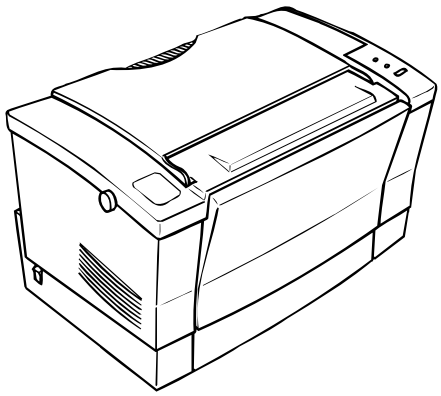
EPSON TERMINAL PRINTER

EPL-5500

SERVICE MANUAL



EPSON

4005431

NOTICE

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

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

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

Epson is a registered trademark of Seiko Epson Corporation.

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

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

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

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

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

SAFETY INFORMATION

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

Since radiation emitted by the laser is completely confined within protective housings, the laser beam cannot escape from the machine during any phase of user operation.

For 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 opfylder IEC825 sikkerheds kravene.

For Finland, Sweden Users;

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

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

For Finland, Sweden Service People

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

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

For Norway Users;

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

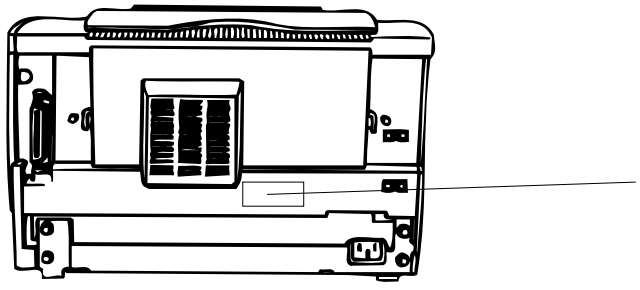
Dette er en halvleder laser. Maksimal effeckt til laserdiode er 5.0×10^{-4} W og bølgelengde er 790 ± 20 nm.

Laser Safety Labels

[Label on rear printer case]

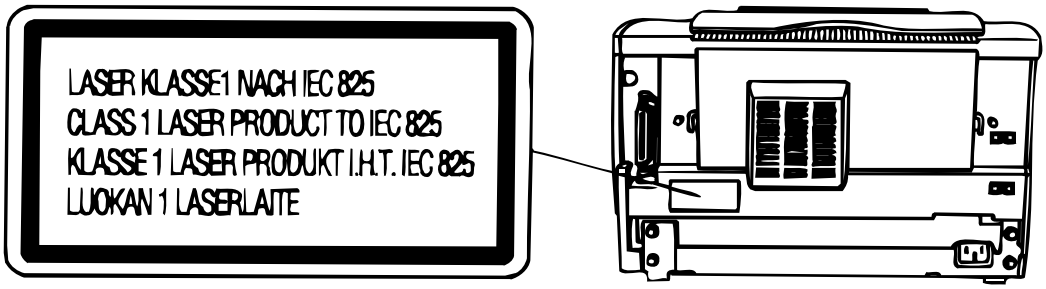
A laser safety labels is attached on the outside of the printer shown below.

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:

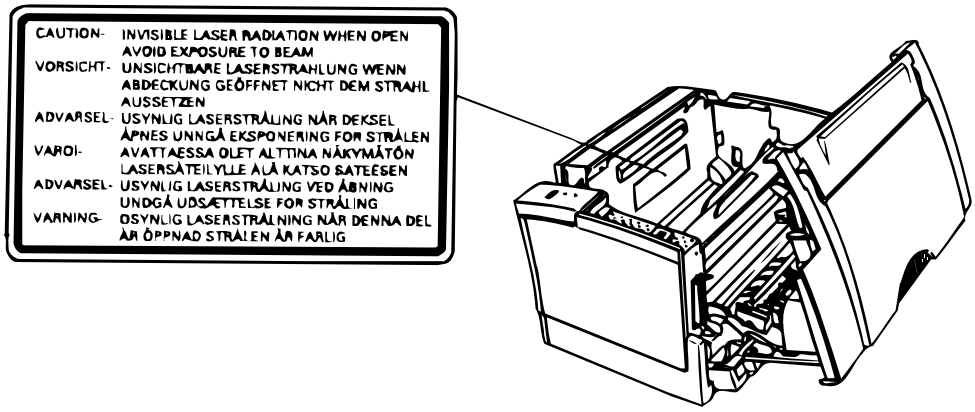
For Europe



[Label inside printer]

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

For Denmark, Finland, Sweden, and Norway



PREFACE

This manual describes functions, theory of electrical and mechanical operations, maintenance, and repair of EPL-5500.
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	October 06, 1995	1st issue
Rev. B	March 15, 1996	Revise the whole pages of the following chapters: Chapter 1 Chapter 2 Chapter 3 Chapter 4 Chapter 5 Chapter 6

Chapter 1 General Description

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1.1 FEATURES

The EPSON® EPL-5500 is non-impact page printer that combines a semi-conductor laser with electrophotographic technology. This printer is small and light, and features high-speed, high-resolution printing. Maintenance is very easy as a result of various built-in diagnostic functions. The main features are:

- ❏ No ozone
- ❏ Printing speed — 6 ppm (pages per minute)
- ❏ Resolution — 600/300 dpi (dots per inch)
- ❏ Light weight — about 5 kg (11 lb)
- ❏ Small footprint
- ❏ Low running cost: separation of the development/toner cartridge and photoconductor unit
- ❏ HP® LaserJet® 4 emulation mode
- ❏ 22 built-in scalable fonts (8 Agfa® and 14 TrueType® fonts)
- ❏ High-performance controller (the controller's CPU is a 22.5 MHz SPARKlite (MB86933H))
- ❏ Bi Resolution Improvement Technology (BiRITech) refines the print quality by eliminating jagged edges from images and characters on 600 dpi and 300 dpi printing
- ❏ Memory Improvement Technology supported
- ❏ Optional EPSONScript Level 2 (PostScript® compatible) module
- ❏ Optional WPS (Windows Printing System) ROM SIMM module
- ❏ Optional I239X, ESC/P 2™ , and FX emulation ROM SIMM module
- ❏ EPSON Micro Gray Technology (EMGTech), which is available when using PCL and EPSONScript Level 2 mode, refines gray scale printing to be comparable to printing on a 1200-dpi printer
- ❏ Small and low-cost optional LocalTalk™ with serial interface module
- ❏ 1MB standard RAM and memory expansion available up to 32MB of RAM with the addition of optional SIMMs
- ❏ Bidirectional parallel interface
- ❏ Toner-saver mode supported
- ❏ A multi-user, multi-emulation mode
- ❏ IES (Intelligent Emulation Switch) allows switching between EPSONScript mode and another mode
- ❏ SPL (Shared Printer Language) enables switching of the printer mode by command

Figure 1-1 shows an exterior view of the EPL-5500.

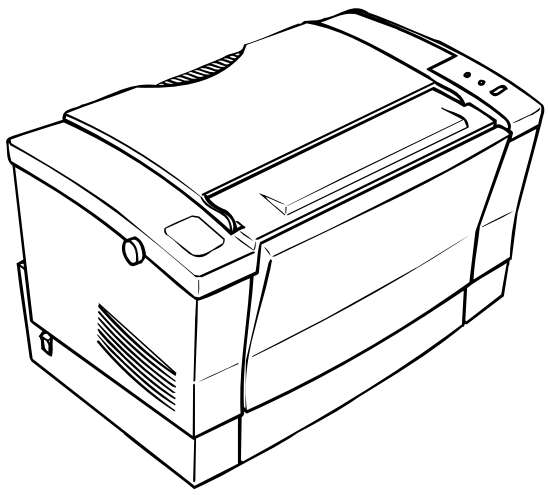

Figure 1-1. Exterior View of the EPL-5500

Table 1-1 lists the optional units available for the EPL-5500.

Table 1-1. Options for the EPL-5500

Cat. No.	Description	Note
C83218✻	Windows Printing System ROM SIMM	Supports Windows Printing System
C83219✻	EPSONScript Level 2 ROM SIMM	Supports EPSONScript Level 2 mode (PostScript Level 2 compatible) fonts and commands (see Note 1)
C83220✻	LQ/FX/I239X ROM SIMM	Supports ESC/P 2, FX, and IBM 2390/2391 emulation modes
—	NLSP Bitmap 2 font ROM	Supports local NLSP bitmap fonts (see Note 2)
—	NLSP Scalable font ROM	Supports local NLSP scalable fonts (see Note 2)
C812491	250-sheet lower paper cassette for the EPL-5500 (A4/B5)	Lower paper cassette
S050005	Developer cartridge	Developer and toner cartridge
S051029	Photoconductor unit	—
C82334✻	LocalTalk™ with serial I/F module	(see Note 3)
C83614✻	Interface cable	RS-232C extension cable for C82334✻
C82335✻	Type-B EX box	Type-B I/F card box (see Note 4)
C82307✻/ C82308✻	32 KB serial interface card	(see Note 5)
C82310✻/ C82311✻	32 KB parallel interface card	(see Note 5)
C82312✻	LocalTalk card	(see Note 5)
C82313✻	GPIB card	(see Note 5)
C82314✻	COAX interface card	(see Note 5)
C82315✻	TWINAX interface card	(see Note 5)
C82324✻	Ethernet interface card for NetWare®	(see Note 5)
C82328✻	FAX card	(see Note 5)
C82331✻	Multi protocol Ethernet card	(see Note 5)

Notes:

1. Requires added memory (RAM) over a total of 2 MB, including standard RAM.
2. NLSP font ROMs do not support ESC/P 2 and FX modes.
3. LocalTalk with serial I/F module (C82334✻) cannot be used with Type-B EX box (C82335✻).
4. Type-B EX box (C82335✻) cannot be used with LocalTalk with serial I/F module (C82334✻) .
5. Type-B EX box (C82335✻) must be installed while using the Type-B I/F card.

1.2 SPECIFICATIONS

This section provides statistical data for the EPL-5500.

1.2.1 Basic Specifications

Printing method: Laser beam scanning and dry electrophotography

Resolution: 600/300 dpi

Printing speed: 6 ppm (letter/A4)

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

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

Paper supply: See Table 1-2.

Table 1-2. Paper Feed Methods

Paper Supply	Capacity Using 20 lb. (75 g/m^2) Paper	Paper Size	Usage Thickness (Ream Weight)
Standard built-in paper tray	150	A5, B5, A4, LT, GLT, EXE, LGL, GLG, F4, HL	16 to 24 lb. (60 to 90 g/m^2)
	5 to 10	Monarch, DL, C5, C6, International B5, Commercial-10	Envelopes made of 20 to 24 lb. (75 to 90 g/m^2) paper
Manual feed slot	1	Any size feedable (Note 2)	16 to 42 lb. (60 to 157 g/m^2)
Lower paper cassette (optional)	250	A4, B5	16 to 24 lb. (60 to 90 g/m^2)

Notes:

1. The weight in pounds (lb) is determined by the weight of 500 sheets cut to 17 × 22 inches; 1 g/m^2 = 0.2659763 lb.
2. Paper size range: width 3 to 8.5 inches (76 to 216 mm)
   length 5 to 14.0 inches (127 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

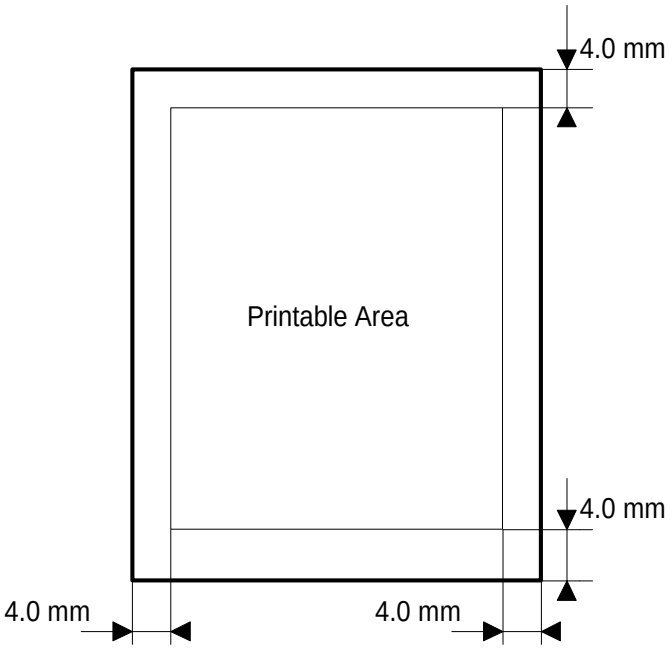

Figure 1-2. Printable Area

Usability of special papers: See Table 1-4.

Table 1-4. Usability of Special Papers

Input	OHP	Envelopes	Labels	Card Stock	Letterhead
Standard built-in paper tray	P	P	P	P	R
Manual feed slot	P	P	P	P	R
Lower paper cassette	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: 100 sheets (face down)

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

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

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

Ozone density: Less than 0.01 ppm

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

1.2.2 Electrical Specifications

Table 1-5. Electrical Requirements and Ranges

Description	100 V Version	200 V Version
Rated voltage	100 ~ 120 VAC	220 ~ 240 VAC
Input voltage range	90 ~ 132 VAC	198 ~ 264 VAC
Rated frequency range	50 ~ 60 Hz	
Input frequency range	47 ~ 63 Hz	
Power consumption	Less than 500 W	Less than 600 W
Power consumption while in standby mode	Less than 15 W (without option)	

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 180,000 sheets

1.2.4 Environmental Conditions for Operation (Including Imaging Cartridge)

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

Humidity: 15 to 85% RH

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

Levelness: 1°

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

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

1.2.5 Environmental Conditions for Storage and Transportation

Temperature: 0 to 35° C (32 to 95° F)

Humidity: 30 to 85% RH

Drop test: Clear to JIS Z0200-1987 Level 1

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

Resistance to atmospheric pressure: More than 61.3 KPa

Storage life: 18 months (following date of manufacture)

1.2.6 Applicable Standards

Safety Standards

120 VAC model:	UL 1950, CSA 22.2 No. 950 Deviation 3
220/240 VAC model:	EN 60950 (IEC950), NEMKO (IEC950), SETI (IEC950), SEMKO (IEC950), DEMKO (IEC950)

Safety Regulations (Laser Radiation)

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

EMI

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

Others

Toner:	No effect on human health (OSHA-TSCA, EINECS)
OPC:	No effect on human health (OSHA)
Ozone:	Less than 0.01 mmp other UL478 (5th edition)
Materials:	SWISS environmental law (must contain no CdS)

1.2.7 Specifications for Consumables

Life:	Developer and toner cartridge: 3,000 pages Photoconductor unit: 20,000 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:	0 to 35° C (32 to 95° F)
Humidity:	30 to 85% RH
Drop test:	Height 76 cm (30.4 inches)
Vibration:	Same as printer
Resistance to atmospheric pressure:	More than 74 Kpa
Storage term:	18 months (following date of manufacture)

1.2.8 Physical Specifications

Dimensions (Width × Depth × Height):

Printer:	352 × 264 × 299 mm (13.9 × 10.4 × 11.8 inches)
Weight:	Approx. 5 kg (11 lb), with consumables, excluding all options

1.2.9 Software Specifications

Built-in modes: HP LaserJet 4 emulation (PCL® 5e)
EPSON GL/2 mode (GL-like mode)

Note: 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 LJ4 GL/2 mode. 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	Not available	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

Note: The EPL-5500 GL/2 mode features all the commands of the LJ4-GL/2 mode, plus a few additional commands. The GL/2 mode emulates some of the HP-GL® plotter (HP 7475A, etc.) commands. If the application software uses unsupported commands for the GL/2 mode, print cannot be assured.

Optional modes: EPSONScript Level 2 (PostScript Level 2 emulation) mode
FX (FX-870/1170, LX-100) emulation mode
ESC/P 2 (Stylus 800/1000) emulation mode
WPS (Windows Printing System) mode

Auxiliary software: Hex dump
Status sheet
Font sample

Built-in fonts: See Table 1-7.

Table 1-7. Built-in Fonts

Resident Fonts	Applicable Mode HP LJ4, GL/2
Bitmap fonts	
Line Printer16.66 cpi(Portrait)	S
Scalable fonts	
Dutch™ 801Roman SWC	S
Dutch 801Bold SWC	S
Dutch 801Italic SWC	S
Dutch 801Bold Italic SWC	S
Swiss™ 742SWC	S
Swiss 742Bold SWC	S
Swiss 742Medium Italic SWC	S

S: Supported, NS: Not Supported

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

Resident Fonts	Applicable Mode HP LJ4 GL/2
Scalable fonts	
Swiss 742Bold Italic SWC	S
Swiss 721Roman SWM	S
Swiss 721Bold SWM	S
Swiss 721Oblique SWM	S
Swiss 721Bold Oblique SWM	S
Dutch 801Roman SWM	S
Dutch 801Bold SWM	S
Dutch 801Italic SWM	S
Dutch 801Bold Italic SWM	S
Symbol SetSWA	S
More WingBatsSWM	S
CourierSWC	S
CourierBold SWC	S
CourierItalic SWC	S
CourierBold Italic SWC	S

S: Supported, NS: Not Supported

1.3 INTERFACE SPECIFICATIONS

The EPL-5500 is equipped with the following external interfaces:

- ❏ Parallel interface
- ❏ Optional LocalTalk / serial interface
- ❏ Optional Type B interface with Type-B EX box

1.3.1 Parallel Interface

The parallel interface has the following two modes:

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

1.3.1.1 Parallel Interface Compatibility Mode

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

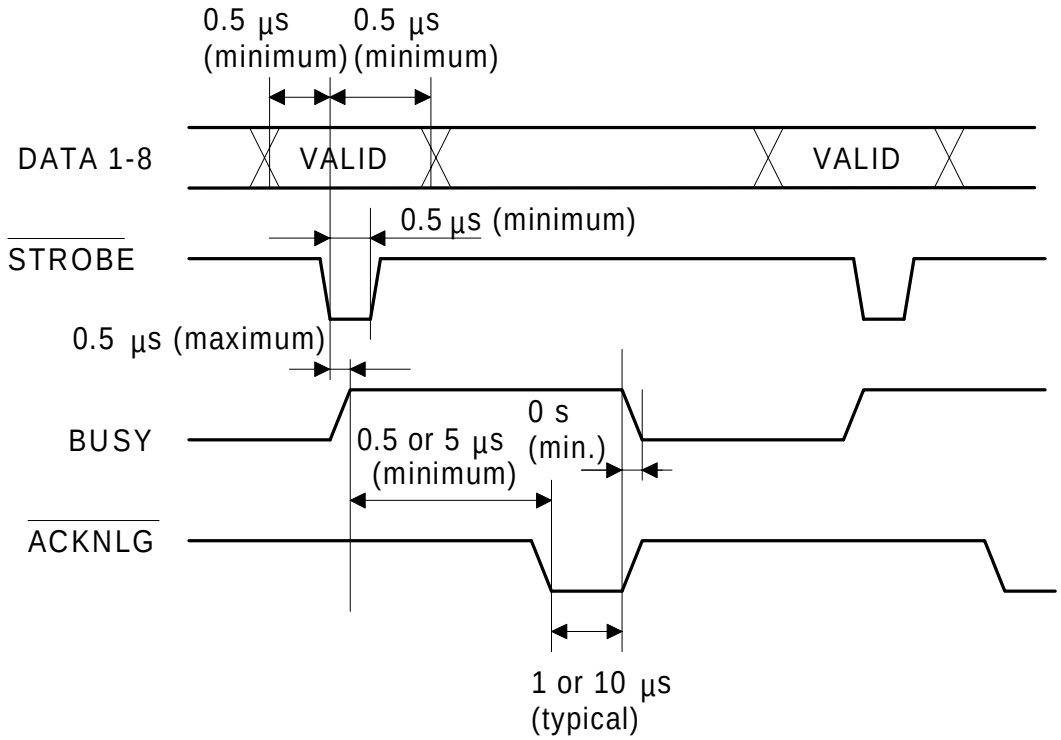

Figure 1-3. Compatibility Mode Signal Timing

Table 1-8. Parallel Interface Pin Assignments

Pin No.	Signal Name	I/O	Description
1	$\overline{\text{STROBE}}$	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 0. The most significant bit (MSB) is DATA 8. 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 1 or 10 µsec. This signal goes LOW when the data reception is completed, which indicates that the printer can accept new data. Timing with the BUSY signal is specified through SelecType.
11	BUSY	OUT	The BUSY signal informs the host computer of the printer state. When the signal is HIGH, the printer cannot accept data.
12	PE	OUT	The PE signal indicates paper empty for the standard tray selected through SelecType or command, or for the optional paper cassette. Paper empty is indicated by HIGH.
13	SLCT	OUT	Used in reverse mode.
14	$\overline{\text{AUTO-FEED}}$	IN	Not used.
15	NC	—	Not used.
16	GND	—	Logic ground level.
17	CHASSIS GND	—	Connected to the printer chassis. The printer chassis GND and the signal GND are connected to each other.
18	NC	—	Not connected.
19-30	GND	—	Ground level for the twisted pair return signal.
31	$\overline{\text{INIT}}$	IN	The $\overline{\text{STROBE}}$ signal is ignored when this signal is LOW.
32	$\overline{\text{ERROR}}$	OUT	This level goes LOW when the printer is: • Out of paper • Paper jam • In the error state • Off line
33	GND	—	Same as for pins 19 to 30.
34	NC	—	Not used.
35	+5	—	Pulled up to +5 V through 1.0K-ohm resistance.
36	$\overline{\text{SLCT IN}}$	—	Used in reverse mode.

1.3.1.2 Reverse Mode

Reverse mode for the EPL-5500 supports the IEEE-P1284 nibble mode. This printer can run in reverse mode, in which the printer can inform the computer of its status with EJL and PJL commands.

System: IEEE-P1284 nibble mode
Connector type: P90-25027-1 (Amphenol) receptacle
Applicable plug: 57-30360 (Amphenol or equivalent)
Signal description: See Table 1-9.

Table 1-9. Parallel Interface Pin 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	These signals are data bits of extension request values received during negotiation. This printer supports following values: 0000 0100: Request Device ID (sent in nibble mode) 0000 0000: Request nibble mode
10	$\overline{\text{ACKNLG}}$	OUT	PtrClk: Printer sends clock data.
11	BUSY	OUT	PtrBusy: Printer sends data bits 3 and 7 during data transfer to host computer.
12	PE	OUT	AckDataReq: Printer sends data bits 2 and 6 during data transfer to host computer.
13	SLCT	OUT	Xflag: Printer sends 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's 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	*n*Init: Fixed at HIGH level.
32	$\overline{\text{ERROR}}$	OUT	*n*DataAvail: 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 +5 V through 1.0K-ohm resistance.
36	$\overline{\text{SLCT IN}}$	IN	1284Active: If this signal is set to HIGH, this printer is actively in P1284 (reverse mode).

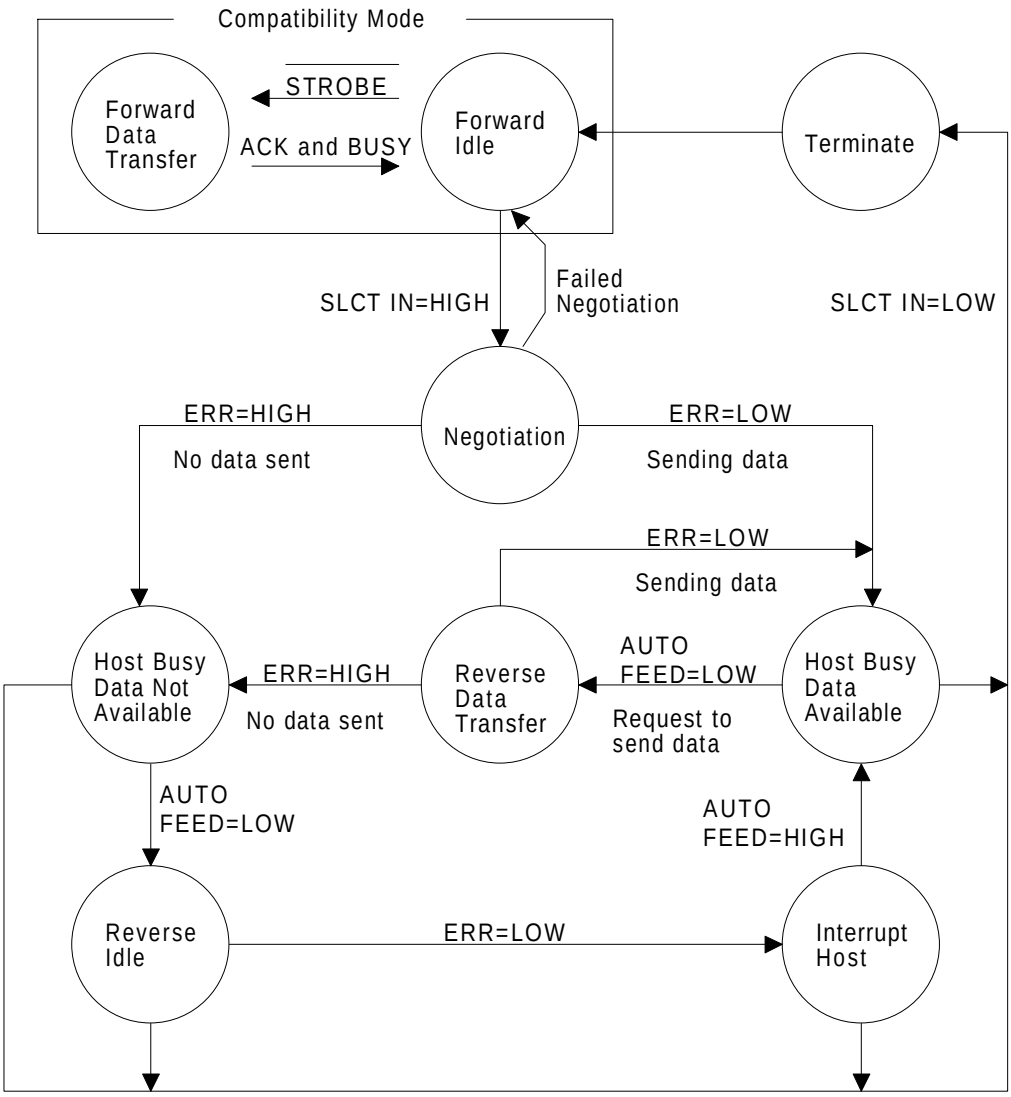

Figure 1-4. Parallel Interface State Switch Diagram

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

Figure 1-5 shows the negotiation timing chart.

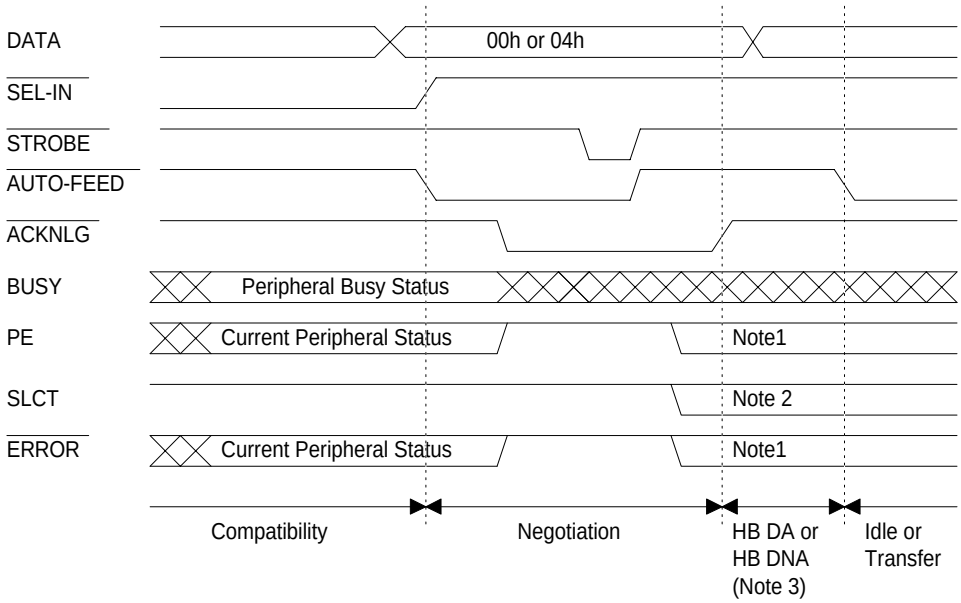

Figure 1-5. Negotiation Timing Chart

Notes:

1. This signal is set to HIGH when no data is being sent.
   This signal is set to LOW during sending of data.
2. This signal is set to HIGH if the extension request value was 04h.
3. HB DA: Host Busy Data is Available
   HB DNA: Host Busy Data is Not Available

Figure 1-6 shows the data transfer timing chart.

Notes:

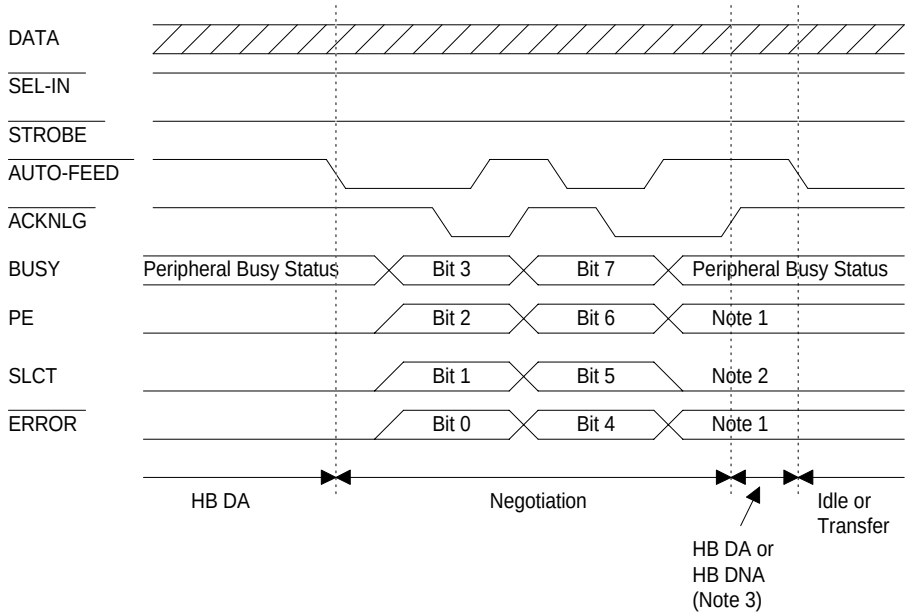

Figure 1-6. Timing Chart for Data Transfer

1. This signal is set to HIGH when no data is being sent.
   This signal is set to LOW during sending of data.
2. This signal is set to HIGH, if extension request value was 04h.
3. HB DA: Host Busy Data is Available
   HB DNA: Host Busy Data is Not Available

Figure 1-7 shows the timing chart for termination.

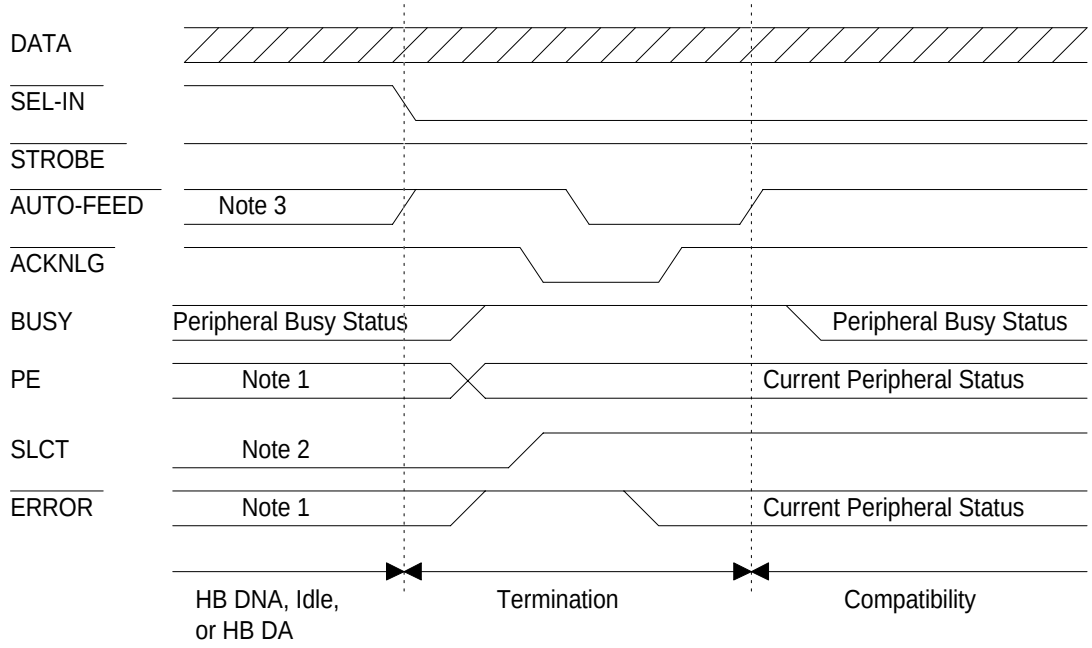

Figure 1-7. Termination Timing Chart

Notes:

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

Figure 1-8 shows the timing chart for interrupts.

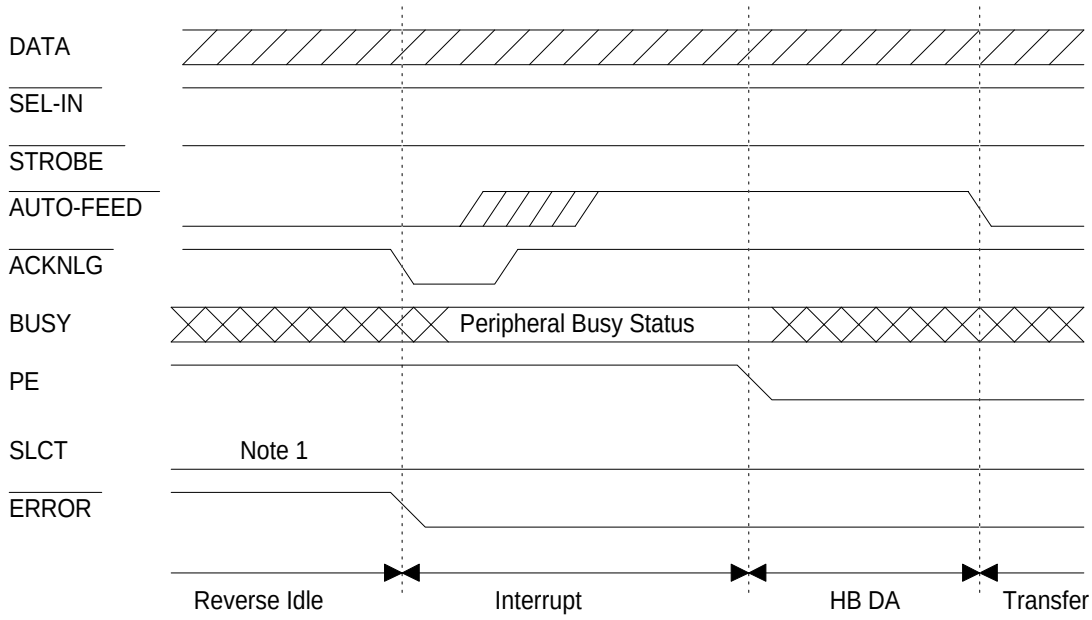

Figure 1-8. Timing Chart for Interrupts

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

1.3.2 Serial Interface

This printer can use the optional LocalTalk / serial interface module.

Type: RS-232C / 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

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

Signal description: See Table 1-10.

Table 1-10. Serial Interface Pin Assignments

Pin No.	Signal Name	I/O	Description
1	CHASSIS-GND	—	Connected to the printer chassis. The printer chassis GND and signal GND are connected to each other.
2	TXD	OUT	Serial ASCII data output by the printer. It maintains the "MARK" state (LOW level) between transmitted character codes. Logic 0 is at HIGH level (SPACE) and logic 1 is at LOW level (MARK).
3	RXD	IN	Serial ASCII data input to the printer. It maintains "MARK" state (LOW level) between received character codes.
5	CTS	IN	Always ignored.
7	SIGNAL-GND	—	Ground.
17	TTY-TXD	OUT	Current loop signal: HIGH impedance (SPACE) between pins 17 and 24 or X-ON signal sent across pins 17 and 24 indicates that the printer is ready to accept data; LOW impedance (MARK) or X-OFF signal being sent indicates that the printer is busy.
20	DTR	OUT	Signal output by printer. When the DTR signal is HIGH, the printer can receive the RXD signal. The SelecType settings do not specify DTR control, the signal level is HIGH while printer power is on. When the SelecType setting is used for DTR control, DTR goes LOW in case of any error conditions. The data (RXD) from host computer must be stopped within 128 characters after DTR goes LOW.
23	TTY-RXD Return	—	Current loop signal: Current return for pin 17
24	TTY-TXD Return	—	Current loop signal: Input data current loop
25	TTY-RXD	IN	Current loop signal: Current return for pin 25

Note : The DTR state can be selected through printer settings.

Handshaking

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

Protocol

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

- DTR / DSR protocol

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

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

- X-ON / X-OFF (DC1 / DC3) protocol

SelecType is used to execute the X-ON / X-OFF protocol. The X-OFF (DC3) code is output if status indicates an error, and the printer warns the host to stop data transmission within 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

This printer can use the optional LocalTalk / serial interface module.

Type:	LocalTalk
Signal level:	Same as RS-422 signal level
Protocol:	X-ON / X-OFF (cannot be combined with DTR control) DTR control (cannot be combined with X-ON / X-OFF)
Transfer speed:	230.4K bps
Signal description:	See Table 1-11.

Table 1-11. LocalTalk Interface Pin Assignments

Pin No.	Signal Name	I/O	Description
1	DTR	OUT	Signal output by the printer. When the DTR signal is HIGH, the printer can receive the RXD signal.
2	CTS	IN	The printer transmits the data through TXD while CTS is HIGH.
3	TXD-	OUT	Serial ASCII data output from the printer. HIGH level; when SD+ voltage is higher than the SD- voltage. LOW level; when SD+ voltage is less than the SD- voltage. Logic 0 is SPACE and logic 1 is MARK. The state must be maintained between transmitted character codes.
4	GND	—	Ground.
5	RXD-	IN	Serial ASCII data input from computer. HIGH level; when RD+ voltage is higher than RD- voltage. LOW level; when RD+ voltage is less than RD- voltage. Logic 0 is “SPACE” and logic 1 is “MARK” state must be maintained between transmitted character codes.
6	TXD+	OUT	Refer to TXD-.
7	NC	—	No connect.
8	RXD+	IN	Refer to RXD-.