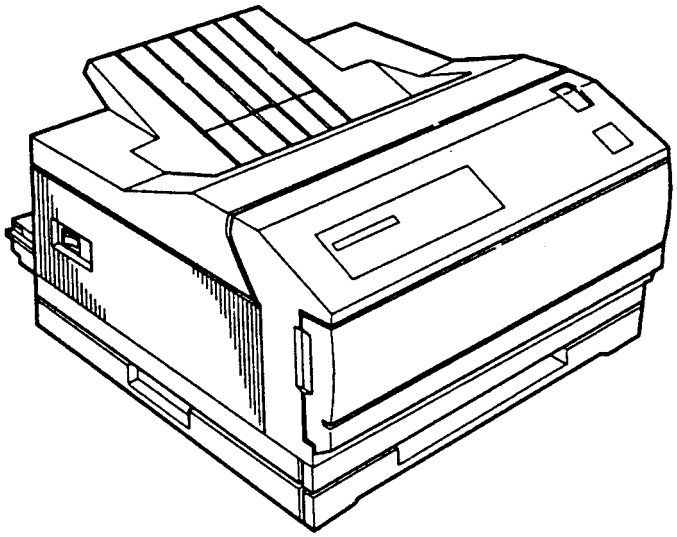
EPSON TERMINAL PRINTER

EPL-9000

SERVICE MANUAL



EPSON

4003603

NOTICE

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

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

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PRECAUTIONS

Precautionary 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 whenperforrning 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 UNITTOA POWER SOURCE UNTIL INSTRUCTED TO DO SO. WHEN THE POWER SUPPLY CABLE MUST BE CONNECTED, USE EXTREME CAUTION IN WORKING ON POWER SUPPLY AND OTHER 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 VOLTAGE, LISTED ON THE SERIAL NUMBER/RATING PLATE. IF THE EPSON PRODUCT HAS A PRIMARY AC RATING DIFFERENT 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 ICs OR OTHER NONAPPROVED COMPONENTS MAY DAMAGE THE PRODUCT 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 cannot escape from the machine during any phase of user operation.

For Europe 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 mW 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.

For Finland, Sweden Users;

VAROITUS
Laitteen käyttäminen muulla kuin tässä käyttöohjeessa mainitulla tavalla saat taa altistaa käyttäjän turvallisuusluokan 1 ylittävälle näkymättömälle lasersäteivlle.

VARNING
Orn apparaten används på annat sätt än i denna bruksanvisning specificerats, kan användaren utsättas för osynlig laserstrålning, som överskrider gränsen for laser klass 1.

For Finland, Sweden Service People

VAROITUS
Avattaessa ja suojalukitus ohitettaessa olet alttiina näkymättömälle laser säteilvlle. Älä katso säteeseen.

VARNING
Osynlig laserstrålning när denna del är oppnad och spärren är urkopplad. Betrakta ej strålen.

For Norwav Users:

ADVARSEL
Dersom apparatet brukes på annen måte enn spesifisert i denne bruksanvisning, kan brukeren utsettes for unsynlig laserstråling som overskrider grensen for laser klasse 1.

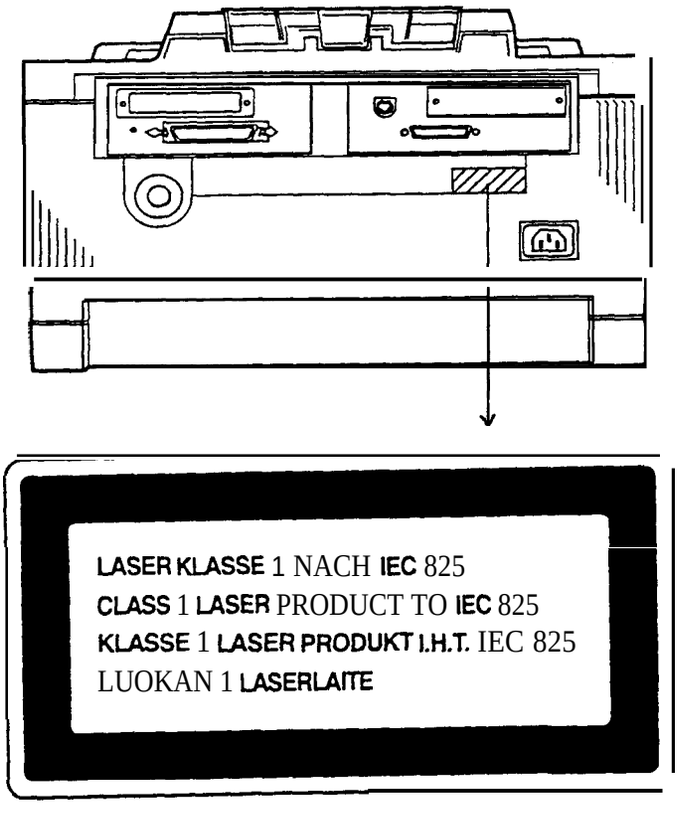
Dette er en halvleder laser. Maksimal effeckt til laserdiode er 5 mW og bølgelengde er 780 nm.

Laser Safety Labels

[Label on rear printer case]

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

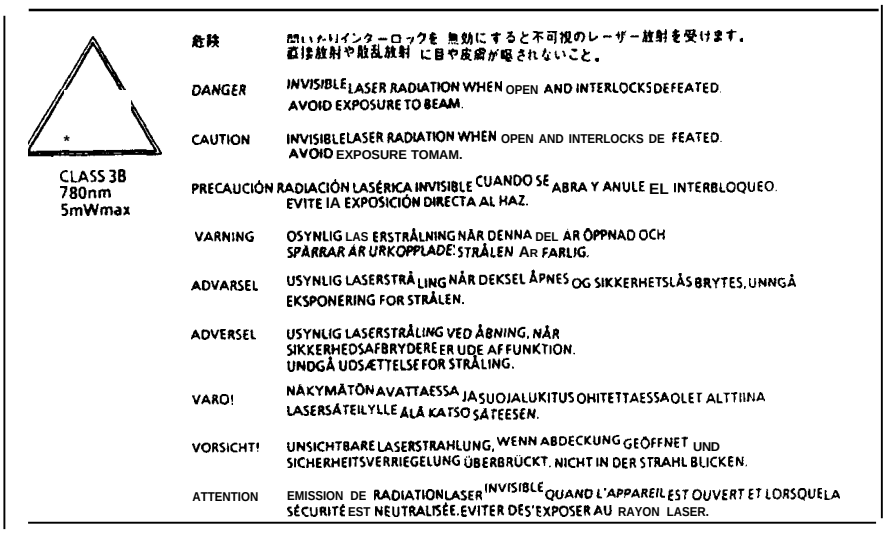
For Europe

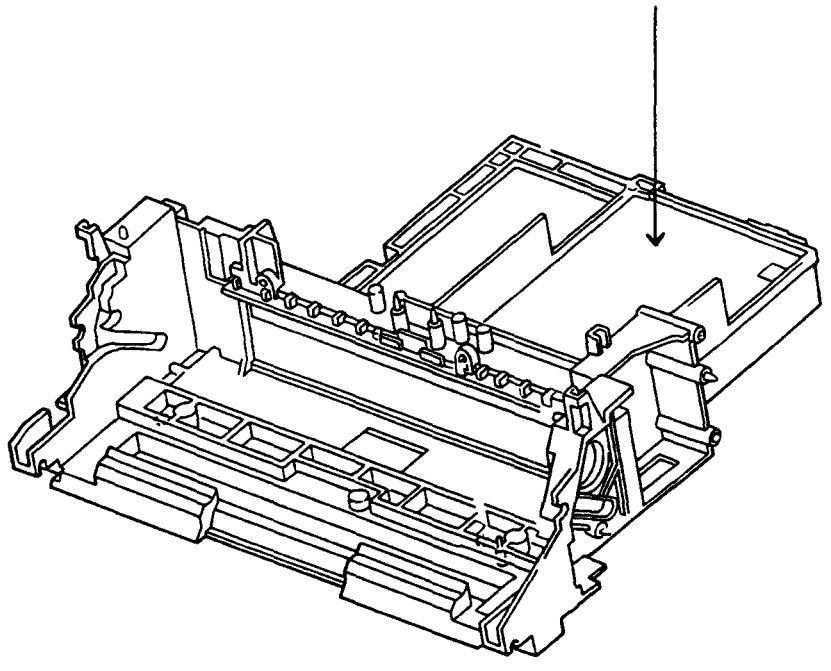


[Label inside printer]

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-9000.
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 to service the equipment.

APPENDIX

Describes connector pin assignments, circuit diagrams, circuit board component layout.

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

REVISION SHEET

Revision	Issue Date	Revision Page
Rev. A	August 5, 1994	1st issue

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Chapter 1 General Description

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1.1 FEATURES

The EPSON® EPL-9000 is a non-impact page printer that combines a semi-conductor laser with electro-photographic technology. This printer is small and light, and features 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 — 8 ppm (pages per minute) (A4 or letter size)
- Resolution — 600/300 dpi (dots per inch)
- Small footprint
- Easy maintenance
- HP® LaserJet® 4 emulation mode
- 45 built-in scalable fonts (35 Intellifonts and 10 TrueType fonts)
- ESC/P 2™ emulation
- High-performance controller (the controller's CPU is a 19.2 MHz SPARKlite (MB86930))
- Bi Resolution Improvement Technology (BiRITech) refines the print quality by eliminating jagged edges from images and characters on 600 dpi and 300 dpi printing.
- Optional EPSONScript Level 2 (PostScript® compatible) module
- EPSON Micro Gray Technology (EMGTech), which is available when using EPSONScript Level 2 mode, refines gray scale printing to be comparable to printing on a 1200-dpi printer
- Small and low-cost optional LocalTalk™ interface module
- 2 MB standard RAM and up to 64 MB RAM with the addition of optional SIMMs
- Bidirectional parallel interface
- High-speed serial communication rate of 57.6K bps
- High-speed parallel communication rate of approximately 400 KB/second
- A multi-user, multi-emulation mode
- IES (Intelligent Emulation Switch) allows switching between EPSONScript 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 EPL-9000.

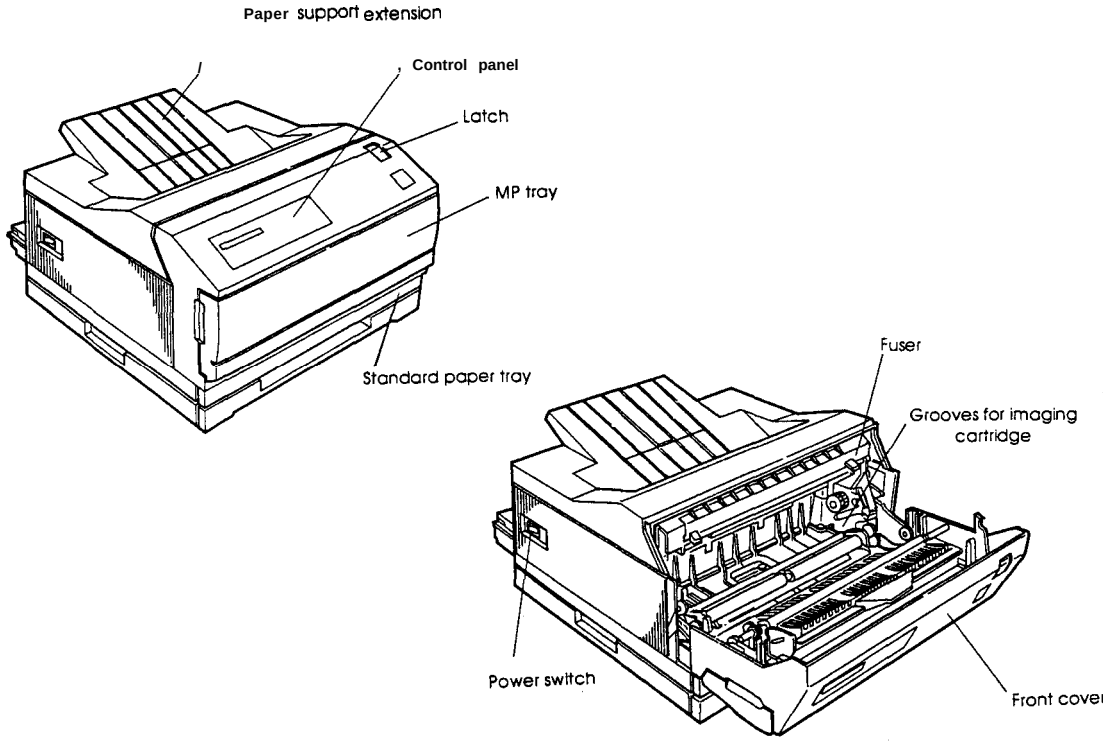


Figure 1-1. Exterior View of the EPL-9000

Table 1-1 lists the optional units available for the EPL-9000.

Table 1-1. Options for EPL-9000

Cat. No.	Description	Note	Machine Type EPL-9000
X3209*	EPSONScript Level 2 Module	Supports EPSONScript Level 2 mode (PostScript Level 2 compatible) fonts and commands	Yes
—	Local language ROM	Supports local language fonts	Yes
C81242*	250 sheet universal paper tray (A4/Letter size)	A4/Letter size paper tray	Yes
C81243*	250 sheet universal paper tray (A3/Double-Letter size)	A3/Double-Letter size paper tray	Yes
C81241*	Lower paper cassette unit	Lower paper cassette unit (No include paper cassette)	Yes
5051022	Imaging cartridge	Toner cartridge	Yes
C82326*	LocalTalk I/F Module	—	Yes
C82307*/ C82308*	32 KB serial interface card	—	Yes
C82310*/ C8231'	32 KB parallel interface card	—	Yes
C82312*	LocalTalk card	—	Yes
C82314*	COAX interface card	—	Yes
C82315*	TWINAX interface card	—	Yes
C82324*	Ethernet interface card for NetWare®	—	Yes

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

1.2 SPECIFICATIONS

This section provides statistical data for the EPL-9000.

1.2.1 Basic Specifications

Printing method:	Laser beam scanning and dry electro-photography
Resolution:	600/300 dpi
Printing speed:	8 ppm (letter/A4), 5 ppm (B4), 4.3 ppm (A3) by cassette feed
First printing time:	18.9 seconds (A4 cassette feed) 19.1 seconds (Letter cassette feed) 25.0 seconds (A3 cassette feed)
Warm-up time:	Less than 120 seconds (at rated current and 20° C (68° F) temperature)
Paper supply:	See Table 1-2.

Table 1-2. Paper Feed Methods

Paper Supply		Capacity (17 lb. (64 g/m²) paper)	Paper Size	Usage Thickness (Ream Weight)
Standard built-in paper tray or optional lower paper cassette unit	A3/Double-letter paper cassette	250	A3, A4, A5, B4, B5, LT, HLT, LGL, EXE, GLG, B, F4	16 to 24 lb. (60 to 90 g/m²)
	A4/Letter paper cassette	250	A4, A5, B5, LT, HLT, EXE	
Manual feeder (MSI)		50	A4, A5, B5, LT, HLT, EXE, GLG, GLT, B, F4	16 to 24 lb. (60 to 135 g/m²)
		30	A4, A5, B5, LT, HLT, EXE	Special paper [label, OHP)
		5	Intemational-B5, MON, C1O, DL, C5	Envelopes made of 16 to 28 lb. (60 to 105 g/m²)

Notes:

1. The weight in pounds (lb) is determined by how much 500 sheets cut to 17x 22 inches would weigh; 1 g/m^2 = 0.2659763 lb.
2. The printer can use manual feed for A3, B4, LGL, GLG, B and F4 size paper, if user supports paper by hand.
3. When inserting A4, AS, B5, LT, HLT, EXE, and GLT size papers, keep the longer side horizontal.

Paper types: See Table 1-3.

Table 1-3. Paper Types

Standard paper	Xerox® 4024 DP paper 20 lb. (75 g/m²)
Normal paper	Regular photocopier paper Bond paper Recycled paper 16 to 24 lb. (60 to 90 g/m²)
Special paper	Card stock (90 to 135 g/m²) Envelopes Labels Letterhead Transparency (OHP) sheets Colored paper

Usability of special papers: See Table 1-4.

Table 1-4. Usability of Special Paper

Input	Standard paper	Normal paper	OHP	Envelopes	Labels	Card Stock
Paper tray	R	R	P	N	P	N
Manual feed (MSI)	R	R	P	P	P	P
Envelope cassette	N	N	N	P	N	N

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

Paper size range: **98 mm (3.87 inches) to 297 mm (11.7 inches)** (Width)
140 mm (5.5 inches) to 432 mm (17 inches) (Length)

Paper feed alignment and direction: Center alignment for **all** sizes

Paper ejection: Face down

Output tray capacity: 250 sheets (standard paper)

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

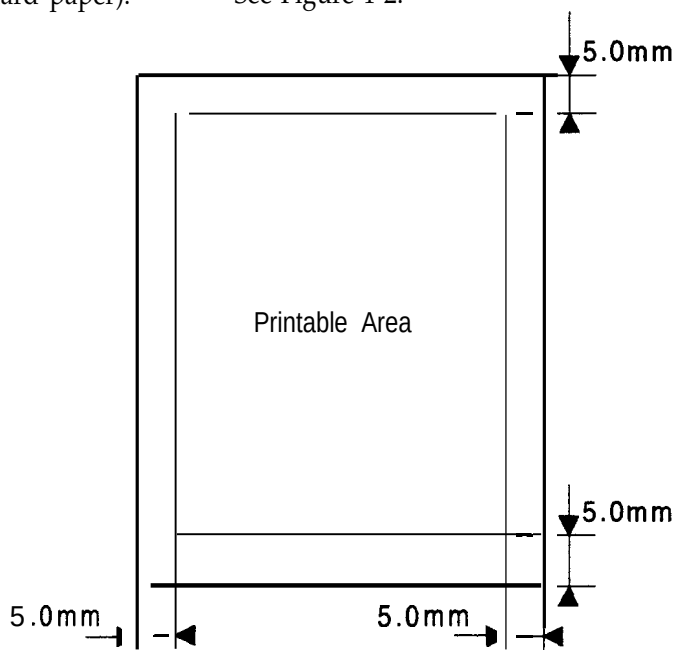


Figure 1-2. Printable Area

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

Noise: Less than 35 dB(A) (standby)
Less than 48 dB(A) (operating)

Ozone density: 0.05 ppm (typical)

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

1.2.2 Electrical Specifications

Table 1-5. Electrical Specifications

Description	100 V Version	200 V Version
Rated voltage	115 VAC	220-240 VAC
Input voltage range	104-127 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

1.2.3 Reliability Specifications

MPBF (Mean Prints Between Failures): Over 12,000 sheets

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

Jam rate: 1 out of 3,000 sheets or less (Standard paper)
1 out of 2,000 sheets or less (Normal paper)
1 out of 25 sheets or less (Label, Envelope, OHP)

Multiple paper feeds: 1 out of 800 sheets or less (Standard paper)
1 out of 500 sheets or less (Normal paper)
1 out of 25 sheets or less (Label, Envelope, OHP)

Paper curl height: 30 mm (1.2 inches) or less

MTTR (Mean Time To Repair): 30 minutes or less

Durability: 5 years or 300,0000 sheets

1.2.4 Environmental Conditions for Operation (Including Imaging Cartridge)

Temperature:	10 to 32° C (50 to 90° F)
Humidity:	20 to 80% RH
Altitude:	2,500 m (8,200 feet) or lower
Levelness:	Printer should be installed on a level plane.
Illuminance:	3,000 IUX or less (Must not be exposed to direct sunlight.)

1.2.5 Environmental Conditions for Storage and Transportation

Temperature:	O to 35° C (32 to 95° 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 variation must be 10° C (18° F)/hour or less
Humidity:	20 to 80% RH over full storage term 5 to 95% RH under extreme conditions (Extremes are allowable for up to 1/30 of full storage term)
Drop test:	Height 52 cm
Vibration:	Vibration frequency 5 to55 Hz and 55 to 5 Hz Acceleration 1 G Acceleration direction 3 direction
Resistance to atmospheric pressure:	More than 740 hecto pascal
Storage term:	12 months (following date of manufacture)

1.2.6 Applicable Standards

Safety *Standards*

120 VAC model:	None
220/240 VAC model:	EN 60950 (IEC950), NEMKO (IEC950), SETI (IEC950), SEMKO (IEC950), DEMKO (IEC950)

Safety Regulations (Laser radiation)

120 VAC model:	None
220/240 VAC model:	VDE 0837 (Laser Class 1)(IEC825), SETI (IEC825), SEMKO(IEC825), DEMKO (IEC825)

EMI

120 VAC model:	None
220/240 VAC model:	DOC Class B 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:	UL478 (5th edition)
Materials:	SWISS Environmental Law (No CdS must be contained)

1.2.7 Specification for Consumable (Imaging Cartridge)

Life: 6,500 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 35° C (32 to 95° 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:	20 to 80% RH over full storage term 5 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 hecto pascal
Storage term:	24 months (following date of manufacture)

1.2.8 Physical Specifications

Dimensions (Width x Depth x Height):

Printer:	437 x 473 x 270 mm (17.2 x 18.6x 10.6 inches)
Weight:	Approx. 17 Kg (37.5 lb.) (consumable, excluding all options)

1.2.9 Software Specifications

Built-in modes: HP LaserJet 4 emulation (PCL® 5e)
EPSON GL/2 mode (LJ4-GL/2 mode and GL-like mode)
FX @$70/1170, LX-100) 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 mode
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 initialize	Ejects paper, switches to PCL, and then initialize
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 cornmands 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.) coremands. If the application software uses unsupported coremands 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 (Continued)

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	NS	NS
Swiss 721	Bold Oblique SWM	s	NS	NS
Dutch 801	Roman SWM	s	s	NS
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	Norweg1
Roman Extension	Italian
ECM94-1	Swedis2
ANSI ASCII	UK
French2	German
Legal	Spanish
IBM®-US	IBM-DN
PcMultilingual	

HP LaserJet4 Mode (scalable fonts) : 34 symbol sets

Roman-8	Norweg1
Italian	ECM94-1
Swedis2	ANSI ASCII
UK	French2
German	Legal
8859-2 1S0	Spanish
PsMath	8859-9 ISO
WiTurkish	MsPublishing
VeMath	DeskTop
Math-8	WiE.Europe
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
SWEDENT	L.AMERICA
ITALY	KOREAR
LEGAL	

PcUSA(437)	PcMultilingual(850)
PcPortuguese(860)T	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)T	PcCanFrench(863)
PcNordic(865)	PcTurk2(857)
PcE.Europe(852)	BpBRASCII
BpAbicomp	

1.3 INTERFACE SPECIFICATIONS

The EPL-9000 is 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.

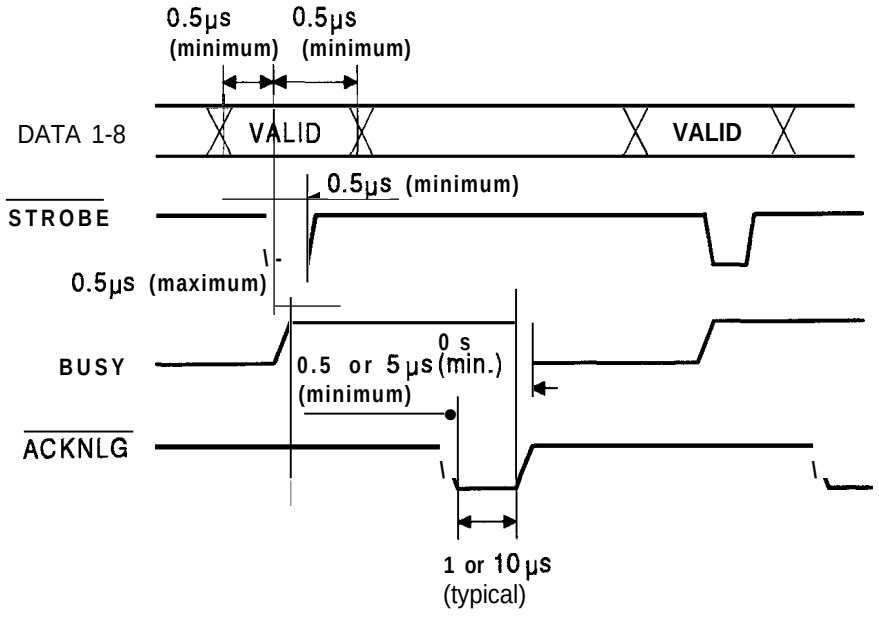


Figure 1-3. Compatibility Mode Signal Timing

Table 1-8. Parallel Interface Pin Assignments

Pin No.	Signal Name	I/O	Description
1	STROBE	IN	STROBE is a strobe pulse used to read data from the host computer. The pulse width must be more than 0.5&c. 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	ACKNLG	OUT	ACKNLG is an acknowledge pulse with an approximate width of 1 or 10 µsec. 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 minter 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 in reverse mode.
14	AUTO-FEED	IN	Not used.
15	NC		Not used.
16	GND	-	Logic around 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 STROBE signal is ignored when this signal is LOW.
32	ERROR	OUT	This level goes LOW when the printer is: • out of paper • in paper jam state • in error state • off line
33	GND		Same as for tins19 to 30.
34	NC	-	Not used.
35	+5	-	Pulled up to +5V through 1.0 Kohm resistance.
36	SLCT IN	-	Use the reverse mode.

1.3.1.2 Reverse Mode

The reverse mode for EPL-9000 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: IEEE-P1284 nibble mode
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 Assignments

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 2 and 6 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 P1284 (reverse mode).

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

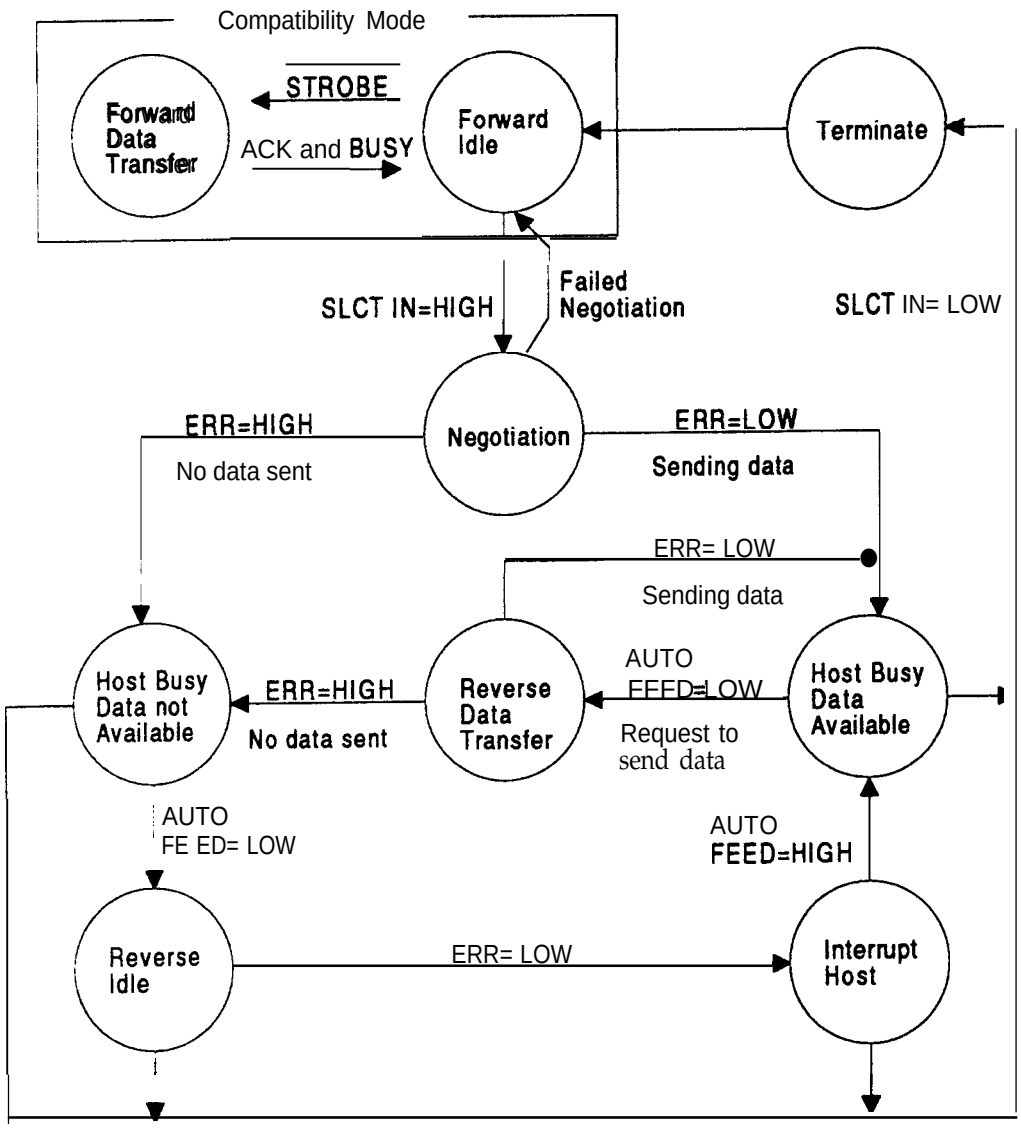


Figure 1-4. Parallel Interface State Switch Diagram

Figure 1-5 shows the negotiation timing chart.

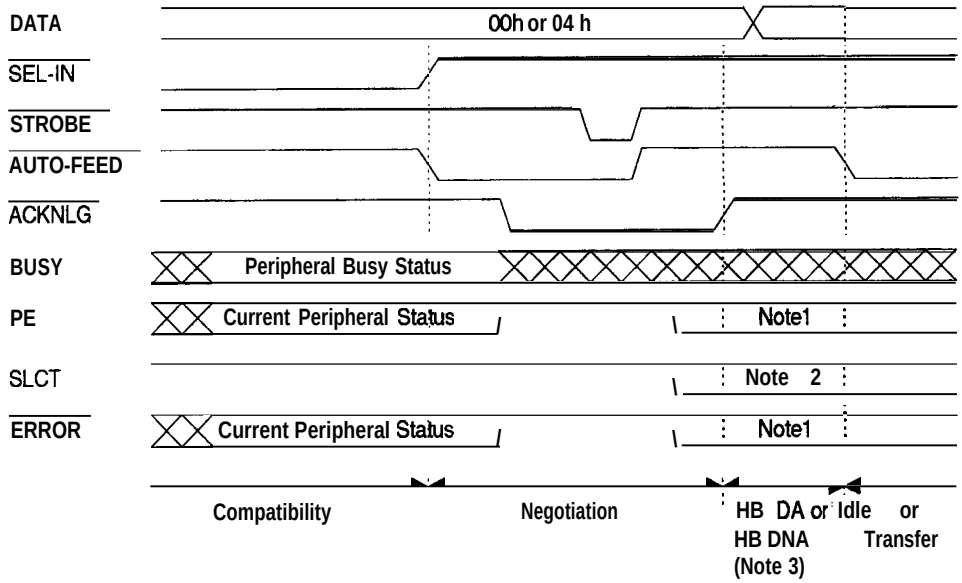


Figure 1-5. Negotiation Timing Chart

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.

Note3: HB DA: Host Busy Data Available
HB DNA: Host Busy Data Not Available

Figure 1-6 shows the data transfer timing chart.

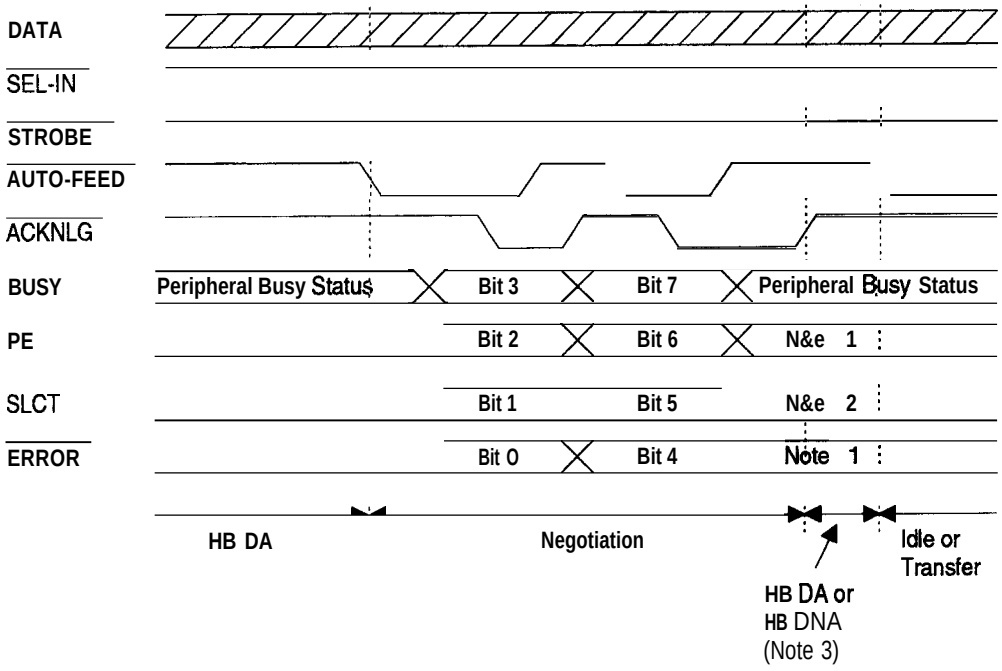


Figure 1-6. Data Transfer Timing Chart

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 the extension request value is 04h.

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

Figure 1-7 shows the terrnination timing chart.

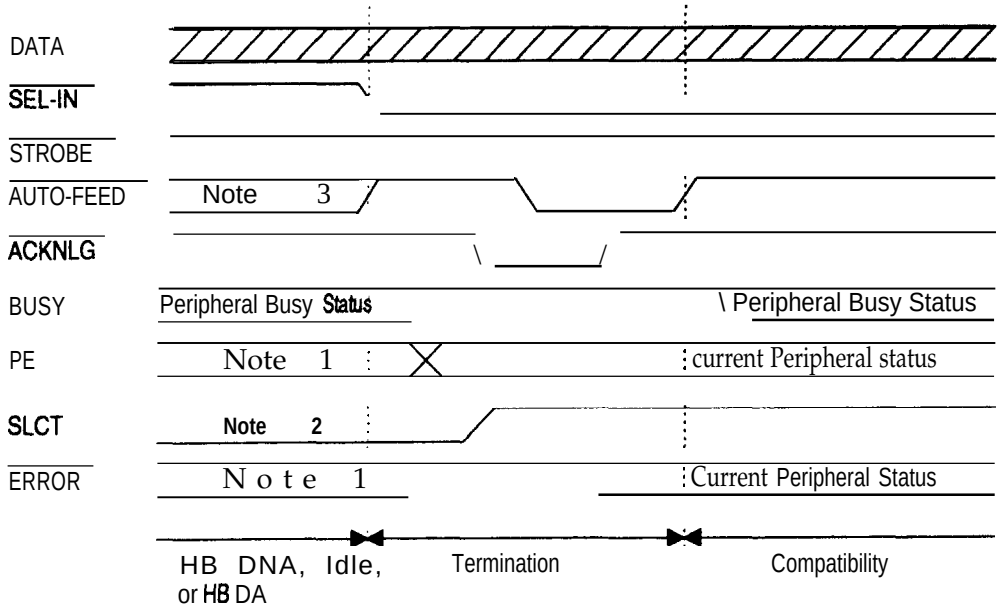


Figure 1-7. Termination Timing chart

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 the extension request value is 04h.

Note3: Idle= LOW

Figure 1-8 shows the interrupt timing chart.

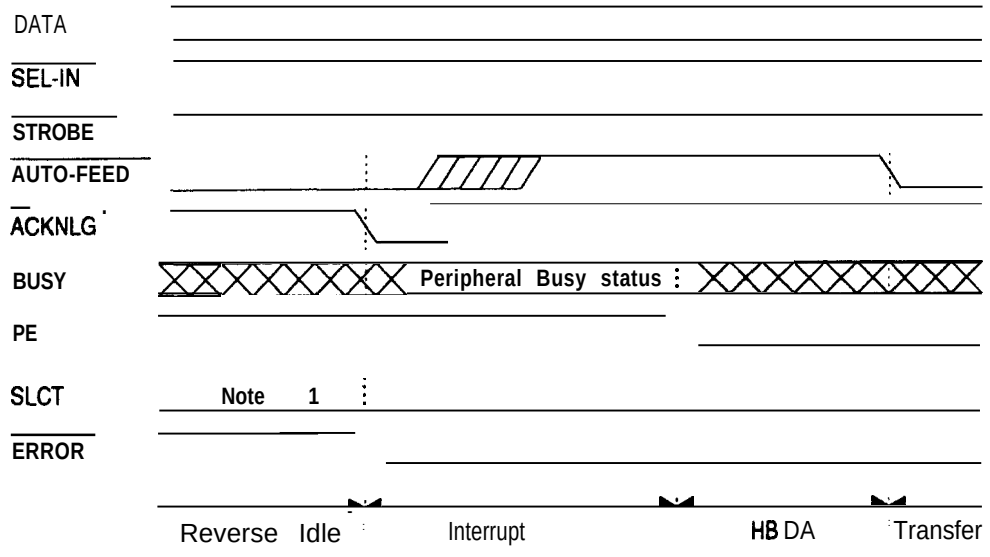


Figure 1-8. Interrupt Timing Chart

Note 1: The signal is set to HIGH, if extension request value was 04h.

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 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: Processed 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.
11 to 17	NC		Not connected.
18	(RD-)	IN	See Note 4.
19	NC		Not connected.
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		Not connected.

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

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

Note3: Although the signals RTS, CTS, DSR, DTR, and DCD are RS-232C level, they can be used for RS-422 mode if selected through SelecType.

Note4: 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 cede 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 (DCl) code is output after all renditions 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 RS-422 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		Not connected.
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.

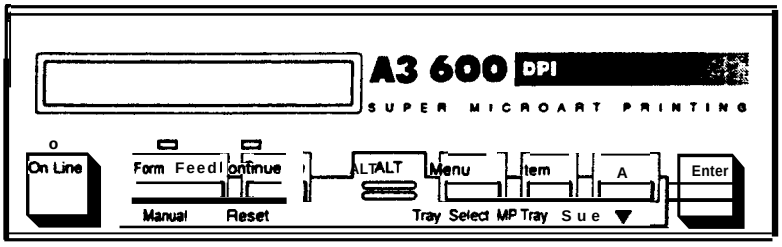


Figure 1-9. Control Panel

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, L, 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.
■ Form Feed	When the printer is off line and the Form Feed light is lit, pressing this button prints out data in the printer's memory.
■ Manual (Form Feed + Alt)	Enters directly (short cut) to manual feed; this setting is the same as the manual setting in the PRINTING MENU of SelecType.
■ 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.
■ ALT	Modifies the function of other buttons.
■ 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.
■ Item	Enters SelecType mode. Changes the item in SelecType mode.
■ MP Tray Size (Item+ Alt)	Enters directly (short cut) to the MP TRAY SIZE setting in TRAY MENU of SelecType.
■ 'r	Changes to the next available option of SelecType.
■ ↓ (↑ + Alt)	Changes to the previous available option of SelecType.
■ Enter	Sets available option of SelecType.

1.4.2 SelecType Functions

The SelecType function on the printer control panel allows the user to control most of the printer's functions, such as printing test pages, selecting a paper size, and changing the printer's configuration. Enter SelecType mode by pressing the Menu or Item button.
Table 1-12 shows the SelecType options.

Table 1-12. SelecType Functions

Menu (Changed by MENU button)	Item (Changed by ITEM button)	Available Options (Changed by ↑ or ↓ button) (Set by ENTER button)
PRINTING	COPIES	1 to 999
	PAGE SIZE	A4, A3, A5, B4, B5, LT, LGR, HLT, LGL, GLT, GLG, EXE, F4, MON, C1O, DL, C5, IB5
	ORIENTATION	PORT, LAND
	MANUAL FEED	OFF, ON
	RITech	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)
	SYMSET	Roman-8, ECM94-1 ,8859-2 ISO, 8859-9 ISO, IBM-US, IBM-DN, PcMultiling, PcE.Europe, PcTk437, WiAnsi, WiE.Europe, WiTurkish, DeskTop, PsText, VeInternati, VeUS, MsPublishin, Math-8, PsMath, VeMath, PiFont, Legal, UK, ANSI ASCII, Swedis2, Italian, Spanish, German, Norweg1, French2, Windows
	FORM	5 to 128 LINES
	SRC SYMSET*	o to 3199
	DEST SYMSET*	o to 3199
[Ps)	—	—
ESCP2	Font	Courier, Roman, Orator S, Sans Ser Rornsn-T, sane-l-l, Prestige, Script
	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	PcUSA, Italic, PcMultilin, PcPortugues, PcCanFrenc, PcNordic, PcTurk2, Pc.E.Europe, BpBRASCII, BpAbicomp
	country	USA, France, Gerrnsny, UK, Denmark Sweden, Italy, Spainl, Japan, Norway, Denmark2, Spain2, LatinArneric, Korea, Legal
	Auto CR	ON, OFF
	Auto LF	ON, OFF
	Zero Char	o, ϕ
	Bit Image	Dark, Light, BarCode

* With option

Table 1-12. SelecType Functions (Continued)

Menu (Changed by MENU button)	Item (Changed by ITEM button)	Available Options (Changed by? or ↓ button) (Set by ENTER button)
FX	Font	Courier, Roman, Orator S, Saris Ser, Prestige, Script
	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	Pc USA, Italic, PcMultilin, PcPortugues, PcCanFrenc, PcNordic, PcTurk2, Pc.E.Europe, BpBRASCII, BpAbicomp
	Country	USA, France, Germany, UK, Denmark, Sweden, Italy, Spain1, Japan, Norway, Denmark2, Spain2, LatinAmeric
	Auto CR	ON, OFF
	Auto LF	ON, OFF
	Zero Char	o, ϕ
	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)
JOB	PAGE PROTECT	OFF, A4, A3, LT, LGL
	RESOLUTION	600,300
	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*

Table 1-12. SelecType Functions (Continued)

Menu (Changed by MENU button)	Item (Changed by ITEM button)	Available Options (Changed by ↑ or ↓ button) (Set by ENTER button)
TRAY SIZE	MP TRAY SIZE	A4, A3, A5, 64,65, LT, LGR, HLT, LGL, GLT, GLG, EXE, F4, MON, C10, DL, C5, IB5
	STD SIZE	A4, A3, A5, 64,65, LT, LGR, HLT, LGL, GLT, GLG, EXE, F4, MON, C10, DL, C5, IB5
	OPT SIZE*	A4, A3, A5, 64,65, LT, LGR, HLT, LGL, GLT, GLG, EXE, F4, MON, C10, DL, C5, IB5
CONFIG	MP MODE	MANUAL, 1ST, EXT
	MP TRAY	UNLOCK, LOCK
	STD TRAY	UNLOCK, LOCK
	OPT TRAY*	UNLOCK, LOCK
	SIZE IGNORE	OFF, ON
	AUTO CONT	OFF, ON
	STANDBY	DISABLE, ENABLE
	AUTO SENSE	ON, PARALLEL, SERIAL, (L/T), (AUX)
	TOP OFFSET	o to 99
	LEFT OFFSET	oto150
	TONER	E''''*F, E**** F, E*** F, E** F, E* F,
	TONER LIFE	6500
	PAGE COUNT	o to 99999999
	SelecType INIT	—
PARALLEL	SPEED	FAST, SLOW
	61-D	ON, OFF
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	OFF, ON

* With option

Table 1-12. SelecType Functions (Continued)

Menu (Changed by MENU button)	Item (Changed by ITEM button)	Available Options (Changed by ↑ or ↓ button) (Set by ENTER button)
TEST	STATUS SHEET	—
	LJ4 FONT SAMPLE	—
	ESCP2 FONT SAMPLE	—
	FX FONT SAMPLE	—
	FACT SHEET	—
	RITech TEST PAGE	—
	PS STATUS SHEET*	—
	PS FONT SAMPLE*	—
	PS FACT SHEET*	—
	CLEANING PRINT	—
	CLEANING EXEC	—

* 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 Form Feed 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 hoMing down the On Line, Form Feed, and Continue buttons until "PRODUCT MENU" is displayed. The factory service settings are shown m 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)
VERSION	CODE ROM	(Displayed version)
	FONT ROM	(Displayed version)
	LL ROM (Local Language ROM)*	(Displayed version)
	PS ROM (EPSONScript Module ROM)*	(Displayed version)
PRODUCT	PCOUNT	(Page counter value displayed)
	PCOUNT CLEAR	(Page counter clear)
	TCOUNT	(Note 1)
	TCOUNT CLEAR	(Toner left counter clear)
	JCOUNT	(Jam counter value displayed)
	JCOUNT CLEAR	(Jam counter clear)

* With option

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

1.4.3.4 EEPROM Format Mode

EEPROM format operations are required only when the video controller board (C135 MAIN) or EEPROM is replaced and these operations are specified m the accompanying documentation.

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

Turn on the printer while holding down the **On Line, Continue,** and Menu buttons until "FORMAT=EPL9000" 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 FULL?	Toner counter value is low
STANDBY	Power down mode
READY	Normal condition
FORM FEED	Form feeding

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.
INSERT IMAGING CRTG	No imaging cartridge	Insert the imaging cartridge
INSERT PAPER TRAY	No paper cassette	Insert the paper cassette
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.
TURN PAPER	Paper insert direction is bad	Rotate and insert paper.
PAPER SET	The paper in the selected tray is different from the paper size selection.	Load proper paper and 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.

Table 1-15. Error Messages (Contined)

Message	status	Measures
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.
REMOVE CART	Cartridge was inserted while Form Feed light was on or the printer was on line.	Remove cartridge and press Continue button.
SERVICE REQ. Xxxxx	Printer problem.	Service required.

1.4.4.3 Warning Messages

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.

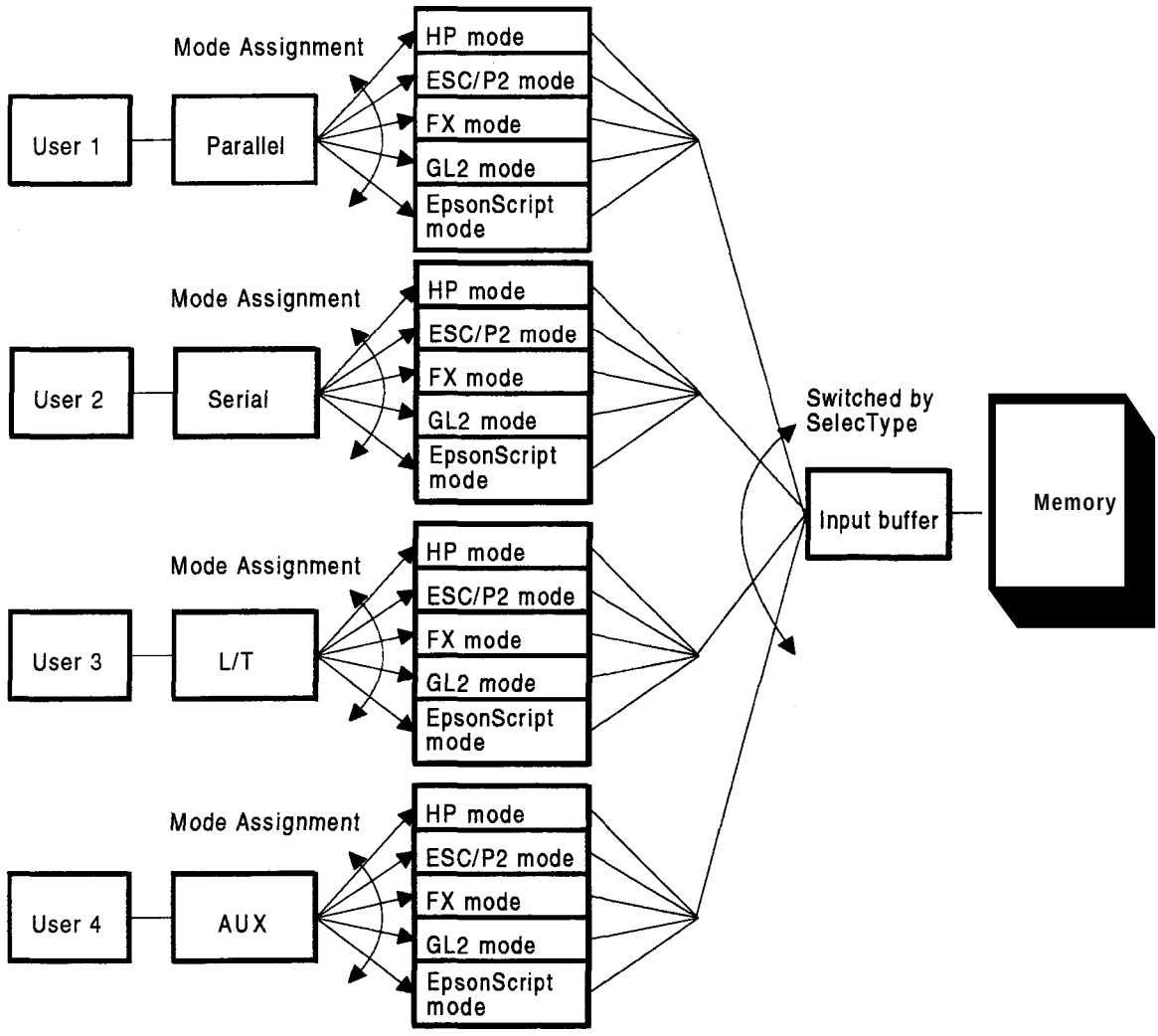


Figure 1-10. Port Fixed Mode

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&twill print first.

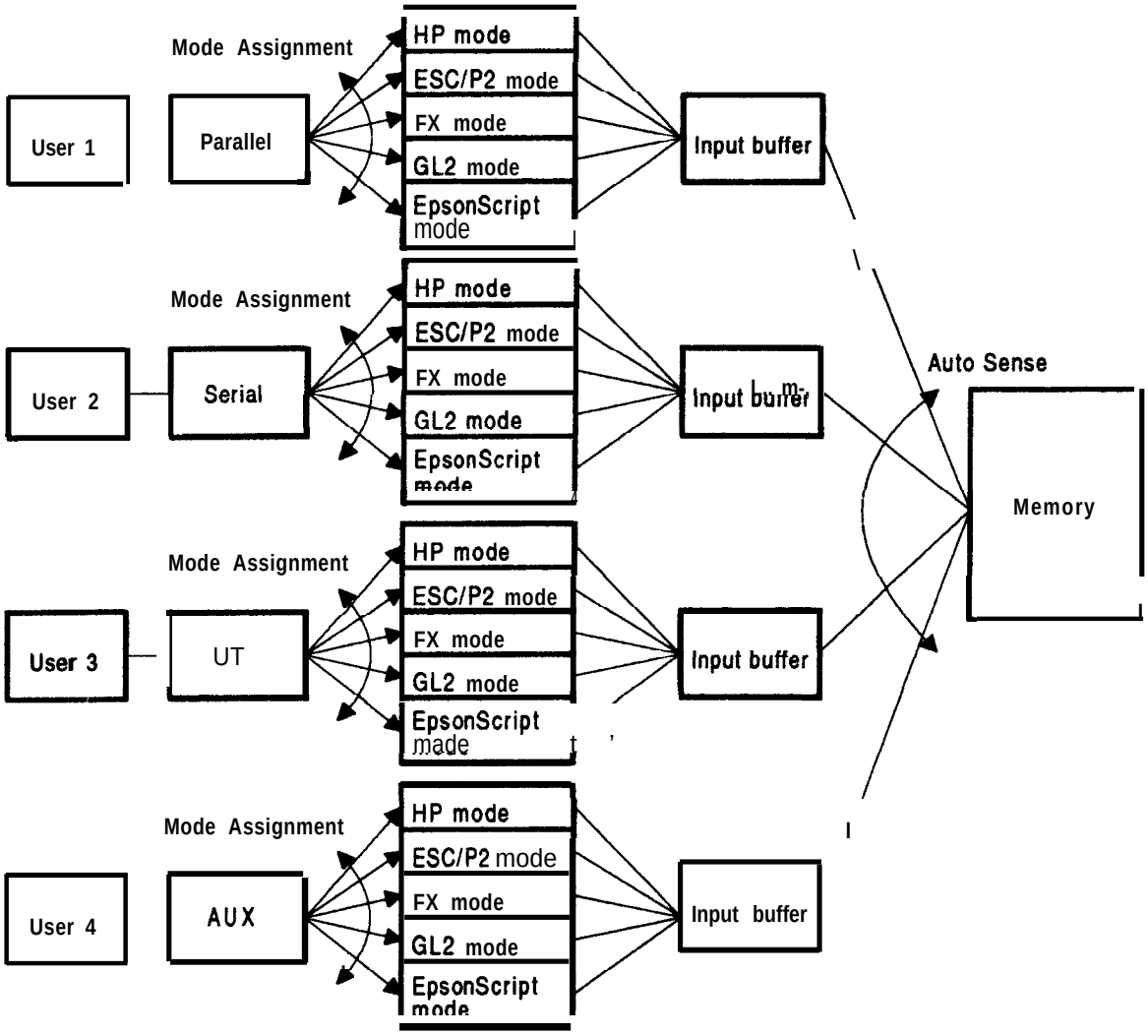


Figure 1-11. Auto Sense Mode

1.4.6 Emulation Mode Switch Functions

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.

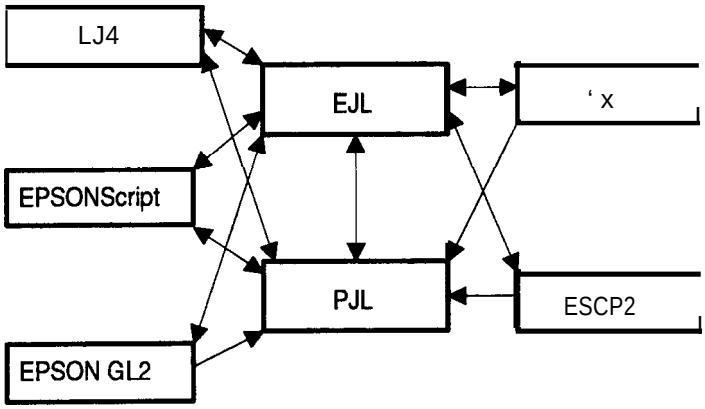


Figure 1-12. Emulation Switch by SPL

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.

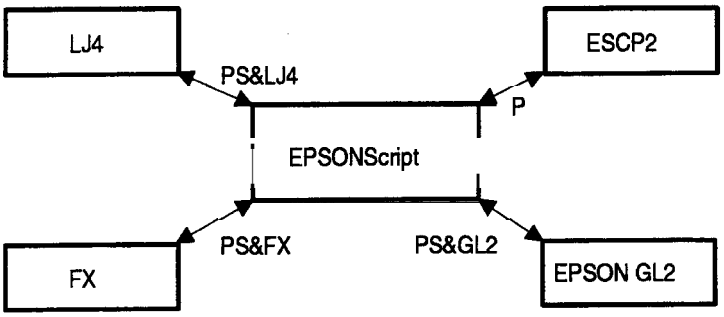
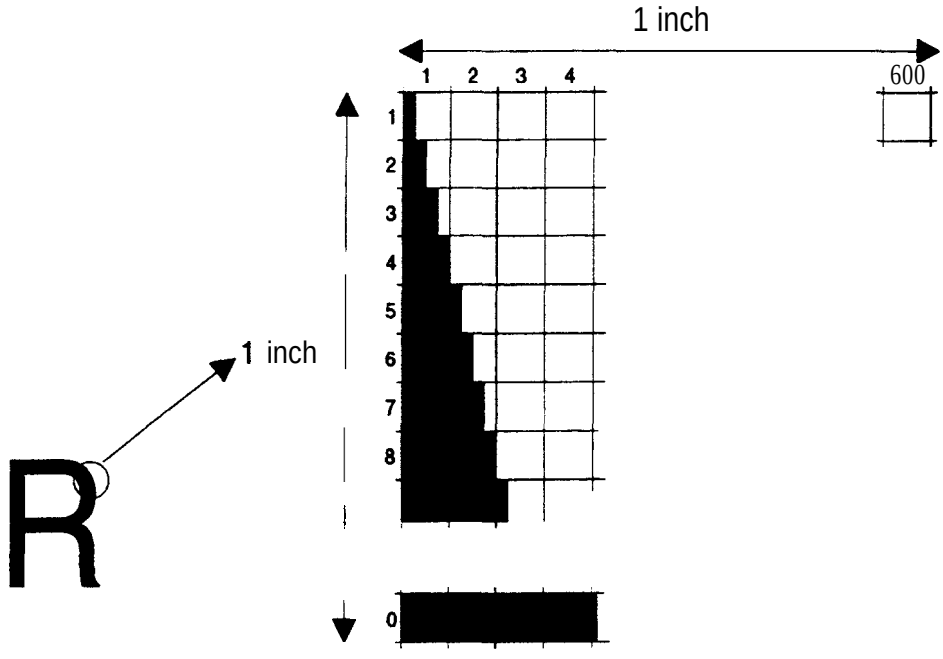


Figure 1-13. Intelligent Emulation Switch

1.4.7 Bi Resolution Improvement Technology

The EPL-9000 printers have BiRITech (Bi Resolution Improvement 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 m 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 m 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.

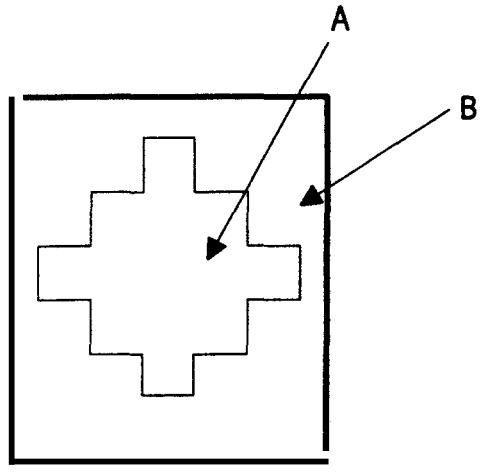


Figure 1-15. RITech Adjustment

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.
- Within the following dimensional size (H x W x D)
  36 mm (1.3 inches) x 108 mm (4.3 inches) x 10 mm (0.4 inches)

1.5 MAIN COMPONENTS

To simplify maintenance and repair, the main components of the EPL-9000 have been designed for easy removal and replacement. The main components are:

- ❑ C135 MAIN board — Video controller circuit board
- ❑ C82326* I/F (optional) — Optional LocalTalk module
- ❑ Control panel
- ❑ MCU PWB board — Engine controller circuit board
- ❑ LVPS unit — Low-voltage supply circuit unit
- ❑ HVPS board — High-voltage supply circuit board
- ❑ ROS unit — Optical unit
- ❑ Fusing unit
- ❑ Drive unit
- ❑ Imaging cartridge
- ❑ Housing
- a Paper tray
- c1 Lower paper cassette unit (optional)

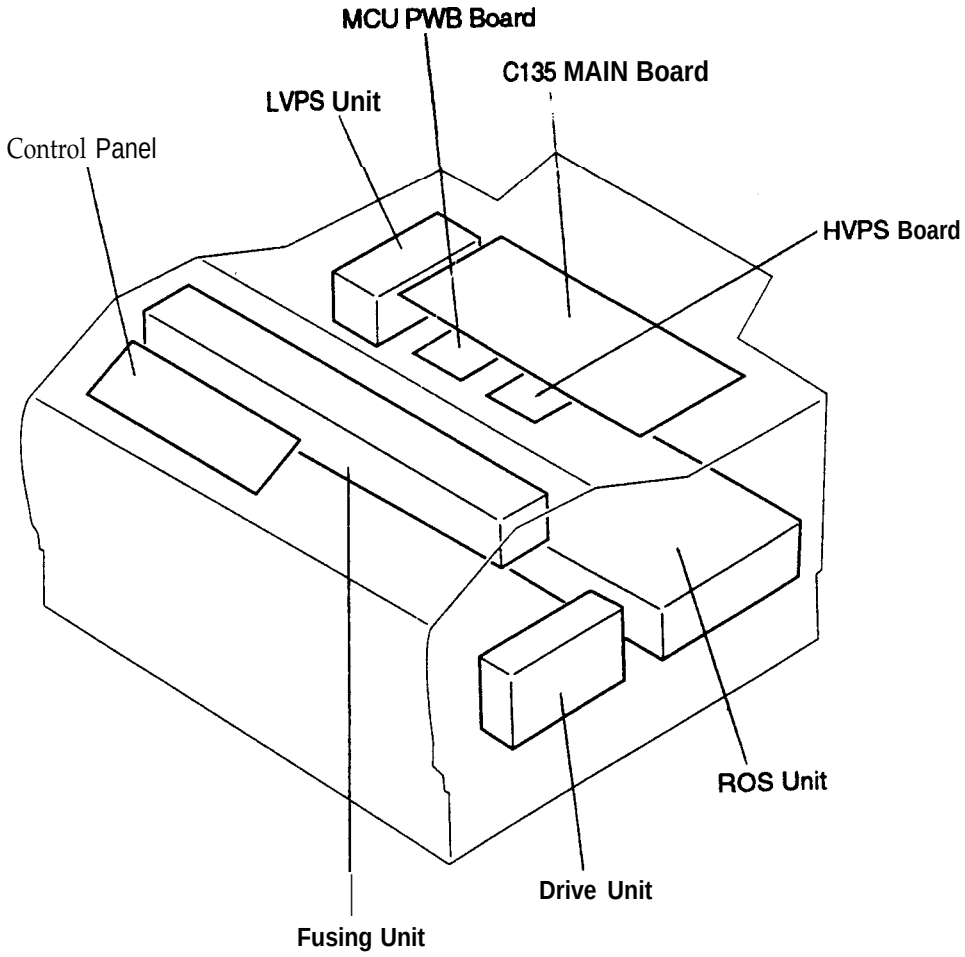


Figure 1-16. Component Layout

1.5.1 C135 MAIN Board

The C135 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 19.2 MHz RISC CPU MB86930 (SPARKlite) (location: ICI) 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 (IC5, 6,14, 13) or two 8M-bit mask ROM (IC16, 15)
Font ROM: two 8M-bit mask ROM (M80A76: IC30, M80A77: IC29)
4M-bit DRAM (IC24, 25,26, 27)
16K-bit EEPROM (IC8)

■ Custom ICs

ASIC E05A91 (IC7)
ASIC E05A92 (IC18)
ASIC E05A93 (IC17)

■ Others

RS-232C interface driver/receiver MAX202 (IC19)
RS-422 interface driver/receiver MC34050 (IC4)
Reset IC M51953BFP (IC23)

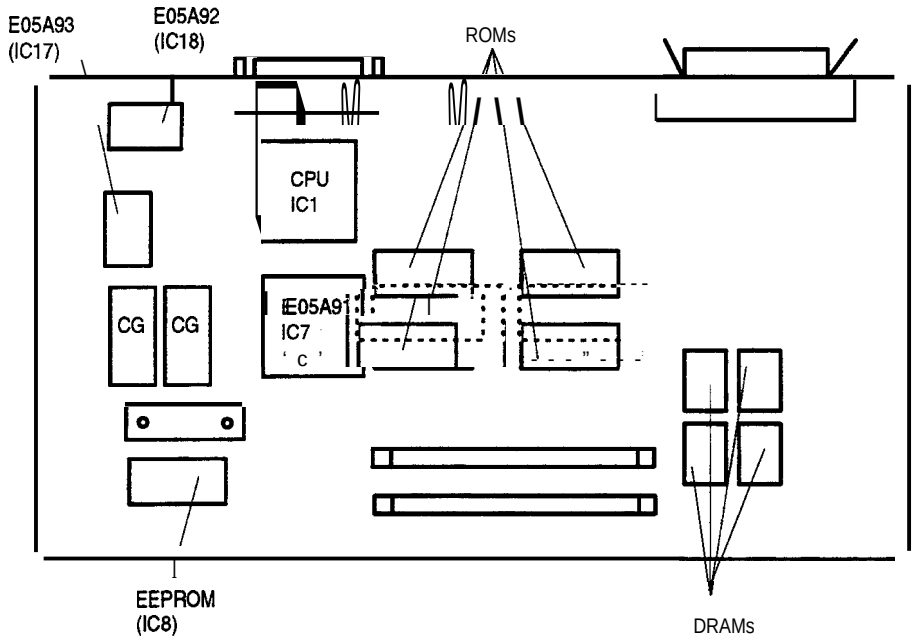


Figure 1-17. C135 MAIN Board

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)

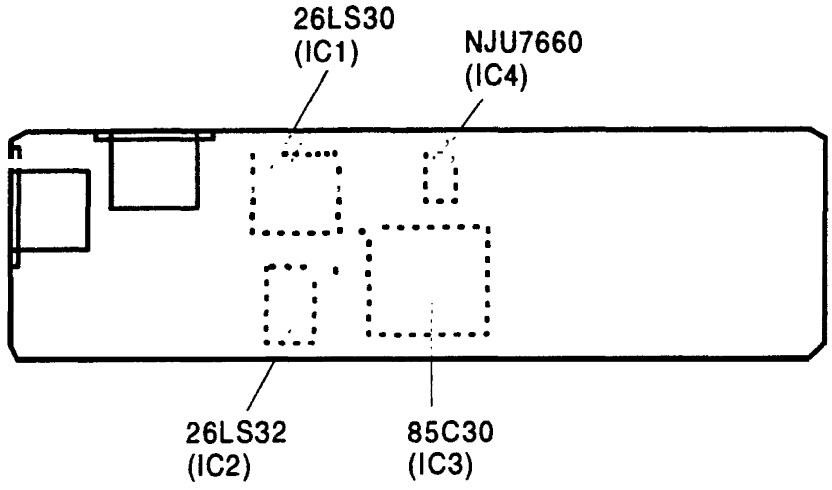


Figure 1-78. C82326* I/F Board

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).

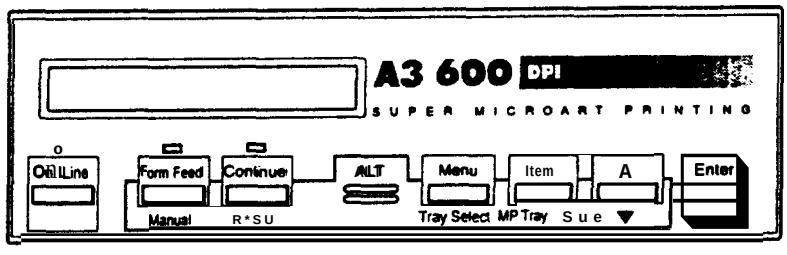


Figure 1-19. Control Panel

1.5.4 MCU PWB Board

This is the engine controller board. It consists ofanpPD782388-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.

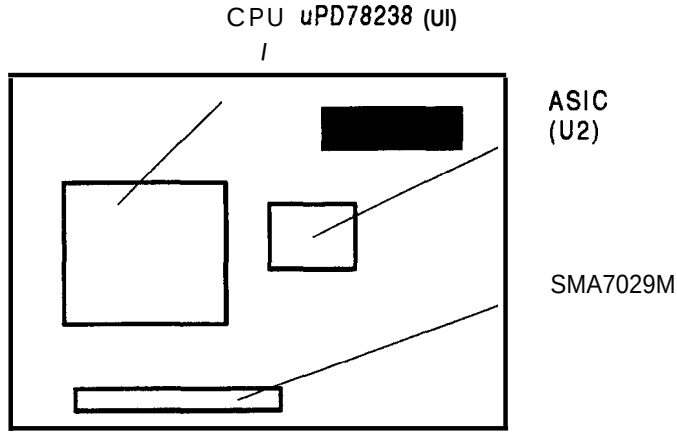


Figure 1-20. MCU PWB Board

1.5.5 LVPS Unit

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

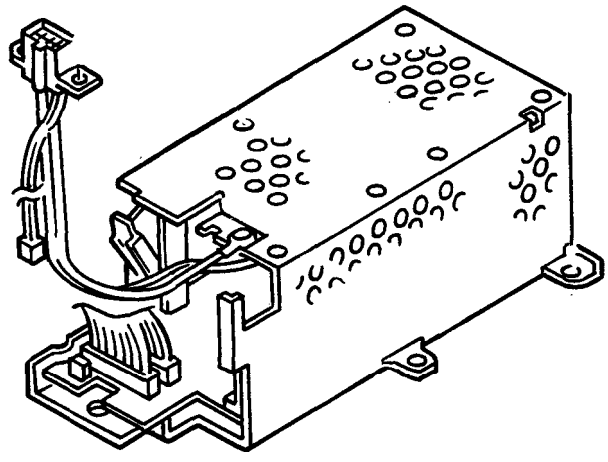


Figure 1-21. LVPS Unit

1.5.6 HVPS Board

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

CAUTION

Do not touch VRl, VR51, VR52, VR53, VR101 and VR102 on the HVPS board. These volumes are for factory setting only.

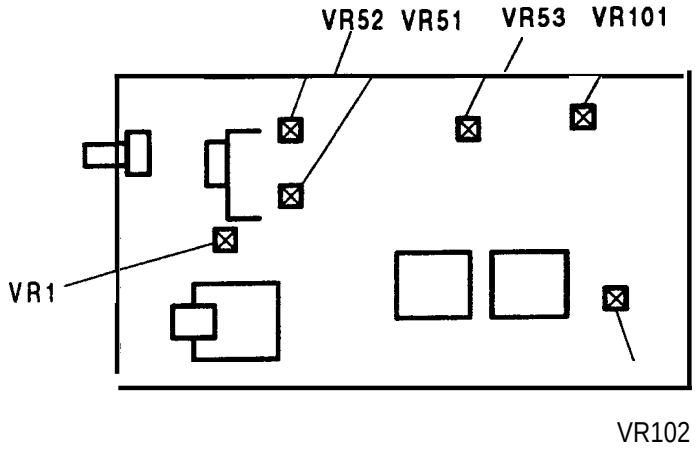


Figure 1-22. HVPS Board

1.5.7 ROS Unit

The ROS 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.

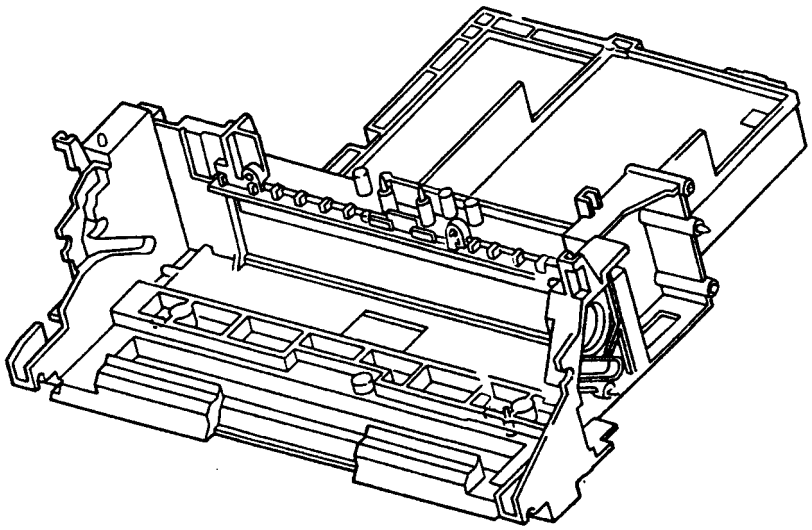


Figure 1-23. ROS Unit

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.

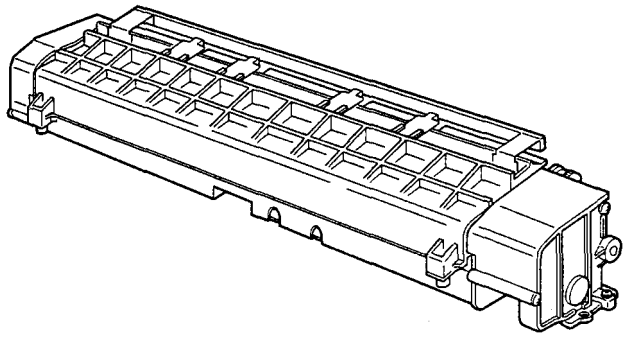


Figure 1-24. Fusing Unit

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.

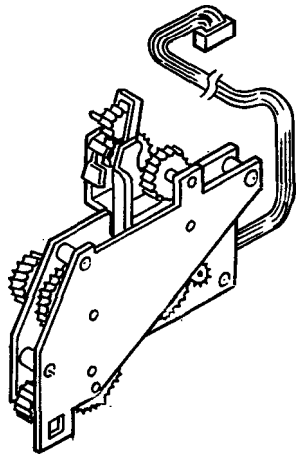


Figure 1-25. Drive Unit

1.5.10 Imaging Cartridge

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

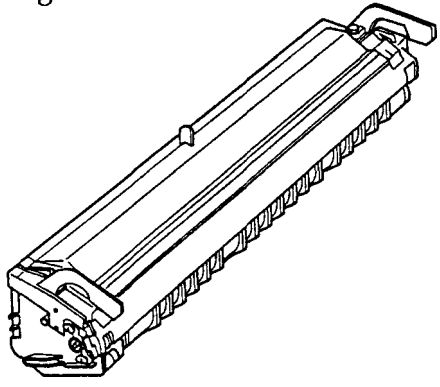


Figure 1-26. Imaging Cartridge

Chapter 2 Operating Principles

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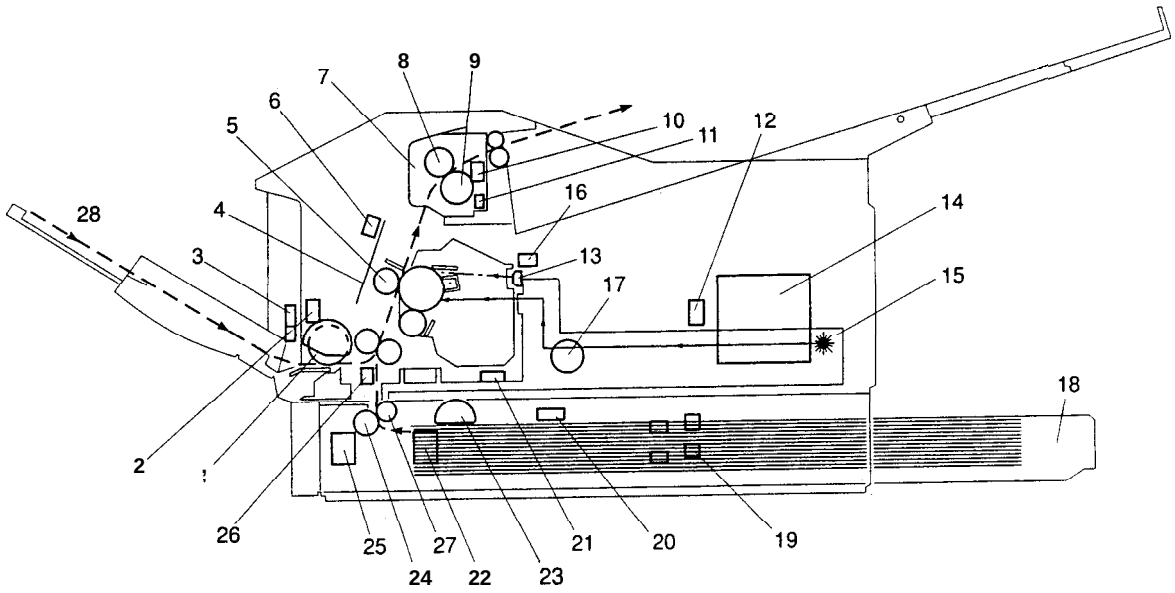
2.1 ENGINE OPERATION

This section describes the function and operating principles of the EPL-9000. Figure 2-1 shows the location and names of the main components for the engine.



1. Pickup roller
2. Pickup solenoid (SL1)
3. MSI sensor (PC2)
4. Trans. chute assembly
5. BIAS transfer roll
6. Chute fan (M3)
7. Fuser assembly
8. Pressure roller
9. Heat roller
10. Exit sensor (PC3)
11. Thermistor (TH1)
12. Interlock switch
13. Erase lamp assembly
14. Fan (M4)
15. Raster output scanner
16. CRU SENSOR PWB
17. Main motor (Ml)
18. Paper cassette
19. Paper size switch (SW4)
20. Paper-out sensor (PC1)
21. Toner sensor
22. Feed solenoid
23. Feed roller
24. Turn roller
25. Turn solenoid
26. REGI. sensor
27. Pitch roller
28. Multi-sheet inserter

Figure 2-1. Main Components

2.1.1 Print Process

This section describes the print process from drum charge to quenching.
Figure 2-2 shows the print process steps, and Figure 2-3 shows the print process diagram.

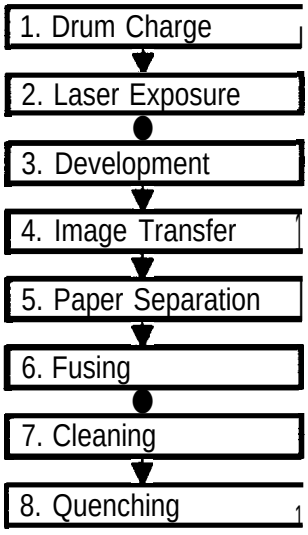


Figure 2-2. Print Process Steps

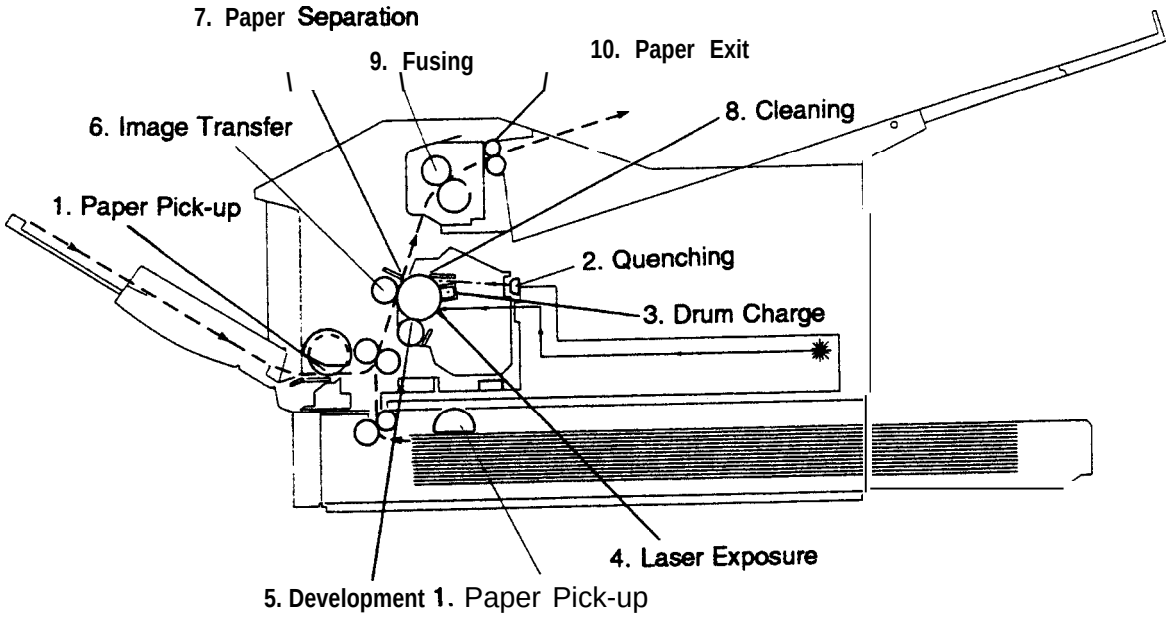


Figure 2-3. Print Process Diagram

2.1.1.1 Drum Charge

Drum charge is the process of charging static electricity to the OPC (Organic Photo Conductor) drum before laser exposure. The charge wire discharge to the OPC drum surface potential of the OPC drum even. The charge screen between the charge wire and the OPC drum, which is connected to the ground through the zener diode, limits the discharge to the OPC drum to maintain the OPC drum surface potential at the specified level (-310 VDC).

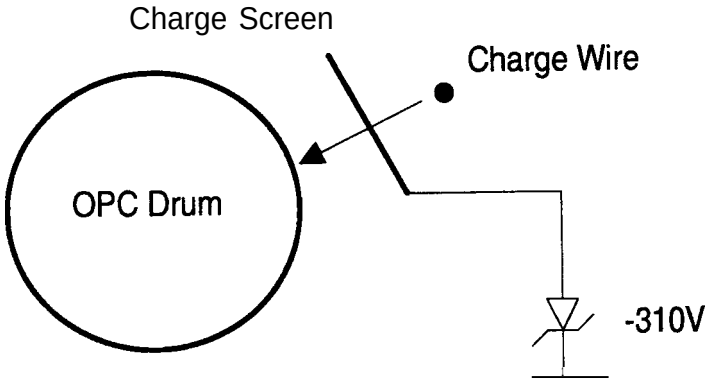


Figure 2-4. Drum Charge

2.1.1.2 Laser Exposure

Laser exposure is the process of creating an invisible static electricity image on the OPC drum by laser beams emitted from the ROS (Raster Output Scanner) Assembly. The polygon mirror is rotated by the polygon motor (scanner motor). This is a six-sided mirror which rotates in the clockwise direction 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 SOS signals in order to make the starting position of each line of the image uniform.

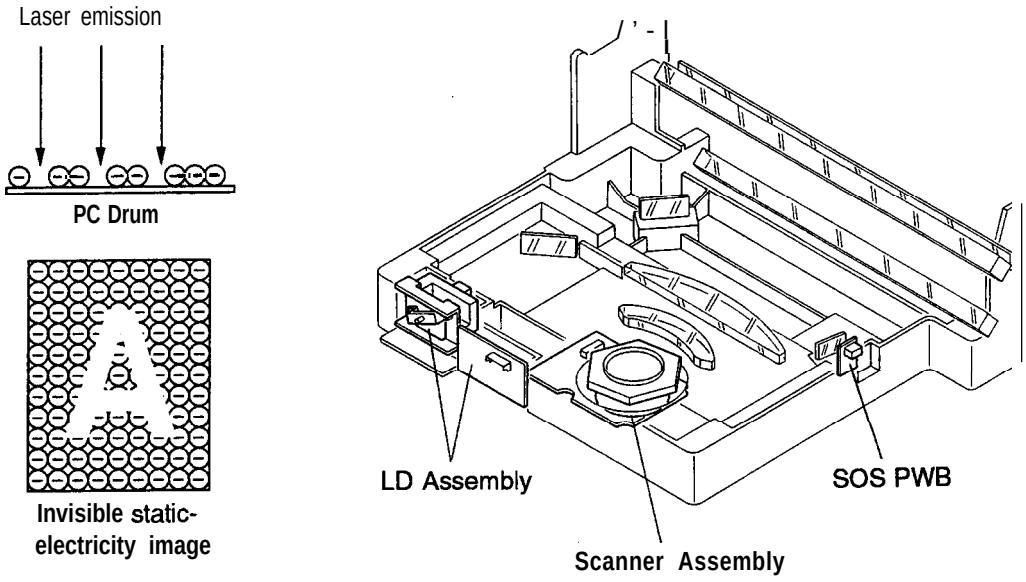


Figure 2-5. Laser Exposure

2.1.1.3 Development

The development is the process of creating a toner image on the OPC drum by applying toner onto the invisible static electricity image. The CM (Charge Metal) blade spreads a thin, even coat of toner over the magnet roll. ALso, as toner passes between the CM blade and the magnet roll, it becomes negatively charged. The magnet roll transports toner to the surface of the OPC drum and controls developing by developing bias. It is ratted and charged developing bias by the magnet roll.

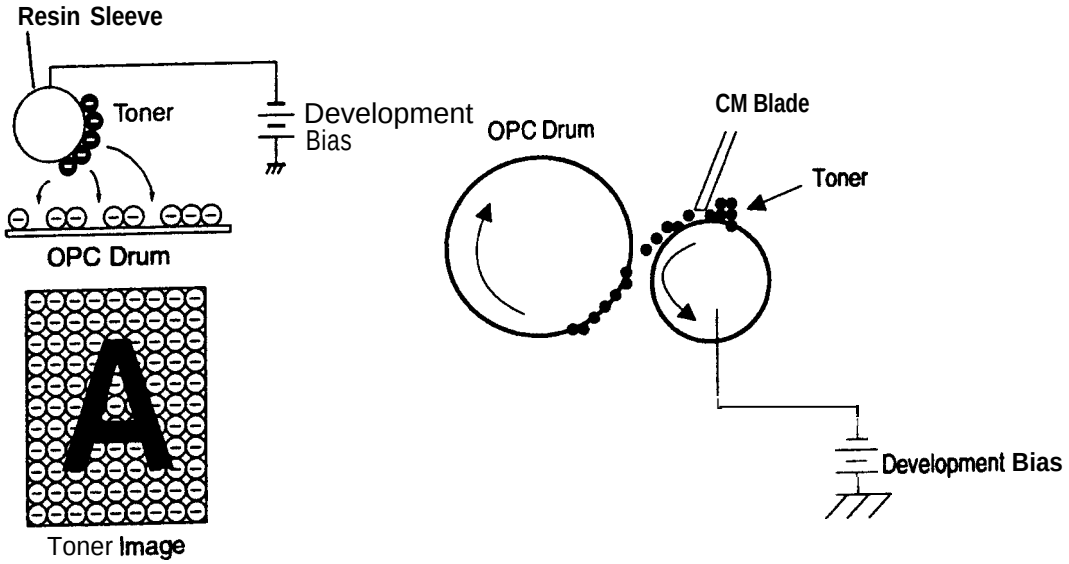


Figure 2-6. Development

2.1.1.4 Image Transfer

Image transfer is the process of transferring the toner image created on the OPC drum in the developing process to paper. As the image transfer process this time, we have used the roller image transfer method instead of the corona image transfer. In the roller image transfer method, there is no generation of ozone due to corona discharge. Also, there is no blur of motion m image transfer because the pressure bonding of the paper with the OPC drum and the BTR (Bias Transfer Roll) is maintained.
Reverse bias is applied to not transfer the positive toner onto the BTR.

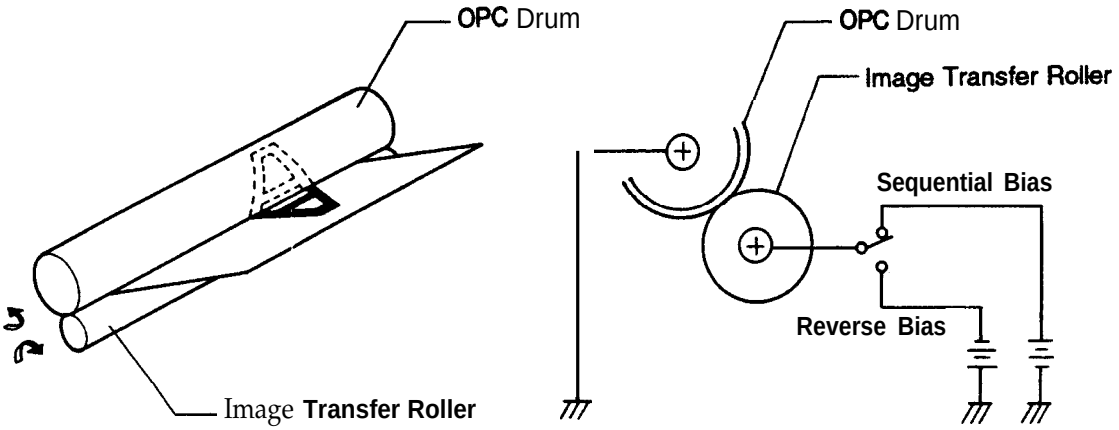


Figure 2-7. Image Transfer

2.1.1.5 Paper Separation

After image is transferred onto the paper, the paper is separated from the OPC drum by means of curvature separation. In the curvature separation method, the diameter of the OPC drum is designed to be small enough to separate the paper from the OPC drum easily. And DETACH SAW (discharge plate) on trans chute assembly support paper separation by discharged from paper backside.

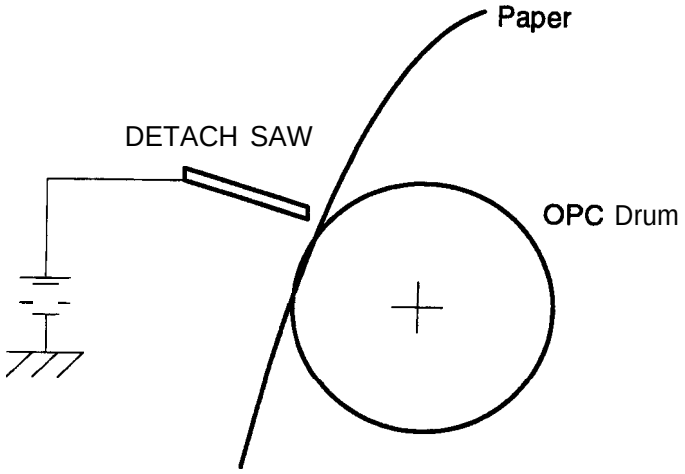


Figure 2-8. Paper Separation

2.1.1.6 Fusing

Fusing is the process of fixing the toner image transferred from the image transfer process on the paper. This time, we have used the heating roller method for fusing. The heating roller method is the process of fixing the toner image using the heat roll that is heated by the heater assy.
When switch on the power, the heater assembly lights up until the temperature of the heat roll becomes 147 degrees C. After the warm up, the MC PWB (Main Control Unit Printed Wiring Board: engine controller board) controls the on/off operation of the heater, according to TEMP signals from the thermistor.

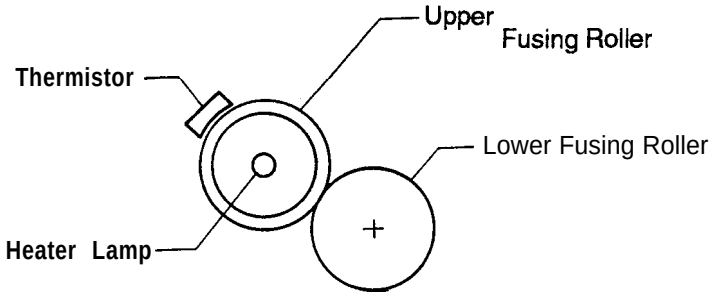


Figure 2-9. Fusing

2.1.1.7 Drum Cleaning

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

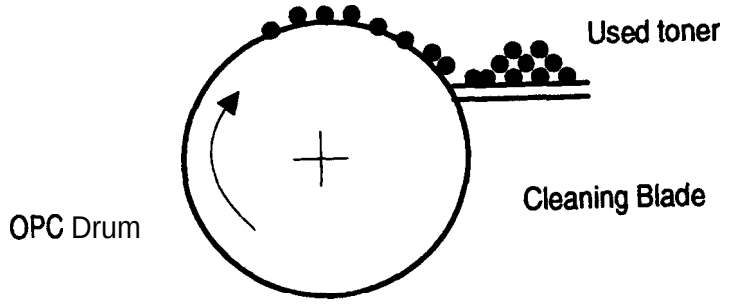


Figure 2-10. Cleaning

2.1.1.8 Quenching

After the cleaning process, the remaining negative charges on the OPC drum surface need to be eliminated to ensure proper print quality for the next print. During the quenching process, the OPC drum surface is exposed to the light from the erase lamp to neutralize the OPC drum surface potential.

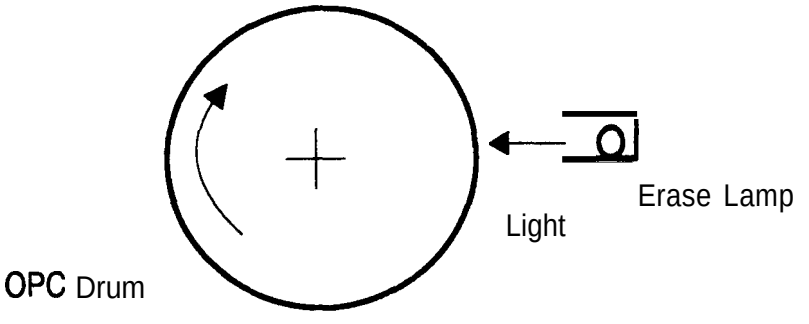


Figure 2-11. Quenching

2.1.2 Paper Feed Mechanism

This section describes the paper feed mechanism. This printer engine has two paper feed methods: one is cassette feeding (optional second cassette feeding is the same), and the other one is manual feeding. Figure 2-12 shows the paper feed procedure diagram, and Figure 2-13 shows the paper feed mechanism diagram.

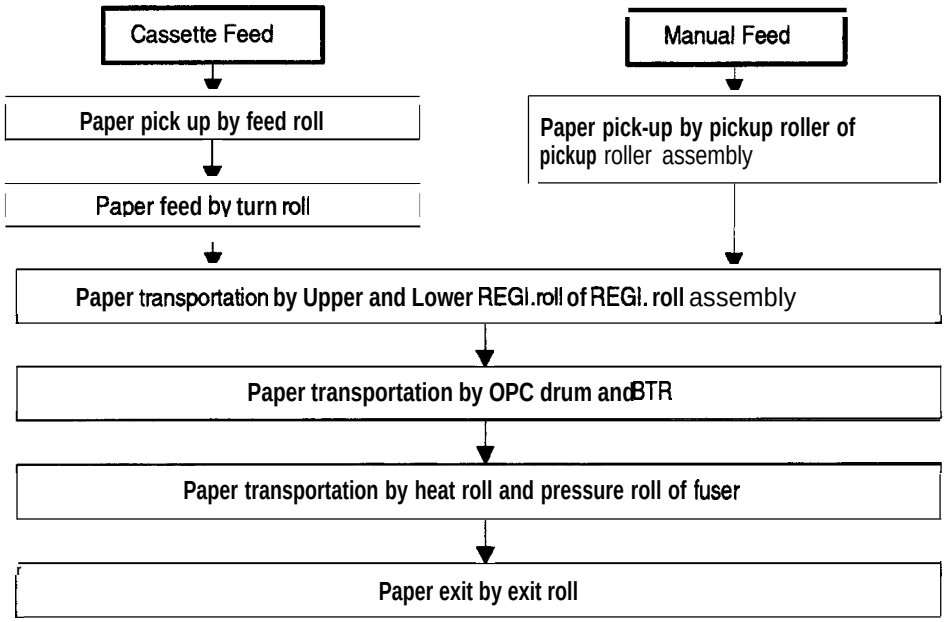


Figure 2-12. Paper Feed Procedure Diagram

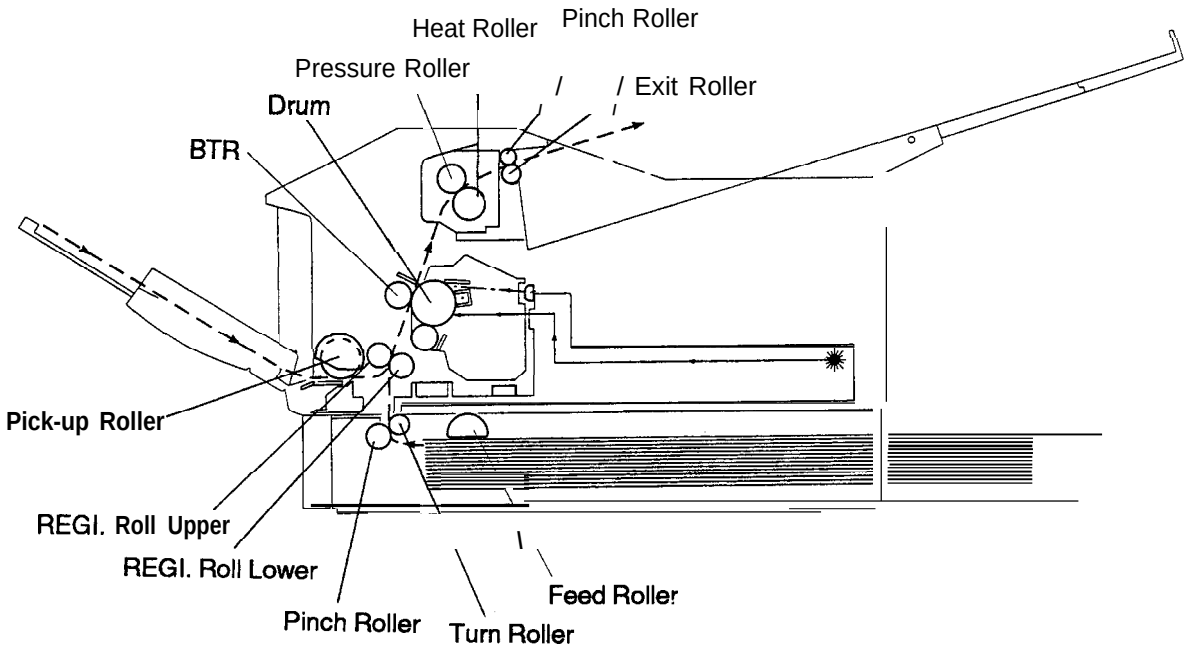


Figure 2-13. Paper Feed Mechanism Diagram

2.1.2.1 Cassette Feed

This printer can use three types of paper cassette: A3 universal cassette, A4 universal cassette, and optional envelope cassette. Figure 2-14 shows the paper cassette and feeder assembly.

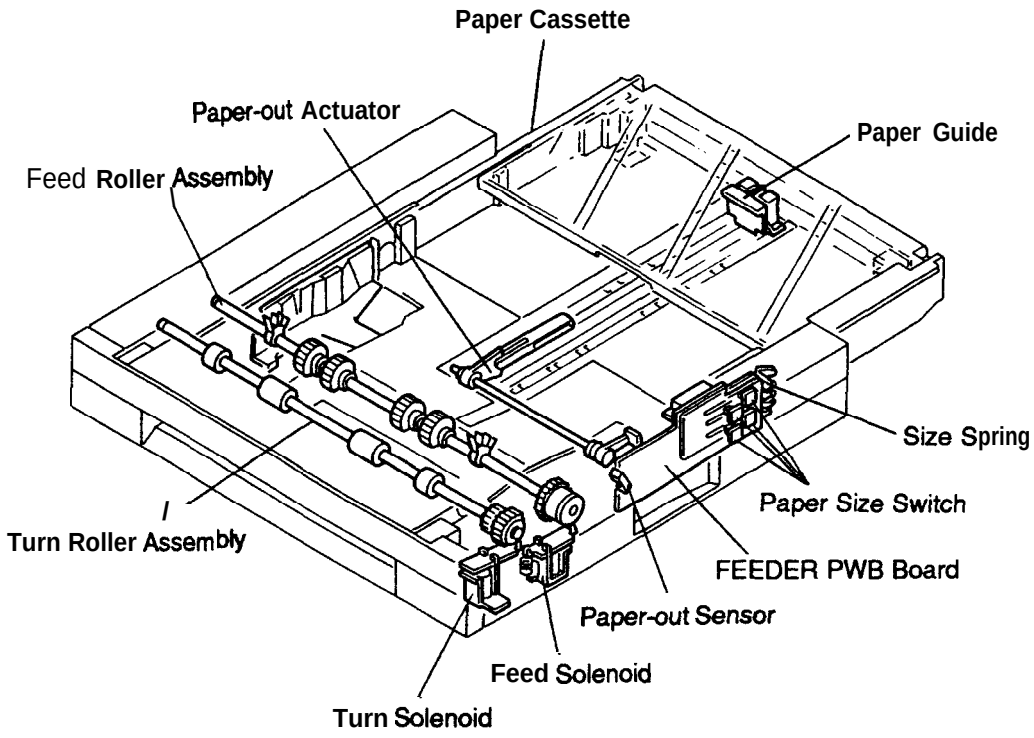


Figure 2-14. Paper Cassette and Feeder Assembly

Paper-out conditions are detected by the paper-out sensor, located on the FEEDER PWB. While paper is in the paper cassette, the paper-out actuator for the paper-out sensor is lifted. When the paper supply runs out, the paper-out actuator is lowered, causing the shutter to interrupt light from the LED to the phot Mransistor. This causes the signal to go HIGH, informing the engine driver board (MCU PWB) that the paper cassette is empty.

The paper cassette of this printer has paper guide plate and paper size detecting cam. The paper guide of this cassette can move to fit several size papers. 'This printer detects paper size by the paper size switch. The paper size detecting cam is rotated by moving the paper guide plate (rear). The paper size switch has four small mechanical switches. The rotating position of paper size detecting cam is detected by these four switches on/off.

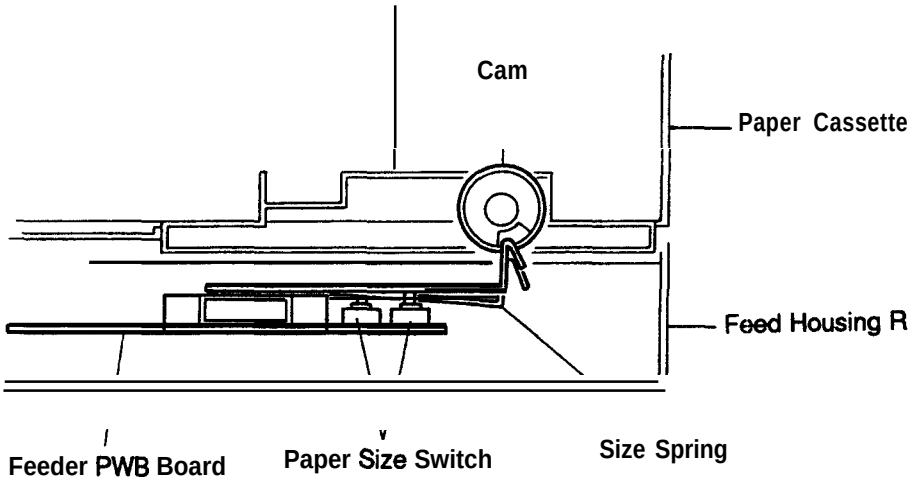


Figure 2-15. Paper Size Detecting

The paper stacked in the paper cassette is pushed by the feed rolls. This causes the top of the paper stack to contact them. The feed solenoid connects or disconnect the main motor drive to the feed roll assembly. When the feed solenoid is on and the feed rolls rotate, the top sheet of paper is separated from the others and transported to turn rolls by friction separation.

The turn rolls send the paper supplied at the paper pick-up section (feed rolls) toward the registration section (REGI. roll assembly and REGI. sensor). The turn solenoid connects or disconnects the main motor drive to the turn roll assembly. While the turn solenoid is on and the turn rolls stop, paper waits before the registration section. This causes through-put up. This printer is long between paper pick-up position and registration section. If paper pick-up is started by the trigger of the START (print start) signal, the video controller waits at paper feeding time. This timing chart is Figure 2-16.

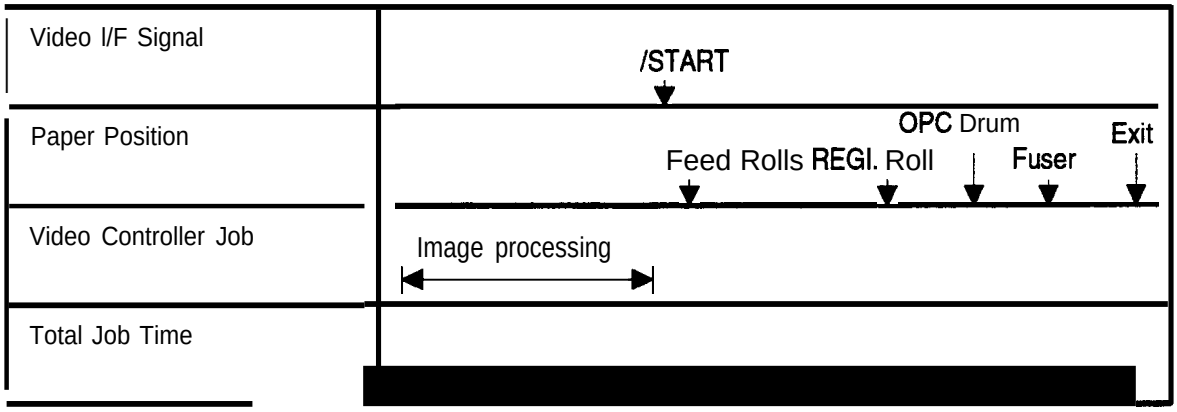


Figure 2-16. Printing Timing Chart (1)

This printer fed paper until before registration section before receiving the $\overline{\text{START}}$ signal of engine controller (MC PWB) so that through put up. This printer add $\overline{\text{PRFD}}$ (Pre Feed) signal of video interface.
When the video controller sends $\overline{\text{PRFD}}$ (Pre Feed) signal of video interface signals to engine controller (MC PWB) before START (print start) signal of video interface signals, this printer sends paper to before REGI. sensor sensed position, and holds the sending paper on this position by turn solenoid on. Then printer starts sending paper and printing when the engine controller (MC PWB) receives START signal. The video controller process printing image between $\overline{\text{PRFD}}$ signal and START signal sending. This timing chart is Figure 2-17.
The $\overline{\text{PRFD}}$ signal used sequence is through put better than no used sequence.

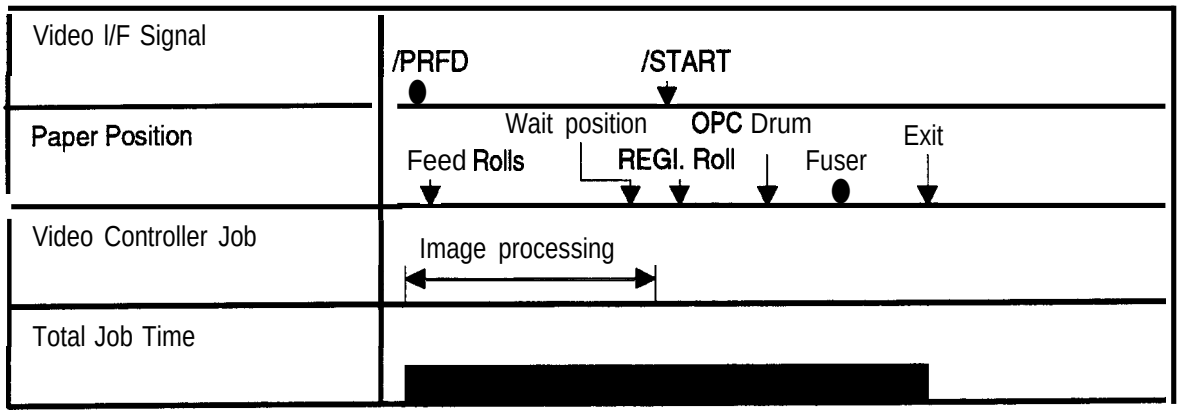


Figure 2-17. Printing Timing Chart (2)

2.1.2.2 Multi-Sheet Inserter Feed (Manual Feed)

This printer has a manual feed slot, called MSI (Multi-Sheet Inserter).
When the pickup solenoid is actuated, the pickup rolls rotate and feed the first page. The pickup rolls stop after one rotation.

Paper-out conditions are detected by the MSI sensor, located above the pickup rolls. While paper is in the MSI, the MSI actuator for the MSI sensor is lifted. When the paper supply runs out, the MSI actuator 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 board (MC PWB) that the MSI is empty.

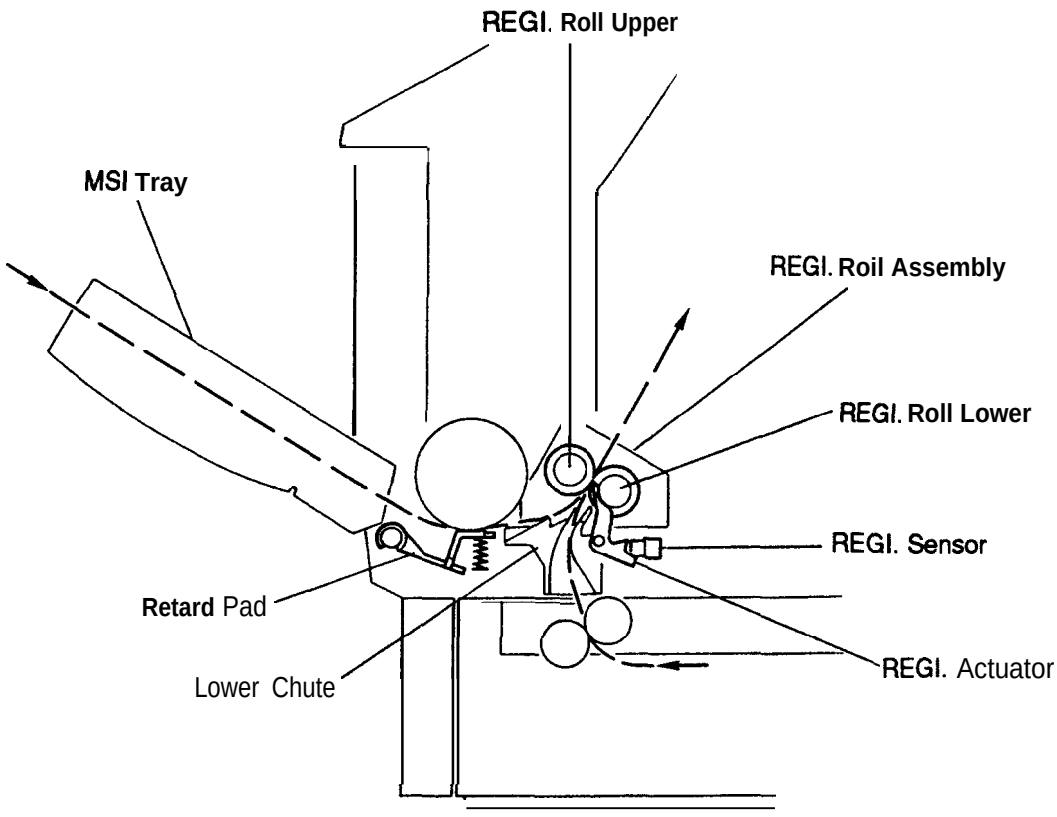


Figure 2-18. MSI Feed

2.1.2.3 Paper Transport

This section describes the paper registration and paper transport.

The printer detects paper inserted in the printer engine from the paper cassette or MSI by the REGI. sensor. After the REGI. sensor detects the paper top edge, the REGI. clutch is turned on and the REGI. roll is rotated. This time, the engine controller (MC PWB) sends the vertical synchronous (TOP: Top Of Paper) signal to video controller.

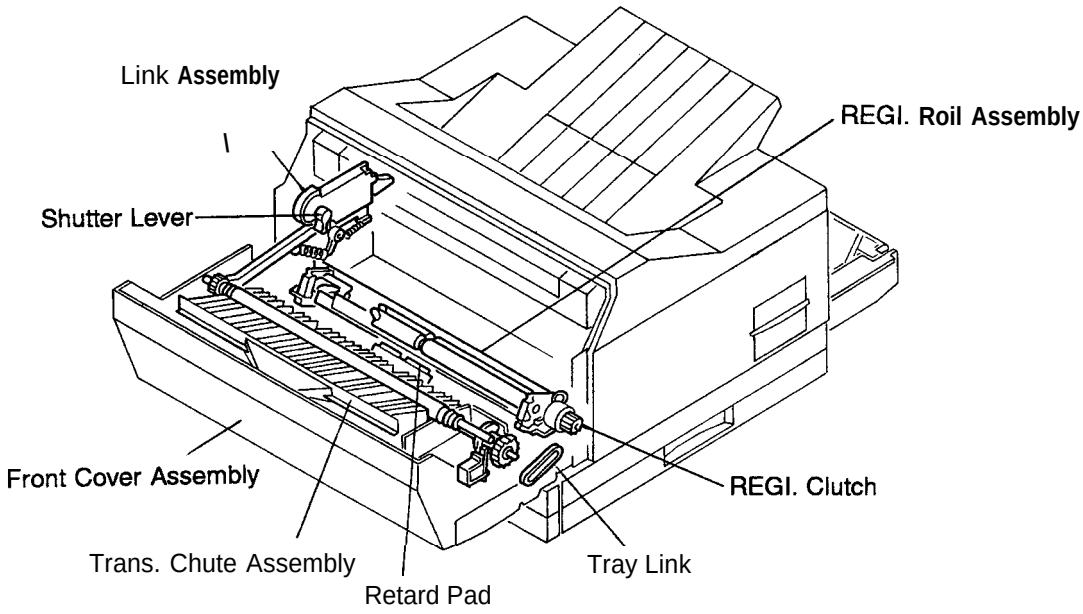


Figure 2-19. Registration Mechanism (1)

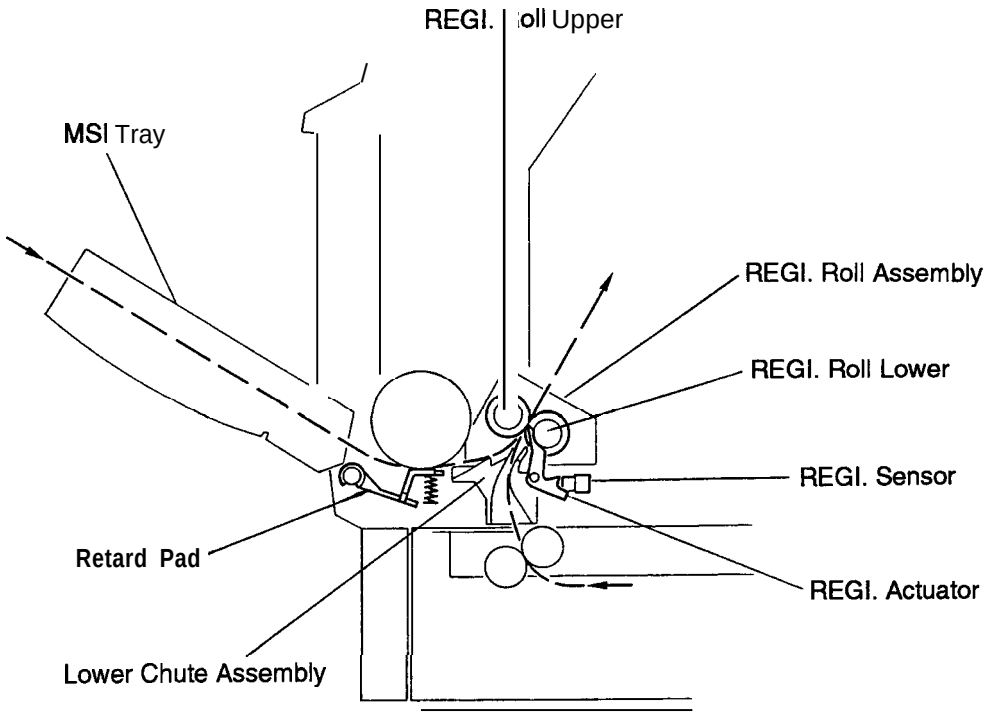


Figure 2-20. Registration Mechanism (2)

This printer uses a contact type image transfer system by BTR. Registration section through paper is transported to fuser by BTR and OPC drum.

The BTR and OPC drum through paper is vacuumed to trans. chute assembly side by air for chute fan. Protect of paper jamming is so that the chute fan vacuum the paper to trans. chute assembly side.

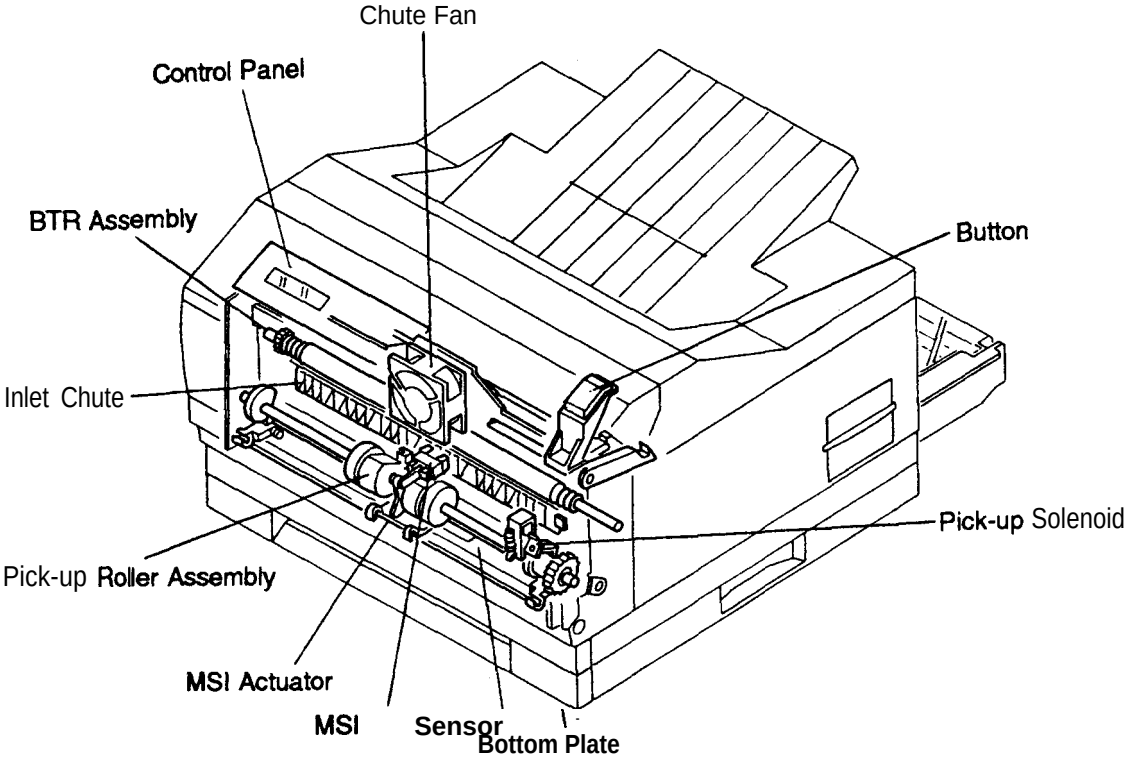


Figure 2-21. Paper Transfer Mechanism

2.1.2.4 Paper Exit

The paper on which the toner image has been fused is fed to the output tray.
The exit sensor is located beyond the pressure roll and the heat roll in the paper path. The engine controller (MC PWB) detects by the exit sensor that paper has been delivered.

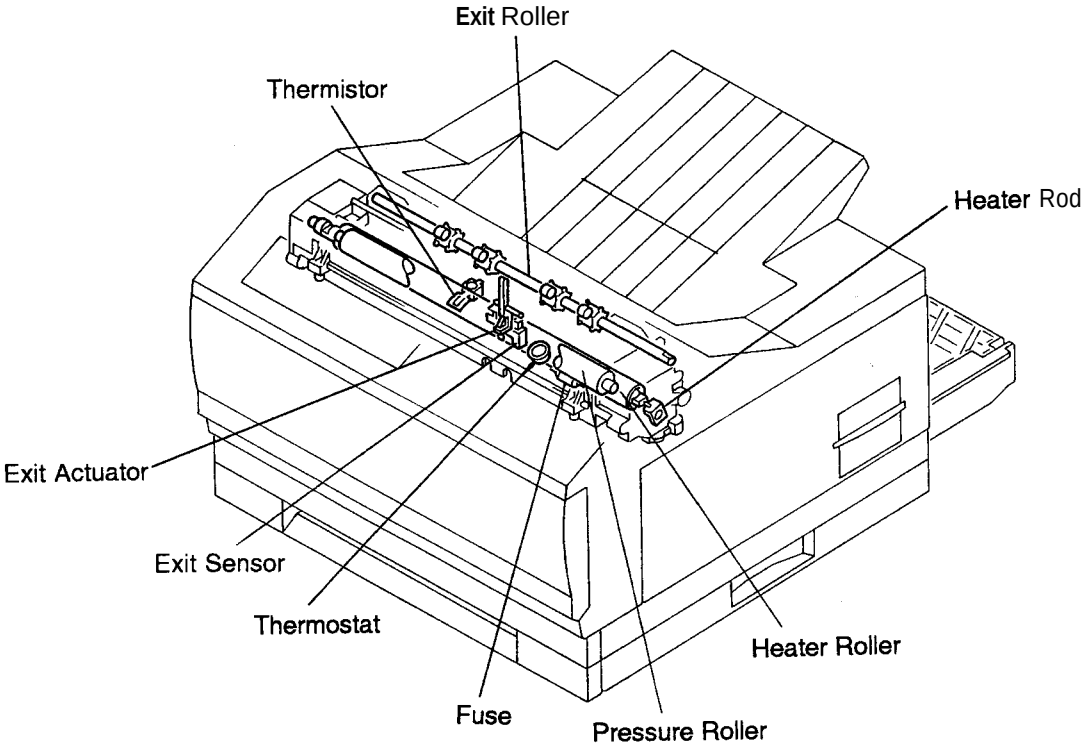


Figure 2-22. Paper Exit Section

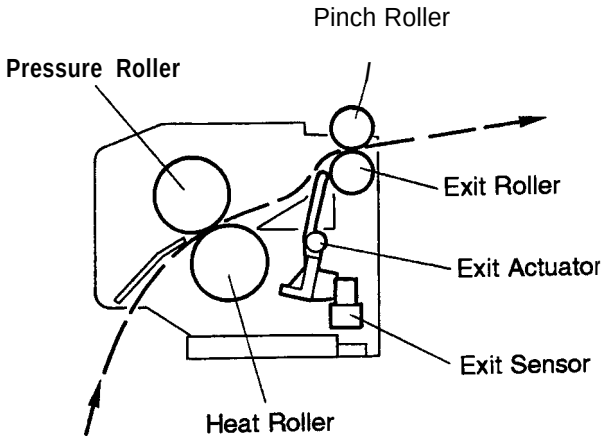


Figure 2-23. Paper Exit Mechanism

2.1.3 Engine Control

This section describes engine control, low voltage supply board **(LVPS),** and high voltage supply board **(HVPS). The** engine is controlled by the engine controller board (MC **PWB).** Figure 2-24 shows the engine **controller** connecting diagram.

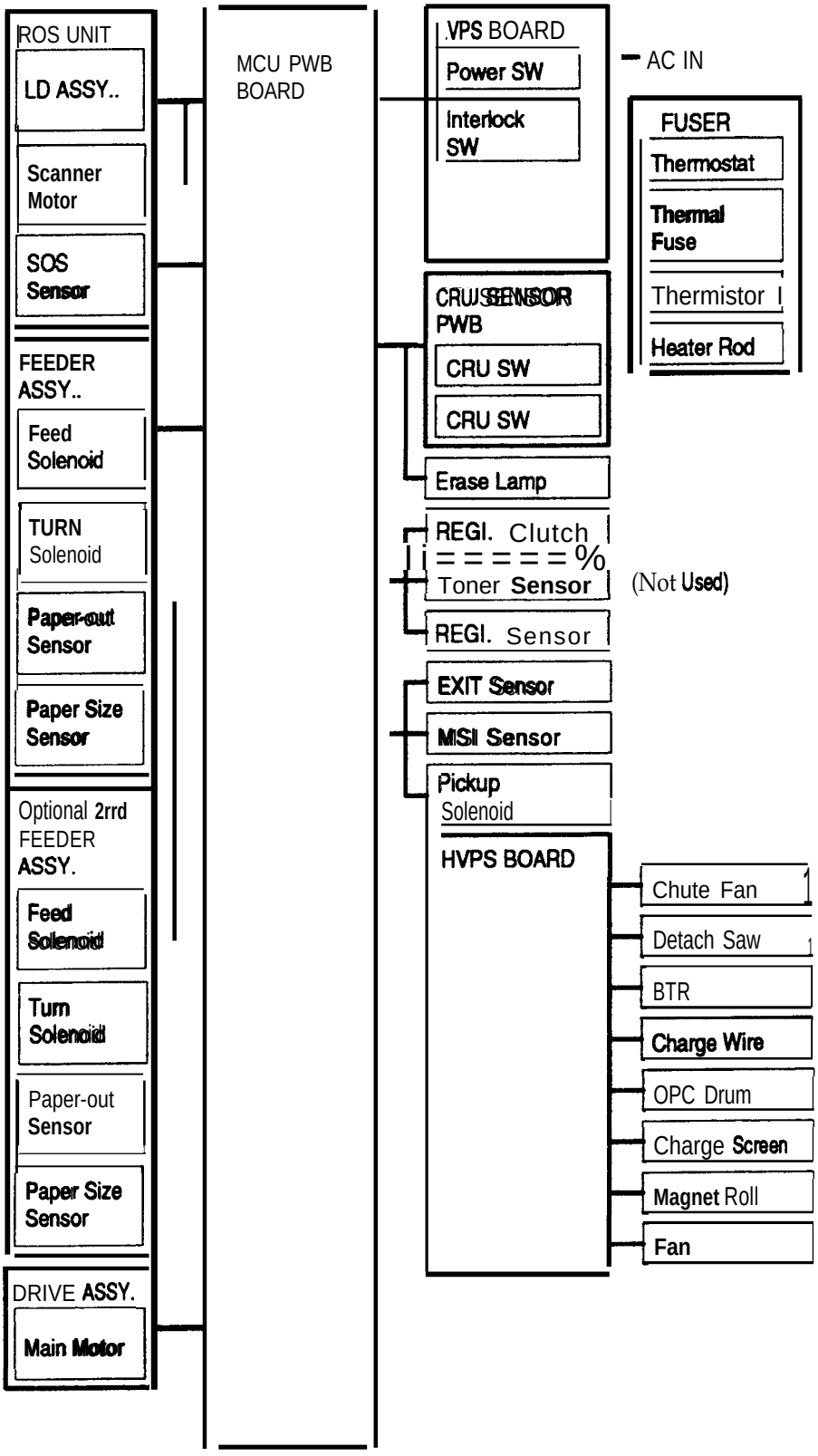


Figure 2-24. Engine Controller Connecting Diagram

2.1.3.1 Main Motor Functions and Control

The power of the main motor drive is used OPC drum drive, developing drive, fusing drive, and paper feeding drive.
Figure 2-25 shows the main motor drive circuit. The main motor is a 4 phase stepping motor. This motor is controlled by the CPU on the engine controller board (MC PWB).

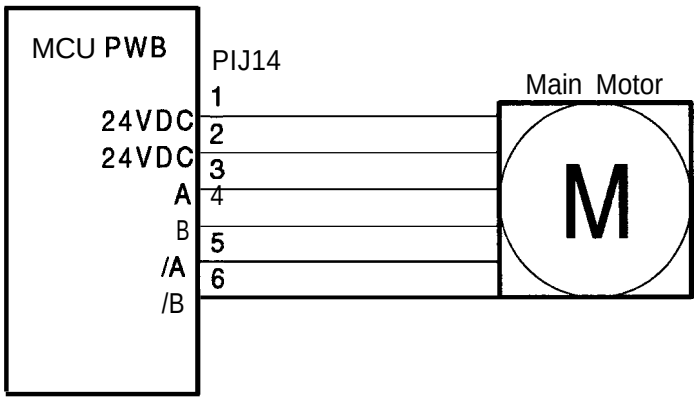
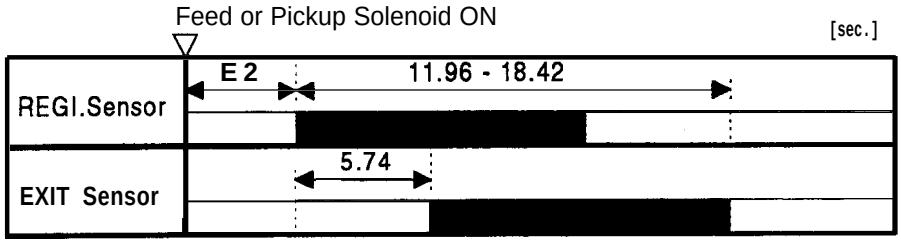


Figure 2-25. Main Motor Drive Circuit

2.1.3.2 REGI. Sensor and Exit Sensor

The REGI. sensor has three functions. One function of the REGI. sensor is to detect the top edge of the paper. This engine starts printing by detecting the signal.
One function is paper size detecting. This printer detects on time of REGI. sensor, while paper is feeding. This time is long, while longer paper is feeding. This time is short, while shorter paper is feeding.
One function is paper jam and feed jam detecting to combine for exit sensor.
If the REGI. sensor does not turn on at paper feeding, it will be judged feed jam. The feed jam is the condition that a paper jam has occurred in the feed process.
If the following conditions are detected, it will be judged paper jam. The paper jam is when paper is jammed in printing process area.

- The REGI. sensor or the exit sensor is on when the power is on or the front cover is closed.
- The REGI. sensor or the exit sensor is not turned on/off within the specified time. (Refer to following timing chart.)



E2: Cassette Feed=4.34
Optional Cassette Feed=6.33
MS I Feed=3.48

Figure 2-26. REGI. Sensor and Exit Sensor On/Off Timing

2.1.3.3 Fuser Control

The fuser is heated by the heater rod. The heater rod's power is AC voltage. The low voltage supply board (LVPS Board) supply AC voltage to the heater rod, when the power supply board receives the HEATER ROD ON signal from the engine controller board (MC PWB). This AC voltage is cut by interlock switch, when the front cover is open.
The temperature for the fuser is detected by the thermistor. Based on the TEMP. signals from the thermistor, the engine controller board (MC PWB) controls the fuser temperature by the HEATER ROD ON signal. standby mode fuser temperature is 147 degrees C, normal paper printing mode is 152 degrees C, and envelope printing mode is 170 degrees C
When paper size is set to MONARCH, DL, C5, or COM-10, the engine controller board (MC PWB) sets the fuser temperature to envelope printing mode.

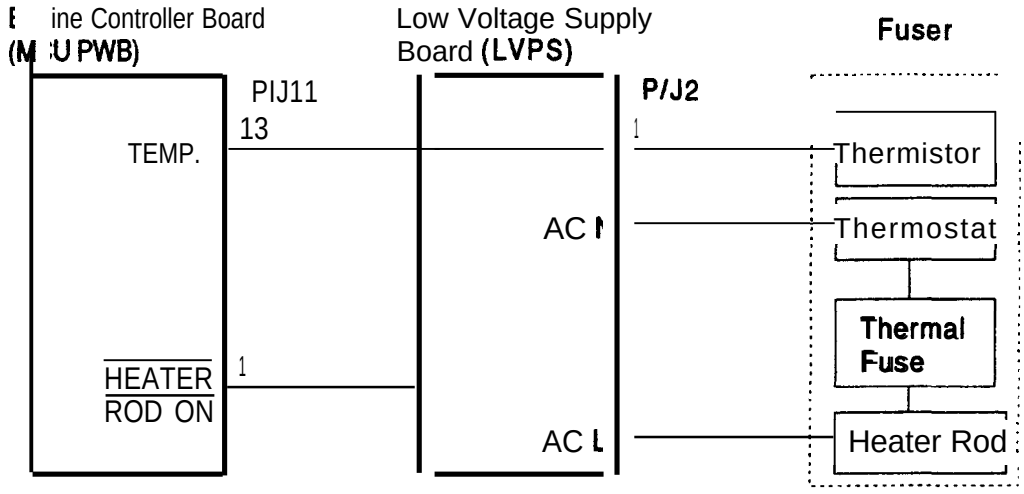


Figure 2-27. Fuser Control Circuit

The following figure is the temperature for the fuser control procedure.

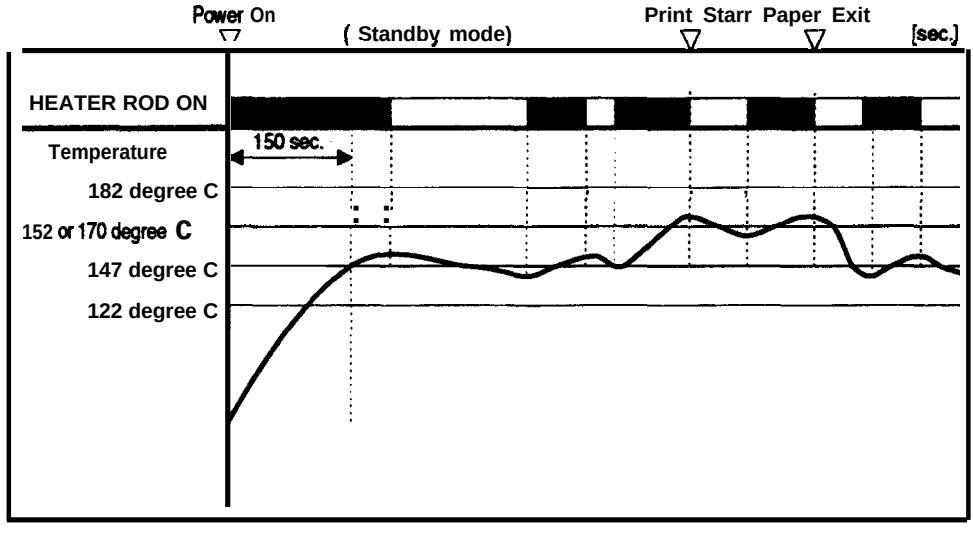


Figure 2-28. Temperature for Fuser Control Procedure

If the following conditions are detected, it will be judged that there is a fuser error (LCD displayed "SERVICE REQ. E0003").

- The warming-up period does not end within 150 sec.
- The thermistor temperature drops to 122 degrees C.
- The thermistor temperature exceeds 182 degrees C.

The thermostat cuts power if the temperature of the fusing section rises to an abnormally high level (220 degrees C).
The thermostat fuse cuts power if the temperature of the fusing section rises toanabnormallyhigh level (over 220 degrees C) and the thermostat did not move.

2.1.3.4 Scanner Motor Control

Figure 2-29 is the scanner motor control circuit. The scanner motor is driving, while the scanner motor receives the SCANNER MOTOR ON signal. SPI1 and SPI2 signals are scanner motor rotating speed setting signals. The printing resolution of this printer is 600 DPI (dot per inch), then SPI1 is HIGH and SPI2 is LOW. In these settings, the scanner motor rotating speed is 8031 rpm.

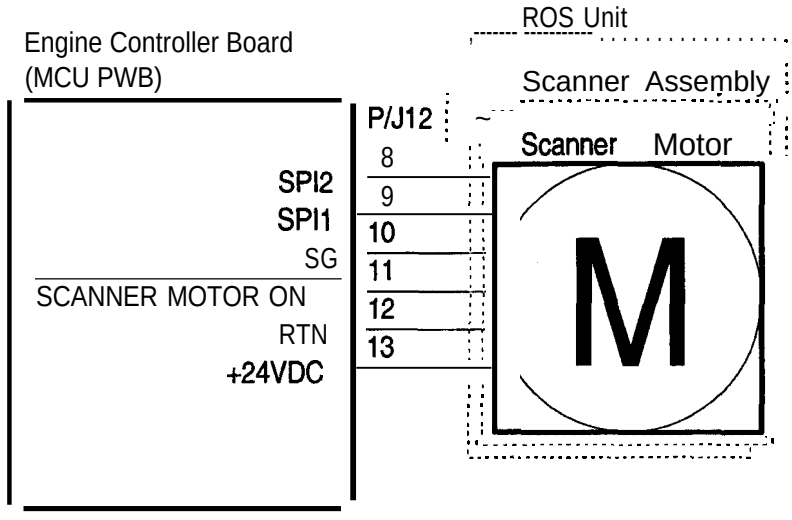


Figure 2-29. Scanner Motor Control

2.1.3.5 Laser Diode Drive

Figure 2-30 is a laser diode drive circuit. Laser diode emission is controlled by four signals (DATA, VL1, VL2, and 5VDC-LD) from the engine controller board (MC PWB).

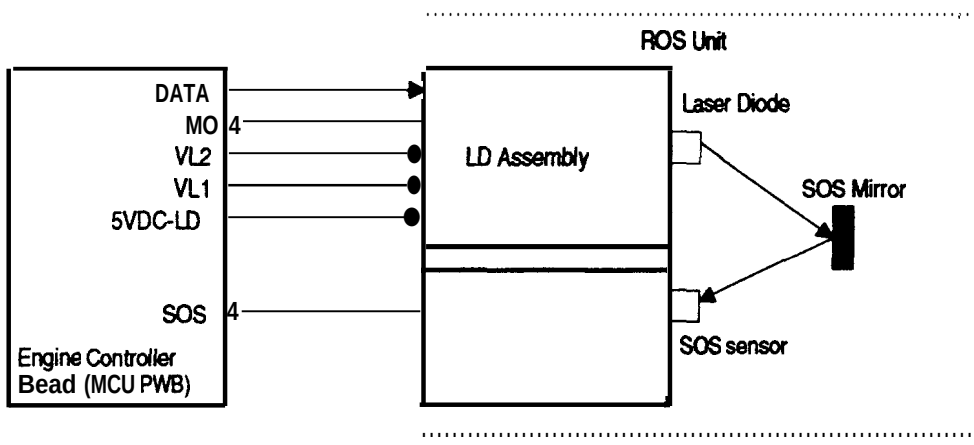


Figure 2-30. Laser Diode Drive Circuit

The DATA signal is the laser on/off signal. When it is LOW, the laser is allowed to emit and when it is HIGH, the laser is stopped.

The MO is the laser emission power monitor analog signal. The engine controller board (MC PWB) adjusts the laser emission power by VL2 and VLl signals. VL2 and VL1 are laser emission power adjust signals, they are analog signals.
If the MO signal is not detected, it will be judged that there ia a laser diode malfunction.
If the SOS signal is not detected, it would be judged as a scanner motor malfunction.

2.1.3.6 Bias Control

This section describes the bias control.
A diagram of drum charge bias, image transfer bias, detach bias and developing bias control circuit is shown in Figure 2-31. These bias generate from the +24 VDC on high voltage supply board (HVPS). These bias cut so that +24 VDC is cut, while the interlock switch is off by case open detected.

These bias are controlled by engine controller board (MC PWB). The $\overline{\text{TR:ON}}$ and TR+ signals are image transfer (roller) bias control. While $\overline{\text{TR:ON}}$ signal is to LOW, the image transfer roller is active. And, while $\overline{\text{TR+}}$ signal is to LOW, the image transfer roller is charged to 1.2K VDC by high voltage supply circuit. And while this signal is to HIGH, the image transfer roller is charged to -0.6K VDC.

The $\overline{\text{CS/DS:ON}}$ signal control to drum charge and DETACH SAW bias. While this signal is LOW, the DETACH SAW is charged to -1.0K VDC, and the OPC drum is charged.
The imaging cartridge has charged screen between charge wire for OPC drum and OPC drum. The charge screen is connected 310 VDC zener diode. The charge screen control potential of OPC drum surface to -310 VDC.

The $\overline{\text{DB:ON}}$ signal control to developing bias. While this signal LOW, the developing roller is charge.
The developing bias is changed by image density control volume. The developing bias is controlled bias level (-205 V to -265 VDC) by this volume. The image density is controlled so that the developing bias level.

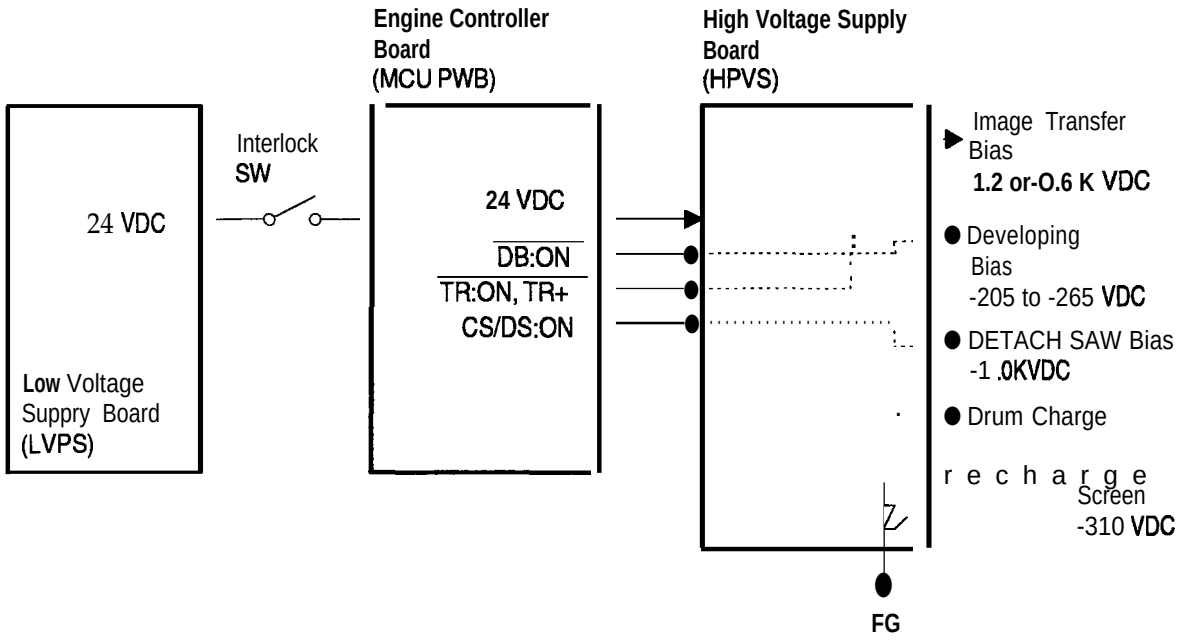


Figure 2-31. Bias Control Circuit

2.1.3.7 Fan Motor and Chute Fan Motor Control

The fan motor rotates at all times after the power is on. The fan motor rotates faster during printing. When printing ends, the fan motor slows down. 'l'he high voltage supply board (HVPS) receives FAN CONTROL signals from the engine controller board (MC PWB) during printing, and the high voltage supply board (HVPS) sends CHUTE FAN ON signal to chute fan and FAN FAST ON to fan during printing.

The fan rotates faster while FAN FAST ON signal receive. The chute fan rotates while CHUTE FAN ON signal receive.

The fan output FAN ALARM signal, while it is locked.

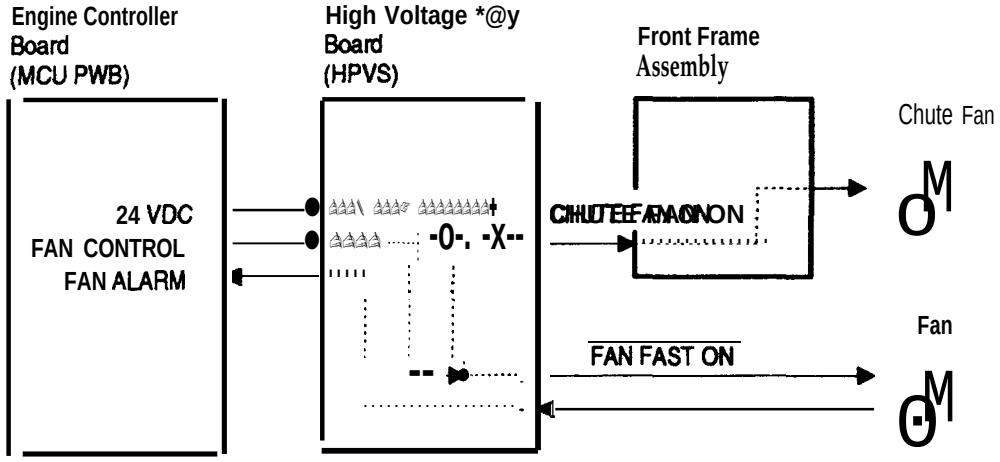


Figure 2-32. Fan and Chute Fan Control Circuit

2.1.3.8 Paper Size Detection

The paper size in paper cassette is detected by four mechanical switches. The paper size signal is analog signal. Table 2-1 is lists the paper size and paper size switches functions.

Table 2-1. Paper Size Detection

Paper Size	Paper Size Switch				Paper Size Signal Level
	SW1	SW2	SW3	SW4	
No paper cassette holder (Option only)	-	-	-	-	0 VDC
No paper cassette	OFF	OFF	OFF	OFF	0.275 to 0.293 VDC
MONARCH	OFF	OFF	OFF	ON	0.554 to 0.583 VDC
LEGAL 13"	OFF	OFF	ON	OFF	0.834 to0.871 VDC
Japan Post Card	OFF	OFF	ON	ON	1.116 to 1.157 VDC
COM-10	OFF	ON	OFF	OFF	1.396 to 1.445 VDC
LETTER : USA ver. or A4: Other ver.	OFF	ON	OFF	ON	1.680 to 1.730 VDC
C5	OFF	ON	ON	OFF	1.962 to 2.015 VDC
DL	OFF	ON	ON	ON	2.248 to 2.298 VDC
LEGAL 14"	ON	OFF	OFF	OFF	2.530 to 2.584 VDC
EXECUTIVE: USA ver. or B5: Other ver.	ON	OFF	OFF	ON	2.814 to 2.868 VDC
B4	ON	OFF	ON	OFF	3.098 to 3.152 VDC
STATEMENT: USA ver. or A5: Other ver.	ON	OFF	ON	ON	3.385 to 3.433 VDC
A3	ON	ON	OFF	OFF	3.671 to 3.715 VDC
LEDGER	ON	ON	ON	OFF	4.247 to 4.276 VDC

2.1.3.9 Imaging Cartridge Sensor

The CRU actuator push to CRU switch and LD switch, while imaging cartridge is set to printer. The CRU switch is imaging cartridge sensor. The LD switch is laser power off switch. Laser power is cut off at no imaging cartridge.

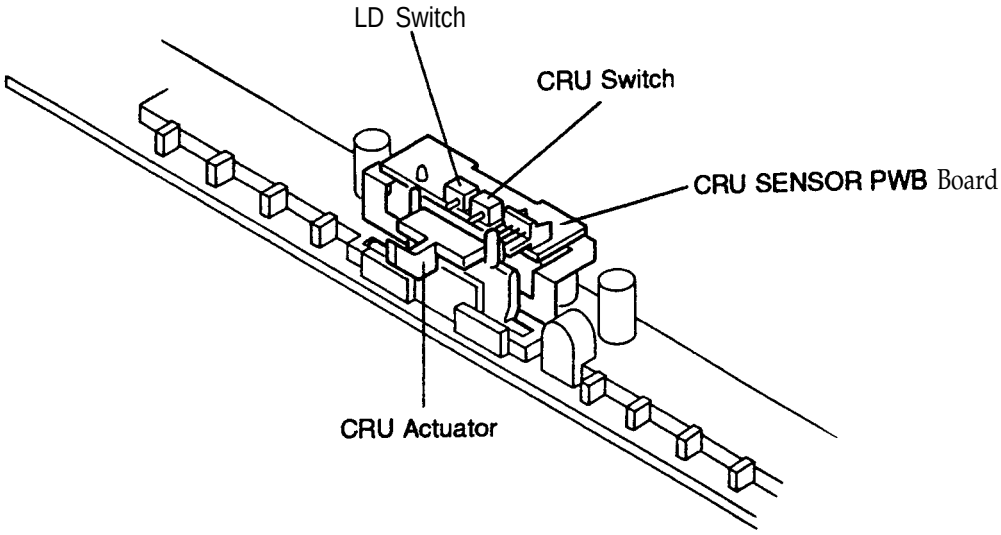


Figure 2-33. Imaging Cartridge Sensor

2.1.3.10 Power Supply Circuit Function and Safety Protection

This printer's low voltage supply board (LVPS) supplies +5 VDC and +24 VDC. The +24 VDC is used bias voltages supply, main motor drive, polygon scanner motor drive, fan motor drive, and solenoid drive. The +24 VDC line is cut, while interlock switch (case open switch) is off. It's a safety protection.

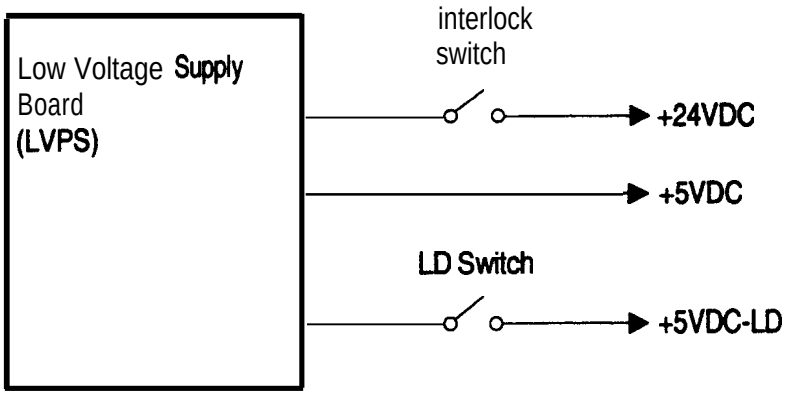


Figure 2-34. Power Supply Circuit

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 C135 MAIN board and the control panel.

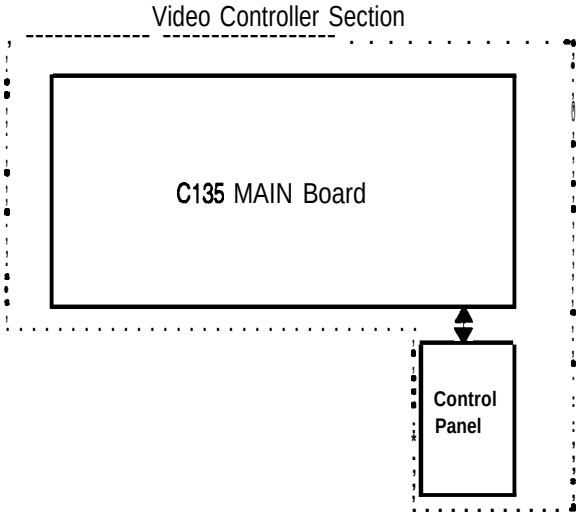


Figure 2-35. Video Controller Section

2.2.1 C135 MAIN Board Operation

Figure 2-36 shows a block diagram of the C135 MAIN board. The C135 MAIN board contains the video controller, which consists of a MB86930 (SPARKlite, 19.2 MHz, 32-bit bus) RISC CPU, the standard cells developed for this printer, DRAMs, ROM, and a 16K-bit EEPROM.

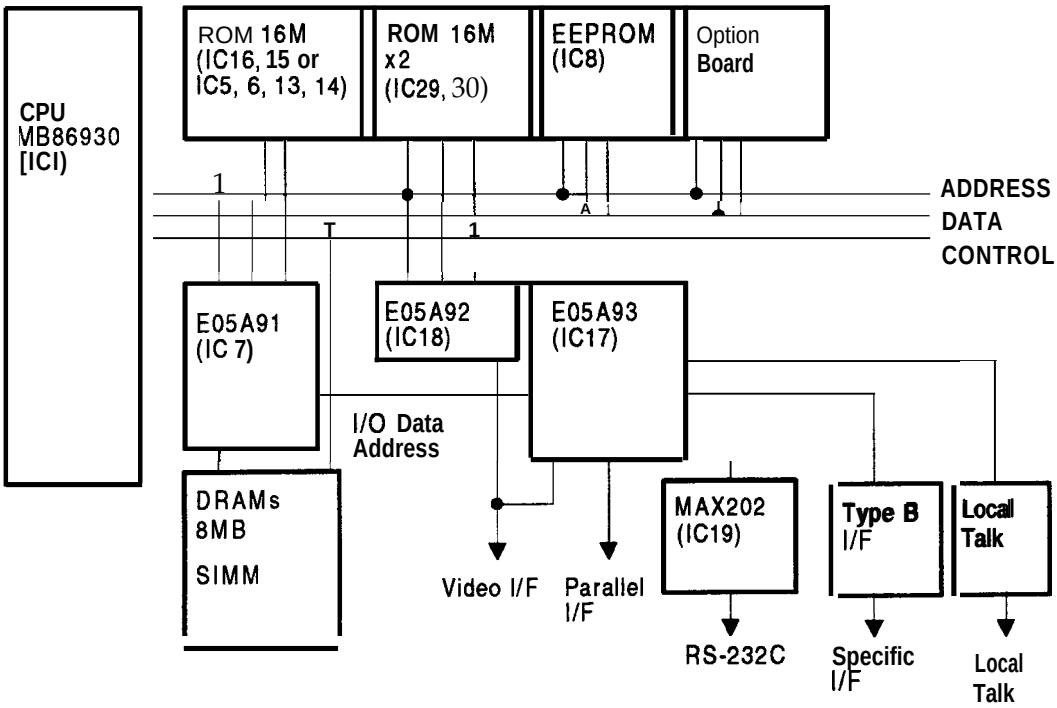


Figure 2-36. C135 MAIN Board Block Diagram

Table 2-2 lists the functions of the C135 MAIN board main elements.

Table 2-2. Functions of C135 MAIN Board Main Elements

Element	Location	Function
MB86930 RISC CPU	ICI	The CPU, which operates at 19.2 MHz, manages the video controller operation.
E05A91 ASIC	IC7	This ASIC contains the following functions: • Address decoding . DRAM management (refresh control, RAS/CAS control)
E05A92 ASIC	IC18	This ASIC contains the following functions: • video signal processing . BiRITech • EMGTech
E05A93 ASIC	IC17	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	IC16,15 or IC5, 6, 13, 14	These ROMs are code ROM.
Two 8M ROMs	IC29, 30	These ROMs are font ROM.
BM ROM	IC9	This ROM is local language ROM (fonts) option.
EEPROM	IC8	This EEPROM stores the following: . Model type . Printed page counter value . Toner life counter value . Jam counter value • SelecType setting
DRAM	IC24, 25,26, 27	These DRAMs are used as the working area of the CPU: input buffer, image buffer, etc.
MAX202	IC19	This IC changes the RS-232C signal level.
MC34050	IC4	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 theE05A92, 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.

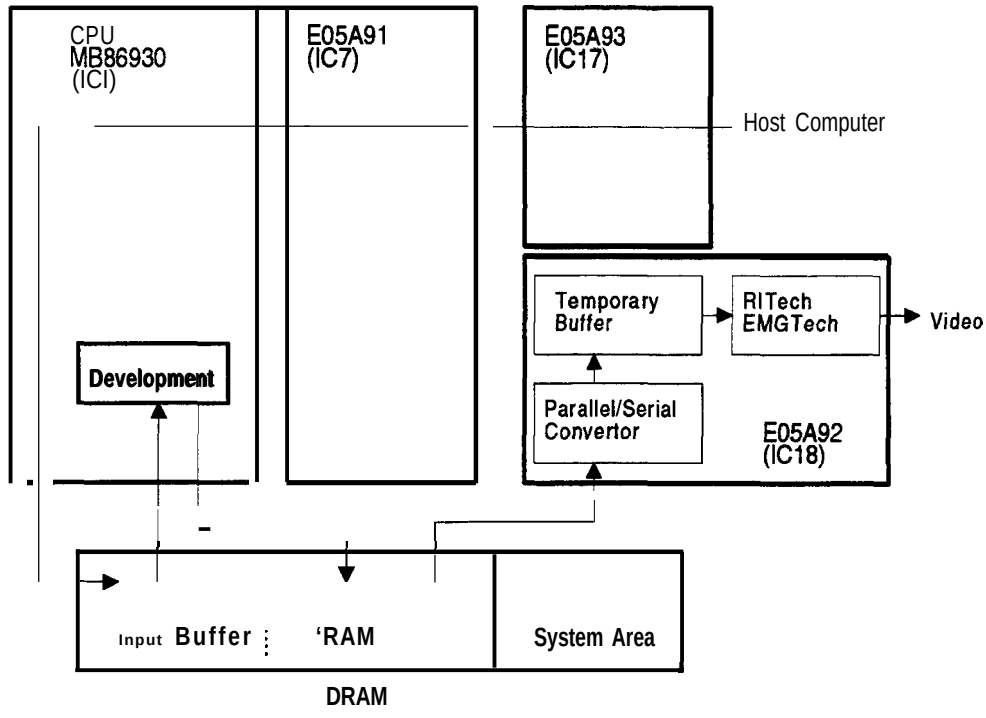


Figure 2-37. Data Flow Diagram

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 4.25 V is detected. The reset time is approximately 128 ms.

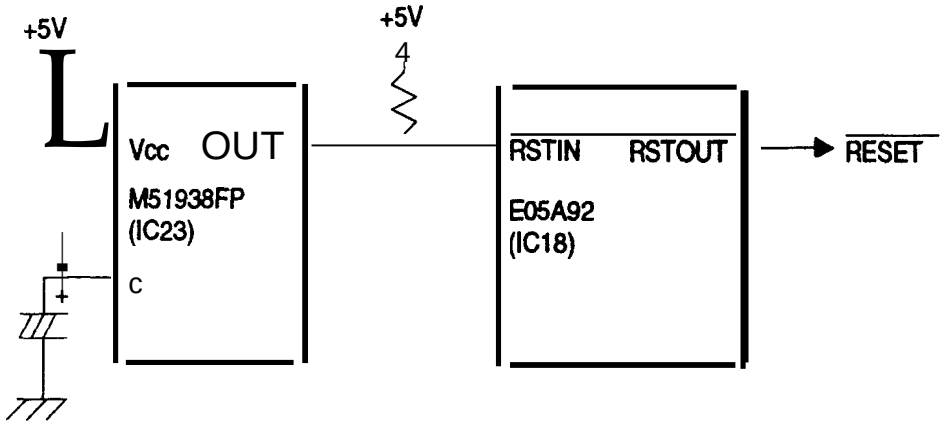


Figure 2-38. Reset Circuit

2.2.1.2 Bus Control Circuit

The MB86930 CPU outputs the R/W (read/write) signal, AS (address strobe) signal, and the BE(), 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.

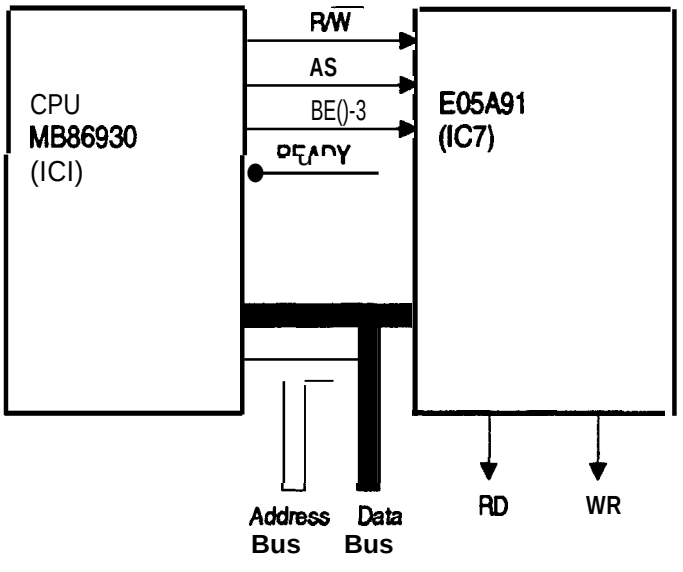


Figure 2-39. Bus Control Circuit

2.2.1.3 Interrupt Control

The ASIC E05A93 deterrnines 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 rnaskable 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 IC24, IC25, IC26, and IC27, providing a total of 2.0 MB. SIMM sockets number 1 (CN1) and number 2 (CN2) 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), RAS/CAS, and WE signals.

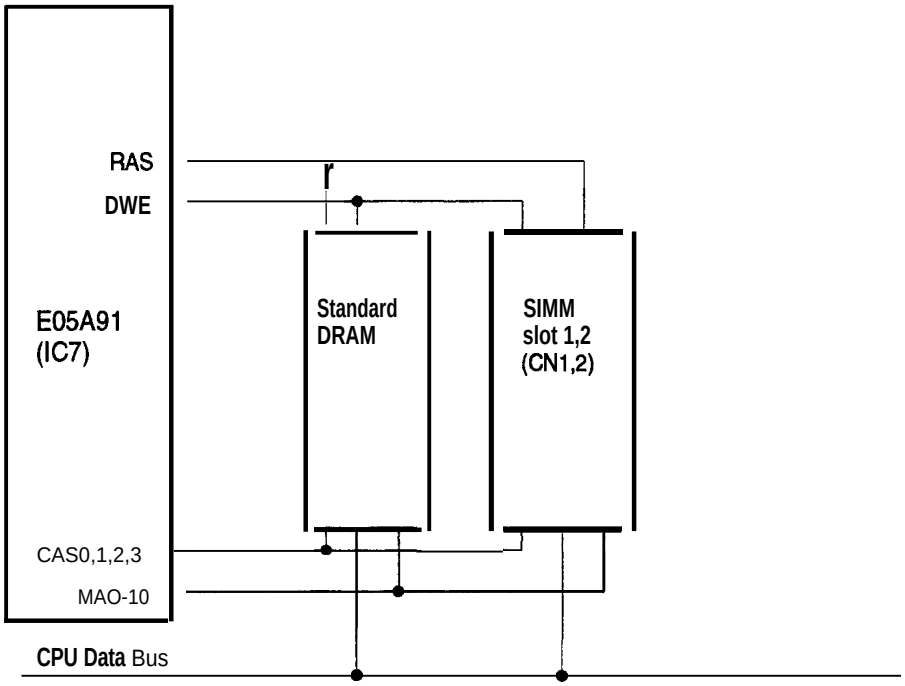


Figure 2-40. DRAM Management

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.

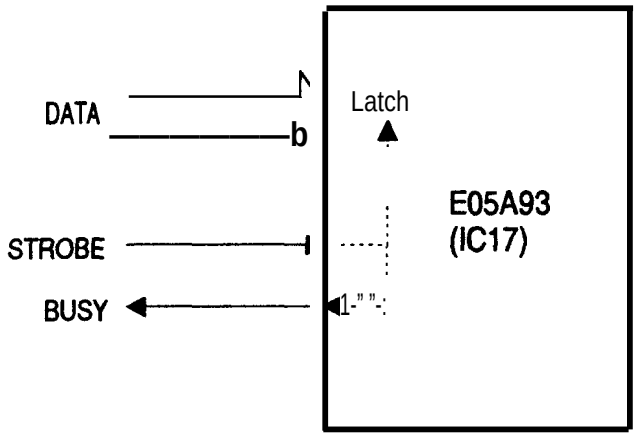


Figure 2-41. Parallel Interface Circuit

2.2.1.6 RS-232C Circuit

This circuit uses the RS-232C receiver/driver IC MAX202 (IC19) 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.

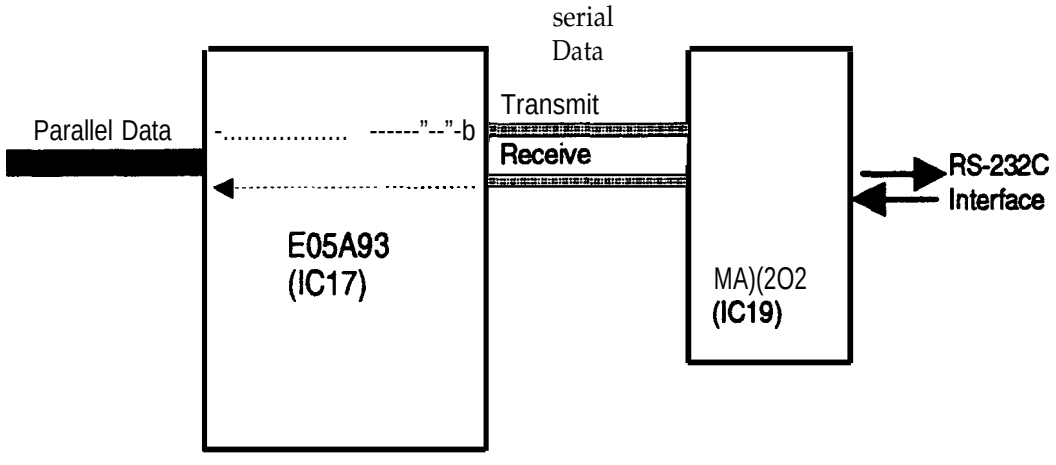


Figure 2-42. RS-232C Circuit

2.2.1.7 RS-422 Circuit

This circuit uses the RS-422 receiver/driver IC MC34050 (IC4) 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.

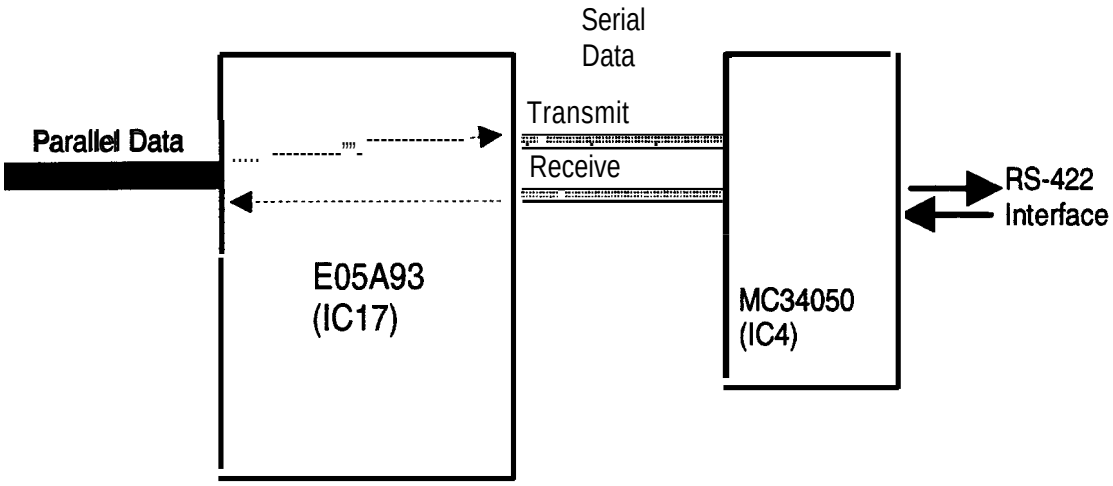


Figure 2-43. RS-422 Circuit

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 (IC17) at the C135 MAIN board.

The 26LS30 (IC1) 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).

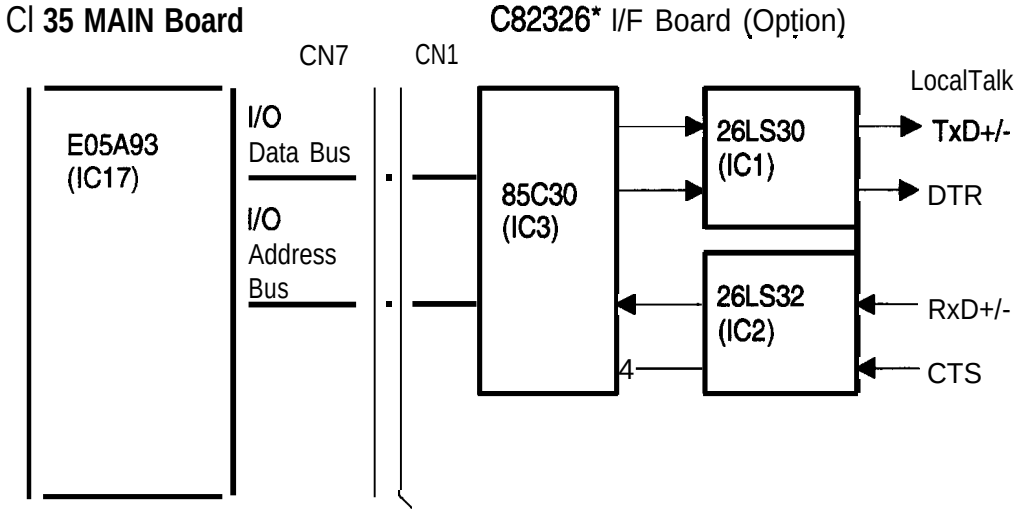


Figure 2-44. LocalTalk Circuit

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 (IC17).

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 W 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 C135 MAIN board and engine controller board) can be broadly divided into four groups. The first group (PRINT, CPRDY, RDY, and PRD) 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 (TOP, BD) is the synchronizing signal for the printing operation. The third group (VIDEO) is the serial video data signal. The fourth group (CMD, CCLK, CBSY, and EBSY) 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, TOP, and BD, all signals are controlled by ASIC E05A93.

This printer has BiRITech and EMGTech functions standard. These functions modify the VIDEO signal with the ASIC E05A92.

Chapter 3 Disassembly and Assembly

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List of Figures

List of Tables

3.1 GENERAL INFORMATION

This chapter describes the disassembly /assembly procedures to be used for replacing the main assemblies of the EPL-9000.

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, take the following precautions:*
  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 maintenance work. Inappropriate tools may damage the machine.*
- *Never open the front cover until the main motor stops completely. Otherwise, the gears may be damaged.*
- *When transporting the printer, remove the imaging cartridge.*
- *When transporting the printer a long distance, pack up it 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	B740200100
Round-nose pliers	Yes	B740400100

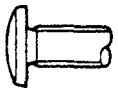
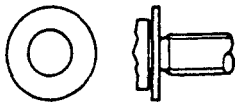
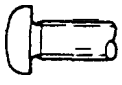
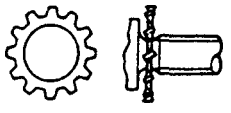
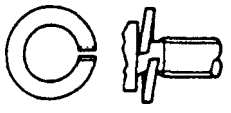
3.1.3 Small Parts

In the following sections, abbreviations are used for small parts such as screws and washers. Table 3-2 lists these abbreviations. Table 3-3 lists screw and washer types.

Table 3-2. Screw Abbreviations

Abbreviation	Part Name
CB	Cross-recessed Bind head
CBB	Cross-recessed Bind head B-tite
CBS(0)	Cross-recessed Bind head S-tite with Outside toothed lock washer
CP	Cross-recessed Pan head
CP(S-P1)	Cross-recessed Pan head with Spring lock washer and 1 Plain washer
CPFS	Cross-recessed Pan Flange head S-tite

Table 3-3. Screw and Washer Types

Head		Body	washer (assembled)
Top	Side		
1. Gross-recessed head 	1. Bind 	1. Normal 	1. Plain washer 1 
	2. Pan 	2. B-tight 	2. Outside toothed lock washer 
	3. Pan Flange 	3. S-tite 	3. Spring washer 

3.1.4 Service Checks after Repair

Check the repaired unit using the list in Table 3-4.

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?	
ROM version		Is it the latest version?	
Cleaning		Are toner and dust removed from the paper path? Is the lens on the optical unit clean? Is the paper take-up roller clean? 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-9000. 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 Housing Removal

This section describes how to remove the rear, top, left, and right covers.

3.2.1.1 Rear Cover Removal

1. Remove the option interface cover.
2. Remove 1 CBB screw (M3 x 8) securing the top cover.
3. Remove 1 CB screw (M3 x 8) securing the rear cover, and remove it.

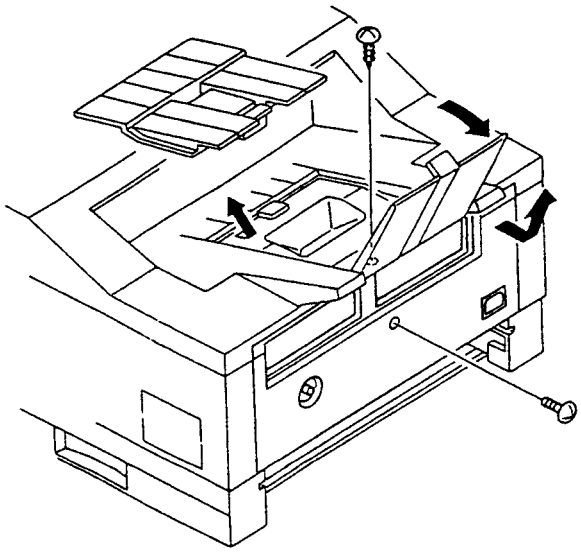


Figure 3-1. Removing the Rear Cover

3.2.1.2 Top Cover Removal

1. Remove the rear cover. (Refer to Section 3.2.1.1.)
2. Remove 4 CB screws (M3 x 8) securing the top cover, and remove it.

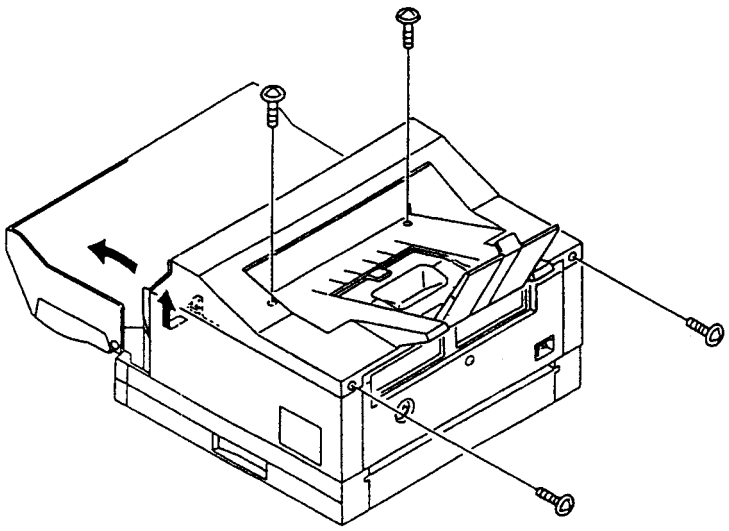


Figure 3-2. Removing the Top Cover

3.2.1.3 Left Cover Removal

1. Remove the rear cover. (Refer to Section 3.2.1.1.)
2. Remove the top cover. (Refer to Section 3.2.1.2.)
3. Remove 1 CB screw (M3 x 8) securing the left cover, and remove it.

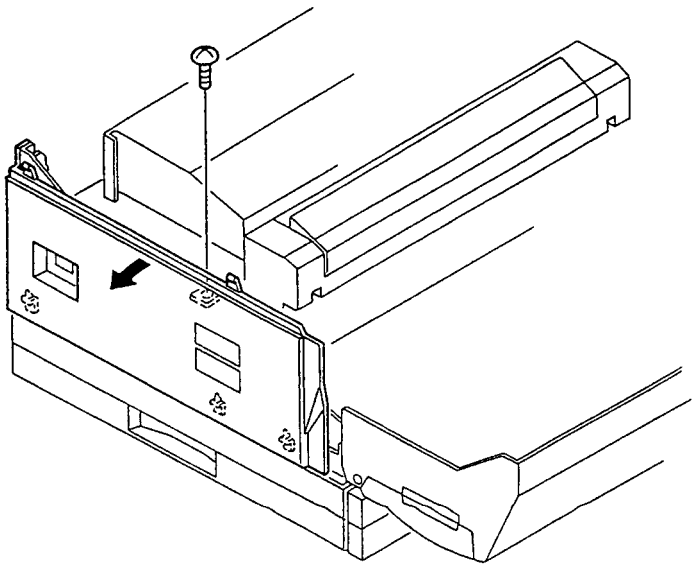


Figure 3-3. Removing the Left Cover

3.2.1.4 Right Cover Removal

1. Remove the rear cover. (Refer to Section 3.2.1.1.)
2. Remove the top cover. (Refer to Section 3.2.1.2.)
3. Remove 1 CB screw (M3 x 8) securing the right cover, and remove it.

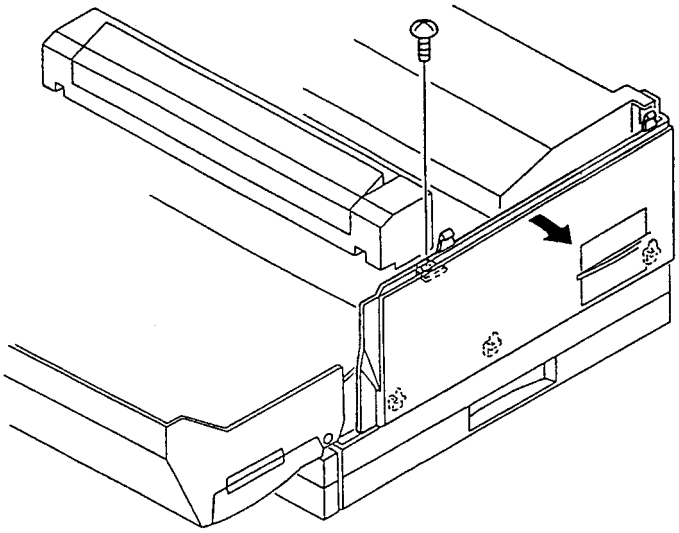


Figure 3-4. Removing the Right Cover

3.2.2 Electrical Component Removal

This section describes how to remove the ELEC cover, C135 MAIN bead, engine controller board (MCU PWB), high voltage supply board (l-lVPS), low voltage supply unit (LVPS), earth plate, and fan unit.

3.2.2.1 ELEC Cover Removal

1. Remove the rear cover. (Refer to Section 3.2.1.1.)
2. Remove the top cover. (Refer to Section 3.2.1.2.)
3. Remove theleftcover. (Refer to Section 3.2.13.)
4. Remove the right cover. (Refer to Section 3.2.1.4.)
5. Remove 18 CB screws (M3 x 6) securing the shield cover, and remove it.

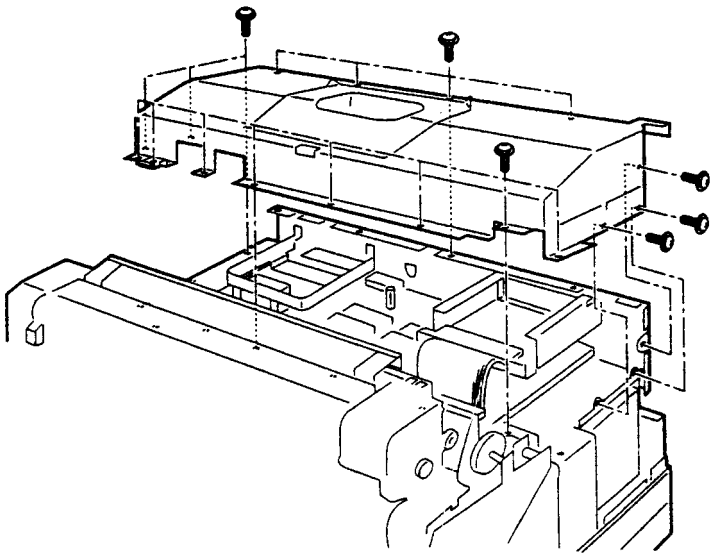


Figure 3-5. Removing the Shield Cover

6. Disconnect CN11 and CN12 from the C135 MAIN board.
7. Remove 8 CB screws (M3 x 6) and 2 CBB screws (M3 x 8) securing the ELEC cover, and remove it.

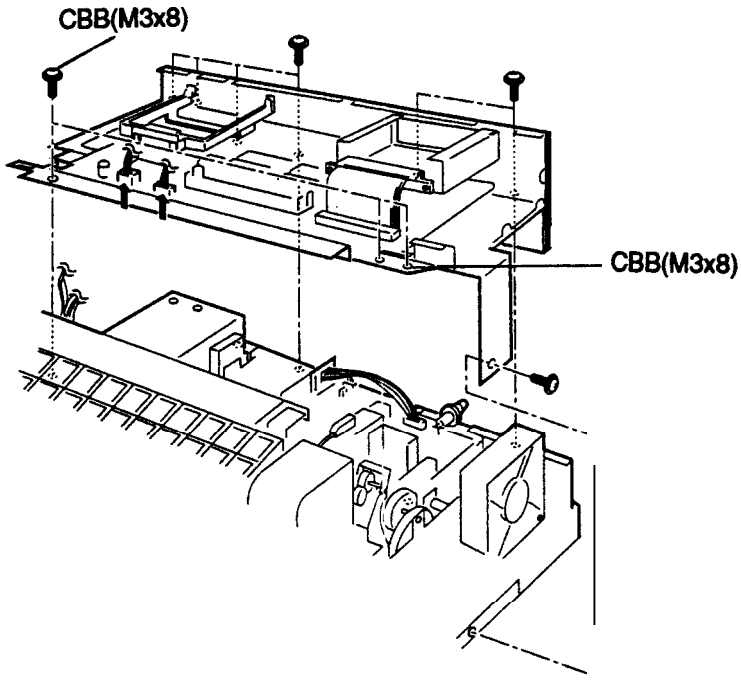


Figure 3-6. Removing the ELEC Cover

3.2.2.2 Video Controller Board (C135 MAIN Board) Removal

1. Remove the rear cover. (Refer to Section 3.2.1.1.)
2. Remove the top cover. (Refer to Section 3.2.1.2.)
3. Remove the left cover. (Refer to Section 3.2.1.3.)
4. Remove the right cover. (Refer to Section 3.2.1.4.)
5. Remove the shield cover. (Refer to Section 3.2.2.1. Steps 1 to 5)
6. Remove 2 CP screws (M3 x 6) securing the font cartridge connector, and remove it.
7. Remove 3 CP screws (M3 x 6) securing the font cartridge guide and cover, and remove them.
8. Remove 2 CP screws (M3 x 6) securing the option interface cover, and remove it.
9. Remove the option interface guide.
10. Remove 4 CB screws (M3 x 6), 2 serial interface connector screws, and 2 small screws from the rear shield cover, and remove it.
11. Disconnect CN11 and CN12 from the C135 MAIN board.
12. Remove 7 CP screws (M3 x 6).
13. Remove the C135 MAIN board.

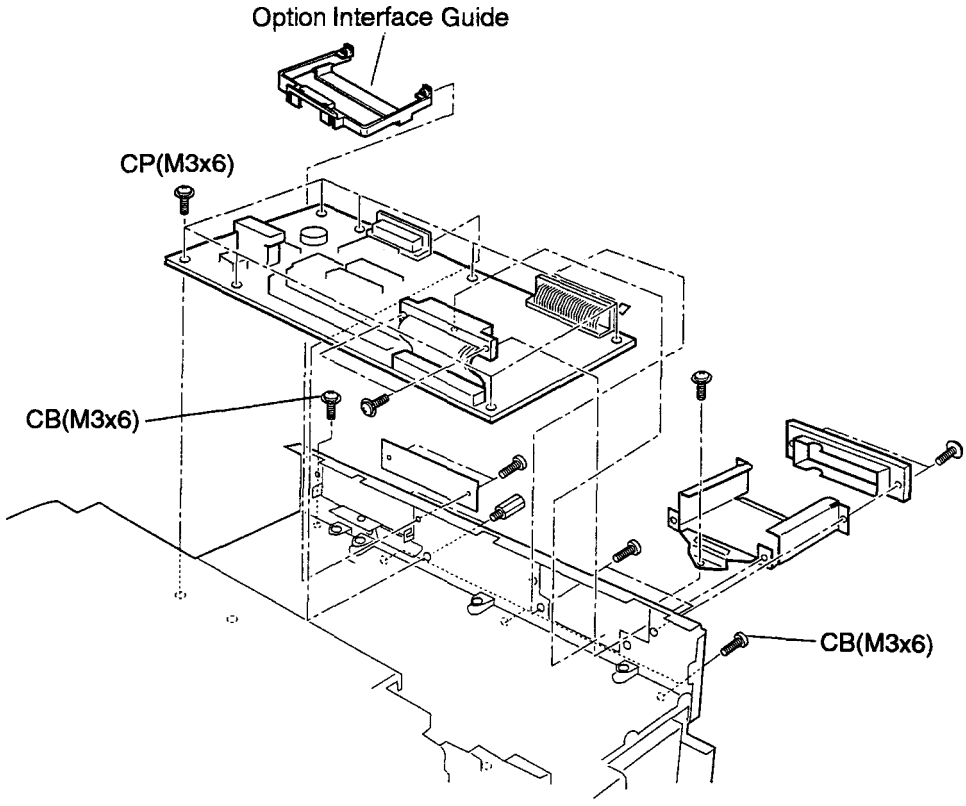


Figure 3-7. Removing the C135 MAIN Board

3.2.2.3 Engine Controller Board (MCU PWB Board) Removal

1. Remove therearcover. (Refer to Section 3.2.1.1.)
2. Remove thetopcover. (Refer to Section 3.2.1.2.)
3. Remove theleftcover. (Refer to Section 3.2.1.3.)
4. Remove therightcover. (Refer to Section 3.2.1.4.)
5. Remove the ELECcover. (Refer to Section 3.2.2.1.)
6. Disconnect connectors P/J12, P/J13, P/J14, P/J15 P/J16, P/J17, P/J18 and P/J19 from the engine controller board.
7. Remove 5 CBB screws (M3 x 6) securing the engine driver board, and remove it.

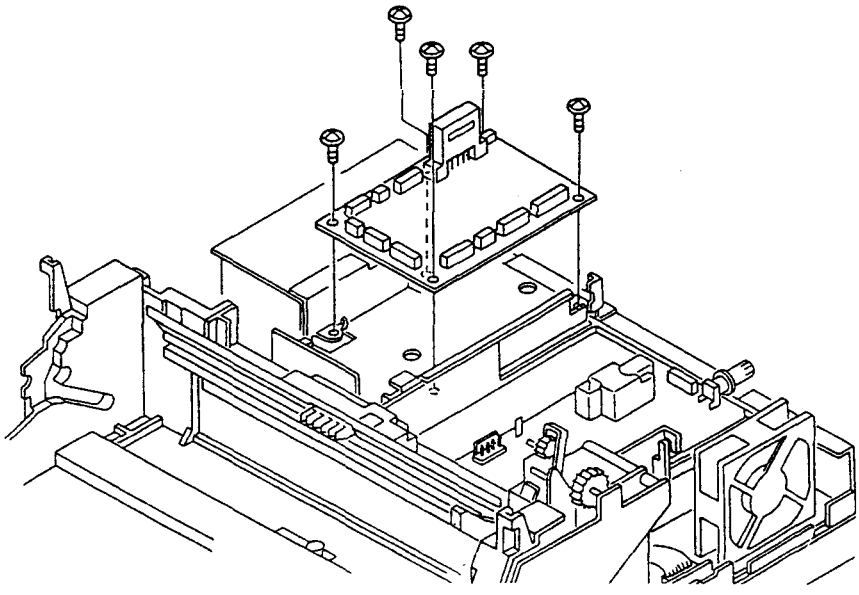


Figure 3-8. Removing the MCU PWB Board

3.2.2.4 High Voltage Supply Board (HVPS Board) Removal

1. Remove the rear cover. (Refer to Section 3.2.1.1.)
2. Remove the top cover. (Refer to Section 3.2.12)
3. Remove the left cover. (Refer to Section 3.2.13.)
4. Remove the right cover. (Refer to Section 3.2.1.4.)
5. Remove the ELEC cover. (Refer to Section 322.1.)
6. Disconnect connectors P/Jill, P/J301, P/J305, P/J306, DS, TR, and CS from the HVPS board.
7. Remove the volume adjustment knob.
8. Remove 5 CBB screws (M3 x 8) securing the HVPS board, and remove it.

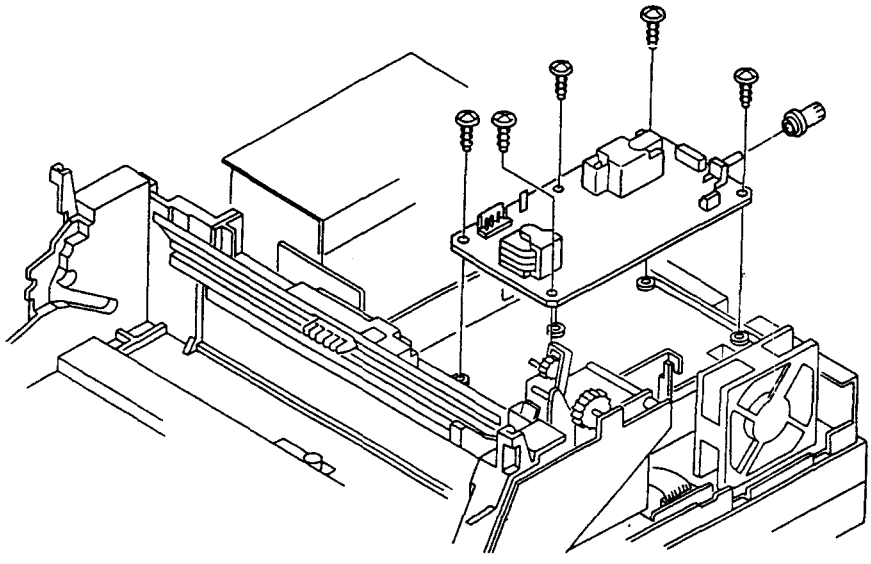


Figure 3-9. Removing the HVPS Board

3.2.2.5 Low Voltage Supply Unit (LVPS Unit) Removal

1. Remove the rear cover. (Refer to Section 3.2.1.1.)
2. Remove the top cover. (Refer to Section 3.2.1.2.)
3. Remove the left cover. (Refer to Section 3.2.1.3.)
4. Remove the right cover. (Refer to Section 3.2.1.4.)
5. Remove the ELEC cover. (Refer to Section 3.2.2.1.)
6. Disconnect the connector P/J11, P/J12, P/J13, P/J14, P/J15, P/J 6, P/J17, P/J18, P/J19 on the MCU PWB board.
7. Remove 3 CB screws (M3 x 6) securing the MCU box, and remove it and the MCU PWB board.
8. Remove the fusing unit. (Refer to Section 3.2.5.1.)

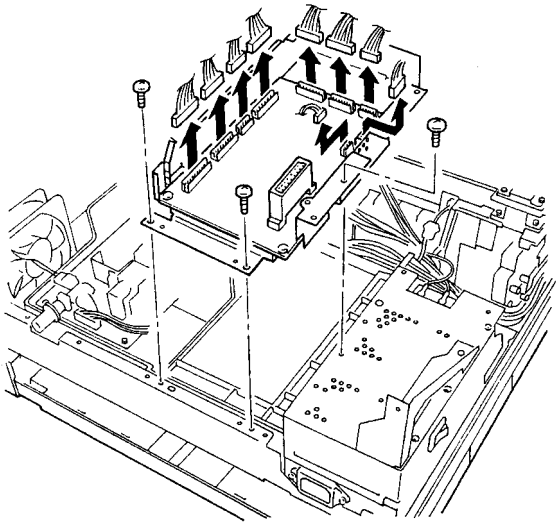


Figure 3-10. Removing the MCU Box

9. Remove 1 CB screw (M3 x 6) securing the earth wire of the HVPS board to the LVPS unit.
10. Remove 2 CBB screws (M3 x 10) securing the ROS unit, and remove connector P101 of the fusing unit.
11. Remove 2 CB screws (M3 x 6) and 1 CBS(0) screw (M3 x 6) securing the LVPS unit, and remove it.
12. Remove the saddle edge H from the LVPS unit.

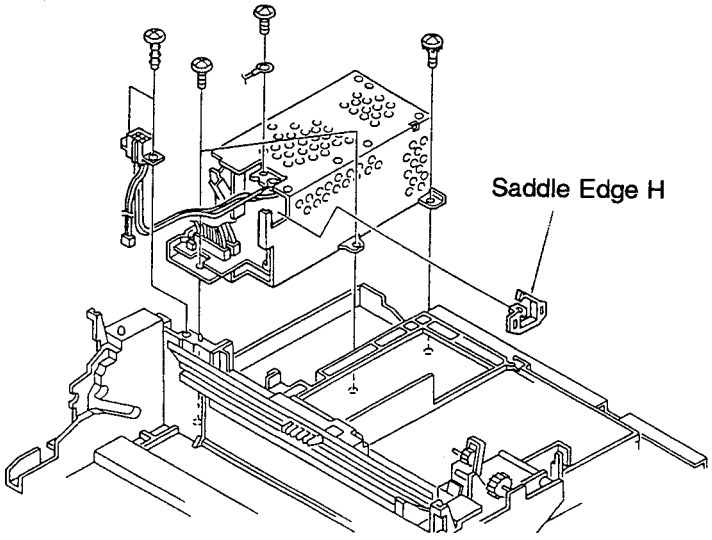


Figure 3-11. Removing the LVPS Unit

3.2.2.6 Earth Plate Removal

1. Remove the rear cover. (Refer to Section 3.2.1.1.)
2. Remove the top cover. (Refer to Section 3.2.1.2.)
3. Remove the left cover. (Refer to Section 3.2.13.)
4. Remove the right cover. (Refer to Section 3.2.1.4.)
5. Remove the ELEC cover. (Refer to Section 3.2.2.1.)
6. Disconnect connectors P/J301 and CS from the HVPS board.
7. Remove 1 CB screw (M3 x 6) securing the earth wire of the earth plate on the LVPS unit.
8. Remove the link assembly. (Refer to Section 3.2.4.1.)
9. Remove 2 CBB screws (M3 x 8) securing the earth plate, and remove it.

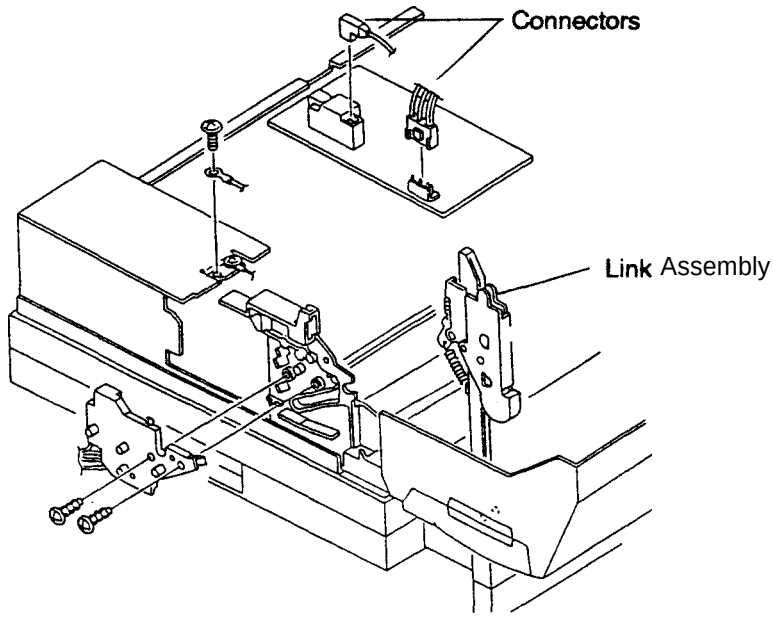


Figure 3-12. Removing the Earth Plate

3.2.2.7 Fan Unit Removal

1. Remove the rear cover. (Refer to Section 3.2.1.1.)
2. Remove the top cover. (Refer to Section 3.2.1.2.)
3. Remove the left cover. (Refer to Section 3.2.13.)
4. Remove the right cover. (Refer to Section 3.2.1.4.)
5. Remove the ELEC cover. (Refer to Section 3.2.2.1.)
6. Disconnect connector P/J305 from the HVPS board.
7. Remove 2 CP(S-P1) screws (M3 x 30) securing the fan unit, and remove it

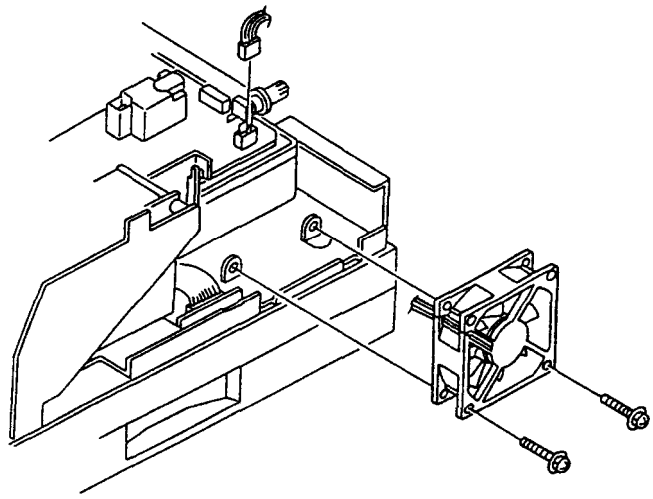


Figure 3-13. Removing the Fan Unit

3.2.3 Feeder Assembly Removal and Disassembly

This section describes how to remove and disassemble the feeder assembly.

3.2.3.1 Feeder Assembly Removal

1. Remove the paper cassette and imaging cartridge.
2. Turn the left cover over.

CAUTION

Place the left cover on a soft cloth, so that it will not be damaged.

3. Remove 4 CB screws (M3 x 8) securing the feeder assembly from the back side, and remove it.
4. Discomect comector P/J115 from the FEEDER PWB board.

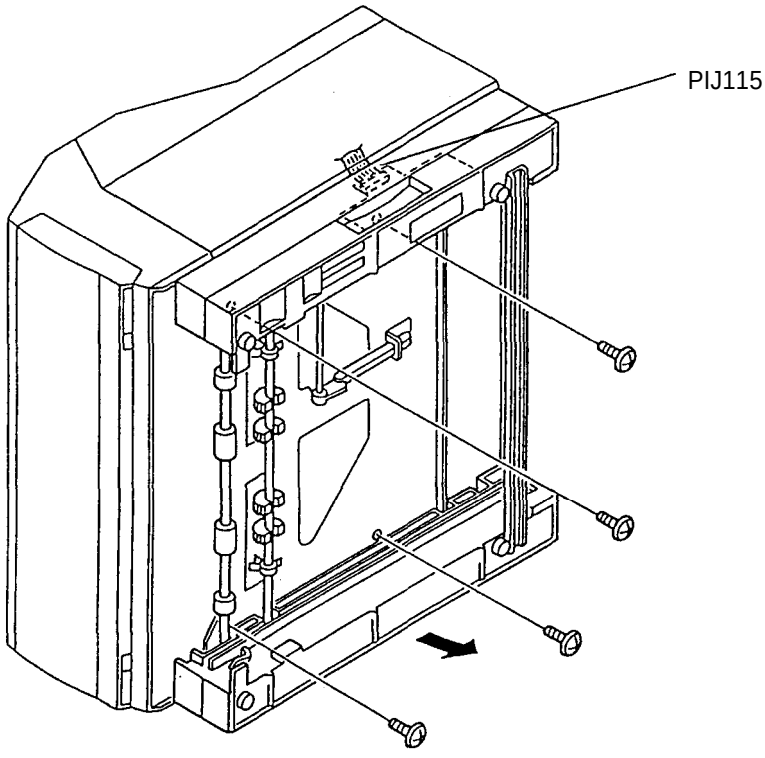


Figure 3-14. Removing the Feeder Assembly

3.2.3.2 Feed Solenoid Removal

1. Remove the paper cassette and imaging cartridge.
2. Remove the feeder assembly. (Refer to Section 3.2.3.1.)
3. Remove 2 CBB screws (M3 x 8) securing the feeder tie plate, and remove it.
4. Remove 2 CBB screws (M3 x 8) and 2 CB screws (M3 x 8) securing the feed housing (right), and remove it.
5. Remove the GEAR IN and GEAR OUT.
6. Disconnect connector P/J201 from the FEEDER PWB board.
7. Remove 1 CB saew (M3 x 8) securing the feed solenoid, and remove it.

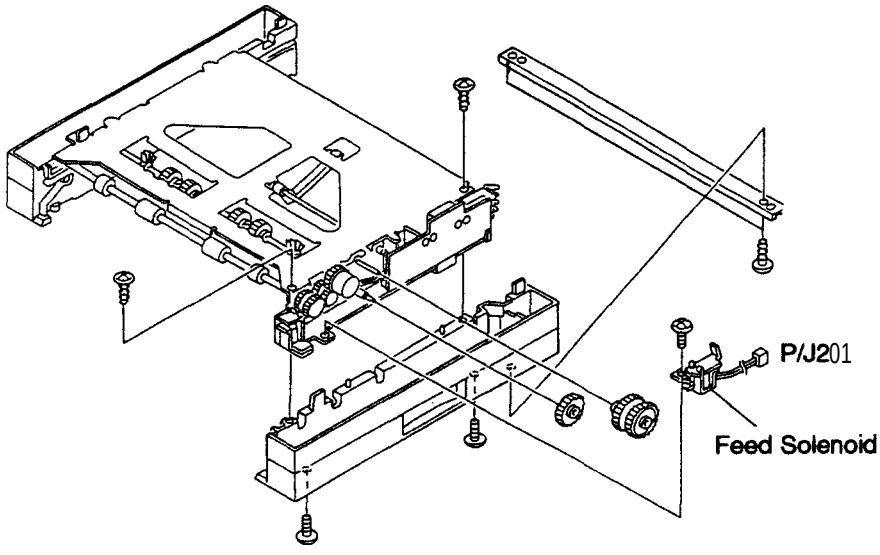


Figure 3-15. Removing the Feed Solenoid

3.2.3.3 Turn Solenoid Removal

1. Remove the paper cassette and imaging cartridge.
2. Remove the feeder assembly. (Refer to Section 3.2.3.1.)
3. Remove 2 CBB screws (M3 x 8) securing the feeder tie plate, and remove it.
4. Remove 2 CBB screws (M3 x 8) and 2 CB screws (M3 x 8) securing the feed housing (right), and remove it.
5. Remove the GEAR IN and GEAR OUT.
6. Disconnect connector P/J202 from the FEEDER PWB.
7. Remove 1 CB sinew (M3 x 8) securing the turn solenoid, and remove it.

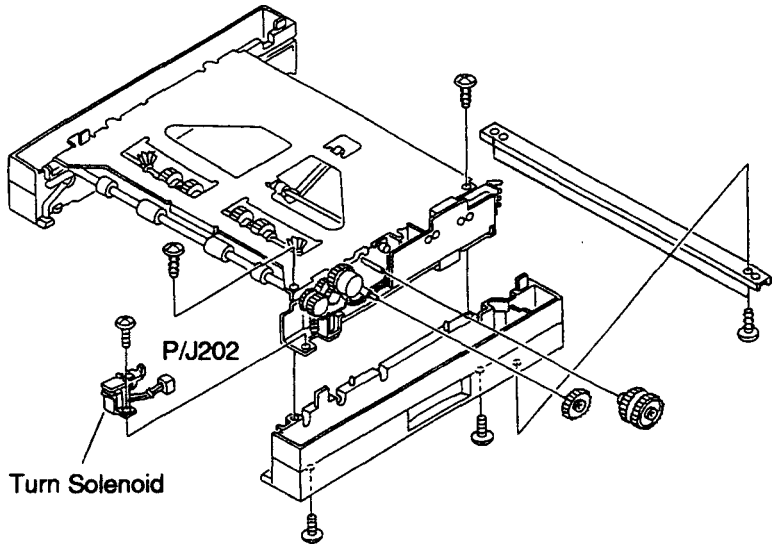


Figure 3-16. Removing the Turn Solenoid

3.2.3.4 Feed Roller Assembly Removal

1. Remove the paper cassette and imaging cartridge.
2. Remove the feeder assembly. (Refer to Section 3.2.3.1.)
3. Remove 2 CBB screws (M3 x 8) securing the feeder tie plate, and remove it.
4. Remove 2 CBB screws (M3 x 8) and 2 CB screws (M3 x 8) securing the feed housing (right), and remove it.
5. Remove the GEAR IN and GEAR OUT.
6. Remove the E-ring (left) securing the feed roller assembly, and remove it.

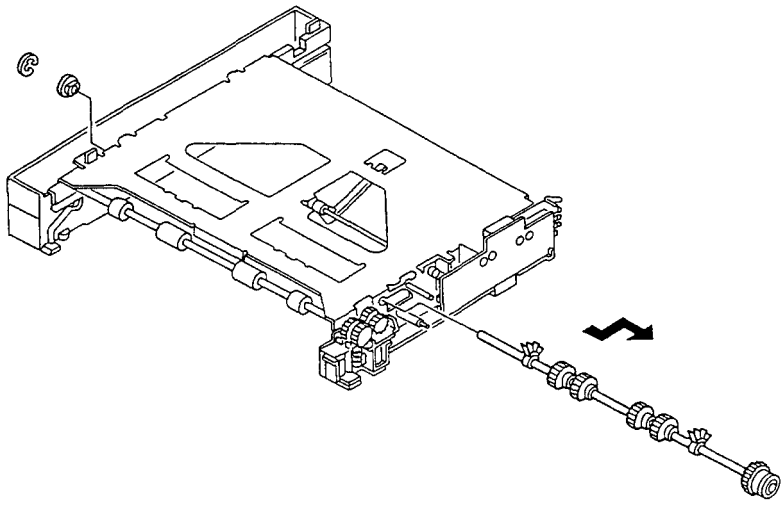


Figure 3-17. Removing the Feed Roller Assembly

3.2.3.5 Feed Roller Removal

1. Remove the paper cassette and imaging cartridge.
2. Remove the feeder assembly. (Refer to Section 3.2.3.1.)
3. Push the plastic face of the feed roller while holding the shaft of the feed roller assembly, and remove the feed roller from the assembly.

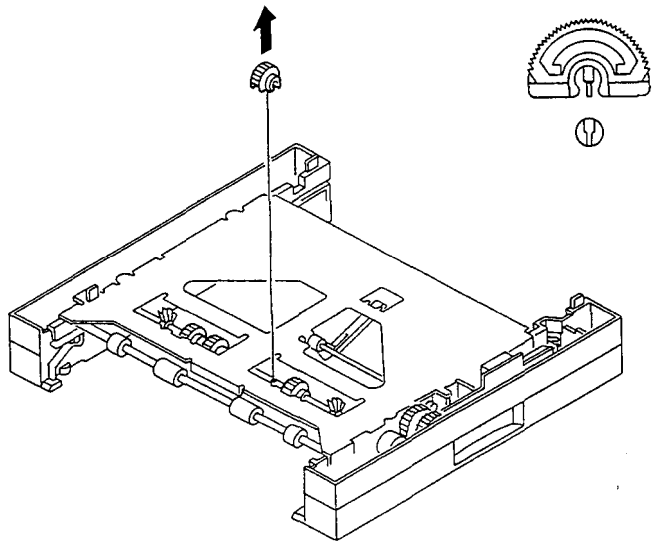


Figure 3-18. Removing the Feed Roller

3.2.3.6 Turn Roller Assembly Removal

1. Remove the paper cassette and imaging cartridge.
2. Remove the feeder assembly. (Refer to Section 3.2.3.1.)
3. Remove 2 CBB screws (M3 x 8) securing the feeder tie plate, and remove it.
4. Remove 2 CBB screws (M3 x 8) and 2 CB screws (M3 x 8) securing the feed housing (right) and remove it.
5. Remove 1 E-ring (left) securing the turnroller assembly and remove it.

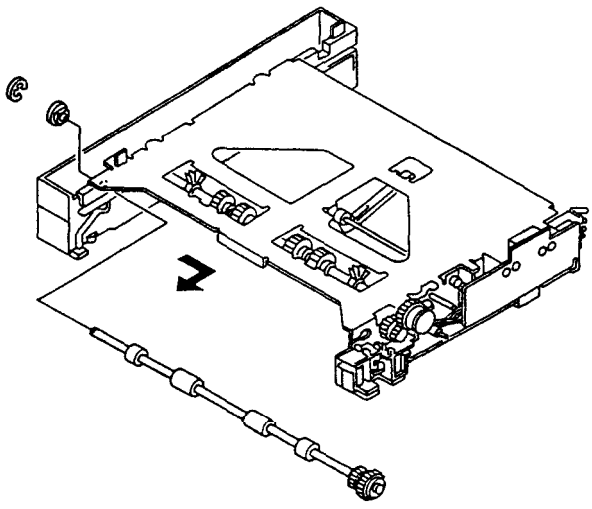


Figure 3-19. Removing the Turn Roller Assembly

3.2.3.7 Paper-out Actuator (PE Sensor Lever) Removal

1. Remove the paper cassette and imaging cartridge.
2. Remove the feeder assembly. (Refer to Section 3.23.1.)
3. Remove 2 CBB screws (M3 x 8) securing the feeder tie plate, and remove it.
4. Remove 2 CBB screws (M3 × 8) and 2 CB screws (M3 × 8) securing the feed housing (right) and remove it.
5. Remove 1 link securing the paper-out actuator.
6. Remove the paper-out actuator from hook holding it.

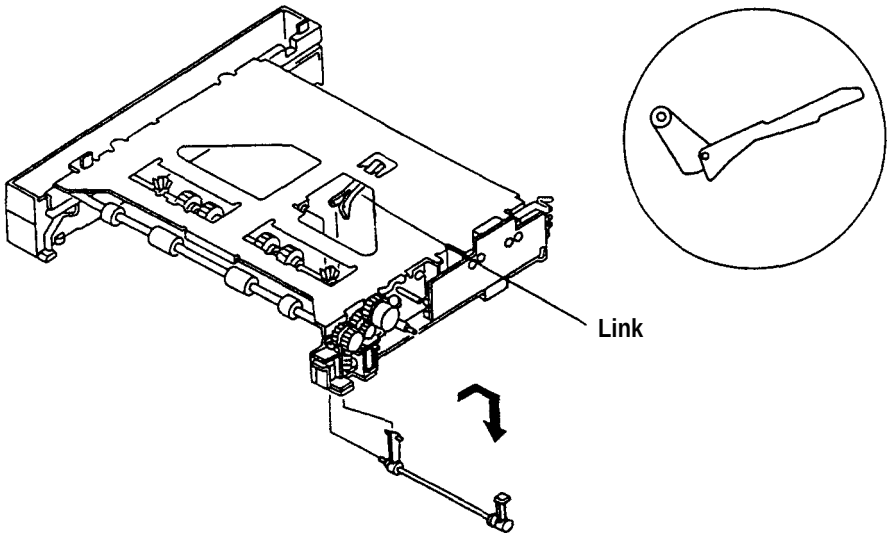


Figure 3-20. Removing the Paper-out Actuator

3.2.3.8 FEEDER PWB Board Removal

1. Remove the paper cassette and imaging cartridge.
2. Remove the feeder assembly. (Refer to Section 3.2.3.1.)
3. Remove 2 CBB screws (M3 x 8) securing the feeder tie plate, and remove it.
4. Remove 2 CBB screws (M3 x 8) and 2 CB screws (M3 x 8) securing the feed housing (right), and remove it.
5. Remove 2 CB screws (M3 x 8) securing the FEEDER PWB board, and remove it.
6. Disconnect comectors P/J116, P/J201, and P/J202 from the FEEDER PWB board.

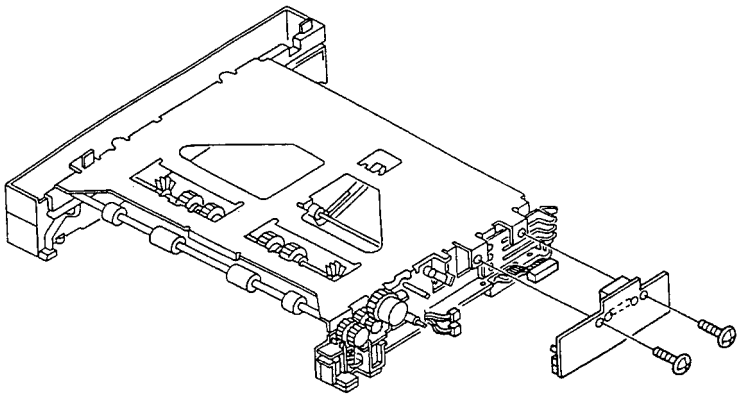


Figure 3-21. Removing the FEEDER PWB Board

3.2.3.9 Size Spring Removal

1. Remove the paper cassette and imaging cartridge.
2. Remove the feeder assembly. (Refer to Section 3.2.3.1.)
3. Remove 2 CBB screws (M3 x 8) securing the feeder tie plate, and remove it.
4. Remove 2 CBB screws (M3 x 8) and 2 CB screws (M3 x 8) securing the feed housing (right), and remove it.
5. Remove 1 CB screw (M3 x 8) securing the size spring, and remove it.

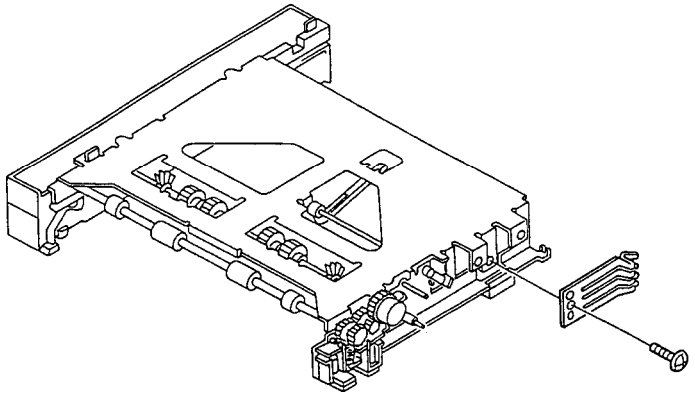


Figure 3-22. Removing the Size Spring

3.2.4 Paper Transportation Section Disassembly

This section describes how to disassemble the paper transportation section.

3.2.4.1 Link Assembly Removal

1. Remove thetopcover. (Refer toSection3.2.l.2.)
2. Remove theleftcover. (Refer to Section 3.2.1.3.)
3. Pull out the paper cassette about 10 cm (3.94 inches) towards the front.
4. Open the front cover unit.
5. Remove the shatter lever.
6. Remove 2 CBB screws (M3 x 8) securing the link assembly, and *remove* it from the ROS unit frame.
7. Remove the link assembly while opening the link spring.

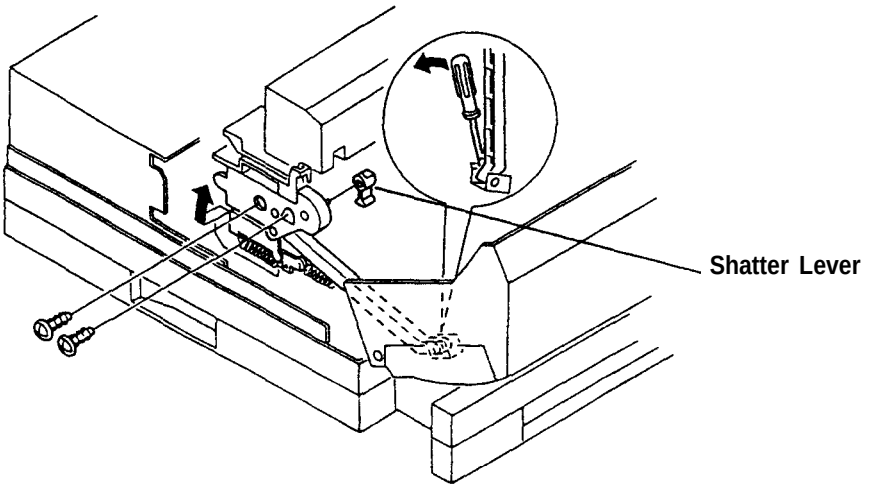


Figure 3-23. Removing the Link Assembly

3.2.4.2 REGI Roll Assembly Removal

1. Open the front cover.
2. Disconnect connectors P/J26and P/J28 from the REGI roll assembly.
3. Remove 3 CBB screws (M3 x 8) securing the REGI roll assembly. (1 screw holds the green earth wire.)
4. Remove the REGI roll assembly.

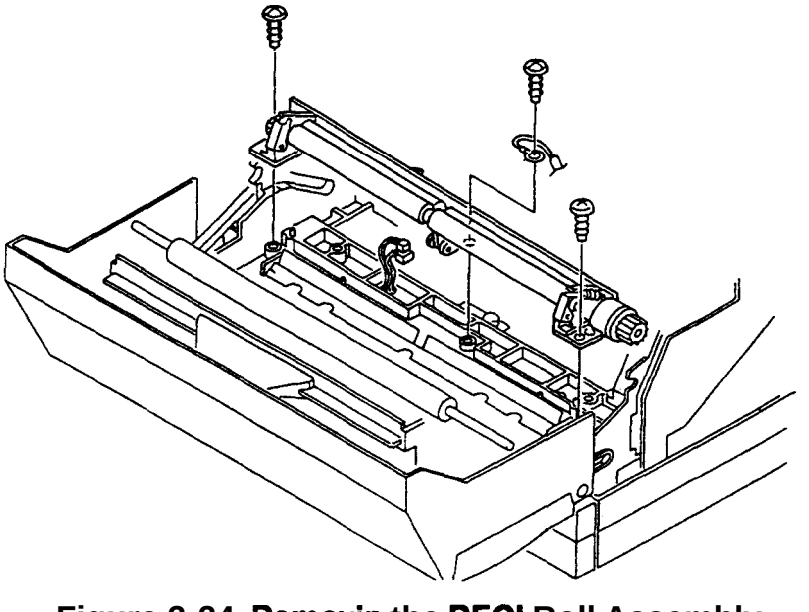


Figure 3-24. Removin the REGI Roll Assembly

3.2.4.3 Lower Chute Assembly Removal

1. Open the front cover.
2. Remove the REGI roll assembly. (Refer to Section 3.2.4.2.)
3. Remove 4 CBB screws (M3 x 8) securing the lower chute assembly, and remove it.

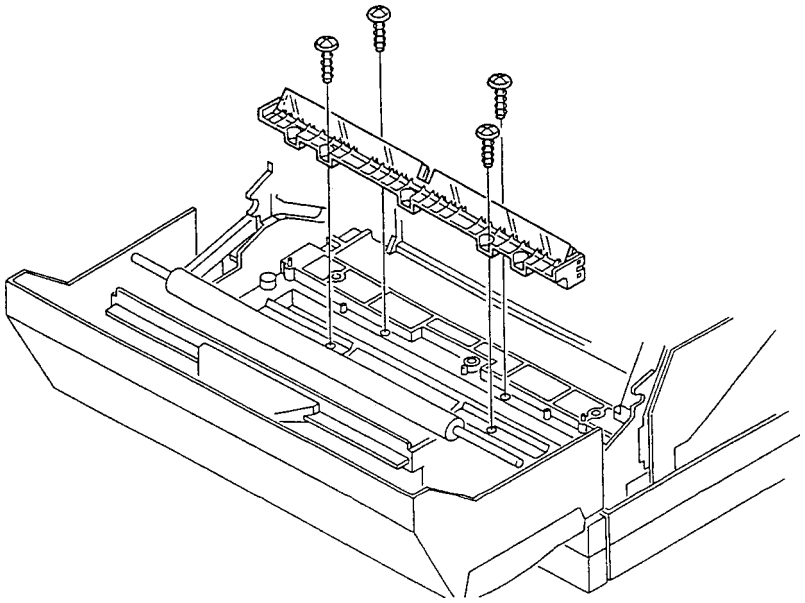


Figure 3-25. Removing the Lower Chute Assembly

3.2.4.4 BTR Assembly Removal

CAUTION

Never touch the surface of the BTR.

1. Open the front cover.
2. Remove the BTR assembly.

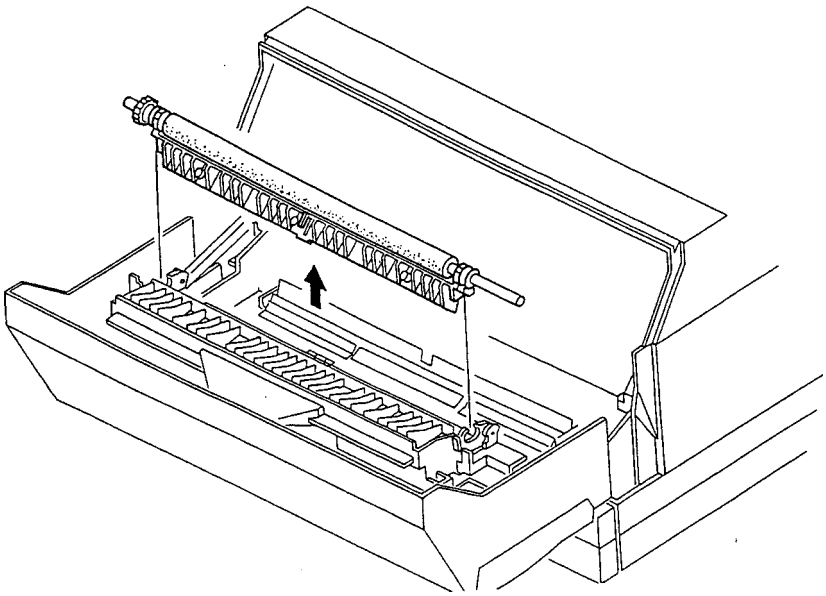


Figure 3-26. Removin the BTR Assembly

3.2.4.5 Front Cover Removal

1. Remove the MSI tray. (Refer to Section 324.13.)
2. Remove the rear cover. (Refer to Section 3.2.1.1.)
3. Remove the top cover. (Refer to Section 3.2.1.2.)
4. Remove the left cover. (Refer to Section 3.2.1.3.)
5. Remove the right cover. (Refer to Section 3.2.1.4.)
6. Remove the ELEC cover. (Refer to Section 3.2.2.1.)
7. Remove the link assembly. (Refer to Section 3.2.4.1.)
8. Disconnect connector P/J16 from the MCU PWB board.
9. Disconnect connector P/J119 from the EXIT sensor on the fusing unit.
10. Disconnect connectors P/J306, CTR, and DS from the HVPS board.
11. Remove 1 CBB screw (M3 x 6) securing the earth wire to the front frame.

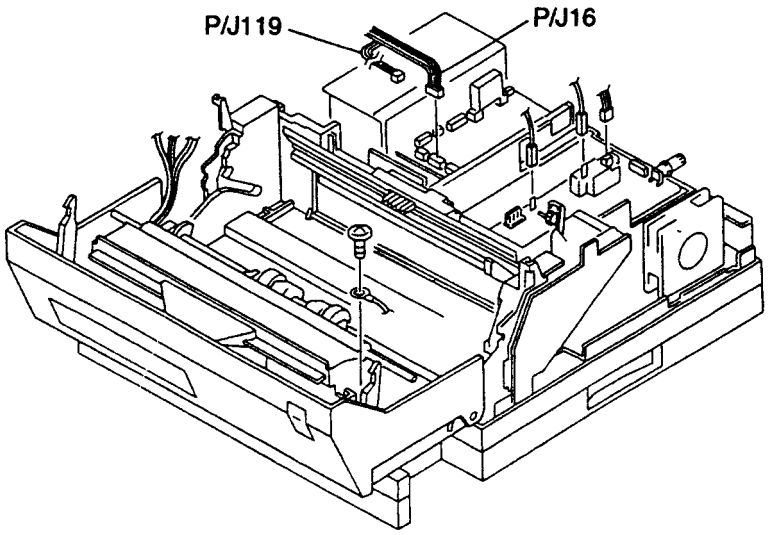


Figure 3-27. Removing the Front Cover (1)

12. Remove 2 CBB screws (M3 x 6) securing the front cover, and remove it.
13. Remove the retard pad from front cover.

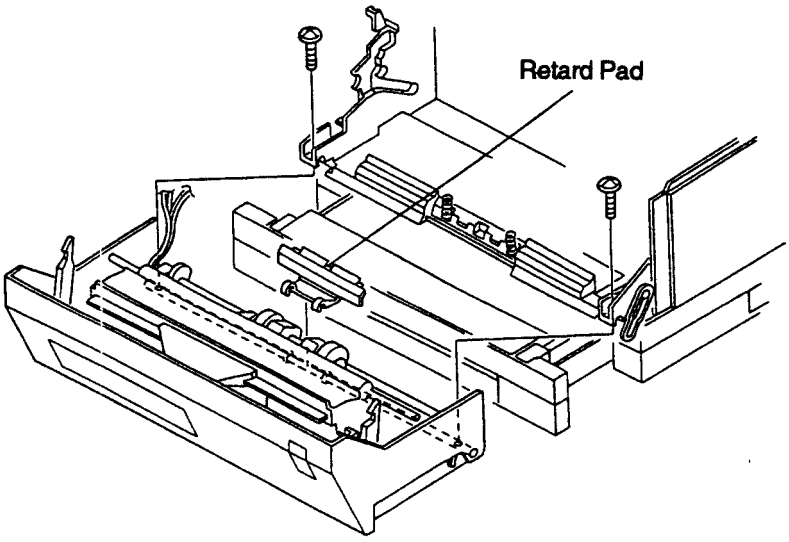


Figure 3-28. Removing the Front Cover (2)

3.2.4.6 Retard Pad Removal

1. Open the front cover.
2. Remove the retard pad.

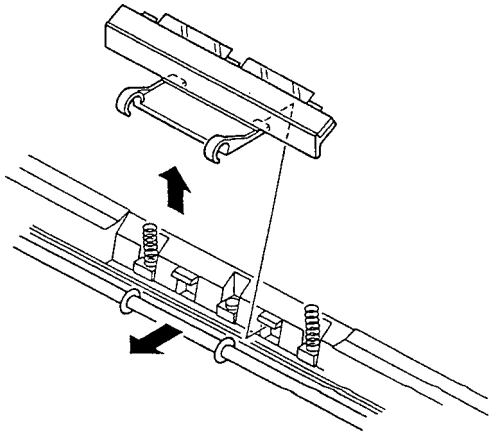


Figure 3-29. Removing the Retard Pad

3.2.4.7 Trans. Chute Assembly Removal

1. Open the front cover.
2. Remove the BTR assembly. (Refer to Section 3.2.4.4.)
3. Disconnect connector P/J129 from the chute fan.
4. Remove 4 CPFS screws (M3 x 10) securing the trans. chute assembly.
5. Remove 2 CBB screws (M3 x 8) securing the wire of the trans. chute assembly.

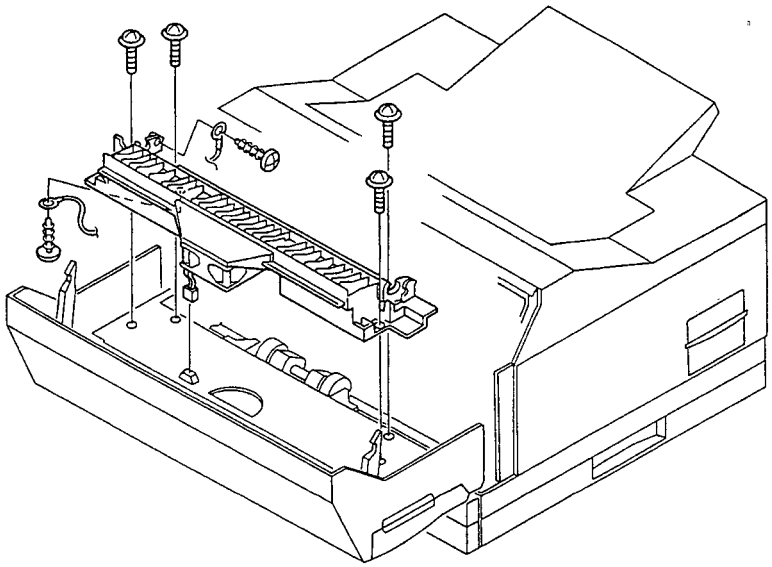


Figure 3-30. Removing the Trans. Chute Assembly

3.2.4.8 Pick-up Roller Assembly Removal

1. Open the front cover.
2. Remove the BTR assembly. (Refer to Section 3.2.4.4.)
3 Remove the KL clip Securing the gear clutch, and remove the clutch.
4. Remove both sides of the KL clips securing the pick-up roller, and remove both sides of the bearings.
5. Remove the pick-up roller.

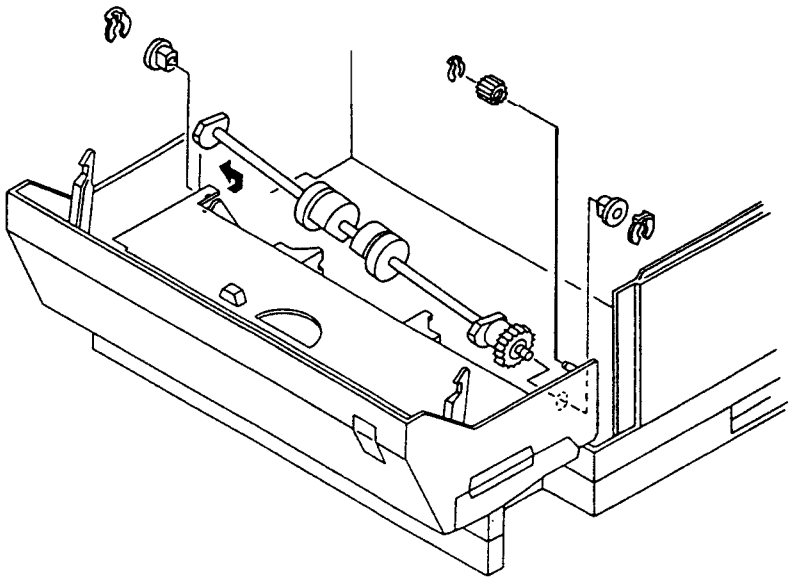


Figure 3-31. Removing the Pick-up Roller Assembly

3.2.4.9 Pick-up Solenoid Removal

1. Remove the top cover. (Refer to Section 3.2.1.2.)
2. Remove the left cover. (Refer to Section 3.2.1.3.)
3 Remove the BTR assembly. (Refer to Section 3.2.4.4.)
4. Remove thetrans. chute assembly. (Refer to Section 3.2.4.7.)
5. Remove the link assembly. (Refer to Section 3.2.4.1.)
6. Remove 5 CBB screws (M3 x 8) securing the front frame assembly to the front rover.
7. Remove thepick-up roller assembly. (Refer to Section 3.2.4.8.)
8. Remove 1 CBB screw (M3 x 8) securing the pick-up solenoid, and remove it.
9. Disconnect connector P/J124 from the pick-up solenoid.

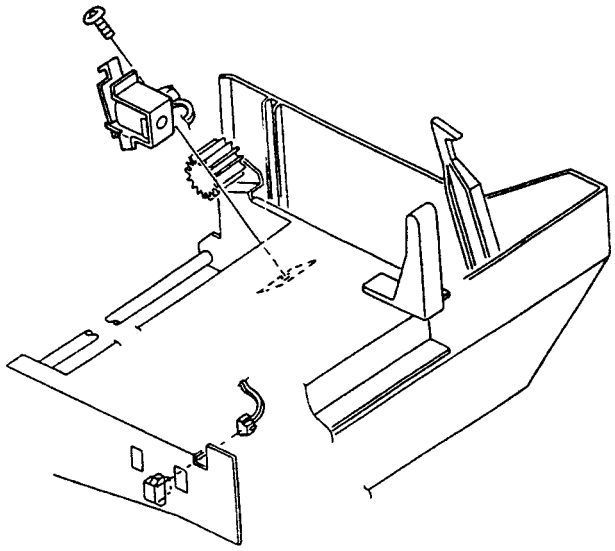


Figure 3-32. Removing the Pick-up Solenoid

3.2.4.10 MSI Sensor Removal

1. Remove the top cover. (Refer to Section 3.2.1.2.)
2. Remove the left cover. (Refer to Section 3.2.1.3.)
3 Remove the BTR assembly. (Refer to Section 3.2.4.4.)
4. Remove the trans. chute assembly. (Refer to Section 3.2.4.7.)
5. Remove the link assembly. (Refer to Section 3.2.4.1.)
6. Remove 5 CBB screws (M3 x 8) securing the front frame assembly to the front cover.
7. Remove 1 CBB screw (M3 x 8) securing the MSI sensor, and remove it.
8. Discomect connector P/J121 from the MSI sensor.

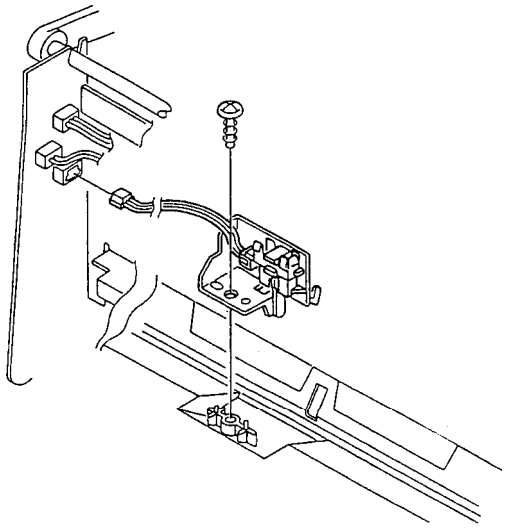


Figure 3-33. Removing the MSI Sensor

3.2.4.11 Bottom Plate Removal

1. Remove the top cover. (Refer to Section 3.2.1.2.)
2. Remove the left cover. (Refer to Section 3.2.1.3.)
3 Remove the BTR assembly. (Refer to Section 3.2.4.4.)
4. Remove the trans. chute assembly. (Refer to Section 3.2.4.7.)
5. Remove the link assembly. (Refer to Section 3.2.4.1.)
6. Remove 5 CBB screws (M3 x 8) securing the front frame assembly to the front cover.
7. Remove 2 springs from the bottom plate.
8. Remove 1 CBB screw (M3 x 6) securing the support bracket, and remove the bottom plate after removing the support bracket.

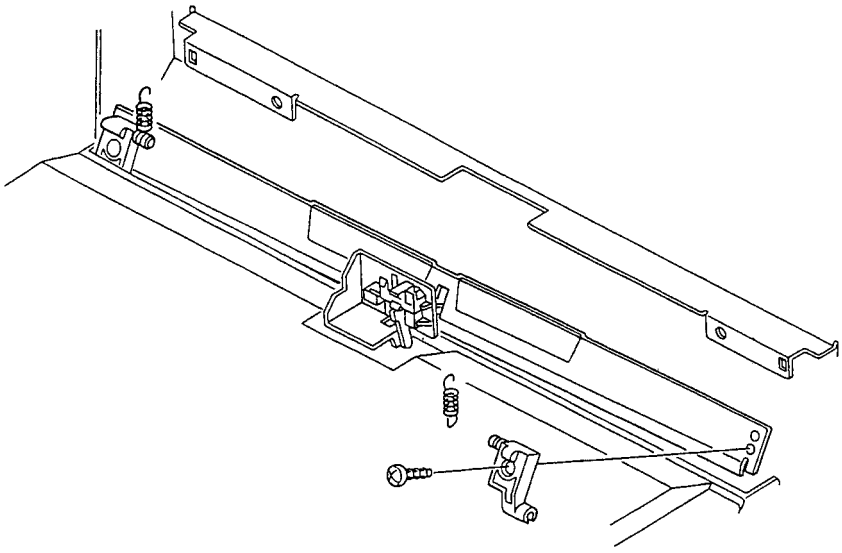


Figure 3-34. Removing the Bottom Plate

3.2.4.12 Control Panel Removal

1. Remove the top cover. (Refer to Section 3.2.1.2.)
2. Remove the left cover. (Refer to Section 3.2.1.3.)
3 Remove the BTR assembly. (Refer to Section 3-2.4.4.)
4. Remove the trans. chute assembly. (Refer to Section 32.4.7.)
5. Remove the link assembly. (Refer to Section 3.2.4.1.)
6. Remove 5 CBB screws (M3 x 8) securing the front frame assembly to the front rover.
7. Disconnect connector P/J124 from the control panel, and remove the panel while pushing 2 hooks..

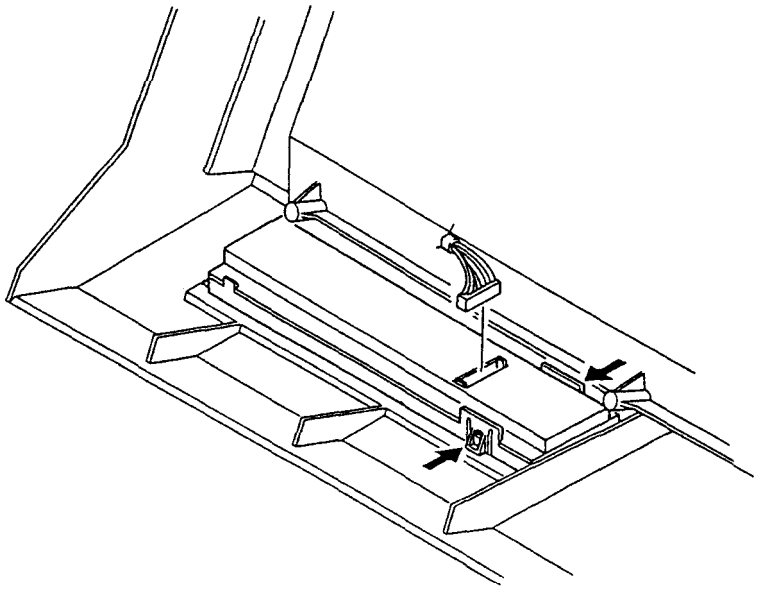


Figure 3-35. Removing the Control Panel

3.2.4.13 MSI Tray Removal

1. Open the MSI tray.
2. Remove the MSI tray from the left side.

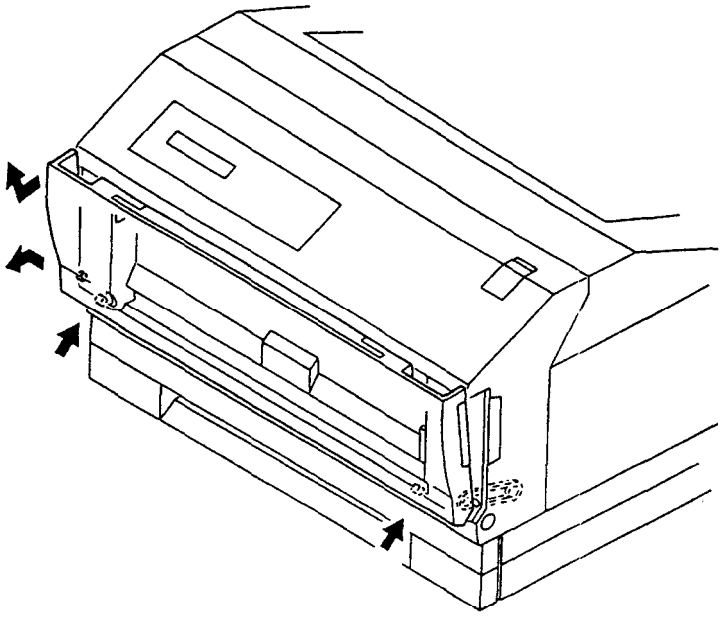


Figure 3-36. Removing the MSI Tray

3.2.5 Fusing Unit Removal and Disassembly

This section describes how to remove and disassemble the fusing unit.

3.2.5.1 Fusing Unit Removal

1. Remove the top cover. (Refer to Section 3.2.1.2.)
2. Disconnect connector P/J119 from the eject sensor.
3 Remove 1 CB screw (M3 x 6) securing the fusing unit.
4. Loosen 2 screws securing the fusing unit, and remove it.

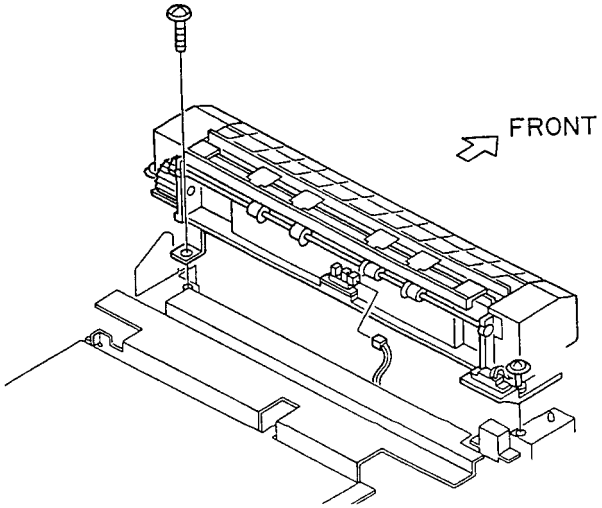


Figure 3-37. Removing the Fusing Unit

3.2.5.2 Pressure Roller Removal

1. Remove the top cover. (Refer to Section 3.2.1.2.)
2. Remove the fusing unit. (Refer to Section 3.2.5.1.)
3 Remove 2 CBB screws (M3 x 8) securing the fusing unit top cover, and remove it.
4. Remove 2 CBB screws (M3 x 8) securing the fusing unit cover R, and remove it.
5. Remove 2 CBB screws (M3 x 8) securing the fusing unit cover L, and remove it.
6. Remove 1 CB screw (M3 x 6) on the fusing unit frame.
7. Remove the pressure roller.

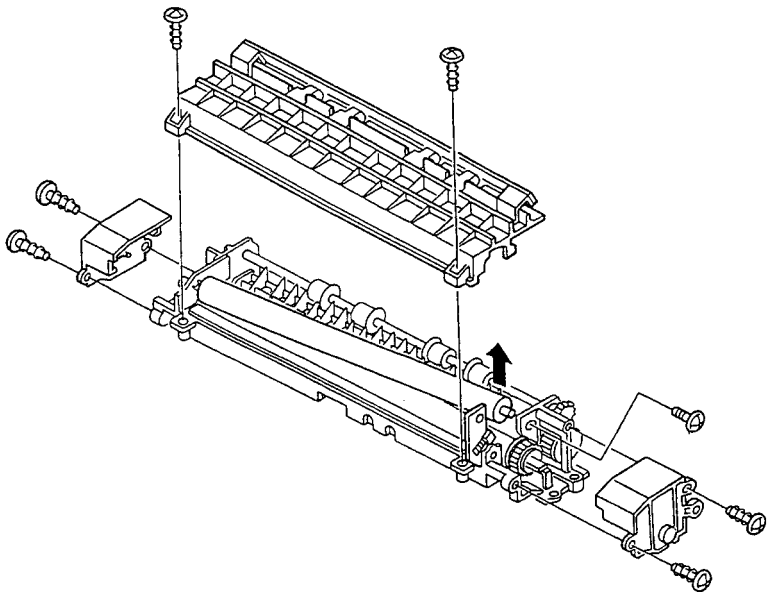


Figure 3-38. Removing the Pressure Roller

3.2.5.3 Exit Chute Removal

1. Remove the top cover. (Refer to Section 3.2.1.2.)
2. Remove the fusing unit. (Refer to Section 3.2.5.1.)
3 Remove 2 CBB screws (M3 x 8) securing the fusing unit top cover, and remove it.
4. **Remove** 2 screws securing the exit chute, **and** remove it.

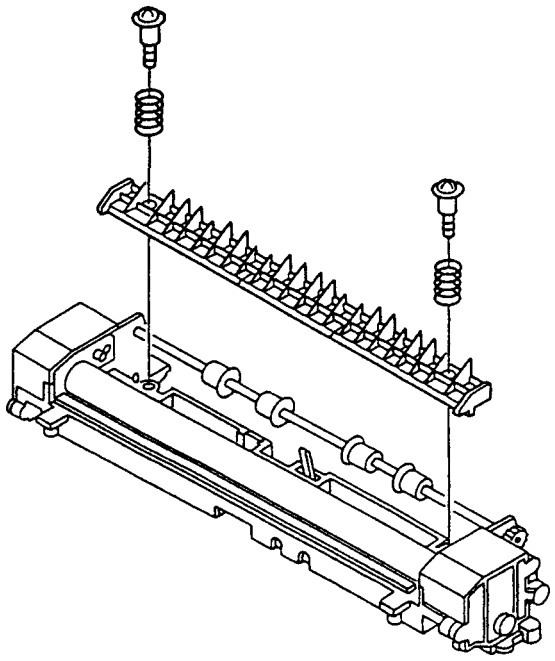


Figure 3-39. Removing the Exit Chute

3.2.5.4 Exit Roller Removal

1. Remove thetopcover. (Refer to Section 3.2.1.2.)
2. Remove the fusing unit. (Refer to Section 3.2.5.1.)
3 Remove 2 CBB screws (M3 x 8) securing the fusing unit top cover, and remove it.
4. Remove 2 E-rings securing the exit roller, and remove it.

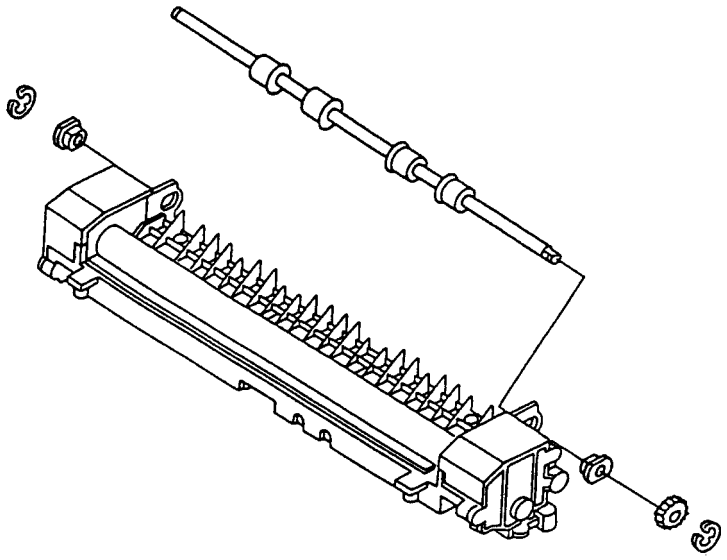


Figure 3-40. Removing the Exit Roller

3.2.5.5 Heater Removal

CAUTION

Never touch the heater with your bare hands

1. Remove the top cover. (Refer to Section 3.2.1.2.)
2. Remove the fusing unit. (Refer to Section 3.2.5.1.)
3. Remove 2 CBB screws (M3 x 8) securing the fusing unit top cover, and remove it.
4. Remove the eject chute. (Refer to Section 3.2.5.3.)
5. Remove 2 CBB screws (M3 x 8) securing the fusing unit cover R, and remove it.
6. Remove 2 CBB screws (M3 x 8) securing the fusing unit cover L, and remove it.
7. Remove the sensor cover and remove 1CP(S-P1) saew (M3 x 10) securing the thermistor, and remove the thermistor.
8. Remove 1 CBB screw (M3 x 8) securing the earth wire.
9. Remove 1 CP(S-P1) screw (M3 x 6) securing connector P/J101.
10. Remove 2 CBB screws (M3 x 8) securing comector P/J101.
11. Remove 1 CP screw (M3 x 6) securing the heater, and remove it.

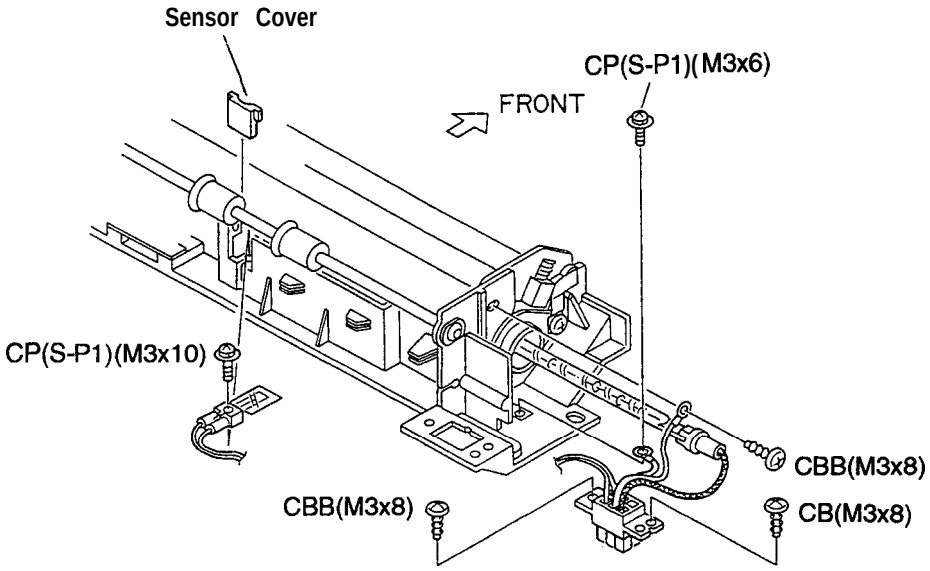


Figure 3-41. Removing the Heater

3.2.5.6 Heat Roller Removal

1. Remove the top cover. (Refer to Section 3.2.1.2.)
2. Remove the fusing unit. (Refer to Section 3.2.5.1.)
3. Remove 2 CB screws (M3 x 6) securing the inlet chute at the bottom of the fusing unit, and remove the inlet chute.
4. Remove 2 CBB screws (M3 x 8) securing the fusing unit top cover, and remove it.
5. Remove 2 CBB screws (M3 x 8) securing the fusing unit cover R, and remove it.
6. Remove 2 CBB screws (M3 x 8) securing the fusing unit cover L, and remove it.
7. Remove the pressure roller. (Refer to Section 3.2.5.2.)
8. Remove the eject chute. (Refer to Section 3.25.3.)
9. Remove the heater. (Refer to Section 3.2.5.5.)
10. Remove the H/R ring securing the right side of the heat roller, and remove the H/R gear.
11. Remove the heat roller along with the left H/R ring and H/R bearing L.
12. Remove the H/R ring and H/R bearing L from the heat roller.

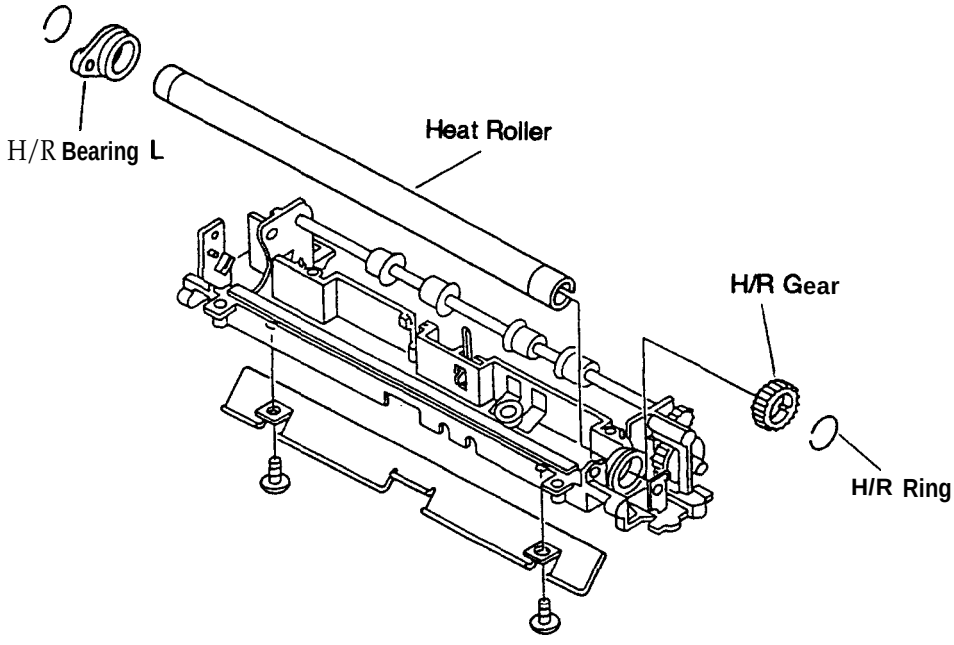


Figure 3-42. Removing the Heat Roller

3.2.5.7 Thermostat Removal

1. Remove the top cover. (Refer to Section 3.2.1.2.)
2. Remove the fusing unit. (Refer to Section 3.2.5.1.)
3. Remove 2 CB screws (M3 x 6) securing the inlet chute at the bottom of the fusing unit, and remove the inlet chute.
4. Remove 2 CBB screws (M3 x 8) securing the fusing unit top cover, and remove it.
5. Remove 2 CBB screws (M3 x 8) securing the fusing unit cover R, and remove it.
6. Remove 2 CBB screws (M3 x 8) securing the fusing unit cover L, and remove it.
7. Remove the pressure roller. (Refer to Section 3.2.5.2.)
8. Remove the eject chute. (Refer to Section 3.2.5.3.)
9. Remove the heater. (Refer to Section 3.2.5.5.)
10. Remove the heat roller. (Refer to Section 3.2.5.6.)
11. Remove 2 CP(S-P1) screws (M3 x 6) securing the thermostat, and remove it.

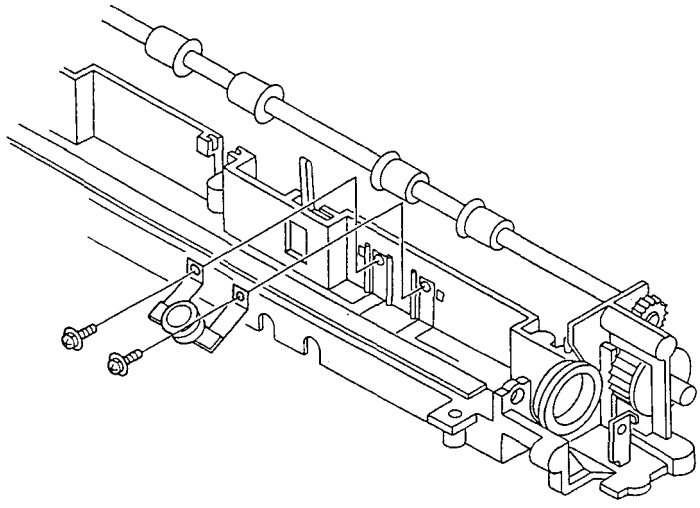


Figure 3-43. Removing the Thermostat

3.2.5.8 Exit Sensor Removal

1. Remove the top cover. (Refer to Section 3.2.1.2.)
2. Remove the fusing unit. (Refer to Section 3.2.5.1.)
3. Remove the exit sensor.

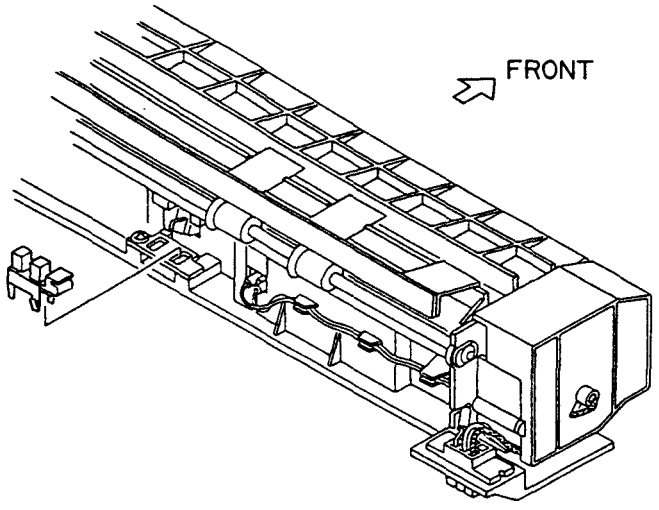


Figure 344. Removing the Exit Sensor

3.2.5.9 Exit Actuator Removal

1. Remove the top cover. (Refer to Section 3.2.1.2.)
2. Remove the fusing unit. (Refer to Section 3.2.5.1.)
3. Remove the exit chute. (Refer to Section 3.2.5.3.)
4. Remove the exit roller. (Refer to Section 325.4.)
5. Remove the exit actuator and spring.

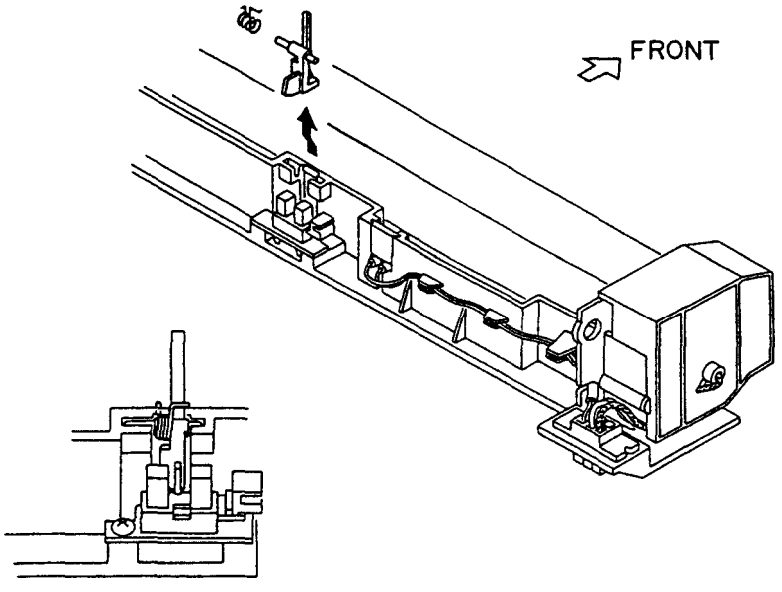


Figure 3-45. **Removing the Exit Actuator**

3.2.6 Drive Unit and Optical Unit Removal

This section describes how to remove the drive unit and the optical unit.

3.2.6.1 Drive Unit Removal

1. Remove the rear cover. (Refer to Section 3.2.1.1.)
2. Remove the top cover. (Refer to Section 3.2.1.2.)
3. Remove the left cover. (Refer to Section 3.2.1.3.)
4. Remove the right cover. (Refer to Section 3.2.l.4.)
5. Remove the ELEC cover. (Refer to Section 3.2.2.1.)
6. Remove the fusing unit. (Refer to Section 3.2.5.1.)
7. Disconnect connector P/J14 from theengine driver board (MCU PWB board).
8. Remove 3 CBB screws (M3 x 29) and 1 CBB screw (M3 x 12) securing the drive unit, and remove it.

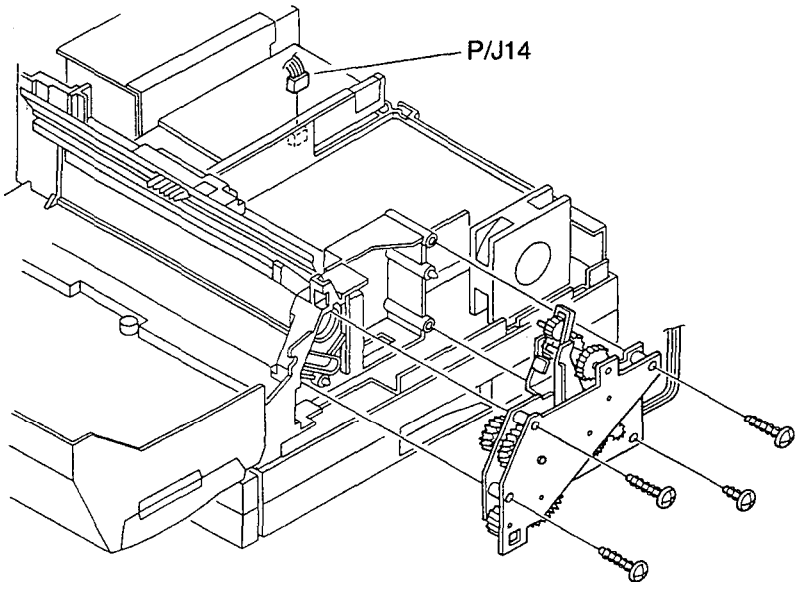


Figure 3-46. Removing the Drive Unit

3.2.6.2 CRU SENSOR PWB Board Removal

1. Remove the rear cover. (Refer to Section 1.1.)
2. Remove the top cover. (Refer to Section 3.2.1.2.)
3. Remove the left cover. (Refer to Section 3.2.13.)
4. Remove the right cover. (Refer to Section 3.2.1.4.)
5. Remove the ELECcover. (Refer to Section 3.2.2.1.)
6. Remove the fusing unit. (Refer to Section 3.2.5.1.)
7. Disconnect connector P/J118 from the CRU sensor.
8. Remove 2 CBB screws (M3 x 8) securing the CRU sensor cover, and remove it.
9. Remove 2 CBB screws (M3 x8) securing the CRU sensor board, and remove it.

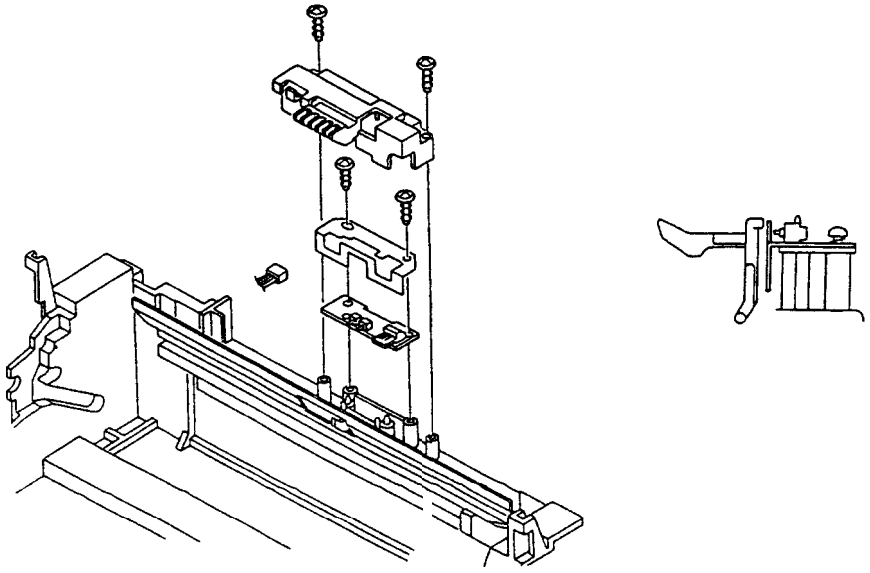


Figure 3-47. Removing the CRU SENSOR PWB Board

3.2.6.3 Erase Lamp Removal

1. Remove therear cover. (Refer to Section 3.2.1.1.)
2. Remove the fusing unit. (Refer to Section 3.2.5.1.)
3. Remove 3 CBB screws (M3 x 8) securing the erase lamp, and remove it.
4. Disconnect the connector from the erase lamp.

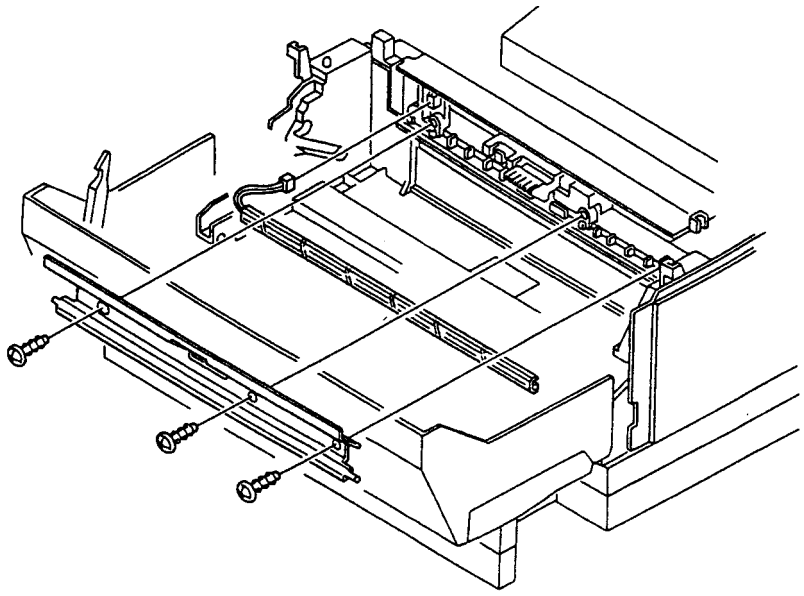


Figure 3-48. Removing the Erase Lamp

CAUTION

There are four screws securing the ROS unit cover. If you unintentionally remove three of these screws while removing the engine driver (MCU PWB) board and high voltage unit from the ROS unit, it is possible for reflected light from the leaser to leak and cause damage. Therefore, do not remove the four screws, as shown in the following figure.
A CAUTION label is pasted under the engine driver (MCU PWB) board to help you avoid damage. Be sure to follow the procedure on the label when you open and shut the ROS unit cover. However, you do not need to open and shut this cover when replacing a defective ROS unit.

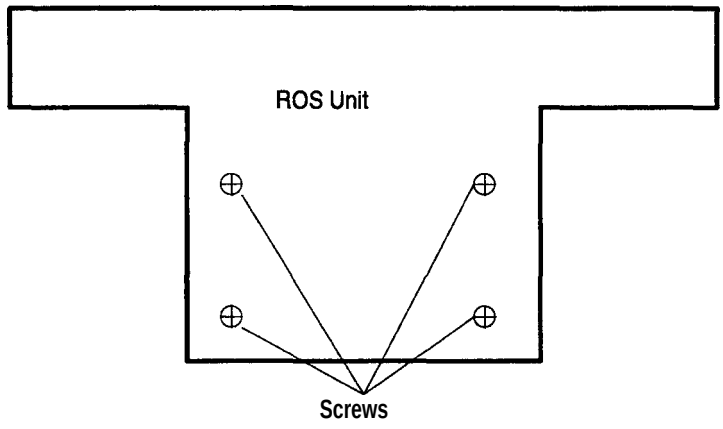


Figure 3-49. Screw Positions

1. Remove the rear cover. (Refer to Section 3.2.1.1.)
2. Remove the top cover. (Refer to Section 3.2.1.2.)
3. Remove the left cover. (Refer to Section 3.2.1.3.)
4. Remove theright cover. (Refer to Section 3.2.1.4.)
5. Remove the ELEC cover. (Refer to Section 3.2.1.5.)
6. Remove the fusing unit. (Refer to Section 3.2.5.1.)
7. Disconnect all connectors from the engine driver (MCU PWB) board.
8. **Remove 2 CB screws (M3** x 6) securing the MCU box, and remove the MCU box and the engine driver (MCU PWB) board.
9. Remove the high voltage nit. (Refer to Section 3.2.2.4.)
10. Remove thelink assembly. (Refer to Section 3.2.4.1.)
11. Remove theearth plate. (Refer to Section 3.2.2.6.)
12. Remove the front cover. (Refer to Section 3.2.4.5.)
13. Remove the drive unit. (Refer to Section 3.2.6.1.)
14. Remove the CRUSENSORPWB board. (Refer to Section 3.2.6.2.)
15. Remove the REGI roller. (Refer to Section 3.2.4.2.)
16. Remove thelower chute assembly. (Refer to Section 3.2.4.3.)
17. Remove theerase lamp. (Refer to Section 3.2.6.3.)
18. **Remove 6 CBB screws (M4** x **10) securing the ROS** unit, and remove it.
19. Disconnect connectors P/J112, P/J113, and P/J114 from the ROS unit.

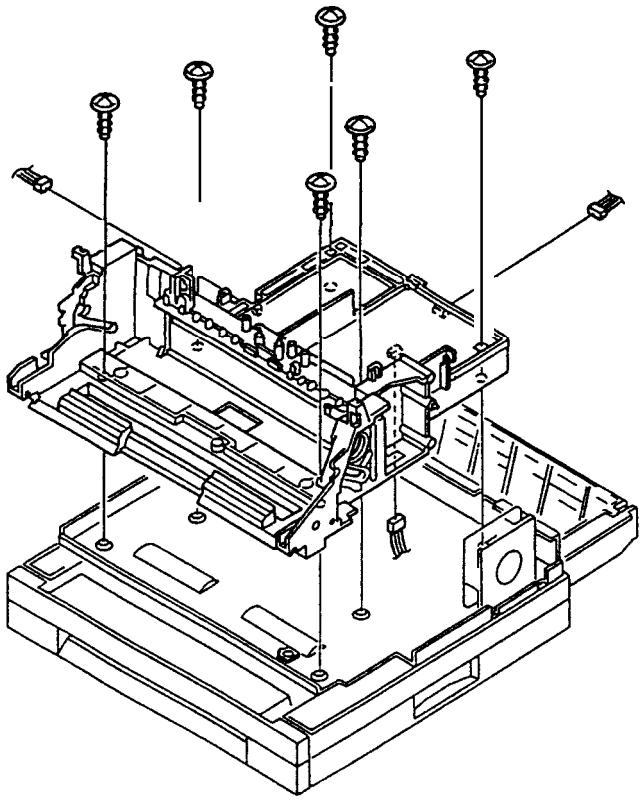


Figure 3-50. Removing the ROS Unit

Chapter 4 Adjustments

No Adjustment is required in this product.

Chapter 5 Troubleshooting

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5.1 OVERVIEW

The EPL-9000 has a sophisticated built-in self-diagnostic function that reduces troubleshooting time by identifying failed 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 when service maintenance is required.

Table 5-1. Messages Requiring Service Maintenance

Error Number	Error Condition	Error Type
E0003	**Fusing unit error**	**Engine error**
E0005	**Fan motor error**	
E0006	**Scanner mirror motor error**	
E0008	**EEPROM 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 alignment)	
C0009	CPU error (reserved)	
Coolo	CPU error (tag overflow)	
C0017 to 31	CPU error (no support interrupt)	
CO036	CPU error (no support coprocessor instruction)	
C0128 to 254	CPU error (un-implemented instruction)	
C0255	CPU error (bleak error)	
cl 000	Standard RAM error	
cl 110	ROM (C135 MAIN board IC29) error	
cl 120	ROM (C135 MAIN board IC30) error	
c1 130	ROM (C135 MAIN board IC5 or ICI 6) error	
cl 140	ROM (C135 MAIN board IC6 or IC16) error	
cl 150	ROM (C135 MAIN board IC14 or IC15) error	
Cl 160	ROM (C135 MAIN board IC13 or IC15) error	
cl 170	Option ROM (C135 MAIN board IC9) error	
Cl 180	Option ROM (EPSONScript module) error	
cl 190	Option font cartridge error	
C1200	EEPROM write error	
C121O	EEPROM write counter overflow	
cl 300	Option Type-B l/F error	
C131O	Unsupported Type-B l/F installed	
Cl 320	LocalTalk l/F module error	
C1999	Other video controller error	
A,B,D, F to Z	Software error	Software error

5.3 TROUBLESHOOTING

This section describes troubleshooting abnormal operations and print quality problems.

5.3.1 Troubleshooting Abnormal Operations

This section describes how to detect malfunctions, determine their cause, and take action, for various types of malfunctions. Each symptom in Table 5-2 refers you to a detailed troubleshooting table later in this chapter.

Table 5-2. Symptoms and Reference Tables

Symptom	Printer Condition	Reference Table
The printer does not operate at all.	The heater lamp in the fusing unit does not come on, so the RAM check is not started.	5-3
The RAM check is not displayed.	The heater lamp in the fusing unit comes on, but RAM check is not started.	5-4
PRINTER OPEN	The paper cover is closed, but the LCD still displays PRINTER OPEN.	5-5
PAPER OUT	The paper is loaded in the MSI tray, but the LCD displays PAPER OUT.	5 6
	The paper is loaded in the standard cassette, but the LCD displays PAPER OUT.	5-7
	The paper is loaded in the standard cassette, but the LCD displays PAPER OUT.	5-8
ILLEGAL CART	The LCD displays ILLEGAL CART.	5-9
FEED JAM	The LCD displays FEED JAM when using the MSI tray.	5-1o
	The LCD displays FEED JAM when using the standard paper cassette.	5-11
	The LCD displays FEED JAM when using the optional paper cassette.	5-12
PAPER JAM	The LCD displays PAPER JAM at power-on.	5-13
	The LCD displays PAPER JAM during paper feeding.	5-14
NSERT IMAGING CARTRIDGE	The LCD displays INSERT IMAGING CARTRIDGE.	5-15
NSERT PAPER TRAY	The LCD displays INSERT PAPER TRAY.	5-16
SERVICE REQ. E0003	The LCD displays SERVICE REQ. E0003.	5-17
SERVICE REQ. E0005	The LCD displays SERVICE REQ. E0005.	5-18
SERVICE REQ. E0006	The LCD displays SERVICE REQ. E0006.	5-19
SERVICE REQ. E0008	The LCD displays SERVICE REQ. E0008.	520
SERVICE REQ. E0014	The LCD displays SERVICE REQ. E0014.	5-21
SERVICE REQ. C0003	The LCD displays SERVICE REQ. C0003.	5-22
SERVICE REQ. C0007	The LCD displays SERVICE REQ. C0007.	5-23
SERVICE REQ. C1000	The LCD displays SERVICE REQ. C1000.	5-24
SERVICE REQ. Cl 110	The LCD displays SERVICE REQ. Cl 110.	5-25
SERVICE REQ. Cl 120	The LCD displays SERVICE REQ. Cl 120.	5-26
SERVICE REQ. Cl 130	The LCD displays SERVICE REQ. C1 130.	527
SERVICE REQ. Cl 140	The LCD displays SERVICE REQ. Cl 140.	5-28
SERVICE REQ. Cl 150	The LCD displays SERVICE REQ. Cl 150.	5-29

Table 5-2. Symptoms and Reference Tables (Continued)

Symptom	Printer Condition	Reference Table
SERVICE REQ. Cl 160	The LCD displays SERVICE REQ. Cl 160.	5-30
SERVICE REQ. Cl 170	The LCD displays SERVICE REQ. Cl 170.	5-31
SERVICE REQ. Cl 180	The LCD displays SERVICE REQ. Cl 180.	5-32
SERVICE REQ. Cl 190	The LCD displays SERVICE REQ. Cl 190.	5-33
SERVICE REQ. C1200 or C1210	The LCD displays SERVICE REQ. C1200 or C1210.	5-34
SERVICE REQ. C1300	The LCD displays SERVICE REQ. C1300.	5-35
SERVICE REQ. C1310	The LCD displays SERVICE REQ. C1310.	5-36
SERVICE REQ. C1320	The LCD displays SERVICE REQ. C1320.	5-37
Other SERVICE REQ. displayed.	The LCD displays SERVICE REQ. error code other than these above.	5-38

Table 5-3. The Printer Does Not Operate at All

Cause	Step	Checkpoint	Finding	Solution
Connector P/J11 on the MCU PWB board may be disconnected.	1	Is connector P/J11 on the MCU PWB board disconnected?	Yes	Connect P/J11 on the MCU PWB board.
The LVPS unit maybe bad.	2	With the power on, is there an output of +5 VDC between pin 6 (+) and pin 7 (-) for P/J11 on the MCU PWB board?	No	Replace the LVPS unit.
The MCU PWB board may be bad.	3	—	—	Replace the MCU PWB board.

Table 5-4. The Printer Does Not Start RAM Check

cause	Step	Checkpoint	Finding	Solution
The video controller board (C135 MAIN board) maybe bad.	1	If you change the C135 MAIN board, does the printer start the RAM check?	Yes	Replace the C135 MAIN board.
The control panel may be bad	2	—	—	Replace the control panel

Table 5-5. The LCD Displays PRINTER OPEN

Cause	Step	Checkpoint	Finding	Solution
The link assembly position may be bad.	,	Is the interlock switch on when the cover is closed?	No	Reset the link assembly.
The LVPS unit maybe bad.	2	—	—	Replace the LVPS unit.

Table 5-6. The LCD Displays PAPER OUT (1)

Cause	Step	Checkpoint	Finding	Solution
The paper-empty sensor of the MSI tray maybe bad.	1	—	—	Replace the paper-empty sensor.

Table 5-7. The LCD Displays PAPER OUT (2)

Cause	Step	Checkpoint	Finding	Solution
The paper-empty sensor flag of the standard feeder position may be incorrect.	1	Is the paper-empty sensor flag position OK?	No	Reset the **paper-empty sensor flag.**
The paper-empty sensor may be bad.	2	—	—	Replace the **paper-empty sensor.**

Table 5-8. The LCD Displays PAPER OUT (3)

Cause	Step	Checkpoint	Finding	Solution
The paper-empty sensor flag of the optional feeder position may be incorrect.	1	Is the paper-empty sensor flag position OK?	No	Reset the **paper-**empty sensor flag.
The paper-empty sensor mav be bad.	2	—	—	Replace the **paper-emptv** sensor.

Table 5-9. 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 bad.	2	Does this printer recognize another legal cartridge?	**Yes**	Replace the cartridge.
The CI 35 MAIN board **may be** bad.	3	—	—	Replace the **C135** MAIN **board.**

Table 5-10. The LCD Displays FEED JAM (1)

Cause	step	Checkpoint	Finding	Solution
The pick-up solenoid coil **may** be open or shorted.	1	**Disconnect connector P/J16 on the MCU PWB board and check the coil resistance between pin 7 and pin 8 on the disconnected cable side of the connector,** using a **multimeter.** Is the resistance approximately 120 ohms?	No	Replace the pick-up solenoid.
		If the **coil** is shorted, check the solenoid drive circuit using the procedure below: 1. Set the **multimeter** for resistance check mode. 2. Place the (-) terminal of the **multimeter** on pin 7 of connector **P/J16** on the **MCU PWB** board. 3. Place the **(+)** terminal of the **multimeter** on pin 8 of connector **P/J11(GND).** Does the **multimeter** detect any current?	**Yes**	Replace the pick-up solenoid **and** the **MCU PWB** board.

Table 5-10. The LCD Displays FEED JAM (1) (Continued)

Cause	Step	Checkpoint	Finding	Solution
The main motor coil may be open or shorted.	2	**Disconnect connector P/J14 on the MCU PWB board and check the coil resistance between: pin 1 and pin 3;** pin 1 and pin 5; pin 2 and pin 4; and pin 2 and pin 6 (four points total) on the disconnected cable side of the connector, using a multimeter. Pin 1 — Pin 3 Pin 1 — Pin 5 Pin 2 — Pin 4 Pin 2 — Pin 6 Are the resistances of all four points approximately 8 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 resistance check mode. 2. Place the (–) terminal of the multimeter on pins 3, 5,4, or 6 of connector P/J14 on the MCU PWB board. 3. Place the (+) terminal of the multimeter on pin 8 of connector P/J11 on the MCU PWB board (GND). Does the multimeter detect any current?	Yes	Replace the MCU PWB board.
The MCU PWB board maybe bad.	3	—	—	Replace the MCU PWB board.
The REGI sensor maybe bad.	4	—	—	Replace the REGI sensor.
The pick-up roller may be bad.	5	—	—	Replace the pick-up roller.

Table 5-11. The LCD Displays FEED JAM (2)

Cause	Step	Checkpoint	Finding	Solution
The feed solenoid of the standard feeder unit coil may be open or shorted.	1	Disconnect connector P/J201 on the FEEDER PWB 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 120 ohms?	No	Replace the feed solenoid.
		If the coil is shorted, check the solenoid drive circuit using the procedure below: 1. Set the multimeter for resistance check mode. 2. Place the (-) terminal of the multimeter on pin 2 of connector P/J201 on the FEEDER PWB board. 3. Place the (+) terminal of the multimeter on GND. Does the multimeter detect any current?	Yes	Replace the feed solenoid and the FEEDER PWB board.
The turn solenoid coil may be open or shorted.	2	Disconnect connector P/J202 on the FEEDER PWB 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 turn solenoid.
		If the coil is shorted, check the solenoid drive circuit using the procedure below: 1. *Set* the multimeter for resistance check mode. 2. Place the (-) terminal of the multimeter on pin 2 of connector P/J202 on the FEEDER PWB board. 3. Place the (+) terminal of the multimeter on GND. Does the multimeter detect arty current?	Yes	Replace the turn solenoid and the FEEDER PWB board.

Table 5-11. The LCD Displays FEED JAM (2) (Continued)

Cause	Step	Checkpoint	Finding	Solution
The main motor coil may be open or shorted.	2	Disconnect connector P/J14 on the MCU PWB board and check the coil resistance between: pin 1 and pin 3; pin 1 and pin 5; pin 2 and pin 4; and pin 2 and pin 6 (four points total) on the disconnected cable side of the connector, using a multimeter. Pin 1 — Pin 3 Pin 1 — Pin 5 Pin 2 — Pin 4 Pin 2 — Pin 6 Are the resistances of all four points approximately 8 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 resistance check mode. 2. Place the (–) terminal of the multimeter on pins 3, 5, 4, or 6 of connector P/J14 on the MCU PWB board. 3. Place the (+) terminal on pin 8 of connector P/J11 on the MCU PWB board (GND). Does the multimeter detect any current?	Yes	Replace the MCU PWB board.
The MCU PWB board maybe bad.	3	—	—	Replace the MCU PWB board.
The REGI sensor maybe bad.	4	—	—	Replace the REGI sensor.
The feed roller may be bad.	5	—	—	Replace the feed roller.

Table 5-12. The LCD Displays FEED JAM (3)

Cause	Step	Checkpoint	Finding	Solution
The feed solenoid of the optional feeder unit coil may be open or shorted.	1	Disconnect connector P/J201 on the FEEDER PWB 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 120 ohms?	No	Replace the feed solenoid.
		If the coil is shorted, check the solenoid drive circuit using the procedure below: 1. Set the multimeter for resistance check mode. 2. Place the (-) terminal of the multimeter on pin 2 of connector P/J201 on the FEEDER PWB board. 3. Place the (+) terminal of the multimeter on GND. Does the muttimeter detect any current?	Yes	Replace the feed solenoid and the FEEDER PWB board.
The turn solenoid coil may be open or shorted.	2	Disconnect connector P/J202 on the FEEDER PWB 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 turn solenoid.
		If the coil is shorted, check the solenoid drive circuit using the procedure below: 1. Set the multimeter for resistance check mode. 2. Place the (-) terminal of the multimeter on pin 2 of connector P/J202 on the FEEDER PWB board. 3. Place the (+) terminal of the multimeter on GND. Does the multimeter detect any current?	Yes	Replace the turn solenoid and the FEEDER PWB board.

Table 5-12. The LCD Displays FEED JAM (3) (Continued)

Cause	Step	Checkpoint	Finding	Solution
The main motor coil may be open or shorted.	2	**Disconnect connector P/J14 on the MCU PWB board and check the coil resistance between: pin 1 and pin 3; pin 1 and pin** 5; pin 2 and pin 4; and pin 2 and pin 6 (four points total) on the disconnected cable side of the connector, using a multimeter. Pin 1 — Pin 3 Pin 1 — Pin 5 Pin 2 — Pin 4 Pin 2 — Pin 6 Are the resistances of all four points approximately 8 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 resistance check mode. 2. Place the (-) terminal of the multimeter on pins 3, 5, 4, or 6 of connector P/J14 on the MCU PWB board. 3. Place the (+) terminal on pin 8 of connector P/J11 on the MCU PWB board (GND). Does the multimeter detect any current?	Yes	Replace the MCU PWB board.
The MCU PWB board maybe bad.	3	—	—	Replace the MCU PWB board.
The REGI sensor maybe bad.	4	"	—	Replace the REGI sensor.
The feed roller maybe bad.	5	—	—	Replace the feed roller.

Table 5-13. The LCD Displays PAPER JAM at Power On

Cause	Step	Checkpoint	Finding	Solution
The REGI sensor maybe bad.	1	—	—	Replace the REGI sensor.
The EXIT sensor may be bad.	2	—	—	Replace the EXIT sensor.

Table 5-14. The LCD Displays PAPER JAM During Paper Feeding

cause	Step	Checkpoint	Finding	solution
The REGI roller or REGI clutch may be bad.	1	**Does paper always jam in the REGI roller area?**	**Yes**	**Replace the REGI roller.**
The BTR roller maybe bad.	2	Does paper always jam in the BTR roller area?	**Yes**	Replace the **BTR** roller.
The fusing unit may be bad.	3	Does paper always jam in the **fusing unit?**	**Yes**	**Replace the fusing** unit.

Table 5-15. The LCD Displays INSERT IMAGING CARTRIDGE

cause	Step	Checkpoint	Finding	Solution
The **CRU** actuator position **may** be bad.	,	Check the position. Is it OK?	No	Reset the **CRU** actuator position.
The **CRU** switch **may be bad.**	2	—	—	Replace the **CRU sensor PWB.**

Table 5-16. The LCD Displays INSERT PAPER TRAY

cause	Step	Checkpoint	Finding	Solution
The FEEDER **PWB may be** bad.	**1**	—	—	Replace the FEEDER **PWB.**

Table 5-17. The LCD Displays SERVICE REQ. E0003

cause	**Step**	**Checkpoint**	**Finding**	**Solution**
The thermistor may be bad.	1	Does the LCD display an error at **power-on?**	Yes	Replace the **thermistor.**
The heater lamp may be bad.	2	Check the heater lamp. Is it **OK?**	**No**	Replace the heater lamp.
The thermal fuse in the fusing unit may be bad.	3	Check the thermal fuse with a **multimeter.** Is it OK?	**No**	Replace the thermal fuse in the fusing unit.
The **LVPS** unit maybe bad.	4	—	—	Replace the **LVPS unit.**

Table 5-18. The LCD Displays SERVICE REQ. E0005

Cause	**Step**	**Checkpoint**	**Finding**	**Solution**
Connector **P/J305** on the **HVPS** board **may be** disconnected.	1	Is connector **P/J305** on the **HVPS** board disconnected?	**Yes**	Connect **P/J305.**
The fan motor may be bad.	2	—	—	Replace the fan motor.

Table 5-19. The LCD Displays SERVICE REQ. E0006

cause	**Step**	checkpoint	**Finding**	**solution**
The ROS unit maybe bad.	1	—	—	Replace the **ROS** unit.
The **MCU PWB board may** be bad.	**2**	—	—	**Replace** the **MCU PWB board.**

Table 5-20. The LCD Displays SERVICE REQ. EOO08

Cause	Step	Checkpoint	Finding	Solution
The MCU PWB board may be bad.	1	—	—	Replace the MCU PWB board.

Table 5-21. The LCD Displays SERVICE REQ. EOO14

Cause	Step	Checkpoint	Finding	Solution
The MCU PWB board may be bad.	,	—	—	Replace the MCU PWB board.
The C135 MAIN board may be bad.	2	—	—	Replace the Cl 35 MAIN board.

Table 5-22. The LCD Displays SERVICE REQ. C0003

Cause	Step	Checkpoint	Finding	Solution
The C135 MAIN board may be bad.	,	—	—	Replace the C135 MAIN board.

Table 5-23. The LCD Displays SERVICE REQ. C0007

Cause	Step	Checkpoint	Finding	Solution
The Cl 35 MAIN board may be bad.	1	—	—	Replace the C135 MAIN board.

Table 5-24. The LCD Displays SERVICE REQ. C1000

Cause	Step	Checkpoint	Finding	Solution
The optional SIMM may be bad.	,	Is operation OK after you remove the optional SIMM?	Yes	Replace the optional SIMM.
The C135 MAIN board may be bad.	2	—	—	Replace the C135 MAIN board.

Table 5-25. The LCD Displays SERVICE REQ. CII1O

Cause	Step	Checkpoint	Finding	Solution
ROM (IC29) on the C135 MAIN board may be bad.	1	Is operation OK after you replace the ROM?	–	Replace ROM (IC29) on the C135 MAIN board.
The Cl 35 MAIN board may be bad.	2	—	—	Replace the C135 MAIN board.

Table 5-26. The LCD Displays SERVICE REQ. C1120

Cause	Step	Checkpoint	Finding	Solution
ROM (IC30) on the C135 MAIN board may be bad.	1	Is operation OK after you replace the ROM?	‘	Replace ROM (IC30) on the C135 MAIN board.
The C135 MAIN board may be bad.	2	—	—	Replace the C135 MAIN board.

Table 5-27. The LCD Displays SERVICE REQ. C1130

Cause	step	Checkpoint	Finding	Solution
ROM (IC5) or (ICI 6) on the C135 MAIN board maybe bad.	1	Is operation OK after you replace the ROM?	–	Replace ROM (IC5) or (IC16) on the C135 MAIN board.
The C135 MAIN board may be bad.	2	—	—	Replace the C135 MAIN board.

Table 5-28. The LCD Displays SERVICE REQ. C1140

Cause	Step	Checkpoint	Finding	Solution
ROM (IC6) or (IC16) on the Cl 35 MAIN board maybe bad.	1	ts operation OK after you replace the ROM?	–	Replace ROM (IC6) or (IC16) on the C135 MAIN board.
The C135 MAIN board may be bad.	2	—	—	Replace the C135 MAIN board.

Table 5-29. The LCD Displays SERVICE REQ. C1150

Cause	Step	Checkpoint	Finding	Solution
ROM (IC14) or (IC15) on the C135 MAIN board maybe bad.	1	Is operation OK after you replace the ROM?	–	Replace ROM (IC14) or (IC15) on the C135 MAIN board.
The Cl 35 MAIN board may be bad.	2	—	—	Replace the C135 MAIN board.

Table 5-30. The LCD Displays SERVICE REQ. C1160

Cause	Step	Checkpoint	Finding	Solution
ROM (IC13)or(IC15) on the C135 MAIN board maybe bad.	1	Is operation OK after you replace the ROM?	–	Replace ROM (IC13) or(IC15) on the C135 MAIN board.
The C135 MAIN board may be bad.	2	—	—	Replace the C135 MAIN board.

Table 5-31. The LCD Displays SERVICE REQ. C1170

Cause	step	Checkpoint	Finding	Solution
ROM (IC9) on the C135 MAIN board may be bad.	1	Is operation OK after you replace the ROM?	–	Replace ROM (IC9) on the C135 MAIN board.
The C135 MAIN board may be bad.	2	—	—	Replace the C135 MAIN board.

Table 5-32. 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 C135 MAIN board may be bad.	3	—	—	Replace the C135 MAIN board.

Table 5-33. The LCD Displays SERVICE REQ. C1190

Cause	Step	Checkpoint	Finding	Solution
The font cartridge may be bad.	,	—	—	Replace the font cartridge.
The C135 MAIN board may be bad.	2	—	—	Replace the C135 MAIN board.

Table 5-34. The LCD Displays SERVICE REQ. C1200 or CI21O

Cause	Step	Checkpoint	Finding	Solution
The EEPROM (IC8) on the C135 MAIN board maybe bad.	1	—	—	Replace the EEPROM (IC8) on the C135 MAIN board.
The C135 MAIN board may be bad.	2	—	—	Replace the C135 MAIN board.

Table 5-35. The LCD Displays SERVICE REQ. C1300

Cause	Step	Checkpoint	Finding	Solution
The optional interface card may be bad.	,	—	—	Replace the optional interface card.
The C135 MAIN board may be bad.	2	—	—	Replace the C135 MAIN board.

Table 5-36. The LCD Displays SERVICE REQ. CI31O

Cause	Step	Checkpoint	Finding	Solution
The optional interface card C82312* and LocalTalk I/F module C82326* are used.	1	—	—	Remove the optional interface card C82312*.
The optional interface card may be bad.	2	—	—	Replace the optional interface card.
The C135 MAIN board may be bad.	3	—	—	Replace the C135 MAIN board.

Table 5-37. The LCD Displays SERVICE REQ. C1320

Cause	Step	Checkpoint	Finding	Solution
The optional LocalTalk I/F module may be bad.	1	—	—	Replace the optional LocalTalk I/F module.
The C135 MAIN board may be bad.	2	—	—	Replace the C135 MAIN board.

Table 5-38. The LCD Displays Another SERVICE REQ. Error

Cause	Step	Checkpoint	Finding	Solution
The C135 MAIN board may be bad.	1	—	—	Replace the C135 MAIN board.

5.3.2 Troubleshooting Print Quality Problems

This section describes how to isolate print quality problems from their possible causes and remedy them, as shown in Table 5-39.

Table 5-39. Print Quality Problems

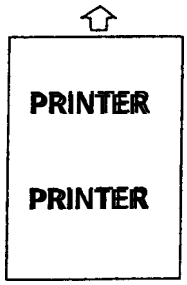
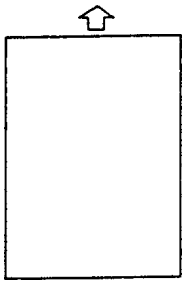
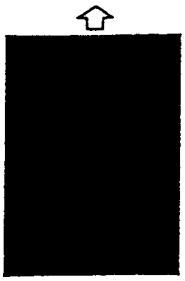
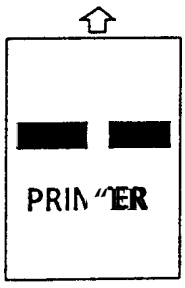
Symptom	Possible Cause	Part Name	Check Item	Remedy
Low image density 	Paper problem	Paper	Check to see if the paper is moist.	Replace the paper.
	Improper charging	Imaging cartridge	—	Replace the imaging cartridge.
		HVPS board	—	Replace the HVPS board.
	Window of optical unit is dirty.	Optical unit	Check the window of the optical unit.	Clean the window.
	Poor image transfer	BTR roller	—	Replace the BTR roller
Blank print 	Window of optical unit is dirty.	Optical unit	—	Clean the window.
	Poor development	Imaging Cartridge	–	Replace the imaging cartridge.
		HVPS board	—	Replace the HVPS board.
	Poor image transfer	HVPS board	—	Replace the HVPS board.
		BTR roller	—	Replace the BTR roller
Black print 	Improper charging	HVPS board	—	Replace the HVPS board.
		Imaging cartridge	–	Replace the imaging cartridge.
White band 	Window of optical unit is dirty.	Optical unit	—	Clean the window.
	Poor image transfer	BTR roller	—	Replace the BTR roller.
	OPC	Imaging cartridge	–	Replace the imaging cartridge.

Table 5-39. Print Quality Problems (Continued)

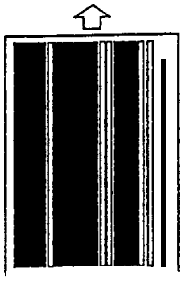
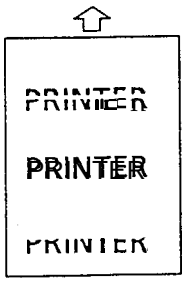
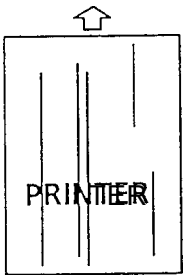
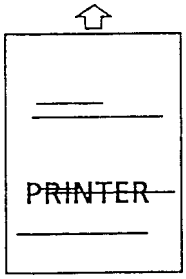
Symptom	Possible Cause	Part Name	Cheek Item	Remedy
White line 	Window of optical unit is dirty.	Optical unit	—	Clean the window.
	Poor image transfer	BTR roller	—	Replace the BTR roller.
	OPC	Imaging cartridge	–	Replace the imaging cartridge.
	Dirt on the fusing roller	Fusing roller	—	Replace the fusing roller.
White line 	Poor image transfer	BTR roller	—	Replace the BTR roller.
	OPC	Imaging cartridge	–	Replace the imaging cartridge.
	Dirt on the fusing roller	Fusing roller	—	Replace the fusing roller.
	Paper feed is bad.	Drive unit	—	Replace the drive unit.
Black line 	Window of optical unit is dirty.	Optical unit	—	Clean the window.
	Poor image transfer	BTR roller	—	Replace the BTR roller
	OPC	Imaging cartridge	–	Replace the imaging cartridge.
	Improper charging	Charge wire	—	Clean the charge wire of the imaging cartridge. (Refer to chapter 6.)
	paper separation is bad.	Trans. chute fan	—	replace the trans. chute fan.
	Dirt on the fusing roller	Fusing roller	—	Replace the fusing roller.
Black line 	Poor image transfer	BTR roller	—	Replace the BTR roller
	OPC	Imaging cartridge	–	Replace the imaging cartridge.
	Dirt on the fusing roller	Fusing roller	—	Replace the fusing roller.

Table 5-39. Print Quality Problems (Continued)

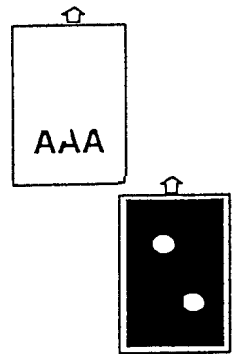
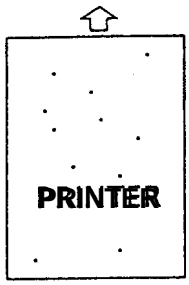
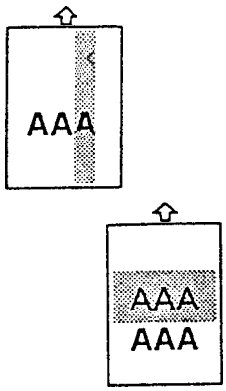
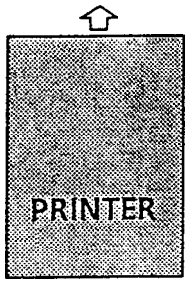
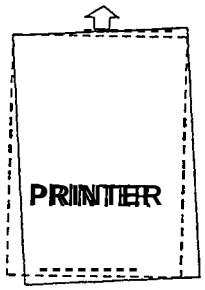
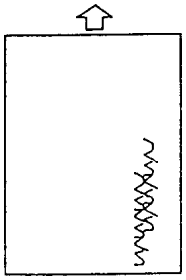
Symptom	Possible Cause	Part Name	Check Item	Remedy
Areas of missing print 	Poor image transfer	BTR roller	—	Replace the BTR roller
	OPC	Imaging cartridge	–	Replace the imaging cartridge.
	Dirt on the fusing roller	Fusing roller	—	Replace the fusing roller.
	Paper problem	Paper	—	replace the paper.
Black specks or dots 	Poor image transfer	BTR roller	—	Replace the BTR roller
	OPC	Imaging cartridge	–	Replace the imaging cartridge.
	Dirt on the fusing roller	Fusing roller	—	Replace the fusing roller.
Ghost 	Erase lamp is bad.	Erase lamp	—	Replace the erase lamp.
	Poor image transfer	BTR roller	—	Replace the BTR roller
	OPC	Imaging cartridge	–	Replace the imaging cartridge.
	Dirt on the fusing roller	Fining roller	—	Replace the fusing roller.
Foggy background 	Erase lamp is bad.	Erase lamp	—	Replace the erase lamp
	Improper charging	HVPS board	—	Replace the HVPS board.
	OPC	Imaging cartridge	–	Replace the imaging cartridge.

Table 5-39. Print Quality Problems (Continued)

Symptom	Possible Cause	Part Name	Check Item	Remedy
Skew 	Paper cassette may be bad.	Paper cassette	—	Replace the paper cassette.
	Imaging cartridge may be bad.	Imaging cartridge.	–	Replace the imaging cartridge.
	Trans. chute unit may be bad.	Trans. chute unit	—	Replace the trans. chute unit.
	Dirt on the fusing roller	Fusing roller	—	Replace the fusing roller.
Paper creases 	Paper cassette may be bad.	Paper cassette	—	Replace the paper cassette.
	Imaging cartridge may be bad.	Imaging cartridge.	–	Replace the imaging cartridge.
	Trans. chute unit may be bad.	Trans. chute unit	—	Replace the trans. chute unit.
	Dirt on the fusing roller	Fusing roller	—	Replace the fusing roller.
No fusing 	Paper problem	Paper	—	Replace the paper.
	Dirt on-the fusing roller	Fusing roller	—	Replace the fusing roller.

Chapter 6 Maintenance

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6.1 MAINTENANCE

The EPL-9000 is page printer that uses the electrophotographic printing method. Unlike most impact or ink-jet printers, the key components in the electrophotographic process are integrated into an expendable imaging cartridge. Therefore, periodic replacement of the imaging cartridge is essential to ensure high-quality output. Replacement of this cartridge and other maintenance iterns are described in this section, which is divided into two subsections: user maintenance and service maintenance (performed by qualified repair personnel).

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 external cleaning and the cleaning of the optical lens and charge wire for optimal print quality.

● External Cleaning

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

● Internal Cleaning

Be sure that the printer has been discomected from the power supply and that the fusing unit is cool. If the optical lens is dirty, wipe its surface with a dry soft cloth.

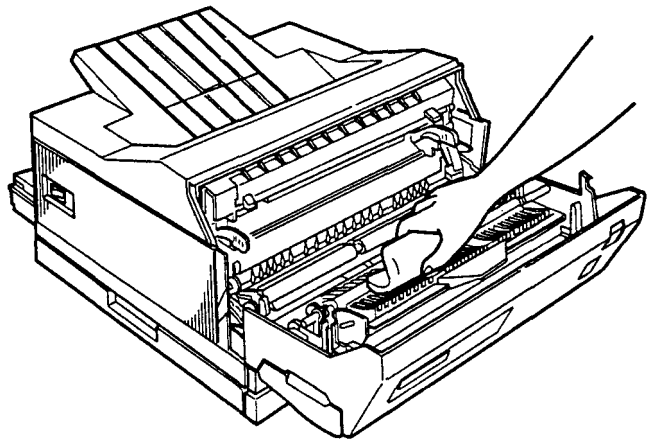

Figure 6-1. Internal Cleaning

● ***Charge*** Wire Cleaning

If the printer begins to print black lines, clean the charge wire as follows:

1. Open the front cover and take out the imaging cartridge. Put it on a flat surface gently, as shown in Figure 6-2.

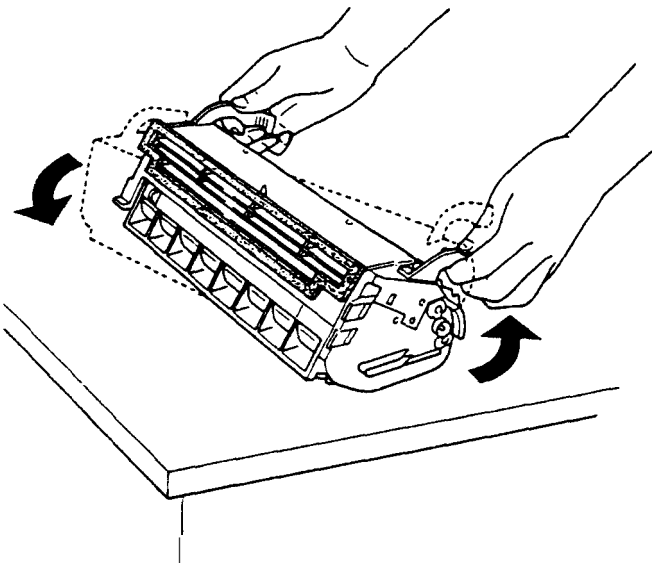

Figure 6-2. Charge Wire Cleaning (1)

2. Locate the three layers in the imaging cartridge and the four slots in the middle *layer.*
3. Clean each slot in the middle layer by pushing the tool into the slot as far as it will go and moving it several times from side to side, as shown in Figure 6-3.

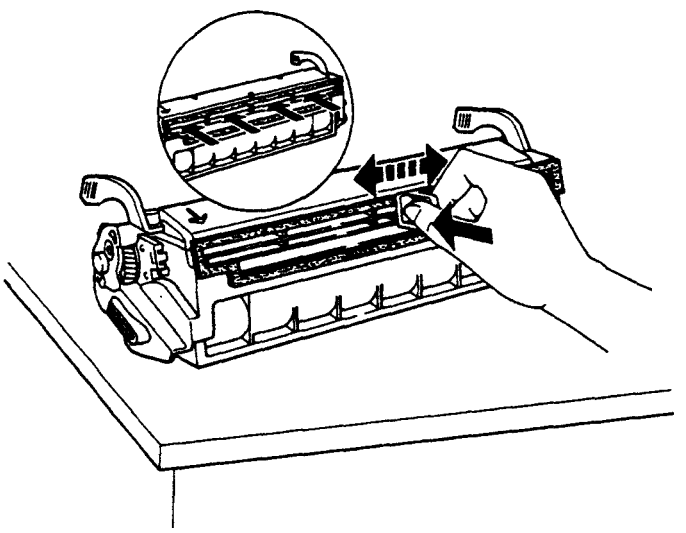

Figure &3. **Charge Wire Cleaning (2)**

4. When you finish cleaning all four slots in the middle layer, reinstall the imaging cartridge m the printer.

6.1.1.2 Imaging Cartridge Replacement

This printer uses the SO51O22 consumable imaging cartridge. The life of this cartridge is 6500 pages when printing on A4 or letter size pages with a 5% print ratio.

If your printed images become faint, enter the SelecType CONFIG menu and use the TONER function to find out approximately how much toner remains in the imaging cartridge.

Count the asterisks between the E (empty) and the F (full). Each asterisk represents about 20% of the total toner capacity. When you see only one asterisk in the SelecType TONER message, indicating that there is less than 20% of the toner left, you should replace the imaging cartridge.

● Imaging Cartridge Replacement

1. Make sure the printer is turned off.
2. Gently open the printer cover and remove the imaging cartridge by pulling it towards you.
3. Dispose of the used imaging cartridge with non burnable iterns.
4. Remove the new imaging cartridge from its aluminum bag. While holding the cartridge horizontally, gently shake it a few times to distribute the toner evenly, as shown Figure 6-4.

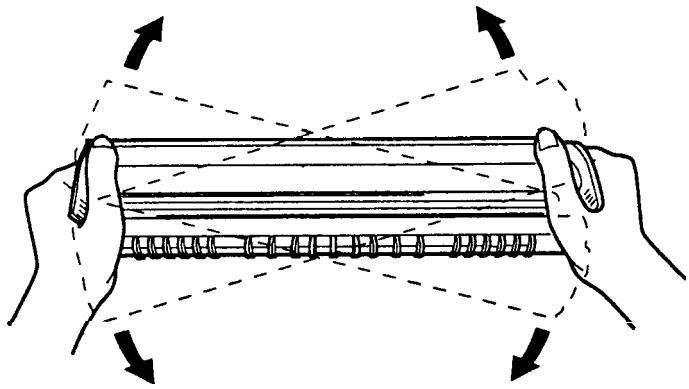

Figure 6-4. Imaging Cartridge Replacement (1)

5. Place the imaging cartridge on a clean, flat surface. Firmly grip the tab on the left side of the cartridge and pull the clear seal all the way out with firm, even pressure, as shown in Figure 6-5.

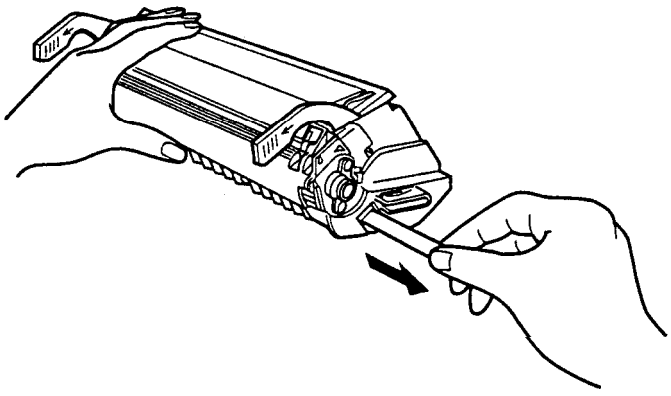

Figure 6-5. Imaging Cartridge Replacement (2)

6. While holding the imaging cartridge, carefully slide the plastic mmer on either side of the cartridge into the grooves, as shown in Figure 6-6. Slide the cartridge gently into the printer as far as it will go.

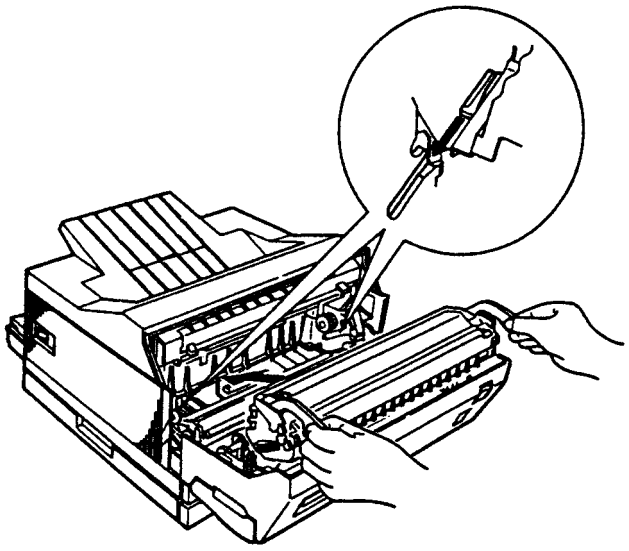

Figure 6-6. Imaging Cartridge Replacement (3)

7. **Close the printer** and gently press the top of the case until the latch clicks shut, as shown m Figure 6-7.

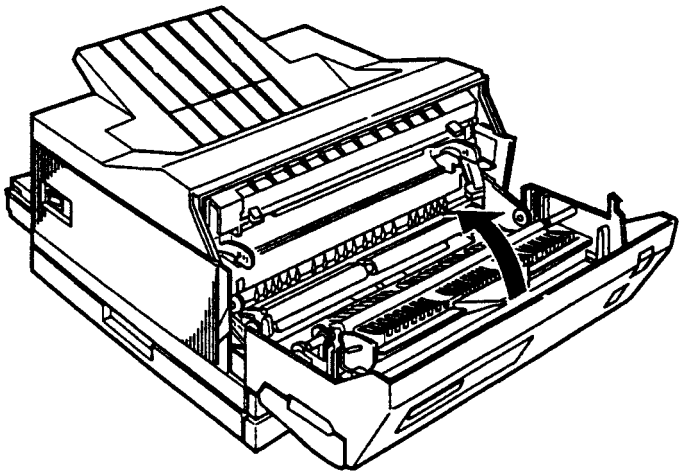

Figure 6-7. Imaging Cartridge Replacement (4)

8. Turn on the printer. WARMING UP and TONER FULL? appear alternately on the display for about 10 seconds. Press Enter while these messages appear. READY then appears on the display.

Note: You must press Enter while the WARMING UP and TONER FULL? messages appear, so that the TONER option m SelecType will register correctly.

9. After READY appears on the display, press Menu once and then press ALT and Menu together once. TEST MENU then appears.
10. Press Item several times until CLEANING PAPER appears. Then press Enter.
11. Put a sheet of standard A4 paper with the long edge first into the MSI tray and then press Continue. CLEANING PRINT flashes on the display as the printer pMts and feeds the paper.

12. When the paper is ejected, READY appears on the display. Press Menu once and then press ALT and Menu together once. TEST MENU appears.
13. Press Item several times until CLEANING EXEC appears.
14. Take the same sheet of paper that was printed in Step 11 and insert it into the MSI tray with the long edge first and the printed side facing up, as shown in Figure 6-8. Then press Continue.

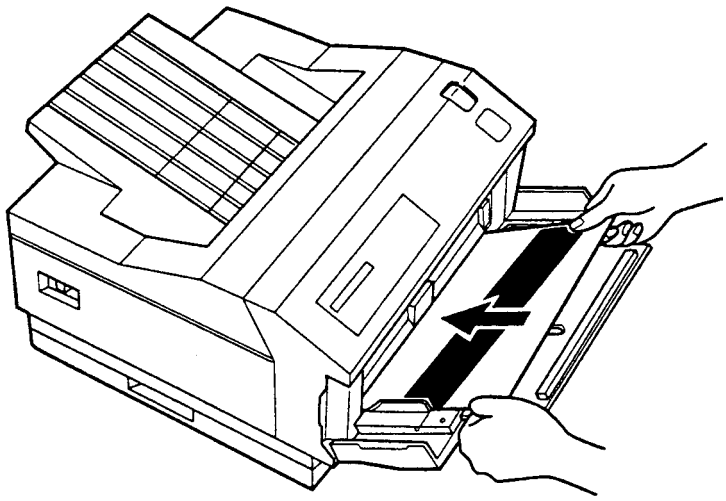

Figure 6-8. Imaging Cartridge Replacement (5)

15. The paper passes through the printer, cleaning the fusing roller. Then press On Line to exit SelecType.

6.1.2 Service Maintenance

This section describes the service to be performed by qualified repair personnel.

6.1.2.1 Fusing Unit Service

The fusing unit requires periodic service because it is subject to functional deterioration as the total number of printed pages increases, resulting in bad print quality. The recommend service internal for the fusing unit is approximately 100,000 pages. This interval is only a suggested value. You do not need perform service exactly at this interval.
The fusing unit is maintained by cleaning its parts, as described below.

6.1.2.2 Fusing Unit Cleaning

Clean each part of the fusing unit using the method specified in Table 6-1. (Refer to Chapter 3 for disassembly procedures.)

Table 6-1. Fusing Unit Cleaning Procedures

Part **Name**	**Cleaning Procedure**
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 .

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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.

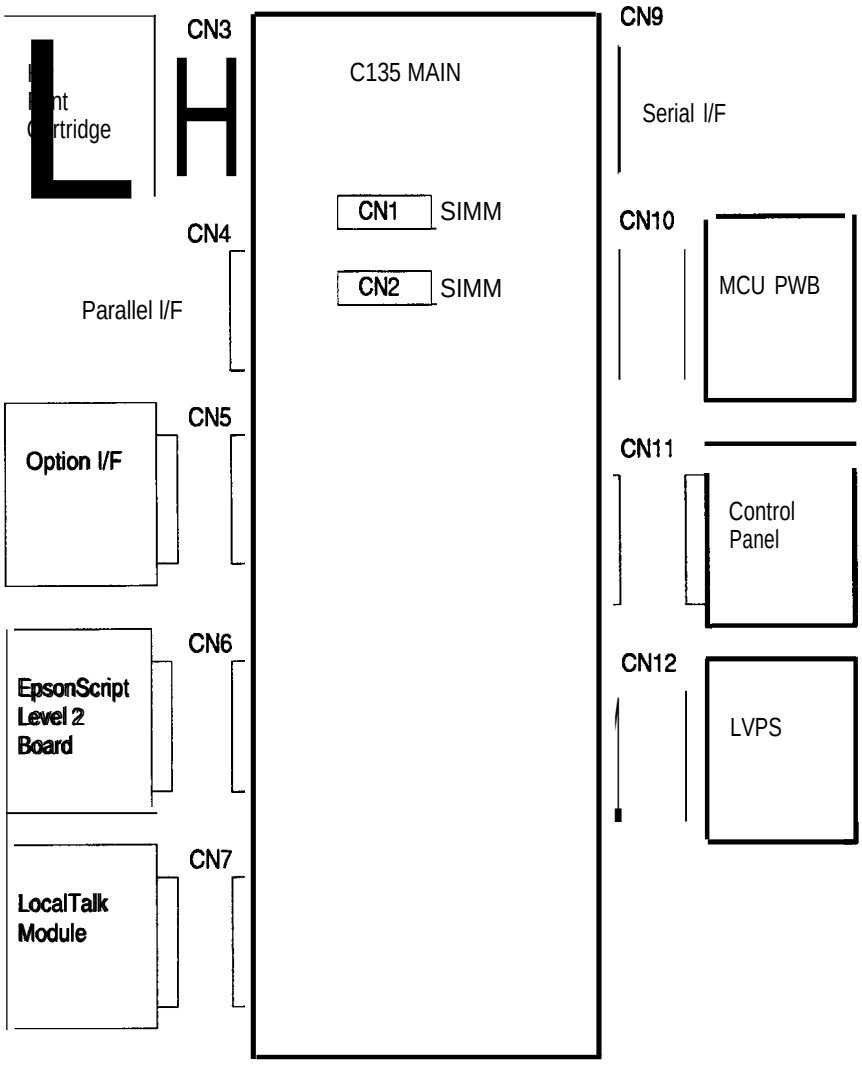

Figure A-1. Cable Connections for the Video Controller Section

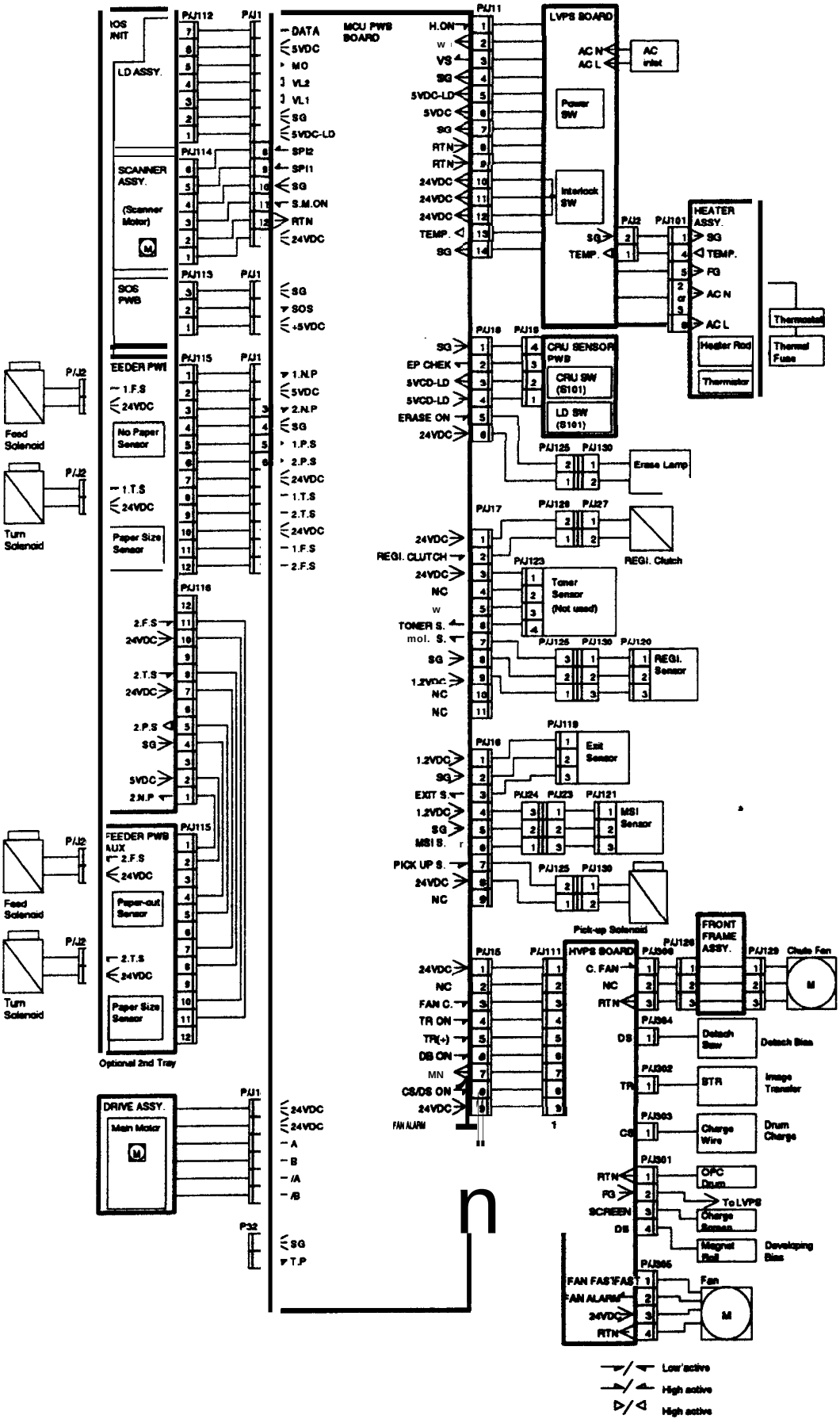

Figure A-2. Cable Connections for the Engine Section

Table A-1. Board Connector Summary

Connector	Description	Pins	Reference
Video Controller Board (C135 MAIN Board)			
CN1	Connector for SIMM	72 pins	Table A-2
CN2	Connector for SIMM	72 pins	Table A-2
CN3	Connector for HP font cartridge	50 pins	Table A-3
CN4	Centronics parallel interface	36 pins	Table 1-8
CN5	Connector for optional I/F (Type-B) card	36 pins	Table A-4
CN6	Connector for EPSONScript Level 2 Module	120 pins	Table A-5
CN7	Connector for LocalTalk I/F Module	30 pins	Table A-6
CN8	Not used	30 pins	—
CN9	Serial interface	25 pins	Table 1-10
CN10	Connector for engine controller board (MCU PWB)	20 pins	Table A-7
CN11	Connector for control panel	20 pins	Table A-8
CN12	Connector for low-voltage supply unit (LVPS)	4 pins	Table A-9
CN13	Not used	36 pins	—
CN14	Not used	68 pins	—
CN15	Not used	68 pins	—
Engine Controller Board (MCU PWB Board)			
PIJ11	Connector for low-voltage supply unit (LVPS)	14 pins	Table A-10
P/J12	Connector for ROS unit	13 pins	Table A-11
P/J13	Connector for FEEDER PWB board	12 pins	Table A-12
P/J14	Connector for main motor	6 pins	Table A-13
P/J15	Connector for HVPS PWB board	11 pins	Table A-14
P/J16	Connector for exit sensor, MSI sensor, and pick-up solenoid	9 pins	Table A-15
P/J17	Connector for REGI. clutch, toner sensor, and REGI. sensor	11 pins	Table A-16
P/J18	Connector for CRU SENSOR PWB board and erase lamp	6 pins	Table A-17
P/J19	Connector for ROS unit	3 pins	Table A-18
P/J20	Not used	—	—
P/J31	Connector for video controller board (C135 MAIN)	20 pins	Table A-7
P32	***Not used***	—	—
Control Panel			
CN1	Connector for engine controller board (MCU PWB)	20 pins	Table A-8
High-Voltage Supply Board (HVPS Board)			
P/J111	Connector for engine controller board (MCU PWB)	10 pins	Table A-14
P/J301	Developing bias etc.	4 pins	Table A-19
P/J302	Image transfer bias	1 pin	—
P/J303	Drum charge bias	1 pin	—
P/J304	DETACH SAW bias	1 pin	—
P/J305	Connector for fan motor	4 pins	Table A-20
P/J306	Connector for chute fan	3 pins	Table A-21

A.1.1 Video Controller Board (C135 MAIN Board)

Table A-2. CNI, 2 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	MAIO	0	Memory address bit 10
20	DQ4	I/o	Date 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	$\overline{\text{WE}}$	o	Write enable
48	NC	—	Not connected
49	DQ8	I/O	Data bus bit 8

Table A-2. CNI, 2 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	PoI	—	Not used
68	PO2	—	Not used
69	PO3	—	Not used
70	PO4	—	Not used
71	NC	—	Not connected
72	Vss	—	Ground

Table A-3. CN3 Pin Assignments

Pin No.	Signal Name	I/O	Description
AI	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
A9	A10	0	Address bus bit 10
A10	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	t/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	A5	0	Address bus bit 5
B7	A7	0	Address bus bit 7
B8	A9	0	Address bus bit 9
B9	A11	0	Address bus bit 11
BIO	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	D0	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	D8	I/O	Data bus bit 8
B19	)10	I/o	Data bus bit 10
B20	)12	I/O	Data bus bit 12
B21	)14	I/O	Data bus bit 14
B22	)15	I/o	Data bus bit 15
B23	RWX	O	Read/write strobe
B24	FCEX	0	Font cartridge enabte
B25	MCLK	0	Clock from CPU

Table A-4. CN5 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	Wriie 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-D0	I/O	Data bus bit 7-O

Table A-5. CN6 Pin Assignments

Pin 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	o	Address bus bit 2
23,24	GND	—	Ground
25	A5	o	Address bus bit 5
26	A6	o	Address bus bit 6
27	A3	o	Address bus bit 3
28	A4	o	Address bus bit 4
29	A9	o	Address bus bit 9
30	A10	o	Address bus bit 10
31	A7	o	Address bus bit 7
32	A8	o	Address bus bit 8
33	A13	o	Address bus bit 13
34	A14	o	Address bus bit 14
35	A11	0	Address bus bit 11
36	A12	o	Address bus bit 12
37	A17	o	Address bus bit 17
38	A18	o	Address bus bit 18
39	A15	o	Address bus bit 15
40	A16	o	Address bus bit 16
41	A21	o	Address bus bit 21
42	A22	o	Address bus bit 22
43	A19	o	Address bus bit 19
44	A20	o	Address bus bit 20
45	A26	o	Address bus bit 26
46	A27	o	Address bus bit 27
47	NC	—	Not connected
48	$\overline{WR}$	o	Write enable
49	A28	o	Address bus bit 28
50	A29	o	Address bus bit 29
51	$\overline{AS}$	o	Address strobe

Table A-5. CN6 Pin Assignments (Continued)

Pin No.	Signal Name	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
56	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	NC	—	Not connected
84	GND	—	Ground
85	D18	I/O	Data bus bit 18
86	D19	I/O	Data bus bit 19
87	D16	I/O	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	1/0	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-5. CN6 Pin Assignments (Continued)

Pin No.	Signal Name	I/O	Description
104	A25	o	Address bus bit 25
105	BWE0	0	Byte enabfes 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	I	Bus request for external device
111	BWE2	o	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-6. CN7 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	Write 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	I/O	Data bit 1
30	DB0	I/O	Data bit O

Table A-7. CN10 Pin Assignments

Pin No.	Signal Name	I/O	Description
1	GND	—	Ground
2	PPRDY	I	Printer ready
3	TOP	I	Paper top
4	STA	I	Engine status
5	CBSY	o	Controller command
6	NC	—	Not connected
7	VDO	o	Video signal
8	CCLK	o	Command clock
9	PRFD	o	Pre feed signal
10	NC	—	Not connected
11	BD	I	Horizontal synchronized signal
12	RDY	I	Ensign ready
13	SBSY	I	Status busy
14	NC	—	Not connected
15	START	o	Print start signal
16	CPRDY	o	Controller ready
17	CMD	o	Command
18	GND	—	Ground
19	GND	—	Ground
20	GND	—	Ground

Table A-8. CN11 Pin Assignments

Pin No.	Signal Name	I/o	Description
1	LCDCLK	o	System clock
2	PPRDY	o	LCD data read
3	SWINIT	I	Switch interrupt
4	GND	—	Ground
5	LCDX	o	Select of LCD
6	AI	I	Address bit 1
7	LEDX	o	LED data write
8	SWRDX	o	Switch data read
9	NC	—	Not connected
10	LCDWRX	o	LCD data write
11	DBO	I/O	Data bus bit O
12	DB7	I/O	Data bus bit 7
13	DB6	1/0	Data bus bit 6
14	DB5	I/O	Data bus bit 5
15	DB4	I/O	Data bus bit 4
16	DB3	I/O	Data bus bit 3
17	DB2	I/O	Data bus bit 2
18	DB1	I/O	Data bus bit 1
19	+5	—	+5 VDC
20	+5	—	+5 VDC

Table A-9. CN12 Pin Assignments

Pin No.	Signal Name	I/O	Description
1	+5	I	+5 VDC
2	+5	I	+5 VDC
3	GND	—	Ground
4	GND	—	Ground

A.1.2 Engine Controller Board (MCU PWB Board)

Table A-10. P/J11 Pin Assignments

Pin No.	Signal Name	I/O	Description
1	H.ON	O	Heater ON
2	SG	—	Ground
3	VS	I	Voltage drop signal
4	SG	—	Ground
5	5VDC-LD	—	+5VDC for ROS unit
6	5VDC	—	+5 VDC
7	SG	—	Ground
8	RTN	—	Ground
9	RTN	—	Ground
10	24VDC	—	+24 VDC
11	24VDC	—	+24 VDC
12	24VDC	—	+24 VDC
13	TEMP.	I	Fuser temperature
14	SG	—	Ground

Table A-n. P/J12 Pin Assignments

Pin No.	Signal Name	I/O	Description
1	DATA	O	Laser diode drive data
2	+5VDC	—	+5 VDC
3	MO	I	Output level of laser diode
4	VL2	O	Laser diode power adjustment 2
5	VL1	0	Laser diode power adjustment 1
6	SG	—	Ground
7	+5VDC	—	+5 VDC
8	SPI2	O	Scanner motor speed control 2
9	SPI1	0	Scanner motor speed control 2
10	SG	—	Ground
11	S M ON	—	Scanner motor on
12	RTN	—	Ground
13	+24VDC	—	+24 VDC

Table A-12 P/J13 Pin Assignments

Pin No.	Signal Name	I/O	Description
1	1.N.P	I	No paper of 1 et cassette
2	+5VDC	—	+5 VDC
3	2.N.P	I	No paper of 2nd cassette
4	SG	—	Ground
5	1.P.S	I	Paper size of lst cassette
6	2.P.S	I	Paper size of 2nd cassette
7	+24VDC	—	+24 VDC
8	1.T.S	O	Tern solenoid on of let cassette
9	2.T.S	0	Tern solenoid on of 2nd cassette
10	+24VDC	—	+24 VDC
11	1.F.S	O	Feed solenoid of 1 st cassette
12	2.F.S	0	Feed solenoid of 2nd cassette

Table A-13. P/J14 Pin Assignments

Pin No.	Signal Name	I/O	Description
1	+24VDC	—	+24 VDC
2	+24VDC	—	+24 VDC
3	A	O	Main motor phase A
4	B	o	Main motor phase B
5	$\overline{A}$	o	Main motor phase $\overline{A}$
6	$\overline{B}$	o	Main motor phase $\overline{B}$

Table A-14. P/J15 Pin Assignments

Pin No.	Signal Name	I/O	Description
1	+24VDC	—	+24 VDC
2	NC	—	Not connected
3	FAN C.	o	Fan speed control
4	TR ON	0	Transfer bias on
5	TR(+)	0	Transfer bias control
6	DB ON	0	Development bias on
7	RTN	—	Ground
8	CS/DS ON	o	Drum charge on
9	+24VDC	—	+24 VDC
10	FAN ALARM	I	Fan error signal
11	NC	—	Not connected

Table A-15. P/J16 Pin Assignments

Pin No.	Signal Name	I/O	Description
1	1.2VDC	—	Sensor power
2	SG	—	Ground
3	EXIT S.	I	Exit sensor signal
4	1.2VDC	—	Sensor power
5	SG	—	Ground
6	MSI S.	I	MSI sensor signal
7	PICK UPS.	O	Pick up solenoid on
8	24VDC	—	+24 VDC
9	NC	—	Not connected

Table A-16. P/J17 Pin Assignments

Pin No.	Signal Name	I/O	Description
1	24VDC	—	+24 VDC
2	REGI.CL.	o	REGI clutch on
3	24VDC	—	+24 VDC
4	NC	—	Not connected
5	SG	—	Ground
6	TONER S.	I	Toner sensor signal (Not used)
7	REGI.S	I	REGI sensor signal
8	SG	—	Ground
9	1.2VDC	—	Sensor power
10	NC	—	Not connected
11	NC	—	Not connected

Table A-17. P/J18 Pin Assignments

Pin No.	Signal Name	I/O	Description
1	SG	—	Ground
2	EP CHEK	I	Imaging cartridge sensor
3	5VDC-LD	I	Laser diode power (input)
4	5VDC-LD	O	Laser diode power (output)
5	ERASE ON	O	Erase lamp on
6	24VDC	—	+24 VDC

Table A-18. P/J19 Pin Assignments

Pin No.	Signal Name	I/O	Description
1	SG	—	Ground
2	Sos	I	SOS sensor signal
3	+5VDC	—	+5 VDC

A.1.3 High-Voltage Supply Board (HVPS Board)

Table A-19. P/J301 Pin Assignments

Pin NO.	Signal Name	I/O	Description
1	RTN	—	Ground
2	FG	—	Frame ground
3	SCREEN	O	Screen voltage adjustment
4	DB	O	Developing bias

Table A-20. P/J305 Pin Assignments

Pin No.	Signal Name	I/O	Description
1	FAN FAST	O	Fan speed control
2	FAN ALARM	I	Fan error signal
3	+24VDC	—	+24 VDC
4	RTN	—	Ground

Table A-21. P/J306 Pin Assignments

Pin No.	Signal Name	I/O	Description
1	C FAN	O	Chute fan control
2	NC	—	Not connected
3	RTN	—	Ground

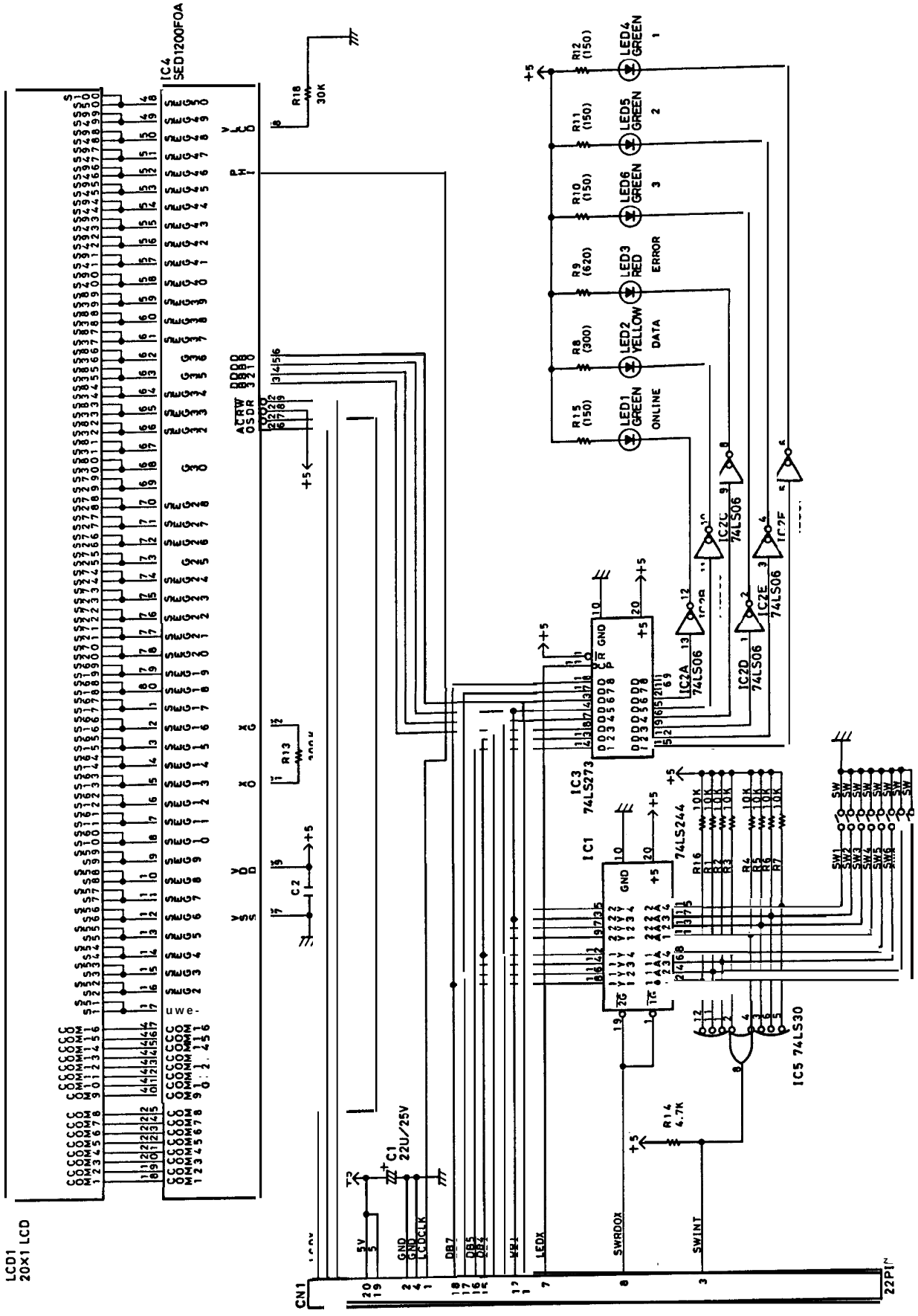

Figure A-4. Control Panel Board Circuit Diagram

A.3 CIRCUIT BOARD COMPONENT LAYOUT

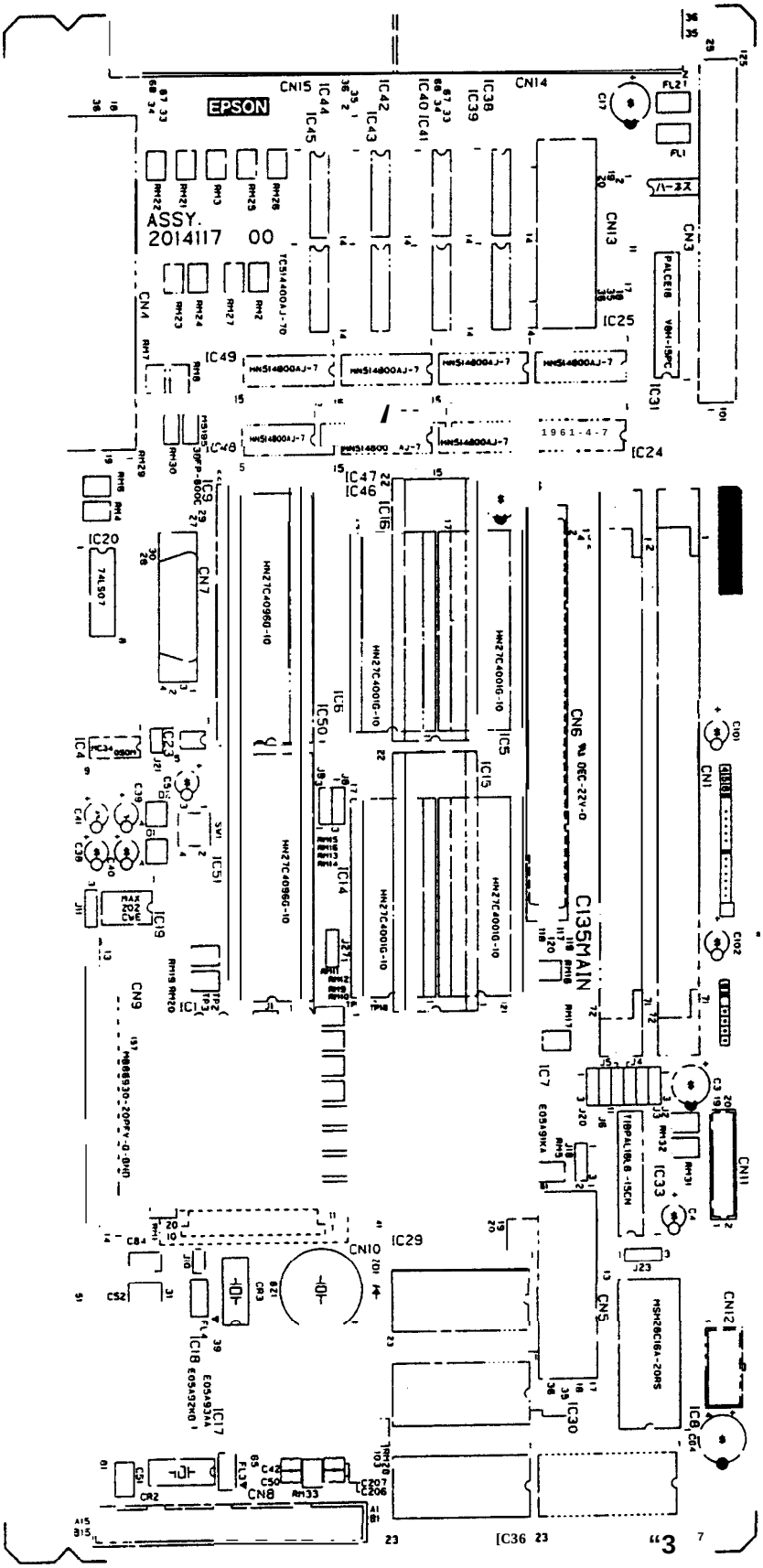

Figure A-5. C135 MAIN Board Component Layout (Front Side)

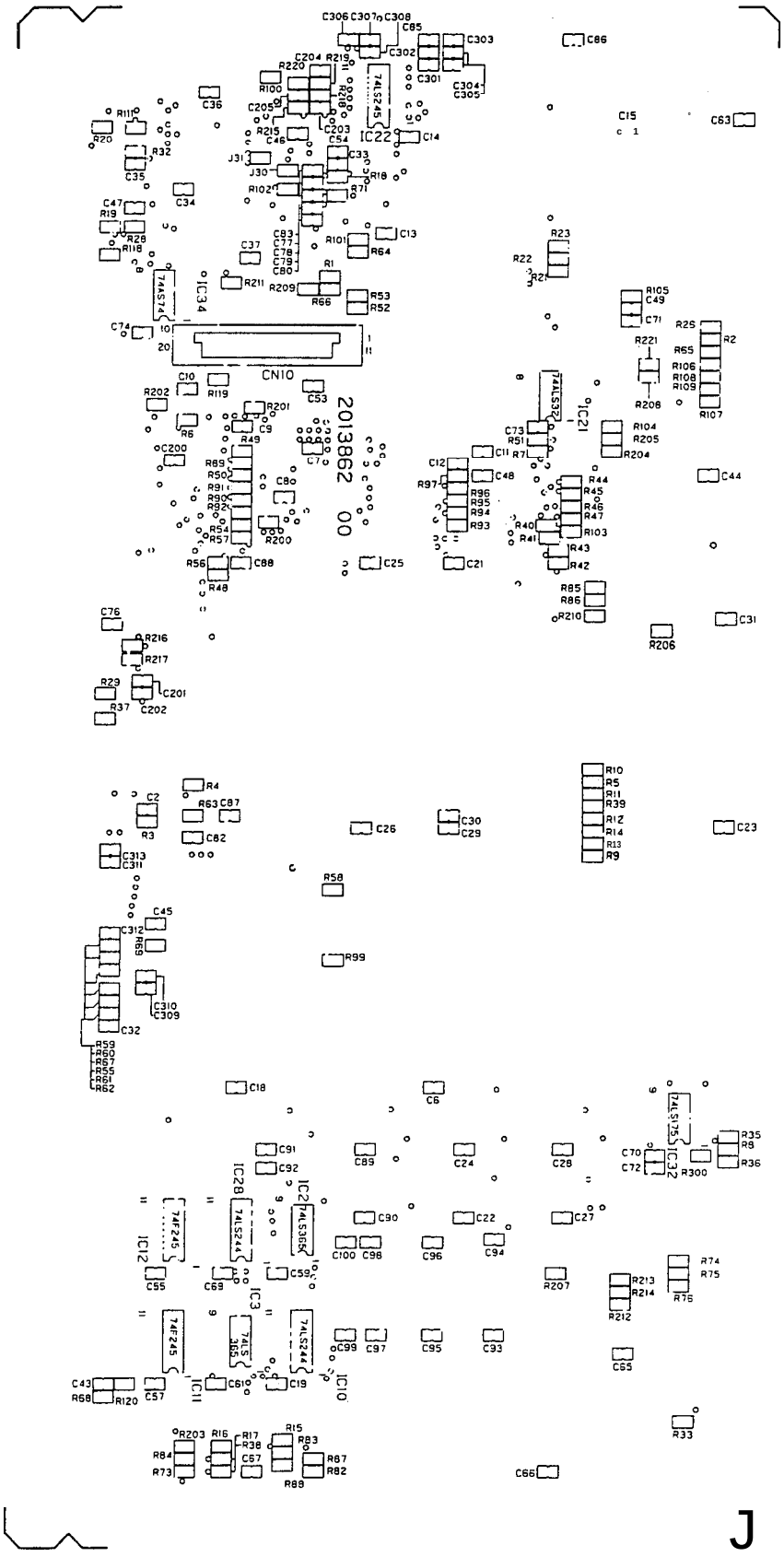

Figure A-6. C135 MAIN Board Component Layout (Rear Side)

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