EPSON TERMINAL PRINTER

EPL-5600

ActionLaser 1600

SERVICE MANUAL

EPSON

4003020

NOTICE

PRECAUTIONS

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

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

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

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

DANGER

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

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

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

WARNING

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

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

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

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

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

SAFETY INFORMATION

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

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

For United States Users;

[Laser Safety]

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

[**CDRH** Regulations]

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

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

[Internal Laser Radiation]

Maximum Radiation Power: $5.7 \times 10^4 (W)$
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 5.7×10^{-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.

Panel   kuin

Orn
kan
for laser   1.

annat i   som

For Norway

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

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

Safety Labels

[Label on rear printer case]

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

For United State

On Line

J: Communication with the hos

F: Communication with the hos

shing: This state occurs when the
versa.

Form Feed

is LED indicates the data processing condi

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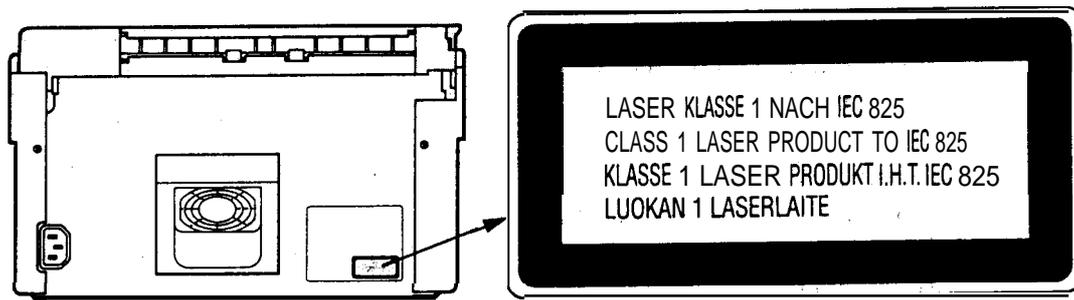
[Label inside printer]

The following laser safety 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
VARO!-	AVATTAESSA OLET ALTTINA NÄKYMÄTÖN LASERSÄTEILYLLE ÄLÄ KATSO SÄTEESEN
ADVARSEL-	USYNLIG LASERSTRÅLING VEDÅBNING 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-5600 / ActionLaser 1600.
The instructions and procedures included herein are intended for the experience repair technician, and attention should be given to the precautions on the preceding page. The chapters are organized as follows:

CHAPTER 1. GENERAL DESCRIPTION

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

CHAPTER 2. OPERATING PRINCIPLES

Describes the theory of printer operation.

CHAPTER 3. DISASSEMBLY AND ASSEMBLY

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

CHAPTER 4. ADJUSTMENTS

Includes a step-by-step guide for adjustment.

CHAPTER 5. TROUBLESHOOTING

Provides Epson-approved techniques for adjustment.

CHAPTER 6. MAINTENANCE

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

APPENDIX

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

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

REVISION SHEET

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

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Chapter 1 General Description

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1.5 MAIN COMPONENTS   1-33

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1.1 FEATURES

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

No ozone

Printing speed — 6 ppm (pages per minute)

Resolution — 600/300 (dots per inch)

Light weight — about 10 kg (22 lb.)

Small footprint

Easy maintenance

HP® ☐ 4 emulation mode

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

~/p 2''' emulation

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

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

Optional Level 2 (Postscript" compatible) module

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

Small and low-cost optional LocalTalk™ interface module

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

Bidirectional parallel interface

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

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

pri A multi-user, multi-emulation mode

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

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

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

EPL-5600

600 DPI

SUPER MICROART PRINTING

SelecType
Menu   Item   On Line

Tray Select   Paper Size   Manual

↑   Form Feed   Continue

Alt   ↓   Enter   Reset

Action Laser™ 1(

600 DPI

SUPER MICROART PRIN

SelecType
Menu   Item

Tray Select   Paper Size

↑   Form Feed

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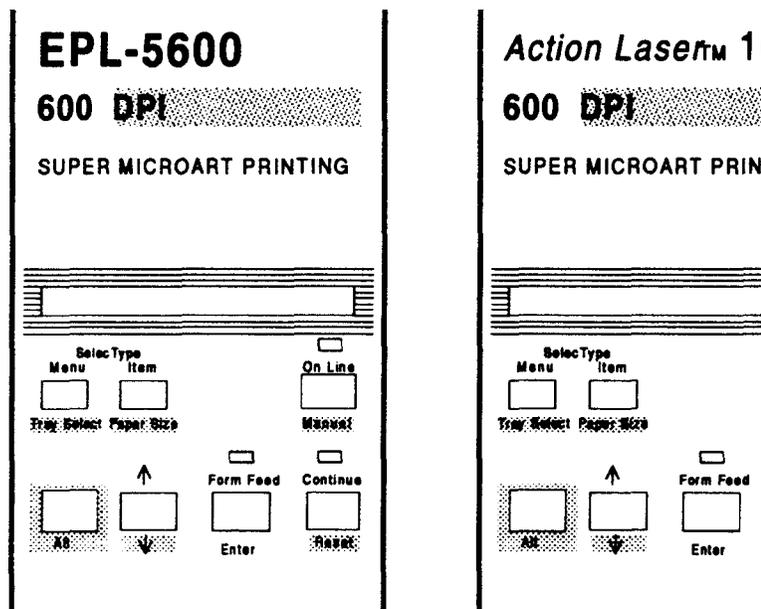
Figure 1-1. Exterior View of the EPL-5600 and 1-19. Contr 1600

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

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

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

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

1.2 SPECIFICATIONS

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

1.2.1 Basic Specifications

Printing method:	Laser beam seaming and dry electro-photography
Resolution:	600/300 dpi
Printing speed:	6 ppm (letter/A4)
First printing time (A4/LT):	Less than 19 seconds (facedown output) Less than 20 seconds (face-up output)
Warm-up time:	Less than 35 seconds (at rated current and 23° C (73° F) temperature)
Paper supply:	See Table 1-2.

Table 1-2. Paper Feed Methods

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

Notes:

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

2. Paper size range: width   3.63 to 8.5 inches (92 to 216 mm)
   length   5.85 to 14.0 inches (148.5 to 356 mm)

Paper types:	See Table 1-3.

Table 1-3. Paper Types

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

Usability of special papers: See Table 1-4.

Table 1-4. Usability of Special Papers

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

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

Paper feed alignment and direction: Center alignment for all sizes

Paper ejection: Face down; face up (optional)

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

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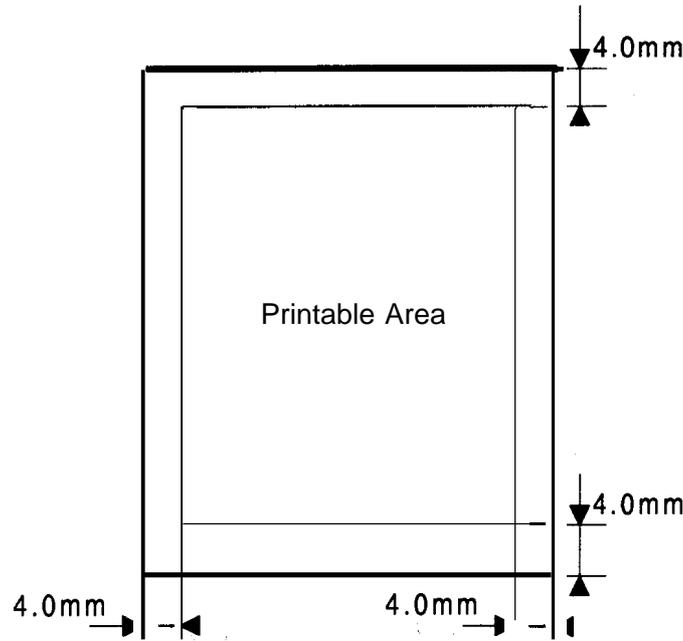
Figure 1-2. Printable Area

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

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

Ozone density: Less than 0.01 ppr^n

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

1.2.2 Electrical Specifications

Table 1-5. Electrical Specifications

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

1.2.3 Reliability Specifications

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

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

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

1.2.4 Environmental Conditions for Operating (Including Imaging Cartridge)

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

Humidity: 15 to 85% RH

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

Levelness: Printer should be installed on a level plane.

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

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

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

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

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

Drop test: Clear to JIS Z0200-1987 Level 1

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

Resistance to atmospheric pressure: More than 613 mb

Storage term: 24 months (following date of manufacture)

1.2.6 Applicable Standards

Safety Standards

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

Safety Regulations (Laser radiation)

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

EMI

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

Others

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

1.2.7 Specification for Consumable (Imaging Cartridge)

Life: 6,000 pages

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

Environmental Conditions for Storage and Transportation

Temperature: O to 30° C (32 to 86° F) over full storage term
                                        –20 to 40° C (-4 to 104″ F) under extreme conditions
                                        (Extremes are allowable for up to 1/30 of full storage term)
                                        Temperature variations must be 10° C (18° F)/hour or less.

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

Drop test: Height 76 cm (30.4 inches)
Vibration: Same as printer
Resistance to atmospheric pressure: More than 740 mb
Storage term: 18 months (following date of manufacture)

1.2.8 Physical Specifications

Dimensions (Width x Depth x Height):

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

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

1.2.9 Software Specifications

Built-in modes: HP LaserJet 4 emulation (PCL® Se)

EPSON GL/2 mode (LJ4-GL/2 mode and GL-like mode)

FX (FX-870/1170, LX-1OO) emulation mode

ESC/P 2 (LQ-570/1070) mode

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

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

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

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

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

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

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

Auxiliary software: Hex dump

Status sheet

Font sample

Built-in fonts: See Table 1-7

Table 1-7. Built-in Fonts

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

S: Supported, NS: Not Supported

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

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

S: Supported, NS: Not Supported

Font Symbol Sets

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

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

HP LaserJet4 Mode (scalable fonts): 34 symbol sets

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

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

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

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

FX Mode: 13 International characters and 9 code tables

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

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

1.3 INTERFACE SPECIFICATIONS

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

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

1.3.1 Parallel Interface

The parallel interface has two modes as follows:

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

1.3.1.1 Compatibility Mode of Parallel Interface

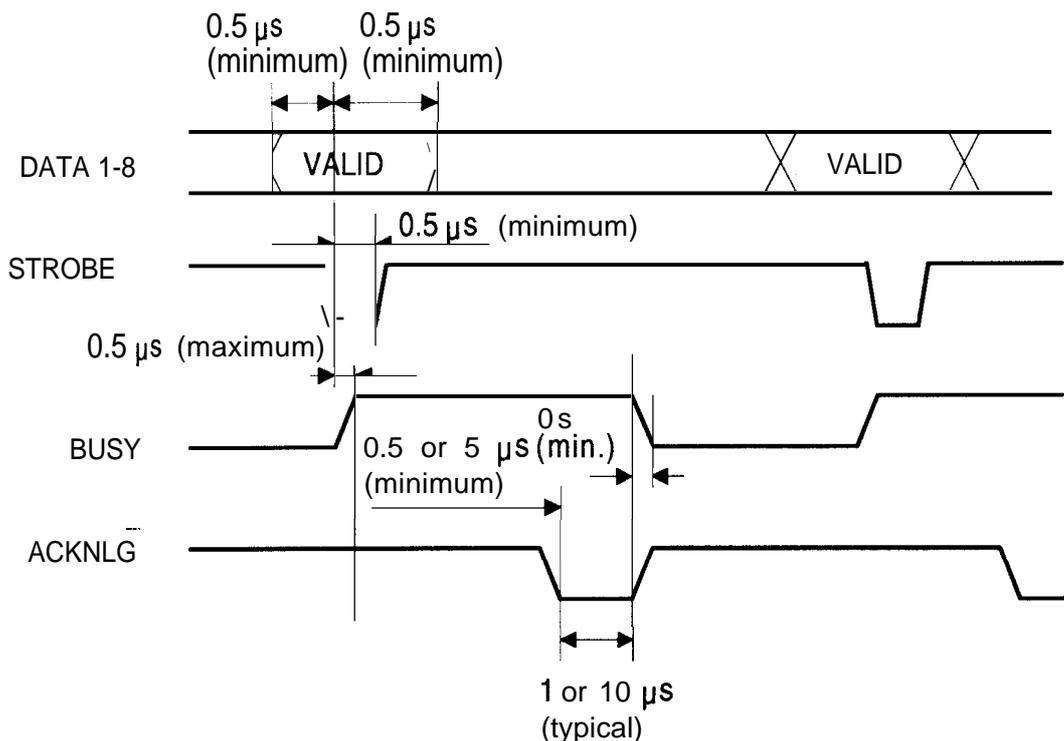|	
System:	$\overline{STROBE}$ synchronization, 8-bit parallel data transfer
Handshaking:	BUSY and $\overline{ACKNLG}$ signals
Connector type:	P90-25027-1 (Amphenol) receptacle
Applicable plug:	57-30360 (Amphenol or equivalent)
Transfer speed:	Approximately 400,000 bytes/second (max.)
Signal timing: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

Figure 1-3. Compatibility Mode Signal Timing

Table 1-8. Parallel Interface Pin Assignment

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

1.3.1.2 Reverse Mode

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

System: Nibble mode of IEEE-P1284

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

Applicable plug: 57-30360 (Amphenol or equivalent)

Signal description: See Table 1-9.

Table 1-9. Parallel Interface Pin Assignment

Pin No.	Signal Name	I/O	Description
1	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	ACKNLG	OUT	PtrClk: Printer data sending clock.
11	BUSY	OUT	PtrBusy: Printer sending data bits 3 and 7 during data transfer to host computer.
12	PE	OUT	AckDataReq: Printer sending data bits 2 and 6 during data transfer to host computer.
13	SLCT	OUT	Xflag: Printer sending data bits 1 and 5 during data transfer to host computer.
14	AUTO-FEED	IN	HostBusy: This signal informs the printer of the host computer state. When the signal is HIGH, the host computer cannot accept data.
15	NC	-	Not used.
16	GND	.	Logic ground level.
17	CHASSIS GND	-	Connected to the printer chassis. The printer chassis GND and the signal GND are connected to each other.
18	NC		Not connected.
19-30	GND		Ground level for the twisted pair return signal.
31	INIT	IN	nInit: High level fixed
32	ERROR	OUT	nDataAvail: Printer sending data bits O and 4 during data transfer to host computer.
33	GND		Same as for pins19 to 30.
.34	NC	.	Not used.
35	+5		Pulled up to +5V through 1.0 Kohm resistance.
36	SLCT IN	IN	1284Active: If this signal is set to HIGH, this printer active P1 284 (reverse mode).

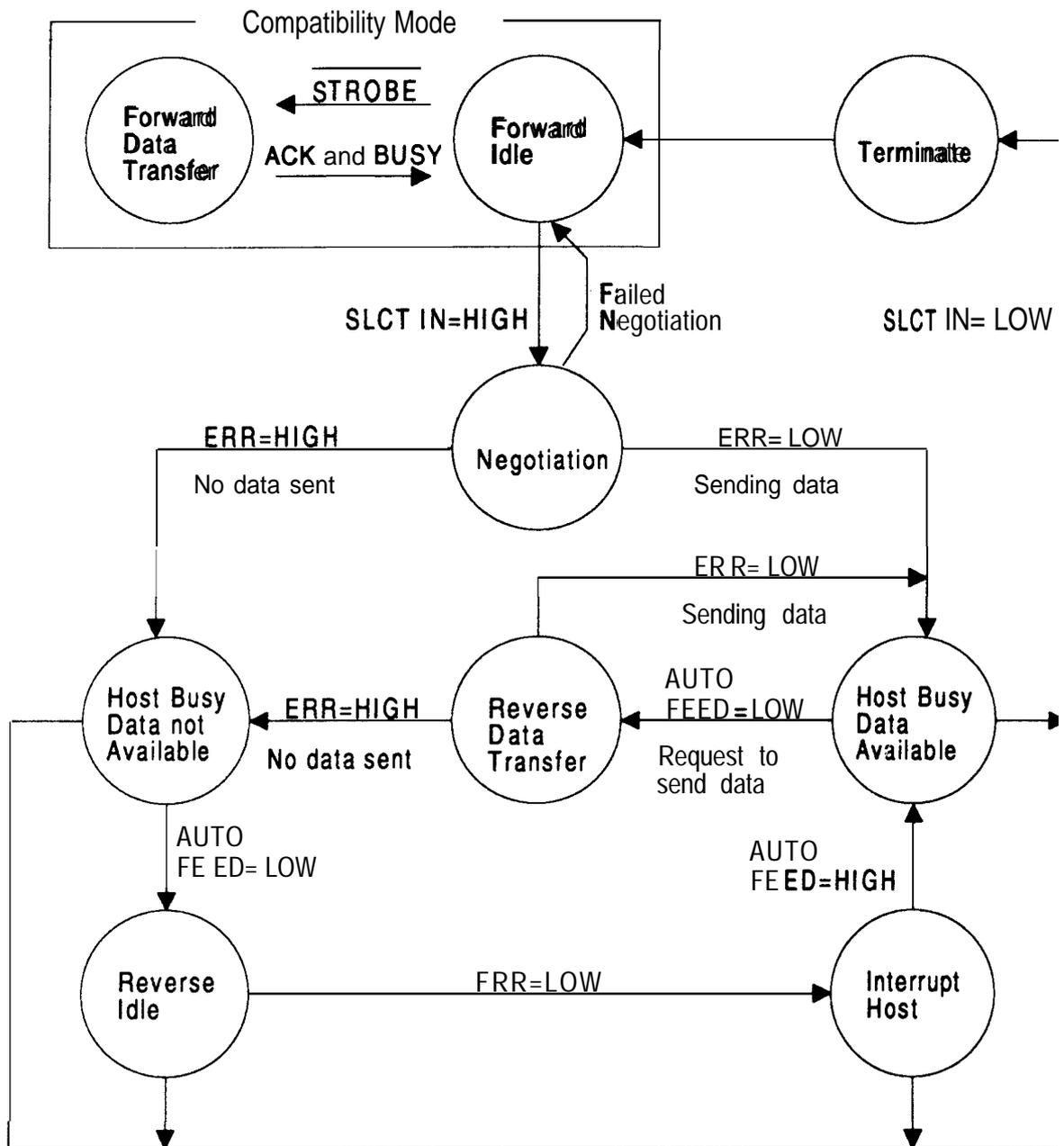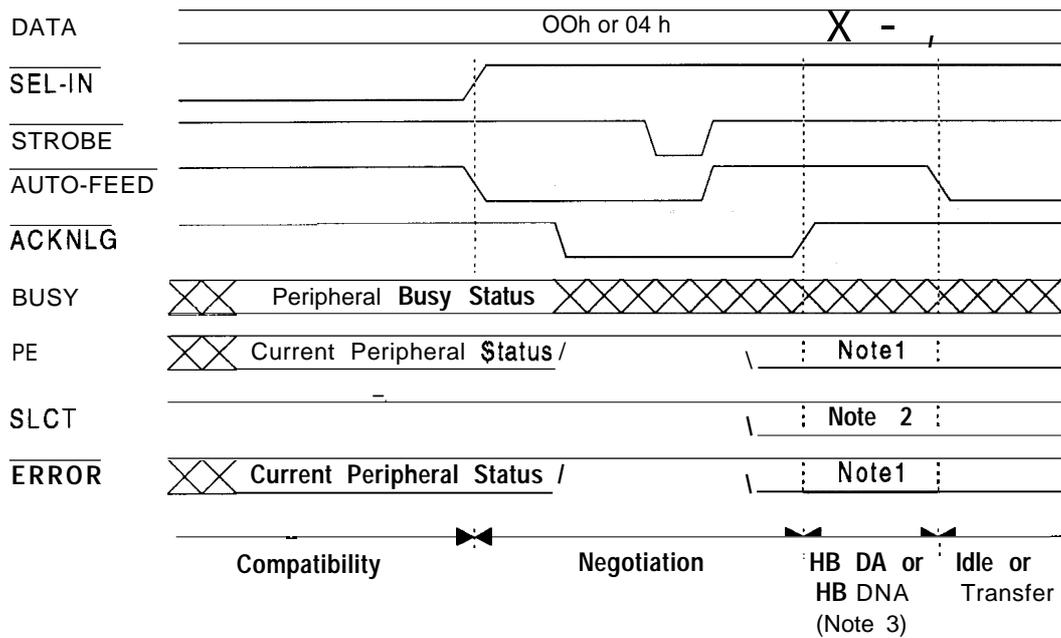Figure 1-4 shows the parallel interface state switch diagram.

Figure 1-4. Parallel Interface State Switch Diagram

Figure 1-5 shows the timing chart of negotiation.

Figure 1-5. Timing Chart of Negotiation

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

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

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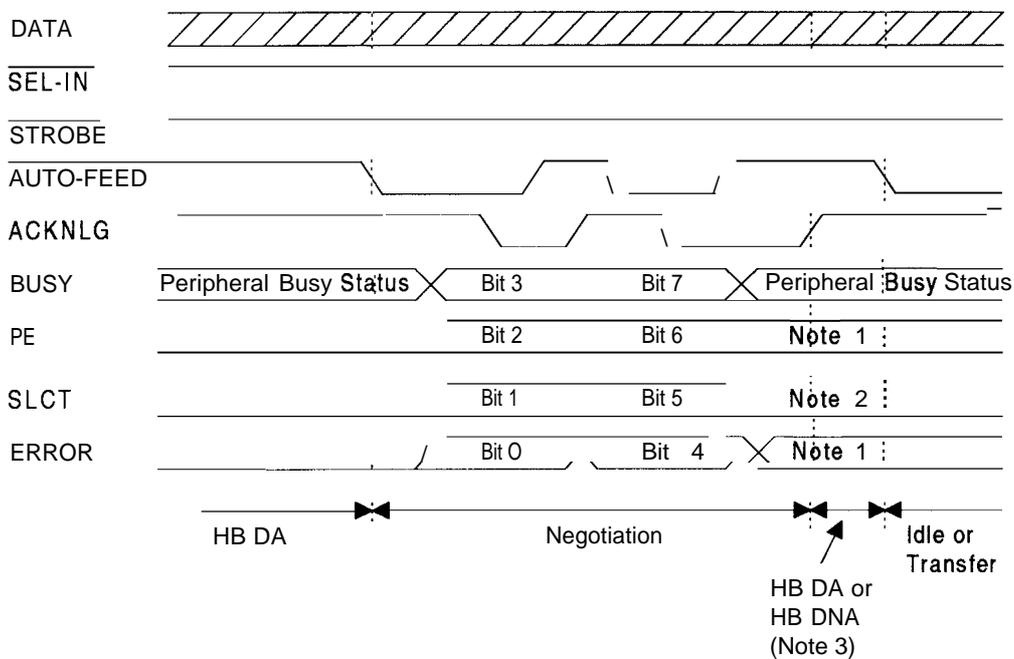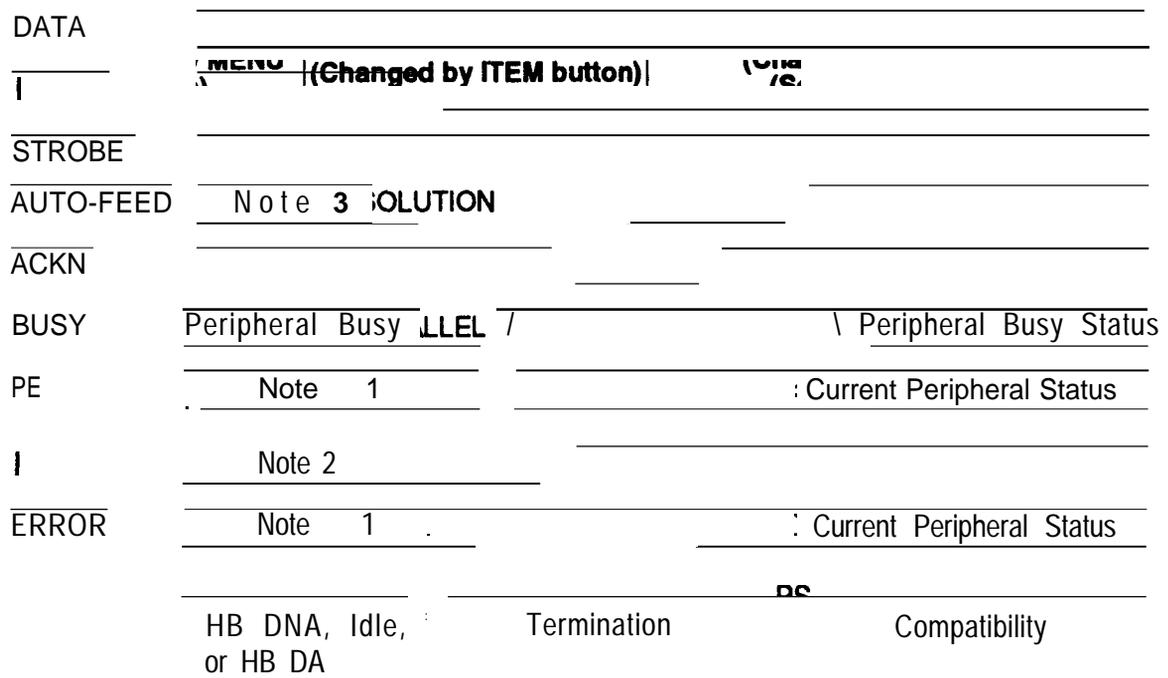HB DNA: Host Busy Data Not Available

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

Figure 1-6. Timing Chart of Data Transfer

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

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

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

Figure 1-7 shows the timing chart of termination.

DATA

STROBE

AUTO-FEED   N o t e **3** ;OLUTION

ACKN

BUSY   Peripheral Busy LLEL /   \ Peripheral Busy Status

PE   Note   1   : Current Peripheral Status

I   Note 2

ERROR   Note   1   : Current Peripheral Status

HB DNA, Idle,   Termination   Compatibility
or HB DA

Figure 1-7.   Chart of Termination

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

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

Note 3:   Idle = LOW

Figure 1-8 shows the timing chart of interrupt.

DATA

I

STROBE

AUTO-FEED | LEFT OFFSET | 0 to 99

ACKNLG | TONER | E·····F, E···· F, E··· F, E·· F, E· F,

BUSY   PAGE COUN   Peripheral Busy Status

PE

I ʀAι   **Note   1**

ERROR

Reverse   Idle   Interrupt   HB   Transfer
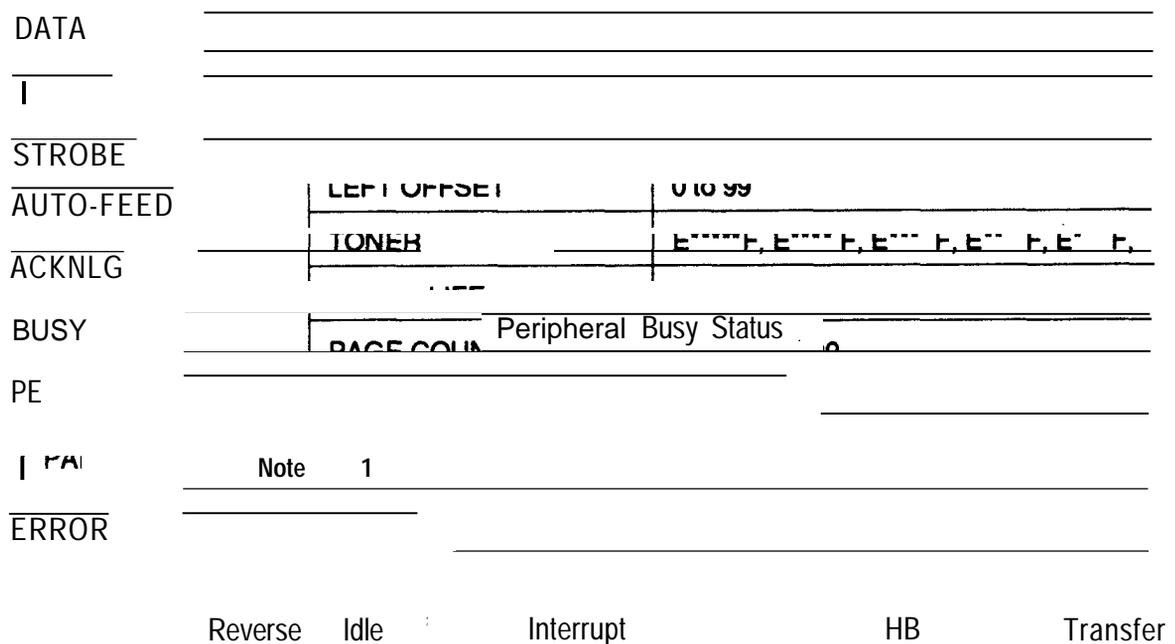
Figure 1-8. Timing Chart of Interrupt

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

1.3.2 Serial Interface

Type:	RS-232C / RS-422
Transfer system:	Full duplex
Synchronization:	Asynchronous start-stop system

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

Protocol:	X-ON/X-OFF (can be combined with DTR control)
	DTR control (can be combined with X-ON/X-OFF)
Transfer speed:	300,600,1200,2400,4800, 9600,19200, 38400, or 57600 bps

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

Signal description:	See Table 1-10.

Table 1-10. Serial Interface Pin Assignments

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

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

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

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

Note 4: SD+, SD-:

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

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

Handshaking

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

Protocol

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

■ DTR/DSR protocol

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

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

■ X-ON/X-OFF (DC1/DC3) protocol

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

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

1.3.3 Optional LocalTalk Interface

This printer can use the optional LocalTalk interface module.

Type:	LocalTalk
Signal level:	Same as 179422 signal level
Protocol:	X-ON/X-OFF (cannot be combined with DTR control)
	DTR control (cannot be combined with X-ON/X-OFF)
Transfer speed:	230.4 K bps
Signal description:	See Table 1-11.

Table 1-11. LocalTalk Interface Pin Assignments

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