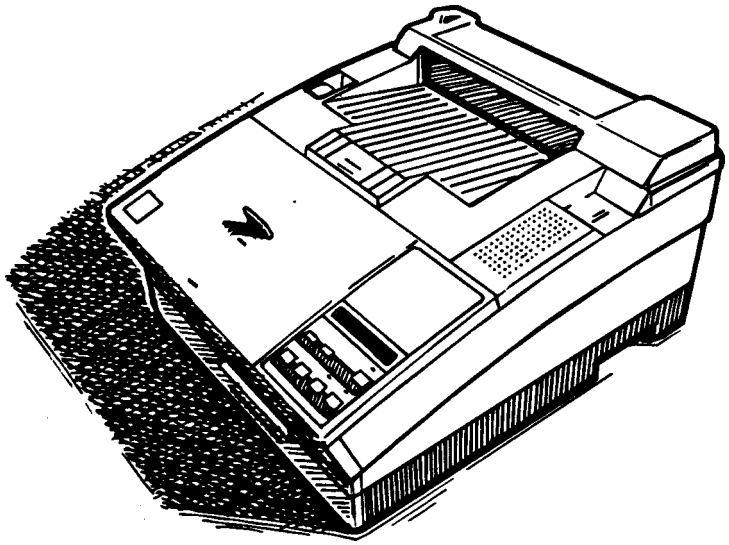
EPSON TERMINAL PRINTER

EPL-5000/5200/5200+

ActionLaser™ 1000 I15OO

SERVICE MANUAL



EPSON

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PRECAUTIONS

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

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

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.

   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

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

MAKE CERTAIN THAT THE SOURCE VOLTAGE IS THE SAME AS THE RATED VOLTAGE, LISTED THE SERIAL NUMBER/RATING PLATE. THE PRODUCT HAS A PRIMARY AC RATING DIFFERENT FROM AVAILABLE POWER SOURCE, DO NOT CONNECT IT TO THE POWER SOURCE.

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

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

5. REPLACE MALFUNCTIONING COMPONENTS ONLY WITH THOSE COMPONENTS BY THE MANUFACTURE; INTRODUCTION — [PcMath] — [Ps 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: 5.7×10^{4} (w)
Wave Length: 780 nm

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

For Other Countries Users;

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

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

For Denmark Users;

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

Klasse 1 laser produkt der opfylder IEC825 sikkerheds kravene.

***For Finland, Sweden* Users;**

> **VAROITUS**
> Laitteen käyttäminen muulla kuin tässä käyttöohjeessa mainitulla tavalla saattaa altistaa käyttäjän turvallisuusluokan 1 ylittävälle näkymättömälle

> **VARNING**
> Om apparaten används på annat sätt an i denna bruksanvisning specificerats, kan användaren utsättas for osynlig laserstrålning, som överskrider gränsen fi

For Norway Users;

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

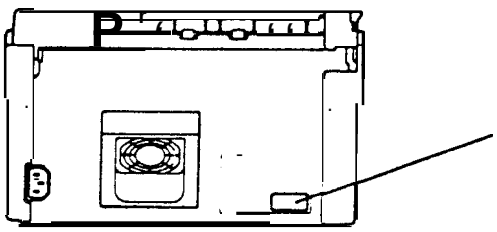
> Dette er en halvleder laser. Maksimal effeckt til laserdiode er 5.7x 10^{-4}W og bølgelengde er 780 nm.

Laser Safety Labels

[Label on rear printer case]

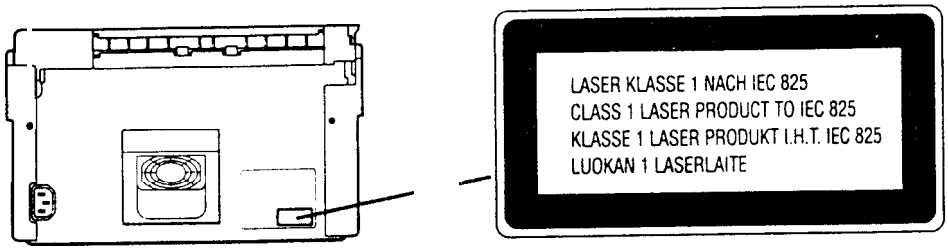
A laser safety labels is attached on the outside of the printer shown below.

For United State



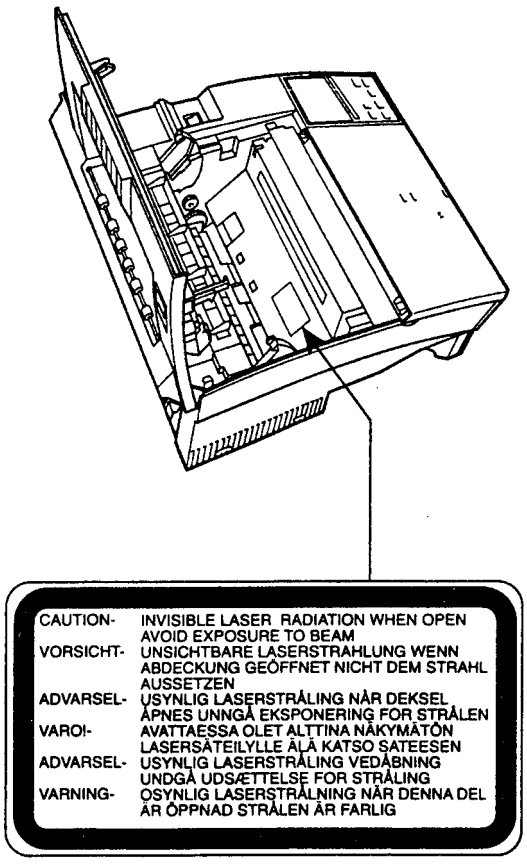
This laser product conforms to the applicable requirement of 21 CFR Chapter I, subchapter J.
SEIKO EPSON CORP.
Hirooka Office
80 Hirooka, Shiojiri-shi, Nagano-ken, JAPAN
MANUFACTURED:

For Europe



[Label inside printer]

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



PREFACE

This manual describes functions, theory of electrical and mechanical operations, maintenance, and repair of l /5200 and Action Laser 1000/1500.

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	January 8, 1993	1st issue
Rev. B	June 28,1993	Page 1-23, 1-31,2-22,3-11 ,4-1
Rev. C	August 5, 1993	Added information for the Cl 08 MAIN-B board: Page B-i, B-1, through B-10
Rev. D	February 28, 1994	Page 1-33
Rev. E	April 4, 1995	Added information for the EPL-5200+: Page C-i, C-1 through C-10

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Chapter 1 General Description

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1.1 FEATURES

The EPL-5000/5200 and the ActionLaser 1000/1500 are non-impact page printers that combine a semi-conductor laser with electro-photographic technology. These printers are small and light, and feature high-speed, high-resolution printing. Also, maintenance is very easy, as a result of various built-in diagnostic functions. The main features are:

- No ozone
- Printing speed —6 PPM
- Resolution —3W DPI
- Light weight — about 10 kg (22 lb.)
- Small footprint
- c1 Face-down tray (standard) /face-up tray (optional)
- High-performance controller (the controller's CPU is a 16.67 MHz Motorola 68000)
- Easy maintenance
- EPL-5000/ActionLaser 1000 has HP LaserJet® 11P emulation mode
- EPL-5200/ActionLaser 1500 has HP LaserJet® III/IIIP/IIISi emulation mode
- EPL-5000/ActionLaser 1000 can be upgraded from HP LaserJet® IIP mode to LaserJet® III/IIIP/IIISi emulation mode with the optional Epson PCL5 /RITech Upgrade Board
- Optional PostScript™ IC card
- Optional Epson GL identity IC card
- High-speed serial communication rate of 38400 bps (except for the ActionLaser 1000)
- A multi-user, multi-emulation mode
- Various types of fonts available in font cards and cartridges
- IES (Intelligent Emulation Switch) allows switching of the printer mode between PostScript™ mode and another mode
- SPL (Shared Printer Language) enables switching of the printer mode by command
- In the EPL-5200/ActionLaser 1500 and in the EPL-5000/ActionLaser 1000 with the optional Epson PCL5/RITech Upgrade Board, Resolution Improvement Technology (RITech) refines the print quality by eliminating jagged edges from images and characters.

Figure 1-1 shows an exterior view of the EPL-5000/5200 and ActionLaser 1000/1500.

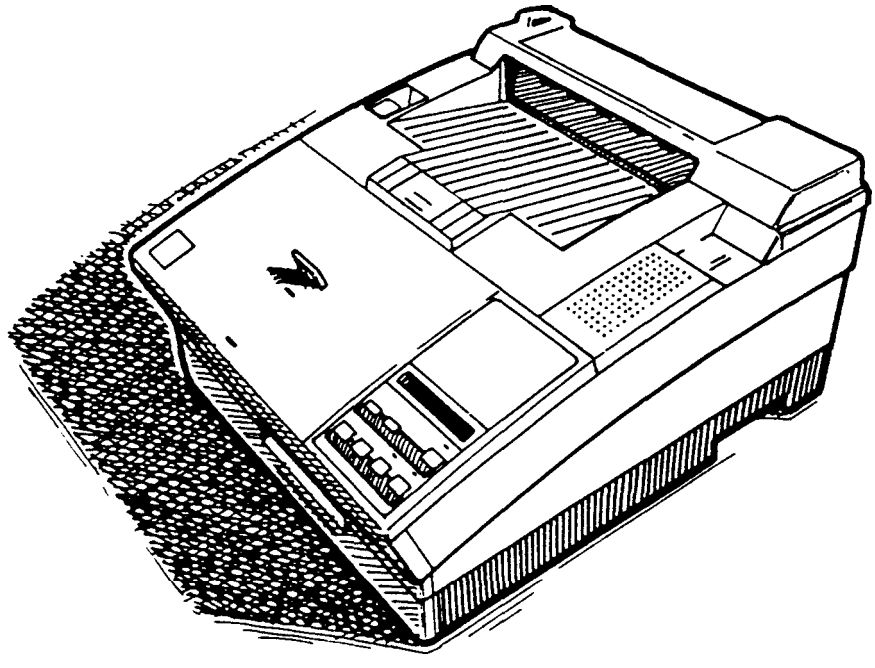

Figure 1-1. Exterior View of the EPL-5000/5200 and Action Laser 1000/1500

Table 1-1 shows the differences in features for the EPL-5000, ActionLaser 1000, EPL-5000 with the optional Epson PCL5/RITech Upgrade Board, ActionLaser 1000 with the optional Epson PCL5/RITech Upgrade Board, EPL-5200, and ActionLaser 1500.

Table 1-1. Differences in Features

Function/ Specification	EPL-5000	Action Laser 1000	EPL-5000 with PCL5® Board	Action Laser 1000 with PCL5® Board	EPL-5200	Action Laser 1500
HP LaserJet® Emulation Level	LaserJet® IIP (PCL4®)	LaserJet® IIP (PCL4®)	LaserJet® 111/IIIP/IIISi (PCL5®)	LaserJet® III/IIIP/IIISi (PCL5®)	LaserJet® 111/IIIP/IIISi (PCL5®)	LaserJet® III/IIIP/IIISi (PCL5®)
GQ mode	Optional	No	Optional	No	Optional	No
Local Language ROM	No	No	Optional	No	Optional	No
Standard RAM Size	0.5MB	0.5MB	0.5MB	0.5MB	1.OMB	1.OMB
Maximum RAM Size (Optional RAM chips installed)	6.5MB	6.5MB	6.5MB	6.5MB	5.0MB	5.0MB
Standard I/F	Parallel/ RS-232C	Parallel	Parallel/ RS-232C	Parallel	Parallel/ RS-232C	Parallel/ RS-232C
Optional I/F Cards	Type-B I/F Cards (Except C82305*, C82306* and C82313*)	Type-B I/F Cards (Include C82305* & C82306* and except C82313*)	Type-B I/F Cards (Except C82305*, C82306* and C82313*)	Type-B I/F Cards (Include C82305* & C82306* and except C82313*)	Type-B I/F Cards (Except C82305*, C82306* and C82313*)	Type-B I/F Cards (Except C82305*, C82306* and C82313*)
RITech	No	No	Yes	Yes	Yes	Yes
Resident Bitmap Fonts	9 Portrait Fonts and None Landscape Fonts (Note)	9 Portrait Fonts and None Landscape Fonts (Note)	9 Portrait Fonts and 7 Landscape Fonts	9 Portrait Fonts and 7 Landscape Fonts	9 Portrait Fonts and 7 Landscape Fonts	9 Portrait Fonts and 7 Landscape Fonts
Resident Scalable Fonts	No	No	13 fonts	13 fonts	13 fonts	13 fonts

Note: Landscape fonts are generated from portrait fonts by firmware.

Table 1-2 lists the optional units available for the EPL-5000/Action Laser 1000, and EPL-5200/Action Laser 1500.

Table 1-2. Options for EPL-5000/5200 and Action Laser 1000/1500

Cat. No.	Description	Note	Machine Type			
			EPL-5000	EPL-5200	Action Laser 1000	Action Laser 1500
5400 -54091	Bit map font card	For GQ mode (5400 Prestige 12N/L, 15N/L, 12 NOB are usable in ESC/P® mode)	Yes (Note 1),	Yes (Note 1)	Yes (Note 2)	Yes (Note 2)
1410-5414	HP bit map font card	For HP emulation mode	Yes	Yes	Yes	Yes
5430	OCR/BAR-CODE font card	For HP L/J and GQ mode (OCR-A/B fonts are also usable in ESC/P® mode)	Yes	Yes	Yes	Yes
C826031	22 scalable font card	For GQ mode	Yes (Note 1)	Yes (Note 1)	' °	' °
C82608*	51 scalable font card	For HP L/J III mode	Yes (Note 3)	'es	Yes (Note 3)	'es
C82609*	PostScript™ card	supports Postscript'" language	Yes (Note 4)	Yes (Note 4)	Yes (Note 4)	Yes (Note 4)
C82602*	EPSON GL Identity card	Supports HP-GL commands	Yes (Note 4)	Yes (Note 4)	Yes (Note 4)	Yes (Note 4]
C82322*	Epson PCL5/ RITech Upgrade Board	HP LaserJet® 111/I IIP/IIISi emulation mode (includes EPSON GL/2 mode) and RITech support	Yes	No	Yes	No
--	GQ chip ROM	Supports GQ mode fonts and commands	Yes (Note 5)	Yes (Note 5)	' °	' °
--	Local language ROM	supports local language fonts	Yes (Note 5)	Yes (Note 5)	' °	' °
C82904*	0.5MByte RAM chips	0.5MByte RAM chip set	Yes	Yes	Yes	Yes
C82905*	2. 0MByte RAM chips	2. 0MByte RAM chip set	Yes	Yes	Yes	Yes
C812302	250 sheet lower paper cassette (A4)	Lower paper cassette	Yes	Yes	No	No
C812301	250 sheet lower paper cassette (A/L)	Lower paper cassette	No	No	Yes	Yes
C81231•	Face-up tray		Yes	Yes	Yes	Yes
S051011	Imaging cartridge	Toner cartridge	Yes	Yes	Yes	Yes
C82305*/ C82306*	Serial interface card		No	No	Yes	No
>82307'/ C82308*	32KB serial interface card		Yes	Yes	Yes	Yes

Table 1-2. Options for EPL-5000/5200 and Action Laser 1000/1500 (Con't)

Cat. No.	Description	Note	Machine Type			
			EPL-5000	EPL-5200	Action Laser 1000	Action Laser 1500
C8231 0'/ C82311"	32KB parallel interface card		Yes	Yes	Yes	Yes
C82312*	LocalTalk™ card		Yes	Yes	Yes	Yes
C82313*	32KB IEEE-488 interface card		No	No	No	No
C82314*	COAX interface card		Yes	Yes	Yes	Yes
C82315*	TWINAX interface card		Yes	Yes	Yes	Yes

Notes:

1. **GQ mode** fonts can be used, if the optional GQ chip is installed.
2. The ActionLaser 1000/1500 uses only card 5400.
3. Scalable fonts for HP LaserJet III mode can used, if the optional Epson PCL5/RITech Upgrade Board is installed.
4. Requires added memory (RAM) over a total 1.5 MB (including standard RAM).
5. The GQ ROM chip option and local language ROM cannot be used at the same time.

1.2 SPECIFICATIONS

This section provides statistical data for the board. The fu and ActionLaser ard main a

the fc

Basic Specifications

Printing method:	Laser beam scanning and dry
Resolution:	300 A-hi (dots per inch)
Printing speed:	6 PPM (pages per minute)
First printing time)M (IC8)	Less than 19 seconds (facedown output) Less than 20 seconds (face-up output)
Warm-up time:	Less than 35 seconds (at rated current and 23° C (73° F) temperature)
Paper supply:	See Table 1-3.

Table 1-3. Paper Feed Methods

Paper Supply		)5A84 (IC3) 4	Paper Size	(Beam Weight)
Standard built-in paper bin	Auto feed	150	A4,LT,GLT,EXE, / IC	16 to 24 lb. C Socket (IC
		– to 10	/ / \ Commercial-10	Envelopes made of 20 to 24 lb. (75 to paper
	Manual feed	.	Any size (Note 2)	16 to 42 lb.
Lower paper cassette (Optional)		250	A4 or LT	16 to 24 lb. Connec

Notes:

1. lb. (ream weight) = 500 sheets of 17x 22 inch paper; 1 g/m^2 = 0.2659763 lb.
2. Paper size range: width 3.63to 8.5 inches
   length 5.85 to 14.0 inches (148.5 to 356 mm)

Paper types: See Table

Table 1-4. Paper Types

Standard paper	Xerox" 4024 U paper 20 lb.
Normal paper	Regular photocopier paper Bond paper 16 to 24 lb. (60 to 90
Special papers	Card (90 to 157 IN B Envelopes Letterhead Transparency sheets Colored

Usability ou special papers: See Table 1-5.

Table 1-5. Usability of Special Papers

input	output	OHP	Envelopes	Labels	Stock	Letterhead
Standard built-in paper bin	Face down	P	P			R
	Face up	R	R			R
Lower paper cassette	Face down	I				P
	Face up	I	I	I	I	P

R: Reliable feeding and good image quality.
P: Possible, but better avoided.
I: Impossible.

Paper feed alignment and direction: Center alignment for all sizes

Paper ejection: Face down; face up (optional)

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

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

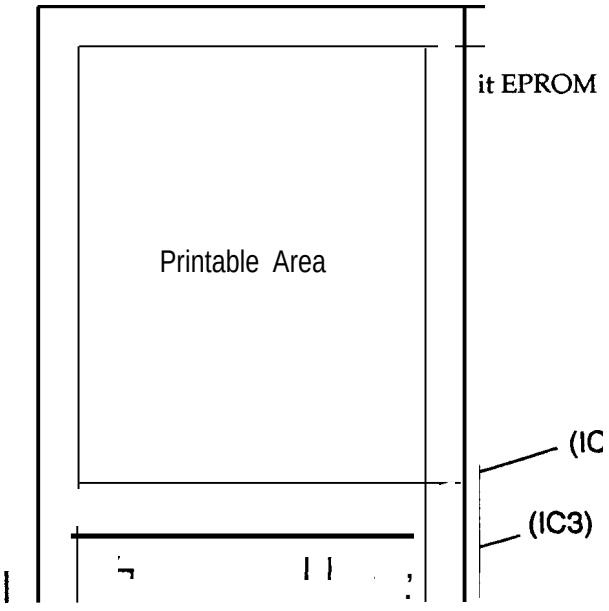

Figure 1-2. Printable Area

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

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

Ozone density: Less than 0.01 ppm

Toxicity: No toxicity exists in toner, or plastic materials

1.2.2 Electrical Specifications

Table 1-6. Electrical Specifications

Description	100 V Version	200 V Version
Rated voltage	100-120 VAC	220-240 VAC
Input voltage range	90-132 VAC	198-264 VAC
Rated frequency range	50-60 Hz	
Input frequency range	47-63 Hz	
Rated current	5.5 A	3.3 A
Power consumption	Less than 600 W	

1.2.3 Reliability Specifications

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

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

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

1.2.4 Environmental Conditions for Operating (Include Imaging Cartridge)

Temperature:	10to35'C (50 to 95 'F)
Humidity:	15 to 85 %RH
Altitude:	2,500 m (8,200 feet) or lower
Levelness:	Printer should be installed on a level plane.
Illuminance:	3,000 IUX or less (Must not be exposed to direct sunlight.)
Surrounding space:	Printer should have at least 100 mm clearance on its sides and rear.

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

Temperature:	Oto35'C (32 to 95 "F) over full storage term -20 to55"C (-4 to 131 "F) under extreme conditions (Extremes are allowable for up to 1/30 of full storage term) Temperature variation must be10'C (18 'F) /hour or less
Humidity:	30to85'%oRH over full storage term 10 to 95 %RH under extreme conditions (Extremes are allowable for up to 1/30 of full storage term)
Drop test:	Clear to JIS Z0200-1987 Level 1
Vibration:	Vibration frequency 5 to 100 Hz and 100 to 5 Hz Acceleration 1 G Acceleration direction 3direction
Resistance to atmospheric pressure:	More than 613 mb
Storage term:	24 months (following date of manufacture)

1.2.6 Applicable Standards

Safety Standards

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

Safety Regulations (Laser radiation)

120 VAC model:	FDA(NCDRH) Class 1
220/240 VAC model:	VDE O&37 (Laser Class 1)(IEC825), SETI (IEC825), SEMKO (IEC825), DEMKO (IEC825)

EMI

120 VAC model:	FCC Part 15 Subpart B Class B
220/240 VAC model:	FTZ (VDE 0871 Class B, 0875 Part 1), CISPR Pub22

Others

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

1.2.7 Specification for Consumable (Imaging Cartridge)

Life:	6,000 pages

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

Environmental Conditions for Storage and Transportation

Temperature:	***Oto30"C(32*** to 86 'F) over full storage term -20 to40"C (-4 to 104 "F) under extreme condition (Extremes are allowable for up to 1/30 of full storage term) Temperature variations must be10"C (18 °F)/hour or less.
Humidity:	30 to 85 %RH over full storage term 10to95'%oRH under extreme conditions (Extremes are allowable for up to 1/30 of full storage term)
Drop test:	Height 76 cm (30.4 inches)
Vibration:	Same as printer
Resistance to atmospheric pressure:	More than 740 mb
Storage term:	18 months (following date of manufacture)

1.2.8 Physical Specifications

Dimensions:	
Printer:	368(W) x **456(D)** x 226(H) mm 14.5(W) x 18.0(D) x 8.9(H) inches
With lower cassette:	368(W) × **480(D) × 336(H) mm** **14.5(W)× 18.9(D) x 13.2(H) inches**
With face-up tray:	368(W) × **6 3 2 (D)** × 360(H) mm **14.5(W)× 24.9(D) x 14.2(H) inches**
With lower cassette and face-up tray:	368(W) × **657(D)** x 430(H) mm 14.5(W) x 25.9(D) x 16.9(H) inches
Weight:	Approx. 10 Kg (22 lb.) (consumable, excluding all options)
With lower cassette;	Approx. 12.8 Kg (28.3 lb.)
With face-up tray;	Approx. 10.1 Kg (22.3 lb.)
With lower cassette and face-up tray;	Approx. 12.9 Kg (28.6 lb.)

1.2.9 Software Specifications

Built-in modes:
HP LaserJet® 11P emulation: (EPL-5000/ActionLaser 1000)
HP LaserJet® III/IIIP/IIISi emulation mode: (EPL-5200/ActionLaser 1500)
Epson GL/2 mode (LJ3-GL/2 mode and GL-like mode):
(EPL-5200/ActionLaser 1500)
ESC/P® 9-pin (FX-86e/286e, FX-800/1000) emulation mode
ESC/P® 24-pin (LQ-2500) mode

Note: The Epson GL/2 mode is similar to the GL/2 mode included in the HP LaserJet® III/IIIP/IIISi emulation. Table 1-7 shows the differences between Epson GL/2 mode and the GL/2 mode in the HP LaserJet® III/IIIP/IIISi 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 1-7. Differences between EPSON GL/2 and GL/2 in the HP LaserJet" III/IIIP/IIISi Emulation

	EPSON GL/2 Mode	GL/2 for HP LaserJet® III/IIIP/IIISi 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 LJ3-GL/2 mode; the other is the GL-like mode.

LJ3-GL2 mode emulates the GL/2 mode in the HP LaserJet® III/IIIP/IIISi emulation. 'l'he user can print with software that supports the HP 7600 series plotter.

The GL-like mode features all the coremands of the LJ3-GL/2 mode, plus two additional commands. The GL-like mode emulates some of the HP-GL plotter (HP 7475A, etc.) commands. If the application software uses unsupported coremands for the GL-like mode, print cannot be assured.

Optional modes:
HP LaserJet® III/IIIP/IIISi emulation (EPL-5000/ActionLaser 1000)
EPSON GL/2 (EPL-5000/ActionLaser 1000)
Page Printer mode (GQ mode) (EPL-5000/5200)
Postscript™ mode (all models)
EPSON GL mode (all models)

Auxiliary software:
Hex dump
Status sheet
Font sampie

Built-in fonts: See Table 1-8 through Table 1-11.

Table 1-8. Built-in Fonts Laser 1000)

Resident Fonts						
fonts						
Courier	Medium	Upright	10	Portrait	s	s
Courier	Bold	Upright	10	Portrait	s	s
Courier	Medium	Italic	10	Portrait	s	NS
Courier	Medium	Upright	12	Portrait	s	s
Courier	Bold	Upright	12	Portrait	s	s
Courier	Medium	Italic	12	Portrait	s	NS
Line printer	Medium	Upright	16.66	Portrait	s	s
	Medium	Upright	12	Portrait	NS	s
	Medium		20	Portrait		s

i: Supported, Not Supported

Table 1-9. Built-in Fonts Laser 1500 and Laser 1000 with FUSING Board)

Resident Fonts					Applicable Mode	
					HP LJ3	
Bitmap fonts						
Courier	Medium	Upright	10	Portrait	S	S
Courier	Bold	Upright	10	Portrait	S	S
Courier	Medium	Italic	10	Portrait	S	NS
Courier	Medium	Upright	10	Landscape	S	S
Courier	Bold	Upright	10	Landscape	S	S
Courier	Medium	Italic	10	Landscape	S	NS
Courier	Medium	Upright	12	Portrait	S	S
Courier	Bold	Upright	12	Portrait	S	S
Courier	Medium	Italic	12	Portrait	S	NS
Courier	Medium	Upright	12	Landscape	S	S
Courier	Bold	Upright	12	Landscape	S	S
Courier	Medium	Italic	12	Landscape	S	NS
Line printer	Medium	Upright	16.66	Portrait	S	S
Line printer	Medium	Upright	16.66	Landscape	S	S
	Medium	Upright	12	Portrait	NS	S
	Medium	Upright	20	Portrait	NS	S
Scalable *fonts for* CAR						
EPSON Roman T	Medium	Upright			S	NS
EPSON Roman T	Bold	Upright			S	NS
EPSON Roman T	Medium	Italic			S	NS
EPSON Roman T	Bold	Italic			S	NS
EPSON Saris Serif U	Medium	Upright			S	NS
EPSON Saris Serif U	Bold	Upright			S	NS
EPSON Saris Serif U	Medium	Italic			S	NS
EPSON Saris Serif U	Bold	Italic			S	NS
EPSON Saris Serif U	Medium	Condensed	Upright		S	NS
EPSON Saris Serif U	Bold	Condensed	Upright		S	NS
EPSON Saris Serif U	Medium	Condensed	Italic		S	NS
EPSON Saris Serif U	Bold	Condensed	Italic		S	NS
ITC	Medium	Upright			S	NS

S: Supported, Not Supported

Table 1-10. Built-in Fonts (EPL-5000 with GQ Chip)

Resident Fonts					Applicable Mode		
					HP		GQ
Bitmap fonts							
Courier	Medium	Upright	10 cpi	Portrait	S	S	S
Courier Bold	Bold	Upright	10 cpi	Portrait	S	S	S
Courier Italic	Medium	Italic	10 cpi	Portrait	S	NS	NS
Courier	Medium	Upright	10 cpi		NS	S	S
Courier Bold	Bold	Upright	10 cpi		NS	S	S
Courier	Medium	Upright	12 cpi	Portrait	S	S	NS
Courier Bold	Bold	Upright	12 cpi	Portrait	S	S	NS
Courier Italic	Medium	Italic	12 cpi	Portrait	S	NS	NS
Line printer	Medium	Upright	16.66 cpi	Portrait	S	S	S
Line printer	Medium	Upright	16.66 cpi		NS	S	S
Presitage	Medium	Upright	12	Portrait	NS	S	S
Presitage	Medium	Upright	20	Portrait	NS	S	S
EDP	Medium	Upright	13	Portrait	NS	NS	S
EDP	Medium	Upright			NS	NS	S
Modern	Medium	Upright	10 point	Portrait	NS	NS	S
FONT *fonts* E	*G(?*						
Courier	Medium	Upright			NS	NS	S
Courier	Bold	Upright			NS	NS	S
Courier	Medium	Oblique			NS	NS	S
Courier	Bold	Oblique			NS	NS	S
EPSON Roman T	Medium	Upright			NS	NS	S
EPSON Roman T	Bold	Upright			NS	NS	S
EPSON Roman T	Medium	n M			NS	NS	S
EPSON Roman T	Bold				NS	NS	S
EPSON Saris serif H	Medium	Upright			NS	NS	S
EPSON Saris serif H	Bold	Upright			NS	NS	S
EPSON Saris serif H	Medium	Oblique			NS	NS	S
EPSON Saris H	Bold				NS	NS	S
EPSON Set	Medium				NS	NS	S

S: Supported, NS: Not **Supported**

Table 1-11. Built-in Fonts (EPL-5200 with GQ Chip Option and EPL-5000 with PCL5® Board and GQ Chip)

Resident Fonts					Applicable Mode		
					HP LJ3	ESC/P®	GQ
Bitmap fonts							
Courier	Medium	Upright	10 cpi	Portrait	S	S	S
Courier	Bold	Upright	10 cpi	Portrait	S	S	S
Courier	Medium	Italic	10 cpi	Portrait	S	NS	NS
Courier	Medium	Upright	10 cpi	Landscape	S	S	S
Courier	Bold	Upright	10 cpi	Landscape	S	S	S
Courier	Medium	Italic	10 cpi	Landscape	S	NS	NS
Courier	Medium	Upright	12 cpi	Portrait	S	S	NS
Courier	Bold	Upright	12 cpi	Portrait	S	S	NS
Courier	Medium	Italic	12 cpi	Portrait	S	NS	NS
Courier	Medium	Upright	12 cpi	Landscape	S	S	NS
Courier	Bold	Upright	12 cpi	Landscape	S	S	NS
Courier	Medium	Italic	12 cpi	Landscape	S	NS	NS
Line printer	Medium	Upright	16.66 cpi	Portrait	S	S	S
Line printer	Medium	Upright	16.66 cpi	Landscape	S	S	S
Presitage	Medium	Upright	12 cpi	Portrait	NS	S	S
Presitage	Medium	Upright	20 cpi	Portrait	NS	S	S
EDP	Medium	Upright	13 cpi	Portrait	NS	NS	S
EDP	Medium	Upright	13 cpi	Landscape	NS	NS	S
Modern	Medium	Upright	10 point	Portrait	NS	NS	S
Scalable font for PCL5®							
EPSON Roman T	Medium	Upright			S	NS	NS
EPSON Roman T	Bold	Upright			S	NS	NS
EPSON Roman T	Medium	Italic			S	NS	NS
EPSON Roman T	Bold	Italic			S	NS	NS
EPSON Saris serif U	Medium	Upright			S	NS	NS
EPSON Saris serif U	Bold	Upright			S	NS	NS
EPSON Saris serif U	*Medium*	Italic			S	NS	NS
EPSON Saris serif U	Bold	Italic			S	NS	NS
EPSON Saris serif U	Medium	Condensed Upright			S	NS	NS
EPSON Saris serif U	Bold	Condensed Upright			S	NS	NS
EPSON Saris serif U	Medium	Condensed Italic			S	NS	NS
EPSON Saris serif U	Bold	Condensed Italic			S	NS	NS
ITC ZapfDingbatts®	Medium	Upright			S	NS	NS
Scalable fonts for GQ							
Courier	Medium	Upright			NS	NS	S
Courier	Bold	Upright			NS	NS	S
Courier	Medium	Oblique			NS	NS	S
Courier	Bold	Oblique			NS	NS	S
EPSON Roman T	Medium	Upright			NS	NS	S
EPSON Roman T	Bold	Upright			NS	NS	S
EPSON Roman T	Medium	Italic			NS	NS	S
EPSON Roman T	Bold	Italic			NS	NS	S
EPSON Saris serif H	Medium	Upright			NS	NS	S
EPSON Saris serif H	Bold	Upright			NS	NS	S
EPSON Saris serif H	Medium	Oblique			NS	NS	S
EPSON Saris serif H	Bold	Oblique			NS	NS	S
EPSON Symbolic Set	Medium	Upright			NS	NS	S

S: Supported, NS: Not Supported

Font Symbol Sets

HP LaserJet® 11P Mode: 26 symbol sets

1S02, 4,6,10,11,14,15,16,17, 21,25,57,60,61,69,84, 85

ISO1OO(ECMA94-1)	Roman Extension
HP German	HP Spanish
HP Legal	HP Roman-8
IBM-US	IBM-DN
PcMultilingual	

HP LaserJet® III/IIIP/IIISi Mode: 41 symbol sets

1S02, 4,6,10,11,14,15,16,17, 21,25,57,60,61,69,84, 85

ISO1OO(ECMA94-1)	
Roman Extension	Venture Math
HP German	Venture International
HP Spanish	Venture US
HP legal	PS Math
HP Roman-8	PS Text
IBM-US	Math 8
IBM-DN	Pi Font
PcMultilingual	Microsoft Publishing
Venture ITC Zapf Dingbatts	Windows
PS ITC Zapf Dingbatts	DeskTop
ITC Zapf Dingbatts® 100	
ITC Zapf **Dingbatts® 200**	
ITC Zapf Dingbatts® 300	

ESC/P Mode: 13 **International Characters**

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

(In addition to the above, Code Page 860,863,850,865 and 437 can also be selected by SelecType.)

GQ Mode: **35** symbol sets (Option)

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

● : Two types, one **with extended graphics and one without.**

Code page 865 (PcNordic)	Code page 860 (PcPortuguese)
Code page 850 (PcMultilingual)	ECMA94-1
Code Page 437 (PcUSA)	Symbolic
Code Page 863 (PcCanFrench)	Code Page 853
Code Page 857	

1.3 INTERFACE SPECIFICATIONS

The EPL-5000/5200 and ActionLaser 1500 are equipped with the following external interfaces:

- ■ Centronics® parallel interface
- ❑ RS-232C interface
- ■ Optional Type B interface (except for C82305*/C82306*)

The ActionLaser 1000 is equipped with the following external interfaces:

- ❑ Centronics® parallel interface
- ■ Optional Type B host interface (including C82305*/C82306*)

1.3.1 Parallel Interface

Type: Centronics®
System: STROBE synchronization, 8-bit parallel data transfer
Handshaking: BUSY and ACKNOWLEDGE signals

Note: While the SelecType setting for BUSY delay is "MIN," the handshaking signal is BUSY only.

Comector type: P90-25027-1 (Amphenol) receptacle
Applicable plug: 57-30360 (Amphenol or equivalent)
Transfer speed: About ***75,000*** bytes/second (max.) (EPL-5000/ActionLaser 1000)
About 125,000 bytes/second (max.) (EPL-5200/ActionLaser 1500)
Signal timing: See Figure 1-3.
Signal description: See Table 1-12.

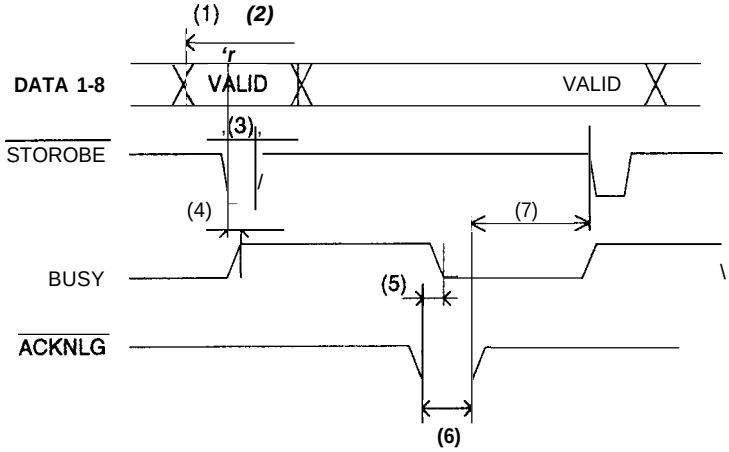

Figure 1-3. Signal Timing

Table 1-12. Signal Timing

No.	Description	Time (μsec.)
(1)	Data set up	0.5 (min.)
(2)	DATA hold	0.5 (min.)
(3)	$\overline{\text{STROBE}}$ (pulse width)	0.5 (min.)
(4)	BUSY delay	4.0 (max.)
(5)	$\overline{\text{ACKNLG}}$ to BUSY –5	o (typ.)
	o	5 (typ.)
	+5	10 (typ.)
	No $\overline{\text{ACKNLG}}$ pulse	—
(6)	$\overline{\text{ACKNLG}}$ pulse width	10 (typ.)
(7)	$\overline{\text{ACKNLG}}$ to $\overline{\text{STROBE}}$	O (min.)

Table 1-13. Centronics® Parallel Interface Pin Assignment

Pin No.	Signal Name	I/O	Description
1	$\overline{\text{STROBE}}$	IN	$\overline{\text{STROBE}}$ is a strobe pulse used to read data from the host computer. The pulse width must be more than 0.5 µsec. Normally it is HIGH, and data is latched at the trailing edge of this signal.
2-9	DATA 1-8	IN	DATA 1 to 8 are parallel data bits. When the signal is HIGH, the data bit is 1, and when it is LOW, the data bit is O. The most significant bit (MSB) is DATA8. The signal state must be maintained for 0.5 µsec. on either side of the $\overline{\text{STROBE}}$ signal active edge.
10	$\overline{\text{ACKNLG}}$	OUT	$\overline{\text{ACKNLG}}$ is an acknowledge pulse with an approximate width of 10 @cc. This signal goes LOW when the data reception is completed, which indicates that the printer can accept new data. Timing with the BUSY signal is specified through SelecType.
11	BUSY	OUT	The BUSY signal informs the host computer of the printer state. When the signal is HIGH, the printer cannot accept data.
12	PE	OUT	The PE signal indicates paper empty for the standard cassette selected through SelecType or command, or for the option paper cassette. Paper empty is indicated by HIGH.
13	SLCT	OUT	Pulled up to +5V through a 3.3 Kohm resistor.
14	$\overline{\text{AUTO-FEED}}$	IN	If the $\overline{\text{AUTO FEED}}$ signal is set to LOW, the printer automagically performs a LF (line feed) upon receiving a CR (Carriage Return) oode from the host computer. In GQ Mode (option) or ESC/P® Mode, $\overline{\text{AUTO-FEED}}$ signal affects the CR operation according to SelecType settings. In HP Mode, AUTO-FEED signal is always ignored. Detection can only be done when the printer is ON or when active interface is switched to parallel interface. This signal is detected only when the power is turned ON, or when the printer is initialized.
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 used.
19-30	GND		Ground level for the twisted pair return signal.
31	$\overline{\text{INIT}}$	IN	The STROBE signal is ignored when this signal is LOW.
32	$\overline{\text{ERROR}}$	OUT	This level goes LOW when the printer is: • out of paper • paper jam • in error state • off line
33	GND		Same as for pins19 to 30.
34	NC		Not used.
35	+5V		Pulled up to +5V through 3.3 Kohm resistance.

Table 1-13. f Messages Interface Pin Assignment (Continued)

ow No.	Signal Name		Description
36	Me	IN	If the signal is LOW when the printer is turned on or initialized, the printer enters the state. In this state, ie pi and stat control codes are ignored. If the signal is HIGH when the printer is turned on or initialized, the select/deselect control by ges is valid. If the printer receives a code, any subsequent data be thrown out until a code is received. Handshaking with the BUSY or ACKNLG however, is for data during this time. It is possible to disable signal with and keep the printer constantly in the selected state. In GQ mode (option) or mode, this affects the or)ata operation according to the printer settings. In HP Mode this signal always ignored.

1.3.2 Serial Interface (Except for the ActionLaser 1000)

Type: RS-232C

Transfer system: duplex

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

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

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

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

Signal description: See Table 1-14.

Table 1-14. Serial Interface Connector Pin Assignments

of c	Signal Name	di	Description
1	o reset the toner counte ress the CONTINUE but		Connected to the printer chassis. The printer chassis and the signal open are connected to each other.
2			Serial ASCII data outputted by the printer. It maintains "MARK" state (LOW between transmitted character codes. Logic O is at HIGH level ("SPACE") and logic 1 is at LOW level ("MARK").
3			data inputted to the printer. it maintains "MARK" state (LOW level) between received character codes.
4		OUT	Transmission request signal outputted from the printer. It is always at HiGH level during power ON.
5		IN	Response signal to the signal inputted to the printer. The printer transmits the data through TXD while is HIGH. can be fixed HIGH through When the setting for is ON, X-ON/X-OFF will not be transmitted if is LOW.

Table 1-14. Serial Interface Connector Pin Assignments (Continued)

Pin No	Signal Name	I/O	Description
6	DSR	IN	Signal inputted to the printer. The printer can transmit data through TXD while DSR is HIGH. X-ON/X-OFF, however, can be transmitted regardless of DSR state. It can always be ignored by setting SelecType (Factory setting).
7	SIGNAL GND		Ground reference (O V) for signals.
8	DCD	IN	Always ignored.
9-19	NC		Not used.
20	DTR	OUT	Signal outputted by the printer. When the DTR signal is HIGH, it indicates that the RXD signal can be received by the printer. The SelecType settings do not specify DTR control, the signal level is HIGH while the printer power is on. When SelecType setting is used for DTR control, DTR goes LOW in case any of the error conditions. The date (RXD) from host computer must be stopped within 128 characters after DTR goes LOW.
21-25	NC		Not used.

Handshaking

When the vacant area for data in the input buffer drops to 128 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 256 bytes, the printer outputs an X-ON code or sets the DTR flag to HIGH, indicating that printer is again ready to receive data.

Protocol

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

■ DTR/DSR protocol

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

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

■ X-ON/X-OFF (DC1/DC3) protocol

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

When the remaining capacity of the receive buffer reaches 128 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.

■ ENQ/ACK Protocol

If the EPSON GL mode (optional) is selected, ENQ/ACK protocol is also supported.

1.3.3 Optional Interface C82305*/C82306* (ActionLaser 1000 Only)

The ActionLaser 1000 can use the non-intelligent serial interface card C82305*/C82306*.

Type:	RS-232C or current loop	
Synchronization:	Asynchronous start-stop system	
	Start bit:	1
	Stop bit:	1
	Data length:	7 bits or 8 bits
	Parity:	Odd, even, or none
Protocol:	X-ON/X-OFF (cannot be combined with DTR control) DTR control (cannot be combined with X-ON/X-OFF)	
Transfer speed:	300,600,1200,2400,4800, 9600, or 19200 bps	
Error:	Overrun error:	Processed as missing data and replaced by "*"
	Parity error:	Replaced by "*"
	Framing error:	Replaced by "*"
	Breaking character: Ignored	

1.4 OPERATING INSTRUCTIONS

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

1.4.1 Control Panel

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

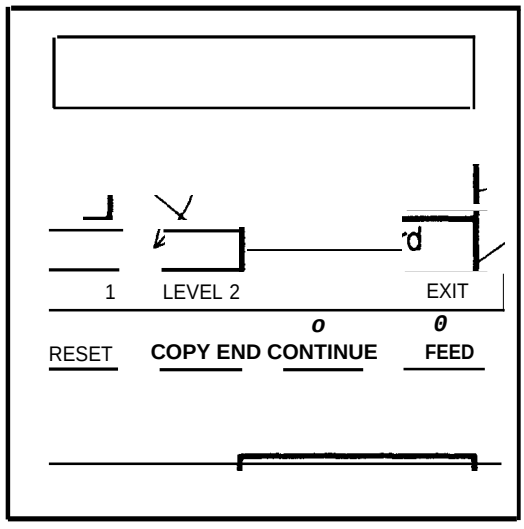

Figure 1-4. Control Panel

Display (LCD)

A 20-character (5 x 7 dot matrix) 1-row crystal display (LCD) unit that indicates printer status. A of printer can be displayed and mode.

Indicator lights

■ **ON** LINE

ON: Communication with the host is possible.

OFF: Communication with the host is impossible.

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

■ FEED

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

ON: Indicates that received data is stored in the printer that has not been printed out. However, the LED does not light up when only non-printable data ds and other control codes) is stored.

OFF: Indicates there is ***no*** printable data remaining in the printer.

Fast flashing: Indicates that the printer is in the process of receiving data from the host.

Slow flashing: Indicates data has arrived on a non-active channel (in auto-sense operation).

CONTINUE

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