SERVICE MANUAL

Impact Serial Dot Matrix Printer

EPSON FX-980

COLOR IMAGING EPSON

EPSON®

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PRECAUTIONS

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

DANGER   Signals a 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 THE POWER SOURCE AND PERIPHERAL DEVICES PERFORMING ANY MAINTENANCE OR REPAIR PROCEDURES.
2. NOWORK 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 VOLTAGES 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 basic functions, theory of electrical and mechanical operations, maintenance and repair procedures of FX-980. The instructions and procedures included herein are intended for the experienced repair technicians, and attention should be given to the precautions on the preceding page. The chapters are organized as follows:

CHAPTER 1.   PRODUCT DESCRIPTIONS

Provides a general overview and specifications of the product.

CHAPTER 2.   OPERATING PRINCIPLES

Describes the theory of electrical and mechanical operations of the product.

CHAPTER 3.   DISASSEMBLY AND ASSEMBLY

Describes the step-by-step procedures for disassembling and assembling the product.

CHAPTER 4.   ADJUSTMENTS

Provides Epson-approved methods for adjustment.

CHAPTER 5.   TROUBLESHOOTING

Provides the step-by-step procedures for troubleshooting.

CHAPTER 6.   MAINTENANCE

Provides preventive maintenance procedures and the lists of Epson-approved lubricants and adhesives required for servicing the product.

APPENDIX

Provides the following additional information for reference:
• EEPROM Address Map
• Connector Pin Assignments
• C276 Main Board / C244 PSH Board Component Layout
• C276 Main Board / C244 PSH Board Circuit Diagram

Revision Status

Revision	Issued Date	Description
A	March 17, 1999	First Release

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Maintenance

Appendix

PRODUCT DESCRIPTION

1.1 Overview

The EPSON FX-980 serial impact dot matrix printeris designed based on the existing FX-2170. Both products are common in most features, but vary in width; the FX-980 is narrower than the FX-2170. So this manual only provides information specific to the FX-980.

1.2 Specifications

These specifications provide statistical information for the FX-980. For information that is not included in this section, refer to the FX-2170 Service Manual.

1.2.1 Features

The main features of this printer are:

☐ Print speed: High speed draft: 506 cps at 10 cpi
                         Draft: 380 cps at 10 cpi
                         NLQ: 95 cps at 10 cpi

☐ Character tables: Standard version: 13 tables
                         NLSP version: 37 tables

☐ Reliability: Total print volume:25 million lines
                                   (except printhead)
                         MTBF: 10,000 power on hours (POH)

☐ Printhead life: 300 million cahracters
                         Ribbon life:7.5 million characters

☐ Interface: Bi-directional parallel interface
                         Type-B interface
                         Serial interface

☐ Control codes: ESC/P2 and IBM 2380 plus emulation

☐ Copy capability: 1 original + 5 copies always
                         1 original + 6 copies at pull tractor feed
                         (front, bottom)

☐ Control panel functions: Font, Pause, Condensed Pause, Tear off,
                         Bin, LF/FF, Load/Eject, Micro   Adjust,
                         Self-Test, Data Dump, and the Default
                         Setting

☐ Power supply: Universal Power Supply version
                         supported
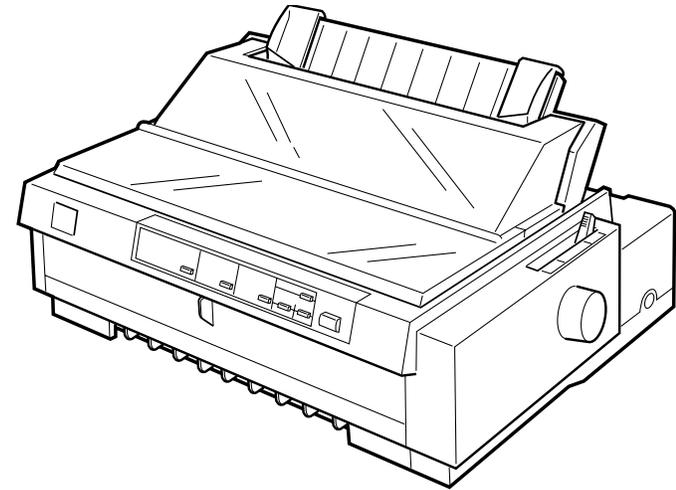
Figure 1-1. Exterior View of the FX-980

1.2.2 Accessories

Table 1-1.   Items Included with the Printer

Enclosed Items	Quantity
User's manual	1
Driver diskette	1
Ribbon cartridge	1
Power supply cable (230 V Version)	1

Table 1-2.   Consumable and Optional Items

Unit	Description
Ribbon cartridge	S015091-0036
Ribbon pack	S010036-0036
High-capacity cut sheet feeder (bin 1)	C806841 (EAI), C806842 (Non-EAI)
Second bin cut sheet feeder (bin 2)	C806851 (EAI), C806852 (Non-EAI)
Pull tractor unit	C800331 (EAI), C800332 (Non-EAI)
Roll paper holder	#8310
32 KB intelligent serial I/F card	C82307* / C82308*
Type-B Local Talk I/F card	C82312*
Coax I/F card	C82314*
Twinax I/F card	C82315*
IEEE-1284 parallel I/F card	C82345*
Type-B Ethernet I/F card for 10Base T/2	C82362*
Type-B Ethernet I/F card for 100Base T / 100Base TX	C82363* [1], C82364*,

1: When you use Ethernet interface card (C82363), you need to attach the optional interface card adapter (C82525*) to the interface card.

1.3 Hardware Specifications

This section also contains information specific to the FX-980. For other information, refer to the FX-2170 Service Manual.

1.3.1 Printing Specifications

☐ Print method: Impact dot matrix

☐ Number of pins: 18 pins

☐ Print pin alignment: 9×2

☐ Print pin diameter: 0.0114 inch (0.29 mm)

☐ Color: Black

☐ Print direction: Bi-directional with logic seeking

☐ Resolution: See the table below:

Table 1-3. Resolution

Printing mode	Horizontal density	Vertical density	Adjacent dot print
Hifh speed draft	90 dpi	72 dpi	No
Draft	120 dpi	72 dpi	No
Draft condensed	240 dpi	72 dpi	No
Draft emphasized	120 dpi	72 dpi	Yes
NLQ	240 dpi	144 dpi	No
Bit image	60, 72, 80, 90, or 120 dpi	72 dpi	Yes
	120 or 240 dpi	72 dpi	No

☐ Print speed and printable columns: See the table below.

Table 1-4. Print Speed and Printable Columns

Print Mode	Character Pitch	Printable Columns	Print Speed (cps)		
			Normal	Copy 1	Copy 2
High-speed draft	10 cpi	80	506	439	337
	12 cpi	96	569	455	404
	15 cpi	120	569	494	426
High-speed draft condensed	17 cpi	137	560	483	322
	20 cpi	160	506	379	329
Draft	10 cpi	80	380	330	284
	12 cpi	96	455	396	341
	15 cpi	120	380	285	285
Draft Condensed	17 cpi	137	325	282	244
	20 cpi	160	380	330	284
Draft emphasized	10 cpi	80	190	165	142
NLQ	10 cpi	80	95	82	71
	12 cpi	96	114	99	85
	15 cpi	120	94	71	31
	17 cpi	137	81	70	60
	20 cpi	160	95	82	71

NOTES:

1. *When the power supply voltage drops to the lower limit, the printer stops printing and then starts printing on that line again more slowly than before.*

2. *When the head temperature rises to the upper limit, the printer stops printing. When the head temperature falls to the normal level, the printer start printing again more slowly than before.*

3. *Copy 1: When the paper thieckess lever is set to 2 or 3.*

4. *Copy 2: When the paper thickness lever is set to 4 or more.*

1.3.2 Paper Handling

☐ Feeding method

- Friction feed (front, rear)

- Push tractor feed (front lever)

- Push & Pull tractor feed (front, rear)

- Pull tractor feed (front, rear, bottom)

☐ Feed speed

- Normal mode: 1/6 inch feed: 46 msec
  Continuous feed: 0.127 MPS (m/second)
                                5.0 IPS (inches / second)

- Copy mode: 1/6 inch feed: 68 msec
  Continuous feed: 0.078 MPS (m/second)
                                3.1 IPS (inches/second)

☐ Input data buffer: 0 Kbyte or 64 Kbyte
                          (depends on the default setting)

☐ Release lever: See the following table.   ☐ Paper thickenss lever: See the following table.

Table 1-5. Release Lever Settings

Lever Position	Paper path / Feeder	Paper / Media
Friction	Manual insertion (front)	Cut sheet (Single sheet & Multipart), Card
	Manual insertion (rear)	Cut sheet (Single sheet & Multipart), Card, Envelope
	CSF Bin 1	Cut sheet (Single sheet & Multipart), Card, Envelops
	CSF Bin 2	Cut sheet (Single sheet)
	Roll paper holder	Roll paper
Front tractor	Push tractor feed (front)	Continuous paper (Single sheet & Multipart), Continuous paper with labels
	Push & Pull tractor feed (front)	Continuous paper (Single sheet & Multipart), Continuous paper with labels
Rear tractor	Push tractor feed (rear)	Continuous paper (Single sheet & Multipart)
	Push & Pull tractor feed (rear)	Continuous paper (Single sheet & Multipart)
Full release	Pull tractor feed (front)	Continuous paper (Single sheet & Multipart), Continuous paper with labels
	Pull tractor feed (rear)	Continuous paper (Single sheet & Multipart)
	Pull tractor feed (bottom)	Continuous paper (Single sheet & Multipart), Continuous paper with labels

Table 1-6. Adjust Lever Setting Position

Setting Position	Paper Thickness (inch)		Paper Thickness (mm)
	Minimum	Maximum	
0	0.0024	0.0043	over 0.06 up to 0.11
1	0.0043	0.0071	over 0.11 up to 0.18
2	0.0071	0.0079	over 0.18 up to 0.20
3	0.0079	0.0098	over 0.20 up to 0.25
4	0.0098	0.0126	over 0.25 up to 0.32
5	0.0126	0.0154	over 0.32 up to 0.39
6	0.0154	0.0185	over 0.39 up to 0.47

1.3.3 Paper Specifications

This section provides paper specifications for the FX-980.

☐ Cut seet (single sheet, not multipart)

Table 1-7. Cut Sheet (Single Sheet, Not Multipart)

		Front Entry		Rear Entry	
		Minimum	Maximum	Minimum	Maximum
Width	(inch) (mm)	3.9 100	10.1 257	3.9 (7.2[*1]) 100 (182[*1])	10.1 257
Length	(inch) (mm)	5.8 148	14.3 364	3.9 (8.3[*1]) 100 (210[*1])	14.3 364
Thickness	(inch) (mm)	0.0025 0.065	0.0055 0.14	0.0025 0.065	0.0055 0.14
Weight	(g/m^2) (lb.)	52 14	90 24	52 14	90 24
Quality		Plain paper, Recycled paper[*2], Not curled, folded, or crumpled			

*1: Value when CSF bin 2 is used.

*2: Printing on recycled paper is available only under normal temperature and humidity conditions.

☐ Cut sheet (multipart)

Table 1-8. Cut Sheet (Multipart)

		Front Entry		Rear Entry [*1]	
		Minimum	Maximum	Minimum	Maximum
Width	(inch) (mm)	3.9 100	10.1 257	3.9 100	10.1 257
Length	(inch) (mm)	5.8 148	14.3 364	3.9 100	14.3 364
Copies		1 original + 5 copies		1 original + 5 copies	
Total Thickness	(inch) (mm)	0.0047 0.12	0.018 0.46	0.0047 0.12	0.018 0.46
Weight (one sheet of multipart)	(g/m^2) (lb.)	40 12	58 15	40 12	58 15
Quality		Plain paper, Recycled paper, Paper that is not curled, folded, or crumpled.			
Jointing		Line glue at the top or one side of form.		Line glue at the top of form.	

*1: Not available for the 2nd CSF.

☐ Envelope

☐ Continuous paper (Single sheet and Multipart)

Table 1-9. Envelope

			Front Entry		Rear Entry	
			Minimum	Maximum	Minimum	Maximum
Envelop (No. 6)	Width	(inch) (mm)	- - -		6.5 165	
	Length	(inch) (mm)	- - -		3.6 92	
Envelop (No. 10)	Width	(inch) (mm)	- - -		9.5 241	
	Length	(inch) (mm)	- - -		4.1 105	
Total Thickness		(inch) (mm)	- - -	- - -	0.0063 0.16	0.020 0.52
			- - -		The difference of thickness at the printable area is within 0.0098 inch (0.25mm).	
Weight		(g/m²) (lb.)	- - -	- - -	45 12	90 24
Quality			- - -		BOND paper, plain paper or AIRMAIL No glue at a flap Not curled, not folded, not crumpled	

Table 1-10. Continuous Paper (Single sheet and Multipart)

		Front Entry		Rear Entry		Bottom Entry	
		Min.	Max.	Min.	Max.	Min.	Max.
Width	(inch) (mm)	4 101.6	10.0 254	4 101.6	10.0 254	4 101.6	10.0 254
Length (one page)	(inch) (mm)	4 101.6	22 558.8	4 101.6	22 558.8	4 101.6	22 558.8
Copies		1 original + 5 copies [1]		1 original + 5 copies		1 original + 5 copies [1]	
Total Thickness	(inch) (mm)	0.0025 0.065	0.018 0.46	0.0025 0.065	0.018 0.46	0.0025 0.065	0.018 0.46
Weight (not multipart)	(g/m²) (lb.)	52 14	82 22	52 14	82 22	52 14	82 22
Weight (one sheet of multipart)	(g/m²) (lb.)	40 12	58 15	40 12	58 15	40 12	58 15
Quality		Plain paper, Recycled paper, Carbonless multipart paper					
Jointing		Point glue or paper staple (both sides)					

*1: When pull tractor is used, 1 original copy + 6 copies is available.

NOTES:

1. *Printing on envelope is available only under normal temperature and humidity conditions.*

2. *Envelopes should be inserted from rear entrance only.*

3. *Set the longer side of envelope horizontally.*

☐ Coutnuous paper with labels

☐ Roll paper

Table 1-11. Continuous Paper with Labels

		Front Entry		Bottom Entry		Rear Entry	
		Min.	**Max.**	**Min.**	**Max.**	**Min.**	**Max.**
Label size		See the figure below.		See the figure below.		---	
Base sheet width	(inch) (mm)	4 101.6	10.0 254	4 101.6	10.0 254	---	---
Base sheet length (one page)	(inch) (mm)	4 101.6	22 558.8	4 101.6	22 558.8	---	---
Base sheet thickness	(inch) (mm)	0.0028 0.07	0.0035 0.09	0.0028 0.07	0.0035 0.09	---	---
Total thickness	(inch) (mm)	0.0063 0.16	0.0075 0.19	0.0063 0.16	0.0075 0.19		
Label weight	(g/m^2) (lb.)	64 17		64 17		---	
Quality		AVERY CONTINUOUS FORM LABELS, AVERY MINI-LINE LABELS or the same quality labels				---	

Table 1-12. Roll Paper

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

NOTES:

1. Printing on labels is available only under normal temperature and humidity condition.

2. The base sheet of labels must be continuous paper.

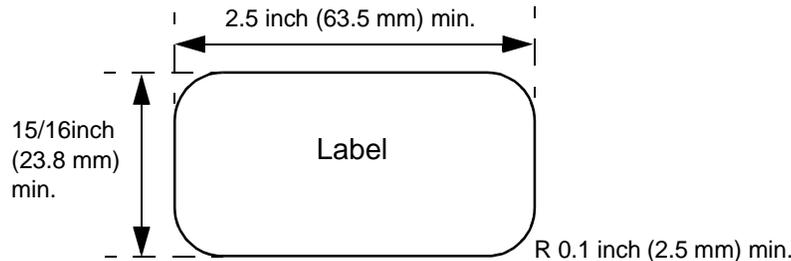*3. Continuous paper with labels should be inserted from the front or bottom entrance.*

2.5 inch (63.5 mm) min.

15/16inch (23.8 mm) min.

Label

R 0.1 inch (2.5 mm) min.

Figure 1-2. Printable Area - Label

1.3.4 Ribbon Specifications

☐ Type: Fabric

☐ Color: Black

☐ Ribbon Life: Approximately 7.5 million characters
                                  (Draft 10 cpi, 14 dots / character)

1.3.5 Electrical Specifications

The electrical specifications for the FX-980 are the same as for the FX-2170 except for the items below. For information on other items, see the FX-2170 Service Manual.

☐ 120 V Version

  ■ Input voltage range: AC 99 to 132 V

  ■ Power consumption: Approximately 46 W
                           (ISO/IEC10561 Letter pattern)
                           Energy Star Compliant

☐ 230 V version

  ■ Power consumption: Approximately 46 W
                           (ISO/IEC10561 Letter pattern)
                           Energy Star Compliant

☐ UPS version

  ■ Rated voltage range: AC 100 to 120 V / AC 220 to 240 V

  ■ Input voltage range: AC 90 to 132 V / AC198 to 264 V

  ■ Rated frequency range: 50 to 60 Hz

  ■ Input frequency range: 49.5 to 60.5 Hz

  ■ Rated current: 1.1 A (max. 2.2 A / 0.6 A (max 1.1 A)

  ■ Power consumption: Approximately 46 W
                           (ISO/IEC10561 Letter pattern)
                           Energy Star Compliant

  ■ Insulation resistance: 10 M Ω min.
                           (between AC line and chassis, DC 500 V)

  ■ Dielectric strength: AC 1500 Vrms. 1 min.
                           (between AC line and chassis)

1.3.6 Reliability

☐ Total print volume: 25 million lines (except printhead)

☐ MTBF: 10000 POH (24% duty)

☐ Printhead life: Approximately 300 million characters

1.3.7 Safety Approvals

☐ 120 V version

  ■ Safety standards: UL1950, CSA C22.2 No. 950

  ■ EMI: FCC part15 subpart B class B
                           CSA C108.8 class B

☐ 230 V version

  ■ Safety standards: EN60950 (VDE)

  ■ EMI: EN55022 (CISPR pub.22) class B
                           AS/NZS 3548 class B

☐ UPS version

  ■ Safety standards: UL1950, CSA C22.2 No. 950,
                           EN60950 (VDE)

■ EMI: FCC part15 subpart B class B
CSA C108.8 class B
EN55022 (CISPR pub.22) class B
AS/NZS 3548 class B

1.3.8 CE Marking

☐ 230 V version & UPS 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

1.3.9 Physical Specifications

☐ Without options
- Dimensions: 528 mm(W) x 404 mm(D) x 236 mm(H)
- Weight: Approximately 11 kg

☐ Including CSF bin 1
- Dimensions: 528 mm(W) x 471 mm(D) x 380 mm(H)
- Weight: Approximately 13 kg

☐ Including CSF bin 1 & bin 2
- Dimensions: 528 mm(W) x 600 mm(D) x 411 mm(H)
- Weight: Aproximately 13.5 kg

1.4 Firmware Specifications

This section describes the firmware specifications for the FX-980.

1.4.1 Control Codes and Fonts

☐ Control codes: ESC/P2 and IBM 2391 Plus Emulation

☐ Character tables:

Standard version (13 character tables)

Italic table	PC 860 (Portuguese)
PC 850 (Multilingual)	PC 437 (US, Standard Europe)
PC 861 (Icelandic)	PC 863 (Canadian-French)
PC 865 (Nordic)	Abicomp
BRASCII	Roman 8
ISO Latin 1	PC 858
ISO 8859-15	

NLSP version (37 character tables)

Italic table	PC437 (US, Standard Europe)	
PC437 Greek	PC850 (Multilingual)	
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)	PC774 (LST 1283:1993)	
Estonia (Estonia)	ISO 8859-2	PC866 LAT. (Latvian)
PC866 UKR (Ukraina)	PC860 (Portuguese)	
PC861 (Icelandic)	PC865 (Nordic)	PC APTEC(Arabic)
PC708 (Arabic)	PC720 (Arabic)	PCAR864 (Arabic)
PC863 (Canadian-French)	Abicomp	
BRASCII	Roman 8	ISO Latin 1
Hebrew7*	Hebrew8*	PC862 (Hebrew)*
PC 858	ISO 8859-15	

* *Not displayed in the Default setting mode.*

International character set (13 countries)

U.S.A.	France	Germany
U.K.	Denmark 1	Sweden
Italy	Spain 1	Japan
Norway	Denmark 2	Spain 2
Latin America		

* *The international and legal characters are these 12 codes:*
      23H, 24H, 40H, 5BH, 5CH, 5DH,
      5EH, 60H, 7BH, 7CH, 7DH, 7EH

☐ Typeface:

■ Bitmap fonts

EPSON Draft (10 cpi, 12 cpi, 15 cpi)
EPSON Roman (10 cpi, 12 cpi, 15 cpi, Proportional)
EPSON Sans Serif (10 cpi, 12 cpi, 15 cpi, Proportional)

■ Bar codes

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

☐ Character tables and available typefaces:

The following bitmap fonts are supported by all character tables available for FX-980.

EPSON Draft, EPSON Roman, EPSON Sans Serif

NOTE: *ESC R command is effective on all the chracter tables.*

1.4.2 Printable Area

Printable area for the FX-980 is the same as for the FX-2170 exept for the point below:

☐ Cut Sheet:

Left Margine (Single/Multipart)	<FX-980> 3 mm or more (Paper width is ≤ 216 mm) 27 mm or more (Paper width is ≤ 257 mm)
Right Margine (Single/Multipart)	<FX-980> 3 mm or more (Paper width is ≤ 216 mm) 27 mm or more (Paper width is ≤ 257 mm)

1.4.3 Interface Specifications

This printer provides bi-directional 8-bit parallel interface, serial interface, and Type-B interface ooptional interface card slot as standard.
For information that is not covered in this section, refer to the FX-2170 Service Manual.

1.4.3.1 Parallel Interface (Forward Channel)

☐ Transmission mode: IEEE-1284 compatibility mode

☐ Signal level: TTL compatible
IEEE-1284 level 1 device)

☐ Pin assignment: The pin assignment (forward channel) is the same as for the FX-2170 except for the function of the pins below:

Pin No.	Function
18	<FX-980> This line is pulled up to +5 V through 3.9 k Ω resistor.
35	<FX-980> This line is pulled up to +5 V through 1.0 k Ω resistor.

☐ BUSY signal is active (HIGH level) under the conditions below:

In addition to the conditions given in the FX-2170 Service Manual,

■ If -ERROR or PE signal is active (low level, high level, respectively).

☐ -ERROR signal is active (low level) under the conditions below:

■ If there is a paper-out error.
■ If there is a release lever error.
■ If there is a cover open error.

☐ PE signal is active (high level) under the condition below:

■ If therer is a paper-out error.

1.4.3.2 Parallel Interface (Reverse Channel)

☐ Transmission mode: 8 bit parallel, IEEE-1284 nibble mode

☐ Synchronization: Refer to the IEEE-1284 specification

☐ Handshaking: Refer to the IEEE-1284 specification

☐ Signal level: IEEE-1284 level 1 device

☐ Data transmission timing: Refer to the IEEE-1284 specification

☐ Device ID:

> [00H][4DH]
> MFG: EPSON;
> CMD: ESCPL2,PRPXL24,BDC;
> MDL: FX-980;
> CLS: PRINTER;
> DES: EPSON[SP]FX-980;

☐ Pin assignment: The pin assignment (reverse channel) is the same as for the FX-2170 except for the functions of the pins below:

Pin No.	Function
18	<FX-980> This line is pulled up to +5 V through 3.9 k Ω resistor.
35	<FX-980> This line is pulled up to +5 V through 1.0 k Ω resistor.

1.4.3.3 Serial Interface

☐ Synchronization: Asychronous

☐ Signal level: EIA-233D
  MARK (logical 1):   -3 V to -25V
  SPAC:E (logical 0):   +3 V to +25V

☐ Word length: Start bit: 1 bit
  Data bit: 8 bit
  Parity biy: Odd, Even, Non, Ignore
  Stop bit: 1 bit or more

☐ Baud rate: 2400, 4800, 9600, or 19200 bps

☐ Handshaking: DTR signal and XON/SOFF

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

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

☐ Connecotr pin assgnment and signals:
  See Table 1-13 on the following page.

Table 1-13.
Connector Pin Assignment and Signals for Serial I/F

Pin No.	Signal Name	In/ Out[*1]	Functional Description
2	TXD	Out	Transmits data.
20	DTR	Out	Indicates that the printer is ready to receive data or not.
11	REV	Out	Connected directly to the DTR signal.
4	RTS	Out	Request to send. Always SPACE level when the printer is powered on. Pulled up to +12 V via 4.7 K Ω resistor.
3	RXD	In	Receives data.
7	Signal GND	-	Signal GND.
1	Chassis GND	-	Chassis GND.
other	NC	-	Not used. Not connected.

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

1.5 Operation Instruction

This section provides information on the FX-980 control panel buttons, LED, and operations. Since the layout and functions of the control panel are mostly common to those of FX-2170, this section only provides the information that is specific to FX-980. For other information, see FX-2170 Service Manual.
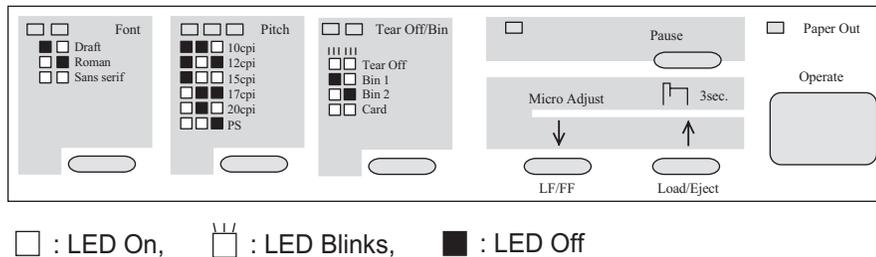

☐ : LED On,   ☐ : LED Blinks,   ■ : LED Off

Figure 1-3. Control Panel

☐ Operations at power on

Turning on the printer while pressing panel buttons executes the functions shown in the following table.

Table 1-14. Operations at Power On

No.	Buttons	Function
1	Load / Eject	NLQ self test
2	LF / FF	Draft self test
3	Pitch	Default setting (See the following table for the setting menu.)
4	Load / Eject & LF / FF	Data dump
5	Font & Tear Off / Bin	EEPROM clear
6	Tear Off / Bin & LF / FF	Clear EEPROM for Driving Line count for ribbon change timing
7	Pause	Bi-d adjustment
8	Font	Alternates copy mode on and off. When "off" is selected, beeps one time. When "on" is selected, beeps two times. The setting is saved to non-volatile memory.
9	The others	Not available.

Table 1-15. Default Setting Menu

Item	Setting / Value[*1]
Character table	Standard version / NLSP version: See Section 1.3 for the character tables available. **PC437**
International character set for Italic table	**Italic U.S.A.**, Italic France, Italic Germany, Italic U.K., Italic Denmark 1, Italic Sweden, Italic Italy, Italic Spain 1
Page length for front tractor	3 inch, 3.5 inch, 4 inch, 5.5 inch, 6 inch, 7 inch, 8 inch, 8.5 inch, **11 inch**, 70/6 inch, 12 inch, 14 inch, 17 inch
Page length for rear tractor	3 inch, 3.5 inch, 4 inch, 5.5 inch, 6 inch, 7 inch, 8 inch, 8.5 inch, **11 inch**, 70/6 inch, 12 inch, 14 inch, 17 inch
Print direction	**Bi-d.**, Uni-d.
Software	**ESC-P2**, IBM 2380 Plus
I/F mode	**Auto**, Parallel, Serial, Optional
Auto I/F wait time	**10 sec.**, 30 sec.
Input buffer	**On**, Off
Baud rate	**19200BPS**, 9600BPS, 4800BPS, 2400 BPS
Parity	**None**, Odd, Even, Ignore
Skip over perforation	On, **Off**
Auto tear off	On, **Off**
Auto line feed	On, **Off**
Auto CR (IBM 2380 Plus)[*2]	On, **Off**
0 slash	On, **Off**
Buzzer	**On**, Off
IBM character table	**Table2**, Table 1

*1: Setings with bold weight meas the standard factory settings.
*2: This setting is effective when IBM Plus 2380 emulation is selected.

□ Status code indicated by the LEDs

Table 1-16. Status code indicated by the LEDs

	Pause	Paper Out	Tear Off / Bin	Condensed	Font
Pause	On	---	---	---	---
Paper out	On	On	---	---	---
Paper jam	On	Blink	---	---	---
Head hot	Blink	---	---	---	---
Cover Open	On	---	---	---	---
Micro Adjust	Blink	---	---	---	---
Tear off	---	---	*	---	---
Bin selection	---	---	*	---	---
Pitch selection	---	---	---	*	---
Font selection	---	---	---	---	*
Fatal error	Blink	Blink	Blink	Blink	Blink

*: Varies depending on the selection. (See Figure 1-2.)

□ Buzzer

Paper out error:	Beeper sounds (...) *
Cover Open error:	Beeper sounds (...) *
Release lever operation error:	Beeper sounds (- - - - -)*
Illegal panel operation:	Beeper sounds (.)*

The description (.) and (-) shows how the beeper sounds.
 (.): Beeper sounds approx.100 ms and interval is approx. 100 ms.
 (-): Beeper sounds approx.500 ms and interval is approx. 100 ms.

1.5.1 Errors

☐ Paper out:
When the printer fails to feed a sheet, it goes a paper out error.

☐ Release lever error:
When release lever position is wrong, it goes a release lever error.

☐ Cover Open error:
When the printer's cover is opened, it goes a release lever error.

☐ Fatal error:
Carriage control error and Power supply voltage error

1.5.2 Bi-directional Adjustment Function

Bi-directional adjustment can be made for the following three modes.

■ High-speed draft mode

■ Draft mode

■ NLQ mode

1.5.3 EEPROM Initialization

Areas reset by EEPROM clear operation (described in Section 1.3.1)
are as shown in the following tables:

Table 1-17. Initialization Area for EEPROM (1/2)

No.	Item	Factory setting
1	Character table selection	PC437
2	Page length (rear tractor)	11 inch
3	Page length (front tractor)	11 inch
4	Page length (CSF Bin 1)	22 inch
5	Page length (CSF Bin 2)	22 inch
6	TOF adjustment value (rear tractor)	8.5 mm
7	TOF adjustment value (front tractor)	8.5 mm
8	TOF adjustment value (CSF Bin 1)	8.5 mm
9	TOF adjustment value (CSF Bin 2)	8.5 mm
10	TOF adjustment value (rear manual insertion)	8.5 mm
11	TOF adjustment value (front manual insertion)	8.5 mm
12	Bottom margin (rear tractor)	11 inch
13	Bottom margin (front tractor)	11 inch
14	Font selection	Roman
15	Pitch selection	10 cpi
16	Copy mode	Off
17	Print direction setting	Bi-D
18	I/F mode selection	Auto
19	Auto I/F wait time setting	10 sec

Table 1-18. Initialization Area for EERPOM (2/2)

No.	Item	Factory setting
20	Auto line feed	Off
21	Auto tear off	Off
21	Skip over perforation	Off
22	High speed draft	On
23	Input buffer	On
24	Software	ESC/P
25	0 slash	Off
26	Buzzer	On
27	Roll paper	Off
28	Auto CR (IBM)	Off
29	Tear-off adjustment value	0 clear
30	Manual insertion wait time	2 or 3 sec.
31	Tear-off wait time	3 sec.
32	Serial baud rate	19200
33	Serial parity	None
34	Paper width measure	On
35	TOF minimum value	4.2 mm
36	I/F timing data	BUSY
37	Paper edge length	0 clear
38	Page length (rear manual insertion)	22 inch
39	Page length (front manual insertion)	22 inch

1.6 Main Components

The main components for the FX-980 are as follows. They are designed for easy disassembly and repair work.

- C276 Main Board

- C166 PSB/PSE / C244 PSH

- C276 PNL Board

- Printer Mechanism

- Housing (upper and lower cases)

1.6.1 C276 Main Board

The C276 Main Board consists of the TMP96C141 CPU, an E05B50 gate array, a PS-RAM, a PROM, and so on.
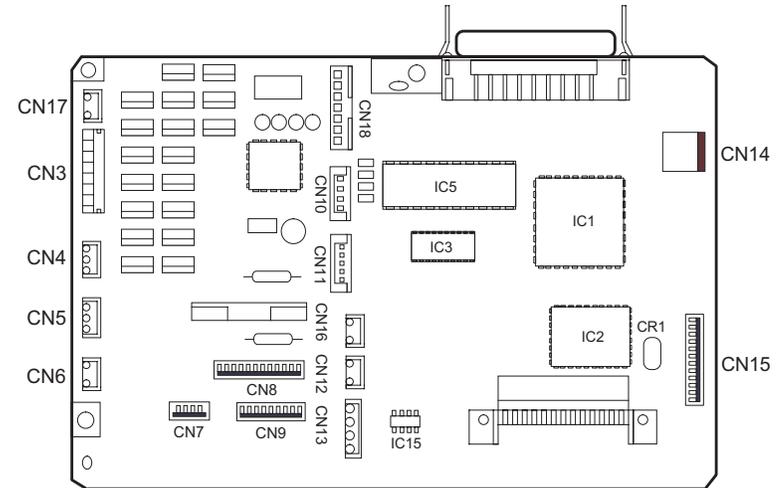

Figure 1-4. C276 Main Board Assembly

1.6.2 C276 PNL Board

This board function is the control panel for the FX-980. It consists of the power switch, six buttons, and the indicator LEDs.
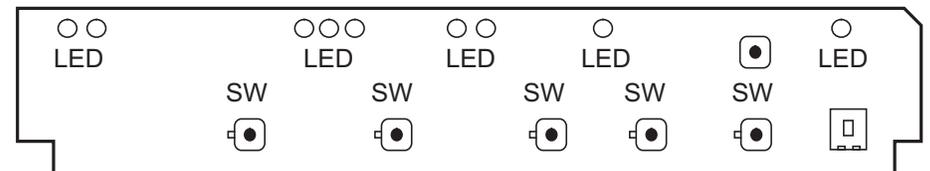
Figure 1-5. C276 PNL Board Assembly

CHAPTER

2

OPERATING PRINCIPLES

2.1 Printer Mechanism Operations

See the LQ-2070 Service Manual.

2.2 Power Supply Operation

See the LQ-2070 Service Manual.

2.3 Control Circuit

The control circuit consists of the C276 Main Board assembly and C276 PNL Board. This section describes the major components and explains how the boards work.

2.3.1 Overview of the Control Circuit Operation

The printer's control circuit includes a TMP96C141 CPU that runs at 19.66 MHz, an E05B50 gate array, a 1M bit PS-RAM (8-bit bus, less than 100ns), a 4M bit PROM (8-bit bus, less than 120ns), and other circuits. It oversees control of all the components in the printer. The following chart shows you a block diagram of the control circuit.
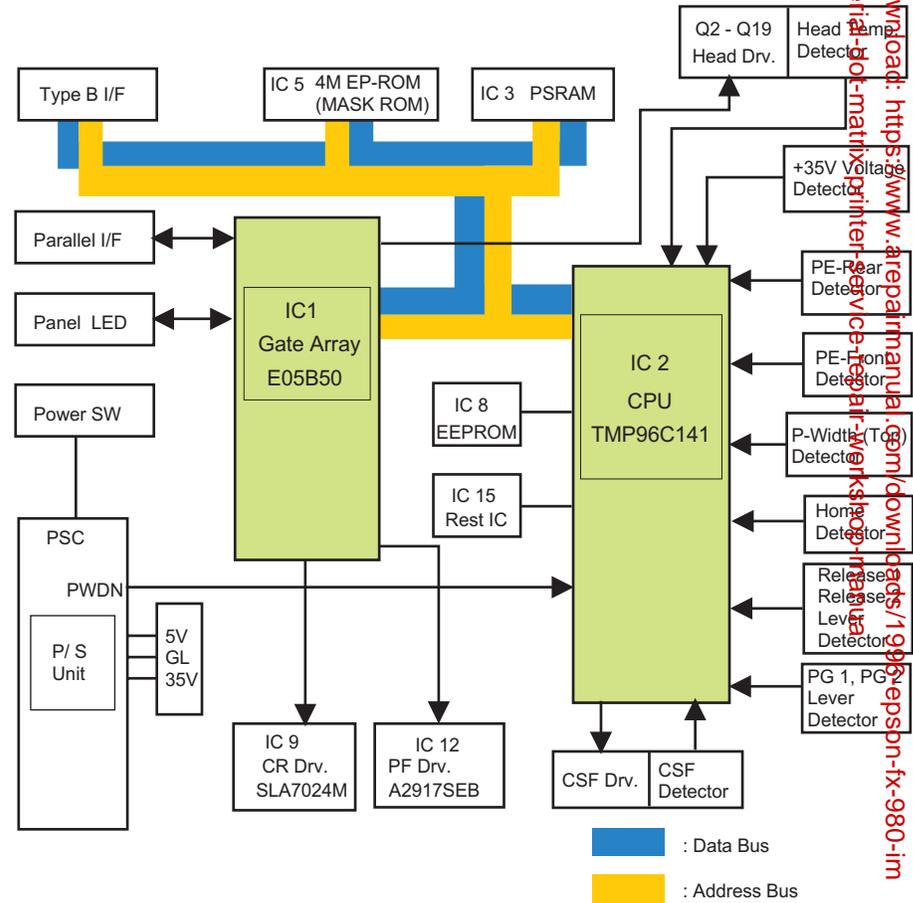
Figure 2-1. Control Circuit Block Diagram