AXIS PCA AND LCD CABLES. REMOVE μ P PCA AND STROKE GENERATOR PCA.

Figure 4-1. Digital and Stroke Generator Troubleshooting Flow Chart 4-3



- ASSUMPTIONS:
- a. GOOD POWER
 - b. LINE VOLT SET CORRECT
 - c. PRIMARY FUSES OK
 - d. ALL TRANSFORMERS (PRIMARY/SECONDARY) OK
 - e. CAMERA MODULE OK

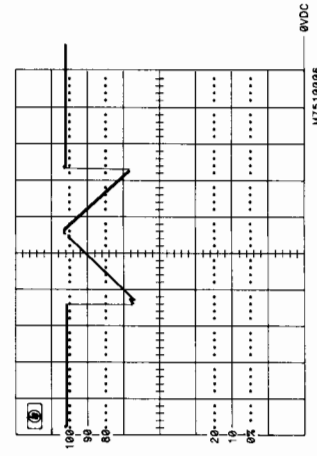
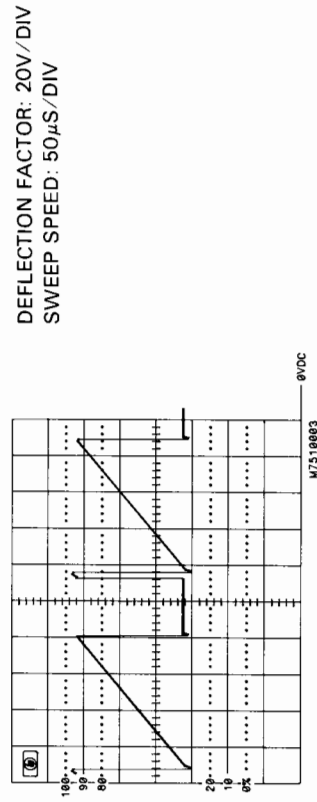
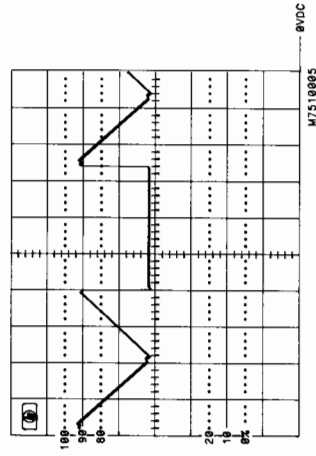
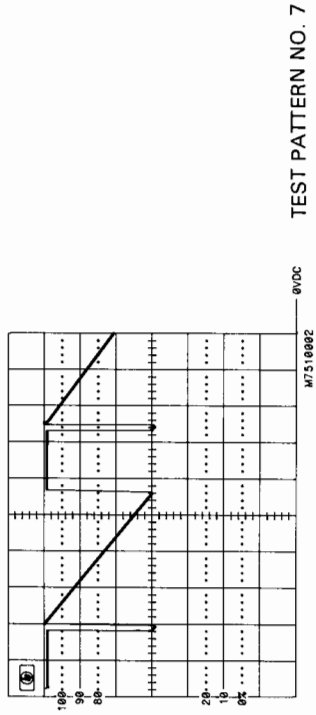
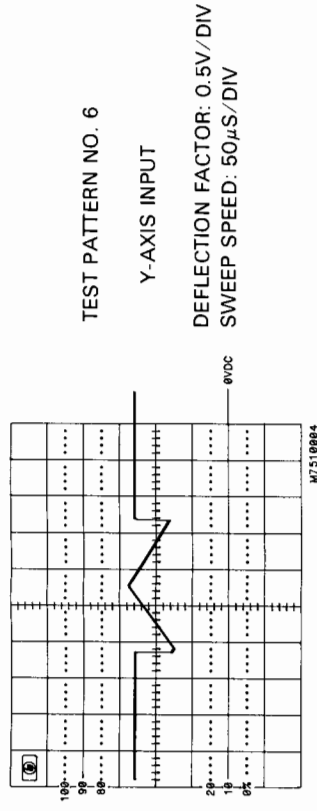
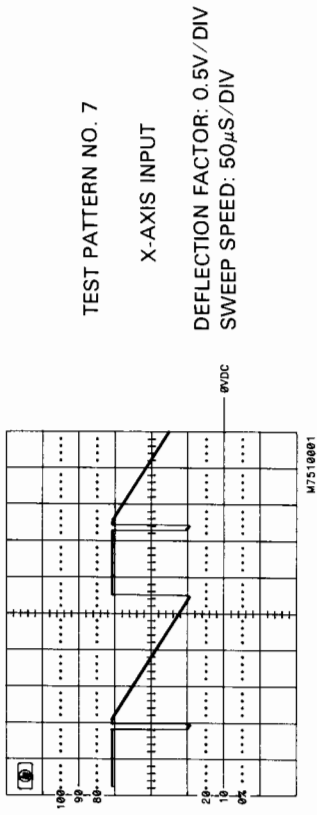
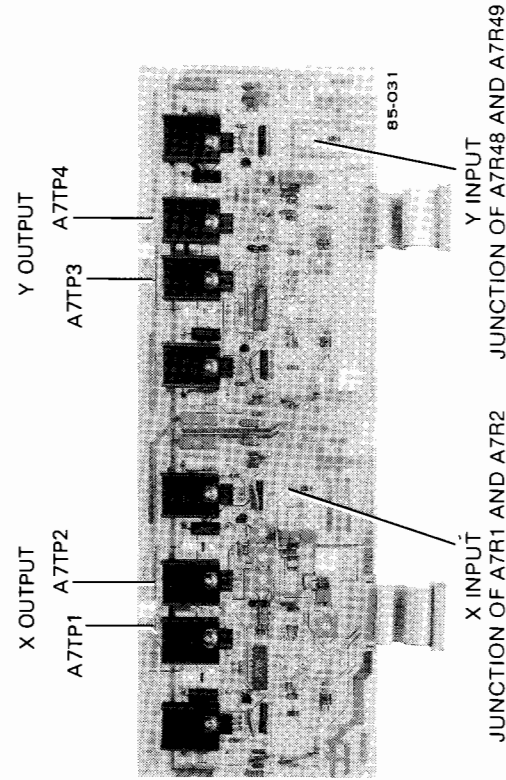
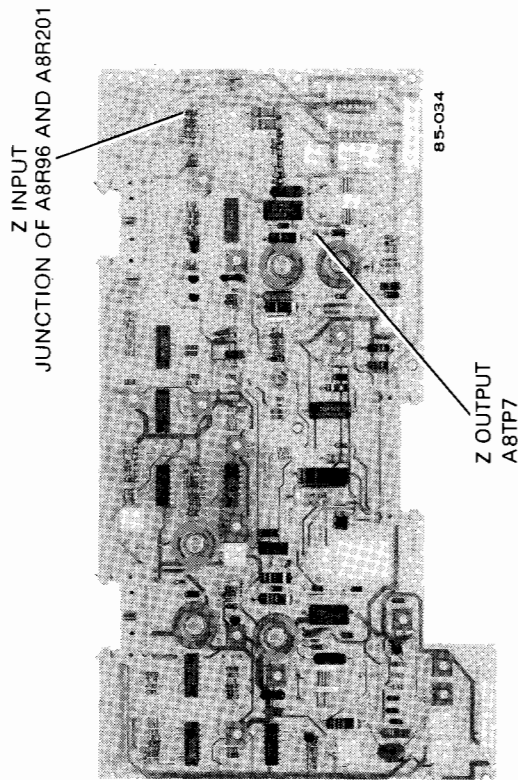


Figure 4-2. Waveforms for Troubleshooting HP 7510A



X-Y AXIS PROBING POINTS



Z-AXIS PROBING POINTS

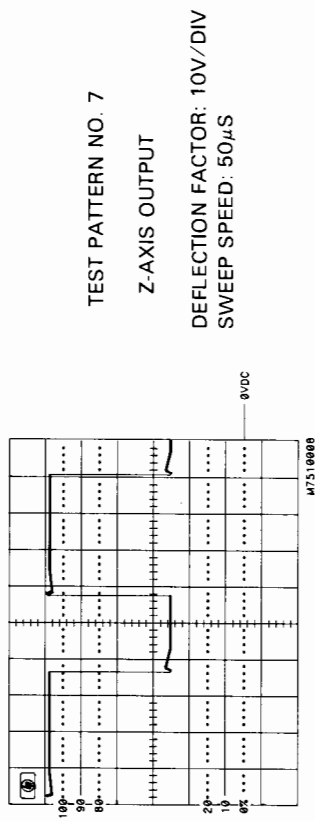
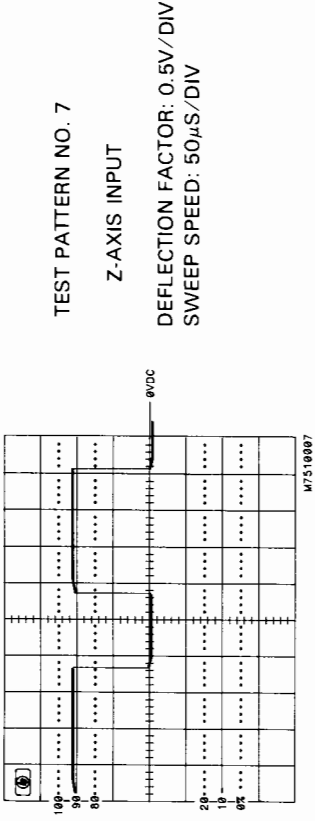
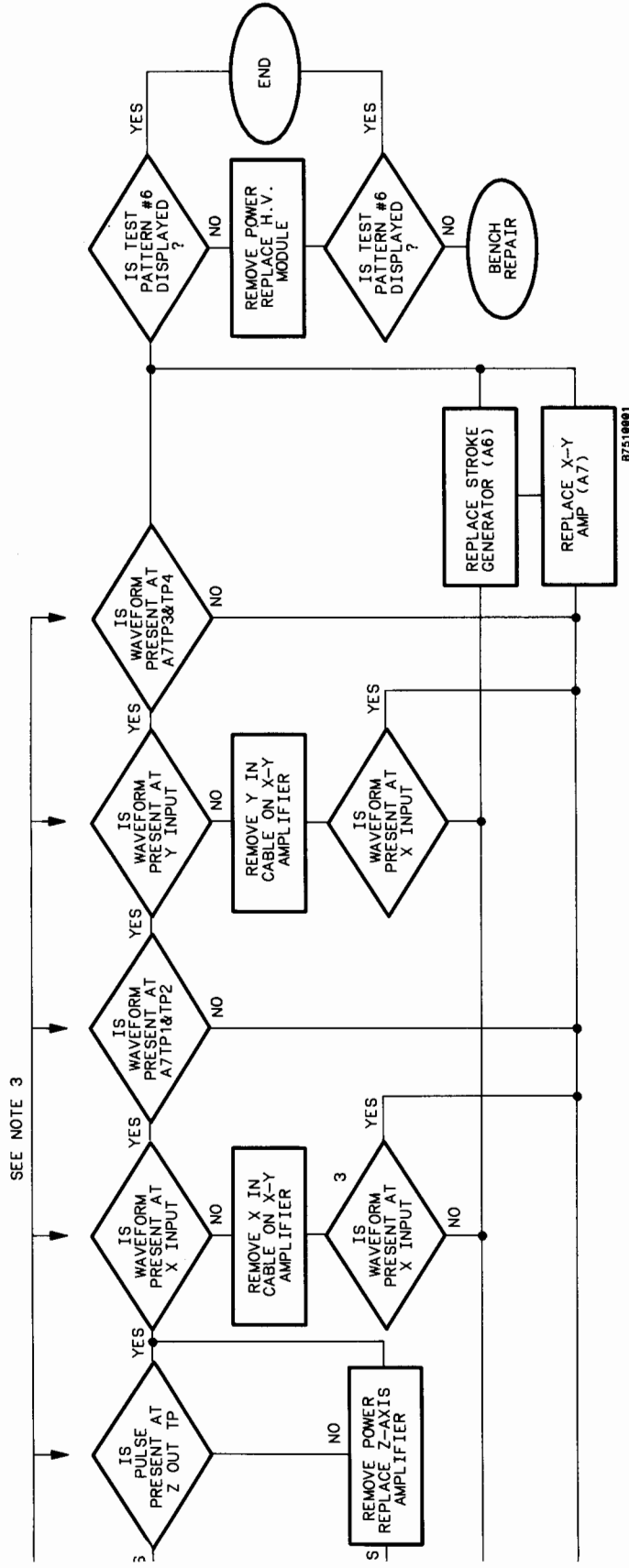


Table 4-3. Low Voltage Power Supply Checks for Troubleshooting

CONNECT DMM TO	VERIFY	TEST LIMITS
A3+15V TP	+15V	+14.95V to +15.05V
A3-15V TP	-15V	-14.95V to -15.05V
A5+5V TP NOTE 1	+5V	+5.15V to 5.25V
A3+20V TP	+20V	+19.0V to 21.0V
A3+220V TP	+220V	+221.95V to 222.05V

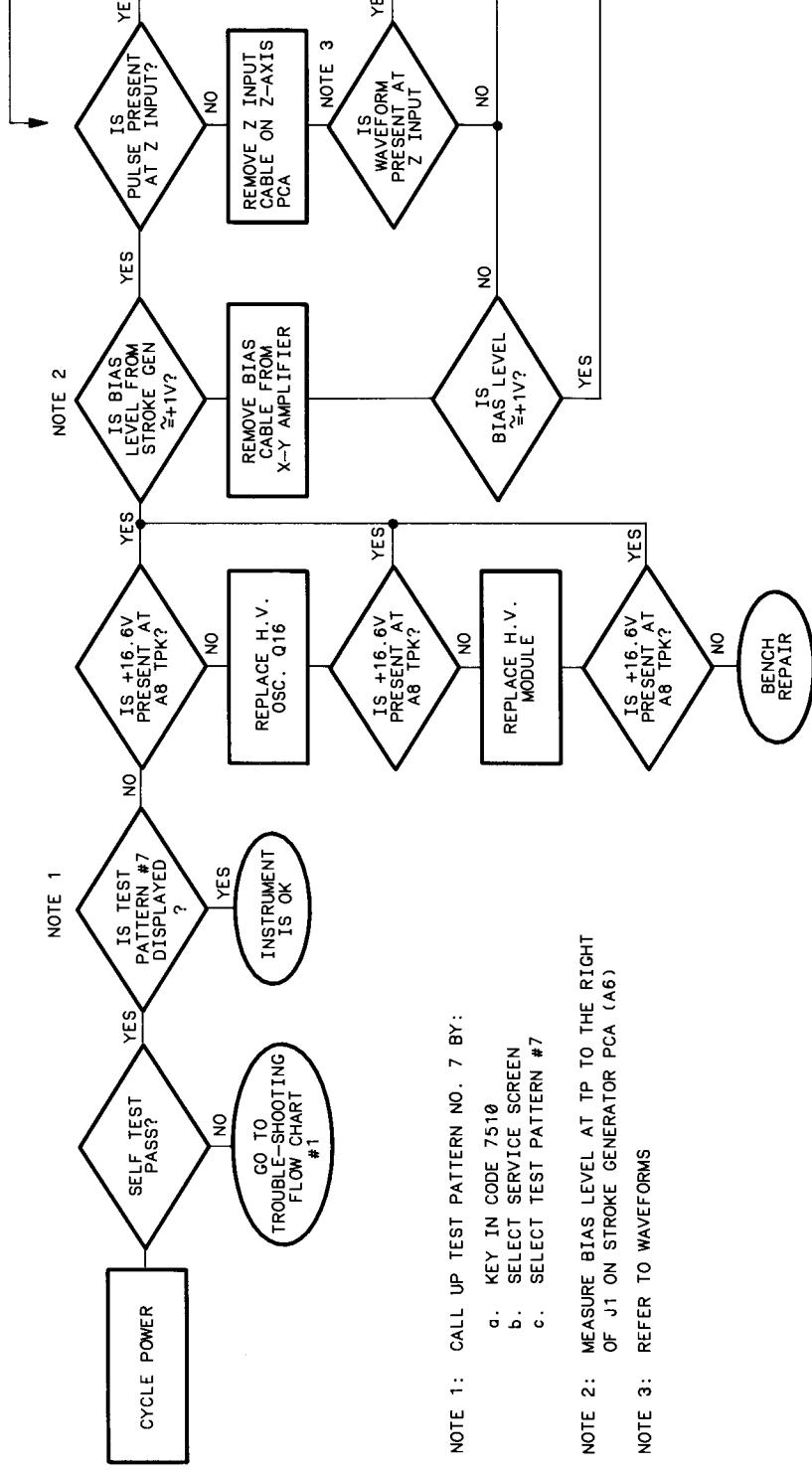
NOTE 1: The +5V supply is measured on the μ P PCA (A5).



SEE NOTE 3

87510001

Figure 4-3. Analog Troubleshooting Flow Chart 4-5



NOTE 1

NOTE 2

NOTE 3

- NOTE 1: CALL UP TEST PATTERN NO. 7 BY:
- a. KEY IN CODE 7510
 - b. SELECT SERVICE SCREEN
 - c. SELECT TEST PATTERN #7

NOTE 2: MEASURE BIAS LEVEL AT TP TO THE RIGHT OF J1 ON STROKE GENERATOR PCA (A6)

NOTE 3: REFER TO WAVEFORMS

4-6. ASSEMBLY REMOVAL INSTRUCTIONS

To remove the Low Voltage Power Supply, μ P, and Stroke Generator PCAs proceed as follows:

- a. Remove power from film recorder.
- b. Loosen PCA cover screws and remove PCA cover (MP10).
- c. Lift PCAs by board extractor handles.
- d. Reverse above procedure when reinstalling the boards. Ensure that the boards align with the PCA guides in the frame. Refer to figure 4-4.

CAUTION

Before seating PCAs into place, ensure that the connectors are properly aligned with the mother board connectors. Damage to the connector pins may result of not aligned correctly.

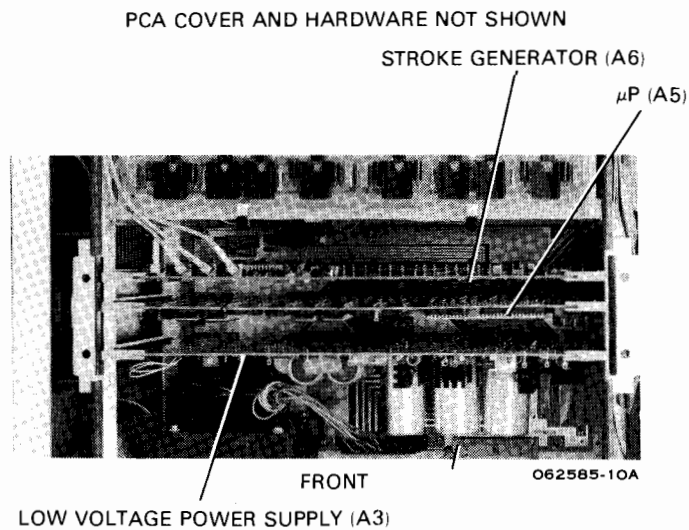


Figure 4-4. Low Voltage Power Supply, μ P, and Stroke Generator PCA Removal

To remove the X-Y Amplifier assembly follow the procedure outline below:

- a. Remove power from instrument.
- b. Disconnect X, Y and Bias cables at A7J4, A7J5 and A7J3.
- c. Remove X and Y output cable at A7J6 and A7J7.
- d. Remove ribbon cables at A8J1 and A8J2 on Z Axis board (A8).
- e. Remove the six screws (H14) and lift board from instrument.
- f. Reverse the above procedure when installing a new assembly. See figure 4-5.
- g. Refer to High Voltage or X-Y Amplifier Adjustment procedures in Section VI of this manual.

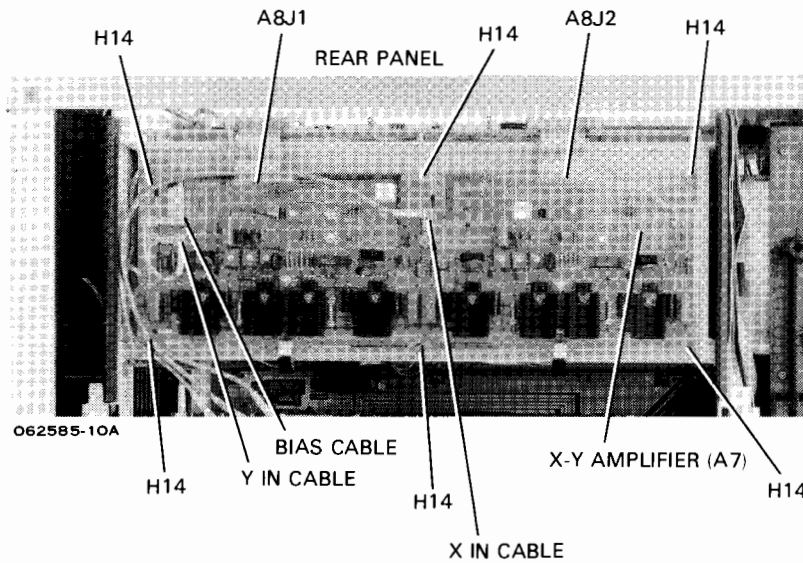


Figure 4-5. X-Y Amplifier Removal

To remove the Z Axis assembly proceed as follows:

- a. Remove power from instrument. Disconnect all cables at A8J1 through A8J6. See figure 4-6.
- b. Remove mounting screw from Q16 (H15) and mounting screws from Z Axis amplifier (H14).
- c. Lift board from instrument.
- d. Carefully remove Q16 from its socket.
- e. Reverse the above procedure to install new assembly. Be careful not to disturb any adjustments or component placements.

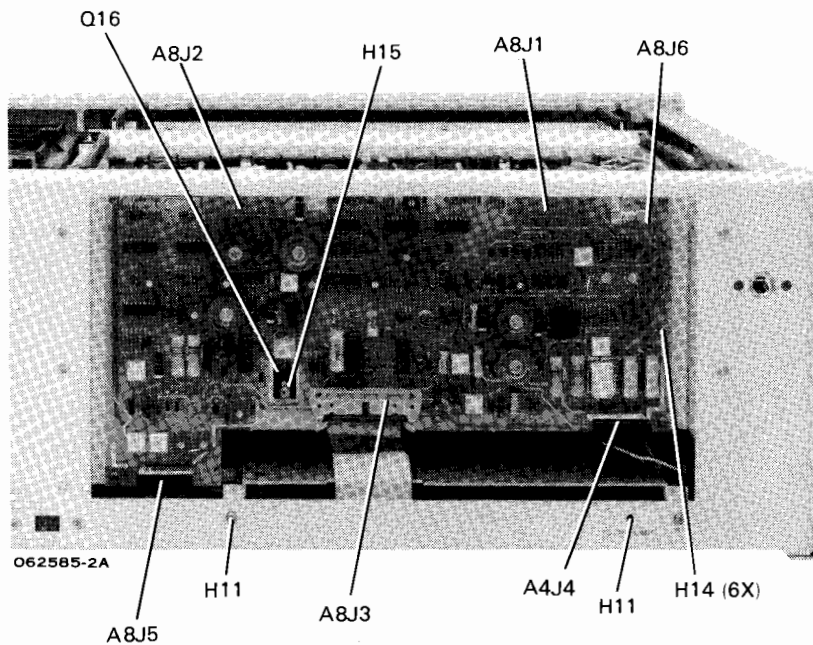


Figure 4-6. Z-Axis and High Voltage Assembly Removal

To remove the High Voltage Assembly proceed as follows:

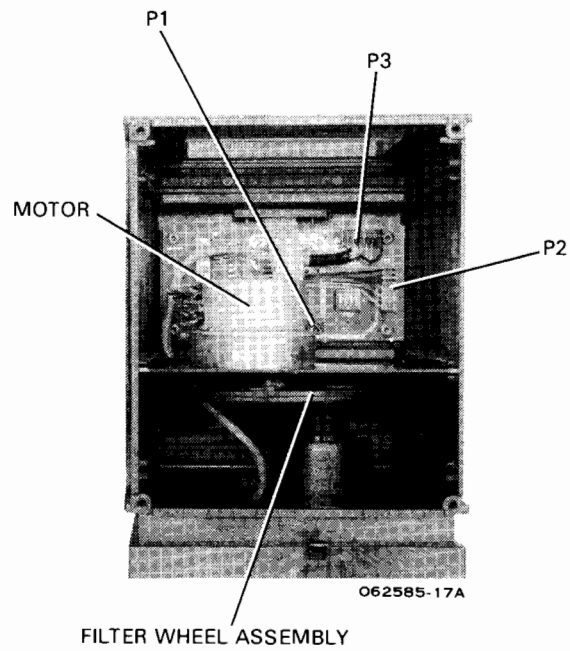
- a. Remove power from instrument. Disconnect socket from CRT base and ribbon cable from Z Axis Amplifier at A8J3.
- b. Remove the two screws (H11) in the rear panel and lift the High Voltage module out.
- c. Reverse the above procedure to install the new module. See figure 4-6.

The Stepper motor is located in the camera module. To replace the motor proceed as follows:

- a. Remove camera module from film recorder.
- b. Remove top cover from camera module (MP2) (H3).
- c. Disconnect cables to module's PCA at P1, P2 and P3. On the Polaroid module, remove only the motor cable.
- d. Slide motor and filter wheel assembly upward from camera module until the camera cable can be removed from the slot in filter wheel bracket.
- e. With a wide blade screwdriver, pry the filter wheel off of stepper motor shaft.
- f. Remove screws that hold stepper motor to bracket and install new motor.
- g. Orient stop pin of filter wheel to the outside of the shutter opening and press it on the motorshaft. Allow approximately 1/16 inch clearance on the motorshaft so wheel will clear the shutter opening. Rotate filter wheel to check clearance.
- h. Reconnect the camera and motor cables first. Route the main cable over the other two cables and reconnect. The camera and motor cables must be routed under the main cable so they do not interfere with the shutter opening.
- i. Install camera module top cover.

CAUTION

Care must be exercised when tightening Torx head screws into plastic camera module. Damage to the unit may result if hardware is overtorqued.

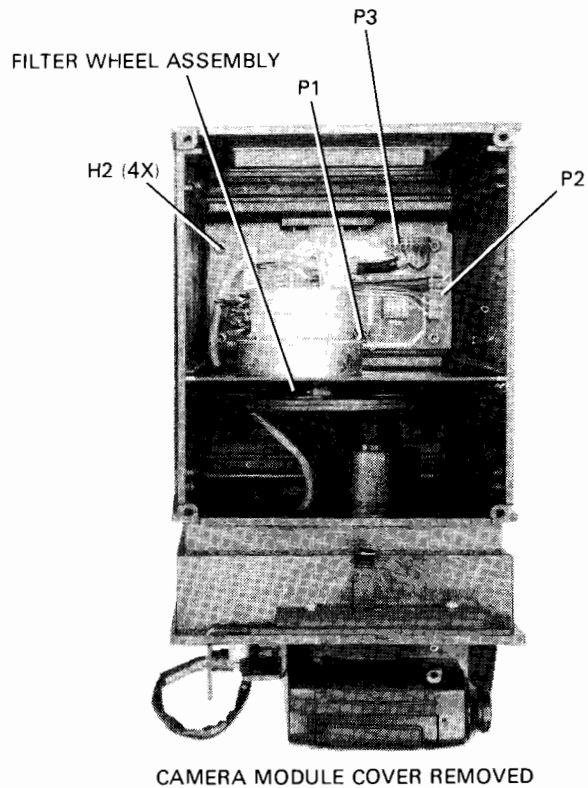


TOP COVER (MP2) AND COVER MOUNTING SCREWS (H3) REMOVED

Figure 4-7. Stepper Motor Replacement

To remove the camera module PCA proceed as follows:

- a. Remove camera module cover with a #10 Torx driver.
- b. Disconnect cables at P1, P2 and P3. Slide filterwheel assembly out of camera module (see figure 4-8).
- c. Remove PCA mounting screws (H2) using a #10 Torx driver.
- d. Reverse the above process to install new PCA.



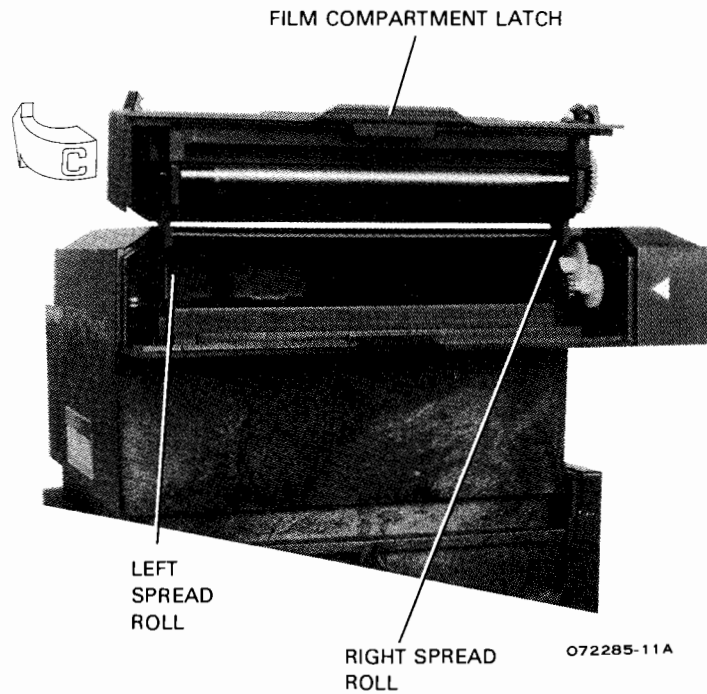
062585-17A

Figure 4-8. Camera Module PCA Replacement

To replace either the Polaroid or 35 mm camera proceed as follows:

Polaroid Camera:

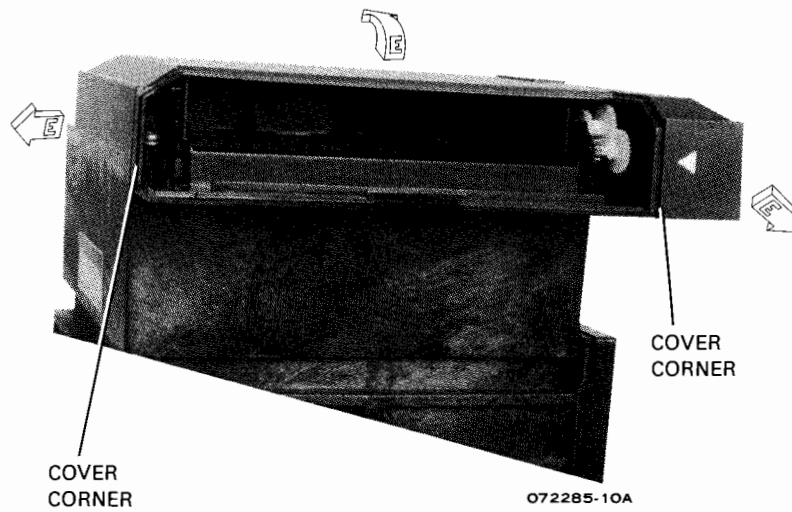
- a. Open film compartment latch of the camera.
- b. Detach the left side of Spread Roll Bracket from the Pivot Pin (see figure 4-9).
- c. Rotate Roller assembly across camera back in the direction as shown in figure 4-9.



NOTE: The letters in ARROWS correspond to steps in the procedure.

Figure 4-9. Polaroid Camera Removal

- d. Detach the right side of Spread Roll Bracket from Pivot Pin.
- e. Spring cover corners apart and lift cover away from camera back (see figure 4-10).
- f. Remove the four screws that hold the camera to the body.
- g. Disconnect camera cable and reinstall new camera using the above procedure in the reverse sequence.



NOTE: The letters in arrows correspond to steps in the procedure.

Figure 4-10. Polaroid Camera Removal

35 mm Camera:

- a. Disconnect camera cable and remove large allen head screw (see figure 4-11).
- b. Using a #15 Torx driver remove the camera bracket.
- c. Remove camera by depressing the lens release button and turning the camera counter clockwise (see figure 4-11).
- d. Reverse above procedure to install the new camera.

CAUTION

Do not interchange lens assemblies between different camera modules. The lens assembly is matched to the each plastic case.

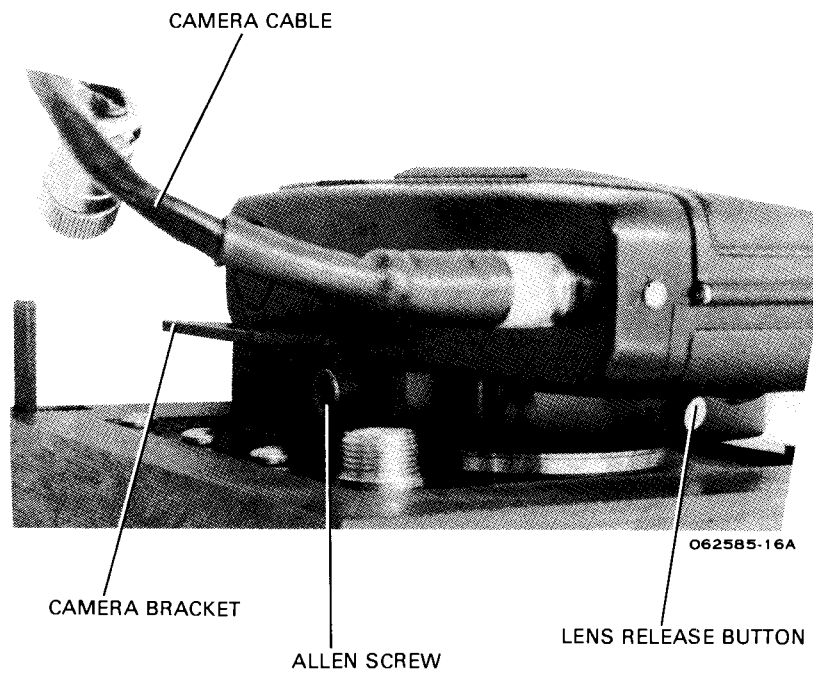


Figure 4-11. 35 mm Camera Removal

To expose the front end of the CRT for the adjustment procedures proceed as follows:

- a. After top cover is removed, remove right top rail (MP18).
- b. Remove housing bracket (MP13).
- c. Remove the four screws (H8) that hold the camera housing (MP27) in place. Lift camera housing away from film recorder.
- d. Remove mirror bracket.
- e. Reverse the above procedure to reassemble the film recorder.

CAUTION

Care must be exercised when tightening Torx head screws into plastic components. Damage to these may result if hardware is overtorqued.

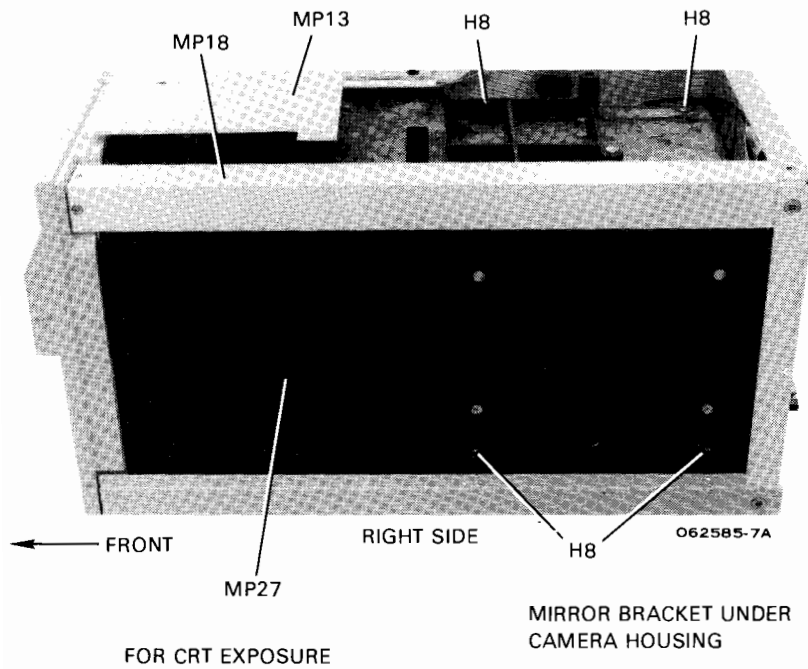


Figure 4-12. Camera Housing Removal

TABLE OF CONTENTS

DIAGNOSTICS

5-1. Introduction	5-1
5-2. Power-up Self Test	5-2
5-3. μ P and Stroke Generator Self Test	5-3
5-4. Keyboard Test	5-4
5-5. HP-IB Echo Test	5-5
5-6. Serial Loop Test	5-6

TABLES

Table	Page
5-1. HP 7510A Error Message List	5-2
5-2. HP-IB Echo Test Program	5-8

ILLUSTRATIONS

Figure	Page
5-1. HP 7510A Status Menu	5-1
5-2. Self Test Failure Troubleshooting Flow Chart	5-3
5-3. Display of Test Number 4	5-4
5-4. Serial Loop Test Failure	5-5
5-5. Intermitten Serial Loop Test Failure	5-5
5-6. Display of Keyboard Test	5-6
5-7. "Enter" Key Test	5-7

DIAGNOSTICS**SECTION****V****5-1. INTRODUCTION.**

This section describes the diagnostic tools designed into the film recorder. The diagnostics consist of five tests:

1. Power-up Test.
2. μ P and Stroke Generator Test.
3. Keyboard Test.
4. HP-IB Echo Test.
5. Serial Loop Test.

The following paragraphs describe these tests.

5-2. POWER-UP SELF TEST.

The self test is initiated every time power is applied to the instrument. During the test, portions of the LCD Assembly (A9), the μ P (A5) and Stroke Generator (A6) are tested. If the STATUS menu is displayed after power-up, the test passed (see figure 5-1). If the test fails, refer to the error message list in table 5-1.

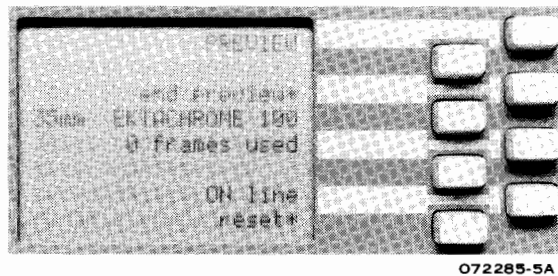


Figure 5-1. HP 7510A Status Menu.

If the test fails, one of the error messages shown in table 5-1 will be displayed on the last line of text of the LCD. To correct the failure, replace the assembly as shown in table 5-1.

Table 5-1. HP 7510A Error Message List.

ERROR MESSAGE	REPLACE PCA
refresh machine	μ p (A5)
system clock	μ p (A5)
HP-IB IC	μ p (A5)
serial IC	μ p (A5)
U2 checksum	μ p (A5)
U3 checksum	μ p (A5)
U4 checksum	μ p (A5)
U6 checksum	μ p (A5)
U7 checksum	μ p (A5)
U8 checksum	μ p (A5)
RAM checkerboard	μ p (A5)
RAM bit patterns	μ p (A5)
stroker	Stroke Generator (A6)
LCD	Follow Troubleshooting Flow chart of figure 5-2.

When an error message cannot be displayed because of an LCD or μ P failure, follow the troubleshooting flow chart of figure 5-2.

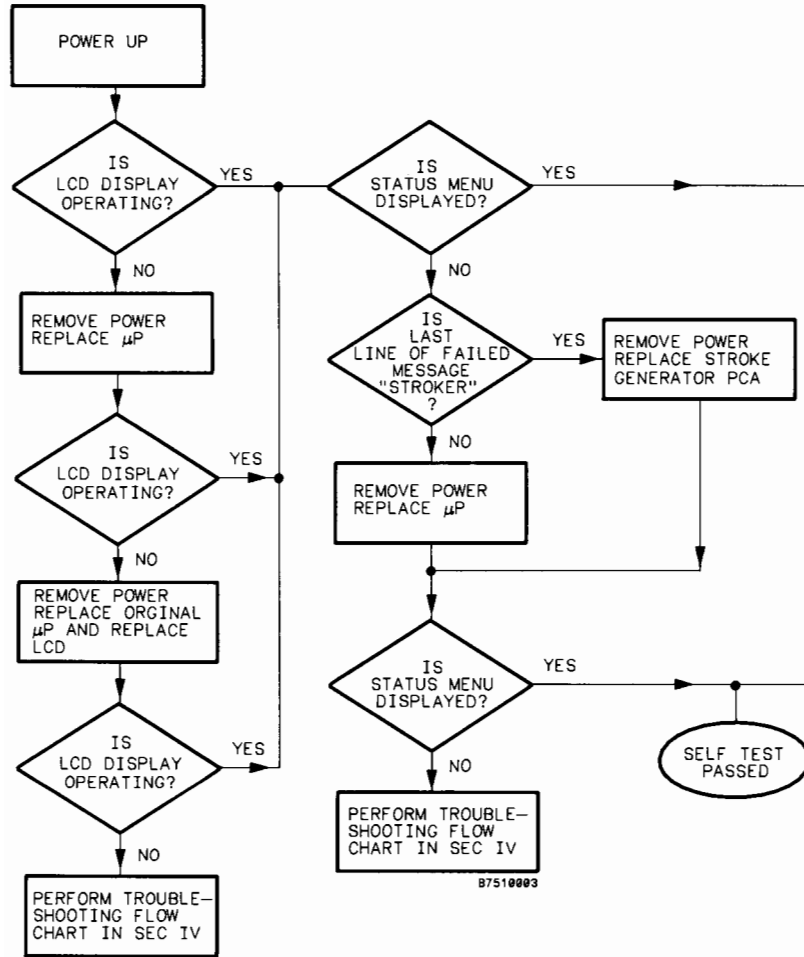


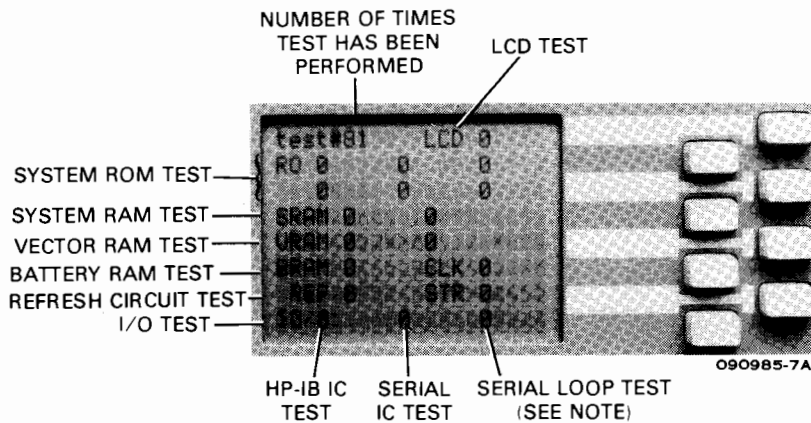
Figure 5-2. Self Test Failure Troubleshooting Flow Chart.

5-3. UP AND STROKE GENERATOR SELF TEST.

The μ P and Stroke Generator self tests perform all the Power-up test plus the Serial Loop test. Once initiated, the test repeats until interrupted by cycling power. To initiate the test perform the procedure outlined below:

- a. Cycle power and wait for STATUS menu to display.
- b. Key in the numbers 7510 to add SERVICE screen to the display.
- c. Select SERVICE menu. Push "exec self-test *" key and select test number 4. Push ENTER to start test.

When the test begins, the information shown in figure 5-3 will be displayed.



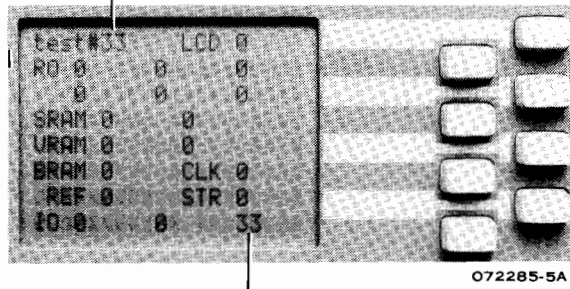
5-3. Display of Test Number 4.

NOTE

Computer/Modem and Terminal ports must be connected together with a male to female RS-232-C cable in order for the Serial Loop Test to pass.

The Numbers next to the text indicates the number of times the test has failed. Note in figure 5-4 that the test has been performed 33 times and the Serial loop test has failed 33 times.

TEST HAS BEEN PERFORMED 33 TIMES

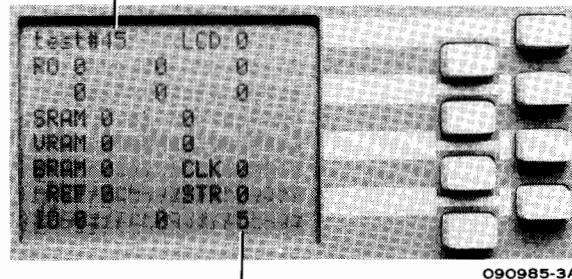


SERIAL LOOP TEST FILED 33 TIMES

Figure 5-4. Serial Loop Test Failure.

The test results shown in figure 5-5 suggest that the Serial Loop Test is failing intermittently. The number of times the test has been performed does not match the number of times the Serial Loop Test has failed.

TEST HAS BEEN PERFORMED 45 TIMES



SERIAL LOOP TEST FAILED 5 TIMES

Figure 5-5. Intermitten Serial Loop Test Failure.

To discontinue testing, turn the instrument off. When the power is interrupted the displayed test results are stored in memory. The test may be resumed from that point on by performing test number 5. If test number 4 is called up from the SERVICE menu, the test number and failure numbers will reset to 0.

5-4. KEYBOARD TEST.

The purpose of the keyboard test is to check the mechanical function of each front panel key. to perform the test follow the procedure below:

- a. Cycle power and wait for STATUS menu to display.
- b. Key in the numbers 7510 to add the SERVICE menu to the display.
- c. Select SERVICE menu. Push "exec self-test *" key and select test number 1. Push ENTER to start testing. Display of test number 1 is shown in figure 5-6.

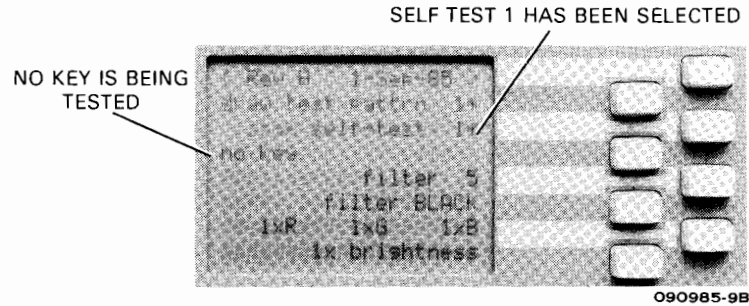


Figure 5-6. Display of Keyboard Test.

- d. Push each front panel key in any sequence and look for the key name to be displayed in line four of the LCD. The soft keys next to the display are labeled F1 through F8 from top to bottom.

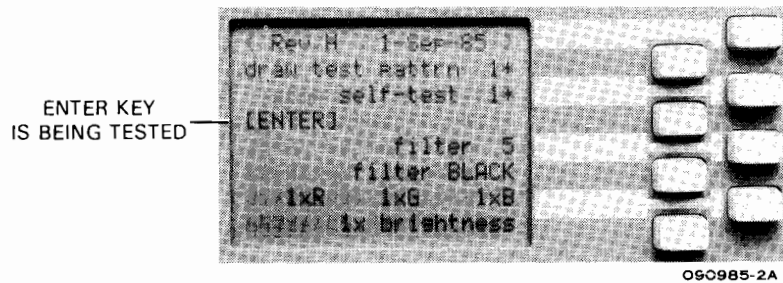


Figure 5-7. "Enter" Key Test.

If a key is pushed and not displayed, the test failed. If all other keys test operational, the failure is with the Keyboard assembly (A2).

To exit the keyboard test push key F3.

5-5. HP-IB ECHO TEST.

This test is designed to check the basic operation of the HP-IB data, management, and handshake lines by echoing transmitted characters back to the HP-IB controller.

Using an HP-85 controller connected to the film recorder's HP-IB connector, input the HP 7510A Echo Test program. The program may be entered either through the HP-85 Plotter Service tape (HP P/N 5010-2585), or manually using the program listed in Table 5-2. Note that the lines beginning with an exclamation point (!) are only commentary and do not impart any action in the program. Commentary lines may be omitted when entering the program into the controller.

To implement the test, follow the instructions listed in lines 80 through 170 inclusive of the HP-IB Echo Test.

The Echo Test program provides three levels of functional tests:

- Level 1. Tests the Data Input/Output lines by receiving and echoing ASCII characters in groups of three, (32, 33, 34 through 124, 125, 126). A display "LEVEL 1 PASSED" on the HP-85 indicates that all ASCII characters were received and echoed with proper recognition of the Attention (ATN) management line, and Data Valid (DAV), Not Ready For Data (NFDR), and Not Data Accepted (NDAC) handshake lines.
- Level 2. Tests the DOI lines for shorts and opens by receiving and echoing characters in a sequence emulating "marching ones" (1, 2, 4128), and "marching zeros" (254, 253, 251127). A display "LEVEL 2 PASSED" on the HP-85 indicates there are no shorts or opens on the DOI lines.
- Level 3. Tests the presence of a Service Request (SRQ) or End or Identify (EOI) when required and the acknowledgement of an Interface Clear (IFC). A display "LEVEL 3 PASSED" on the HP-85 indicates recognition and proper operation of the SRQ, EOI, and IFC management lines.

Table 5-2. HP-IB Echo Test Program

```

10 !      7510A HP-IB ECHO TEST
20 !
30 !      (SEPT 1, 1985)
40 !
50 CLEAR
60 DISP : 7510A HP-IB ECHO TEST"
70 DISP " *POWER ON 7510A WHILE HOLDING      DOWN 'CLEAR' BUTTON"
80 DISP " *PRESS FOLLOWING 7510A FRONT      PANEL BUTTONS:"
90 DISP " 1)'OFF line'"
100 DISP " 2)'7'"
110 DISP " 3)'5'"
120 DISP " 4)'1'"
130 DISP " 5)'0'"
140 DISP " 6)'SERVICE menu*'"
150 DISP " 7)'exec self-test 1*'"
160 DISP " 8)'2'"
170 DISP " 9)'ENTER'"
180 DISP " *PRESS 'CONT' ON HP85"
190 PAUSE
200 CLEAR
210 DIM S$(4), T$(4)
220 M=7 :
230 N=705 :
240 ON TIMEOUT 7 GOTO 1090
250 SET TIMEOUT M;10 :
260 ! *****
270 ! LEVEL 1 TEST (ASCII I/O)
280 ! PARTIALLY TEST DI01-DI08
290 ! TEST DAV, NRFD, NDAC, AND ATN
300 ! *****
310 L=1
320 FOR I=32 TO 124
330 T$=CHR$(I)&CHR$(I+1)&CHR$(I+2)
340 GOSUB 990
350 CLEAR @ DISP "TEST IN PROGRESS"
360 NEXT I
370 DISP "" @ DISP "LEVEL 1 PASSED" @ DISP ""
380 ! *****
390 ! LEVEL 2 TEST (MARCHING 1'S AND 0'S)
400 ! FULLY TEST DI01-DI08
410 ! TEST DAV, NRFD, NDAC, AND ATN
420 ! *****
430 L=2
440 T$=CHR$(1)&CHR$(2)&CHR$(4)
450 GOSUB 990
460 T$=CHR$(8)&CHR$(16)&CHR$(32)
470 GOSUB 990
480 T$=CHR$(64)&CHR$(128)&CHR$(254)
490 GOSUB 990
500 T$=CHR$(253)&CHR$(251)&CHR$(247)
510 GOSUB 990
520 T$=CHR$(239)&CHR$(223)&CHR$(191)
530 GOSUB 990
540 T$=CHR$(127)&CHR$(85)&CHR$(170)
550 GOSUB 990
560 DISP "LEVEL 2 PASSED" @ DISP ""
570 ! *****
580 ! LEVEL 3 TEST
590 ! TEST SRO, EOI, AND IFC LINES
600 ! *****
610 L=3
620 OFF INTR M :
630 CONTROL M,1 ; 0 :
640 Q=0
650 A=-1
660 ON INTR M GOSUB 990 :

```

Table 5-2 HP-IB Echo Test Program (con't)

```

670 T$=CHR$(153)&CHR$(51)&CHR$(102)
680 OUTPUT N USING "#,K" ; T$&CHR$(10) ! ADDRESSES 7550 TO BE A LISTENER
690 TRIGGER M ! I/F PUTS A 'GET' ON HP-IB
700 O=1
710 ENABLE INTR M;B ! I/F ENABLED FOR 'SRQ' FROM 7510
720 WAIT .01 ! TIME FOR I/F TO CONFIRM 'SRQ'
730 IF A<>68 THEN GOTO 1110 ! TESTS IF 'SRQ' ASSERTED
740 A=-1
750 ENTER N USING "%,K" ; S$ ! I/F SETUP TO ACKNOWLEDGE 'EOI'
760 IF S$<>T$(1,1) THEN GOTO 1120 ! TESTS IF 'EOI' ASSERTED WITH CHR$(153)
770 ENTER N USING "%,K" ; S$ ! TESTS IF 7550 SENT CHR$(51),(102)&(10)
780 IF S$<>T$(2,3) THEN GOTO 1130 ! S$ SHOULD CONTAIN ONLY CHR$(51)&(102)
790 OUTPUT N USING "#,K" ; T$&CHR$(10) ! ADDRESSES 7510 TO BE A LISTENER
800 ABORTIO M ! I/F ASSERTS 'IFC' UNADDRESSING 7550
810 TRIGGER M ! I/F PUTS A 'GET' ON HP-IB
820 WAIT .01 ! TIME FOR I/F TO CONFIRM 'SRQ'
830 IF A<>-1 THEN GOTO 1140 ! TESTS IF 7550 DIDN'T ASSERT 'SRQ'
840 ENTER N USING "K" ; S$
850 IF S$<>T$ THEN GOTO 1150 ! TESTS IF 7510 ECHOED T$ CORRECTLY
860 DISP "LEVEL 3 PASSED" @ DISP ""
870 DISP "END OF TEST"
880 END
890 ! *****
900 ! INTERRUPT SERVICE ROUTINE
910 ! *****
920 STATUS M,1 ; B
930 IF O<>1 THEN GOTO 1160 ! TESTS IF 'SRQ' ASSERTED W/O TRIGGER
940 A=SPOLL(N) ! SERIAL POLL RESPONSE SHOULD BE 68
950 O=2
960 ENABLE INTR M;B ! I/F REENABLED TO ACKNOWLEDGE A 'SRQ'
970 RETURN
980 ! *****
990 ! HP-IB OUTPUT AND ECHO CHECK
1000 ! *****
1010 OUTPUT N USING "#,K" ; T$&CHR$(10)
1020 ENTER N USING "%,K" ; S$
1030 IF S$<>T$ THEN GOTO 1100 ! TESTS IF 7510 ECHOED T$ CORRECTLY
1040 RETURN
1050 ! *****
1060 ! ERROR DISPLAY ROUTINE
1070 ! *****
1080 BEEP
1090 DISP "LEVEL #";L;"TIMEOUT FAILURE" @ END
1100 DISP "LEVEL #";L;"FAILED WHEN T$ = ";T$(1,3) @ DISP @ END
1110 DISP "LEVEL #3 FAILED AS 'SRQ' WAS NOT ASSERTED" @ END
1120 DISP "LEVEL #3 FAILED AS 'EOI' WAS NOT ASSERTED" @ END
1130 DISP "LEVEL #3 FAILED AS 'EOI' WAS ASSERTED" @ END
1140 DISP "LEVEL #3 FAILED AS 'IFC' WAS NOT ACKNOWLEDGED" @ END
1150 DISP "LEVEL #3 FAILED WHEN T$ = ";T$(1,3) @ END
1160 DISP "LEVEL #3 FAILED AS 85'S 'SRQ' ACKNOWLEDGE WAS ENABLED" @ END
26072

```

5-6. SERIAL LOOP TEST.

The serial loop test checks the RS-232-C interface circuits of the film recorder. To implement the test perform the following steps:

- a. Remove power from instrument and connect a Male to Female RS-232-C cable, HP Model 17355D, between Computer/Modem and Terminal connectors on the rear panel of the instrument.
- b. Turn on instrument and wait for STATUS menu to display.
- c. Key in the numbers 7510 to add SERVICE menu to the display.
- d. Select SERVICE menu. Push "exec self-test*" key and select test number 3. Push ENTER key to start testing.
- e. If serial loop test passes, the message "serial loop passed" is added to the display.
- f. The message "serial loop failed" is added to the display if the test failed.

If the test fails, check rear panel connectors and the RS-232-C cable. Also check cables from main board (A1) to the rear panel connectors. Perform the uP and Stroke Generator test and see if the Serial IC test passes.

TABLE OF CONTENTS

ADJUSTMENTS

6-1. Introduction	6-1
6-2. Adjustment Notes	6-1
6-3. Recommended Test Equipment	6-3
6-4. Low Voltage Power Supply Verification	6-5
6-5. Stroke Generator Adjustments	6-6
6-6. High Voltage or X-Y Amplifier Adjustments	6-12
6-7. Z-Axis Gain and Intensity Adjustments	6-16
6-8. CRT, X-Y Amplifier, and Stroke Generator Adjustments ..	6-18

TABLES

Table	Page
6-1. Adjustment Overview	6-2
6-2. Recommended Test Equipment	6-2

ILLUSTRATIONS

Figure	Page
6-1. PCA Location Identification	6-4
6-2. Low Voltage Power Supply Check	6-5
6-3. HP 7510A Status and Service Menus	6-6
6-4. Test Pattern Number 2	6-7
6-5. Test Pattern Number 8	6-8
6-6. Intensity and Z-Gain Adjustment	6-8
6-7. Stroke Generator Adjustment Locations	6-11
6-8. Test Pattern Number 3	6-13
6-9. High Voltage and X-Y Amplifier Adjustment Locations	6-14
6-10. Intensity and Z-Gain Adjustment	6-16
6-11. Test Pattern Number 2	6-17
6-12. Z-Axis Gain and Intensity Adjustment Locations	6-19

ADJUSTMENTS**SECTION****VI****6-1. INTRODUCTION**

This section contains the adjustment procedures necessary to return the instrument to proper operating condition after a PCA has been replaced. The adjustments described in this section may be performed independently of each other. An overview of all adjustments is given in table 6-1.

Assembly removal instructions are given in Section IV of this manual.

If the CRT or two of the PCAs are replaced, a complete instrument calibration will be required. For the complete adjustment procedure, refer to Section III of the HP 7510A Service Manual.

6-2. ADJUSTMENT NOTES

Warm Up. Allow the instrument to warm up 15 minutes before making any adjustments. The internal timer of the film recorder may be used to watch for proper warm up time. The instrument defaults to the "OFF LINE" configuration when power is applied. This configuration keeps the HP 7510A from parsing any HP-GL commands. After approximately 15 minutes of warm up time, the recorder will switch to the "ON LINE" configuration. If the instrument needs to be turned off momentarily any time during the adjustment procedure, the "ON LINE" configuration may be chosen via the STATUS menu. A Service test pattern may be chosen immediately after the instrument has been turned on. After the instrument switches to the "ON LINE" configuration, the test pattern is drawn.

Preview Time Out. To prevent CRT phosphor burns, the film recorder will blank the CRT if a test pattern is left on screen 15 minutes or more. Pushing any front panel key will restore the test pattern.

Table 6-1. Adjustment Overview

PCA REPLACED	REQUIRED ADJUSTMENTS	PARA. NO.	STEP(S)
Low Voltage Power Supply (A3)	Low Voltage Power Supply Verification	6-4	a
Stroke Generator (A6)	X-Y Positioning and Gain	6-5	d, g
	Trace and Ortho	6-5	e, f
	Intensity, Z-Axis Gain and Intensity Limit	6-5	j, h, l
High Voltage or X-Y Amplifiers	Intensity Limit	6-6	b
	X-Y Plate Average	6-6	d, e
	Focus Limit, Astig Gain, Focus and Astig	6-6	h-k
	Deflection Response	6-6	j-o
	X-Y Positioning, Trace, Ortho and X-Y Deflection Gain	6-6	9-u
Z-Axis Gain and Intensity Adjustments	Intensity Z-Gain and Intensity Limit	6-7	b-d
	X-Y Plate Average	6-7	f-g
	Focus Limit, Astig Gain, Focus, Lens and Astig	6-7	j-m
	Deflection Response	6-7	m-9
	X-Y Positioning, Trace Ortho and X-Y Sys. Gain	6-7	s-w

6-3. RECOMMENDED TEST EQUIPMENT

A complete list of required test equipment is given in table 6-2. Test equipment equivalent to that recommended may be substituted, provided it meets the required characteristics. For best results, use recently calibrated test equipment.

Table 6-2. Recommended Test Equipment

INSTRUMENT TYPE	CRITICAL SPECIFICATION	RECOMMENDED MODEL
Digital Multimeter	Voltage Range: -30V to +300V	HP Model 3468
2 Channel Oscilloscope with 10:1 Divider Probe	Bandwidth: 100 MHz each channel	HP Model 1740A
X6 Magnifier		HP Part No. 1000-0801
Template		HP Part No. 07510-43803

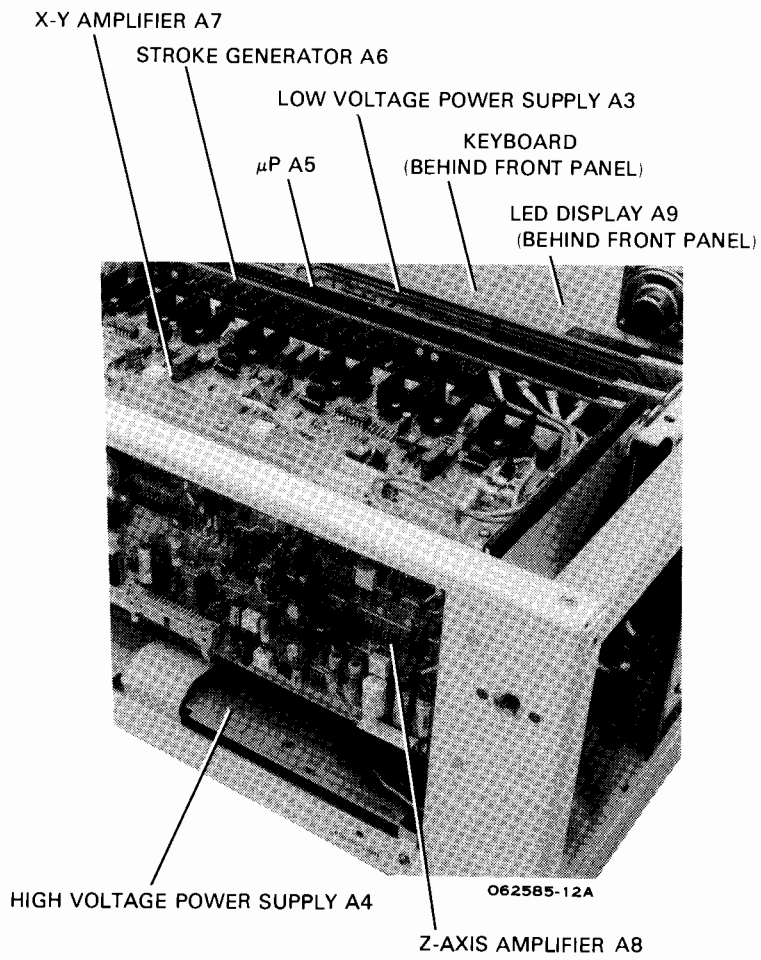


Figure 6-1. PCA Location Identification

6-4. LOW VOLTAGE POWER SUPPLY VERIFICATION

Perform the following checks if the Power Supply PCA (A3) has been replaced:

- a. Install the replacement Low Voltage Power supply PCA. Apply power to film Recorder and verify that the LEDs for each supply is turned on (refer to figure 6-2).

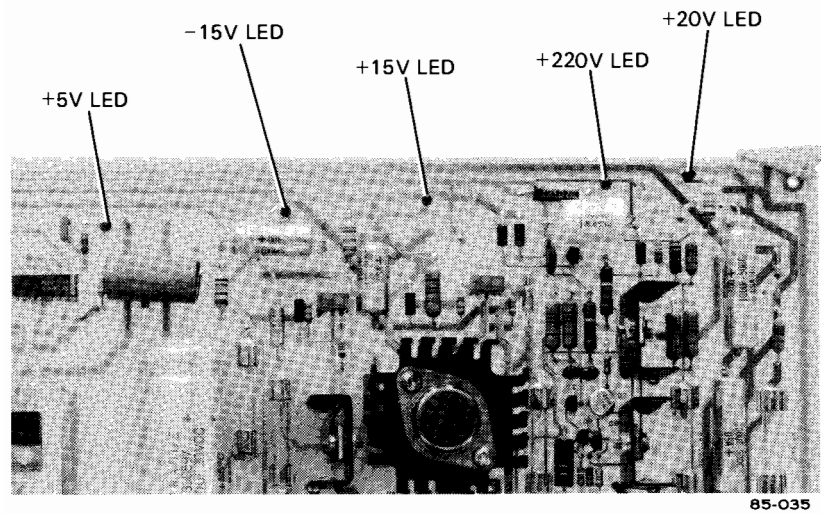


Figure 6-2. Low Voltage Power Supply Check

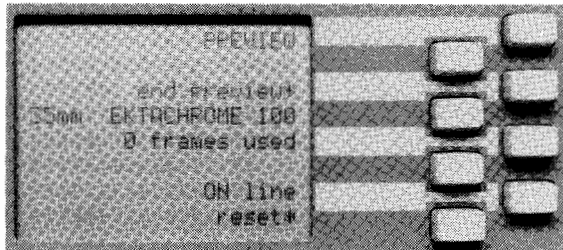
6-5. STROKE GENERATOR ADJUSTMENTS

The Stroke Generator adjustments must be performed with the CRT exposed. Refer to Paragraph 4-3, Section IV of this manual for the disassembly instructions.

Perform the following adjustments if the Stroke Generator PCA (A6) has been replaced:

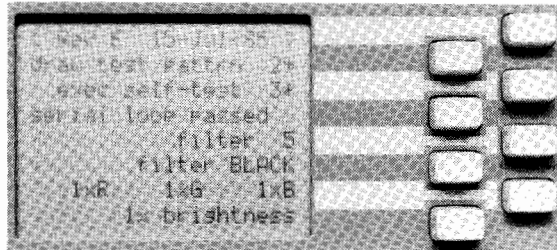
- a. After replacing the Stroke Generator PCA (A6) hold CLEAR key and apply power to instrument. Allow the instrument to switch from "OFF LINE" to "ON LINE" configuration for proper warm up time.
- b. From the STATUS menu, key in the code 7510 to gain access to the SERVICE menu.

STATUS menu



072285-5A

SERVICE menu



072285-3A

Figure 6-3. HP 7510A Status and Service Menu

NOTE: Access to the SERVICE Menu is disabled on power-up. This menu has several special functions which should only be used by qualified service personnel.

- c. Call up test pattern number 2 from SERVICE menu. Place template over CRT.

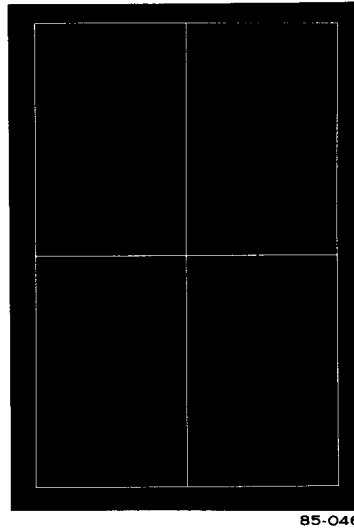
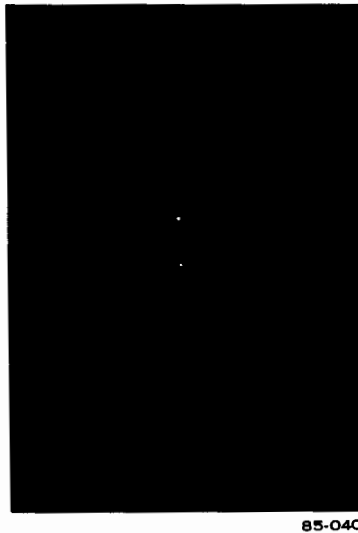


Figure 6-4. Test Pattern Number 2

- d. Adjust POS X (A7R11) and POS Y (A7R58) to place center lines of test pattern on template cross hairs.
- e. Adjust TRACE (A8R180) so that center horizontal line of test pattern is parallel to center line of template pattern.
- f. Adjust ORTHO (A8R144) so that center vertical line of test pattern is parallel to center line of template pattern.
- g. Adjust X SYS Gain (A7R3) and Y SYS Gain (A7R50) so that test pattern is the same size as the template.
- h. Call up test pattern number 8 from SERVICE menu.



85-040

Figure 6-5. Test Pattern Number 8

- i. Connect oscilloscope to Z OUTPUT TP (A8TP7). Set deflection factor of oscilloscope for 10V/DIV and a sweep speed of $2\mu\text{s}/\text{DIV}$.
- j. Set Int Adj (A8R178) so that the base line of the waveform rests at +10V (see figure 6-6).

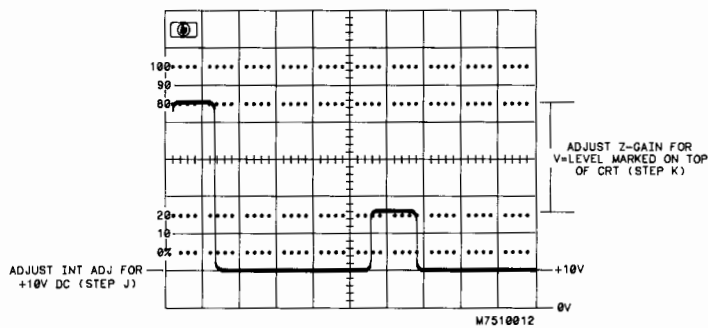


Figure 6-6. Intensity and Z Gain Adjustment

- k. Adjust Z Gain (A8R116) so that the amplitude difference between the first pulse (larger pulse) and the second pulse (smaller pulse) is equal to the value marked on top of CRT (figure 6-6).
- l. Set Int Limit (A8R166) so that bottom dot of the test pattern displayed on the film recorder is just extinguished. View the test pattern through the X6 magnifier.

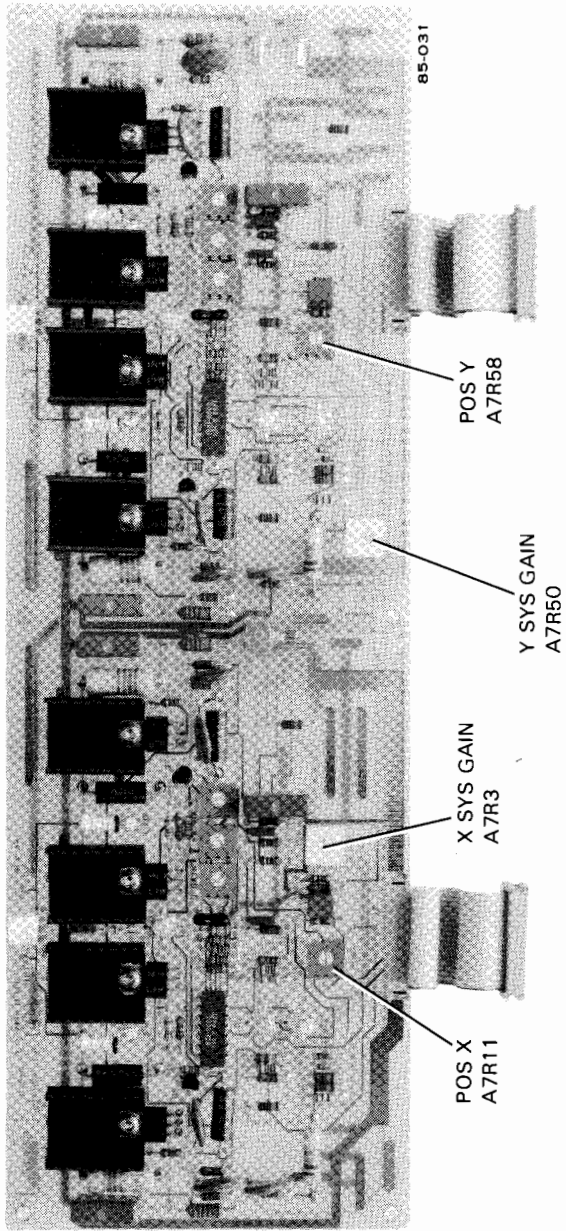
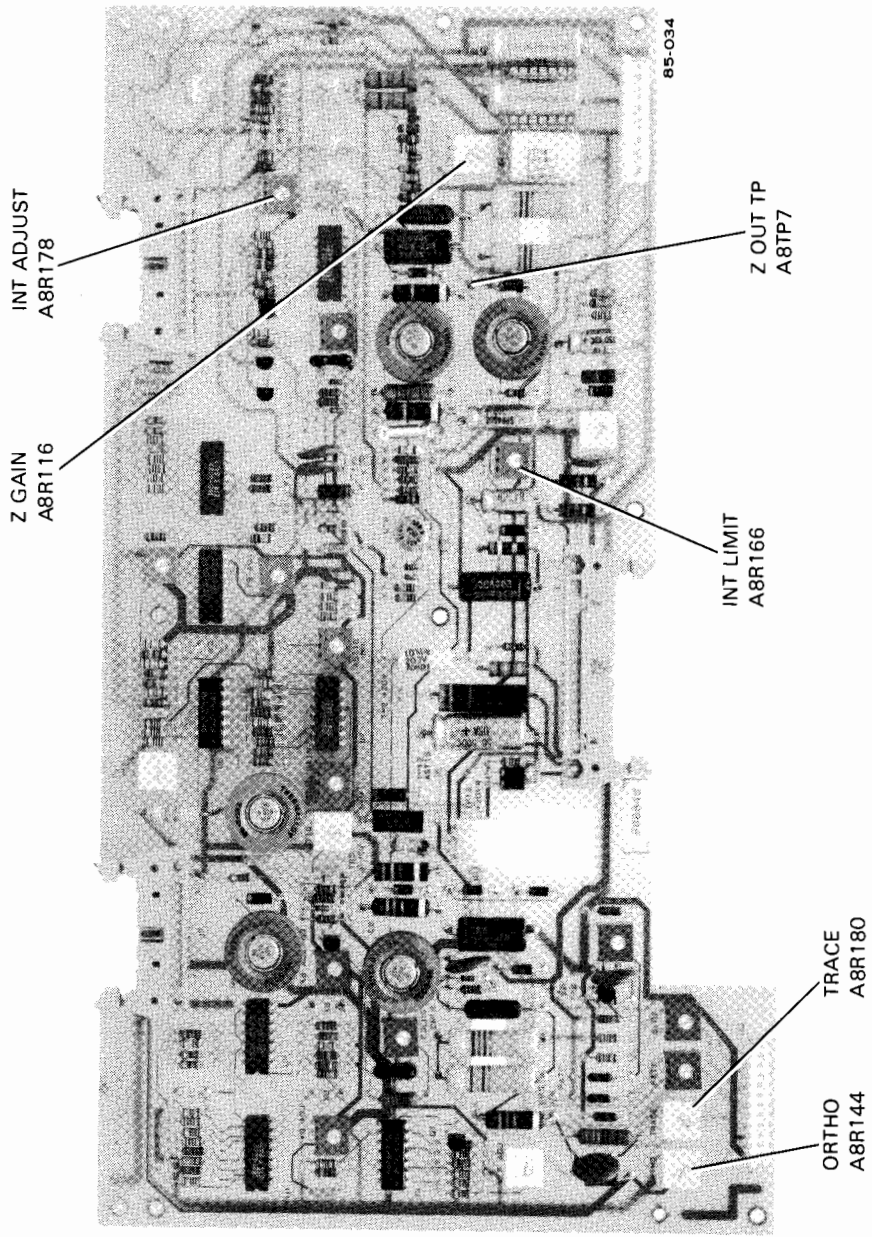


Figure 6-7.
Stroke Generator Adjustment Locations
6-11

6-6. HIGH VOLTAGE OR X-Y AMPLIFIER ADJUSTMENTS

Perform the following adjustments if the High Voltage PCA (A4) or the X-Y Amplifier PCA (A7) has been replaced.

- a. After replacing the High Voltage Power supply or X-Y Amplifier, hold CLEAR key and apply power to instrument. Allow the instrument to switch from "OFF LINE" to the "ON LINE" configuration for proper warm up time.
- b. After warm up time, access the SERVICE menu and call up Test Pattern number 8. Adjust Intensity Limit (A8R166) until bottom dot just disappears. View dot with the X6 magnifier.
- c. Disconnect X, Y, and Bias input cables on X-Y Axis amplifier.
- d. Connect DMM differentially between A7TP1 and A7TP2. Adjust Pos X (A7R11) for $-0.2V$ to $+0.2V$.
- e. Connect DMM differentially between A7TP3 and A7TP4. Adjust Pos Y (A7R58) for $-0.2V$ to $+0.2V$.
- f. Reconnect X, Y, and Bias cables on X-Y Axis amplifier.
- g. Call up Test Pattern number 3 from SERVICE menu.
- h. Adjust Focus Limit (A4R19) and Astig Gain (A8R172) for best spot size and focus at location 1 of test pattern. A4R19 is accessible through plug on rear panel. Rear panel is labeled Focus Limit.
- i. Rotate Focus (A8R200) and Astig (A8R181) fully clockwise.
- j. View line crossing at location 1 with the X6 magnifier and adjust Slot (A8R182) for minimum width of horizontal line.
- k. Adjust Focus (A8R200) and Astig (A8R181) for equal and minimum width of both horizontal and vertical line.
- l. View location 2 and adjust YF (A8R71) for narrowest and equal width lines.
- m. View location 3 and adjust XF (A8R26) for narrowest and equal width lines.

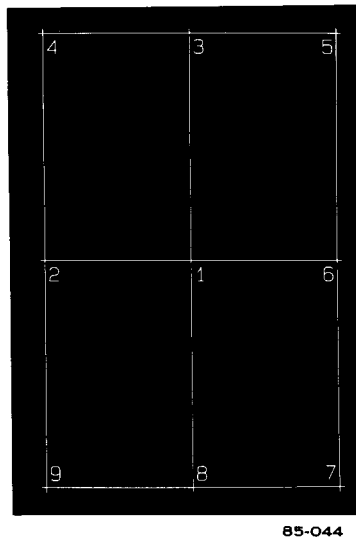
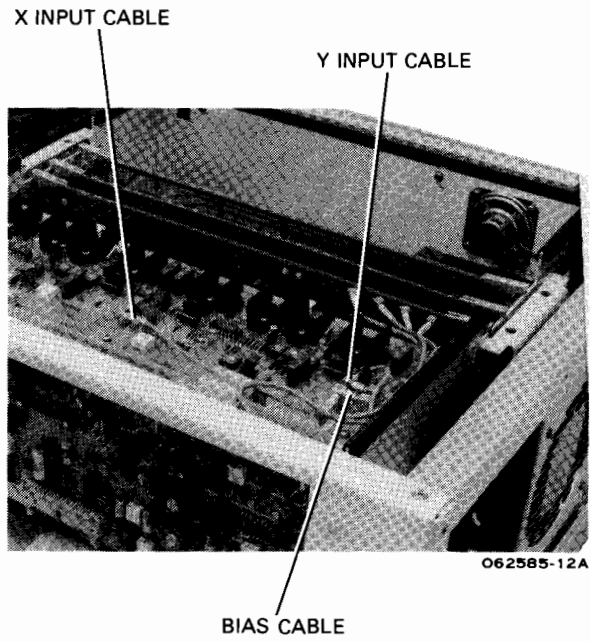
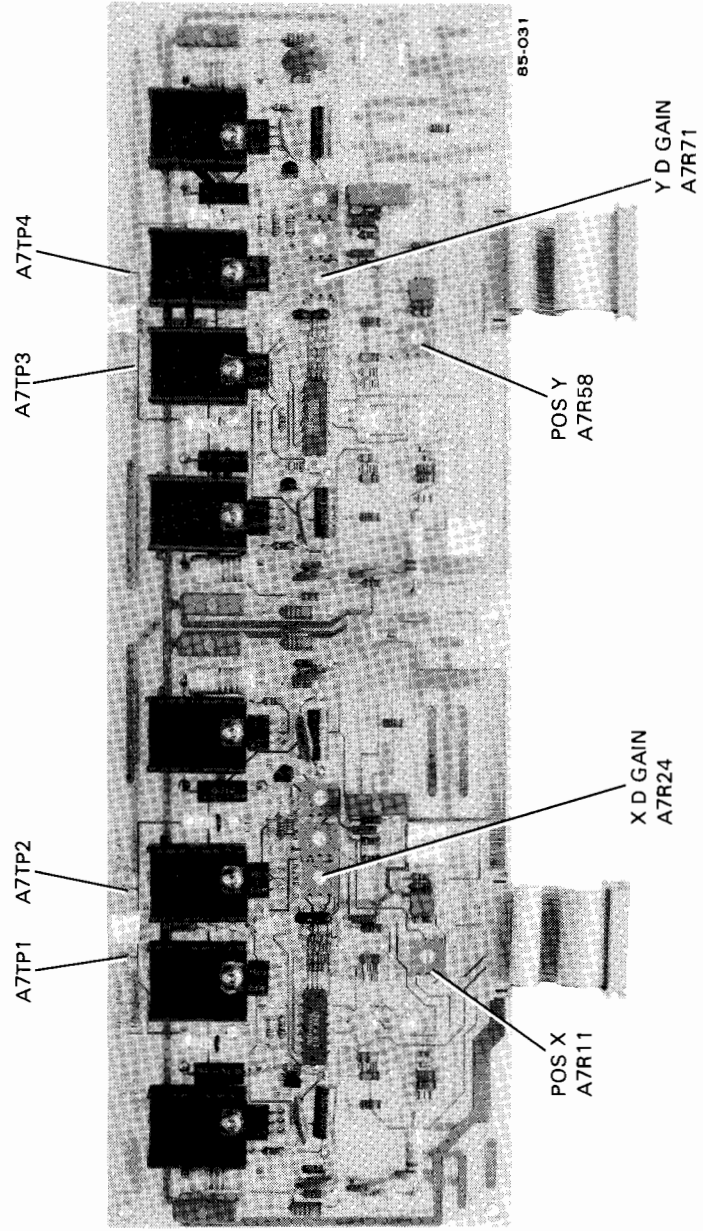
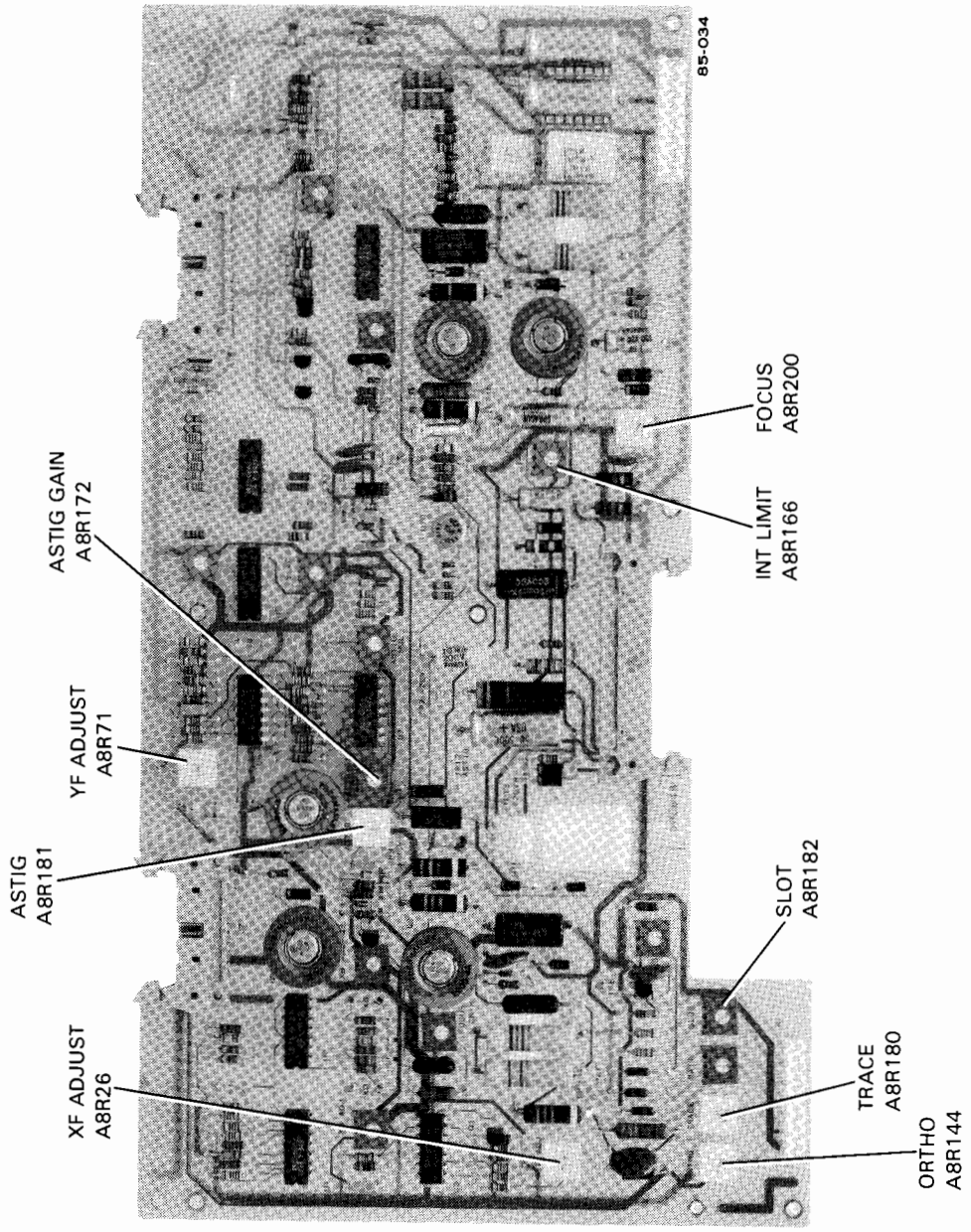


Figure 6-8. Test Pattern number 3

- n. View location 4 and adjust Astig Gain (A8R172 for narrowest and equal width lines).
- o. Repeat steps k through n.
- p. Call up test pattern number 2 from SERVICE menu. Place template over CRT (see figure 6-4).
- q. Adjust POS X (A7R11) and POS Y (A7R58) to place center lines of test pattern on template cross hairs.
- r. Adjust TRACE (A8R180) so that center horizontal line of test pattern is parallel to center line of template pattern.
- s. Adjust ORTHO (A8R144) so that center vertical line of test pattern is parallel to center line of template pattern.
- t. Adjust X D Gain (A7R24) and Y D Gain (A7R71) so that test pattern is the same size as the template.
- u. Compare positioning against template and repeat steps q through t.



P/O Figure 6-9. High Voltage and X-Y Amplifier Adjustment Locations



P/O Figure 6-9. High Voltage and X-Y Amplifier Adjustment Locations 6-15

6-7. Z AXIS GAIN AND INTENSITY ADJUSTMENTS

Perform the following adjustments if the Z Axis PCA (A8) has been replaced.

- After replacing the Z-Axis PCA, hold CLEAR key and apply power to the instrument. Allow instrument to switch from "OFF LINE" configuration to the "ON LINE" configuration.
- Access the SERVICE menu and call up test pattern number 8. Adjust Intensity (A8R178) so that base line of the waveforms rests at +10V (see figure 6-10).

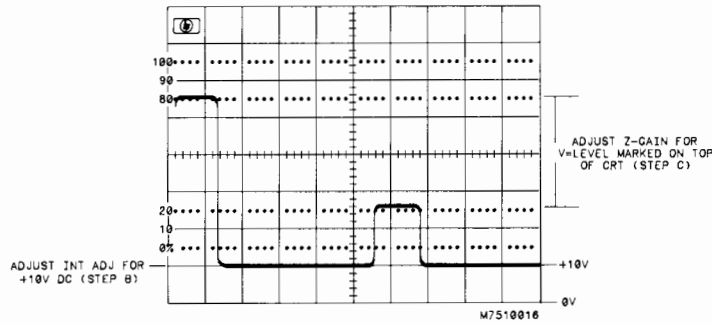
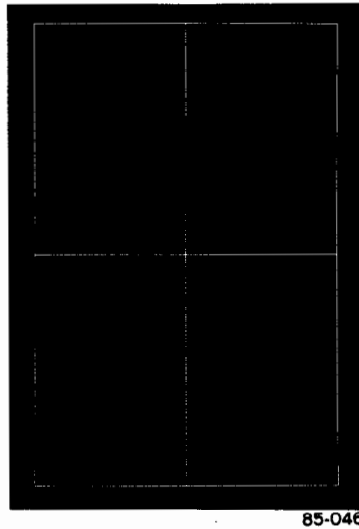


Figure 6-10. Intensity and Z Gain Adjustment

- Adjust Z Gain (A8R116) so that amplitude difference between the first pulse (larger pulse) and the second pulse (smaller pulse) is equal to the value marked on top of CRT.
- Set Intensity Limit (A8R166) so that bottom dot of the test pattern displayed on the film recorder is just extinguished. View the test pattern through the X6 magnifier.
- Disconnect X, Y, and Bias input cables on the X-Y Axis amplifier.
- Connect DMM differentially between A7TP1 and A7TP2. Adjust Pos X (A7R11) for $-0.2V$ to $+0.2V$.
- Connect DMM differentially between A7TP3 and A7TP4. Adjust Pos Y (A7R58) for $-0.2V$ to $+0.2V$.

- h. Reconnect X, Y, and Bias cables on X-Y Axis amplifier.
- i. Call up Test Pattern number 3 from SERVICE menu (see figure 6-8).
- j. Adjust Focus Limit (A4R19) and Astig Gain (A8R172) for best spot size and focus at location 1 of test pattern. Use the X6 magnifier to make this adjustment.
- k. Rotate Focus (A8R200) and Astig (A8R181) fully clockwise.
- l. View line crossing at location 1 with X6 magnifier and adjust Slot (A8R182) for minimum width of horizontal line.
- m. Adjust Focus (A8R200) and Astig (A8R181) for equal and minimum width of both horizontal and vertical line.
- n. View location 2 and adjust YF (A8R71) for narrowest and equal width lines.
- o. View location 3 and adjust XF (A8R26) for narrowest and equal width lines.
- p. View location 4 and adjust Astig Gain (A8R172) for narrowest and equal width lines.



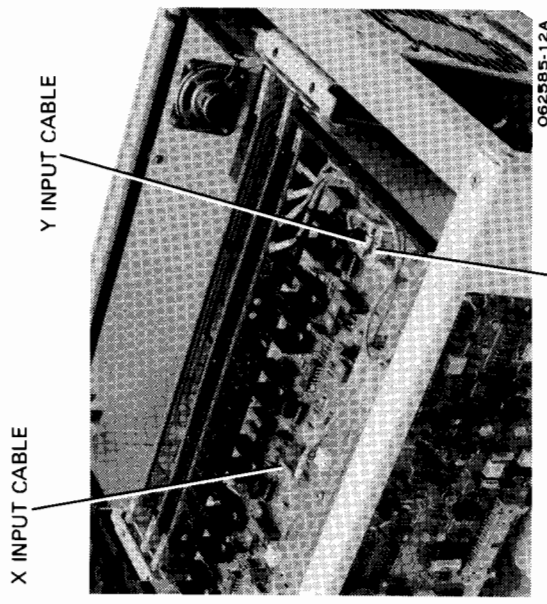
85-046

Figure 6-11. Test Pattern 2

- q. Repeat steps m through p.
- r. Draw test pattern 2 from SERVICE menu and install template over CRT.
- s. Adjust Pos X (A7R11) and Pos Y (A7R58) to place center lines of test pattern over cross hairs of template.
- t. Adjust Trace (A8R180) so that center horizontal line of test pattern is parallel to center line of template.
- u. Adjust Ortho (AR144) so that the center vertical line of test pattern is parallel to the centerline of template.
- v. Adjust X Sys Gain (A7R3) and Y Sys Gain (A7R50) so that test pattern is same size as the template.
- w. Review positioning and repeat steps s through v as necessary.

6-8. CRT, X-Y AMPLIFIER, AND STROKE GENERATOR ADJUSTMENTS

If the CRT or two of the PCAs are replaced, the adjustment procedures described in Section III of the Service Manual must be performed.



BIAS CABLE

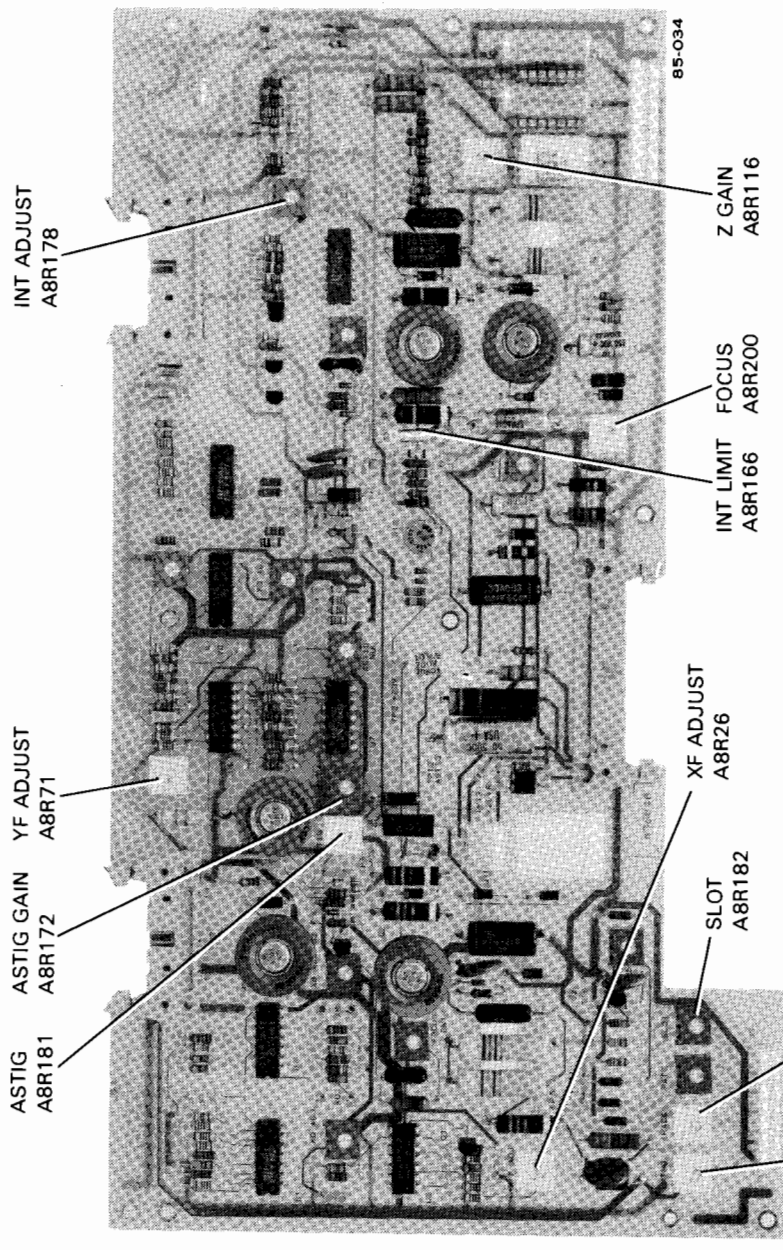
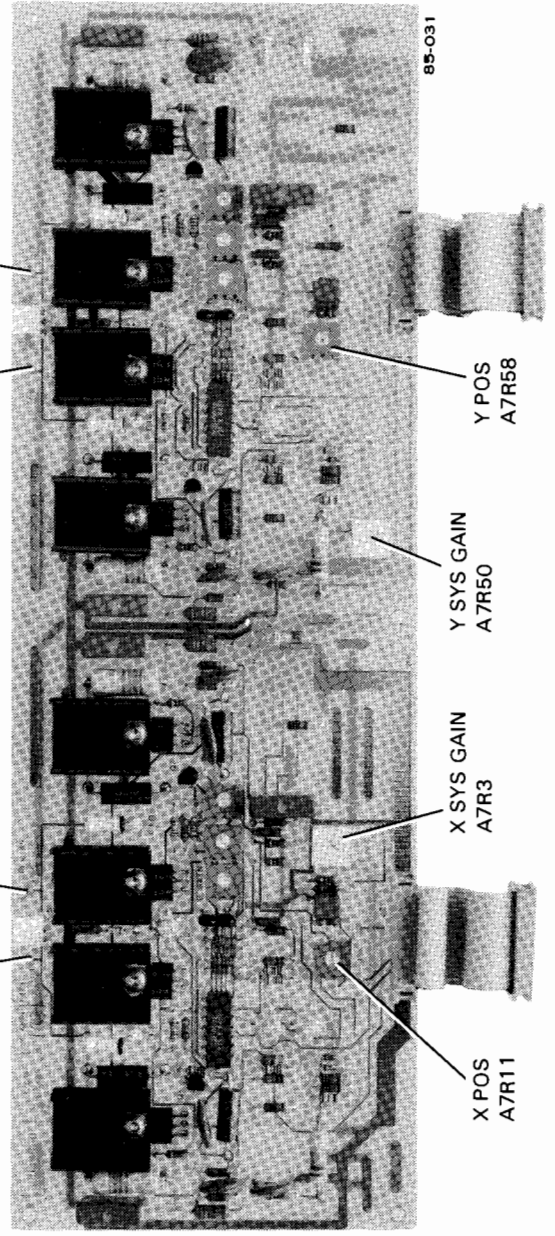


Figure 6-12. Z-Axis Gain and Intensity Adjustment Locations 6-19

PERIPHERALS

SECTION

VII

Not applicable to this product.

TABLE OF CONTENTS

REPLACEMENT PARTS

8-1. Introduction	8-1
-------------------------	-----

TABLES

Table	Page
8-1. Expense Tool Package (07510-67901)	8-1
8-2. Inventory Parts Package (07510-67801)	8-2
8-3. Replaceable Parts	8-3

ILLUSTRATIONS

Figure	Page
8-1. Electrical Assembly Identification	8-2
8-2. Chassis Parts Identification	8-4
8-3. Camera Module Parts Identification 4	8-6

REPLACEMENT PARTS**SECTION****VIII****8-1. INTRODUCTION**

Replaceable Parts for the 7510A Film Recorder are listed in table 8-3. Parts break down are shown in figure 8-1.

Parts list for the Expense Tool Package is given in table 8-1. The inventory parts package list is given in table 8-2.

Table 8-1. Expense Tool Package (07510-67901)

DESCRIPTION	PART NO.	QTY
Carrying Case	07510-64501	1
Template	07510-43803	1
Microscope (6X)	1000-0801	1
PCA-Extender	07510-66510	1
Service Manual	07510-90900	1
Operating Manual	07510-90901	1
Programming Manual	07510-90902	1
Pocket Guide	07510-90905	1
Instructions	07510-90906	1
Content List	07510-90905	1
Cable (BNC-SMA)	08160-61610	1

Table 8-2. Inventory Parts Package (07510-67801)

DESCRIPTION	PART NO.	QTY
HV Power Supply	07510-60503	1
PCA-Keyboard	07510-66511	1
PCA-Camera PCA (35-mm)	07510-66515	1
RB-EXCH PCA-Stroker	07510-69503	1
RB-EXCH PCA-XY Amp	07510-69504	1
RB-EXCH PCA-Z Amp	07510-69505	1
RB-EXCH PCA-Processor	07510-69514	1
RB-EXCH PCA-LVPS	07510-69518	1
QN S PPNR	1854-0433	1
LCD (20 x 8)	2090-0088	1
Fuse 1A	2110-0001	5
Fuse .25A	2110-0004	5
Fuse 1ASB	2110-0007	5
Fuse 4A	2110-0055	5
Fuse 2A SB	2110-0303	5
Stepper Motor	3140-0802	1
Fan 120CFM	3160-0097	1
Content List	07510-90907	1

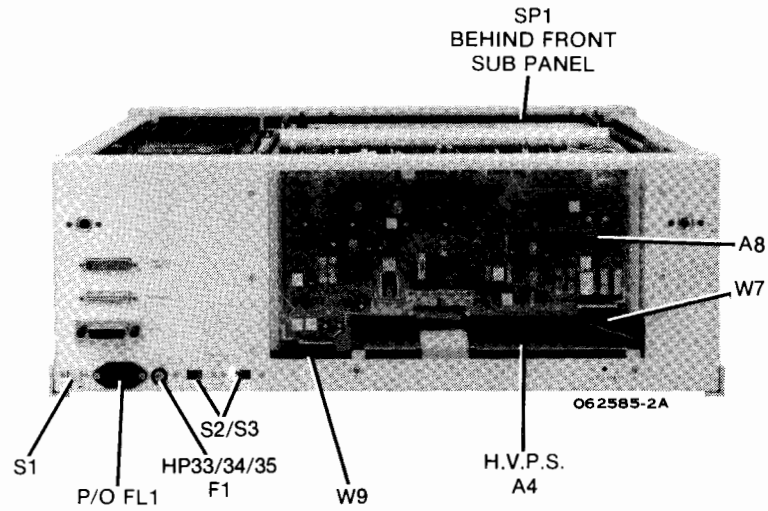
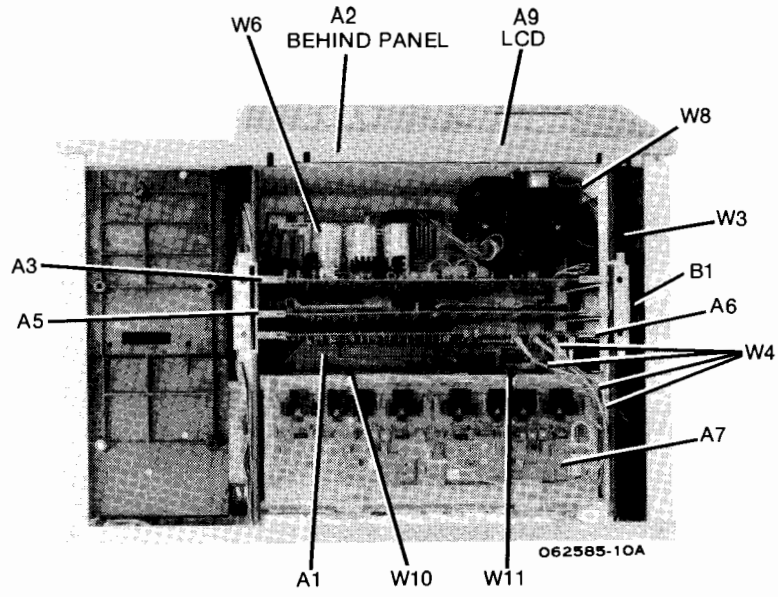
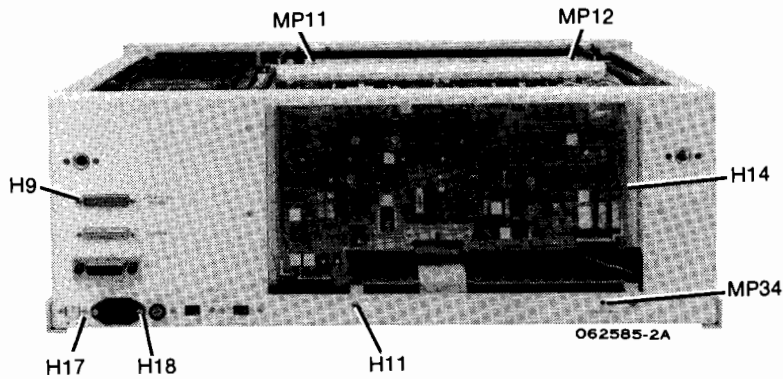
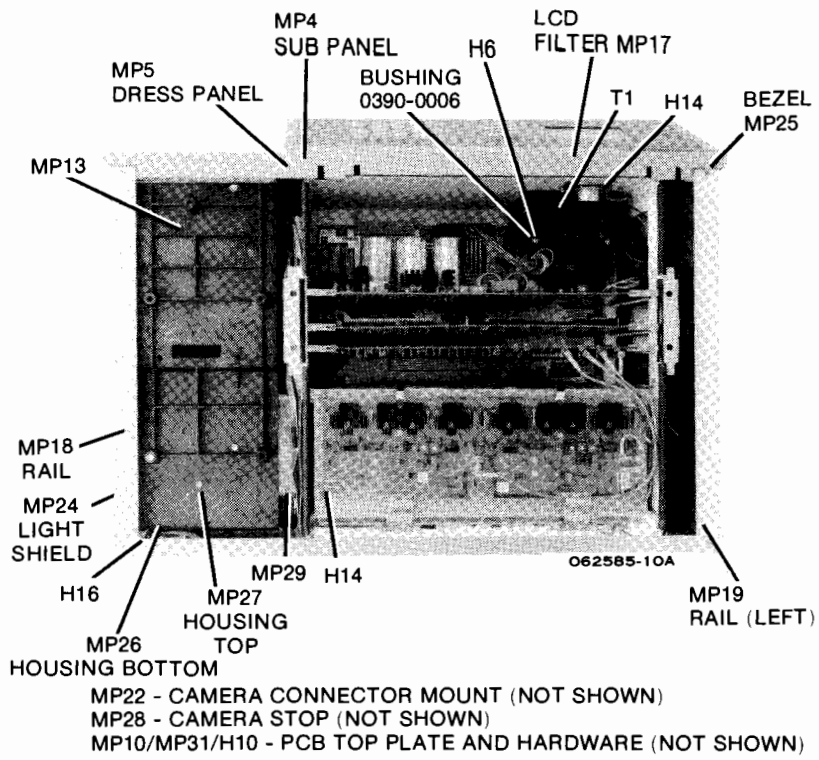


Figure 8-1. Electrical Assembly Identification

Table 8-3. Replaceable Parts

Refr. Desig.	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
A1	07510-66517	9	1	MOTHER BOARD ASSEMBLY	28480	07510-66517
A2	07510-66511	3	1	KEYBOARD ASSEMBLY	28480	07510-66511
A3	07510-66518	0	1	LVPS BO ASSEMBLY	28480	07510-66518
A4	07510-60503	1	1	HV ASSEMBLY	28480	07510-60503
A5	07510-66514	6	1	68000 PROC BOARD	28480	07510-66514
A6	07510-60503	3	1	HV ASSEMBLY	28480	07510-66503
A7	07510-66504	4	1	X-Y AMPLIFIER BOARD ASSEMBLY	28480	07510-66504
A8	07510-66505	5	1	Z-AXIS BOARD ASSEMBLY	28480	07510-66505
A9	2090-0088	7	1	LCD ASSEMBLY	28480	2090-0088
A10	07510-66519	1	1	ARC PROT BD	28480	07510-66519
B1	3160-0097	8	1	FAN-TBAX 120-CFM 115V 50/60-HZ	28480	3160-0097
F1	2110-0002	9	1	FUSE-2A 250V NTO 1.25 X .25 UL 120V OPER	75195	312002
F1	2110-0001	7		FUSE-1A 250V NTO 1.25 X .25 UL 220V OPER		
FL1	9135-0168	7	1	LINE FILTER	28480	9135-0168
L1	5060-0435	8	1	COIL: ALIGNMENT Z-AXIS	28480	5060-0435
L2	01336-66002	3	1	COIL ALIGNMENT	28480	01336-66002
O16	1854-0433	5	1	ON S PPWR HPSPEC	28480	1854-0433
S1	5041-1418	7	1	ROCKER SWITCH	28480	5041-1418
S2	3101-2476	6	2	SWITCH-SLIDE	28480	3101-2476
S3	3101-2476	6		SWITCH-SLIDE	28480	3101-2476
SP1	9160-0273	8	1	SPEAKER 8 DHMS	28480	9160-0273
V1	5083-5380	0	1	CRT P-48 NA NG	28480	5083-5380
W1	07510-61624	9	1	CABLE AC ASSY-PRIMARY	28480	07510-61624
W2	07510-61617	0	1	CABLE ASSY-FAN	28480	07510-61617
W3	07510-61611	4	2	CABLE-COAX	28480	07510-61611
W4	07510-61612	5	2	CABLE-COAX	28480	07510-61612
W5	07510-61618	1	1	CABLE LCD-KEYS ASSY-FRT PNL	28480	07510-61618
W6	07510-61619	2	1	CABLE ASSY-Z-AXIS	28480	07510-61619
W7	07510-61620	5	1	CABLE ASSY-SPEAKER	28480	07510-61620
W8	07510-61621	6	1	CABLE ASSY-CRT INT	28480	07510-61621
W9	07510-61608	9	1	CABLE ASSY-X DUT	28480	07510-61608
W10	07510-61609	0	1	CABLE ASSY-Y DUT	28480	07510-61609

See introduction to this section for ordering information



- MP2 - INSTRUMENT FEET
- MP9 - PLATE AC COVER
- MP20 - RAIL (BOTTOM RIGHT SIDE)
- MP21 - RAIL (BOTTOM LEFT SIDE)

Figure 8-2. Chassis Parts Identification

Table 8-3. Replaceable Parts (Cont'd)

Refr. Desig.	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
H1	0380-1686	6	2	STANDOFF-HEX	28480	0380-1686
H2	0390-0006	3	8	INSULATOR-FLG-BSHG NYLON	28480	0390-0006
H3	0515-0636	1	4	SCREW-MACHINE ASSEMBLY M4 X 0.7 25MM-LG	00000	ORDER BY DESCRIPTION
H4	0515-0678	1	2	SCREW-MACHINE M2 X 0.4 10MM-LG PAN-HD	00000	ORDER BY DESCRIPTION
H5	0515-1037	8	4	M3 PANHEAD 45L	28480	0515-1037
H6	0515-1404	3	4	MACHINE-SCREW	28480	0515-1404
H7	0535-0011	8	2	NUT-HEX DBL-CHAM M2 X 0.4 1.45MM-THK	00000	ORDER BY DESCRIPTION
H8	0624-0600	0	4	SCR TAPPING 4-20	28480	0624-0600
H9	1251-2942	7	9	SCREW POST LOCK	28480	1251-2942
H10	1390-0365	8	4	PLUNGER-LATCHING	28480	1390-0365
H11	0515-0372	2	19	SCREW-MACHINE ASSEMBLY M3 X 0.5 8MM-LG	00000	ORDER BY DESCRIPTION
H12	0515-0374	4	11	SCREW MACHINE ASSEMBLY M3 X 0.5 10MM-LG	00000	ORDER BY DESCRIPTION
H13	0515-0382	4	6	SCREW METRIC	00000	ORDER BY DESCRIPTION
H14	0515-0430	3	39	MSPH M3 6 SMS10	28480	0515-0430
H15	0515-0664	5	1	MSPH M3 12 SMS10	28480	0515-0664
H16	0515-0700	0	6	MSFH M4 X 8 T10	28480	0515-0700
H17	0515-1031	2	6	MSFH M3 6 T10	28480	0515-1031
H18	0515-1035	6	8	MSFH M3 8 T10	28480	0515-1035
H19	2190-0584	0	24	WASHER-LK HLCL 3.0-MM 3.1-MM-ID	28480	2190-0584
H20	2190-0584	0		WASHER-LK HLCL 3.0-MM 3.1-MM-ID	28480	2190-0584
H21	3050-0891	7	10	WASHER-FL MTLCL 3.0 MM 3.3-MM-ID	28480	3050-0891
H22	3050-1071	7	1	WASHER	28480	3050-1071
H23	3050-1140	1	1	WASHER-SHOULDER	28480	3050-1140
MP1	0403-0150	7	3	GUIDE-PC	28480	0403-0150
MP2	0403-0176	7	4	FEET	28480	0403-0176
MP3	0403-0517	0	6	CARD GUIDES	28480	0403-0517
MP4	07510-00205	4	1	PANEL-SUB-DRESS	28480	07510-00205
MP5	07510-00207	6	1	DRESS PNL-FRONT	28480	07510-00206
MP6	07510-01201	2	1	SHIELD-FAN	28480	07510-01201
MP7	07510-01202	3	1	SHIELD-FAN-INNER	28480	07510-01202
MP8	07510-01211	4	1	BKT-ARC PROT BD	28480	07510-01211
MP9	07510-01212	5	1	PLATE-AC COVER	28480	07510-01212
MP10	07510-01217	0	1	PCB TOP PLATE	28480	07510-01217
MP11	07510-01218	1	1	PANEL BKT-LEFT	28480	07510-01218
MP12	07510-01219	2	1	PANEL BKT-RIGHT	28480	07510-01219
MP13	07510-01220	5	1	HOUSING BRACKET	28480	07510-01220
MP14	07510-04102	6	1	TOP PDWER ASSY	28480	07510-04102
MP15	07510-20601	6	1	ARC PROT SHEET	28480	07510-20601
MP16	07510-22501	9	1	SHOCK RING	28480	07510-22501
MP17	07510-22701	1	1	FILTER-LCD	28480	07510-22701
MP18	07510-23708	0	1	SUPPRT-TOP RIGHT	28480	07510-23708
MP19	07510-23704	6	1	SUPPRT-TOP LEFT	28480	07510-23704
MP20	07510-23705	7	1	RAIL-BOTTOM-RIGHT	28480	07510-23705
MP21	07510-23706	8	1	RAIL-BOTTOM-LEFT	28480	07510-23706
MP22	07510-24701	5	1	CONNECTOR-MOUNT	28480	07510-24701
MP23	07510-27101	5	1	GASKET-CRY	28480	07510-27101
MP24	07510-40601	8	1	SHIELD-LIGHT	28480	07510-40601
MP25	07510-42201	8	1	BEZEL-FRONT	28480	07510-42201
MP26	07510-44105	5	1	HOUSING-CAM BDTTDM	26480	07510-44105
MP27	07510-44106	6	1	HOUSING-CAM TOP	28480	07510-44106
MP28	07510-46301	7	1	CAMERA STOP	28480	07510-46301

See introduction to this section for ordering information

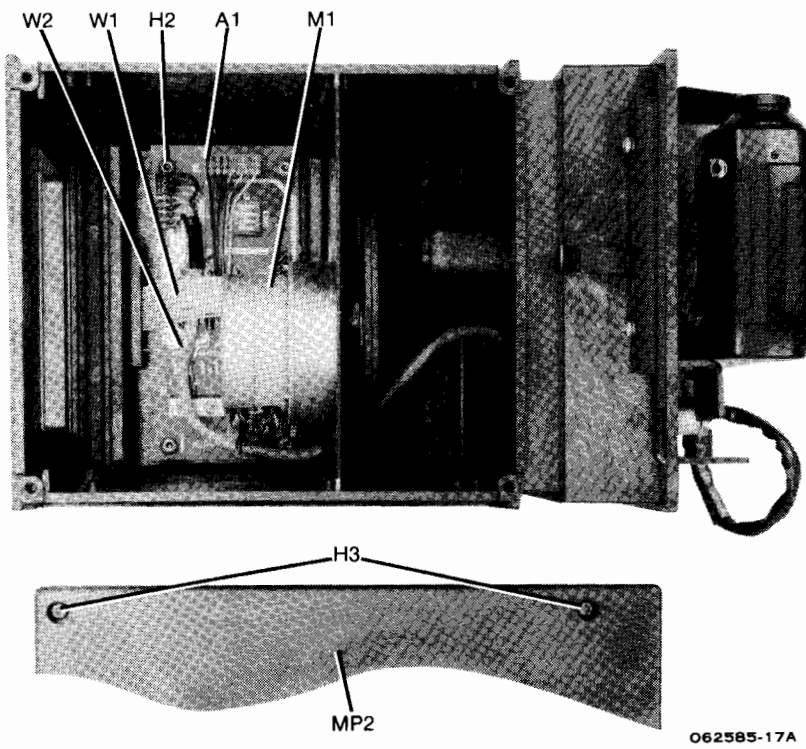


Figure 8-3. Camera Module Parts Identification

Table 8-3. Replaceable Parts (Cont'd)

Refr. Desig.	HP Part Number	C D	Qty	Description	Mfr Code	Mfr Part Number
MP29	07510-60601	0	1	CRT SHIELD ASSY	28480	07510-60601
MP30	07510-61201	8	1	GROUND STRAP ASSY	28480	07510-61201
MP31	1390-0366	9	4	GROMMET-LATCHING	28480	1390-0366
MP32	1390-0724	3	2	1/4-TURN-STUD	28480	1390-0724
MP33	5000-0408	9	2	BRACKET-CDIL	28480	5000-0408
MP34	2110-0565	9	1	FUSE CARRIER	28480	2110-0565
MP35	2110-0566	0	1	FUSE HOLDER BODY	28480	2110-0566
MP36	2110-0569	3	1	NUT-FUSE HOLDER	28480	2110-0569
MP37	0340-1074	2	8	INSULATOR TO-220	28480	0340-1074
MP38	6960-0068	2	1	PLUG HOLE .161	28480	6960-0068
MP39	07510-04102	8	1	COVER-TOP	28480	07510-04102
MP40	07510-05201	0	1	INNER FAN HOUSING	28480	07510-01222
MP41	07510-01222	7	1	AC SHIELD	28480	07510-01222
MP42	07510-05202	1	1	OUTER FAN HOUSING	28480	07510-05202
MP43	07510-01223	8	1	TRANSFORMER SHIELD	28480	07510-01223
MISC	0400-0287	5	1	RUBBER CHANNEL (1.667 in.)	28480	0400-0287
	0400-0009	9	2	GROMMET-HINGE	28480	0400-0009
	0363-0040	8	2	CONTACT-LEAF SPG	28480	0363-0040
	0380-1403	5	2	SPCR-RND 10MM	28480	0380-1403
	0380-1516	1	2	SPCR-RUN .095 IN.	00000	ORDER BY DESCRIPTION
	07510-41201	6	1	BRACKET-MIRROR	28480	07510-41201
	1000-0683	8	1	MIRROR	28480	1000-0683
	54100-21102	7	1	HT SNK SPCR	28480	54100-21102
17510A Parts List						
	1000-0692	9	1	CAMERA	28480	1000-0692
A1	07510-66515	7	1	BD ASSY-CAM 35/AF	28480	07510-66515
H1	0515-1266	5	2	CONNECTOR HARDWARE MSFH M2 X 10 T6	28480	0515-1266
H2	0624-0600	0	8	COVER SCR TAPPING 4-20	28480	0624-0600
H3	0515-0658	7	2	MSPH M2 6 SMS6	28480	0515-0658
H4	3030-0571	8	1	CS 1/4-20 X .375	28480	3030-0571
M1	3140-0795		1	STEP MOTOR	28480	3140-0795
MP1	PPNR-20733	6	1	KNOB-SLTDR	28480	PPNR-20733
MP2	07510-44102	2	1	CVR TOP-CAMERA BOX	28480	07510-44102
MP3	07510-62502	4	1	FILTERWHEEL-35	28480	07510-62502
W1	07510-61615	8	1	CABLE ASSY-CAM BD	28480	07510-61615
W2	17510-61601	9	1	CABLE ASSY-CAM	28480	17510-61601
17515A Polaroid Parts List						
	1000-0684	9	1	CAMERA	28480	1000-0684
A1	07510-66515	7	1	BD ASSY-CAM 35/AF	28480	07510-66515
H1	0515-1266	5	2	MSFH M2 X 10 T6	28480	0515-1266
H2	0624-0600	0	8	SCR TAPPING 4-20	28480	0624-0600
H3	0515-0658	7	2	MSPH M2 6 SMS6	28480	0515-0658
MP1	PPNR-20733	6	1	KNOB-SLTDR	28480	PPNR-20733
MP2	07510-44102	2	1	CVR TOP-CAMERA BOX	28480	07510-44102
MP3	07510-62503	5	1	FILTER WHEEL-AF	28480	07510-62503
MP4	17515-04101	3	1	BAFFLE	28480	17515-04101
W1	07510-61615	8	1	CABLE ASSY-CAM BD	28480	07510-61615
W2	17515-61602	9	1	CAMERA CABLE	28480	17515-61602

See introduction to this section for ordering information

TABLE OF CONTENTS

DIAGRAMS

9-1. Introduction	9-1
-------------------------	-----

ILLUSTRATIONS

Figure	Page
9-1. Simplified Block Diagram	9-3

9-1. INTRODUCTION

This Section provides a simplified block diagram of the HP Model 7510A Film Recorder.

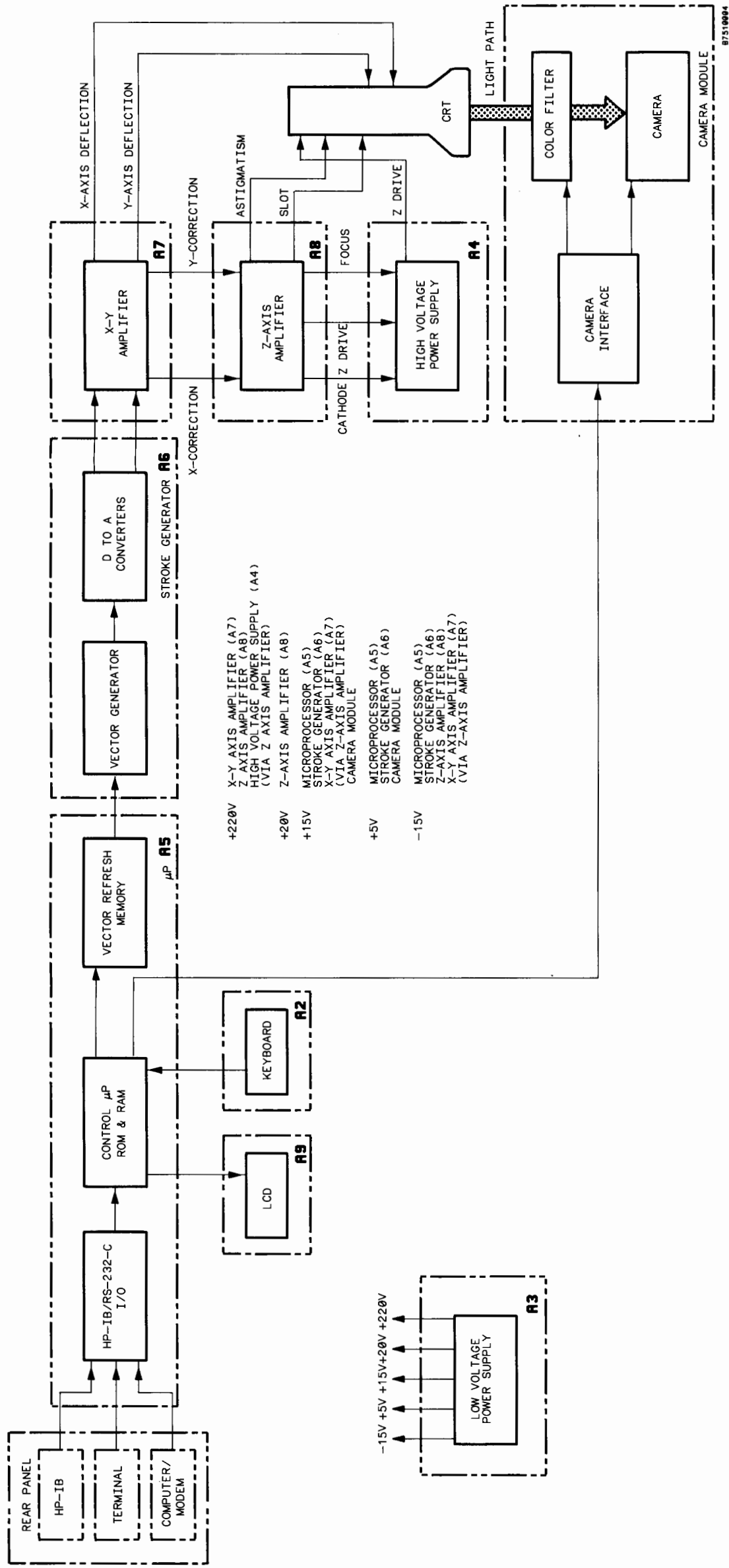


Figure 9-1. 7510A
Simplified Diagram
9-3

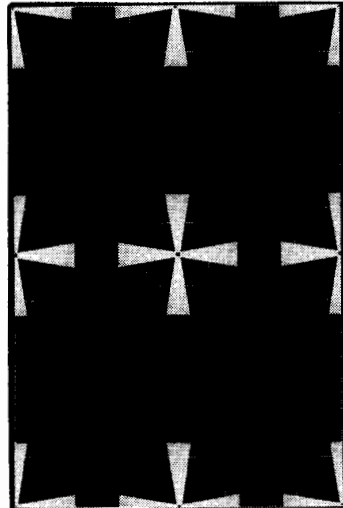
10-1. INTRODUCTION

Contained in this section is a picture of each of the Test Patterns used in the adjustment and troubleshooting procedures described in this manual and the 7510A Service Manual.

The test patterns are accessible only via the SERVICE screens. Access to this screen is disabled on power-up. The screen has several special functions which should only be used by HP service personnel.

To gain access to the test patterns perform the following steps:

- a. Turn on instrument to obtain STATUS menu. Press OFF LINE and "PREVIEW" keys.
- b. Key in code "7510" and select SERVICE menu.
- c. Call up desired Test Pattern Number and press ENTER.



85-047

TEST PATTERN NO. 1

USED FOR: DISPLAY RESOLUTION
VERIFICATION
HP 7510A SERVICE MANUAL
SECTION III, PARAGRAPH 3-16.

TEST PATTERN NO. 2

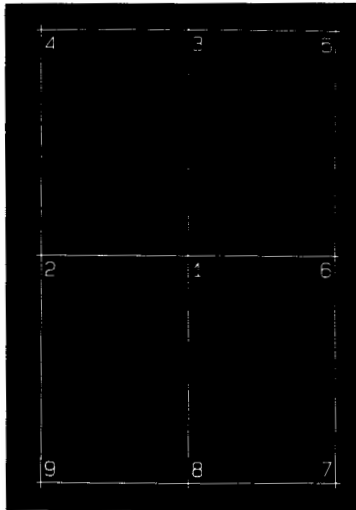
USED FOR: STROKE GENERATOR
ADJUSTMENTS
SECTION VI, PARAGRAPH 6-5.

Z-AXIS GAIN AND INTENSITY
ADJUSTMENTS
SECTION VI, PARAGRAPH 6-7.

FINAL POSITION AND GAIN
ADJUSTMENTS
HP 7510A SERVICE MANUAL
SECTION III, PARAGRAPH 3-15.



85-046



85-044

TEST PATTERN NO. 3

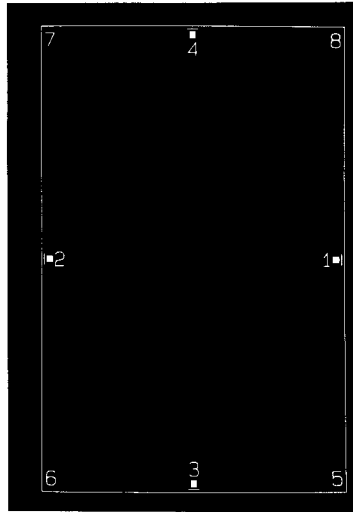
USED FOR: HIGH VOLTAGE AND X-Y
AMPLIFIER ADJUSTMENTS
SECTION VI, PARAGRAPH 6-6.

Z-AXIS GAIN AND INTENSITY
ADJUSTMENTS
SECTION VI, PARAGRAPH 6-7.

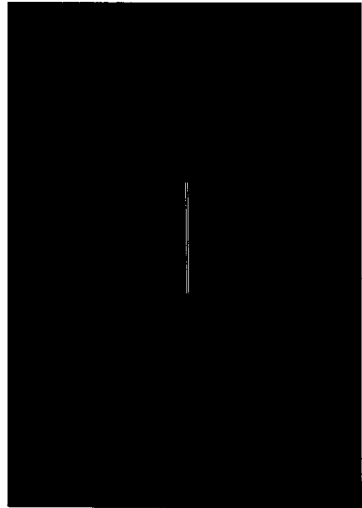
DEFLECTION RESPONSE
ADJUSTMENT
HP 7510A SERVICE MANUAL,
SECTION III, PARAGRAPH 3-13.

TEST PATTERN NO. 4

USED FOR: STROKE GENERATOR
ADJUSTMENTS
HP 7510A SERVICE MANUAL,
SECTION III, PARAGRAPH 3-14.



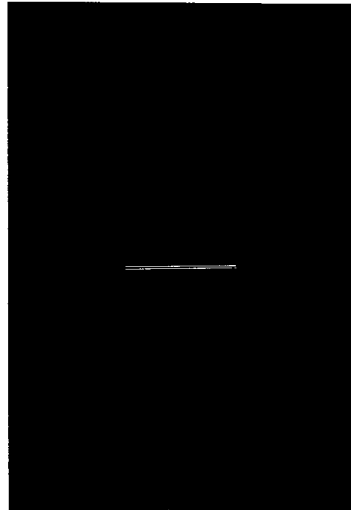
85-045



85-043

TEST PATTERN NO. 5

USED FOR: STROKE GENERATOR
ADJUSTMENTS
HP 7510A SERVICE MANUAL,
SECTION III, PARAGRAPH 3-14.



85-042

TEST PATTERN NO. 6

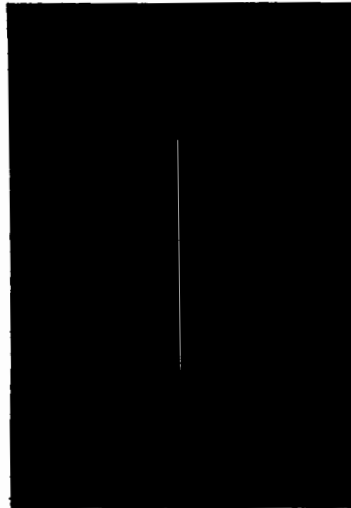
USED FOR: TROUBLESHOOTING Y-AXIS
AMPLIFIER
SECTION IV, PARAGRAPH 4-5.

STROKE GENERATOR
ADJUSTMENTS
7510A SERVICE MANUAL,
SECTION III, PARAGRAPH 3-14.

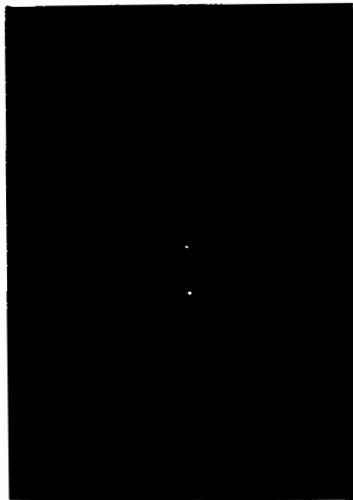
TEST PATTERN NO. 7

USED FOR: TROUBLESHOOTING X AND
Z-AXIS AMPLIFIERS
SECTION IV, PARAGRAPH 4-5.

WRITING SPEED ADJUSTMENT
(P/O STROKE GENERATOR AD1)
HP 7510A SERVICE MANUAL,
SECTION III, PARAGRAPH 3-14.



85-041



85-040

TEST PATTERN NO. 8

USED FOR: STROKE GENERATOR
ADJUSTMENTS
SECTION VI, PARAGRAPH 5-5.

Z-AXIS GAIN AND INTENSITY
ADJUSTMENTS
SECTION VI, PARAGRAPH 6-7.

Z-AXIS GAIN AND INTENSITY
ADJUSTMENTS
HP 7510A SERVICE MANUAL,
SECTION III, PARAGRAPH 3-7.

DEFLECTION RESPONSE
ADJUSTMENTS
HP 7510A SERVICE MANUAL,
SECTION III, PARAGRAPH 3-13.

TABLE OF CONTENTS

SERVICE NOTES/IOSM

11-1. Introduction	11-1
--------------------------	------

11-1. INTRODUCTION.

This section is reserved for the insertion of any Service Notes that may have been generated for the 7510A Film Recorder.

