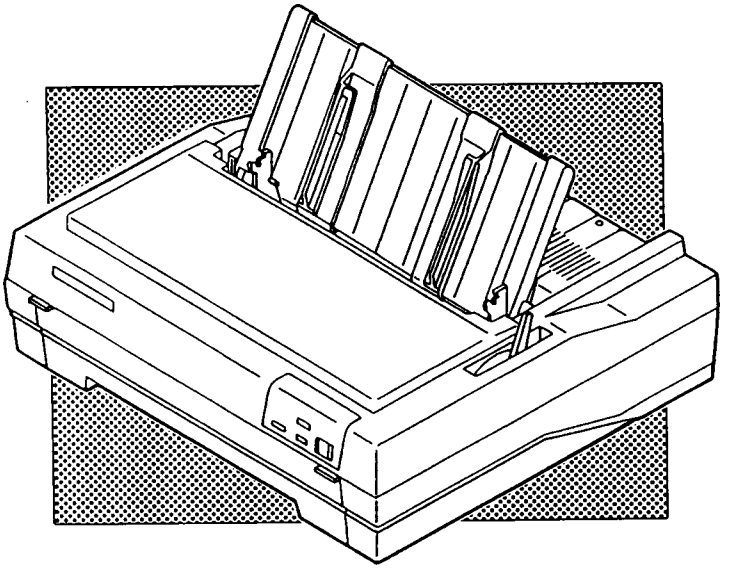
EPSON

EPSON TERMINAL PRINTER

FX-870/1170



SERVICE MANUAL

4001461
REV. A

NOTICE

“ The contents of this manual are subject 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.

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 a 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 THE HOST COMPUTER BEFORE PERFORMING ANY MAINTENANCE OR REPAIR PROCEDURE.**
2. **NO WORK SHOULD BE PERFORMED ON THE UNIT BY PERSONS UNFAMILIAR WITH BASIC SAFETY MEASURES AS DICTATED FOR ALL ELECTRONICS TECHNICIANS IN THEIR LINE OF WORK.**
3. **WHEN PERFORMING TESTING AS DICTATED WITHIN THIS MANUAL, DO NOT CONNECT THE UNIT TO A POWER SOURCE UNTIL INSTRUCTED TO DO SO. WHEN THE POWER SUPPLY CABLE MUST BE CONNECTED, USE EXTREME CAUTION IN WORKING ON POWER SUPPLY AND OTHER ELECTRONIC COMPONENTS.**

WARNING

1. **REPAIRS ON EPSON PRODUCT SHOULD BE PERFORMED ONLY BY AN EPSON CERTIFIED REPAIR TECHNICIAN.**
2. **MAKE CERTAIN THAT THE SOURCE VOLTAGE IS THE SAME AS THE RATED VOLTAGE, LISTED ON THE SERIAL NUMBER/RATING PLATE. IF THE EPSON PRODUCT HAS A PRIMARY-AC RATING DIFFERENT FROM THE 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 μP CHIPS AND CIRCUITRY, USE STATIC DISCHARGE EQUIPMENT, SUCH AS ANTI-STATIC WRIST STRAPS, WHEN ACCESSING INTERNAL COMPONENTS.**
5. **REPLACE MALFUNCTIONING COMPONENTS ONLY WITH THOSE COMPONENTS RECOMMENDED BY THE MANUFACTURER; 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 the FX-870/1170.
The instructions and procedures included herein are intended for the experienced repair technician, and attention should be given to the precautions on the preceding page. The chapters are organized as follows:

Chapter 1 - Provides a general product overview, lists specifications, and illustrates the main components of the printer.

Chapter 2 - Describes the theory of printer operation.

Chapter 3 - Includes a step-by-step guide for product disassembly and assembly.

Chapter 4 - Includes a step-by-step guide for adjustment.

Chapter 5 - Provides Epson-approved techniques for troubleshooting.

Chapter 6 - Describes preventive maintenance techniques.

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

REVISION SHEET

REVISON	*DATE ISSUED*	*CHANGE DOCUMENT*
A	**June 15, 1992**	**1st issue**

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CHAPTER 1

GENERAL DESCRIPTION

LIST OF FIGURES

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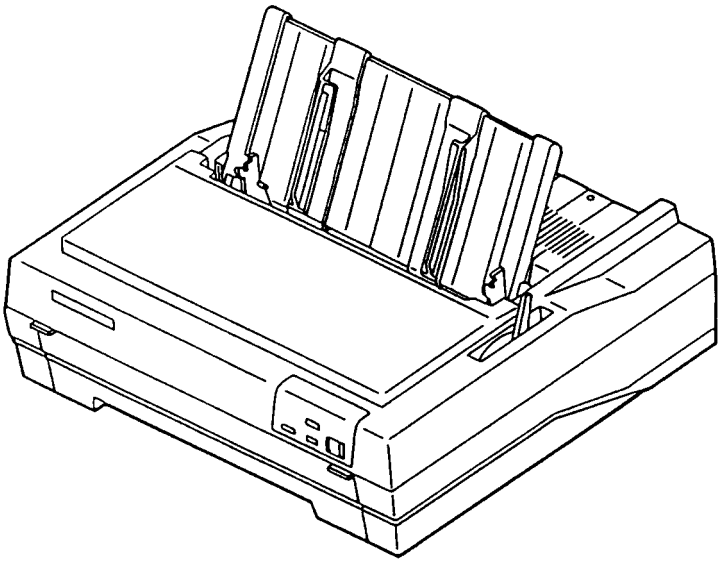
1.1 Scope

These specifications apply to the EPSON FX-870/1170 dot matrix printer.

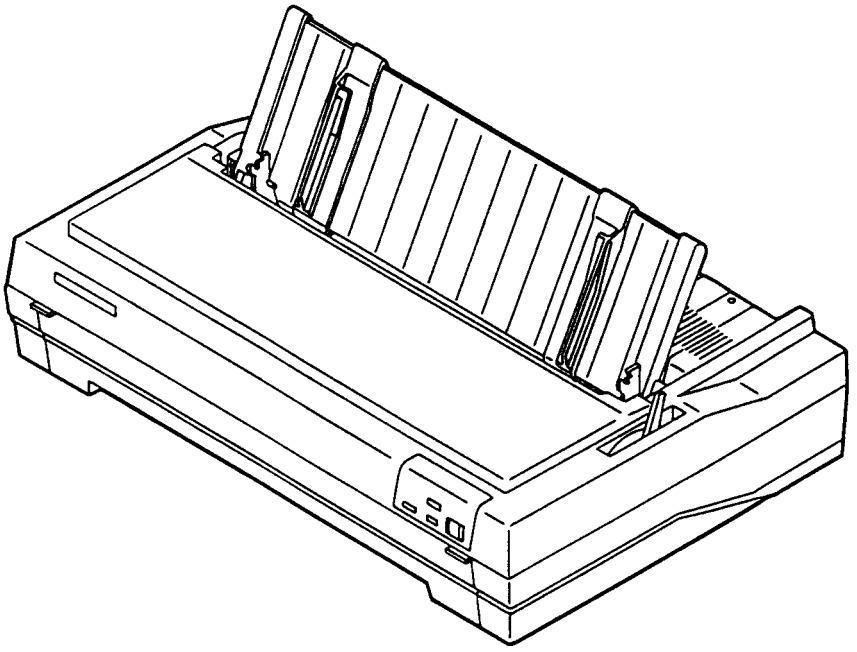
1.1.1 Features

- Upward compatibility with the FX-850(+)/1050(+), FX-800/1000, FX-86e/286e
- 380 cps (high-speed draft for both 80 and 136-column models)
- 285 cps (draft pica), 342 cps (draft elite)
- Advanced paper handling
  - Continuous paper
  - -3 paths for insertion (front/bottom/rear)
  - - Dual paper park and auto load (front/rear)
  - - The standard tractor unit can be set to 3 positions (2 push and 1 pull)
  - - Continuous paper can be used without removing the cut-sheet feeder (CSF)
  - Cut sheets
  - -2 paths for insertion (top/optional front)
  - - Auto loading
- 24K byte input buffer
- 16 character tables are supported for European model.
  (Italic, PC437, 850,860,863,865, 437 Greek, 851,869,852,853,857, 855,866, GOST, 861)
- 6 character tables are supported for Non-European model.
  (Italic, PC437, 850,860,863, 865)
- Default setting mode replaces DIP switches.
- Type B optional I/F boards can be installed.

Figure 1-1 shows an exterior view of the FX-870/1170.



80-column model



136-column model

Figure 1-1. External View of the FX-870/1170

1.1.2 *Options*

C806371 (U.S. version)	Plain cut sheet feeder (80-column)
C806372 (other)	Plain cut sheet feeder (80-column)
C806391 (U.S. version)	Plain cut sheet feeder (136-column)
C806392 (other)	Plain cut sheet feeder (136-column)
C806381 (U.S. version)	Cut sheet feeder (80-column)
C806382 (other)	Cut sheet feeder (80-column)
C806401 (U.S. version)	Cut sheet feeder (136-column)
C806402 (other)	Cut sheet feeder (136-column)
C800201 (U.S. version)	Tractor unit (80-column)
C800202 (other)	Tractor unit (80-column)
C800211 (U.S. version)	Tractor unit (136-column)
C800212 (other)	Tractor unit (136-column)
C814001	Front sheet guide (80-column)
C814011	Front sheet guide (136-column)
C82305 (inch screw)	Serial I/F card
C82306 (mm screw)	Serial I/F card
C82307 (inch screw)	32KB intelligent serial I/F card
C82308 (mm screw)	32KB intelligent serial I/F card
C82310 (inch screw)	32KB intelligent parallel I/F card
C82311 (mm screw)	32KB intelligent parallel I/F card
C82313	32KB IEEE-488 I/F card
#8750	Fabric ribbon cartridge (80-column)
#8755(M)	Fabric ribbon cartridge (136-column)
#8758	Fabric ribbon sub cartridge
#8310	Roll paper holder (only for 80-column model)

1.2 Specifications

1.2.1 Hardware Specifications

1.2.1.1 Printing Method

Printing method: **Impact dot matrix**

Pin configuration: **9 wires**
(diameter 0.29 mm)

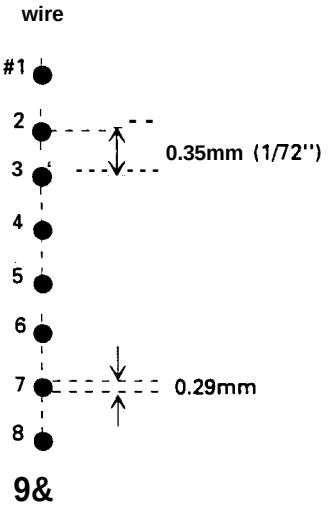


Figure 1-2. Pin Configuration

Dot matrix: **9 x 7 matrix (high-speed draft)**
9 x 9 matrix (draft)
18x 23 matrix (NLQ)

1.2.1.2 Paper Handling

Feeding method: **Friction feed (front/top)**
Push tractor feed (front/rear)
Pull tractor feed (front./rear/bottom)
Push-pull tractor feed (front/rear)

Fanfold:	**Tractor feed**
Cut sheet:	**Friction feed**
Envelope:	**Friction feed**
Label:	**Tractor feed**
Roll:	**Friction feed**

Line spacing: **1/6", 1/8", or programmable (min.1/216")**

Table 1-1. Line Feed Speed (1 line = 1/6")

	Intermittent feed		Continuous feed	
Type of paper	Thin ms	Thick ms	Thin ms (ips)	Thick ms (ips)
Fanfold paper	77	85	55 (3.0)	66 (2.5)
Cut sheet (manual)	69	77	45 (3.7)	55 (3.0)
Cut sheet (CSF)	71	77	48 (3.5)	55 (3.0)

* **Thin:** Thickness is less than or equal to 0.18 mm.
  Thick: Thickness is more than 0.18 mm.

******* precautions for Handling Paper *******

1) Friction feed

- **Set the release lever to the FRICTION position.**
- **Load the paper from the front or top entrance.**
- **Do not use continuous paper.**
- **Do not perform any reverse paper feeds within the top 8.5 m m area and bottom 22 mm area.**
- **Do not perform reverse feeds greater than 1/6" after the paper end has been detected.**
- **Use the paper-tension unit.**
- **Insert the multi-part cut sheet forms only from the front.**

2) Push tractor feed

- **Set the release lever to the REAR PUSH/FRONT PUSH position.**
- **Load the paper from the rear or front entrance.**
- **Release the friction feed mechanism.**
- **M u lti-part paper must be carbonless.**
- **Use the paper-tension unit.**
- **Do not perform reverse feeds greater than 1/6".**
- **Do not perform reverse feeding after the paper end has been detected, because accuracy of paper feed cannot be assured.**

3) Pull tractor feed

- **Set the release lever to the PULL position.**
- **Load the paper from the front, rear, or bottom entrance.**
  (The front or bottom entrance is recommended for thick paper or labels.)
- **Release the friction feed mechanism.**
- **Remove the paper-tension unit and attach the pull tractor unit.**
- **Insert the paper from either front or bottom.**
- **Multi-part paper must be carbonless.**
- **Do not perform reverse feeds.**

4) Push-pull tractor feed

- **Set the release lever to the REAR PUSH/FRONT PUSH position.**
- **Load the paper from the front or rear entrance.**
- **Release the friction feed mechanism.**
- **Remove the paper-tension unit and attach the pull tractor unit.**
- **Remove any slack in the paper between the platen and the pull tractor.**
- **Precisely adjust the horizontal position of the pull tractor and push tractor.**
- **Multi-part paper must be carbonless.**
- **Do not perform reverse feeds greater than 1/6".**
- **Do not perform reverse feeds after the paper end has been detected.**

1.2.1.3 Paper Specifications

See Tables 1-2, 1-3, 1-4, 1-5, 1-6, and 1-7.
Recycled paper, envelopes, and labels require the following environmental conditions.

Normal environment
Temperature: 15-25 deg. C (59-68 deg. F)
Humidity: 30-60 % RH

Table 1-2. Specifications for Cut Sheets (Plain Paper)

Width		
top insertion	**148-257 mm (5.8-10.1")**	**80-column**
	148-420 mm (5.8-16.5")	**136-column**
front insertion	**182-257 mm (7.2-10.1")**	**80-column**
	182-364 mm (7.2-14.3")	**136-column**
Length	**Up to *364* mm (14.3")**	
Thickness	**0.065-0.14 mm *(0.0025-0.0055")***	
Weight	**14-24 lb (45-78 Kg) (52.3-90 g/m²)**	
Quality	**Plain paper**	
	Recycled paper (in normal environment)	

Table 1-3. Specifications for Cut Sheets (Carbonless Duplicating Paper)

Width		
front insertion	182-257 mm (7.2-10.1")	80-column
	182-364 mm (7.2-14.3")	136-column
Length	Up to 297 mm (1 1.7")	80-column
	Up to 364 mm (14.3")	136-column
Quality	Carbonless duplicating paper	
Thickness	0.12-0.22 mm (0.0047-0.0086")	
Weight	12-15 lb (34-50 kg) (40-58 g/m²) - each	
Copies	4 sheets (1 original + 3 copies) maximum	

Table 1-4. Specifications for Continuous Paper

Width	101-254 mm (4-10")	80-column
	101-406 mm (4-16")	136-column
Thickness	0.065-0.32 mm (0.0025-0.012")	
Weight	14-22 lb (45-70 kg) (52.3-82 g/m²) - single sheet	
	12-15 lb (34-50 kg) (40-58.2 g/m²) - each	
Quality	Plain or carbonless duplicating paper	
	Recycled paper (in normal environment)	
	(with push tractor and optional pull tractor)	
Copies	4 sheets (1 original + 3 copies) maximum	

Table 1-5. Specifications for Envelopes

Size	No. 6 166 mm x 92 mm
	No. 10 240 mm x 104 mm
Thickness	0.16-0.52 mm (0.0063-0.0197")
	* Differences in thickness within the printing area must be less than 0.25 mm (0.0098").
Weight	12-24 lb (39-78 kg) (45-91 g/m²)
Quality	Bond paper, plain paper, airmail

Notes: 1) Envelopes must be inserted from the top.

2) Keep the longer side of the envelope horizontal during insertion.

3) Set the left edge of a No. 6 envelope at the sheet guide setting mark.

4) Do not feed envelopes with the cut sheet feeder.

Table 1-6. Specifications for Labels

Size	*2 1/2"* **x 15/16"**
	4" x 15/16"
	4" x 17/16"
Thickness	**0.07-0.09 mm (0.0028-0.0031") - base paper**
	0.16-0.19 mm *(0.0063-0.0075")* **- total**
Quality	**Plain paper**

Notes: 1) Labels must be fanfold.

2) Example of labels **AVERY CONTINUOUS FORM LABELS**

AVERY MINI-LINE LABELS

3) Labels should be used with the pull tractor (front, bottom), or with the front push tractor.

4) Do not perform reverse feed at any time. (including by hand).

5) Remove labels from the paper path when not in use.

Table 1-7. Specifications for Roll Paper

Size	**216 +/- 3 mm (8.5 +/- 0.12")**
Thickness	**0.07-0.09 mm** *(0.0028-0.0035")*
Weight	*14-22* **lb (45-70 Kg) (52.3-82 g/m²)**
Quality	**Plain paper**

Note: Roll paper isavailable only forthe 80-column model optionally, and itsdiameter must notexceed 127 mm (5").

1.2.1.4 Printable Area

1) Cut sheets

top insertion	**148-257 mm (5.8-10.1"): 80 columns**
	148-420 mm (5.8-16.5") : 136 columns
front insertion	**182-257 mm (7.2-10.1"): 80 columns**
	182-364 mm (7.2-14.3"): 136 columns

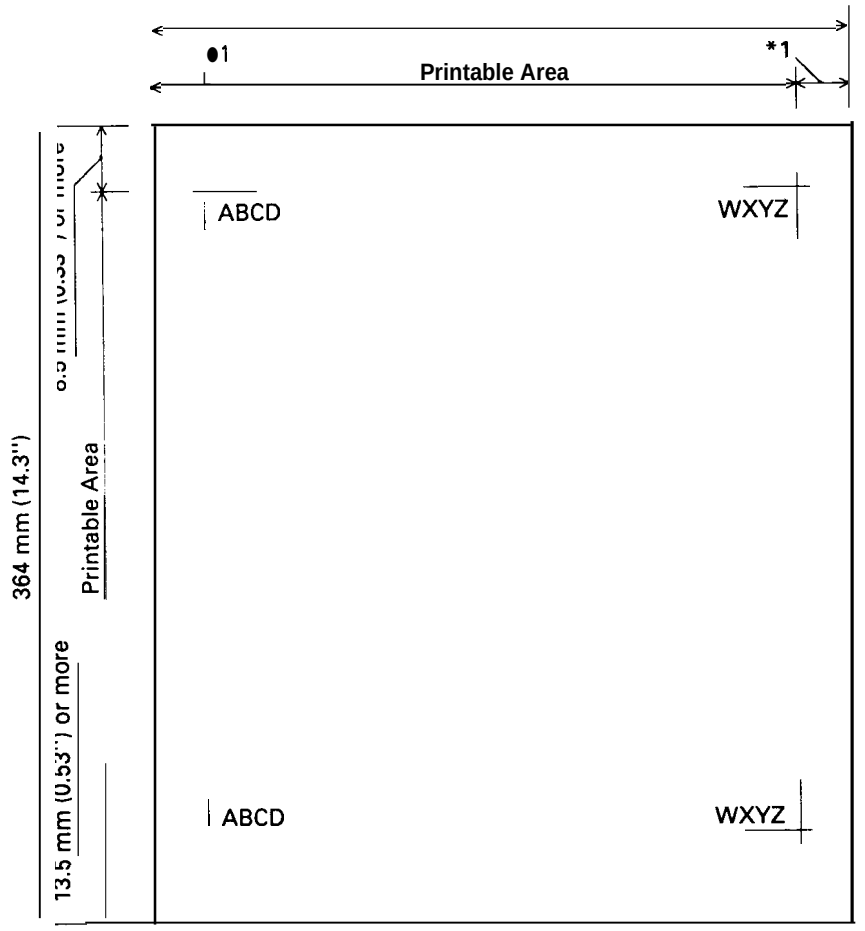


Figure 1-3. Printable Area for Cut Sheets

*** 1 3.0 mm (0.1 2") or more when the paper width is less than 364 mm (14.3"). 25 mm (0.9") or more when the paper width is 420 mm (16.5"). (136-column)**
3.0 mm (0.12") or more. (80-column)

Note: Paper feed accuracy cannot be assured within 24 mm (0.94") from the bottom edge of the paper. (top insertion)

Paper feed accuracy cannot be assured within 48.5 mm (1.9") from the bottom edge of the paper. (front insertion)

2) Continuous paper

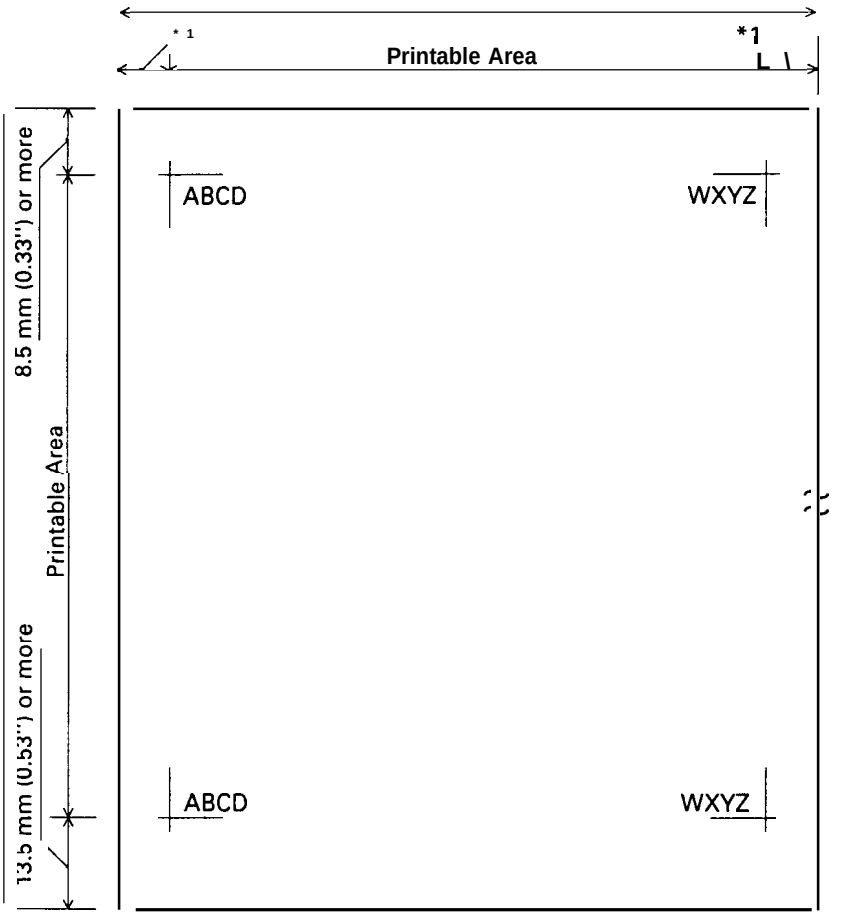


Figure 1-4. Printable Area for Continuous Paper

***1 13 mm (0.51”) or more when the paper width is 101 mm to 241 mm (4” to 9.5”). 25 mm (1.0”) or more when the paper width is 254 mm (10”). (80 columns) .**
13 mm (0.51”) or more when the paper width is 101 mm to 377.8 mm (4” to 14.87”). 25 mm or more when the paper width is 381 mm to 406 mm (15” to 16”). (136 columns)

3) Roll paper (80-column model only)

top insertion **216 +/- 3 mm (8.5 +/- 0.12")**

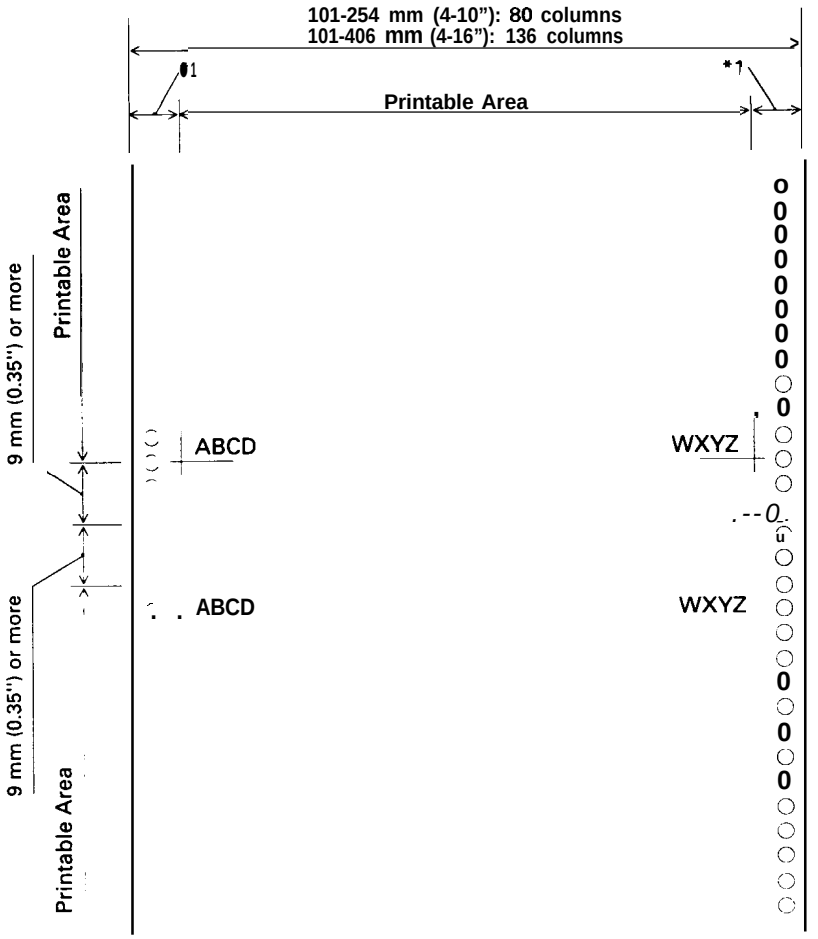


Figure 1-5. Printable Area for Roll Paper

***1 3.0 mm (0.1 2") or more**

Note: Paper feed accuracy cannot be assured within 24 mm (0.94") from the bottom edge of the paper. (top insertion only)

1.2.1.5 Ribbon Cartridge

Ribbon **Cartridge type (same as FX series)**

 # 8750 - 80-column model

 # 8755(M) - 136-column model

 # 8758- Subcartridge

Color **Black**

Life of ribbon **3 x 106 characters (at 14 dots/character)**

1.2.1.6 Electrical Specifications

See Table 1-8 and 1-9.

Table 1-8. Electrical Specifications for 120V Model

Rated voltage	120 VAC
Input voltage range	103.5-132 V AC
Rated frequency range	50-60 Hz
Input frequency range	49.5-60.5 Hz
Rated current	1.8 A
Power consumption	Approx. 45 W (80 columns) Approx. 45 W (136 columns) (Self test in draft mode, 10 cpi)
Dielectric strength	1.0 kVAC, 1 second (Between AC line and chassis)

Table 1-9. Electrical Specifications for **220/240V** *Model*

Rated voltage	220-240 VAC
Input voltage range	198-264 VAC
Rated frequency range	50-60 Hz
Input frequency range	49.5-60.5 Hz
Rated current	0.9 A
Power consumption	Approx. 45 W (80 columns) Approx. 45 W (136 columns) (Self test in draft mode, 10 cpi)
Dielectric strength	1.5 kVAC, 1 second (Between AC line and chassis)

1.2.1.7 Environmental Conditions

Table 1-10. Environmental Conditions

Temperature	5 to 35 deg.C (41 to 95 deg. F) — operating -30 to 60 deg.C (-22 to 140 deg. F) — in shipment container
Humidity	10 to 80 %. RH — operating 5 to 85 % RH — non-operating
Resistance to shock	IG, within 1 ms — operating 2G, within 1 ms — non-operating
Resistance to vibration	0.25G, 55 Hz max. — operating 0.50G, 55 Hz max. — non-operating

1.2.1.8 Reliability

MCBF	5 million lines (excluding a printhead) (MCBF: Mean Cycles Between Failures)
MTBF (expected value)	4000 power on hours (duty cycle 25%) — 80-column model 6000 power on hours (duty cycle 25%) —136-column model (MTBF : Mean Time Between Failures)
Printhead Life	100 million characters (14 dots/character)

1.2.1.9 Safety Approvals

Safety standards	UL1950 with D3	(U.S.A model)
	CSA22.2#220	
	EN 60950 (TUV)	(EUR model)
R.F.I	FCC class B	(U.S.A model)
	VDE0871 (Self certification)	(EUR model)

1.2.2 Firmware Specifications

1.2.2.1 Print Control

Printing direction

Text mode Bidirectional printing with logic seeking.
(Unidirectional printing can be specified by software.)

Bit image mode Unidirectional printing

Character sets ASCII characters

— ESC/P mode —

International characters (13 countries) and their italics
PC 437,850,860,863,865, 437 Greek, 851,869,852,853,857, 855,866, GOST, 861 (European model)
PC 437,850,860,863,865 (Non-European model)

— IBM mode —

PC 473,865
(PC = Personal Computer character table)
Fonts: Draft, NLQ Roman, NLQ Saris serif

Table 1-11. Character Size and Pitch

Type of letters	Width [mm]	Height [mm]	Character pitch [mm]
Pica	2.1	3.1	2.54 (10 cpi)
Condensed	1.05	3.1	1.48 (17 cpi)
Elite	1.7	3.1	2.11 (12 cpi)
Condensed elite	0.85	3.1	1.27 (20 cpi)

Table 1-12. Printable Columns

Type of letters	Printable columns [cpl]	
	80-column model	136-column model
Pica	80	136
Condensed	137	233
Elite	96	163
Condensed elite	160	272

Table 1-13. Print Speed

Type of letters	Print speed [cps]
High-speed draft	380 (320) [1421
Draft pica	285 [142]
Draft elite	342 [170]
Condensed draft pica	243 [122]
Emphasized draft pica	142 [711
NLQ normal pica	57

Notes: 1) The printing speed for high speed draft is reduced to the value in "( )" with thick paper (over 0.18 mm).

2) The printing speed for high speed draft is reduced to the value of "draft pica" when any graphic character is in the line.

3) The printing speed for draft is reduced to the value in "[ ]" when any italic character is in the line.

4) The speed for high duty printing is reduced to approximately half of each speed, except for the printing speed in "[l".

1.2.2.2 Input Data Buffer

24K **or OK bytes (selectable with power on default settings; see Section 1.5.2.)**

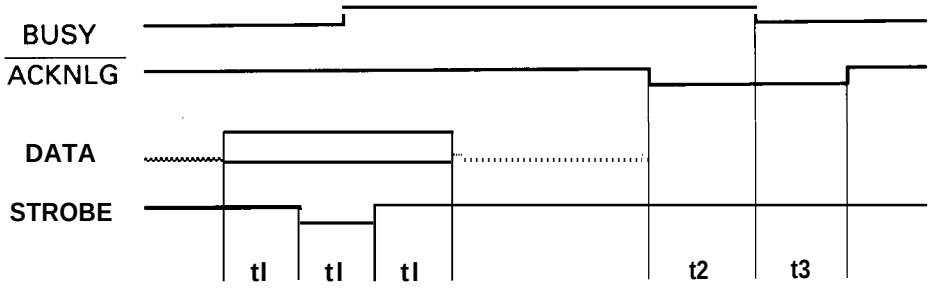
, 1.3 Interface

This printer has a built-in, 8-bit centronics parallel interface.

1.3.1 Parallel Interface

Data transmission mode	**8-bit parallel**
Synchronization	**Controlled by external STROBE pulse.**
Handshaking	**Controlled by ACKNLG and BUSY signals.**
Logic level	**TTL- compatible**
Connector plug	**57-30360 (Amphenol) or equivalent**

It is recommended that the interface cable be as short as possible (10 feet maximum).



t_1: 0.5 us (min.)
t2: 7 us (approx.)
t3: 5 us (approx.)

Figure 1-6. Data Transmission Timing

Table 1-14. Connector Pin Assignments and Signal Functions

Signal Pin No.	Return Pin No.	Signal Name	Dir.	Description
1	19	$\overline{\text{STROBE}}$	In	$\overline{\text{STROBE}}$ pulse to read data in. Pulse width must be more than 0.5 μs at receiving terminal.
2	20	DATA 1	In	These signals represent the 1st to 8th bits of parallel data, respectively. Each signal is HIGH when data is a logical 1 and LOW when a logical O.
3	21	DATA 2	In	
4	22	DATA 3	In	
5	23	DATA 4	In	
6	24	DATA 5	In	
7	25	DATA 6	In	
8	26	DATA 7	In	
9	27	DATA 8	In	

(Continued)

Signal Pin No.	Return Pin No.	Signal Name	Dir.	Description
10	28	$\overline{\text{ACKNLG}}$	out	Approx.12 μs pulse. LOW indicates that data has been received and that the printer is ready to accept more data.
11	29	BUSY	out	A HIGH signal indicates that the printer cannot receive more data. The signal becomes HIGH in the following cases: 1. During data entry 2. During input buffer full 3. During printer error status
12	30	PE	out	A HIGH signal indicates that the printer is out of paper.
13	—	—	—	Pulled up to +5V through a 3.3 K-ohm resistor.
14	—	$\overline{\text{AUTO FEED}}$ XT	In	When this signal is LOW, paper is automatically fed one line upon receipt of a CR code. (The signal level can be set LOW by default.)
15	—	NC	—	Not used.
16	—	Ov	—	Logic GND level.
17	—	CHASSIS GND	—	Printer chassis GND. In the printer, the chassis GND and the logic GND are short-circuited.
18	—	NC	—	Not used.
9 to 30	—	GND	—	TWISTED-PAIR RETURN signal GND level.
31	—	INIT	In	When the level of this signal becomes LOW, the printer controller is reset to its initial state and the print buffer is cleared. This signal is normally atthe HIGH level, and its pulse width must be more than 50 μs at the receiving terminal.
32	—	$\overline{\text{ERROR}}$	out	The level of this signal becomes LOW when the printer is in — 1. Paper-out status 2. Error status
33	—	GND	—	TWISTED-PAIR RETURN signal GND level.
34	—	NC	—	Not used.
35	—	—	—	Pulled up to +5V through a 3.3 K-ohm resistor.
36	—	$\overline{\text{SLCT IN}}$	In	The data between DC3 and DC1 is invalid when this signal is HIGH. (The level of this signal is factory set to LOW.)

Notes: 1) Direction of signal flow is as viewed from the printer.

2) Return means TWISTED PAIR RETURN and is to be connected at signal ground level.

3) Be sure to use a twisted-pair cable for each signal and always complete connection on the return side. To prevent noise effectively, these cables should be shielded and connected to the chassis of the host computer and the printer, respectively.

4) All interface conditions are based on TTL level. Both the rise and fall times of each signal must be less than 0.2 μs.

5) Data transfer must not be carried out by ignoring the $\overline{\text{ACKNLG}}$ or BUSY signal.
(Data transfer to this printer can be carried out only after confirming the $\overline{\text{ACKNLG}}$ signal or when the level of the BUSY signal is LOW.)

, 1.3.2 Optional Interface

The following interface cards can be used for this printer.

Table 1-15. Optional Interface

Catalog #	Type
C82305* (inch screw)	Serial I/F card
C82306* (inch screw)	Serial I/F card
C82307* (inch screw)	32KB intelligent serial I/F card
C82308* (inch screw)	32KB intelligent serial I/F card
C8231O* (inch screw)	32KB intelligent parallel I/F card
C82312* (inch screw)	32KB intelligent parallel I/F card
C82313* (inch screw)	Local Talk I/F card card
C82314* (inch screw)	Coax I/F card
C82315* (inch screw)	Twinax I/F card

Note: The last digit of catalog # "*" varies depending on the country.

1.4 Control Panel

1.4.1 Components

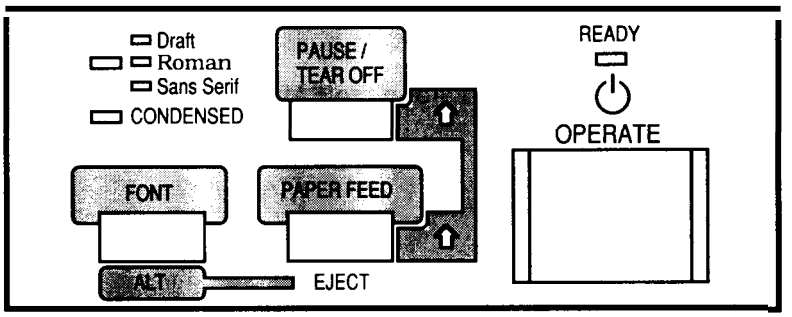


Figure 1-7. Control Panel

Buttons

OPERATE *1* **lock type button**

PAUSE/TEAR OFF

PAPER FEED **(non-lock Push type buttons)**

FONT

Indicators **3 LEDs**

READY — (green)

FONT (Draft, Roman, Saris serif) — (green)

CONDENSED — (green)

1.4.2 Buttons

[PAUSEI

Selects printing or pause alternately when there is some data to print in the input buffer.

Advances continuous paper to tear-off position when the printer has printed all received data and is ready to receive more print data.

[PAPER FEED]

Advances the paper line by line using the current line spacing setting while the printer is ready to print or paused by PAUSE button.
Holding down the button for about 1 second, it advances the paper to the next top-of-form (TOF) position.

Loads continuous paper inserted in the push tractor or cut sheets in the CSF when the printer has detected a paper out.

[FONT]

Selects NLQ Roman, NLQ Saris serif, Draft, and condensed of those 3 fonts in rotation:
(Draft ⟶ Draft cond. ⟶ Roman ⟶ Roman cond. ⟶ Sans. ⟶ Saris. cond. ⟶ Draft ⟶ Draft cond. ....)
(The factory *setting* is the Draft, uncondensed font)
The selection is executed when the button is released.
The selection is stored in non-volatile memory.

Enables the micro feed function when pressed along the PAUSE or PAPER FEED button. The micro feed function is described below.

[FONT]+[PAUSE] or [FONT]+[PAPER FEED]

Activates the function. The PAUSE and PAPER FEED buttons micro-adjust the paper position up or down, as described below:

[FONT]+ [PAUSE]

Advances the paper forward by 1/108 inch per step.

[FONT]+[PAPER FEED]

Moves the paper backward by 1/108 inch per step.

Pressing FONT along with PAUSE or PAPER FEED lets you micro-adjust the following positions:

- **the loading position, immediately after paper is loaded in the printer.**
- **the tear-off position, when paper has been advanced for tear off.**
- **the current print position.**

The adjusted loading and tear-off positions will be stored in non-volatile memory (except for the loading position of cut sheets by manual insertion).

You can end micro feed (or micro adjust) mode by pressing the FONT button again. The printer exits this mode automatically in several seconds if no operation is performed.

Pressing FONT+ PAUSE or FONT+ PAPER FEED switches bins when a double-bin CSF is installed, there is no paper in the paper path, and friction feed is selected.

[FONT]+[PAPER FEED]

Ejects a cut sheet forward or feeds continuous paper backward to the paper park position.

1.4.3 Indicators

<READY>

Ready to print :	*ON*
Tear-off :	**Blinking (75% duty)**
Pause :	**Blinking (50% duty)**
Paper error :	**Blinking (25% duty)**
Head hot :	**Blinking (25% duty)**

<FONT>

Draft :	**OFF**
NLQ Roman :	**ON**
NLQ Saris serif:	**Blinking**

<CONDENSED>

Normal pitch :	**OFF**
Condensed pitch :	**ON**

When an error occurs, the READY, FONT, and CONDENSED LEDs will be used in combination to identify the error.

All indicators blink simultaneously: Fatal error
All indicators blink sequentially in the clockwise direction: Voltage error

1.5 Functions

1.5.1 Default Settings

Users can set certain default parameters, which will be used at printer initialization.

To change the parameters shown in Table 1-16, Group 1 Features, follow the steps below.

1. **Turn on the printer while pressing the FONT button. Then, the current default settings will be printed on the paper loaded in the paper path.**

2. **Press the FONT button to select a parameter. The FONT and CONDENSED LEDs turn on, off, or blink to show the current parameter selected. Press the FONT button as many times as necessary to make the LEDs indicate the setting you want. (See Table 1-16.)**

3. **Press the PAUSE button to change the setting. The READY LED shows your selection.**

4. **Repeat this procedure for any Group 1 feature you want to change. (After you have set the feature at the bottom of Table 1-16, the printer returns to the first feature in Table 1-16.)**

5. **When all the settings are as you want them, turn off the printer. The settings will be stored in non-volatile memory.**

To change the settings shown in Table 1-17, Group 2 Features (ESC/P mode), or in Table 1-18, Group 2 Features (IBM mode), follow the steps below.

1. **Turn on the printer while pressing the FONT and PAUSE buttons. Then, the current CG table for either ESC/P or IBM mode will be printed on the paper loaded in the paper path.**

2. **Press the FONT button to select the character table. The FONT, CONDENSED, and READY LEDs turn on, off, or blink to show your selection. Press the FONT button as many times as necessary until the FONT, CONDENSED, and READY LEDs indicate the character set you want.**

3. **Turn off the printer. The settings will be stored in non-volatile memory.**

Table 1-16. Group 1 Features

FONT LED	COND. LED	Feature	Setting	READY LED
OFF	ON	Emulation	ESC/P	OFF
			IBM Proprinter	ON
OFF	BLINKS	Character pitch	Pica	OFF
			Elite	ON
ON	OFF	Page length	11 inch	OFF
			12 inch	ON
ON	ON		8.5 inch	OFF
			70/6 inch (A4)	ON
ON	BLINKS	Skip over perforation	No skip	OFF
			Skip 1 inch	ON
BLINKS	OFF	Zero face	o	OFF
			0	ON
BLINKS	ON	Auto tear-off	Valid	OFF
			Invalid	ON
BLINKS	BLINKS	Auto LF with CR	Depends on I/F	OFF
			Valid	ON

Note: The factory setting is that the READY LED is OFF for all features.