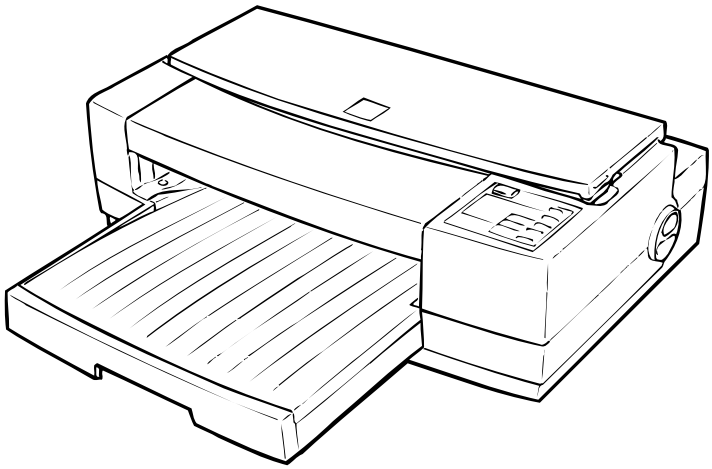
EPSON COLOR INKJET PRINTER

Stylus Pro XL

SERVICE MANUAL



EPSON

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Chapter 1 Product Description

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1.1 FEATURES

The Stylus Pro XL is a 64 + 48-nozzle (monochrome and CMY) color ink jet dot matrix printer. The major features of this printer are:

- ❑ High-quality color print
  - -Micro Dot 720 dpi printing
  - -Plain paper 720 dpi printing
  - -Special coated paper 720 dpi printing
- ❑ High print speed
  - -LQ 200 cps
- ❑ Built-in auto sheet feeder
  - -Holds 100 cut sheets (64 g/m2)
  - -Holds 10 envelopes
  - -Holds 50 transparency films
  - -Hold 70 special paper
- ❑ Built-in 3 I/
  - -Mac serial I/F
  - -Parallel I/F
  - -Type B I/F (option)
- ❑ Easy setup.
  - -No dip-switches
  - -Multi-lingual setting messages (5 languages)
- ❑ 4 scalable fonts and 5 LQ fonts standard.
  - -Roman T, Sans Serif H, Roman, Sans Serif (scalable)
  - -Roman, Sans Serif, Courier, Prestige, Script (LQ)
- ❑ 21 character tables

  Italic, PC437, PC850, PC860, PC863, PC865, PC437, Greek, PC852, PC853, PC858, PC857, PC866, PC869, PC861, BRASCII, Abicomp, MAZOWIA, Code MJK, ISO 8859-7, ISO Latin 1T, Bulgaria
- ❑ Low running cost

The figure below shows the Stylus Pro XL.

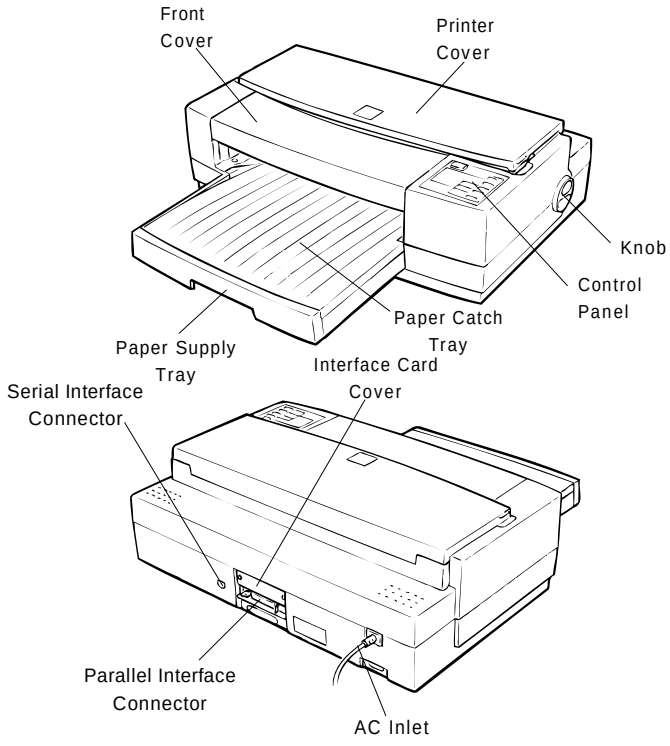

Figure 1-1. Exterior View of the Stylus Pro XL

Table 1-1. Interface Cards

Interface Card	Model Number
Serial interface card	C823051/C823061
32KB serial interface card	C823071/C823081
32KB parallel interface card	C82310✻
32KB IEEE-488 interface card	C82313✻
LocalTalk® interface card	C82312✻
Twinax interface card	C82315✻
Coax interface card	C82314✻

✻ *The asterisk represents the last digit, which varies by country.*

1.2 SPECIFICATIONS

This section provides statistics and other detailed information for the printer.

1.2.1 Printing Specifications

Print system: On demand ink jet system

Nozzle configuration: 64 nozzles (16 × 4 staggered): monochrome
48 nozzles (16 × 3 staggered): color

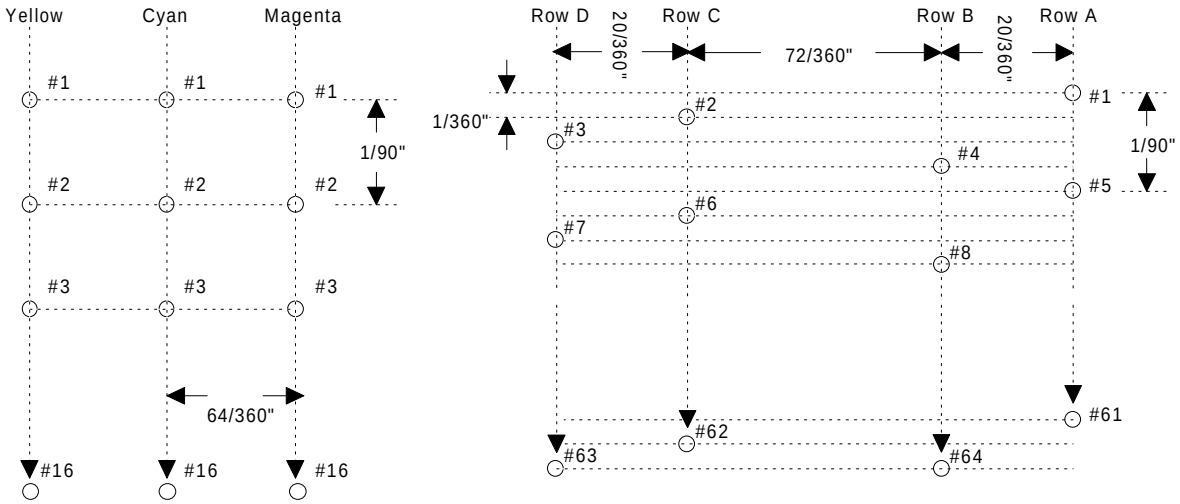

Figure 1-2. Nozzle Configuration

Printing direction: Bidirectional with logic-seeking

Print speed: See Table 1-2.

Printable columns: See Table 1-2.

Table 1-2. Print Speed and Printable Columns

Character Pitch	Printable Columns	Print Speed (LQ)
10 cpi (Pica)	127	200 cps
12 cpi (Elite)	152	240 cps
15 cpi	190	300 cps
17 cpi (Pica condensed)	218	340 cps
20 cpi (Elite condensed)	254	400 cps

Character sets: Legal and 14 international character sets.

Character tables: See Table 1-3.

Table 1-3. Character Tables

Character Tables	Bit map font	Scalable font	
	EPSON Roman EPSON Sans Serif EPSON Courier EPSON Prestige EPSON Script	EPSON Roman EPSON Sans Serif	EPSON Roman EPSON Sans Serif H
Italic	❍	❍	m
PC437 (U.S./Standard Europe)	❍	❍	m
PC850 (Multilingual)	❍	❍	m
PC860 (Portuguese)	❍	❍	m
PC861 (Iceland)	❍	❍	m
PC863 (Canadian-French)	❍	❍	m
PC865 (Nordic)	❍	❍	m
Abicomp	❍	m	m
BRASCII	❍	m	m
PC437 (Greek)	❍	m	×
PC852 (East Europe)	❍	❍	×
PC853 (Turkish)	❍	m	×
PC855 (Cyrillic)	❍	m	×
PC857 (Turkish)	❍	m	×
PC866 (Russian)	❍	m	×
PC869 (Greek)	❍	m	×
MAZOWIA (Poland)	❍	m	×
Code MJK (Czecho/Slovakia)	❍	m	×
ISO 8859-7 (Greek)	❍	m	×
ISO Latin 1T (Turkish)	❍	m	×
Bulgaria (Bulgaria)	❍	m	×

❍ Supported × *Not supported*

Fonts:

[Bitmap LQ fonts]

- EPSON Roman (10 cpi/12 cpi/15 cpi/Proportional)
- EPSON Sans Serif (10/12/15/Proportional)
- EPSON Courier (10/12/15)
- EPSON Prestige (10/12/15)
- EPSON Script (10/12/15)

[Scalable fonts]

- EPSON Roman 10.5 points, 8 ~ 32 points (in units of 2 points)
- EPSON Sans Serif 10.5 points, 8 ~ 32 points (in units of 2 points)
- EPSON Roman T 10.5 points, 8 ~ 32 points (in units of 2 points)
- EPSON Sans Serif H 10.5 points, 8 ~ 32 points (in units of 2 points)

Control codes: ESC/P 2 and expanded raster graphics code

Input data buffer: 64KB

1.2.2 Paper Handling Specifications

Feeding method: Friction feed paper is fed from the built-in auto sheet feeder (ASF).

Notes: *The following operations are not allowed.*

1. *Reverse feeding within 3 mm (0.12 in.) from the top edge of the paper or 16 mm (0.63 in.) from the bottom edge of the paper.*
2. *Reverse feeding beyond 7.9 mm (0.3 in.).*

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

Paper path: Cut sheet: Built-in auto sheet feeder (ASF) (front entry)

Feeding speed: 89 msec. (at 1/6-inch feed pitch)

1.2.3 Paper Specifications

Table 1-4. Cut Sheet Paper Specifications

Size (W × L)	A3+/US B+: 329 mm (13.0 in.) × 483 mm (19.0 in.)
	A3: 297 mm (11.7 in.) × 420 mm (16.5 in.)
	US B: 279 mm (11.0 in.) × 432 mm (17.0 in.)
	Legal: 216 mm (8.5 in.) × 356 mm (14.0 in.)
	Letter: 216 mm (8.5 in.) × 279 mm (11.0 in.)
	A4: 210 mm (8.3 in.) × 297 mm (11.7 in.)
	Executive: 184 mm (7.25 in.) × 267 mm (10.5 in.)
	Statemrnt: 140 mm (5.5 in.) × 216 mm (8.5 in.)
Thickness	0.08 mm (0.003 in.) ~ 0.11 mm (0.004 in.)
Weight	64g/m^2 (17 lb.) ~ 90 g/m^2 (24 lb.)
Quality	Plain paper, Special coated paper for 720dpi, Special coated paper for 360dpi, Transparency film, High Quality Glossy paper, Glossy paper

Note:
- Special coated paper for 720dpi, Special coated paper for 360dpi, Transparency film
- High Quality Glossy paper printing are only available at normal temparature.

Table 1-5. Envelope Specifications

Size (W × L)	No. 10:240 mm (9 ½ in.) × 104 mm (4 ⅛ in.)
	DL:220 mm (8.7 in.) × 110 mm (4.3 in.)
	C5: 229 mm (9.0 in.) × 162 mm (6.4 in.)
Thickness	Less than 0.52 mm (0.020 in.)
Weight	75 g/m^2 (20 lb) ~ 90 g/m^2 (24 lb)
Quality	Plain paper

Note:
- *Envelope Printing is only available at normal temperature.*
- *Keep the longer side of the envelopes horizontal at setting.*

Printable area: Cut sheets

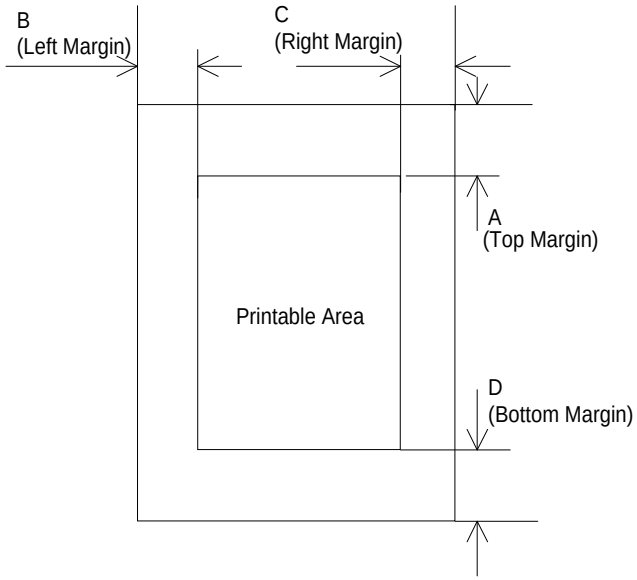

Figure 1-3. Printable Area for Cut Sheets

Envelopes

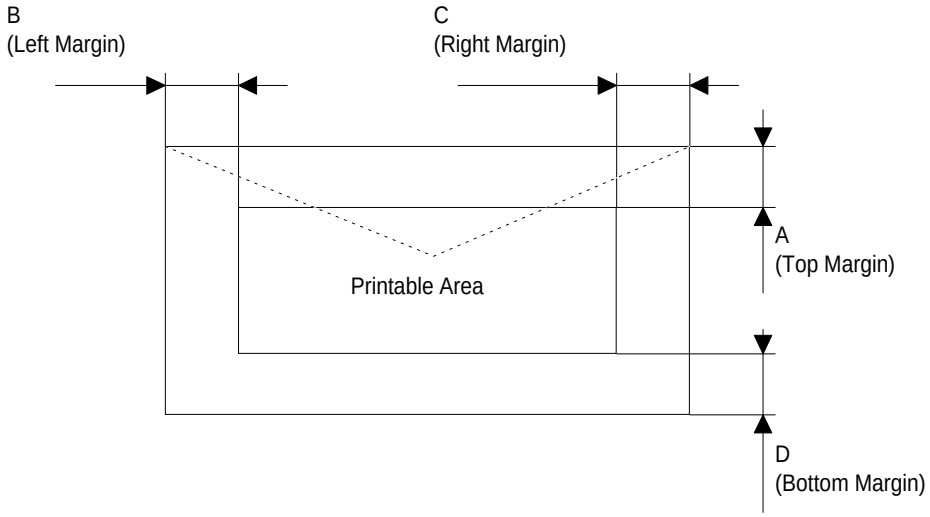

Figure 1-4. Printable Area for Envelopes

Notes: *A: The minimum top margin = 3 mm (0.12 in.)*
B: The minimum left margin = 3 mm (0.12 in.)
C: The minimum right margin is:
A3+/US B+ size: 3mm (0.12 in.)
A3 size: 3 mm (0.12 in.)
A4 size: 3 mm (0.12 in.)
A4 (Landscape)size:3 mm (0.12 in.)
USB size: 9 mm (0.35 in.)
Legal size: 9 mm (0.35 in.)
Letter size: 9 mm (0.35 in.)
Letter size (Landscape)size:9 mm (0.35 in.)
Executive size: 9 mm (0.35 in.)
Statement size: 9 mm (0.35 in.)
Envelopes: 3 mm (0.12 in.)
D: The minimum bottom margin = 14 mm (0.55 in.)

Setting the adjust lever: The adjust lever on the carriage unit must be set to the proper position for the paper thickness, as shown in Table 1-6.

Table 1-6. Adjust Lever Settings

Lever Position	Paper	Paper Thickness
LEFT (Vertical)	Cut Sheets	0.08 ~ 0.11 mm (0.003 ~ 0.004 in.)
RIGHT (Horizontal)	Envelopes	Less than 0.5 mm (0.020 in.)

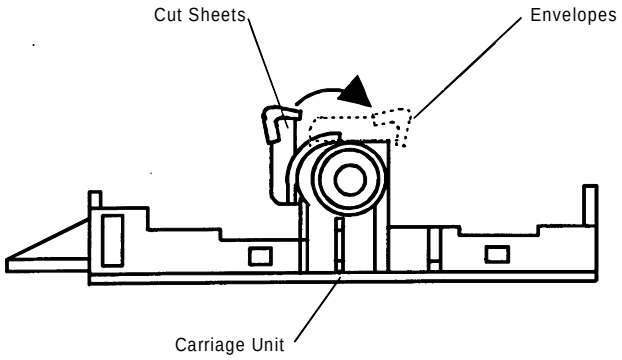

Figure 1-5. Setting the Adjust Lever

1.2.4 Ink Cartridge Specifications

Black

Type: Exclusive cartridge

Color: Black

Print capacity: 1.2 million characters (315 dots/character, Roman 10 cpi)

Life: The effective life from the indicated production date is 2 years.

Storage temperature: –30 ~ 40° C (–22 ~ 104° F) (Storage: a month or less at 40° C (104° F))
–30 ~ 60° C (–22 ~ 140° F) (Transit: a month or less at 40° C (104° F))
–30 ~ 60° C (–22 ~ 140° F) (Transit: 120 hours or less at 60° C (140° F))

Dimension (W × D × H): 26.9 × 67.4 × 41.8 mm (1.06 × 2.65 × 1.65 in.)

Color

Type: Exclusive cartridge

Colors: Cyan, magenta, yellow

Print capacity: 28 sheets/color (A4 or letter, full-image printing at 360 dpi)

Life: The effective life from the indicated production date is 2 years.

Storage temperature: –30 ~ 40° C (–22 ~ 104° F) (Storage: a month or less at 40° C (104° F))
–30 ~ 60° C (–22 ~ 140° F) (Transit: a month or less at 40° C (104° F))
–30 ~ 60° C (–22 ~ 140° F) (Transit: 120 hours or less at 60° C (140° F))

Dimension (W × D × H): 54.0 × 67.4 × 41.8 mm (2.13 × 2.65 × 1.65 in.)

Notes: *The ink cartridge cannot be refilled; it is the only consumable article.*
Do not attempt to use an ink cartridge that has exceeded its ink life.
Ink freezes at –3° C (37° F); however, it can be used after it returns to room temperature.

1.2.5 Electrical Specifications

Table 1-7. Rated Electrical Ranges

Specification	120 V Version	220 - 240 V Version
Rated voltage	120 VAC	220 - 240 VAC
Input voltage range	103.5 ~ 132 V	198 ~ 264 V
Rated frequency range	50 ~ 60 Hz	50 ~ 60 Hz
Input frequency range	49.5 ~ 60.5 Hz	49.5 ~ 60.5 Hz
Rated current	0.6 A	0.4 A
Power consumption	Approx. 20 W (self-test with 10-cpi LQ characters)	Approx. 20 W (self-test with 10-cpi LQ characters)
Insulation resistance	10 MΩ, minimum (applying 500 VDC between AC line and chassis)	10 MΩ, minimum (applying 500 VDC between AC line and chassis)
Dielectric strength	1000 VAC rms - 1 minute or 1200 VAC rms - 1 second (between AC line and chassis)	1500 VAC rms - 1 minute (between AC line and chassis)

1.2.6 Environmental Conditions

Table 1-8. Acceptable Environmental Conditions

Condition	Operating	Non Operating
Temperature	10 ~ 35° C (50 ~ 95° F) *1	–20 ~ 60° C (–4 ~ 122° F) *2
Humidity	20 ~ 80% RH *1,3	5 ~ 85% RH *2,3
Shock resistance	1G (within 1 msec.)	2G (within 2 msec.) *2
Vibration resistance	0.15 G	0.50 G 2

**1 : For printer operation, conditions must be in the range shown in the figure below.*
**2 : These conditions are applicable when the printer is in its shipping container.*
**3 : Without condensation.*

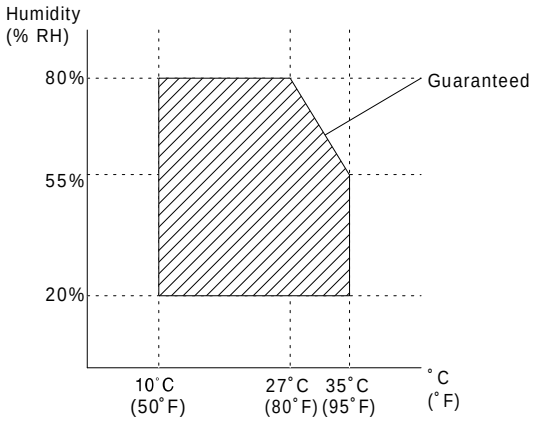

Figure 1-6. Temperature / Humidity Range

1.2.7 Reliability

Total print volume:	75,000 pages (A4, letter)
Printhead life:	1,000 million dots/nozzle

1.2.8 Safety Approvals

Safety standards:	120 V version:	UL1950 with D3, CSA22.2 #950 with D3
	220-240 V version:	EN 60950 (TÜV, SEMKO, DEMKO, NEMKO, SETI)
Radio frequency interference (RFI):	120 V version:	FCC Part 15 Subpart B Class B
	220-240 V version:	Vfg.243 (VDE0878 part 3, part 30) EN55022 (CISPR PUB. 22) class B

1.2.9 Physical Specifications

Dimensions (W × D × H):	580 × 597 × 182 (mm) (22.8 × 23.5 × 7.17 in.)
Weight:	About 10 Kg (22 lb)

1.3 INTERFACE SPECIFICATIONS

The Stylus Pro XL is standard-equipped with an 8-bit parallel and serial interface.

1.3.1 Parallel Interface Specifications

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

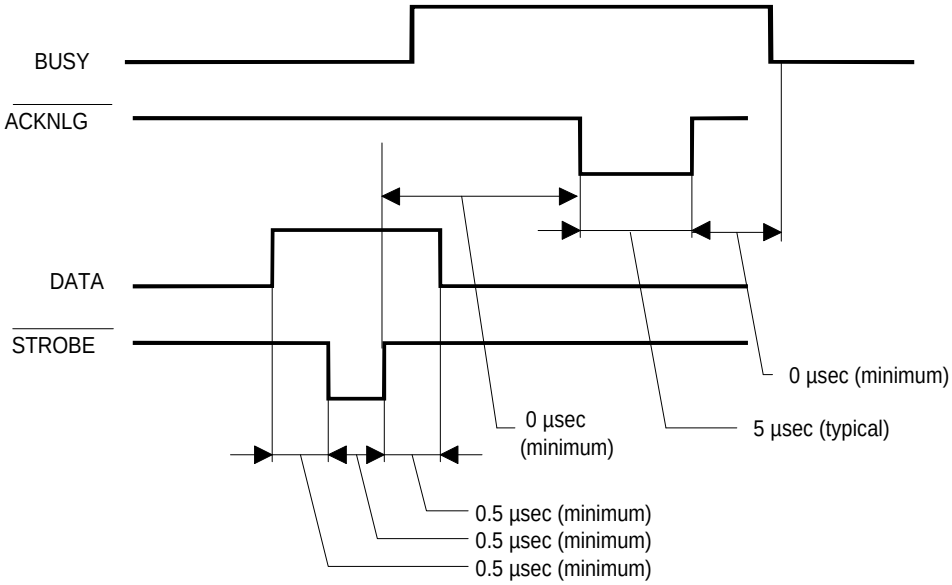

Figure 1-7. Data Transmission Timing

Note: *Transition time (rise time and fall time) of every input signal must be less than 0.2 µs.*

The Busy signal is active (HIGH) under the following conditions:

- ❑ During data reception (See Figure 1-7.)
- ❑ When the input buffer is full
- ❑ When the INIT input signal is active
- ❑ During initialization
- ❑ When the $\overline{\text{ERROR}}$ or PE signal is active
- ❑ During the self-test mode
- ❑ During the demonstration mode
- ❑ During the default setting mode
- ❑ When a fatal error occurs

The $\overline{\text{ERROR}}$ signal is active (LOW) under the following conditions:

- ❑ When a paper-out error occurs
- ❑ When a no ink cartridge error occurs
- ❑ When a fatal error occurs

The PE signal is active (HIGH) under the following conditions:

- ❑ When a paper-out error occurs
- ❑ When a fatal error occurs

Table 1-9 shows the connector pin assignments and signal functions of the 8-bit parallel interface.

Table 1-9. Signal and Connector Pin Assignments for Parallel Interface

Pin No.	Signal Name	I/O*	Description
1	$\overline{\text{STROBE}}$	I	The $\overline{\text{STROBE}}$ pulse is used to read data from the host computer. The pulse width must be 0.5 μs or more. Normally, it is HIGH, and data is latched with the 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 the $\overline{\text{STROBE}}$ signal's active edge.
10	$\overline{\text{ACKNLG}}$	O	$\overline{\text{ACKNLG}}$ is an acknowledge pulse with a width of approximately 10 μs. This signal goes LOW upon the completion of data reception to indicate 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 any more data.
12	PE	O	This signal indicates whether paper is available in the printer or not. A HIGH level indicates no paper.
13	SLCT	O	Pulled up to +5 V through a 1.0 KΩ resistor in the printer.
14	$\overline{\text{AFXT}}$	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.
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 or runs out of paper.
35	+5 V	—	Pulled up to +5 V through 1.0 KΩ resistor in the printer.
17	CHASSIS	—	Chassis ground.
16	GND	—	Signal ground.
19-30	—	—	—
33,36	—	—	Not used.
15,18,34	—	—	—

* *The I/O column indicates the direction of the signal as viewed from the printer.*

1.3.2 Serial Interface Specifications

Data format: *RS-422 serial*

Synchronization: *Asynchronous*

Handshaking: *By DTR signal and X-ON/X-OFF protocol*

Table 1-10. DTR and X-ON/X-OFF Protocol

State	**Buffer Space**	**DTR**	**X-ON/X-OFF**
Busy	Less than 512 bytes	Off	X-OFF
Ready	More than 1,024 bytes	On	X-ON

Word length
- *Start bit:* *1 bit*
- *Data bit:* *8 bit*
- *Parity bit:* *none*
- *Stop bit:* *1 bit*

Bit rate: *57.6K bps /230.4 Kbps*

Adaptable connector: *8-pin mini-circular connector*

Recommended I/F cable: *Apple® System Peripheral-8 cable*

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

Pin No.	**Signal Name**	**I/O***	**Description**
1	DTR	Out	Data terminal ready
2	NC	—	No connection
3	$\overline{TXD}$	Out	Transmit data
4	SG	In	Signal ground
5	$\overline{RXD}$	In	Receive data
6	TXD	Out	Balanced transmit
7	NC	—	No connection
8	RXD	In	Balanced receive

* *The I/O column indicates the data flow as viewed from the printer.*

1.4 OPERATIONS

This section describes the basic operations of the printer.

1.4.1 Control Panel

The control panel for this printer has 1 lock-type, 5 non-lock-type push buttons, and 14 LED indicators for easy operation of the various printer functions.

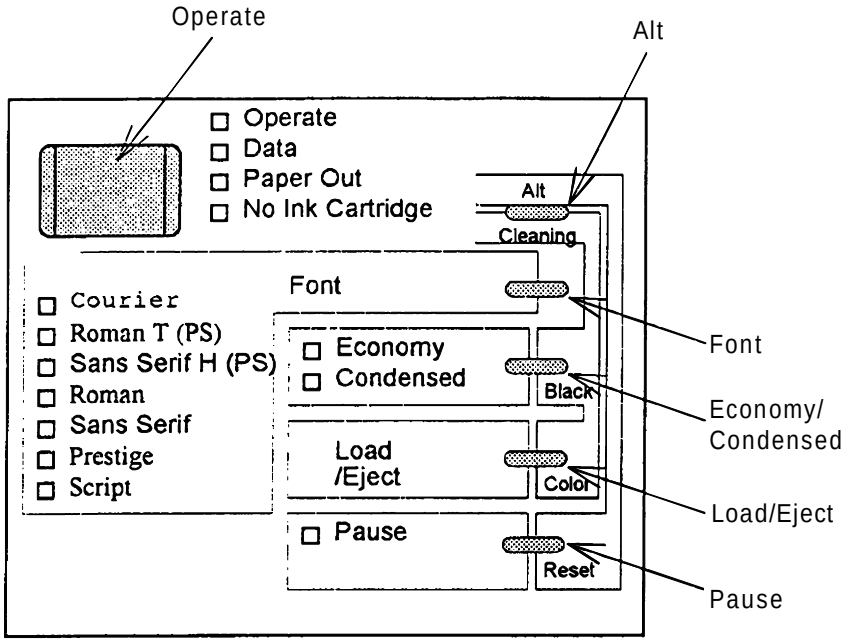

Figure 1-8. Control Panel Appearance

Buttons

Operate	*Turns the printer on or off.*
Alt	*Modifies the function of other buttons. Holding down this button for 3 seconds causes the printer to move the carriage to the ink cartridge installation position. Pressing* Alt *again causes the carriage to return to the home position.*
Font	*Cycles through the font choices. Pressing the* Font *button, while holding down the* Alt *button causes the carriage to move to the gap adjustment position. Pressing the* Alt *button again causes the carriage to return to the home position.*
Economy/Condensed	*Selects either economy or condensed printing mode. Pressing the* Economy/Condensed *button while holding down the* Alt *button starts the color printhead cleaning cycle.*
Load/Eject	*Either loads a new sheet into the printer or ejects paper currently in the paper path. Pressing the* Load/Eject *button while holding down the* Alt *button starts the black printhead cleaning cycle.*
Pause	*Stops printing temporarily or resumes printing if it has been stopped temporarily. Pressing* Pause *while holding down the* Alt *button resets the printer.*

Indicators

Operate	*On when the printer is on. Blinks during power on and off sequence.*
Data	*On when print data is in the input buffer.* Data *and* Pause *lights blink if an error occurs.*
Paper Out	*On when the printer is out of paper. Blinks when a paper jam occurs.*
No Ink Cartridge	*On when ink cartridge is out.*
Economy	*On when economy printing mode is selected.*
Condensed	*On when condensed printing mode is selected.*
Font	*These LEDs indicate the selected font.*
Pause	*On when printing is paused.*

1.4.2 Panel Operation at Power On

You can activate the following modes by doing the following:

Self-test mode	*Turn on the printer while holding down the* Load/Eject *button.*
Hex dump mode	*Turn on the printer while holding down the* Font *and* Load/Eject *buttons. Once this mode is selected, the printer prints all received data in hexadecimal format.*
Demonstration mode	*Turn on the printer while holding down the* Alt *button.*
Default setting mode	*Turn on the printer while holding down the* Economy/ Condensed *button. For more information about the mode, see Section 1.4.3.*
Initialize EEPROM	*Turn on the printer while holding the* Alt, Font, Load/Eject, *and* Pause *buttons.*

Table 1-12. Printer Condition Panel Status

Printer status	**Indicators**						+
^	Operate	**Data**	**Paper Out**	**No Ink Cartridge**	**Economy**	**Condensed**	**Pause**
Power on condition	On	—	—	—	—	—	—
Data exit	—	On	—	—	—	—	—
Economy mode	—	—	—	—	On	—	—
Condensed mode	—	—	—	—	—	On	—
Pause condition	—	—	—	—	—	—	On
Power on/off sequence	Blinks	—	—	—	—	—	—
Ink sequence	—	—	—	—	—	—	Blinks
Ink cartridge change mode	—	—	—	—	—	—	Blinks
Head gap adjust mode	—	Blinks	—	—	—	—	—
Paper out	—	—	On	—	—	—	—
No ink cartrdige	—	—	—	On	—	—	—
Paper jam condition	—	—	Blinks	—	—	—	—
Maintenance request	—	Blinks	Blinks	Blinks	—	—	Blinks
Cartidge error	—	Blinks	—	—	—	—	Blinks

— don't care

1.4.3 Default Settings

The printer can save some printer setting parameters that define its functions at initialization. You can change these parameters by using the printer's default setting mode.

1.4.3.1 Default Setting Items

You can use the default setting mode to change settings listed in the table below. Activate default-setting mode by holding down Economy/Condensed *while turning on the printer.*

Table 1-13. Default Setting Items

Menu Contents	**Description**	**Factory Setting**
Character table	Selects the character table	—
Print direction	Controls the print direction. (See Tables 1-12 and 1-13) Auto Bi-D Uni-D	—
Network I/F mode	Off: For normal environments. On: For network environments.	Off
Auto line feed	On: Valid Off: Invalid	—
Loading position	3.0/8.5 mm (0.12/0.33 in.)	3.0 mm
Interface mode	Auto I/F mode Parallel I/F mode Serial I/F mode Optional I/F mode	—
Auto I/F wait mode	10/30 seconds	10 sec.

Table 1-14. Characteristics of Print Direction Mode

Mode	**Black and White Printing**	**Color (CMYK) Printing**
Auto	Throughput and quality is better.	Throughput is better. Color quality with special paper is worse. (Color correction depends on the printing direction.)
Bi-D	Throughput is best. Print quality may be down.	Throughput is better. Color quality with special paper is worse. (Color correction depends on the printing direction.)
Uni-D	Throughput is worse. Print quality is better.	Throughput is worse. Color quality is best.

Table 1-15. Printing Direction and ESC U Command

Default Setting Mode	**Auto**			**Bi-D**			**Uni-D**		**+**
^	**ESC U0**	**ESC U1**	**None**	**ESC U0**	**ESC U1**	**None**	**ESC U0**	**ESC U1**	**None**
Character mode (for MS-DOS®)	Auto	Auto	Auto	Bi-D	Uni-D	Bi-D	Uni-D	Uni-D	Uni-D
Raster graphics mode (for Windows™)	Bi-D	Uni-D	Auto	Bi-D	Uni-D	Bi-D	Bi-D	Uni-D	Uni-D

Note: *Printing direction is controlled by driver in Windows environment.*

1.4.3.2 Changing the Default Settings

To change the printer's default settings:

1. *Hold down the* Economy/Condensed *button and turn on the printer. The printer prints a sheet that shows the firmware version and describes how to select the language used to print messages.*
2. *Press the* Font *button until the appropriate font LED is selected. The following table shows which language corresponds to which font LED.*

Table 1-16. Language Selection

Language	**Font LED**
English	Courier
Français	Roman T (PS)
Deutsch	Sans Serif H (PS)
Italiana	Roman
Español	Sans Serif

3. *Press the* Alt *button. The printer prints the current settings using the selected language. It also prints a table showing how to change the printer settings.*
4. *Press the* Font *button to advance through the setting menu. The current printer settings are indicated by the Courier, Roman T (PS), and San Serif H (PS) LEDs. Each time you press the Font button, you adance to the next setting, and the three font LEDs change according to the selection.*

Table 1-17. Feature Selection

Menu				***Setting Value***			**+**
Feature/Menu	**Courier LED**	**Roman T (PS) LED**	**Sans Serif H (PS) LED**	**Setting**	**Operate LED**	**Data LED**	**Paper Out LED**
Character table	On	On	On	See Table 1-18			+
Print direction	On	Off	Off	Auto	On	Off	Off
^				Bi-D	Off	On	Off
^				Uni-D	On	On	Off
Network I/F mode	Off	On	Off	Off	Off	Off	Off
^				On	On	Off	Off
Auto line feed	On	On	Off	Off	Off	Off	Off
^				On	On	Off	Off
Loading position	Off	Off	On	3 mm	Off	Off	Off
^				8.5 mm	On	Off	Off
Interface mode	On	Off	On	Auto	On	Off	Off
^				Parallel	Off	On	Off
^				Serial	On	On	Off
^				Option	Off	Off	On
Auto I/F wait time	Off	On	On	10 sec.	Off	Off	Off
^				30 sec.	On	Off	Off

5. *Change the setting value by pressing* Alt *button. Pressing the* Alt *button changes the setting for the current menu. The status of the LEDs will be changed as the button is pressed.*

Table 1-18. Character Table Selection

Version	Settings	*Operate LED*	*Data LED*	Paper Out *LED*
Common	Italic U.S.A.	Off	Off	Off
^	Italic France	On	Off	Off
^	Italic Germany	Blinks	Off	Off
^	Italic U.K.	Off	On	Off
^	Italic Denmark 1	On	On	Off
^	Italic Sweden	Blinks	On	Off
^	Italic Italy	Off	Blinks	Off
^	Italic Spain 1	On	Blinks	Off
^	PC437	Blinks	Blinks	Off
^	PC850	Off	Off	On
Standard	PC860	On	Off	On
^	PC863	Blinks	Off	On
^	PC865	Off	On	On
^	PC861	On	On	On
^	BRASCII	Blinks	On	On
^	Abicomp	Off	Blinks	On
NLSP	PC437 Greek	Off	Off	On
^	PC853	Blinks	Off	On
^	PC855	Off	On	On
^	PC852	On	On	On
^	PC857	Blinks	On	On
^	PC866	Off	Blinks	On
^	PC869	On	Blinks	On
^	MAZOWIA	Blinks	Blinks	On
^	Code MJK	Off	Off	Blinks
^	ISO 8859-7	On	Off	Blinks
^	ISO Latin 1T	Blinks	Off	Blinks
^	Bulgaria	Off	On	Blinks

6. *Repeat steps 4 and 5 to change other printer settings. The setting menu selection will return to the first menu after the last menu selection is over.*
7. *Turn off the printer. The setting is stored in non-volatile memory.*

1.4.4 Error Conditions

The printer can detect various errors and indicate them with LEDs.

Table 1-19. Error Indications

Error	Data LED	Paper Out LED	No Ink Cartridge LED	Economy LED	Condensed LED	Pause LED
Paper out	Off	On	Off	Off	Off	Off
No ink cartridge	Off	Off	On	Off	Off	Off
Paper jam	Off	Blinks	Off	Off	Off	Off
Maintenance request	Blinks	Blinks	Blinks	Blinks	Blinks	Blinks
Carriage error	Blinks	Off	Off	Off	Off	Blinks

1.4.5 Printer Initialization

There are three initialization methods: hardware initialization, software initialization, and panel initialization.

1.4.5.1 Hardware Initialization

Hardware initialization is performed by:
- *Turning on the printer.*
- *Sending the parallel interface* $\overline{INIT}$ *signal.*

(If the $\overline{INIT}$ *signal is active when the printer is turned on, hardware initialization is started when the* $\overline{INIT}$ *signal becomes inactive.)*

When the hardware initialization is performed:
- *The printer mechanism is initialized.*
- *Input data buffer is cleared.*
- *Downloaded character definitions are cleared.*
- *Print buffer is cleared.*
- *Default values are set.*

1.4.5.2 Software Initialization

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

When the software initialization is performed:
- *Print buffer is cleared.*
- *Default values are set.*

1.4.5.3 Panel Initialization

This printer is initialized by pressing the Load/Eject *button while pressing the* Alt *button.*

When the panel initialization is performed:
- *Input data buffer is cleared.*
- *Print buffer is cleared.*
- *Default values are set.*

1.5 MAIN COMPONENTS

The main components of the Stylus Pro XL are:

- ❏ *Printer mechanism (M-4A60)*
- ❏ *Main control board (C162 MAIN Board)*
- ❏ *Power supply unit (C137 PSB/PSE Board)*
- ❏ *Control panel board (C137 PNL Board)*
- ❏ *Housing*

1.5.1 Main Control Board (C162 MAIN Board)

The Main Control Board (C162 MAIN Board) consists of an H8/3003 16-bit CPU, E05A96 gate array, a program ROM (4M), a dynamic RAM (4M), a mask ROM (4M or 8M), an EEPROM (1K), and a lithium battery for powering the protect counters. The reset IC (M51955 and PST 592) is equipped with both a logic system and a power system. The 8M program ROM is used only for the NLSP (National Language Support Printer) specification.

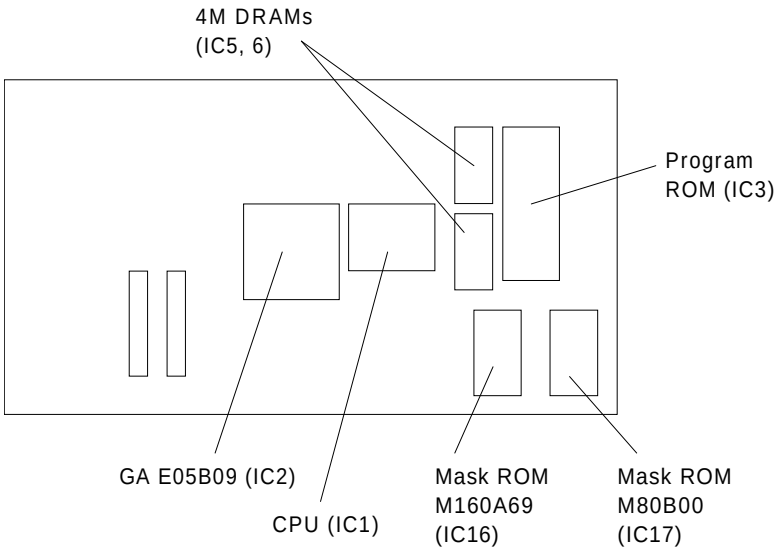

Figure 1-9. C162 MAIN Board Component Layout

1.5.2 Power Supply Board (C137 PSB/PSE Board)

The power supply board (C137 PSB/PSE Board) consists of an RCC switching regulator circuit. This board is equipped with a power switch connected to the secondary circuit. Thus, if the printer is turned off, it can continue to operate in order to eject the paper and perform the head capping operation. The power on/off signal is always monitored by the E05A96 gate array on the C162 MAIN Board, and the logic system recognizes the power switch status.

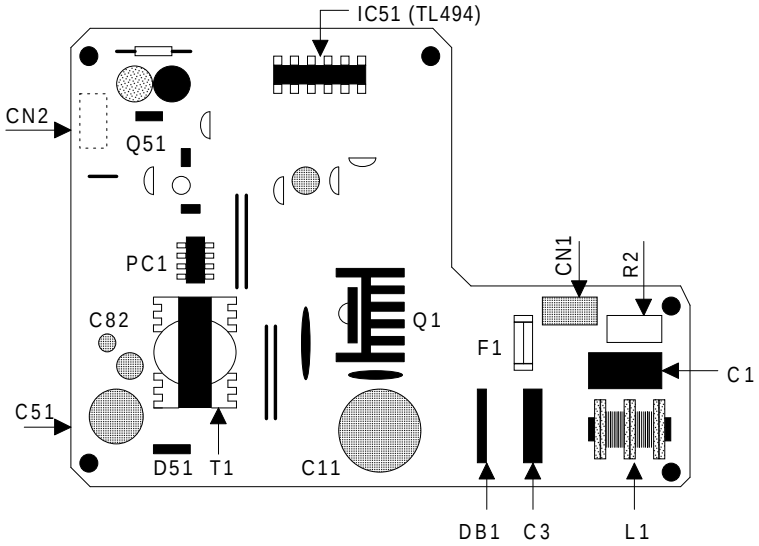

Figure 1-10. C137 PSB / PSE Board Component Layout

1.5.3 Control Panel (C137 PNL Board)

The 14 LEDs on this board indicate the error status (there is no buzzer system); by using the 6 switches in combination with one another, the printer can operate in each protect operation (color or black cleaning, cartridge exchanging, self-test, default setting value exchanging, reset, and EEPROM clear operation).

1.5.4 Printer Mechanism (M-4A60)

The M-4A60 printer mechanism is equipped with a 64-nozzle black printhead and 48-nozzle color (CMY) printhead on the carriage unit. Resolution of 720 dpi is possible with special (non-absorbent) paper.

The ink system has both a black pump unit and a color pump unit. Waste ink from each printhead is made to flow into the individual caps. Power for the pump system and paper feed system is supplied from the paper feed motor.

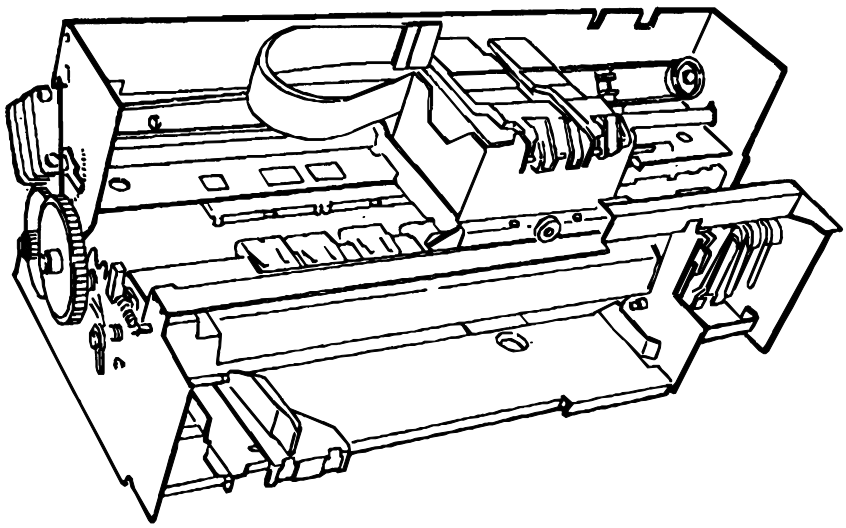

Figure 1-11. Printer Mechanism (M-4A60)

1.5.5 Housing

The Stylus Pro XL housing consists of the printer cover, upper case, and the lower case. Attached to the housing are the front paper support and the ejected paper support with paper separator.

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 Pro XL.

2.2 OPERATING PRINCIPLES OF THE PRINTER MECHANISM

The Stylus Pro XL 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.

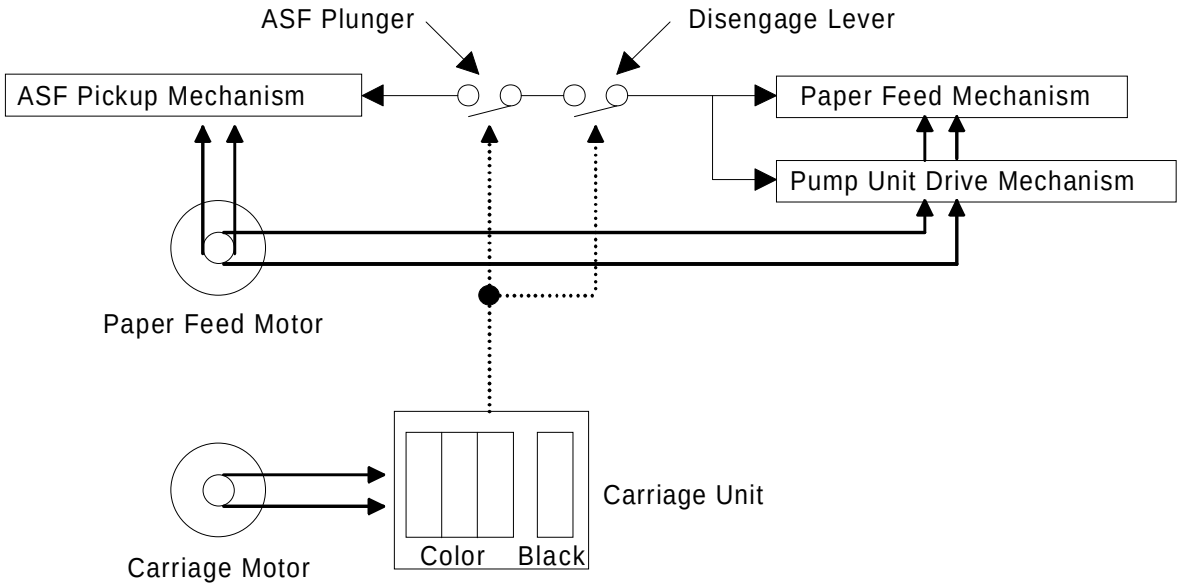

Figure 2-1. Printer Mechanism Block Diagram

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 more compact and ensure a high level of reliability. The figure below shows the structure of the printhead and ink supply system.

❑Piezo 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 ejected fr om the nozzles when the vibration plate compresses this area.

❑ Nozzles These eject ink against the paper's surface in response to the application of the print signal. There are 64 (black head) or 48 (color head) individual nozzles making up the printhead.

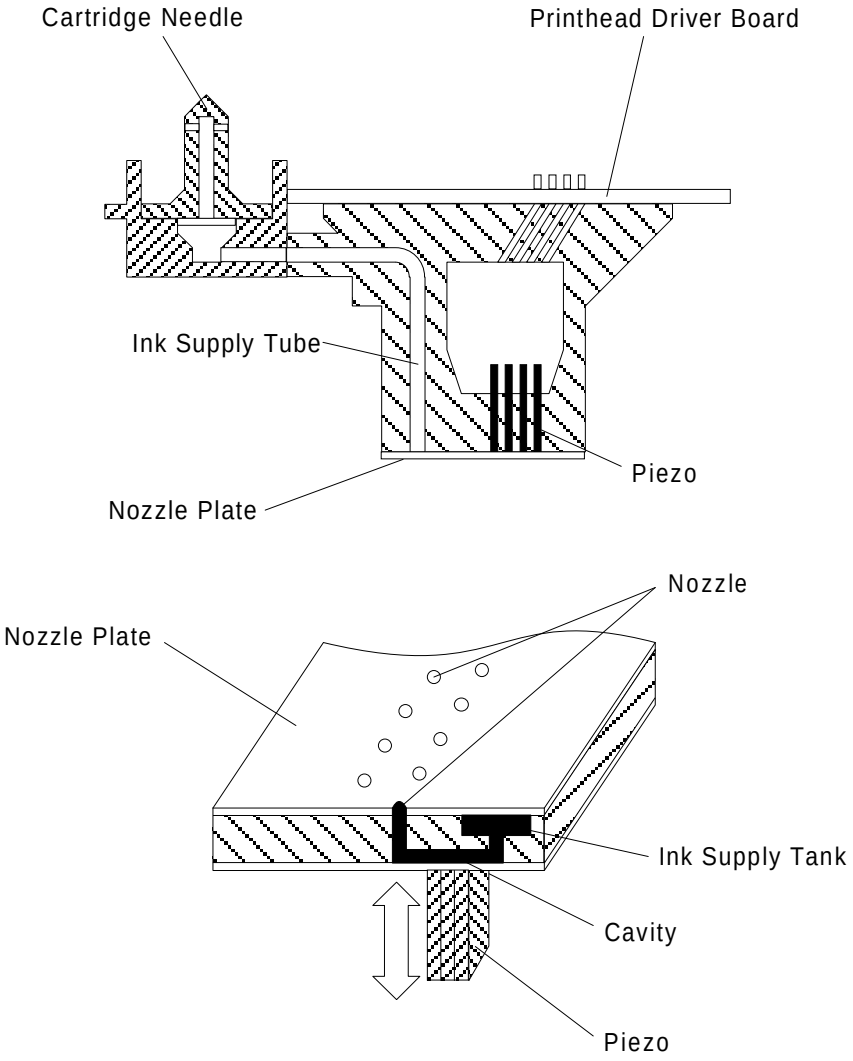

Figure 2-2. Structure of Printhead

Principles of the Printing Operation

The printhead operates in one of two modes to eject ink from each nozzle:

- ❑ 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 a constant level.

- ❑ Ejecting 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 ejected from the nozzle.

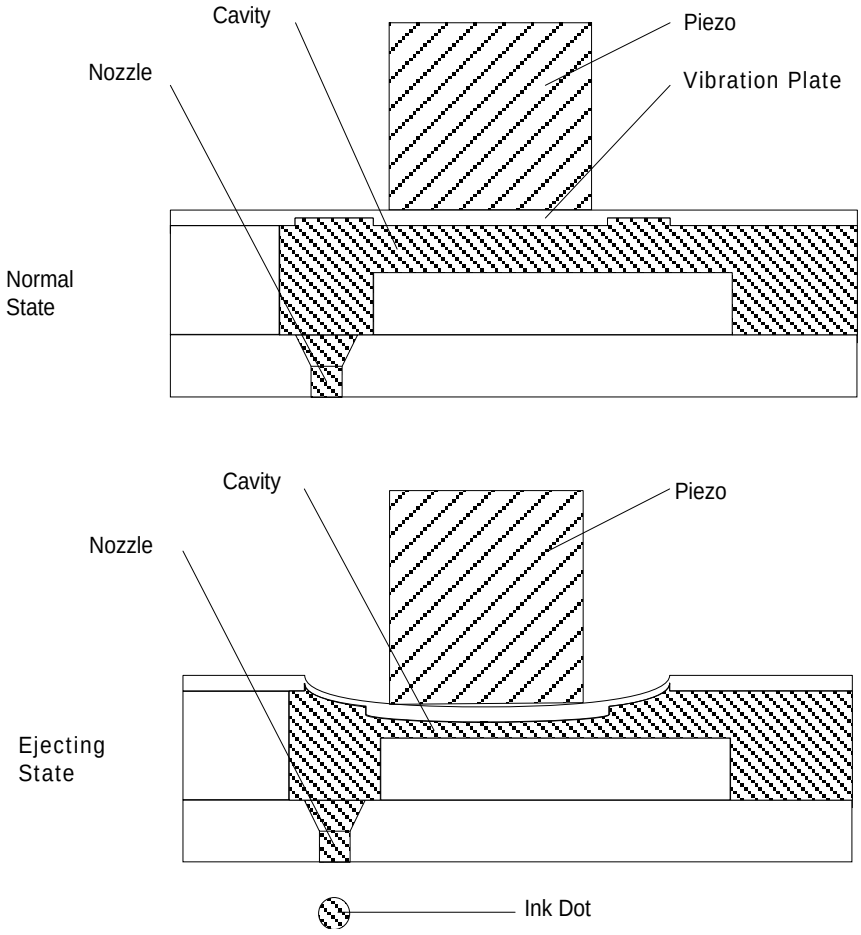

Figure 2-3. Principles of the Printing Operation

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 ejected from the nozzle, according to the change of volume in the cavity.

A thermistor is attached to the side of the color 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 change the timing of the Tc pulse. (The Tc pulse is shown in Section 2.3.2.5.)

Micro Dot Printing mode

The Stylus Pro XL printer has a special printing mode, called “Micro Dot Printing mode”. This printing mode can be selected by a command from the host computer. Using the Micro Dot printing mode can improve the quality of output. In Micro Dot Printing mode, the ink dot size became to be smaller than the normal dot size.