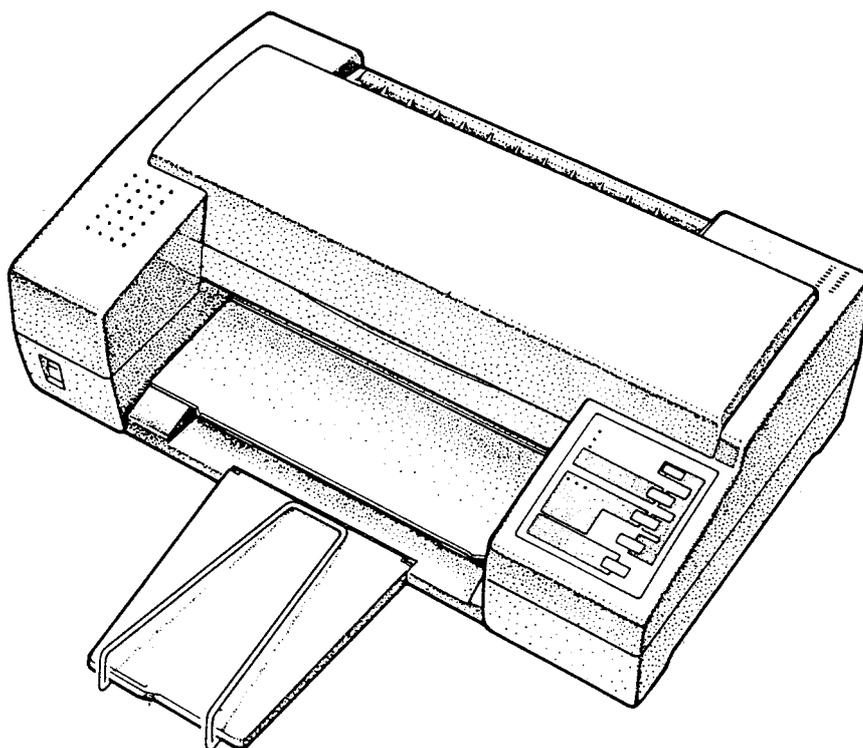


EPSON TERMINAL PRINTER

Stylus[™] 800

SERVICE MANUAL



EPSON

4001968
Rev. A

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PRECAUTIONS

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

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

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

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

DANGER

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

PREFACE

This manual describes functions, theory of electrical and mechanical operations, maintenance, and repair of stylus 800.

The instructions and procedures included herein are intended for the experience repair technician, and attention should be given to the precautions on the preceding page. The chapters are organized as follows:

CHAPTER 1. GENERAL DESCRIPTION

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

CHAPTER 2. OPERATING PRINCIPLES

Describes the theory of printer operation.

CHAPTER 3. DISASSEMBLY AND ASSEMBLY

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

CHAPTER 4. ADJUSTMENTS

Includes a step-by-step guide for adjustment.

CHAPTER 5. TROUBLESHOOTING

Provides Epson-approved techniques for adjustment.

CHAPTER 6. MAINTENANCE

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

APPENDIX

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

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

REVISION SHEET

Revision	Issue Date	Revision Page
Rev. A	December 18, 1992	First issue
Rev. B	May 7, 1993	Added information: Chapter 2 (Page 2-23) Chapter 3 (Page 3-5/6) Chapter 6 (Page 6-1/2)
Rev. C	June 11, 1993	Corrected the figure: Chapter 2 (Page 2-8)
Rev. D	March 10, 1994	Added information: Appendix (Page A-i, A-5', A-7', A-8', A-9', A-1 O')

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Chapter 1 General Description

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1.1 FEATURES

The Stylus 800 is a serial inkjet printer that uses a newly developed inkjet technology to accomplish a superb quality output with high-speed printing. The major features of this printer are:

- ❑ High print quality from a new inkjet technology.
- ❑ Fast printing of LQ characters at 150 cps.
- ❑ Compact design saves precious work space.
- ❑ Built-in auto sheet feeder with a capacity for a maximum of 100 cut sheets (either A4 or Letter).
- ❑ Equipped with 4 scalable fonts and 15 bit-mapped fonts, standard.
- ❑ 8 character tables for the U.S.
 - 6 character tables for Pacific countries.
 - 16 character tables for European countries.

The figure below shows a view of the printer.

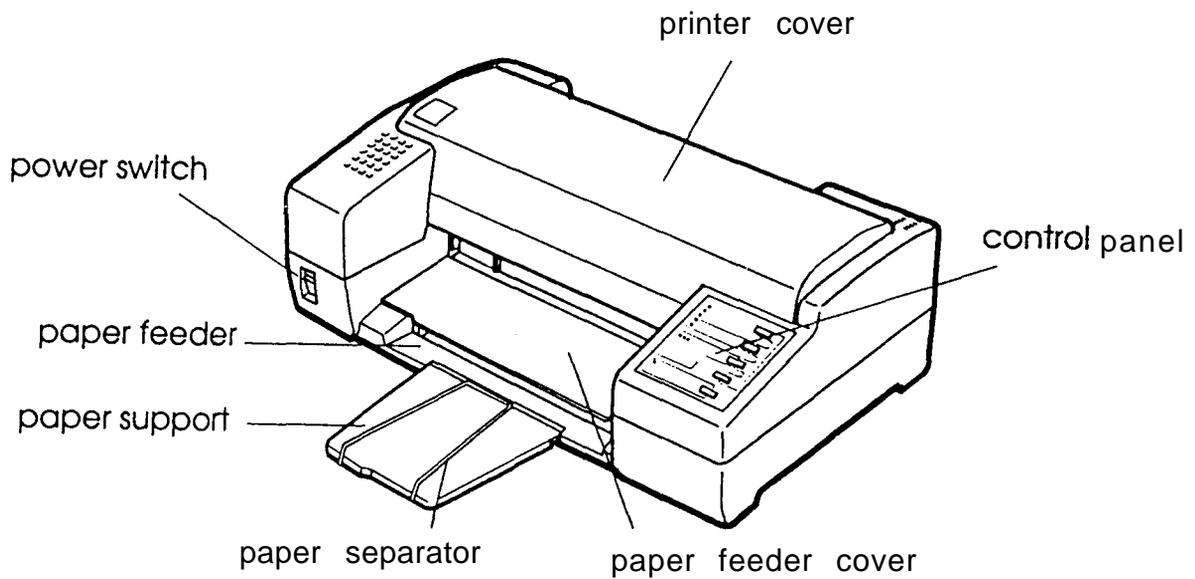


Figure 1-1. View of the Stylus 800

1.2 SPECIFICATIONS

This section provides detailed statistics for this printer.

1.2.1 Printing Specification

Print system: On-demand ink jet system
 Nozzle configuration: 48 nozzles (12 nozzles x 4 staggered columns)

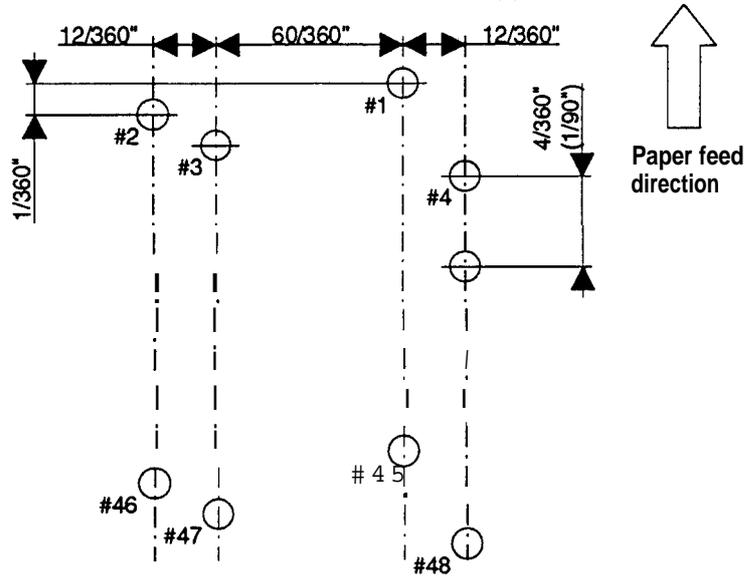


Figure 1-2. Nozzle Configuration

Printer direction: Bidirectional printing with logical seeking control
 PMt speed: See Table 1-1.
 Printable columns: See Table 1-1.

Table 1-1. Print Speed and Printable Columns

Character Pitch	Printable Columns	Print Speed (LQ)
10 cpi	80	150 cps
12 cpi	96	180 cps
15 cpi	120	225 cps
17 cpi (10 cpi/Condensed)	137	257 cps
20 cpi (12 cpi/Condensed)	160	300 cps

Character sets: Legal and 14 international character sets.
 Character tables: See Table 1-2.

Table 1-2. Character Tables

Character Table	US Version	European Version	Pacific Version
ITALIC	○	○	○
PC437 (U.S./Standard Europe)	○	○	○
PC850 (Multilingual)	○	○	○
PC860 (Portuguese)	○	○	○
PC863 (Canadian-French)	○	○	○
PC865 (Nordic)	○	○	○
PC437 Greek	x	○	x
PC851 (Greek)	x	○	x
PC852 (East Europe)	x	○	x
PC853 (Turkish)	x	○	x
PC855 (Cyrillic)	x	○	x
PC857 (Turkish)	x	○	x
PC866 (Russian)	x	○	x
ABICOMP	○	x	x
BRASCII	○	x	x

Fonts: *[Bit-mapped fonts]*
 - EPSON Roman (10cpi/12cpi/15cpi/Proportional)
 - EPSON **Sans** serif (10/12/15/Proportional)
 - EPSON Courier (10/12/15)
 - EPSON Prestige (10/12)
 - EPSON Script (10/12)

[Scalable fonts]
 - EPSON Roman **8-32 points (Unit= 2 points)**
 - EPSON **Sans** serif **8-32 points (Unit= 2 points)**
 - EPSON Roman T **8-32 points (Unit= 2 points)**
 - EPSON **Sans Serif** H **8-32 points (Unit= 2 points)**

Print mode: *[For Bit-mapped fonts]*
 Selection and mixture of the following mode are allowed.
 - Print quality (LQ)
 - Character pitch (10/12/15 cpi or proportional)
 - Condensed (not available with 15 cpi character pitch)
 - Double width - Double height
 - Emphasized - Double strike
 - Italic - Underline
 - Double underline - Overscore
 - Strike through - Shadow / outline

[For scalable fonts]
 - Emphasized - Double strike
 - Italic - Underline
 - Double underline - Overscore
 - Strike through - Shadow / outline

Control codes: ESC/P2

1.2.2 Paper Handling Specification

Feeding system: Friction feed from built-in sheet feeder or manual insertion slot.

Notes: The following operation are not allowed.

1. Reverse feeding within 3 mm (0.12 inches) from the top edge of the paper or 16 mm (0.63 inches) from the bottom edge of the paper.

2. Reverse feeding beyond 7.9 mm (0.3 inches).

Feeding pitch: 1/6, 1/8 inch feed or programmable with a 1/360 inch minimum increment.

Paper path: Built-in sheet feeder (front entry)
Manual insertion slot (Top-rear entry)

Feeding speed: 87 msec. (at 1/6 inch feed pitch)

1.2.3 Paper Specification

Usable paper:

Cut sheet [With Built-in sheet feeder]

Size: For European/Pacific version:
A4 (W x L: 210 mm (8.3") x 297 mm (11.7"))
For U.S. version:
Letter (W x L: 216 mm (8.5") x 279 mm (11.0"))
Thickness: 0.065-0.14 mm (0.0026 - 0.0055")
Weight: 64 - 90 g/m² (18 -24 lb./55 - 78 Kg)
Quality: Bond Paper, Photocopier paper

[With manual insertion]

Width: 182-216 mm (7.2 - 8.5")
Length: 257- 297 mm (10.1 - 11.7")
Thickness: 0.065-0.11 mm (0.0026- 0.0043")
Weight: 52- 90 g/m² (14 -24 lb / 45- 78 Kg)
Quality: Bond Paper, Photocopier paper

<Envelope>

Size: #6 (W x L: 166 mm (6½") x 92 mm (35/8"))
#10 (W x L: 240 mm (9½") x 104 mm (4½"))
Thickness: 0.16-0.52 mm (0.0063 - 0.0197")

Note: The variation in paper thickness within the printable area must be 0.25 mm (0.0098") or less.

Weight: 45-90 g/m² (12 -24 lb.)
Quality: Bond paper, Airmail, Photocopier paper

Notes 1. Envelopes are usable only with manual insertion feed.

2. Printing with envelopes guaranteed only under normal temperature and humidity condition.

3. Insert envelopes into the manual insertion slot sideways.

Printable area: Cut Sheet (with built-in sheet feeder)

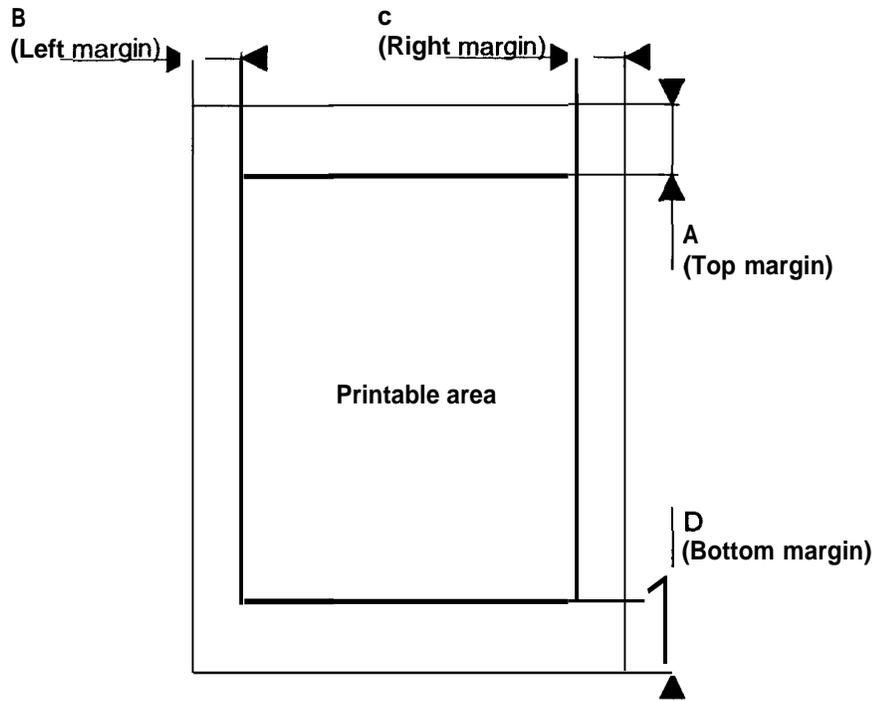


Figure 1-3. Printable Area - Cut Sheet (Built-in Sheet Feeder)

Cut Sheet / Envelope (with the manual insertion slot)

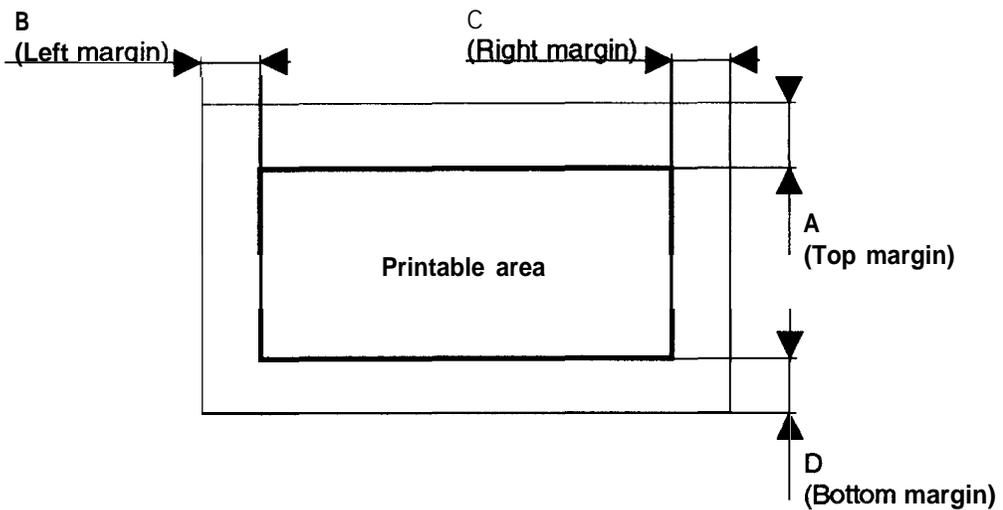


Figure 1-4. Printable Area - Cut Sheet/ Envelope (Manual Insertion Slot)

- Note:**
- A:** The minimum top margin= 3 mm (0.12")
 - B:** The minimum left margin= 3 mm (0.12")
 - C:** The minimum right margin is:
 - A4 size= 3.8 mm (0.15")
 - Letter size = 9.7mm (0.38")
 - Manual insertion = 3 mm (0.12")
 - D:** The minimum bottom margin= 13 mm (0.51")

Adjust lever settings: The adjust lever, attached to the carriage unit, must be set to proper position for the paper thickness, as shown in Table 1-3.

Table 1-3. Adjust Lever Settings

Lever Position	Paper Type	Paper Thickness
LEFT	Cut Sheets	0.065 ~ 0.11 mm (0.0026 ~ 0.0055")
RIGHT	Envelopes	0.16- 0.52 mm (0.0063- 0.020")

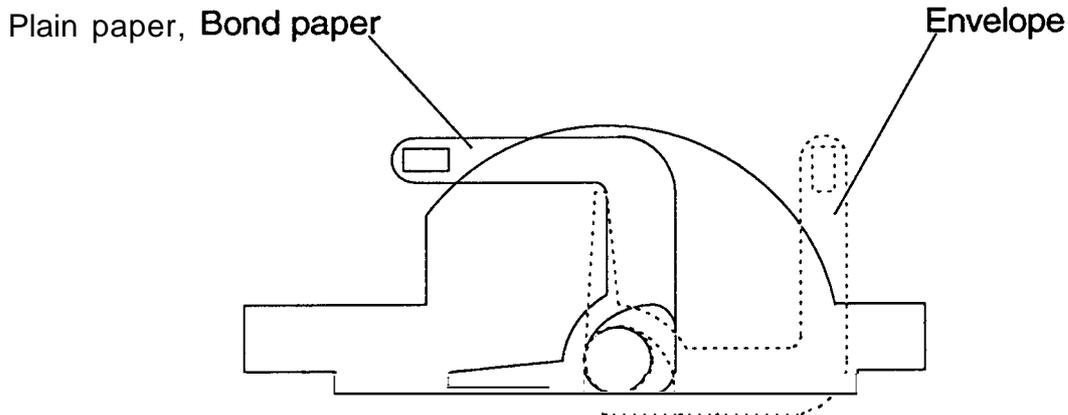


Figure 1-5. Adjust Lever

1.2.4 Ink Cartridge

Type: Exclusive cartridge (S020025)

Ink color: Black

Print capacity: 0.7 million characters (LQ)

Note: This figure is equivalent to a 700page print volume when printing is performed at 1000 characters perpage on letter or A4-size paper.

Ink Capacity: 29.0+0.5/-1.0 cc

Life: The effective life from the indicated production date is:
-2 years (total period of time in package and after unpacking)
-6 months (after unpacking)

Temperature conditions: [Storage] -30- 40°C (-22 -104 °F)
(Up to 1 month at 40°C (140 °F))
[Transport] -30 ~ 60°C (-22 -140 °F)
(Up to 1 month at 40°C (104 °F) or 120 hours at 60°C (140 °F))

Note: The ink inside the ink cartridge freezes if it kept below -3°C (26.6 °F). It requires several hours to unfreeze at room temperature (25 °C (77 °F)).

Dimension: Width 28.5 mm (1.12")
Depth 54.5 mm (2.15")
Height 38.5 mm (1.52")

1.2.5 Environmental Conditions

Table 1-4. Environmental Conditions

Description	Operating	Storage
Temperature	10-35 °c (50 - 95 °F)(*1)	-20- 60 °C (-4 - 140 °F) (*2)
Humidity	20- 80% RH (*1,*3)	5- 85% RH (*2,*3)
Resistance to shock	1 G, within 1 msec.	2 G, within 2 msec. (*2)
Resistance to vibration	0.15 G, 10-55 Hz	0.50 G, 10-55 Hz (*2)

Note: ● 1 = Operating conditions must be in this range.
 *2= When the printer is in the shipping container.
 *3 = Without condensation.

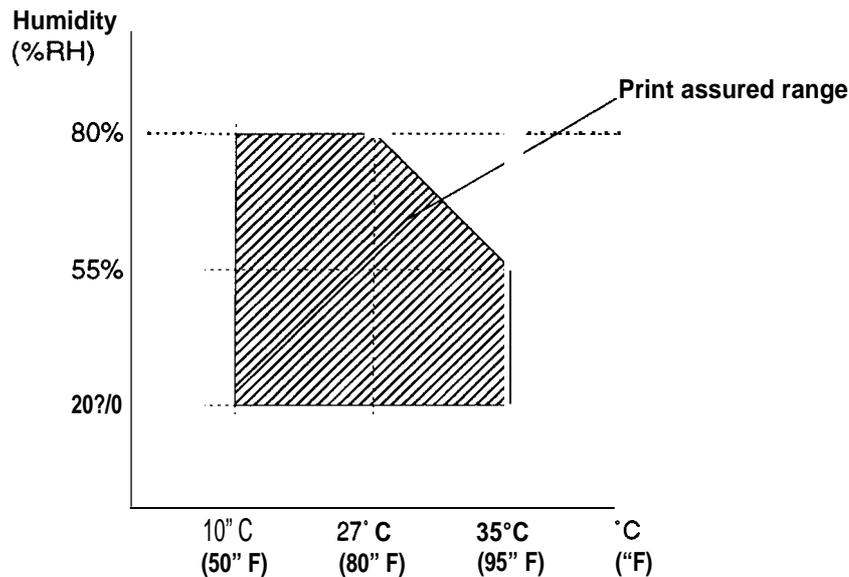


Figure 1-6. Temperature/ Humidity Range

1.2.6 Electrical Specifications

Table 1-5. Electrical Specifications

Item	120V Version	220- 240V Version
Rated voltage	120V AC	220- 240V AC
Input voltage range	103.5- 132V	198- 264V
Rated frequency range	50- 60 Hz	50- 60 Hz
Input frequency range	49.5- 60.5 Hz	49.5- 60.5 Hz
Rated current	0.5 A	0.3 A
Power consumption	Approx. 13W (self test with 10 cpi LQ characters)	Approx. 13W (self test with 10 cpi LQ characters)
Insulation resistance	10 MΩ, minimum (applying 500VDC between AC line and chassis)	10 MΩ, minimum (applying 500VDC between AC line and chassis)
Dielectric strength	1000VAC rms -1 minute or 1200VAC rms -1 second (between AC line and chassis)	1500VAC rms -1 minute (between AC line and chassis)

1.2.7 Reliability

MTBF:	4000 power on hours (POH) at a duty cycle of 10%
MCBF:	3 million lines (excluding the printhead)
Printhead life:	1 billion dots per nozzle
Total print volume:	75000 pages (with A4 or Letter size paper)

1.2.8 Safety Approval

Safety standards:	US version:	UL1950 with D3 CSA22.2 #220
	European version:	EN 60950 (TÜV) IEC 950 (SEMKO, DEMKO, NEMKO, SETI)
Radio frequency interface (RFI):	US version:	FCC part 15, subpart B, class B
	European version:	Vfg. 243 (VDE 0878 part 3, part 30)
		EN 55022 (CISPR Pub.22) class B

1.2.9 Physical Specification

Size (W x D x H):	435 x 264X 154 (mm) (17.1X 10.4X 6.1 (inch))
Weight	Approx. 5.0 Kg (excluding ink cartridge)

1.3 INTERFACE SPECIFICATION

The Stylus 800 is equipped with an 8 bit parallel interface, standard.

Data format: 8 bit parallel
 Synchronization: STROBE pulse synchronization
 Handshaking: By BUSY and ACKNLG signals
 Signal level: TTL-compatible level
 Adaptable connector: 36-pin 57-30360 (Amphenol) or equivalent
 Data transmission timing: See Figure 1-7.

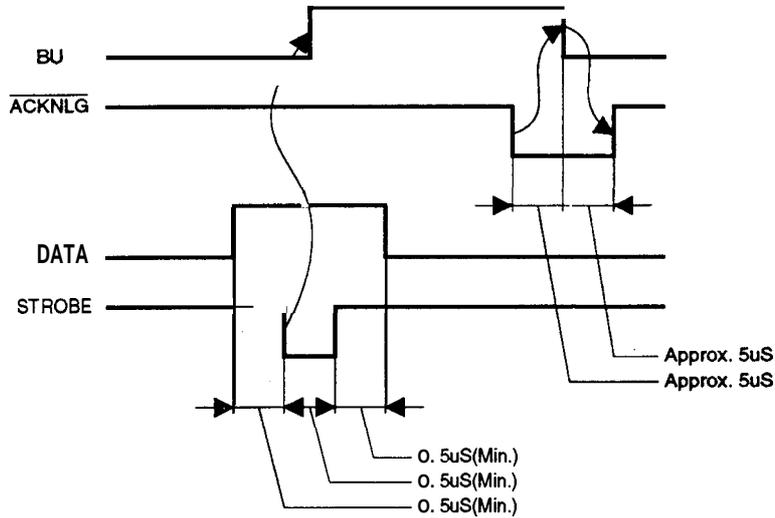


Figure 1-7. Data Transmission Timing

Table 1-6 shows the connector pin assignments and signal functions of the 8-bit parallel interface.

Table 1-6. Signal and Connector Pin Assignments

Pin No.	Signal Name	I/O	Description
1	STROBE	I	The STROBE pulse is used to read data from the host computer. The pulse width must be 0.5@ or more. Normally, it is HIGH, and data is latched with rising edge of this signal.
2-9	DATA 1-8	I	DATA 1-8 are parallel data bits. When one of these signals is HIGH, the data bit is 1; when LOW, the data bit is 0. The most significant bit (MSB) is DATA 8. The signal state must be maintained for 0.5 μS on either side of STROBE signal's active edge.
10	ACKNLG	O	ACKNLG is an acknowledge pulse with a width of approximately 10 μS. This signal goes LOW upon the completion of data reception, to indicates that the printer is ready to receive further data.
11	BUSY	O	The BUSY signal informs the host computer of the printer's status. When this signal is HIGH, the printer cannot accept further data.
12	PE	O	This signal indicates whether paper is available in the printer or not. A HIGH level indicates a no paper condition.
13	SLCT	O	Pulled up to +5V through a 1.0 KΩ resistor in the printer.
14	AFXT	I	If this signal is set to LOW, the printer automatically performs one line feed upon receipt of a CR (carriage return) code. The status of this signal is checked only at power on and initialization.
15	NC		Not used.

Table 1-6. Signal and Connector Pin Assignments (Continued)

Pin No.	Signal Name	I/o	Description
16	GND		Signal ground.
17	CHASSIS-GND	-	Chassis ground. (Both chassis ground and signal ground are connected in the printer.)
18	NC		Not used.
19-30	GND		Twisted-pair return signal ground.
31	$\overline{\text{INIT}}$	I	If this signal goes LOW, the printer is initialized. The pulse width of this signal must be 50 μS or more.
32	$\overline{\text{ERROR}}$	O	This signal goes LOW if the printer: - has a fatal error. - runs out of paper.
33	GND	-	Signal ground.
34	NC	-	Not used.
35	+5V	-	Pulled up to +5 V through 1.0 KW resistor in the printer.
36	-	-	Not used. (* Reserved.)

Note: The direction of the signal is as viewed from the printer.

1.4 PRINTER OPERATIONS

This section describes the basic operations of the printer.

1.4.1 Control Panel

The control panel of this printer contains five non-lock type push buttons and nine LED indicators for easy operation of the various printer functions.

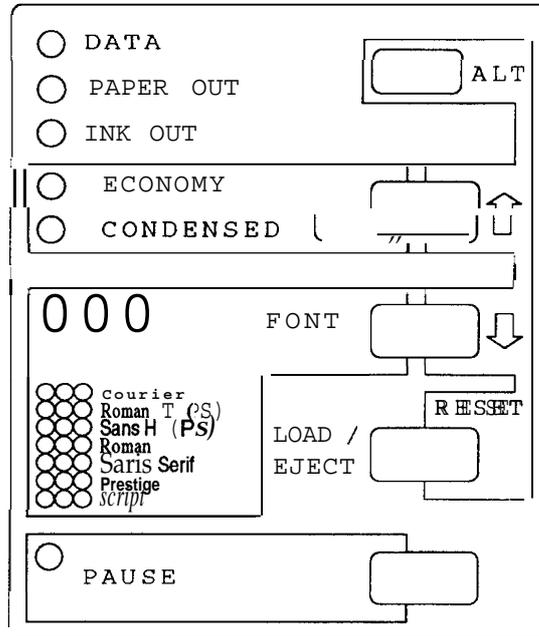


Figure 1-8. Control Panel

[Buttons]

PAUSE	Switches printer status between printing and no printing, if any print data exists in the input buffer.
ECONOMY/CONDENSED	Selects ECONOMY printing mode or CONDENSED printing mode alternately. Also works as a reverse micro feed button, if the ALT button has been pressed.
FONT	Selects one of the available fonts. Also works as a forward micro feed button, if the ALT button has been pressed.
LOAD/EJECT	When you press this button, the printer either loads new paper into the printer or ejects paper currently in the printer paper path. Also works as a RESET button, if the ALT button has been pressed.
ALT	This button alternates the function of certain buttons. When you hold down this button in PAUSE mode for 5 seconds, the printer moves the carriage to the ink cartridge installation/replacement position.

[Indicators]

PAUSE	Lights when the printer is in PAUSE mode.
DATA	Lights when there is print data in the input buffer.
PAPER OUT	Lights when the printer is out of paper. Blinks if a paper jam has occurred.
INK OUT	Lights when the printer detects ink end in the ink cartridge. Blinks when the ink level becomes low.
ECONOMY/CONDENSED	This LED shows the currently selected mode.
FONT	Indicates the currently selected font.

1.4.2 Panel Operation at Power On

The following functions can be activated at power on by holding down the specified button on the control panel.

- Self-test mode: Start the self-test printing mode by turning the printer on while holding down the FONT button.
- Hex dump mode: Start the built-in hexadecimal data dump print mode by returning the printer on while holding down the FONT and LOAD/EJECT buttons. Once this mode is selected, the printer prints all received print data in hexadecimal form.
- Demonstration mode: Start printing of a demonstration page by returning on the printer while holding down the ALT button.

Other functions that can be activated with the control panel at power on, such as the default setting mode and the initial ink charge mode, are described in the sections that follow.

1.4.3 Default Setting

The printer can memorize certain number of printer setting parameters that defines its functions at the initialization. You can change these parameters with the default setting mode for your specific preference of the printer setting.

1.4.3.1 Default Setting Item

The settings listed in the table below can be made with the default setting mode. The default-setting mode can be activated by hold down the ECONOMY/CONDENSED button while turning on the printer. (Refer to the user's guide for the detail operation of the default-setting mode.)

Table 1-7. Default Setting Item

Menu Contents	Description	Factory Setting
Character Table	Select the character table	
Auto Print Direction	ON: Print direction is automatically selected as to maintains optimal print quality (alignment). OFF: Depends on the command 'ESC U'.	ON
Network I/F Mode	ON: For network environment, such as LocalTalk. (Time-out printing is disabled.) ON: For normal environment. (Time-out printing is enabled.)	OFF
Mixed Text/Graphics Mode	ON: To ensure proper printing of the image containing graphics and scalable font, with certain applications, such as MS Word, WordPerfect V.5.1 or earlier. ● 1 OFF: For normal use.	OFF
Auto Line Feed	ON: Line feed operation is automatically performed by CR code input. OFF:NO line feed operation with single CR code.	OFF

Note: *1= If set to ON, the capacity of input buffer is limited to 8Kbyte.

1.4.4 Initial ink Charge

When the printer is to be set up for primary use, whole ink supply path of the printer must be filled with a new ink, by performing the initial ink charge operation.

- [Step 1] Turn the printer on and press the PAUSE button to pause the printer.
- [Step 2] Open the printer cover and hold down the ALT button until the printhead moves to the ink cartridge replace position.
- [Step 3] Install the ink cartridge on the printhead, and press the ALT button again to move the printhead to capping position. Then, turn off the printer.
- [Step 4] Turn the printer on while holds down the ALT and the PAUSE buttons to start the initial charge operation.

The PAUSE LED blinks while the initial ink charge operation is in progress, and when it completes, the printer automatically becomes ready state.

CAUTION

- The ink cartridge must be installed just after unpacking the package.
- The initial ink charge operation should not be performed more than twice on the same printer. It, otherwise, consumes too much ink in the ink cartridge and shorten the waste ink tank life.

1.4.5 Error Conditions

The printer detects various errors and indicates them with the LED indicators and the buzzer.

Table 1-8. Error Codes

Error	PAPER LED	INK END LED	PAUSE LED	Buzzer	Recovery
Paper out	ON	OFF	OFF	♥♣ x 3 times	Load the paper and press the buttons as follows: 1. PAUSE 2. LOAD/EJECT
Paper jam	BLINKS	OFF	OFF	♥♣ x 3 times	Same as above.
Ink low ● 1	OFF	BLINKS		No beeps	Press PAUSE button and replace the ink cartridge with a new one. Then, press PAUSE button again to resume printing. ● 2
Ink end	OFF	ON	OFF	♥♣ x 3 times	Replace the ink cartridge and press PAUSE button.
No ink cartridge	OFF	ON	OFF	♥♣ x 3 times	Install the ink cartridge and press PAUSE button.
Carriage Error	OFF	OFF	OFF	♠♦ x 5 times	Turn off the printer, and turn it on again.
Waste ink tank over-flow	OFF	ON	BLINKS	♥♣ x 3 times	Service maintenance required. (Replace the waste ink absorbing material and reset the protect counters.)

Notes: V : 0.1 second beep 4 : 0.5 second beep
 ♣ : 0.1 second interval ♦ : 0.2 second interval

*1: This is not treated as an error.

*2: It is not necessary to replace the ink cartridge until the printer detects the 'Ink End' error.

1.5 MAIN COMPONENTS

The main components of this printer are:

- Printer mechanism (M-481O)
- Main control board (C106 MAIN BOARD)
- Power supply unit (C106 PSB/PSE BOARD)
- Control panel
- Housing

1.5.1 Main Control Board (C106 MAIN BOARD)

The C106 MAIN BOARD is the main **controller** of the Stylus 800. It takes charge of interfacing with the host computer and processing of received print data, as well as control of the whole printer mechanism. This board consists of the following components.

CPU (IC1):	8-bit CPU (TMP96C141F-20) 19.6608 MHz operating clock
Gate-array (IC3):	Includes the following functions: - MMU (Memory Management Unit) - IFU (Interface Control Unit) - BMU (Bit Manipulation Unit) - PCU (I/O Port Control Unit) - Head control unit (2 channel: HCU1, HCU2)
Program ROM (IC4):	1 Mbit EPROM
CG ROM (IC7/8):	4 Mbit Mask ROM (IC8 / for US, Pacific version) 8 Mbit Mask ROM (IC7 / for European version)
RAM (IC5):	1 Mbit PSRAM
EEPROM (IC10):	1 Kbit (64 x 16 Bit) EEPROM 3 lines serial bus
CR Motor driver (IC13):	Hybrid IC SMA7024MEL Constant current unipolar drive
PF Motor driver (QM1):	Hybrid IC SMA6501 Constant voltage unipolar drive

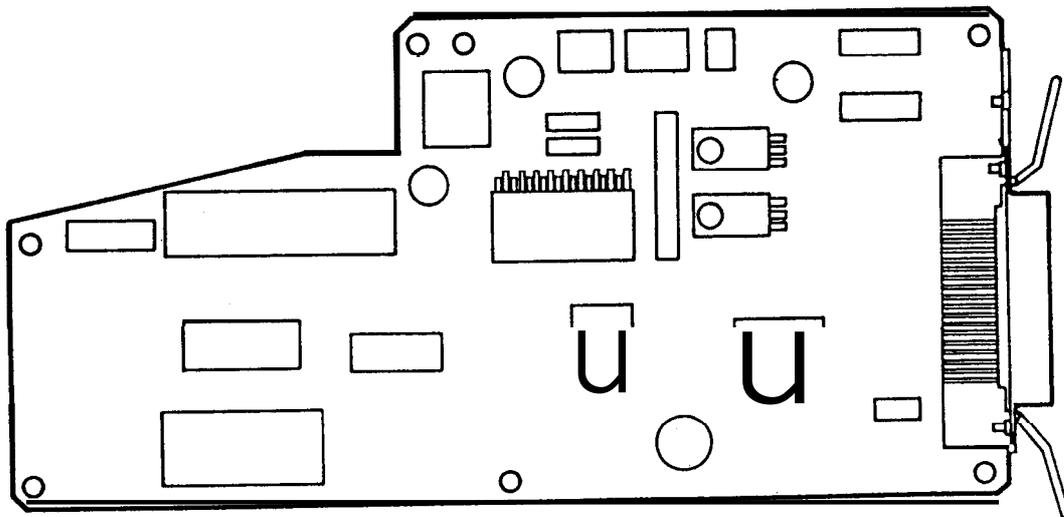


Figure 1-9. C106 MAIN BOARD Component Layout

1.5.2 Power Supply Unit (C106 PSB/PSE BOARD)

The power supply unit converts input AC voltage and generates different DC voltages required by the printer mechanism and other electrical circuitries. The C106 PSB BOARD is for 120VAC input, and the C106 PSE BOARD is for 220 to 240VAC input.

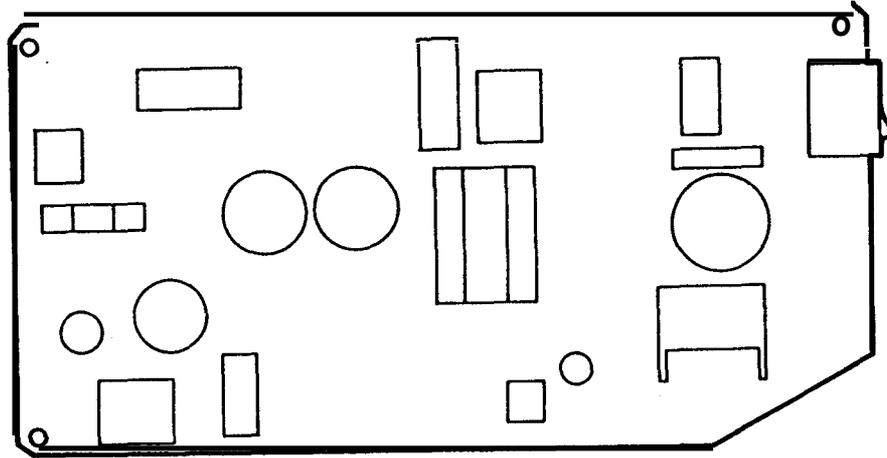


Figure 1-10. C106 PSB/PSE BOARD Component Layout

1.5.3 Printer Mechanism (M-4810)

This printer mechanism M-4810 is specifically designed for the Stylus 800, and it consists of the carriage assembly, which includes the printhead and the ink supply system, the carriage motor, the paper feed motor, the paper feeding mechanism, and the pump mechanism.

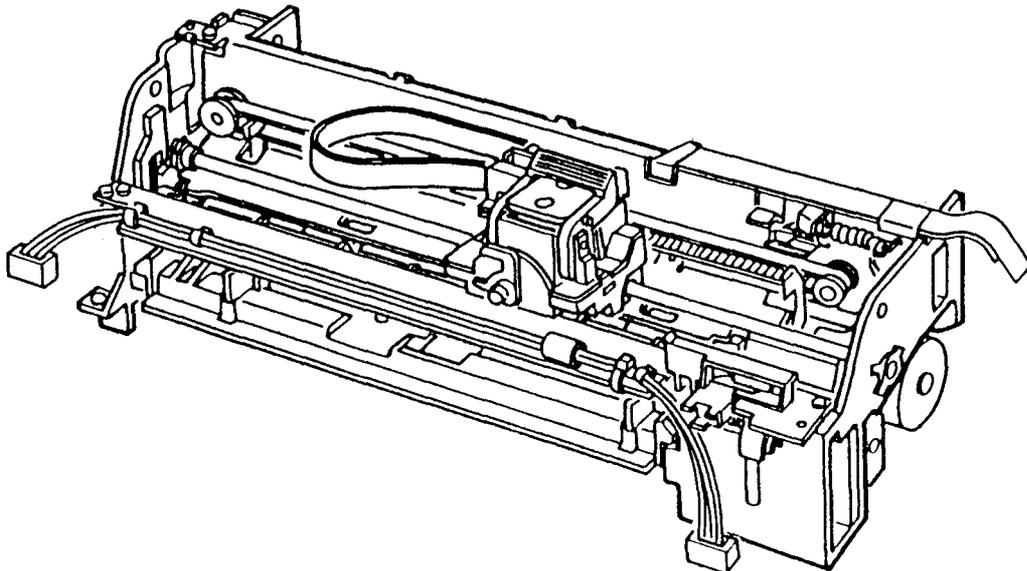


Figure 1-11. Printer Mechanism (M-4810)



Chapter 2 Operating Principles

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2.1 OVERVIEW

This section describes the operating principles of the printer mechanism and the electrical circuits of the Stylus 800.

2.2 OPERATING PRINCIPLES OF THE PRINTER MECHANISM

The Stylus 800 printer mechanism is composed of the printhead unit, paper feed mechanism, carriage drive mechanism, pump mechanism, and various sensors. The figure below shows a functional block diagram of the printer mechanism.

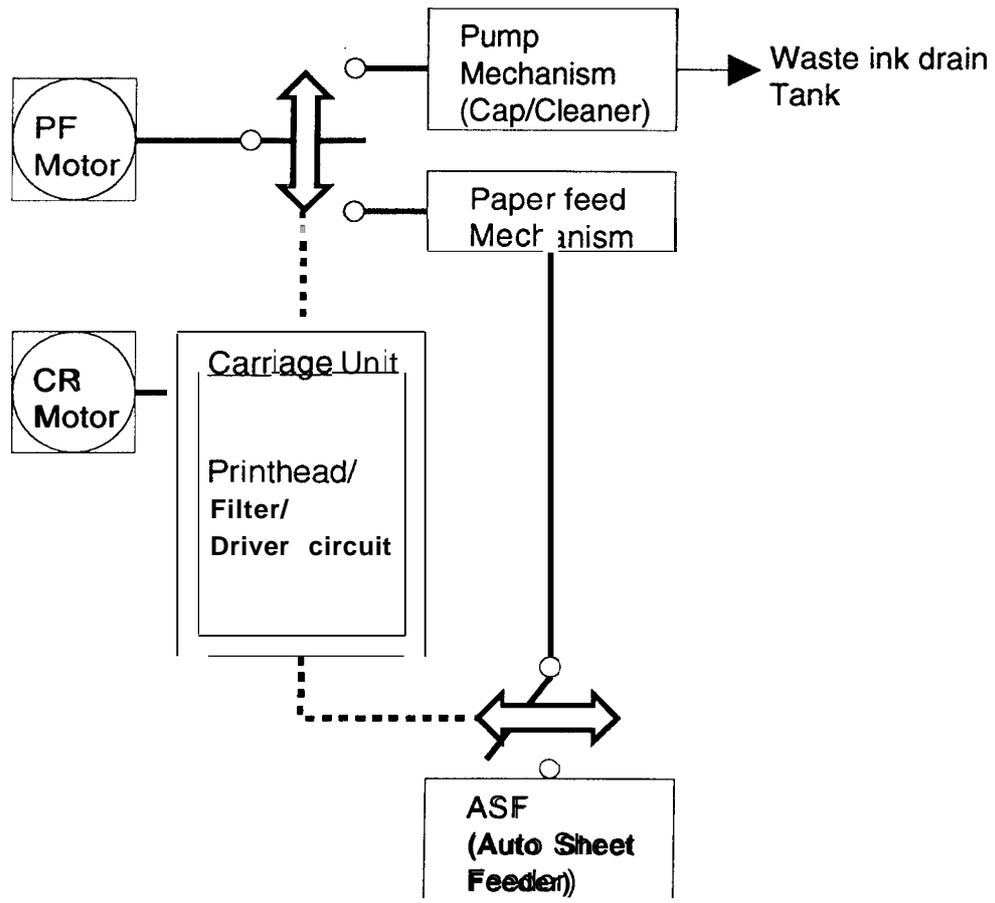


Figure 2-1. Functional Block Diagram of the Printer Mechanism

2.2.1 Printer Mechanism

The printer mechanism of this printer uses a drop-on-demand ink jet system similar to the system used on all other Epson ink jet printers. However, the printhead in this system is completely redesigned to make it compact and highly reliable. The figure below shows the structure of the printhead and ink supply system.

- MLP MLP is the abbreviation for Multi-Layer Piezoelectric element. When a drive pulse (voltage) is applied, this element pushes the vibration plate, compressing the cavity for ink injection from the nozzle.
- Cavity Ink supplied from the ink cartridge is stored in this space and is injected from the nozzles when the vibration plate compresses this area.
- Nozzles These inject ink against the paper's surface in response to the application of the print signal. There are 48 individual nozzles making up this printhead.

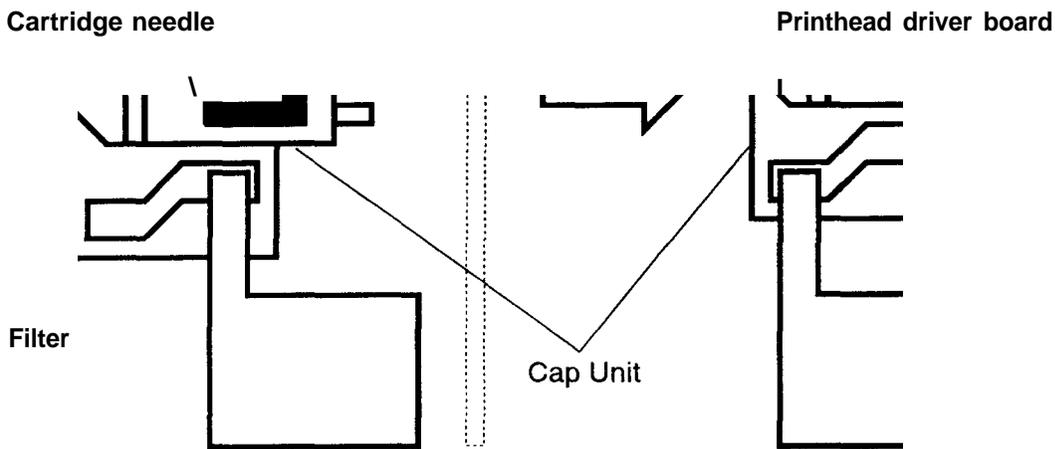


Figure 2-10. Cap Mechanism

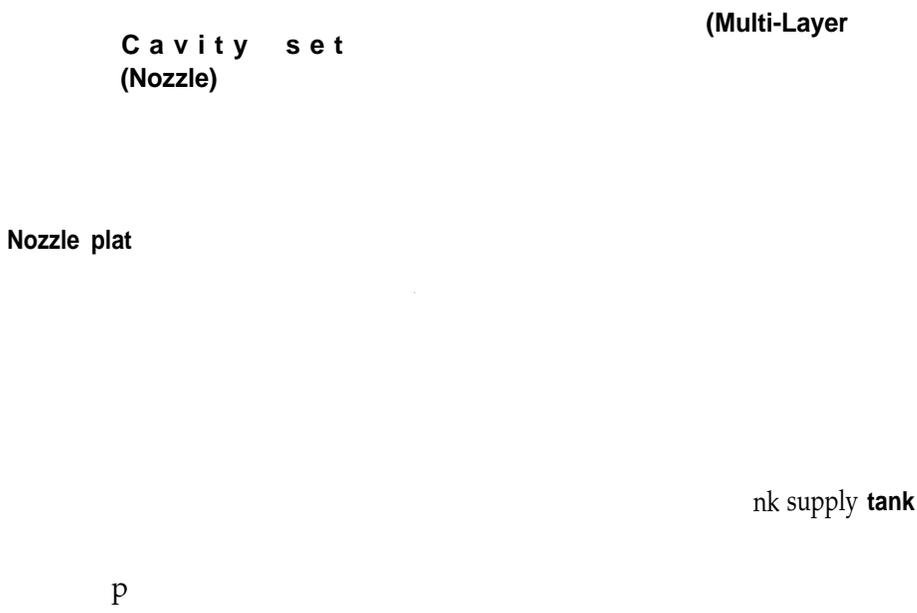


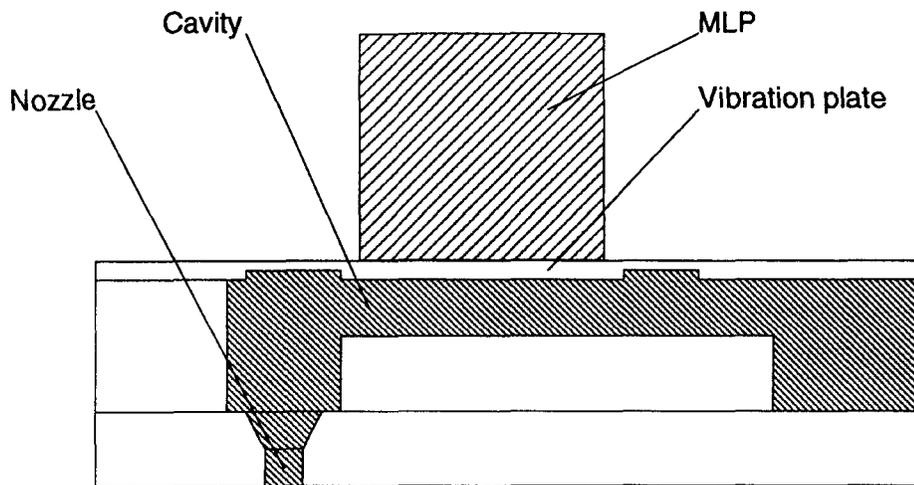
Figure 2-2. Structure of

Principles of the Printing Operation

The operation of the printhead to inject ink from each nozzle is:

(1) Normal state

No electrical charge is applied to the MLP (Multi-Layer Piezoelectric) element attached to the back of the cavity, and pressure inside the cavity is kept at constant level.



(2) Injecting state

The head data signal is applied to the specific nozzle control line to select the active nozzle for printing, and the MLP element is gradually charged by the drive voltage. By charging the MLP element, the vibration plate is bent to compress the cavity. Then, ink is injected from the nozzle.

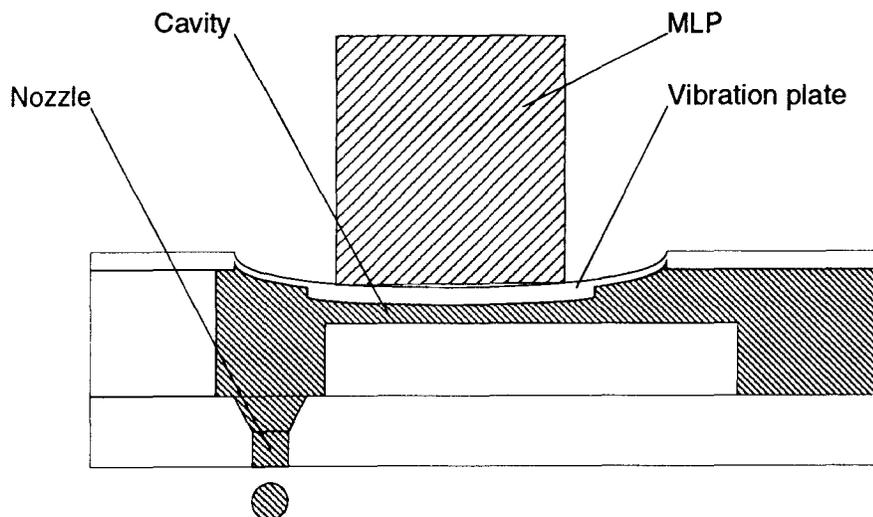


Figure 2-3. Principles of the Printing Operation

When the ink charge or printhead cleaning operation is performed, the ink in the cavity is vacuumed out with the pump mechanism. During printing, on the other hand, the ink is simultaneously supplied from the ink **cartridge** and injected from the nozzle, according to the change of volume in the cavity.

A thermistor is attached to the printhead drive board to monitor the temperature, because the viscosity of the ink varies, depending on the temperature. The detected temperature level is fed back to the printhead drive voltage control circuit to regulate the drive voltage to a proper level.

2.2.2 Carriage Drive Mechanism

The timing belt attached to the base of the carriage unit is driven by the carriage motor, causing the carriage unit to move along the guide shaft left to right, or vice versa. The carriage drive motor on this printer is a 4-phase, 200-pole, hybrid-type stepping motor mechanism, allowing the printer to stop the carriage or change the carriage movement at any position. The position of the carriage is recognized by the home position sensor and position information is fed back to the carriage drive control circuit to determine the motor phase switching mode.

Table 2-1. Carriage Drive Motor Specifications

Item	Description
Motor Type	4-phase 200-pole hybrid-type stepping motor
Drive Voltage	35 V 10Yo (31.5 -38.5 V)
Coil Resistance	10.0 (± 7% / pole (at 25° C, 77°
Drive Frequency	960 -5400 pps
Excitation Mode	1-2 phase excitation

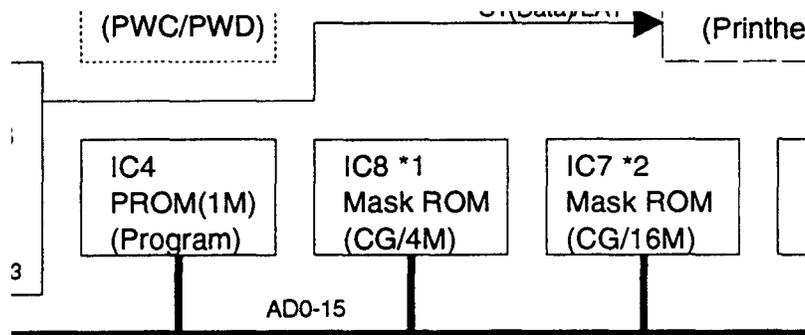


Figure 2-4. Carriage Drive Mechanism

2.2.2.1 Platen Gap Adjust Lever

Set the platen gap adjust lever, attached to the carriage unit, to an appropriate position for the paper thickness used for printing.

Table 2-2. Platen Gap Adjust Lever Position

Paper Type	Lever Position	Platen Gap
Cut sheet	Horizontal (A)	—
Envelope	Vertical (B)	+0.7 mm

Plain paper, Bond paper

Envelope
jra



Figure 2-5. Platen Gap Adjust Lever