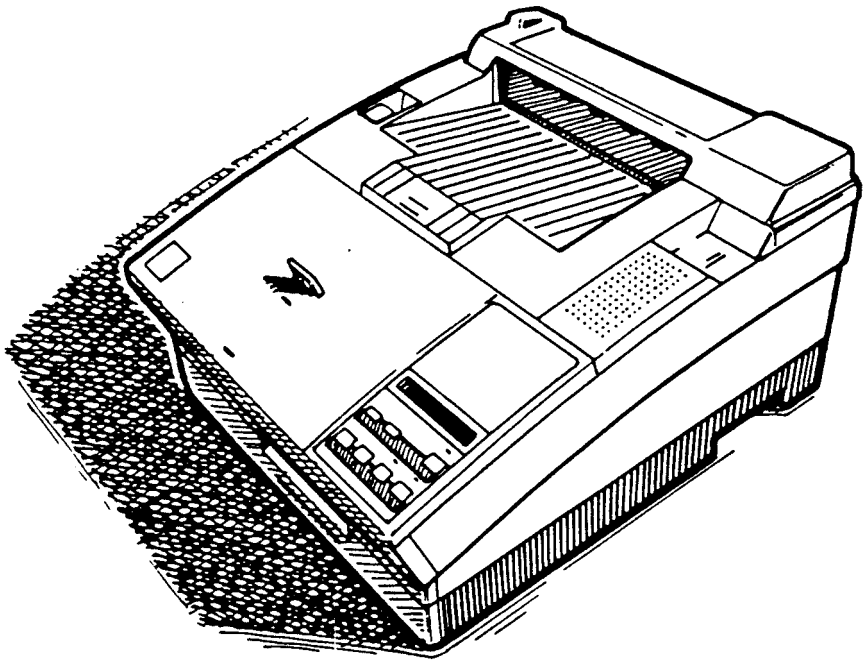
EPSON TERMINAL PRINTER

EPL-5600

ActionLaser 1600

SERVICE MANUAL



EPSON

4003020

NOTICE

The contents of this manual are subjects to change without notice.

All efforts have been made to ensure the accuracy of the contents of this manual. However, should any errors be detected, SEIKO EPSON would greatly appreciate being informed of them.

The above notwithstanding SEIKO EPSON can assume no responsibility for any errors in this manual or the consequence thereof.

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General Notice: Other product names used herein are for identication purposes only and maybe trademarks of their respective campanies.

PRECAUTIONS

Precautiomry notations throughout the text are categorized relative to 1) personal injury and 2) damage to equipment.

DANGER Signals a precaution which, if ignored, could result in serious or fatal personal injury. Great caution should be exercised in performing procedures preceded by DANGER Headings.

WARNING Signals a precaution which, if ignored, could result in damage to equipment.

The precautionary measures itemized below should always be observed when performing repair/ maintenance procedures.

DANGER

1. ALWAYS DISCONNECT THE PRODUCT FROM BOTH THE POWER SOURCE AND PERIPHERAL DEVICES PERFORMING ANY MAINTENANCE OR REPAIR PROCEDURE.

2. NO WORK SHOULD BE PERFORMED ON THE UNIT BY PERSONS UNFAMILIAR WITH BASIC SAFETY MEASURES AS DICTATED FOR ALL ELECTRONICS TECHNICIANS IN THEIR LINE OF WORK.

3. WHEN PERFORMING TESTING AS DICTATED WITHIN THIS MANUAL, DO NOT CONNECT THE UNIT TO A POWER SOURCE UNTIL———— TO DO SO. WHEN THE POWER SUPPLY CABLE MUST BE CONNECTED, USE EXTREME CAUTION IN WORKING ON POWER SUPPLY AND ELECTRONIC COMPONENTS.

WARNING

1. REPAIRS ON EPSON PRODUCT SHOULD BE PERFORMED ONLY BY AN EPSON CERTIFIED REPAIR TECHNICIAN.

2. MAKE CERTAIN THAT THE SOURCE VOLTAGE IS THE SAME AS THE RATED [illegible] AGE, LISTED ON THE SERIAL NUMBER/RATING PLATE. IF THE EPSON PRODUCT HAS A PRIMARY AC RATING DIFFEREM FROM AVAILABLE POWER SOURCE, DO NOT CONNECT IT TO THE POWER SOURCE.

3. ALWAYS VERIFY THAT THE EPSON PRODUCT HAS BEEN DISCONNECTED FROM THE POWER SOURCE BEFORE REMOVING OR REPLACING PRINTED CIRCUIT BOARDS AND/OR INDIVIDUAL CHIPS.

4. IN ORDER TO PROTECT SENSITIVE MICROPROCESSORS AND CIRCUITRY, USE STATIC DISCHARGE EQUIPMENT, SUCH AS ANTI-STATIC WRIST STRAPS, WHEN ACCESSING INTERNAL COMPONENTS.

5. REPLACE MALFUNCTIONING COMPONENTS ONLY WITH THOSE COMPONENTS BY THE MANUFACTURE; INTRODUCTION OF SECOND-SOURCE OR OTHER COMPONENTS MAY DAMAGE THE AND VOID ANY APPLICABLE: EPSON WARRANTY.

SAFETY INFORMATION

This printer is a page printer which operates by means of a laser. There is no possibility of danger from the laser, provided the printer is operated according to the instructions in this manual provided.

Since radiation emitted by the laser is completely confined within protective housings, the laser beam camot escape from the machine during any phase of user operation.

For United States Users;

[Laser Safety]

This printer is certified as a Class 1 Laser product under the U.S. Department of Health and Human Services (DHHS) Radiation Performance Standard according to the Radiation Control for Health and Safety Act of 1968. This means that the printer does not produce hazardous laser radiation.

[CDRH Regulations]

The Center for Devices and Radiological Health (CDRH) of the U.S. Food and Drug Administration implemented regulations for laser products on August 2,1976. Compliance is mandatory for products marketed in the United States. The label shown below indicates compliance with the CDRH regulations and must reattached to laser products marketed in the United States.

WARNING: Use of controls, adjustments or performance of procedures other than those specified in this manual may result in hazardous radiation exposure.

[Internal Laser Radiation]

Maximum Radiation Power: 5.7x 104(W)
Wave Length: 780 nm

This is a Class IIIb Laser Diode Assay that has an invisible laser beam. The print head unit is NOT A FIELD SERVICE ITEM. Therefore, the print head unit should not be opened under any circumstances.

For Other Countries Users;

WARNING: Use of controls, adjustments or performance of procedures other than those specified in this manual may result in hazardous radiation exposure.

This is a semiconductor laser. The maximum power of the laser diode is 5.7 × 10^{-4} W and the wavelength is 780 nm.

For Denmark Users;

ADVARSEL Usynlig laserstråling ved åbning, når sikkerhedsafbrydere er ude af funktion. Undgå udsættelse for stråling.

Klasse 1 laser produkt der opfylder IEC825 sikkerheds kravene.

This section describes the

Panel kuin

1

Orn annat i
kan som
for laser 1.

For Norway

ADVARSEL
Dersom annen enn Continue i
ins kan brukeren for som overskrider
for laser 1.

Dette er en laser. effeckt er 5.7 x W
er 7S0 nm.

Safety Labels

[Label on rear printer case]

A laser safety labels is attached on the outside of the printer shown below.

For United State

On Line

J: Communication with the hos

F: Communication with the hos

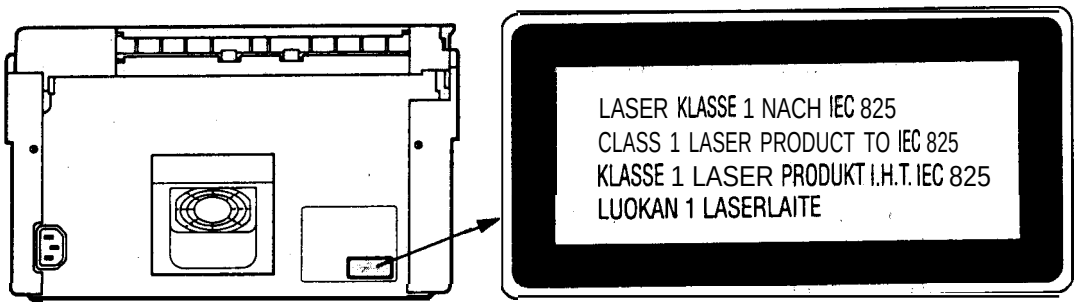
shing: This state occurs when the
versa.

Form Feed

is LED indicates the data processing condi

This laser product conferms to the applicable requirement of 21 CFR Chapter 1, subchapter J.
SEIKO EPSON CORP.
Office
80 Hirooka, Nagano-ken,
JAPAN
MANUFACTURED:

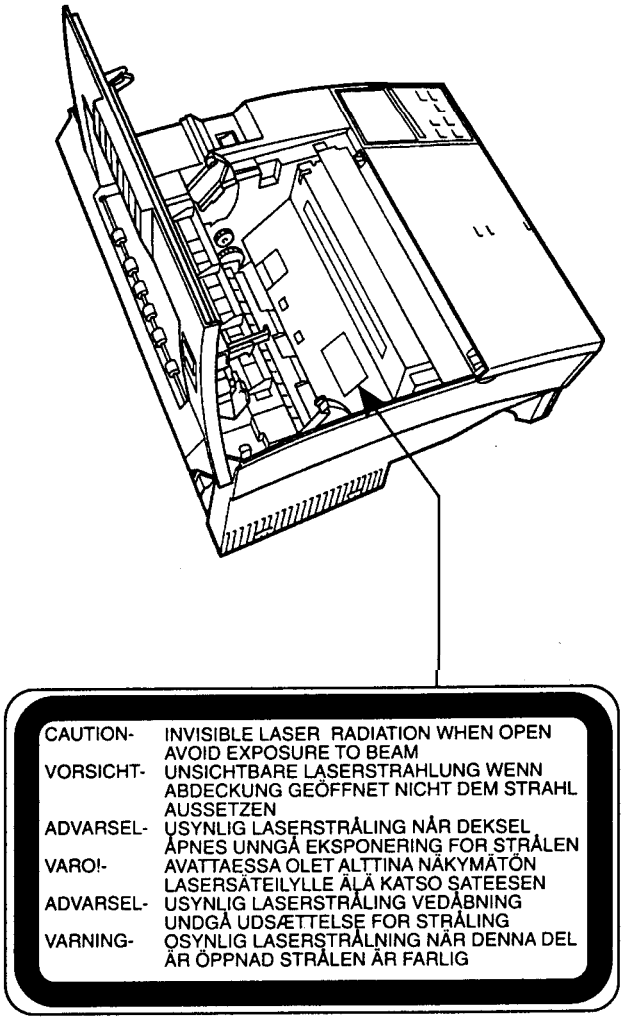
For Europe



[Label inside printer]

The following laser safety label will be attached inside the printer as shown below.

For Denmark, Finland, Sweden, and Norway



PREFACE

This manual describes functions, theory of electrical and mechanical operations, maintenance, and repair of EPL-5600 / ActionLaser 1600.
The instructions and procedures included herein are intended for the experience repair technician, and attention should be given to the precautions on the preceding page. The chapters are organized as follows:

CHAPTER 1. GENERAL DESCRIPTION

Provides a general product overview, lists specifications and illustrates the main components of the printer.

CHAPTER 2. OPERATING PRINCIPLES

Describes the theory of printer operation.

CHAPTER 3. DISASSEMBLY AND ASSEMBLY

Includes a step-by-step guide for product disassembly and assembly.

CHAPTER 4. ADJUSTMENTS

Includes a step-by-step guide for adjustment.

CHAPTER 5. TROUBLESHOOTING

Provides Epson-approved techniques for adjustment.

CHAPTER 6. MAINTENANCE

Describes preventive maintenance techniques and lists lubricants and adhesives required to service the equipment.

APPENDIX

Describes connector pin assignments circuit diagrams, circuit board component layout and exploded diagram.

The contents of this manual are subject to change without notice.

REVISION SHEET

Revision	Issue Date	Revision Page
Rev. A	February 2, 1994	1st issue

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Chapter 1 General Description

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1.1 FEATURES

The Epson* I/F board has the LocalTalk interface built, which all page us print that connect a semi-conductor laser with ers. The LocalTalk M technology. These or a Loc are small and ion. and feature high-speed, high-resolution printing. Maintenance is very easy as a result of various built-in diagnostic functions. The main features are:

No ozone

Printing speed — 6 ppm (pages per minute)

Resolution — 600/300 (dots per inch)

Light weight — about 10 kg (22 lb.)

Small footprint

Easy maintenance

HP® 4 emulation mode

45 built-in scalable fonts (35 and 10 TrueType fonts)

~/p 2'" emulation

High-performance controller (the controller's CPU is a 17.6 MHz

Bi Resolution Improvement Technology refines the print quality by eliminating jagged edges from images and characters on 600 and 300 printing.

Optional Level 2 (Postscript" compatible) module

EPSON Miao Gray Technology which is available when using Level 2 mode, refines gray scale printing to be comparable to printing on a printer

Small and low-cost optional LocalTalk™ interface module

2 MB standard RAM and up to 64 MB RAM the addition of optional

Bidirectional parallel interface

1.! High-speed serial communication rate of 57.6K bps

Th High-speed parallel communication rate of approximately 400 provides m

pri A multi-user, multi-emulation mode

pa (Intelligent Emulation Switch) allows switching between mode and another mode

SPL (Shared Printer Language) enables switching of the printer mode by command

Figure 1-1 shows an exterior view of the and 1600.

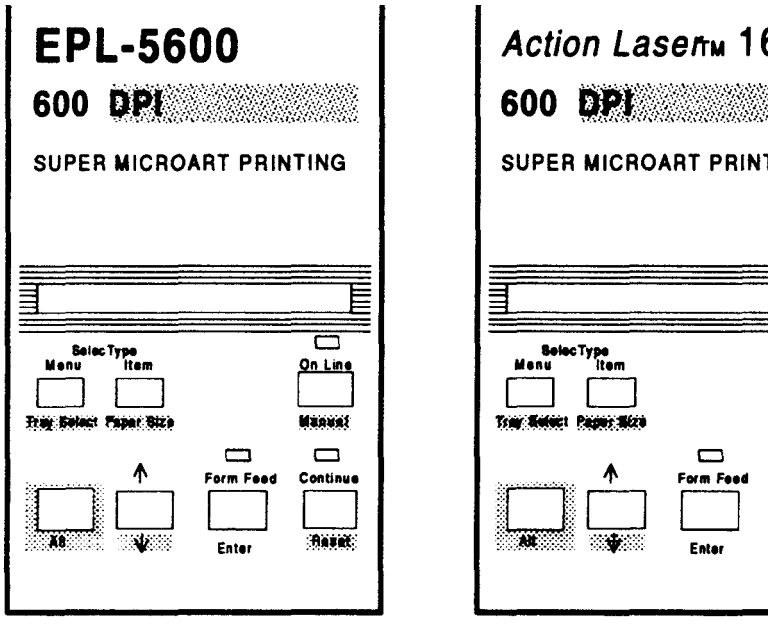


Figure 1-1. Exterior View of the EPL-5600 and 1-19. Contr 1600

Table l-l lists the optional units available for the EPL-5600 and ActionLaser 1600.

Table 1-1. Options for EPL-5600 and ActionLaser 1600

Cat. No.	Description	Note	Machine Type	
			EPL-5600	Action-Laser 1600
C83209*	EPSONScript Level 2 Module	Supports EPSONScript Level 2 mode (PostScript Level 2 compatible) fonts and commands	Yes	Yes
—	Local language ROM	Supports local language fonts	Yes	No
C812302	250 sheet lower paper cassette for EPL-5600 (A4)	Lower paper cassette	Yea	No
C812301	250 sheet lower paper cassette for AL-1 600 (Letter)	Lower paper cassette	No	Yes
C81 231*	Face-up tray	—	Yes	Yes
SO51O16	Imaging cartridge	Toner cartridge	Yes	Yes
C82326*	LocalTalk™ I/F Module	—	Yes	Yes
C82307*/ C82308*	32 KB serial interface card	—	Yes	Yes
C82310*/ C8231'	32 KB parallel interface card	—	Yes	Yes
C82312*	LocalTalk card	—	Yes	Yes
C82314*	COAX interface card	—	Yes	Yes
C82315%	TWINAX interface card	—	Yes	Yes
C82324*	Ethernet interface card for NetWare®	—	Yes	Yes

Note: LocalTalk card (C82312*) cannot use with LocalTalk I/F module (C82326*).

1.2 SPECIFICATIONS

This section provides statistical data for the EPL-5600 and ActionLaser 1600.

1.2.1 Basic Specifications

Printing method: Laser beam seaming and dry electro-photography

Resolution: 600/300 dpi

Printing speed: 6 ppm (letter/A4)

First printing time (A4/LT): Less than 19 seconds (facedown output)
Less than 20 seconds (face-up output)

Warm-up time: Less than 35 seconds
(at rated current and 23° C (73° F) temperature)

Paper supply: See Table 1-2.

Table 1-2. Paper Feed Methods

Paper Supply		Capacity (20 lb. (70 g/m^2) paper)	Paper Size	Usage Thickness (Ream Weight)
Standard built-in paper tray	Auto feed	150	A5, B5, A4, LT, GLT, EXE, LGL, GLG, F4, HL	16 to 24 lb. (60 to 90 g/m^2)
		5 to 10	Monarch, DL, C5, Commercial-10	Envelopes made of 20 to 24 b. (75 to 90 g/m^2) paper
	Manual feed	1	Any size feedable (Note 2)	16 to 42 lb. (60 to 157 g/m^2)
Lower paper cassette (optional)		250	A4 or LT	16 to 24 lb. (60 to 90 g/m^2)

Notes:

1. The weight in pounds (lb) is determined by how much 500 sheets cut to 17 x 22 inch would weigh; 1 g/m^2 = 0.2659763 lb.
2. Paper size range: width 3.63 to 8.5 inches (92 to 216 mm)
   length 5.85 to 14.0 inches (148.5 to 356 mm)

Paper types: See Table 1-3.

Table 1-3. Paper Types

Standard paper	Xerox" 4024 DP paper 20 lb. (75 g/m^2)
Normal paper	Regular photocopier paper Bond paper Recycled paper 16 to 24 lb. (60 to 90 g/m^2)
Special papers	Card stock (90 to 157 g/m^2) Envelopes Labels Letterhead Transparency (OHP) sheets Colored paper

Usability of special papers: See Table 1-4.

Table 1-4. Usability of Special Papers

Input	output	OHP	Envelopes	Labels	Card Stock	Letterhead
Standard built-in paper tray	Face down	P	P	P	P	R
	Face up	R	R	R	R	R
Lower paper cassette	Face down	N	N	N	N	P
	Face up	N	N	N	N	P

R: Reliable feeding and good image quality.
P: Possible, but better avoided.
N: Not supported.

Paper feed alignment and direction: Center alignment for all sizes

Paper ejection: Face down; face up (optional)

Output tray capacity: 100 sheets (face down)
20 sheets (face up) (standard paper)

Printable area (standard paper): See Figure 1-2.

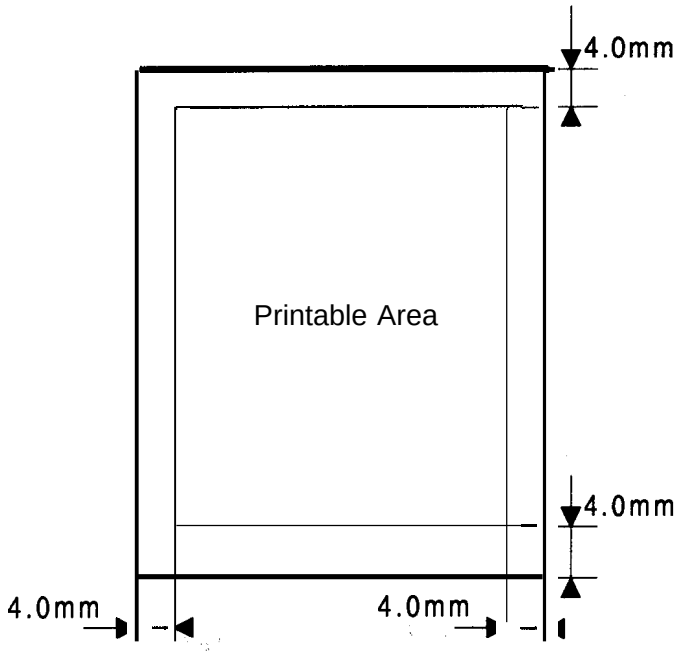


Figure 1-2. Printable Area

Note: The actual printable area depends on the printer mode.

Noise: Less than 35 dB(A) (standby)
Less than 47 dB(A) (operating)

Ozone density: Less than 0.01 ppm

Toxicity: No toxicity exists in organic photoconductor (OPC), toner, or plastic materials

1.2.2 Electrical Specifications

Table 1-5. Electrical Specifications

Description	100 V Version	200 V Version
Rated voltage	100-120 VAC	220-240 VAC
Input voltage range	90-132 VAC	198-264 VAC
Rated frequency range	50-60 Hz	
Input frequency range	47-63 Hz	
Power consumption	Less than 500 W	Less than 600 W
Power consumption while in standby mode	Less than 30 W (without optional interface card and font cartridge)	

1.2.3 Reliability Specifications

MPBF (Mean Prints Between Failures): Over 25,000 sheets

Note: MPBF indicates average number of pages printed before occurrence of problem requiring replacement or service.

MTBF (Mean Time Between Failures): 3000 Power on hours (POH)
Jam rate: 1 out of 2,000 sheets or less (excluding multiple-sheet feeding)
Feed failure: 1 out of 2,000 sheets or less (excluding multiple-sheet feeding)
Multiple paper feeds: 1 out of 500 sheets or less
Paper curl height: 30 mm (1.2 inches) or less
Leading edge bending (1 cm or more): 1 out of 1,000 sheets
MTTR (Mean Time To Repair): 30 minutes or less
Durability: 5 years or 180,0000 sheets

1.2.4 Environmental Conditions for Operating (Including Imaging Cartridge)

Temperature: 10 to 35° C (50 to 95° F)

Humidity: 15 to 85% RH

Altitude: 2,500 m (8,200 feet) or lower

Levelness: Printer should be installed on a level plane.

Illuminance: 3,000 lux or less (Must not be exposed to direct sunlight.)

Surrounding space: **Printer should have at least 100 mm of clearance on its sides and rear.**

1.2.5 Environmental Conditions for Storage and Transportation (Excluding Imaging Cartridge)

Temperature: O to 35° **C (32 to 95° F) over full storage term**
-20 to 55° C (-4 to 131° F) under extreme conditions
(Extremes are allowable for up to 1/30 of full storage term)
Temperature variation must be 10" C (18° F)/hour or less

Humidity: 30 to 85% RH over full storage term
10 to 95% RH under extreme conditions
(Extremes are allowable for up to 1/30 of full storage term)

Drop test: Clear to JIS Z0200-1987 Level 1

Vibration: Vibration frequency 5 to 100 Hz and 100 to 5 Hz
Acceleration 1 G
Acceleration direction 3 direction

Resistance to atmospheric pressure: More than 613 mb

Storage term: 24 months (following date of manufacture)

1.2.6 Applicable Standards

Safety Standards

120 VAC model:	UL 1950, CSA 22.2 N0.950 Deviation 3
220/240 VAC model:	EN 60950 (IEC950), NEMKO (IEC950), SETI (IEC950), SEMKO (IEC950), DEMKO (IEC950)

Safety Regulations (Laser radiation)

120 VAC model:	FDA (NCDRH) Class 1
220/240 VAC model:	VDE 0837 (Laser Class 1)(IEC825), SETI (IEC825), SEMKO (IEC825), DEMKO (IEC825)

EMI

120 VAC model:	FCC Part 15 Subpart B Class B
220/240 VAC model:	Vfg 243 (VDE 0878 Part 3,30) EN55022 class B (CISPR Pub.22 class B)

Others

Toner:	No effect on human health (OSHA-TSCA, EINECS)
OPC:	No effect on human health (OSHA)
Ozone:	Less than 0.01 mrnp other UL478 (5th edition)
Materials:	SWISS Environmental Law (No CdS must be contained)

1.2.7 Specification for Consumable (Imaging Cartridge)

Life: 6,000 pages

Note: In continuous printing mode with A4/letter paper at a 5% image ratio (black/white ratio). The life varies, depending on the printing mode (continuous or intermittent) and/or the image ratio.

Environmental Conditions for Storage and Transportation

Temperature:	O to 30° C (32 to 86° F) over full storage term –20 to 40° C (-4 to 104" F) under extreme conditions (Extremes are allowable for up to 1/30 of full storage term) Temperature variations must be 10° C (18° F)/hour or less.
Humidity:	30 to 85% RH over full storage term 10 to 95% RH under extreme conditions (Extremes are allowable for up to 1/30 of full storage term)
Drop test:	Height 76 cm (30.4 inches)
Vibration:	Same as printer
Resistance to atmospheric pressure:	More than 740 mb
Storage term:	18 months (following date of manufacture)

1.2.8 Physical Specifications

Dimensions (Width x Depth x Height):

Printer:	368 x 456 x 226 mm (14.5 x 18.0x 8.9 inches)
With lower cassette:	368 x 480 x 336 mm (14.5 x 18.9x 13.2 inches)
With face-up tray:	368 x 632 x 360 mm (14.5 x 24.9 x 14.2 inches)
With lower cassette and face-up tray:	368 x 657 x 430 mm (14.5 x 25.9 x 16.9 inches)

Weight:	Approx. 10 Kg (22 lb.) (consumable, excluding all options)
With lower cassette:	Approx. 12.8 Kg (28.3 lb.)
With face-up tray:	Approx. 10.1 Kg (22.3 lb.)
With lower cassette and face-up tray:	Approx. 12.9 Kg (28.6 lb.)

1.2.9 Software Specifications

Built-in modes: HP LaserJet 4 emulation (PCL® Se)
EPSON GL/2 mode (LJ4-GL/2 mode and GL-like mode)
FX (FX-870/1170, LX-1OO) emulation mode
ESC/P 2 (LQ-570/1070) mode

Note: The EPSON GL/2 mode is similar to the GL/2 mode included in the HP LaserJet 4 emulation. Table 1-6 shows the differences between EPSON GL/2 mode and the GL/2 mode in the HP LaserJet 4 emulation. While in EPSON GL/2 mode, the operator can enter GL/2 mode without sending the ESC %#B (Enter GL/2 mode) command. If the operator's application software cannot send the ESC %#B command, then use this mode.

Table 1-6. Differences between EPSON GL/2 and GL/2 in the HP LaserJet 4 Emulation

	EPSON GL/2 Mode	GL/2 for HP LaserJet 4 Emulation Mode
PCL mode	Does not exist	Exists as the initial made
Paper eject	Supports PG, AF commands	Supported in PCL
Auto eject	SelecType setting	Not available
Reduced printing	SelecType setting	Available in PCL
Switch to PCL (ESC %#A)	Not supported	supported
Reset (ESC E)	Ejects paper and then initializes	Ejects paper, switches to PCL, and then initializes
PJL. EJL. and ES	Supported	Supported
Advance Full Page (PG, AF)	supported	Not supported

Notes: EPSON GL/2 mode has two operational modes. One is LJ4-GL/2 mode; the other is the GL-like mode.

LJ4-GL2 mode emulates the GL/2 mode in the HP LaserJet 4 emulation. The user can print with software that supports the HP 7600 series plotter.

The GL-like mode features all the commands of the LJ4-GL/2 mode, plus a few additional commands. The GL-like mode emulates some of the HP-GL® plotter (HP 7475A, etc.) commands. If the application software uses unsupported commands for the GL-like mode, print cannot be assured.

Optional modes: EPSONScript Level 2 (PostScript Level 2 emulation) mode

Auxiliary software: Hex dump
Status sheet
Font sample

Built-in fonts: See Table 1-7

Table 1-7. Built-in Fonts

Resident Fonts			Applicable Mode		
			HP LJ4 GL/2	ESC/P 2	FX
Bitmap fonts					
Line Printer	16.66 cpi	(Portrait)	S	NS	NS
Prestige	12 cpi	(Portrait)	NS	S	S
Prestige	20 cpi	(Portrait)	NS	S	S

S: Supported, NS: Not Supported

Table 1-7. Built-in Fonts (Con't)

Resident Fonts		Applicable Mode		
		HP LJ4 GL/2	ESC/P 2	FX
Scalable fonts				
Dutch™ 801	Roman SWC	s	NS	NS
Dutch 801	Bold SWC	s	NS	NS
Dutch 801	Italic SWC	s	NS	NS
Dutch 801	Bold Italic SWC	s	NS	NS
Zapf Humanist 601	Demi SWC	s	NS	NS
Zapf Humanist 601	Bold SWC	s	NS	NS
Zapf Humanist 601	Demi Italic SWC	s	NS	NS
Zapf Humanist 601	Bold Italic SWC	s	NS	NS
Ribbon 131	SWC	s	NS	NS
Clarendon	Condensed SWC	s	NS	NS
Swiss™ 742	SWC	s	NS	NS
Swiss 742	Bold SWC	s	NS	NS
Swiss 742	Medium Italic SWC	s	NS	NS
Swiss 742	Bold Italic SWC	s	NS	NS
Swiss 742	Condensed SWC	s	NS	NS
Swiss 742	Bold Condensed SWC	s	NS	NS
Swiss 742	Condensed Italic SWC	s	NS	NS
Swiss 742	Bold Italic Condensed SWC	s	NS	NS
Incised 901	SWC	s	NS	NS
Incised 901	Black SWC	s	NS	NS
Incised 901	Italic SWC	s	NS	NS
Original Garamond	SWC	s	NS	NS
Original Garamond	Bold SWC	s	NS	NS
Original Garamond	Italic SWC	s	NS	NS
Original Garamond	Bold Italic SWC	s	NS	NS
Audrey Two	SWC	s	NS	NS
Flareserif 821	SWC	s	NS	NS
Flareserif 821	Extra Bold	s	NS	NS
Swiss 721	Roman SWM	s	s	NS
Swiss 721	Bold SWM	s "	s	NS
Swiss 721	Oblique SWM	s	N S	NS
Swiss 721	Bold Oblique SWM	s	NS	NS
Dutch 801	Roman SWM	s	s	N S
Dutch 801	Bold SWM	s	s	NS
Dutch 801	Italic SWM	s	NS	NS
Dutch 801	Bold Italic SWM	s	NS	NS
Symbol Set	SWA	s	NS	NS
More WingBats	SWM	s	NS	NS
Courier	SWC	s	s	s
Courier	Bold SWC	s	s	s
Courier	Italic SWC	s	NS	NS
Courier	Bold Italic SWC	s	NS	NS
Letter Gothic	Roman SWC	s	s	s
Letter Gothic	Bold SWC	s	s	s
Letter Gothic	Italic SWC	s	s	s

S: Supported, NS: Not Supported

Font Symbol Sets

HP LaserJet 4 Mode (bitmap fonts): 15 symbol sets

Roman-8	
Roman Extension	Italian
ECM94-1	Swedis2
ANSI ASCII	
French2	German
Legal	Spanish
	IBM-DN
PcMultilingual	

HP LaserJet4 Mode (scalable fonts): 34 symbol sets

Ronam-8	
Italian	ECM941
Swedis2	ANSI ASCII
UK	French2
German	Legal
8859-2 1S0	Spanish
PsMath	8859-9 IS0
WiTurkish	MsPublishing
VeMath	DeskTop
Math-8	
PcTk437	Windows
PsText	IBM-US
IBM-DN	McText
PcMultilingual	VeInternational
VeUS	PiFont
PcE.Europe	symbol
WiAnsi	Wingdings

ESC./P 2 Mode: 15 **International characters and 9** code tables

USA	SPAIN1
FRANCE	JAPAN
GERMANY	NORWAY
UK	DENMARK2
DENMARK1	SPAIN2
SWEDEN 1	L.AMERICA
ITALY	
LEGAL	

PcUSA(437)	PcMulIilingual(850)
PcPortuguese(860)	TPcCanFrench(863)
PcNordic(865)	PcTurk2(857)
PcE.Europe(852)	BpBRASCII
BpAbicomp	

FX Mode: 13 International characters and 9 code tables

USA	SPAIN1
FRANCE	JAPAN
GERMANY	NORWAY
UK	DENMARK2
DENMARK1	SPAIN2
SWEDENT	L.AMERICA
ITALY	

PcUSA(437)	PcMultilingual(850)
PcPortuguese(860)	P&mFrench(863)
PcNordic(865)	PcTurk2(857)
PcE.Europe(852)	BpBRASCII
BpAbicomp	

1.3 INTERFACE SPECIFICATIONS

The EPL-5600 and ActionLaser 1600 are equipped with the following external interfaces:

- Parallel interface
- RS-232C/RS-422 interface
- Optional LocalTalk interface
- Optional Type B interface

1.3.1 Parallel Interface

The parallel interface has two modes as follows:

- Compatibility mode (same as parallel interface of EPSON's current page printer)
- Reverse mode

1.3.1.1 Compatibility Mode of Parallel Interface

System:	$\overline{\text{STROBE}}$ synchronization, 8-bit parallel data transfer
Handshaking:	BUSY and $\overline{\text{ACKNLG}}$ signals
Connector type:	P90-25027-1 (Amphenol) receptacle
Applicable plug:	57-30360 (Amphenol or equivalent)
Transfer speed:	Approximately 400,000 bytes/second (max.)
Signal timing:	See Figure 1-3.
Signal description:	See Table 1-8.

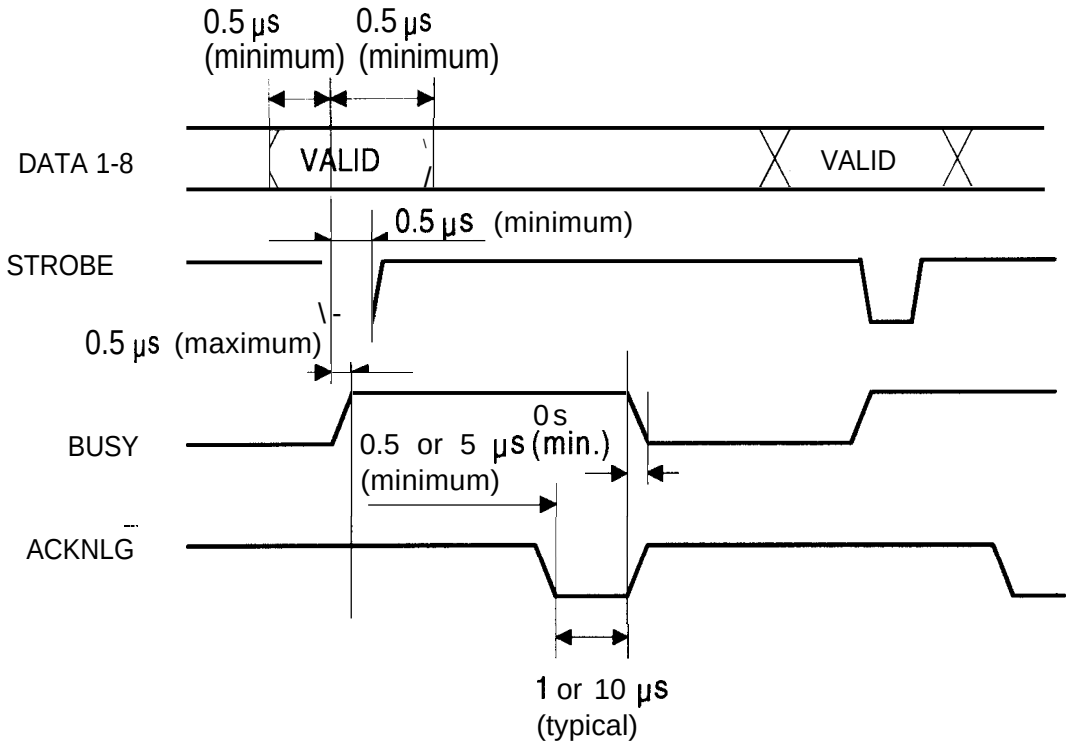


Figure 1-3. Compatibility Mode Signal Timing

Table 1-8. Parallel Interface Pin Assignment

Pin No.	Signal Name	I/O	Description
1	$\overline{\text{STROBE}}$	IN	$\overline{\text{STROBE}}$ is a strobe pulse used to read data from the host computer. The pulse width must be more than 0.5 µsec. Normally it is HIGH, and data is latched at the trailing edge of this signal.
2-9	DATA 1-8	IN	DATA 1 to 8 are parallel data bits. When the signal is HIGH, the data bit is 1, and when it is LOW, the data bit is O. The most significant bit (MSB) is DATA8. The signal state must be maintained for 0.5 µsec. on either side of the STROBE signal active edge.
10	$\overline{\text{ACKNLG}}$	OUT	$\overline{\text{ACKNLG}}$ is an acknowledge pulse with an approximate width of 1 or 10 wee. This signal goes LOW when the data reception is completed, which indicates that the printer can accept new data. Timing with the BUSY signal is specified through SelecType.
11	BUSY	OUT	The BUSY signal informs the host computer of the printer state. When the signal is HIGH, the printer cannot accept data.
12	PE	OUT	The PE signal indicates paper empty for the standard tray selected through SelecType or command, or for the optional paper cassette. Paper empty is indicated by HIGH.
13	SLCT	OUT	Use at reverse mode.
14	$\overline{\text{AUTO-FEED}}$	IN	Not used.
15	NC	·	Not used.
16	GND		Logic ground level.
17	CHASSIS GND	-	Connected to the printer chassis. The printer chassis GND and the signal GND are connected to each other.
18	NC	·	Not connected.
19-30	GND		Ground level for the twisted pair return signal.
31	INIT	IN	The $\overline{\text{STROBE}}$ signal is ignored when this signal is LOW.
32	$\overline{\text{ERROR}}$	OUT	This level goes LOW when the printer is: • out of paper . paper jam . in error state . off line
33	GND	·	Same as for pins 19 to 30.
34	NC	·	Not used.
35	+5		Pulled up to +5V through 1.0 Kohm resistance.
36	$\overline{\text{SLCT IN}}$	·	Use the reverse mode.

1.3.1.2 Reverse Mode

The reverse mode for EPL-5600/ActionLaser 1600 supports the nibble mode of IEEE-P1284. This printer can run in reverse mode, in which the printer can inform the computer of its status by EJL and PJL commands.

System: Nibble mode of IEEE-P1284

Connector type: P90-25027-1 (Amphenol) receptacle

Applicable plug: 57-30360 (Amphenol or equivalent)

Signal description: See Table 1-9.

Table 1-9. Parallel Interface Pin Assignment

Pin No.	Signal Name	I/O	Description
1	$\overline{\text{STROBE}}$	IN	HostClk: This signal is a strobe pulse used to read extension request values from the host computer during negotiation.
2-9	DATA 1-8	IN	The signals are data bits of extension request values during negotiation. This printer supports following values: 0000 0100: Request Device ID (by nibble mode sending) 0000 0000: Request nibble mode
10	$\overline{\text{ACKNLG}}$	OUT	PtrClk: Printer data sending clock.
11	BUSY	OUT	PtrBusy: Printer sending data bits 3 and 7 during data transfer to host computer.
12	PE	OUT	AckDataReq: Printer sending data bits 2 and 6 during data transfer to host computer.
13	SLCT	OUT	Xflag: Printer sending data bits 1 and 5 during data transfer to host computer.
14	$\overline{\text{AUTO-FEED}}$	IN	HostBusy: This signal informs the printer of the host computer state. When the signal is HIGH, the host computer cannot accept data.
15	NC	-	Not used.
16	GND	·	Logic ground level.
17	CHASSIS GND	-	Connected to the printer chassis. The printer chassis GND and the signal GND are connected to each other.
18	NC		Not connected.
19-30	GND		Ground level for the twisted pair return signal.
31	INIT	IN	nInit: High level fixed
32	$\overline{\text{ERROR}}$	OUT	nDataAvail: Printer sending data bits O and 4 during data transfer to host computer.
33	GND		Same as for pins19 to 30.
.34	NC	·	Not used.
35	+5		Pulled up to +5V through 1.0 Kohm resistance.
36	$\overline{\text{SLCT IN}}$	IN	1284Active: If this signal is set to HIGH, this printer active P1 284 (reverse mode).

Figure 1-4 shows the parallel interface state switch diagram.

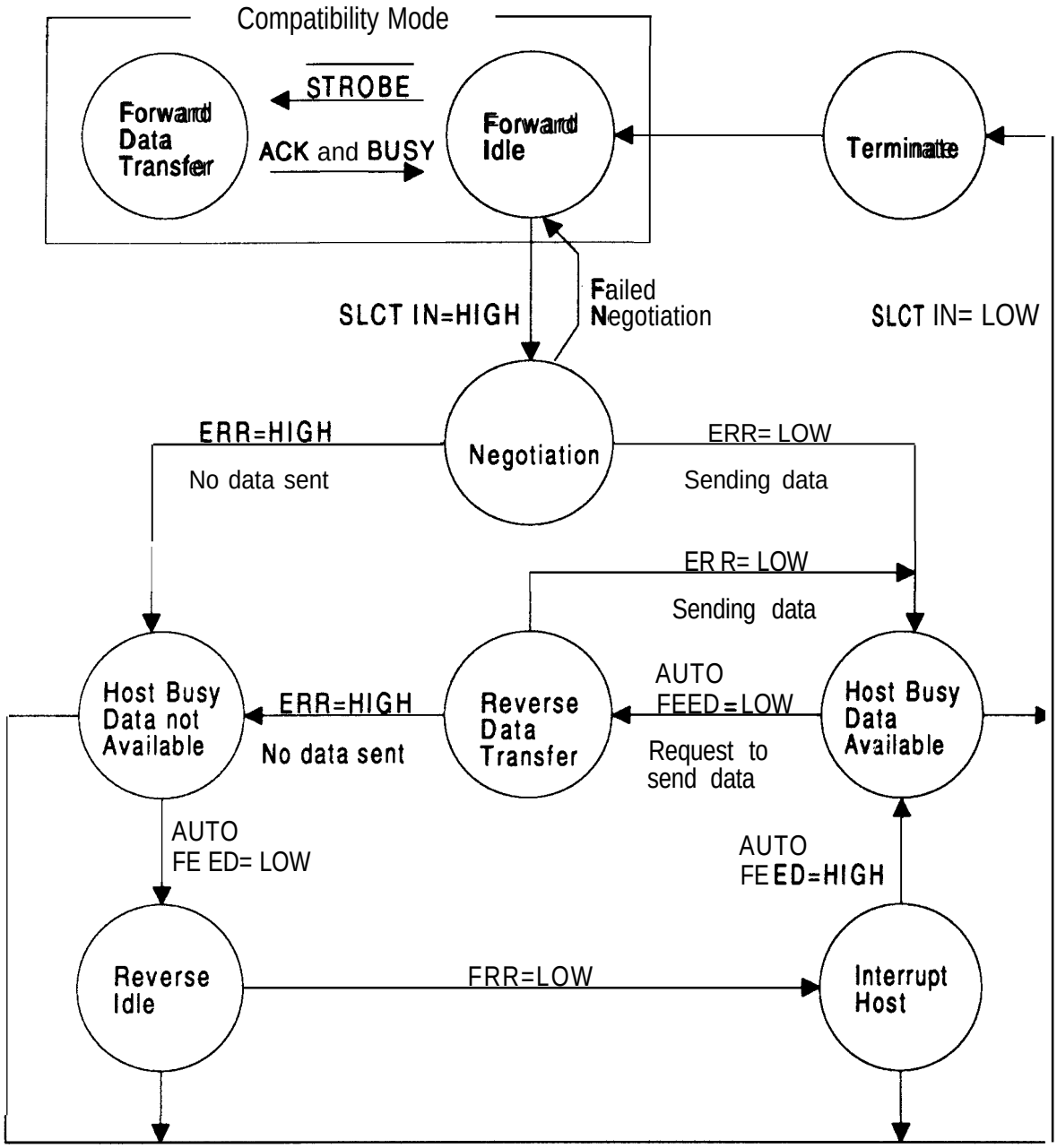


Figure 1-4. Parallel Interface State Switch Diagram

Figure 1-5 shows the timing chart of negotiation.

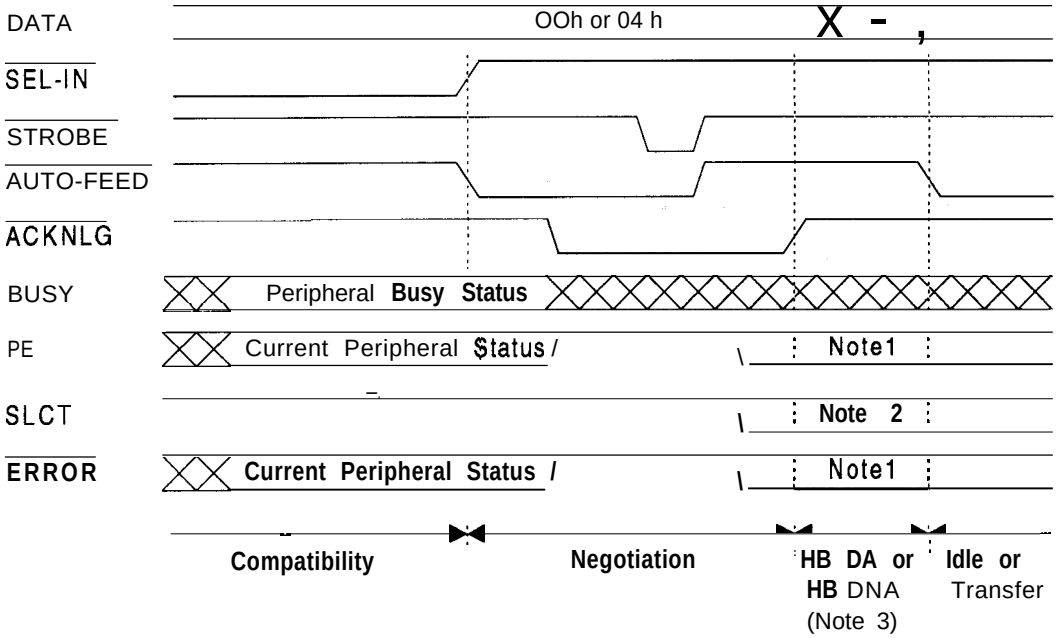


Figure 1-5. Timing Chart of Negotiation

Note 1: The signal is set to HIGH when not sending data.
The signal is set to LOW when sending data.

Note 2: The signal is set to HIGH, if extension request value was 04h.

Note 3: HB DA: Host Busy Data Available
HB DNA: Host Busy Data Not Available

Figure 1-6 shows the timing chart of data transfer.

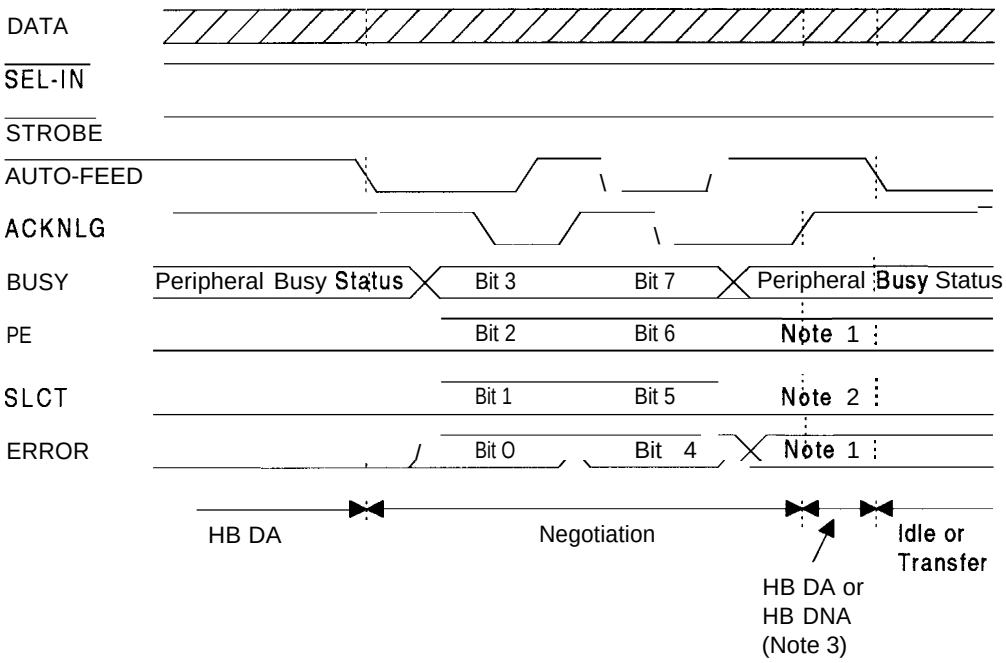


Figure 1-6. Timing Chart of Data Transfer

Note 1: The signal is set to HIGH when not sending data.
The signal is set to LOW when sending data.

Note 2: The signal is set to HIGH, if extension request value was 04h.

Note 3: HB DA: Host Busy Data Available
HB DNA: Host Busy Data Not Available

Figure 1-7 shows the timing chart of termination.

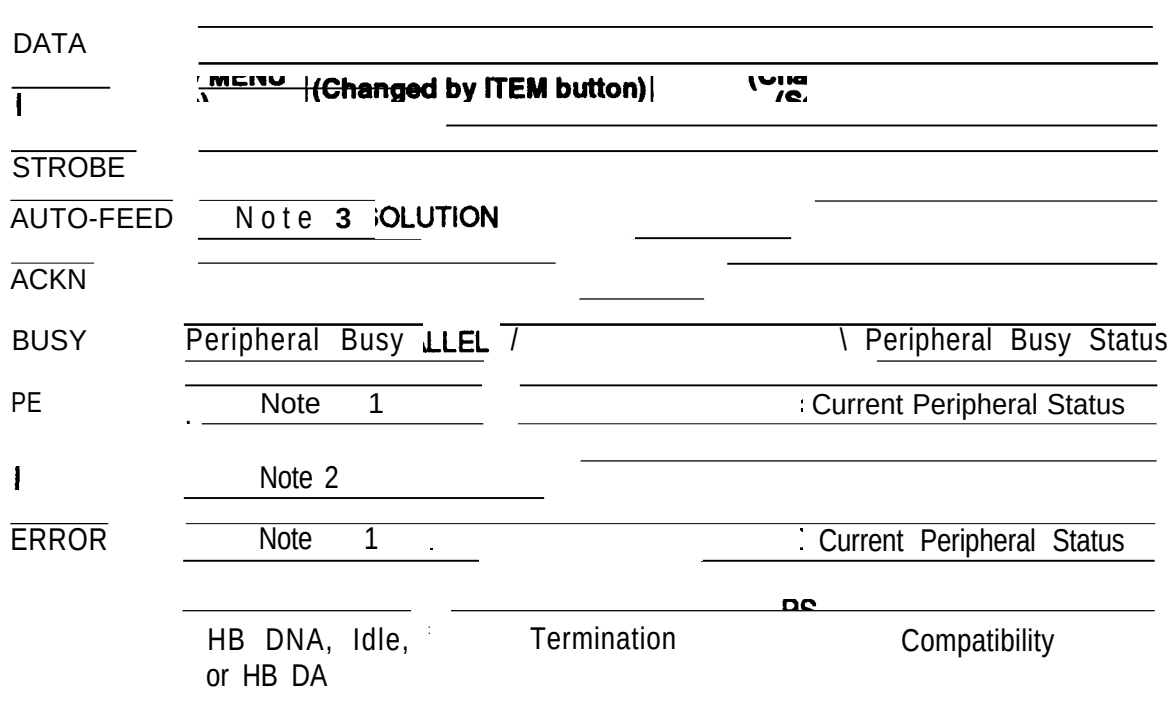


Figure 1-7. Chart of Termination

Note 1: The signal is HIGH when HB DNA.
The signal is LOW when HB DA.

Note 2: The signal is set to HIGH, if extension request value was

Note 3: Idle = LOW

Figure 1-8 shows the timing chart of interrupt.

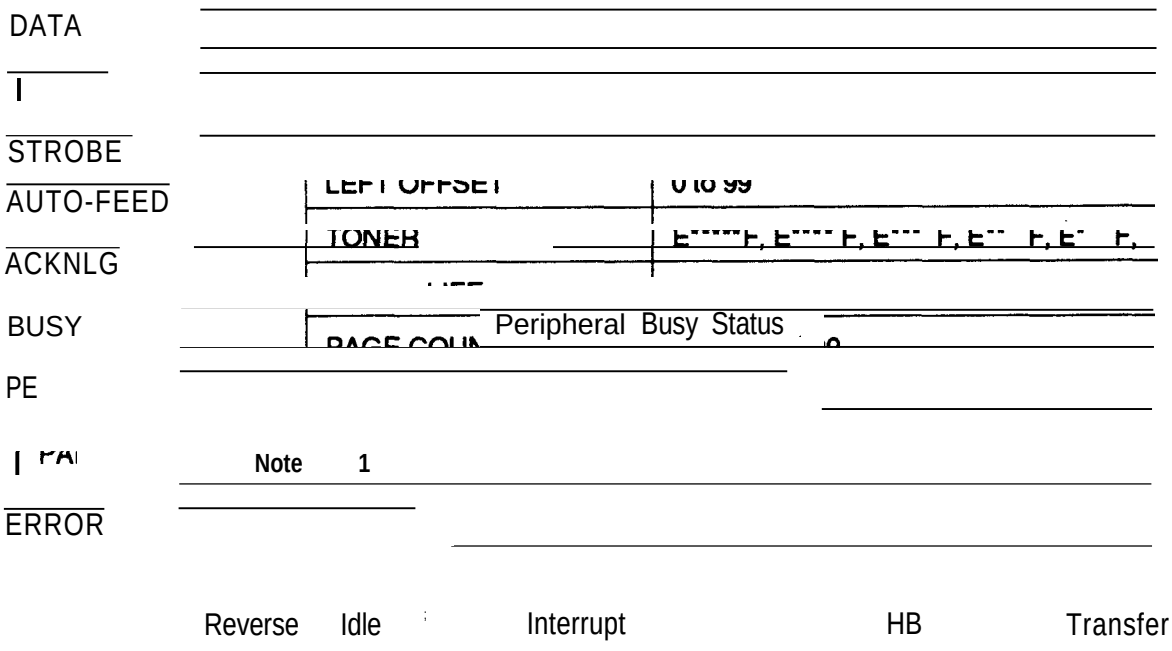


Figure 1-8. Timing Chart of Interrupt

Note 1: The signal is set to HIGH, if extension request value was

1.3.2 Serial Interface

Type: RS-232C/RS-422

Transfer system: Full duplex

Synchronization: Asynchronous start-stop system
- Start-bit: 1 bit
- Stop-bit: 1 or 2 bits
- Data length: 7 bits or 8 bits
- Parity: Odd, even, or none

Protocol: X-ON/X-OFF (can be combined with DTR control)
DTR control (can be combined with X-ON/X-OFF)

Transfer speed: 300,600,1200,2400,4800, 9600,19200, 38400, or 57600 bps

Error:
- Overrun error: Precessed as missing data and replaced by "*"
- Parity error: Replaced by "*"
- Framing error: Replaced by "*"
- Breaking character: Ignored

Signal description: See Table 1-10.

Table 1-10. Serial Interface Pin Assignments

Pin No.	Signal Name	I/O	Description
1	CHASSIS-GND	-	Connected to the printer chassis. The printer chassis GND and the signal GND are connected to each other.
2	TXD	OUT	Serial ASCII data output by the printer. It maintains "MARK" state (LOW level) between transmitted character codes. Logic O is at HIGH level ("SPACE") and logic 1 is at LOW level ("MARK').
3	RXD (RXD+)	IN	Serial ASCII data input to the printer. It maintains "MARK" state (LOW level) between received character codes.
4	RTS	OUT	Transmission request signal output from the printer. It is always at HIGH level during power ON.
5	CTS	IN	Always ignored.
6	DSR	IN	Signal input to the printer. The printer can transmit data through TXD while DSR is at HIGH level. X-ON/X-OFF, however, can be transmitted regardless of DSR state. It can always be ignored by setting SelecType (factory setting).
7	SIGNAL-GND	-	Ground.
8	DCD	IN	Always ignored.
9	(SD+)	OUT	See note 4.
10	(SD-)	OUT	See note 4.
I 1 to 17	NC		No connect.
18	(RD-)	IN	See note 4.
19	NC		No connect.
20	DTR	OUT	Signal output by printer. When the DTR signals HIGH, the RXD signal can be received by the printer. The SelecType settings do not specify DTR control, the signal level is HIGH while the printer power is on. When SelecType setting is used for DTR control, DTR goes LOW in case of any error conditions. The data (RXD) from host computer must be stopped within 128 characters after DTR goes LOW.
21-25	NC		No connect.

Note 1: ( ) indicates an RS-422 signal, which is SelecType.

Note 2: "CT'S', "DSR", and "DTR" states can be selected through SelecType.

Note 3: Although the signals RTS, Cl%, DSR, DTR, and DCDare RS-232C level, they can be used for RS-422 mode if selected through SelecType.

Note 4: SD+, SD-:
Serial ASCII data output from the printer.
HIGH level; when SD+ voltage is higher than SD-voltage.
LOW level; when SD+ voltage is less than SD- voltage.
Logic O is "SPACE" and logic 1 is "MARK" state must be maintained between transmitted character codes.

RD+, RD-:
Serial ASCII data input from the computer.
HIGH level; when RD+ voltage is higher than RD- voltage.
LOW level; when RD+ voltage is less than RD- voltage.
Logic O is "SPACE" and logic 1 is "MARK" state must be maintained between transmitted character codes.

Handshaking

When the vacant area for data in the input buffer drops to 256 bytes, the printer outputs an X-OFF code or sets the DTR signal level to LOW, indicating that the printer cannot receive more data. Once the vacant area for data in the buffer recovers to 512 bytes, the printer outputs an X-ON code or sets the DTR flag to HIGH, indicating that the printer is again ready to receive data.

Protocol

There are two types of protocols, as listed below, and each of them can be designated by SelecType independently.

■ DTR/DSR protocol

SelecType is used to execute the DTR/DSR control protocol. The DTR signal is set to HIGH when the printer is ready to receive data, and to LOW when conditions indicate an error or that the receiving buffer is full.

When the error is cleared and the printer returns to on-line mode, the signal returns to HIGH. When SelecType is used to set the DTR control OFF, DTR is always set HIGH. The printer transmits TXD only when DSR is at the HIGH level (DSR is always considered HIGH when the SelecType setting for DSR is OFF). X-ON/X-OFF transmission is independent of the DSR state.

■ X-ON/X-OFF (DC1/DC3) protocol

SelecType is used to execute the X-ON/X-OFF protocol. The X-OFF (DC3) code is output if status indicates an error, and the printer warns the host to stop data transmission within 128 characters. No further X-OFF codes are sent in response to additional data received from the host after the X-OFF code has been sent once. The X-ON (DC1) code is output after all conditions given in the error are cleared.

When the remaining capacity of the receive buffer reaches 256 characters, X-OFF (DC3) is output once. It is sent only once, even if there are multiple errors. The printer goes on line automatically at power on, and outputs an X-ON code. Transmission of X-ON/X-OFF codes can be defined by SelecType.

1.3.3 Optional LocalTalk Interface

This printer can use the optional LocalTalk interface module.

Type: LocalTalk

Signal level: Same as 179422 signal level

Protocol: X-ON/X-OFF (cannot be combined with DTR control)
DTR control (cannot be combined with X-ON/X-OFF)

Transfer speed: 230.4 K bps

Signal description: See Table 1-11.

Table 1-11. LocalTalk Interface Pin Assignments

Pin No.	Signal Name	I/O	Description
1	DTR	OUT	Signal output by the printer. When the DTR signals HIGH, the RXD signal can be received by the printer.
2	CTS	IN	The printer transmits the data through TXD while CTS is HIGH.
3	TXD-	OUT	Serial ASCII data output from the printer. HIGH level; when SD+ voltage is higher than SD- voltage. LOW level; when SD+ voltage is less than SD- voltage. Logic O is "SPACE" and logic 1 is "MARK" state must be maintained between transmitted character codes.
4	GND		Ground.
5	RXD-	IN	Serial ASCII data input from computer. HIGH level; when RD+ voltage is higher than RD- voltage. LOW level; when RD+ voltage is less than RD- voltage. Logic O is "SPACE" and logic 1 is "MARK" state must be maintained between transmitted character codes.
6	TXD+	OUT	Refer to TXD-.
7	NC		No connect.
8	RXD+	IN	Refer to RXD-.

1.4 OPERATING INSTRUCTIONS

This section describes the functions performed through the control panel, such as test print, hexadecimal dump, and SelecType functions.

1.4.1 Control Panel

The printer control panel gives you easy control over most common printer operations. The panel consists of a liquid crystal display (LCD), indicator lights, and buttons.

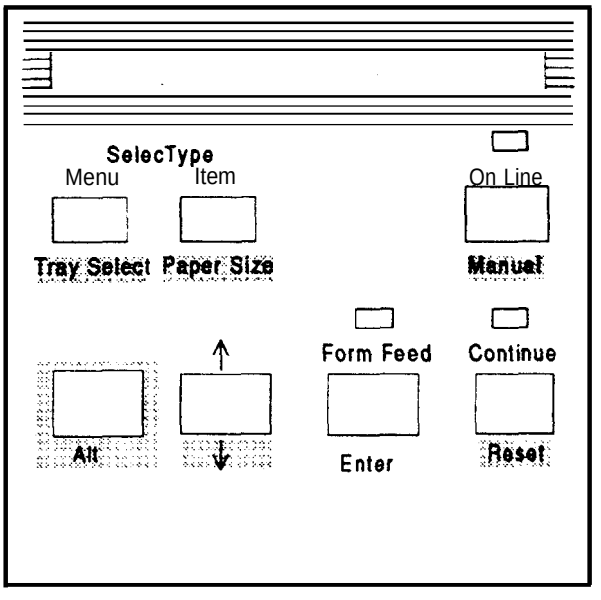


Figure 1-9. Control Panel

Display (LCD)

A 20-character (5 x 7 dot matrix) by l-row liquid crystal display (LCD) unit that indicates printer status. A variety of printer parameters can be displayed and set using SelecType mode.

Indicator lights

■ ***On*** Line

ON: Communication with the host is possible.

OFF: Communication with the host is not currently possible.

Flashing: This state occurs when the system cannot shift from off line to on line, or vice versa.

■ Form Feed

This LED indicates the data processing condition for each interface channel: S, P, and O.

ON: Received data is stored in the printer but has not been printed.

OFF: There is no printable data remaining in the printer.

Flashing: The printer is processing data.

■ Continue

Flashes when an error is detected or a maintenance procedure is needed. An error message appears on the display at the same time.

Buttons

■ ON LINE	Switches the printer between on-line and off-line mode. While in SelecType mode, this button exits SelecType mode.
■ Manual (ON LINE + ALT)	Enters directly (short cut) to manual feed; this setting is the same as the manual setting in the PRINTING MENU of SelecType.
■ ITEM	Enters SelecType mode. Changes the item in SelecType mode.
■ Paper Size (ITEM+ ALT)	Enters directly (short cut) to the paper size setting of the standard and optional paper tray in PRINTING MENU of SelecType.
■ MENU	Enters SelecType mode. Changes the menu in SelecType mode.
■ Tray Select (MENU+ ALT)	Enters directly (short cut) to the paper tray select setting in CONFIG MENU of SelecType.
■ ALT	Modifies the function of other buttons.
■ 'r	Changes to the next available option of SelecType.
■ ↓ (↑ + ALT)	Changes to the previous available option of SelecType.
■ ENTER	Sets available option of SelecType.
■ FORM FEED	When the printer is offline and the Form Feed light is lit, pressing this button prints out data in the printer's memory.
■ CONTINUE	Pressing this button when the Continue light is flashing clears an error.
■ RESET (CONTINUE + ALT)	Enter to reset operation; LCD displays "RESET", printing stops, and the input buffer of current interface is cleared. If the RESET button is depressed continuously after "RESET" is displayed, the message displayed on the LCD changes to "RESET ALL" (about 5 seconds), and the printer enters to WARM BOOT operation; printer clears all RAM.

1.4.2 Auto Sens Functions

The possible tc function on the printer control , seri allows the user to control most of the printer's functions, the c as printing test pages, selecting a paper size, and changing the printer's configuration. Enter mode by pressing the MENU or ITEM button. Table 1-12 shows the options.

nt 1-12. Functions

Menu User Parallel	iL2 mode button)	Available Optima by button) ENTER button)
PRINTING	COPIES	1 to 999
	PAGE SIZE	A4, A5, B5, LT, HLT, LGL, GLT, GLG, EXE, F4, MON, C1O, DL, C5,
	ORIENTATION	PORT, LAND
	MANUAL FEED	OFF, ON
		OFF, LIGHT, MEDIUM, DARK
LJ4	FONT SRC	RESIDENT, CARTRIDGE, DOWNLOAD
	FONT NUMBER	O to (available)
	PITCH	0.44 to 99.99 CPI (step 0.01)
	HEIGHT	4.00 to 999.75 PT. (Step 0.25)
		Roman-8, ECM94-1, 8859-2 ISO, IBM-US, PcTk437, DeskTop, Math-8, Inpu buffer PiFont, Legal, ANSI ASCII, Italian, Spanish, German, Norwegl, Windows
	FORM	5 to 128 LINES
	SRC	O to 3199
	DEST SYMSET*	o to 3199
	—	—
ESCP2	Font	Courier, Prestige, Orator S, Roman-T, Saris-H
	Pitch	10 CPI, 12 15 Prop
	Condensed	On, Off
	T-Margin	0.40 to 1.50 Inch (step 0.05)
	Text	1 to (Available) LINES
	CG Table	Italic, PcTurk2,
	Country	USA, France, UK, Denrnak, Sweden, Italy, Japan, Norway, Korea, Legal

With **option**

Table 1-12. SelecType Functions (Cont.)

Menu (Chang M&MENU b	Item (Changed by ITEM button)	Available Options (Changed by ↑ or ↓ button) (Set by ENTER button)
ESCP2 (Cont.)	Auto CR	ON, OFF
	Auto LF	ON, OFF
	Zero Char	o, ϕ
	Bit Image	Dark, Light, BarCode
FX	Font	Courier, Prestige, Orator S
	Pitch	10 CPI, 12 CPI, 15 CPI, Prop
	Condensed	ON, OFF
	T-Margin	0.40 to 1.50 Inch (step 0.05)
	Text	1 to (Available) LINES
	CG Table	Italic, PcUSA, PcMultilin, PcPortugues, PcCanFrenc, PcNordic, PcTurk2, Pc.E.Europe, BpBRASCII, BpAbicomp
	Country	USA, France, Germany, UK, Denmak, Sweden, Italy, Spainl, Japan, Norway, Denmark2, Spain2, LatinAmeric
	Auto CR	ON, OFF
	Auto LF	ON, OFF
	Zero Char	o,@
	Bit Image	Dark, Light, BarCode
GL2	GLMODE	LJ4GL2, GLlike
	SCALE	OFF, AO, Al , A2, A3
	ORIGIN	CORNER, CENTER
	PEN	0, 1,2,3,4, 5,6
	END	BUTT, SQUARE, TRIANGULAR, ROUND
	JOIN	MITERED, MITEREDBEVELED, TRIANGULAR, ROUND, BEVELED, NONE
	PENO	0.05 to 5.00 mm (step 0.05)
	PEN1	0.05 to 5.00 mm (step 0.05)
	PEN2	0.05 to 5.00 mm (step 0.05)
	PEN3	0.05 to 5.00 mm (step 0.05)
	PEN4	0.05 to 5.00 mm (step 0.05)
	PEN5	0.05 to 5.00 mm (step 0.05)
	PEN6	0.05 to 5.00 mm (step 0.05)

Table 1-12. SelecType Functions (Cont.)

Menu (Changed by MENU button)	Item (Changed by ITEM button)	Available Options (Changed by ↑ or ↓ button) (Set by ENTER button)
JOB	PAGE PROTECT	OFF, LT, LGL, A4
	RESOLUTION	300,600
	TIMEOUT	5 to 300
EMULATION	PARALLEL	LJ4, FX, ESCP2, PS*, GL2, PS&LJ4*, PS&FX*, PS&ESCP2*, PS&GL2*
	SERIAL	LJ4, FX, ESCP2, PS*, GL2, PS&LJ4*, PS&FX*, PS&ESCP2*, PS&GL2*
	L/T*	LJ4, FX, ESCP2, PS*, GL2, PS&LJ4*, PS&FX*, PS&ESCP2*, PS&GL2*
	AUX*	LJ4, FX, ESCP2, PS*, GL2, PS&LJ4*, PS&FX*, PS&ESCP2*, PS&GL2*
TRAY SIZE	STD SIZE	A4, A5, B5, LT, HLT, LGL, GLT, GLG, EXE, F4, MON, C10, DL, C5, IB5
	OPT SIZE*	LT, A4
CONFIG	STD TRAY*	LOCK, UNLOCK
	OPT TRAY*	LOCK, UNLOCK
	SIZE IGNORE	OFF, ON
	AUTO CONT	OFF, ON
	STANDBY	DISABLE, ENABLE
	DENSITY	MEDIUM, DARK, DARKEST, LIGHTEST, LIGHT
	AUTO SENSE	ON, PARALLEL, SERIAL, (L/T), (AUX)
	TOP OFFSET	*o* to 99
	LEFT OFFSET	*0* to 99
	TONER	E*****F, E**** F, E*** F, E** F, E* F.
	TONER LIFE	5000 to 9000
	PAGE COUNT	o to 99999999
	SelecType INIT	
PARALLEL	SPEED	FAST, LOW
	BI-D	ON, OFF

* With option

Table 1-12. SelecType Functions (Cont.)

Menu (Changed by MENU button)	Item (Changed by ITEM button)	Available Options (Changed by ↑ or ↓ button) (Set by ENTER button)
SERIAL	SERIAL TYPE	RS232C, RS422
	WORD LENGTH	8,7
	BAUD RATE	9600, 19200,38400,57600,300, 600, 1200,2400,4800
	PARITY	NONE, EVEN, ODD
	STOP BIT	1,2
	DTR	ON, OFF
	XON/XOFF	ON, OFF
	DSR	ON, OFF
TEST	STATUS SHEET	—
	LJ4FONTSAMPLE	—
	ESCP2 FONT SAMPLE	—
	FX FONT SAMPLE	—
	FACT SHEET	—
	RITech TEST PAGE	—
	PS STATUS SHEET*	–
	PS FONT SAMPLE*	—
	PS FACT SHEET*	—

* With option

1.4.3 Service Mode

This printer has four service modes as follows:

- Hexadecimal Dump Mode
- Language Setting Mode
- Factory Service Mode
- EEPROM Format

1.4.3.1 Hexadecimal Dump Mode

The hexadecimal dump mode is a useful tool in trouble shooting data control problems. To enter hexadecimal dump mode, turn on the printer while holding down the ON LINE button until "HEX DUMP MODE" is displayed.

1.4.3.2 Language Setting Mode

The language setting mode allows the user to specify a language for panel displays and the status sheet. To enter language setting mode, turn on the printer while holding down the MENU button until "CONFIG LANGUAGE" is displayed. The options are changed by pressing the ↑ and ↓ buttons and are set by pressing the ENTER button. Available options areas follows:

ENGLISH, FRANÇAIS, DEUTCH, ITALIANO, Español, SVENSKA, DANSK, NEDERL, SUOMI, PORTUGUÊS

1.4.3.3 Factory Service Mode

The factory service mode is a useful tool for service people. This mode is not available to users. To enter factory service mode, turn on the printer while holding down the ON LINE and CONTINUE buttons until "PRODUCT MENU" is displayed. The factory service settings are shown in Table 1-13.

Table 1-13. Factory Service Mode

Menu (Changed by MENU button)	Item (Changed by ITEM button)	Available Options (Changed by ↑ or ↓ button) (Set by ENTER button)
PRODUCT	NAME	AL1600, EPL-5600
	TCOUNT	(Note 1)
	TCOUNT CLEAR	(toner left counter clear)
	PCOUNT	(page counter value displayed)
	PCOUNT CLEAR	(page counter clear)
	JCOUNT	(jam counter value displayed)
	JCOUNT CLEAR	(jam counter clear)
VERSION	CODE ROM	(displayed version)
	FONT ROM	(displayed version)
	LL ROM (Local Language ROM)*	(displayed version)
	PS ROM (EPSONScript Module ROM)*	(displayed version)

* With option

Note 1: This counter value is left of toner weight (µgrams) in imaging cartridge.

1.4.3.4 EEPROM Format

EEPROM format operations are required only when the Video Controller Board (C125 MAIN board) or EEPROM is replaced and these operations are specified in the accompanying documentation.

EEPROM format functions (printer mme, default paper size (A4 or letter), toner counter, page counter, jam counter, and panel settings) are all stored in memory.

Defaults for the EEPROM format functions can be written to EEPROM as follows:

■ EPL-5600

Turn on the printer while holding down the ITEM, ↑, and CONTINUE buttons until "FORMAT=EPL5600" is displayed.

■ ActionLaser 1600

Turn on the printer while holding down the MENU, ALT, and FORM FEED buttons until "FORMAT=AL1600" is displayed.

1.4.4 Display of Messages

This printer displays three types of messages on the LCD: status messages, error messages, and power on messages.

1.4.4.1 Status Messages

The LCD panel normally indicates the printer's status and the software mode.

Table 1-14. Status Messages

Message	status
SELF TEST	Internal self test
RESET ALL	Warm boot
RESET	Resetting
RESET TO SAVE	SelecType is changed while Form Feed light is on. Press the RESET button to reset.
WARMING UP	Warming up
TONER LOW	Detect toner low
STANDBY	Power down mode
READY	Normal condition

1.4.4.2 Error Messages

If any of the following errors occurs, it will be displayed on the LCD panel. The error must be cleared immediately using the measures shown in the following table.

Table 1-15. Error Messages

Message	status	Measures
PAPER JAM	A paper jam has occurred.	Open the cover and remove the jammed paper. Then close the cover.
FEED JAM	A paper jam has occurred in the feed process.	Remove the jammed paper. Then press the CONTINUE button.
PRINTER OPEN	Cover is open.	Close the cover.
MANUAL FEED	Select manual feed.	Insert paper and press ON LINE button.
PAPER OUT	No paper is left in either the standard tray or the optional cassette.	Load paper in paper tray or optional cassette.
TONER OUT	Over 25 pages have printed since a toner low condition was detected.	Replace the imaging cartridge.
PAPER SET	The paper in the selected tray is different from the paper size selection.	Load proper paper and press the CONTINUE button, or simply press the CONTINUE button.
PRINT OVERRUN	Engine speed faster than print image processing.	Press the CONTINUE button.
MEM OVERFLOW	Data has filled the buffer.	Confirm and press the CONTINUE button. And add optional SIMM.
ILLEGAL CART	The inserted cartridge is not supported.	Remove cartridge and press CONTINUE button.
INSERT CART	Cartridge was removed while Form Feed light was on or the printer was on line.	Reinstall cartridge and press CONTINUE button.

Table 1-15. Error Messages (Cont.)

Message	status	Measures
REMOVE CART	Cartridge was inserted while Form Feed light was on or the printer was on line.	Remove cartridge and press CONTINUE button.
RAM ERROR (Note)	Either the SIMM is damaged or it is not supported.	Power off and then remove SIMM.
EEPROM ERROR	EEPROM data error.	press the CONTINUE button.
SERVICE REQ. XXXXX	Printer problem.	Service required.

Note: This printer displayed "RAM ERROR 1" or "RAM ERROR 2". If "RAM ERROR 1" is displayed, the problem is caused by the SIMM inserted in socket connector CN8. If "RAM ERROR 2" is displayed, the problem is caused by the SIMM inserted in socket connector CN9.

1.4.4.3 Warning Message

If any of the following warnings occurs, it will be displayed on the LCD panel.

Table 1-16. Warning Messages

Message	status	Measures
CHECK PAPER SIZE	The paper in the selected tray is different from the paper size chosen when SIZE IGNORE = OFF setting.	Press the CONTINUE button.
IMAGE OPTIMUM	Because of insufficient memory, the printer uses a lower print quality.	Press the CONTINUE button.

1.4.5 Printer Sharing

This section describes printer sharing. This printer has two methods of printer sharing, port fixed mode and auto sense mode. These modes are selected by SelecType menu "AUTO SENSE".

1.4.5.1 Port Fixed Mode

When the printer is in port fixed mode, only one interface port is active. Data from other ports is ignored.

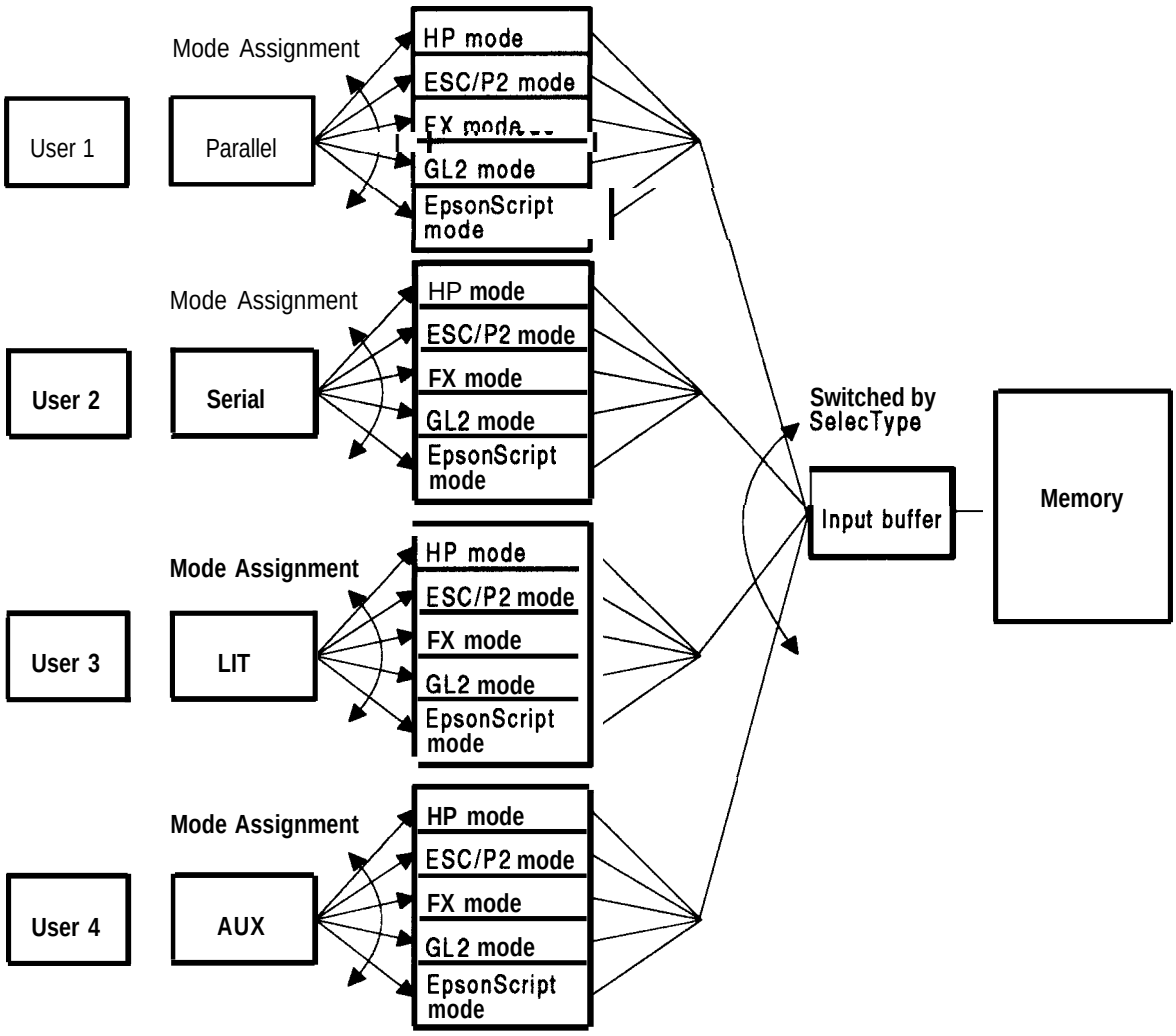


Figure 1-10. Port Fixed Mode

1.4.5.2 Auto Sense Mode

It is possible to allocate each mode to parallel, serial, L/T, and AUX. The entire memory will be allocated to the channels that are used. The interface that receives the data first will print first.

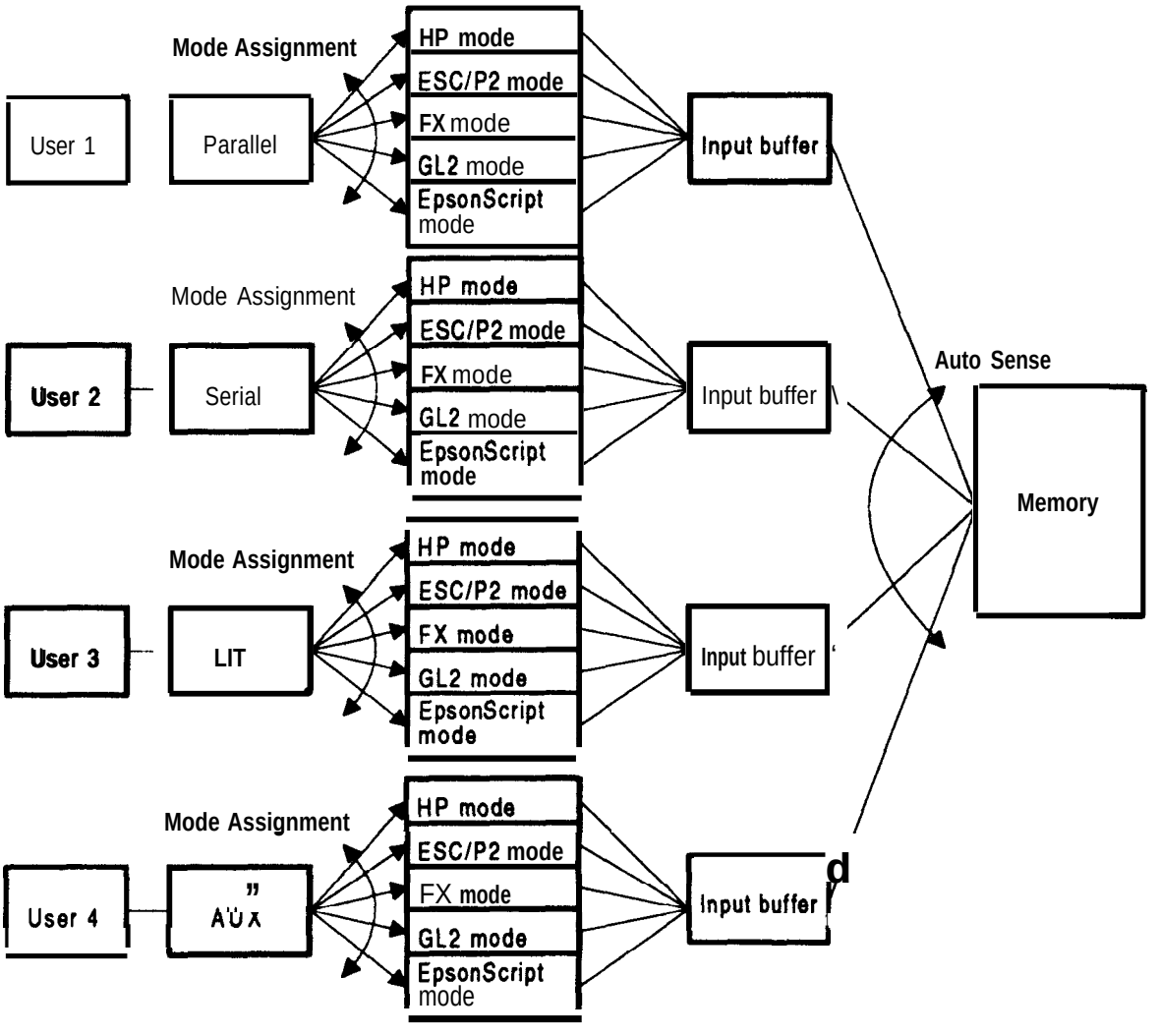


Figure 1-11. Auto Sense Mode

1.4.6 Emulation Mode Switch Function

This section describes the emulation mode switch function.

1.4.6.1 Emulation Switch by SPL

The two types of emulation switch functions described below are available on this printer. Together they are referred to as SPL (Shared Printer Language).

EJL: EPSON Job Language

This is EPSON's original language system. It is able to skip among various destinations, as shown in Figure 1-12.

PJL: Printer Job Language

This is HP's original language, which is available with the LaserJet 4 printer.
It is able to skip among various destinations, as shown in Figure 1-12. The precise specifications for this language are based on the HP LaserJet 4.

The figure below shows three types of mode switching.

Neither EJL nor PJL switches the mode directly. They first exit the current mode and return to EJL or PJL. Then they enter another mode.

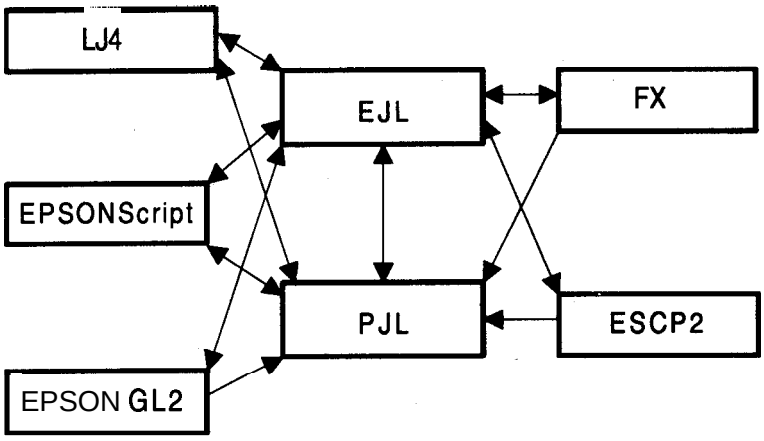


Figure 1-12. Emulation Switch by SPL

1.4.6.2 Intelligent Emulation Switch

The Intelligent Emulation Switch (IES) automatically switches the emulation switch mode, depending on the data sent from the host computer through one of the interface channels. It is able to switch between EPSON Script and other modes as shown in the figure below.

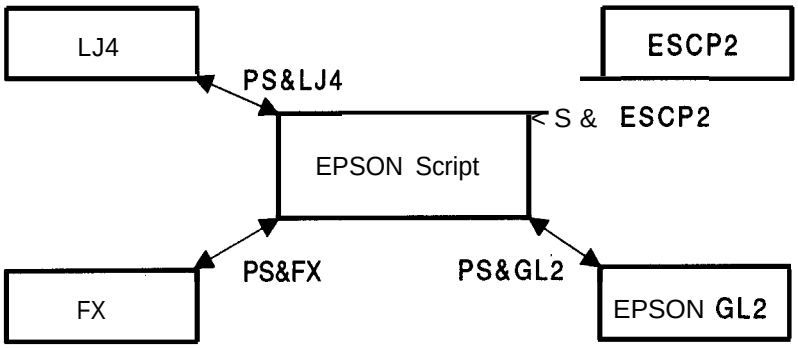
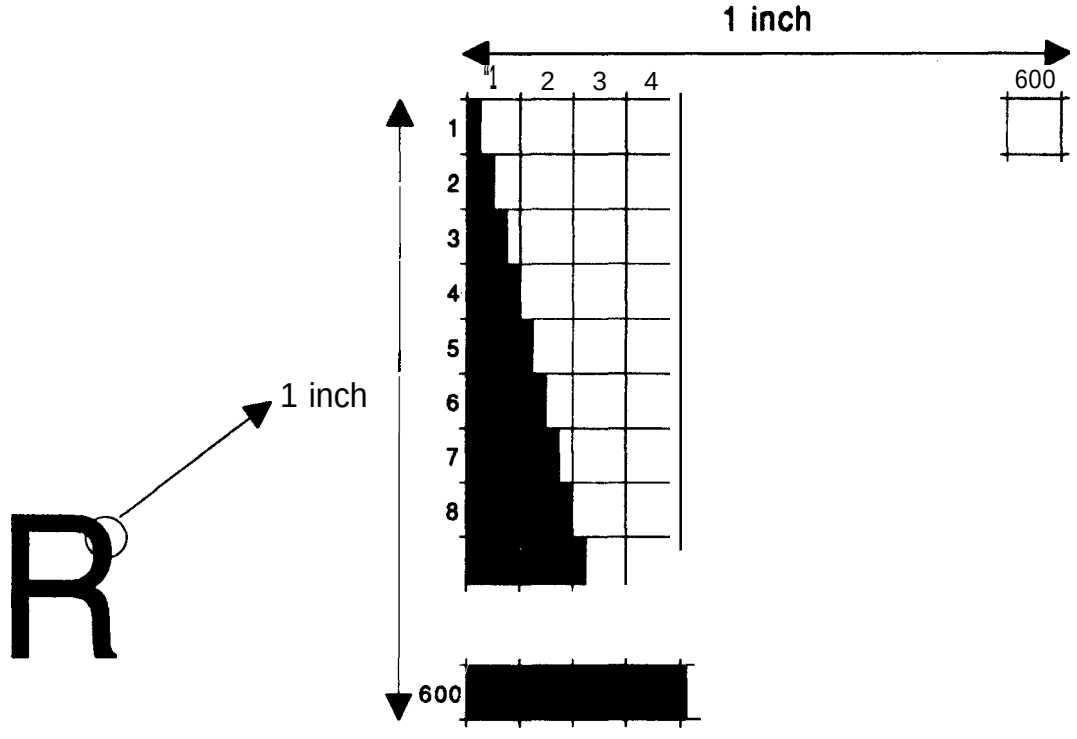


Figure 1-13. Intelligent Emulation Switch

1.4.7 Bi Resolution improvement Technology

The EPL-5600/ActionLaser 1600 printers have BiRITech (Bi Resolution Improvement t Technology), which is designed to improve print quality at 600 dpi and 300 dpi. By this method, the dot map data extracted from the image data is reassembled to improve print data.

The main improvement of this technique is in eliminating "jaggies" in diagonal lines. It is most effective when the dot map data fits the development characteristics of the printer mechanism well. It is therefore necessary to set appropriate values in SelecType.



(When 600 DPI printing)

Figure 1-14. Effect of BiRITech

Note: BiRITech is not as effective for printing a mesh pattern or gray scale. In such cases, BiRITech must be set to OFF. (The default setting is MEDIUM.) Since the BiRITech effect depends on the toner condition, it should be adjusted when the imaging cartridge is replaced or after the imaging cartridge is used for a long time.

The following settings are available in SelecType Level for RITech: DARK, MEDIUM, LIGHT, OFF. When the toner density of area A is almost the same as that of area B (as shown in the figure below), the RITech setting is at its optimum setting. In other words, the optimum setting is achieved when it is difficult to distinguish the shape of area A from that of B.

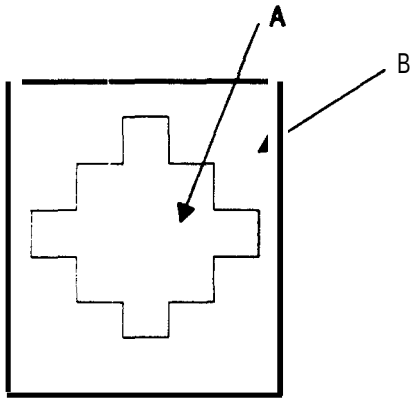


Figure 1-15. RITech Adjustment

1.4.8 Optional Memory

If you have difficulty printing complex, graphics-intensive pages or if you regularly use downloaded fonts, you may need to install the optional SIMM sets on this printer's controller board. The printer's controller board comes with 2.0 MB of RAM installed.

By installing additional SIMMs, you can increase the printer's memory to a total of 64 MB, including the resident memory.

EPSON supplies several types of memory option (SIMM). Other SIMMs can be purchased from other vendors. Be sure the SIMM meets the requirements listed below.

- 72-pin type
- Capacity is one of the following: 1,2,4,8,16,32 MB
- Access speed is less than 70 ns.
- With-in the following dimensional size
  36 mm (Height) x 108 mm (Width) x 10 mm (Depth)

1.5 MAIN COMPONENTS

To simplify maintenance and repair, the main components of the EPL-5600/ActionLaser 1600 have been designed for easy removal and replacement. The main components are:

- ❑ C125 MAIN Board — Video controller circuit board
- ❑ C82326* I/F (optional) — Optional LocalTalk module
- ❑ Control Panel
- ❑ PWB-A Board — Engine controller circuit board
- ❑ PWB-E Board — Power supply circuit board
- ❑ PWB-F Board — High-voltage supply circuit board
- ❑ Optical Unit — Printhead unit
- ❑ Fusing Unit
- ❑ Drive Unit
- ❑ Imaging Cartridge
- cl Housing
- ❑ Lower Paper Cassette Unit (optional)
- ❑ Face-up Output Tray (optional)

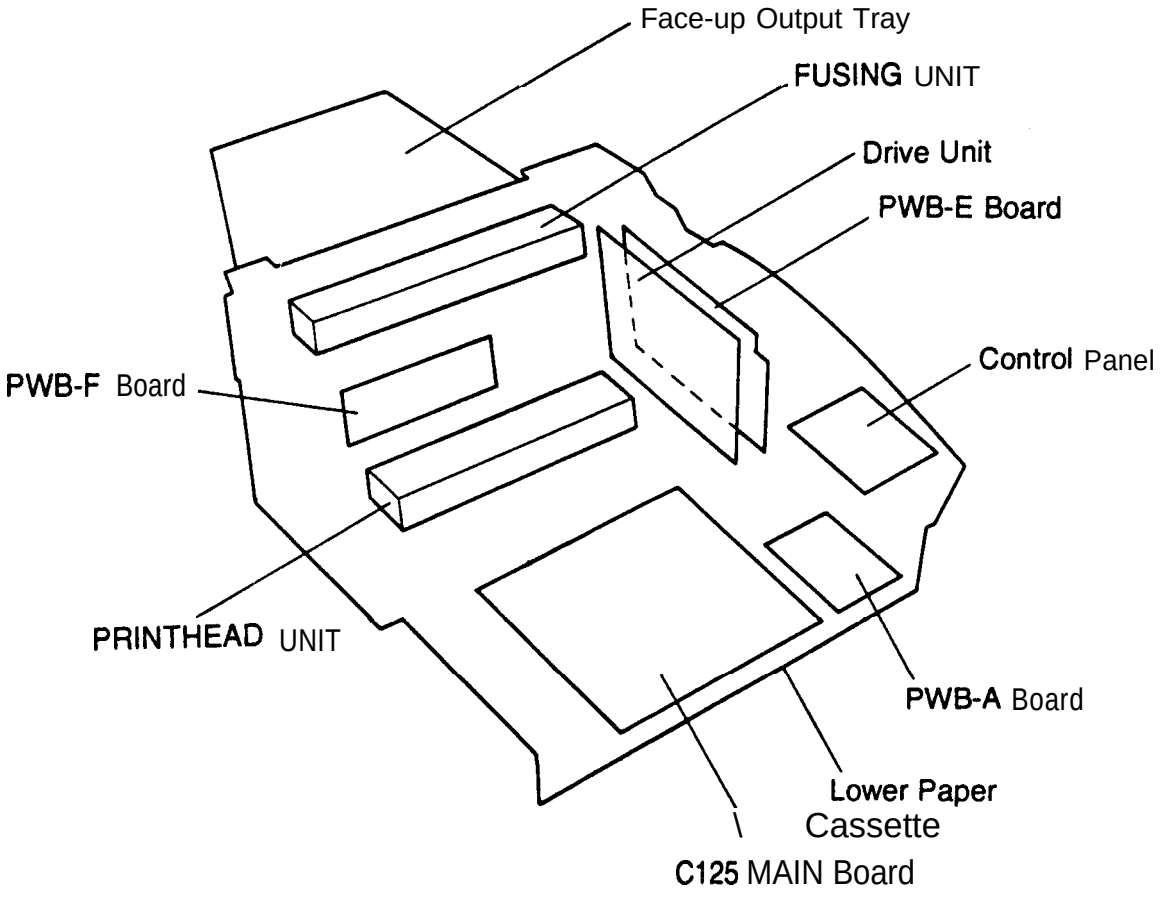


Figure 1-16. Component layout

1.5.1 C125 MAIN Board

The C125 MAIN board is a video controller board. The primary functions of this board are receiving print data from the host, generating the print image (video), and sending the print image to the engine controller via the video interface. A 32-bit 17.6 MHz RISC CPU MB86930 (SPARKlite) (location: IC1) is used, and the following memory chips and custom ICs are assigned to the 4 GB memory space.

■ Memory chips

Code ROM: four 4M-bit EP-ROM (IC7, 8,15, 18) or two 8M-bit mask ROM (IC21, 22)
Font ROM: two 8M-bit mask ROM (M80A74: IC4, M80A75: IC5)
4M-bit DRAM (IC16, 17,19, 20)
16K-bit EEPROM (IC8)

■ Custom ICs

ASIC E05A91 (IC9)
ASIC E05A92 (IC25)
ASIC E05A93 (IC24)

■ Others

RS-232C interface driver/receiver ADM232 (IC28)
RS-422 interface driver/receiver MC34050 (IC6)
Reset IC M51953BFP (IC27)

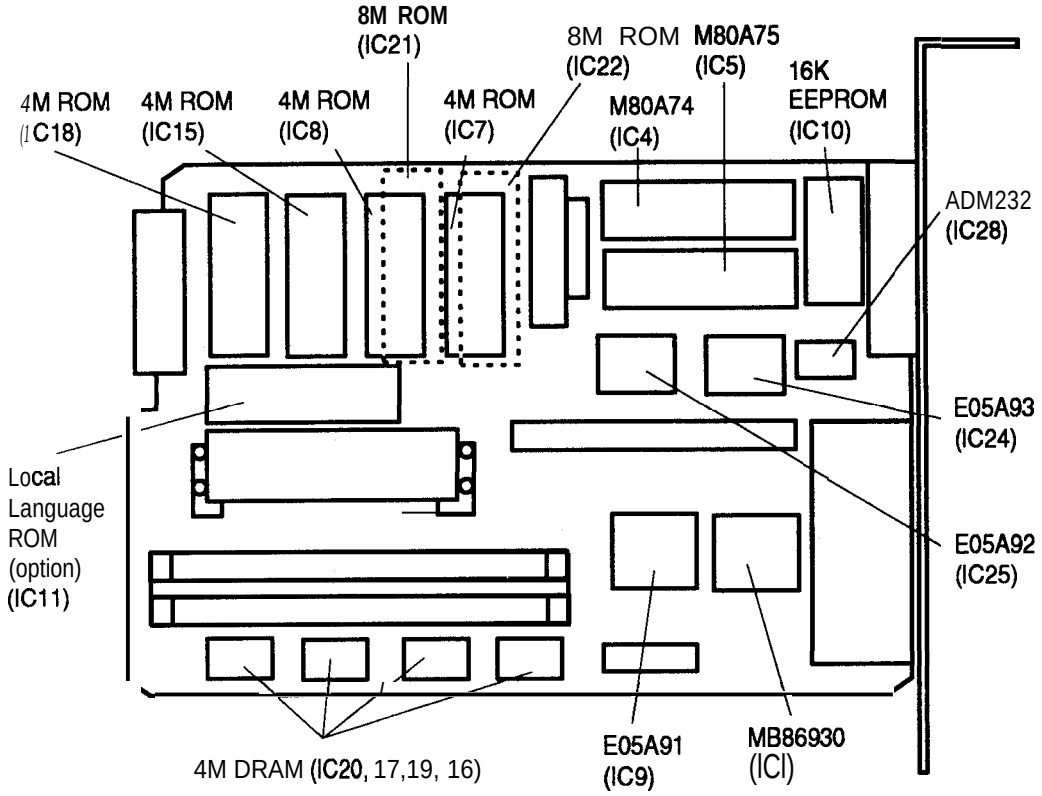


Figure 1-17. C125 Main Board

There are two types of C125 MAIN boards used as after service parts. The following table shows differences between them.

Table 1-17. Differences in Components for the C125 MAIN Board

	EPL-5600	ActionLaser 1S00
Serial interface connector	Mini screw type connector	Inch screw type connector
IC11	IC socket	None

1.5.2 C82326* I/F Board (Optional LocalTalk Module)

The C82326* I/F board has the LocalTalk interface circuit, which allows this printer to connect to Apple® Macintosh® computers. The LocalTalk Module is available for a LocalTalk connection.

■ Main Chips

85C30 (IC3)
26LS30 (ICI)
26LS32 (IC2)
NJU7660 (IC4)

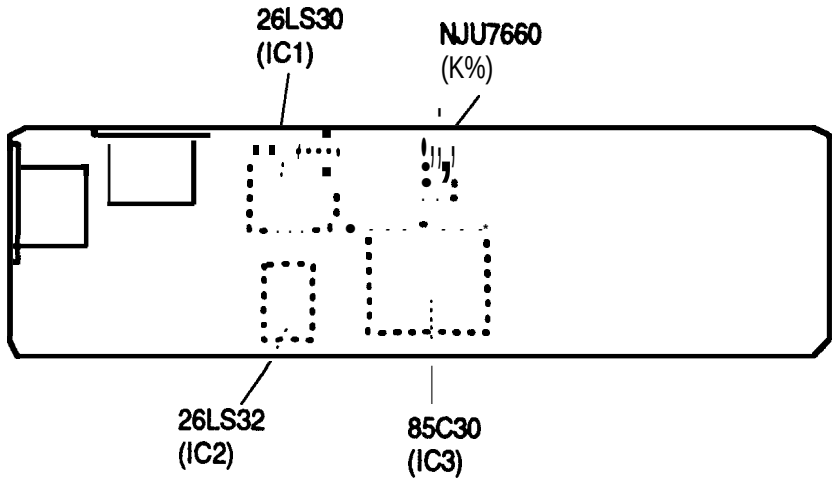


Figure 1-18. C82326* i/F Board

1.5.3 Control Panel

The control panel includes a 20 column x 1 row LCD panel, which provides many functions for the printer (e.g., displaying error messages or printer operation status). There are two types of control panels.

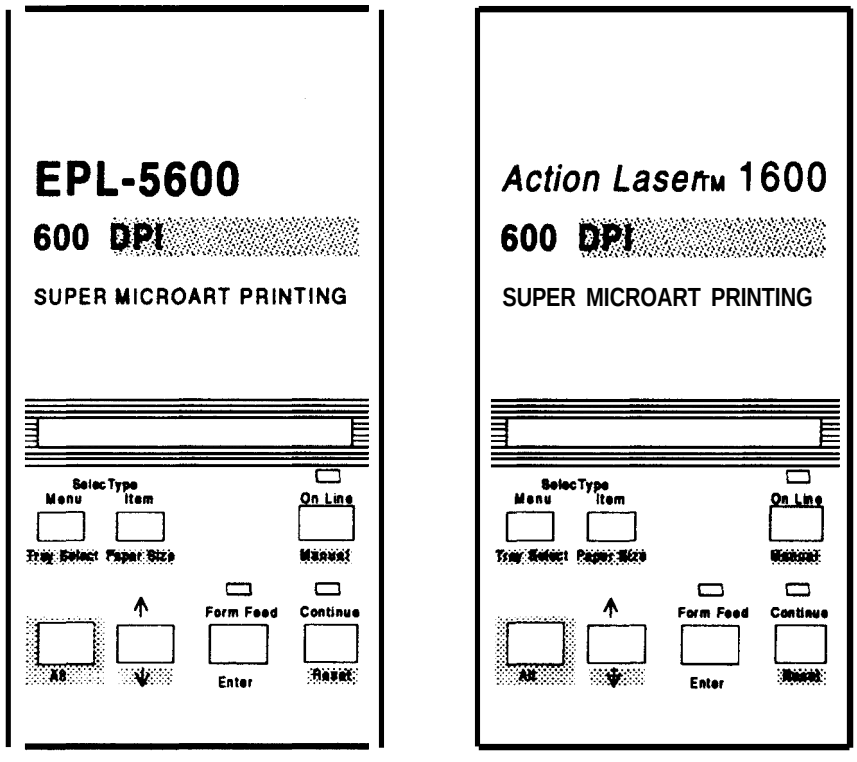


Figure 1-19. Control Panel

1.5.4 PWB-A Board

This is the engine controller board. It consists ofanM37451M48-bit CPU (including a MASK ROM) and a gate array. The board controls laser scanning (the polygon mirror drive motor), image synchronization, laser beam pulse width, and power.

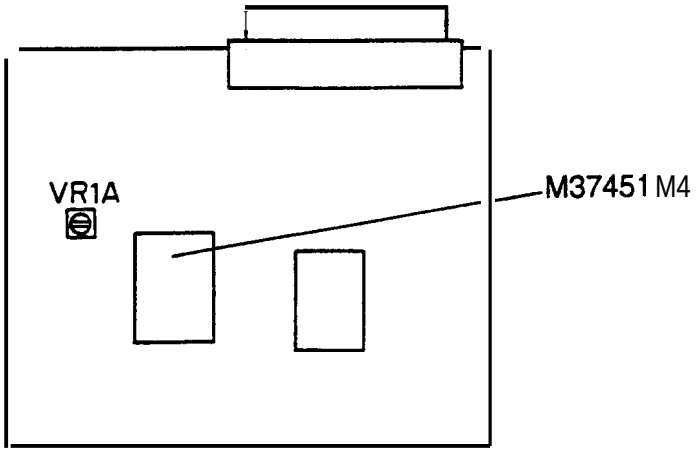


Figure 1-20. PWB-A Board

1.5.5 PWB-E Board

The PWB-E is the power supply board, which consists of a switching regulator circuit. It converts the AC line voltage into +24 V and +5 VDC voltages. There are two types of power supply board, the 100/120 V type and 220/240 V type. The difference between the two circuits is only in the input section.

CAUTION

Do not touch VR1E on PWB-E board. This volume is for factory setting only.

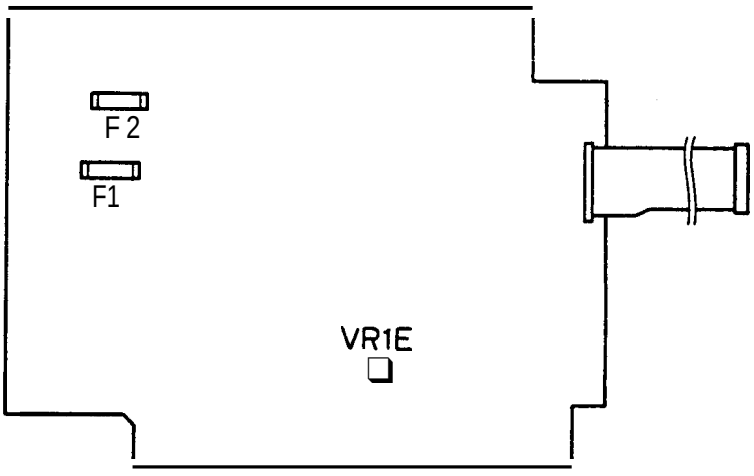


Figure 1-21. PWB-E Board

1.5.6 PWB-F Board

The PWB-F is the high-voltage supply circuit board. It converts the development bias, OPC drum charge bias, and image transfer bias.

CAUTION

Do not touch VR1F and VR2F on the PWB-F board. These volumes are for factory setting only.

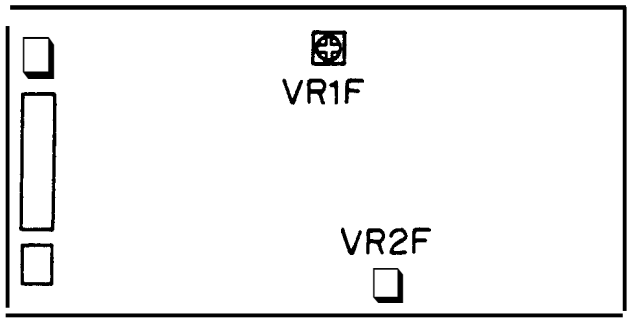


Figure 1-22. PWB-F Board

1.5.7 Optical Unit

The optical unit consists of the laser diode (semi-conductor laser), the mirror motor (scanner motor) which drives the polygon mirror for laser scanning, and several mirrors and lenses. The laser beam generated by the laser diode is conducted to the OPC drum surface by way of the polygon mirror, as well as several mirrors and lenses, to create a latent electro-photographic image on the drum.

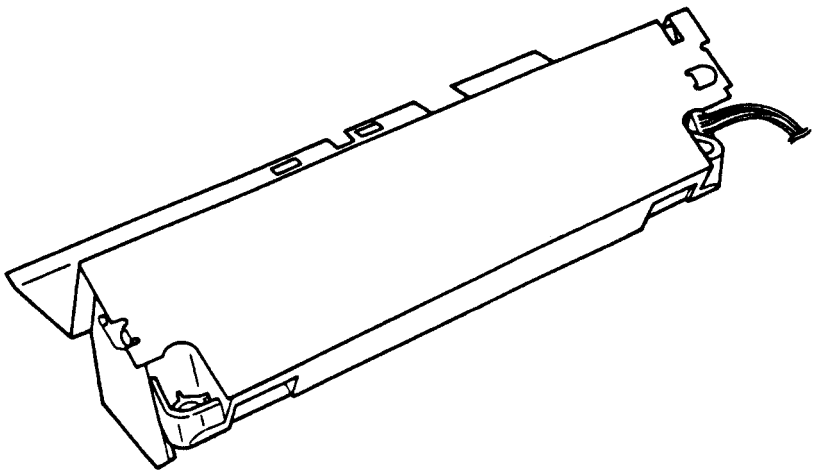


Figure 1-23. Optical Unit

1.5.8 Fusing Unit

The fusing unit fixes the toner to the paper using heat and pressure. This unit has a heater lamp, thermistor, and thermal fuse. There are two types of fusing units, the 120 V type and the 220/240 V type. The only difference between them is the heater lamp.

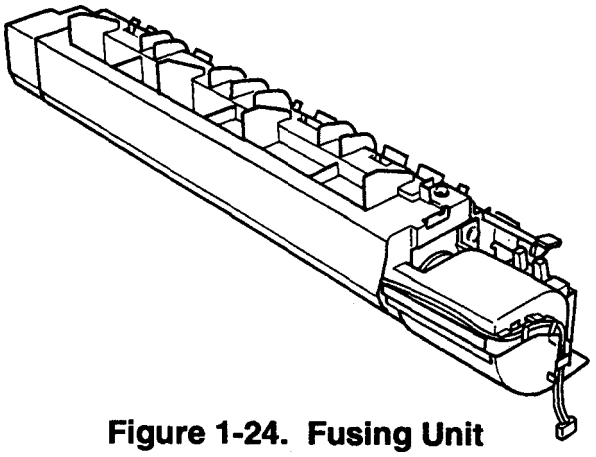


Figure 1-24. Fusing Unit

1.5.9 Drive Unit

The drive unit consists of the main motor and a series of gears and clutches. It drives the paper transport rollers, OPC drum, sleeve roller, fusing roller, and some other mechanisms.

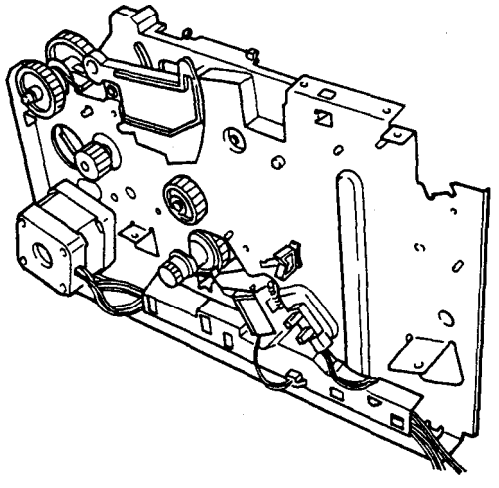


Figure 1-25. Drive Unit

1.5.10 Imaging Cartridge

The core mechanisms of the printing process, such as charging, developing and cleaning, are integrated into this imaging cartridge.

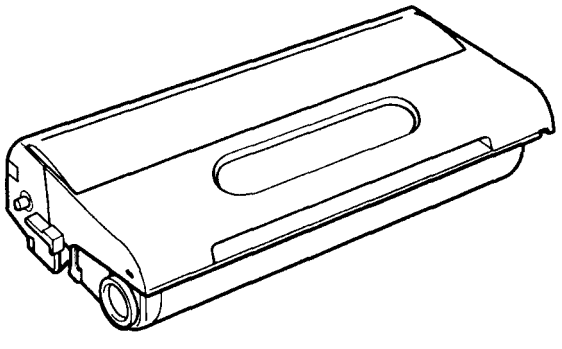


Figure 1-26. Imaging Cartridge

1.5.11 Lower Paper Cassette

The optional lower paper cassette allows you to feed up to an additional 250 sheets of A4 or letter-size paper into this printer.

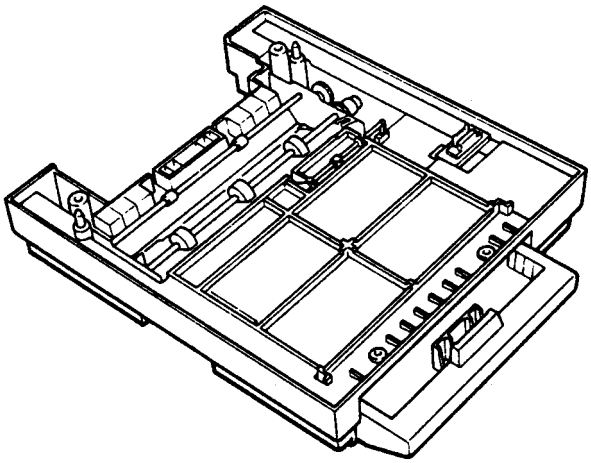


Figure 1-27. Lower Paper Cassette

1.5.12 Face-Up Output Tray

The face-up output tray is an optional tray useful for feeding single sheets of paper types, such as envelopes, transparencies, labels, or heavy paper. **The** face-up feeding method reduces **curling,** and the tray catches the paper at the paper ejection area at the top back of the printer.

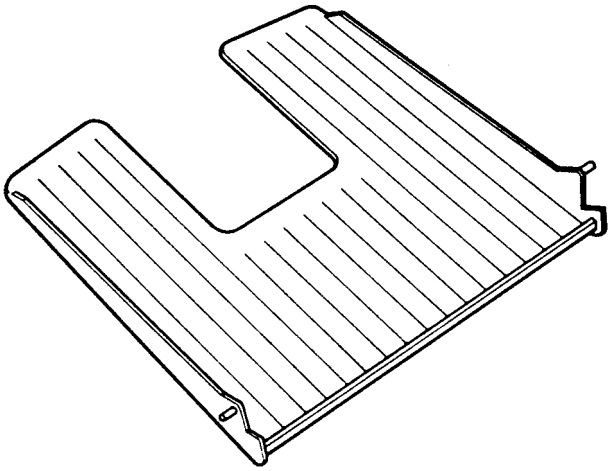


Figure 1-28. Face-Up Output Tray

Chapter2 Operating Principles

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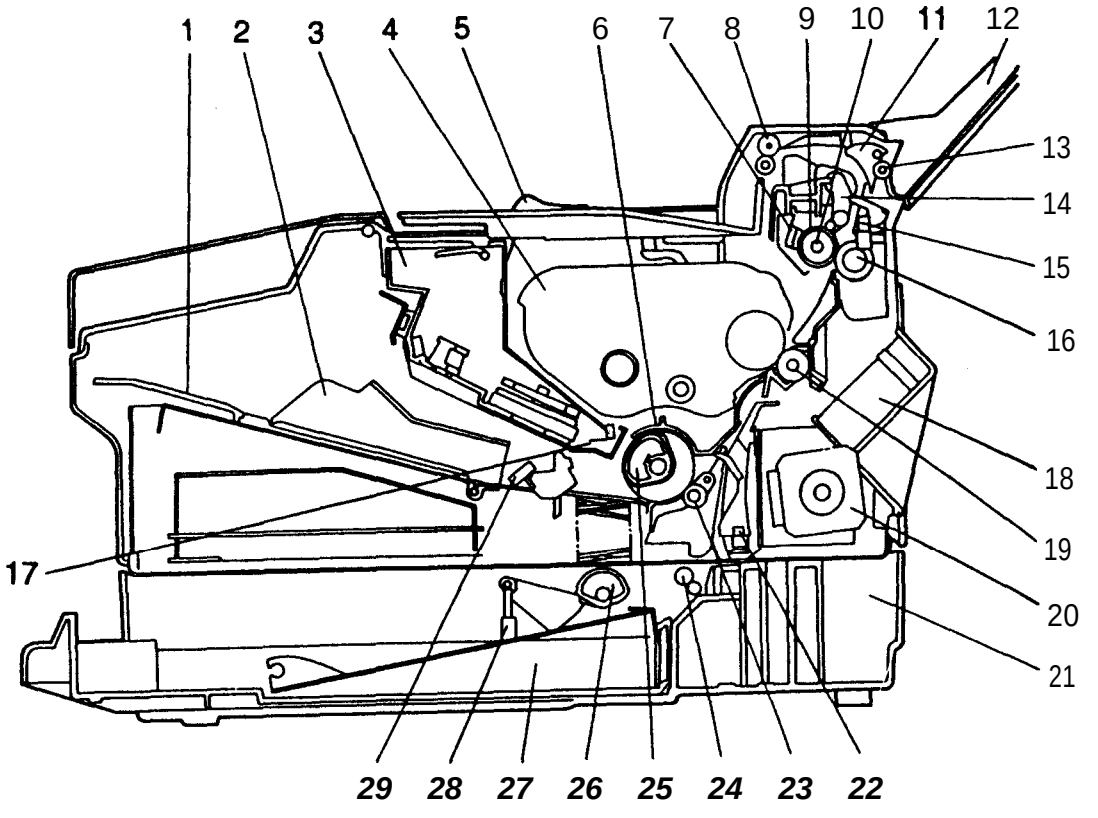
2.1 ENGINE OPERATION

This section describes the functions and operating principles of the EPL-5600, ActionLaser 1600 engine.

Figure 2-1 shows the locations and names of the main engine components.



1. Paper tray
2. Paper guide
3. Optical unit
4. Imaging cartridge
5. Upper lock release lever
6. Roller cover
7. Thermistor (TH1)
8. Face-down exit roller
9. Upper fusing roller
10. Heater lamp (Hi)
11. Face-up/face-down switching guide
12. Face-up tray (option)
13. Face-up exit roller
14. Fusing separator
15. Paper exit sensor (PC3)
16. Lower fusing roller
17. Toner empty sensor
18. cooling fan
19. Image transfer roller
20. Main motor (M1)
21. Lower paper cassette (option)
22. Paper take-up sensor (PC2)
23. Transport roller
24. Transport roller (for option)
25. Paper take-up roller
26. Paper take-up roller (for optian)
27. Paper cassette (for option)
28. Paper empty sensor (PC4) (for option)
29. Paper empty sensor (PC1)

Figure 2-1. Main Components

2.1.1 Print Process

This section describes the print process from paper feeding to paper exit.

Figure 2-2 shows a diagram of the print process.

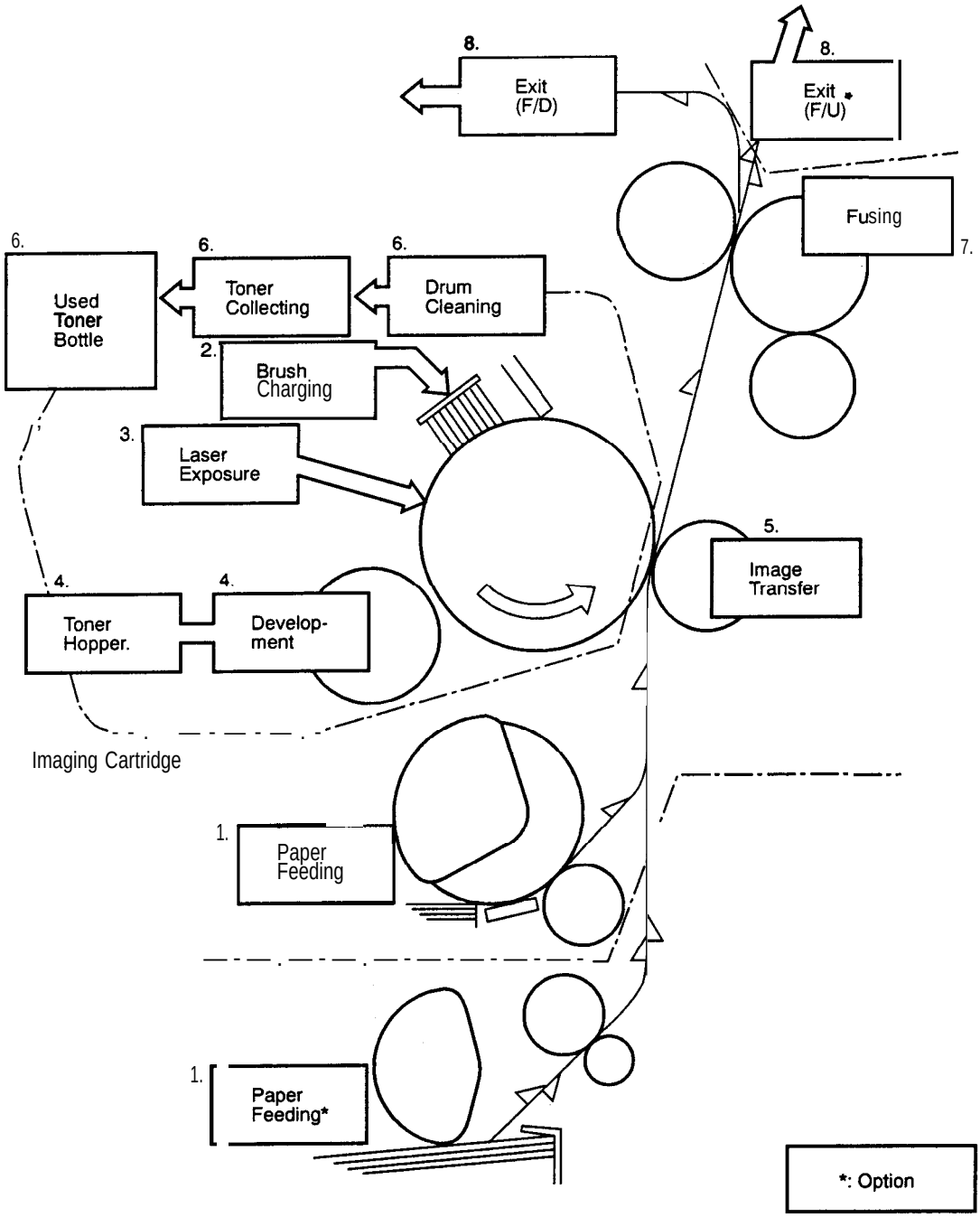


Figure 2-2. Print Process Diagram

2.1.1.1 Paper Feeding

There are two methods of feeding the paper into the printer. One is by using the multi-purpose tray (standard tray), and the other is by using the optional 250-sheet lower paper cassette.

Paper-out conditions are detected by the paper empty sensor, located above the paper tray or the cassette. While paper is in the tray or cassette, the detection lever for the paper empty sensor is lifted. When the paper supply runs out, the detection lever is lowered, causing the shutter to interrupt light from the LED to the photo-transistor. This causes the signal to go HIGH, informing the engine driver that the paper tray or the cassette is empty.

When the paper take-up solenoid is actuated, the paper take-up roller rotates and feeds the first page. The paper take-up roller stops after one rotation. Unlike the EPL-7000/7100/7500 and EPL-8000/8100, which have a synchronizing roller, the EPL-5600/ActionLaser 1600 has no synchronizing roller installed. The timing to align the leading edge of the page with the image is detected by the paper take-up sensor.

When the page is on top of the paper take-up sensor, the detection lever is lowered, allowing light from the LED to reach the photo-transistor. This causes the signal to go HIGH, informing the engine driver that paper has been detected.

The paper exit sensor is located beyond the fusing roller in the paper path. When paper passes the paper exit sensor, the detection lever is lowered, allowing light from the LED to reach the photo-transistor. This causes the signal to go HIGH, informing the engine driver that paper has been delivered.

Multi-Purpose Tray (Standard Troy)

The paper guide can be moved to fit against the sides of various sizes of paper, allowing the paper to be fed.

Although the paper take-up roller stops after one rotation, the transport rollers continue to feed the first page, because these rollers are independent of the paper take-up roller. At this time, the depression cam attached to the paper take-up roller depresses the paper lift-up plate to prevent the feeding of a second sheet.

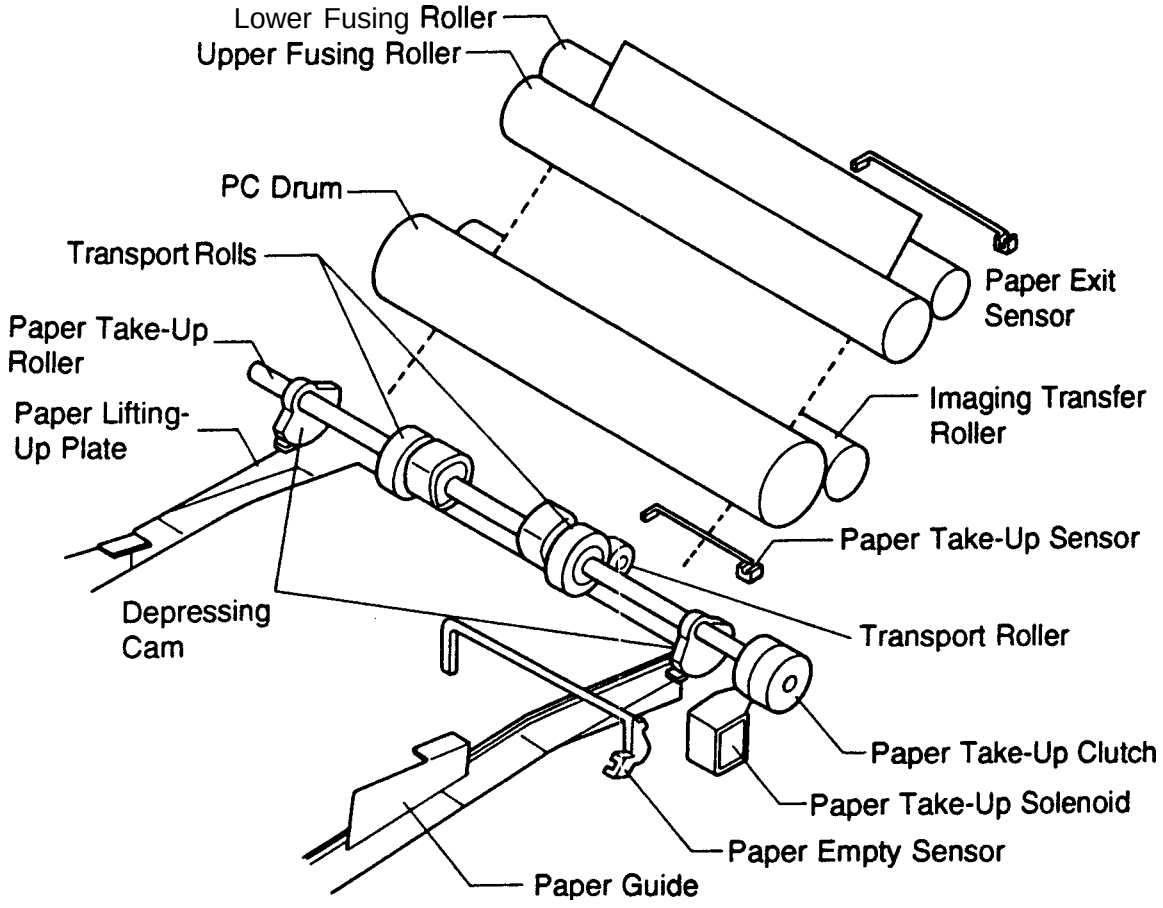


Figure 2-3. Paper Feeding from the Multi-Purpose Tray

Lower Paper Cassette

A maximum of 250 sheets can be loaded in the 250-sheet lower paper cassette (option). The cassette must be capable of handling the paper size, however. (The lower paper cassette unit can hold letter or A4 paper.)

The driving force for paper feeding and transport is from the transmission gear. All electrical controls are performed on the printer side through the coupling comector.

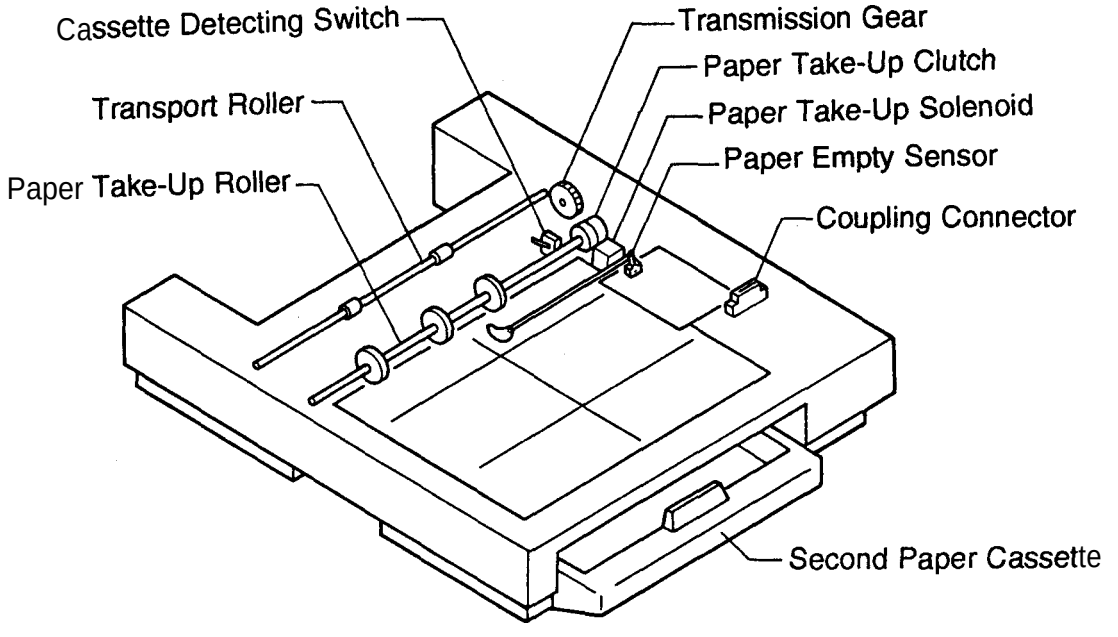


Figure 2-4. Paper Feeding from the Lower Paper Cassette

2.1.1.2 Drum Charge

Drum charge is the process of charging the PC drum with static electricity before laser exposure. This printer uses a brush charge method, rather than the corona charge method, to charge the drum. In the brush charge method, there is no generation of ozone as a result of corom discharge. This method also allows the drum to be charged at a low voltage, because a direct electric load is applied to the PC drum.

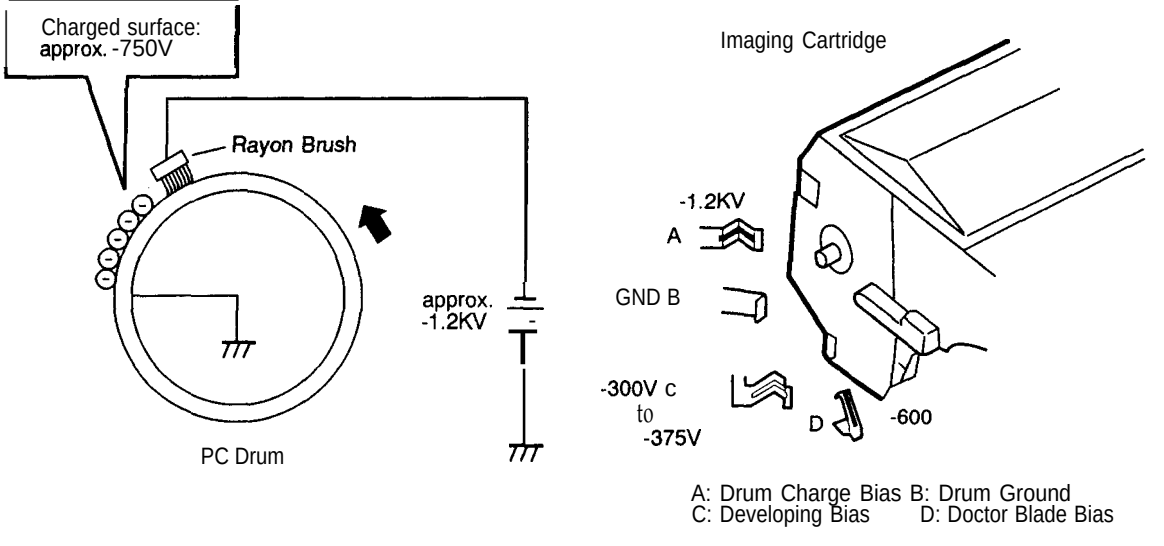


Figure 2-5. Drum Charge

2.1.1.3 Laser Exposure

Laser exposure is the process of creating an invisible static electric image on the PC drum with laser beams emitted from the optical unit. The mirror motor (scanner motor) rotates the six-sided mirror counterclockwise to produce a laser light scan. (One side of the mirror produces one scan.) The SOS (start of scan) sensor detects the laser rays from the SOS mirror and outputs the SOS signals to make the starting position of each line of the image uniform.

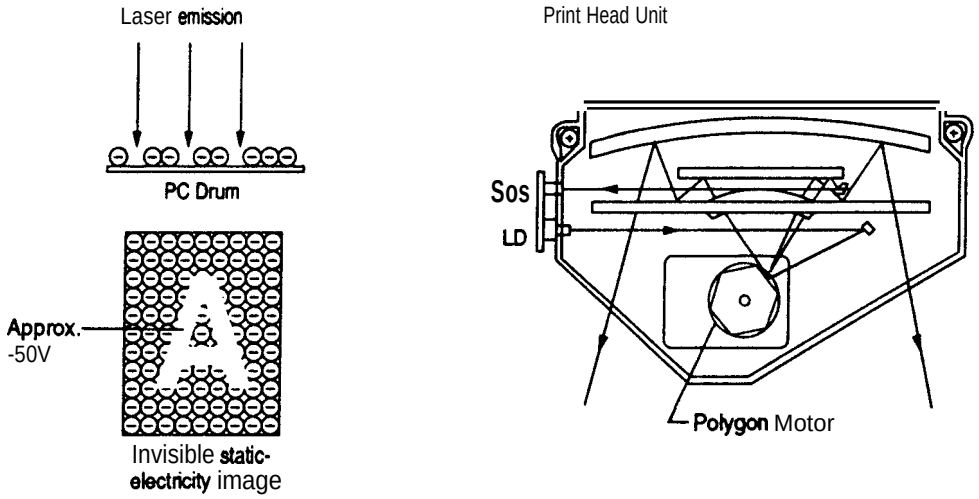


Figure 2-6. Laser Exposure

2.1.1.4 Development

Development is the process of creating a toner image on the PC drum by applying toner to the invisible static electric image. The doctor blade spreads a thin, even mat of toner over the flexible sleeve. When the toner passes between the doctor blade and the flexible sleeve, it becomes negatively charged. The flexible sleeve transports toner to the surface of the PC drum and controls the development with the developing bias voltage.

No positively charged toner is transported to the PC drum, and the doctor blade is negatively charged to prevent the printout from having a foggy background.

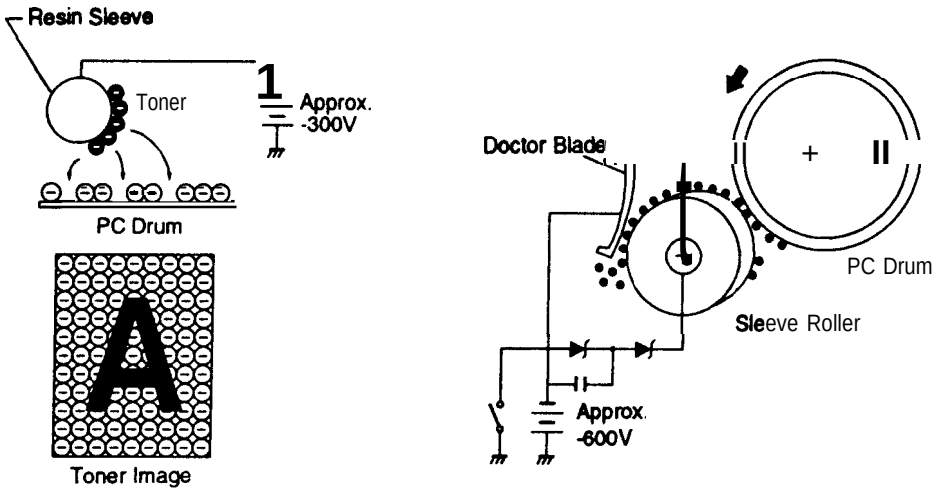


Figure 2-7. Development

2.1.1.5 Drum Cleaning

After the image is transferred onto paper, any remaining toner on the PC drum is scraped off by the cleaning blade and collected in the used toner bottle.

2.1.1.6 Image Transfer

Image transfer is the process of transferring the toner image created on the PC drum during the developing process to the paper. This printer uses the roller image transfer method, instead of corona image transfer, as the image transfer process. In roller image transfer, there is no generation of ozone as there is with corona discharge. Also, there is no blurring caused by motion in the image transfer, because the image transfer roller is maintained for the pressure bonding of the paper with the PC drum.

A reverse bias voltage is applied so that the positive toner is not transferred onto the image transfer roller. (The drum charge bias voltage is used.)

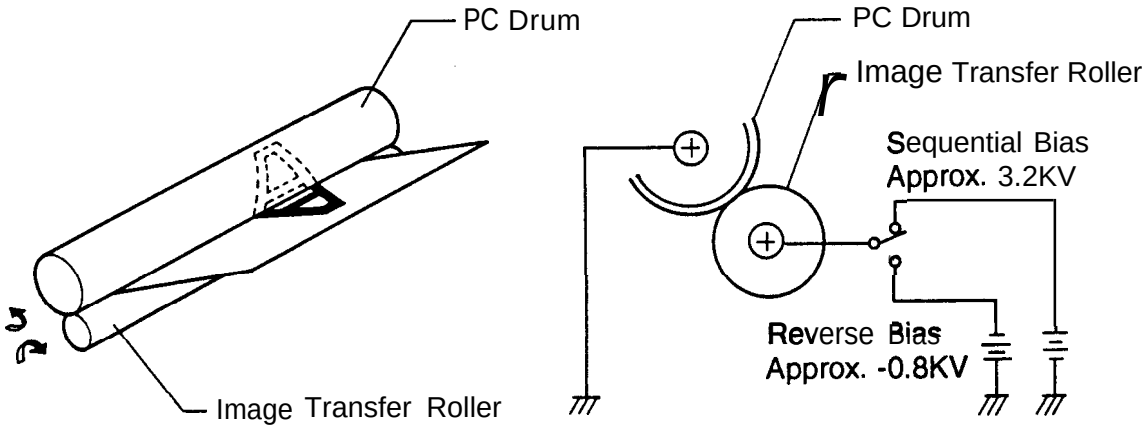


Figure 2-8. Image Transfer

2.1.1.7 Fusing

Fusing is the process of fixing the toner image transferred during the image transfer process onto the paper. This printer uses the heating roller method for fusing. The heating roller method fixes the toner image with an upper fusing roller that is heated by the heater lamp.

After power is turned on, the heater lamp lights up until the temperature of the upper fusing roller reaches 165° C (329" F). After warm-up, the mechanical control board controls the ON/OFF operation of the heater lamp, based on the TH1 signals from the thermistor.

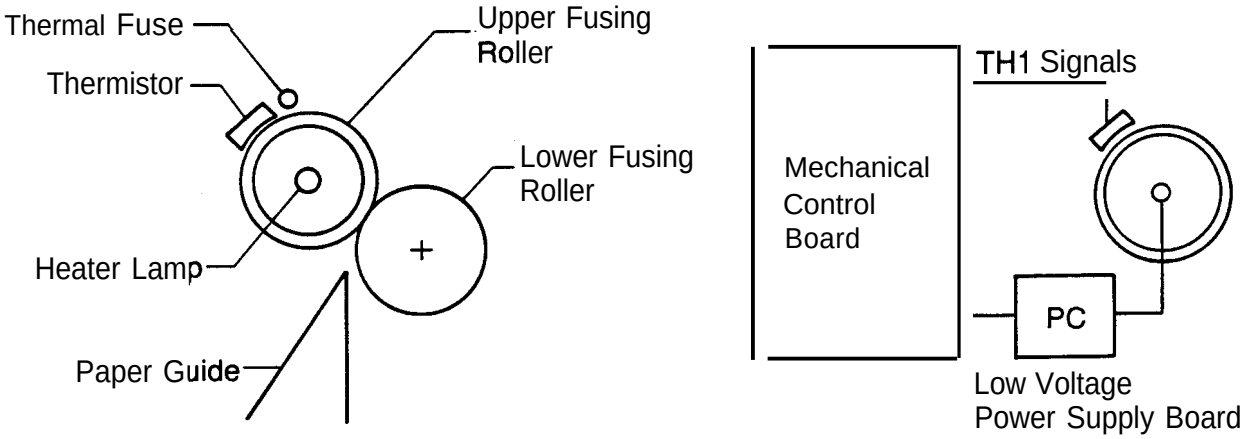


Figure 2-9. Fusing

2.1.1.8 Paper Exit

The paper on which the toner image has been fused is fed to the face-down tray or the face-up tray.

2.1.2 Engine Control

This section describes engine control, the power supply board, and the high-voltage supply board. The engine is controlled by the engine controller board (PWB-A board). Figure 2-10 shows an engine controller connecting diagram.

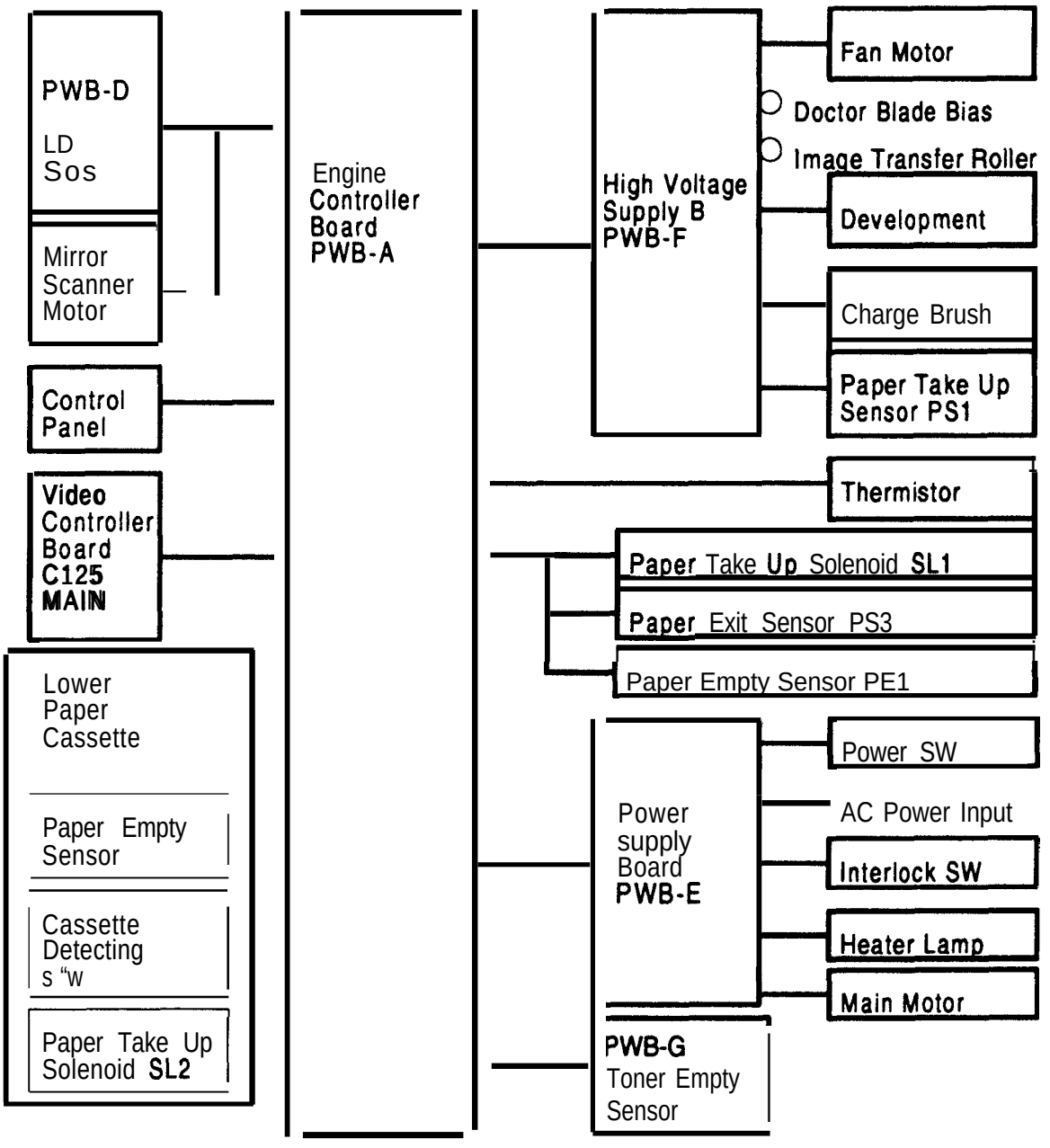


Figure 2-10. Engine Controller Connecting Diagram

2.1.2.1 Main Motor Functions and Control

Power from the main motor (Ml) drive is used for the P/C (photo conductor) drive, the developing drive, the fusing drive, the standard paper slot feeding drive, and the lower paper cassette (option) feeding drive. Figures 2-11 through 2-16 show the positions of the gears and rollers.

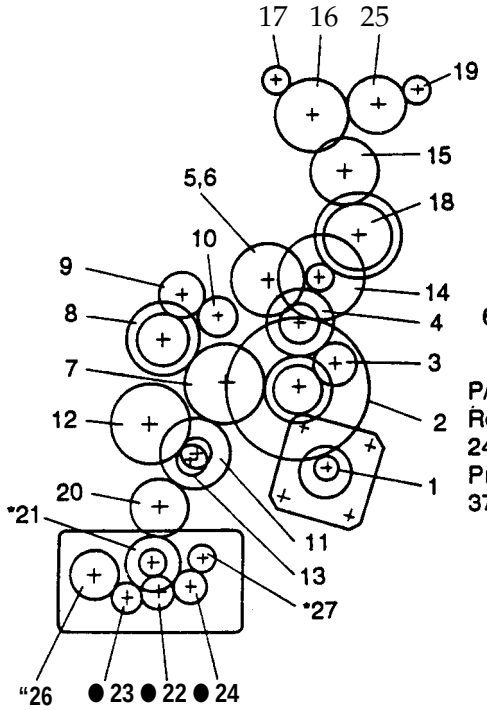


Fig2-11. Gear and Roiler Positions

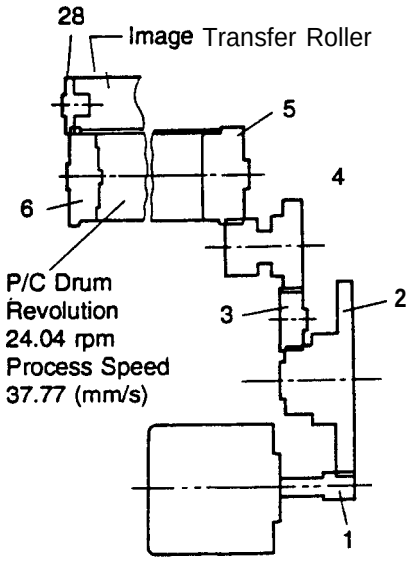


Fig. 2-12. P/C Drive Section

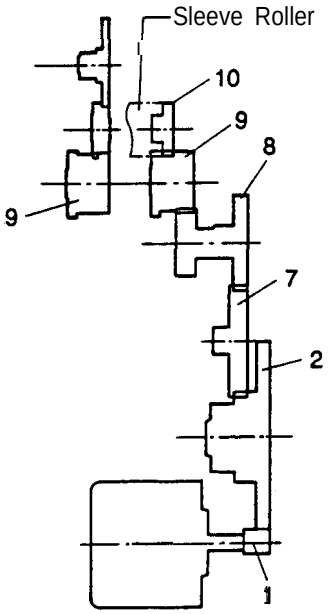


Fig. 2-13. Developing Drive Section

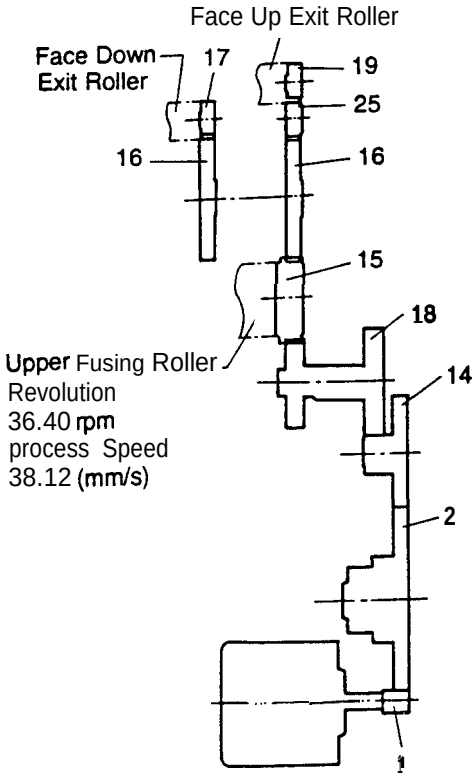


Fig. 2-14. Fusing Drive Section

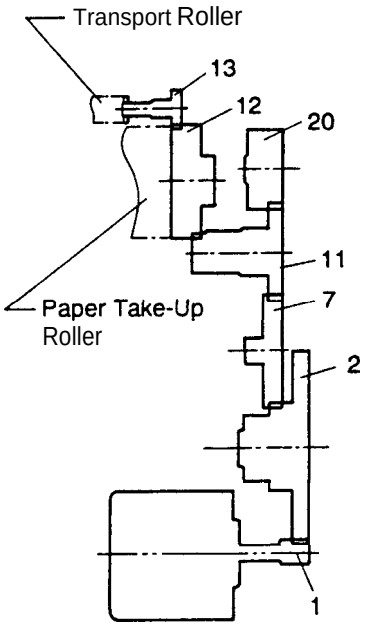


Fig. 2-15. Feeding Drive Section

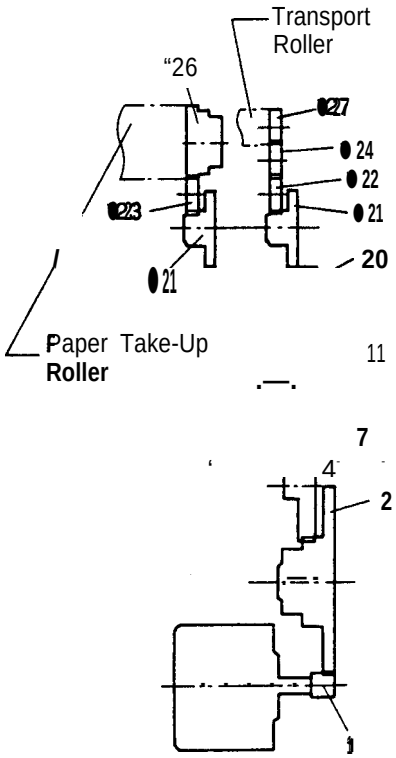


Fig. 2-16. Feeding Drive Section (Option)

Table 2-1. Gears and Rollers

No.	No. of Gear Teeth	Roller Name	No.	No. of Gear Teeth	Roller Name
1	18	Main Motor (Ml)	15	36	Upper Fusing Roller
2	23/38/126		16	54	
3	29		17	15	Face-Down Exit Roller
4	14/32		18	39/48	
5	43	P/C Drum	19	15	Face-Up Exit Roller
6	30	P/C Drum	20	24/32	
7	47		21*	14/24	
8	29/41		22*	18	
9	26		23*	18	
10	23	Sleeve Roller	24*	18	
11	16/40		25*	16	
12	46/69	Paper Take-Up Roller	26"	16	Paper Take-Up Roller
13	23	Transport Roller	27*	28	Transport Roller
14	16/75		28	14	Image Transfer Roller

•Option (lower paper cassette)

Figure 2-17 shows the main motor drive circuit. The main motor (Ml) is a four-phase stepping motor. This motor is controlled by the CPU (IC1A) on the engine controller board (PWB-A). The power supply board (PWB-E) has a stepping motor driver IC. This IC drives the main motor (Ml) with a constant current. The main motor (Ml) is stopped when the CPU (IC1A) on the engine controller board (PWB-A) outputs TdA and TdB signals."

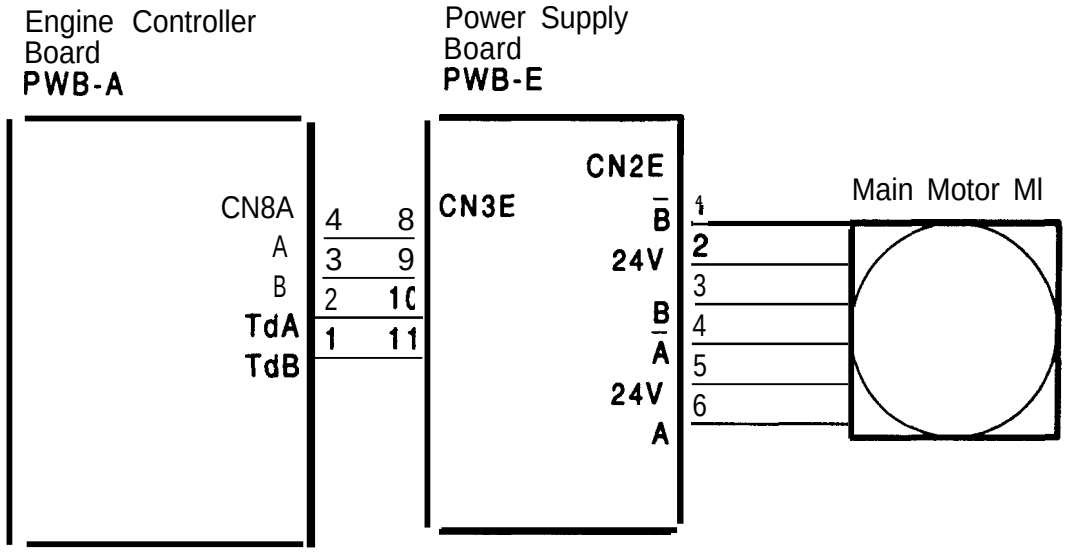


Figure 2-17. Main Motor Drive Circuit

2.1.2.2 Paper Take-Up Sensor and Paper Exit Sensor

The paper take-up sensor has three functions:

1. To detect the top edge of paper. The engine starts printing when the detection signal is received.
2. To detect paper size. The printer detects the time it takes for paper to pass the paper take-up sensor during paper feeding. If this time is long, longer paper is feeding; if the time is short, shorter paper is feeding.
3. To detect paper jams and feed jams.

If the paper take-up sensor does not turn on for paper feeding, the printer detects a feed jam. A feed jam is a paper jam that occurs in the feed process.

If any of the following conditions is detected, the printer detects a paper jam. A paper jam is a jam that occurs in the printing process area.

- The paper take-up sensor (PC2) or the paper exit sensor (PC3) is on at power on or when the upper case is closed.
- The paper take-up sensor (PC2) or the paper exit sensor (PC3) is not turned on/off within the specified time. (Refer to the following timing chart.)

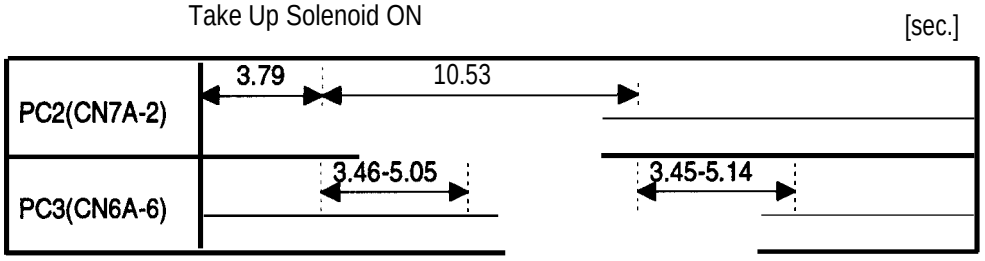


Figure 2-18. Paper Take-Up Sensor and Paper Exit Sensor On/Off Timing

2.1.2.3 Fuser Control

The fuser is heated by the heater lamp, which is powered by AC voltage. When the power supply board receives a FUSER LAMP signal from the engine controller board (PWB-A), the power supply board (PWB-E) supplies the AC voltage to the heater lamp. This AC voltage is cut by the interlock switch when the case is open.

The fuser temperature is detected by the thermistor. Based on the TH1 signals from the thermistor, the engine controller board (PWB-A) controls the fusing temperature (165° C, 329° F) using the FUSER LAMP signaL

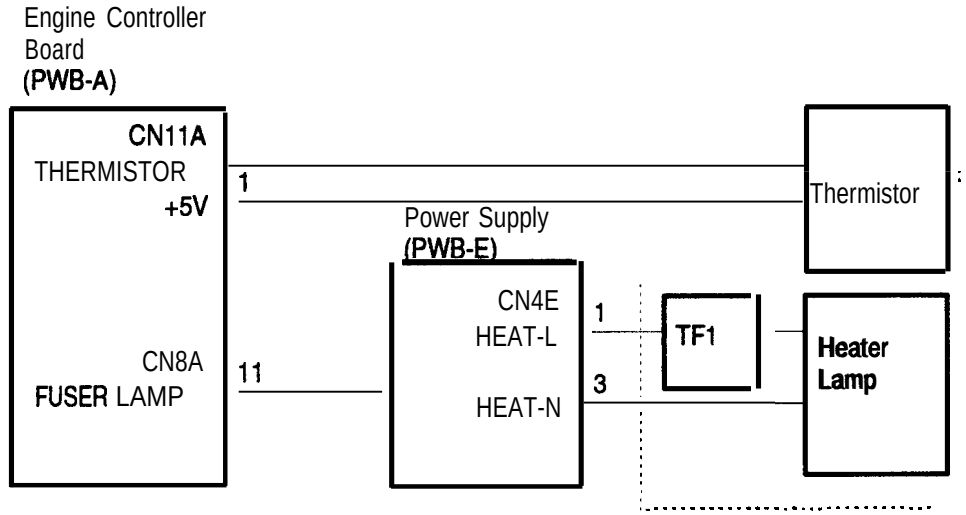


Figure 2-19. Fuser Control Circuit

The following figure shows the fuser temperature control procedure.

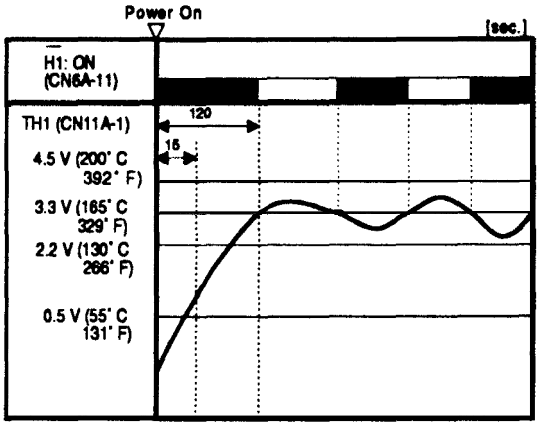


Figure 2-20. Temperature for Fuser Control Procedure

If the following renditions are detected, the printer indicates a fuser error (the LCD displays SERVICE REQ. EOO03).

. The thermistor temperature does not reach 55° C (131° F) within 15 seconds.
. The warm-up period doesnotend within 120 seconds.
• The thermistor temperature drops to 130° C (266° F).
• The thermistor temperature exceeds 200° C (392° F).

The thermo fuse (TF1) cuts power if the temperature of the fusing section rises to an abnormally high level (over 200° C, 392° F).

2.1.2.4 Scanner Mirror Motor Control

Figure 2-21 is the scanner mirror motor (M2) control circuit. The scanner mirror motor is driven while the scanner motor receives the SCANNER MIRROR MOTOR (M2:ON) signaL

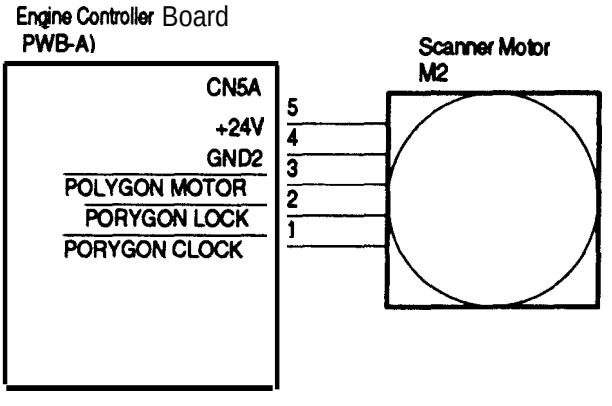


Figure 2-21. Scanner Motor Control Circuit

Figure 2-22 shows the scanner mirror motor driving timing chart. The scanner mirror motor rotates 0.15 seconds after the main motor (Ml) turns on. If the MIRROR MOTOR LOCK (M2:LOCK) signal is not turned on within 3 seconds after the scanner mirror motor turns on, the printer indicates a scanner mirror motor malfunction.

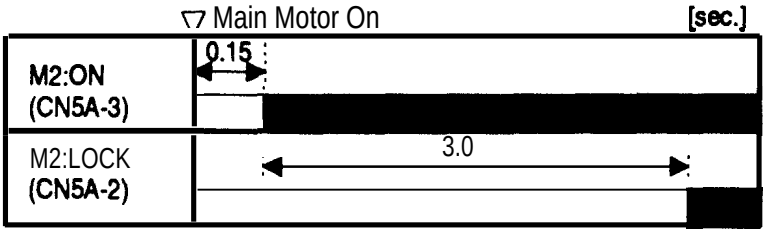


Figure 2-22. Scanner Motor Driving Start Timing

2.1.2.5 Laser Diode Drive

Figure 2-23 shows the laser diode drive circuit. Laser diode emission is controlled by three signals (L DATA, DA1, and DA2) from the engine controller board (PWB-A).

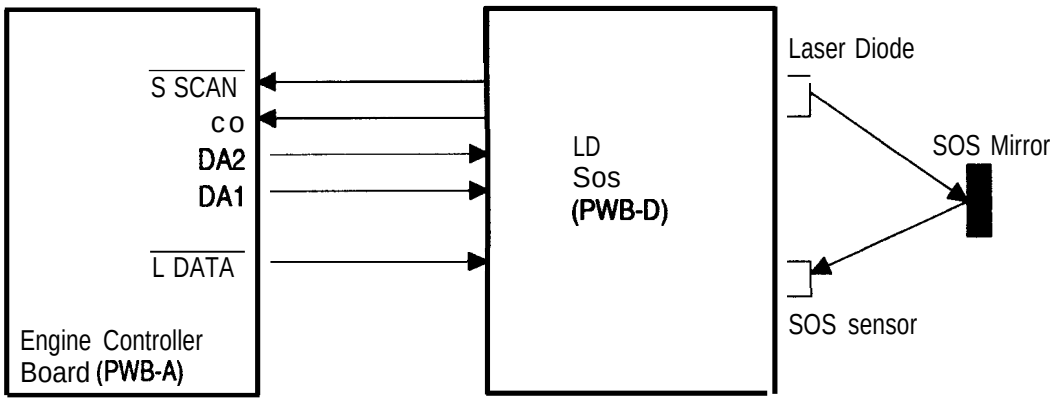


Figure 2-23. Laser Diode Drive Circuit

The L DATA signal is the laser ON/OFF signal. When it is LOW, the laser emits, and when it is HIGH, the laser stops emitting. L DATA is the combination of the two signals in the figure below. If the VIDEO or the FORCED LASER DIODE ON signal is activated (LOW), the L DATA signal will be active. The VIDEO signal is an image signal sent from the video controller board (C125 MAIN board). The FORCED LASER DIODE ON signal is a laser emission signal to apply the laser beam to the SOS sensor.

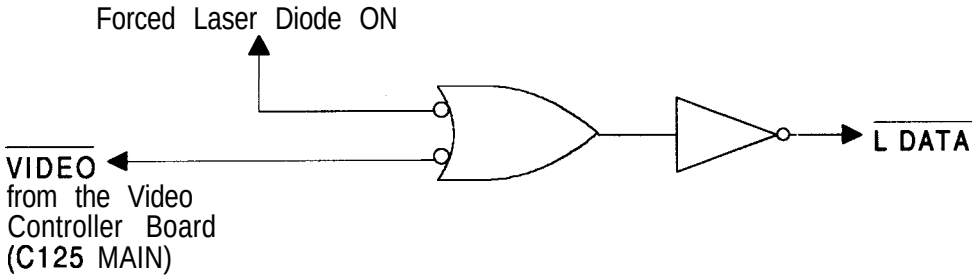


Figure 2-24. /L DATA Generation Circuit

The laser diode is forcibly activated between 0.2 seconds and 0.1 seconds after the scanner mirror motor (M2) turns ON. At this time, laser emission power is adjusted. LDVR1 and LDVR2 are the laser emission power adjust signals; they are analog signals. LDVR1 is a tuning, and LDVR2 is a fine tuning.

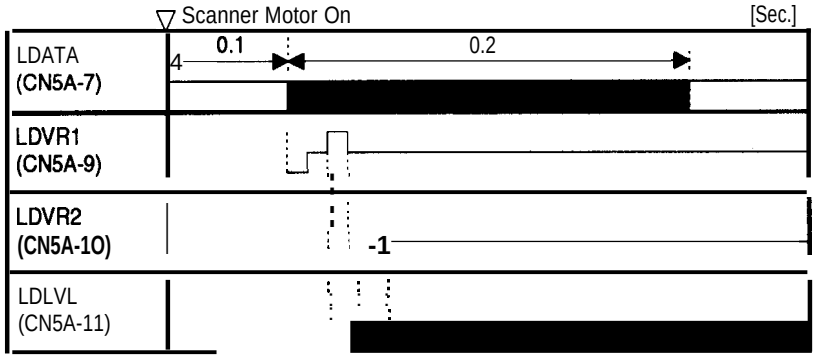


Figure 2-25. Laser Emission Power Adjustment Timing

If the $\overline{\text{SCAN}}$ signal is not detected, the printer indicates a laser diode malfunction. If the scanner mirror motor (M2) does not rotate, the printer also indicates a laser diode malfunction.

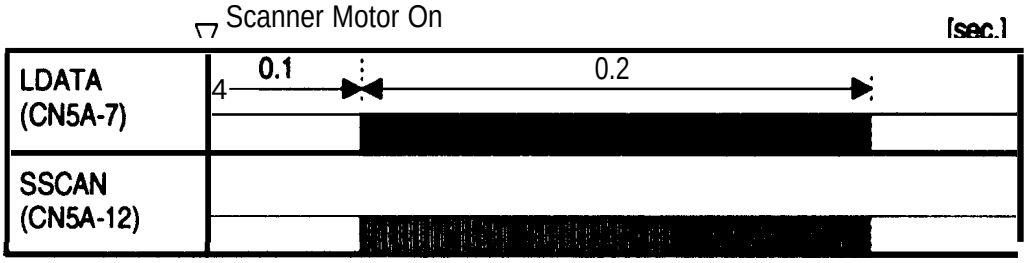


Figure 2-26. Laser Diode Error Detection

2.1.2.6 Biaa Voltages and Laser Drive liming

Figure 2-27 is a diagram of the drum charge bias voltage, image transfer bias voltage, doctor blade bias voltage, and the developing bias voltage control circuit. These bias voltages are generated from the +24 VDC from the high-voltage supply board (PWB-F). If the printer detects a case open condition, the interlock switch is set to OFF, which cuts the +24 VDC, which, in turn, cuts the bias voltages.

These bias voltages are controlled by the engine controller board (PWB-A). The CH2:ON (I-W-T') signal is the image transfer (roller) bias voltage control. While this signal is LOW, the image transfer roller is charged to 3.2K VDC by the high-voltage supply circuit. And while this signal is HIGH, the image transfer roller is charged to –0.8K VDC. The $\overline{\text{CH1:ON}}$ (HV-C/T.R) signal controls thedrumcharge. While this signal is LOW, the PCdrumischarged to –1.2K VDC.

The $\overline{\text{DB:CNT}}$ (HV-B.VR) signal is an analog signal for developing bias voltage control. This signal controls the bias voltage level (–300V to –375K VDC) using analog data. 'The image density is controlled by the developing bias voltage level.

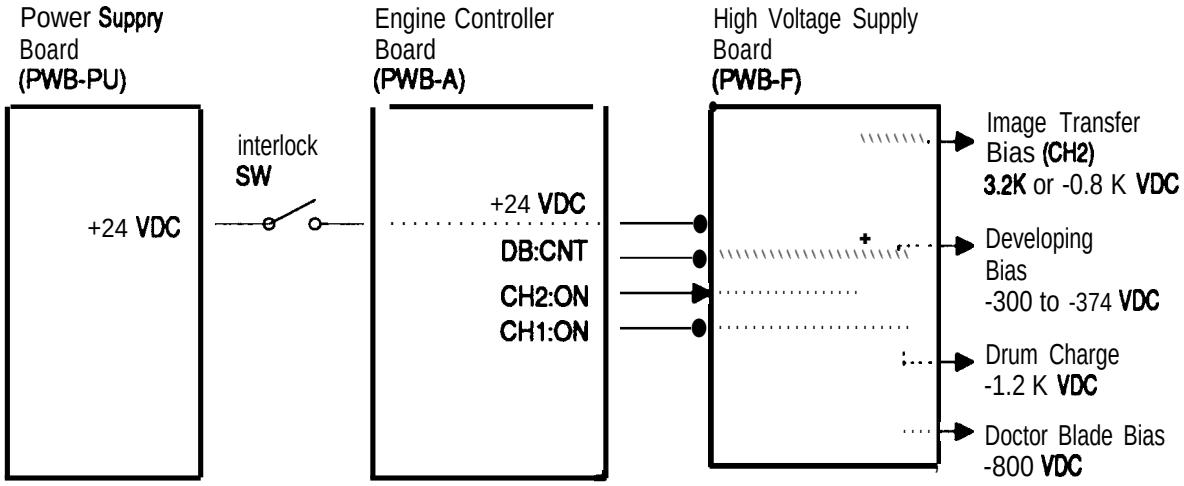


Figure 2-27. High-Voltage Supply Block Diagram

Figure 2-28 shows the print process, and Figure 2-29 shows the power on sequence. During the power on sequence (initialization), the printer detects mechanical errors.

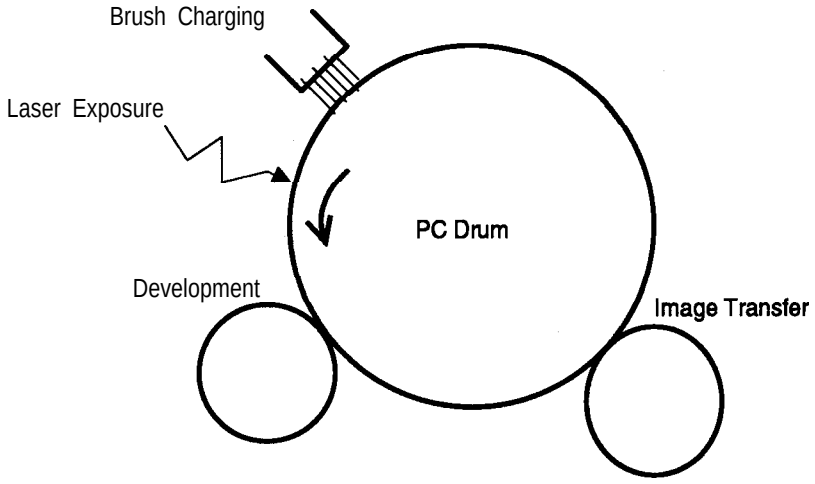


Figure 2-28. Print Process

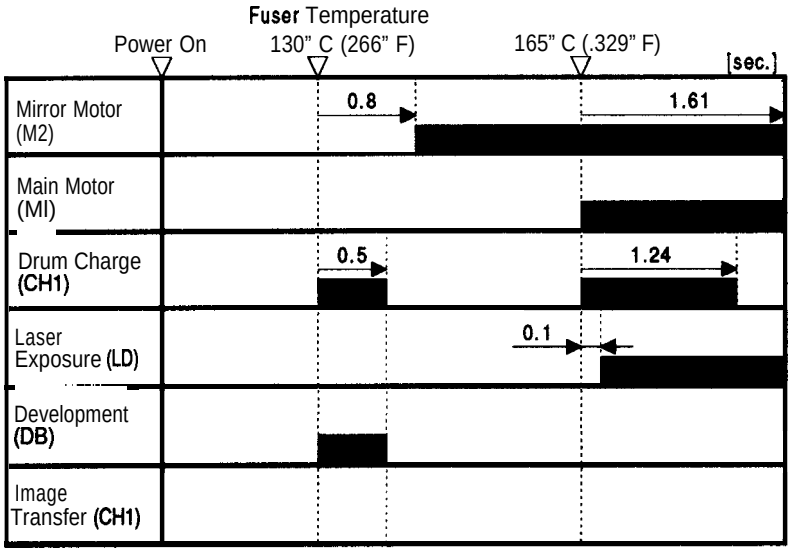


Figure 2-29. Power On Sequence

Figure 2-30 shows the start print sequence. The printer's engine starts printing when the $\overline{\text{PRINT}}$ signal is received from the video controller board.

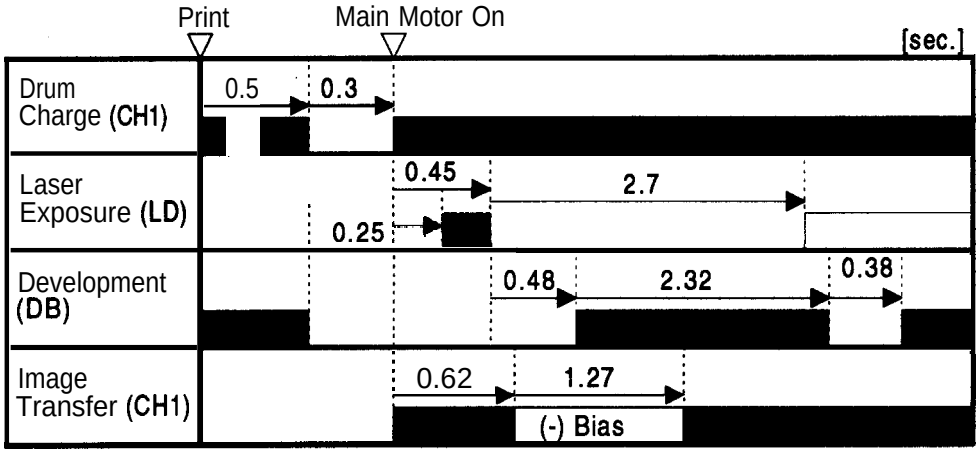


Figure 2-30. Print Sequence (Start)

Figure 2-31 is the end of the print sequence. The printer stops the main motor (Ml) from rotating when the paper exit sensor turns off after 2.53 seconds.

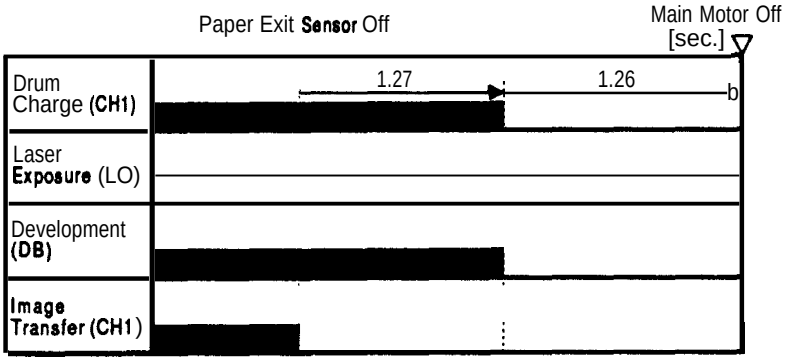


Figure 2-31. Print Sequence (End)

2.1.2.7 Fan Motor Control

The fan motor (M3) rotates at all times after initialization of the engine has been completed. The fan motor rotates faster during printing. When printing ends, the fan motor slows down after 15 seconds.

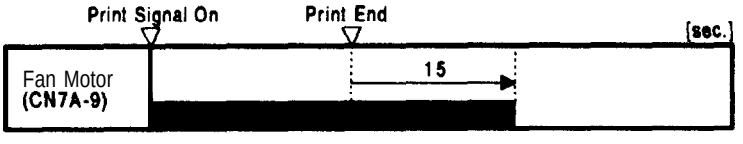


Figure 2-32. Fan Motor Speed Control Timing

If the voltage of pin IC1A-64 on the engine controller board (PWB-A) does not exceed 150mV for 1 second, the printer indicates a fan motor malfunction.

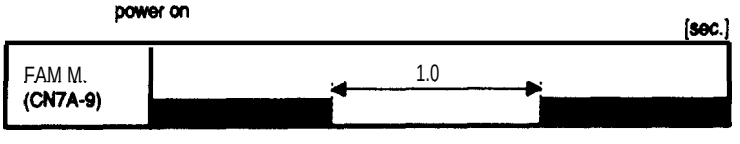


Figure 2-33. Fan Motor Malfunction Search Timing

2.1.2.8 Power Supply Circuit Function and Safety Protection

The printer's power supply board (PWB-E) supplies the +5 VDC and +24 WC. The +24 VDC is used as the bias voltage supply, main motor (Ml) drive, scanner mirror motor (M2) drive, fan motor (M3) drive, and solenoid drive. For safety protection, the +24 VDC line is cut when the interlock switch (case open switch) is off.

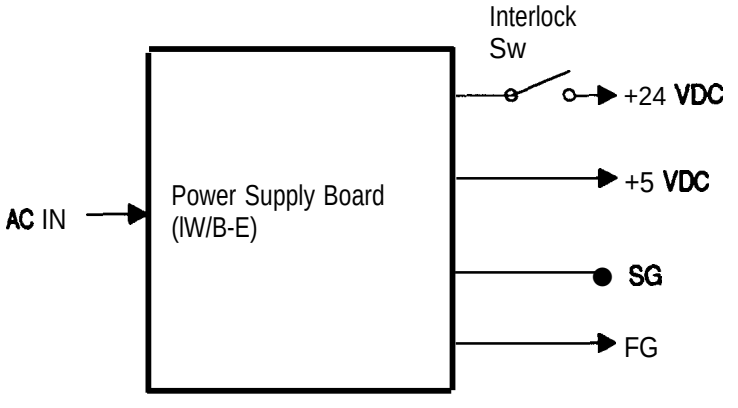


Figure 2-34. Power Supply Circuit Block Diagram

2.2 VIDEO CONTROLLER OPERATION

The video controller section generates the video signals for the received data. The video controller section is separate in the C125 MAIN board and the control panel. The control panel is connected to the engine controller board (PWB-A), but is controlled by the C125 MAIN board, which sends the signals for the control panel through the engine controller board.

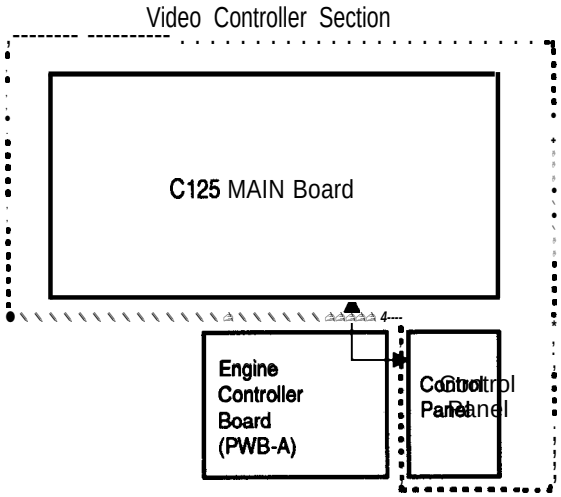


Figure 2-35. Video Controller Section

2.2.1 C125 MAIN Board Operation

Figure 2-36 shows a block diagram of the C125 MAIN board. The C125 MAIN board contains the video controller, which consists of a MB86930 (SPARKlite, 17.6 MHz, 32-bit bus) RISC CPU, the standard cells developed for this printer, DRAMs, ROM, and a 16K-bit EEPROM.

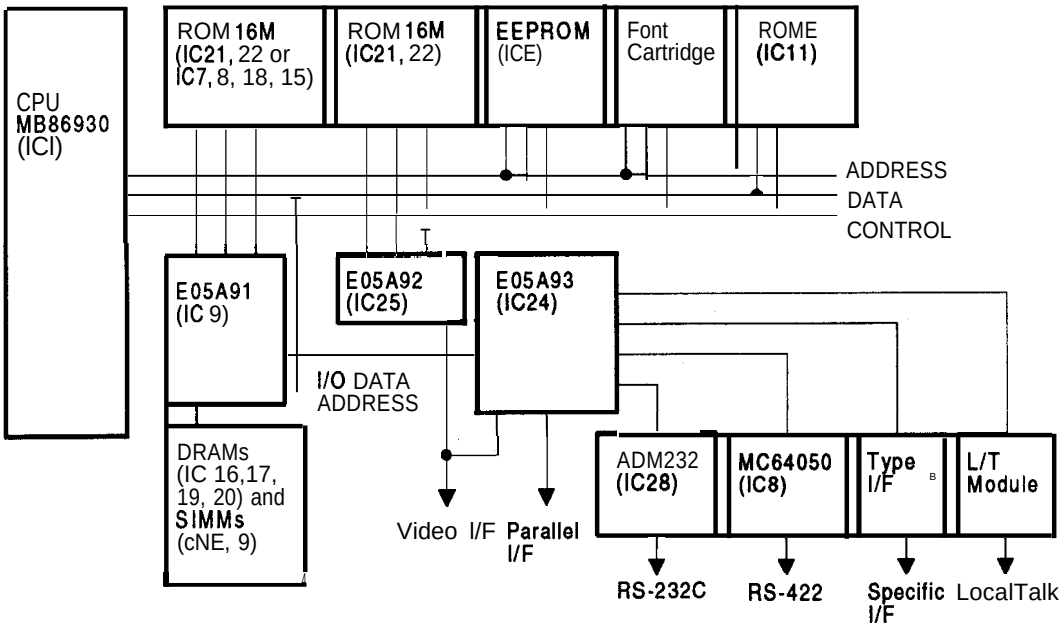


Figure 2-36. C125 MAIN Board Block Diagram

Table 2-2 lists the functions of the C125 MAIN board main elements.

Table 2-2. Functions of C125 MAIN Board Main Elements

Element	Location	Function
MB86930 RISC CPU	ICI	The CPU, whch operates at 17.6 MHz, manages the video controller operation.
E05A91 ASIC	IC9	This ASIC contains the following functions: . Address decoding . DRAM management (refresh control, RAS/CAS control)
E05A92 ASIC	IC25	This ASIC contains the following functions: • Video signal processing . BiRITech • EMGTech
E05A93 ASIC	IC24	This ASIC contains the following functions: . Video interface . Bi-Parallel interface • RS-232C interface . RS-422 interface • LocalTalk module control • Type-B interface card control . Control panel control
Two 8M ROMs or four 4M ROMs	IC21,22 or IC7,8,18,15	These ROMs are code ROM.
Two 8M ROMs	IC4,5	These ROMs are font ROM.
8M ROM	IC11	This ROM is local language ROM (fonts) option (except in ActionLaser 1800).
EEPROM	IC10	This EEPROM stores the following: . Model type . Printed page counter value . Toner life counter value . Jam counter value . SelecType setting
DRAM	IC16,17,19, 20	These DRAMs are used as the working area of the CPU: input buffer, image buffer, etc.
ADM232	IC28	This IC changes the RS-232C signal level.
MC34050	IC8	This IC changes the RS-422 signal level.

Print data and commands transmitted from the host computer via parallel, serial, or optional interfaces are read using the interrupt process of the CPU and stored in the DRAM input buffer.

Data and commands in the input buffer are processed by the CPU, which then stores the printing bitmap data (image data) in the V (video) -RAM (image buffer) in the DRAM. The size of the V-RAM depends on the available DRAM size. A "PRINT OVERRUN" occurs when the V-RAM is so small that the CPU cannot process data faster than it is transmitted to the engine controller board. If such an error occurs, the user can increase the V-RAM by using SelecType setting "PAGE PROTECT".

The E05A91 transmits image data stored in the V-RAM to E05A92. The E05A92 changes image the data format from 32 bits parallel data to serial data, and stores it in the internal temporary buffer. The temporary buffer has a capacity equivalent to several lines. This is controlled by the E05A92, which synchronizes and transmits the temporary buffer's data to the engine controller board. The E05A92 then manipulates the printer data according to the BiRITech and EMGTech settings.

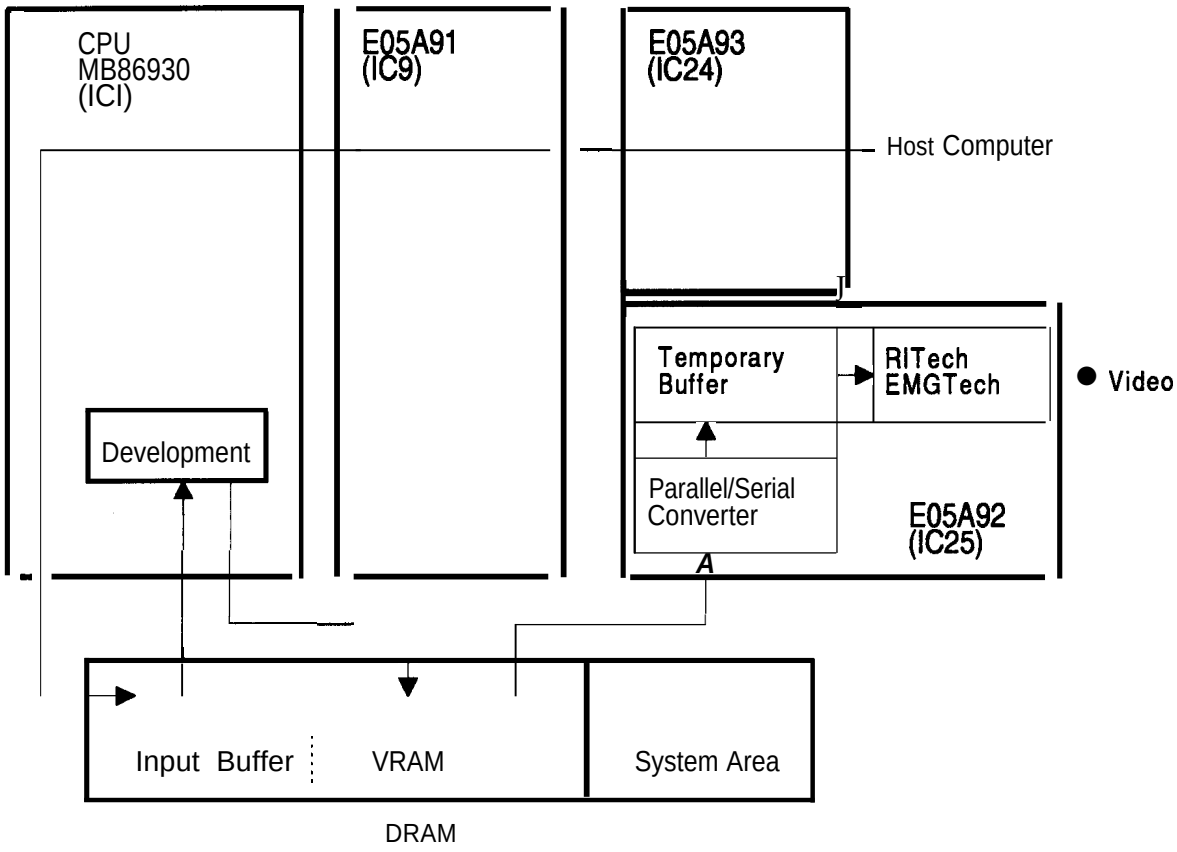


Figure 2-37. Data Flow Diagram

2.2.1.1 Reset Circuit

The entire system (the CPU and the external devices) can be initialized if the RESET signal (CPU pin 113) are active simultaneously. This circuit uses an M51938 IC to monitor the supply voltage if a voltage level less than 425 V is detected. The reset time is approximately 128 ma.

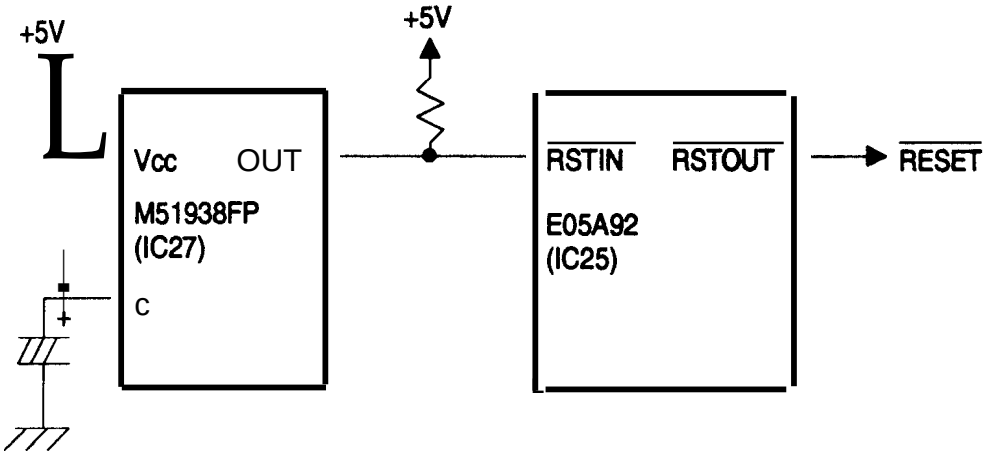


Figure 2-38. Reset Circuit

2.2.1.2 Bus Control Circuit

The MB86930 CPU outputs the R/W (read/write) signal, AS (address strobe) signal, and the BE0, BE1, BE2, and BE3 signals (byte enables) to the ASIC E05A91. The ASIC E05A91 uses these signals to generate the RD (read strobe) signal, WR (write strobe) signal, and READY signal.

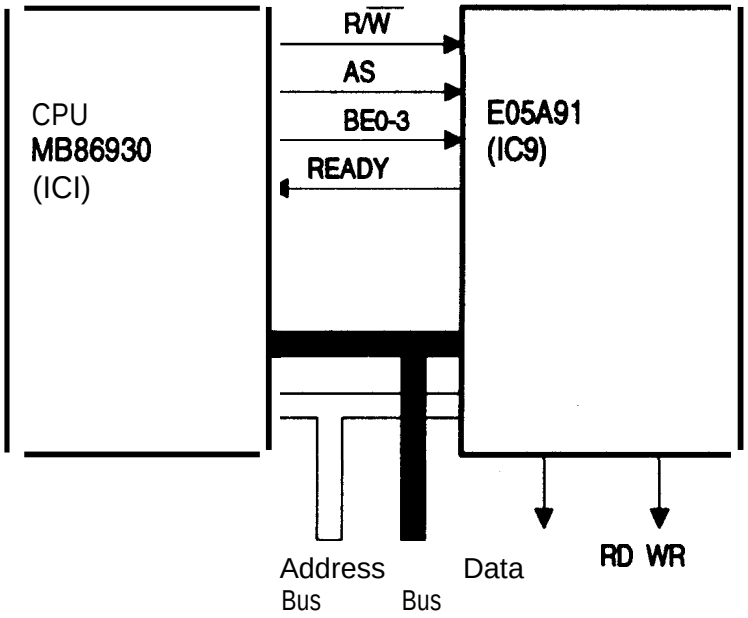


Figure 2-39. Bus Control Circuit

2.2.1.3 Interrupt Control

The ASIC E05A93 determines the priority level of the interrupt and outputs it to terminals IRL0 - IRL3. Then an interrupt is sent to the CPU. When the IRL0-3 value is 1111b, the CPU process is a non-maskable interrupt process. When the IRL0-3 value is 0000b, the CPU process is a standard process. When the IRL0-3 is any other value, the CPU process is a maskable interrupt process.

2.2.1.4 DRAM Management

The video controller uses DRAMs for the system RAM and for the V-RAM.

In this printer, a standard four 512K x 8 DRAMs are mounted in locations IC20, IC19, IC17, and IC16, providing a total of 2.0 MB. SIMM sockets number 1 (CN8) and number 2 (CN9) are optional SIMM sockets. These SIMM sockets can use 1,2,4,8,16,32 MB SIMM (32-bit bus).

The DRAMs (including optional SIMMs) are managed by the ASIC E05A91. The ASIC E05A91 handles the management. The E05A91 outputs MAO-10 (memory address), ItAS/CAS, and WE signals.

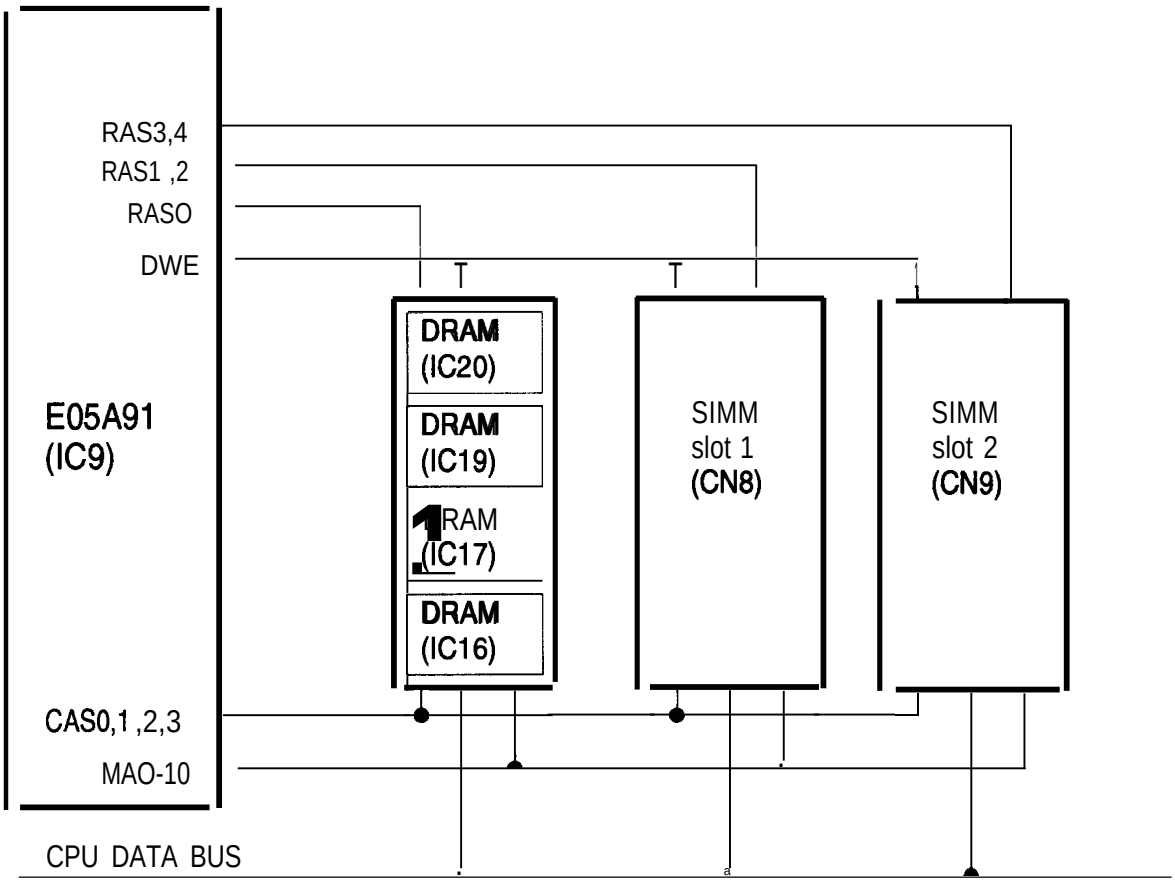


Figure 2-40. DRAM Management

2.2.1.5 Parallel Interface Circuit

Figure 2-41 shows the parallel interface circuit block diagram. Data sent from the host computer is latched within the E05A93 by the STROBE signal. The E05A93 outputs the BUSY signal automatically to stop the host computer from sending additional data. The CPU resets the BUSY signal after reading the data from the E05A93, so that the printer is ready to receive more data from the host computer.

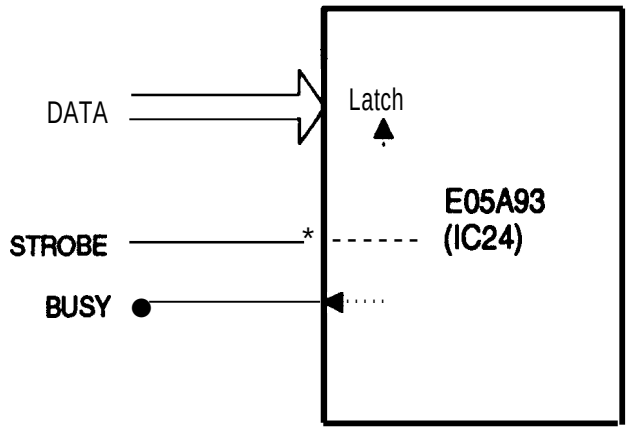


Figure 2-41. Parallel Interface Circuit

2.2.1.6 RS-232C Circuit

This circuit uses the RS-232C receiver/driver IC ADM232 (IC28) to change the signal level from the RS-232C signal level (-12 VDC or +12 VDC) to the TTL signal level (O V or +5 V) or from the TTL signal level to the RS-232C signal level. This IC converts +5 VDC to +12 VDC and -12 VDC. The E05A93 standard cell changes serial (RS-232C) data to parallel data.

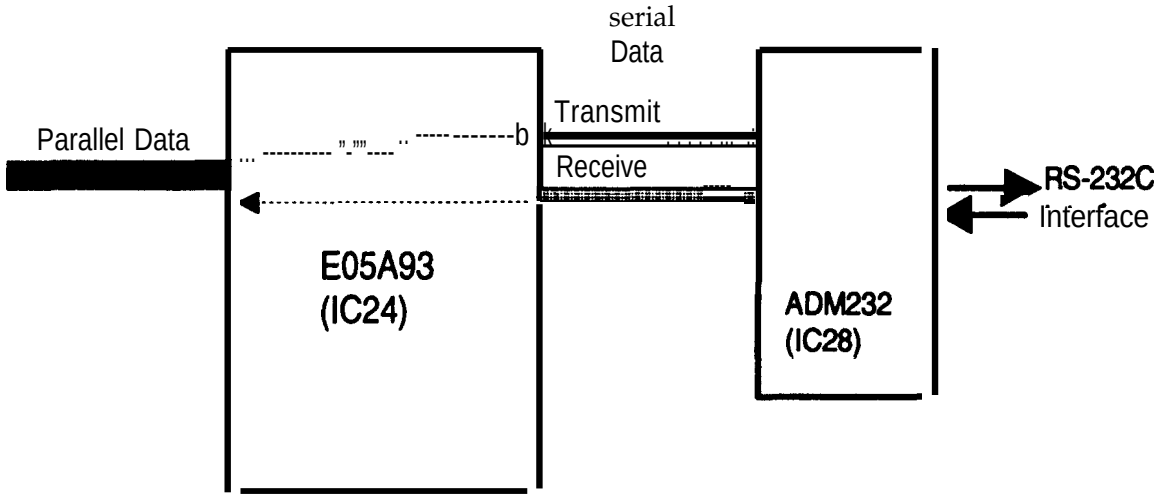


Figure 2-42. RS-232C Circuit

2.2.1.7 RS-422 Circuit

This circuit uses the RS-422 receiver/driver IC MC34050 (IC6) to change the signal level from the RS-422 signal level to the TTL signal level (O V or +5 V) or from the TTL signal level to the RS-422 signal level.

The E05A93 standard cell changes serial (RS-422) data to parallel data.

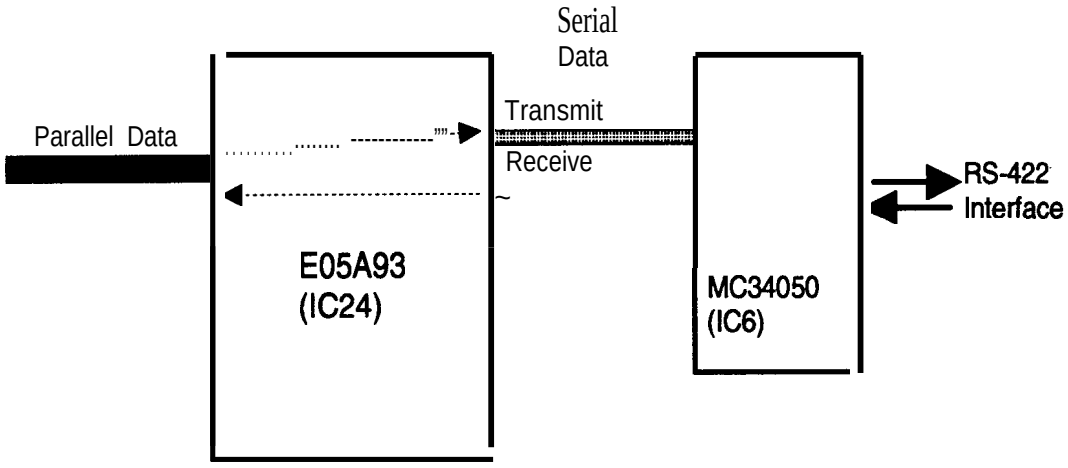


Figure 2-43. RS-422 Circuit

2.2.1.8 LocalTalk Circuit

The LocalTalk circuit is an optional C82326* I/F board. It uses three ICs: 85C30 (IC3), 26LS30 (ICI), and 26LS32 (IC2). The 85C30 (IC3) changes parallel data to serial data or serial data to parallel data. It is controlled by E05A93 (IC24) at the C125 MAIN board.

The 26LS30 (ICI) and the 26LS32 (IC2), which are signal level change ICs, changes a TTL signal level to a LocalTalk signal level (compatible with RS-422 signal level).

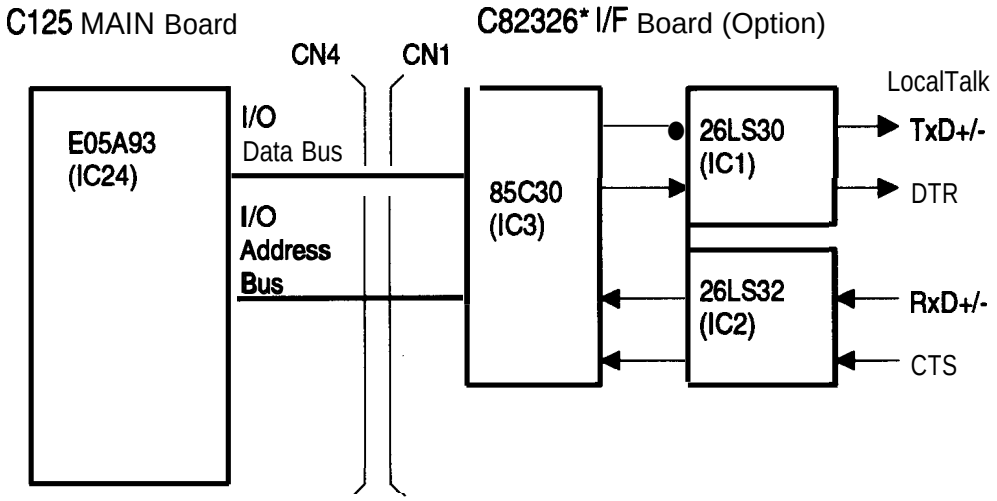


Figure 2-44. LocalTalk Circuit

2.2.1.9 Optional Type-B Interface

This printer supports an EPSON Type-B optional interface, which is controlled by the INH and BIF signals from the E05A93 (IC24).

2.2.1.10 Video Interface

The ASIC E05A92 maps the SRAM into a memory space different from the system memory. The CPU transmits data from the V-RAM (in the system RAM) to the SRAM using the ASIC E05A92. The ASIC cell converts the image data in the SRAM from parallel to serial, synchronizes it, and then transmits it to the engine controller board. In other words, the SRAM is a temporary buffer used to transmit the image data to the engine controller board. This serial image data is called the VIDEO signal of video interface.

The signal line of the internal video interface circuit (the C125 MAIN board and engine controller board) can be broadly divided into four groups. The first group (PRINT, CPRDY, EPRDY, and PRDY) gives the status of either the video controller or engine controller and indicates whether they are ready to communicate with each other or ready to start the printing operation. The second group (VSYNC, HSYNC) is the synchronizing signal for the printing operation. The third group (VIDEO) is the serial video data signal. The fourth group (CMD, SRCLK, CTBSY, and ETBSY) is used to transfer the commands (from the video controller) or the status (from the engine controller) for printer mechanism control. Except for VIDEO, PRINT, VSINC, and HSYNC, all signals are controlled by ASIC E05A93.

This printer has BiRITech and EMGTech functions standard. These functions modify the VIDEO signal with the ASIC EO.5A92.

Chapter3 Disassembly and Assembly

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3.1 GENERAL INFORMATION

This chapter describes the disassembly/assembly procedures to be used for replacing the main assemblies of the EPL-5600/ActionLaser 16(X).

3.1.1 Precautions for Disassembly/Assembly

Follow the precautions below when disassembling/assembling the printer.

WARNING

- *Disconnect the power cord before disassembling/assembling the printer.*
- *Be sure to handle the fusing unit carefully, because the unit remains hot for a while after the printer stops printing.*
- *If it is necessary to plug in the power cord and operate the printer after disassembling it, please be careful of the following:*
  1. *Keep your hands and clothing well away from operating or rotating parts (such as rollers, fan motors, etc.).*
  2. *Never touch electric terminals or high-voltage components (such as the charger and the high voltage unit).*

CAUTION

- *Do not disassemble the imaging cartridge.*
- *If the imaging cartridge is removed from the printer, do not place it in direct sunlight.*
- *Do not disassemble the optical unit.*
- *Never turn power on if the optical* unit is not *installed.*
- *To prevent damage to ICs from static electricity, do not touch the ICs on the circuit board or the terminals of peripheral electrical components with your hands.*
- *Use only the recommended tools to ensure safe and efficient maintenancee work. Inappropriate tools may damage the machine.*
- *Never open the upper unit until the main motor stops completely. Otherwise, the gears may be damaged.*
- *When transporting the printer, remove the imaging cartridge from the printer.*
- *When transporting the printer a long distance, pack up the printer using the original packing material.*

3.1.2 Tools

Use the tools listed in Table 3-1 for disassembling/assembling the printer and for troubleshooting.

Table 3-1. Tools

Name	Commercially Available?	Part No.
Philips screwdriver No. 2	Yes	B743800200
Regular screwdriver	Yes	B743000100
Tweezers	Yes	B641000100
Soldering iron	Yes	B7402OO1OO
Round-nose pliers	Yes	B740400100

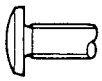
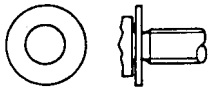
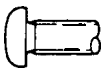
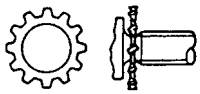
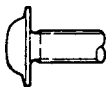
3.1.3 Small Parts

In the following sections, abbreviations are used for small parts, such as screws and washers. Tables 3-2 and 3-3 list these abbreviations.

Table 3-2. Abbreviations Used for Screws

Abbreviation	Part Name
CP	Cross-recessed Pan head
c c	Cross-recessed Cup head
CP(O)	Cross-recessed Pan head with Outside toothed lock washer
CP(S)(P1)	Cross-recessed Pan head with Spring lock washer and 1 Plain washer
CCB	Cross-recessed Cup head Bind
SCB	Slotted Cross-recessed B-tight
SCB(S)(P1)	Slotted Cross-recessed Bind with Spring washer and 1 Plain washer

Table 3-3. Screw Types and Abbreviations

Head		Body	Washer (assembled)
Top	Side		
1. Cross-recessed head 	1. Bind 	1. Normal 	1. Plain washer 1 
2. Slotted Cross-recessed head 	2. Pan 	2. B-tight 	2. Outside toothed lock washer 
	3. Cup 		3. Spring washer 

3.1.4 Service Checks after Repair

Check the repaired unit using the following list on completion of servicing.

Table 3-4. Checks after Repair

Item	Location	Check Point	Check
Operation	Control panel	Do all LEDs, LCD, and buttons function normally?	
	Heater lamp	Does the heater lamp turn ON normally?	
	Test print (status sheet, font sample, feature print)	Is the test print performed normally?	
	HP font cartridge	Do cartridge fonts print on font sample printing?	
	Data print	Does data print in all modes?	
Adjustment	Print position	Is the gap between the top edge of the paper and the horizontal line in the FACT SHEET print exactly 19.1 mm (0.75 inch) for EPL-5600 or 14.3 mm (0.56 inch) for ActionLaser 1600 ?	
ROM version		Is it the latest version?	
Cleaning		Is toner and dust removed from the paper path? Is the lens on the optical unit cleaned? Is the paper take-up roller cleaned? Is the roller in the fusing unit cleaned? is the outer surface of the printer clean?	
Packing		Is the imaging cartridge removed from the printer? Is the unit packed securely? Are accessories packed also?	

3.2 DISASSEMBLY AND ASSEMBLY

This section describes and illustrates the procedures for removing and disassembling the components of the EPL-5600/ActionLaser 1600. Cleaning is described in Chapter 6. The assembly procedures are not described, except for special notes where necessary, because assembly can be accomplished by performing disassembly in reverse.

3.2.1 Removal of the Video Controller Section

The control section is comprised of the video controller board (the C125 MAIN board) and the control panel board. "

3.2.1.1 Video Controller Board (C125 MAIN Board) Removal

CAUTION

Before you remove the video controller board, make sure that you remove any optional cards or cartridges. Otherwise, you may damage the cartridge or card connectors on the board as well as the cartridge or card itself.

1. Turn the printer so that its left side faces you.
2. Remove the 2 SCB screws (M3 x 14) securing the interface card cover; then pull off the cover.
3. Remove the 3 SCB(S)(P1) screws (M3 x 6) that secure the metal bracket on the left side of the printer.

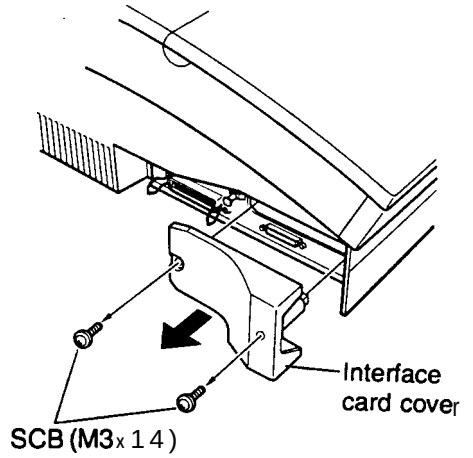


Figure 3-1. Removing the Interface Cover

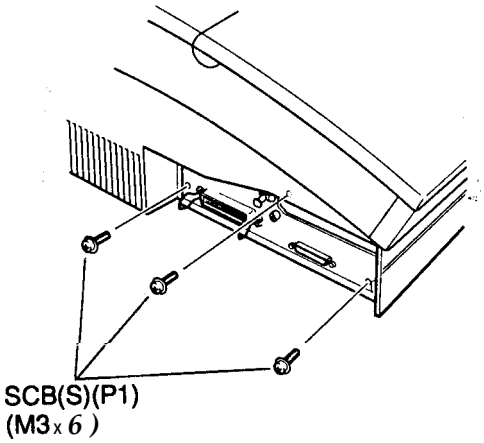


Figure 3-2. Removing the 3 Screws

4. Pull the tab on the bottom of the bracket to release the video controller board, as shown below.
5. Grasp the board with both hands and pull it out of its slot.

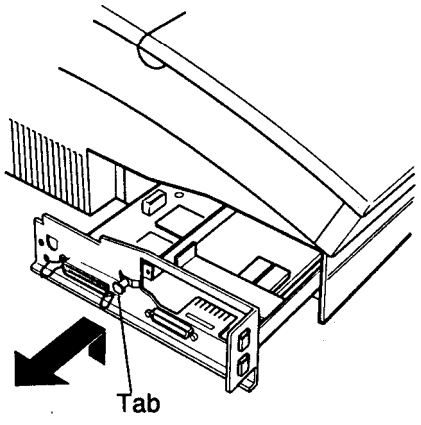


Figure 3-3. Pulling the Tab

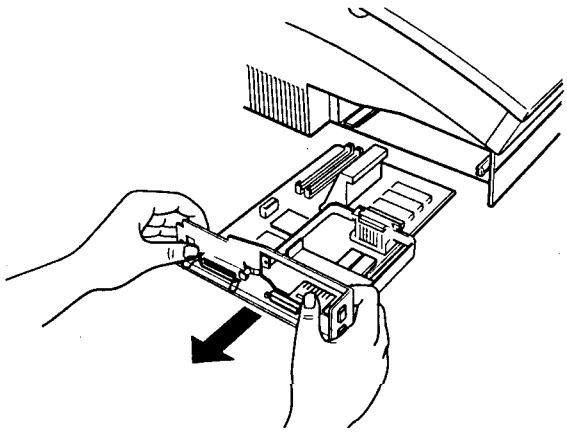


Figure 3-4. Removing the Video Controller Board

3.2.1.2 LocalTalk Module (C82326* I/F Board) Removal

1. Remove the video controller board (C125 MAIN board). (Refer to Section 3.2.1.1.)
2. Remove 2 CP screws (M3 x5) from the LocalTalk module.
3. Remove the LocalTalk module from the video controller board (C125 MAIN board).

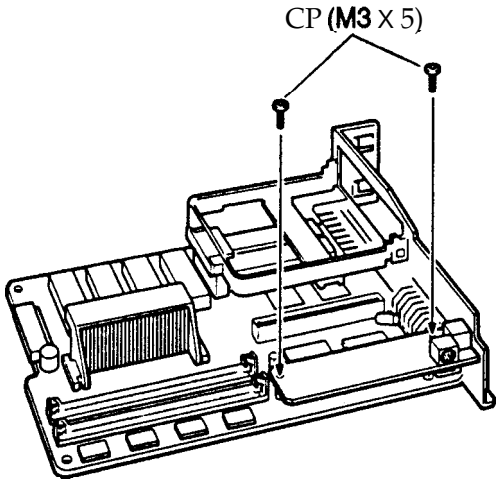


Figure 3-5. Removing the 2 Screws

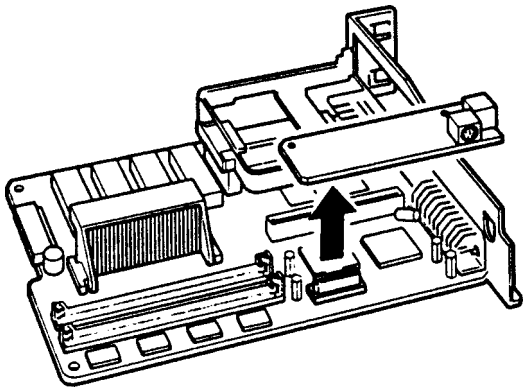


Figure 3-6. Removing the LocalTalk Module

3.2.1.3 Control Panel Removal

1. Open the top cover. Remove the imaging cartridge. Cover the imaging cartridge to protect it from light or place it in a dark area.
2. Remove 1 CC screw (M3 x 8) from the control panel.
3. Lift the control panel, and then remove connector CN3 on the engine controller board (PWB-A).
4. Remove the control panel.

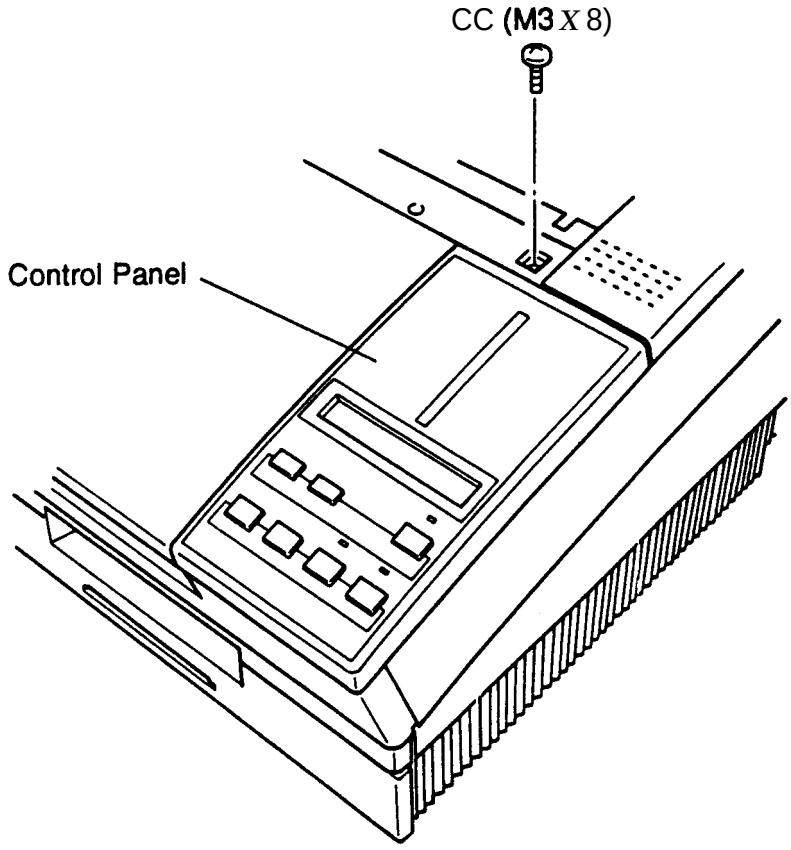


Figure 3-7. Removing the Control Panel

3.2.2 Housing Removal

This section describes how to remove the cases and the rear frame.

3.2.2.1 Case Removal

1. Remove the video controller board (C125 MAIN board). (Refer to Section 3.2.1.1.)
2. Open the top cover. Remove the imaging cartridge. Cover the imaging cartridge to protect it from light or place it in a dark area.
3. Remove the control panel. (Refer to Section 3.2.1.3.)
4. Remove the paper cover.
5. Remove 3 CC screws (M3 x 8) for the paper guide case, and remove the paper guide case.
6. Loosen 2 CC screws (M3 x 8) and the front cover.
7. Remove 1 CCB screw (M3 x 8) and 2 CC screws (M3 x 8), and remove the right cover.
8. Remove 3 CC screws (M3 x 8) and left cover.
9. Remove the top cover.

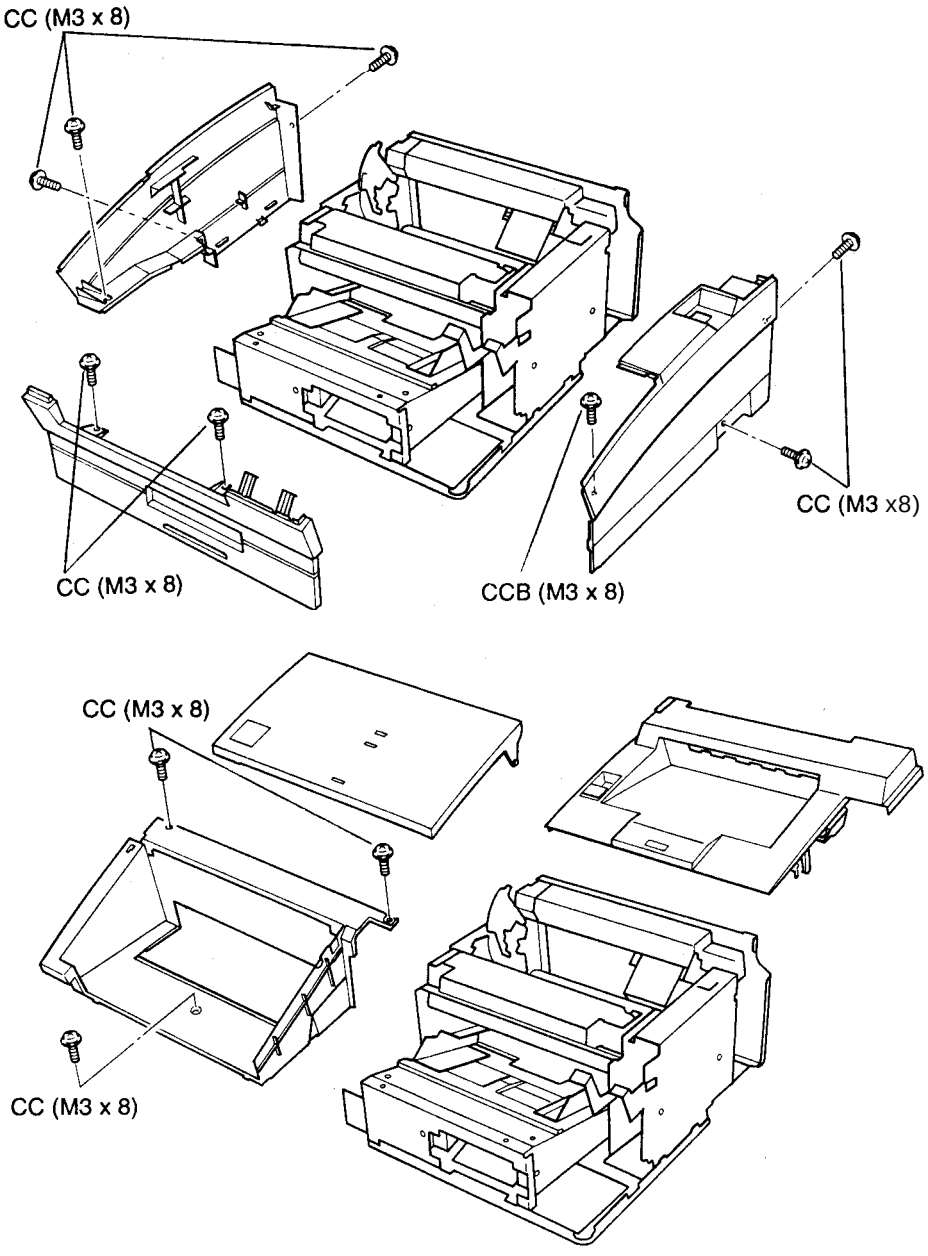


Figure 3-8. Removing the Housing

3.2.2.2 Rear Frame Removal

1. Remove the video controller board (C125 MAIN board). (Refer to Section 3.2.1.1.)
2. Open the top cover. Remove the imaging cartridge. Cover the imaging cartridge to protect it from light or place it in a dark area.
3. Remove the control panel. (Refer to Section 3.2.1.3.)
4. Remove the paper cover.
5. Remove the right cover and left cover. (Refer to Section 3.2.2.1.)
6. Remove the top cover.
7. Remove 6 CP(O) screws (M3 x 6) and lift the rear frame.
8. Disconnect connector CN1 on the power supply board (PWB-E) and connector CN2 on the high-voltage supply board (PWB-F).

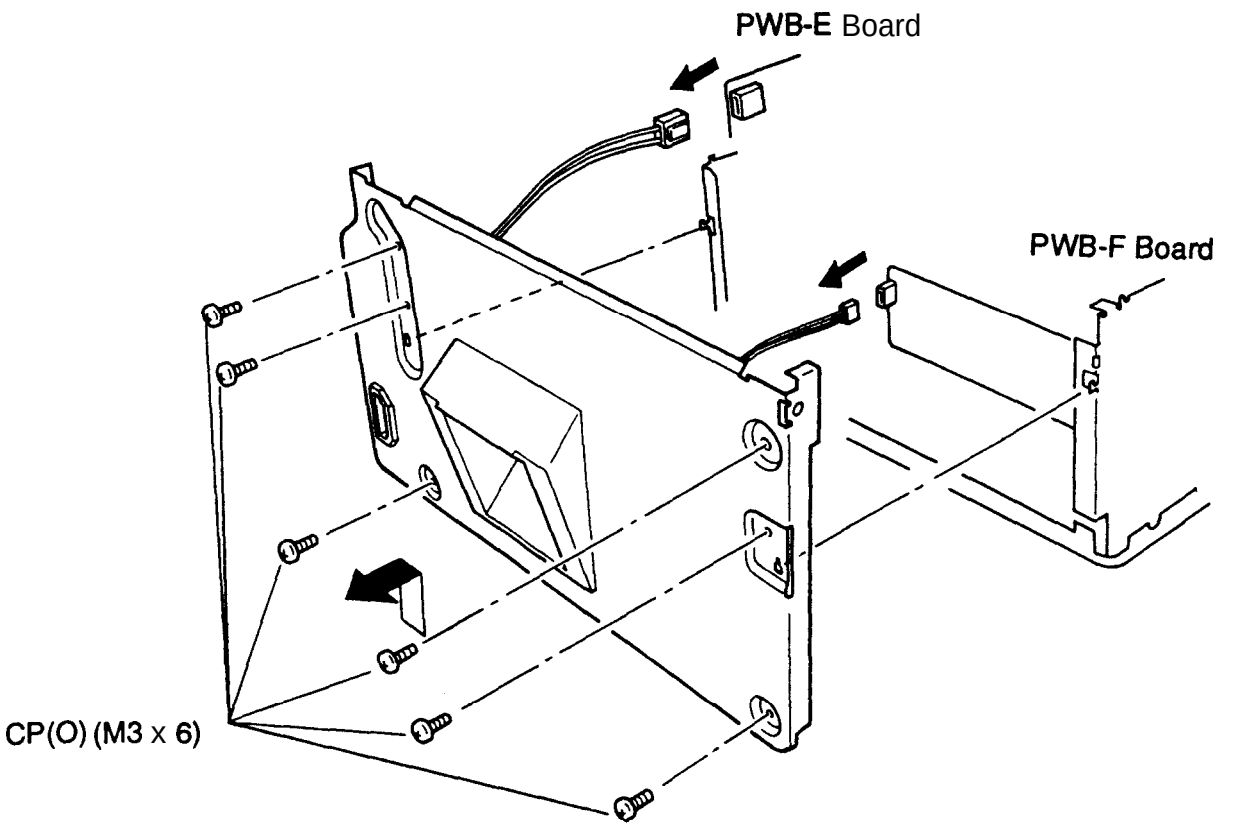


Figure 3-9. Removing the Rear Frame

3.2.3 Disassembling the Engine

This section describes disassembling the engine, including the engine controller board (PWB-A) and power supply board (PWB-E).

3.2.3.1 Engine Controller Board (PWB-A) Removal

1. Remove thevideocontroller board (C125 MAIN board). (Refer to Section 3.2.1.1.)
2. Open the top cover. Remove the imaging cartridge. Cover the imaging cartridge to protect it from light or place it in a dark area.
3. Remove the control panel. (Refer to Section 3.2.1.3.)
4. Remove the paper cover.
5. Remove the right cover. (Refer to Section 3.2.2.1.)
6. Disconnect connectors CN2, CN6, CN7, CN9, CN8, CN5, and CN4 on the engine controller board (PWB-A).
7. Remove 4 CC screws (M3 x 6) on the engine controller board (PWB-A).
8. Remove the engine controller board (PWB-A).

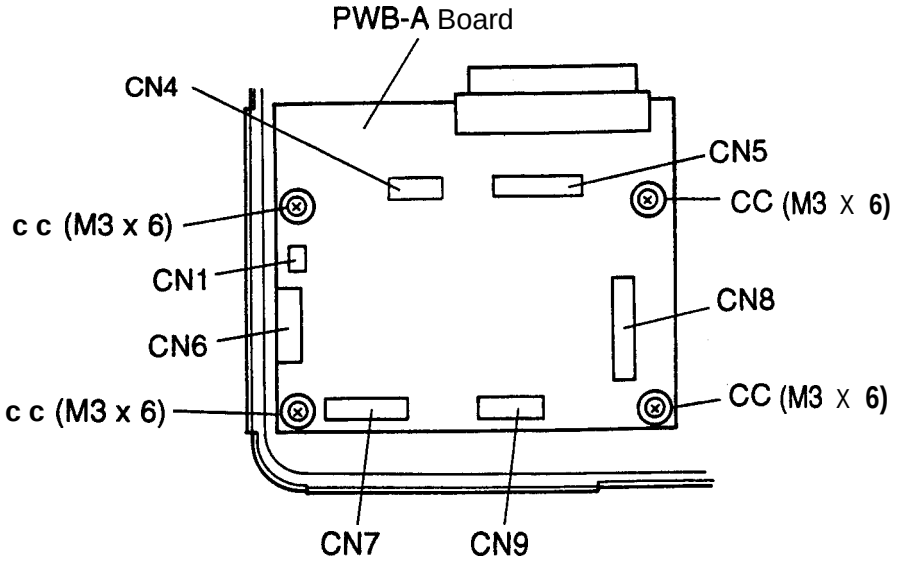


Figure 3-10. Removing the Engine Controller Board (PWB-A)

3.2.3.2 Power Supply Unit (PWB-E) Removal

1. Open the top cover. Remove the imaging cartridge. Cover the imaging cartridge to protect it from light or place it in a dark area.
2. Remove the control panel. (Refer to Section 3.2.13.)
3. Remove the paper cover.
4. Remove the right cover. (Refer to Section 3.2.2.1.)
5. Disconnect connectors CN1, CN4, and CN2 on the power supply board (PWB-E) and CN8 on engine controller board (PWB-A).
6. Disconnect the connectors for the interlock switch.
7. Remove 2 CP(O) screws (M3 x 6), and remove the power supply unit.

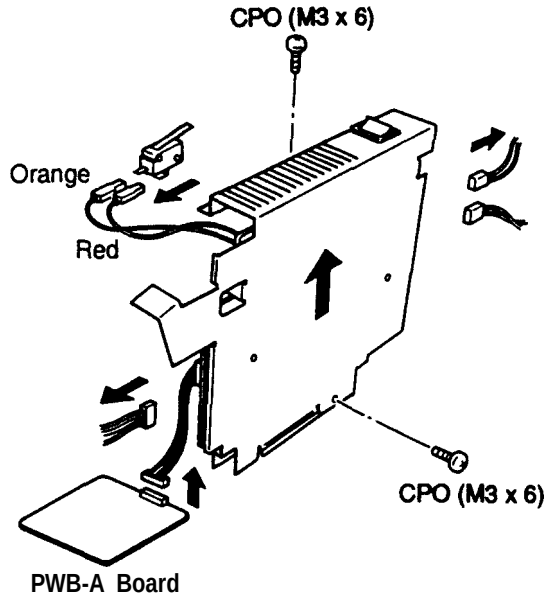


Figure 3-11. Removing the Power Supply Unit

3.2.3.3 Interlock Switch Removal

1. Open the top cover. Remove the imaging cartridge. Cover the imaging cartridge to protect it from light or place it in a dark area.
2. Remove the control panel. (Refer to Section 3.2.13.)
3. Remove the paper cover.
4. Remove the right cover. (Refer to Section 3.2.2.1.)
5. Remove the power supply unit. (Refer to Section 3.2.3.2.)
6. Remove 2 CC screws (M3 x 16) for the interlock switch, and remove the interlock switch.

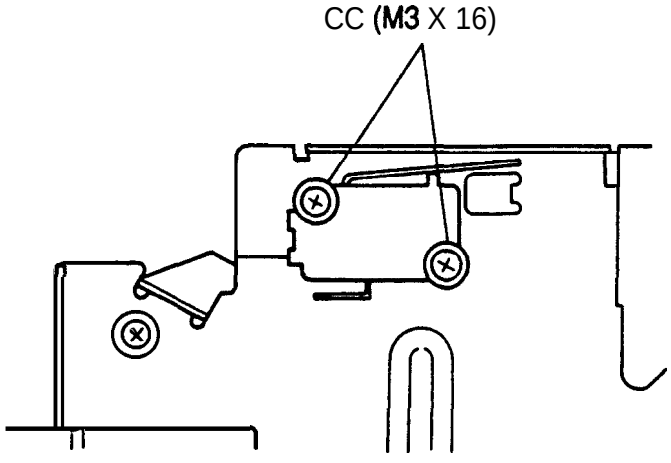


Figure 3-12. Removing the Interlock Switch

3.2.3.4 Optical Unit Removal

CAUTION

- *Do not touch the optical unit except at the time of replacement.*
- *Do not open the unit under any conditions.*
- *Do not remove the circuit board from the optical unit under any condition.*
- *Do not loosen the 2 screws that secured with a black paint (shown in position A in the figure).*
- *Do not loosen the 2 screws (shown in position B in the figure).*

1. Open the top cover. Remove the imaging cartridge. Cover the imaging cartridge to protect it from light or place it in a dark area.
2. Remove the control panel. (Refer to Section 3.2.1.3.)
3. Remove the paper guide.
4. Remove the paper guide case. (Refer to Section 3.2.2.1.)
5. Disconnect comector CN5 on the engine controller board (PWB-A).
6. Remove 2 CC screws (M3 x 6) and 1 CC screw (M3x12), and remove the optical unit.

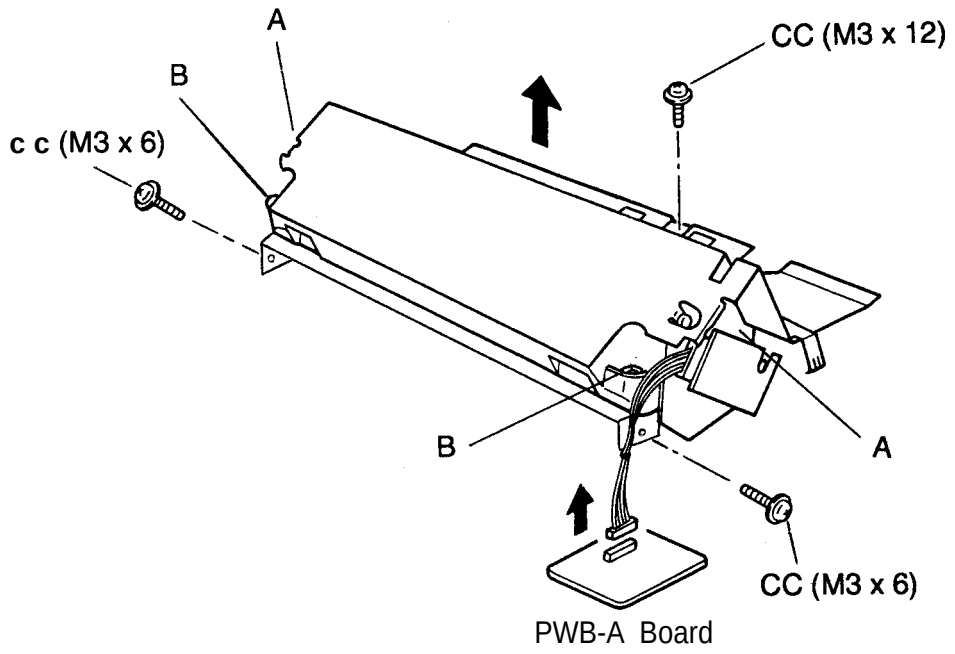


Figure 3-13. Removing the Optical Unit

3.2.3.5 Paper Empty Sensor Removal

1. Open the top cover. Remove the imaging cartridge. Cover the imaging cartridge to protect it from light or place it in a dark area.
2. Remove the control panel. (Refer to Section 3.2.1.3.)
3. Remove the paper cover.
4. Remove the paper guide case. (Refer to Section 3.2.2.1.)
5. Remove thepowersupply unit. (Refer to Section 3.2.3.2.)
6. Remove the optical unit. (Refer to Section 3.23.4.)
7. Remove the paper empty sensor.
8. Disconnect the connector for the paper empty sensor.

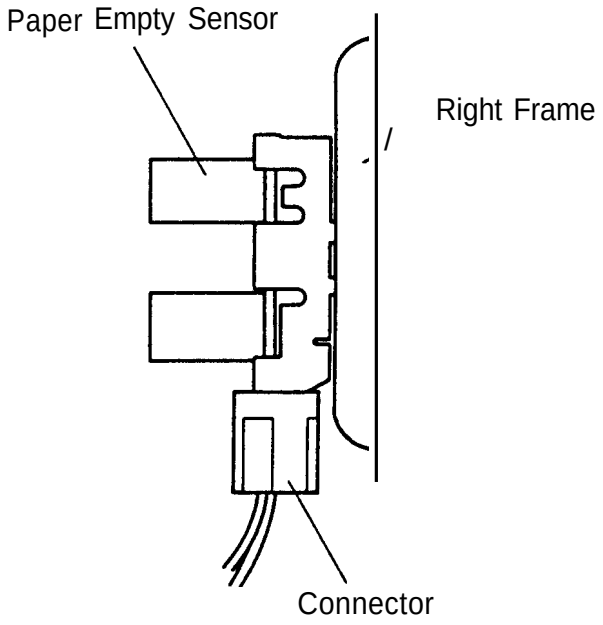


Figure 3-14. Removing the Paper Empty Sensor

3.2.3.6 High-Voltage Supply Board (PWB-F) Removal

1. Open the top cover. Remove the imaging cartridge. Cover the imaging cartridge to protect it from light or place it in a dark area.
2. Remove the control panel. (Refer to Section 3.2.1.3.)
3. Remove the paper cover.
4. Remove the right cover and left cover. (Refer to Section 3.2.2.1.)
5. Remove the top cover. (Refer to Section 3.2.2.1.)
6. Remove the rear frame. (Refer to Section 3.2.2.2.)
7. Disconnect connectors CN1, CN3, the red wire terminal, and the black wire terminal on the high-voltage supply board (PWB-F).
8. Remove 3 CP screws (M3 x 8) on the high-voltage supply board, and remove the high-voltage supply board (PWB-F).

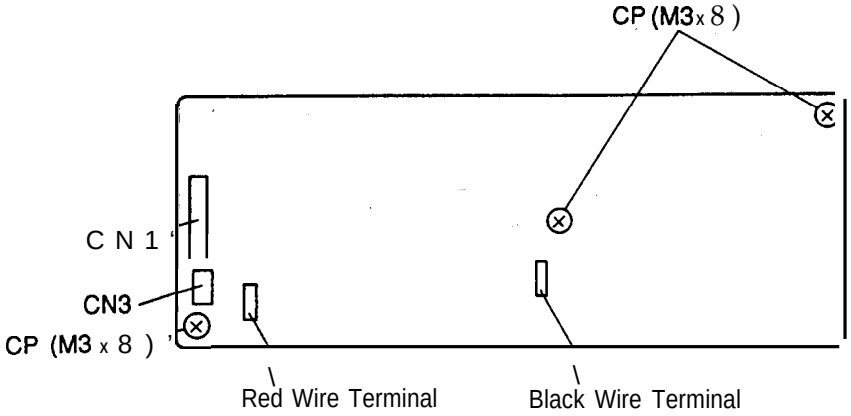


Figure 3-15. Removing the High-Voltage Supply Board

3.2.3.7 Main Motor (Ml) Removal

1. Open the top cover. Remove the imaging cartridge. Cover the imaging cartridge to protect it from light or place it in a dark area.
2. Remove the control panel. (Refer to Section 3.2.1.3.)
3. Remove the paper cover.
4. Remove the right cover and left cover. (Refer to Section 3.2.2.1.)
5. Remove the top cover. (Refer to Section 3.2.2.1.)
6. Remove the rear frame. (Refer to Section 3.2.2.2.)
7. Remove 4 CP(S)(P1) screws (M3 x 6) for the main motor (Ml).
8. Lift the main motor (Ml), and discomect the comector for the main motor (Ml).

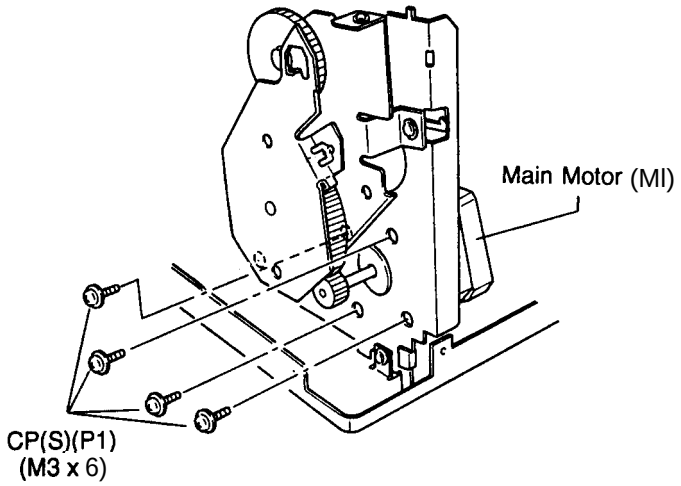


Figure 3-16. Removing the Main Motor

3.2.3.8 Fan Motor (M3) Removal

1. Open the top cover. Remove the imaging cartridge. Cover the imaging cartridge to protect it from light or place it in a dark area.
2. Remove the control panel. (Refer to Section 3.2.1.3.)
3. Remove the paper cover.
4. Remove therightcoverand left cover. (Refer to Section 3.2.2.1.)
5. Remove the top cover. (Refer' to Section 3.2.2.1.)
6. Remove the rear frame. (Refer to Section 3.2.2.2.)
7. Remove 2 CCBscrews(M3× 8), and remove the fan motor (M3).

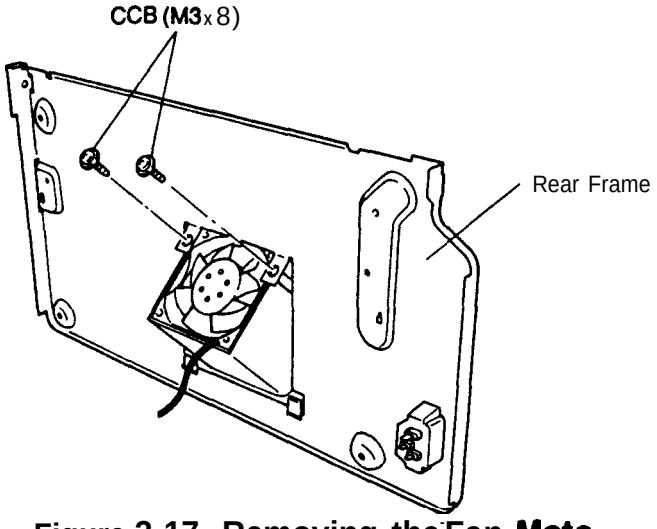


Figure 3-17. Removing the Fan Moto

3.2.3.9 Fusing Unit Removal

1. Open the top cover. Remove the imaging cartridge. Cover the imaging cartridge to protect it from light or place it in a dark area.
2. Remove the control panel. (Refer to Section 3.2.1.3.)
3. Remove the paper cover.
4. Remove the right cover and left cover. (Refer to Section 3.2.2.1.)
5. Remove the upper unit. (Refer to Section 3.2.2.1.)
6. Remove the rear frame. (Refer to Section 3.2.2.2.)
7. Disconnect the connector for the thermistor in the fusing unit, the connector for the paper exit sensor, and CN4 on the power supply board (PWB-E).
8. Remove 2 CP(O) screws (M3 x 6) on the fusing unit, and remove the fusing unit.

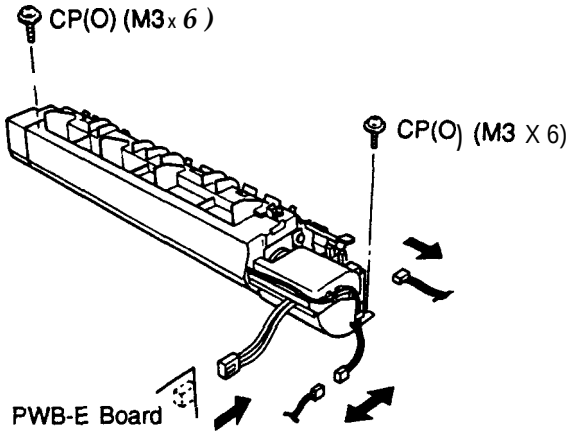


Figure 3-18. Removing the Fusing Unit

3.2.3.10 Fusing Unit Disassembly

This section describes how to remove the paper exit sensor, heater lamp, cleaning, lower fusing roller, and upper fusing roller.

1. Remove the fusing unit. (Refer to Section 3.2.3.9.)
2. Remove the paper exit sensor.
3. Remove 2 CC screws (M3 x 6) for the side covers, and remove the side covers.

CAUTION

Do *not touch the glass surface of the lamp with your bare hands.*

4. Remove 2 CC screws (M3 x 6) on the heater lamp support plate, and remove the heater lamp support plate.
5. Remove the heater lamp.

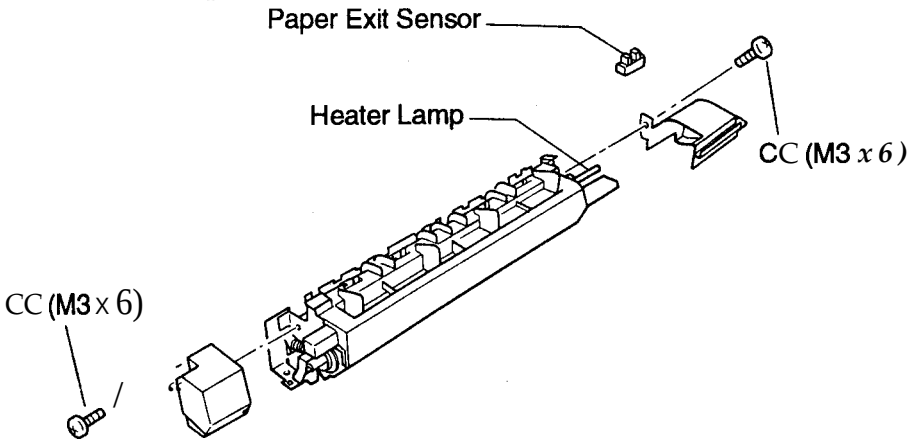


Figure 3-19. Disassembling the Fusing Unit -1

CAUTION

Be *careful not to scratch the surface of the upper fusing roller.*

6. Remove 2 CC screws (M3 x 6) on the guide plate, and remove the guide plate.
7. Remove 2 springs and 2 bushings on the lower fusing roller, and remove the lower fusing roller.
8. Remove 2 C-rings and 2 bushings on the upper fusing roller, and remove the upper fusing roller.

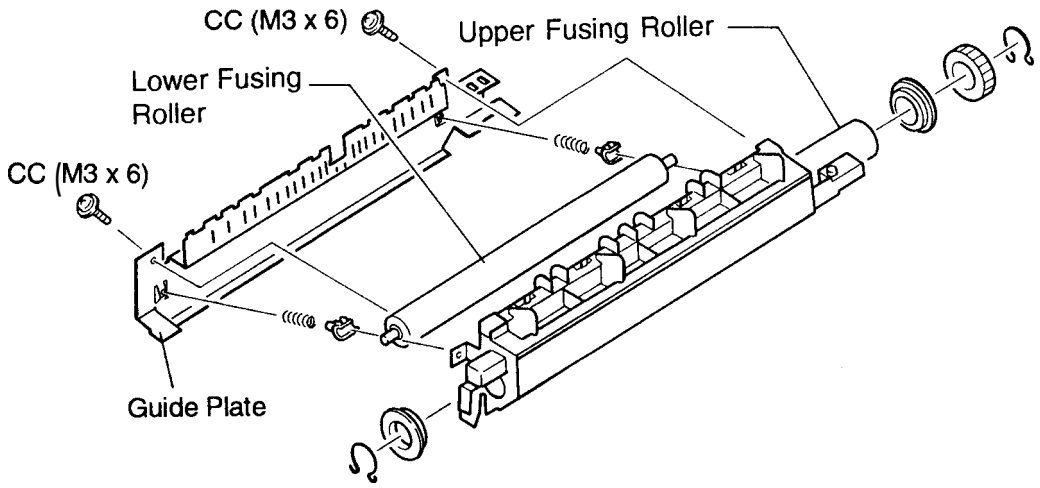


Figure 3-20. Disassembling the Fusing Unit -2

3.2.3.11 Image Transfer Roller Removal

1. Open the top cover. Remove the imaging cartridge. Cover the imaging cartridge to protect it from light or place it in a dark area.
2. Remove the control panel. (Refer to Section 3.2.1.3.)
3. Remove the paper cover.
4. Remove the left and right covers. (Refer to Section 3.2.2.1.)
5. Remove the top cover. (Refer to Section 3.2.2.1.)
6. Remove the rear frame. (Refer to Section 3.2.2.2.)
7. Remove the fusing unit. (Refer to Section 3.2.3.9.)
8. Slide the image transfer assembly to the left, lift up the right side, and remove the image transfer assembly.
9. Remove the image transfer roller.

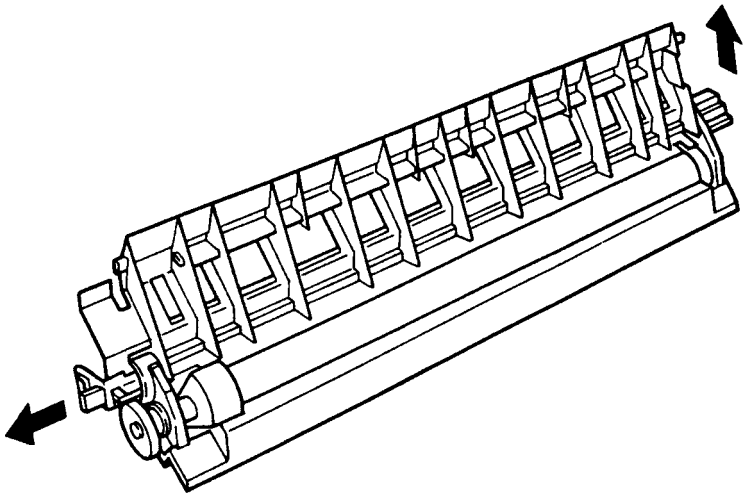


Figure 3-21. Removing the Image Transfer Assembly

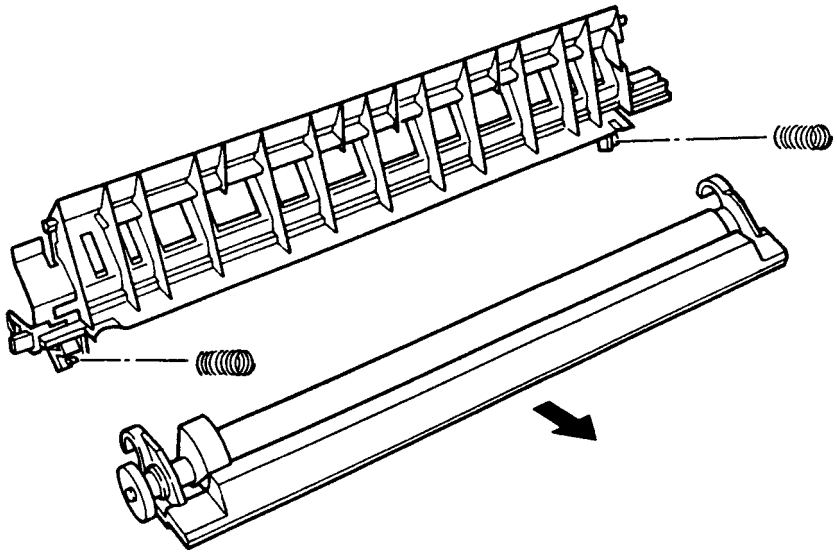


Figure 3-22. Removing the Image Transfer Roller

3.2.3.12 Paper Take-Up Roller Removal

1. Open the top cover. Remove the imaging cartridge. Cover the imaging cartridge to protect it from light or place it in a dark area.
2. Remove the control panel. (Refer to Section 3.2.1.3.)
3. Remove the paper cover.
4. Remove the left and right covers. (Refer to Section 3.2.2.1.)
5. Remove the top cover. (Refer to Section 3.2.2.1.)
6. Remove the rear frame. (Refer to Section 3.2.2.2.)
7. Remove the fusing unit. (Refer to Section 3.2.3.9.)
8. Remove the power supply unit. (Refer to Section 3.2.3.2.)
9. Remove the optical unit. (Refer to Section 3.2.3.4.)
10. Remove the image transfer assembly. (Refer to Section 3.2.3.11.)
11. Disconnect connectors CN1, CN3, the red wire terminal, and the black wire terminal on the high-voltage supply board (PWB-F).
12. Disconnect the connector CN4 on the engine controller board (PWB-A).
13. Remove the 2 CC screws (M3 x 8) on the guide plate.
14. Remove the guide plate and the paper empty sensor flag.
15. Remove 2 CC screws (M3 x 8) on the paper take-up assembly.
16. Slide the paper take-up assembly to the right, lift the left side up, and remove the paper take-up assembly.

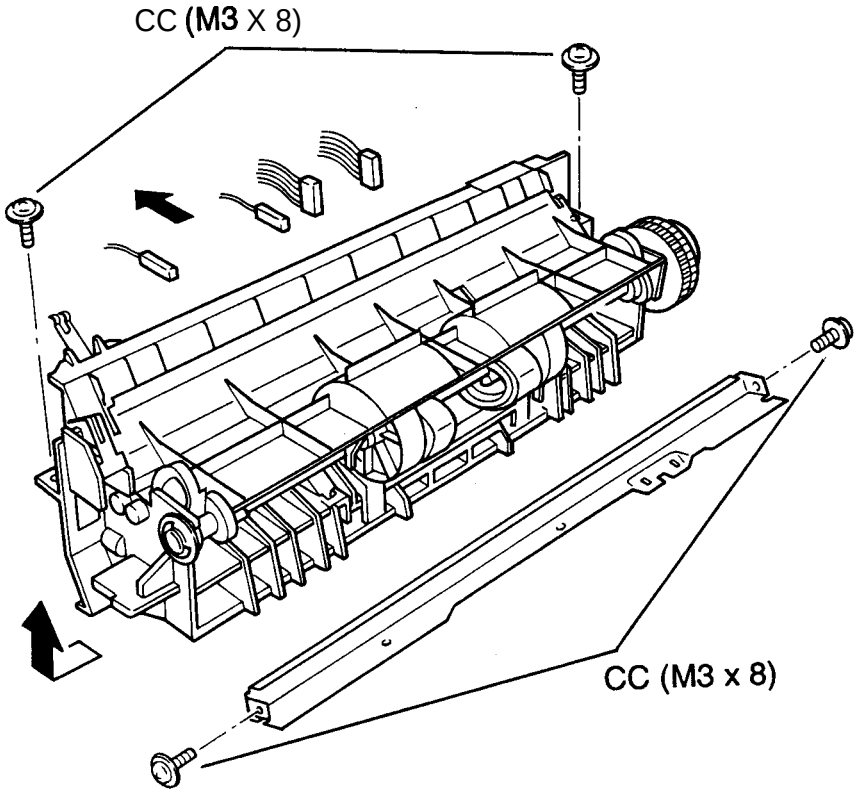


Figure 3-23. Removing the Paper Take-Up Assembly

16. Remove the roller cover.
17. Remove 1 E-ringon the paper take-up clutch, and remove the paper take-up clutch.
18. Remove 2 E-rings and left bushings on the paper take-up roller shaft.
19. Remove the paper take-up roller.

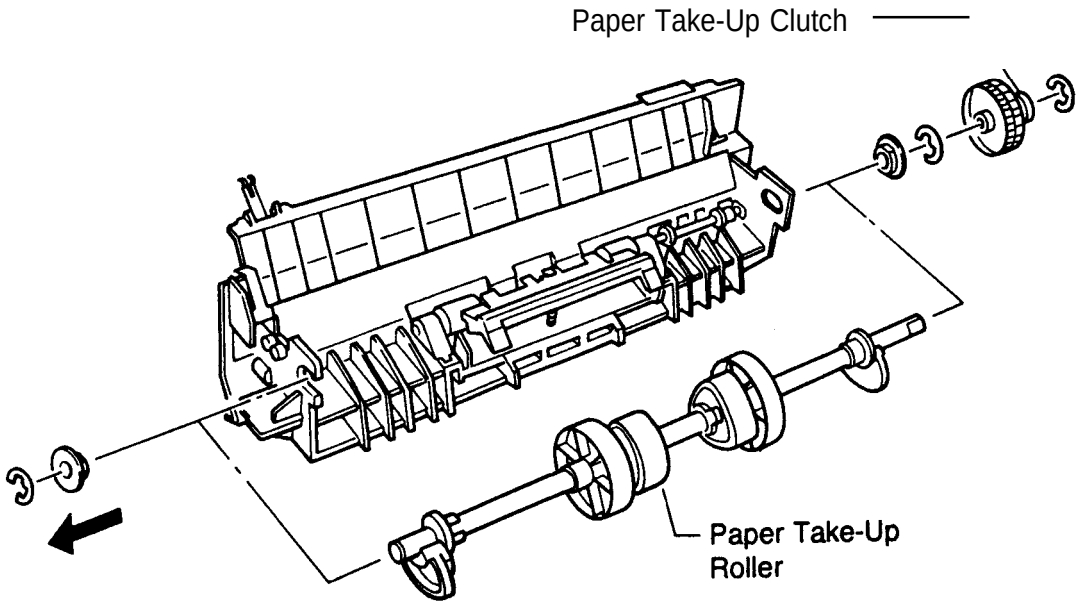


Figure 3-24. Removing the Paper Take-Up Roller

Chapter 4 Adjustment

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4.1 ADJUSTMENT

This section describes the adjustment procedure for the EPL-5600 and ActionLaser 1600. This adjustment must be performed after every servicing operation, especially when any component or part is replaced.

4.1.1 Print Position Adjustment

You can adjust the vertical print position on a sheet of paper by turning the image synchronizing volume control on the engine controller board (PWB-A). After the engine controller board (PWB-A) is replaced, be sure to adjust the print position following the procedure below.

1. Set Language Setting to ENGLISH in Language Setting Mode,
2. Printa STATUS SHEET using SelecType.
3. Check that the registration gap between the leading edge of paper and the printing of a horizontal line is the correct value as follows.

   S'I'ATUSSHEETpage for EPL-5600 (A4 paper) : 19.1 ± 2.5 mm (0.75 ± 0.10 inch)
   STATUS SHEET page for ActionLaser 1600 (letter paper) : 143 ± 25 mm (0.56 ± 0.10 inch)

   If not, adjust the print position as described in the next few steps.

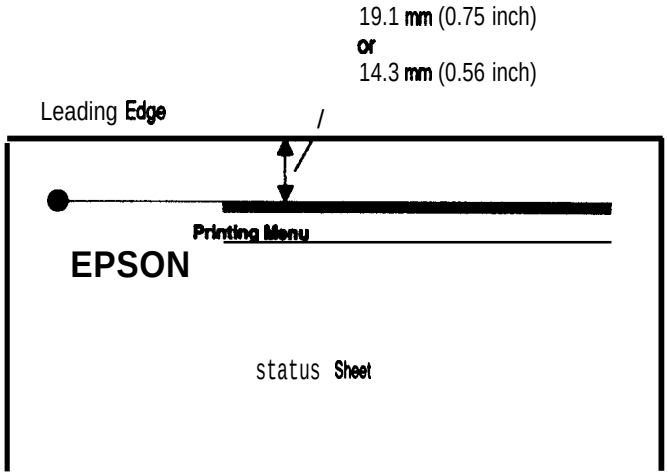

Figure 4-1. Print Position Adjustment

4. Turn the printer power off.
5. Open the upper unit, open the paper cover, and remove the one screw securing the control panel.

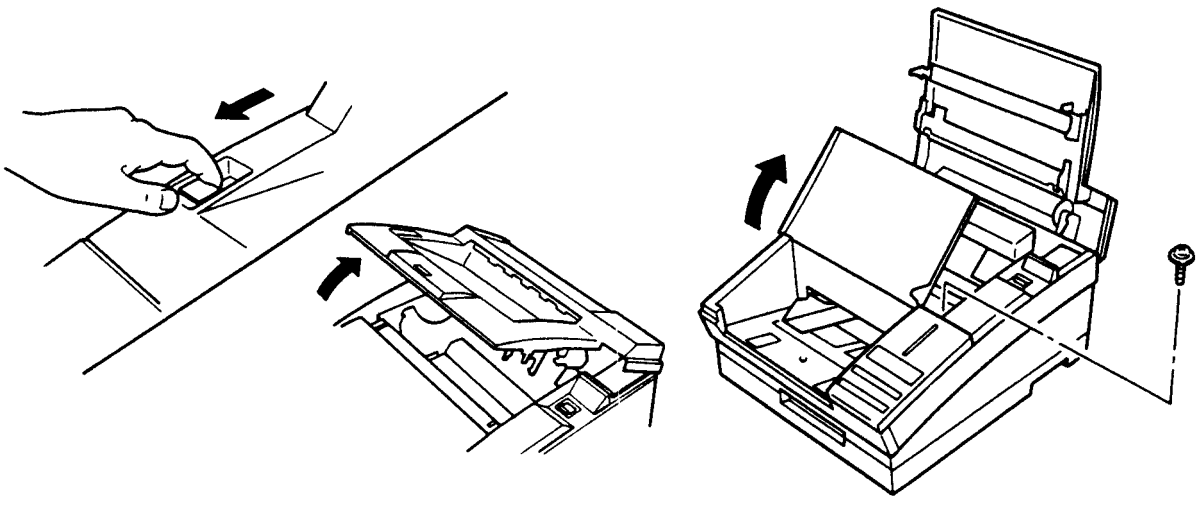

Figure 4-2. Opening the Upper Unit, Paper Cover, and Removing 1 Screw

6. While holding the control panel, adjust the image synchronizing adjustment volume (VR1A) on the engine controller board (PWB-A) so that the gap for the print position of the horizontal line (vertical print position) becomes 19.1 mm (0.75 inch) for EPL-5600 or 14.3 mm (0.56 inch) for ActionLaser 1600.
   - Turn VR1A clockwise to decrease the gap for the print position of the horizontal line.
   - Turn VR1A counterclockwise to increase the gap.
7. Turn on the printer.
8. Print a STATUS SHEET in SelecType to again check the print position.
9. Repeat steps 4 to 8 until the print position is 19.1 mm (0.75 inch) or 14.3 mm (0.56 inch).
10. Reattach the control panel, securing it with the one screw, close the paper cover, and close the upper unit.

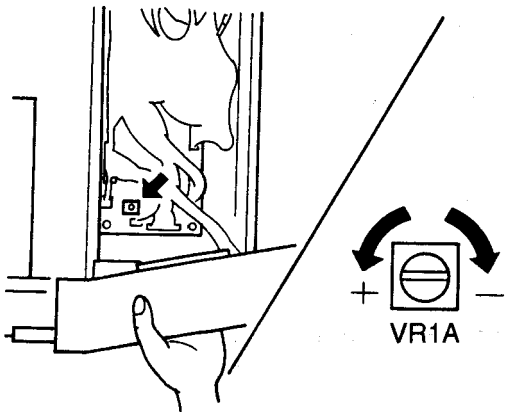

Figure 4-3. Holding the Control Panel and Adjusting VR1A

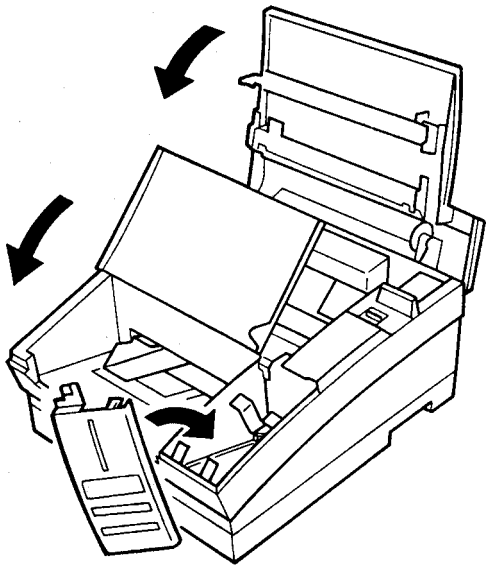

Figure 4-4. Closing the Paper Cover and the Upper Unit

Chapter 5 Troubleshooting

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5.1 OVERVIEW

The EPL-5600 and ActionLaser 1600 have a sophisticated, built-in, self-diagnostic function that reduces troubleshooting time by identifying failed parts or components. This self-diagnostic test overcomes the troubleshooting problems for page printers, in which even a trivial failure can result in a serious print quality problem.

5.2 SELF-DIAGNOSTIC FUNCTION

This section describes the self-diagnostic function in which the controller automatically checks the operating conditions of each component. If any abnormality is detected, the printer displays an error message on the LCD panel. Table 5-1 lists the messages that tell you if service maintenance is required.

Table 5-1. Messages Requiring Service Maintenance

Error Number	Error Condition	Error Type
E0003	Fusing Unit Error	Engine Error
E0004	Main Motor Error	
E0005	Fan Motor Error	
E0006	Scanner Mirror Motor Error	
E0009	Laser Light Error	
EO014	Communication Error for Engine Controller and Video Controller	
C0001	CPU error (reserved)	Video Controller Error
C0002	CPU error (privilege violation)	
C0003	CPU error (illegal instruction)	
C0004	CPU error (no support FPU instruction)	
C0007	CPU error (address miss align)	
C0009	CPU error (reserved)	
C0010	CPU error (tag overflow)	
C0017 to 31	CPU error (no support interrupt)	
CO036	CPU error (no support coprocessor instruction)	
C0128 to 254	CPU error (unimplemented instruction)	
C0255	CPU error (bleak error)	
Clooo	RAM error	
C1110	ROM (CI 25 MAIN board IC 4) error	
cl 120	ROM (CI 25 MAIN board IC 5) error	
C1130	ROM (C125 MAIN board IC 7 or IC22) error	
cl 140	ROM (C125 MAIN board IC 8 or IC22) error	
cl 150	ROM (C125 MAIN board IC 18 or IC21) error	
C1160	ROM (C125 MAIN board IC 15 or IC21) error	
cl 170	Option ROM (C125 MAIN board IC 11) error	
CI 180	Option ROM (EPSONScript Module) error	
cl 190	Option font cartridge error	
C1200	EEPROM write error	
CI21O	EEPROM write counter overflow	
C1300	Option Type-B I/F error	
C131O	Unsupported Type-B I/F installed	
C1320	LocalTalk I/F module error	
C1999	Other Video Controller error	
A,B,D, F to Z	Software Error	Software Error

5.3 TROUBLESHOOTING TOOL

There is an extension cable provided for this printer to check the waveforms of the video controller board. You can remove the video controller board (C125 MAIN board) from the board slot and still check its waveforms by connecting the board to the engine with this cable. The following table shows the extension cable and connecting points.

Table 5-2. Extension Cable

Connector on Video Controller Board (C125 MAIN Board)	Connector on Engine Controller Bead (PWB-A)	Extension Cable	Part Code
CN7	CN1	#F606	1015058

5.4 TROUBLESHOOTING

This section describes the troubleshooting of abnormal operations and print quality problems.

5.4.1 Troubleshooting of Abnormal Operation

This section describes how to detect malfunctions, and determine the cause and suggests what actions to take for various types of malfunctions. Each paragraph refers you to a detailed troubleshooting table.

Table 5-3. Symptoms and Reference Tables

Symptom	Printer Condition	Reference Table
The printer does not operate at all.	The heater lamp infusing unit does not come on, and so RAM check is not started.	~-4
RAM check not displayed.	The heater lamp in fusing unit comes on, but RAM check is not started.	5-5
COVER OPEN	The paper cover is closed, but the LCD still displays COVER OPEN.	5-6
PAPER OUT	The paper is loaded in the paper tray, but the LCD displays PAPER OUT.	5-7
ILLEGAL CART	The LCD displays ILLEGAL CART.	5-8
FEED JAM	The LCD displays FEED JAM.	5-9
FEED JAM displayed for the lower paper cassette.	The LCD displays FEED JAM when using the lower paper cassette.	5-1o
PAPER JAM	The LCD displays PAPER JAM at power on.	5-11
PAPER JAM displayed during paper feeding.	The LCD displays PAPER JAM during paper feeding.	5-12
RAM ERROR	The LCD displays RAM ERROR.	5-13
EEPROM ERROR	The LCD displays EEPROM ERROR at power on.	5-14
SERVICE REQ. E0003	The LCD displays SERVICE REQ. E0003.	5-15
SERVICE REQ. E0004	The LCD displays SERVICE REQ. E0004.	5-16
SERVICE REQ. E0005	The LCD displays SERVICE REQ. E0005.	5-17
SERVICE REQ. E0006	The LCD displays SERVICE REQ. E0006.	5-18
SERVICE REQ. E0009	The LCD displays SERVICE REQ. E0009.	5-19
SERVICE REQ. E0014	The LCD displays SERVICE REQ. E0014.	5-20

Table 5-3. Symptoms and Reference Tables (Continued)

Symptom	Printer Condition	Reference Table
SERVICE REQ. C0003	The LCD displays SERVICE REQ. C0003.	5-21
SERVICE REQ. C0007	The LCD displays SERVICE REQ. C0007.	5-22
SERVICE REQ. C1000	The LCD displays SERVICE REQ. C1000.	5-23
SERVICE REQ. Cl 110	The LCD displays SERVICE REQ. Cl 110.	5-24
SERVICE REQ. Cl 120	The LCD displays SERVICE REQ. Cl 120.	525
SERVICE REQ. Cl 130	The LCD displays SERVICE REQ. Cl 130.	5-26
SERVICE REQ. Cl 140	The LCD displays SERVICE REQ. Cl 140.	5-27
SERVICE REQ. Cl 150	The LCD displays SERVICE REQ. Cl 150.	528
SERVICE REQ. Cl 160	The LCD displays SERVICE REQ. Cl 160.	529
SERVICE REQ. Cl 170	The LCD displays SERVICE REQ. Cl 170.	5-30
SERVICE REQ. Cl 180	The LCD displays SERVICE REQ. Cl 180.	531
SERVICE REQ. Cl 190	The LCD displays SERVICE REQ. Cl 190.	5-32
SERVICE REQ. C1200 or C1210	The LCD displays SERVICE REQ. C1200 or C1210.	5-33
SERVICE REQ. C1300	The LCD displays SERVICE REQ. C1300.	5-34
SERVICE REQ. C131O	The LCD displays SERVICE REQ. C1310.	5-35
SERVICE REQ. C1320	The LCD displays SERVICE REQ. C1320.	5-36
Other SERVICE REQ. displayed.	The LCD displays another SERVICE REQ. error code	5-37

Table 5-4. The Printer Does Not Operate at All

Cause	Step	Checkpoint	Finding	Solution
Connector CN1 on the PWB-E board may be disconnected.	1	Is connector CN1 on the PWB-E board disconnected?	Yes	Connect CN1 on PWB-E bead.
The fuse on the PWB-E board may be blown.	2	Is fuse blown on the PWB-E board?	Yes	Replace the fuse.
Connector CN8 on PWB-A board may be disconnected.	3	Is connector CN8 on the PWB-A board disconnected?	Yes	Connect CN8 on PWB-A board.
PWB-E board maybe dead.	4	With the power on, is there an output of +5 VDC between pin 8 (+) and pin 5 (-) for CN8 on PWB-A board?	No	Replace the PWBE board.
PWB-A board may be dead.	5	—	—	Replace the PWB-A board.

Table 5-5. The Printer Does Not Start RAM Check

Cause	Step	Checkpoint	Finding	Solution
The video controller board (C125 MAIN board) maybe dead.	1	If you change the C125 MAIN board, does the printer start the RAM check?	Yes	Replace the C125 MAIN board.
The control panel may be dead.	2	—	—	Replace the control panel.

Table 5-6. The LCD Displays COVER OPEN

cause	Step	Checkpoint	Finding	Solution
The interlock switch terminal connector may be disconnected.	1	Is interlock switch terminal connector disconnected?	Yes	**Connect the terminal connector on the interlock switch.**
The interlock switch position may be incorrect.	2	Does the switch turn on when the case is closed?	No	**Reseat the interlock switch.**
The interlock switch may be dead.	3	Does the switch toggle? (Check with multimeter.)	No	**Replace the interlock switch.**
The PWB-E board maybe dead.	4			**Replace the PWB-E board.**

Table 5-7. The LCD Displays PAPER OUT

Cause	Step	Checkpoint	Finding	Solution
The paper empty sensor flag position may be incorrect.	1	Is paper empty sensor flag position OK?	No	Reseat the paper empty sensor flag.
The paper empty sensor may be dead.	2	—	—	Replace the paper empty sensor.

Table 5-8. The LCD Displays ILLEGAL CART

Cause	Step	Checkpoint	Finding	Solution
The installed cartridge may be illegal. (Check the user's guide.)	1	Can this printer use the inserted cartridge?	No	Replace with a supported cartridge
The cartridge may be dead.	2	Does this printer recognize another, legal cartridge?	Yes	Replace the cartridge.
The C125 MAIN board maybe dead.	3	—	—	Replace the C125 MAIN board.

Table 5-9. The LCD Displays FEED JAM

Cause	step	Checkpoint	Finding	Solution
Connector for paper take-up solenoid may be disconnected.	1	Is connector disconnected?	Yes	Connect it.
The paper take-up solenoid coil maybe open or shorted.	2	Disconnect connector CN6 on the PWB-A board and check coil resistance between pin 7 and pin 8 on the disconnected cable side of the connector using a multimeter. Is the resistance approximately 80 ohms?	No	Replace the paper take-up solenoid.
		If the coil is shorted, check the solenoid drive circuit using the procedure below: 1. Set the multimeter for voltage. 2. Place the (-) terminal of the multimeter on pin 7 of connector CN6 on the PWB-A board. 3. Place the (+) terminal of the multimeter on pin 5 (GND). With power on, does the multimeter detect any current?	Yes	Replace the paper take-up solenoid and the PWE3-A board.
Paper take-up sensor flag position maybe incorrect.	3	Is paper take-up sensor flag position incorrect?	Yes	Reseat the paper take-up sensor flag
Paper take-up roller may be bad.	4	—	—	Replace the paper take-up roller,

Table 5-10. The LCD Displays FEED JAM for Lower Paper Cassette

Cause	Step	Checkpoint	Finding	Solution
The paper take-up solenoid coil for the lower paper cassette may be open or shorted.	1	Disconnect connector PJ2 on the lower paper cassette circuit board and check the coil resistance between pin 1 and pin 2 on the disconnected cable side of the connector using a multimeter. Is the resistance approximately 220 ohms?	No	Replace the paper take-up solenoid.
		If the coil is shorted, check the solenoid drive circuit using the following procedure: 1. Set the multimeter to voltage. 2. Place the (–) terminal on pin 2 of connector PJ2 on the lower paper cassette board. 3. Place the (+) terminal on ground to jumper J2. With power on, does the multimeter detect any current?	Yes	Replace the paper take-up solenoid and PWB-A board.
The paper take-up roller in the lower paper cassette may be bad.	2	—	—	Replace the paper take-up roller.

Table 5-11. The LCD Displays PAPER JAM at Power On

Cause	Step	Checkpoint	Finding	Solution
The paper take-up sensor flag position may be incorrect.	1	Is the paper take-up sensor flag position OK?	No	Reposition the paper take-up sensor flag.
The paper exit sensor flag position may be incorrect.	2	Is the paper exit sensor flag position OK?	No	Reposition the paper exit sensor flag.
The paper take-up sensor connector may be disconnected.	3	*Is* the paper take-up sensor connector disconnected?	Yes	Connect it.
The paper exit sensor connector may be disconnected.	4	Is the paper exit sensor connector disconnected?	Yes	Connect it.
The paper exit sensor may be dead.	5	—	—	Replace it.
The paper take-up sensor may be dead	6	—	—	Replace it.

Table 5-12. The LCD Displays PAPER JAM during Paper Feeding

Cause	Step	checkpoint	Finding	Solution
The imaging cartridge may not be installed.	1	Is the imaging cartridge installed?	No	Install the imaging cartridge.
The paper take-up roller may be bad.	2	Does paper always jam in paper take-up roller area?	Yes	Replace the paper take-up roller.
The image transfer roller may be bad.	3	Does paper always jam in the image transfer roller area?	Yes	Replace the image transfer roller.
The fusing unit may be bad.	4	Does paper always jam in the fusing unit?	Yes	Replace it.

Table 5-13. The LCD Displays RAM ERROR

Cause	step	Checkpoint	Finding	Solution
The optional SIMM may be bad.	,	Is the operation OK after you remove the optional SIMM?	Yes	Replace the SIMM.
The standard RAM may be bad.	2	—	—	Replace the C125 MAIN board.

Table 5-14. The LCD Displays EEPROM ERROR

Cause	Step	Checkpoint	Finding	Solution
The EEPROM on the C125 MAIN board may be bad.	,	—	—	Replace it.

Table 5-15. The LCD Displays SERVICE REQ. E0003

Cause	Step	Checkpoint	Finding	Solution
The connector for the thermistor may be disconnected.	1	Is the connector for the thermistor disconnected?	Yes	Connect it.
The PWB-A board maybe dead.	2	Does the heater lamp remain lit up until an error occurs?	Yes	Replace the PWB-A board.
The heater lamp or thermal fuse in fusing unit maybe bad.	3	Does the heater lamp come on at power on?	No	Replace the heater tamp or thermal fuse infusing unit.
The PWB-E board maybe dead.	4	—	—	Replace the PWB-E board.

Table 5-16. The LCD Displays SERVICE REQ. E0004

Cause	Step	Checkpoint	Finding	Solution
The main motor coil may be open or shorted.	1	Disconnect connector CN2 on the PWB-E board and check the coil resistance between: pin 1 and pin 2; pin 2 and pin 3; pin 4 and pin 5; and pin 5 and pin 6 (4 points total) on the disconnected cable side of the connector using a multimeter. Pin 1 — Pin 2 Pin 2 — Pin 3 Pin 4 — Pin 5 Pin 5 — Pin 6 Are the resistances of all four points approximately 9 ohms?	No	Replace the main motor.
		If any coil is shorted, check the main motor drive circuit using the following procedure 1. Set the multimeter to voltage. 2. Place the (-) terminal of the multimeter on pins 1, 3, 4, or 6 of connector CN2 on the PWB-E board. 3. Place the (+) terminal on pin 6 of connector CN3 of the PWB-E board (GND). With power on, does the multimeter detect current?	Yes	Replace the PWB-E board.
The PWB-E board maybe dead.	2	—	—	Replace the PWB-E board.

Table 5-17. LCD Displays SERVICE REQ. E0005

cause	Step	Checkpoint	Finding	Solution
Connector CN2 on PWB-F board maybe disconnected.	1	**Is connector CN2 on the PWB-F board disconnected?**	**Yes**	**Connect it.**
The fan motor may be dead.	2	—	—	Replace it.

Table 5-18. The LCD Displays SERVICE REQ. E0006

cause	Step	Checkpoint	Finding	Solution
The optical unit may be bad.	1	—	—	Replace the optical unit.
The PWB-A board maybe bad.	2	—	—	Replace the PWB-A board.

Table 5-19. The LCD Displays SERVICE REQ. E0009

Cause	Step	Checkpoint	Finding	Solution
The optical unit may be dead.	1	—	—	Replace the optical unit.
The PWB-A bead may be dead.	2	—	—	Replace the PWB-A board.

Table 5-20. The LCD Displays SERVICE REQ. EO014

Cause	Step	Checkpoint	Finding	Solution
The PWB-A board may be bad.	,	—	—	Replace the PWB-A board.
The C125 MAIN board may be bad.	2	—	—	Replace the C125 MAIN board.

Table 5-21. The LCD Displays SERVICE REQ. C0003

Cause	Step	Checkpoint	Finding	Solution
The C125 MAIN board may be bad.	1	—	—	Replace the C125 MAIN board.

Table 5-22. The LCD Displays SERVICE REQ. C0007

Cause	Step	Checkpoint	Finding	Solution
The C125 MAIN bead may be bad.	1	—	—	Replace the C125 MAIN board.

Table 5-23. The LCD Displays SERVICE REQ. C1OOO

cause	Step	Checkpoint	Finding	Solution
The optional SIMM may be bad.	,	Is the operation OK after you remove the optional SIMM?	Yes	Replace the SIMM.
The C125 MAIN board may be bad.	2	—	—	Replace the C125 MAIN board.

Table 5-24. The LCD Displays SERVICE REQ. C111O

Cause	step	Checkpoint	Finding	Solution
The ROM (IC4) on the C125 MAIN board may be bad.	,	Is the operation OK after you replace the ROM?	—	Replace the ROM (IC4) on the C125 MAIN board.
The C125 MAIN board may be bad.	2	—	—	Replace the C125 MAIN board.

Table 5-25. The LCD Displays SERVICE REQ. C1120

Cause	Step	Checkpoint	Finding	Solution
The ROM (IC5) on the C125 MAIN board may be bad.	,	Is the operation OK after you replace the ROM?	—	Replace the ROM (IC5) on the C125 MAIN board.
The C125 MAIN board may be bed.	2	—	—	Replace the C125 MAIN board.

Table 5-26. The LCD Displays SERVICE REQ. C1130

Cause	Step	Checkpoint	Finding	Solution
The ROM (IC7) or (IC22) on the C125 MAIN board may be bad.	1	Is the operation OK after you replace the ROM?	—	Replace the ROM (IC7) or (IC22) on the C125 MAIN board.
The C125 MAIN board may be bad.	2	—	—	Replace the C125 MAIN board.

Table 5-27. The LCD Displays SERVICE REQ. C1140

Cause	Step	Checkpoint	Finding	Solution
The ROM (IC8) or (IC22) on the C125 MAIN board may be bad.	1	Is the operation OK after you replace the ROM?	–	Replace the ROM (IC8) or (IC22) on the Cl 25 MAIN board.
The C125 MAIN board may be bad.	2	—	—	Replace the C125 MAIN board.

Table 5-28. The LCD Displays SERVICE REQ. C1150

Cause	Step	Checkpoint	Finding	Solution
The ROM (IC18) or (IC21) on the C125 MAIN board may be bad.	1	Is the operation OK after you replace the ROM?	–	Replace the ROM (IC18) or (IC21) on the Cl 25 MAIN board.
The C125 MAIN board may be bad.	2	–	—	Replace the C125 MAIN board.

Table 5-29. The LCD Displays SERVICE REQ. C1160

Cause	Step	Checkpoint	Finding	Solution
The ROM (IC15) or (IC21) on the Cl 25 MAIN board may be bad.	1	Is the operation OK after you replace the ROM?	–	Replace the ROM (IC15) or (IC21) on the Cl 25 MAIN board.
The C125 MAIN board may be bad.	2	—	—	Replace the C125 MAIN board.

Table 5-30. The LCD Displays SERVICE REQ. C1170

Cause	Step	Checkpoint	Finding	Solution
The ROM (IC11) on the C125 MAIN board maybe bad.	1	Is the operation OK after you replace the ROM?	"	Replace the ROM (IC11) on the C125 MAIN board.
The C125 MAIN board may be bad.	2	—	—	Replace the C125 MAIN board.

Table 5-31. The LCD Displays SERVICE REQ. C1180

Cause	Step	Checkpoint	Finding	Solution
The ROMs on the EPSONScript Level 2 Module may be bad.	1	—	—	Replace the ROMs on the EPSONScript Level 2 Module.
The EPSONScript Level 2 Module circuit maybe bad.	2	—	—	Replace the EPSON-Script Level 2 Module.
The Cl 25 MAIN board may be bad.	3	—	—	Replace the C125 MAIN board.

Table 5-32. The LCD Displays SERVICE REQ. C1190

Cause	Step	Checkpoint	Finding	Solution
The font cartridge may be bad.	,	–	—	Replace the font cartridge.
The C125 MAIN board may be bad.	2	—	—	Replace the C125 MAIN board.

Table 5-33. The LCD Displays SERVICE REQ. C1200 of CI21O

Cause	step	Checkpoint	Finding	Solution
The EEPROM (IC1O) on the C125 MAIN board may be bad.	1	—	—	Replace the EEPROM (IC10) on the C125 MAIN board.
The C125 MAIN board may be bad.	2	—	—	Replace the C125 MAIN board.

Table 5-34. The LCD Displays SERVICE REQ. C1300

Cause	Step	Checkpoint	Finding	Solution
The optional interface card may be bad.	1	—	—	Replace the optional interface card.
The C125 MAIN board may be bad.	2	—	—	Replace the C125 MAIN board.

Table 5-35. The LCD Displays SERVICE REQ. C131O

Cause	Step	Checkpoint	Finding	Solution
The optional interface card C82312* and LocalTalk I/F module C82326* are used.	1	—	—	Remove the C82312*.
The optional interface card mav be bad.	2	—	—	Replace the optional interface card.
The Cl 25 MAIN board may be bad.	3	—	—	Replace the C125 MAIN board.

Table 5-36. The LCD Displays SERVICE REQ. C1320

Cause	Step	Checkpoint	Finding	Solution
The optional LocalTalk I/F module may be bad.	1	—	—	Replace the LocalTalk I/F module.
The C125 MAIN board may be bad.	2	—	—	Replace the C125 MAIN bed.

Table 5-37. The LCD Displays Another SERVICE REQ. Error

Cause	Step	Checkpoint	Finding	Solution
The C125 MAIN board may be bad.	1	—	—	Replace the C125 MAIN board.

5.4.2 Print Quality Anomaly

This section describes how to isolate a print quality problem from the possible causes.

Table 5-38. Print Quality Anomaly

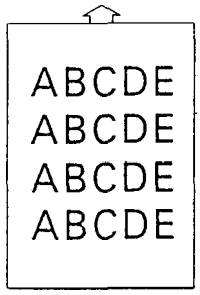
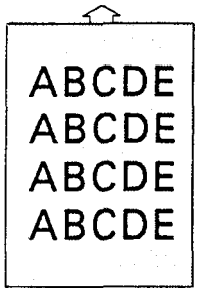
Symptom	Possible Cause	Part Name	Check item	Remedy
Low image density. 	Poor development	Imaging cartridge	Check the toner level in the imaging cartridge.	Shake the imaging cartridge.
				Replace the imaging cartridge.
		PWB-F board	—	Replace the PWB-F board.
	Improper charging	Imaging cartridge	–	Replace the imaging cartridge.
		PWB-F board	—	Replace the PWB-F board.
	Image transfer problem	Image transfer roller	Check to see if the surface of image transfer roller is darnaged.	Replace the image transfer roller.
		PWB-F board	—	Replace the PWB-F board.
	Paper problem	**Paper**	Check to see if paper is moist.	Replace paper.
	Defective optical unit	**Optical unit**	—	**Replace the optical** unit.
	Improper print density setting	–	—	Adjust the print density using SelecType.
Foggy background 	Poor development	Imaging cartridge	–	Replace the imaging cartridge.
			Check the wiring of developing bias line.	Replace the PWB-F board.
	Improper charging	Drum charge	—	Replace the PWB-F board.
			Check the wiring of PC drum charging bias line.	Replace the imaging cartridge.
	Improper print density setting	–	—	Adjust the print density in SelecType.
	Defective optical unit	Optical unit	—	Replace the optical unit.

Table 5-38. Print Quality Anomaly (Continued)

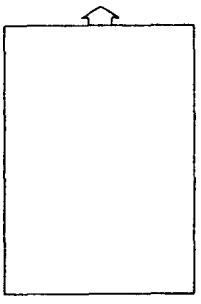
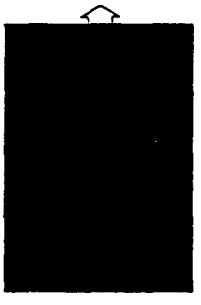
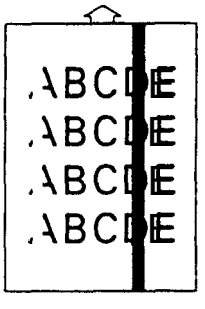
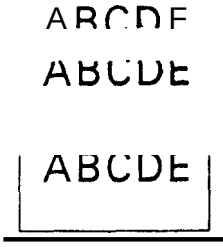
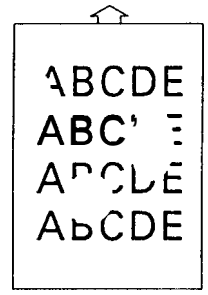
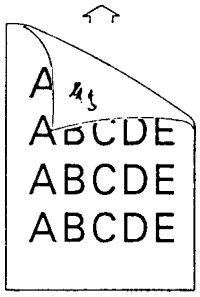
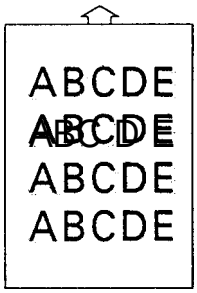
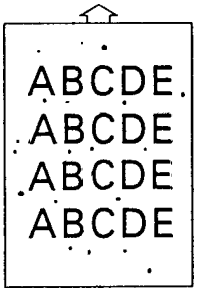
Symptom	Possible Cause	Part Name	Check Item	Remedy
Blank print 	Poor development	Imaging cartridge	Check whether the imaging cartridge is installed properly.	Reinstall the imaging cartridge.
		PWB-F board	—	Replace the PWB-F board.
	Improper charging	PWB-F board	—	Replace the PWB-F board.
	Poor image transfer	Image transfer roller	Check the surface of the image transfer roller.	Replace the image transfer roller.
		PWB-F board	—	Replace the PWB-F board.
	improper print density setting	–	—	Adjust the print density in SelecType.
	Defective optical unit	Optical unit	—	Replace the optical unit.
Black print 	Improper charging	Imaging cartridge	–	Replace the imaging cartridge.
		PWB-F board	—	Replace the PWB-F board.
	Poor development	Imaging cartridge	–	Replace the imaging cartridge.
		PWB-F board		Replace the PWB-F board.
	Improper print density setting	–	—	Adjust the print density in SelecType
	Defective optical unit	Optical unit	—	Replace the optical unit.
White/black lines and bands. 	Improper charging	Imaging cartridge	–	Shake the imaging cartridge.
				Replace the imaging cartridge.
	Poor development	PWB-F board	—	Replace the PWB-F board.
		Imaging cartridge	–	Replace the imaging cartridge.
	Improper drum cleaning	Imaging cartridge	–	Replace the imaging cartridge.
	Dirt on the fusing roller	Fusing roller	—	Clean the fusing roller.
White/black lines and bands 	Improper fusing	Fusing roller	—	Clean the fusing roller.
		Thermistor	—	Replace the thermistor
	Defective optical unit	Optical unit	—	Replace the optical unit.
	Poor image transfer	Image transfer roller	Check the surface of image transfer roller.	Replace the image transfer roller.

Table 5-38. Print Quality Anomaly (Continued)

Symptom	Possible Cause	Part Name	Check ftem	Remedy
Areas of missing print 	Poor image transfer	Image transfer roller	Check the surface of the image transfer roller.	Replace the image transfer roller.
		PWB-F board	—	Replace the PWB-F board.
	Poor development	Imaging cartridge	—	Shake the imaging cartridge.
			—	Replace the imaging cartridge.
	Poor development	PWB-F board	—	Replace the PWB-F board.
	Paper problem	Paper	Check to see if paper is moist.	Replace the paper.
Toner smudges on back side of pages 	Smears on paper path	Image transfer roller	Check the surface of image transfer roller.	Clean the image transfer roller.
		Fusing roller	—	Clean the fusing roller.
		Other paper paths	Check the paper path.	Clean the paper path.
Print offset 	Improper fusing	Fusing roller	Check if there is any dust or damage on the fusing roller surface.	Clean or replace fusing roller.
	Dirty drum	Imaging cartridge		Replace the imaging cartridge.
Black specks or dots 	Poor development	Imaging cartridge		Shake the imaging cartridge. Replace the imaging cartridge.
		PWB-F board		Replace the PWB-F board.
	Defective PC drum	Imaging cartridge		Replace the imaging cartridge.

Chapter 6 Maintenance

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6.1 MAINTENANCE

The EPL-5600 and ActionLaser 1600 are page printers that use an electrophotographic printing method. Unlike with most impact or ink-jet printers, the key components in the electrographic process are integrated into an expendable cartridge (the imaging cartridge). Therefore, periodic replacement of the imaging cartridge is essential to ensure high-quality output. Other maintenance items are also described in this section, which is divided into two sections: user maintenance (preventive maintenance) and service maintenance (repair).

6.1.1 User Maintenance

Users can achieve maximum print quality from the printer by following the procedures below:

6.1.1.1 Cleaning

This section describes the cleaning required for **optimal print quality.**

● External Cleaning

Be sure to disconnect the printer from the power outlet before cleaning it. Wipe the cover and external parts of the printer with a damp cloth that has been soaked in a neutral cleaning solution.

● Internal Cleaning

Be sure the printer has been disconnected from the power supply and that the fusing unit has cooled down. If the optical unit lens is dirty, clean it using a soft cloth.

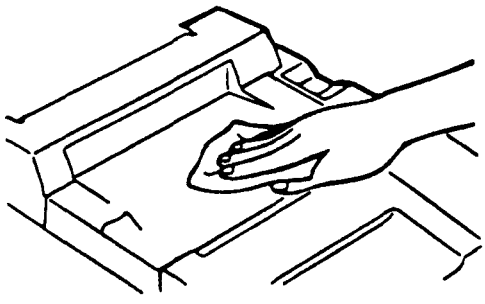

Figure 6-1. External Cleaning

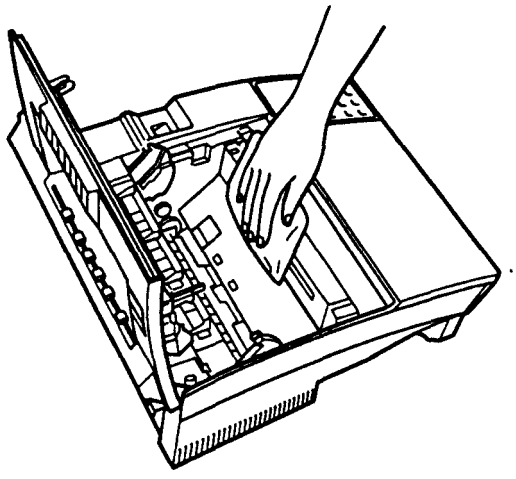

Figure 6-2. Cleaning Optical Unit Lens

6.1.1.2 Consumable Replacement

This printer uses consumable imaging cartridge SO51O16. The life of this cartridge is 6000 pages when printing on A4 or letter size pages with a 5% print ratio.

If printed images become faint, remove the cartridge and gently shake it. This will distribute the toner and may make the images darker. If the image is still too light, replace the imaging cartridge. The procedure for changing the imaging cartridge is described below.

● Imaging Cartridge Replacement

1. Gently open the upper unit and remove the imaging cartridge by pulling it out.
2. Dispose of the used imaging cartridge.
3. While holding the new imaging cartridge horizontally, gently shake it a few times to distribute the toner evenly.

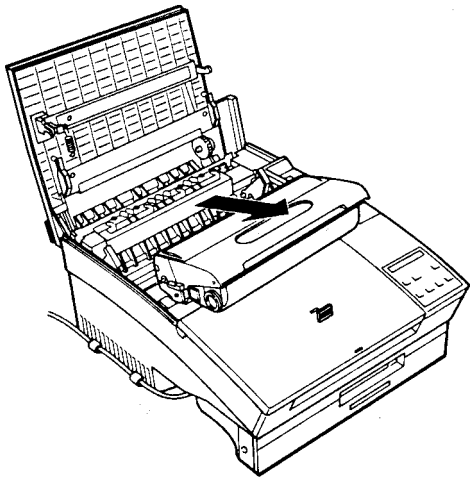

Figure 6-3. Removing the Imaging Cartridge

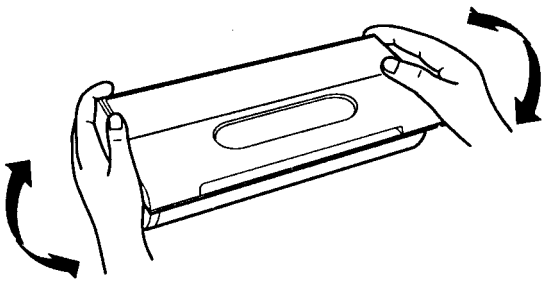

Figure 6-4. Shaking the Imaging Cartridge

4. Set the imaging cartridge on a clean, flat surface. Firmly grip the tab on the left side of the cartridge. Pull the clear seal all the way out with firm, even pressure, as shown.
5. Shake the imaging cartridge again.
6. Insert the imaging cartridge into the printer by placing the pins on each side of the cartridge into the grooves inside the printer. Slide it gently into the opening until it stops. Close the upper unit.

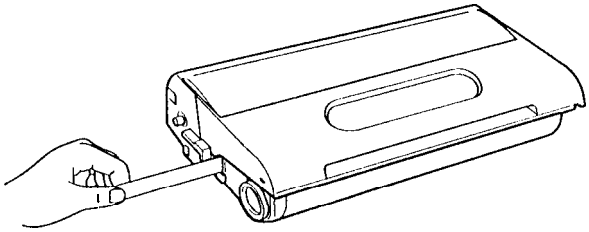

Figure 6-5. Removing the Clear Seal

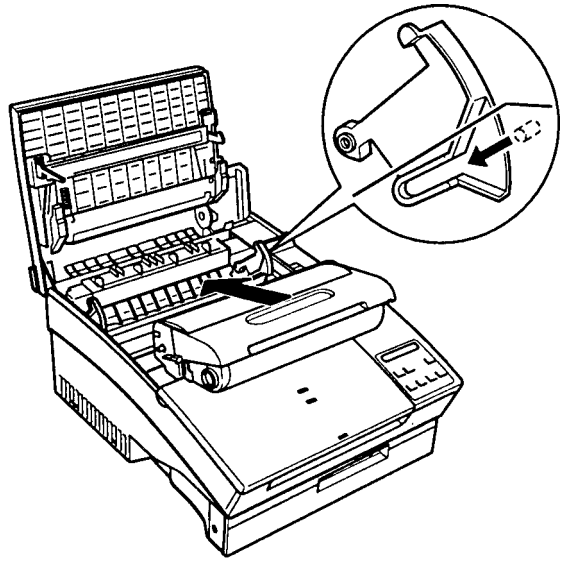

Figure 6-6. Inserting the Imaging Cartridge

6.1.2 Service Maintenance

This section describes the periodic service maintenance and cleaning required.

6.1.2.1 Periodic Service Maintenance

The following units require periodic service maintenance because they are subject to functional deterioration as the total number of printed pages increase, resulting in bad print quality.

Table 6-1. Periodic Service Maintenance

Unit	Service Interval
Image Transfer Roller	Approx. 100,000 pages
Fusing Unit	Approx. 100,000 pages

The service interval listed above is only a reference value. You do not need to perform service maintenance exactly at this time.

6.1.2.2 Cleaning

Some parts of this printer require regular cleaning.

Clean each part using the specified method and tools. (Refer to Chapter 3 for disassembly procedures.)

Table 6-2. Cleaning Parts and Procedures

Parts Name	Cleaning Procedure
Image Transfer Roller	Wipe the surface with a dry soft cloth.
Optical Lens	
Paper Take-Up Roller	
Upper Fusing Roller (in Fusing Unit)	Dip a soft cloth in silicon oil and wipe the dust off.
Lower Fusing Roller (in Fusing Unit)	
Thermistor (in Fusing Unit)	Dip a soft cloth in denatured alcohol and wipe the dust off.
Paper Separator and Rollers (in Fusing Unit)	

Appendix A Reference Materials

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A.1 CONNECTOR PIN ASSIGNMENTS

Figures A-1 and A-2 illustrate the interconnection of the primary components. Table A-1 gives the size and a description of each connector.

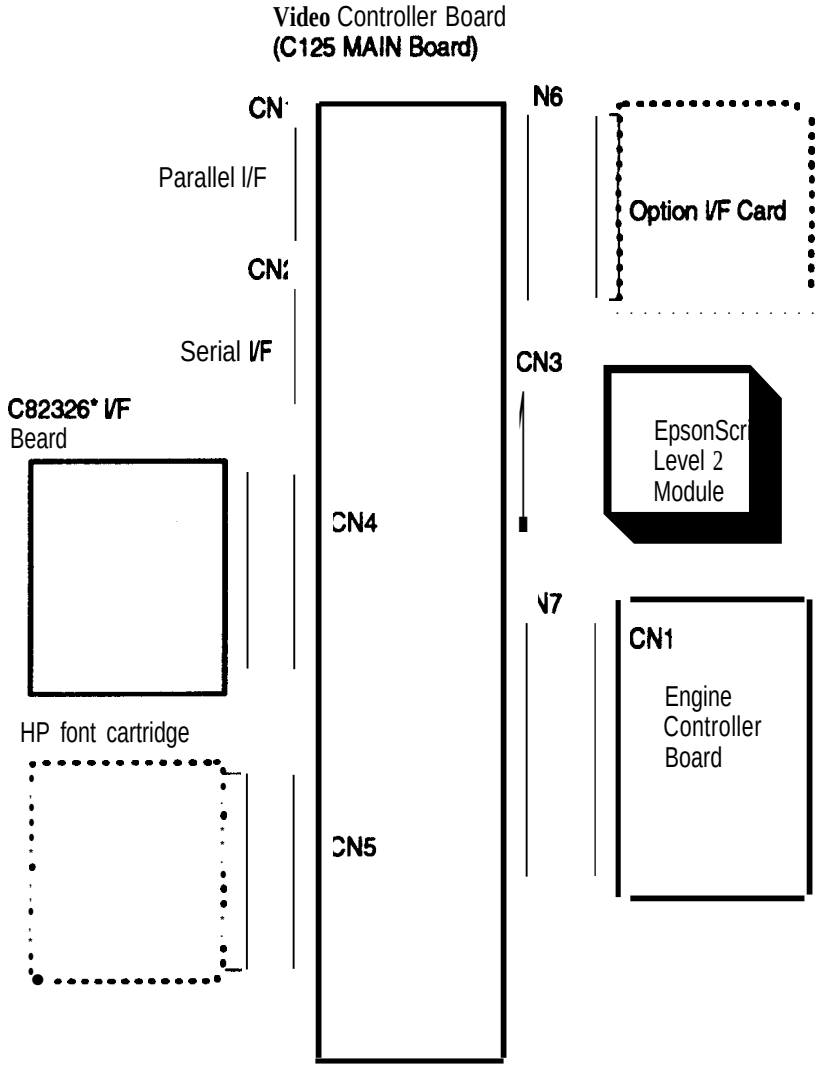

Figure A-1. Cable Connections for the Video Controller Section

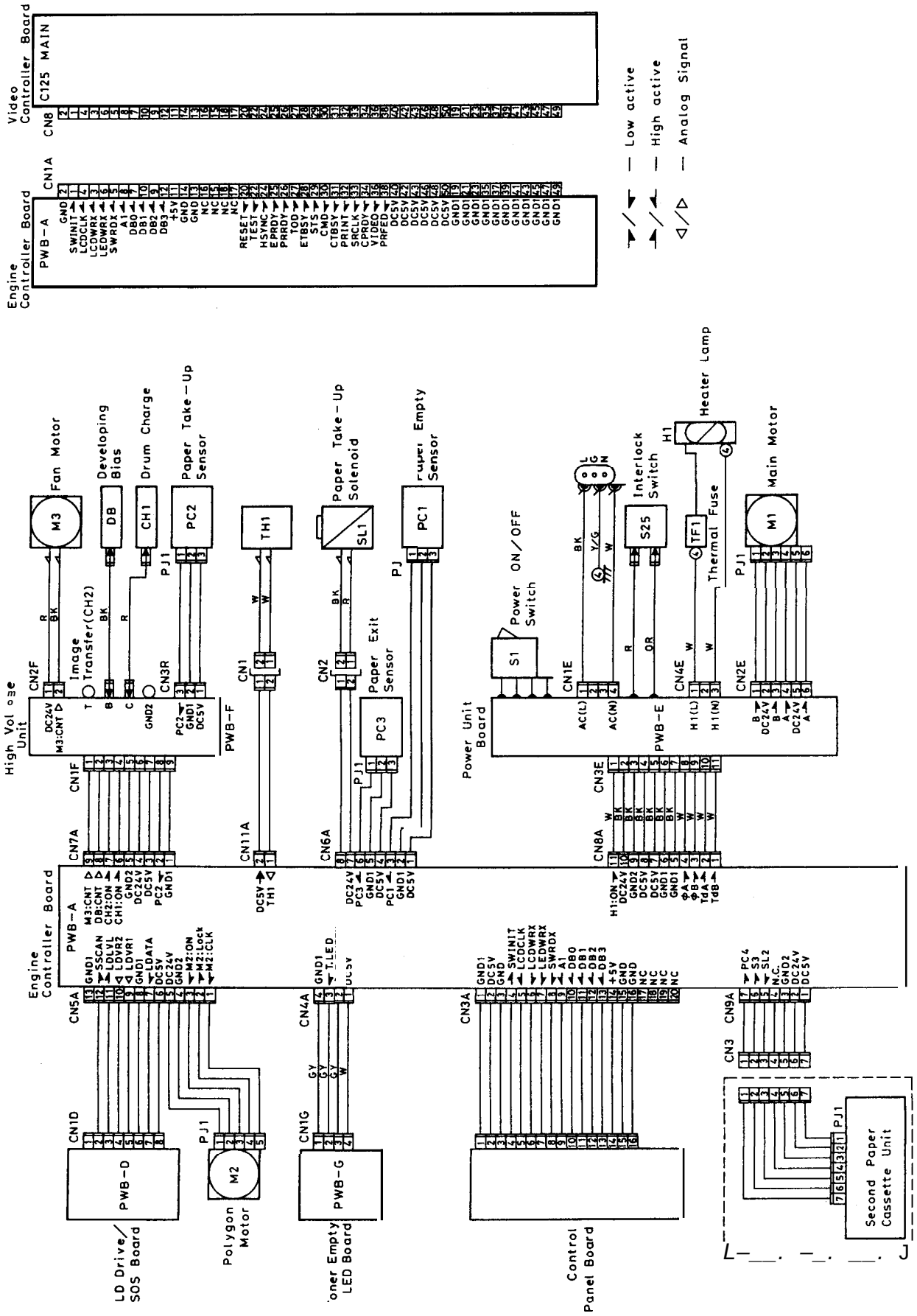

Figure A-2. Cable Connections for the Engine Section

Table A-1. Board Connector Summary

Connector	Description	Pins	Reference
Video Controller Board (C125 MAIN Board)			
CN1	Centronics parallel interface	36 pins	Table 1-8
CN2	Serial interface	25 pins	Table 1-10
CN3	Connector for EPSONScript Level 2 Module	120 pins	Table A-2
CN4	Connector for LocalTalk I/F Module	30 pins	Table A-3
CN5	Connector for HP font cartridge	50 pins	Table A-4
CN6	Connector for optional I/F (Type-B) card	36 pins	Table &5
CN7	Connector for engine controller board (PWB-A board)	50 pins	Table A-6
CN8	Connector for SIMM	72 pins	Table A-7
CN9	Connector for SIMM	72 pins	Table A-7
CN10	Not used	30 pins	—
Engine Controller Board (PWB-A Board)			
CN1	Connector for video controller board (C125 MAIN board)	50 pins	Table A-6
CN2	Not used	—	.
CN3	Connector for control panel	16 pins	—
CN4	Toner empty sensor	4 pins	Table A-8
CN5	Connector for optical unit	13 pins	Table A-9
CN6	Connector for paper take-up solenoid, paper exit sensor, and paper empty sensor	8 pins	Table A-10
CN7	Connector for high-voltage supply board (PWB-F board)	9 pins	Table A-11
CN8	Connector for power supply board (PWB-E board)	11 pins	Table A-12
CN9	Connector for lower paper cassette	7 pins	Table A-13
CN10	Not used	—	—
CN11	Connector for thermistor	2 pins	Table A-14
Control Panel			
CN1	Connector for engine controller board (PWB-A board)	16 pins	—
Power *Supply Board (PWB-E Board)*			
CN1	Connector for AC power inlet	4 pins	—
CN2	Connector for main motor	6 pins	Table A-15
CN3	Connector for engine controller board (PWB-A board)	11 pin	Table A-12
CN4	Connector for heater lamp	3 pins	Table A-16
High-Voltage Supply Board (PWB-F Board)			
CN1	Connector for engine controller board (PWB-A board)	9 pins	Table A-11
CN2	Connector for fan motor	2 pins	Table A-1?
CN3	Connector for paper take-up sensor	3 pins	Table A-18

A.1.1 Video Controller Board (C125 MAIN Board)

Table A-2. CN3 Pin Assignments

P n No.	Signal Name	I/o	Description
1,2	+5 V	—	+5 VDC
3,4	GND	—	Ground
5	D2	I/O	Data bus bit 2
6	D3	I/O	Data bus bit 3
7	DO	I/O	Data bus bit O
8	D1	I/O	Data bus bit 1
9	D6	I/O	Data bus bit 6
10	D7	I/O	Data bus bit 7
11	D4	I/O	Data bus bit 4
12	D5	I/O	Data bus bit 5
13	D10	I/O	Data bus bit 10
14	D11	I/O	Data bus bit 11
15	D8	I/O	Data bus bit 8
16	D9	I/O	Data bus bit 9
17	D14	I/O	Data bus bit 14
18	D15	I/O	Data bus bit 15
19	D12	I/O	Data bus bit 12
20	D13	I/O	Data bus bit 13
21	BWE1	o	Byte enables 1
22	A2	0	Address bus bit 2
3,24	GND	—	Ground
25	A5	o	Address bus bit 5
26	A6	0	Address bus bit 6
27	A3	0	Address bus bit 3
28	A4	0	Address bus bit 4
29	A9	0	Address bus bit 9
30	A10	0	Address bus bit 10
31	A7	0	Address bus bit 7
32	A8	0	Address bus bit 8
33	A13	0	Address bus bit 13
34	A14	0	Address bus bit 14
35	Al 1	0	Address bus bit 11
36	A12	0	Address bus bit 12
37	A17	0	Address bus bit 17
38	A18	0	Address bus bit 18
39	A15	0	Address bus bit 15
40	A16	0	Address bus bit 16
41	A21	0	Address bus bit 21
42	A22	0	Address bus bit 22
43	A19	0	Address bus bit 19
44	A20	0	Address bus bit 20
45	A26	0	Address bus bit 26
46	A27	0	Address bus bit 27
47	NC	—	Not connected
48	WR	o	Write enable
49	A28	0	Address bus bit 28
50	A29	0	Address bus bit 29
51	$\overline{AS}$	0	Address strobe

Table A-2. CN3 Pin Assignments (Continued)

Pin No.	Signal Nams	I/O	Description
52	RW	o	Read/write signal
53	A30	0	Address bus bit 30
54	A31	0	Address bus bit 31
55	RDYIN	I	Input ready signal
58	NC	—	Not connected
57	OPT1	o	Option select 1
58	NC	—	Not connected
59	RD	o	Read strobe
60	NC	—	Not connected
61	MCLK	o	Clock from CPU
62	NC	—	Not connected
63	ID0	I	Board identification O
64	ID1	I	Board identification 1
65	NC	—	Not connected
66	VCLK	O	Video clock
67	RESET	0	Reset signal
68	OPT0	0	Option select O
69,70	+5 v	—	+5 VDC
71	EXINIT	I	Initialize signal from the option
72	VDOIN	I	video
73	NMI	I	NMI signal
74	TOP	o	TOP signal for video I/F
75,76	GND	—	Ground
77	VDOOT	—	video out
78	NC	—	Not connected
79	RSTIN	—	Reset in signal
80	HSYNC	o	HSYNC for video I/F
81,82	+5 v	—	+5 VDc
83	—	—	
84	GND	—	Ground
85	D18	I/O	Data bus bit 18
86	D19	I/O	Data bus bit 19
87	D16	I/0	Data bus bit 16
88	D17	I/O	Data bus bit 17
89	D22	I/O	Data bus bit 22
90	D23	I/O	Data bus bit 23
91	D20	I/o	Data bus bit 20
92	D21	I/O	Data bus bit 21
93	D26	I/O	Data bus bit 26
94	D27	I/O	Data bus bit 27
95	D24	I/O	Data bus bit 24
96	D25	I/O	Data bus bit 25
97	D30	I/O	Data bus bit 30
98	D31	I/O	Data bus bit 31
99	D28	I/O	Data bus bit 28
100	D29	I/O	Data bus bit 29
101	GND	—	Ground
102	GND	—	Ground
103	A24	O	Address bus bit 24

Table A-2. CN3 Pin Assignments (Continued)

Pin No.	Signal Name	I/O	Description
104	A25	O	Address bus bit 25
105	BWE0	0	Byte enables O
106	NC	—	Not connected
107	BREQ	I	Bus request
108	BGRNT	O	Bus grant
109	BGAT	0	Bus grant for external device
110	BREQ		Bus request for external device
111	BWE2	0	Byte enables 2
112	BWE3	0	Byte enables 3
113	RDYOT	I	Option ready
114	IRL0	I	Interrupt request bus bit O
115	IRL1	I	Interrupt request bus bit 1
116	IRL2	I	Interrupt request bus bit 2
117	GND	—	Ground
118	IRL3	I	interrupt request bus bit 3
119	CPUID1	o	CPU ID bit 1
120	CPUID0	0	CPU ID bit O

Table A-3. CN4 Pin Assignments

Pin No.	Signal Name	I/O	Description
1,2,3,4	Vcc	—	+5 VDC
5	DTCT	I	Interrupt
6	NMI	o	Non-maskable interrupt
7	RST	0	Reset signal
8	AB4	0	Address bus bit 4
9	AB3	0	Address bus bit 3
10	PCLK	0	Clock
11	IREQ	0	Interrupt to option
12	DREQ	0	Data request
13	WR	0	Wriie strobe
14	RD	0	Read strobe
15	CS	0	Option select
16, 17	GND	—	Ground
18, 19	GND	—	Ground
20	AB2	o	Address bus bit 2
21	AB1	0	Address bus bit 1
22	AB0	0	Address bus bit O
23	DB7	I/O	Data bit 7
24	DB6	I/O	Data bit 6
25	DB5	I/O	Data bit 5
26	DB4	I/O	Data bit 4
27	DB3	I/O	Data bit 3
28	DB2	I/O	Data bit 2
29	DB1	1/0	Data bit 1
30	DB0	I/O	Data bit O

Table A-4. CN5 Pin Assignments

Pin No.	Signal Name	I/O	ascription
A1	ASX	O	Address strobe
A2	LDSX	0	Lower data strobe
A3	NC	—	Not connected
A4	FCX	O	Font cartridge enable
A5	A2	0	Address bus bit 2
A6	A4	0	Address bus bit 4
A7	A6	0	Address bus bit 6
A8	A8	0	Address bus bit 8
/49	A10	0	Address bus bit 10
AIO	A12	0	Address bus bit 12
A11	A14	0	Address bus bit 14
A12	A16	0	Address bus bit 16
A13	A18	0	Address bus bit 18
A14	A20	0	Address bus bit 20
A15	D1	I/O	Data bus bit 1
A16	D3	I/O	Data bus bit 3
A17	D5	I/O	Data bus bit 5
A18	D7	I/O	Data bus bit 7
A19	D9	I/O	Data bus bit 9
A20	D11	I/O	Data bus bit 11
A21	D13	I/O	Data bus bit 13
A22, 23	GND	—	Ground
A24, 25	+5 V	—	+5 VDC
B1	UDSX	O	Upper data strobe
B2	FCX	0	Address decode
B3	GND	—	Ground
B4	A1	O	Address bus bit 1
B5	A3	0	Address bus bit 3
B6	AS	0	Address bus bit 5
B7	A7	0	Address bus bit 7
08	A9	0	Address bus bit 9
B9	AII	0	Address bus bit 11
B10	A13	0	Address bus bit 13
B11	A15	0	Address bus bit 15
B12	A17	0	Address bus bit 17
B13	A19	0	Address bus bit 19
B14	Do	I/O	Data bus bit O
B15	D2	I/O	Data bus bit 2
B16	D4	I/O	Data bus bit 4
B17	D6	I/O	Data bus bit 6
B18	Da	I/O	Data bus bit 8
B19	D10	I/O	Data bus bit 10
B20	D12	f/o	Data bus bit 12
B21	D14	I/O	Data bus bit 14
B22	D15	I/O	Data bus bit 15
B23	RWX	O	Read/write strobe
B24	FCEX	0	Font cartridge enable
B25	MCLK	0	Clock from CPU

Table A-5. CN6 Pin Assignments

Pin No.	Signal Name	I/o	Description
1-6	+5V	—	+5 VDC
7	TXD	o	Transmitted data
8	READY	0	Ready signal
9	RXD	I	Received data
10	NC	—	Not connected
11	RESET	o	Reset signal
12	INH	0	I/F disabled
13	CMREQ	I	Request command
14	WRRDY	I	I/F ready
15	RDREQ	I	Data read request
16	WR	o	Write enable
17	RD	0	Read enable
18	CS	0	Chip select
19-24	GND	—	Ground
25-28	A3-AO	o	Address bus bit 3-O
29-36	D7-DO	I/O	Data bus bit 7-O

Table A-6. CN7 Pin Assignments

Pin No.	Signal Name	I/O	Description
1	SWINIT	I	Switch interrupt
2	GND	—	Ground
3	LCDWRX	O	Write strobe to LCD
4	LCDCLK	O	Clock to LCD
5	SWRDX	O	Read strobe to switch
6	LEDWRX	O	Write enable to LED
7	DB0	I/O	Data bus bit O
8	AI	O	Address bus bit 1
9	DB2	I/O	Data bus bit 2
10	DB1	I/O	Data bus bit 1
11	+5 V	—	+5 VDC
12	DB3	I/O	Data bus bit 3
13,14	GND	—	Ground
15-18	NC	—	Not connected
19	GND	—	Ground
20	RESETX	O	Reset signal
21	GND	—	Ground
22	NC	·	Not connected
23	GND	—	Ground
24	HSYNCX	I	HSYNC for video I/F
25	EPRDYX	I	Engine controller ready
26	PRDYX	I	Print ready
27	TODX	I	Video request
28	ETBSYX	I	Engine controller busy
29	STSX	I	Status transfer
30	CMDX	O	Command transfer
31	CTBSYX	O	Video controller busy
32	PRINITX	O	Print signal
33	SRCLKX	O	Serial transfer clock
34	CPRDYX	O	Video controller ready
35	GND	—	Ground
36	VIDEOX	O	video signal
37	GND	—	Ground
38	NC	—	Not connected
39	GND	—	Ground
40	+5 v	—	+5 VDC
41	GND	—	Ground
42	+5 v	—	+5 VDC
43	GND	—	Ground
44	+5 v	—	+5 VDC
45	GND	—	Ground
46	+5 v	—	+5 VDC
47	GND	—	Ground
4a	+5 v	—	+5 VDC
49	GND	—	Ground
50	+5 v	—	+5 VDC

Table A-7. CN8, 9 Pin Assignments

Pin No.	Signal Name	I/O	Description
1	Vss	—	Ground
2	DQ0	I/O	Data bus bit O
3	DQ16	I/O	Data bus bit 16
4	DQ1	I/O	Data bus bit 1
5	DQ17	I/O	Data bus bit 17
6	DQ2	I/O	Data bus bit 2
7	DQ18	I/O	Data bus bit 18
8	DQ3	I/O	Data bus bit 3
9	DQ19	I/O	Data bus bit 19
10	Vcc	—	+5 VDC
11	NC	—	Not connected
12	MAO	o	Memory address bit O
13	MA1	0	Memory address bit 1
14	MA2	0	Memory address bit 2
15	MA3	0	Memory address bit 3
16	MA4	0	Memory address bit 4
17	MA5	0	Memory address bit 5
18	MA6	0	Memory address bit 6
19	MA1O	0	Memory address bit 10
20	DQ4	I/O	Data bus bit 4
21	DQ20	I/O	Data bus bit 20
22	DQ5	I/O	Data bus bit 5
23	DQ21	I/O	Data bus bit 21
24	DQ6	I/O	Data bus bit 6
25	DQ22	I/O	Data bus bit 22
26	DQ7	I/O	Data bus bit 7
27	DQ23	I/O	Data bus bit 23
28	MA7	o	Memory address bit 7
29	NC	—	Not connected
30	Vcc	—	+5 VDC
31	MA8	o	Memory address bit 8
32	MA9	0	Memory address bit 9
33	$\overline{\text{RAS3}}$	0	RAS 3
34	$\overline{\text{RAS2}}$	0	RAS 2
35	MP2	—	Not used
36	MP0	—	Not used
37	MP1	—	Not used
38	MP3	—	Not used
39	Vss	—	Ground
40	$\overline{\text{CAS0}}$	o	CAS O
41	$\overline{\text{CAS2}}$	0	CAS 2
42	$\overline{\text{CAS3}}$	0	CAS 3
43	$\overline{\text{CAS1}}$	0	CAS 1
44	$\overline{\text{RAS0}}$	0	RAS O
45	$\overline{\text{RAS1}}$	0	RAS 1
46	NC	—	Not connected
47	WE	o	Write enable
48	NC	—	Not connected
49	DQ8	I/O	Data bus bit 8

Table A-7. CN8, 9 Pin Assignments (Continued)

Pin No.	Signal Name	I/O	Description
50	DQ24	I/O	Data bus bit 24
51	DQ9	I/O	Data bus bit 9
52	DQ25	I/O	Data bus bit 25
53	DQ10	I/O	Data bus bit 10
54	DQ26	I/O	Data bus bit 26
55	DQ11	I/O	Data bus bit 11
56	DQ27	I/O	Data bus bit 27
57	DQ12	I/O	Data bus bit 12
58	DQ28	I/O	Data bus bit 28
59	Vcc	—	+5 VDC
60	DQ29	I/O	Data bus bit 29
61	DQ13	I/O	Data bus bit 13
62	DQ30	I/O	Data bus bit 30
63	DQ14	I/O	Data bus bit 14
64	DQ31	I/O	Data bus bit 31
65	DQ14	I/O	Data bus bit 14
66	NC	—	Not connected
67	PO1	—	Not used
68	PO2	—	Not used
69	PO3	—	Not used
70	PO4	—	Not used
71	NC	—	Not connected
72	Vss	—	Ground

A.1.2 Engine Controller Board (PWB-A Board)

Table A-8. CN4 Pin Assignments

Pin No.	Signal Name	I/O	Description
1	DC5V	—	+5 VDC
2	T. EMPTY	I	Toner empty signal
3	$\overline{\text{T.LED}}$	O	Toner empty sensor LED drive
4	GND1	—	Ground

Table A-9. CN5 Pin Assignments

Pin No.	Signal Name	I/O	Description
1	M2:CLK	O	M2 drive clock
2	M2:LOCK	I	M2 lock signal
3	M2:ON	O	M2 drive
4	GND2	—	Ground
5	24 VDC	—	+24 VDC
6	5 VDC	—	+5 VDC
7	LDATA	O	Laser data
8	GND1	—	Ground
9	LDVR1	O	Laser power adjust 1
10	LDVR2	O	Laser power adjust 2
11	LDLVL	I	Laser power signal
12	SSCAN	I	Horizontal synchronous signal
13	GND1	—	Ground

Table A-10. CN6 Pin Assignments

Pin No.	Signal Name	I/O	Description
1	5 VDC	—	+5 VDC
2	GND1	—	Ground
3	PC1	1 “	Paper empty
4	5 VDC	—	+5 VDC
5	GND1	—	Ground
6	PC3	I	Paper exit
7	24 VDC	—	+24 VDC
8	SL1:ON	O	Paper take-up solenoid drive

Table A-11. CN7 Pin Assignments

Pin No.	Signal Name	I/O	Description
1	GND1	—	Ground
2	PC2	I	Paper take-up
3	DC5V	—	+5 VDC
4	DC24V	·	+24 VDC
5	GND2	—	Ground
6	CH1 :ON	O	Drum charge on
7	CH2:ON	O	Image transfer on
8	DB:CNT	O	Developing bias control
9	M3:CNT	O	M3 control

Table A-1 2. CN8 Pin Assignments (Also CN3 on PWB-E Board)

Pin No.	Signal Name	I/O	Description
1	TdB	O	Ml phase B control
2	TdA	O	Ml phase A control
3	@B	O	Ml phase B clock
4	ϕA	O	Ml phase A clock
5,6	GND1	—	Ground
7,8	5 VDC	—	+5 VDC
9	GND2	—	Ground
10	24 VDC	—	+24 VDC
11	H1:ON	O	Heater lamp on

Table A-13. CN9 Pin Assignments

Pin No.	Signal Name	I/O	Description
1	5 VDC	—	+5 VDC
2	24 VDC	—	+24 VDC
3	GND2	—	Ground
4	NC	—	Not connected
5	SL2	O	Lower cassette solenoid on
6	S3	I	Lower cassette detected
7	PC4	I	Lower cassette paper empty

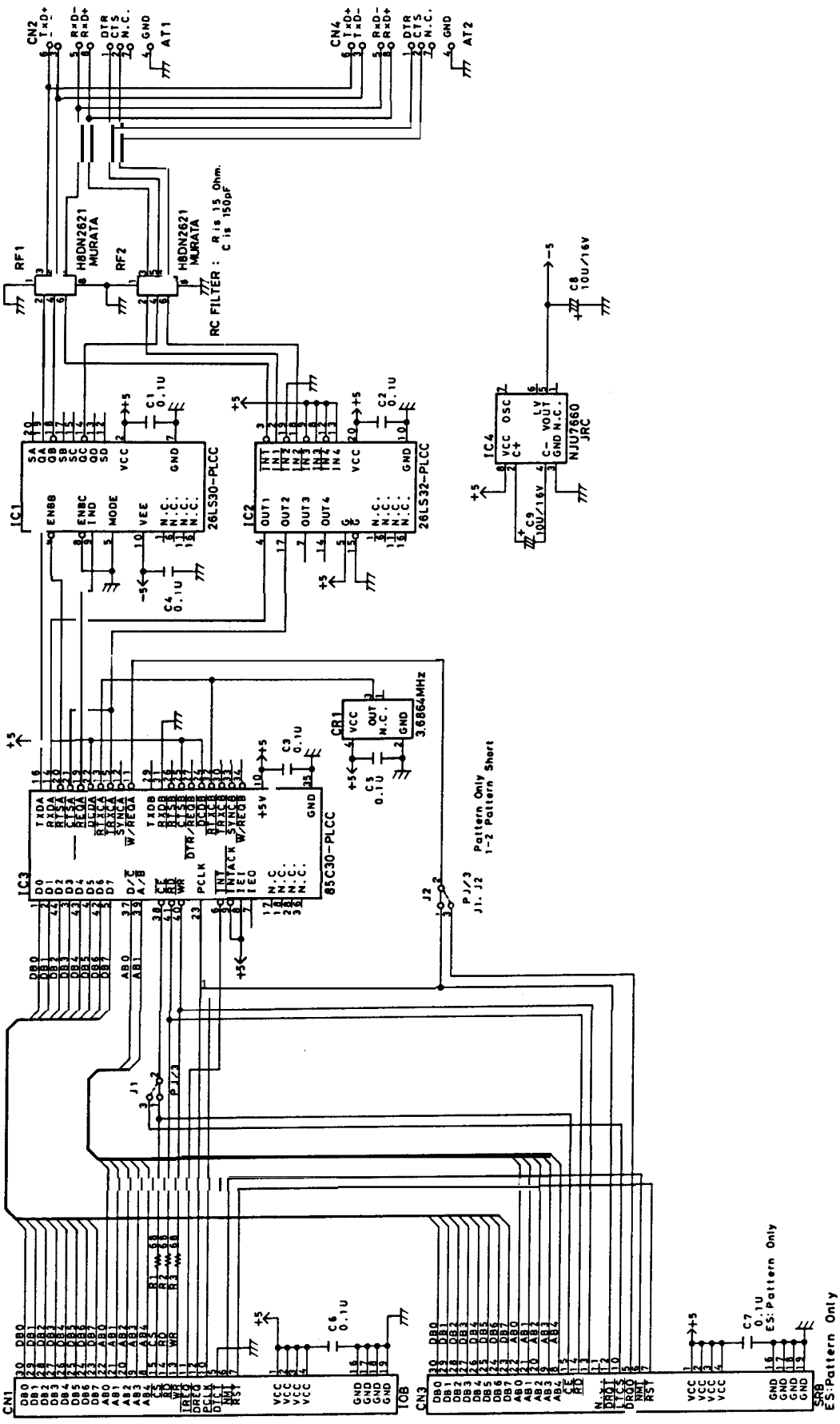

Figure A-4. C82326* I/F Board Circuit Diagram

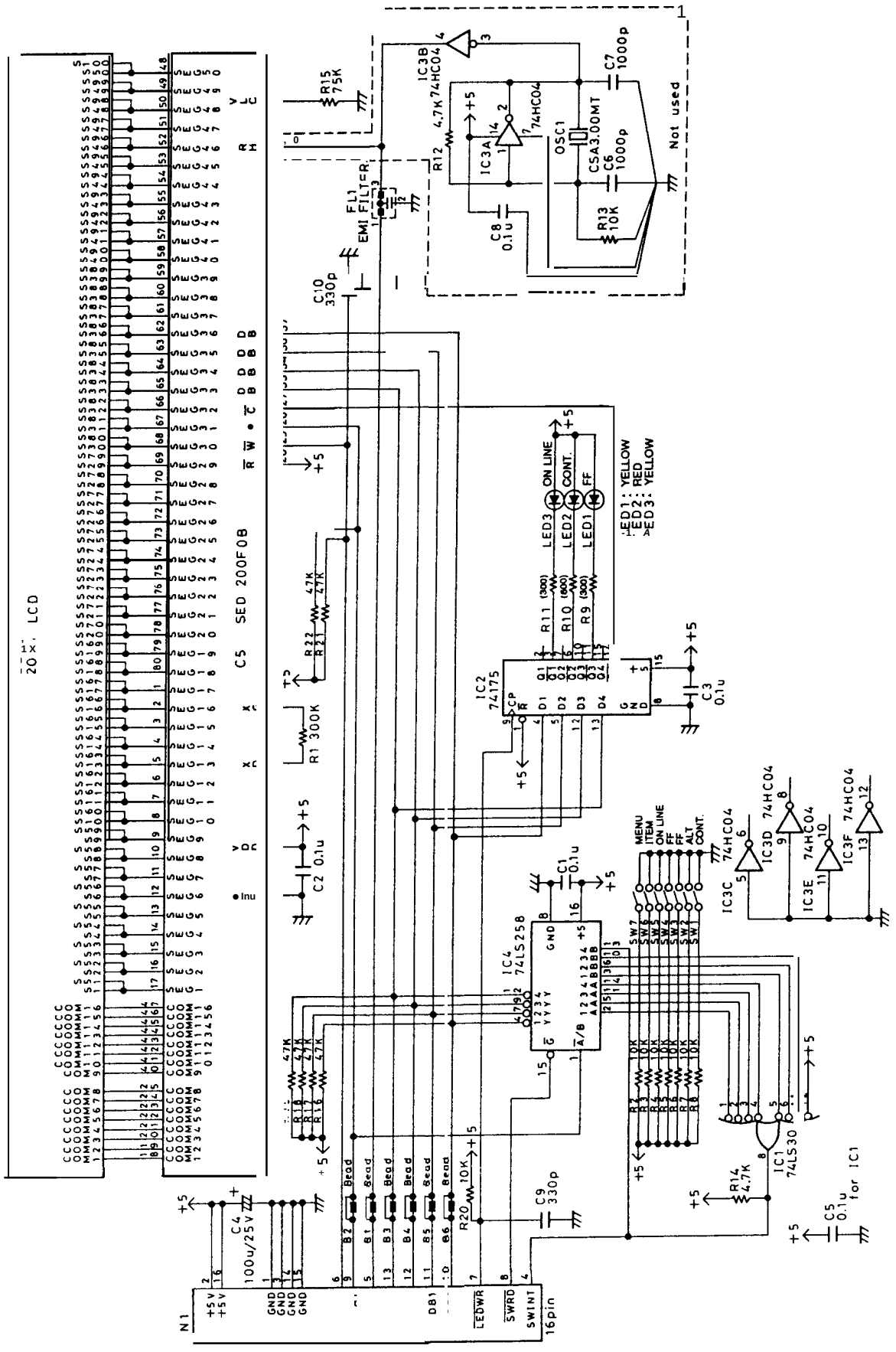

Figure A-5. Control Panel Circuit Diagram

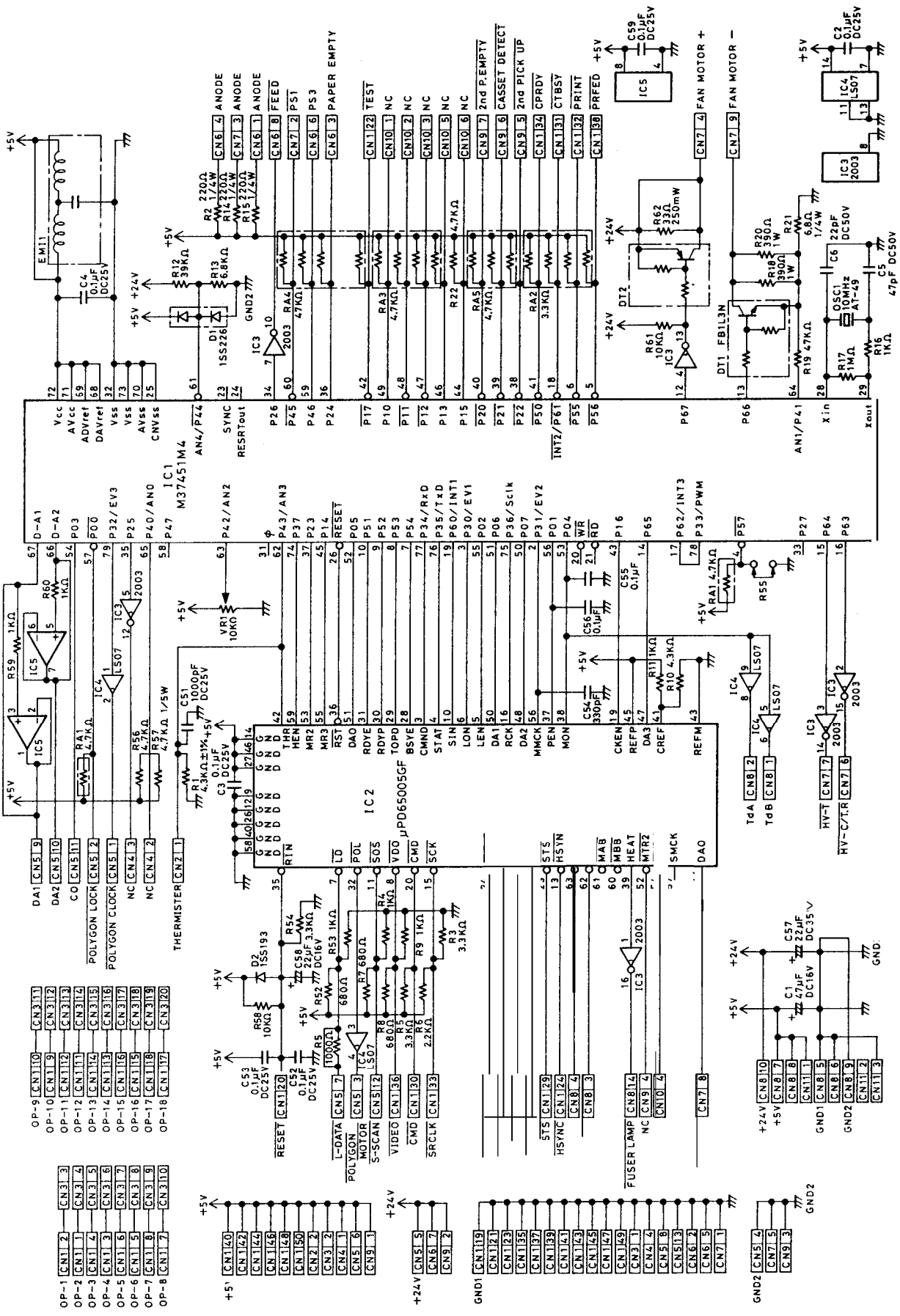

Figure A-6. PWB-A Board Circuit Diagram

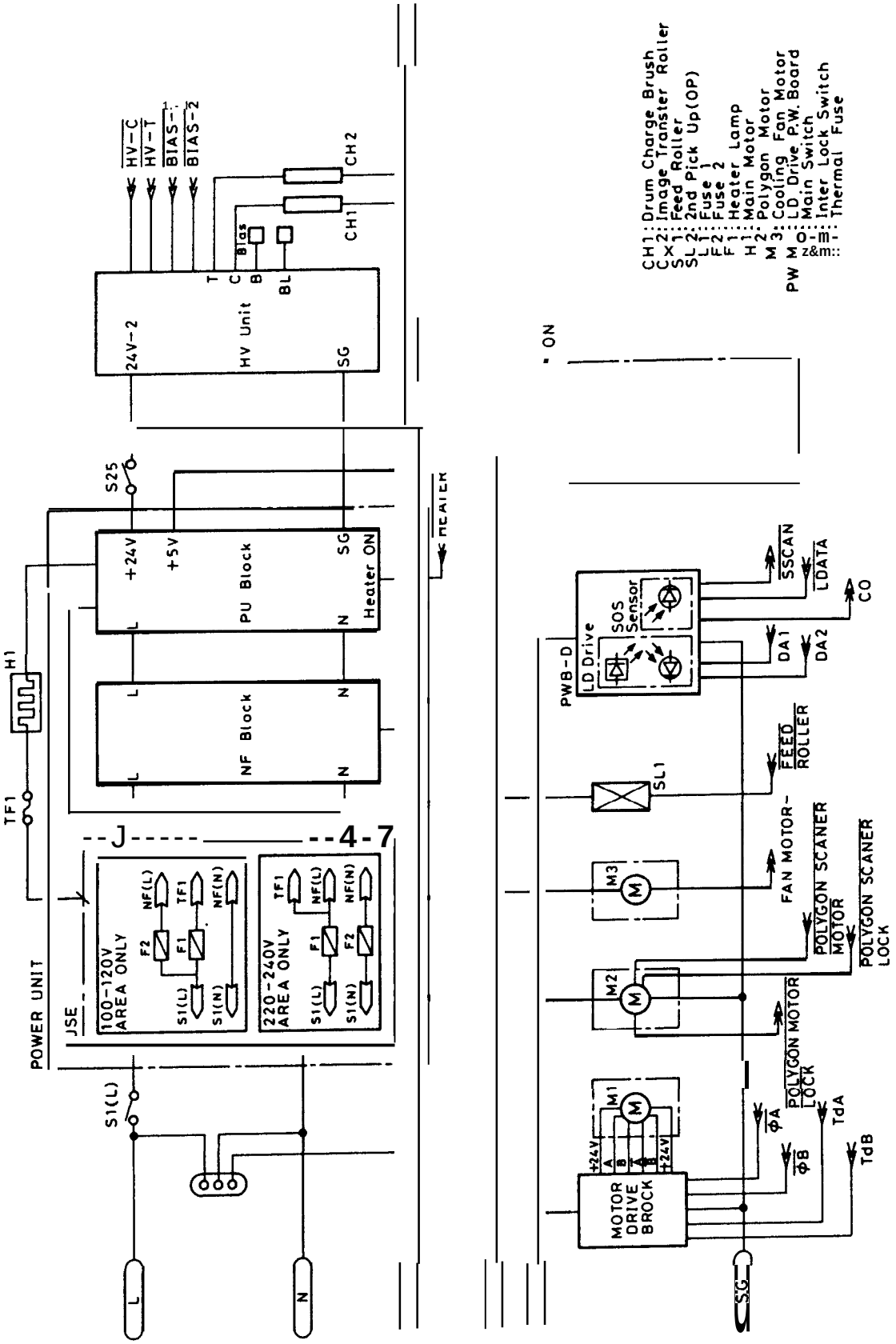

Figure A-7. Basic Circuit Diagram

A.3 CIRCUIT BOARD COMPONENT LAYOUT

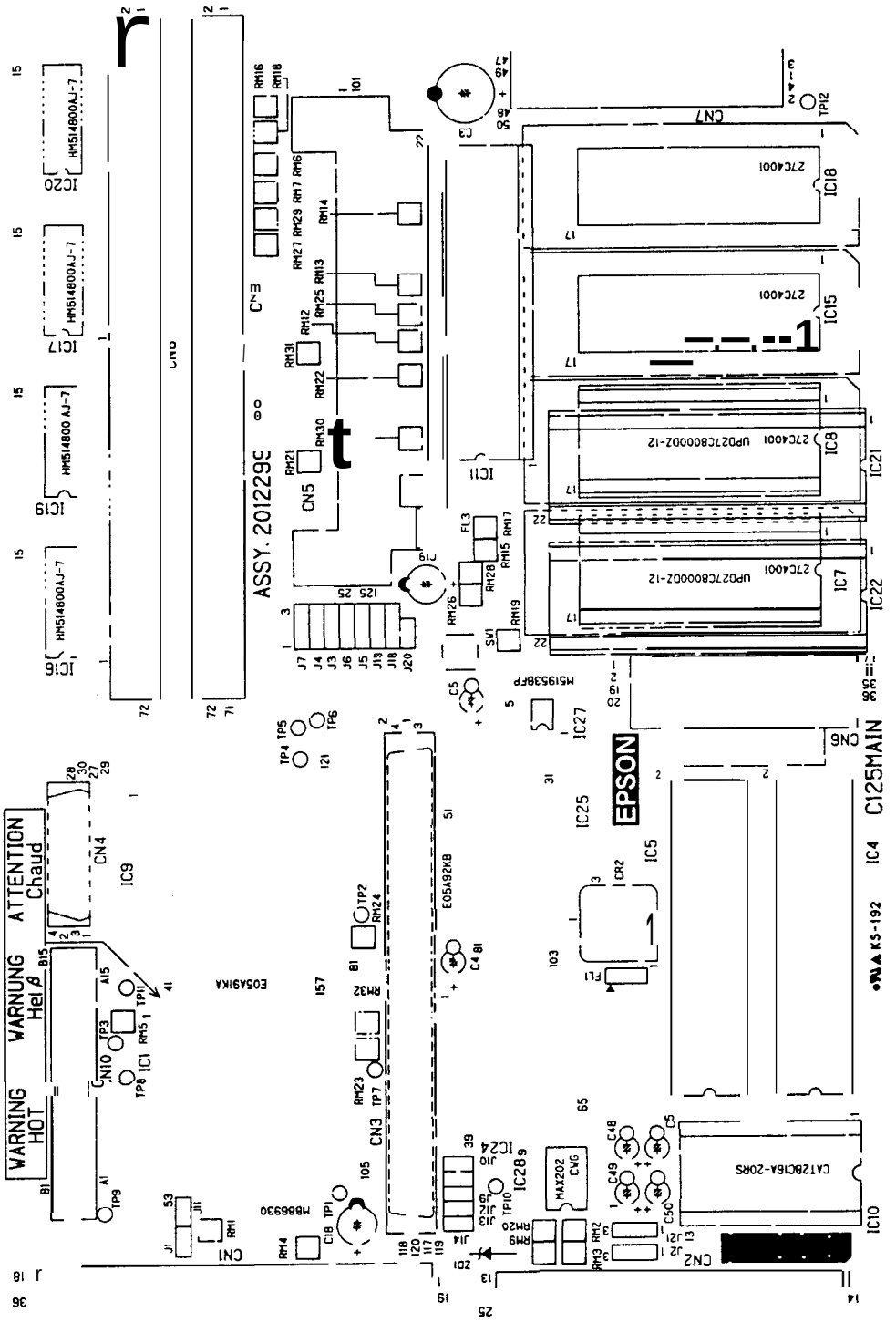

Figure A-8. C125 MAIN Board Component Layout (Front Side)

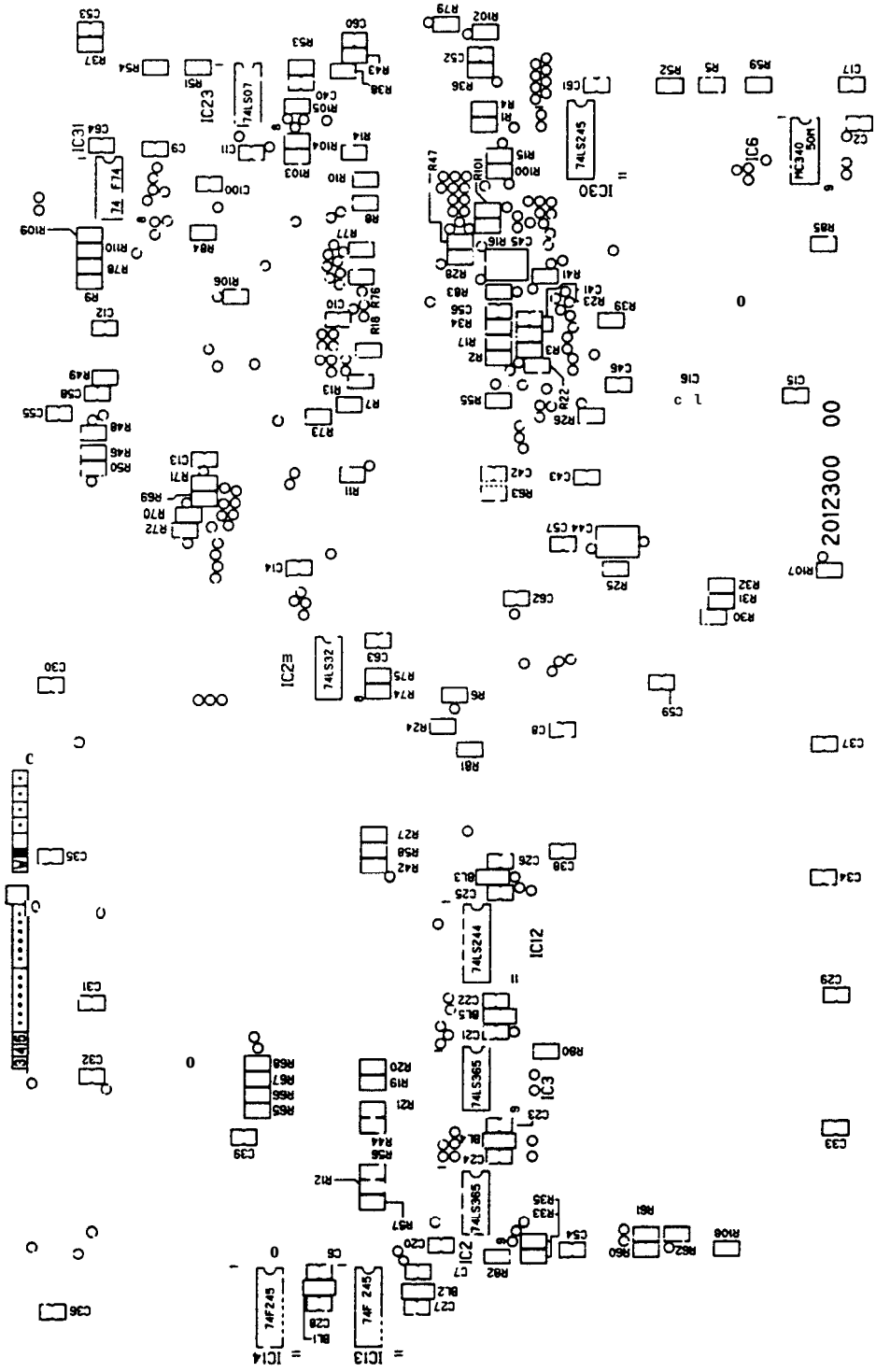

Figure A-9. C125 MAIN Board Component Layout (Rear Side)