EPSON TERMINAL PRINTER

DLQ-3000

SERVICE MANUAL

EPSON

4003444
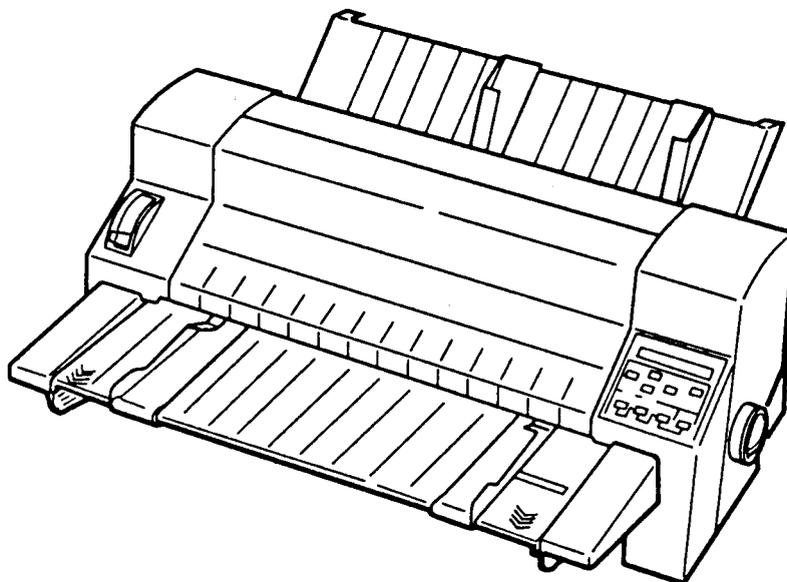
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PRECAUTIONS

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

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

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

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

DANGER

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

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 VOLT- AGE, 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.

PREFACE

This manual describes functions, theory of electrical and mechanical operations, maintenance, and repair of DLQ-3000.
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. PRODUCT 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. ADJUSTMENT

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	June 1,1994	1st issue
REV.B	November 22,1994	2nd issue

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CHAPTER 1 Product Description

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1.1 FEATURES

The DLQ-3000 is 24-pin serial dot-matrix and flat-bed type impact printer. The main features are:

❏ Optional color printing using the optional color ribbon (black, magenta, cyan, yellow).

❏ Use of ESC/P2 control codes

❏ Printing speed
   10 cpi LQ character: 120 cps
   10 cpi draft: 360 cps
   10 cpi High speed draft: 444 cps

❏ Copy capacity
   Up to 5 copies plus an original can be printed.

❏ High speed loading
   1.5 second to load a sheet from cut sheet feeder.

❏ No DIP-switches to set

❏ 14 international and legal character sets.

❏ 8 character tables (standard model)
   14 character tables (consolidated model)

❏ 4 scalable fonts, 9 bitmap LQ fonts and 2 draft fonts.

Figure 1-1 shows an exterior view of the DLQ-3000 and Table 1-1 lists the optional units available for the DLQ-3000.
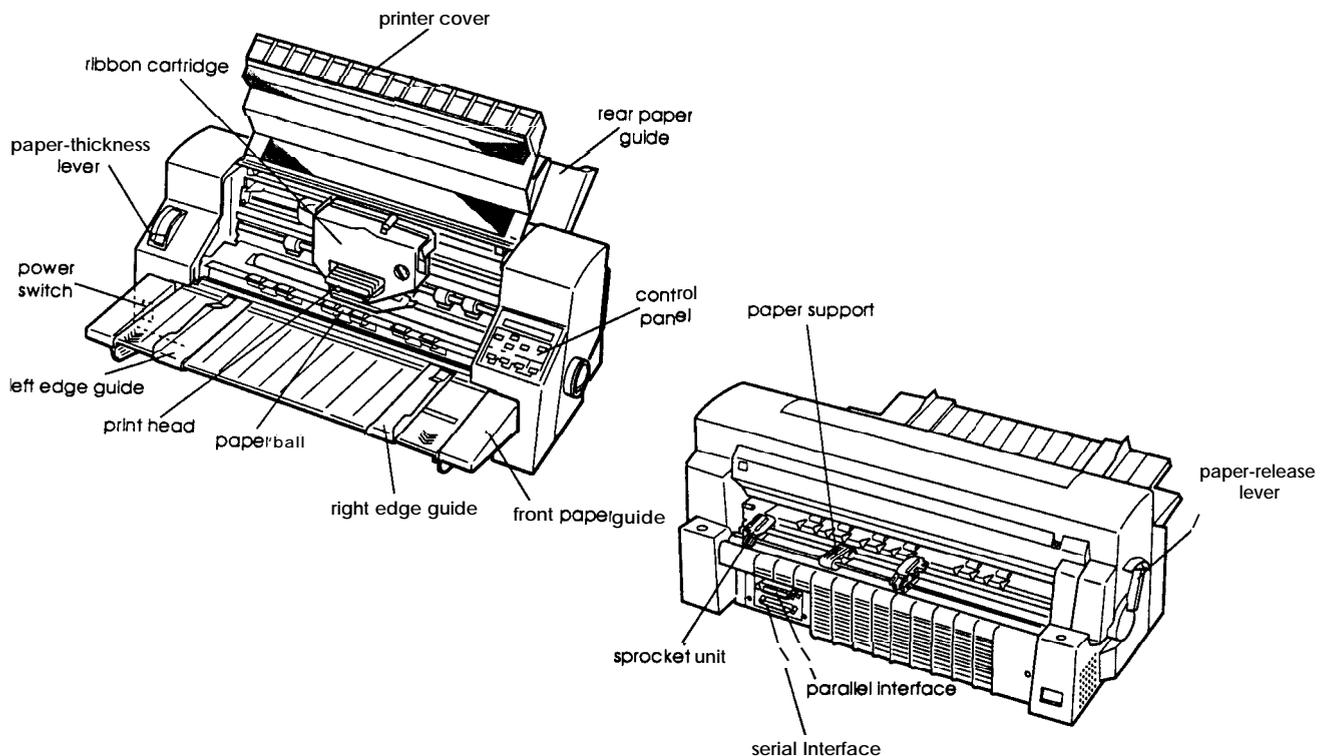
Figure 1-1. Exterior View of the DLQ-3000

Table 1-1. Optional Units

Model	Description
C80630*	Cut Sheet Feeder
S01 5066	Ribbon Cartridge (Black)
S015067	Ribbon Cartridge (Color)
S015068	Film Ribbon Cartridge (Black)

*: The last digit vanes by country.

1.2 SPECIFICATIONS

This section provides detailed information about the DLQ-3000.

1.2.1 Hardware Specifications

Printing method: Serial impact dot matrix
Pin configuration: 24 wires
Pin diameter: 0.0079 inch (0.2 mm)
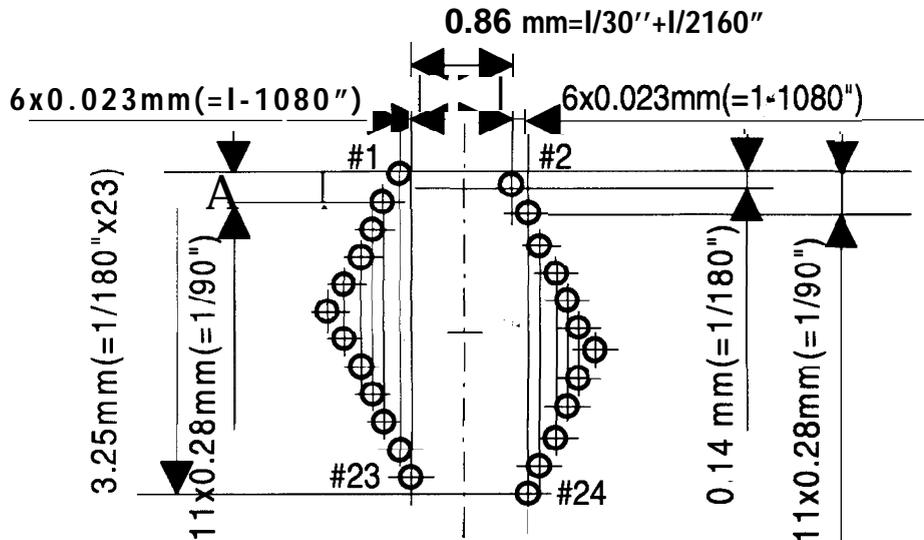
Figure 1-2. Pin Configuration

Print direction
   Text: Bidirectional with logic seeking
           Uni-directional mode can be selected by software.
   Image: Bidirectional with logic seeking
           Uni-directional mode can be selected by software and default
           setting.

1.2.1.1 Paper Handling Specifications

Feeding system: 1. Friction feed
              - Set the release lever to FRICTION.
                During envelope printing, set it horizontally the longer side.
                During No.6 envelope printing, the left sheet edge guide must
                beat the marked position.
             2. Tractor feed
              - Set the release lever to TRACTOR.
                Do not perform reverse line feeds greater than 1/6 inch.
              - Set left and right sheet edge guides on the front paper guide at
                both ends.

Feeding pitch: 1/360 inch (1/6 inch, 1/8 inch, or programmable in units as small as
             1/360 inch)

Feeding speed
1/6 inch line feed: 42 ms
   Continuous feed: 6 inches/see.

Paper path
   Cut sheet (Single):   Front and rear entry manual insertion, and optional CSF.
   Cut sheet (Multi part):   Rear entry manual insertion, and optional CSF.
   Continuous paper: Rear entry push tractor feed with paper parking function.

The paper thickness lever must be set at the proper position as shown below.

Table 1-2. Paper Thickness Lever

Lever Position	Paper Thickness
0	0.06 mm -0.11 mm (0.0024 in. -0.0043 in.)
1	0.11 mm -0.15 mm (0.0043 in. -0.0059 in.)
2	0.15 mm -0.19 mm (0.0059 in. -0.0075 in.)
3	0.19 mm -0.25 mm (0.0075 in. - (0.0098 in.)
4	0.25 mm -0.31 mm (0.0098 in. -0.0122 in.)
5	0.31 mm -0.37 mm (0.0122 in. -0.0146 in.)
6	0.37 mm -0.42 mm (0.0146 in. -0.0165 in.)
7	0.42 mm -0.47 mm (0.0165 in. -0.0185 in.)
8	0.47 mm -0.51 mm (0.0185 in. -0.0201 in.)
9	0.51 mm -0.55 mm (0.0201 in. -0.0217 in.)

1.2.1.2 Paper Specifications

Table 1-3. Cut Sheet Paper (Single Sheet) Specifications

Width	92 mm -364 mm [3.6 in. -14.3 in.]
Length	92 mm -364 mm [3.6 in. -14.3 in.]
Thickness	0.065 mm -0.12 mm [0.0025 in. -0.0047 in.]
Weight	52.3 g/m^2 - 105 g/m^2 [14 lb. -27 lb.]
Quality	Standard and recycled paper (not curled, folded, or crumpled)

Table 1-4. Cut Sheet Paper (Multi-part) Specifications

Width	92 mm -364 mm [3.6 in. -14.3 in.]
Length	92 mm -364 mm [3.6 in. -14.3 in.]
Copies	1 original+ 5 copies (using fabric ribbon) 1 original only (using film ribbon)
Total thickness	0.12 mm -0.46 mm [0.0047 in. -0.018 in.]
Weight	40 g/m^2 -58 g/m^2 [12 lb. -15 lb.]
Quality	Carbonless multi-part paper (not curled, folded, or crumpled)

Table 1-5. Envelope Specifications

Size	NO.6 width 165 mm x length 92 mm [6.5 in. x 3.6 in.] No.1O width 241 mm x length 105 mm [9.5 in. x 4.1 in.]
Thickness	0.16 mm – 0.52 mm [0.0063 in. - 0.020 in.]
Weight	45 g/m^2 -91 g/m^2 [12 lb. -24 lb.]
Quality	Plain paper, bond paper, airmail paper (not curled, folded, or crumpled and no glue at flaps)

Notes: . Variations in envelope thickness must be less than 0.25 mm **(0.0098”).**
. When inserting envelopes, keep the longer side horizontal.

Table 1-6. Continuous Paper (Single Sheet and Multi-part) Specifications

Width	101-406 mm [4 - 16 in.]
Single sheet length	101- 559 mm [4 - 22 in.]
Copies	1 original+ 5 copies (using fabric ribbon) 1 original only (using film ribbon)
Total thickness	0.065 mm - 0.46 mm [0.0025 in. - 0.018 in.]
Single sheet weights	52.3 g/m^2 - 105 g/m^2 [14 lb. - 27 lb.]
Multi-part weights	40 g/m^2 - 58 g/m^2 [12 lb. - 15 lb.]
Quality	Standard paper, recycled paper, carbonless multi-pad paper

Table 1-7. Continuous Paper with Labels Specifications

Label size (W x L)	63.5 mm (min.) x 23.8 mm (min.) [2.5 in. (min.) x 15/16 in. (min.)]
Width of base paper	101 mm- 406 mm [4 in. x 16 in.]
Length of base paper	101 mm - 559 mm [4 in. x 22 in.]
Thickness of base paper	0.07 mm - 0.09 mm [0.0028 in. - 0.0035 in.]
Total thickness	0.16 mm - 0.19 mm [0.0063 in. - 0.0075 in.]
Weight	68g/m2[17 lb.]
Quality	Plain paper

Notes: • *Labels must be continuous paper.*
• *Examples of labels   - AVERY CONTINUOUS FORM LABELS*
- AVERY MINI-LINE LABELS

Printable area: See Figures 1-3 and 1-4.
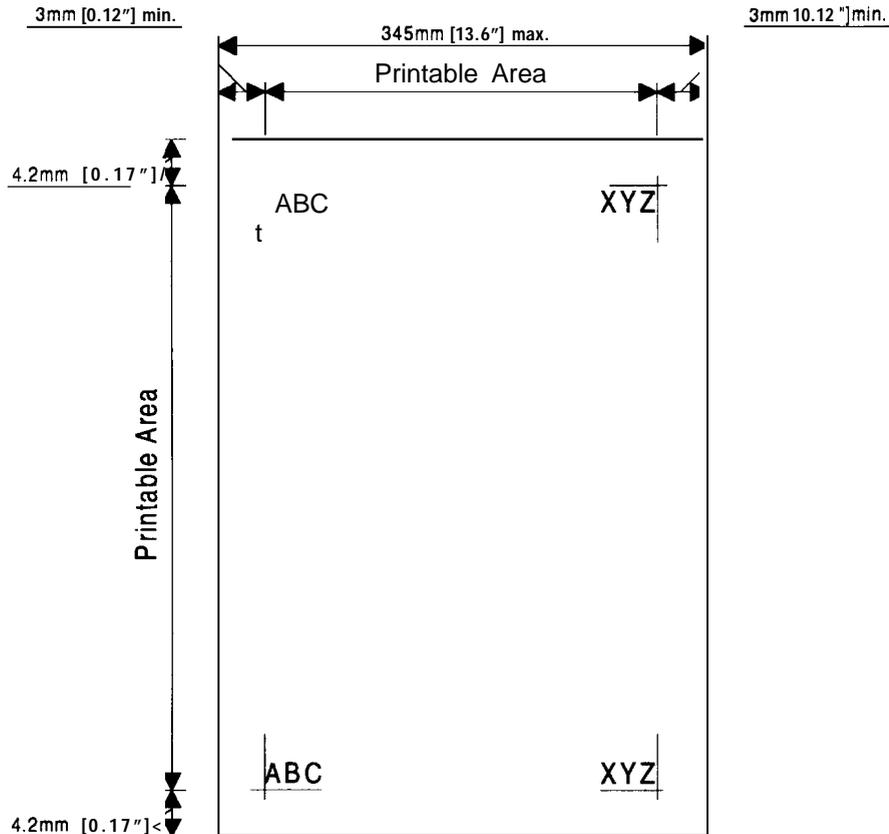
Figure 1-3. Printable Area for Cut Sheet
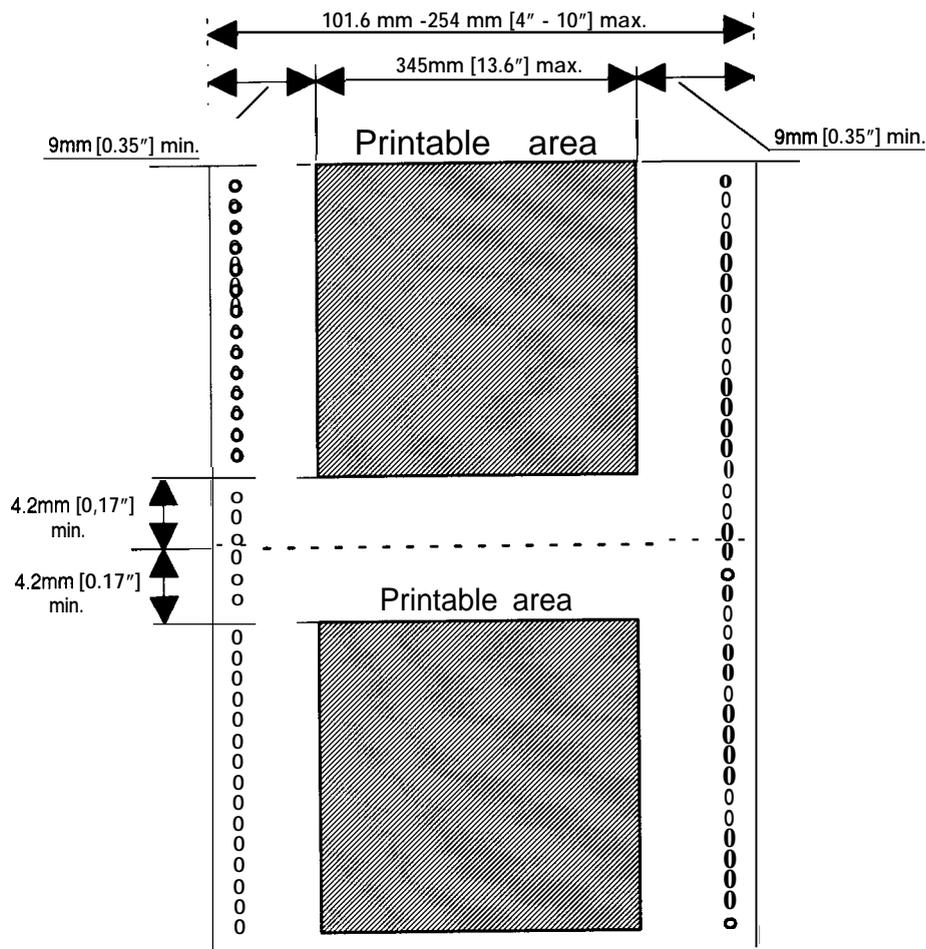
Figure 1-4. Printable Area for Continuous Paper

1.2.1.3 Ribbon Cartridge Specifications

● Ribbon cartridge (black): No. S015066

- Life: 6 million characters at 48 dots/1 character

- Cartridge dimensions: 153 mm (W) x 105 mm (D) x 33 mm (H) (6.0 in. x 4.1 in. x 1.3 in.)

- Cartridge weight: 117 g (0.26 lb.)

Note: *Ribbon cartridges are not reusable.*

● Ribbon cartridge (color): No. S015067

- Life: Black: 1.4 million characters at 48 dots/character
                           Cyan: 1.0 million characters at 48 dots/character
                           Magenta: 1.0 million characters at 48 dots/character
                           Yellow: 0.7 million characters at 48 dots/character

- Cartridge dimensions: 153 mm (W) x 105 mm (D) x 33 mm (H) (6.0 in. x 4.1 in. x 1.3 in.)

- Cartridge weight: 117 g (0.26 lb.)

Note: *Ribbon cartridges are not reusable.*

● Film ribbon cartridge (black): No. S015068

- Life: 0.1 million 10 cpi characters at LQ mode

- Cartridge dimensions: 153 mm (W) x 119 mm (D) x 33 mm (H) (6.0 in. x 4.7 in. x 1.3 in.)

- Cartridge weight: 109 g (0.24 lb.)

1.2.1.4 Electrical Specifications

Table 1-8. Electrical Specifications

Description	120 V Version	230 V Version
Rated voltage	120 VAC	220-240 VAC
Input voltage range	103.5-132 VAC	198-264 VAC
Rated frequency range	50- 60 Hz	
Input frequency range	49.5- 60.5 Hz	
Rated current	7A	4A
Power consumption	Approx. 105W (self-test in 10 cpi draft)	
Dielectric strength	1000 VAC rms for 1 minute or 1200 VAC rms for 1 second (between AC line and chassis)	1500 VAC rms for 1 minute (between AC line and chassis, 500 VDC)

1.2.1.5 Environmental Conditions

Operating
- **Temperature:**   **5to35'C (41 to 95 "F)**
- **Humidity:**   **10 to** 80% RH without condensation

Operating (using the optional film ribbon)
- Temperature: 15to35'C (59 to 95 'F)
- Humidity: 10 to 80% RH without condensation

Operating (during printing of envelopes or labels)
- Temperature: 15to25"C (59 to 77 "F)
- Humidity: 20 to 60% RH without condensation

Storage
- Temperature: -20 to60'C (-4 to 140 'F)
- Humidity: 5 to 85% RH without condensation

Storage (when the optional film ribbon is installed)
- Temperature: -20 to40'C (-4 to 104 'F)
- Humidity: 5 to 85% RH without condensation

1.2.1.6 Reliability

MTBF: 8000 Power On Hours (25% duty)

Printhead life: 200 million strokes/wire

1.2.1.7 Safety Approvals

Safety standards: U.S version: UL1950 with D3, CSA22.2 #950 with D3
                         European version: EN 60950 (TÜV)
                                             IEC950 (SEMKO, DEMKO, NEMKO, SETI)

RFI: U.S. version: FCC part 15 subpart B class B
                         European version: Vfg.243 (VDE0878 part 3, part 30)
                                             EN55022 (CISPR PUB. 22) class B

1.2.1.8 Physical Specifications

Dimensions (W x D x H):   670 mm x 509 mm x 285 mm (26.4 in. x 20.0 in. x 11.2 in.)
Weight: 15.0 Kg (33.1 lb.)

Dimensions (W x D x H):   670 mm x 559 mm x 445 mm (26.3 in. x 22.0 in. x 17.5 in.)
(Including CSF)
Weight: 16.8 Kg (37.0 lb.)

1.2.2 Firmware Specifications

Control code:	ESC/P2
Character sets:	Legal and 14 international character sets

Standard model:
Italic table
PC437 (Us.)
PC850 (Multilingual)
PC860 (Portuguese)
PC863 (Canadian-French)
PC865 (Nordic)
BRASCII (Brazilian Portuguese)
Abicomp (Brazilian Portuguese)

Consolidated model:
PC437 Greek (Greek)
PC852 (East Europe)
PC853 (Turkish)
PC855 (Cyrillic)
PC857 (Turkish)
PC866 (Russian)
PC869 (Greek)
PC861 (Iceland)
ISO Latin IT (Turkish)
ISO 8859-7 (Latin/Greek)
MAZOWIA (Polish)
Code MJK (Czech)
Bulgaria (Bulgarian)
PC864 (Arabic)

Bitmap fonts:
EPSON Roman
EPSON Sans serif
EPSON Courier
EPSON Prestige
EPSON Script
EPSON Script C
EPSON OCR B
EPSON Orator
EPSON Orator S
EPSON Draft
EPSON High Speed Draft

Scalable fonts:
EPSON Roman   8-32 points (in units of *2* points)
EPSON Serif   8-32 points (in units of 2 points)
EPSON Roman T   8-32 points (in units of *2* points)
EPSON Saris Serif H 8-32 points (in units of 2 points)

Print mode:
Double-width
Double-height
Condensed
Bold
Double-strike
Underline (single, double, single-broken, double-broken line)
Overscore (single, double, single-broken, double-broken line)
Strike through (single, double, single-broken, double-broken line)
Italics
Super/subscript
Outline
Shadow

Resolution:	See Table 1-9.
Printing speed:	See Table 1-10.
Printable columns:	See Table 1-10.
Input data buffer:	128K byte

Table 1-9. Resolution

Printing Mode	Horizontal Density	Vertical Density	Adjacent Dot Print
High speed draft	90 dpi	180 dpi	No
Draft	120 dpi	180 dpi	No
Draft condensed	240 dpi	180 dpi	No
LQ	360 dpi	180 dpi	No
8-pin bit image	60,80,90 or 120 dpi	60 dpi	Yes
	120 or 240 dpi	60 dpi	No
24-pin bit image	60,90,120 or 180 dpi	180 dpi	Yes
	360 dpi	180 dpi	No
Raster graphics	180 or 360 dpi	180 or 360 dpi (*)	Yes

*   When a color ribbon is installed, the printer cannot print 360 dpi vertically for raster graphics. In this case, the printer changes the vertical density.

Table 1-10. Printing Speed

Print Mode	Character Size	Maximum Printing Spsed (cps)								
		Mode 0	Mode 1	Mode 2	Mode 3	Mode 4	Mode 5	Mode 6	Mode 7	Mode 8
High speed draft	10 cpi	444	444	160	160	240	120	80	80	60
Draft	10 cpi	360	333	240	120	180	120	80	80	60
	12 cpi	432	400	288	144	216	144	96	96	72
	15 cpi	540	500	360	180	270	180	120	120	90
Draft cond-ensed	17 cpi	308	285	205	103	154	205	137	137	103
	20 cpi	360	333	240	120	180	240	160	160	120
LQ	10 cpi	120	111	80	40	60	120	80	40	60
	12 cpi	144	133	96	48	72	144	96	48	72
	15 cpi	180	167	120	60	90	180	120	60	90
LQ condensed	17 cpi	205	190	137	68	103	205	137	68	103
	20 cpi	240	222	160	80	120	240	160	80	120
Raster (360dpi)	10 cpi	20	20	20	20	20	20	20	20	20

These modes are selected by several conditions as follows flowchart;
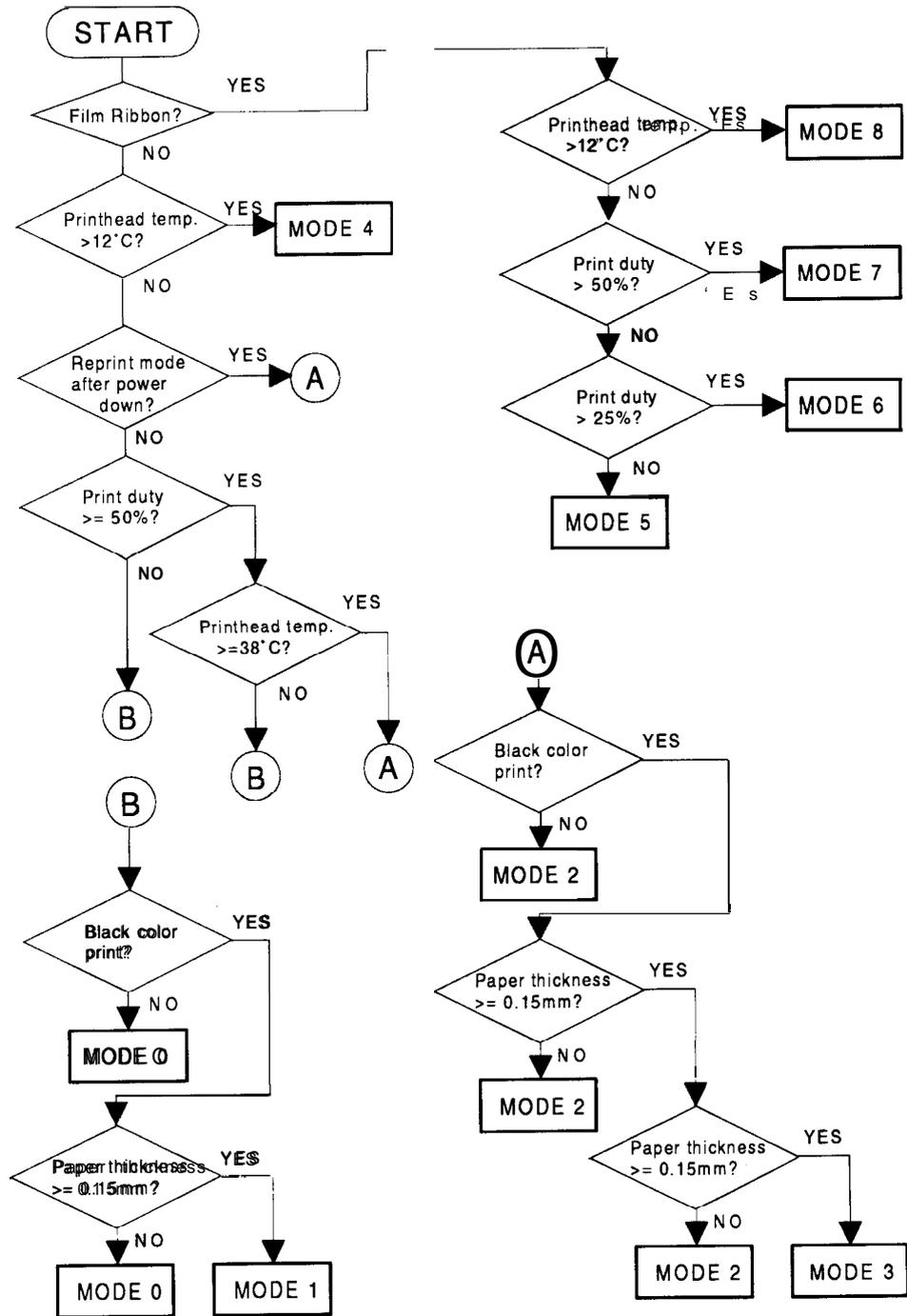
1.3 INTERFACE OVERVIEW

The printer provides an 8-bit parallel interface and serial interface as standard. Moreover, it is possible to interface to various computers using the optional type-B interface board. This section describes the specifications of the standard interfaces.

1.3.1 Parallel Interface Specifications

Data format: 8-bit parallel, IEEE-1284 compatibility mode
Synchronization: By $\overline{\text{STROBE}}$ pulse
Handshaking: By BUSY and $\overline{\text{ACKNLG}}$ signal
Signal level: TTL-compatible level, IEEE-P1284 level 1 device
Adaptable connector: 57-30360 (Amphenol) or equivalent
Data transmission timing: See Figure 1-5.
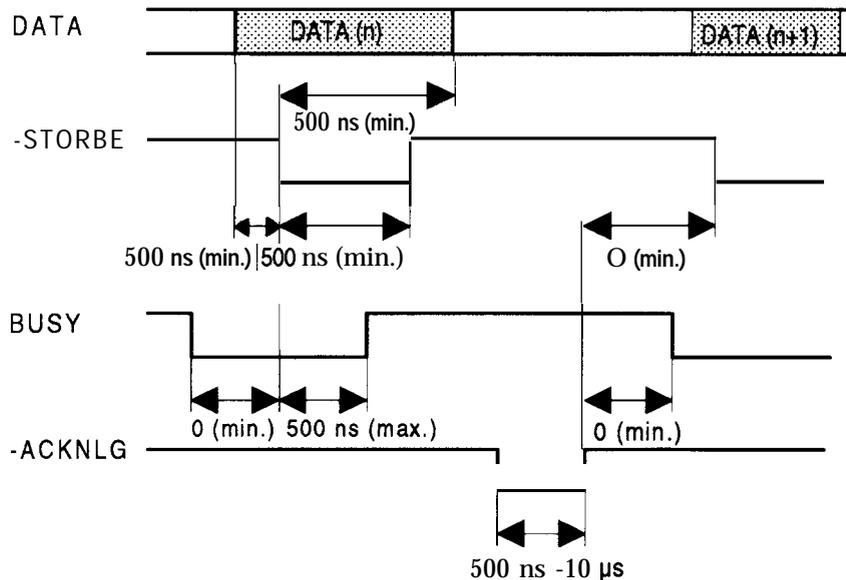
Figure 1-5. Data Transmission Timing

Note: Transition time (rise time and fall time) of every input signal must be less than 200 ns and every output signal must be less than 120ns.

The BUSY signal is at a HIGH level before either -ERROR signal is at a LOW level or the PE signal is at a HIGH level until all these signals return to their inactive state. The BUSY signal is at a HIGH level in the following cases:

> During data reception (see the figure above)
> When the input buffer is full
> When the $\overline{\text{INIT}}$ input signal is active
> During initialization
> When the ERROR signal is active
> In the self-test mode
> In the SelecType
> When the parallel interface is not selected.

The $\overline{\text{ERROR}}$ signal is at a LOW level when the printer is in one of the following conditions:

> Printer hardware error (fatal error)
> A paper-out error
> Release lever operation error

PE signal is at a HIGH level during paper out error.

Table 1-11 shows the connector pin assignments and signal functions for the 8-bit parallel interface.

Table 1-11. Signal and Connector Pin Assignments for Parallel Interface

Pin No.	**Signal** Name	**Return GND Pin**	I O	Description
1	$\overline{\text{STROBE}}$	19	In	Strobe pulse. Input data is latched at the falling edge of this signal.
2-9	DATA1-8	20-27	In	Parallel input data to the printer. Active-HIGH input. LSB: DATA1 MSB: DATA8
10	$\overline{\text{ACKNLG}}$	28	Out	Indicates that data has been received and the printer is ready to accept more data.
11	BUSY	29	Out	A HIGH level means the printer cannot accept further data.
12	PE	30	Out	A HIGH level means a paper-out error. Always the logical opposite of the ERROR signal.
13	SLCT		Out	Always at a HIGH level (pulled up to +5 V through a 1 K-ohm resistor).
14	$\overline{\text{AFXT}}$		In	Auto feed execution means that a line feed is automatically performed upon input of a CR code. Checked when the printer is initialized. Active-LOW signal.
31	INIT	16	In	Initialize printer. Minimum 50 µs pulse is necessary. Active-LOW signal.
32	$\overline{\text{ERROR}}$		out	A LOW level means that an error has occurred.
36	SLIN	30	In	Not used.
18,35	Logic H		out	Pulled up to +5V and shorted to +5V via Schottky diode, making these signals appear low to the host when the printer is turned off.
17	Chassis GND	-	-	Chassis GND
16,19-30, 33	GND			Signal GND
15,34	NC			Not used. Not connected.

Note: /n/Out refers to the direction of signal flow as viewed from the printer.

1.3.2 Serial Interface Specifications

Data format: RS-232C serial

Synchronization: Asynchronous

Handshaking   By DTR (REV) signal or X-ON/OFF protocol

Table 1-12. Serial Interface Handshaking

DTR Signal	X-ON/X-OFF Protocol	Description
MARK	X-OFF (DC3/13H)	When the number of bytes remaining in the input buffer reaches 256 or less, the signal level goes to MARK and X-OFF code is sent to the host computer. This indicates that the printer is not ready to receive data.
SPACE	X-ON (DC1/1 IH)	When the number of bytes remaining in the input buffer reaches 512 or less, the signal level goes to SPACE and X-ON code is sent to the host computer. This indicates that the printer is ready to receive data.
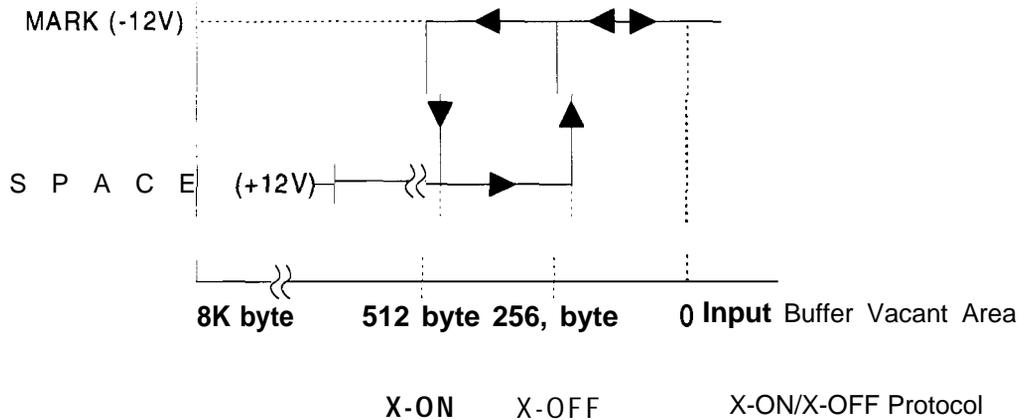
Figure 1-6. Handshaking for RS-232C Interface

Word length
    Start bit: 1 bit
    Data bit: 8 bits
    Parity bit: Odd, Even, or None
    Stop bit: 1 bit or more

Bit rate: **300,** 600, 1200, 2400, 4800, 9600, 19,200 bps

Logic level: EIA-232D   MARK (logical 1): -3V to -25V
                                            SPACE (logical 1): +3V to +25V

Error handling: When parity error is detected, the received byte is changed to the "*" character cede. Overrun error and framing error are ignored.

Connector: 25 pin subminiature D-shell connector (female) or equivalent

Data transmission timing: See Figure 1-7.
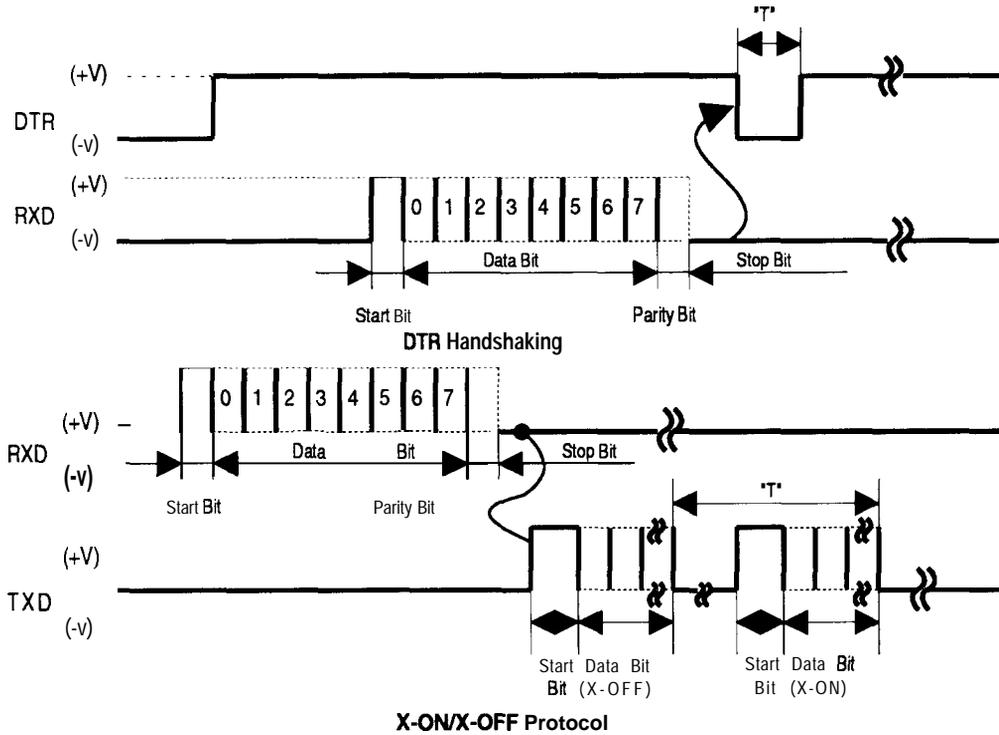
Figure 1-7. Serial Data Transmission Timing

Notes: The value of "T" varies according to the input data.
The word structure of serial data is 1 start bit + 8 data bits + parity (Odd, Even, or none) +
1 or more stop bits.

Table 1-13 shows the connector pin assignments and signal functions for the RS-232C serial interface.

Table 1-13. Signal and Connector Pin Assignments for Serial Interface

Pin No.	Signal Name	I/O	Description
2	TXD	out	Transmit data.
20	DTR	Out	Indicates that the printer is ready to receive data or not.
11	REV	out	Connected directly to the DTR signal.
3	RXD	In	Receive data.
7	SIGNAL GND	-	Signal ground level.
1	CHASSIS GND	-	Chassis GND.
Other	NC		Not used. Not connected.

Note: /n/Out refers to the direction of signal flow as viewed from the printer.

1.3.3 Optional Interface

Type-B and Type level 2 optional interfaces are available except for C82305 and C82306 serial interface.

1.3.4 Interface Selection

The printer has 3 interfaces; the parallel interface, serial interface and optional interface. These interfaces are selected manually by SelecType or selected automatically.

● Manual selection

One of 3 interfaces can be selected by SelecType.

● Automatic selection

The automatic interface selection is enabled by SelecType. In this automatic interface selection mode, the printer is initialized to the idle state scanning in which interface receives data when it is powered on. The interface that receives data first is selected. When the host stops data transfer, the printer is returned to idle state. As long as the host sends data to the printer interface is busy state, the selected interface is let as it is.

● Interface state and interface selection

When the parallel interface is not selected, the interface is in a BUSY state. When the serial interface is not selected, the interface sends XOFF and sets the DTR signal MARK. When the optional interface is not selected, the printer sends disable commands to the optional interface. When the printer is initialized or returned to the idle state, the parallel interface is in a READY state, the serial interface sends XON and sets the DTR SPACE and the printer sends enable commands to the optional interface. Notice that the interrupt signal such as a -INIT signal on the parallel interface is not effective while that interface is not selected.

1.3.5 Prevention Host from Data Transfer Timeout

Hosts abandons data transfer to peripherals when a peripheral is in BUSY state for dozens of seconds continuously. To prevent hosts from this kind of timeout, the printer receives data very slowly, several bytes per minute, even if the printer is in BUSY state. This slowdown is started when the rest of the input buffer becomes several hundreds of bytes. At last, when the input buffer is full, the printer is continuously in BUSY state.

1.4 OPERATING INSTRUCTIONS

This section describes the control panel operation functions, self-test, hexadecimal dump, and printer initialization methods, etc.

1.4.1 Control Panel Operation

On the control panel, there are five non-locking switches, four LEDs, and a 16-column liquid crystal display (LCD) as shown in Figure 1-8.
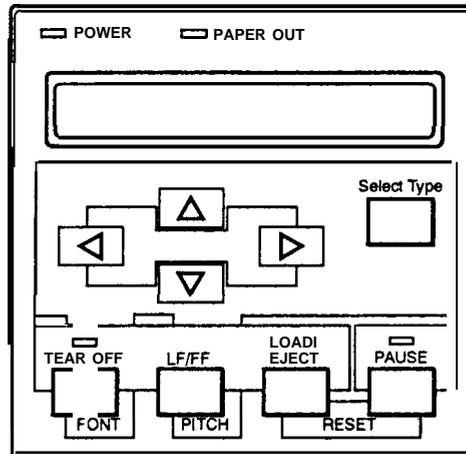

Figure 1-8. Panel Apperance

Indicator Lights

■ POWER (Green):   Lights when turning on the printer.
■ PAPER OUT (Red):   Lights when the printer is out of paper
■ TEAR OFF (Orange):   Lights when the printer is in TEAR OFF mode.
■ PAUSE (Orange):   Lights when the printer is in PAUSE mode.

Buttons

■ SelecType: Enters SelecType Level 1 and 2.
■ TEAR-OFF: The printer has 2 types of tear-off functions; manual tear-off and auto tear-off. The manual tear-off is performed by pressing the TEAR-OFF button. Auto-tear off is enabled by SelecType.
■ LOAD/EJECT: When you press this button, the printer either loads new paper into the printer or ejects paper currently in the printer paper path.
■ PAUSE: Press the PAUSE button during printing to stop printing and press the button to restart printing when the printer is paused. Even if the printer is paused, the printer interface does not stop receiving data until the input buffer is full.
■ LF/FF: See Table 1-14.
■ RESET: Press the PAUSE and LOAD/EJECT buttons at the same time to initialize the printer.
■ FONT: When you press this button, the printer select a font from among the built-in fonts after enters SelecType mode.
■ PITCH: When you press this button, the printer select a character per inch after enters SelecType mode.

Table 1-14. Paper Feeding Functions

Operations	Tractor Feed		Friction Feed	
	Not Paper Out	**Paper Out State**	**Not Paper Out**	**Paper Out State**
Press LF/FF shortly	Line feed (*1)	Load continuous paper	Line feed	Load a sheet (*2)
Press LF/FF for a few seconds	Form feed (*1)	Load continuous paper	Form feed	Load a sheet (*2)
Press LOAD/EJECT	Paper park (*1)	Load continuous paper	Eject	Load a sheet (*2)
Press ↓ button	Micro feed (forward) (*3)	-	Micro feed (forward)	—
Press ↑ button	Micro feed (backward) (*3)	-	Micro feed (backward)	-
Insert a sheet to the manual insertion slot	—	—	—	Load inserted sheet (*2)

(*l): **When the printer** is in tear-off state, these functions are performed after returning from the tear-off position.

(’2): If a manually inserted sheet is once loaded, the printer enters manual insertion mode. After that, even if data remains in the buffer, the printer goes into paper out error state at the end of every a sheet and waits for inserting the next sheet. CSF is enabled again by CSF sheets loading operation or by initialization.

(*3): When the printer is in tear-off state, the micro feed function is used for adjusting the tear-off position. This adjusted position is saved into a non-volatile memory.

1.4.2 Printer State and LCD/LED Indication

The table below shows the LCD messages and LED conditions that indicate the printer states except for SelecType. When the printer gets into more than one state, the printer indicates the highest priority state.

Table 1-15. Printer State and LCD/LED Indication

Priority	Printer State	LCD Message	PE LED	PAUSE LED	TEAR OFF LED
13	Stand-by	Ready	off	off	off
12	Hex dump mode	Hex Dump	off	off	off
11	Ordinary printing	Printing	off	off	off
11	Test printing	Test printing	off	off	off
11	Setting printing	Setting Printing	off	off	off
10	Pause	Pause	off	On	off
9	Data is in buffer but the printer is paused	Data in Buffer	off	Blinking	off
8	Tear-off	Cut the Paper	off	On/Off (*1)	On
7	The entry to SelecType 1	SelecType 1	off	off	off
7	The entry to SelecType 2	SelecType 2	off	off	off
6	Print head is overheated	Please wait	off	On/Off(*1)	or-t/o ff(*1)
5	Paper out error (*2)	Paper Out	On	On	On/Off(*1)
4	Release lever operation error (*3)	Put Lever Back	Blinking	On	On/Off(*1)
3	Cover open error	Cover Open	On/Off(*1)	On	On/Off(*1)
2	Program reload mode	Program Mode	off	off	off
1	Fatal error (*4)	Please Turn Off	Blinking	On	off

(*1): Depends on the previous printer state is pause state or not.

(*2): Paper-out error occurs in the following conditions:
       Paper is not loaded after loading is attempted.
       The full sheet finishes printing after loading single sheets by manual insertion.
       The end of continuous paper is reached.

(*3): Occurs when the friction lever is not at the proper position. (i.e. The lever is set up at the friction position even if continuous paper is loaded.)

(*4): Fatal error occurs in the following conditions:
       Voltage of power supply is abnormal.
       The print head temperature is abnormal.
   - Carriage cannot move correctly.
       Error occurs during executing EEPROM control commands or program reload mode.
       The printer control circuit does not work correctly.

1.4.3 Self-test

This section explains how to run the self-test.

(1) Hold down the LF/FF button and turn on the printer to start the self-test.
(2) If paper is not loaded, the printer attempts to load paper.
(3) If the printer cannot load the paper, it will indicate paper out. In this case, insert paper again and press the LOAD/EJECT button.
(4) Alphanumeric characters are printed continuously.
(5) Press the PAUSE button and turn off the printer to quit self-test.

1.4.4 Hexadecimal Dump Function

The hexadecimal dump is a useful tool in troubleshooting data control problems. This section describes how to run the hex dump.

(1) Hold down the LF/FF and LOAD/EJECT buttons at the same time and turn on the printer to enter hex dump mode.
(2) If paper is not loaded, the printer attempts to load paper.
(3) If the printer cannot load the paper, it will indicate paper out. In this case, insert paper again and press the LOAD/EJECT button.
(4) First, the following message is printed in the language selected in the default-setting mode.

Hex Dump:	When English, French, or German is selected.
Dump esadecimale:	When Italian is selected.
Volcado hex:	When Spanish is selected.

(5) The printer is ready to receive data.
(6) The received data is printed as both hexadecimal codes and ASCII characters. If a corresponding printable character does not exit, the printer outputs a period (.).
(7) Press the LF/FF button to print remaining data in data buffer. Then turn off the printer to quit hex dump mode.

*Note: In hex dump mode, the character table depends on the default setting, and 10 **cpi** draft is selected automatically.*

1.4.5 Setting Print

(1) Hold down the SelecType button and turn on the printer to enter the setting print.
(2) If paper is not loaded, the printer attempts to load paper.
(3) If the printer cannot load the paper, it will indicate paper out. In this case, insert paper again and press the LOAD/EJECT button.
(4) First, the firmware version is printed. Then the user changeable printer default is printed in the language selected.
(5) When the printer finishes the setting printing, the Printhead sheet is ejected or if it is continuous paper, the printer feeds the sheet to the tear-off position. Then the printer enter the ordinary stand-by mode.
(6) All interfaces keep a busy state during the setting printing.

1.4.6 SelecType Function

The DLQ-3000 is equipped with a SelecType function to change default settings.

1.4.6.1 SelecType Phase Transitions

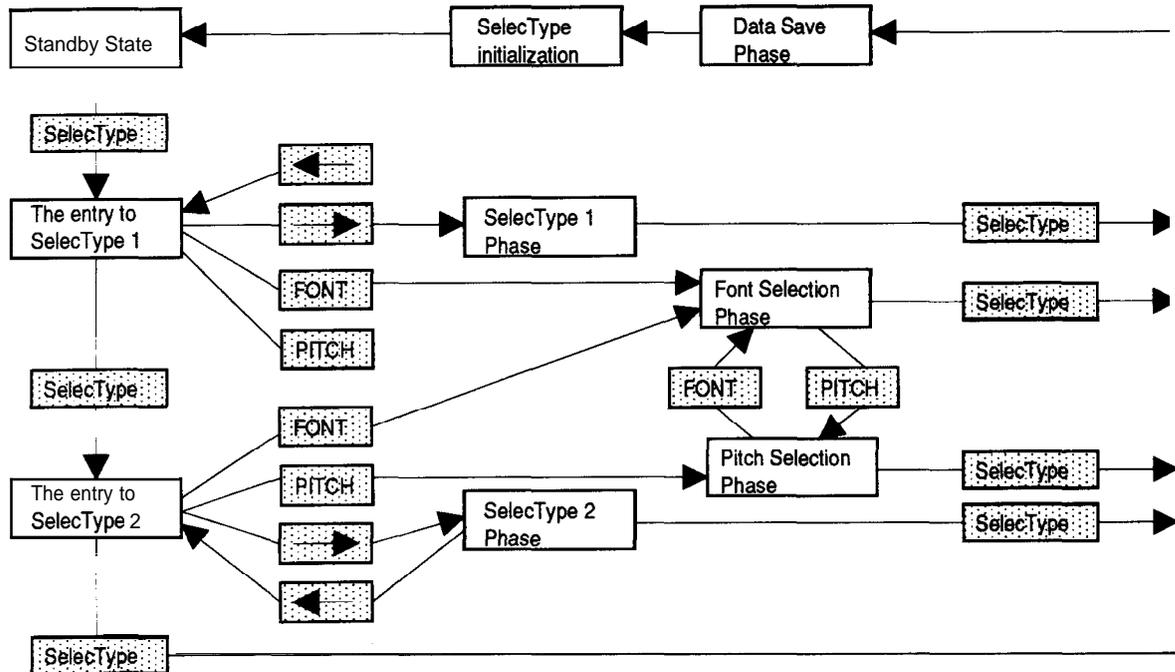The figure below shows the SelecType phase transitions.

Figure 1-9. SelecType Phase Transitions

1.4.6.2 SelecType 1 and 2 Operations

(1) When the SelecType 1 or 2 phase starts, the first feature is displayed. The feature is changed by pressing the ↓ (next) and ↑ (previous) button. When the desired feature is displayed on the LED, press the → (enter) button to display the option.

(2) After choosing a feature by pressing the → (enter) button, the current selected option is displayed with "*". If it is not necessary to change the displayed option, press the ← (escape) button to return to the feature menu.

(3) When an option is displayed, press the ↓ (next) and ↑ (previous) button, so that options that are available for the selected feature are displayed. Choose the desired option and press the →(enter) button to select that option. When the "Other" option is selected, another option menu appears. In this case, choose the desired option and press the → (enter) button again to select it.

(4) Press the ← (escape) button to return to the previous menu. By pressing the+ (escape) button several times it is possible to return to the SelecType 1 or 2 entry state.

(5) Press the SelecType button to exit from every SelecType phase. By pressing the SelecType button, the settings are saved into a non-volatile memory if there are any. After that, the SelecType initialization is performed automatically and the printer is returned to the stand-by state. The user's settings are effective at once and remain in effect until they are changed again.

(6) Choose the "Standard Setting" in SelecType 2 feature menu. Select it by pressing the → (enter) button. The message "Really?" is displayed. If yes, then press the → (enter) button to execute, if no, press the ← (escape) button to return to the feature menu. When the → (enter) button is pressed, all the settings are reset to the standard settings and then the printer is returned to the feature menu. After that, exit SelecType by pressing the SelecType button.

1.4.6.3 Font and Pitch Selection Operations

(1) When the font or pitch selection phase starts, the currently selected default font or default pitch is displayed with "*".

(2) Press the ↓ (next) and ↑ (previous) button to the desired font or pitch, and press the+ (enter) button to select it. Then the selected font or pitch is displayed with "*".

(3) Press the SelecType button to exit from the font or pitch selection phase. By pressing the SelecType button, the settings are saved into a non-volatile memory if there are any. After that, the SelecType initialization is performed automatically and the printer is returned to the stand-by state. The user's settings are effective at once and remain in effect until they are changed again.

1.4.7 Program Reload Mode

The printer has a 128K byte Flash-EEPROM as a printer control software storage and a boot-strap program in a Mask-ROM. This Flash-EEPROM can electrically erase all the data in itself at once and reprogram.   Using this program reload mode, the printer control software can be changed completely. The new software file can be transmitted to the printer through the built-in parallel interface with the IPL (Initial Program Loader) file. At first, the built-in bootstrap program loads the IPL file in the printer's RAM then jumps to the IPL start address. After that, the IPL program can control the printer.   The IPL program loads the new printer control software file and reprograms the Flash-EEPROM. Finally, the IPL program jumps to the new software start address in the reprogrammed Flash-EEPROM.

1.4.7.1 Reprogramming Operation

(1) Turn on the printer while the TEAR-OFF, LF/FF, LOAD/EJECT and PAUSE buttons are depressed.

(2) Transmit the IPL file through the built-in parallel interface. If the IPL ID code is not correct, the printer enter a fatal error state. The printer is also in a fatal error state when a sum error occurs during IPL file transfer. The IPL file must be Intel-hex format.

(3) Transmit the new printer software file to the printer.   At this time, the printer is controlled by the IPL program.

1.4.7.2 Bootstrap

The figure below shows a bootstrap program flow.

Boot-strap Start

| Is it reprogram mode? | ← 0 | Start current Flash-E EPROM software. (jump to OO0400H) If Flash-E EPROM's program is not proper, display "Unproper F/W" and get into the fatal error state. |

YES

| Load IPL file in RAM and test sum. | error | Display "Sum Error" or "Buffer Over" message. Then fatal error state. |

O K

| Is it OK IPL ID code? | N O | Display "IPL ID Error" message. Then fatal error state. |

YES

Start IPL on RAM
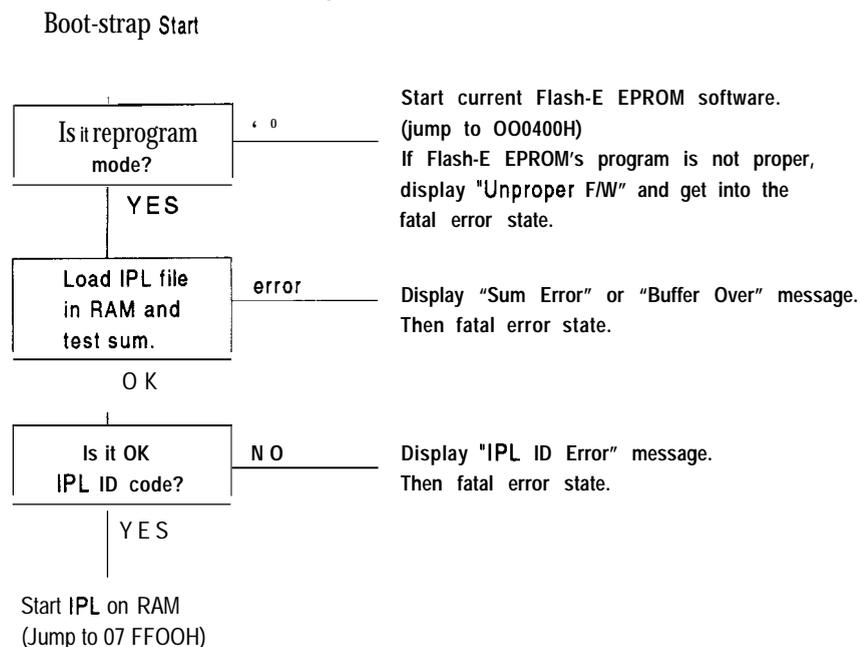(Jump to 07 FFOOH)

Figure 1-10. Bootstrap Program Flow

1.4.8 Printer Status and Buzzer

The DLQ-3000 is equipped with a buzzer on the control board. The buzzer sounds as follows:

Paper out error: ...
Release lever operation error: ----
Fatal error: ----
Illegal operation in SelecType: .

Note: *(.):beeper sounds* for 100 ms and interval between beeps *is 100 ms.*
(-):beeper sounds for 500 ms *and interval* between beeps *is 100 ms.*

1.4.9 Printer Initialization

There are 4 initialization methods: power-on, hardware, software, and SelecType initialization.

1.4.9.1 Power-on Initialization

Power-on initialization is performed by turning the printer on. When the power-on initialization is performed:

The printer mechanism is initialized.
The interface selection is initialized to the idle state when the automatic interface selection is enabled or is initialized to the default interface when that function is disabled.
The parallel interface AFXT signal level is sensed.
All the printer settings are initialized to default.
All the printing data is cleared.
The download character definitions are cleared.
The printer is set to the standby condition, if a fatal error does not occur.

1.4.9.2 Hardware Initialization

The hardware initialization is performed by

The falling edge of a negative pulse when the parallel interface is selected or in automatic interface selection idle state.
Hardware initialization request command that is sent to the printer from the optional interface is selected or the automatic interface selection idle state is selected.

When the hardware initialization is performed:

All the printing data is cleared.
The download character definition is cleared.
The printer settings are changed to default.
The printer is set to the stand-by condition, if a fatal error does not occur.

1.4.9.3 Software Initialization

Software initialization is performed upon receipt of the control code ESC @. When the software initialization is performed:

Data to be printed on the same line as ESC @ that is not yet printed is cleared.
Printer settings are changed to the default settings, except that the download character set is not cleared.

1.4.9.4 SelecType Initialization

When SelecType is terminated, initialization is also performed. When this initialization is performed:

All the printer settings are changed to default but the download character definition is not cleared.
The printer is set to the stand-by state.

1.4.10 Default Settings

When users change, they can be refer to the default setting at the time of initialization of this printer. These standard settings are shown below.

Table 1-16. Initialize Default Settings

Font	Roman
Pitch	10 cpi
Character Table	PC 437
Page Length Tractor CSF	11 inch A4
Line Spacing	1/6 inch

Top Margin   Tractor
             Manual Insertion
             CSF
	0.33 inch (8.5 mm)
	0.33 inch (8.5 mm)
	0.33 inch (8.5 mm)

Bottom Margin Tractor	0.00 inch (0.0 mm)
Left Margin	O column
Right Margin	136 column
Graphic Print Direction	Bi-directional
Message Language	English
Software	ESC/P2
Interface	Auto Selection
Interface Auto Selection Timeout	10 sec.
Input Buffer	On
Serial Interface Baud Rate Parity	19,200 bps None
Auto Tear-off	off
Auto LF	off
Auto CR	off
AGM	off
Copy Mode	copy 1