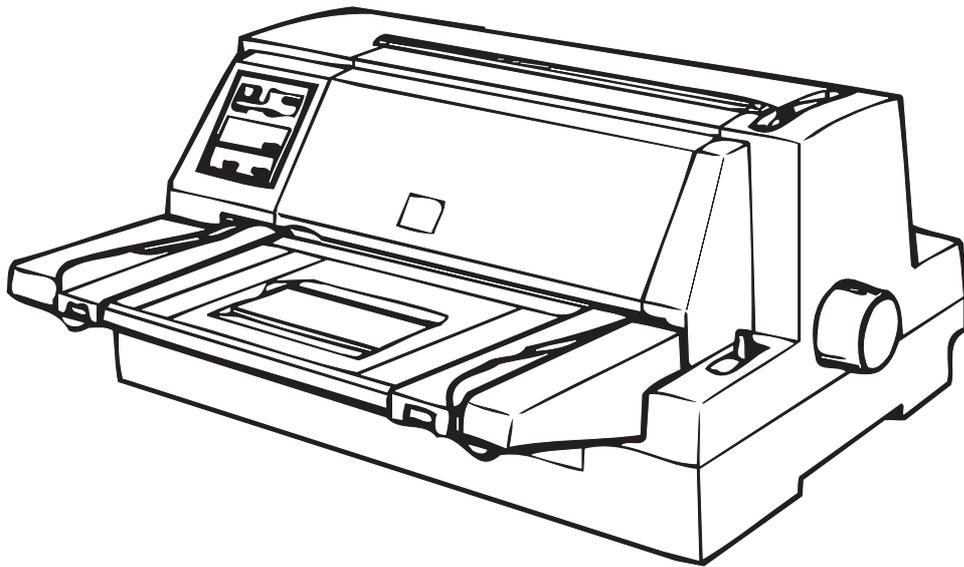**EPSON**

IMPACT DOT MATRIX PRINTER

EPSON LQ-670

SERVICE MANUAL

SEIKO EPSON CORPORATION

4007875

NOTICE

- All rights reserved. Reproduction of any part of this manual in any form whatsoever without SEIKO EPSON's express written permission is forbidden.
- 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 consequences thereof.

EPSON is a registered trademark of SEIKO EPSON CORPORATION.

General Notice:

Other product names used herein are for identification purposes only and may be trademarks or registered trademarks of their respective companies.

Copyright © 1997 by SEIKO EPSON CORPORATION
Nagano, Japan

PRECAUTIONS

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

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

CAUTION   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.

WARNING

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

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.

CAUTION

1. REPAIRS ON EPSON PRODUCT SHOULD BE PERFORMED ONLY BY 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.

PREFACE

This manual describes functions, theory of electrical and mechanical operations, maintenance, and repair of EPSON LQ-670.

The instructions and procedures included herein are intended for the experience repair technician, and attention should be given to die 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. ADJUSTMENT

Includes a step-by-step guide for adjustment.

CHAPTER 5. TROUBLESHOOTING

Provides EPSON-approved techniques for troubleshooting.

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	Issued Data	Contents
Rev. A	May 28, 1997	First issue

TABLE OF CONTENTS

vi

Chapter 1
Product Descriptions

1.1 Specifications

This specifications provide characteristics of the serial impact dot matrix printer LQ-670.

1.1.1 Features

LQ-670 is a 24pin serial impact dot matrix printer for the VAR(value added reseller) market.
The major features of this printer are;

- ❑ Columns   :106 columns (10cpi)
- ❑ Printing Speed   :High speed draft   300cps
                              :Draft   250cps
                              :LQ   83cps at 10cpi
- ❑ Feeding Method   :Friction feed   (front manual, rear CSF)
                              :Push tractor feed   (rear)
- ❑ Feeder   :Rear push tractor
                               CSF Bin1/Bin2   (Option)
                               Roll paper holder   (Option)
- ❑ Paper/Media   :Single sheet, Continuous paper, Multi part paper, Envelope, Card,
                               Label and Roll paper.
- ❑ Fonts   :9LQ & 1 Draft Bitmap and 4 Scarable typefaces
                              :8 Bar code fonts
- ❑ Character tables   :Standard version   11 tables
                               NLSP version   20 tables
- ❑ Input buffer   :64 Kbytes
- ❑ Acoustic noise   :55dB(A) (ISO7779 pattern)
- ❑ Reliability   :Total print volume   6.5 million lines(except print head)
                              :(MTBF)   5000 POH
                              :Print head life   200 million strokes/wire
                              :Ribbon life   2 million characters
- ❑ Interface   :Bi-directional parallel interface (IEEE-1284 nibble mode supported)
                               Type B/I/F level 2 (Option)
- ❑ Control code   :ESC/P 2 and IBM 2390 Plus emulation
- ❑ Copy capability   :1 original + 4 copies
- ❑ Control panel functions   :Font, Condensed, Pause, Tear off, Bin, LF/FF, Load/Eject, Micro Adjust
                               and the default settings
- ❑ Printable area   :70 lines are available at A4.
                              (Top margin 0 mm setting and Bottom margin 0 mm setting are available)
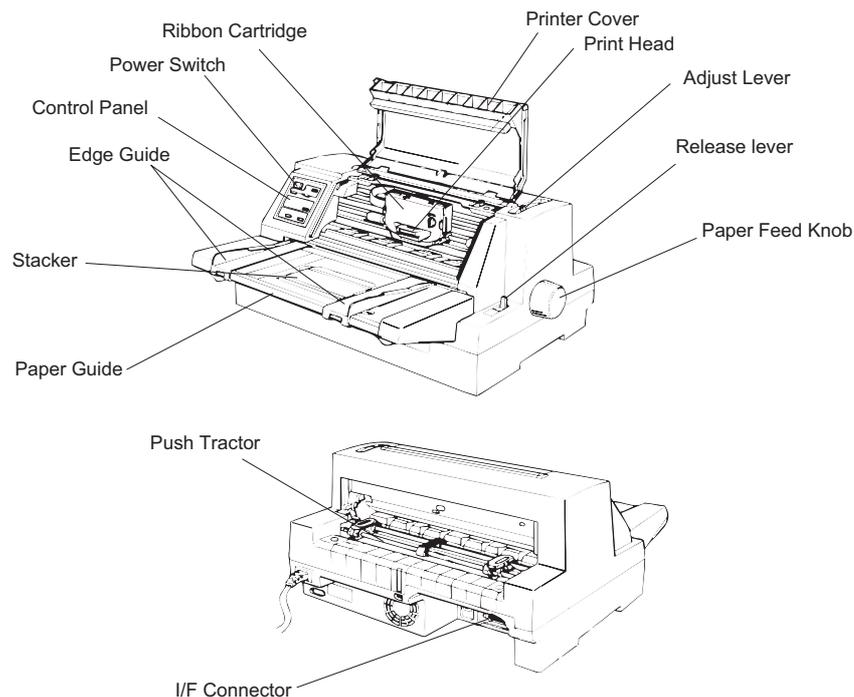
Figure 1-1. Exterior of LQ-670

❑ Consumables and optional units

Table 1-1. Consumables and Optional Units

Name	Part Number
Ribbon cartridge	S015016
High capacity cut sheet feeder (Bin1)	C806781 (EAI version)
High capacity cut sheet feeder (Bin1)	C806782 (Non-EAI version)
Second bin cut sheet feeder (Bin2)	C806791 (EAI version)
Second bin cut sheet feeder (Bin2)	C806792 (Non-EAI version)
Roll paper holder	#8310
Serial I/F card	C82305* / C82306*
32KB intelligent serial I/F card	C82307* / C82308*
32KB intelligent parallel I/F card	C82310* / C82311*
Local Talk I/F card	C82312*
32KB IEEE-488 I/F card	C82313*
Coax I/F card	C82314*
Twinax I/F card	C82315*
Ethernet I/F card	C82331*
IEEE-1284 parallel I/F card	C82345*
Multi Protocol Ethernet I/F card	C82346*

Note)*: The number represented by an asterisk varies, depending on the country.

1.2 Hardware Specifications

This section describes hardware specification for the LQ-670.

1.2.1 Printing Method

- ❑ Printing Method : Impact dot matrix
- ❑ Number of pins : 24 pins
- ❑ Print pin arrangement : 12x2 staggered
- ❑ Print pin diameter : 0.0079 inch (0.20 mm)
- ❑ Color : Black
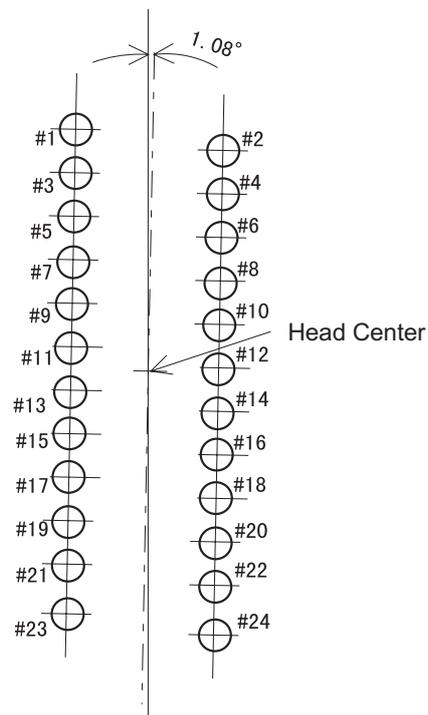- ❑ Print direction : Bi-direction with logic seeking

Figure 1-2. Pin Configuration

1.2.2 Printing Specifications

❑ Copy capability   :1 original + 4 copies
❑ Print speed and printable columns

Table 1-2. Print Speed and Printable Columns

Printing Mode	Character Pitch	Printable Columns	Print Speed(cps)	
			Normal	Copy
High speed Draft	10cpi	106	300	200
Draft	10cpi	106	250	167
	12cpi	127	300	200
	15cpi	159	375	250
Draft condensed	17cpi	181	214	143
	20cpi	212	250	167
LQ	10cpi	106	83	70
	12cpi	127	100	83
	15cpi	159	125	104
LQ condensed	17cpi	181	143	119
	20cpi	212	167	139

Note) When the power supply voltage drops to the lower limit, the printer stops printing and then starts printing the rest of that line again but at the slower speed than before.
Note) When the head temperature rises to the upper limit, the printer stops printing. When the head temperature falls to the normal level, the printer starts printing again but slower than before.

❑ Resolution

Table 1-3. Resolution

Printing Mode	Horizontal density	Vertical density	Adjacent dot print
High speed draft	90dpi	180dpi	No
Draft	120dpi	180dpi	No
Draft condensed	240dpi	180dpi	No
LQ	360dpi	180dpi	N0
8 pins bit image	60, 80, 90 or 120dpi	60dpi	Yes
	120 or 240dpi	60dpi	No
24 pins bit image	60,90,120 or 180dpi	180dpi	Yes
	360dpi	180dpi	No
Raster graphics	180 or 360dpi	180 or 360dpi	Yes

❑ Control code   : ESC/P 2 and IBM 2390 Plus emulation (Refer to control code)

1.2.3 Paper Handling Specifications

❑ Feeding method　　　:Friction feed　　　　　　　　(front manual, rear CSF)
　　　　　　　　　　　　 Push tractor feed　　　　　　(rear)
❑ Feeder　　　　　　　:Rear push tractor
　　　　　　　　　　　　 CSF Bin1/Bin2　　(Option)
　　　　　　　　　　　　 Roll paper holder(Option)

❑ Paper path　　　　　:Manual Insertion　Front in, front out
　　　　　　　　　　　　 CSF　　　　　　　　Rear in, front out
　　　　　　　　　　　　 Tractor　　　　　　 Rear in, front out

❑ Line Spacing　　　　:1/6 inch or programmable in increments of 1/360 inch

❑ Feed speed　　　　　:Refer to the table 1-4.

❑ Release Lever　　　　:The release lever must be set according to the table 1-5.

❑ Paper thickness lever　:The paper thickness lever must be set at the proper position according to the table 1-6.

Table 1-4. Feeding Speed

	Normal mode	Copy mode
1/6 inch feed	60 msec	70 msec
Continuous feed	0.127MPS(m/sec)	0.092 MPS(m/sec)
	5.0 IPS(inches/sec)	3.6 IPS(inches/sec)

Table 1-5. Release Lever Position

Lever Position	Paper path/Feeder	Paper/Media
Friction	Manual insertion(front)	Cut sheet(Single sheet& Muti part) Card
	CSF Bin1	Cut sheet(Single sheet & Multi part) Envelope, Card
	CSF Bin2	Cut sheet(Single sheet)
	Roller paper holder	Roll paper
Tractor	Push tractor feed(rear)	Continuous paper(Single sheet & Multi part)

Table 1-6. Paper Thickness Lever Position

Lever Position	Paper thickness (inch)		Paper thickness (mm)	
	Minimum	Maximum	Minimum	Maximum
0	0.0024	0.0047	0.065	0.12
1	0.0047	0.0075	0.12	0.19
2	0.0075	0.0102	0.19	0.26
3	0.0102	0.0126	0.26	0.32
4	0.0126	0.0142	0.32	0.36
5	0.0142	0.0157	0.36	0.40
6	0.0157	0.0205	0.40	0.52

1.2.4 Paper Specification

This section describes printable area and types of paper that can be used in this printer.

❑ Cut Sheets
The following table shows specification for cut sheets.

Table 1-7. Cut Sheet (Single sheet, Not Multi Part)

		Front Entry(Manual Insertion)		Rear Entry(CSF bin1)		Rear Entry(CSF bin2)	
		Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
Width	(inch)	3.6	11.7	3.9	11.7	3.9	11.7
	(mm)	91	297	100	297	100	297
Length	(inch)	3.5	16.5	3.6	16.5	8.3	16.5
	(mm)	90	420	92	420	210	420
Thickness(inch)		0.0025	0.0055	0.0025	0.0055	0.0025	0.0055
	(mm)	0.065	0.14	0.065	0.14	0.065	0.14
Weight	(g/m^2)	52	90	52	90	52	90
	(lb)	14	24	14	24	14	24
Quality		Plain paper, Reclaimed paper, Not curled, not folded, not crumpled.					

Note): Printing on reclaimed paper is available only under the normal temperature and humidity condition.

Table 1-8. Cut Sheet (Multi Part)

		Front Entry (Manual Insertion)		Rear Entry (CSF)	
		Minimum	Maximum	Minimum	Maximum
Width	(inch)	3.6	11.7	3.9	11.7
	(mm)	91	297	100	297
Length	(inch)	3.5	16.5(11.7)	3.6	16.5
	(mm)	90	420(297) ( ):Value of line glue one side of form.	92	420
Copies		1 original + 4 copies		1 original + 4 copies	
Total thickness	(inch)	0.0047	0.015	0.0047	0.015
	(mm)	0.12	0.39	0.12	0.39
Weight (g/m^2) (one sheet of multi part) (lb)		40 / 12	58 / 15	40 / 12	58 / 15
Quality		Plain paper, Reclaimed paper Not curled, not folded, not crumpled		Plain paper, Reclaimed paper Not curled, not folded, not crumpled	
Jointing		Line glue at the top or one side of form		Line glue at the top of form	

Note): Printing on multi part. Don't use CSF 2nd bin.

❑ Envelope

Table 1-9. Envelope Specification

		Front Entry (Manual Insertion)		Rear Entry (CSF)	
		Minimum	Maximum	Minimum	Maximum
Envelope (No.6)	Width (inch) (mm)	6.5 165		6.5 165	
	Length (inch) (mm)	3.6 92		3.6 92	
Envelope (No.10)	Width (inch) (mm)	9.5 241		9.5 241	
	Length (inch) (mm)	4.1 105		4.1 105	
Total thickness (inch) (mm)		0.0063 0.16	0.0197 0.52	0.0063 0.16	0.0197 0.52
		The difference of thickness at the printable area is within 0.0098 inch (0.25mm)		The difference of thickness at the printable area is within 0.0098 inch (0.25mm)	
Weight (g/m²) (lb)		45 12	91 24	45 12	91 24
Quality		BOND paper, PLANE paper or AIR MAIL. No glue at a flap, Not curled, not folded, not crumpled		BOND paper, PLANE paper or AIR MAIL. No glue at a flap, Not curled, not folded, not crumpled	

Note1): Printing on envelope is available only under normal temperature and humidity conditions.
Note2): Set the longer side of envelope horizontally.
Note3): Don't use CSF 2nd bin.

❑ Card

Table 1-10. Card Specification

		Front Entry (Manual Insertion)		Rear Entry(CSF)	
		Minimum	Maximum	Minimum	Maximum
Width	(inch) (mm)	4.1 105	5.8 148	4.1 105	5.8 148
Length	(inch) (mm)	4.1 105	5.83 148	4.1 105	5.8 148
Thickness	(inch) (mm)	0.0087 0.22		0.0087 0.22	
Weight	(g/m²) (lb)	192 51		192 51	
Quality		Plain paper, Reclaimed paper Not curled, not folded, not crumpled		Plain paper, Reclaimed paper Not curled, not folded, not crumpled	

Note1): Printing card is available only under normal temperature and humidity conditions.
Note2): Don't use CSF 2nd bin.

❏ Continuous paper (Single sheet and Multi part)

Table 1-11. Continuous Paper (Single Sheet and Multi Part)

		Rear Entry (Tractor)	
		Minimum	Maximum
Width	(inch)	4	12
	(mm)	101.6	304.8
Length(one page)	(inch)	4	22
	(mm)	101.6	558.8
Copies		1 original + 4 copies	
Total thickness	(inch)	0.0025	0.015
	(mm)	0.065	0.39
Weight	(g/m^2)	52	82
(not multi part)	(lb)	14	22
Weight	(g/m^2)	40	58
(one sheet of multi part)	(lb)	12	15
Quality		Plain paper, Reclaimed paper Carbonless multi part paper	
Jointing		Point glue or paper staple(both side)	

❏ Continuous paper with Labels

Table 1-12. Continuous Paper with Labels

		Rear Entry (Tractor)	
		Minimum	Maximum
Label size		See the figure below.	
Base sheet width	(inch)	4	12
	(mm)	101.6	304.8
Base sheet length	(inch)	4	22
(one page)	(mm)	101.6	558.8
Base sheet	(inch)	0.0028	0.0035
Thickness	(mm)	0.07	0.09
Total thickness	(inch)	0.0063	0.0075
		0.16	0.19
Label weight	(g/m^2)	68	
	(lb)	17	
Quality		A VERY CONTINUOUS FORM LABELS, A VERY MINI-LINE LABELS or the same quality labels	

Note): Printing on label is available only under the normal temperature and humidity conditions.
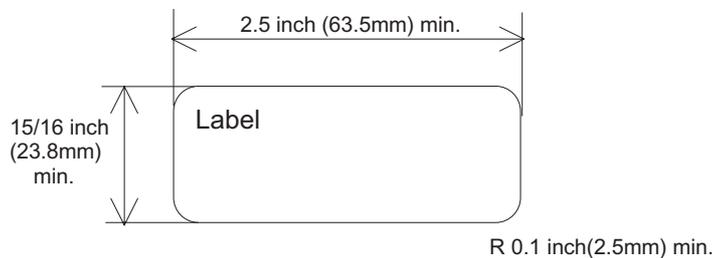*Note):* The base sheet of labels must be continuous paper.

2.5 inch (63.5mm) min.

Label

15/16 inch (23.8mm) min.

R 0.1 inch(2.5mm) min.

Figure 1-3. Label Size

❑ Roll paper

Table 1-13. Roll Paper Specification

		Rear Entry (Roll paper holder)	
		Minimum	Maximum
Width	(inch)	8.5	
	(mm)	216	
Length	(inch)	-----	
	(mm)		
Thickness	(inch)	0.0028	0.0035
	(mm)	0.07	0.09
Weight	(g/m^2)	52	82
	(lb)	14	22
Quality		Plain paper, Reclaimed paper. Not curled, not folded, not crumpled.	

1.2.5 Printable Area

❑ Cut sheets
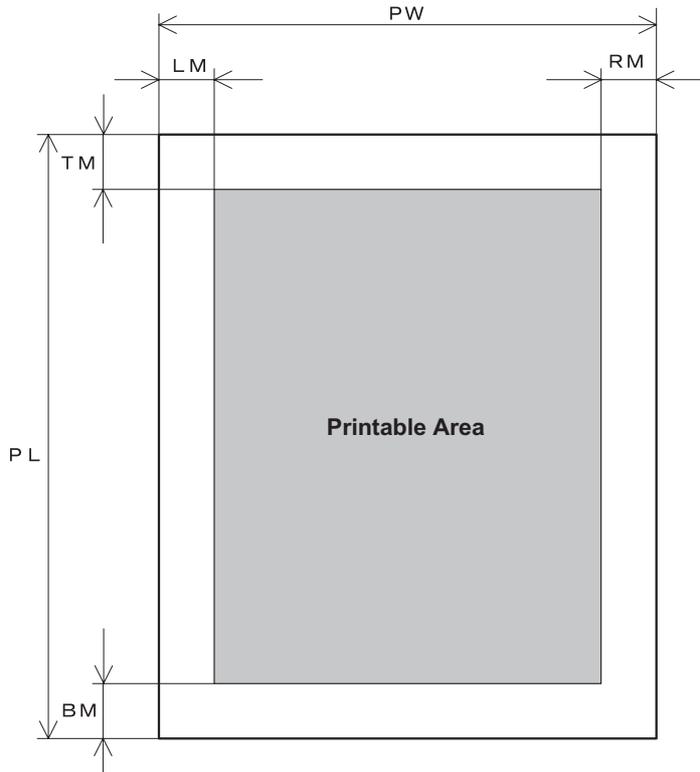
Figure 1-4. Printable Area for Cut Sheet

Table 1-14. Printable Area for Cut Sheet

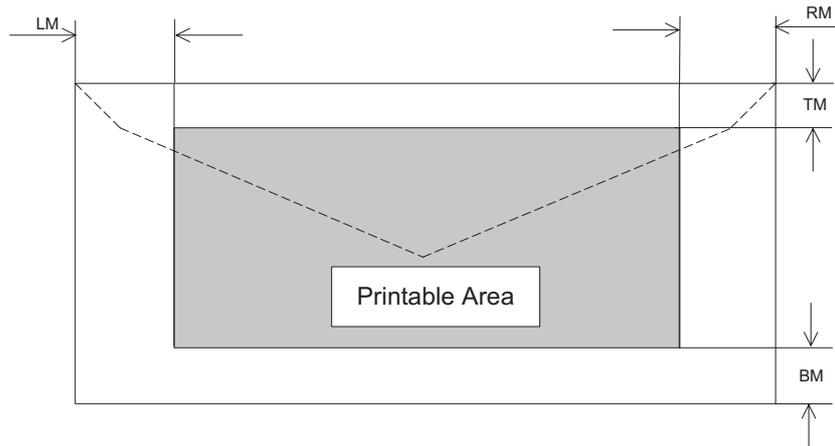|		Single sheet	Multi part
PW	(Width)	(Refer to section 1.2.4)	(Refer to section 1.2.4)
PL	(Length)	(Refer to section 1.2.4)	(Refer to section 1.2.4)
LM	(Left margin)	3 mm or more(PW<=297mm)	3 mm or more(PW<=297mm)
RM	(Right margin)	3 mm or more(PW<=297mm)	3 mm or more(PW<=297mm)
TM	(Top margin)	0.0mm or more	0.0mm or more
BM	(Bottom margin)	0.0mm or more	0.0mm or more

❑ Envelope and card

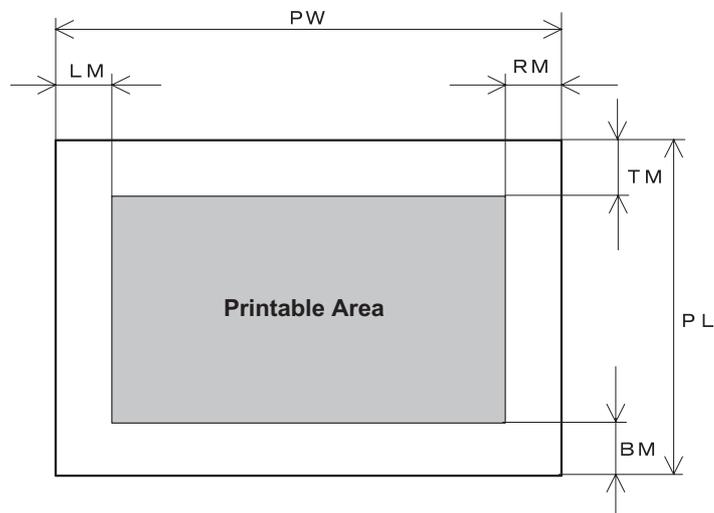

Figure 1-5. Printable Area for Envelope

Figure 1-6. Printable Area for Card

Table 1-15. Printable Area for Envelope and Card

		Envelope	Card
PW	(Width)	(Refer to section 1.2.4)	(Refer to section 1.2.4)
PL	(Length)	(Refer to section 1.2.4)	(Refer to section 1.2.4)
LM	(Left margin)	3 mm or more	3 mm or more
RM	(Right margin)	3 mm or more	3 mm or more
TM	(Top margin)	0.0mm or more *1	0.0mm or more *1
BM	(Bottom margin)	0.0mm or more	0.0mm or more

*Note *1)*: When loading the paper from CSF, TM(Top margin) is 4.2 mm or more.

❑ Continuous paper
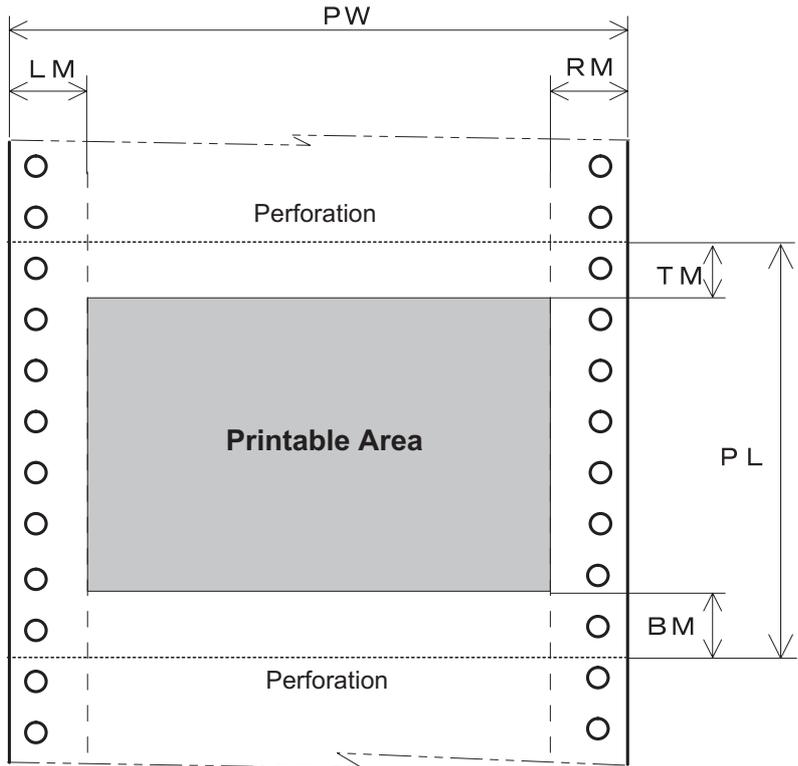
Figure 1-7. Printable Area for Continuous Paper

Table 1-16. Printable Area for Continuous Paper

		Continuous paper
PW	(Width)	(Refer to section 1.2.4)
PL	(Length)	(Refer to section 1.2.4)
LM	(Left margin)	13mm or more
RM	(Right margin)	13mm or more
TM	(Top margin)	4.2mm or more
BM	(Bottom margin)	4.2mm or more

❑ Roll paper
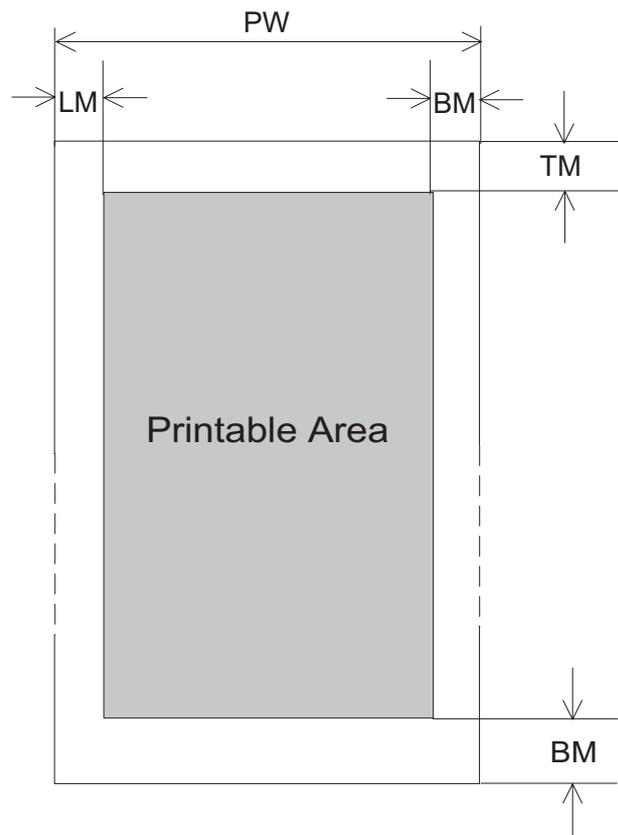
Figure 1-8. Printable Area for Roll Paper

Table 1-17. Printable Area for Roll Paper

		Continuous paper
PW	(Width)	(Refer to section 1.2.4)
PL	(Length)	(Refer to section1.2.4)
LM	(Left margin)	3mm or more
RM	(Right margin)	3mm or more
TM	(Top margin)	0.0mm or more
BM	(Bottom margin)	0.0mm or more

1.2.6 Ribbon Cartridge

- ❑ Type : Fabric
- ❑ Color : Black
- ❑ Ribbon life : 2 million characters (LQ 10cpi, 48 dots/character)
- ❑ Dimensions :120.5mm(W) x 101.5mm(D) x 23.5mm(H)

1.2.7 Input data buffer

- ❑ 0 Kbyte or 64 Kbyte*

Note*): Depends on default settings.

1.2.8 Electrical Specification

- ❑ 120V version

  - ■ Rated voltage : AC120V
  - ■ Input voltage range : AC103.5 to 132V
  - ■ Rated frequency range : 50 to 60 Hz
  - ■ Input frequency range : 49.5 to 60.5 Hz
  - ■ Rated current : 0.7A(max.2.2A)
  - ■ Power consumption : Approx.30W (ISO/IEC10561 Letter pattern)
    Energy Star Compliant
  - ■ Insulation resistance : 10 MΩ min.(between AC line and chassis, DC 500V)
  - ■ Dielectric strength : AC1000 Vrms. 1min.or
    AC1200 Vrms. 1 sec.(between AC line and chassis)

- ❑ 230 V version

  - ■ Rated voltage : AC220 to 240V
  - ■ Input voltage range : AC198 to 264V
  - ■ Rated frequency range : 50 to 60Hz
  - ■ Input frequency range : 49.5 to 60.5Hz
  - ■ Rated current : 0.4A (max.1.1A)
  - ■ Power consumption : Approx.30W (ISO/IEC10561 Letter pattern)
    Energy Star Compliant
  - ■ Insulation resistance : 10MΩ min. (between AC line and chassis, DC 500V)
  - ■ Dielectric strength : AC1500 Vrms. 1min.(between AC line and chassis)

1.2.9 Reliability

- ❑ Total print volume : 6.5 million lines (except print head)
- ❑ (MTBF) : 5000 POH
- ❑ Print head life : 200 million strokes/wire
- ❑ Ribbon life : 2 million characters

1.2.10 Environmental Condition

❑ Temperature
   ■ Operating   : 5 to 35 °C(without condensation)
                             : 15 to 25 °C (without condensation and during printing on multi part paper, envelope, card or label)
   ■ Non-operating   : −30 to 60 °C

❑ Humidity
   ■ Operating   : 10 to 80% RH (without condensation)
                             : 30 to 60% RH (without condensation and during printing on multi part paper, envelope, card or label)
   ■ Non-operating   : 0 to 85% RH (without condensation)

❑ Resistance to shock
   ■ Operating   : 1G, within 1ms
   ■ Non-operating   : 2G, within 2ms

❑ Resistance to vibration
   ■ Operating   : 0.25G,10 to 55 Hz
   ■ Non-operating   : 0.50G,10 to 55 Hz

1.2.11 Safety Approvals

❑ 120V version
   ■ Safety standards   : UL1950 with D3
                             CSA C22.2 No.950 with D3
   ■ EMI   : FCC part15 subpart B class B
                             : CSA C108.8 class B

❑ 230V version
   ■ Safety standards   : EN60950(VDE, NEMKO)
   ■ EMI   : EN55022(CISPR pub.22) class B
                             : AS/NZS 3548 class B

1.2.12 CE Marking

❑ 230V version
   ■ Low Voltage Directive 73/23/EEC   : EN60950
   ■ EMC Directive 89/336/EEC   : EN55022 class B
                                              : EN61000-3-2
                                              : EN61000-3-3
                                              : EN50082-1
                                              : IEC801-2
                                              : IEC801-3
                                              : IEC801-4

1.2.13 Acoustic Noise

❑ Level   : Approx. 55 dB(A) (ISO 7779 pattern)

1.3 Firmware Specification

This section provides detailed information about LQ-670 firmware.

1.3.1 Control Codes and Fonts

❑ Control codes: :ESC/P 2 and IBM 2390 Plus emulation

❑ Typefaces   :Bit map font

EPSON Draft	10CPI, 12CPI, 15CPI
EPSON Roman	10CPI, 12CPI, 15CPI, Proportional
EPSON Sans Serif	10CPI, 12CPI, 15CPI, Proportional
EPSON Courier	10CPI, 12CPI, 15CPI
EPSON Prestige	10CPI, 12CPI
EPSON Script	10CPI
EPSON OCR-B	10CPI
EPSON Orator	10CPI
EPSON Orator-S	10CPI
EPSON Script C	Proportional
EPSON Draft(Arabic)	10CPI, 12CPI
EPSON Draft(Hebrew)	10CPI, 12CPI
EPSON Miriam	10CPI, Proportional
EPSON David	10CPI, Proportional
EPSON Naskh	10CPI, Proportional
EPSON Kufi	10CPI, Proportional

:Scalable font

EPSON Roman	10.5pt., 8pt.-32pt.(every 2pt.)
EPSON Sans Serif	10.5pt., 8pt.-32pt.(every 2pt.)
EPSON Roman T	10.5pt., 8pt.-32pt.(every 2pt.)
EPSON Sans Serif H	10.5pt., 8pt.-32pt.(every 2pt.)

:Bar code

Ean-13
EAN-8
Interleaved 2 of 5
UPC-A
UPC-E
Code 39
Code 128
POSTNET

❑ International character sets   :14 countries and legal
U.S.A, France, Germany, U.K., Denmark 1, Sweden,
Italy, Spain 1, Japan, Norway, Denmark 2, Spain 2,
Latin America, Korea, Legal

*Note)*The international and legal characters are these 12 codes;
23H, 24H, 5BH, 5CH, 5DH. 5EH, 60H, 7BH, 7CH, 7DH, 7EH.

❑ Character tables : The standard version has 11 character tables and the NLSP version has 20 charater tables, as shown in the following table.

Table 1-18. Character Tables

	Character table	Bitmap font	Scalable font
Standard version	**Italic table** **PC437(US Standard Europe)** **PC850(Multilingual)** **PC860(Portuguese)** **PC861(Icelandic)** **PC863(Canadian-French)** **PC865(Nordic)** **Abicomp** **BRASCII** Roman 8 ISO Latin 1	EPSON Draft EPSON Roman EPSON Sans Serif EPSON Courier EPSON Prestige EPSON Script EPSON OCR-B EPSON Orator EPSON Orator-S EPSON Script C	EPSON Roman EPSON Sans Serif EPSON Roman T EPSON Sans Serif H
NLSP version	**Italic table** **PC437(US, Standard Europe)** **PC850(Multilingual)** **PC860(Portuguese)** **PC861(Icelandic)** **PC865(Nordic)**	EPSON Draft EPSON Roman EPSON Sans Serif EPSON Courier EPSON Prestige EPSON Script EPSON OCR-B EPSON Orator EPSON Orator-S EPSON Script C	EPSON Roman EPSON Sans Serif EPSON Roman T EPSON Sans Serif H
	PC864(Arabic)	EPSON Draft EPSON Roman	(Not supported)
	PC437 Greek PC852(East Europe) PC853(Turkish) PC855(Cyrillic) PC857(Turkish) PC866(Russian) PC869(Greek) MAZOWIA(Poland) Code MJK(CSFR) ISO 8859-7 (Latin/Greek) ISO Latin 1T(Turkish) Bulgaria(Bulgarian) Estonia(Estonia) PC744(LST 1283:1993) ISO 8859-2 PC866 LAT.(Latvian)	EPSON Draft EPSON Roman EPSON Sans Serif EPSON Courier EPSON Prestige EPSON Script	(Not supported)
	PCAPTEC(Arabic) PC708(Arabic) PC720(Arabic) PCAR864(Arabic)	EPSON Draft(Arabic) EPSON Naskh EPSON Kufi	(Not supported)
	Hebrew7 *1 Hebrew8 *1 PC862(Hebrew) *1	EPSON Draft(Hebrew) EPSON Miriam EPSON David	(Not supported)

Note *1)　These fonts are not selected in the default setting mode.
Note)　ESC R command is effective on the character tables with bold weight.

1.3.2 Interface Specification

This printer provides bi-directional 8-bit parallel interface and Type-B optional interface slot as standard.

1.3.2.1 Parallel interface (Forward channel)

[Transmission mode]	: 8 bit parallel, IEEE-1284 compatibility mode
[Adaptable connector]	: 57-30360 (Amphenol) or equivalent
[Synchronization]	: /STROBE pulse
[Handshaking]	: BUSY and /ACKNLG signals
[Signal level]	: TTL compatible (IEEE-1284 level 1 device)

Table 1-19. Connector Pin Assignment and Signals

Pin No.	Signal Name	Return GND Pin	In/Out *	Function description
1	/STROBE	19	In	Stroke pulse. Input data is latched at falling edge of the signal.
2~9	DATA1~8	20~27	In	Each signal represents information of parallel data from 1 bit to 8 bit. The data is 1 at "HIGH" and is 0 at "LOW".
10	/ACKNLG	28	Out	This signal (negative pulse) indicates that the printer has received data and is ready to accept next one. The pulse width is 5μs.
11	BUSY	29	Out	This signal's "HIGH" level indicates that the printer is not ready to accept data. On the other hand, "LOW" means the printer can take data. (Refer to the next page for conditions when this signal becomes high level)
12	PE	28	Out	This signal's "HIGH" level indicates that the printer is in a state of paper-out error.(Refer to the next page for the condition when this signal becomes high level.)
13	SLCT	28	Out	Always at high level when the printer is powered on.
14	/AFXT	30	In	Not used.
31	/INIT	30	In	This signal's negative pulse initializes printer.
32	/ERROR	29	Out	This signal's low level means the printer is in a state of error. (Refer to the next page for conditions when the signal becomes low level)
36	/SLIN	30	In	Not used.
18	Logic H	----	Out	This line is pulled up to +5V through 3.9 kΩ resistor.
35	+5V	---	Out	This line is pulled up to +5V through 1.0 kΩ resistor.
17	Chassis	---	---	Chassis GND.
16,33 19-30	GND	---	---	Signal GND.
15,34	NC	---	---	Not connected.

Note)*In/Out shows the direction of signal flow from the printer's point of view.
*Note)*If the signal is "LOW" and active state, the signal is marked with "/".

BUSY signal is active (high level) under the following conditions.

- ☐ In the process of receiving data.
- ☐ In the condition of being input buffer full
- ☐ In the condition of being /INIT signal active(low level)
- ☐ During hardware initialization
- ☐ In the condition of being /ERROR or PE signal active(low level, high level, respectively)
- ☐ In the self test mode
- ☐ In the adjustment mode
- ☐ In the default-setting mode

/ERROR signal is active(low level) under the following conditions.

- ☐ In the condition of the release lever error
- ☐ In the condition of the paper-out error
- ☐ In the condition of the paper-jam error

PE signal is active(high level) under the following condition.

- ☐ In the condition of paper-out error

*Note)*It becomes possible to input the data without outside equipment by setting appropriate connecting.
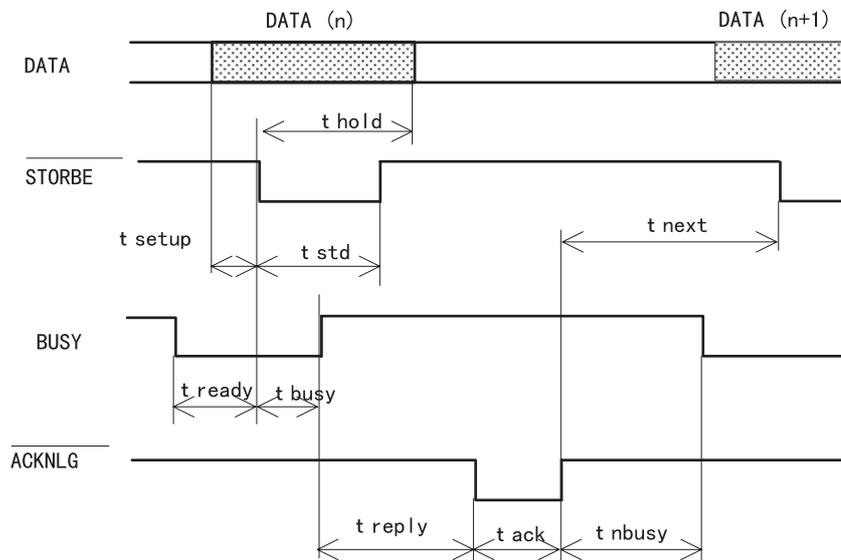
Figure 1-9. Data Transmission Timing

Table 1-20. Maximum and Minimum Timings for Data Transmission

Parameter	Minimum	Maximum
tsetup	500 nsec	---
thold	500 nsec	---
tstb	500 nsec	---
tready	0	---
tbusy	---	500 nsec
treply	---	---
tack	500 nsec	10 us
tnbusyt	0	---
tnext	0	---
ttout*	---	120 nsec
ttin**	---	200 nsec

Note) * Rise and fall time of output signals.
** Rise and fall time of input signals.

1.3.2.2 Parallel Interface (Reverse channel)

[Transmission mode]	: IEEE 1284 nibble mode
[Adaptable connector]	: 57-30360(Amphenol) or equivalent
[Synchronization]	: /STROBE pulse
[Handshaking]	: BUSY and /ACKNLG signals
[Signal Level]	: IEEE-1284 level 1 device
	TTL compatible
[Data transmission timing]	: Refer to the IEEE-1284 specification
[Extensibility request]	: The printer responds to the extensibility request in the affirmative, when the request is 00H or 04H, which mean;

        00H:Request nibble mode of reverse channel transfer

        04H:Request device ID in nibble mode of reverse channel transfer.

[Device ID]	: [00H] [3AH]
	MFG: EPSON;
	CMD:ESCPL2,PRPXL24, BDC;
	MDL;LQ-670;
	CLS:PRINTER;

Table 1-21. Connector Pin Assignment and Signals

Pin No.	Signal Name	Return GND Pin	In/Out*	Function description
1	HostClk	19	In	Host clock signal
2~9	DATA1~8	20~27	In	Parallel input data to the printer.
10	PtrClk	28	Out	Printer clock signal.
11	PtrBusy, DataBit-3,7	29	Out	Printer busy signal and reverse channel transfer data bit 3 or 7.
12	AckDataReq, DataBit-2, 6	28	Out	Acknowledge data request signal and reverse channel transfer data bit 2 or 6.
13	Xflag, DataBit-1, 5	28	Out	X-flag signal and reverse channel transfer data bit1 or 5.
14	HostBusy	30	In	Host busy signal.
31	/INIT	30	In	Not used.
32	/Data Avail, DataBit-0, 4	29	Out	Data available signal and reverse channel transfer data bit0 or 4.
36	1284-Active	30	In	1284 active signal.
18	Logic-H	---	Out	A high signal indicates that all other signals sourced by the peripheral are in a valid state.
35	+5V	---	Out	This line is pulled up to +5V through 1.0 kΩ resistor.
17	Chassis	---	---	Chassis GND.
16,33, 19-30	GND	---	---	Signal GND.
15,34	NC	---	---	Not connected.

Note*): In/Out refers to the direction of signal flow/from the printer's point of view.

1.3.2.3 Optional Interface

Type-B optional interface cards are available.

Table 1-22. Optional Interface

Reply message	ESC/P2	IBM 2390 Plus
Main-Type	MT24p,PW106cl10cpi,PRG(W0xxxx)rev	MT24p,PW106c110cpi,PRG(W0xxxx)rev
Product-Name	LQ-670	LQ-670
Emulation-Type	ESCPL2-00	PRPXL24-01
Entity-Type	EPSONLQ2	EPSONPRPXL24

1.3.2.4 Interface Selection

The printer has 2 interfaces; the parallel interface and Type B optional interface. These interfaces are selected manually by Default setting or selected automatically.

1.3.2.5 Manual selection

Out of 2 interfaces can be selected by Default Setting.

1.3.2.6 Automatic selection

The automatic interface selection is enabled by Default Setting. In this automatic interface selection mode, the printer is initialized to the idle state scanning which interface receives data when it is powered on. Then the interface that receives data first is selected. When the host stops data transfer and the printer is in stand-by state for the seconds specified by Default Setting, the printer is returned to the idle state. As long as the host sends data or the printer interface is busy state, the selected interface is let as it is.

1.3.2.7 Interface state and interface selection

When the parallel interface is not selected, the interface gets into a busy state. When the Type-B serial interface card is installed and it 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 gets into a ready state, the serial interface sends XON and sets the DTR SPACE and the printer sends enable commands to the optional interface. Caution that the interrupt signal such as a /INIT signal on the parallel interface is not effective while that interface is not selected.

1.3.3 Prevention Hosts from Data Transfer Timeout

Generally, 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 in busy state continuously.

1.4 Operation

1.4.1 Control Panel
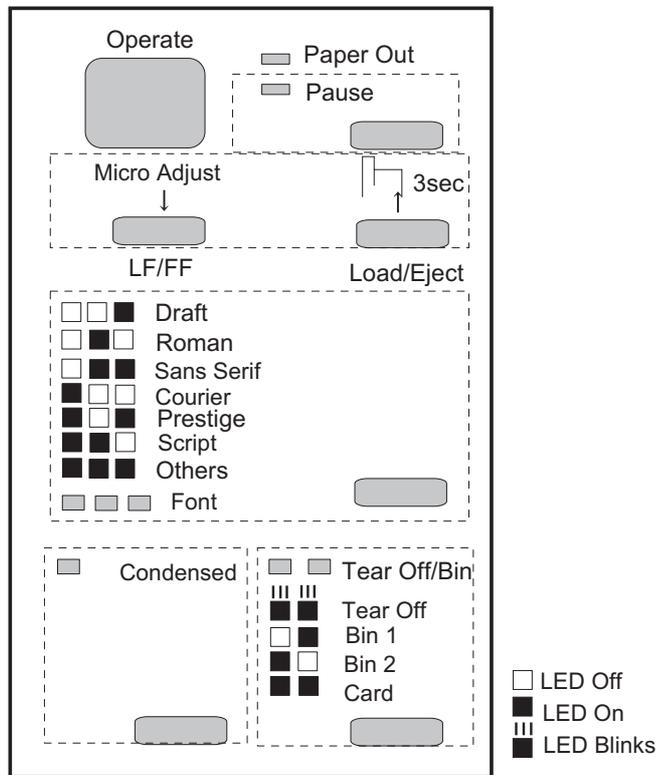
There are 7 switches and 8 LEDs on the panel as shown below.

Figure 1-10. Control Panel

1.4.1.1 Usual Operation

❑ Operate
This switch turns the printer on and off. It is the secondary switch.

❑ Pause
This switch alternates printer activity between printing and non-printing.
Holding it down over 3 seconds when the printer is in the stand by state, the Micro Adjust function
is enabled. Pressing it again, this function is disabled.

❑ Load/Eject
Pressing it loads cut sheet or continuous paper when the printer is out of paper.
Pressing it ejects cut sheet to the stacker or continuous paper to the paper park.

❑ LF/FF
Pressing it shortly executes line feed.
Holding it down for a few seconds executes form feed when continuous paper is used, or ejects cut
sheet to the stacker when cut sheet is used.

❑ Tear Off
When continuous paper is used, pressing it moves a page to the Tear-off position. And pressing it
again moves a next page to the TOF position.

❑ Bin
Pressing it selects CSF bin number or the Card mode* when cut sheet is used.
Note)* Card mode is for using post card or envelope.

❑ Font
Pressing it selects one of following fonts.
Draft, Roman, Sans serif, Courier, Prestige, Script and Others *.
Note)* Others means the font selected in the Default Setting Mode.

❑ Condensed
Pressing it alternates condensed and non-condensed mode.

❑ Micro Adjust
Micro Adjust ⇑/⇓ switches is effective when the Micro Adjust function is enabled by Pause switch.
Pressing the Micro Adjust ⇑/⇓ switches execute micro feed backward and forward by 1/80 inch.
The TOF adjustment is enabled in the TOF position after loading, and the Tear-off adjustment is enabled in the Tear-off position.