EPSON TERMINAL PRINTER

EPL-N1200

SERVICE MANUAL

EPSON

NOTICE

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 when performing repair/maintenance procedures.

DANGER

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

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

3. WHEN PERFORMING TESTING AS DICTATED WITHIN THIS MANUAL, DO NOT CONNECT THE UNIT TO A POWER SOURCE UNTIL 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. MARE 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 INDMDUAL 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 United States Users;

[Laser Safety]

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

[CDRH Regulations]

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

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

[Internal Laser Radiation]

Maximum Radiation Power: 5.0×10^{-4} (W)
Wave Length: 790 ± 20 nm

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

For Other Countries Users;

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

> This is a semiconductor laser. The maximum power of the laser diode is 5.0×10^{-4} W and the wavelength is 790 ± 20 nm.

For Denmark Users;

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

> Klasse 1 laser produkt der onfvlder IEC825 sikkerheds kravene.

VAROITUS

Laitteen käyttäminen muulla kuin tässä käyttöohjeessa mainitulla tavalla saattaa altistaa käyttäjän turvallisuusluokan 1 ylittävälle näkymättömälle lasersäteiylle.

VARNING

Om apparaten används på at-mat 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 säteilylle. Ala katso säteeseen.

VARNING

Osynlig laserstrålning när denna del är öppnad och spärren är urkopplad Betrakta ei strblen.

For Norway Users;

ADVARSEL

Dersom apparatet brukes på annen måte enn spesifisert i denne bruksan visning, kan brukeren utsettes for unsynlig laserstråling som over&rider gren sen for laser klasse 1.

Dette er en halvleder laser. Maksimal effeckt til laserdiode er 5.0 x 10^{-4} W og bølgelengde er 790 ± 20 nm.

Laser Safety Labels

[Label on rear printer case]

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

For United State

This laser product conforms to the applicable requirement of 21 CFR
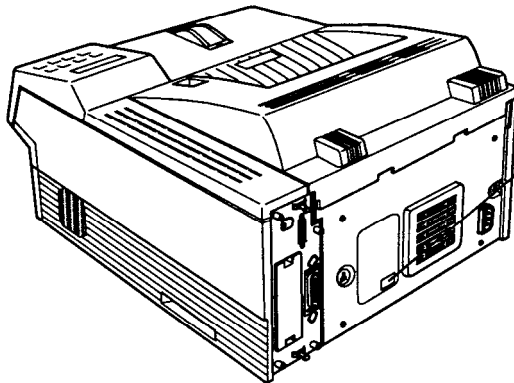Chapter I, subchapter J.
 SEIKO EPSON CORP.
 Hirooka Office
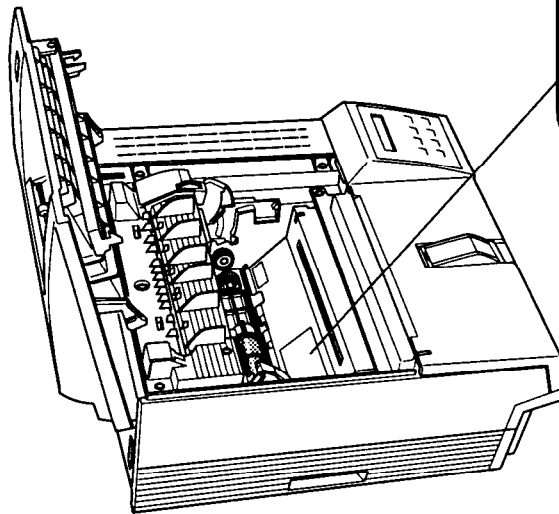 80 Hirooka, Shiojiri-shi, Nagano-ken,
 Japan
MANUFACTURED:

For Europe

LASER KLASSE 1 NACH IEC 825
CLASS 1 LASER PRODUCT TO IEC 825
KLASSE 1 LASER PRODUKT LH.T. IEC 825
LUOKAN 1 LASERLAITE

[Label inside printer]

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

For Denmark, Finland, Sweden, and Norway

CAUTION - INVISIBLE LASER RADIATION WHEN OPEN
AVOID EXPOSURE TO BEAM
VORSICHT- UNSICHTBARE LASERSTRAHLUNG WENN
ABDECKUNG GEÖFFNET NICHT DEM STRAHL
AUSSETZEN
ADVARSEL- USYNLIG LASERSTRÅLING NÅR DEKSEL
ÅPNES UNNGÅ EKSPONERING FOR STRÅLEN
VAROI- AVATTAESSA OLET ALTTIINA NÄKYMÄTÖN
LASERSÄTEILYLLE ÄLÄ KATSO SÄTEESEEN
ADVARSEL- USYNLIG LASERSTRÅLING VED ÅBNING
UNDGÅ UDSÆTTELSE FOR STRÅLING
VARNING- OSYNLIG LASERSTRÅLNING NÄR DENNA DEL
ÄR ÖPPNAD STRÅLEN ÄR FARLIG

PREFACE

This manual describes functions, theory of electrical and mechanical operations, maintenance, and repair of EPL-N1200.
The instructions and procedures included herein are intended for the experience repair technician, and attention should be given to the precautions on the preceding page. The chapters are organized as follows:

CHAPTER 1. GENERAL DESCRIPTION

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

CHAPTER 2. OPERATING PRINCIPLES

Describes the theory of printer operation.

CHAPTER 3. DISASSEMBLY AND ASSEMBLY

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

CHAPTER 4. ADJUSTMENTS

Includes a step-by-step guide for adjustment.

CHAPTER 5. TROUBLESHOOTING

Provides Epson-approved techniques for adjustment.

CHAPTER 6. MAINTENANCE

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

APPENDIX

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

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

REVISION SHEET

Revision	Issue Date	Revision Page
Rev. **A**	December 9 1996	1st issue

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Chapter 1   General Description

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1.1 FEATURES

The EPSON® EPL-N1200 is a non-impact page printer that combines a semi-conductor laser with electro-photographic technology. Resolution is 600/300 DPI and print speed is 12 PPM.   The main features are:

o   Upward compatibility with the EPL-5600

o   No ozone generation

o   Printing speed — 12 PPM (pages per minute) for A4 size or letter paper

o   Resolution — 600/300 DPI (dots per inch)

o   Standard paper tray holds up to 250 sheets

o   Standard paper tray can be used as manual feed slot

o   Lower paper cassette (500 sheets) available as option

o   Small footprint because output tray is held within the printer

o   Support of HP® LaserJet® 4 (LJ4) emulation mode, EPSON GL/2 mode, ESC/P 2 mode, and IBM I239X mode in standard model

o   45 built-in scalable fonts (14 Windows TrueType compatible and 31 LJ4 compatible)

o   With memory improvement technology, standard RAM supports 600 DPI at full-page size in all modes (LJ4, GL/2, FX, ESC/P2, and I239X modes)

o   High-performance controller (20 MHz SPARKlite (MB86930) CPU)

o   Bi Resolution Improvement Technology (BiRITech) refines print quality, eliminating jagged edges from images and characters on 600 and 300 DPI printing.

o   Optional EPSONScript Level 2 (PostScript® compatible) module

o   Optional LocalTalk/Serial Module and Type-B interfaces can be used simultaneously

o   2 MB standard RAM and up to 64 MB RAM using optional SIMMs

o   Two bidirectional parallel interface ports, Parallel B and Parallel C
     Parallel B : Supports IEEE 1284 compatible, Nibble modes
     Parallel C: Supports IEEE 1284 compatible, Nibble, and ECP modes

o   High-speed parallel communication rate
     Parallel B : Approx. 400 KB / second in fast mode
     Parallel C: Approx. 2 MB / second in ECP mode

o   Support for EPA Energy Star program

o   Multi-port and multi-emulation are supported

o   IES (Intelligent Emulation Switch) allows switching between EPSONScript mode and other mode

o   Setting for automatic release of paper size errors

Figure 1-1 shows an exterior view of the EPL-N1200.
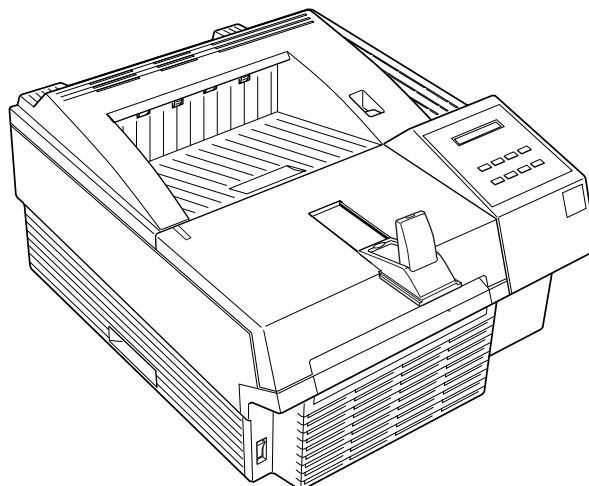
Figure 1-1. EPL-N1200 Exterior View

Table 1-1 lists optional units available for the EPL-N1200.

Table 1-1. EPL-N1200 Options

Cat. No.	Description	Note
C83219✶	EPSONScript Level 2 ROM Module	Supports EPSONScript Level 2 ROM mode (PostScript Level 2 compatible) fonts and commands
—	72-pin RAM SIMM memory modules	For IBM PC compatibles
C81262✶	500 sheet lower paper cassette A4	Lower paper cassette
C812631	500 sheet lower paper cassette Letter	Lower paper cassette
S051016	Imaging cartridge	Toner cartridge
C82334✶	LocalTalk™ / Serial Module	—
C83620✶	RS-232C intrerface cable (9 pin)	For C82334✶
C83619✶	RS-232C intrerface cable (25 pin)	For C82334✶
C83618✶	Current loop cable	For C82334✶
C82307✶/ C82308✶	32 KB serial interface card	—
C82310✶/ C82311	32 KB parallel interface card	—
C82312✶	LocalTalk™ interface card	—
C82314✶	COAX interface card	—
C82315✶	TWINAX interface card	—
C82323✶	GPIB interface card	—
C82331✶	Ethernet interface card for NetWare®	å

Note: The LocalTalk card (C82312✶) cannot be used with LocalTalk setting on the LocalTalk/Serial I/F module (C82355✶).

1.2 SPECIFICATIONS

This section provides statistical data for the EPL-N1200.

1.2.1 Basic Specifications

Print method: Laser beam scanning and dry electro-photography

Resolution: 600 DPI

Printing speed: 12 PPM (letter/A4)

First print time (A4/LT): Less than 16 seconds (A4/Letter; at Polygon-motor stop)
(Warm-up time must be added in above value at standby mode)

Warm-up time: 60 seconds (at rated current and 23° C (73° F) temperature)

Paper supply: See Table 1-2.

Table 1-2. Paper Feed Methods

Paper Supply	Capacity	Paper Size	Usable Thickness (Ream Weight)
Standard paper tray	250*3)	A5, B5, A4, LT, GLT, EXE, LGL, GLG, F4, HL, Custom	16 to 24 lb.*4) (60 to 90 g/m^2) 16 to 41.8 lb.*5) (60 to 157 g/m^2)
	10 (Envelope)	Monarch, DL, C5, C6, International B5, Commercial-10	Envelopes made of 16 to 24 lb. (60 to 90 g/m^2) paper
Lower paper cassette (optional)*1)	500*3)	A4 or LT*2)	16 to 24 lb. (60 to 90 g/m^2)

*1:Two units maximum can be mounted.

*2:Paper size is fixed either A4 or Letter.

*3:70g/m^2 (20lb.)paper

*4:When you set pieces of paper on standard paper tray.

*5:When you set a piece of paper on standard paper tray.

*6) It can be used as manual feeding paper slot.

Note 1: **The weight in pounds (lb.) is determined by how much 500 sheets cut to 17×22 inch would weigh; 1 g/m^2 = 0.2659763 lb.**

Note 2: Paper size range: width   3.62 to 8.5 inches (92 to 216 mm)
                            length   5.83 to 14.0 inches (148 to 356 mm)

Paper types: See Table 1-3.

Table 1-3. Paper Types

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

Usability of special papers: See Table 1-4.

Table 1-4. of Special Papers Usability

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

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

Paper feed alignment and direction: Center alignment for all sizes

Paper ejection: Face down

Output tray capacity: 250 sheets (standard paper ; 20 lb. (75g/m^2))

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

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

Harmonic noise: Less than 36 dB(A) standby
Less than 52 dB(A) operating

Ozone density: Less than 0.02 PPM

Toxicity: No toxicity exists in organic photo-conductor (OPC), toner, and plastic materials
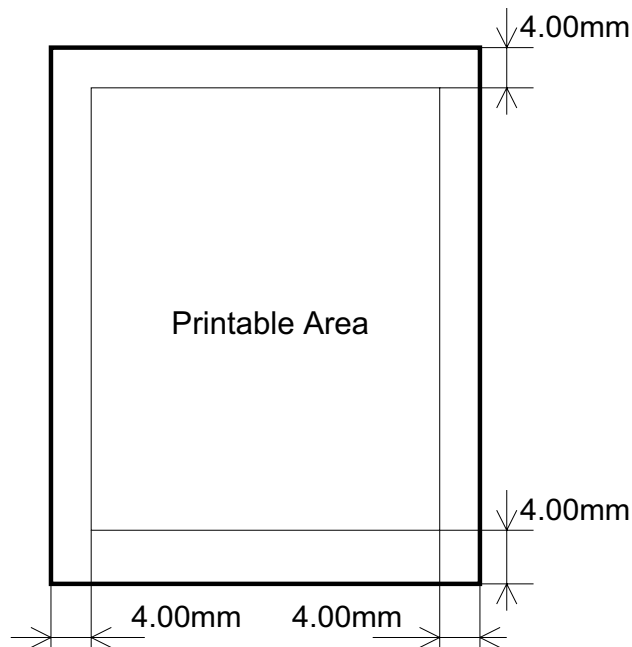
Figure 1-2. Printable Area

1.2.2 Electrical Specifications

Table 1-5. Electrical Specifications

Description	100 V Version	230 V Version
Rated voltage	100 ~ 120 VAC	230 VAC
Rated frequency range	50 ~ 60 Hz	
Input frequency range	47 ~ 63 Hz	
Power consumption	Less than 700 W	Less than 800 W
Power consumption in non-standby mode	Less than 150 W (Average)	
Power consumption in standby mode (Heater lamp is off.)	Less than 30 W (without any optionals installed)	

1.2.3 Reliability Specifications

MPBF (Mean Prints Between Failures): Over 50,000 sheets

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

MTBF (Mean Time Between Failures):	3000 Power on hours (more than 10 months)
Jam rate:	1 out of 2,000 sheets or less (excluding multiple-sheet feeding)
Feed failure:	1 out of 2,000 sheets or less (excluding multiple-sheet feeding)
Multiple-sheet feeding:	1 out of 500 sheets or less
Paper curl height:	30 mm (1.2 inches) or less (Standard paper)
	30 mm (1.2 inches) or less (OHP sheet)
Leading edge bending (1 cm or more):	1 out of 1,000 sheets
MTTR (Mean Time To Repair):	30 minutes or less
Durability:	5 years or 300,000 sheets

1.2.4 Environmental Conditions for Operating (Including Imaging Cartridge)

Temperature:	10 to 35°C (50 to 95°F)
Humidity:	15 to 85% RH
Altitude:	2,500m (8,200 feet) or lower
Levelness:	1 degree or less (front to rear,right to left)
Illuminance:	3,000 lux or less (must not be exposed to direct sunlight)
Surrounding space:	Printer should have at least 100mm of clearance on sides and rear.

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

Temperature:	0 t o 3 5 ° C (32 to 95°F) overfull storage period
Humidity:	30 to 85% RH overfull storage period
Drop test:	Clear to JISZ0200-1987 Level1
Vibration:	Vibration frequency 5 to 100Hz and 100 to 5Hz Sweep time10 minutes Acceleration1G Acceleration direction 3 directions Acceleration time180 minutes(60 minutes for ach direction X, Y, Z)
Resistance to atmospheric pressure:	61.3 to 101.3 KPa
Storage period:	18 months (after date of manufacture)

1.2.6 Applicable Standards (without any electrical optional unit)

Safety Standards

120 VAC model:	UL 1950 Deviation 3, CSA 22.2 No.950 Deviation 3
230 VAC model (Europe):	EN 60950 (IEC950), NEMKO (IEC950), CE marking (low voltage directive)

Safety Regulations (Laser Radiation)

120 VAC model:	FDA (NCDRH) Class 1
230 VAC model (Europe):	VDE 0837 (Laser Class 1)(IEC825)

EMI

120 VAC model:	FCC Part 15 Subpart B Class B, DOC Class B
230 VAC model (Europe):	Vfg 243 (VDE 0878 Part 3,30), EN55022 class B (CISPR Pub.22 class B), CE marking (EMC directive)
230 VAC model (Pacific):	AS/NZS 3548

Others

Toner:	No effect on human health (OSHA, TSCA, EINECS)
OPC:	No effect on human health (OSHA)
Ozone:	Less than 0.02 PPM other UL478 (5th edition)
Materials:	SWISS Environmental Law (No CdS must be contained)
Power Consumption	Applies to International Energy Star Program standard

1.2.7 Specification for Consumable (Imaging Cartridge)

Life: 6,000 pages

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

Environmental Conditions for Storage and Transportation

Temperature:	0 t o 3 0 ° C(32 to 86°F) overfull storage period
Humidity:	30 to 85% RH over full storage period
Drop test:	Height 76 cm (30.4 inches): 1 corner, 3 edges, 6 sides
Vibration:	Same as printer
Resistance to atmospheric pressure:	Same as printer
Storage period:	18 months after date of manufacture

1.2.8 Physical Specifications

Dimensions (Width $\times$ Depth $\times$ Height):

Printer:	411 $\times$ 484 $\times$ 265 mm (16.2 $\times$ 19.0 $\times$ 10.4 inches)
With one lower cassette:	411 $\times$ 484 $\times$ 365 mm (16.2 $\times$ 19.0 $\times$ 14.4 inches)
With two lower cassettes:	411 $\times$ 484 $\times$ 466 mm (16.2 $\times$ 19.0 $\times$ 18.3 inches)

Weight:	Approx. 15 Kg (33.1 lb.) (including imaging cartridge, excluding optional unit)

1.2.9 Software Specifications

Built-in modes: HP LaserJet4 emulation (PCL$^{\circledR}$ 5e)
                         EPSON GL/2 mode (LJ4-GL/2 mode and GL-like mode)
                         FX (FX-870/1170,LX-100) emulation mode
                         ESC/P2 (Stylus800/1000) mode
                         I239X (IBM 2390/2391 Plus emulation)
                         EPSON PostScript Level 2 (Option)

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 initializes	Ejects paper, switches to PCL, and then initializes
PJL, EJL, and ES	Supported	Supported
Advance Full Page (PG, AF)	Supported	Not supported

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

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

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

Optional modes: EPSON Script Level 2(PostScript Level 2 emulation) mode

Auxiliary software: Hexdump
                        Status sheet
                        Font sample

Built-in fonts: SeeTable1-7.

Table 1-7. Built-in Fonts (Bitmap Fonts)

Resident Fonts			**Applicable Mode**			
			HP LJ4 GL/2	**ESC/P 2**	**FX**	**I239X**
Line Printer	16.66 CPI	(Portrait)	V	-	-	-
OCR B	10 CPI	(Portrait)	-	V	V	V

V: Supported, -: Not Supported

Table 1-7. Built-in Fonts (Scalable Fonts)

Resident Fonts		Applicable Mode			
		HP LJ4 GL/2	ESC/P 2	FX	I239X
EPSON Roman		-	V	V	-
EPSON Sans serif		-	V	V	V
EPSON Prestige		-	V	V	V
EPSON Script		-	V	V	V
EPSON Gothic		-	-	-	V
EPSON Presentor		-	-	-	V
EPSON Orator		-	-	-	V
Dutch™ 801	Roman SWC	V	-	-	-
Dutch 801	Bold SWC	V	-	-	-
Dutch 801	Italic SWC	V	-	-	-
Dutch 801	Bold Italic SWC	V	-	-	-
Zapf Humanist 601	Demi SWC	V	-	-	-
Zapf Humanist 601	Bold SWC	V	-	-	-
Zapf Humanist 601	Demi Italic SWC	V	-	-	-
Zapf Humanist 601	Bold Italic SWC	V	-	-	-
Ribbon 131	SWC	V	-	-	-
Clarendon	Condensed SWC	V	-	-	-
Swiss™ 742	SWC	V	-	-	-
Swiss 742	Bold SWC	V	-	-	-
Swiss 742	Medium Italic SWC	V	-	-	-
Swiss 742	Bold Italic SWC	V	-	-	-
Swiss 742	Condensed SWC	V	-	-	-
Swiss 742	Bold Condensed SWC	V	-	-	-
Swiss 742	Condensed Italic SWC	V	-	-	-
Swiss 742	Bold Italic Condensed SWC	V	-	-	-
Incised 901	SWC	V	-	-	-
Incised 901	Black SWC	V	-	-	-
Incised 901	Italic SWC	V	-	-	-
Original Garamond	SWC	V	-	-	-
Original Garamond	Bold SWC	V	-	-	-
Original Garamond	Italic SWC	V	-	-	-
Original Garamond	Bold Italic SWC	V	-	-	-
Audrey Two	SWC	V	-	-	-
Flareserif 821	SWC	V	-	-	-
Flareserif 821	Extra Bold	V	-	-	-
Swiss 721	Roman SWM	V	V	-	-
Swiss 721	Bold SWM	V	V	-	-
Swiss 721	Oblique SWM	V	-	-	-
Swiss 721	Bold Oblique SWM	V	-	-	-
Dutch 801	Roman SWM	V	V	-	-
Dutch 801	Bold SWM	V	V	-	-
Dutch 801	Italic SWM	V	-	-	-
Dutch 801	Bold Italic SWM	V	-	-	-
Symbol Set	SWA	V	-	-	-
More WingBats	SWM	V	-	-	-

V: Supported, -: Not Supported

Table 1-7. Built-in Fonts (Scalable Fonts; Cont')

Resident Fonts		Applicable Mode			
		HP LJ4, GL/2	**ESC/P 2**	**FX**	**I239X**
Courier	SWC	V	V	V	V
Courier	Bold SWC	V	V	V	V
Courier	Italic SWC	V	-	-	-
Courier	Bold Italic SWC	V	-	-	-
Letter Gothic	Roman SWC	V	V	V	-
Letter Gothic	Bold SWC	V	V	V	-
Letter Gothic	Italic SWC	V	-	-	-
Ext. Graph		-	V	V	V

V: Supported, -: Not supported

Font Symbol Sets and Character Tables

HP LaserJet 4 Mode (bitmap fonts) : 28 symbol sets

Roman-8	Norweg1	Roman Extension	French
HP German	ItalianT	JIS ASCII	ECM94-1
Swedis2	ANSI ASCII	Norweg2	UK
French2	German	HP Spanish	Legal
Chinese	8859-2 ISO	Spanish	IRV
Swedish	Portuguese	8859-9 ISO	IBM Portuguese
IBM Spanish	IBM®-US	IBM-DN	PcMultilingual

HP LaserJet4 Mode (scalable fonts) : 45 symbol sets

Roman-8	Norweg1	Roman Extension	French
HP German	Italian	JIS ASCII	ECM94-1
Swedis2	ANSI ASCII	Norweg2	UK
French2	German	HP Spanish	Legal
Chinese	8859-2 ISO	Spanish	IRV
Swedish	Portuguese	PsMath	8859-9 ISO
IBM Portuguese	WiTurkish	DeskTop	Math-8WiE.Europe
PcTk437	Windows	PsText	IBM-US
IBM-DN	McText	PcMultilingual	VeInternational
VeUS	PiFont	PcE.Europe	Symbol
WiAnsi	TWingdings	MsPublishing	VeMathRIBM SPanish

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

USA	SPAIN1	FRANCE	JAPAN
GERMANY	NORWAY	UK	DENMARK2
DENMARK1	SPAIN2	SWEDEN	L.AMERICA
ITALY	KOREA	TLEGAL	

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

I239X Mode : 5 code tables

PcUSA(437)	PcMultilingual(850)
RPcPortuguese(860)	PcCanFrench(863)
PcNordic(865)	

1.2.10 Lower Paper Cassette (Option) Specifications

Paper Size:	A4 or Letter
Paper Weight:	60 to 90 g/m^2 (16 to 24 lb)
Print Speed:	12 PPM (letter/A4)
Paper Feed:	Automatic feed delivery system. Cassette capacity up to 500 sheets (75 g/m^2 or 20 lb paper)
Feeding Speed (first print):	First Lower Paper Cassette: 16 seconds or less; (A4 or letter) Second Lower Paper Cassette 16 seconds or less; (A4 or letter)
Feeding Speed (subsequent sheets)	12 PPM (A4/Letter)
Paper Type:	Plain paper, such as copier paper
Power Supply:	5 V DCand 24 VDC are supplied by the printer
Dimensions and Weight: (Width $\times$ Depth $\times$ Height)	Lower paper cassette entire housing; 405 $\times$ 477 $\times$ 107 mm (18.8 $\times$ 19.0 $\times$ 4.2 inches) 2.8 Kg (6.2 lb.) Paper Cassette; 252 $\times$ 318 $\times$ 82 mm (9.9 $\times$ 12.5 $\times$ 3.2 inches) 1.1 Kg (2.4 lb.)
Harmonic noise:	Less than 52 dB(A) (operating)

1.3 INTERFACE SPECIFICATIONS

The EPL-N1200 is equipped with the following external interfaces:

- ■ Parallel interface B
- ■ Parallel interface C
- ■ Serial interface on optional LocalTalk/Serial module
- ■ LocalTalk interface on optional LocalTalk/Serial module

1.3.1 Parallel Interfaces

There are two parallel interfaces: parallel interface B and parallel interface C. Each interface has his own connector.

Parallel Interface B

Interface specification complies with IEEE 1284-I.

Operating modes: Compatibility (standard) and nibble (reverse) modes

Transfer speed: APPROX. 400 KB/second (MAX.)

Connector type: Amphenol or equivalent (IEEE 1284B - type connector)

Parallel Interface C

Interface specification complies with IEEE 1284-II.

Operating modes: Compatibility (standard), nibble (reverse), and ECP modes

Transfer speed: APPROX. 2MB/second in ECP mode (MAX.)

Connector type: IEEE 1284C - type connector

1.3.1.1 Compatibility (Standard) Mode

System: $\overline{\text{STROBE}}$ synchronization, 8-bit parallel data transfer

Handshaking: BUSY and $\overline{\text{ACKNLG}}$ signals

Applicable plug: 57-30360 (Amphenol or equivalent)

Signal timing: See Figure 1-3.
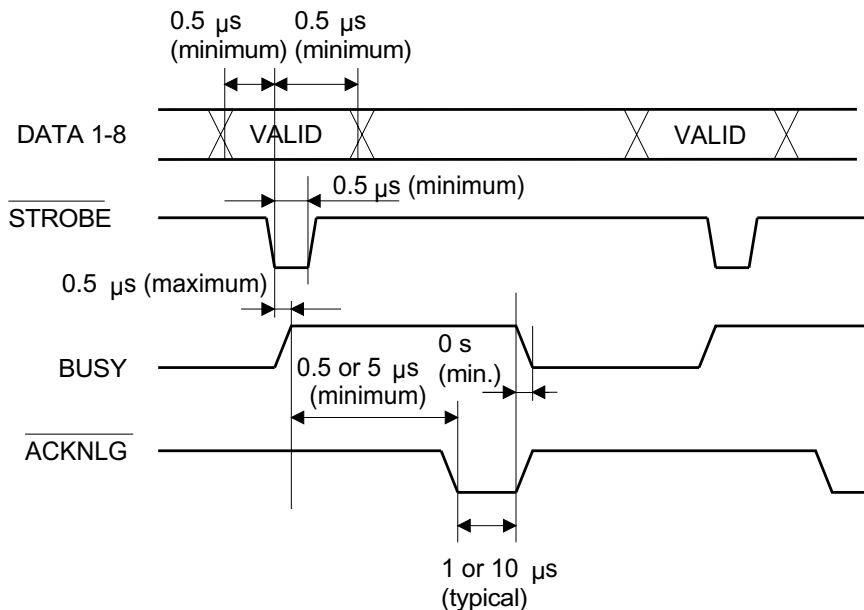
Signal description: See Table 1-8.

Figure 1-3. Compatibility Mode Signal Timing

Table 1-8. Parallel Interfaces Pin Assignment

Parallel-B			Parallel-C			Description
Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O	
1	$\overline{\text{STROBE}}$	I	15	$\overline{\text{STROBE}}$	I	STROBE is a strobe pulse used to read data from the host computer. The pulse width must be more than 0.5 μsec. Normally it is HIGH, and data is latched at the trailing edge of this signal.
2-9	DATA 1-8	I	6-13	DATA 1-8	I/O	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 0. The most significant bit (MSB) is DATA8. The signal state must be maintained for 0.5 μsec. on either side of the $\overline{\text{STROBE}}$ signal active edge.
10	$\overline{\text{ACKNLG}}$	O	3	$\overline{\text{ACKNLG}}$	O	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	O	1	BUSY	O	The BUSY signal informs the host computer of the printer state. When the signal is HIGH, the printer cannot accept data.
12	PE	O	5	PE	O	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	O	2	SLCT	O	Use at reverse mode.
14	$\overline{\text{AUTO-FEED}}$	I	17	$\overline{\text{AUTO-FEED}}$	I	Not used.
15,18, 34	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.
19-30	GND	-	19-35	GND	-	Ground level for the twisted pair return signal.
31	$\overline{\text{INIT}}$	I	14	$\overline{\text{INIT}}$	I	The STROBE signal is ignored when this signal is LOW.
32	$\overline{\text{ERROR}}$	O	4	$\overline{\text{ERROR}}$	O	This level goes LOW when the printer is: out of paper paper jam in error state off line
33	GND	-	-	-	-	Same as for pins 19 to 30.
35	+5	-	-	-	-	Pulled up to +5V through 1.0 Kohm resistance.
36	$\overline{\text{SLCT IN}}$	-	16	$\overline{\text{SLCT IN}}$	I	Use the reverse mode.
-	-	-	18	Host Logic High	I	Hosyt logic high signal
-	-	-	36	Peripheral Logic High	O	Peripheral logic high signal

1.3.1.2 Nibble (Reverse), ECP Mode

The reverse mode for EPL-N1200 supports the IEEE-P1284 nibble mode. This printer can run in reverse mode, in which the printer can inform the computer of its status by EJL and PJL commands.

System: Nibble mode of IEEE-P1284

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

Applicable plug: 57-30360(Amphenol or equivalent)

Signal description: See Table 1-9.

Table 1-9. Parallel Interface Pin Assignment

| Pin No.	Signal Name	I/O	Description
1	$\overline{\text{STROBE}}$	IN	HostClk: This signal is a strobe pulse used to read extension request values from the host computer during negotiation.
2-9	DATA 1-8	IN	The signals are data bits of extension request values during negotiation. This printer supports following values: 0000 0100: Request Device ID (by nibble mode sending) 0000 0000: Request nibble mode
10	$\overline{\text{ACKNLG}}$	OUT	PtrClk: Printer data sending clock.
11	BUSY	OUT	PtrBusy: Printer sending data bits 3 and 7 during data transfer to host computer.
12	PE	OUT	AckDataReq: Printer sending data bits 2 and 6 during data transfer to host computer.
13	SLCT	OUT	Xflag: Printer sending data bits 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	$\overline{\text{INIT}}$	IN	nInit: High level fixed
32	$\overline{\text{ERROR}}$	OUT	nDataAvail: Printer sending data bits 0 and 4 during data transfer to host computer.
33	GND	-	Same as for pins 19 to 30.
34	NC	-	Not used.
35	+5	-	Pulled up to +5V through 1.0 Kohm resistance.
36	$\overline{\text{SLCT IN}}$	IN	1284Active: If this signal is set to HIGH, this printer active P1284 (reverse mode).
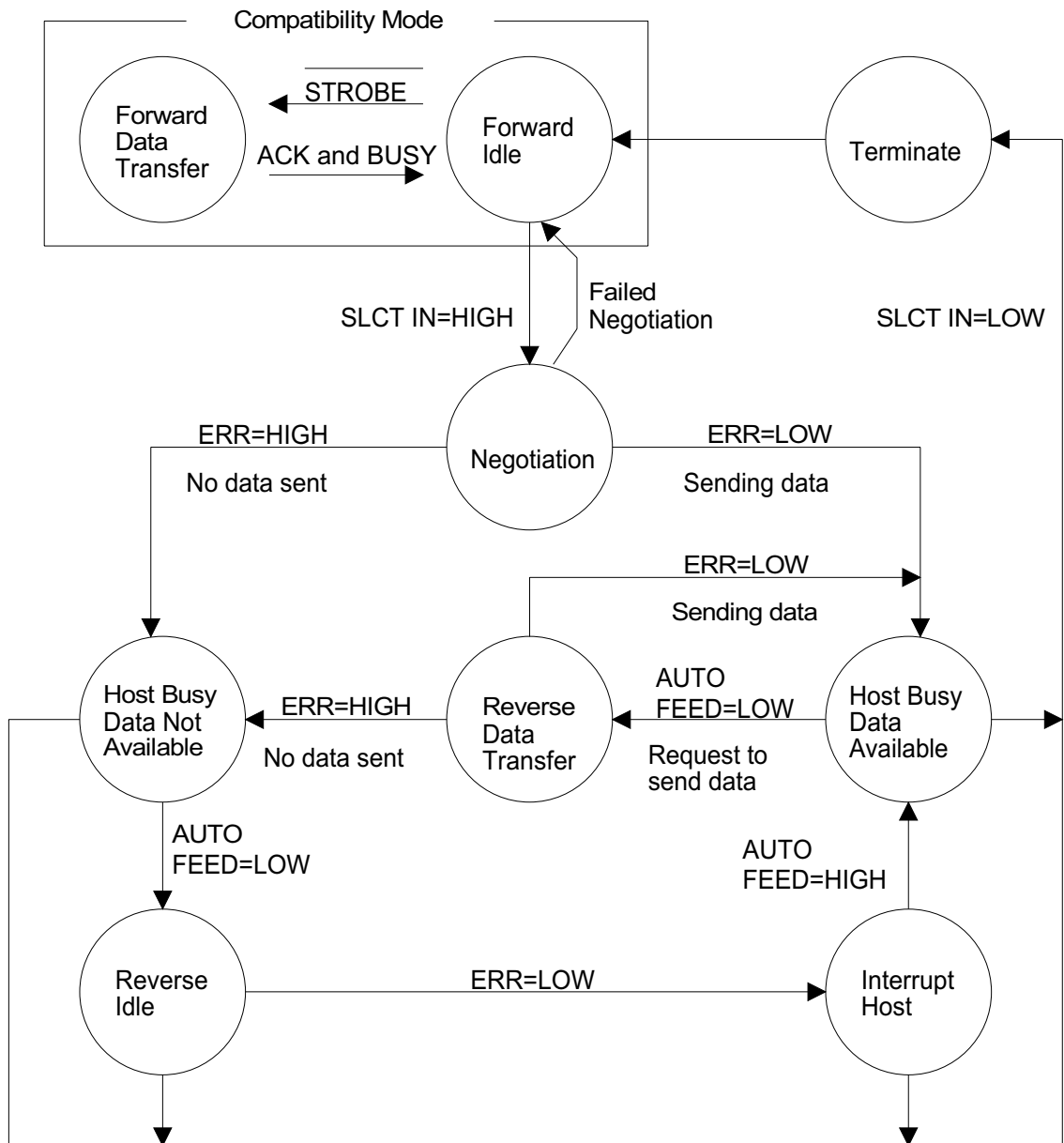
Figure 1-4. Parallel Interface State Switch Diagram

Figure 1-4 shows the parallel interface state switch diagram.
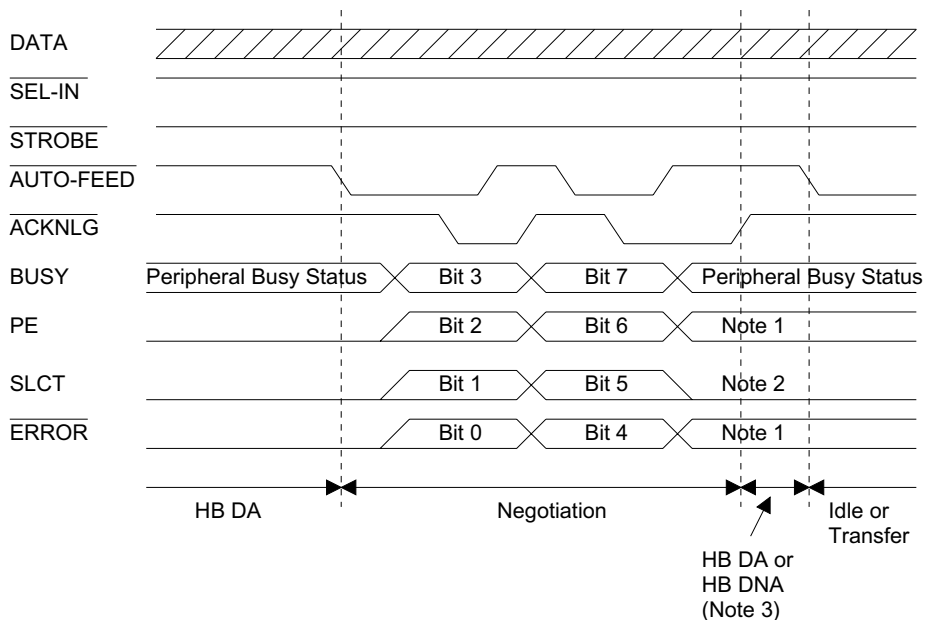
Figure 1-5 shows the timing chart for negotiation.
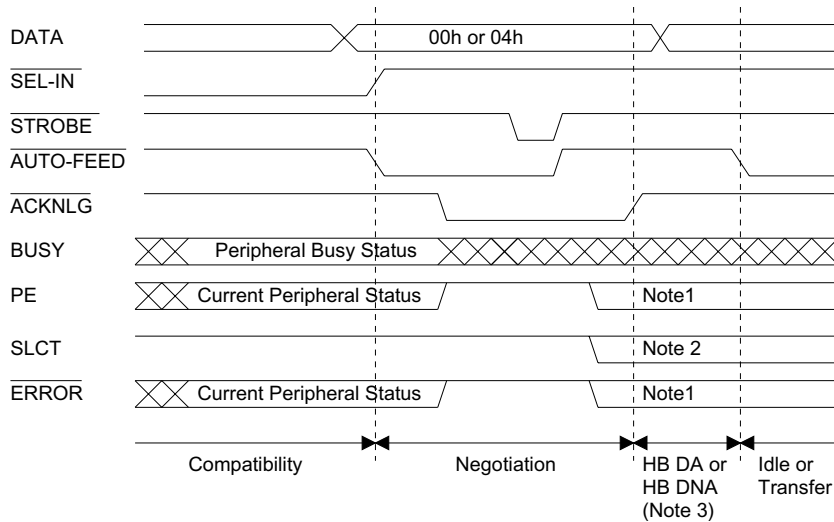
Figure 1-5. Negotiation Timing Chart

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.

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

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

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 extension request value was 04h.

Note 3: HB DA: Host Busy Data Available
HB DNA: Host Busy Data Not Available
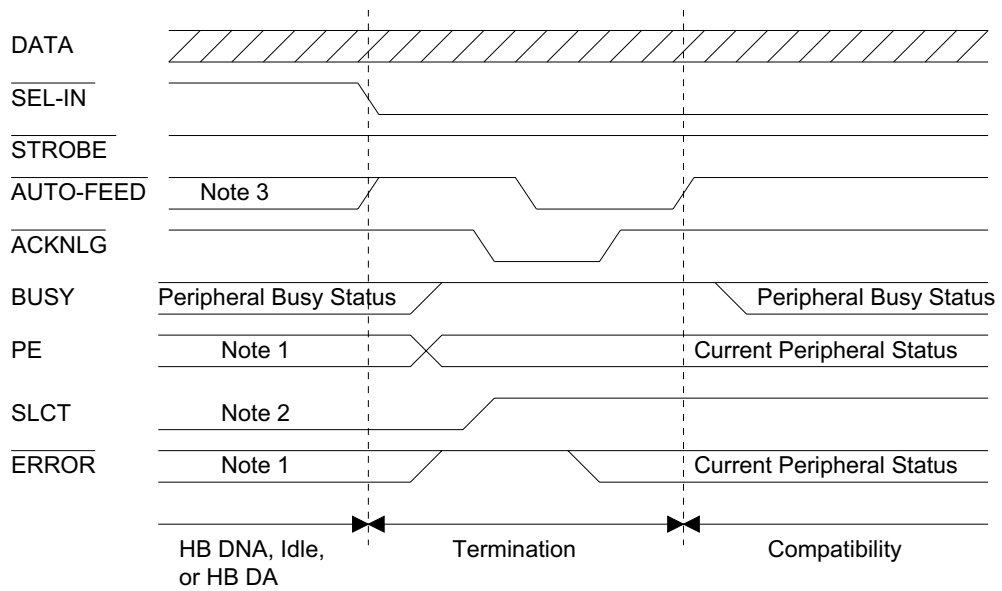
Figure 1-7. Termination Timing Chart
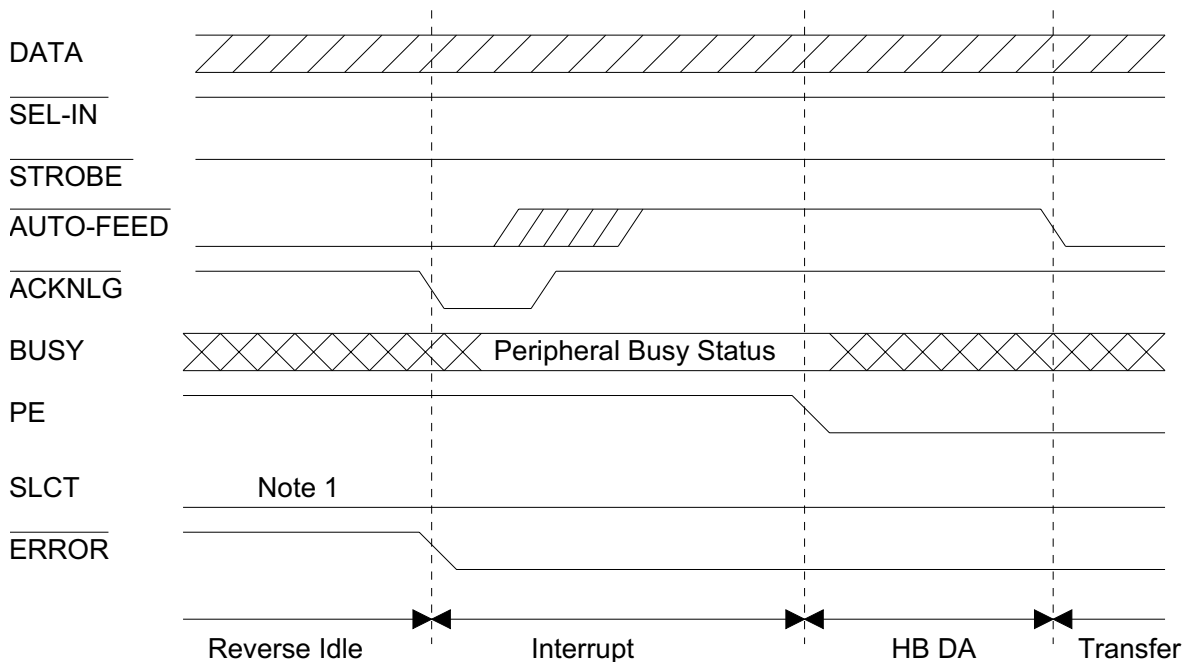
Figure 1-7 shows the timing chart of termination.

Note 1:   The signal is HIGH when HB DNA.
           The signal is LOW when HB DA.
Note 2:   The signal is set to HIGH, if extension request value was 04h.
Note 3:   Idle = LOW

Figure 1-8 shows the timing chart for an interrupt.

Figure 1-8. Interrupt Timing Chart

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

1.3.2 Optional Serial Interface (LocalTalk/Serial Module)

The optional LocalTalk/Serial module contains serial interface with the following characteristics.

Type:	RS-232C or current loop
Transfer system:	Full duplex
Synchronization:	Asynchronous start-stop system

	Start-bit:	1 bit
	Stop-bit:	1 or 2 bits
	Data length:	7 bits or 8 bits
	Parity:	Odd, even, or none

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

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

Note 1: For RS-232C signal level, speeds of 38400 BPS and above place restrictions on the host computer, cable, and other operating conditions.

Note 2 For current loop signal level, speeds of 2400 BPS and above place restrictions on the host computer, cable, and other operationg conditions.

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

Applicable plug Circular miniature DIN 8-pin plug

Signal Level
(EIA BASED) : TXD, DTR

Out put Voltage	(VOH)	5 to 15 V
	(VOL)	-5 to -15 V
Open circuit voltage	(VO)	within ±15 V
Impedance with power off	(rO)	300 ohms (MIN.)
Load capacitance	(CL)	2500 pF (MAX.)
Through rate		30 V/u SEC (MAX.)
Load resistance	(Lo)	3 K to 7 K ohms

RXD, CTS

Input Voltage	(VIH)	3 V (MIN.)
	(VIL)	-5 V (MIN.)*1
Input signal range		+25 V (MAX.)*1
Input impedance	(RI)	3 K to 7 K ohms
Imput current	(II)	+ 8 mA (MAX)*1
Open-circuit input voltage	(EL)	-2 V (MAX>)*1

Note : Annotations "MIN". and "MAX." apply to absolute values.

Signal descriptions: See Table 1-10.

Table 1-10. Serial Interface Pin Assignments

Pin No.	RS-232C		Current Loop		Description
^	Signal Name	I/O	Signal Name	I/O	^
1	DTR	O	N.C.	-	Signal output by the printer. When the DTR signals HIGH, the RXD signal can be received by the printer. The SelecType setting doesn't 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 256 characters after DTR goes LOW.
2	CTS	I	N.C.	-	Always ignored.
3	TXD	O	TTY-TXD return	-	TXD: Serial ASCII data output from the printer. It maintains "MARK" state (LOW level) between transmitted character codes. Logic 0 is at HIGH level ("SPACE") and logic 1 is at LOW level ("MARK"). TTY-TXD return: Refer to TTY-TXD.
4	GND	-	GND	-	Ground.
5	RXD	I	TTY-RXD return	-	RXD: Serial ASCII data input to the printer. It maintains "MARK" state ("LOW level) between received character codes. TTY-TXD return: Refer to TTX-RXD.
6	N.C.	-	TTY-TXD	O	TTY-TXD: Serial ASCII data output from the printer. The logic is determined by the impedance between pins 3 and 6. Logic 0 is high impedance ("SPACE") at current off and logic 1 is low impedance ("MARK") at current on. It maintains "MARK" state (LOW level) between transmitted character codes
7	N.C.	-	N.C.	-	Not connected.
8	N.C.	I	TTY-RXD	I	TTY-RXD: Serial ASCII data input to the printer. The logic is determined by the impedance between pins 5 and 8. Logic 0 is high impedance ("SPACE") when current is off and logic 1 is low impedance ("MARK") when current is on. It maintains "MARK" state (LOW level) between transmitted character codes

Handshaking

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

Protocol

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

o   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.

o   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 256 characters. No further X-OFF codes are sent in response to additional data received from the host after the X-OFF code has been sent once. The X-ON (DC1) code is output after all conditions given in the error are cleared.

When the remaining capacity of the receive buffer reaches 512 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 (LocalTalk/Serial Module)

The optional LocalTalk/Serial module contains LocalTalk interface with the following characteristics.

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	O	Signal output by the printer. When the DTR signals HIGH, the RXD signal can be received by the printer.
2	CTS	I	The printer transmits the data through TXD while CTS is HIGH.
3	TXD-	O	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 0 "SPACE" and logic 1 "MARK" must be maintained between transmitted character codes.
4	GND	-	Ground.
5	RXD-	I	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 0 "SPACE" and logic 1 "MARK" must be maintained between transmitted character codes.
6	TXD+	O	Refer to TXD-.
7	N.C.	-	Not connected.
8	RXD+	I	Refer to RXD-.

Buttons

o	On Line	Switches the printer between on-line and off-line modes. While in SelecType mode, this button exits SelecType mode.
o	Manual Feed (On Line + ALT)	Enters directly (a short cut) to manual feed; this setting is the same as the manual setting in the PRINTING Menu of SelecType.
o	Item	Enters SelecType mode. Changes the item in SelecType mode.
o	Page Size (Item+ ALT)	Enters directly (a short cut) to the paper size setting for the standard and optional paper tray in Printing Menu of SelecType.
o	Paper Source (Menu+ ALT)	Enters directly (short cut) to the paper tray select setting in Config Menu of SelecType.
o	ALT	Modifies functions of other buttons.
o	↑	Changes to the next SelecType option.
o	↓ (↑ + ALT)	Changes to the previous SelecType option.
o	Enter	Sets the current option in SelecType.
o	Form Feed	When the printer is off line and the Form Feed light is lit, pressing this button prints data in the printer's memory.
o	Continue	Pressing this button when the Continue light is flashing clears an error.
o	SelecType	Selects one of three modes, OneTouch menu 1, OneTouch menu 2, or SelecType mode.
o	Menu	Selects one of three menus, Paper Source, RITech, or SelecType.
o	Value	Selects one of three menus, Manual Feed, MP Tray Size, or selects item option in SelecType.
o	Enter	Selects one of three menus, Orientation, Toner Save Mode, or defines setting value or executes an operation in SelecType.
o	RESET (Continue + ALT)	Enter to reset operation; LCD displays "Reset", printing stops, and the input buffer of current interface is cleared. If the Continue + ALT buttons aredepressed continuously after "Reset" displays, the message displayed on the LCD changes to "Reset ALL" (after about 5 seconds), and the printer enters to Warming Up" operation; printer clears all RAM.

1.4 OPERATING INSTRUCTIONS

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

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.
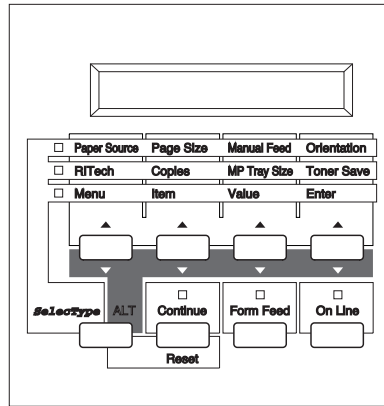
Figure 1-9. Control Panel

Display (LCD)

A 20-character (5 × 7 dot matrix) by 1-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

o 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.

o   Form Feed

This LED indicates the data processing condition for each interface channel.

ON:	Received data stored in the printer but has not been printed.
OFF:	No printable data remains in the printer.
Flashing:	The printer is processing data.

o   Continue

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

o OneTouch Menu 1

Indicates that OneTouch setting mode is active and OneTouch Menu 1 is in use.

o One Touch Menu 2

Indicates that OneTouch setting mode is active and OneTouch Menu 2 is in use.

o SelecType

Indicates that SelecType setting mode is active.

o All LEDs are flashing

An error has occurred that requires a service call.

1.4.2 SelecType Functions

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 Menu	Paper Source	**Auto, MP, LC1*11), LC2*12)**
	Page Size	**A4*1), A5, B5, LT*3), HLT, LGL, GLT, GLG, EXE, F4, MON, C10, DL, C5, IB5, CTM**
	Orientation	**Port**, Land
	Copies	**1** to 999
	Manual Feed	**Off**, On
	Resolution	**600**, 300
LJ4 Menu	Font Source	**Resident,** SIMM, Download
	Font Number	**0** to (available; MAX. 65535)
	Pitch	0.44 to **10.00** to 99.99 CPI (step 0.01)
	Height	4.00 to **12.00** 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 **60***3), to **64***2), to 128 lines
	Source SymSet*16)	0 to **277** to 3199
	Desrt SymSet*16)	0 to **277** to 3199
PS Menu*4)	Err Sheet	**Off,** On
	MicroGray	**Off**
	Protect Level	**1** to 5
ESCP2 Menu	Font	**Courier**, Prestige, Roman, Sans serif, Roman T, Orator S, Sans H, Script, OCR B
	Pitch	**10 CPI**, 12 CPI, 15 CPI, Prop
	Condensed	**Off**, On
	T.Margin	0.40 to **0.50** to 1.50 Inch (step 0.05)
	Text	1 to 62*3), to 66*2), to (available; MAX. 81) Lines

* With option

Table 1-12. SelecType Functions (Cont.)

Menu (Changed by Menu button)	Item (Changed by Item button)	Available Options (Changed by ↑ or ↓ button) (Set by Enter button)
ESCP2 Menu (Cont.)	CG Table	Italic, **PcUSA**, PcMultilin, PcPortugues, PcCanFrenc, PcNordic, PcTurkish2, Pc.E.Europe, BpBR ASCII, BpAbicomp
	Country	**USA**, France, Germany, UK, Denmak, Sweden, Italy, Spain1, Japan, Norway, Denmark2, Spain2, LatinAmeric, Korea
	Auto CR	**On**, Off
	Auto LF	**Off,** On
	Bit Image	**Dark**, Light, BarCode
	Zero Char	**0**, ө
FX Menu	Font	**Courier**, Prestige, Roman, Sans serif, Script, Orator S, OCR B.
	Pitch	**10cpi**, 12cpi, 15cpi, Prop
	Condensed	**Off,** On
	T.Margin	0.40 to **0.50** to 1.50 Inch (step 0.05)
	Text	1 to **62***3) to 66*2) to (Available 81 MAX.) Lines
	CG Table	Italic, **PcUSA**, PcMultilin, PcPortugues, PcCanFrenc, PcNordic, PcTurkish2, Pc.E.Europe, BpBRASCII, BpAbicomp
	Country	**USA**, France, Germany, UK, Denmak, Sweden, Italy, Spain1, Japan, Norway, Denmark2, Spain2, LatinAmeric
	Auto CR	**On**, Off
	Auto LF	**Off**, On
	Bit Image	**Dark**, Light, BarCode
	Zero Char	**0**, φ
I239X Menu	Font	**Courier**, Prestige, Gothic, Orator, Script, Presentor, Sans serif
	Pitch	**10cpi**, 12cpi, 15cpi, 17cpi,20cpi,24cpi, Prop
	Code Page	**437,** 850, 860, 863, 865
	T.Margin	0.30 to **0.40** to 1.50 Inch (step 0.05)
	Text	1 to **62***3) to 66*2) to (Available 81 MAX.) Lines
	Auto CR	**Off**, On
	Auto LF	**Off**, On
	Alt. Graphics	**Off**, On
	Bit Image	**Dark**, Light
	Zero Char	**0**, φ
	CharacterSet	1*3), 2*2)

Table 1-12. SelecType Functions (Cont.)

Menu (Changed by Menu button)	Item (Changed by Item button)	Available Options (Changed by ↑ or ↓ button) (Set by Enter button)
Emulation Menu	Parallel B	**LJ4**, ESCP2, FX, I239X, PS*4), GL2, Auto
	Parallel C	**LJ4**, ESCP2, FX, I239X, PS*4), GL2, Auto
	Serial*6)	**LJ4**, ESCP2, FX, I239X, PS*4), GL2, Auto
	L/T*6)	PS*4), GL2, Auto, **LJ4**, ESCP2, FX, I239X
	AUX*	**LJ4**, ESCP2, FX, I239X, PS*4), GL2, Auto
Tray Size Menu	MP Tray Size*0)	**A4***2), A5, B5, **LT***3), HLT, LGL, GLT, GLG, EXE, F4, MON, C10, DL, C5, C6, IB5
	LC1 Size*8)*11)	A4, LT
	LC2 Size*8)*12)	A4, LT
Config Menu	RITech*0)	**Medium**, Dark, Off, Light
	Toner Save	**Off,** On
	Density	**3**, 4, 5, 1, 2
	Top Offset	-9.0 to **0.0** to 99.0 mm
	Left Offset	-9.0 to **0.0** to 99.0 mm
	Size Ignore	**Off,** On
	Auto Cont	**Off,** On
	Page Protect	**Auto**, On
	Image Optimum	**Auto**, Off, On
Setup Menu	Interface	**Auto**, ParallelB, ParallelC, Serial*6), L/T*5), AUX*10)
	Time Out	0, 5 to **60** to 300
	Standby	**Enable**, Disable
	Lang*18)	English
	Lang*18)	Francais
	Sprache*18)	Deutch
	Ling*18)	Italiano
	Leng*18)	Espanol
	Sprak*18)	Svenska
	Sprog*18)	Dansk
	Taai*18)	Nederal.
	Kieli*18)	Soumi
	Idiom*18)	Portugues
	Panel Lock*1`7)	Off, On
	Toner*8)	E****F, E*** F, E*** F, E* F, E F
	Toner Count Clear	
	Page Count*8)	0 to 99999999

^	SelecType Init	

Table 1-12. SelecType Functions (Cont.)

Menu (Changed by Menu button)	Item (Changed by Item button)	Available Options (Changed by ↑ or ↓ button) (Set by Enter button)
Test Menu	Status Sheet	—
	LJ4 Font Sample	—
	ESCP2 Font Sample	—
	FX Font Sample	—
	I239X Font Sample	—
	PS Status Sheet*4)	—
	PS Font Sample*4)	—
Parallel B Menu	Speed	**Fast**, Normal
	Bi-D	**On**, Off
	Buffer Size*21)	**Normal,** Maximum, Minimum
Parallel C Menu	Speed	**Fast**, Normal
^	Buffer Size*21)	**Normal,** Maximum, Minimum
Serial Menu*6)	Word Length	**8**, 7
	Baud Late	**9600**, 19200, 38400, 57600, 300, 600, 1200, 2400, 4800
	Parity	**None**, Even, Add
	Stop Bit	**1**, 2
	Xon/Xoff*7)	**On**, Off, Robst
	DTR	**On**, Off
	Buffer Size*21)	**Normal**, Maximum, Minimum
L/T Menu*5)	Buffer Size*21)	**Normal**, Maximum, Minimum
AUX Menu*10)	Buffer Size*21)	**Normal**, Maximum, Minimum
JOB	PAGE PROTECT	OFF, LT, LGL, A4
	RESOLUTION	300, 600
	TIMEOUT	5 to 300

*1) GL/2 menu doesn't have it.

*2) Factory setting for Europe and Taiwan.

*3) Factory setting for North America

*4) Can be selected only when EPSONScript Level 2 ROM Module is installed

*5) Can be selected only when LocalTalk/Serial module is installed and LocalTalk is selected on the module.

*6) Can be selected only when LocalTalk/Serial module is installed and serial I/F is selected on the module.

*7) LJ4 is the factory setting without EPSONScript Level 2 ROM Module.

*8) The item is display-only and can 't be selected.

*10)   Can be selected only when Type-B I/F is installed.

*11)   Can be selected only when the lower paper cassette is set as unit 1.

*12)   Can be selected only when the lower paper cassette is set as unit 2.

*13)   Can be selected only when content-information data exists.

*15)   Internally always set to OFF. It is not displayed on the LCD as a setting item.

*17)   This item is not displayed on the LCD.

*18)   Setting Item Lang is displayed for a language setting value for both setting the item and the value.

*21)   After resetting the value, warm boot or restart the printer to make the value effective.

1.4.3 Service Mode

This printer has the following three service modes:

■　Hexadecimal Dump Mode
■　EEPROM Format
■　Error Recovery

1.4.3.1 Hexadecimal Dump Mode

Hexadecimal dump mode is a useful tool for troubleshooting 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.
To exit the hexadecimal dump mode, executing warm boot by resetting or turning printer power off, waiting a few seconds, then turning it on again.

1.4.3.2 EEPROM Format

EEPROM format operation is required only when the main controller board (C205 MAIN board) or EEPROM is replaced and these operations are specified in the accompanying documentation.

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

Default Factory Setting

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

Turn on the printer while holding down the On Line, Reset, and Menu buttons until "Format Nvram" is displayed.

This function :

* Clears the page counter

* Clears the paper jamcounter

* Writes the factory default setting. The destination is identified by the jumper setteing on the main controller board. Refer to Table 1-13..

Table 1-13. Main Controller Board Default Paper Size Setting

Jumper Address	Setting	Fcatory Default Paper Size	Market
J4	Close pin 1 and pin 2	A4	Eurpoe, Asia, and Oceania
^	Open pin 1 and pin2	Letter	North America

Clear Page Counter to 0

Clears EEPROM page counter to 0 by turning the printer while holding down the On Line, Menu, and Item buttons until "PCOUNT CLEAR" is displayed.

1.4.3.3 Error Recovery

The LCD on the control panel unit indicates the printer status and error code if the printer has fatal error.

CPU reset

This function can be used without restarting the printer to attempt to recover from a fatal error ("E*****" or "C2XXX") that occurs during printer operation.

Press the SelecType, Menu, Item, Value, and Enter buttons.

Displays the detailed information for the fatal error code

This function let you know the meaning of the error status ("E*****" or "C2XXX") in details.

1. Press the Continue, SelecType, and Menu buttons.

2. The printer diplays "ERR YXXXX 0X*******".

3. Press any button.

4. The printer diplays "ERR TYPE 0X*******".

5. Press any button, then return to 2.

6. "Printing SysErr? >" desplays, and you can print an error status sheet by pressing the Enter button.

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	Message Type
Self Test	Internal self test	Status
Reset All	Warm boot	Status
Reset	Resetting	Status
Reset to Save	A control panel setting has been changed. Press the Continue or On Line button to bring the change becomes valid when a reset or warm boot is performed.	Status
Form Feed	Paper form feeding	Status
Warming up	Warming up	Status
Standby	Power down mode	Status
Ready	Normal condition	Status
Menus Locked	This message is valid when Panel Lock is set to on by EJL command. Press any button.	Warning
Chack Paper Size	This message is valid when Size Ignore is off. Paper size is different from the page size you are attempting to print. Press the Continue button or performs a reset or warm boot.	Warning
Image Optimum	Couldn't be printed at the specified resolution, due to memory shortage.	Warning
Toner Low	Detected toner low (remaining toner is 0 %.)	Warning

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 occurred.	Open the top cover and remove jammed paper. Then close the top cover.
Feed Jam	A paper jam occurred in the feed process.	Open the top cover and remove jammed paper. Then close the top cover.
Printer Open	Cover is open.	Close the top cover.
Manual Feed XXX	Manual feed selected.	Insert paper and press the On Line button. Perform a reset or warm boot.
Paper Out XXXXX YYYY	No paper is left in either the standard tray or optional cassette.	Load proper paper in paper tray or optional cassette.
Toner Out	The engine detects toner out and printing is terminated.	Replace the imaging cartridge Press the Continue button clear the error temporarily.
Paper Set XXXXX YYYY	The paper in the selected tray is different from the paper size selection.	When Auto Cont is off: Load proper paper in the correct paper tray. Press the Continue button without replacing paper. When Auto Cont is on: The error is automatically cleared.
Print Overrun	Engine speed is faster than print image processing.	When the Auto Cont is off: Press Continue button. When Auto Cont is on: The error is automatically cleared.
Mem Overflow	Data has filled the buffer.	When Auto Cont is off: Press the Continue button. Perform reset or warm boot. When Auto Cont is on: The error is automatically cleared.
Illegal AUX I/F Card	The inserted I/F card not supported.	Turn power off and remove the I/F card.
Illegal I/F Module	The inserted I/F module not supported.	Turn power off and remove the I/F module.
Service Req XYYYY	Printer problem	Service required.

1.4.4.3 Warning Message

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

Table 1-16. Warning Messages

Message	Status	Measures
Menus Locked	Occurs when Panel Lock=On is set by EJL. When the setting is on, press Menu, Item, Value or Enter button in One Touch Mode or press Enter button in SelecType mode. Also displays the warning to indicate that setting values can't be saved in EEPROM.	Press any button to release this warning.
Check Paper Size	Paper in the selected tray is different from the paper size chosen with Size Ignore = Off.	Press the Continue button.
Image Optimum	Because of insufficient memory, the printer uses a lower print quality.	Increase memory size. Press the Continue button.
Toner Low	Remaining toner is 0 %.	Replace the imaging cartridge with a new one. You can clear the error temporarily by pressing the Continue button.

1.4.5 Multi-user and Multi-emulation

This printer has a multi-user and multi-emulation functions. It can be connected simultaneously to and receive print codes from up to four different hosts or networks (when the optional module and I/F card are installed.).
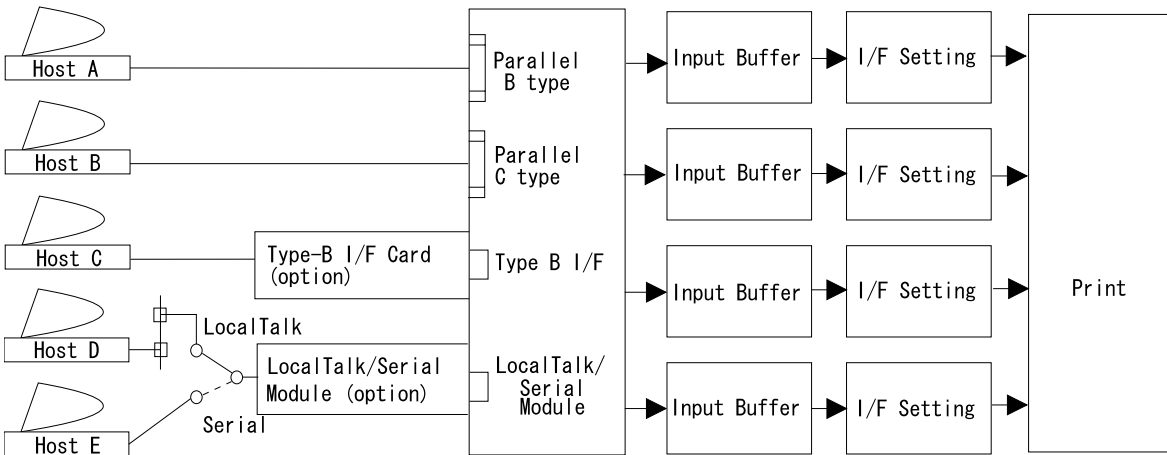
Figure 1-10. Multi-port and Multi-emulation

Note 1: LocalTalk/Serial Module and Type-B I/F card can be used simultaneously.

Note 2: Selection of one of two interfaces for the LocalTalk/Serial Module is determined by the type of cable and jumper settings on the module. Jumper settings for the module are recognized when the printer is powered on.

Note3: Installation of a Type-B I/F card is recognized when the printer is powered on.

1.4.6 Emulation Mode Switch Function

This section describes the emulation mode switch function.

1.4.6.1 Emulation Switch by SPL

The four types of emulation switch functions described below are available on this printer.

EJL: Eson Job Language

This is EPSON's original language system. It is able to skip among various destinations, as shown in Figure 1-11.

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 1-11. 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.
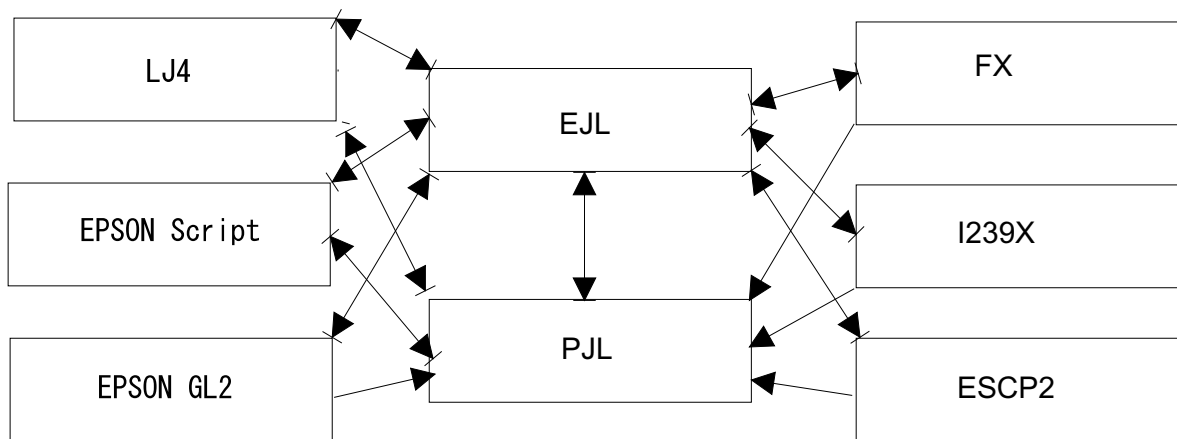
Figure 1-11. Emulation Switch by SPL

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.
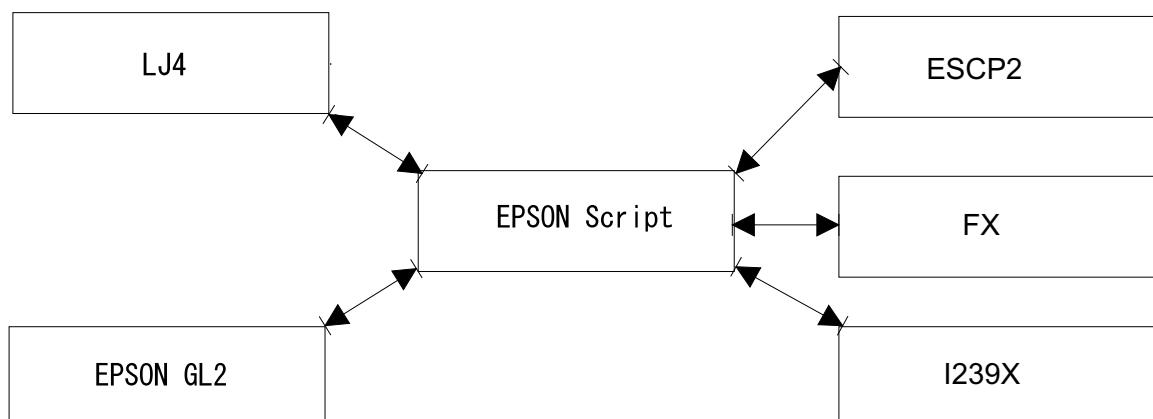
Figure 1-12. Intelligent Emulation Switch

1.4.7 Bi Resolution Improvement Technology

The EPL-N1200 printer has BiRITech (Bi Resolution Improvement Technology), which is designed to improve print quality at 600 DPI and 300 DPI. Using this method, dot map data extracted from the image data and reassembled to improve print quality.

The main improvement of this technique is in eliminating "jaggies" in diagonal lines. It is most effective when the dot map data fits the development characteristics of the printer mechanism well. It is therefore necessary to set appropriate values in SelecType.
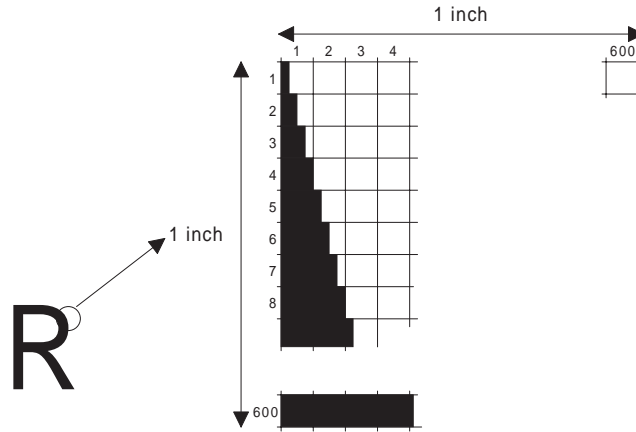
(When 600 DPI printing)
Figure 1-13. BiRITech Effect

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

The following settings are available in SelecType Level for RITech: DARK, MEDIUM, LIGHT, OFF. When the toner density of area A is almost the same as that of area B (as shown in the figure below), the RITech setting is at its optimum setting. In other words, the optimum setting is achieved when it is difficult to distinguish the shape of area A from that of B.
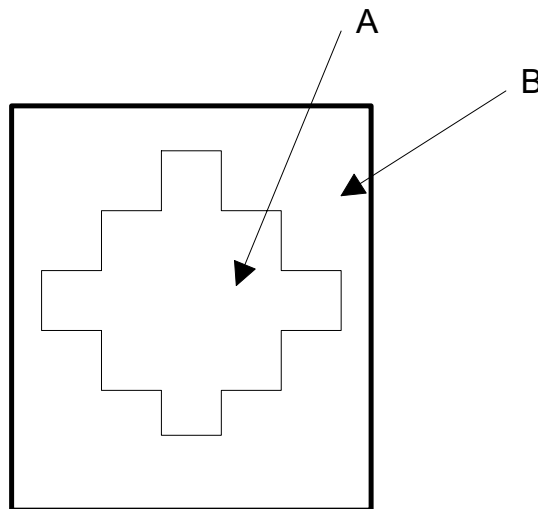
Figure 1-14. RiTech Adjustment

1.4.8 Printer Initialization

There are three ways to initialize this printer before entering the on line state.

Reset Procedure

This is performed by holding down the Alt and Reset buttons. The reset procedure aborts printing on the active interface only, then performs the reset. It can be used to cancel multi-copy printing or abort prinitng of invalid data.

1. Compared print requests made up to the point of the reset are lost.

2. Data input from the current port up to the point of the reset is lost.

3. Errors are canceled.

Warm Boot Procedure

This is performed by holding down the Alt and Reset buttons for several seconds. The worm boot procedure aborts printing on all interfaces, and performs the reset.

1. Initialization of memory.

2. The data input buffers for all interfaces are cleared.

Cold Start Procedure

This is performed by turning the power switch is on. A cold start performs the following processes.

1. Initialization of engine.

2. Check of ROM, EEPROM, and DRAM.

3. Check of peripheral devicess.

4. Initialization of memory.

5. Initialization of peripheral devices.

1.4.9 Toner Save Mode

The Tonere Save Mode uses about 50 % less toner than the normal. The printer saves toner by substituting a gray shade for the black inside of characters. The outsides of the characters are still printed in full black.
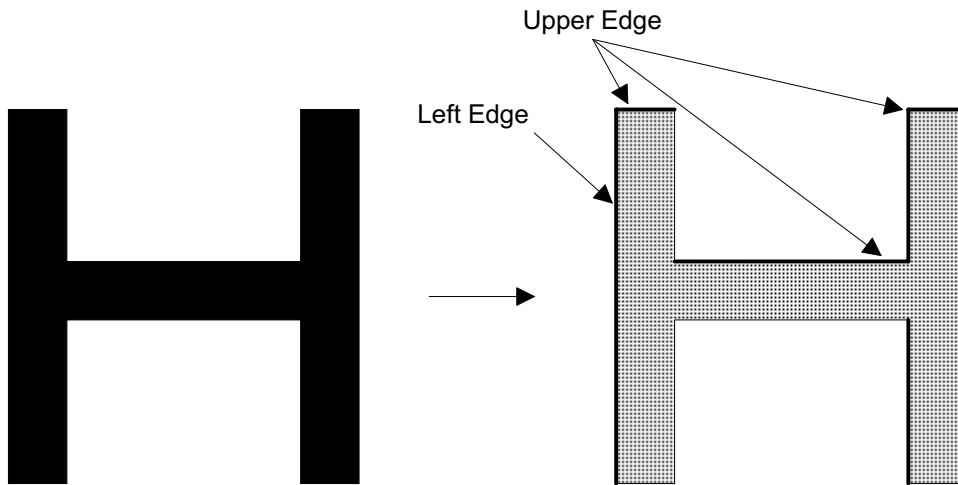
Figure 1-15. Toner Save Mode

1.4.10 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 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 (SIMMs). 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:
  36 mm (Height) $\times$ 108 mm (Width) $\times$ 10 mm (Depth)

  1.4" (Height) $\times$ 4.3" (Width) $\times$ 0.4" (Depth)

1.5 MAIN COMPONENTS

To simplify maintenance and repair, the main components of the EPL-N1200 has been designed for easy removal and replacement. The main components are:

- ❏ C205 MAIN Board   Main controller circuit board
- ❏ C173 PROG Board*1)   Program ROM circuit board
- ❏ Control panel Unit
- ❏ PWB-A Board   Engine controller circuit board
- ❏ PU1 Board   Power supply circuit board
- ❏ HV1 Board   High-voltage supply circuit board
- ❏ Optical Unit   Printhead unit
- ❏ Fusing Unit
- ❏ Imaging Cartridge
- ❏ Lower Paper Cassette Unit (optional)

    Only for specific models.
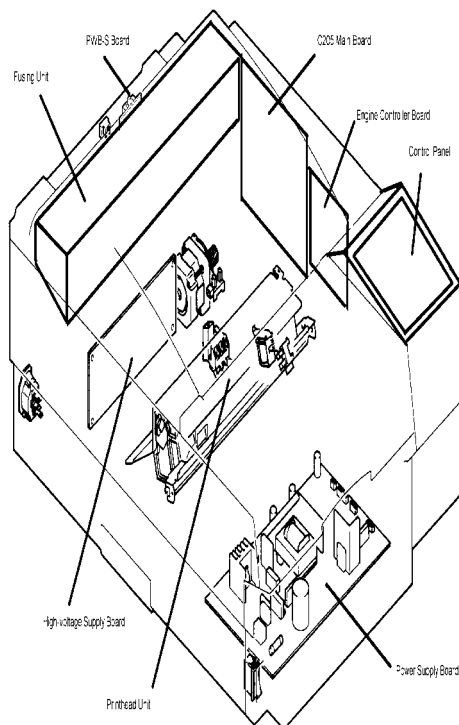
Figure 1-16. Component Layout

1.5.1 C205 MAIN Board

The C205 MAIN board is a Main controller board. The primary functions of this board are receiving print data from the host, generating the print image (Main), and sending the print image to the engine controller via the Main interface. A 32-bit 20 MHz RISC CPU MB86930 (SPARKlite) (location: IC15) is used, and the following memory chips and custom ICs are assigned to the 4 GB memory space.

■ Memory chips

Font ROM: two 8M-bit ROMs (IC32, IC33)
Code ROM: two 8M-bit ROMs (IC12, IC13)
4M-bit DRAM (IC18, 19, 20, 21)
1K-bit EEPROM (IC5)

■ Custom ICs

ASIC E05A91 (IC1)
ASIC E05A93 (IC11)
ASIC E05B17 (IC16)
ASIC E05B27 (IC43)
ASIC E05B31 (IC38)

■ Other

Reset IC 953B (IC2)
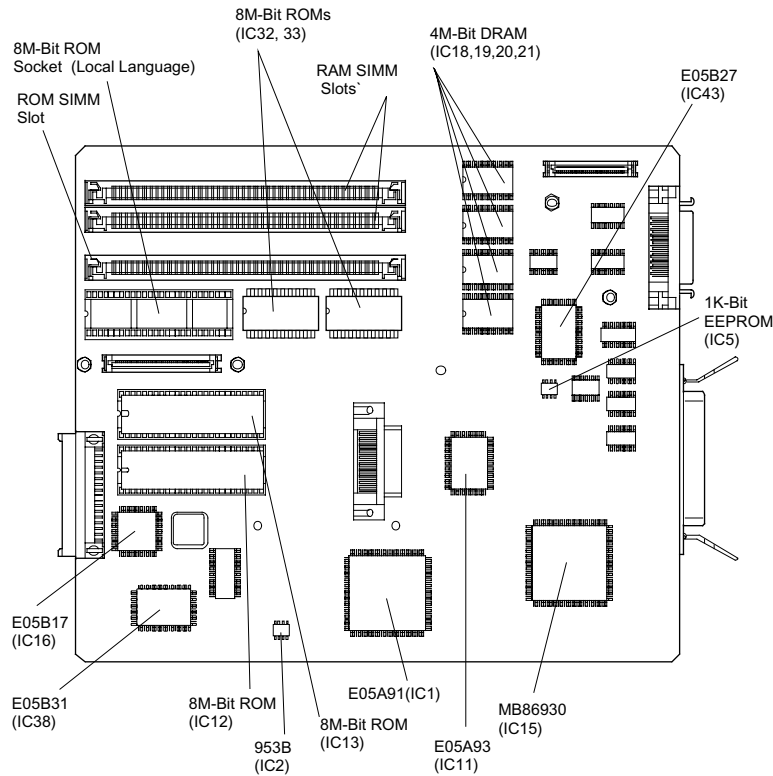
Figure 1-17. C205 Main Board

There are two types of C205 MAIN boards used as after service parts. The following table shows differences between them.

Table 1-17. Differences in Components for the C205 MAIN Board

	For USA	For Others
Standard Paper Size	Letter Size Paper	A4 Size Paper
Jumper J4 Setting	Open Pin 1 and Pin 2	Close Pin 1 and Pin2

1.5.2 C173 PROG Board

The C173 PROG board, which is mounted on the C205 MAINboard, includes the program ROMs. It consists of four 4M-bit flash ROMs and its peripheral bus interface communicating with C205 Main board.
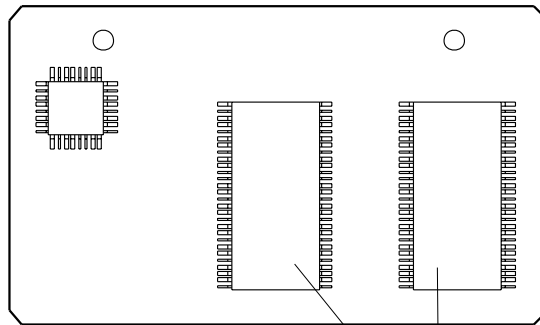
4M-bit Flash ROM
(IC1, 2, 3, 4)

Figure 1-18. C173 PROG Board

1.5.3 Control Panel

The control panel includes a 20 column × 1 row LCD panel, which provides many functions for the printer (e.g., displaying error messages or printer operation status).
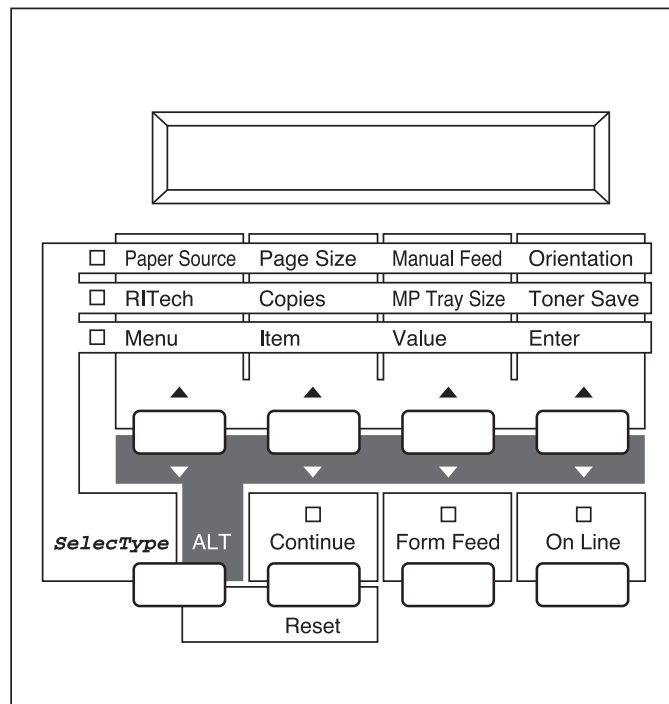
Figure 1-19. Control Panel

1.5.4 Engine Controller Board

The engine controller board consists of an M37451 8-bit CPU (including a P-ROM) and a gate array. The board controls laser scanning (the polygon mirror drive motor), image synchronization, laser beam pulse width, and power.

M37451(IC1)
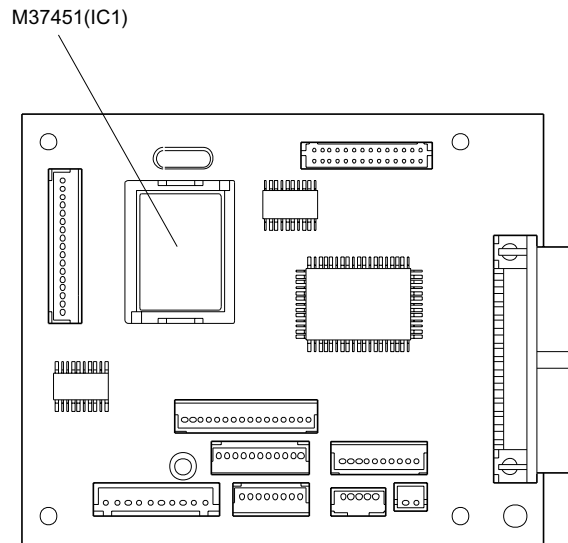
Figure 1-20. Engine Controller Board

1.5.5 Power Supply Board

The power supply board consists of a switching regulator circuit. It converts the AC line voltage into +24 V and +5 VDC voltages. There are two types of power supply board, the 100/120 V type and 230 V type. The difference between the two circuits is only in the input section.

CAUTION

Do not touch VR1 and VR61 on the power supply board. These volumes are for factory setting only.
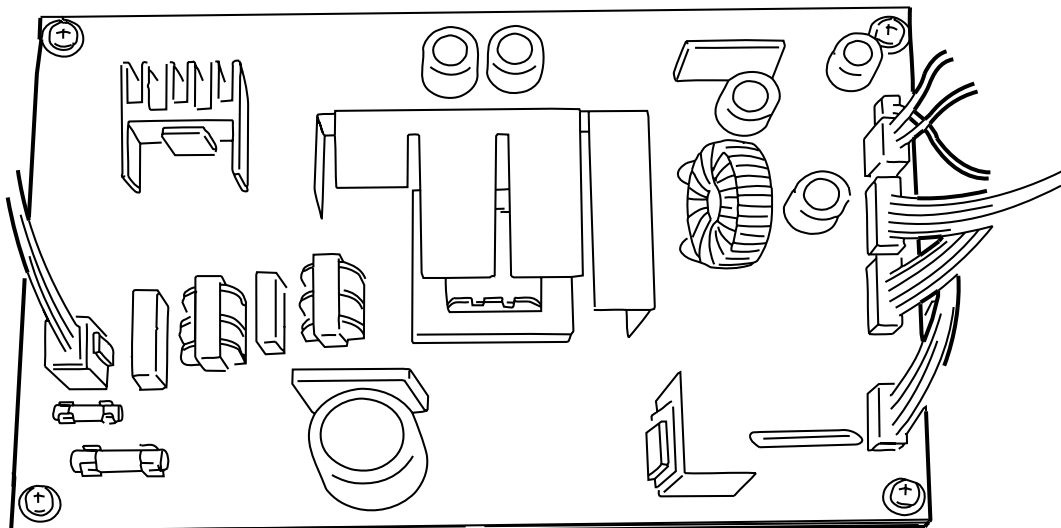
Figure 1-21. Power Supply Board

1.5.6 High-Voltage Supply Board

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

CAUTION

Do not touch VR1 and VR2 on the high-voltage supply board. These volumes are for factory setting only.
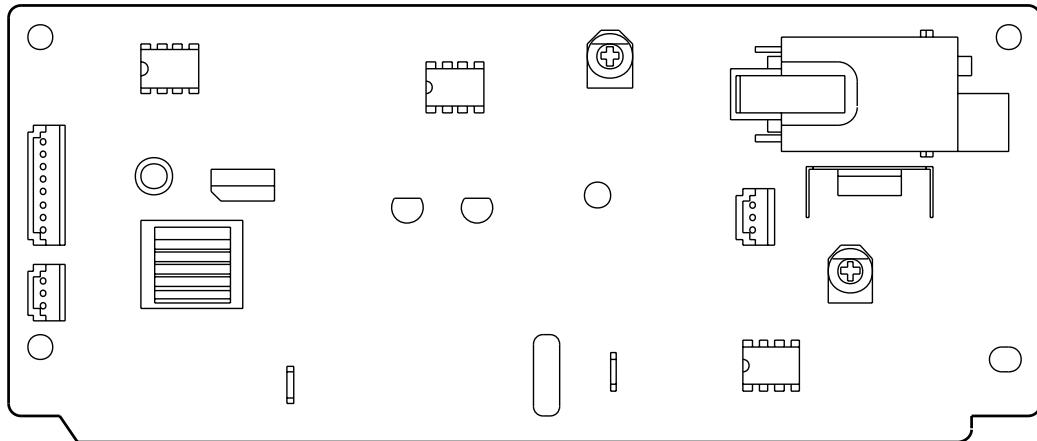
Figure 1-22. High-Voltage Supply Board

1.5.7 Optical Unit

The optical unit consists of the laser diode (semi-conductor laser), the mirror motor (scanner motor) which drives the polygon mirror for laser scanning, and several mirrors and lenses. The laser beam generated by the laser diode is conducted to the OPC drum surface by way of the polygon mirror, as well as several mirrors and lenses, to create a latent electro-photographic image on the drum.
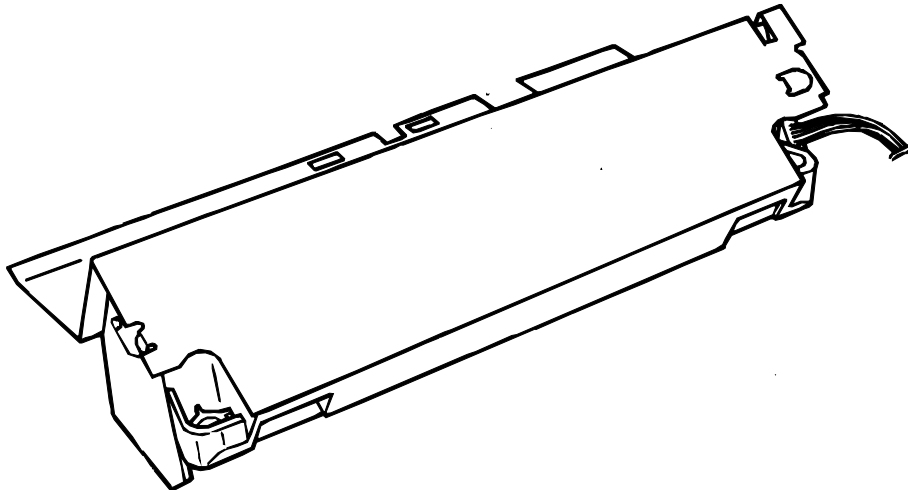
Figure 1-23. Optical Unit

1.5.8 Fusing Unit

The fusing unit fixes the toner to the paper using heat and pressure. This unit has a heater lamp, thermistor, and thermostat. There are two types of fusing units, the 100/120 V type and the 230 V type. The only difference between them is the heater lamp.
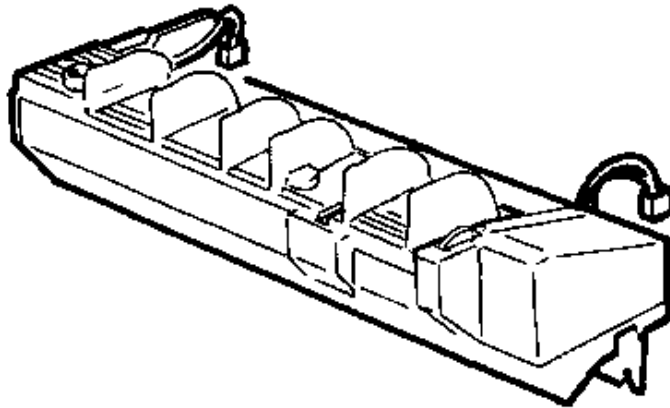
Figure 1-24. Fusing Unit

1.5.9 Imaging Cartridge

The core mechanisms of the printing process, such as charging, developing, and cleaning, are integrated into this imaging cartridge.
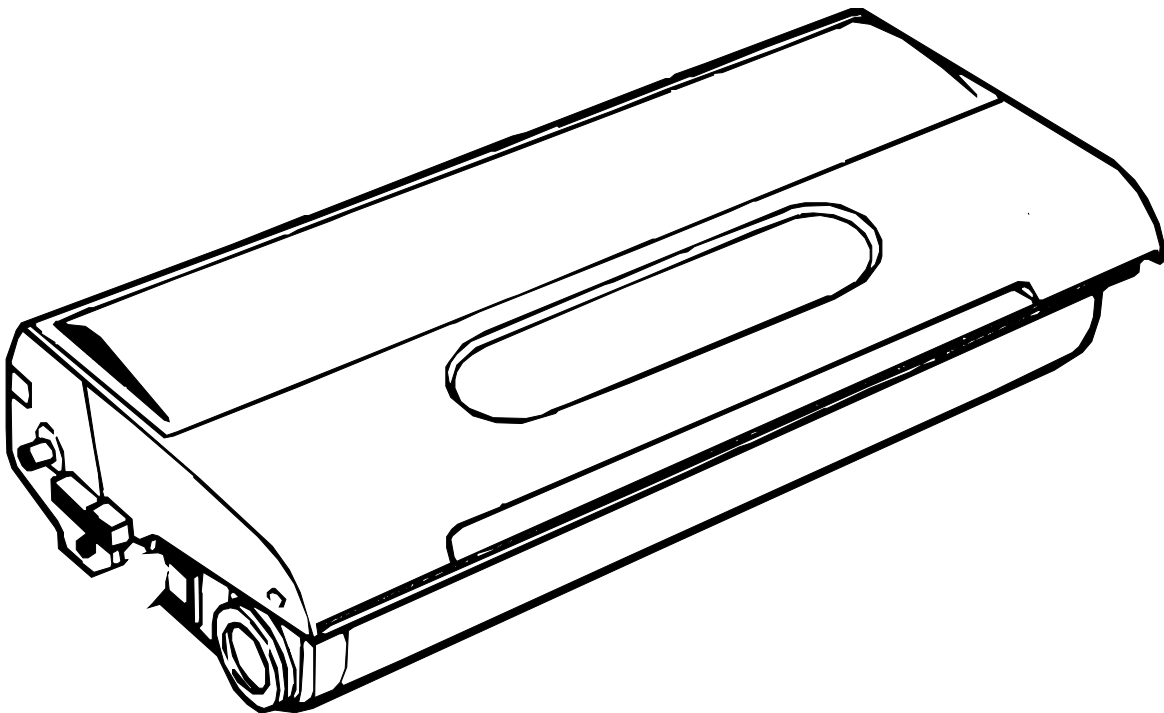
Figure 1-25. Imaging Cartridge

1.5.10 Lower Paper Cassette

The optional lower paper cassette allows you to feed up to an additional 500 sheets of A4 or letter-size paper into this printer. You can add the two lower papaer cassettes for the printer.

PWB-B Board
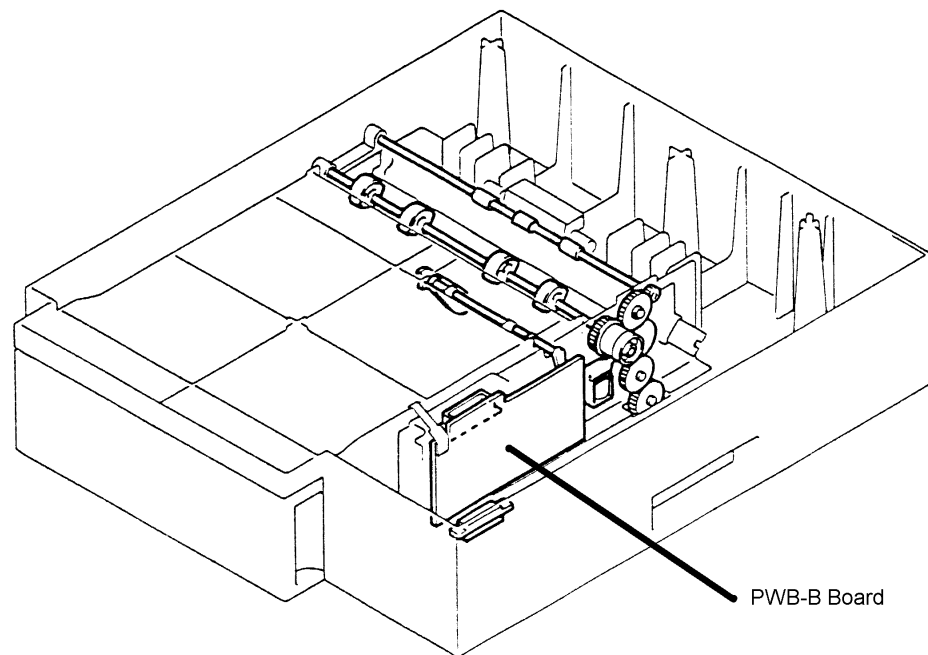
Figure 1-26. Lower Paper Cassette

Chapter 2   Operating Principles

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2.1 ENGINE OPERATION

This section describes the functions and operating principles of the EPL-N1200 engine.

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

1. Paper Guide
2. Paper Empty Sensor   Lever
3. Optical Unit
4. Imaging Cartridge
5. Paper Take-up Roller
6. Heater Lamp (H1)
7. Thermostat
8. Paper Exit Roller
9. Upper Fusing Roller
10. Paper Exit Sensor Lever
11. Paper Exit Sensor (PC3)
12. Lower Fusing Roller
13. Image Transfer Roller
14. Cooling Fan (M3))
15. Main Motor (M1)

16. Paper Take-up Sensor Lever
17. Transfer Roller
18. Paper Take-up Roller
19. Paper Empty Sensor Lever
20. Transfer Roller
21. Paper Take-up Roller
22. Paper Empty Sensor Lever
23. 2nd Lower Paper Cassette Unit (Option)
24. 1st Lower Paper Cassette Unit (Option)
25. Power Supply Unit (PU1)
26. Multi- Purpose Paper Tray

Figure 2-1. Main Components

2.1.1 Print Process

This section describes the print process from paper feeding to paper exit.
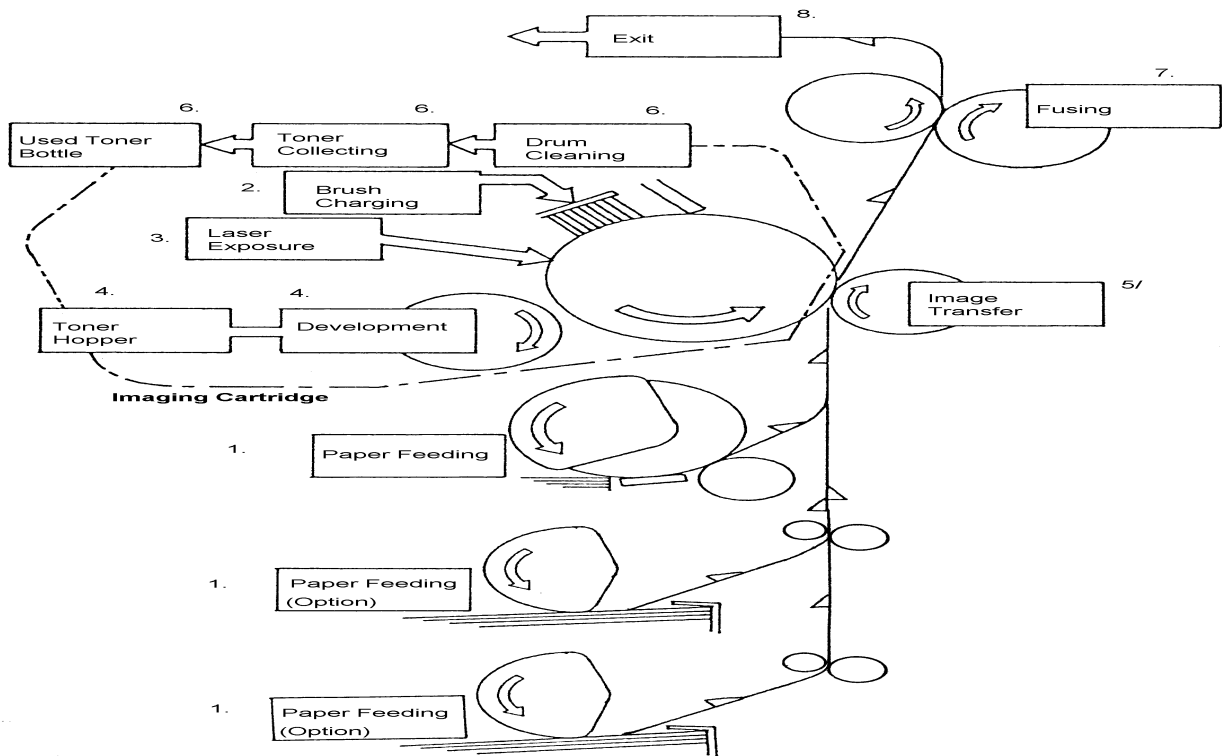
Figure 2-2 shows a diagram of the print process.

Figure 2-2. Print Process Diagram

2.1.1.1 Paper Feeding

There are two methods of feeding paper into the printer. One uses the multi—purpose tray (standard tray), and the other uses one or two optional 500-sheet lower paper cassettes.

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

When the paper take-up solenoid is actuated, the paper take-up roller rotates and feeds the first page. The paper take-up roller stops after one rotation. The timing to align the leading edge of the page with the image is detected by the paper take-up sensor.

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

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

Multi-Purpose Tray (Standard Tray)

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

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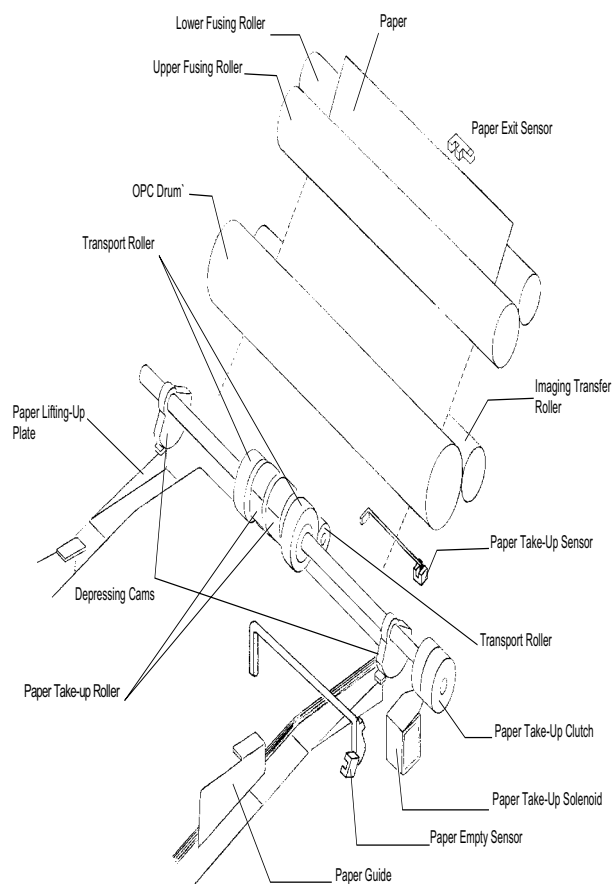

Figure 2-3. Paper Feeding from the Multi-Purpose Tray

Lower Paper Cassette

A maximum of 500 sheets can be loaded in the optional 500-sheet lower paper cassette. The paper size, however, must be a size that the casette is capable of handling. (The lower paper cassette unit can hold letter or A4 paper.)

The driving force for paper feeding and transport is from the transmission gear. All electrical controls are performed on the printer side through the coupling connector.
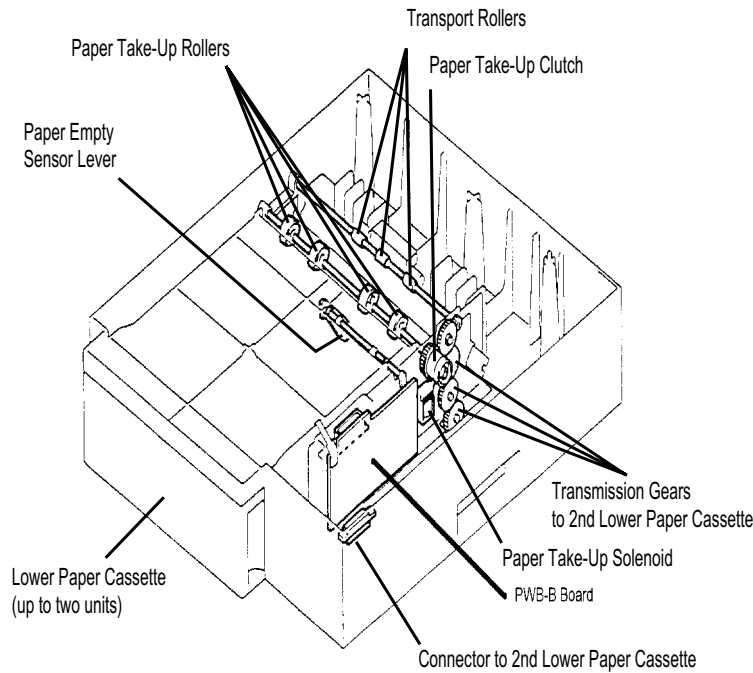
Figure 2-4. Paper Feeding from the Lower Paper Cassette

2.1.1.2 Drum Charge

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

A:Drum Charge Bias   B:Drum Ground
C:Developing Bias   D:Doctor Blade Bias
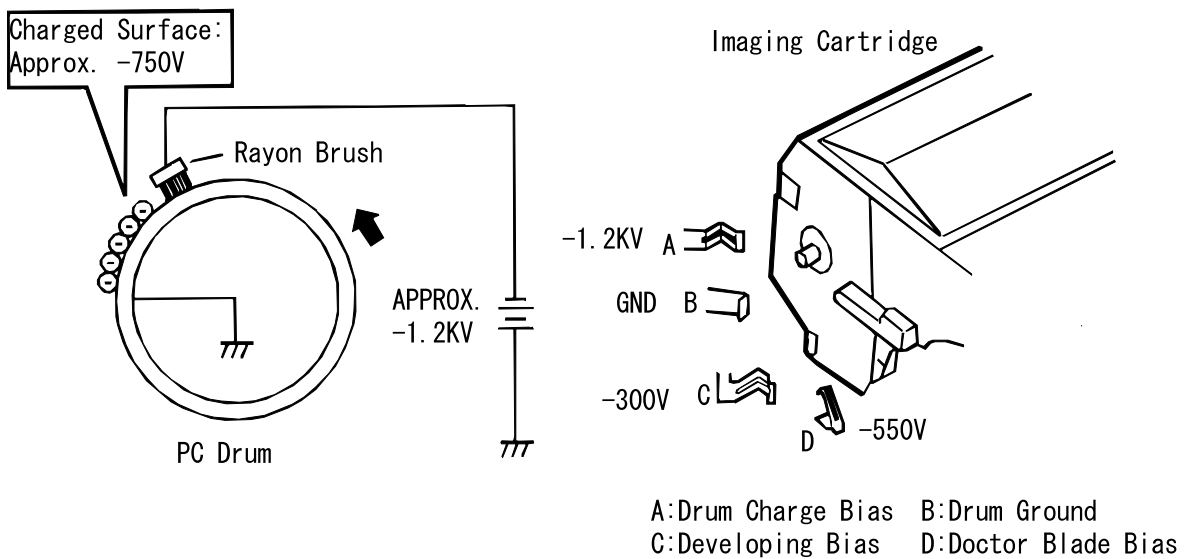
Figure 2-5. Drum Charge

2.1.1.3 Laser Exposure

Laser exposure is the process of creating an invisible static electric image on the PC drum with laser beams emitted from the optical unit. The mirror scanner motor (polygon motor) rotates the six-sided mirror counterclockwise to produce a laser light scan. (One side of the mirror produces one scan.) The SOS (start of scan) sensor detects the laser rays from the SOS mirror and outputs the SOS signals to make the starting position of each line of the image uniform.
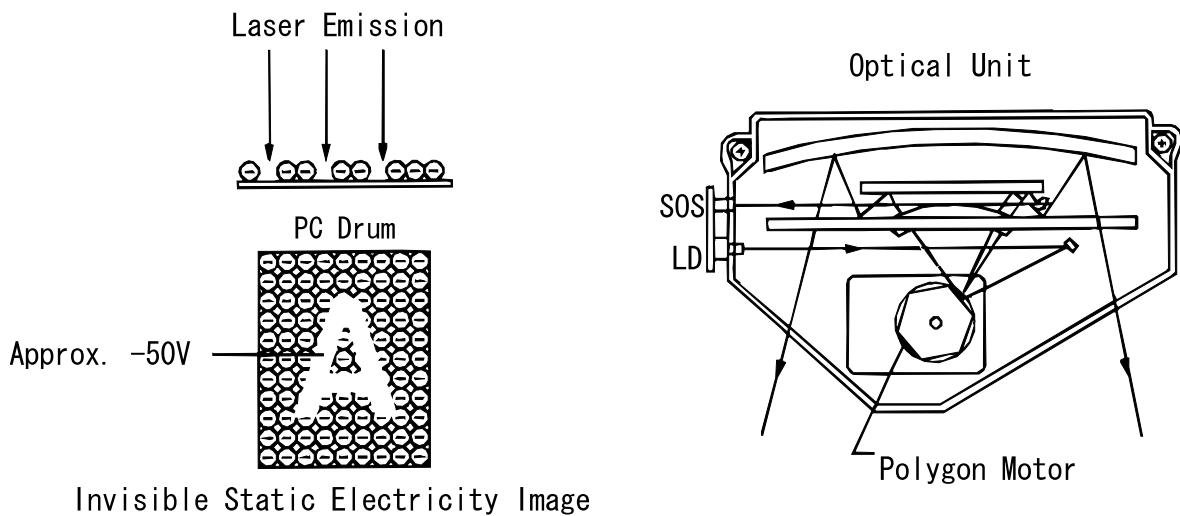
Figure 2-6. Laser Exposure

2.1.1.4 Development

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

No positively charged toner is transported to the PC drum, and the doctor blade is negatively charged to prevent the printout from having a foggy background.
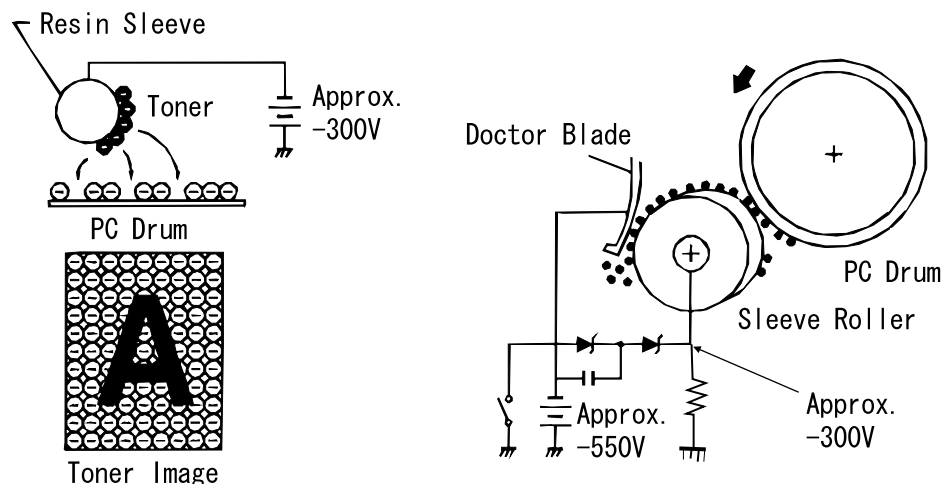
Figure 2-7. Development

2.1.1.5 Drum Cleaning

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

2.1.1.6 Image Transfer

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

A reverse bias voltage is applied so that the positive toner is not transferred onto the image transfer roller. (The drum charge bias voltage is used.)
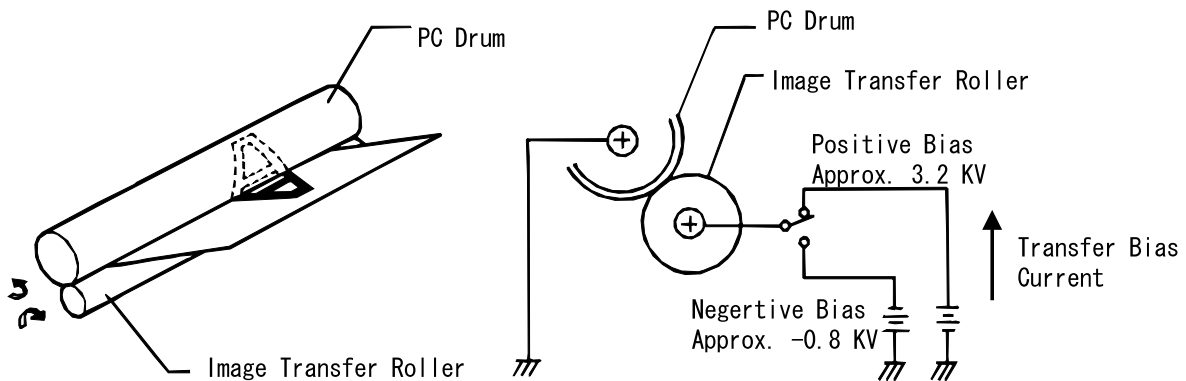
Figure 2-8. Image Transfer

2.1.1.7 Fusing

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

The thermistor (TH1) detects the temperature of the upper fusing roller and the value is fed back to the PWB-A board to controls On/Off operation of the heater lamp.

If the thermostat (S3) detects 210° C (410° F), inside the terminal, S3 goes open and cut the current off to the heater lamp (H1).
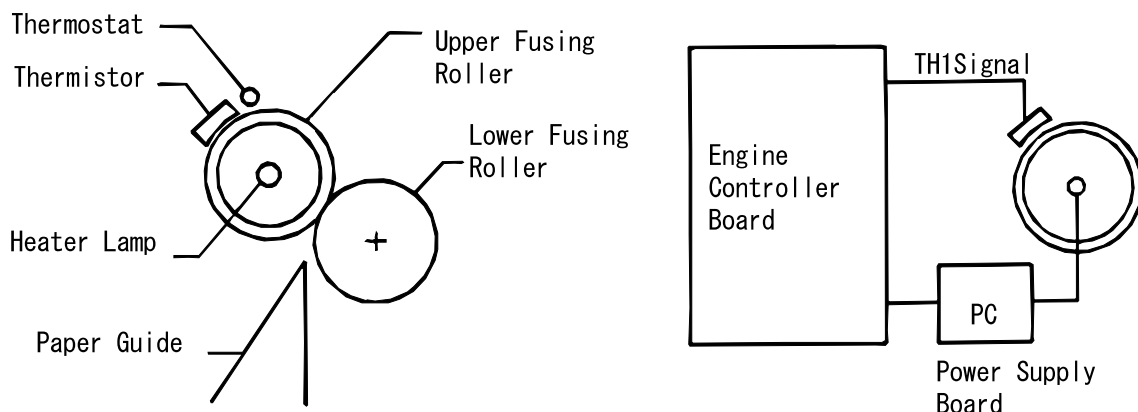
Figure 2-9. Fusing

2.1.1.8 Paper Exit

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

2.1.1.9 Toner Empty Sensor

Toner empty is detected by the toner empty LED and the photo sensor on the toner empty detection board.

When there is enough toner in the imaging cartridge, light is not reflected from the toner empty sensor LED. When toner in the imaging cartridge is empty, light from the toner empty sensor LED is reflected by the reflective mirror. Then, the photo sensor receives the light and the controller recognizes a toner empty condition.
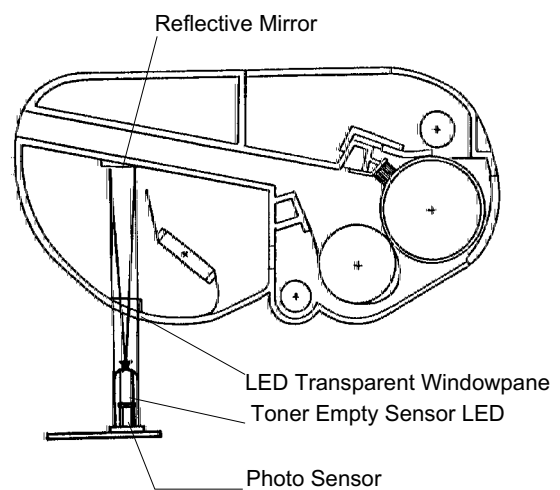
When you open and close the top cover after the printer has detected a toner empty signal, the controller assumes that the imaging cartridge has been replaced and resets the toner empty status.

Toner is enough   **Toner is empty**
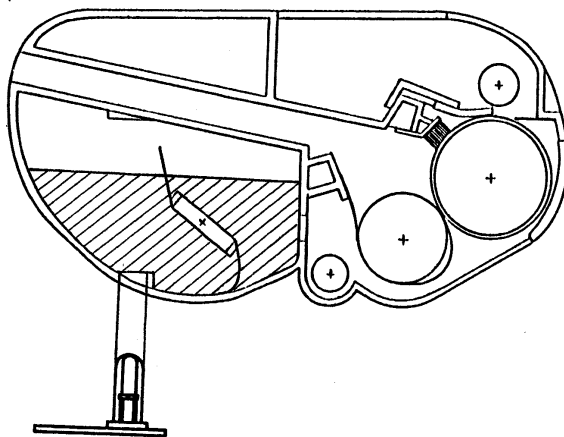
Figure 2-10. Toner is Enough   **Figure 2-11. Toner is Empty**

2.1.2 Engine Control

This section describes engine control, the power supply board, and the high-voltage supply board. The engine is controlled by the engine controller board (PWB-A board). Figure 2-12 shows an engine controller connecting diagram.
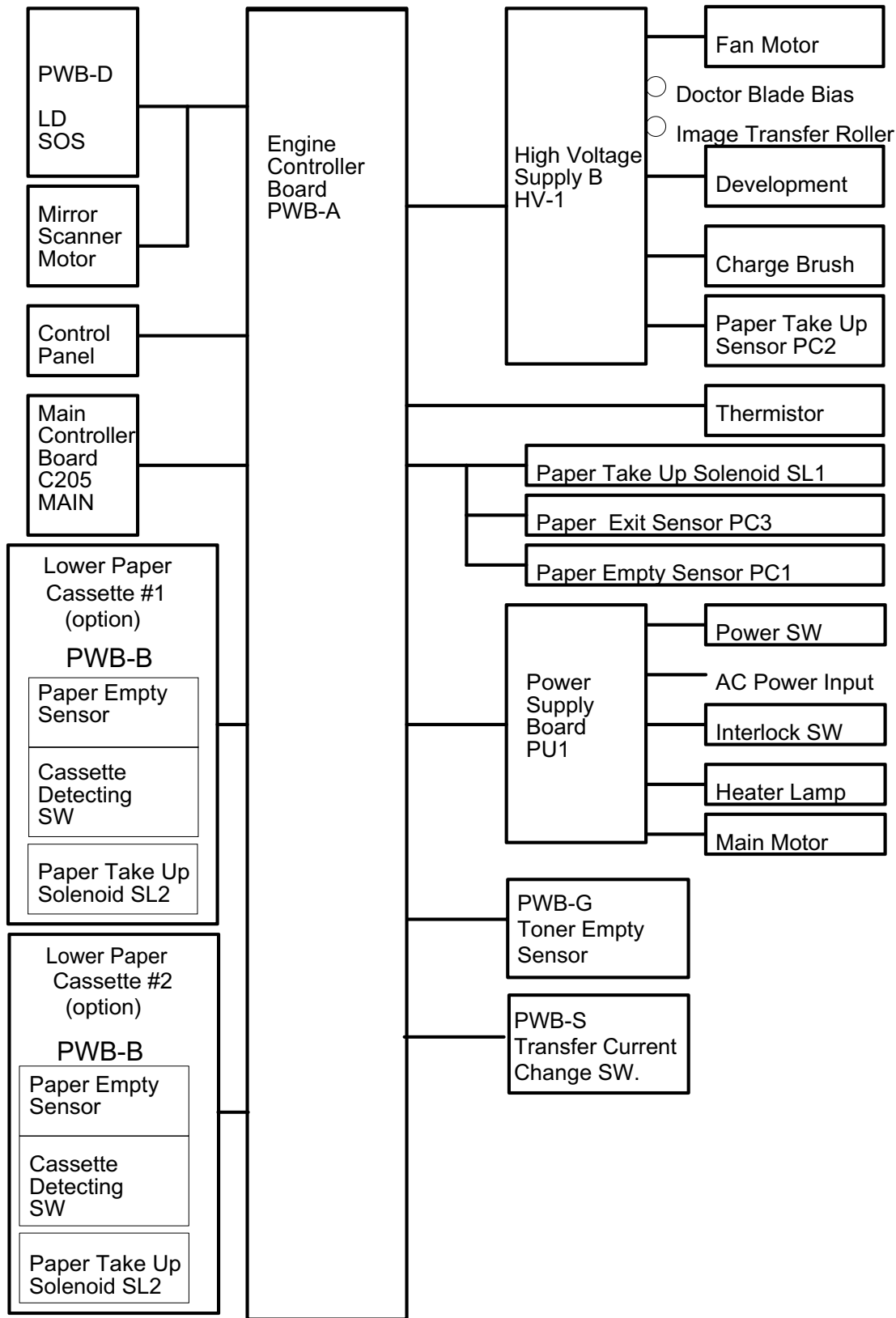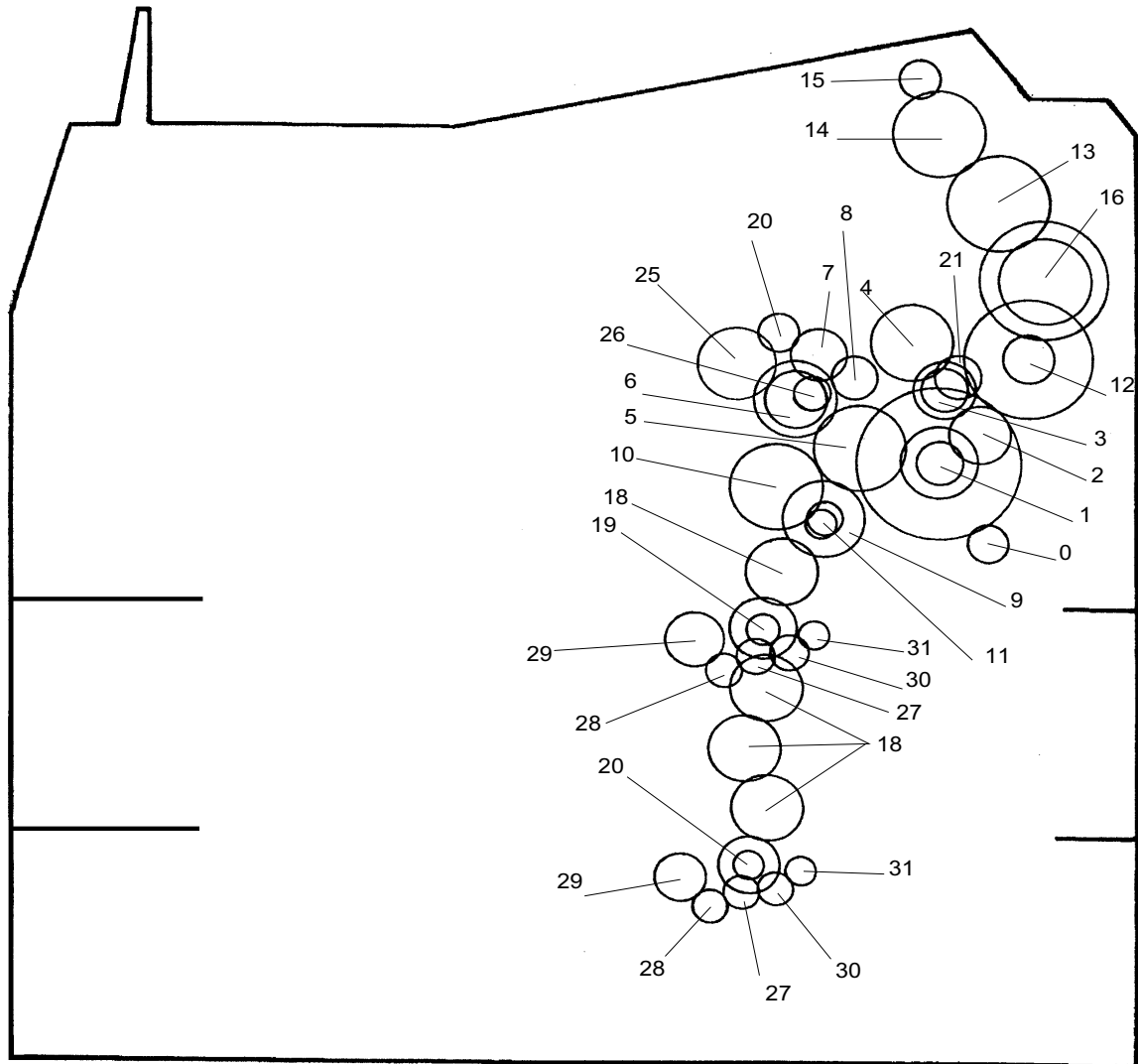

Figure 2-12. Engine Controller Connecting Diagram

2.1.2.1 Main Motor Functions and Control

Power from the main motor (M1) drive is used for the P/C (photo conductor) drive, the developing drive, the fusing drive, the standard paper slot feeding drive, and the lower paper cassette (optional) feeding drive. Figures 2-13 and 2-14 show the positions of the gears and rollers.

0:   Main Motor (M1)
4:   PC Drum
10: Paper Take-up Roller
11: Transport Roller
13: Upper Fusing Roller
15: Paper Exit Roller
21: Image Transfer Roller

Figure 2-13. Gears and Rollers (1)

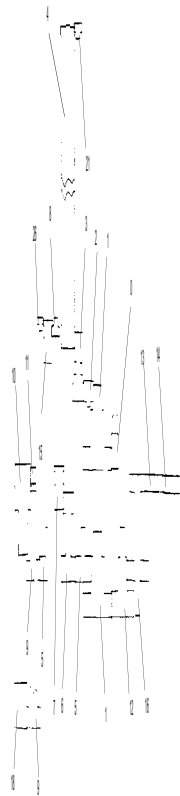**Figure 2-14. Gear and Roller Positions**

Table 2-1. Gears and Rollers

No.	No. of Gear Teeth	Roller Name	No.	No. of Gear Teeth	Roller Name
0	20	Main Motor (M1)	15	14	Paper Exit Roller
1	84/38/23		16	50/35	
2	29		18	36/27	
3	32/24		19	24/14	
4	43/30	P/C Drum	20	22/17	
5	47		21	16	Image Transfer Roller
6	41/29		25	39	
7	28/26/24		26	17	
8	23		27	18	
9	40/16		28	18	
10	69/46	Paper Take-Up Roller	29	28	
11	23	Transport Roller	30	18	
12	66/18		31	14	
13	40	Upper Fusing Roller			
14	35				

Figure 2-15 shows the main motor drive circuit. The main motor (M1) is a four-phase stepping motor. This motor is controlled by the CPU (IC1) on the engine controller board (PWB-A). The power supply board (PU1) has a stepping motor driver IC. This IC drives the main motor (M1) with a constant current.
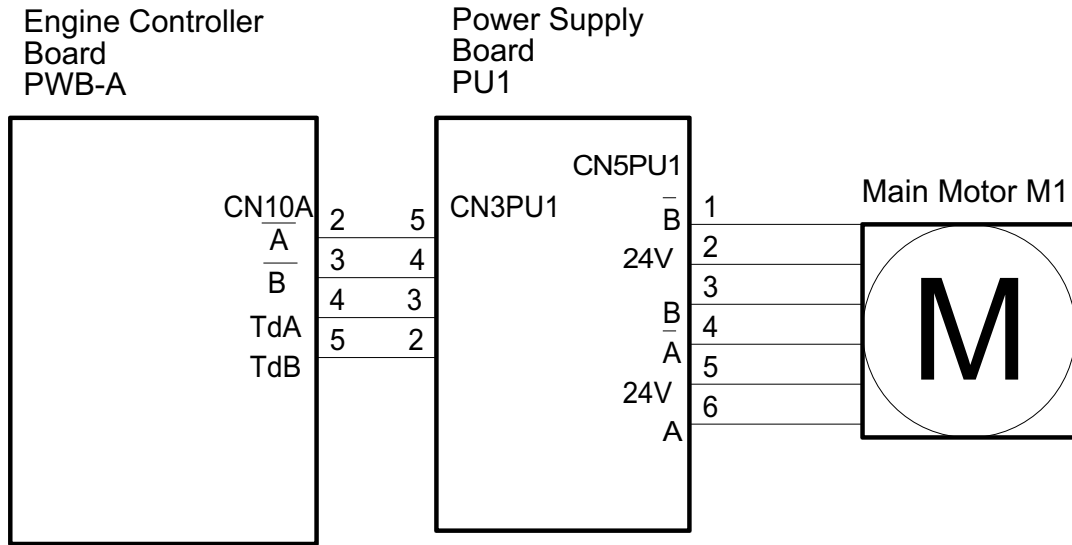
Figure 2-15. Main Motor Drive Circuit

2.1.2.2 Fuser Control

The fuser is heated by the heater lamp, which is powered by AC voltage. When the power supply board receives a $\overline{\text{FUSER LAMP}}$ signal from the engine controller board (PWB-A), the power supply board (PU1) supplies the AC voltage to the heater lamp. This AC voltage is cut by the interlock switch when the top cover opens.

The fuser temperature is detected by the thermistor. Based on the TH1 signal from the thermistor, the engine controller board (PWB-A) controls the fusing temperature using the $\overline{\text{FUSER LAMP}}$ signal.
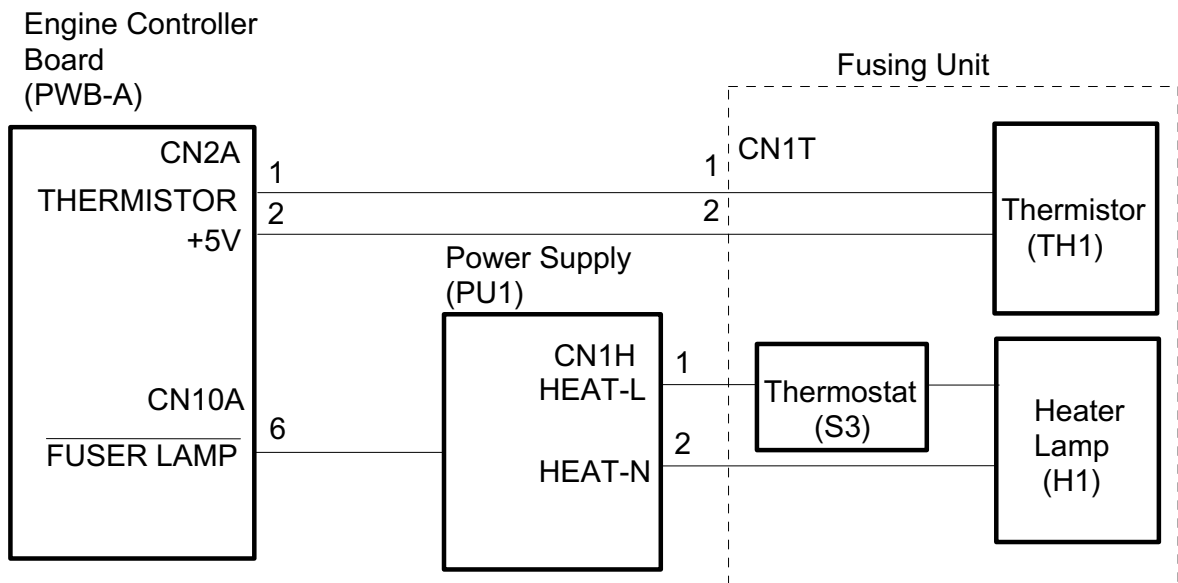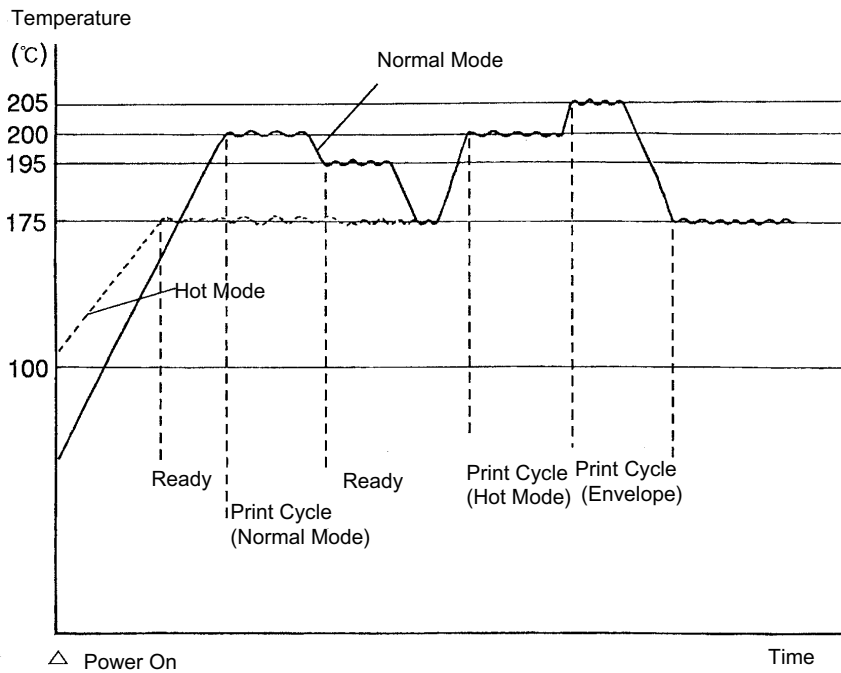
Figure 2-16. Fuser Control Circuit

The following figure shows the fuser temperature control operation.

Figure 2-17. Temperature for Fuser Control Procedure

There is a thermistor to the surface of the upper fusing roller to detect its temperature and to controls the fusing lamp On/Off operation. There are three temperature control modes for the upper fusing roller on the fusing unit.

Normal Node

When the temperature of the upper fusing roller is less than 100° C (212° F) after printer power on, fusing temperature is controlled to heat the roller to 195° C (383° F) during standby and to 200° C (392° F) during printing. After the standby state has continued for 300 seconds or more, or the printing state has continued for 120 seconds or more, the printer enters hot mode.

Hot Mode

When the temperature of the upper fusing roller is less than 100° C (212° F) or more at the printer power on, the fusing temperature is controlled keep the roller at 175° C (347° F) during standby and 200° C (392° F) during printing.

Envelope Mode

When the printer encounters paper smaller than the exective paper, such as an envelope, in the standard MP tray, the fusing temperature is controlled to keep the roller at 175° C (347° F) during standby and 200° C (392° F) during printing. When the roller temperature is 100° C (212° F) or more at printer power on, the fusing temperature is controlled to keep the roller at 175° C (347° F) during standby and 205° C (401° F) during printing.

The thermostat goes open (S3) if the temperature of the fusing section rises to an abnormally high level (over 210° C, 410° F).

### 2.1.2.3 Scanner Mirror Motor Control

Figure 2-18 is the scanner mirror motor (M2) control circuit. The scanner mirror motor is driven while the scanner motor receives the POLYGON MOTOR (M2:ON) signal.
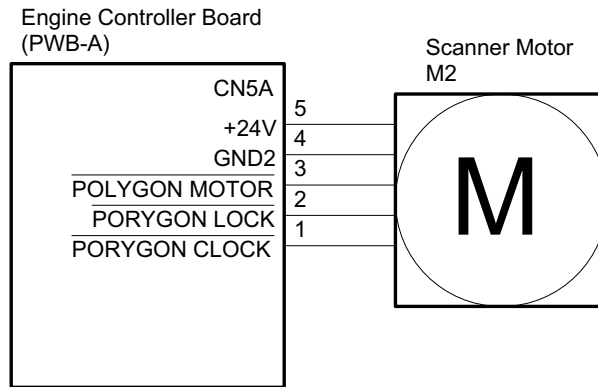

Figure 2-18. Scanner Motor Control Circuit

2.1.2.4 Laser Diode Drive

Figure 2-19 shows the laser diode drive circuit. Laser diode emission is controlled by three signals (L DATA, DA1, and DA2) from the engine controller board (PWB-A).
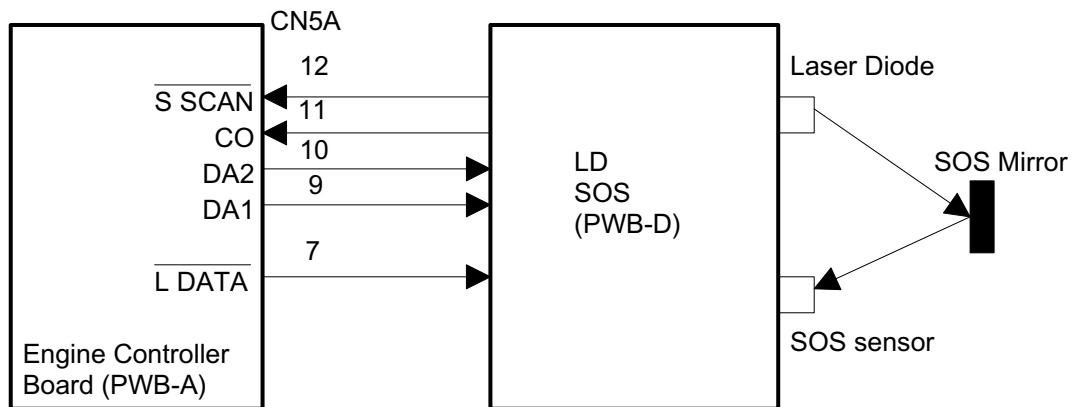
Figure 2-19. Laser Diode Drive Circuit

The L DATA signal is the laser ON/OFF signal. When it is LOW, the laser emits, and when it is HIGH, the laser stops emitting. L DATA is the combination of the two signals in the figure below. If the VIDEO or the FORCED LASER DIODE ON signal is activated (LOW), the L DATA signal will be active. The VIDEO signal is an image signal sent from the video controller board (C205 MAIN board). The FORCED LASER DIODE ON signal is a laser emission signal to apply the laser beam to the SOS sensor.
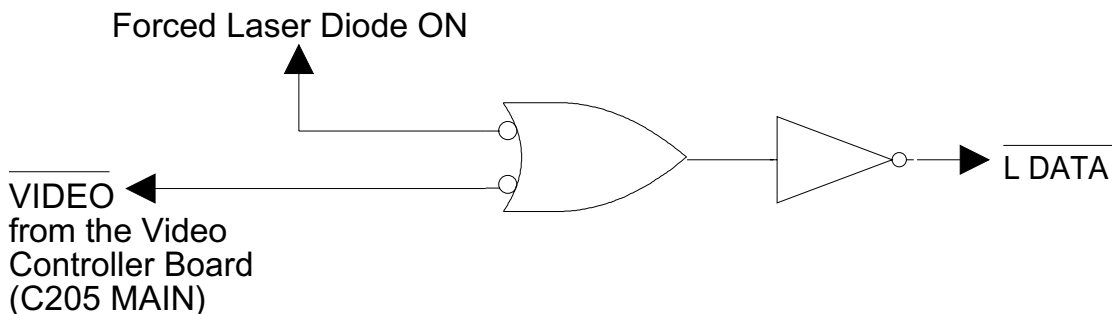
Figure 2-20. /L DATA Generation Circuit

2.1.2.5 Bias Voltages and Laser Drive Timing

Figure 2-21 is a diagram of the drum charge bias voltage, image transfer bias voltage, doctor blade bias voltage, and the developing bias voltage control circuit. These bias voltages are generated from the +24 VDC from the high-voltage supply board (HV1). If the printer detects the top cover open condition, the interlock switch is set to OFF, which cuts the +24 VDC, which, in turn, cuts the bias voltages.

These bias voltages are controlled by the engine controller board (PWB-A). The $\overline{\text{HV-T}}$ signal is the image transfer (roller) bias voltage control. While this signal is LOW, the image transfer roller is charged to 3.2K VDC by the high-voltage supply circuit. And while this signal is HIGH, the image transfer roller is charged to –0.8K VDC. The $\overline{\text{HV-CT.R}}$ signal controls the drum charge. While this signal is LOW, the PC drum is charged to –1.2K VDC.

The $\overline{\text{HV-B.VR}}$ signal is an analog signal for developing bias voltage control. This signal controls the bias voltage level (–175 V to –375 VDC) using analog data. The image density is controlled by the developing bias voltage level.
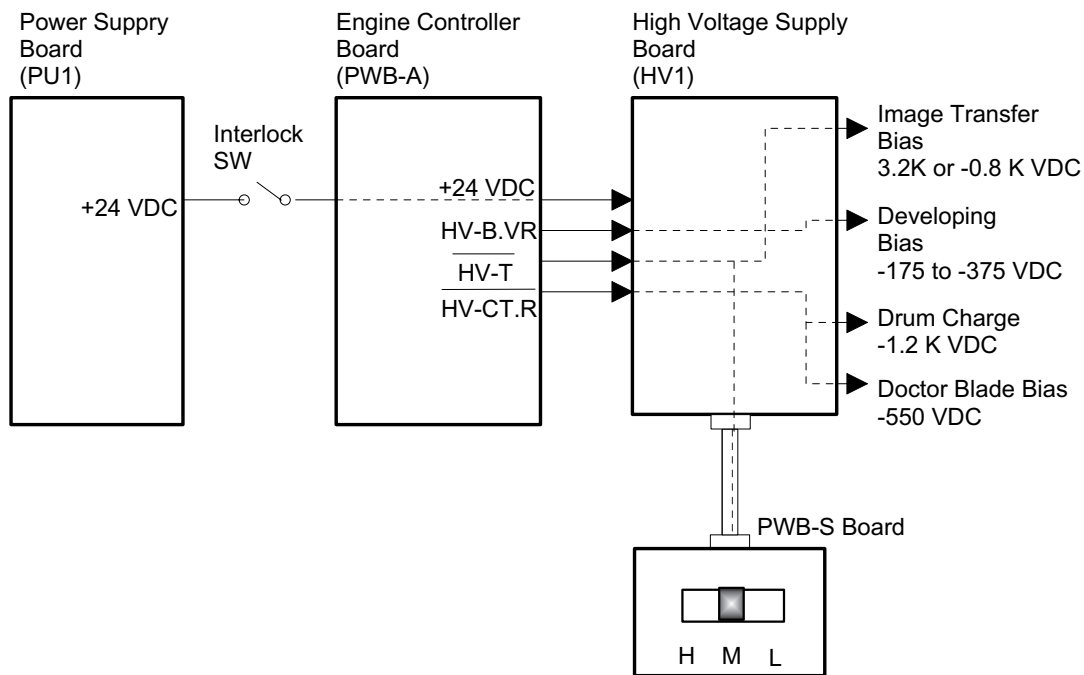

Figure 2-21. High-Voltage Supply Block Diagram

There is a three position slide switch on the PWB-S board. The switch can select one of three image transfer bias current values. The standard position is M.
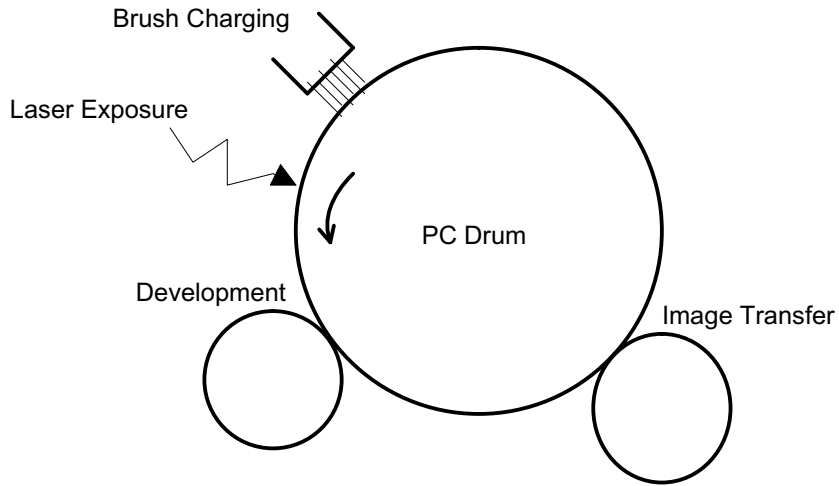
If the printer is used in an environment with high temperature and high humidity and an image transfer problem occurs, especially with small size of paper, it is recommended that the switch be positioned at H.

If the printer is used in an environment with low temperature and low humidity and a toner smear problem occurs at the age of the transparency sheets, it is recommended that the switch be positioned at L
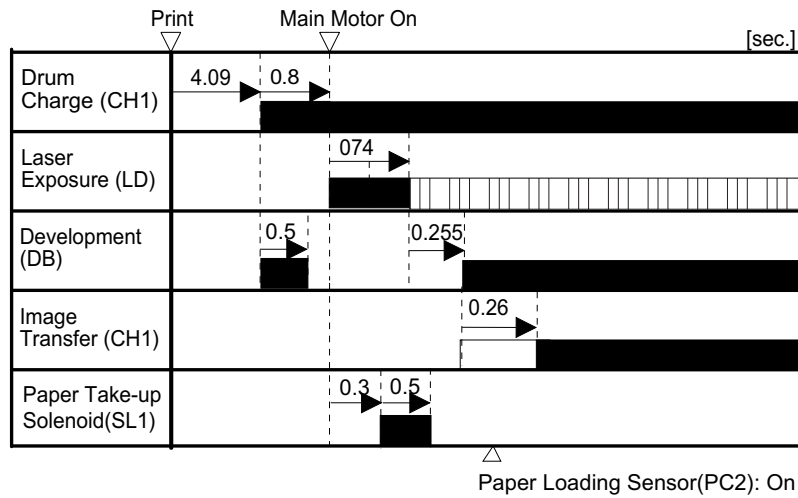
Each position's current value is shown below.

        H: 18 uA
        M: 8 uA
        L: 5 uA

Figure 2-22 shows the print process.
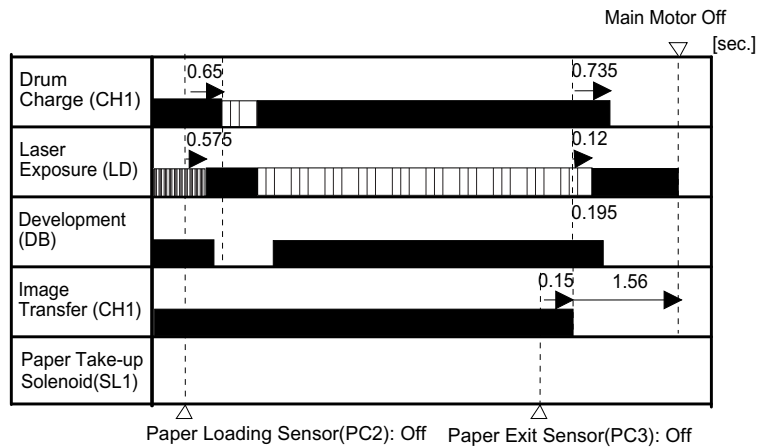
Brush Charging

Laser Exposure

PC Drum

Development

Image Transfer

Figure 2-22. Print Process

Figure 2-23 shows the start print sequence. The printer's engine starts printing when the $\overline{\text{PRINT}}$ signal is received from the video controller board.

Print   Main Motor On
                                                                [sec.]

Drum Charge (CH1)	4.09	0.8		
Laser Exposure (LD)		074		
Development (DB)	0.5		0.255	
Image Transfer (CH1)			0.26	
Paper Take-up Solenoid(SL1)		0.3	0.5	

Paper Loading Sensor(PC2): On

Figure 2-23. Print Sequence (Start)

Figure 2-24 is the end of the print sequence. The printer stops the main motor (M1) from rotating when the paper exit sensor turns off after 1.71 seconds.

Main Motor Off
                                                                [sec.]

Drum Charge (CH1)	0.65		0.735	
Laser Exposure (LD)	0.575		0.12	
Development (DB)			0.195	
Image Transfer (CH1)			0.15	1.56
Paper Take-up Solenoid(SL1)				

Paper Loading Sensor(PC2): Off   Paper Exit Sensor(PC3): Off

Figure 2-24. Print Sequence (End)

2.1.2.6 Power Supply Circuit Function and Safety Protection

The printer's power supply board (PU1) supplies the +5 VDC and +24 VDC. The +24 VDC is used as the bias voltage supply, main motor (M1) drive, scanner mirror motor (M2) drive, fan motor (M3) drive, and solenoid drive. For safety protection, the +24 VDC line is cut when the interlock switch (cover open switch) is off.
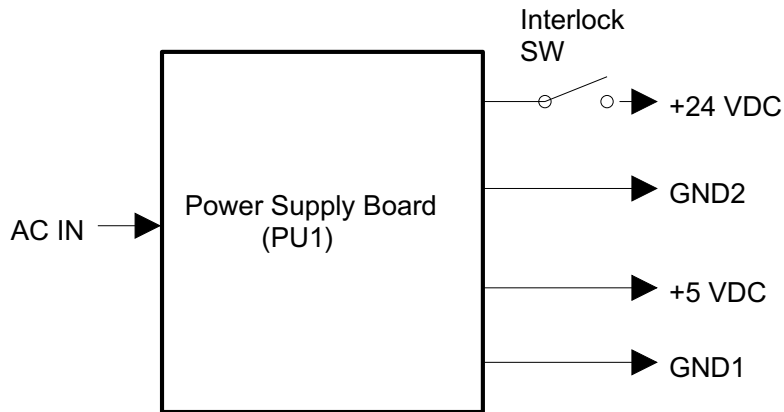
Figure 2-25. Power Supply Circuit Block Diagram

2.2 VIDEO CONTROLLER OPERATION

The video controller section generates the video signals for the received data. The video controller section is separate in the C205 MAIN board and the control panel. The control panel is connected to the engine controller board (PWB-A), but is controlled by the C205 MAIN board, which sends the signals for the control panel through the engine controller board.
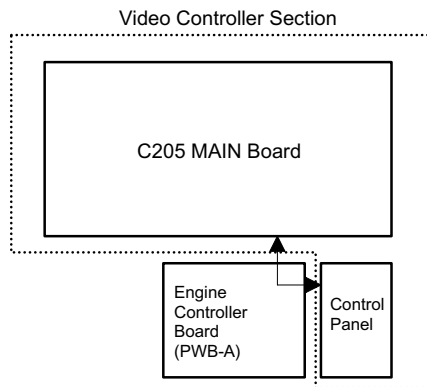
Figure 2-26. Video Controller Section

2.2.1 C205 MAIN Board Operation

Figure 2-27 shows a block diagram of the C205 MAIN board. The C205 MAIN board contains the video controller, which consists of a MB86930 (SPARKlite, 20 MHz, 32-bit bus) RISC CPU, the standard cells developed for this printer, RAMs, ROMs, and a EEPROM.
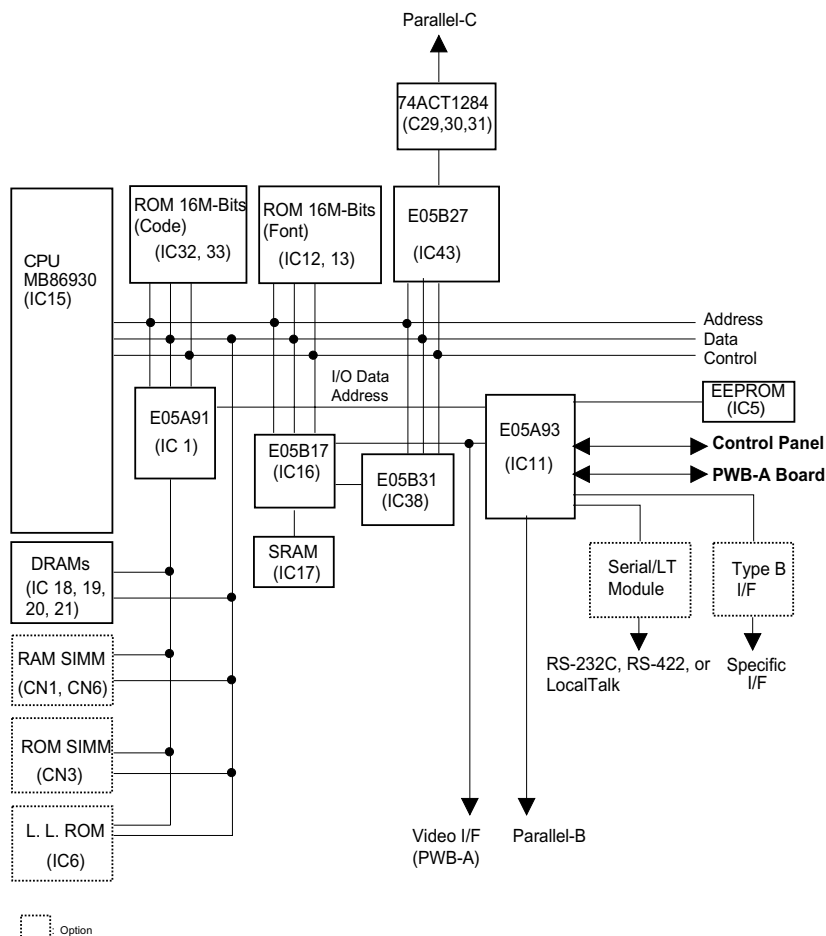
Figure 2-27. C205 Main Board Block Diagram

Table 2-2 lists the functions of the C205 MAIN board main elements.

Table 2-2. Functions of C205 MAIN Board Main Elements

Element	Location	Function
MB86930 RISC CPU	IC15	The CPU, which operates at 20 MHz, manages the video controller operation.
E05A91 ASIC	IC1	This ASIC contains the following functions: Address decoding DRAM management (refresh control, RAS/CAS control)
E05B31 ASIC	IC38	This ASIC contains the following functions: Video signal processing
E05A93 ASIC	IC11	This ASIC contains the following functions: Video interface Parallel-B interface Serial/LocalTalk I/F board interface Type-B interface card control Control panel control
E05B17 ASIC	IC16	This ASIC contains the following functions: BiRITech
E05B27 ASIC	IC43	This ASIC contains the following functions: Parallel-C interface
Two 8 M-bit ROMs	IC12,13	These ROMs are code ROM.
Two 8M-bit ROMs	IC32,33	These ROMs are font ROM.
Option 8M-Bit ROM	IC6	This ROM is a local language ROM option for fonts.
EEPROM	IC5	This 1 K-bit EEPROM stores the following: Model type Printed page counter value Toner life counter value Jam counter value SelecType setting
SRAM	IC17	It provides working memory area for E05B17.
DRAM	IC18,19,20, 21	These DRAMs are used as the working area of the CPU: input buffer, image buffer, etc.

Print data and commands transmitted from the host computer via parallel-B/C, serial/LocalTalk, 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 bit map data (image data) in the V (video) -RAM (image buffer) of 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 E05B17. The E05B17 changes the image data format from 32 bits parallel data to serial data, and stores it in the internal temporary buffer. The temporary buffer has a capacity equivalent to several lines. This is controlled by the E05B17, which synchronizes and transmits the temporary buffer's data to the engine controller board. The E05B17 then manipulates the printer data according to the BiRITech setting.
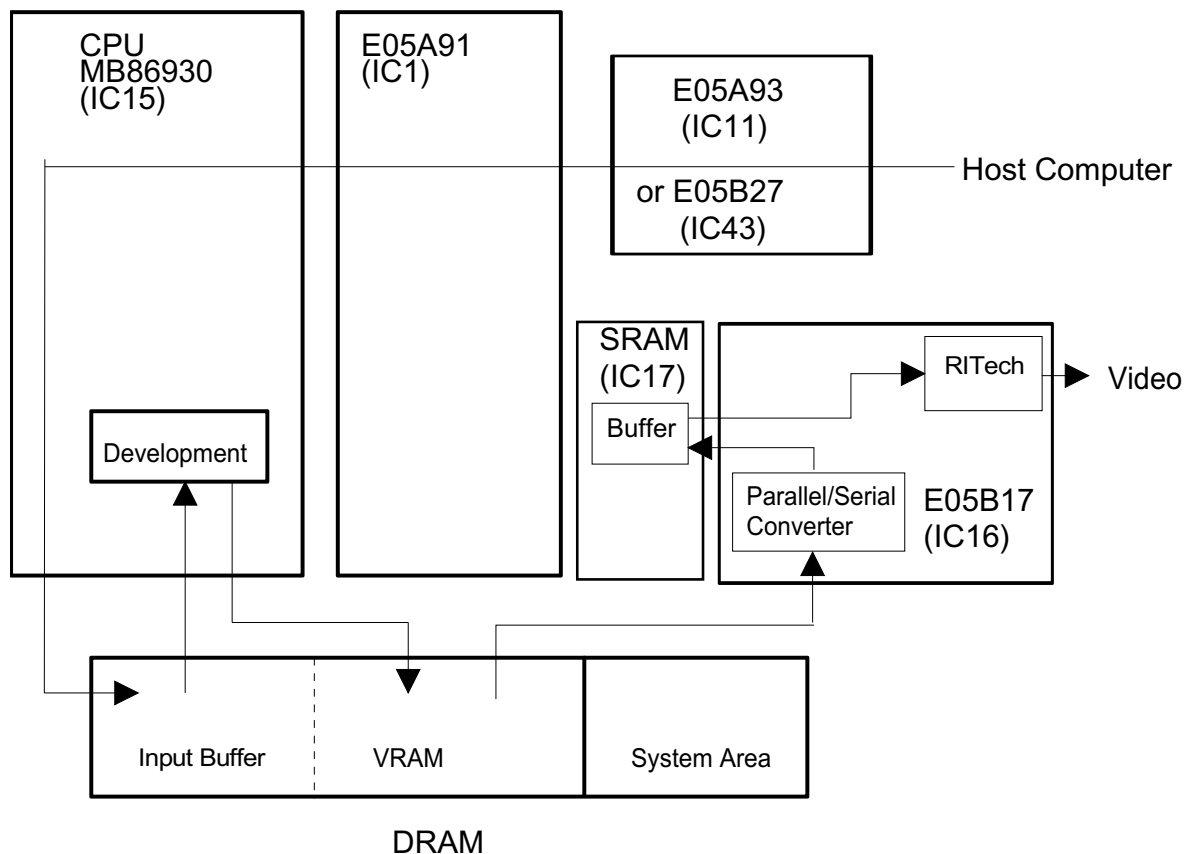

Figure 2-28. Data Flow Diagram

2.2.1.1 Reset Circuit

The entire system (CPU and external devices) can be initialized if the $\overline{\text{RESET}}$ signal (CPU pin 113) is active simultaneously. This circuit uses an M5193B IC to monitor the supply voltage if the voltage level less than 4.25 V is detected. The reset time is approximately 128 ms.
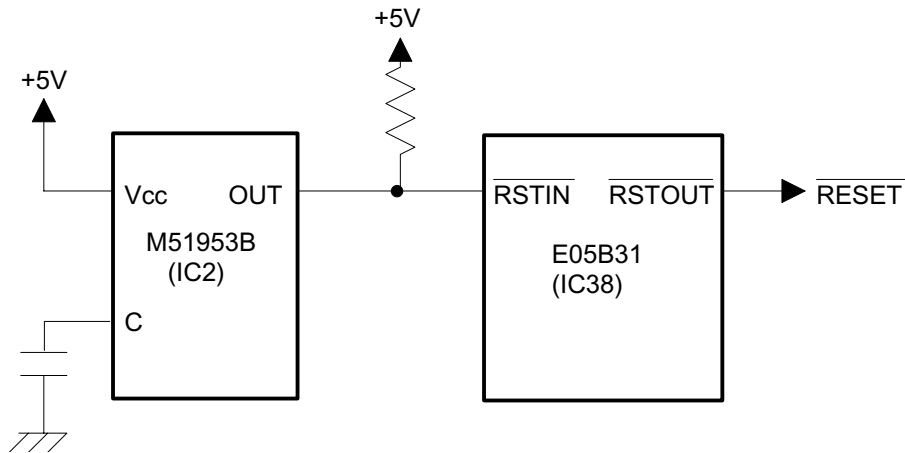

Figure 2-29. Reset Circuit

2.2.1.2 Bus Control Circuit

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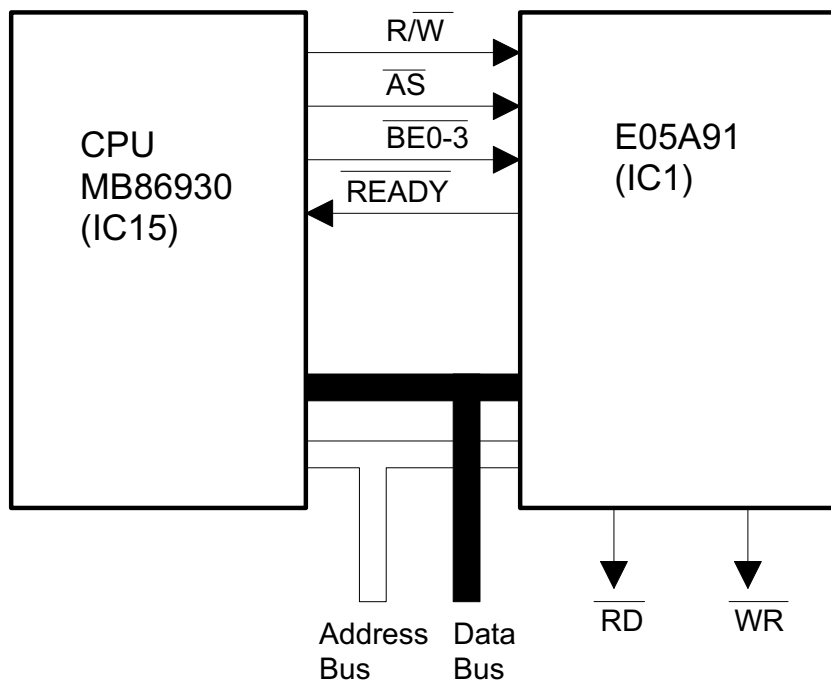

Figure 2-30. Bus Control Circuit

2.2.1.3 Interrupt Control

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

2.2.1.4 DRAM Management

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

In this printer, four standard 512K × 8bit DRAMs are mounted in locations IC18, IC19, IC20, and IC21, providing a total of 2 MB. SIMM sockets number 1 (CN1) and number 2 (CN6) 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, which also outputs MA0-10 (memory address), $\overline{\text{RAS}}/\overline{\text{CAS}}$, and $\overline{\text{DWE}}$ signals.
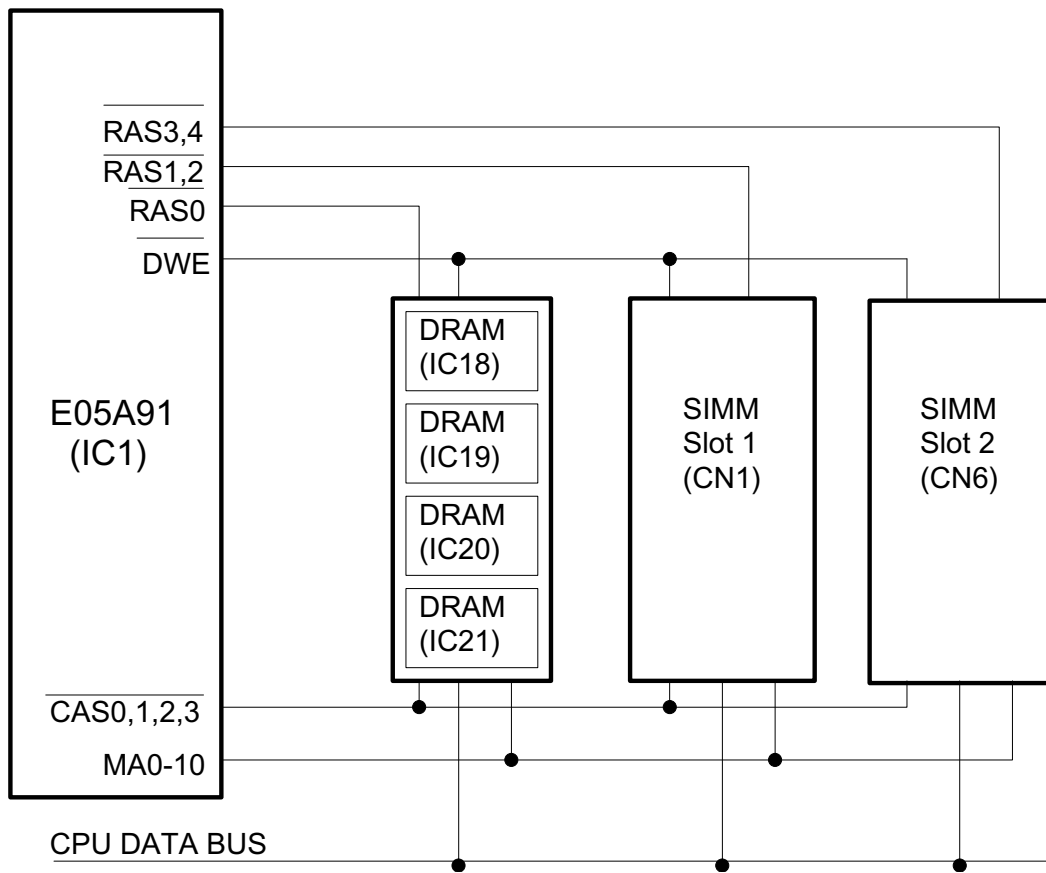
Figure 2-31. DRAM Management

2.2.1.5 Parallel-B Interface Circuit

Figure 2-32 shows the Parallel-B interface circuit block diagram. Data sent from the host computer is latched within the E05A93 by the $\overline{STROBE}$ signal. The E05A93 outputs the BUSY signal 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.
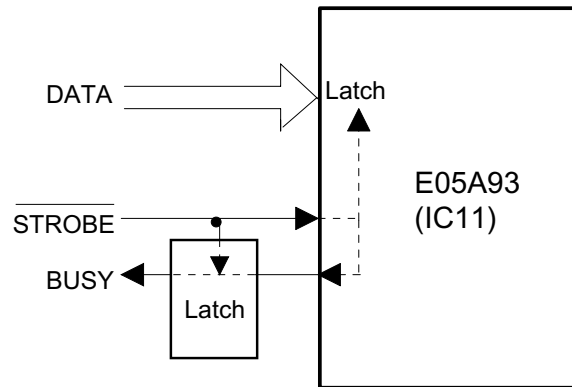

Figure 2-32. Parallel-B Interface Circuit

2.2.1.6 Parallel-C Interface Circuit

Figure 2-33 shows the Parallel-C interface circuit block diagram. The 74ACT1284 is a bi-directional bus driver IC that used to satisfy the data bus length under the IEEE1284 standard. The E05B27(IC43) is used the Parallel-C interface to support, not only standard parallel interface, but also compatibility mode and bi-directional mode (Nibble and ECP) under the IEEE1284 standard.
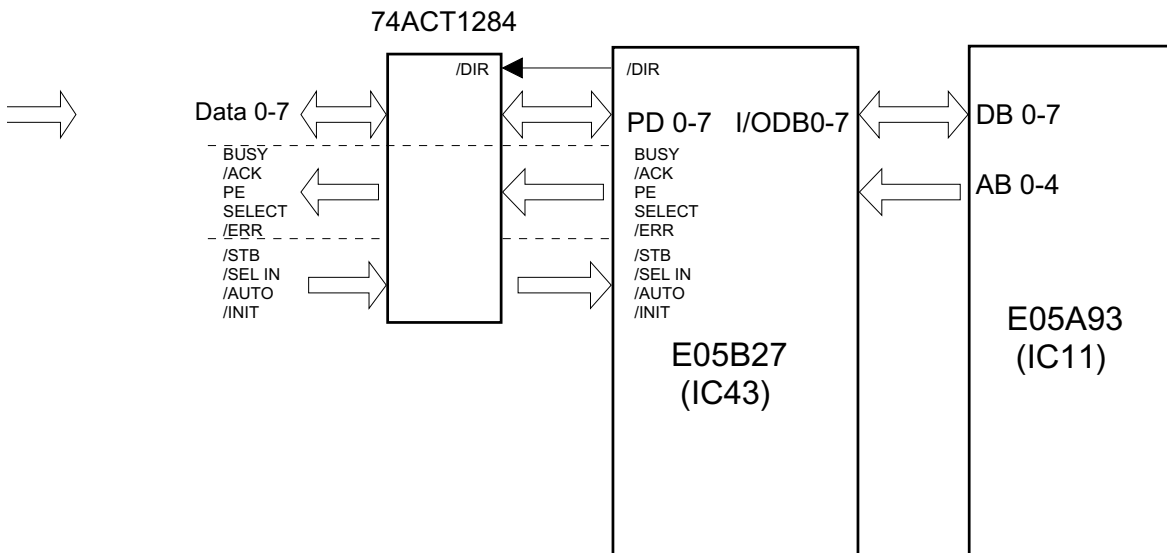

Figure 2-33. Parallel-C Interface Circuit

2.2.1.7 Video Interface

The ASIC E05B17 (IC16) maps the SRAM into a different memory space from system memory. The CPU transmits data from the V-RAM (in the system RAM) to the SRAM using the ASIC E05B17. 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 creates VIDEO signal of video interface.

The signal line of the internal video interface circuit (the C205 MAIN board and engine controller board) can be broadly divided into four groups. The first group (PRINT, CPRDY, EPRDY, and PRDY) gives the status of either the video controller or engine controller and indicates whether they are ready to communicate with each other or ready to start the printing operation.

The second group (VSYNC, HSYNC) is the synchronizing signal for the printing operation. The third group (VIDEO) is the serial video data signal. The fourth group (CMD, SRCLK, CTBSY, and ETBSY) is used to transfer the commands (from the video controller) or status (from the engine controller) for printer mechanism control. Except for VIDEO, PRINT, VSINC, and HSYNC, all signals are controlled by ASIC E05A93.

This printer has BiRITech function standard. These functions modify the VIDEO signal with the ASIC E05B17 (IC16).

Chapter 3   Disassembly and Assembly

Table of Contents

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-N1200.

3.1.1 Precautions for Disassembly/Assembly

Follow the precautions below when disassembling/assembling the printer.

WARNING

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

CAUTION

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

3.1.2 Tools

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

Table 3-1. Tools

Name	Commercially Available?	Part No.
Philips screwdriver No. 2	Yes	B743800200
Regular screwdriver	Yes	B743000100
Tweezers	Yes	B641000100
Soldering iron	Yes	B740200100
Round-nose pliers	Yes	B740400100
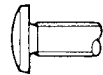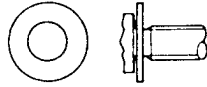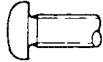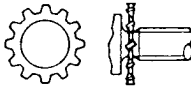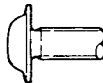
3.1.3 Small Parts

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

Table 3-2. Abbreviations Used for Screws

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

Table 3-3. Screw Types and Abbreviations

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

3.1.4 Service Checks after Repair

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

Table 3-4. Checks after Repair

Item	Location	Check Point	Check
Operation	Control panel	Do all LEDs, LCD, and buttons function normally?	
	Heater lamp	Does the heater lamp turn ON normally?	
	Test print (status sheet, font sample, feature print)	Is the test print performed normally?	
	Data print	Does data print in all modes?	
Adjustment	Print position	Does the J4 on the main controller board match for the specific standard paper size (A4 size paper of letter size paper)?	
ROM version	Status sheet or C205 MAIN board	Is it the latest ROM version?	
Cleaning		Is toner and dust removed from the paper path? Is the lens on the optical unit cleaned? Is the paper take-up roller cleaned? Is the rollers in the fusing unit cleaned? Is the outer surface of the printer clean?	
Packing		Is the imaging cartridge removed from the printer? Is the unit packed securely? Are accessories packed also?	

3.2 DISASSEMBLY AND ASSEMBLY

This section describes and illustrates the procedures for removing and disassembling the components of the EPL-N1200. 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 Main Controller Section Removal

The control section is comprised of the main controller board (C205 MAIN board) and the control panel unit.

3.2.1.1 Main Controller Board (C205 MAIN Board) Removal

CAUTION

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

1. Turn the printer so that its back side faces you.

2. Remove the four thumbscrews (M3 × 14).

3. Pull the plastic tabs to release the main controller board.

5. Grasp the board with both hands and pull it out of its slot.
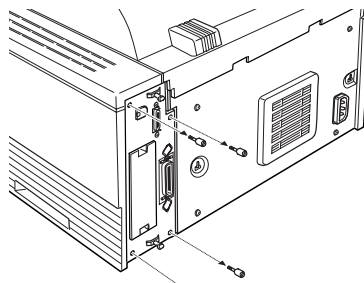
Figure 3-1. Main Controller Board Removal (1)
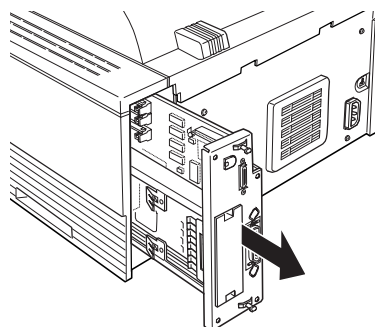
Figure 3-2. Main Controller Board Removal (2)

3.2.1.2 Control Panel Removal

1. Open the top cover. Remove the imaging cartridge. Cover the imaging cartridge to protect it from light or place it in a dark area.

2. Remove the main controller board. (Refer to Section 3.2.1.1.)

3. Remove one CC (M3x6) screw from the control panel and lift the panel forward.

4. Remove two CC (M3x8) screws and take the right cover away.

5. Remove two CC (M3x8) screws on the paper guide case.

6. Remove four CC (M3x6) screws on the top and two CC (M3x6) screws at the right of the shield cover and take it away.

7. Remove connector CN3 on the engine controller board.

8. Remove the control panel.
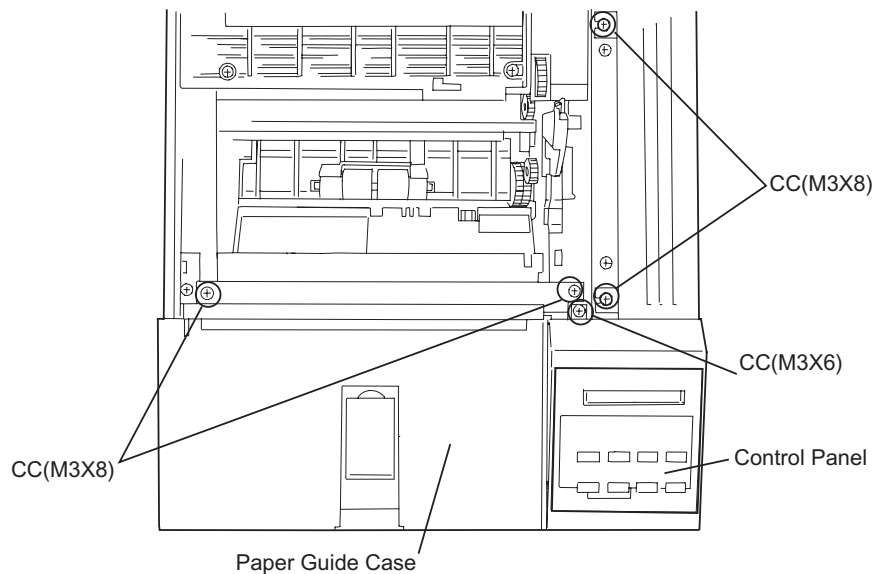
Figure 3-3. Control Panel Removal
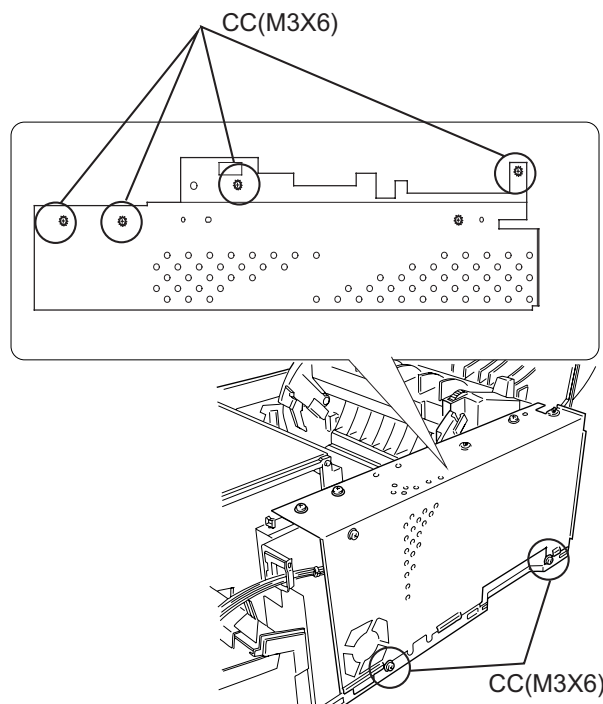
Figure 3-4. Shield Cover Removal

CN3
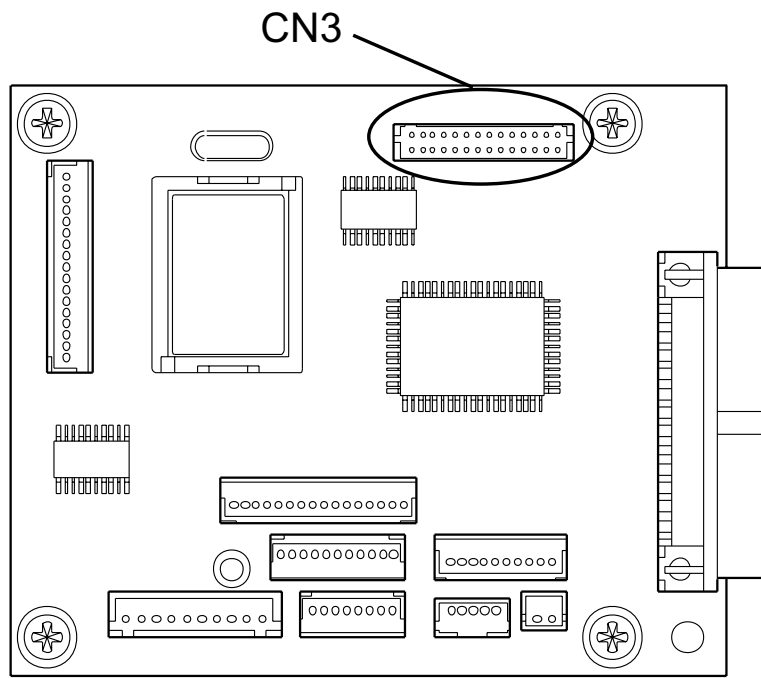
Figure 3-5. Connectors on Engine Driver Board

3.2.2 Engine Disassembly

This section describes disassembling the engine, including the engine controller board and power supply board.

3.2.2.1 Engine Controller Board Removal

1. Open the top cover. Remove the imaging cartridge. Cover the imaging cartridge to protect it from light or place it in a dark area.

2. Remove the main controller board. (Refer to Section 3.2.1.1.)

3. Remove one CC (M3x6) screw from the control panel and lift the panel forward.

4. Remove two CC (M3x8) screws and take the right cover away.

5. Remove two CC (M3x8) screws on the paper guide case.

6. Remove four CC (M3x6) screws on the top and two CC (M3x6) screws at the right of the shield cover and take it away.

7. Remove all connectors, CN2, CN3, CN4, CN5, CN6, CN7, CN9, and CN10 on the engine controller board.

8. Remove four CC (M3x6) screws on the engine controller board.

9. Remove the engine controller board.
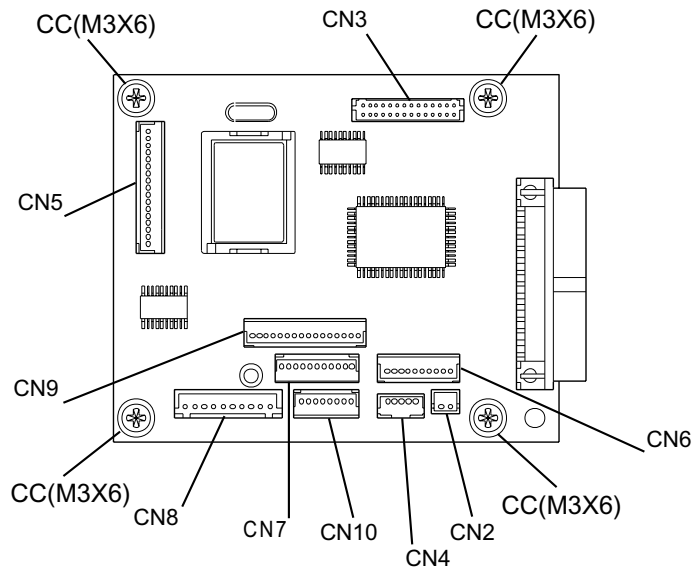
Figure 3-6. Engine Controller Board Removal

3.2.2.2 Power Supply Unit Removal

1. Open the top cover. Remove the imaging cartridge. Cover the imaging cartridge to protect it from light or place it in a dark area.

2. Remove one CC (M3 × 6) screw from the control panel then lift the panel forward.

3. Remove two CC (M3x8) screws on the paper guide case.

4. Loosen one CC (M3x8) screw which secures the front cover.

5. Remove the paper guide case and the front cover.

6. Remove one CP(O) (M3x6) screw on the power supply board shield cover and take the PS unit shield cover away.

7. Remove two CP(O) (M3x8) screws which secure the power supply unit frame and release two fooks from the bottom frame. Then remove the power supply unit frame by pulling it forward.

8. Remove all connectors on the power supply board, CN1, CN2, CN3, CN4, CN5, CN6, blue socket and white socket cables on the power supply board.

9. Remove four CC (M3x6) screws securing the power supply board and its frame.

Figure 3-7. Front Cover Removal
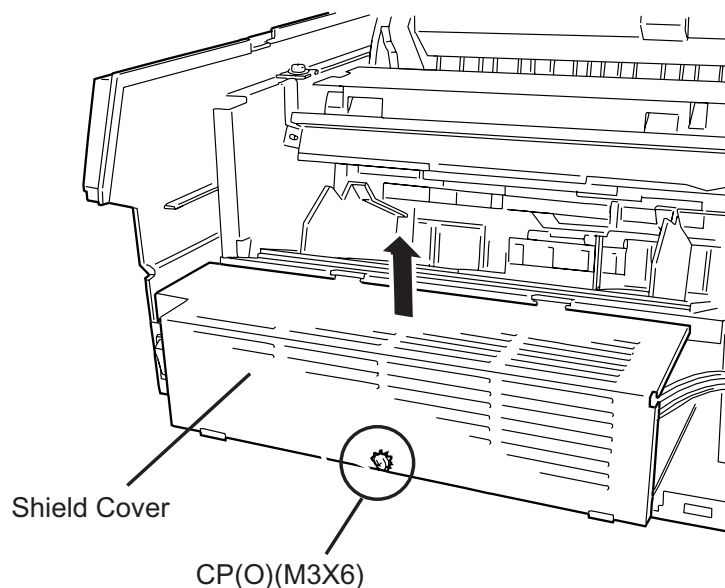
Figure 3-8. Shield Cover Removal

CP(O)(M3X8)

CP(O)(M3X8)
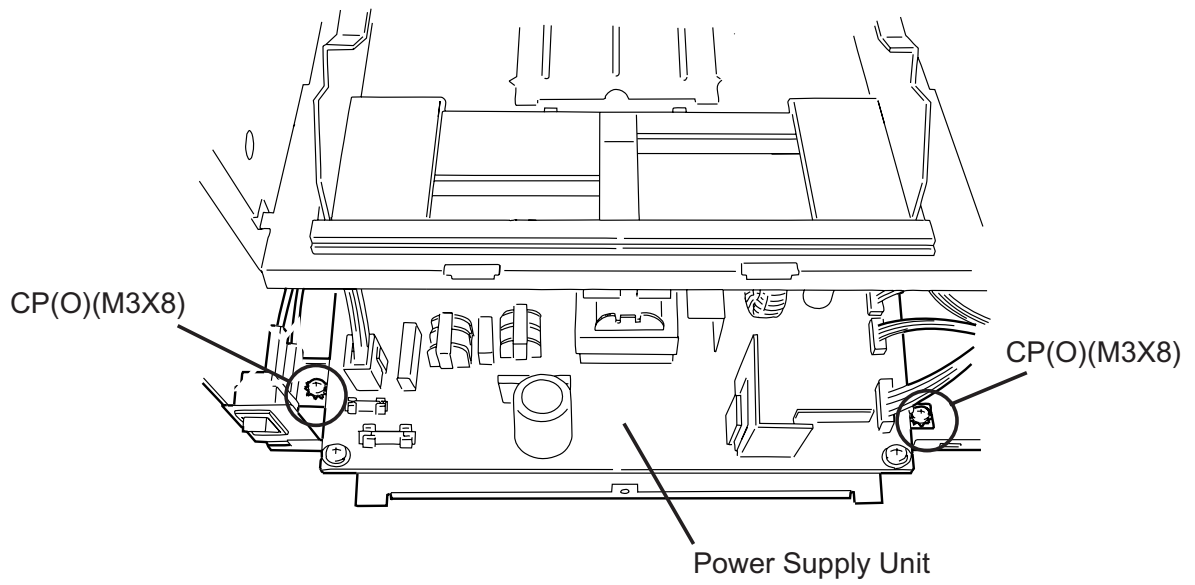
Power Supply Unit

Figure 3-9. Power Supply Unit Removal (1)

CC(M3X6)

CC(M3X6)

CN4

CN6

CN2

CN3

CN5

Blue

White

CC(M3X6)

CC(M3X6)

CN1
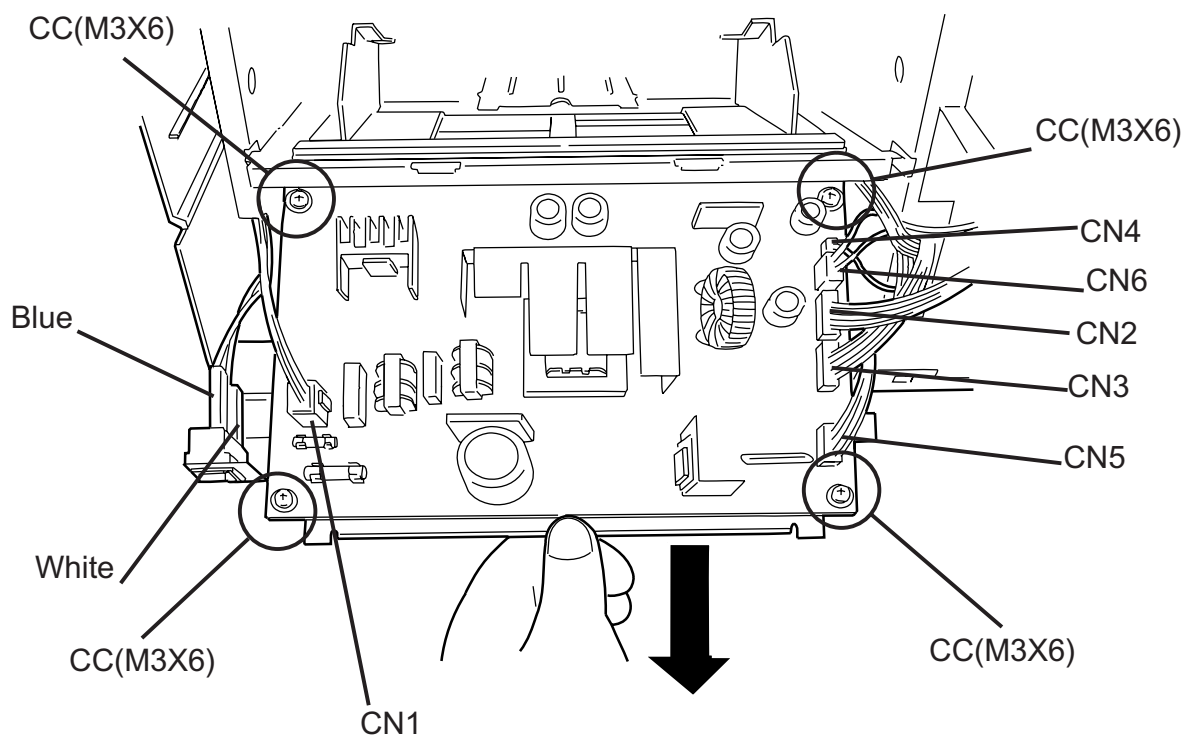
Figure 3-10. Power Supply Unit Removal (2)

ASSEMBLING POINT

When you install the power supply unit into the printer, insert the tabs on the power supply unit frame into the holes in the bottom frame correctly.
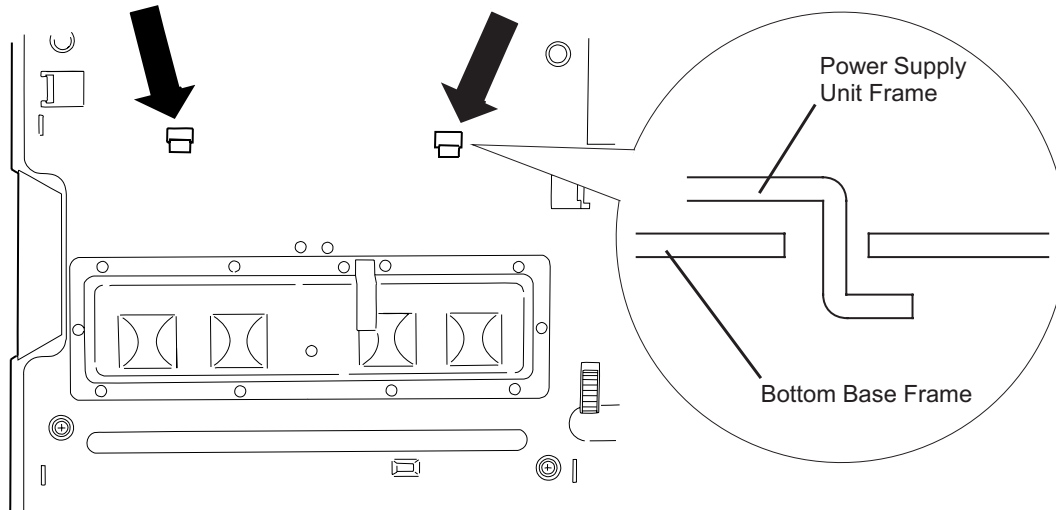
Figure 3-11. Power Supply Unit Installation

3.2.2.3 Interlock Switch Removal

1. Open the top cover. Remove the imaging cartridge. Cover the imaging cartridge to protect it from light or place it in a dark area.

2. Remove the main controller board. (Refer to Section 3.2.1.1.)

3. Remove one CC (M3 $\times$ 6) screw from the control panel and lift the panel forward.

4. Remove two CC (M3x8) screws and take the right cover away.

5. Remove two CC (M3x8) screws on the paper guide case.

6. Remove four CC (M3x6) screws on the top and two CC (M3x6) screws at the right of the shield cover and take it away.

7. Remove two CP(S)(P) (M3x16) screws.

8. Remove two cables (orange and red) from the interlock switch.
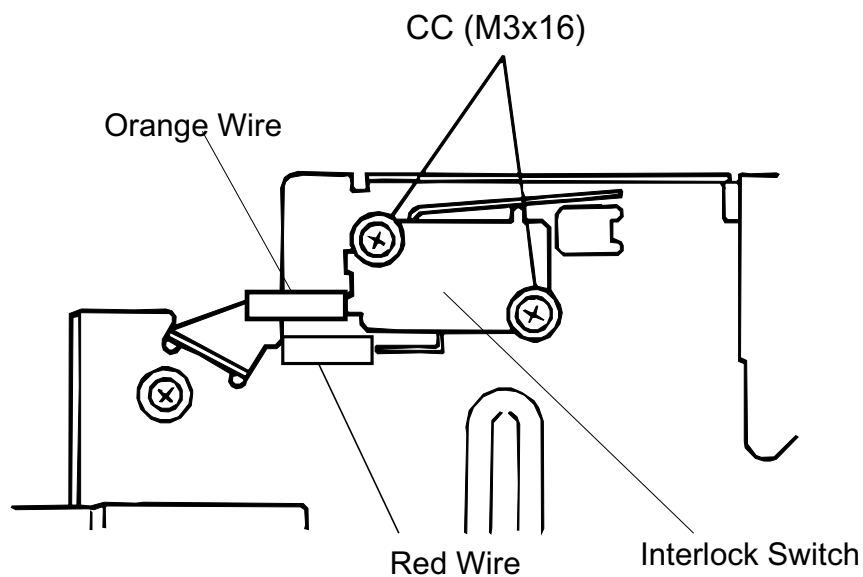
Figure 3-12. Interlock Switch Removal

3.2.2.4 Optical Unit Removal

CAUTION

> ■ *Do not touch the optical unit except at the time of replacement.*
> ■ *Do not open the unit under any conditions.*
> ■ *Do not remove the circuit board from the optical unit under any condition.*
> ■ *Do not loosen two screws that secured with a black paint, shown in position A in Figure*
>   *3-14.*
> ■ *Do not loosen two screws shown in position B in Figure 3-14.*

1. Open the top cover. Remove the imaging cartridge. Cover the imaging cartridge to protect it from light or place it in a dark area.

2. Remove the main controller board. (Refer to Section 3.2.1.1.)

3. Remove one CC (M3 × 6) screw from the control panel and lift the panel forward.

4. Remove two CC (M3x8) screws and take the right cover away.

5. Remove two CC (M3x8) screws on the paper guide case.

6. Remove four CC (M3x6) screws on the top and two CC (M3x6) screws at the right of the shield cover and take it away.

7. Remove connector CN5 on the engine controller board.

8. Remove one CC (M3x6) screw on the right frame which secures the optical unit.

9. Loosen two CC (M3x8) screws and take the left cover away.

10. Remove one CC (M3x6) screw on the left frame which secures the optical unit.

11. Remove one CC (M3x14) screw on the bottom side of the optical unit, then remove the optical unit.

CC(M3X8)   Left Cover
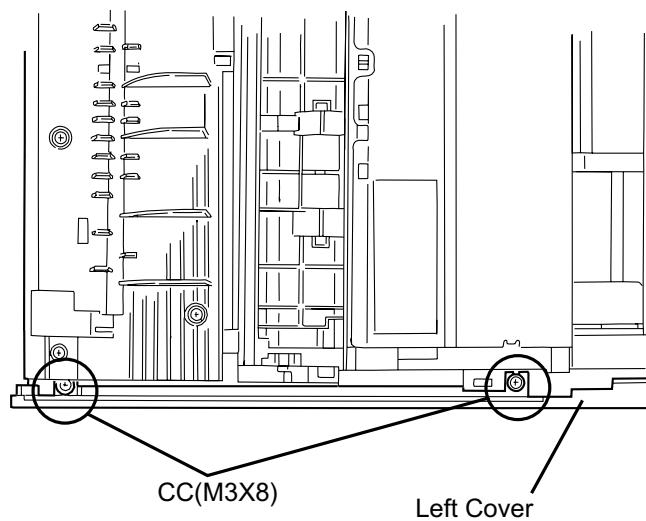
Figure 3-13. Left Cover Removal
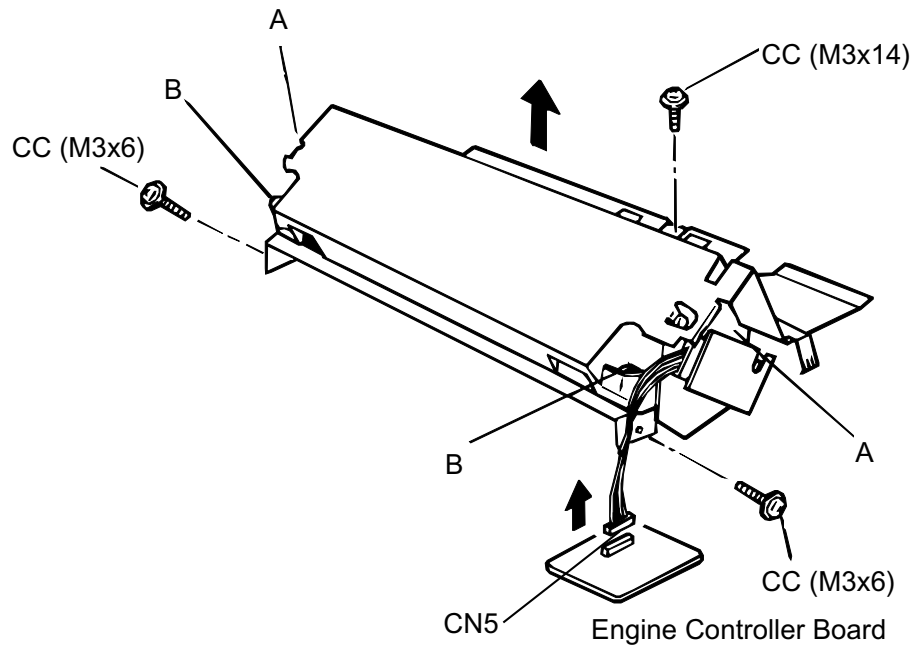
Figure 3-14. Optical Unit removal

3.2.2.5 Paper Empty Sensor Removal

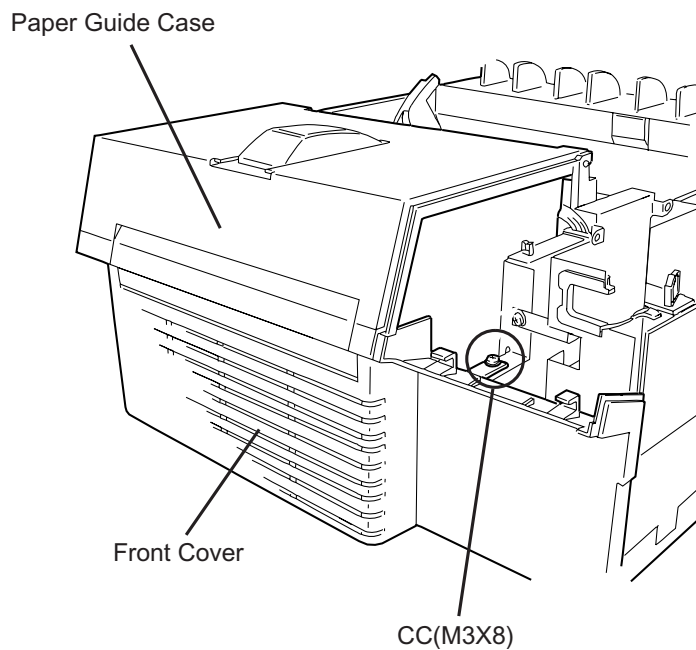1. Open the top cover. Remove the imaging cartridge. Cover the imaging cartridge to protect it from light or place it in a dark area.

2. Remove the optical unit. (Refer to Section 3.2.2.4.)

3. Disconnect tabs for the paper empty sensor and remove the paper empty sensor .
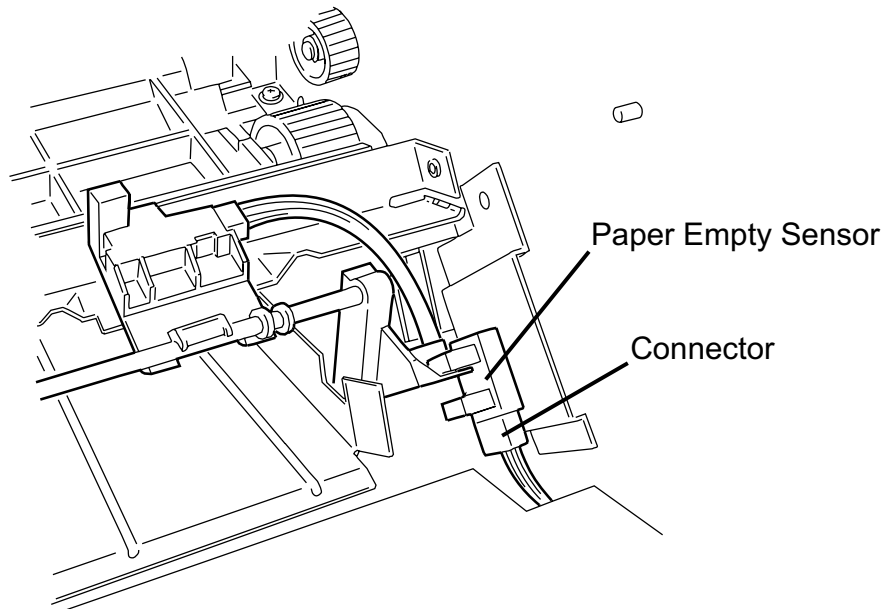
Figure 3-15. Paper Empty Sensor Removal

4. Disconnect connector for the paper empty sensor.

3.2.2.6 Toner End Sensor Removal

1. Open the top cover. Remove the imaging cartridge. Cover the imaging cartridge to protect it from light or place it in a dark area.

2. Remove the optical unit. (Refer to Section 3.2.2.4.)

3. Disconnect tabs for the toner end sensor and remove the toner end sensor.

4. Disconnect connector for the toner end sensor.
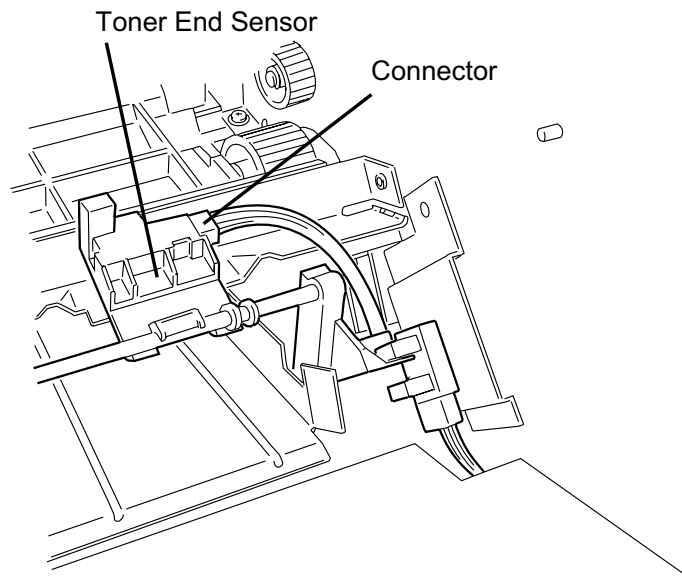
Figure 3-16. Toner End Sensor Removal

3.2.2.7 Paper Take-up Solenoid Removal

1. Open the top cover. Remove the imaging cartridge. Cover the imaging cartridge to protect it from light or place it in a dark area.

2. Remove the toner end sensor. (Refer to Section 3.2.2.6.)

3. Remove the roller cover.

4. Remove the bracket which mounted the toner empty sensor.

5. Disconnect the cable for the paper take-up solenoid from the base unit.

6. Remove one CC (M3 × 6) screw from the paper take-up solenoid and remove the paper take-up solenoid.
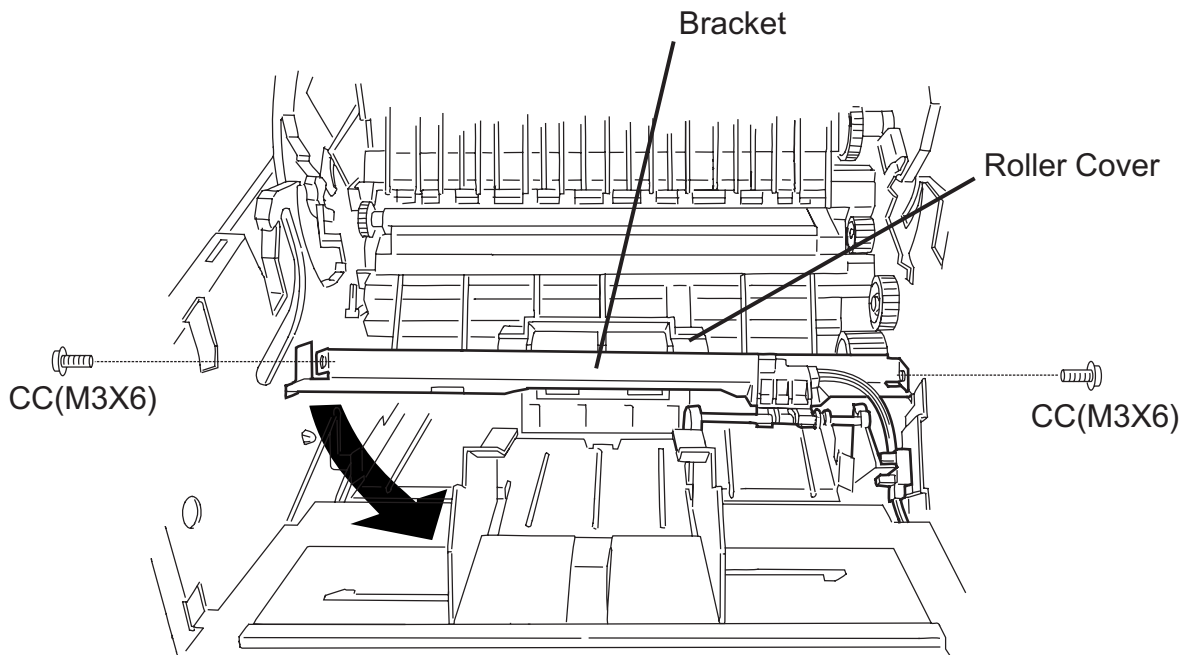
Figure 3-17. Bracket Removal
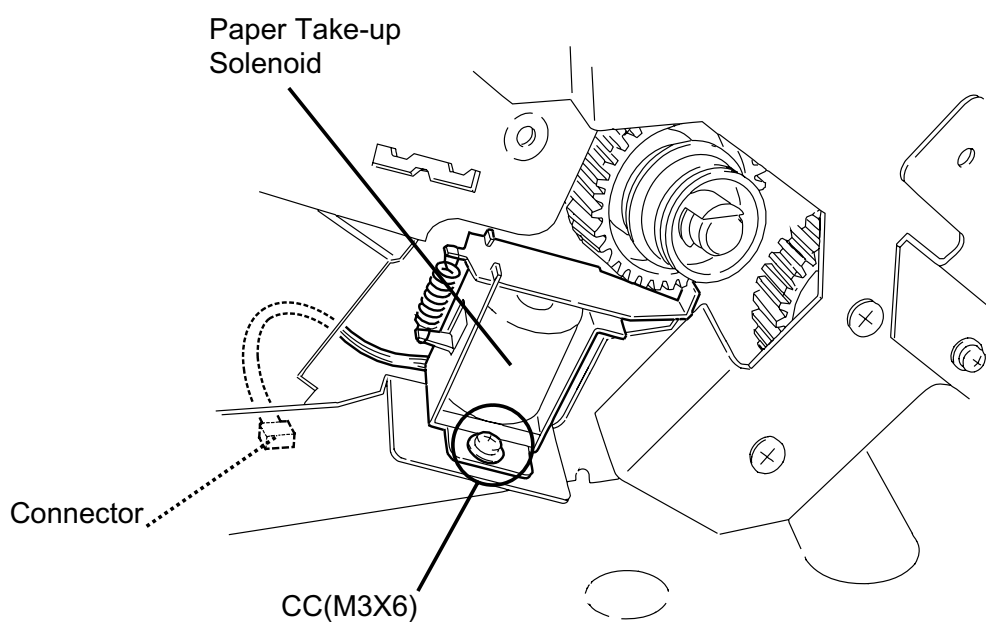
Figure 3-18. Paper Take-up Solenoid Removal

3.2.2.8 High-Voltage Supply Board Removal

1. Open the top cover. Remove the imaging cartridge. Cover the imaging cartridge to protect it from light or place it in a dark area.

2. Remove the main controller board. (Refer to Section 3.2.1.1.)

3. Loosen two CC (M3x8) screws which secure the right cover.

4. Remove left and right tabs for the top cover from the printer base unit then remove the top cover. (Refer to Figure 3-2)

5. Remove one CC (M3x6) screw on the fusing unit cover and remove the fusing unit cover.

6. Remove four CP(O) (M3x6) screws on the rear panel unit.

7. Disconnect connector from the paper exit sensor then lay the rear panel unit flat.

8. Remove connectors CN1, CN2, CN3, the red wire terminal, and the black wire terminal on the high-voltage supply board.

9. Remove three CP(B) (M3 $\times$ 6) screws on the high-voltage supply board then remove the high-voltage supply board.

CC(M3X6)
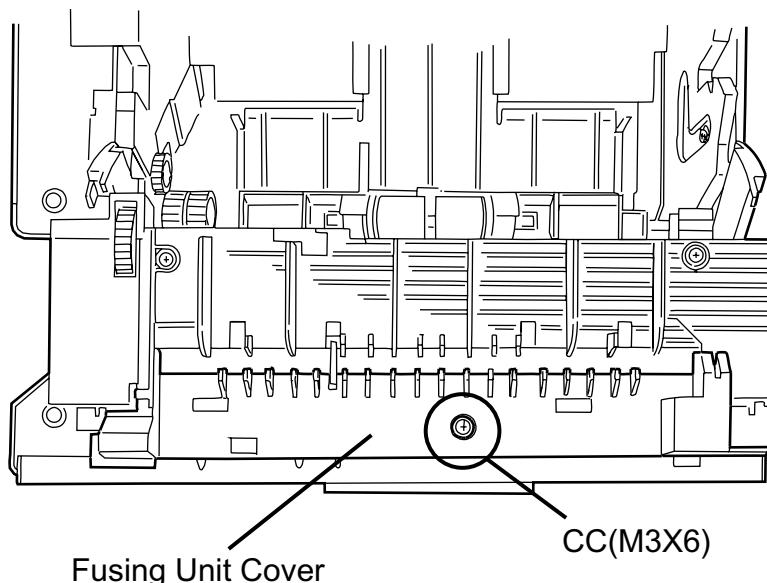
Fusing Unit Cover

Figure 3-19. Fusing Unit Cover Removal

Paper Exit Sensor

CP(O)(M3X6)

CP(O)(M3X6)

CP(O)(M3X6)

CP(O)(M3X6)
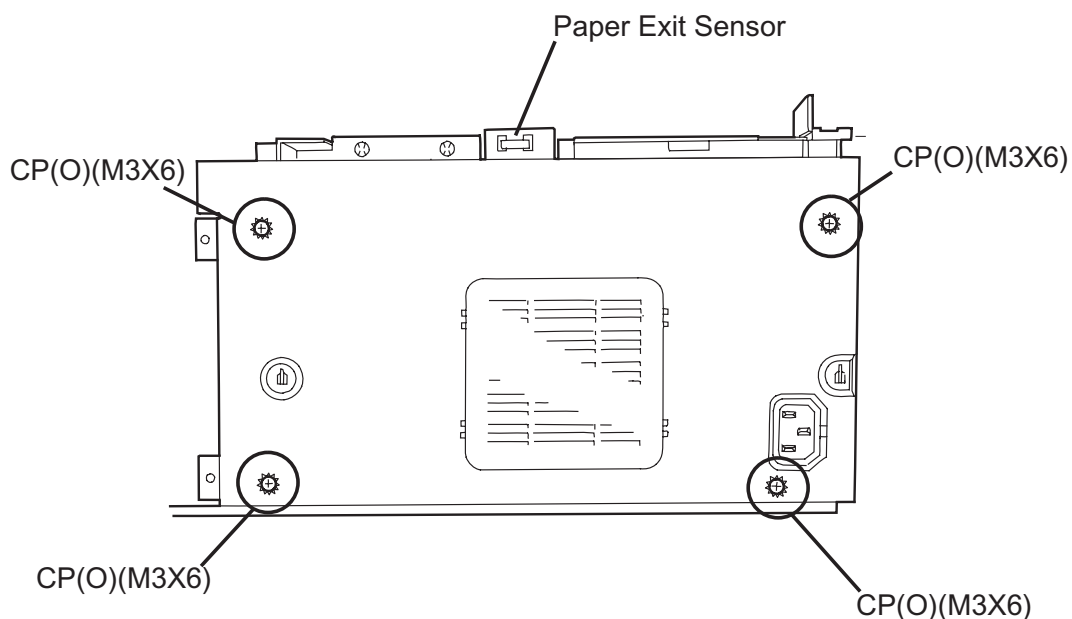
Figure 3-20. Rear Panel Unit Removal
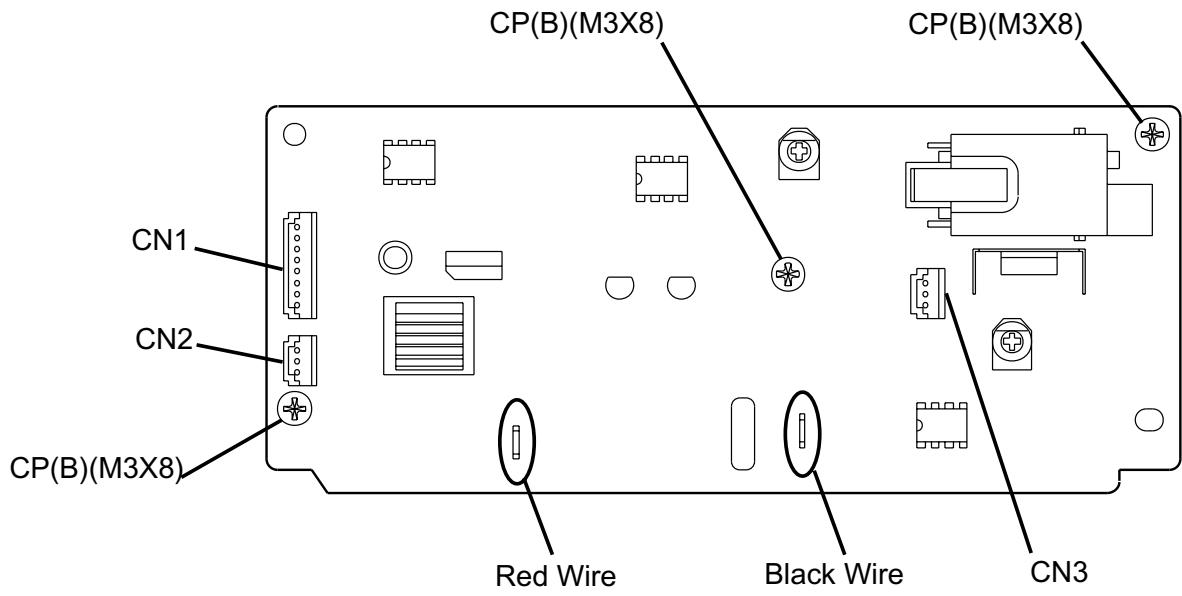
Figure 3-21. High-Voltage Supply Board Removal

3.2.2.9 Main Motor Removal

1. Open the top cover. Remove the imaging cartridge. Cover the imaging cartridge to protect it from light or place it in a dark area.

2. Remove the main controller board. (Refer to Section 3.2.1.1.)

3. Loosen two CC (M3x8) screws which secure the right cover.

4. Remove left and right tabs for the top cover from the printer base unit then remove the top cover.

5. Remove one CC (M3x6) screw on the fusing unit cover and remove the fusing unit cover.

6. Remove four CP(O) (M3x6) screws on the rear panel unit.

7. Disconnect connector for the paper exit sensor then lay the rear panel unit flat.

8. Remove one CC (M3 $\times$ 6) screw from the control panel and lift the panel forward.

9. Remove two CC (M3x8) screws on the paper guide case.

10. Remove four CC (M3x6) screws on the top and two CC (M3x6) screws at the right of the shield cover and take it away.

11. Remove two CP(S)(P) (M4 $\times$ 6) screws for the main motor.

12. Lift the main motor, and disconnect connector for the main motor.
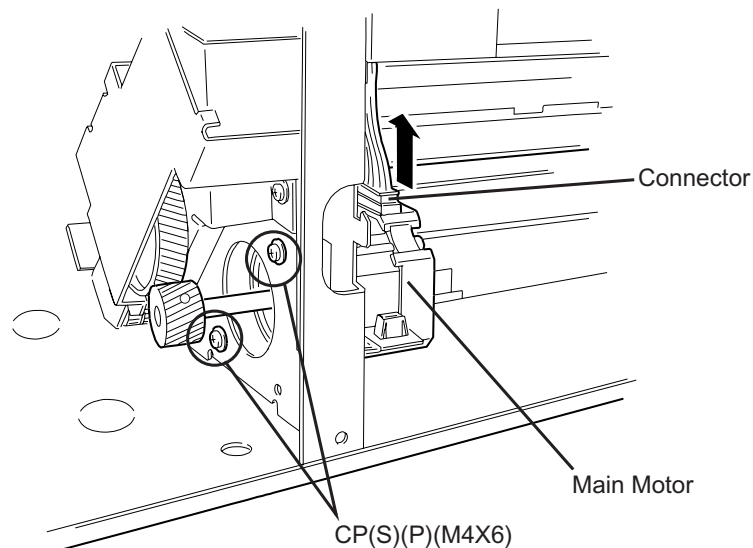
Figure 3-22. Main Motor Removal

3.2.2.10 Paper Take-up Sensor Removal

1. Open the top cover. Remove the imaging cartridge. Cover the imaging cartridge to protect it from light or place it in a dark area.

2. Remove the high-voltage supply board. (Refer to Section 3.2.2.8.)

3. Remove the main motor. (Refer to Section 3.2.2.9.)

4. Remove the sensor lever.

5. Remove the paper take-up sensor.

6. Disconnect connector for the paper take-up sensor.

Figure 3-23. Paper Take-up Sensor Removal

3.2.2.11 Fan Motor Removal

1. Open the top cover. Remove the imaging cartridge. Cover the imaging cartridge to protect it from light or place it in a dark area.

2. Remove the main controller board. (Refer to Section 3.2.1.1.)

3. Loosen two CC (M3x6) screws which secure the right cover.

4. Remove left and right tabs of the top cover from the printer base unit then remove the top cover.

5. Remove one CC (M3x6) screw on the fusing unit cover and remove the fusing unit cover.

6. Disconnect connector for the paper exit sensor then lay the rear panel unit flat.

7. Disconnect connector for the fan motor.

8. Remove two CCB(M3x8) screws then remove the fan motor.
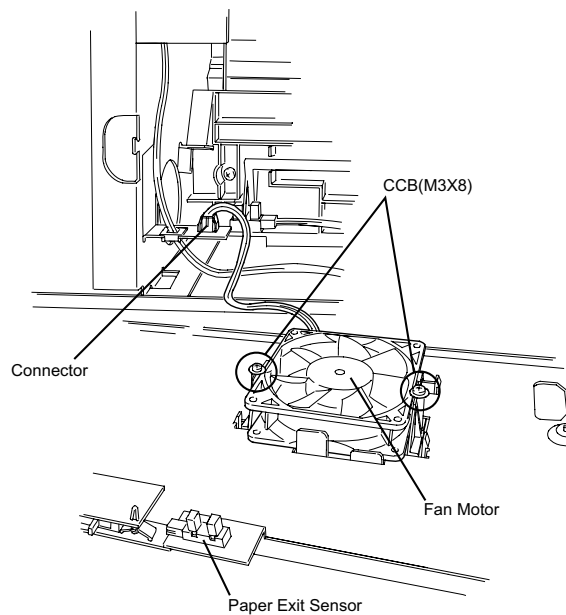
Figure 3-24. Fan Motor Removal

3.2.2.12 Fusing Unit Removal

1. Open the top cover. Remove the imaging cartridge. Cover the imaging cartridge to protect it from light or place it in a dark area.

2. Remove the main controller board. (Refer to Section 3.2.1.1.)

3. Loosen two CC (M3x8) screws which secure the right cover.

4. Release left and right tabs of the top cover from the printer base unit then remove the top cover.

5. Remove one CC (M3x6) screw on the fusing unit cover and remove the fusing unit cover.

6. Disconnect two connectors for the thermistor and the fusing unit lamp.

7. Remove two CP(O) (M3x6) screws on the fusing unit then remove the fusing unit.
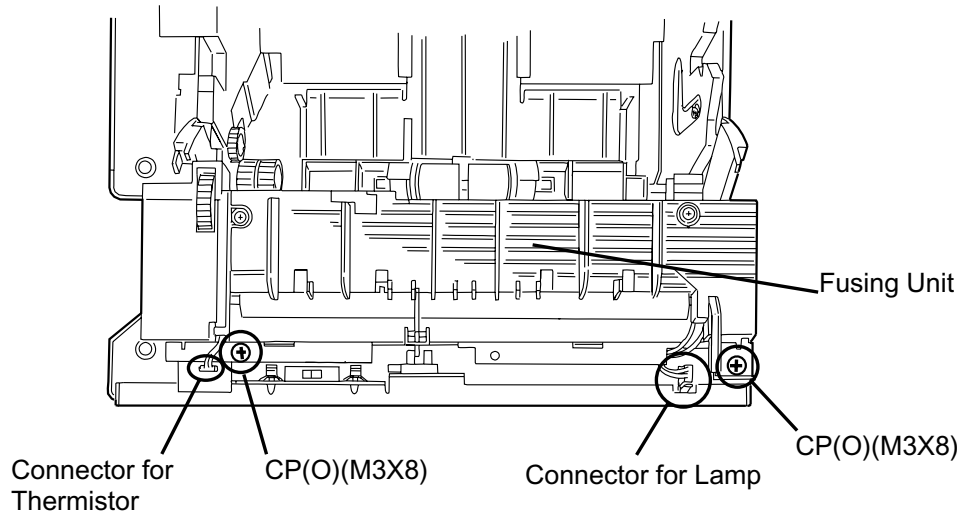
Figure 3-25. Fusing Unit Removal

3.2.2.13 Paper Exit Sensor Removal

1. Remove the fusing unit. (Refer to Section 3.2.2.12.)

2. Remove the paper exit sensor.

3. Disconnect the paper exit sensor from connector of the cable.
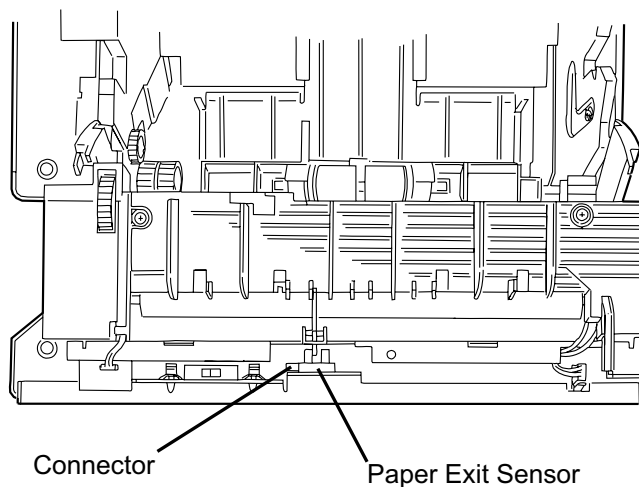
Figure 3-26. Paper Exit Sensor Removal

3.2.2.14 Fusing Lamp Removal

1.   Remove the fusing unit. (Refer to Section 3.2.2.12.)

2.   Remove two CCB (M3x8) screws which secure both sides of the fusing unit cover, then remove both sides of the fusing unit cover.

3.   Remove the fusing lamp.

CAUTION

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

CCB(M3X8)

CCB(M3X8)
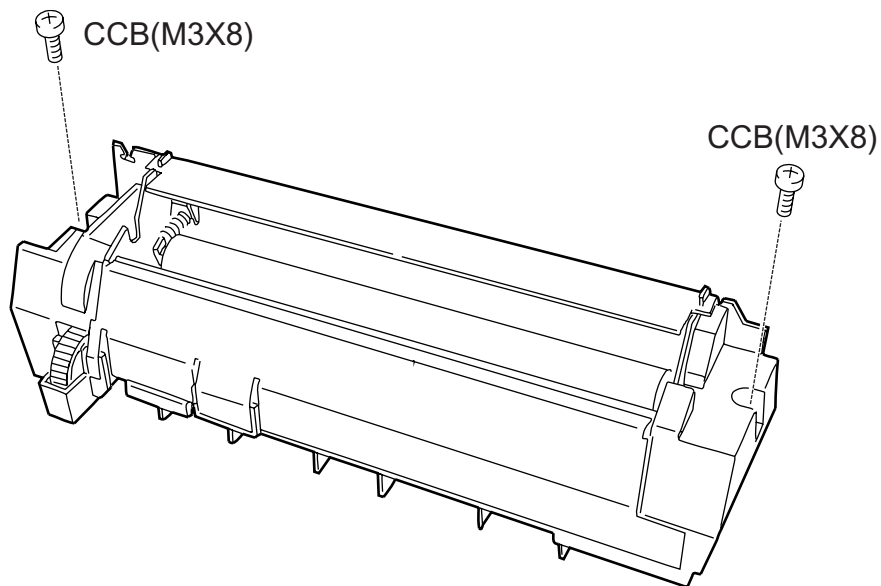
Figure 3-27. Fusing Unit Removal (1)
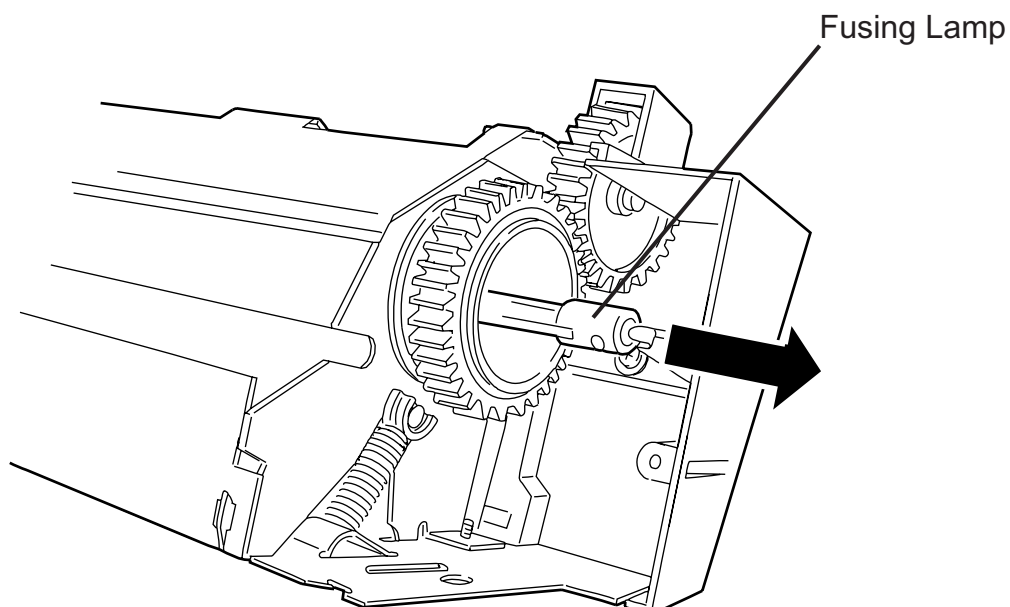
Fusing Lamp

Figure 3-28. Fusing Unit Removal (2)

3.2.2.15 Thermistor and Thermostat Removal

1. Remove the fusing unit. (Refer to Section 3.2.2.12.)

2. Remove the fusing lamp. (Refer to Section 3.2.2.13.)

3. Take the thermistor cable out of its guide in the fusing unit housing.

4. Remove two CC (M3 × 6) screws on the top surface of the fusing unit, and remove the side covers.

5. Divide the fusing unit into two parts.

6. Remove one CC (M3 × 10) screw then remove the Thermistor.

7. Remove two CS(P) (M3x6) screws then remove the thermostat.

CAUTION

* Do not touch the glass surface of the lamp with your bare hands.
* The thermistor and thermostat must be attached at the fusing roller.
* The connector for the thermistor must be inserted firmly.

CC(M3X6)
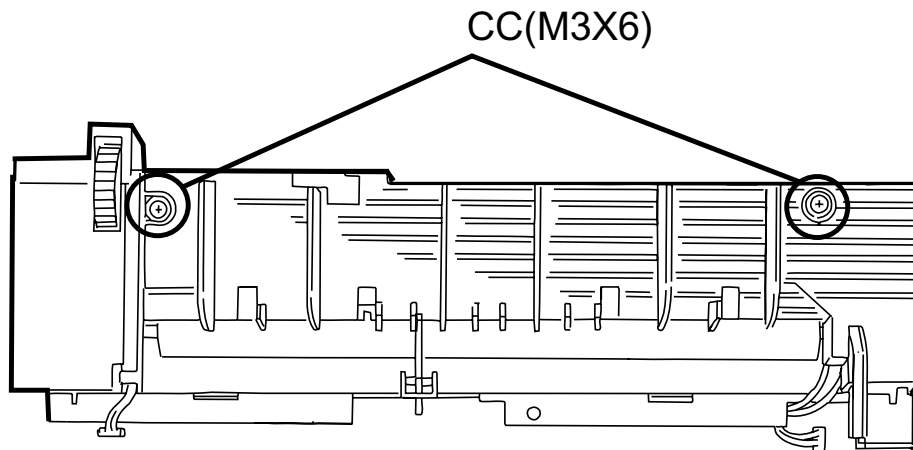
Figure 3-29. Fusing Unit Disassembly

CC(M3X10)   CS(P)(M3X6)

Thermistor   Thermostat
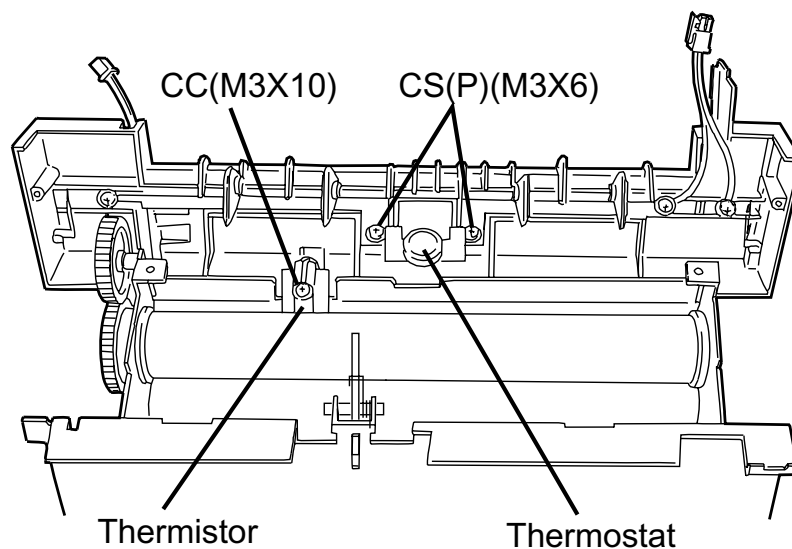
Figure 3-30. Thermistor and Thermostat Removal

3.2.2.16 Image Transfer Roller Removal

1.   Remove the fusing unit. (Refer to Section 3.2.2.12.)

2.   Remove the spacer.

3.   Slide the image transfer assembly to the left, lift up the right side, and remove the image transfer assembly.

4.   Remove the image transfer Roller.

CAUTION

> * *Do not touch the surface of the image transfer roller with your bare hands.*
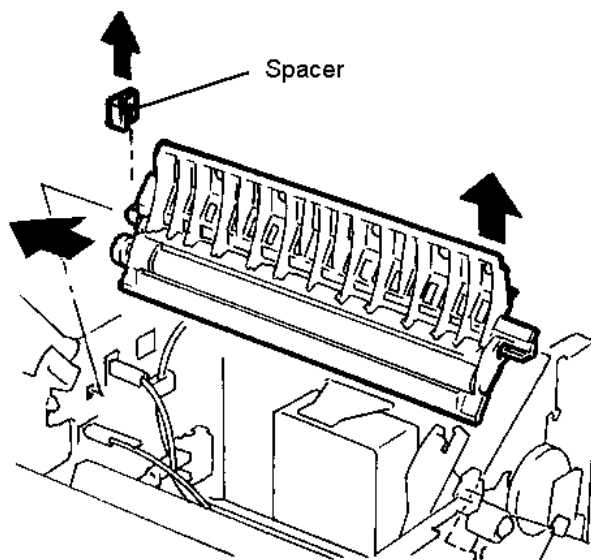
Figure 3-31. Image Transfer Assembly Removal
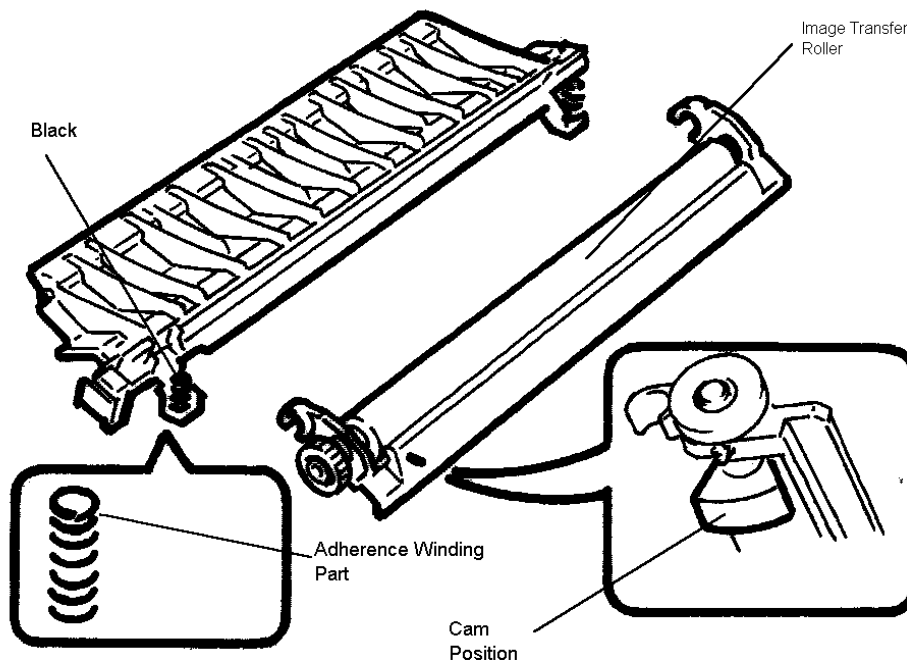
Figure 3-32. Image Transfer Roller Assembly Construction
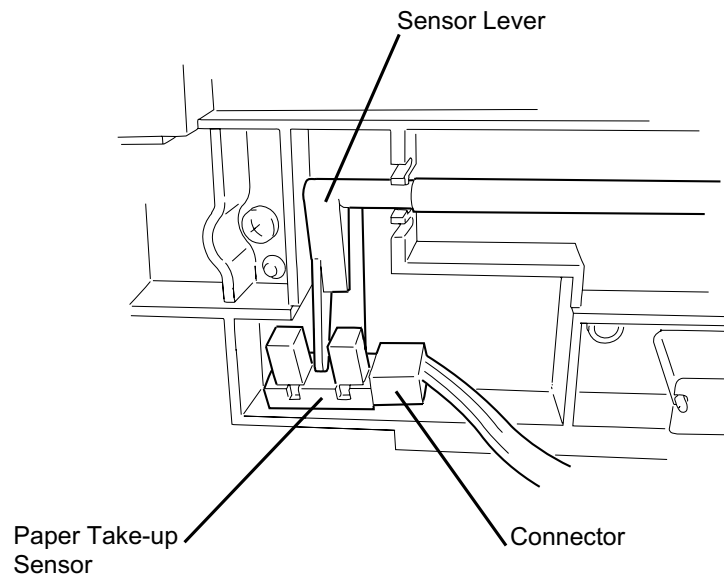
3.2.2.17 Paper Take-Up Roller Removal

1.   Open the top cover. Remove the imaging cartridge. Cover the imaging cartridge to protect it from light or place it in a dark area.

2.   Remove the fusing unit. (Refer to Section 3.2.2.12.)

3.   Remove the image transfer assembly. (Refer to Section 3.2.2.16.)

4.   Remove the optical unit. (Refer to Section 3.2.2.4.)

5.   Remove the roller cover.

6.   Disconnect the cable for the toner empty sensor and remove the bridge which mounts the toner empty sensor.

7.   Disconnect connectors CN1, CN2, CN3, the red wire terminal, and the black wire terminal on the high-voltage supply board.

8.   Remove two CC (M3 $\times$ 8) screws on the paper pick unit.

9.   Slide the paper pick unit to the left, lift the left side up, and remove the paper pick unit.

11. Remove one E-ring on the paper take-up clutch, and remove the paper take-up clutch.

12. Remove two E-rings and left bushings on the paper take-up roller shaft.

13. Remove the paper take-up rollers.
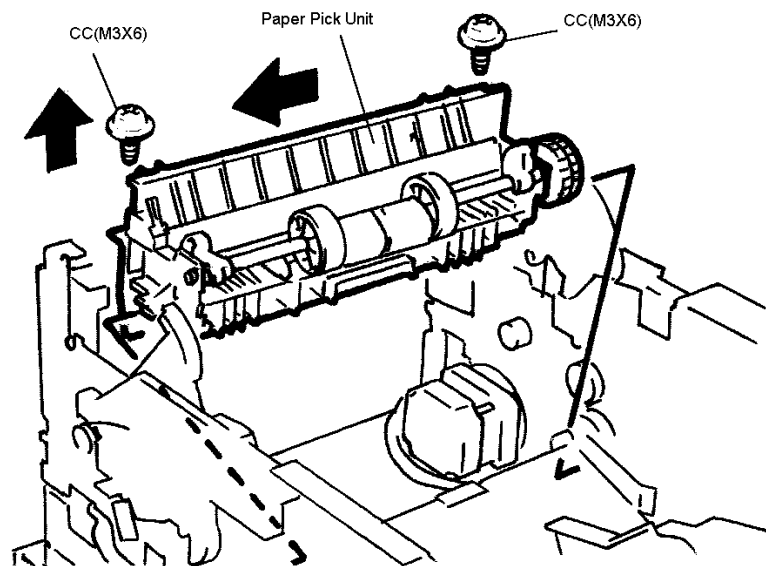
Figure 3-33. Paper Pick Assembly Removal
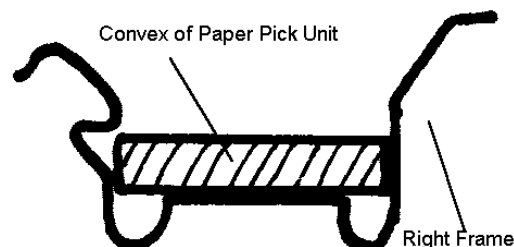
Figure 3-34. Right Frame and Paper Pick Assy Matching
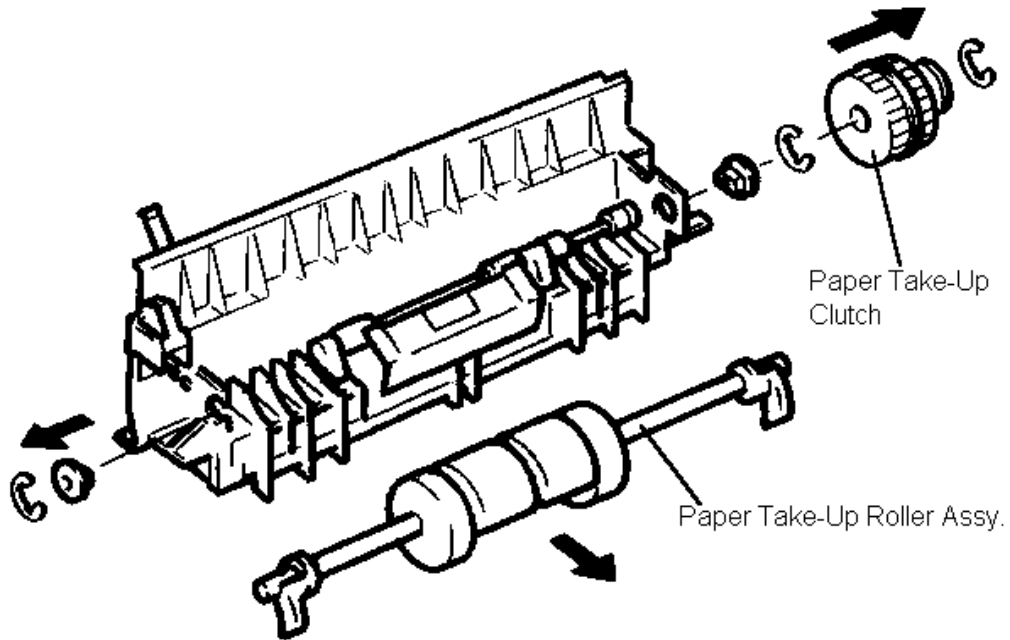
Figure 3-35. Paper Pick Assy Removal
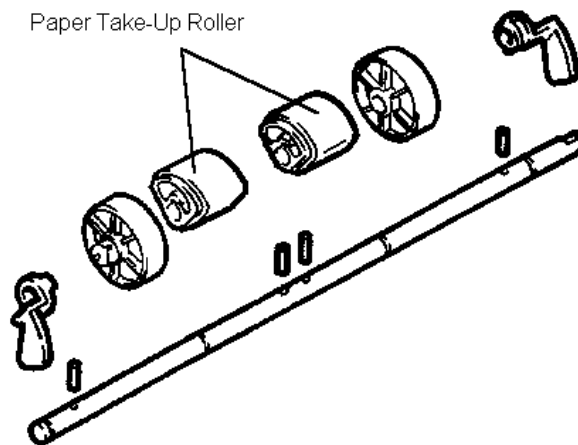
Figure 3-36. Paper Take-Up Roller Removal

Chapter 4   Adjustment

No adjustment is required in this product.

Chapter 5   Troubleshooting

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5.1 OVERVIEW

The EPL-N1200 has a sophisticated, built-in, self-diagnostic function that reduces troubleshooting time by identifying failed parts or components. This self-diagnostic test overcomes the troubleshooting problems for page printers, in which even a trivial failure can result in a serious print quality problem.

5.2 SELF-DIAGNOSTIC FUNCTION

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

Table 5-1. Messages Requiring Service Maintenance

Error Number	Error Condition	Error Type
E0003	Fusing Unit Error	Engine Error
E0005	Fan Motor Error	
E0006	Scanner Mirror Motor Error	
E0009	Laser Light Error	
E0014	Communication Error for Engine Controller and main Controller	
C0001	CPU error (reserved)	Main Contropller Error
C0002	CPU error (privilege violation)	
C0003	CPU error (illegal instruction)	
C0004	CPU error (no support FPU instruction)	
C0007	CPU error (address misalignment)	
C0009	CPU error (reserved)	
C0010	CPU error (tag overflow)	
C0017 to 31	CPU error (no support interrupt)	
C0036	CPU error (no support coprocessor instruction)	
C0128 to 254	CPU error (unimplemented instruction)	
C0255	CPU error (break error)	
C1000	RAM error (no RAM present	
C1001	RAM error (insufficient RAM for minimum stack)	
C1002	RAM error (insufficient RAM for standard size)	
C1003	Optional RAM error	
C1100	Font ROM checksum error (0 - 15 bits)	
C1101	Font ROM checksum error (16 - 31 bits)	
C1120	Program ROM checksum error (0 - 7 bits)	
C1121	Program ROM checksum error (8 - 15 bits)	
C1122	Program ROM checksum error (16 -23 bits)	
C1123	Program ROM checksum error (24 -31 bits)	
C1170	NLSP font ROM checksum error	
C1180	Option ROM SIMM checksum error	
C1200	EEPROM write error	
C1210	EEPROM write counter overflow	
C1400	Engine initialization fault	
C1999	Other main controller error	
C2000	Software error	
A,B,D,F-Z	Other software error	Software Error

5.3 TROUBLESHOOTING

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

5.3.1 Troubleshooting of Abnormal Operation

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

Table 5-2. Symptoms and Reference Tables

Symptom	Printer Condition	Reference Table
The printer does not operate at all.	The heater lamp in fusing unit does not come on, and so RAM check is not started.	5-3
RAM check not displayed.	The heater lamp in fusing unit comes on, but RAM check is not started.	5-4
Printer Open	The top cover is closed, but the LCD still displays Printer Open.	5-5
Paper Out	Paper is loaded in the paper tray, but the LCD displays Paper Out.	5-6
Illegal AUX I/F Card or Illegal I/F Module	The LCD displays Illegal AUX I/F Card or Illegal I/F Module.	5-7
Feed Jam	The LCD displays Feed Jam.	5-8
Feed Jam displayed for the lower paper cassette.	The LCD displays Feed Jam when using the lower paper cassette.	5-9
Paper Jam	The LCD displays Paper Jam at power on.	5-10
Paper Jam displayed during paper feeding.	The LCD displays Paper Jam during paper feeding.	5-11
Mem Overflow	The LCD displays Mem Overflow.	5-12
SERVICE REQ. E0003	The LCD displays SERVICE REQ. E0003.	5-13
Main motor doesn't rotate correctly	—	5-14
SERVICE REQ. E0005	The LCD displays SERVICE REQ. E0005.	5-15
SERVICE REQ. E0006	The LCD displays SERVICE REQ. E0006.	5-16
SERVICE REQ. E0009	The LCD displays SERVICE REQ. E0009.	5-17
SERVICE REQ. E0014	The LCD displays SERVICE REQ. E0014.	5-18
SERVICE REQ. C0XXX	The LCD displays SERVICE REQ. C0XXX.	5-19
SERVICE REQ. C1001/1002	The LCD displays SERVICE REQ. C1001/1002.	5-20
SERVICE REQ. C1003	The LCD displays SERVICE REQ. C1003.	5-21
SERVICE REQ. C110X	The LCD displays SERVICE REQ. C110X.	5-22
SERVICE REQ. C112X	The LCD displays SERVICE REQ. C112X.	5-23
SERVICE REQ. C1170	The LCD displays SERVICE REQ. C1170.	5-24
SERVICE REQ. C1180	The LCD displays SERVICE REQ. C1180.	5-25
SERVICE REQ. C12XX	The LCD displays SERVICE REQ. C12XX.	5-26
SERVICE REQ. C1400	The LCD displays SERVICE REQ. C1420.	5-27
Other SERVICE REQ. displayed.	The LCD displays another SERVICE REQ. error code.	5-28

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

Cause	Step	Checkpoint	Finding	Solution
Connector CN1 on the power supply board may be disconnected.	1	Is connector CN1 on the power supply board disconnected?	Yes	Connect CN1 on power supply board.
The fuse on the power supply board may be blown.	2	Is fuse F1 or F2 blown on the power supply board?	Yes	Replace the fuse.
Connector CN3 on engine controller board may be disconnected.	3	Is connector CN3 on the engine controller board disconnected?	Yes	Connect CN3 on engine controller board.
The power supply board may be dead.	4	With the power on, is there an output of +5 VDC between pin 1, 2, or 3 (+) and pin 4, 5, or 6 (–) for CN3 on engine controller board?	No	Replace the power supply board.
The engine controller board may be dead.	5	—	—	Replace the engine controller board.

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

Cause	Step	Checkpoint	Finding	Solution
The main controller board (C205 MAIN board) may be dead.	1	If you change the C205 MAIN board, does the printer start the RAM check?	Yes	Replace the C205 MAIN board.
The control panel may be dead.	2	—	—	Replace the control panel.

Table 5-5. The LCD Displays Printer Open

Cause	Step	Checkpoint	Finding	Solution
The interlock switch terminal connector may be disconnected.	1	Is interlock switch terminal connector disconnected?	Yes	Connect the terminal connector on the interlock switch.
The interlock switch position may be incorrect.	2	Does the switch turn on when the top cover is closed?	No	Reseat the interlock switch.
The interlock switch may be dead.	3	Does the switch toggle? (Check with multimeter.)	No	Replace the interlock switch.
The power supply board may be dead.	4	—	—	Replace the power supply board.

Table 5-6. The LCD Displays Paper Out

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

Table 5-7. The LCD Displays Illegal AUX I/F Card or Illegal I/F Module

Cause	Step	Checkpoint	Finding	Solution
The installed I/F card or I/F module may be illegal. (Check the user's guide.)	1	Can this printer use the inserted I/F card or I/F module?	No	Replace with a supported I/F card or module.
The I/F card or I/F module may be dead.	2	Does this printer recognize another, legal I/F card or I/F module?	Yes	Replace the I/F card or I/F module.
The C205 MAIN board may be dead.	3	—	—	Replace the C205 MAIN board.

Table 5-8. The LCD Displays Feed Jam

Cause	Step	Checkpoint	Finding	Solution
Connector for paper take-up solenoid may be disconnected.	1	Is connector disconnected?	Yes	Connect it.
The paper take-up solenoid coil may be open or shorted.	2	Disconnect connector CN6 on the engine controller board and check coil resistance between pin 4 and pin 5 on the disconnected cable side of the connector using a multimeter. Is the resistance approximately 82 ohms?	No	Replace the paper take-up solenoid.
		If the coil is shorted, check the solenoid drive circuit using the procedure below: 1. Set the multimeter for voltage range. 2. Place the (-) terminal of the multimeter on pin 7 of connector CN6 on the engine controller board. 3. Place the (+) terminal of the multimeter on pin 5 (PICK-UP1). With power on, does the multimeter detect any voltage?	Yes	Replace the paper take-up solenoid and the engine controller board.
Paper take-up sensor flag position may be incorrect.	3	Is paper take-up sensor flag position incorrect?	Yes	Reseat the paper take-up sensor flag.
Paper take-up roller may be bad.	4	—	—	Replace the paper take-up roller.

Table 5-9. The LCD Displays Feed Jam for Lower Paper Cassette

Cause	Step	Checkpoint	Finding	Solution
The paper take-up solenoid coil of the lower paper cassette may be open or shorted.	1	Disconnect connector CN3 on PWB-B board and check the coil resistance between pin 1 and pin 2 on the disconnected cable side of the connector using a multimeter. Is the resistance approximately 220 ohms?	No	Replace the paper take-up solenoid.
		If the coil is shorted, check that the terminal between emitter and collector of the transistor Q1 is shorted.	Yes	Replace the paper take-up solenoid and PWB-B board.
The paper take-up roller in the lower paper cassette may be bad.	2	—	—	Replace the paper take-up roller.

Table 5-10. The LCD Displays Paper Jam at Power On

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

Table 5-11. The LCD Displays Paper Jam during Paper Feeding

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

Table 5-12. The LCD Displays Mem Overflow

Cause	Step	Checkpoint	Finding	Solution
The optional SIMM may be bad.	1	Is operation OK after you remove the optional SIMM?	Yes	Replace the SIMM.
Standard RAM may be bad.	2	—	—	Replace the C205 MAIN board.

Table 5-13. The LCD Displays SERVICE REQ. E0003

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

Table 5-14. Main Motor Doesn't Rotate Correctly

Cause	Step	Checkpoint	Finding	Solution
The main motor coil may be open or shorted.	1	Disconnect connector CN5 on the power supply board and check the coil resistance between: pin 1 and pin 2; pin 2 and pin 3; pin 4 and pin 5; and pin 5 and pin 6 (4 points total) on the disconnected cable side of the connector using a multimeter. Pin 1 — Pin 2 Pin 2 — Pin 3 Pin 4 — Pin 5 Pin 5 — Pin 6 Are resistances of all four points approximately 4 ohms?	No	Replace the main motor.
		If any coil is shorted, check the main motor drive circuit using the following procedure: 1. Set the multimeter to voltage range. 2. Place the (+) terminal of the multimeter on pins 1, 3, 4, or 6 of connector CN5 on the power supply board. 3. Place the (-) terminal on pin 2 of connector CN7 of the power supply board (GND). With power on, does the multimeter detect voltage?	Yes	Replace the power supply board.
The power supply board may be dead.	2	—	—	Replace the power supply board.

Table 5-15. The LCD Displays SERVICE REQ. E0005

Cause	Step	Checkpoint	Finding	Solution
Connector CN4 on the power siupply board may be disconnected.	1	Is connector CN4 on the power siupply board disconnected?	Yes	Connect it.
The fan motor may be dead.	2	—	—	Replace it.

Table 5-16. The LCD Displays SERVICE REQ. E0006

Cause	Step	Checkpoint	Finding	Solution
The optical unit may be bad.	1	—	—	Replace the optical unit.
The engine controller board may be bad.	2	—	—	Replace the engine controller board.

Table 5-17. The LCD Displays SERVICE REQ. E0009

Cause	Step	Checkpoint	Finding	Solution
The optical unit may be dead.	1	—	—	Replace the optical unit.
The engine controller board may be dead.	2	—	—	Replace the engine controller board.

Table 5-18. The LCD Displays SERVICE REQ. E0014

Cause	Step	Checkpoint	Finding	Solution
The engine controller board may be bad.	1	—	—	Replace the engine controller board.
The C205 MAIN board may be bad.	2	—	—	Replace the C205 MAIN board.

Table 5-19. The LCD Displays SERVICE REQ. C0XXX

Cause	Step	Checkpoint	Finding	Solution
The C205 MAIN board may be bad.	1	—	—	Replace the C205 MAIN board.

Table 5-20. The LCD Displays SERVICE REQ. C1000/1001/1002

Cause	Step	Checkpoint	Finding	Solution
The C205 MAIN board may be bad.	2	—	—	Replace the C205 MAIN board.

Table 5-21. The LCD Displays SERVICE REQ. C1003

Cause	Step	Checkpoint	Finding	Solution
The optional SIMM may be bad.	1	Is operation OK after you remove the optional SIMM?	Yes	Replace the SIMM.
The C205 MAIN board may be bad.	2	—	—	Replace the C205 MAIN board.

Table 5-22. The LCD Displays SERVICE REQ. C110X

Cause	Step	Checkpoint	Finding	Solution
The ROM (IC32 or IC33) on the C205 MAIN board may be bad.	1	Is operation OK after you replace the ROM?	—	Replace the ROM (IC32 or IC33) on the C205 MAIN board.
The C205 MAIN board may be bad.	2	—	—	Replace the C205 MAIN board.

Table 5-23. The LCD Displays SERVICE REQ. C112X

Cause	Step	Checkpoint	Finding	Solution
The ROM (IC12 or IC13) on the C205 MAIN board may be bad.	1	Is operation OK after you replace the ROM?	—	Replace the ROM (IC12 or IC13) on the C205 MAIN board.
The C205 MAIN board may be bad.	2	—	—	Replace the C205 MAIN board.

Table 5-24. The LCD Displays SERVICE REQ. C1170

Cause	Step	Checkpoint	Finding	Solution
The optional ROM (IC6) on the C205 MAIN board may be bad.	1	Is operation OK after you replace the ROM?	—	Replace the optional ROM (IC6) on the C205 MAIN board.
The C205 MAIN board may be bad.	2	—	—	Replace the C205 MAIN board.

Table 5-25. The LCD Displays SERVICE REQ. C1180

Cause	Step	Checkpoint	Finding	Solution
The optional ROM SIMM board may be bad.	1	Is operation OK after you replace the ROM SIMM?	—	Replace the optional ROM SIMM board.
The C205 MAIN board may be bad.	2	—	—	Replace the C205 MAIN board.

Table 5-26. The LCD Displays SERVICE REQ. C12XX

Cause	Step	Checkpoint	Finding	Solution
The EEPROM (IC5) on the C205 MAIN board may be bad.	1	—	—	Replace the EEPROM (IC5) on the C205 MAIN board.
The C205 MAIN board may be bad.	2	—	—	Replace the C205 MAIN board.

Table 5-27. The LCD Displays SERVICE REQ. C1400

Cause	Step	Checkpoint	Finding	Solution
The engine controller board may be bad.	1	—	—	Replace the engine controller board.
The C205 MAIN board may be bad.	2	—	—	Replace the C205 MAIN board.

Table 5-28. The LCD Displays Another SERVICE REQ. Error

Cause	Step	Checkpoint	Finding	Solution
The C205 MAIN board may be bad.	1	—	—	Replace the C205 MAIN board.

5.3.2 Print Quality Anomaly

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

Table 5-29. Print Quality Anomaly
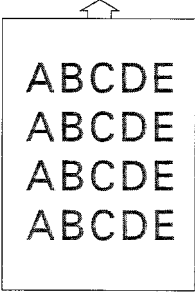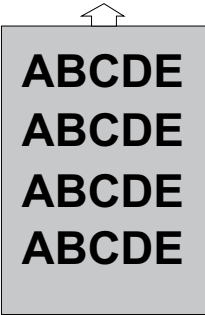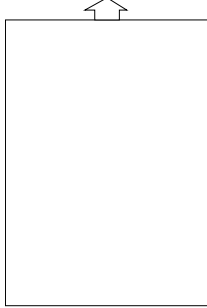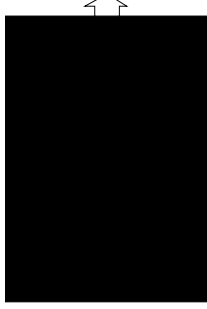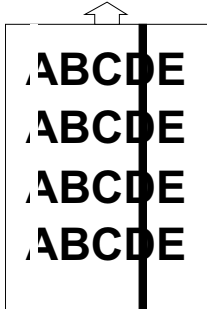
Symptom	Possible Cause	Part Name	Check Item	Remedy
Low image density	Poor development	Imaging cartridge	Check the toner level in the imaging cartridge.	Shake the imaging cartridge.
				Replace the imaging cartridge.
		High-voltage supply (HV1) board	—	Replace the HV1 board.
	Improper charging	Imaging cartridge	—	Replace the imaging cartridge.
		HV1 board	—	Replace the HV1 board.
	Image transfer problem	Image transfer roller	Check to see if the surface of image transfer roller is damaged.	Replace the image transfer roller.
		HV1 board	—	Replace the HV1 board.
	Paper problem	Paper	Check to see if paper is moist.	Replace paper.
	Defective optical unit	Optical unit	—	Replace the optical unit.
	Improper print density setting	—	—	Adjust the print density using SelecType.
Foggy background	Poor development	Imaging cartridge	—	Replace the imaging cartridge.
			Check the wiring of developing bias line.	Replace the HV1 board.
	Improper charging	Drum charge	—	Replace the HV1 board.
			Check the wiring of PC drum charging bias line.	Replace the imaging cartridge.
	Improper print density setting in SelecType level 2	—	—	Adjust the print density in SelecType.
	Defective optical unit	Optical unit	—	Replace the optical unit.

Table 5-29. Print Quality Anomaly (Continued)

Symptom	Possible Cause	Part Name	Check Item	Remedy
Blank print	Poor development	Imaging cartridge	Check whether the imaging cartridge is installed properly.	Reinstall the imaging cartridge.
		HV1 board	—	Replace the HV1 board.
	Improper charging	HV1 board	—	Replace the HV1 board.
	Poor image transfer	Image transfer roller	Check the surface of the image transfer roller.	Replace the image transfer roller.
		HV1 board	—	Replace the HV1 board.
	Improper print density setting.	—	—	Adjust the print density in SelecType.
	Defective optical unit	Optical unit	—	Replace the optical unit.
Black print	Improper charging	Imaging cartridge	—	Replace the imaging cartridge.
		HV1 board	—	Replace the HV1 board.
	Poor development	Imaging cartridge	—	Replace the imaging cartridge.
		HV1 board	—	Replace the HV1 board.
	Improper setting of the print density.	—	—	Adjust the print density by SelecType.
	Defective optical unit	Optical unit	—	Replace the optical unit.
White/black lines and bands	Improper charging	Imaging cartridge	—	Shake the imaging cartridge.
				Replace the imaging cartridge.
	Poor development	HV1 board	—	Replace the HV1 board.
		Imaging cartridge	—	Replace the imaging cartridge.
	Improper drum cleaning	Imaging cartridge	—	Replace the imaging cartridge.
	Dirt on the optical unit lens.	Optical unit	—	Clean the optical unit lens.
	Dirt on the fusing roller	Fusing roller	—	Clean the fusing roller.

Table 5-29. Print Quality Anomaly (Continued)
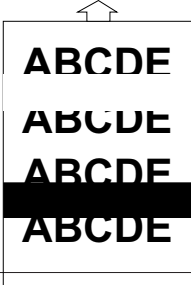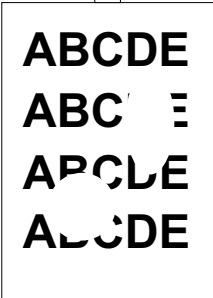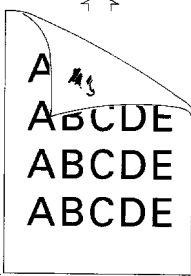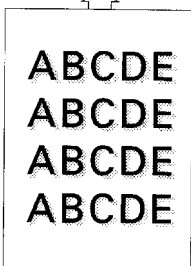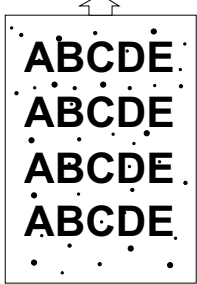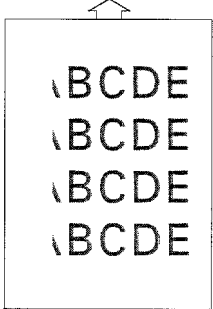
Symptom	Possible Cause	Parts Name	Check Item	Remedy
White/black lines and bands	Improper fusing	Fusing roller	—	Clean the fusing roller.
		Thermistor	—	Replace the thermistor.
	Defective optical unit	Optical unit	—	Replace the optical unit.
	Poor image transfer	Image transfer roller	Check the surface of image transfer roller.	Replace the image transfer roller.
Areas of missing print	Poor image transfer	Image transfer roller	Check the surface of the image transfer roller.	Replace the image transfer roller.
		HV1 board	—	Replace the HV1 board.
	Poor development	Imaging cartridge	—	Shake the imaging cartridge.
			—	Replace the imaging cartridge.
	Poor development	HV1 board	—	Replace the HV1 board.
	Paper problem	Paper	Check to see if paper is moist.	Replace the paper.
Toner smudges on back side of pages	Smears on paper path.	Image transfer roller	Check the surface of image transfer roller.	Clean the image transfer roller.
		Fusing roller	—	Clean the fusing roller.
		Other paper paths	Check the paper path.	Clean the paper path.
Print offset	Improper fusing	Fusing roller	Check if there is any dust or damage on the fusing roller surface.	Clean or replace fusing roller.
	Dirty drum	Imaging Cartridge	—	Replace the imaging cartridge.

Table 5-29. Print Quality Anomaly (Continued)

Symptom	Possible Cause	Parts Name	Check Item	Remedy
Black specks or dots ABCDE ABCDE ABCDE ABCDE	Poor development	Imaging cartridge	—	Shake the imaging cartridge. Replace the imaging cartridge.
		HV1 board	—	Replace the HV1 board.
	Defective PC drum	Imaging cartridge	—	Replace the imaging cartridge.
Left side printing missing BCDE BCDE BCDE BCDE	Top cover isn't closed properly.	Top cover	—	Close the top cover correctly.

Chapter 6   Maintenance

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6.1 MAINTENANCE

The EPL-N1200 is a page printer that use an electro-photographic printing method. Unlike with most impact or ink-jet printers, the key components in the electro-photographic process are integrated into an expendable cartridge (the imaging cartridge). Therefore, periodic replacement of the imaging cartridge is essential to ensure high-quality output. Other maintenance items are also described in this section, which is divided into two sections: user maintenance (preventive maintenance) and service maintenance (repair).

6.1.1 User Maintenance

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

6.1.1.1 Cleaning

This section describes the cleaning required for optimal print quality.

●External Cleaning

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

●Internal Cleaning

Be sure the printer has been disconnected from the power supply and that the fusing unit has cooled down. If the optical unit lens is dirty, clean it using a soft cloth.
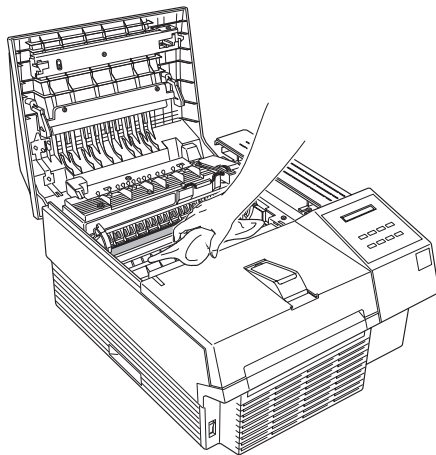
Figure 6-1. External Cleaning   **Figure 6-2. Optical Unit Lens Cleaning**
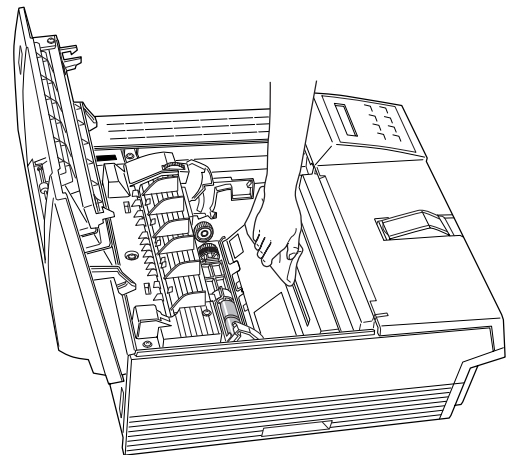
6.1.1.2 Consumable Replacement

This printer uses consumable imaging cartridge S051016. The life of this cartridge is 6000 pages when printing on A4 or letter size pages with a 5% print ratio continuously.

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

●Imaging Cartridge Replacement

1. Gently open the top cover and remove the imaging cartridge by pulling it out.

2. Dispose of the used imaging cartridge.

3. While holding the new imaging cartridge horizontally, gently shake it a few times to distribute the toner evenly.
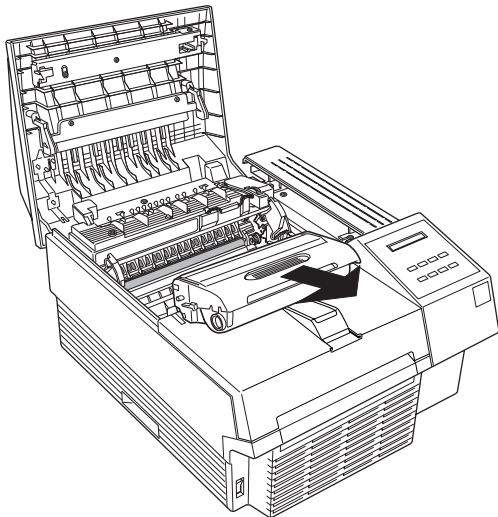
Figure 6-3. Imaging Cartridge Removal　　**Figure 6-4. Imaging Cartridge Shaking**
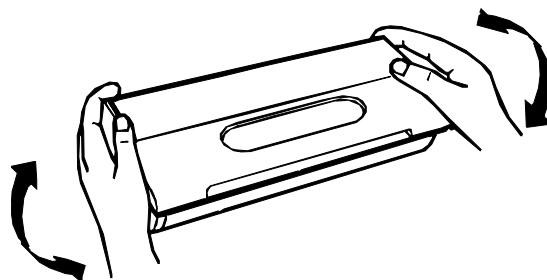
4. Set the imaging cartridge on a clean, flat surface. Firmly grip the tab on the left side of the cartridge. Pull the clear seal all the way out with firm, even pressure, as shown.

5. Shake the imaging cartridge again.

6. Insert the imaging cartridge into the printer by placing the pins on each side of the cartridge into the grooves inside the printer. Slide it gently into the opening until it stops. Close the top cover. And reset the toner counter.
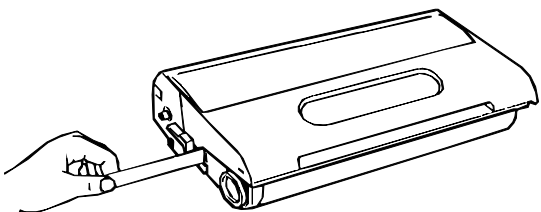
Figure 6-5. Clear Seal Removal　　**Figure 6-6. Imaging Cartridge Insertion**
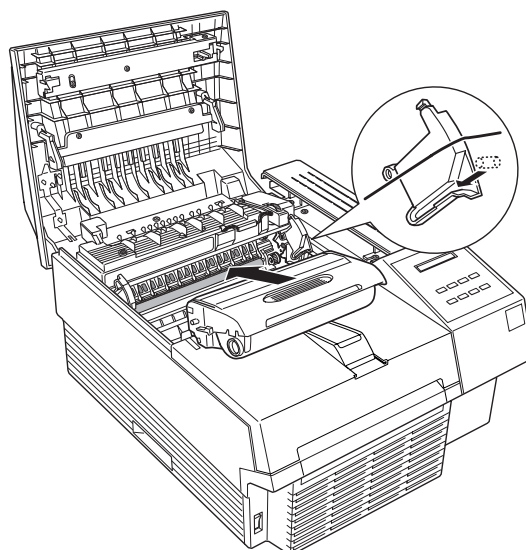
6.1.2 Service Maintenance

This section describes the periodic service maintenance and cleaning required.

6.1.2.1 Periodic Service Maintenance

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

Table 6-1. Periodic Service Maintenance

Unit	Service Interval
Imaging Cartridge	APPROX. 4,800 to 6,000 pages
Paper Take-Up Roller	APPROX. 100,000 pages
Image Transfer Roller	APPROX. 50,000 to 100,000 pages
Fusing Unit	APPROX. 50,000 to 100,000 pages

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

6.1.2.2 Cleaning

Some parts of this printer require regular cleaning. For example, whenever the paper jams during paper loading or when print quality problem happen.

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

Table 6-2. Cleaning Parts and Procedures

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

Appendix A   Reference Materials

Table of Contents

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List of Tables

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.
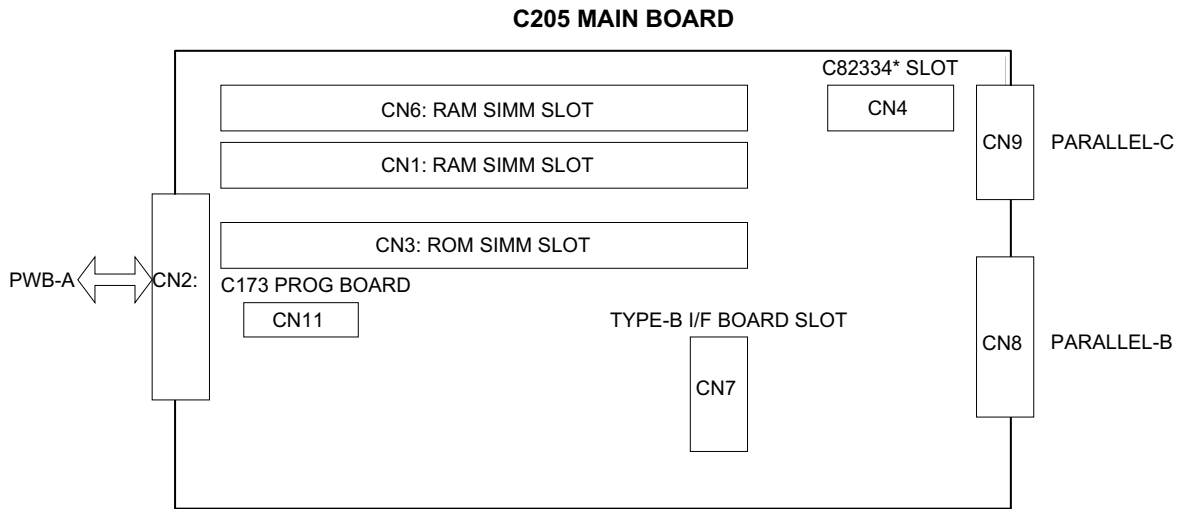
C205 MAIN BOARD

Figure A-1. Video Controller Section Cable Connection

Figure A-2. Engine Section Cable Connection

Table A-1. Board Connector Summary

Connector	Description	Pins	Reference
Main Controller Board (C205 MAIN Board)			
CN1	Connector for RAM SIMM	72 pins	Table A-2
CN2	Connector for engine controller board	50 pins	Table A-3
CN3	Connector for ROM SIMM	72 pins	Table A-4
CN4	Connector for Serial/LocalTalk I/F Module	60 pins	Table A-5
CN5	Not used	—	—
CN6	Connector for RAM SIMM	72 pins	Table A-2
CN7	Connector for optional Type-B I/F card	60 pins	Table A-6
CN8	Parallel-B interface	36 pins	Table 1-8
CN9	Parallel-C interface	36 pins	Table 1-8, 9
CN10	Not used	—	—
CN11	Connector for C173 PROG board	80 pins	Table A-7
Engine Controller Board (PWB-A Board)			
CN1	Connector for main controller board (C205 MAIN board)	50 pins	Table A-3
CN2	Connector for thermistor of fusing unit	2 pins	—
CN3	Connector for control panel	18 pins	—
CN4	Toner empty sensor	4 pins	Table A-8
CN5	Connector for optical unit	13 pins	Table A-9
CN6	Connector for paper take-up solenoid, paper exit sensor, and paper empty sensor	8 pins	Table A-10
CN7	Connector for high-voltage supply board	8 pins	Table A-11
CN8	Connector for power supply board	8 pins	Table A-12
CN9	Connector for lower paper cassette	12 pins	Table A-13
CN10	Connector for power supply board	6 pins	Table A-14
Control Panel			
CN1	Connector for engine controller board	18 pins	—
Power Supply Board (PU1 Board)			
CN1	Connector for AC power inlet	6 pins	—
CN2	Connector for engine controller board	8 pins	Table A-12
CN3	Connector for engine controller board	6 pins	Table A-14
CN4	Connector for cooling fan motor	3 pins	Table A-15
CN5	Connector for main motor	6 pins	Table A-16
CN6	Connector for interlock switch	2 pins	—
CN7	Not used	2 pins	—
High-Voltage Supply Board (HV1 Board)			
CN1	Connector for engine controller board	8 pins	Table A-11
CN2	Connector for paper take-up sensor	3 pins	Table A-17
CN3	Connector for PWB-S board	3 pins	—

A.1.1 Main Controller Board (C205 MAIN Board)

Table A-2. CN1 and 6 Pin Assignments

Pin No.	Signal Name	I/O	Description
1,39,72	Vss	—	Ground
2	DQ0	I/O	Data bus bit 0
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
10,30,59	Vcc	—	+5 VDC
11,29,46,48,66,71	NC	—	Not connected
12	A0	O	Memory address bit 0
13	A1	O	Memory address bit 1
14	A2	O	Memory address bit 2
15	A3	O	Memory address bit 3
16	A4	O	Memory address bit 4
17	A5	O	Memory address bit 5
18	A6	O	Memory address bit 6
19	A10	O	Memory address bit 10
20	DQ4	I/O	Data bus bit 4
21	DQ20	I/O	Data bus bit 20
22	DQ5	I/O	Data bus bit 5
23	DQ21	I/O	Data bus bit 21
24	DQ6	I/O	Data bus bit 6
25	DQ22	I/O	Data bus bit 22
26	DQ7	I/O	Data bus bit 7
27	DQ23	I/O	Data bus bit 23
28	A7	O	Memory address bit 7
31	A8	O	Memory address bit 8
32	A9	O	Memory address bit 9
33	$\overline{RAS3}$	O	RAS 3
34	$\overline{RAS2}$	O	RAS 2
35	MP2	—	Not used
36	MP0	—	Not used
37	MP1	—	Not used
38	MP3	—	Not used
40	$\overline{CAS0}$	O	CAS 0
41	$\overline{CAS2}$	O	CAS 2
42	$\overline{CAS3}$	O	CAS 3
43	$\overline{CAS1}$	O	CAS 1
44	$\overline{RAS0}$	O	RAS 0
45	$\overline{RAS1}$	O	RAS 1
47	$\overline{WE}$	O	Write enable
49	DQ8	I/O	Data bus bit 8

Table A-2. CN1 and 6 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
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	DQ15	I/O	Data bus bit 15
67	PD1	—	Not used
68	PD2	—	Not used
69	PD3	—	Not used
70	PD4	—	Not used

Table A-3. CN2 Pin Assignments

Pin No.	Signal Name	I/O	Description
1	SWINT	I	Switch interrupt
2	GND	—	Ground
3	LCDWRX	O	Write strobe to LCD
4	LCDCLK	O	Clock to LCD
5	SWRDX	O	Read strobe to switch
6	LEDWRX	O	Write enable to LED
7	DB0	I/O	Data bus bit 0
8	A0	O	Address bus bit 0
9	DB2	I/O	Data bus bit 2
10	DB1	I/O	Data bus bit 1
11	+5 V	—	+5 VDC
12	DB3	I/O	Data bus bit 3
13	DB4	I/O	Data bus bit 4
14	GND	—	Ground
15	DB6		Data bus bit 6
16	DB5		Data bus bit 5
17	DOTCLK		Clock to LCD
18	DB7	I/O	Data bus bit 7
19	GND	—	Ground
20	RESETX	O	Reset signal
21	GND	—	Ground
22	NC	—	Not connected
23	GND	—	Ground
24	HSYNCX	I	HSYNC for Main I/F
25	EPRDYX	I	Engine controller ready
26	PRDYX	I	Print ready
27	TODX	I	Main request
28	ETBSYX	I	Engine controller busy
29	STSX	I	Status transfer
30	CMDX	O	Command transfer
31	CTBSYX	O	Main controller busy
32	PRINITX	O	Print signal
33	SRCLKX	O	Serial transfer clock
34	CPRDYX	O	Main controller ready
35	GND	—	Ground
36	VIDEO	O	Video signal
37	+5 V	—	+5 VDC
38	NC	—	Not connected
39	GND	—	Ground
40	+5 V	—	+5 VDC
41	+5 V	—	+5 VDC
42	+5 V	—	+5 VDC
43	GND	—	Ground
44	+5 V	—	+5 VDC
45	GND	—	Ground
46	+5 V	—	+5 VDC
47	GND	—	Ground
48	+5 V	—	+5 VDC
49	GND	—	Ground
50	+5 V	—	+5 VDC

Table A-4. CN3 Pin Assignments

Pin No.	Signal Name	I/O	Description
1,39,72	Vss	—	Ground
2	D0	I/O	Data bus bit 0
3	D16	I/O	Data bus bit 16
4	D1	I/O	Data bus bit 1
5	D17	I/O	Data bus bit 17
6	D2	I/O	Data bus bit 2
7	D18	I/O	Data bus bit 18
8	D3	I/O	Data bus bit 3
9	D19	I/O	Data bus bit 19
10,30,59	Vcc	—	+5 VDC
11	$\overline{RD}$	O	Read signal
12	A0	O	Memory address bit 0
13	A1	O	Memory address bit 1
14	A2	O	Memory address bit 2
15	A3	O	Memory address bit 3
16	A4	O	Memory address bit 4
17	A5	O	Memory address bit 5
18	A6	O	Memory address bit 6
19	A10	O	Memory address bit 10
20	D4	I/O	Data bus bit 4
21	D20	I/O	Data bus bit 20
22	D5	I/O	Data bus bit 5
23	D21	I/O	Data bus bit 21
24	D6	I/O	Data bus bit 6
25	D22	I/O	Data bus bit 22
26	D7	I/O	Data bus bit 7
27	D23	I/O	Data bus bit 23
28	A7	O	Memory address bit 7
29	A19	O	Memory address bit 19
31	A8	O	Memory address bit 8
32	A9	O	Memory address bit 9
33	$\overline{A20}$	O	Memory address bit 20
34	$\overline{EEP}$	O	+5 VDC
35	$\overline{RESET}$	—	Reset
36	A21	O	Memory address bit 21
37	A22	O	Memory address bit 22
38	A23	O	Memory address bit 23
40	A11	O	CAS 0
41	A13	O	CAS 2
42	A14	O	CAS 3
43	$\overline{A12}$	O	CAS 1
44	$\overline{CS0}$	O	RAS 0
45	$\overline{CS1}$	O	RAS 1
46	$\overline{A18}$	—	Memory address bit 18
47	$\overline{WR}$	O	Write enable
48	A17	O	Memory address bit 17
49	D8	I/O	Data bus bit 8

Table A-4. CN3 Pin Assignments (Continued)

Pin No.	Signal Name	I/O	Description
50	D24	I/O	Data bus bit 24
51	D9	I/O	Data bus bit 9
52	D25	I/O	Data bus bit 25
53	D10	I/O	Data bus bit 10
54	D26	I/O	Data bus bit 26
55	D11	I/O	Data bus bit 11
56	D27	I/O	Data bus bit 27
57	D12	I/O	Data bus bit 12
58	D28	I/O	Data bus bit 28
60	D29	I/O	Data bus bit 29
61	D13	I/O	Data bus bit 13
62	D30	I/O	Data bus bit 30
63	D14	I/O	Data bus bit 14
64	D31	I/O	Data bus bit 31
65	D15	I/O	Data bus bit 15
66	A16	O	Memory address bit 16
67	R/B	—	Not used
68	NC	O	Write signal
69,70	NC	—	Not used
70	PO4	—	Not used
71	A15	O	Memory address bit 15

Table A-5. CN4 Pin Assignments

Pin No.	Signal Name	I/O	Description
27,28,29,30	VCC	—	+5 VDC
57,58,59,60	VCC	—	+5 VDC
3,4,5,6	GND	—	Ground
41,42,43,44	GND	—	Ground
45	RESET	—	Not used
46	INH	—	Not used
47	CMREQ	—	Not used
48	WRRDY	—	Not used
49	RDREQ	—	Not used
50	WRT	—	Not used
51	RDT	—	Not used
52	TYPB	—	Not used
53	TXD	—	Ground
54	READY	—	+5 VDC
55	RXD	—	Not used
56	NC	—	Not used
7	DB0	I/O	Data bus bit 0
8	DB1	I/O	Data bus bit 1
9	DB2	I/O	Data bus bit 2
10	DB3	I/O	Data bus bit 3
11	DB4	I/O	Data bus bit 4
12	DB5	I/O	Data bus bit 5
13	DB6	I/O	Data bus bit 6
14	DB7	I/O	Data bus bit 7
15	AB0	O	Address bus bit 0
16	AB1	O	Address bus bit 1
17	AB2	O	Address bus bit 2
18	AB3	O	Address bus bit 3
19	AB4	O	Address bus bit 4
20	CS	O	Chip select signal
21	RD	O	Read signal
22	WR	O	Write signal
23	IREQ	O	Address bus bit 13
24	NMI	O	Address bus bit 14
25	DREQ	O	Address bus bit 11
26	DTCT	O	Address bus bit 12
1	PCLK	O	Clock
2	RST	O	Reset signal
31	TXD+	—	Not used
32	TXD-	—	Not used
33	RXD+	—	Not used
34	RXD-	—	Not used
35	DTR	—	Not used
36	CTS	—	Not used
37	NC	—	Not used
38	NC	—	Not used
39	LCD	—	Not used
40	SWRD	—	Not used

Table A-6. CN7Pin Assignments

Pin No.	Signal Name	I/O	Description
1,2,3,4,5,6	+5V	—	+5 V DC
19,20,21,22,23,24	GND	—	Ground
7	$\overline{\text{TXD}}$	—	Ground
8	$\overline{\text{READY}}$	—	+5 VDC
9	RXD	—	Not used
10	$\overline{\text{NC}}$	—	Not used
11	$\overline{\text{RESET}}$	O	Reset signal
12	$\overline{\text{INH}}$	O	I/F disabled
13	$\overline{\text{CMREQ}}$	I	Request command
14	$\overline{\text{WRRDY}}$	I	I/F ready
15	$\overline{\text{RDREQ}}$	I	Data read request
16	$\overline{\text{WR}}$	O	Write signal
17	$\overline{\text{RD}}$	O	Read signal
18	$\overline{\text{CS}}$	O	Chip select signal
25	A3	O	Address bus bit 3
26	A2	O	Addres bus bit 2
27	A1	O	Addres bus bit 1
28	A0	O	Addres bus bit 0
29	D7	I/O	Data bus bit 7
30	D6	I/O	Data bus bit 6
31	D5	I/O	Data bus bit 5
32	D4	I/O	Data bus bit 4
33	D3	I/O	Data bus bit 3
34	D2	I/O	Data bus bit 2
35	D1	I/O	Data bus bit 1
36	D0	I/O	Data bus bit 0

Table A-7. CN11 Pin Assignments

Pin No.	Signal Name	I/O	Description
5	D0	I/O	Data bus bit 0
7	D1	I/O	Data bus bit 1
9	D2	I/O	Data bus bit 2
11	D3	I/O	Data bus bit 3
13	D4	I/O	Data bus bit 4
15	D5	I/O	Data bus bit 5
17	D6	I/O	Data bus bit 6
19	D7	I/O	Data bus bit 7
21	D8	I/O	Data bus bit 8
23	D9	I/O	Data bus bit 9
25	D10	I/O	Data bus bit 10
27	D11	I/O	Data bus bit 11
29	D12	I/O	Data bus bit 12
31	D13	I/O	Data bus bit 13
33	D14	I/O	Data bus bit 14
35	D15	I/O	Data bus bit 15
6	D16	I/O	Data bus bit 16
8	D17	I/O	Data bus bit 17
10	D18	I/O	Data bus bit 18
12	D19	I/O	Data bus bit 19
14	D20	I/O	Data bus bit 20
16	D21	I/O	Data bus bit 21
18	D22	I/O	Data bus bit 22
20	D23	I/O	Data bus bit 23
22	D24	I/O	Data bus bit 24
24	D25	I/O	Data bus bit 25
26	D26	I/O	Data bus bit 26
28	D27	I/O	Data bus bit 27
30	D28	I/O	Data bus bit 28
32	D29	I/O	Data bus bit 29
34	D30	I/O	Data bus bit 30
36	D31	I/O	Data bus bit 31
49	A0	O	Address bus bit 0
50	A1	O	Address bus bit 1
51	A2	O	Address bus bit 2
52	A3	O	Address bus bit 3
53	A4	O	Address bus bit 4
54	A5	O	Address bus bit 5
55	A6	O	Address bus bit 6
56	A7	O	Address bus bit 7
57	A8	O	Address bus bit 8
58	A9	O	Address bus bit 9
59	A10	O	Address bus bit 10
60	A11	O	Address bus bit 11
61	A12	O	Address bus bit 12
62	A13	O	Address bus bit 13
63	A14	O	Address bus bit 14
64	A15	O	Address bus bit 15
65	A16	O	Address bus bit 16
66	A17	O	Address bus bit 17
67	A18	O	Address bus bit 18
68	A19	O	Address bus bit 19
69	A20	O	Address bus bit 20
70	A21	O	Address bus bit 21

Table A-7. CN11 Pin Assignments (Continued)

Pin No.	Signal Name	I/O	Description
71	A22	O	Address bus bit 22
72	A23	O	Address bus bit 23
73	RD/$\overline{BY}$	—	Not used
74	$\overline{RESET}$	O	Reset signal
75,76	VPP	—	+5 V DC
1,2,3,4	VCC	—	+5 V DC
37,38,77,78,79,80	VSS	—	Ground
39	$\overline{CSI0}$	O	Chip select inable 0
40	$\overline{CSI1}$	O	Chip select inable 1
41	$\overline{CSO0}$	—	Not used
42	$\overline{CSO1}$	—	Not used
43	$\overline{RD}$	O	Read signal
44	$\overline{WR}$	O	Write signal
45	$\overline{BWE0}$	O	Bus write enable 0
46	$\overline{BWE2}$	O	Bus write enable 1
47	$\overline{BWE1}$	O	Bus write enable 2
48	$\overline{BWE3}$	O	Bus write enable 3

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

Table A-8. CN4 Pin Assignments

Pin No.	Signal Name	I/O	Description
1	GND1	—	Ground
2	TONER LED	O	LED power
3	TONER LEVEL	I	Toner empty signal
4	+5V	—	+5 VDC

Table A-9. CN5 Pin Assignments

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

Table A-10. CN6 Pin Assignments

Pin No.	Signal Name	I/O	Description
1	ANODE	—	+5 VDC
2	GND1	—	Ground
3	PS3	I	Paper exit signal
4	+24V	—	+24 VDC
5	PICK-UP1	—	Paper take-up solenoid trigger
6	ANODE	I	+5 VDC
7	GND1	—	Ground
8	P.EMP1	O	Paper empty sensor signal

Table A-11. CN7 Pin Assignments

Pin No.	Signal Name	I/O	Description
1	GND1	—	Ground
2	PS1	I	Paper take-up signal
3	ANODE	—	+5 VDC
4	+24V	—	+24 VDC
5	GND2	—	Ground
6	HV-CT.R	O	Drum charge on
7	HV-T	O	Image transfer on
8	HV-B.VR	O	Developing bias control

Table A-12. CN8 Pin Assignments

Pin No.	Signal Name	I/O	Description
1, 2, 3	+5V	—	+5 VDC
4, 5, 6	GND1	—	Ground
7	GND2	—	Ground
8	+24V	—	+24 VDC

Table A-13. CN9 Pin Assignments

Pin No.	Signal Name	I/O	Description
1	+5V	O	+5 VDC
2	+24V	O	+24 VDC
3	$\overline{GND2}$	—	Ground
4	$\overline{P.EMP2}$	I	Paper empty signal
5	PSIZE20	I	Paper size signal 1
6	PSIZE21	I	Paper size signal 2
7	PSIZE22	I	Paper size signal 3
8	PICK-UP2	O	Paper take-up solenoid 2
9	PREFED2	O	Paper feed 2
10	PICK-UP3	O	Paper take-up solenoid 3
11	PREFED3	I	Paper feed 3
12	BIN SELECT	I	Lower paer cassette select

Table A-14. CN10 Pin Assignments

Pin No.	Signal Name	I/O	Description
1	$\overline{FAN\ MOTOR}$	O	Fan motor On
2	$\overline{OB}$	—	M1 phase B
3	$\overline{OA}$	O	M1 phase A
4	TdA	O	Reference A
5	$\overline{TdB}$	—	Reference B
6	$\overline{FUSER\ LAMP}$	O	Fusing lamp On

A.1.3. Power Supply Board (PU1 Board)

Table A-15. CN4 Pin Assignments

Pin No.	Signal Name	I/O	Description
1	FAN	O	Fan control
2	+24V	—	+24 VDC

Table A-16. CN5 Pin Assignments

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

A.1.4. High-Voltage Supply Board (HV1 Board)

Table A-17. CN2 Pin Assignments

Pin No.	Signal Name	I/O	Description
1	ANODE	O	LED power
2	GND1	—	Ground
3	$\overline{PS1}$	II	Paper take-up signal

2 CIRCUIT DIAGRAM

Figure A-3. C205 MAIN Board Circuit Diagram

A.3 CIRCUIT BOARD COMPONENT LAYOUT
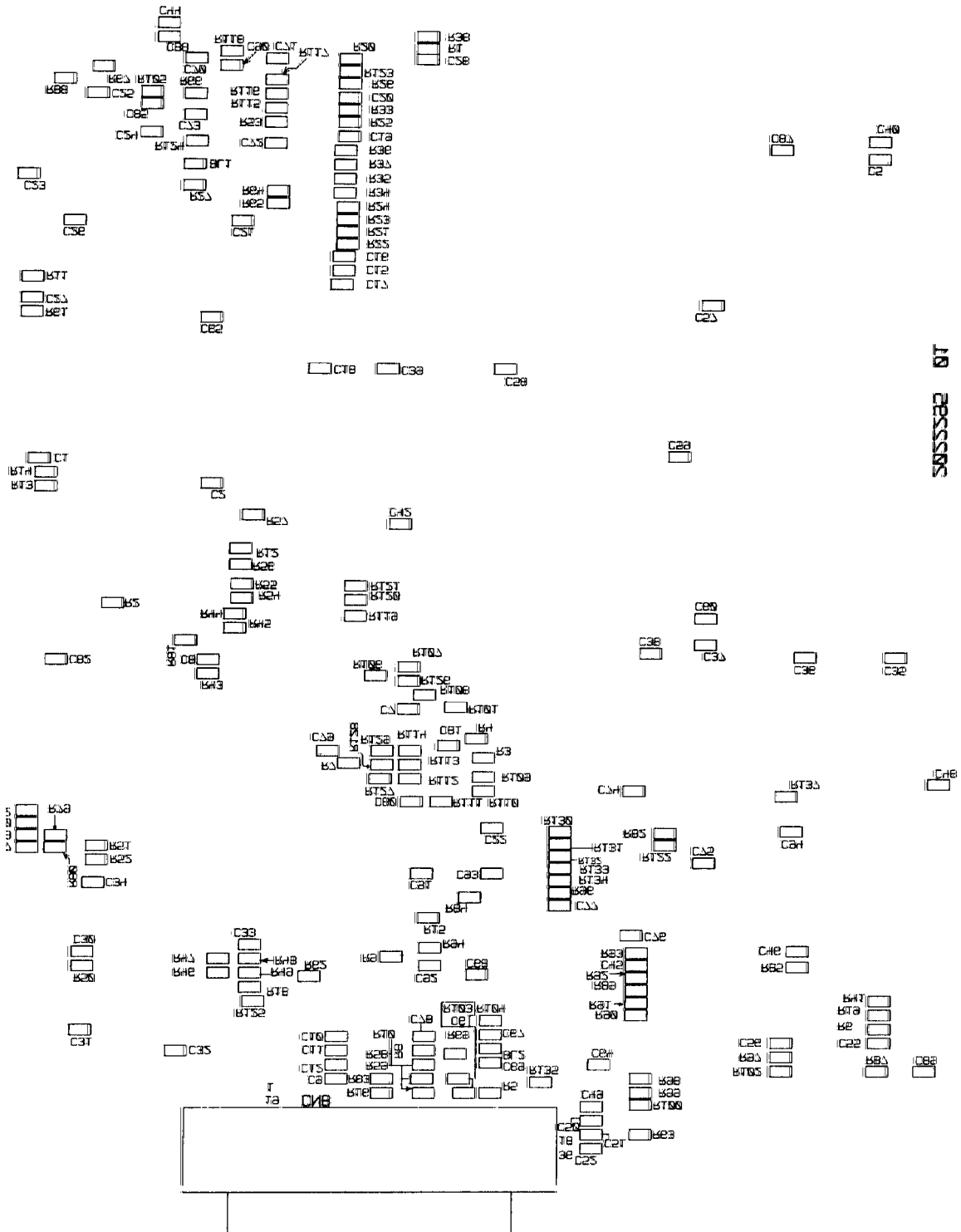

Figure A-4. C205 Main Board Component Layout (Front)

Figure A-5. C205 Main Board Component Layout (Rear)