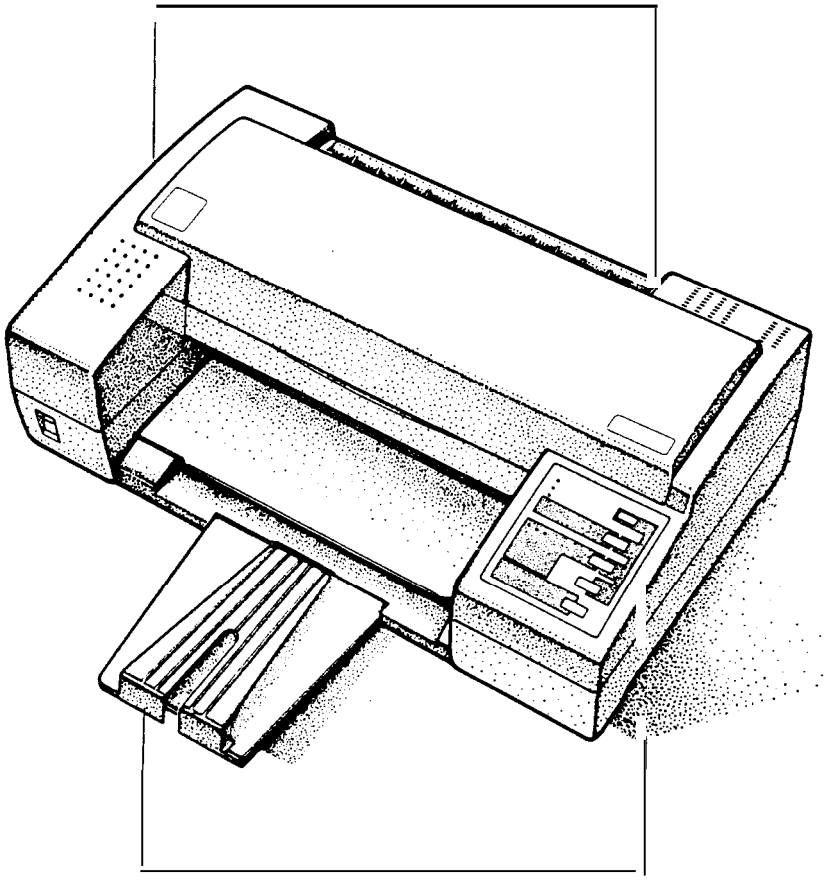
EPSON TERMINAL PRINTER

Stylus™ 800+

SERVICE MANUAL



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NOTICE

The contents of this manual are subjects to change without notice.

All efforts have been made toensure theaccuracyof thecontentsof 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 consequence thereof.

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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 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 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. ADJUSTMENT

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	April 20, 1994	Ist issue

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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 produce superb quality output with high-speed printing. The major features of this printer are:

- ❑ High print quality from a MACH (Multi-Layer ACtuator Head) inkjet technology.
- ❑ Fast printing of LQcharacters at 165 cps and draft characters at 250 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 with4 scalable fonts, 5 bitmap LQ fonts, and 1 draft font, standard.
- ❑ 9 character tables for the standard version
  15 character tables for the NLSP (National Langauage Support) version.

The figure below shows a view of the printer.

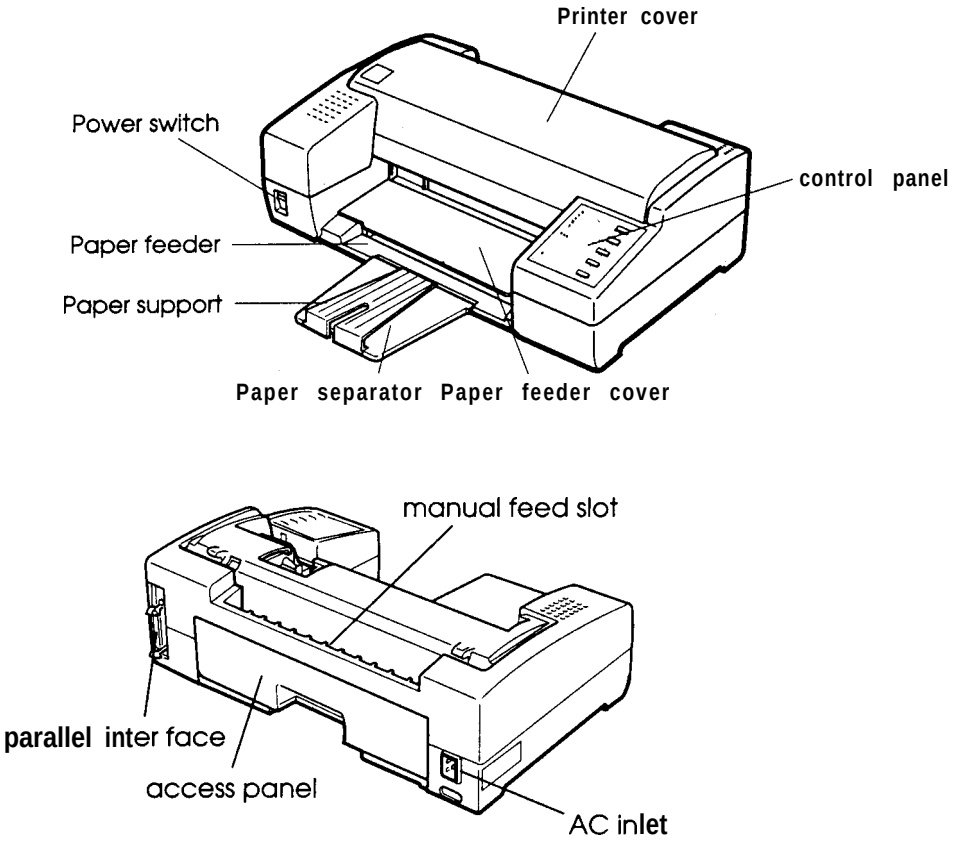

Figure 1-1. View of the Stylus 800+

Table 1-1. Consumable for the Stylus 800+

Part No.	Description	Type
S020025	Ink cartridge	Black ink cartridge

Table 1-2 shows the differences in features for the Stylus 800 and Stylus 800+.

Table 1-2. Feature Comparison

Function/Specification	stylus 800	stylus 800+
LQ Fonts (10 cpi) Printing Speed	150 cps	165 cps
Draft Fonts (10 cpi) Printing Speed	cannot printing	250 cps
Resident Bitmap Fonts	Roman ‘ sane serif Courier Prestige script	Draft Roman Sans Serif Courier Prestige script
Resident Scalable Fonts	Roman Roman T Sans Serif Saris Serif H	Roman Roman T Saris serif Sans Serif H

1.2 SPECIFICATIONS

This section provides detailed statistics for this printer.

1.2.1 Printing Specifications

Print system: On-demand inkjet system

Nozzle configuration: 48 nozzles (12 nozzles x 4 staggered columns)

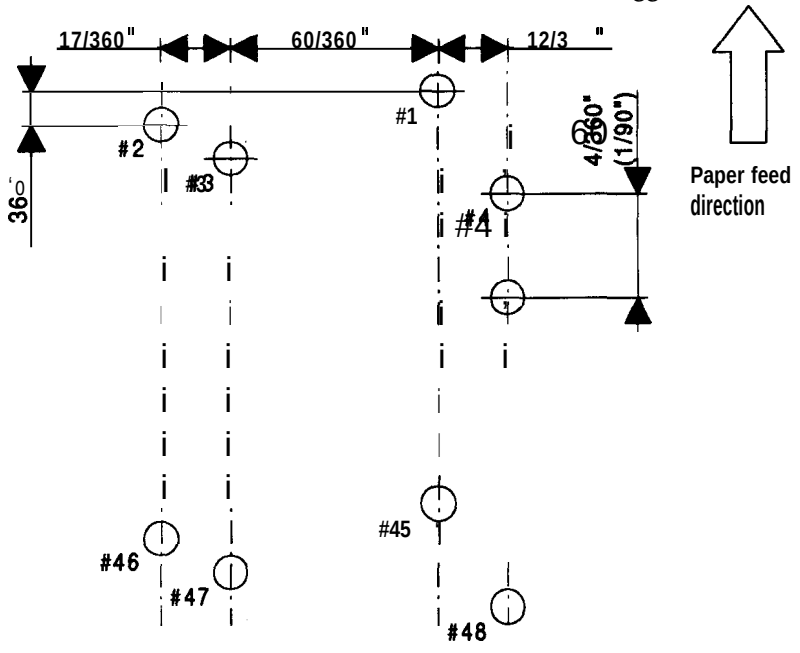

Figure 1-2. Nozzle Configuration

Print direction: Bidirectional printing with logical seeking control

Print speed and printable columns: See table below.

Table 1-3. Print Speed and Printable Columns

Character Pitch	Printable Columns	Print Speed (LQ)	Print Speed (Draft)
10 cpi	80	165 cps	250 cps
12 cpi	96	198 cps	300 cps
15 cpi	120	246 cps	375 cps
17 cpi (10 cpi/ condensed)	137	283 cps	429 cps
20 cpi (12 cpi/ condensed)	160	330 cps	500 cps

Character sets: Legal and 14 international character sets.

Character tables: See the table below.

Table 1-4. Character Tables

Character Table	standard Version	NLSP Version
Italic	o	0
PC437 {IJ.S./Standard Europe)	O	O
PC850 (Multilingual)	o	0
PC860 (Portuguese)	o	x
PC863 (Canadian-French)	o	x
PC865 (Nordic)	o	x
PC861 (Iceland)	o	x
PC437 Greek	x	O
PC851 (Greek)	x	o
PC852 (East Europe)	x	o
PC853 (Turkish)	x	O
PC855 (Cyrillic)	x	o
PC857 (Turkish)	x	o
PC866 (Russian)	x	o
PC869 (Greek)	x	o
Abicomp	O	x
BRASCII	o	x
MAZOWIA (Poland)	x	o
Code MJK (Czecho/Slovakia)	x	o
ISO 8859-7 (Greek)	x	o
ISO Latin IT (Turkish)	x	O
Bulgaria (Bulgaria)	x	o

o supported x Not supported

Fonts:

Bitmap fonts —

- EPSON Draft (10 cpi/12 cpi/15 cpi)
- EPSON Roman (10/12/15/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 8-32 points (units= 2 points)
- EPSON Sans Serif 8-32 points (units= 2 points)
- EPSON Roman T 8-32 points (units= 2 points)
- EPSON Saris Serif H 8-32 points (units= 2 points)

Print mode:

For bitmap fonts —

Selection and mixture of the following modes 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

Input buffer: 32KB or 8KB (selected using the default setting labeled "Mixed text/ graphics mode")

1.2.2 Paper Handling Specification

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

Note: The following operations are not allowed.

1. *Reverse feeding within 3mm (O. 12 inches) from the top edge 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 or l&in& feed or programmable in 1/360-inch minimum increments.

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

Feeding speed: 87 rns (at 1/6-inch feed pitch)

1.2.3 Paper Specifications

Usable paper:

cut sheet

With the 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 (85") x279 mm (11.0"))
Thickness:	0.065- 0.14 mm (0.0026 - 0.0055")
weight	64- 90 g/m^2 (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/m^2 (14 - 24 lb / 45- 78 kg)
Quality:	Bond paper, Photocopier paper

Envelope

Size:	#6 (W x L : 166 mm (6⅝") x 92 mm (3⅝")) # 10 (W x L : 240 mm (9½") x 104 mm (4⅛"))
Thickness:	0.16-052 mm (0.0063 - 0.020")

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

weight:	45- 90 g/m^2 (12- 24 lb.)
Quality:	Bond paper, Air mail

Notes 1. Envelopes are usable only with manual insertion feed.
2. Printing on envelopes is guaranteed only at normal temperature and humidity.
3. Insert envelopes into the manual insertion slot sideways.

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

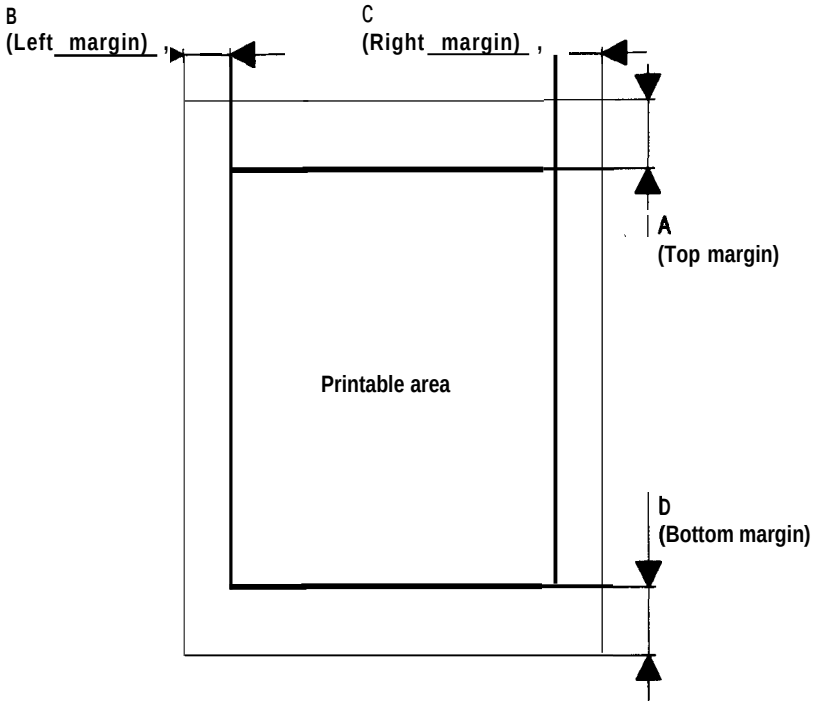

Figure 1-3. Printable Area — Cut Sheet (Built-in Sheet Feeder)

Cut Sheet / envelopes (with the manual insertion slot)

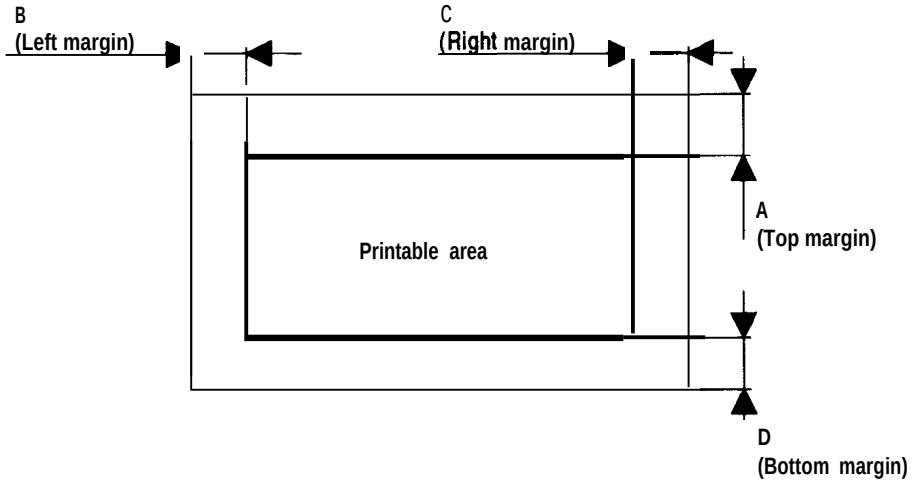

Figure 1-4. Printable Area — Cut Sheet/ Envelope (Manual Insertion Slot)

Notes: A: The minimum top margin= 3 mm (O. 12")
B: The minimum left margin = 3 mm (0.12")
C: The minimum right margin is
A4 size= 3.0 mm (O. 12")
Letter size = 9.0 mm (0.38")
Manual insertion =3 mm (O. 12") (Paper widths A4 (210 mm))
Manual insertion = 'Paper width" 207 mm (8.3") (Paper width ≥ A4 (210 mm))
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 below.

Table 1-5. Adjust Lever Settings

Lever Position	Paper Type	Paper Thickness
Left	Cut Sheets	0.065-0.11 nun (0.0026- 0.0056")
Right	Envelopes	0.16- 0.52 mm (0.0063- 0.020")

Plain paper, bond paper Envelopes

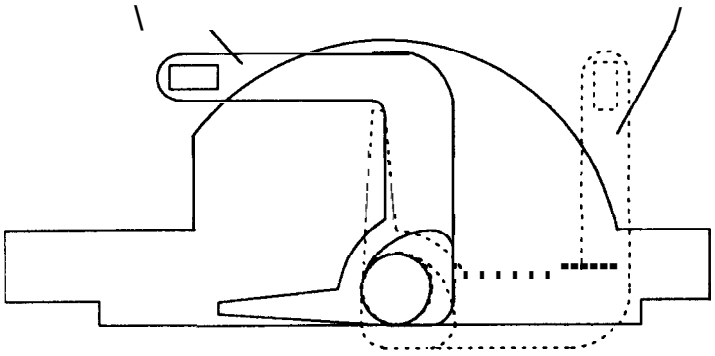

Figure 1-5. Adjust Lever

1.2.4 Ink Cartridge

Type: Exclusive cartridge (S020025)

Ink color: Black

Print capacity: *0.7* million characters (LQ)

Ink capacity: 29.0 +0.5/–1.0 cc

Life: The effective life from the indicated production date is:
2years (total 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′ P′))

Note: Ink freezes in the ink cartridge if kept below-C (26.6° 9. It requires several hours to unfreeze at mom temperature (25° C(77 9).

Dimensions:
Width 28.5 mm (1.12")
Depth 54.5 mm (215″)
Height 38.5 mm (1.52")

1.2.5 Environmental Conditions

Table 1-6. Requirements for Operation and Storage

Description	Operating	Storage
Temperature	10- 35° C (50 - 95° F)*1	-20- 50° c (-4 - 122° F) ● 2
Humidity	20- 80% RH *1,3	5- 85 % RH *2,3
Resistance to shock	1 G, within 1 ms	2 G, within 2 ms ● 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 shown in the figure Mow.
*2= When the printer is in the shipping container.
*3= Without condensation.

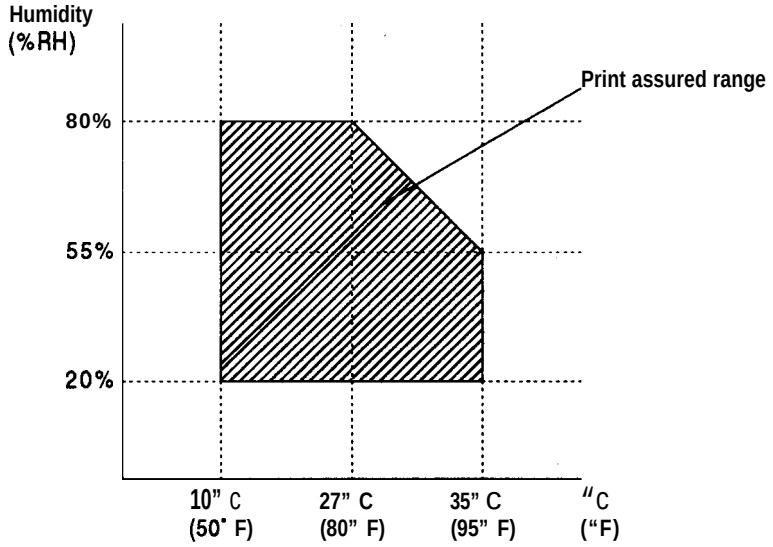

Figure 1-6. Temperature/ Humidity Range

1.2.6 Electrical Specifications

Table 1-7. Electrical Specifications

Item	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	0.5 A	0.3 A
Power consumption	Approx. 13 W (self-test with 10 cpi LQ characters)	Approx. 13 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)

1.2.7 Reliability

MTBF:	4000 power on hours (POH) at a duty cycle of 10'Yo
Printhead life:	1 billion dots per nozzle
Total print volume:	75000 pages (with A4 or letter-size paper)

1.2.8 Safety Approvals

Safety standards:	US. version:	UL1950 with D3 CSA22.2 #220
	European version:	EN 60950 (TÜV) IEC 950 (SEMKO, DEMKO, NEMKO, SETI)

Radio frequency interference (lWI):

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 Specifications

Size (W × Dx H):	*435* × *264* × 154 mm (17.1 x 10.4x 6.1 inches)
Weight	Approximately 4.8 kg, excluding the ink cartridge

1.3 INTERFACE SPECIFICATIONS

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 57-30364) (Amphenol) or equivalent
Data transmission timing:	See Figure 1-7.

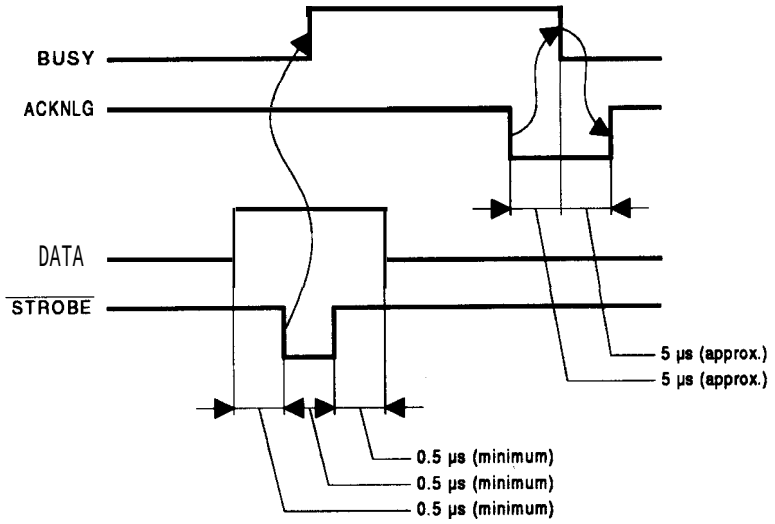

Figure 1-7. Data Transmission Timing

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

Table 1-8. 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 0.5µs 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 O. 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 the acknowledge pulse, with a width of approximately 10 p.s. This signal goes LOW on completion of data reception to indicate 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 no paper.
13	SLCT	O	Pulled up to +5 V through a 1.OK S2 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 1-8. Signal and Connector Pin Assignments (Continued)

Pin No.	Signal Name	I/O	Description
16	GND	—	Signal ground.
17	CHASSIS-GND	—	Chassis ground. (Both chassis 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 go& 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	+5 V	—	Pulled up to +5V through 1.0KΩ 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 for this printer contains five non-lock type push buttons and nine LED indicators for easy operation of the various printer functions.

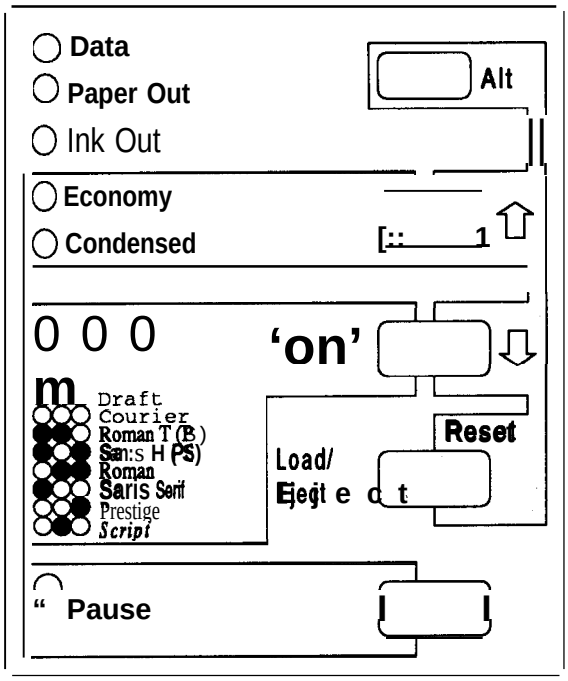

Figure 1-8. Control Panel

Buttons

Pause	Switches printer status between printing and no printing, if there is print data in the input buffer. When you hold down this button and the **Alt** button in pause mode for 2 seconds, the printer initiates printhead cleaning.
Economy/Condensed	Selects economy or condensed printing 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 paper path. Also works as a reset button, if the **Alt** button has been pressed.
Alt	This button alternates functions of certain buttons. When you hold down this button in pause mode for 3 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 occurs.
Ink Out	Lights when the printer detects an 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

You can turn on the following functions at power on by holding down buttons on the control panel.

Self-test mode:	Start self-test printing by turning the printer on while holding down the Font button (LQ self-test) or LoadEject button (Draft self-test).
Hex dump mode:	Start the built-m hexadecimal data dump print mode by turning the printer on while holding down the Font and Load/Eject buttons. Once this mode is selected, the printer pMts all received data m hexadecimal format.
Demonstration mode:	Start printing of a demonstration page by turning on the printer while holding down the Alt button.
Smudge prevention mode:	Enter smudge prevention mode by turning on the printer while holding down the Alt and Font buttons. If the paper has a tendency to smudge during high duty printing, you can prevent smudges using this feature. In this mode, the printer waits a few seconds after printing a line to line feed.

Other functions that can be activated from 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 lets you set and save some default settings that it will start with after every initialization. You can define the settings in the table below in default setting mode. Start default setting mode by holding down the Economy/Condensed button while turning on the printer.

Table 1-9. Default Setting ttem

Menu Contents	Description	Factory Setting
Character Table	Selects the character table	
Auto Print Direction	ON: Print direction is selected automatically for optimal print quality (alignment). OFF: Depends on the ESC U command.	ON
Network I/F Mode	ON: For netvvorkenvironments, such as LocalTalk. (Time-out printing is disabled.) ON: For normal environments. (Time-out printing is enabled.)	OFF
Mixed Text/ Graphics Mode	ON: To ensure proper printing of images containing graphics and scalable fonts using certain applications, such as MS Word or WordPerfect version 5.1 or earlier. *1 OFF: For normal use.	OFF
Auto Line Feed	ON: Line feed operation is performed automatically upon receipt of the CR code. OFF: No line feed operation with CR code.	OFF

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

1.4.4 Initial Ink Charge

When the printer is setup for the first time, the printer's entire ink supply path must be filled with ink by performing the initial ink charge operation, as described below.

1. Begin initial ink charge by pressing the Alt and Pause buttons and turning on the printer.
2. Install the ink cartridge.
3. Press the Alt button.

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

CAUTION

- *The ink cartridge* **must be** *installed immediately* ***after*** *unpacking the package.*
- *Do not* ***perform*** *the initial ink charge operation more than twice on the same printer. Otherwise, the operation consumes too much ink in the cartridge and shortens the life of the waste ink tank.*

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 end	ON	OFF	OFF	3 short beeps	Load paper and press the following buttons: 1. Pause 2. Load/Eject
Paper jam	BLINKS	OFF	OFF	3 short beeps	Same as above.
Ink low ●1	OFF	BLINKS	—	No beeps	Press Pause and replace the ink cartridge with a new one. Then, press Pause again to resume printing. *2
Ink end	OFF	ON	OFF	3 short beeps	Replace the ink cartridge and press Pause.
No ink cartridge	OFF	ON	OFF	3 short beeps	Install the ink cartridge and press Pause.
Carriage error	OFF	OFF	OFF	5 long beeps	Tum the printer off and back on again.
Waste ink tank over-flow	OFF	ON	BLINKS	3 short beeps	Service maintenance required. (Replace the waste ink absorbing material and reset the protect counters.)

Notes: *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-4611)
- Main control board (C134 MAIN Board)
- Power supply unit (C106 PSB-B/C106 PSE-B Board)
- Control panel
- Housing

1.5.1 Main Control Board (C134 MAIN Board)

The C134 MAIN board is the main controller of the Stylus 800+. It takes charge of interfacing with the host computer and processing received print data, as well as control of the whole printer mechanism. This board consists of the following components

CPU (IC1)	16-bit CPU (TMP96C141F-20) 19.6608 MHz operating clock
Gate array (IC3)	E05B00
Program ROM (IC4)	1M-bit EPROM or 1M-bit mask ROM
CG ROM (IC7/8)	4M-bit mask ROM M40B21 (IC8 / for standard version) 8M-bit mask ROM M80A71 (IC7 / for NLSP version)
RAM (IC5)	1M-bit PSRAM
EEPROM (IC10)	1K-bit (64x 16 bit) EEPROM
CR motor driver (IC13)	Hybrid IC SMA7024ME Constant current unipolar drive
PF motor driver (QM1)	Hybrid IC SMA6501 Constant voltage unipolar drive

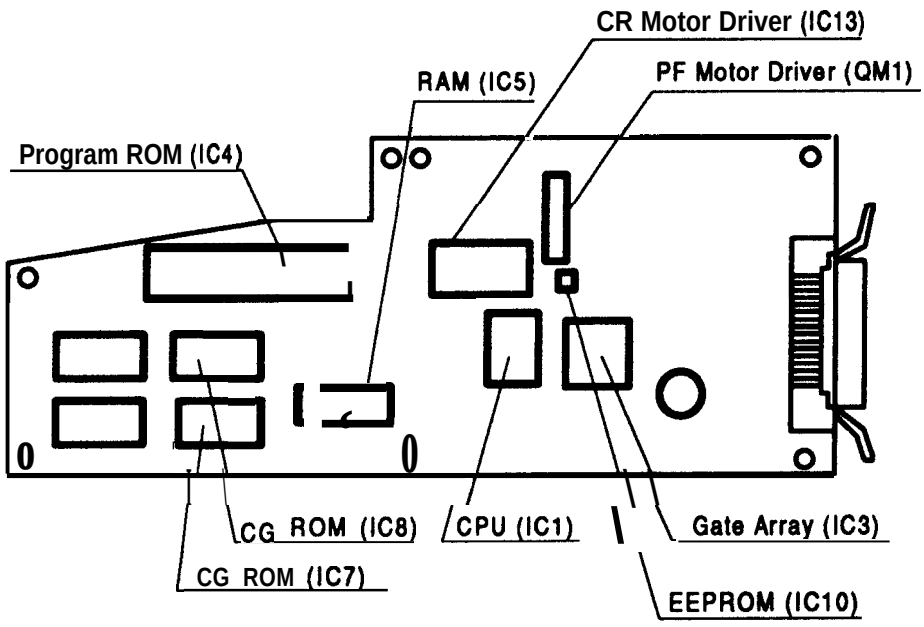

Figure 1-9. C134 MAiN Board Component Layout

1.5.2 Power Supply Unit (C106 PSB-B/C106 PSE-B Board)

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

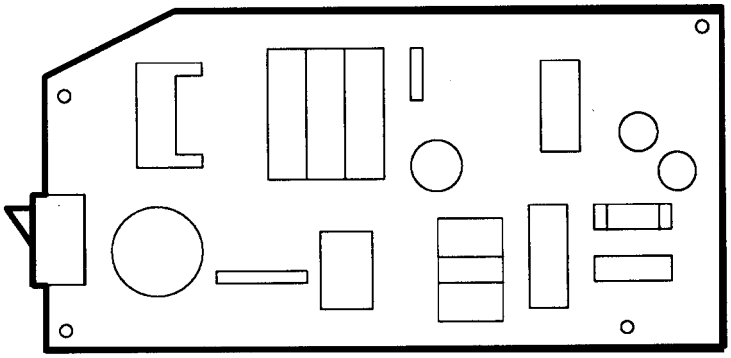

Figure 1-10. C106 PSB-B/PSE-B Board Component Layout

1.5.3 Printer Mechanism (M-4811)

The M-4811 printer mechanism is specifically designed for the Stylus 800+. 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.

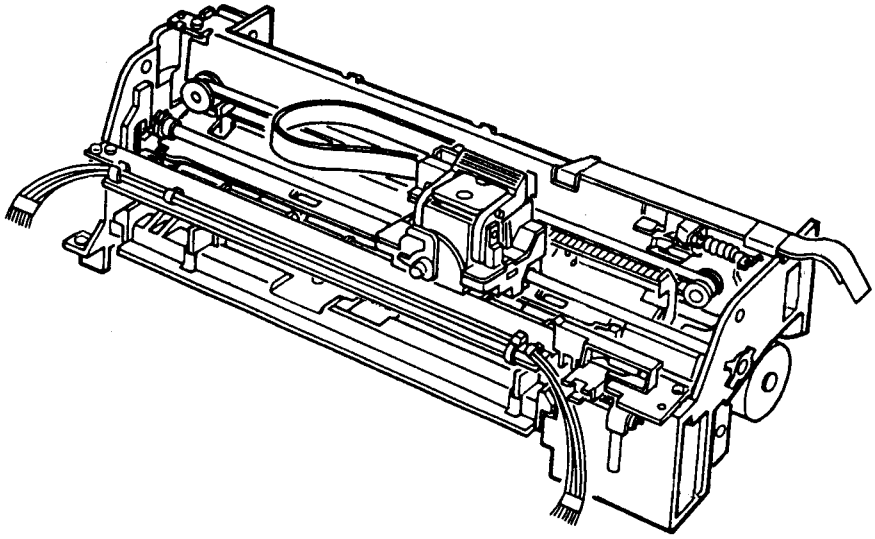

Figure 1-11. Printer Mechanism (M-4811)

Chapter 2 Operating Principles

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2.1 OVERVIEW

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

2.2 PRINTER MECHANISM OPERATING PRINCIPLES

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.

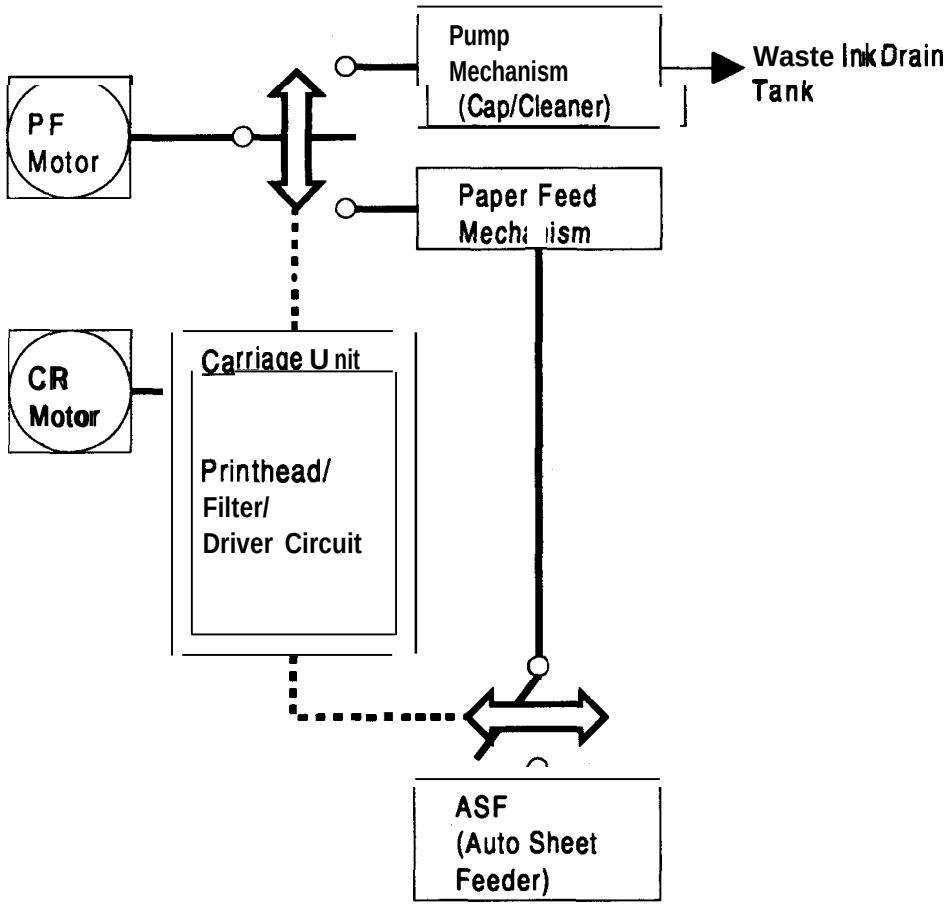

Figure 2-1. Functional Block Diagram of the Printer Mechanism

2.2.1 Printer Mechanism

The printer mechanism for this printer uses a drop-on-demand ink jet system similar to all other EPSON ink jet printers, but the printhead has been completely redesigned to make it compact and highly reliable. The figure below shows the structure of the printhead and ink supply system.

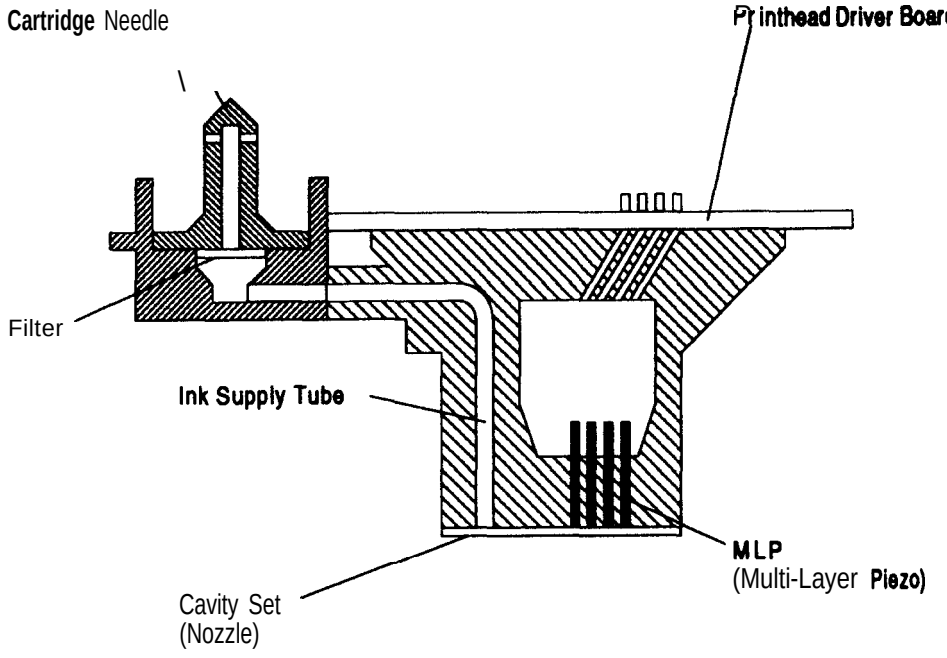

Figure 2-2. Structure of the Printhead 1

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 ejection from the nozzle.

Cavity — Ink supplied from the ink cartridge is stored in this space and is ejected from 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 48 individual nozzles making up this printhead.

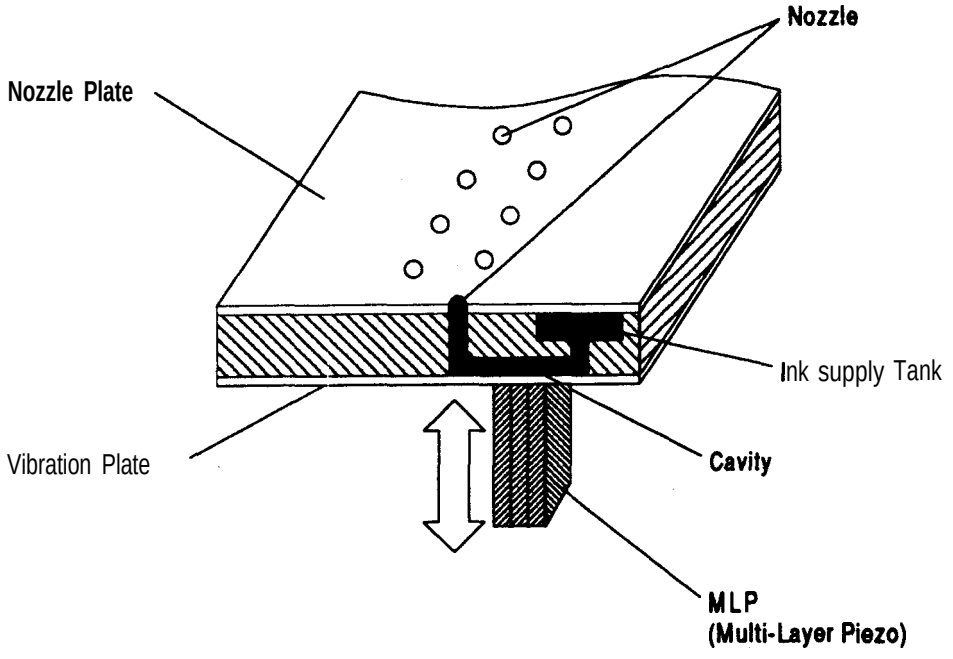

Figure 2-3. Structure of the Printhead 2

Principles of the Printing Operation

The printhead performs the following operations to eject ink from each nozzle:

1. Normal state

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

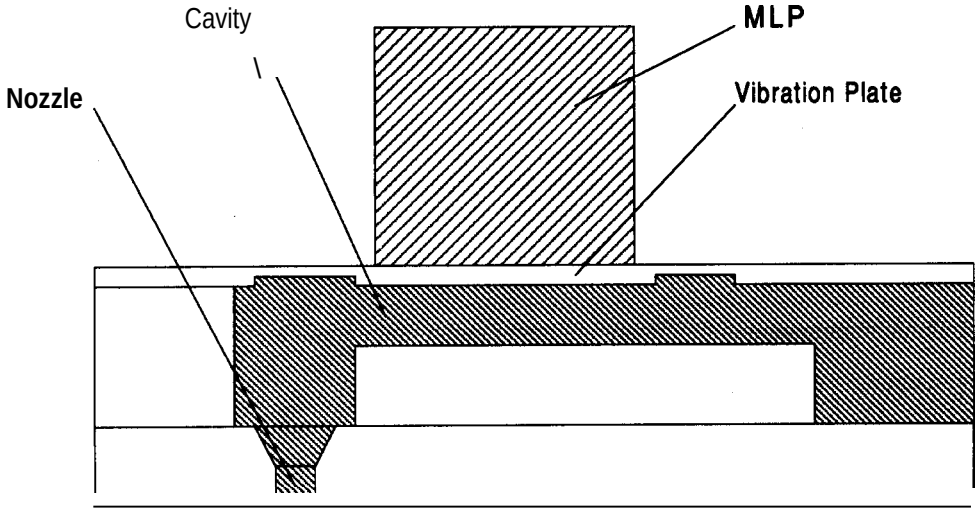

Figure 2-4. Principles of the Printing Operation 1

2. Ejection

The head data signal is applied to the control line of a nozzle to select the active nozzle for printing, and the MLP element is gradually charged with the drive voltage. Charging the MLP element bends the vibration plate to compress the cavity. Then, ink is ejected from the nozzle.

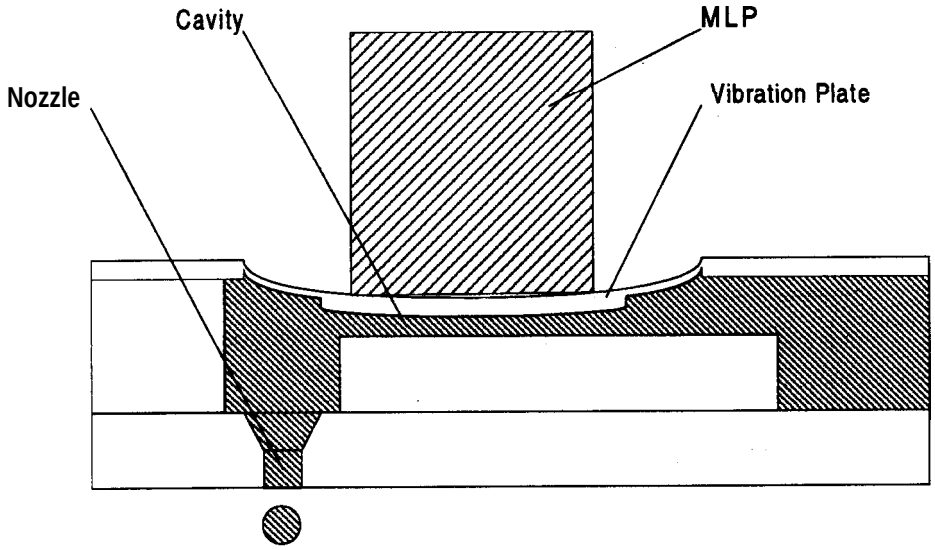

Figure 2-5. Principles of the Printing Operation 2

When the ink charge or printhead cleaning operation is performed, ink in the cavity is vacuumed out with the pump mechanism. During printing, on the other hand, ink is simultaneously supplied from the ink cartridge and ejected from the nozzle, according to the change in the volume of 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* carriage unit to move along the carriage guide shaft from 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 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 ± 5%
Coil Resistance	10.0 Ω ± 7%/pale (at 25° C, 77° F)
Drive Frequency	960- 6000 pps
Excitation Mode	1-2 phase excitation

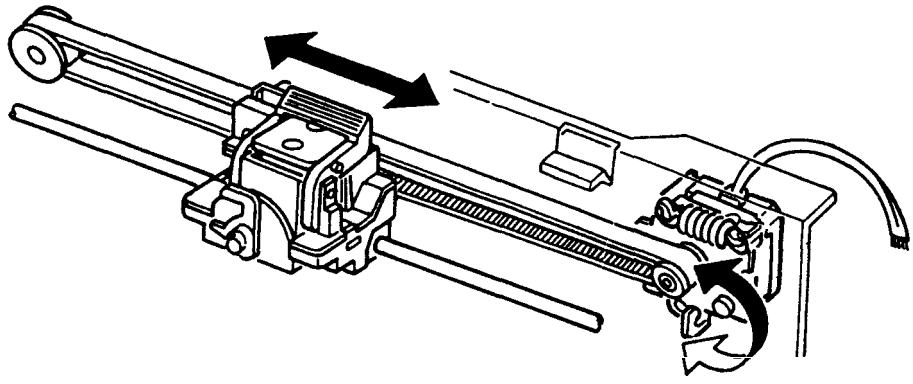

Figure 2-6. Carriage Drive Mechanism

2.2.2.1 Adjust Lever

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

Table 2-2. Adjust Lever Position

Paper Type	Lever Position	Platen Gap
cut sheet	*Horizontal* (A)	—
Envelopes	Vertical (B)	+0.7 mm

Plain paper, bond paper Envelopes

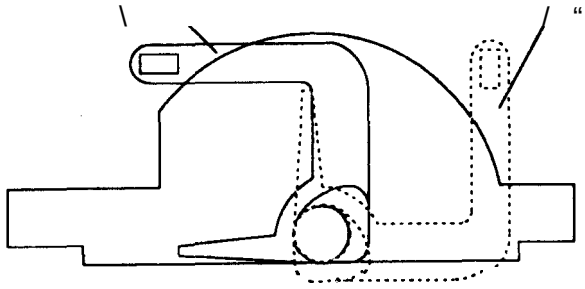

Figure 2-7. Adjust Lever

2.2.3 Paper Feed Mechanism

This printer's paper feed mechanism can feed paper either from the built-in ASF (auto sheet feeder) or the manual feed slot. The paper feed drive motor is a 4-phase, 46-pole, PM-type stepping motor that directly drives the paper feed mechanism (paper advancing operation, paper pickup operation). This motor also drives the pump mechanism, but only when the printer is in the cleaning state.

Table 2-3. Paper Feed Drive Motor Specifications

Item	Description
Motor Type	4-phase /48-pole PM-type stepping motor
Drive Voltage	35 v ± 5%
Coil Resistance	54 ± 3 Ω / pole (at 25° C, 77° F)
Drive Frequency	650-800 pps
Excitation Mode	2-2 phase excitation

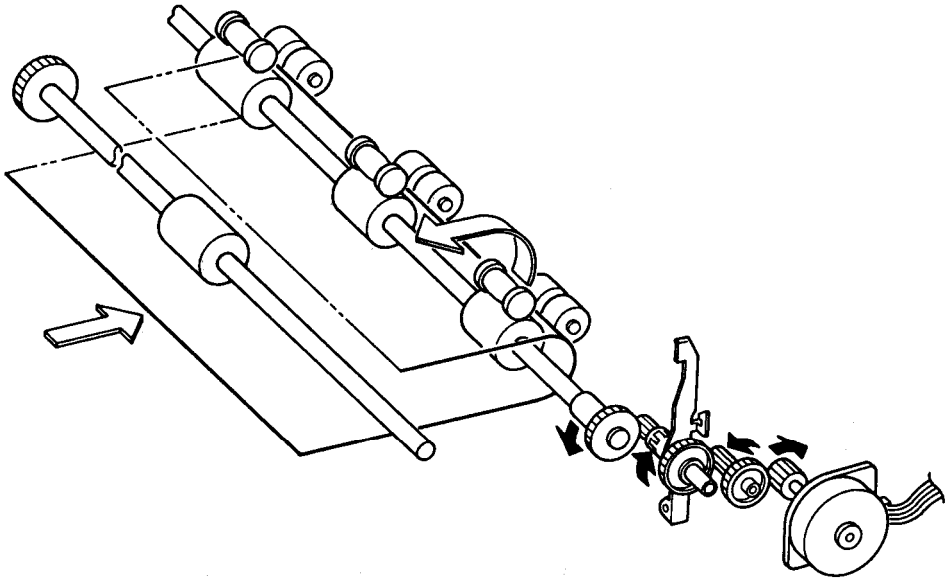

Figure 2-8. Paper Feed Mechanism 1

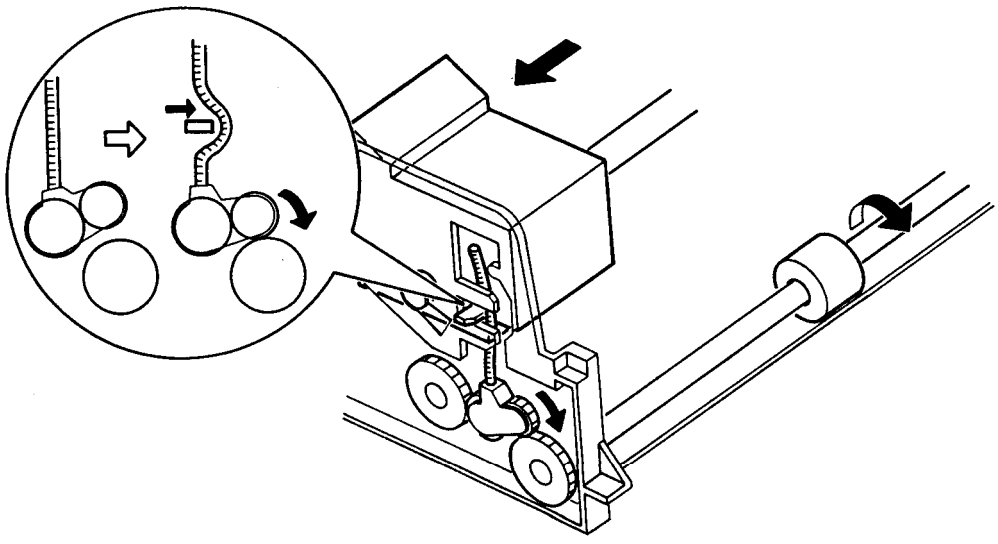

Figure 2-9. Paper Feed Mechanism 2

2.2.4 Ink System

This printer's ink system is composed of the following mechanisms:

- ❑ Ink cartridge
- Pump mechanism
- ❑ Cap mechanism
- ❑ Printhead cleaning mechanism
- ❑ Waste inkdraintank

The figure below shows a diagram of the ink system.

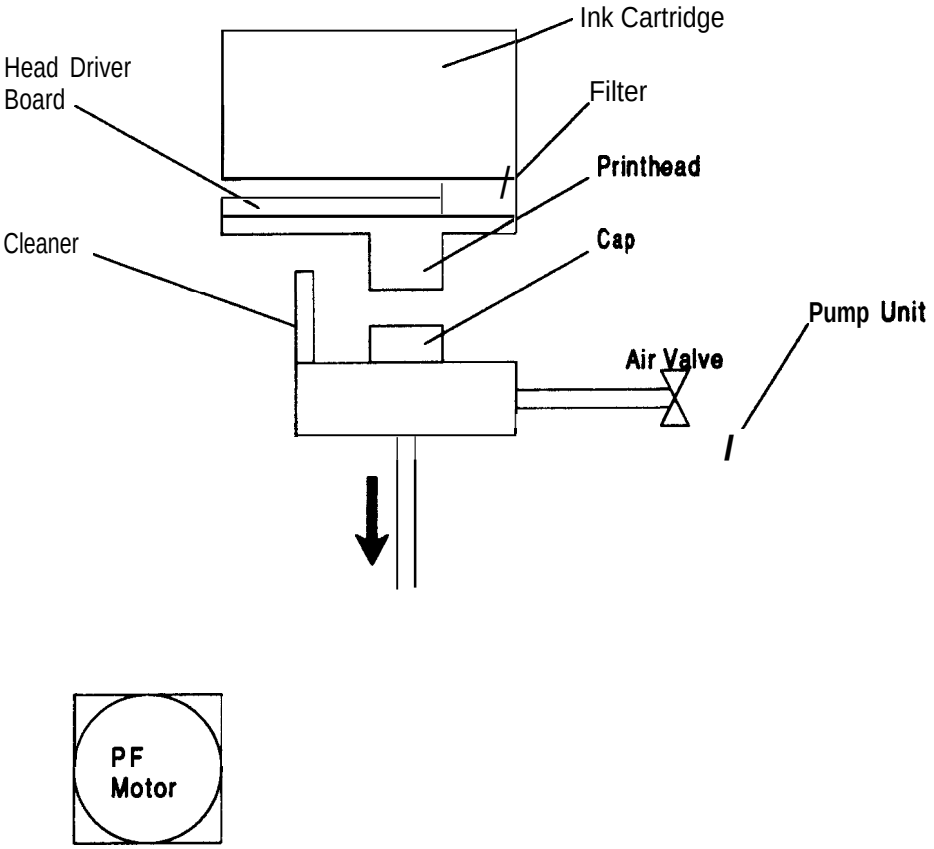

Figure 2-10. Diagram of the Ink System

2.2.5 Pump Mechanism

The paper feed motor drives the pump mechanism when the transmission gear is moved to the position where the paper feed motor engages the pump mechanism gear trains, when the carriage unit is at the ink system home position. The figure below shows a block of the pump mechanism. Pump system operation depends on the rotational direction of the paper feed drive motor, as shown in table below.

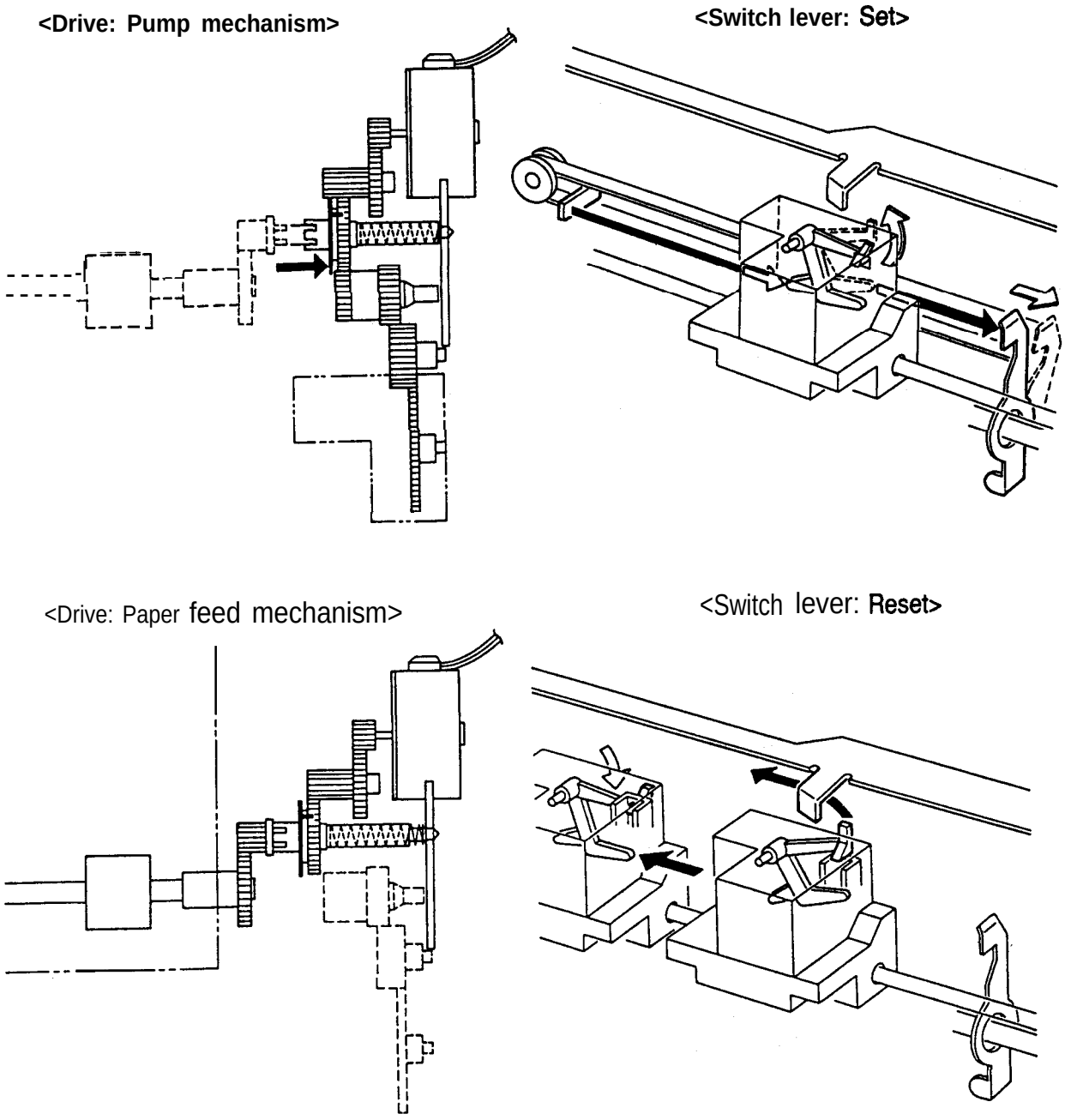

Figure 2-11. Pump Mechanism Block

Table 2-4. Pump Mechanism Operation

PF Motor Rotational Direction	Operation
clockwise (CW) (forward rotation)	Pumping Pseudo-pumping (false absorbing) Gear backrush compensation Micro absorbing
Counterclockwise (CCW) (backward rotation)	Pump pulley reeet Gear backrush compensation

The pump draws ink from the printhead nozzles and drains it to the waste ink drain tank. This operation is performed by the printer to eliminate dust/bubbles within the nozzles. The figure below illustrates pump operation. When the paper feed drive motor rotates CW (forward), the pulley pump in the wheel pump unit rotates in the direction of the arrow, while squeezing the ink tube to push the ink out of the tube and into the waste ink drain tank. On the other hand, when the motor rotates CCW, the pulley pump moves inward along the grooves of the wheel pump, releasing the pressure applied to the ink tube.

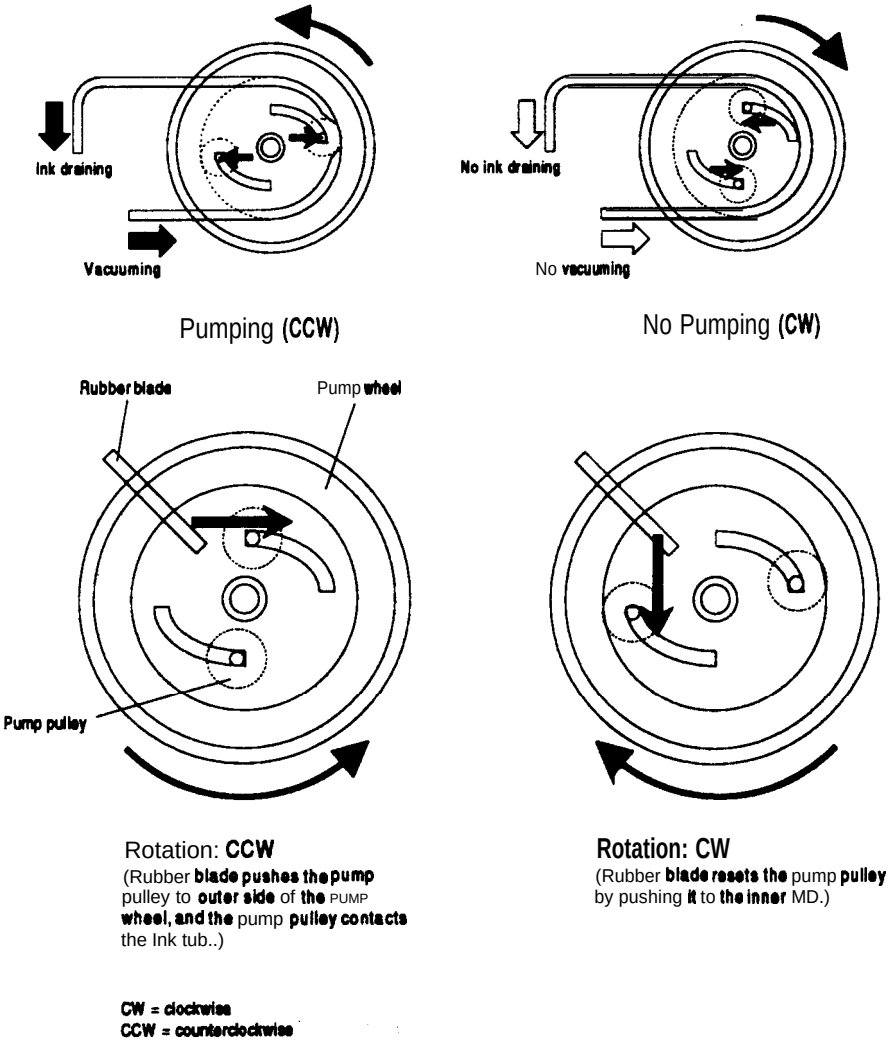

Figure 2-12. Pump Operation

2.2.6 Cap Mechanism

The cap mechanism prevents the printhead nozzles from drying or bubbles from forming inside the nozzle while the printer is not in use. The printhead capping operation is performed automatically so that a cap closely contacts the printhead surface when the carriage unit is moved to the ink system home position.

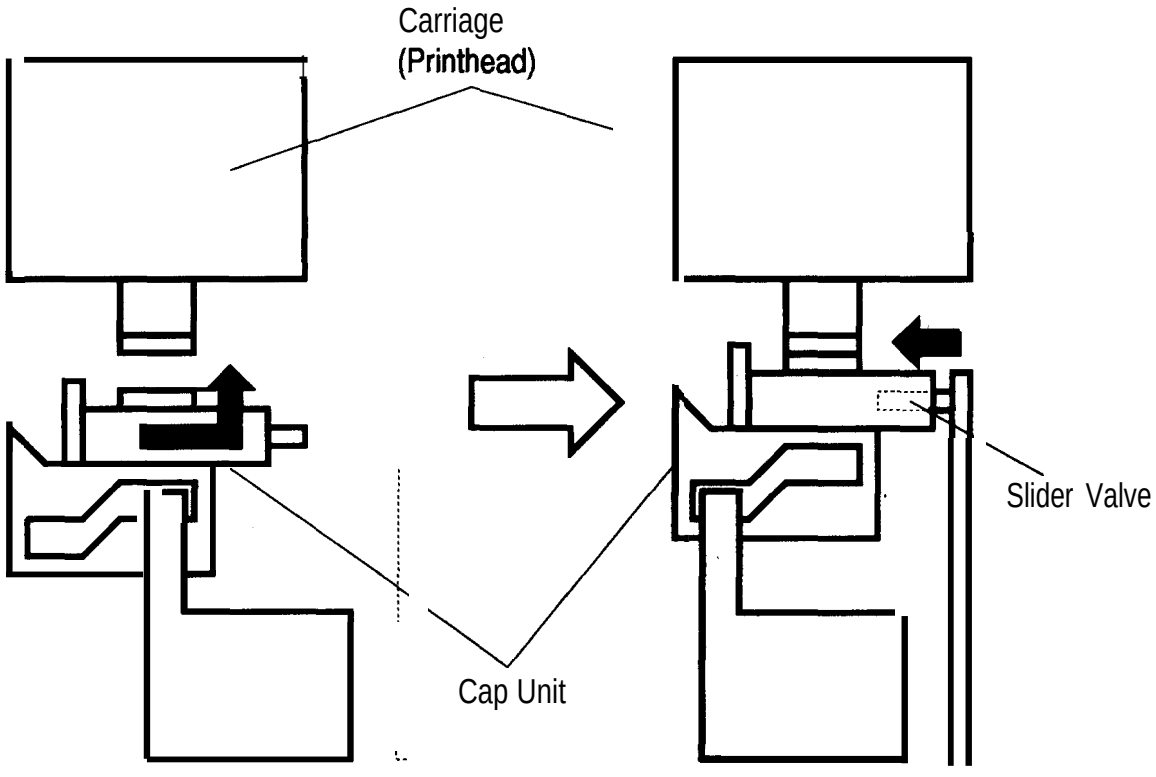

Figure 2-13. Cap Mechanism

2.3 OPERATING PRINCIPLES OF THE CIRCUITS

The Stylus 800+ contains the following circuit board units:

C134 MAIN board (main control circuit board)
C106 PSB-B/PSE-B board (power supply circuit board)

In addition to the circuit boards above, part of the printhead drive circuit is built on a separate circuit board installed in the carriage unit, and the printhead is attached directly to this board. The figure below shows a block diagram of the circuits.

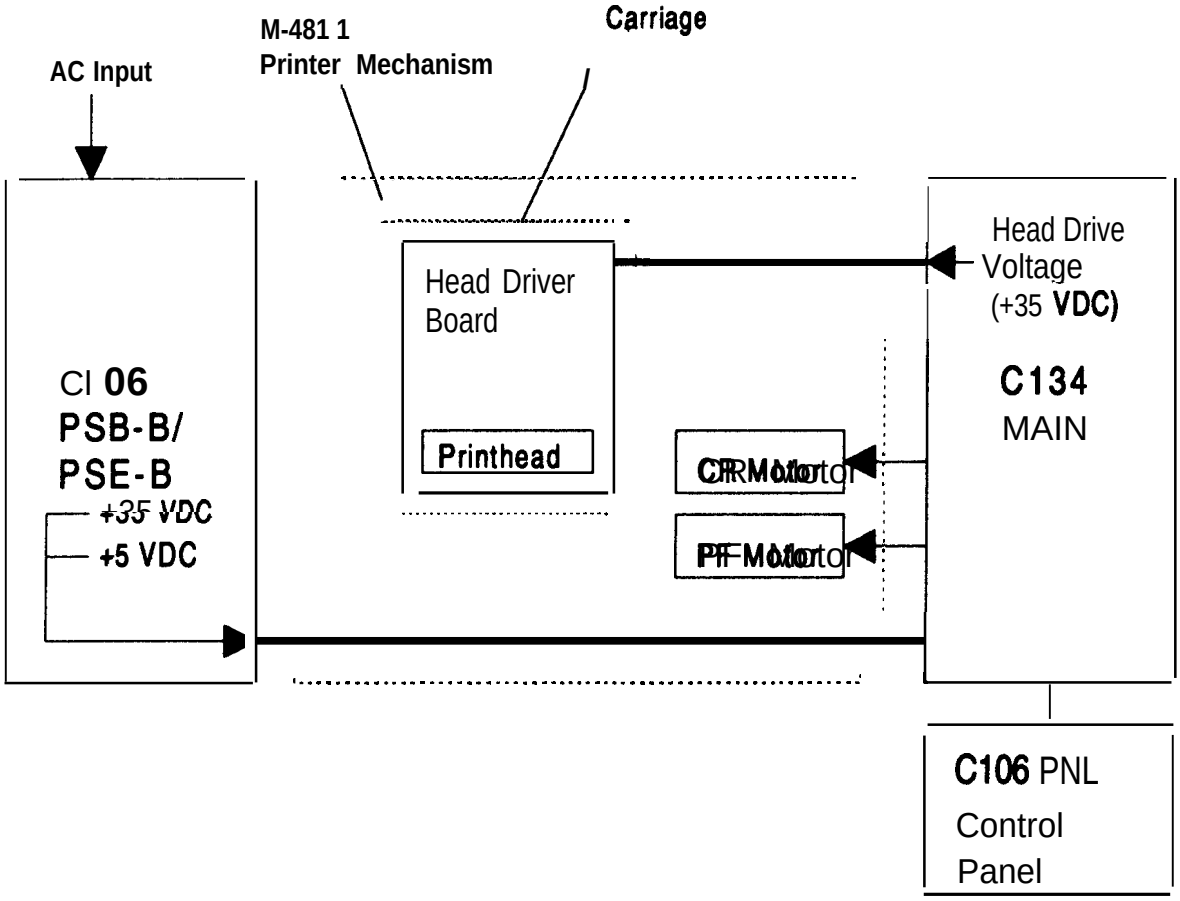

Figure 2-14. Block Diagram of the Circuits

2.3.1 Operating Principles of the Power Supply Circuit

The power supply circuitry for this printer is provided either by the C106 PSB-B BOARD (120 VAC) or the C106 PSE-B BOARD (220-240 VAC). Both boards are identical in design and functionality, except for components in the primary circuit that accommodate the specified input voltage. The application of output voltages is summarized in the table below.

Table 2-5. DC Voltage Distribution

Voltage	Application
+35 VDC	Motor drive (carriage and paper feed) Printhead (through the drive voltage generation circuit)
+5 VDC	C134 MAIN board Sensors (home position and paper end) control panel (PF motor holding voltage)

The figure below shows a block diagram of the power supply circuit (C106 PSB-B/PSE-B). This power supply circuit employs the RCC (ringing choke converter) switching control system. The input AC voltage supplied from the external AC source is first input to the filter circuit for higher harmonics absorption. The AC voltage is then input to the rectification and smoothing circuit, converting it into DC voltage. This DC voltage is input to the switching circuit for switching operation. Along with the switching operation on the primary side, +35 VDC is generated after passing through the smoothing circuit. The +35 VDC level is fed back to the primary switching circuit through the +35 V line voltage detection circuit and, thus, the +35 VDC output level is stabilized. This +35 VDC is also input to the +5 VDC regulation circuit to regulate a stable +5 VDC.

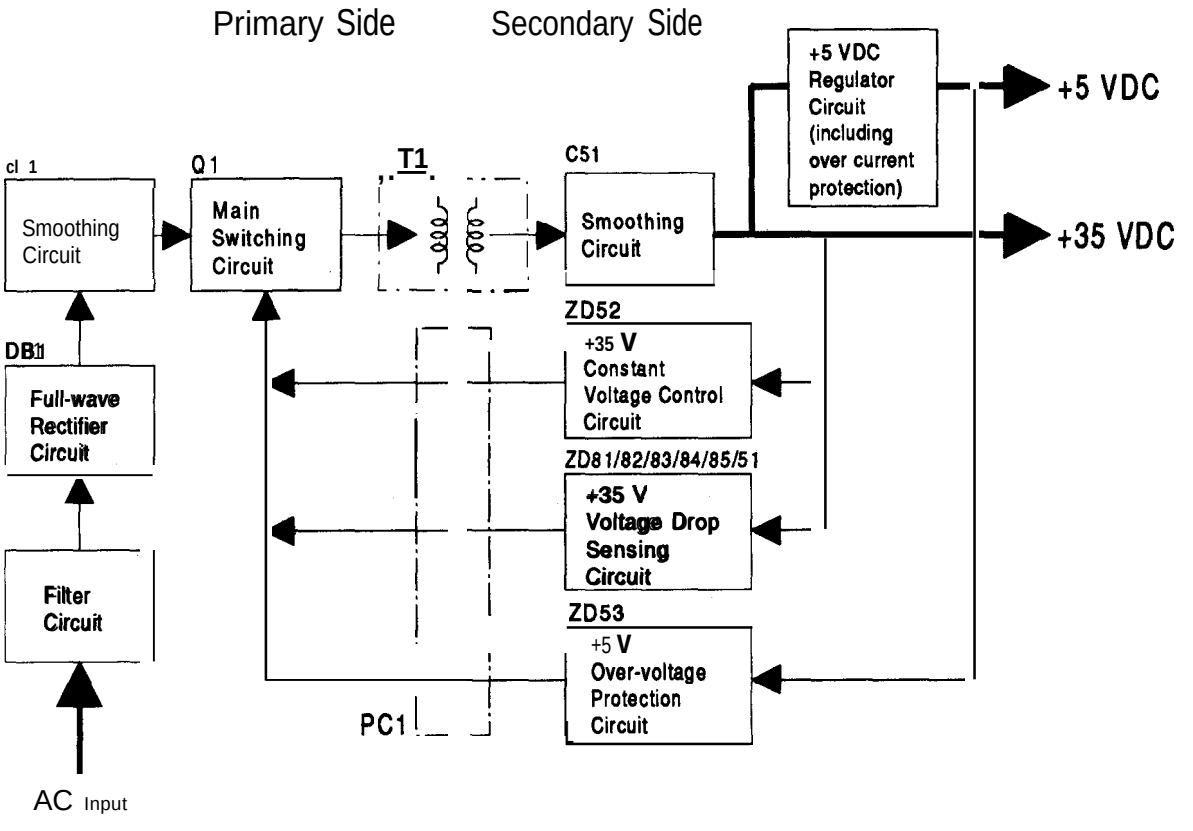

Figure 2-15. Power Supply Circuit Block Diagram

This circuit contains the protection circuits described below.

1. +5 VDC line overvoltage protection circuit
   The output voltage level of the +5 V line is monitored with a Zener diode (ZD53), and if the voltage level exceeds the predefine level (+7 V), this status is fed back to the primary switching circuit through a photocoupler (PC1) to stop the +35 V generation.
2. +5 VDC line over current protection circuit
   The output current is monitored with detection resistors (R53 and R81) and fed back to the +5 VDC generation switching control IC (IC51). If the current level exceeds the limit, the control IC shortens the ON time of the switching transistor (Q51) to decrease the output voltage level (constant current operation).
3. +35 VDC line voltage drop sense circuit
   The output level is monitored with Zener diodes (ZD81, 82,83,84,85, and 51). If the voltage level drops below the limit level (+32 V), it activates photocoupler PC1, and this stops the primary switching circuit operation.
4. +35 VDC line constant voltage output control circuit
   The output level of the +35 VDC line is monitored by a detection circuit that consists of a Zener diode (ZD52). This circuit feeds back the output voltage level status througha photocouplerto the primary switching circuit to control the ON/OFF time of the switching transistor for constant output voltage control.

2.3.2 Operating Principles of the Main Control Circuit

The C134 MAIN board is the main control circuit of this printer. This circuit is controlled by the l&bit TMP96C141F CPU (ICI), running at 19.6608 MHz. This CPU has a unique architecture, making it capable of handling data on an 6-bit bus width data bus or a 16-bit bus width data bus. Therefore, a 16-bit data bus width ROM is used on this board, increasing the internal process" speed. Gate array E05B00 (IC3) manages printhead drive control, external I/F control (fir% Centronics parallel interface), and the control panel. The CPU directly controls both the carriage drive motor and the paper feed motor. This board also is equipped with a 93C46 EEPROM (IC1O) to store parameters, such as the printer mechanism control parameter, default setting parameters, as well as the special counter value used for printhead protection.

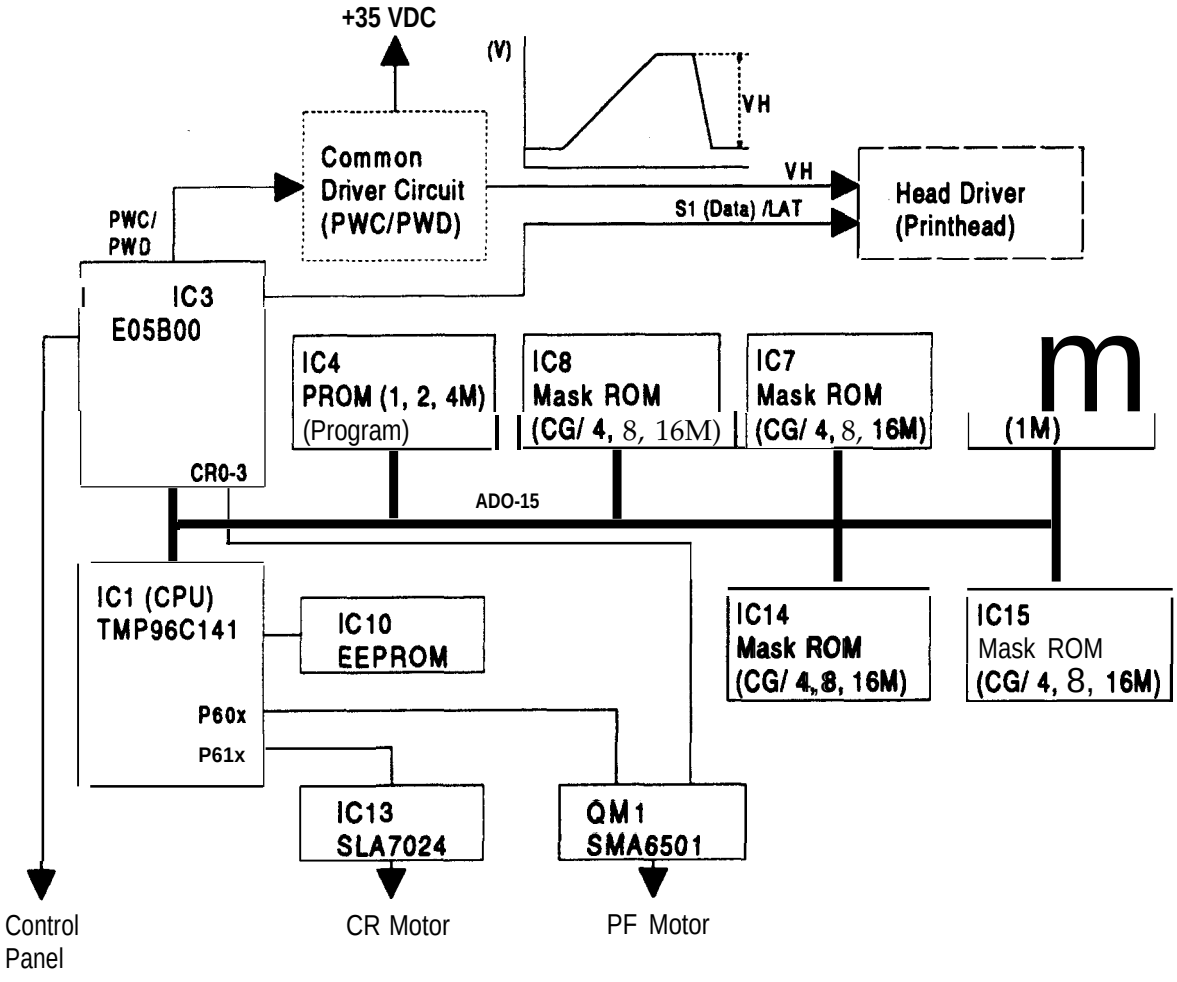

Figure 2-16. Main Control Circuit Block Diagram

2.3.2.1 Reset Circuits

The C135 MAIN board contains two reset circuits: the +5 V monitor reset circuit and the +35 V monitor reset circuit. The +5 V monitor reset circuit monitors the voltage level of the +5 V line, using reset IC PST592 (IC12), and outputs a reset signal to both the CPU (ICI, TMP96C141) and the E05B00 gate array (IC3), when the voltage level drops below +4.2 V. The +35 V monitor reset circuit, on the other hand, monitors the voltage level of the +35 V line, using reset IC 51955BFP (IC11), and outputs a reset signal to the CPU. The reset signal is generated when the voltage level drops, and this causes a non-maskable interrupt (NMI).

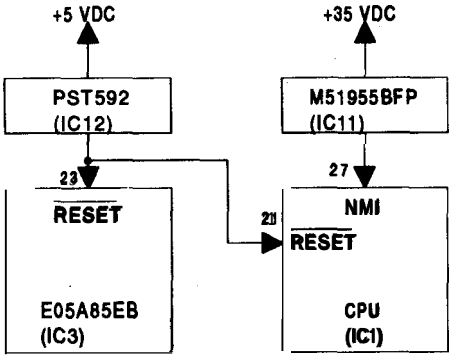

Figure 2-17. Reset Circuit Block Diagram

2.3.2.2 Sensor Circuits

The following sensor circuits enable the main board to monitor printer mechanism status:

1. HP sensor — A photocoupler-type HP (home position) sensor is attached to the back of the carnage unit to detect the carriage home position as a print reference position. A HIGH level from the signal indicates that the carriage is in home position.
2. PE sensor — A mechanical switch PE (paper end) sensor is built into the printer mechanism to determine whether there is paper in the printer or not.
3. IE sensor — Two electrical contacts are attached to the ink cartridge holder in the carriage unit, and when the ink cartridge is installed, the metal pins built into the ink cartridge touch these contacts. The IE (ink end) sensor circuit applies a HIGH level signal when performing the ink end status detection operation. The ink level is determined by the resistance between the two contacts by measuring the input signal level with analog port ANO (pin 73) of CPU.
4. Thermistor — A thermistor is attached to theprinthead unit to monitor its temperature. The CPU changes the printhead drive signal's pulse width (charge pulse width) based on the temperature level.

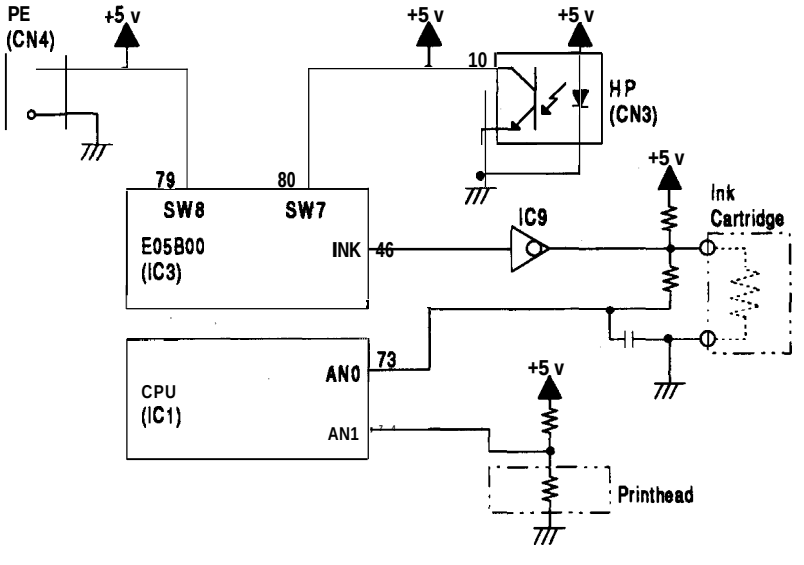

Figure 2-18. Sensor Circuit Block Diagram

2.3.2.3 Ink End Detection

The IE (Ink End) sensor attached to the carriage detects, not only the ink end, but&m when ink is low and whether an ink cartridge (I/C) is installed. The detected status is divided into seven modes based on the output voltage level of the IE sensor.

☐ Abnormal condition mode:	**Error condition**	(not **printable)**
☐ Normal **conditon** mode:	Normal **condition**	**(printable)**
Ink low mode:	Ink is low	**(printable)**
☐ Mode A:	Ink is low (during printing)	(printable)
❑ Mode B:	**Ink end** (during pumping)	(not printable)
☐ **Ink end** mode:	**Ink end**	(not printable)
☐ No **ink cartridge** mode:	No I/C (not **installed)**	(not printable)

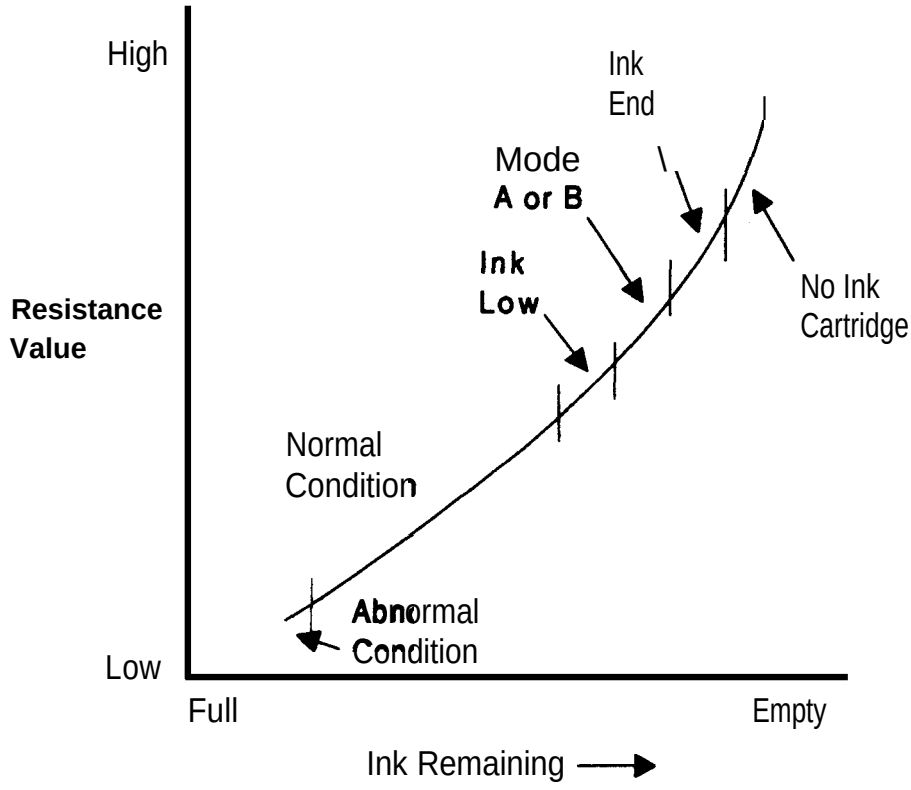

Figure 2-19. Ink End Detection

When the ink end detection operation has determined ink status, the **printer** indicates the status on the control panel, **as described below:**

1. During **printing:** If an ink end is detected, the printhead is **capped** and the control panel indicates an INK END error.

2. During pump operation: If Mode B is detected, the printer indicates an INK END error after the detection operation sequence completes and **interrupts** pump **operation.**

   If Ink **end** mode, Abnormal mode, or No ink cartridge mode is detected, the printer indicates an INK END error after interrupting pump operation.

3. **In** standby **state:** If Ink end mode, Abnormal mode, or No ink cartridge **mode** is detected, the **printer** indicates an INK END error on the control **panel.**

2.3.2.4 Carriage Motor Drive Circuit

The SLA7024 carriage motor drive IC (IC13) drives the carriage motor for the printer mechanism using a constant current, unipolar drive system. Gate array E05B00 (IC3) selects the motor phase drive current level using the output signals from ports CR0 to CR3 (pins 75 to 78). The phase switching operation is directly controlled by the phase control signals output from ports P600 to P603 (pins l-to 4) of the CPU. The table below shows the carriage motor drive modes

Table 2-6. Carriage Motor Drive Modes

CR Speed (CPS)	Drive Frequency (PPS)	Phase Excitation	Acceleration Current (A/Phase)	Normal/Deceleration current (A/Phase)
250	6000	1-2 phase	0.60	0.45/0.45
165	3960	1-2 phase	0.60	0.30/0.60
63	2000	1-2 phase	0.60	0. 80/0.80
40	960	1-2 phase	0.60	0. 60/0.60
HOLD	—	2-2 phase	Approximately 0.15	

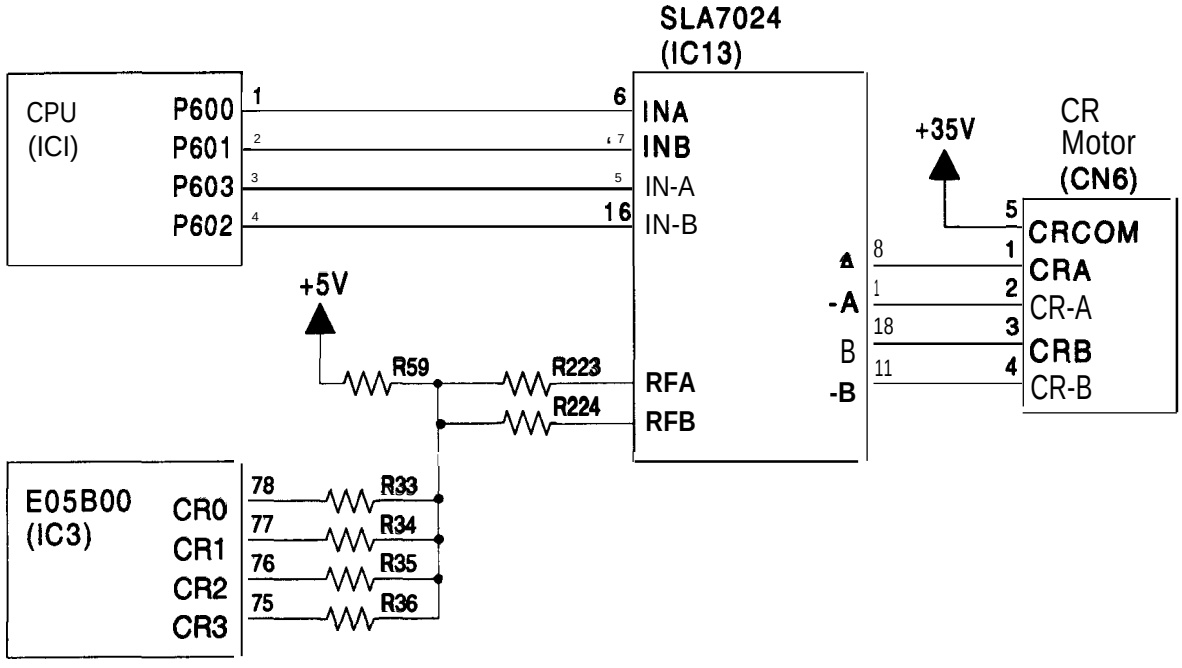

Figure 2-20. Carriage Motor Drive Circuit Block Diagram

2.3.2.5 Paper Feed Motor Drive Circuit

The paper feed motor for this printer drives the following mechanisms:

- ❑ Paper feed mechanism
- Paper pickup mechanism
- Pump mechanism

The SMA6501 driver IC (QM1) drives the paper feed motor using a constant voltage, unipolar drive system. The CPU outputs phase control signals from ports P610 to P613 (pins 5 to 8) for the phase switching operation. The CPU also outputs the supply voltage switching control signal from port TO3 (pin 12) to switch the supply voltage to +5 VDC when the paper feed motor control is m HOLD mode. The drive modes are shown in the table below.

Table 2-7. Paper Feed Motor Drive Modes

Mode	Phase Excitation	Drive Frequency (PPS)
Continuous feed	2-2 phase	800
Pump drive	2-2 phase	650

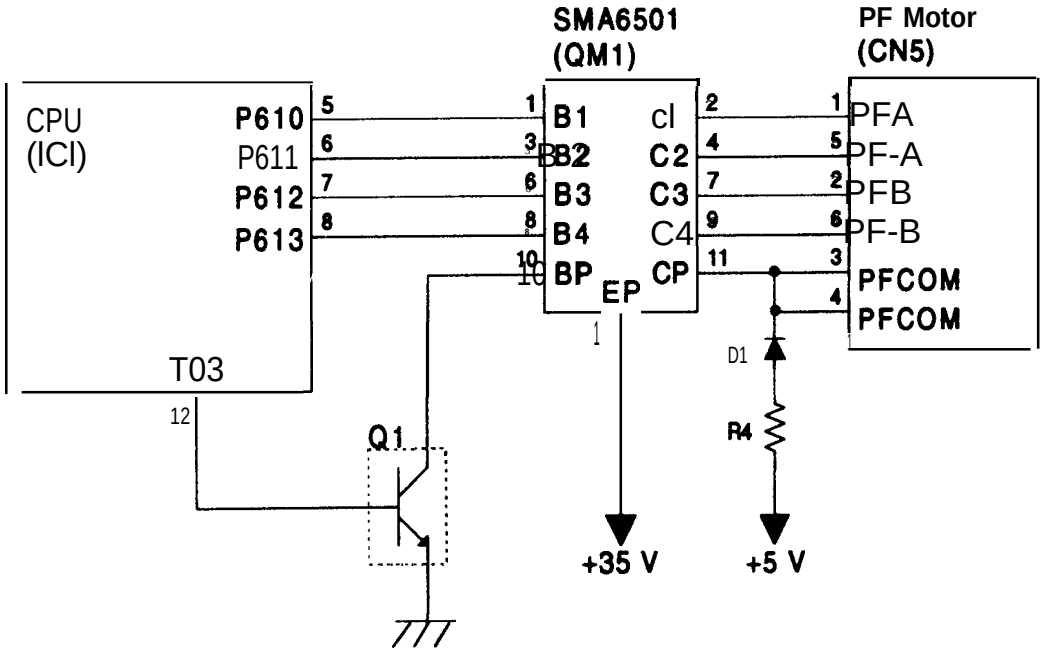

Figure 2-21. Paper Feed Motor Drive Circuit Block Diagram

2.3.2.6 Printhead Drive Circuit

The printhead drive circuit for this printer is composed of the following two parts:

- Commondrivecircuit(trapezoidal drivepulsegeneration)
- ❑ Head drive circuit (nozzle control built on the printhead)

The SED5620D 64-bit thermal head driver in the head drive circuit on the printhead is used as a nozzle selector to drive the printhead nozzles selectively. Print data is converted into serial data by gate array E05B00 (IC3) and is output from port S1 (pin 63) to the head drive circuit on the printhead as data for each nozzle. Then, the SED5620D head driver latches the head data when gate array E05B00 outputs the LAT signal, and the latched data becomes 48-bit parallel data, with one bit corresponding to each nozzle of the printhead. When data transfer and nozzle selection is complete, gate array E05B00 outputs the common drive pulse PWC (charge pulse) and PWD (discharge pulse) to the common drive circuit. The common drive circuit then generates the trapezoidal pulse and applies it to the printhead as a common drive pulse. After this, the nozzle selected by the head data is activated to inject ink by energizing the MLP element drive with the applied trapezoidal drive pulse.

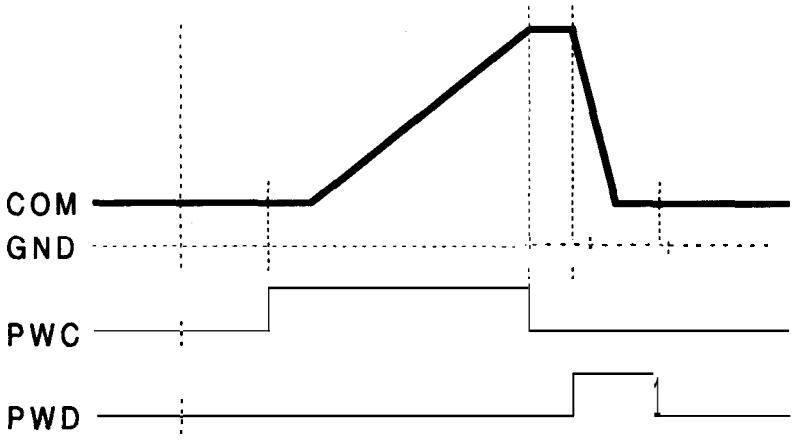

Figure 2-22. Printhead Drive Pulse

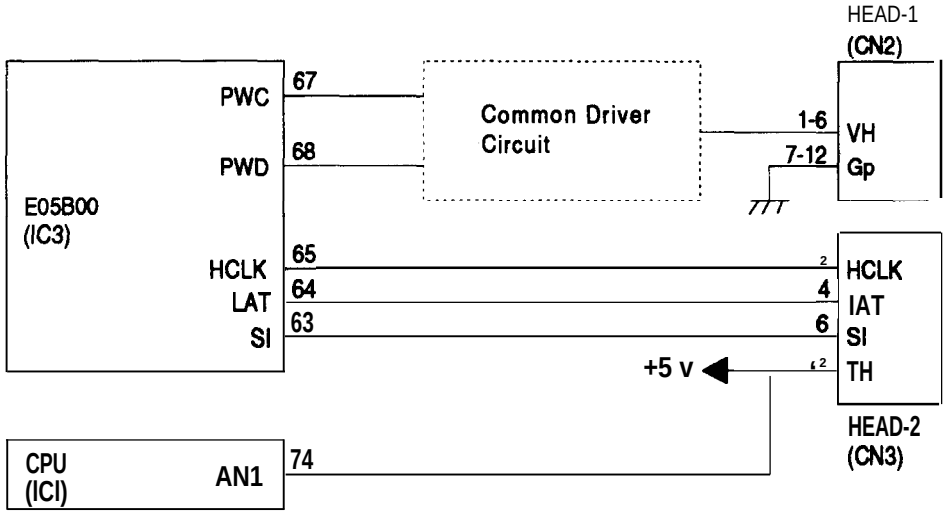

Figure 2-23. Printhead Drive Circuit Diagram

2.4 INK SYSTEM MANAGEMENT

This section explains how the ink system is controlled to protect the printhead and ink supply system and ensure highquality output. Ink system control is composed of the following operations:

- Power on
- a caning
  Standby
- Initial charge
  Refresh
  Cleaner blade
- I/C (ink cartridge) replacement
- Disengage ON
- Micro absorbing

These ink system operations are controlled by the values indicated m the following counters and timers:

Refresh timer
Flushing counter
Protect counter

The figure below shows how the carriage position determines which ink system operation is to be executed.

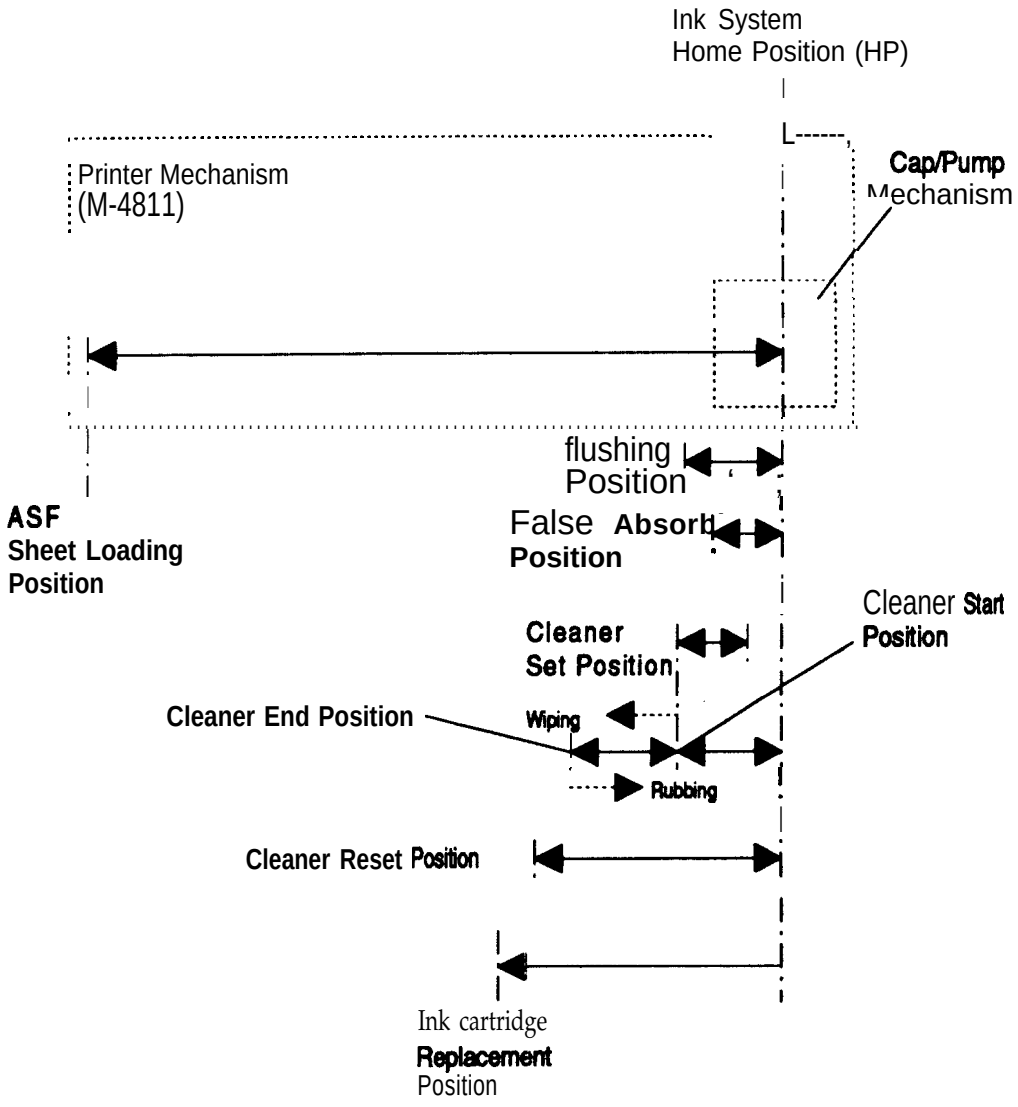

Figure 2-24. Relationship of Ink System Operation to carriage Position

2.4.1 Ink Operations

Various ink operations can be performed selectively by the printer.

2.4.1.1 Power on Operation

Power on consists of the following operations (only one of which is performed, depending on the position of the carriage and condition of ink cartridge when the printer is turned on):

At ink system home position
Ink level is normal

1. Moves the carriage to the flushing position and performs the flushing operation.
2. Returns the carriage to thehomeposition (standby for printing).

Note: The false absorbing operation is performed precedes the above-mentioned sequence, depending on the protect counter R value.

❑ Notatink system home position

1. Performs cleaner blade - I operation. (Refer to Section 2.4.1.6)
2. Performs ink absorbing operation.
3. Performs pressure release operation.
4. Performs micro absorbing operation.
5. Performs false absorbing operation.
6. Performs cleaner blade - II operation (including the flushing operation).
7. Moves the carriage to the standby position.

At ink system home position
Ink is low

1. Performs cleaner blade - I operation.
2. Performs ink absorbing operation.
3. Performs pressure release operation.
4. Performs micro absorbing operation.
5. Performs false absorbing operation.
6. Performs cleaner blade - II operation (including the flushing operation).
7. Moves the carriage to the standby position.

No inkcartridge

1) Displays INK END.
2) Enter the pause mode.

Note: /n the flushing operation, the printhead moves to the position where the cap covers the nozzles and then ink is injected from all the nozzles foward the cap.

2.4.1.2 Cleaning Operation

'l'his operation is performed when clcaning is selected by pressing the Alt and Pause buttons simultaneously. There are three cleaning modes, each of which is performed selectively, depending on the value of cleaning counter K and the number of printed lines from the previous cleaning operation.

☐ CL1 (-Normal)
1. If the carriage is out of home position, it returns to the home position.
2. Printer starts deaner blade- I operation.
3. Printer changes the gear engagement (pump drive ON).
4. Ink absorbing operation begins.
5. Printer performs pressure release operation.
6. Printer performs micro absorbing operation.
7. Printer performs the false absorbing operation.
8. Cleaner blade - II operation begins (including the flushing operation).
9. Printer moves the carriage to the standby position and changes the printer state to pause.

❑ ICL2 (Intensive)
1. If the carriage is out of home position, it returns to the home position.
2. Printer starts cleaner blade - I operation.
3. Printer changes the gear engagement (pump drive ON).
4. Ink absorbing operation begins.
5. Printer performs the pressure release operation.
6. Printer performs the false absorbing operation.
7. Rubbing operation begins.
8. Printer changes the gear engagement (pump drive ON).
9. The micro absorbing operation begins.
10. Printer performs the false absorbing operation.
11. Cleaner blade - II operation (including the flushing operation) starts.
12. Printer moves the carriage to the standby position.

❑ CL3 (False) This indudes the same operations as CL1, except that the carriage is moved to the false absorbing position and the false absorbing operation is performed in step 4.

2.4.1.3 Standby Operation

The standby operation prevents an increase in the viscosity of the ink held inside the printhead nozzles. This operation is performed automatically if no data is received for more than three seconds from the last print data.

1. Printer counts the number of flushing operations from the last standby operation, using the combined print counter N. Then it performs flushing based on the counter value.
2. Printer moves the carriage to the home position.

2.4.1.4 Initial Charge operation

This operation is performed when initial charge mode is selected to charge the printhead with ink. The operation has two modes, depending on the value held by protect counters B and C.

❑ Initial Charge

1. If the ink cartridge is not mounted on the carriage, load the ink cartridge.
2. Printer performs cleaner blade - I operation.
3. Printer Changes thegearengagement (pump drive on).
4. Printer performs ink absorbing operation (absorption = high).
5. Printer performs pressure release operation.
6. Printer performs ink absorbing operation (absorption = middle).
7. Printer performs pressure release operation.
8. Performs rubbing operation.
9. Performs micro absorbing operation.
10. Performs false absorbing operation.
11. Performs cleaner blade -II operation (including the flushing operation).
12. Moves the carriage to the standby position.

❑ False Charge

This operation is identical with the initial charge operation, except that the operations for steps 4 and 6 are changed as follows:

. Printer moves the carriage to the false absorbing position and performs the false absorbing operation. Then, moves the carriage to home position after step 8.

2.4.1.5 Refresh Operation

This operation prevents an increase in the viscosity of the ink inside the printhead and eliminates any ink attached to the nozzle plate surface. Refresh consists of the following operations:

❑ Refresh - I operation

Activated by the REFRESH-I signal, output every 20 seconds during continuous printing.

1. Printer returns the carriage to home position.
2. Carriage moves to the flushing position.
3. Printer performs flushing operation.
4. Printer performs false absorbing operation, if the ink level counter R value exceeds 3000.
5. Printer returns to the previous state.

❑ Print start

Ejects high-viscosity ink inside the nozzles when the printing starts from the standby state.

1. Carriage moves to the flushing position and printer performs flushing.
2. Printer starts printing operation.

❑ False absorbing

Absorbs ink inside the cap and eliminates ink attached to the nozzle plate surface.

1. Moves the carriage to the false absorbing position.
2. Performs false absorbing operation.
3. Resets the pump pulley.
4. Release a mechanical pressure of the pump drive mechanism.
5. Adjusts the phase with paper feeding mechanism gears.
6. Returns the carriage to the home position.

2.4.1.6 Cleaner Blade Operation

The cleaner blade operation eliminates any dust or ink attached to the nozzle plate surface. This operation consists of the following separate operational modes.

❑ ICleanerblade- I Eliminates any dust attached to the nozzle plate surface before the ink absorbing operation is performed.

1. Printer positions the cleaner blade.
2. Printer moves the carriage tothedeanerstart position.
3. Printer moves the carriage to the deanerend position (head surface is wiped off with the cleaner blade).
4. Printer resets the cleaner blade.
5. Printer returns the carriage to the home position.

❑ Cleaner blade -11 Eliminates any dust or ink on the nozzle plate surface after the ink absorbing operation is performed.

1. Printer positions the cleaner blade.
2. Printer moves the carriage to the cleaner start position.
3. Printer moves the carriage tothedeanerend position (head surface is wiped off with the cleaner blade).
4. Printer resets the cleaner blade.
5. Printer moves the carriage to the flushing position and performs flushing.
6. Printer moves the carriage to the home position.

❑ Rubbing Removes dust or ink adhering to the head surface.

1. Printer positions the cleaner blade.
2. Printer moves the carriage to the cleaner start position.
3. Printer moves the carriage to the cleaner end position (wiping = rubber side)
4. Printer moves the carriage to the flushing position (wiping = felt side).
5. Moves the carriage to the home position. (l'his resets the cleaner blade.)

2.4.1.7 Ink Cartridge (I/C) Replacement Operation

This operation is performed when the ink cartridge is replaced.

1. Printer moves the carriage to the I/C replacement position.
2. Replace the ink cartridge.
3. Printer performs the cleaner blade-I operation.
4. Printer performs the ink absorbing operation with an absorption amount selected based on the ink status of the previous I/C (ink end or ink low).
5. Printer performs themicro absorbing operation.
6. Printer performs the false absorbing operation.
7. Printer performs the cleaner blade-II operation.

2.4.1.8 Disengage On Operation

This operation moves the switch lever to the position where it transmits the PF motor drive to the pump mechanism.

1. Printer moves the carriage to the ASF sheet loading position, where the lever is settothe specified position.
2. Printer moves the carriage to the pump disengage lever position.
3. Printer releases mechanical pressure of the paper feed drive mechanism (generates a backlash).
4. Printer moves the carriage to the false absorbing position.
5. Printer adjusts thegearphase to the pump drive mechanism gears.
6. Printer moves the carriage to home position.

2.4.1.9 Micro Absorbing Operation

Once the ink cartridge is installed, if it is removed from the printer, a small amount of air may get into the ink path in the form of tiny bubbles. Such small air bubbles block the ink path and act as an obstacle to ink ejection from the nozzle. This operation eliminates any small air bubbles from the printhead cavity.

1. Printer performs the false absorbing operation.
2. Printer performs the micro absorbing operation.

2.4.2 Counter and Timer

The 93C46 EEPROM (IC1O) on the main board stores certain counter and timer values used for control of ink system operation.

2.4.2.1 Refresh - I Timer

This timer is used to prevent an increase in the viscosity of ink in the nozzle. It counts every 20 seconds during the printing operation. It resets when:

- The flushing operation completes preceding printing.
- The refresh - I operation completes.

2.4.2.2 Flushing Counter

The flushing counter consists of the following counters.

Ink level counter R	This counter indicates the amount of ink that exists in the cap, in proportion to the number of flushing operations. When the counter value exceeds or equals 3000 (R ≥ 3000), the printer performs the false absorbing operation.
Combined print counter N	This counter is used to keep a wet condition inside the cap. The flushing operation is performed based on the counter N value at the flushing position, when the printer is in the standby state.

2.4.2.3 CL Counter K

This counter is used to switch cleaning operation mode, to prevent an excessive ink drainage. The counter value is changed when CL1 or CL2 cleaning operation is performed.

2.4.2.4 Protect Counter

There are four protect counters to manage the amount of ink draining to the waste ink drain tank. The value of these counters is stored in the EEPROM on the main board at power off.

Protect counter A	This counter is used to manage the total amount of drained ink. If the counter value is equal to or exceeds 16000 (A ≥ 16000), the printer indicates an error on the control panel and maintenance is required.
Protect counter B	This counter prevents excessive ink drainage to the waste ink drain tank by limiting the total number of the initial charge operations. If the operation is selected when the counter value is equal to or exceeds 10 (B> 10), the printer only performs the false charging operation.
Protect counter C	This counter is used to prevent a continual initial charge operation. If the operation is selected while the counter value is 1 (C = 1), the printer only performs the false charging operation.
Ink counter R	This counter counts the amount of ink inside the cap.

Chapter 3 Disassembly and Assembly

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List of Figures

3.1 OVERVIEW

This section describes procedures for disassembling the main components of this printer. Unless otherwise specified, the disassembled unit or components can be reassembled simply by reversing the disassembly procedure. The assembly procedure is, therefore, omitted. Precautions for any disassembly or assembly procedure are titles ***Disassembly/Assembly*** *Points.* Adjustments required after assembling the unit are titled *Required Adjustments.*

3.1.1 Precautions for Disassembling the Printer

Refer to the precautions below when disassembling the printer.

WARNING

- *Disconnect the power cable before disassembling or assembling* ***the printer.***
- ***Wear protective*** *goggles to protect your* ***eyes from*** *ink.* ***If ink gets*** *in your eyes, wash it away with fresh water and see a doctor immediately.*
- *If the ink comes into contact with your skin, wash it* ***off with*** *soap and water. If irritation occurs, contact a doctor.*

CAUTION

- *Never remove the ink* ***cartridge from*** *the* ***carriage*** *unless instructed to do so.*
- *When transporting the printer* ***after*** *installing the ink cartridge, be sure to pack the printer for transportation without removing the ink* ***cartridge.***
- *When transporting the printer, be sure to pack it with the protective material.*
- ***Use*** *only recommended tools* ***for disassembling, assembling, or adjusting the*** *printer.*
- *Apply lubricants and adhesives as specified. (See Chapter 6.)*
- *Make specified adjustments when you disassemble the printer. (See Chapter 4.)*

3.2 DISASSEMBLY AND ASSEMBLY

WARNING

Follow the precautions in ***Section*** *3.1.1 when* ***disassembling*** *the printer.*

This chapter consists of the sections shown in the diagram below. Refer to the **exploded** view of the printer in the Appendix, **if necessary.**

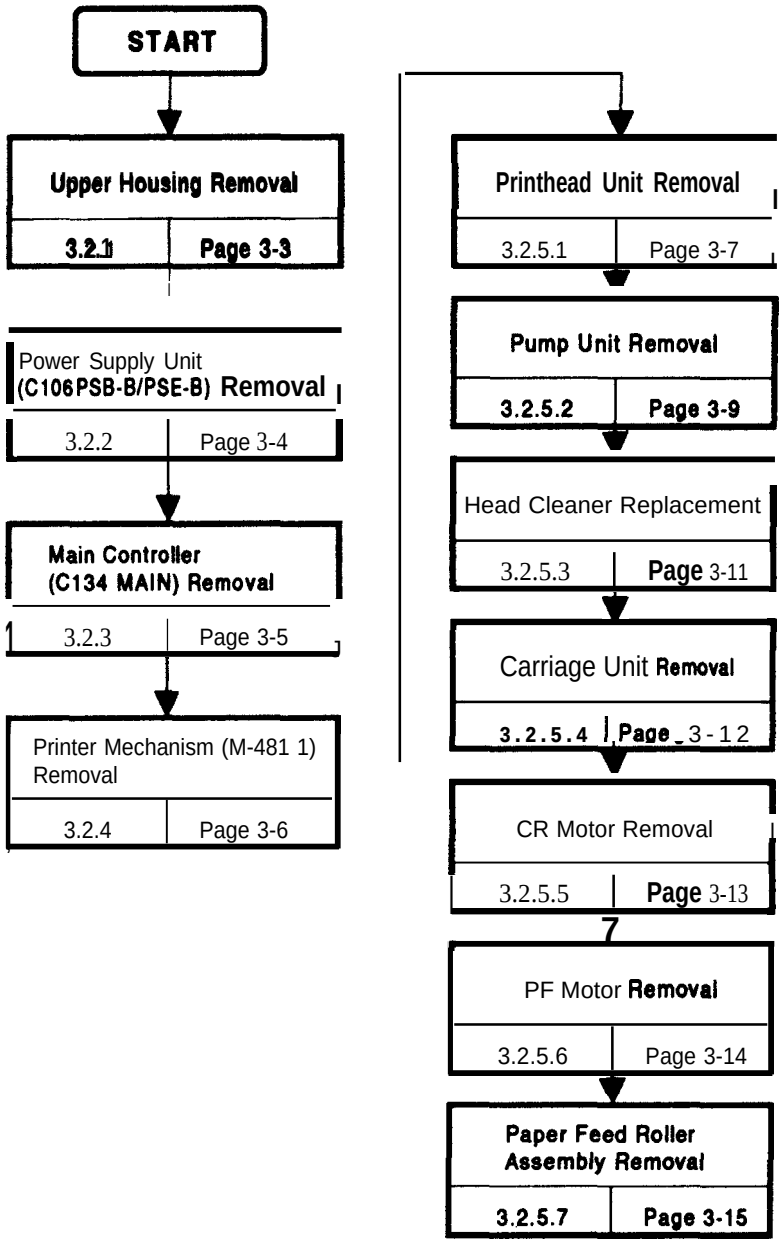

Figure 3-1. Disassembly Flowchart

3.2.1 Upper Housing Removal

[Step 1] Remove the printer cover by releasing the tabs holding it to the upper housing.

[Step 2] Remove the paper support by releasing the tabs holding it to the lower housing.

[Step 3] Remove the rear paper guide.

[Step 4] Remove the control panel. (Release the tab by inserting a screwdriver into the hole in the upper housing, as shown in figure below.)

[Step 5] Remove2 screws (CBB (M3 x 12)).

[Step 6] Release 3 tabs by inserting a flathead screwdriver into the holes at the bottom of the lower housing, as shown in figure below.

DISASSEMBLY/ASSEMBLY POINT

*Holds the upper housing **firmly** and **pull** it while releasing the tabs.*

[Step 7] Remove theupperhousingby lifting the front side.

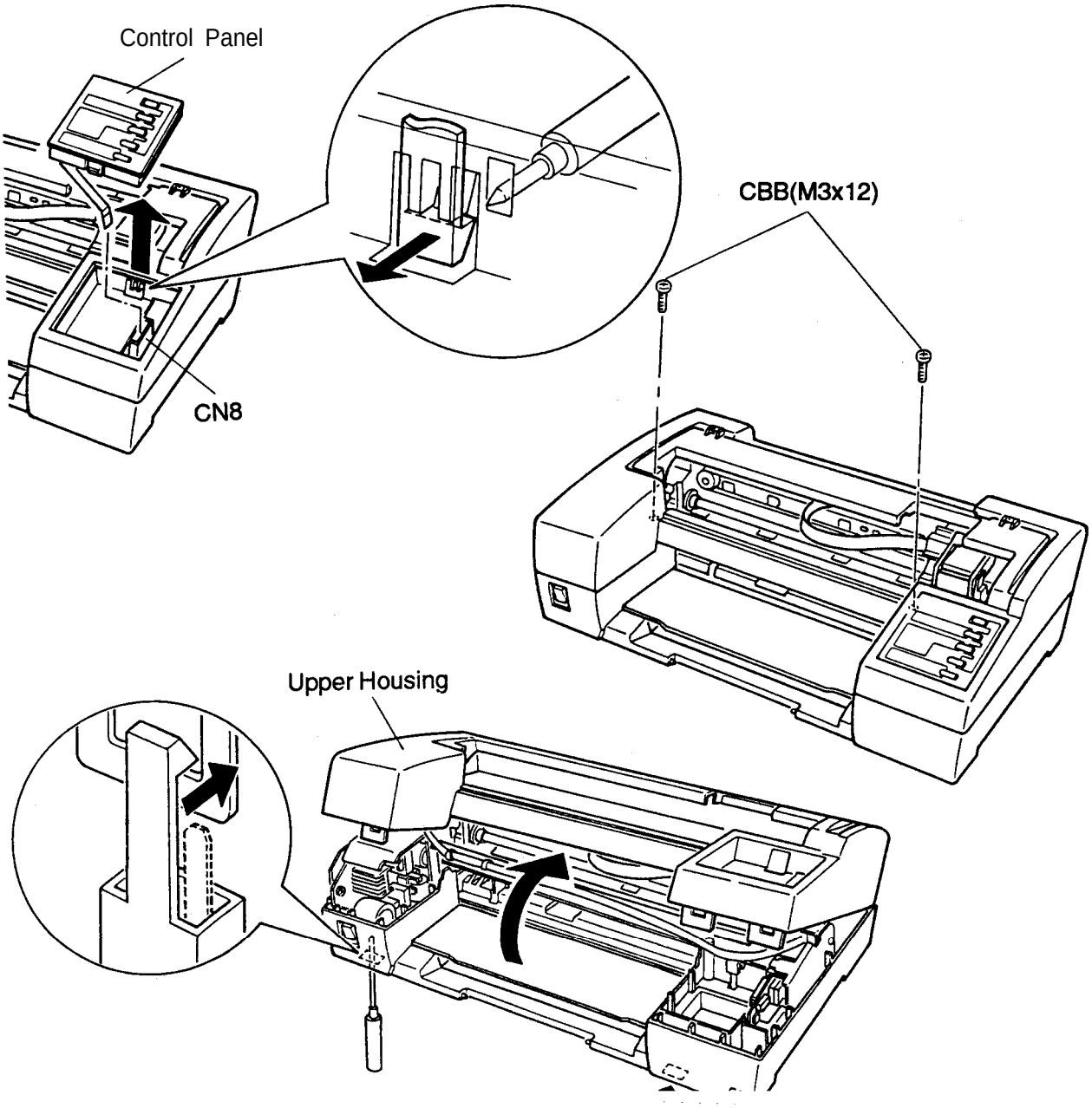

Figure 3-2. Upper Housing Removal

3.2.2 Power Supply Unit (C106 PSB-B/PSE-B Board) Removal

[Step 1] Remove theupperhousing. (Relkr to section 3.2.1.)

[Step2] Disconnect the cables from connectors CN1 and CN3 of the C106 PSB-B/PSE-B board.

[Step 3] Remove 5 screws (2 CBB (M3 x6),2 CBS (M3 × 6), 1 CB(O) (M4 × 8)) securing the power supply unit to the lower housing, as shown in the figure below.

[Step 4] Push in the locking tab and take out the power supply unit by sliding it toward theback of the printer.

DISASSEMBLY/ASSEMBLY POINT

- *When you disconnect and connect the **cable from** connector **CN3** of the **C106 PSB-B/PSE-B** board, squeeze the end of the cable to remove or insert it.*
- *When you connect the cable to connector **CN3** of the **C106 PSB-B/PSE-B board,** align the yellow stripe on the **cable** with pin 1 of **CN3.***

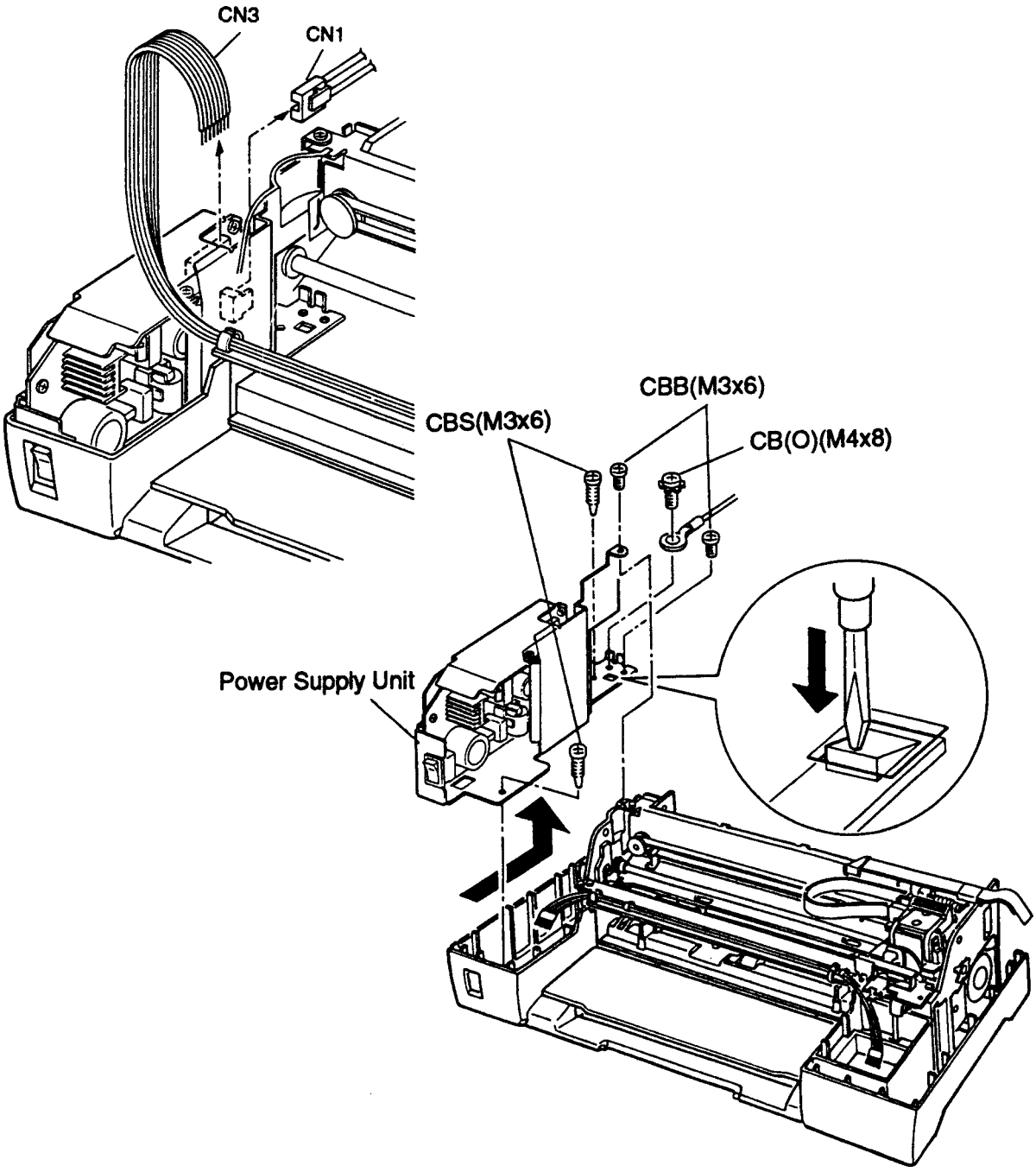

Figure 3-3. Power Supply Unit Removal

3.2.3 Main Controller (C134 MAIN Board) Removal

[Step 1] Remove the upper housing. (Refer to section 3.2.1.)

[Step 2] Disconnect the cables from the connectors CN2, CN3, CN4, CN5, CN6, and CN7 of the C134 MAIN board.

[Step 3] Remove 4 screws (2 CBB (M3 x 10) and 2 CBS (M3 × 6)) and takeout the main controller.

DISASSEMBLY/ASSEMBLY POINT

- *When you replace the main board, initialize the EEPROM contents as follows:*
  1) Reassemble the printer.
  2) Turn the printer on while holding down the ALT, ECONOMY/CONDENSED, LOAD/EJECT and PAUSE buttons on the control panel.
- *When you replace the main board, you must also replace the block resistor in location RM22. Take the resistor from the old main board and use itin the new board for proper printhead drive voltage control.*
- *When you replace the main board, the waste ink absorbing materials must be replaced at the same time.*
- *When you disconnect and reconnect the cable from connector CN7 of the C134 MAIN board, squeeze the end of the cable to remove or insert it.*
- *When you connect the cable to connector CN7 of the C134 MAIN board, align the yellow stripe on the cable with pin 1 of CN7.*
- *When you connect the cable to connector CN6 of the C134 MAIN board, align the red stripe on the cable with pin 1 of CN6.*

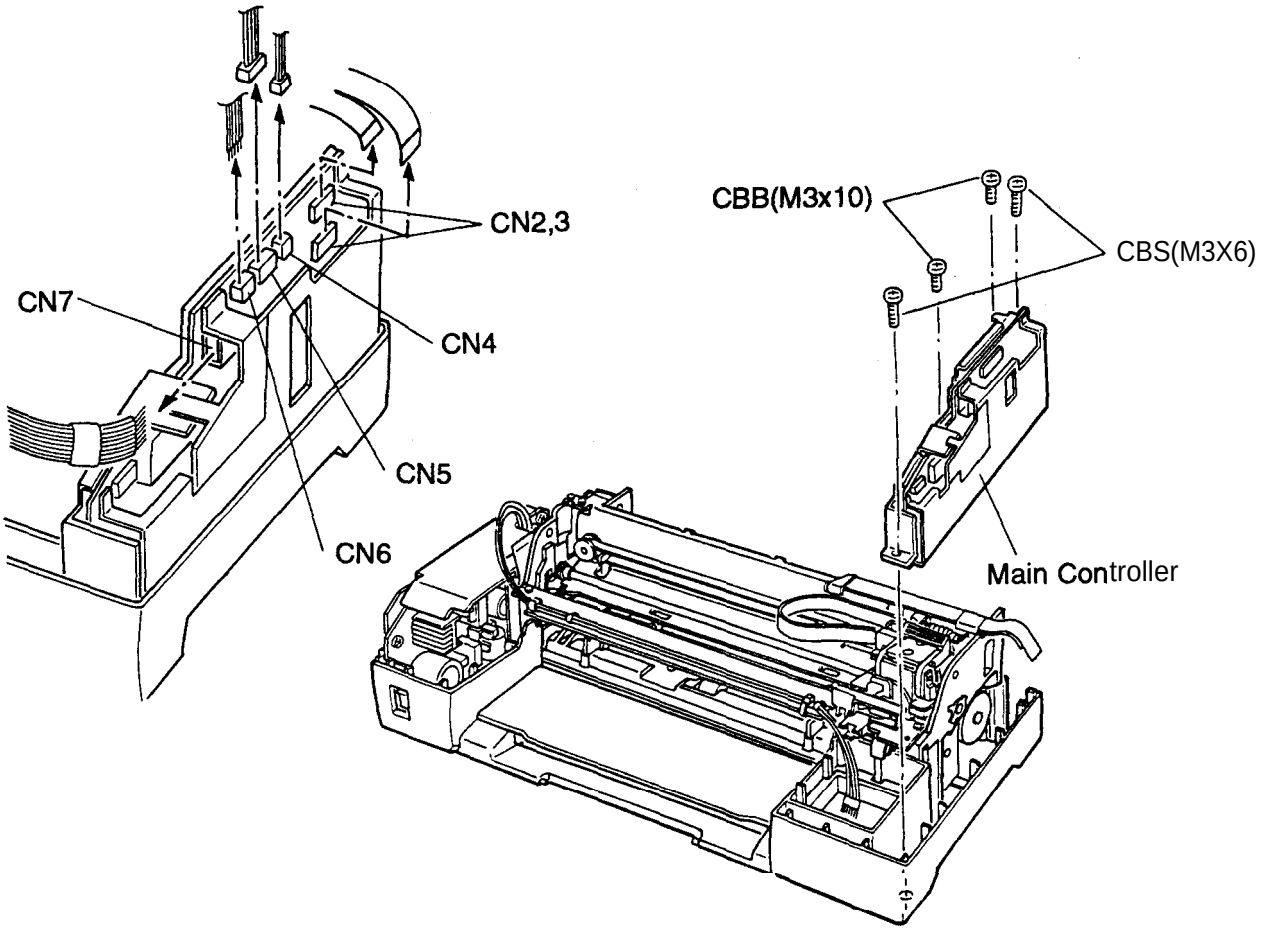

Figure 3-4. Main Controller Removal

REQUIRED ADJUSTMENT

Bi-Directional Printing Alignment Adjustment (Chapter 4, Section 4.2)
Default Setting Parameter Registration (Chapter 4, Section 4.3)

3.2.4 Printer Mechanism (M-4811) Removal

[Step 1] Remove the upper housing. (Refer to section 3.2.1.)

[Step 2] Remove the power supply unit. (Refer to section 3.2.2.)

[Step 3] Remove the main controller. (Refer to section 3.2.2.)

[Step 4] Move the carnage to the center of the printer.

[Step 5] Remove 4 screws (CB (M4 × 16)) and takeout the printer mechanism.

DISASSEMBLY/ASSEMBLY POINT

- *Wipe off any ink around the end of the ink drain tube when you remove the mechanism.*
- *When you reinstall the printer mechanism, make sure that the waste ink drain tube is inserted properly into the space between the lower housing and the waste ink absorbing material.*

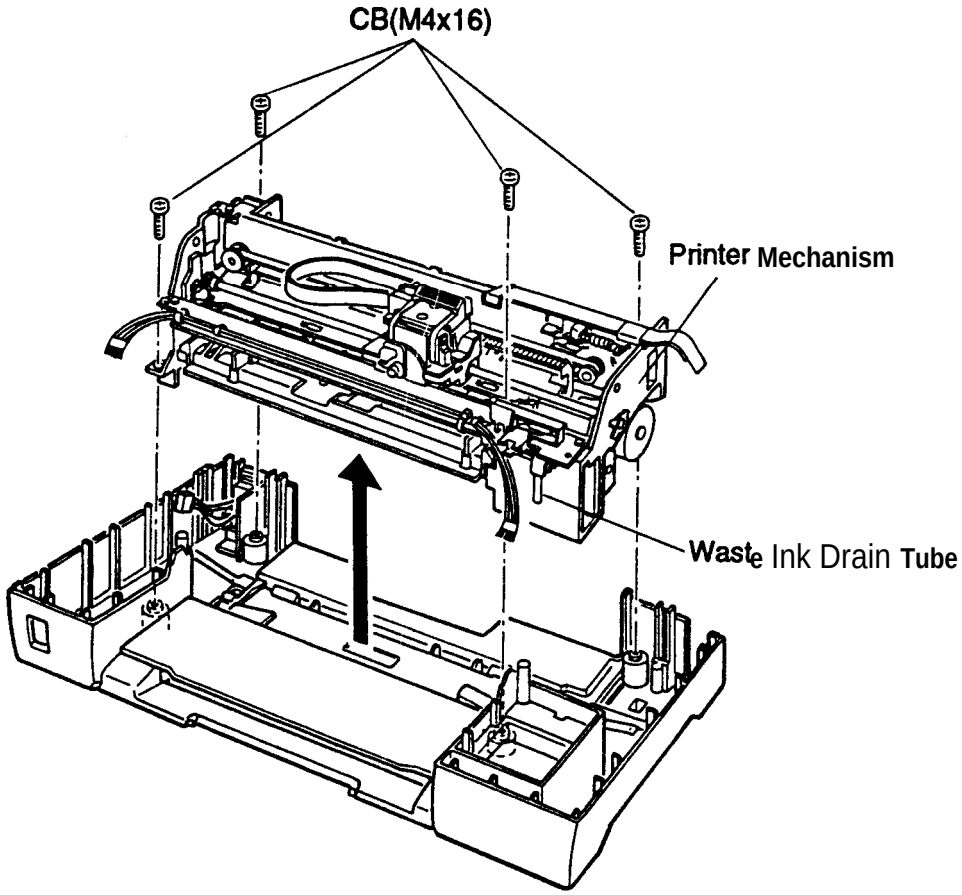

Figure 3-5. Printer Mechanism (M-4811) Removal

CAUTION

When you replace the printhead or the printer mechanism, you must replace the block resistor in location RM22 on the C134 MAIN board. (Every new printhead and printer mechanism comes with its own block resistor, to ensure optimal control of the driver circuit.)

REQUIRED ADJUSTMENT

Bi-directional Printing Alignment Adjustment (Chapter& Section 4.2)

3.2.5 Printer Mechanism Disassembly

The procedures described in this section explain how to remove components from within the printer mechanism.

3.2.5.1 Printhead Unit Removal

[Step 1] Remove the printer mechanism. (Refer to section 3.2.4.)

[Step 2] Move the carnage to the middle of the printer. The carriage is located between first and second paper guide roller, as illustrated in the figure below. Pull the ink cartridge clamp towards you and remove the ink cartridge.

[Step 3] Release the 4 tabs holding the carriage cover and takeoff the cover.

[Step 4] Remove the tension bar that holds the printhead unit in place.

[Step 5] Disconnect the cables from the printhead unit (the FFC cables from comectors CN2 and CN3, and the cable from connector CN1) and remove it.

CAUTION

- *Take measures to protect the printhead unit from static electricity, because the driver IC is directly attached on the printhead unit.*
- *Never touch the nozzle surface or the metallic cover of the printhead. Handle it only by holding the edges of the printhead.*
- *When you replace the printhead or the printer* mechanism, you *must replace the block resistor in location RM22 on the C134 MAIN board. (Every new printhead or printer mechanism comes with its own block resistor, to ensure optimal control of the driver circuit,)*

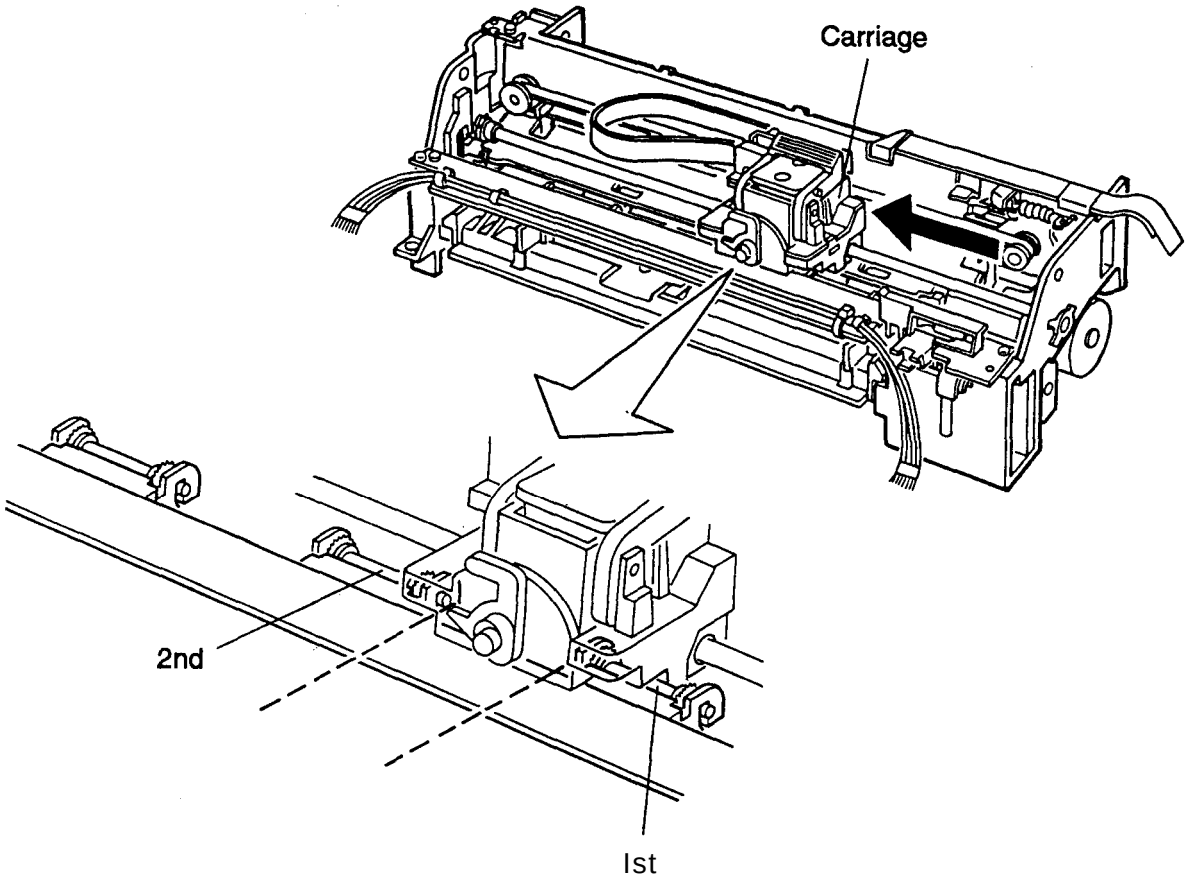

Figure 3-6. Printhead Unit Removal

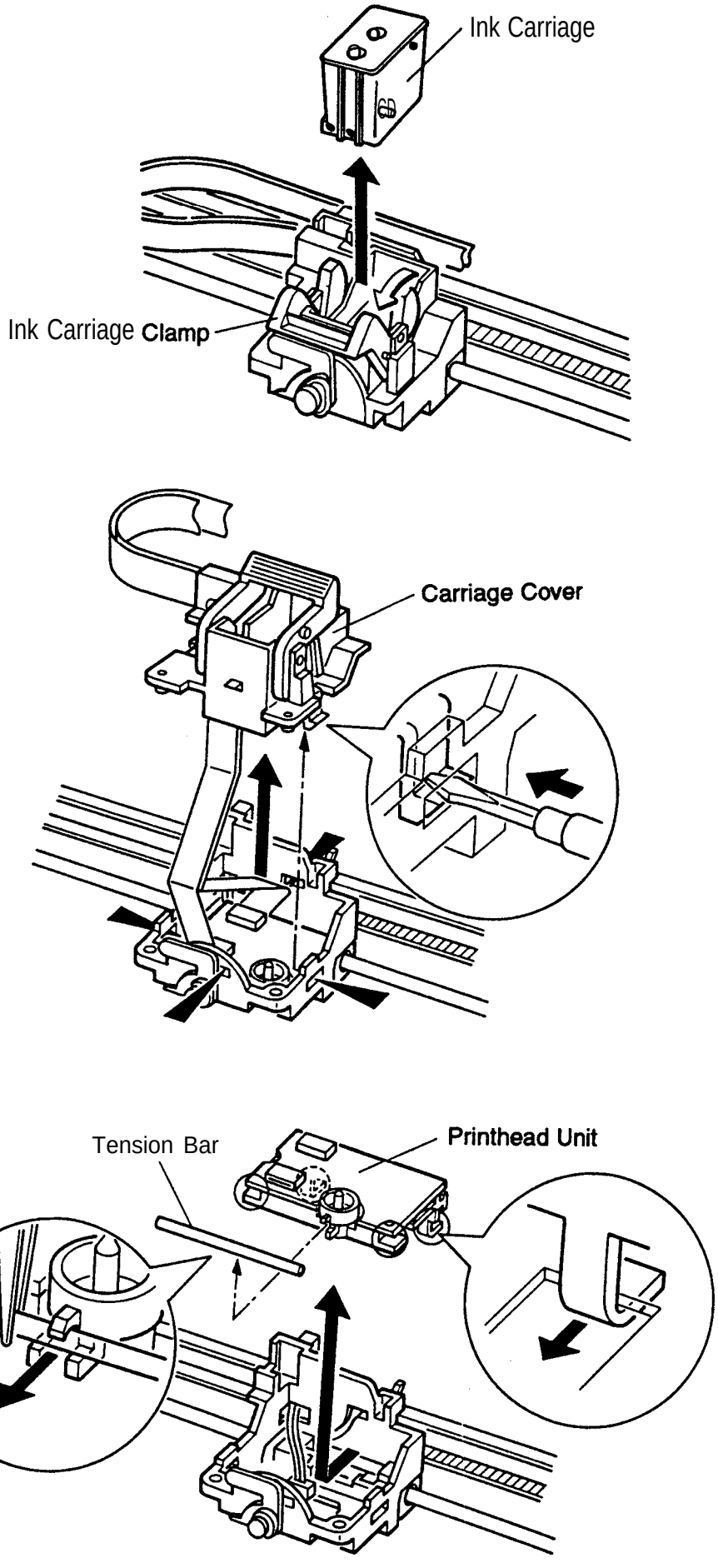

Figure 3-7. Printhead Unit Removal (Continued)

3.2.5.2 Pump Unit Removal

[Step 1] Remove the printer mechanism. (Refer to section 3.2.4.)

[Step 2] Move the carriage to the middle of the printer. The carriage is located between the first and second paper guide rollers, as illustrated in the figure below.

[Step 3] Remove 2 screws (CBB (M3 x 10)) attaching the front paper guide assembly to the mechanism.

[Step 4] Lift the front side of the carriage and hold it. Lift the left end of the front paper guide assembly slightly, and then lift the right end. Take out the front paper guide assembly by pulling it toward you.

[Step 5] Insert a piece of paper between the printhead and the printer mechanism to protect the surface of the printhead from being darnaged.

[Step 6] Push the pump unit inward by releasing the tab securing the pump unit to the holder plate. At the same time, release the tab at the bottom of the pump unit. Then take the pump unit out of the printer mechanism.

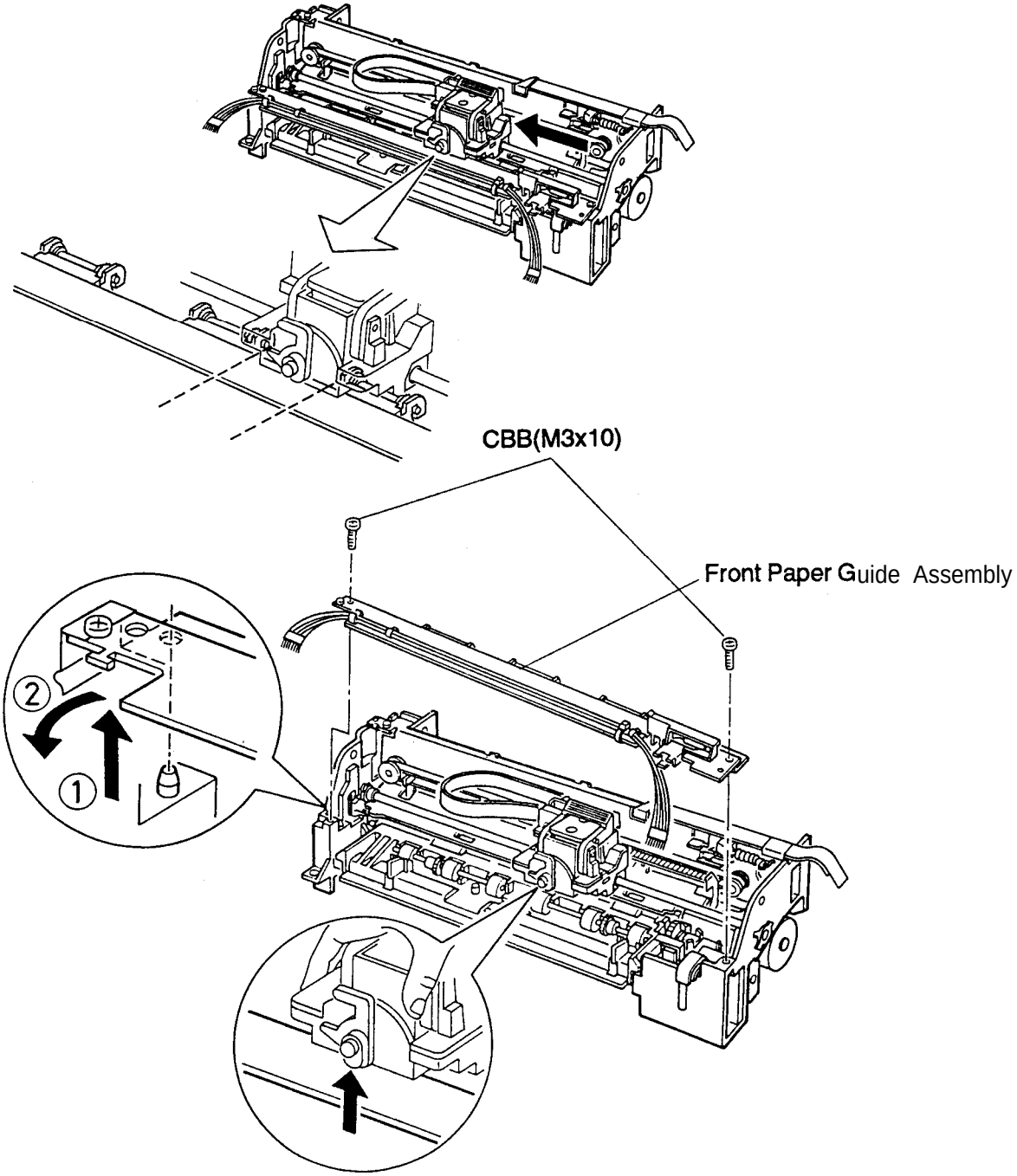

Figure 3-8. Pump Unit Removal

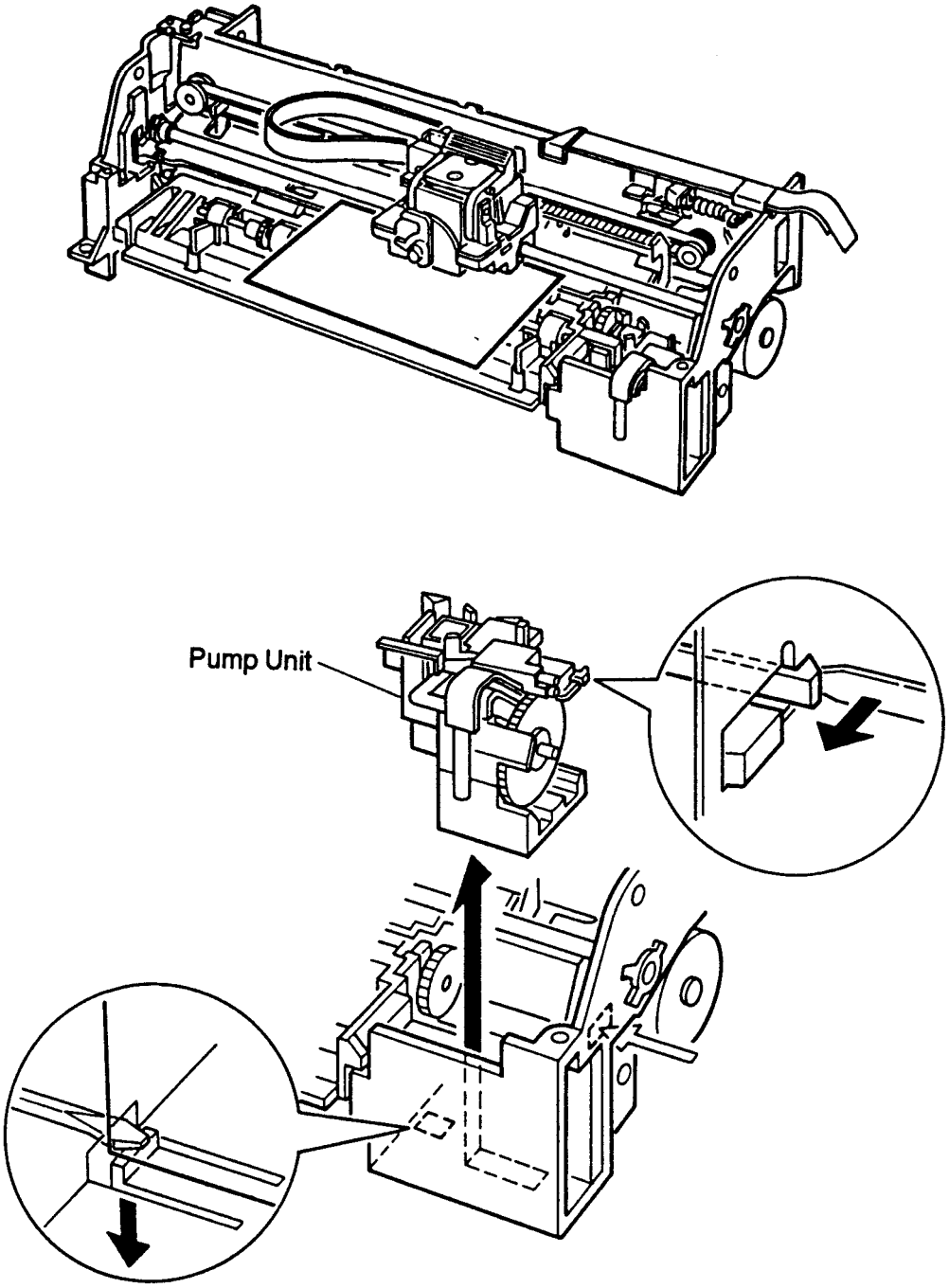

Figure 3-9. **Pump Unit Removal (Continued)**

3.2.5.3 Head Cleaner Replacement

[Step 1] Remove the pump unit. (Refer tosection3.2.5.2.)

[Step 2] Remove the head cleaner from the pump unit.

CAUTION

*Keeping the head cleaner clean is extremely important to keep the ink injection system working properly in the **printhead,** and it directly **affects** printing quality.*
*Therefore, handle the head cleaner vey **carefully,** and **observe** the following instructions.*
- *Never touch the head cleaner with your bare hands.*
- *When attaching the head cleaner to the pump unit, **wear gloves** and use clean tweezers to handle it.*

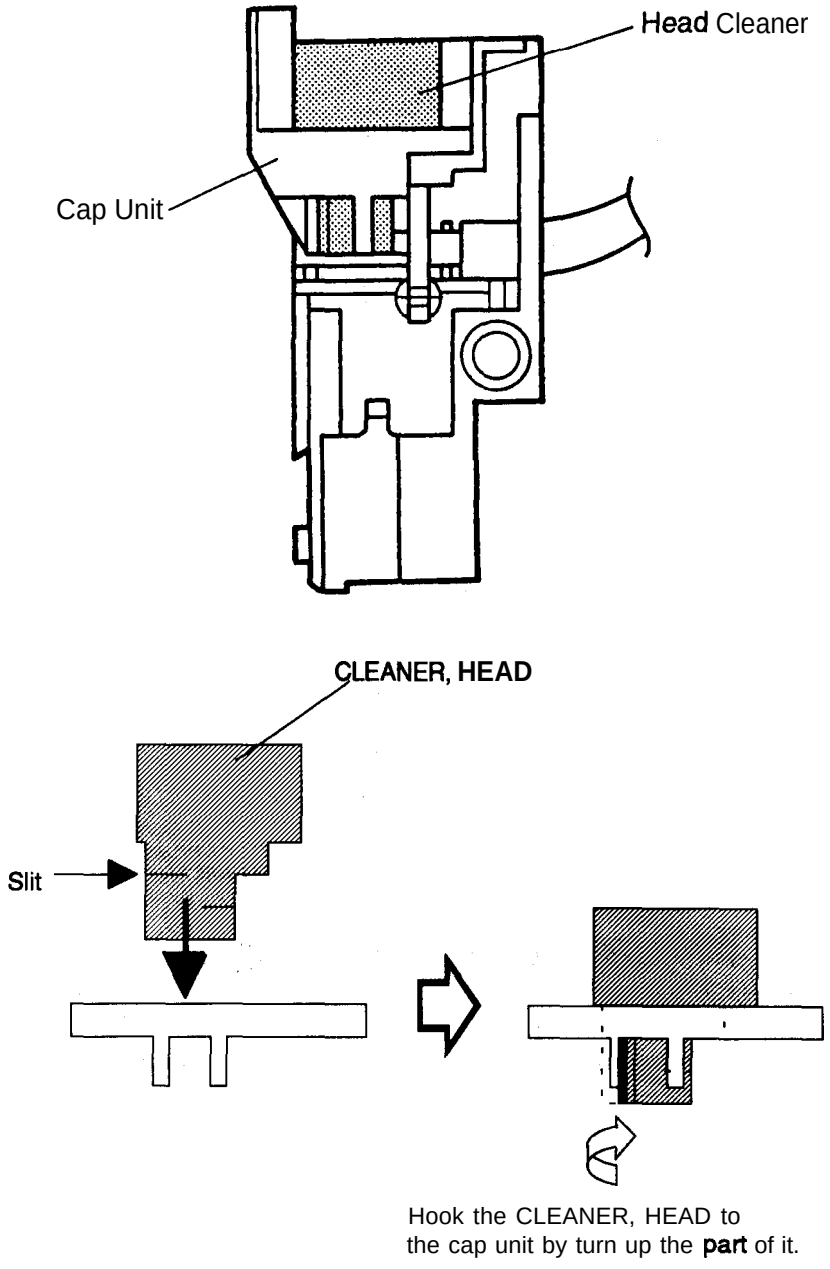

Figure 3-10. Head Cleaner Replacement

3.2.5.4 Carriage Unit Removal

[Step 1] Remove the printer mechanism. (Refer to section 3.2.4.)

[Step 2] Remove the tension spring that holds the CR motor in place. Then take the timing belt out of the CR motor drive pulley and the driven pulley.

[Step 3] Remove the ground spring plate on the left side.

[Step 4] Rotate the shaft holder that holds both ends of the carriage guide shaft, and push the ends inward to disengage them from the left and the right frames of the printer mechanism.

[Step 5] Remove the FFC cables that go through the base frame assembly.

[Step 6] Remove the carnage unit along with the carriage guide shaft.

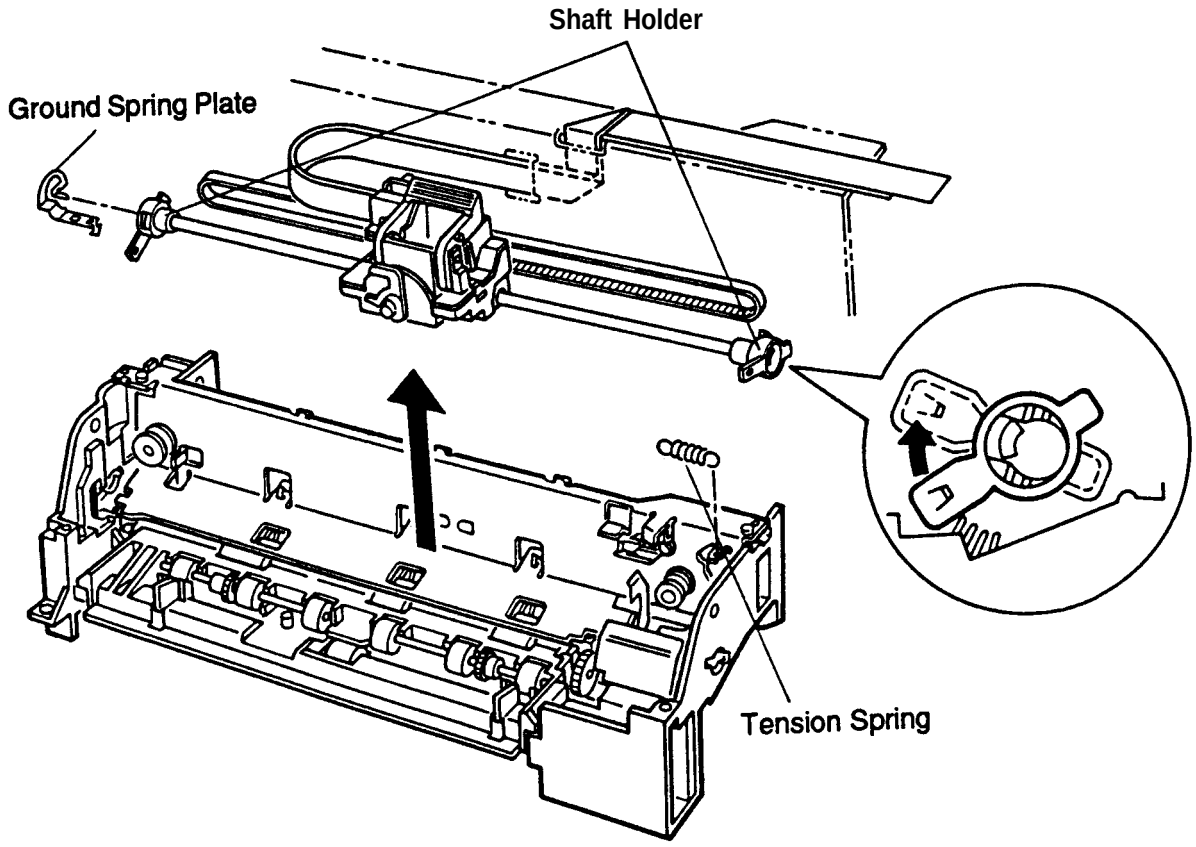

Figure 3-11. Carriage Unit Removal

REQUIRED ADJUSTMENT

Paper Gap Adjustment (Chapter 4, Section 4.4)

3.2.5.5 CR Motor Removal

[Step 1] Remove theprintermechanism. (Refer tosection3.2.4.)

[Step 2] Remove the tension spring and take the timing belt out of the CR motor dnvepulley.

[Step 3] Remove 3 screws (CP(P2) (M3 x 10)) securing the CR motor tothe CRmotorholder plate, and remove the CR motor.

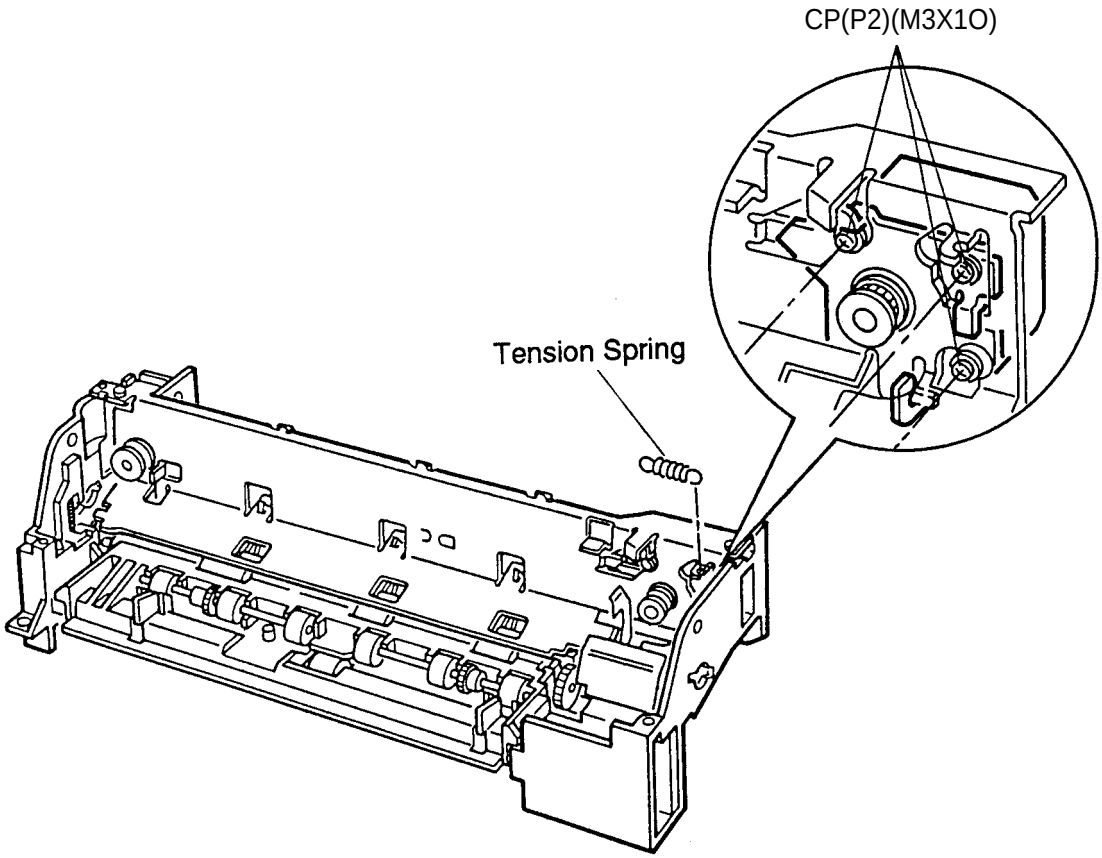

Figure 3-12. CR Motor Removal

3.2.5.6 PF Motor Removal

[Step 1] Remove theprintermechams m. (Refer to section 3.2.4.)

[Step 2] Remove 3 screws (CBB (M3 x IO)), and remove the holding plate.

DISASSEMBLY/ASSEMBLY POINT

Since the holding plate retains the pressure springs under it, be sure not to loose them when removing the holding plate.

[Step 3] Remove 1 screw (CBB (M3 x IO)), andremovethe PFmotor.

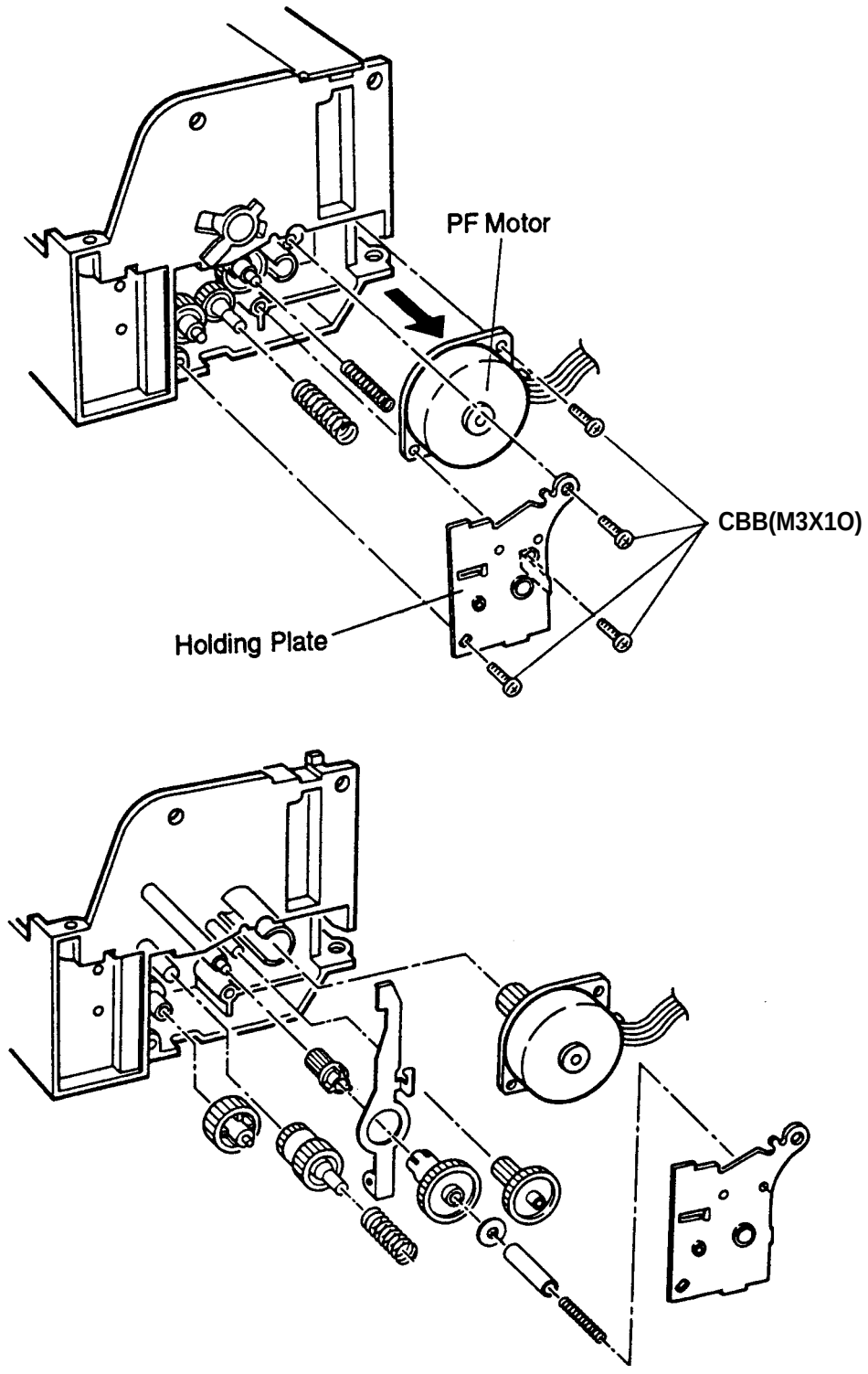

Figure 3-13. PF Motor Removal

3.2.5.7 Paper Feed Roller Assembly Removal

[Step 1] Remove the printer mechanism. (Refer tosection3.2.4.)

[Step 2] Remove thecarnage unit. (Refer to section 3.2.5.4.)

[Step 3] Remove 2 screws (CBB (M3 x IO)), and remove theleft frame assembly.

[Step 4] Remove 2 screws (CBB (M3x 10)), and remove the right frame assembly.

[Step 5] Remove the paperfeed roller assembly.

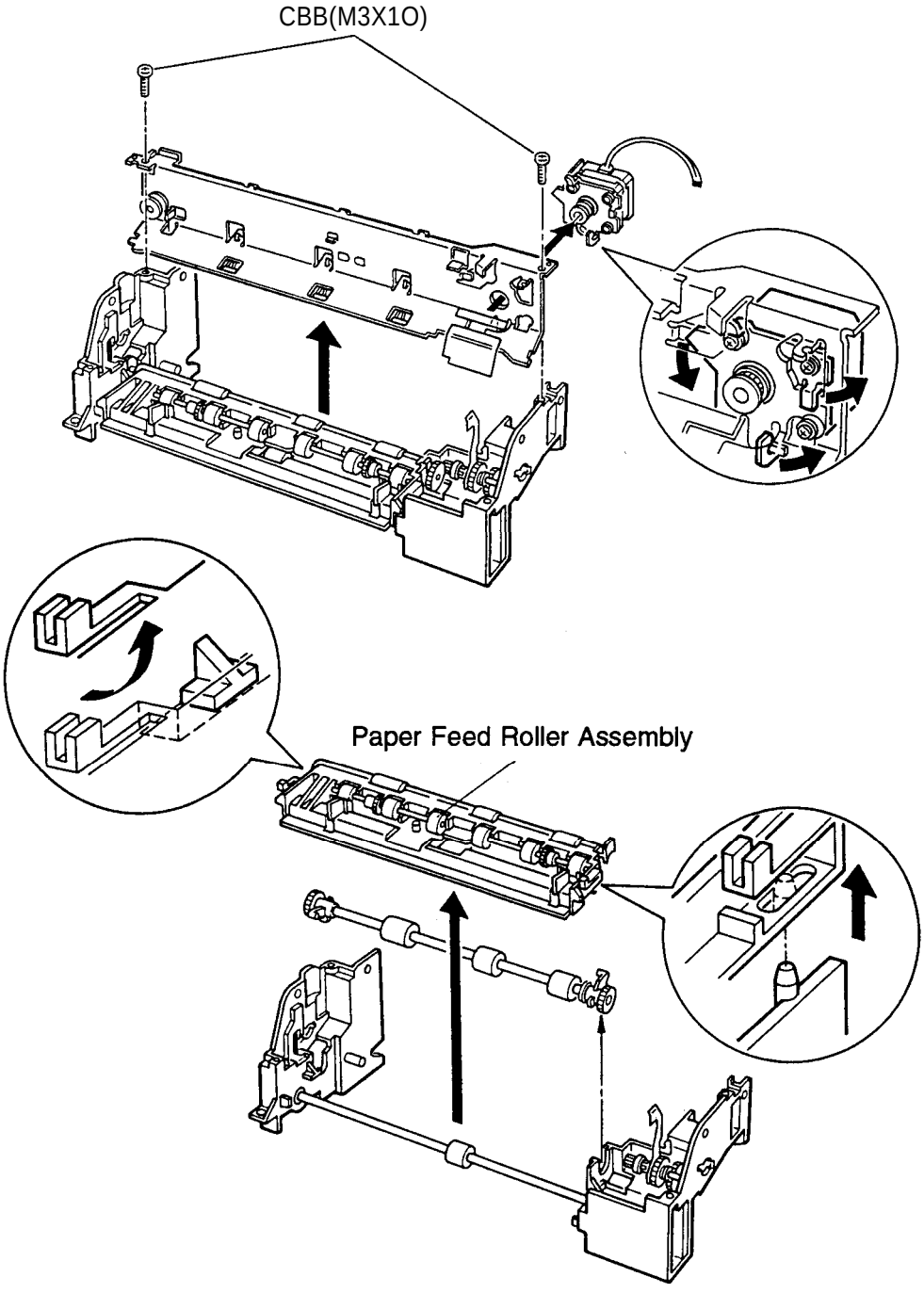

Figure 3-14. Paper Feed Roller Assembly Removal

REQUIRED ADJUSTMENT

Paper Gap Adjustment (Chapter 4, Section 4.4)

Chapter 4 Adjustment

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4.1 OVERVIEW

This section describes the adjustment procedures required when you disassemble and assemble the printer for repair.

4.1.1 Precaution for Adjusting the Printer

Refer to the precaution below when adjusting the printer.

WARNING

***Unless otherwise** specified, disconnect the power cable before you perform any adjustments.*

4.2 BI-DIRECTIONAL PRINTING ALIGNMENT ADJUSTMENT

The bi-directional printing alignment adjustment is required after you have removed the printer mechanism or replaced the main board. This adjustment lets you determine the compensation value required to adjust deviations in the print position caused by the different print speeds that result from the slight variations allowed within the tolerances of the mechanical components. The adjustment modifies the print timing between odd-numbered lines and even-numbered lines in bi-directional printing. The printer stores this compensation data in the EEPROM on the main board (C134 MAIN), and refers to it when bidirectional printing is performed.

1. Load a stack of paper into the auto sheet feeder of the printer.
2. Connect the PC to the printer and turn on both units.
3. Execute BASIC on the PC and start the DONAUP.BAS program.
4. When the Market Select menu appears, enter your market number.
5. When the Main Menu appears, enter 2 to select Bi-D Printing Alignment.
6. Follow the instructions displayed on the monitor, and press Enter to start the adjustment.
7. The printer prints the draft mode check pattern with a sample compensation value.
8. Check the printed draft mode sample pattern. If the character" l" is not vertically aligned in both odd- and even-numbered lines, enter a compensation value in the range -30 to +30.
   - Positive compensation value: Shift 2nd line to the left
   - Negative compensation value: Shift 2nd line to the right
9. For confirmation, the printer pMts the draft mode sample pattern with the selected compensation value. If the alignment is correct, press Y for LQ mode adjustment.
10. The printer prints the LQ mode sample pattern. The procedure for LQ mode adjustment is same as for draft mode.
11. If the alignment is correct, press Y to finish the adjustment.
12. Terminate the program by selecting 6 from the Main Menu, and turnoff the printer.

Because the compensation value you specify is not valid until the printer is turned off, be sure to turn off the printer immediately after you finish the adjustment.

4.3 DEFAULT SETTING PARAMETER REGISTRATION

The set-up value that specifies the product distribution destination is stored in EEPROM on the main board (C134 MAIN). Therefore, this set-up value must be written in EEPROM when the main board or the EEPROM chip is replaced.

1. Connect the PC to the printer and turn on both units.
2. Execute BASIC on the PC and start the DONAUP.BAS program.
3. When the Market Select menu appears, enter your market number.
4. When the Main Menu appears, enter 1 to select Default Setting Parameter Registration.
5. When the next menu appears, press Y and then Enter. The program transfers the default setting parameters to the printer.
6. Press Y and then Enter to return to the Main Menu. The transferred setting parameters are stored in EEPROM when the printer is turned off.

4.4 PAPER GAP ADJUSTMENT

When the printer mechanism is disassembled to remove or replace the carriage unit, adjust the distance between the printhead and the paper surface (the paper gap) to 1.0 mm to ensure higher print quality.

1. Place the paper gap (PG) gauge (#F609) in the adjustment position on the left side, as shown in the figure below, so that the top edge of the gauge contacts the support plate of the base frame assembly.
2. Move the carriage to the position where the PG gauge is attached, while lifting up the front edge of the carriage to widen the gap between the printhead and the mechanism.
3. Carefully place the carriage on the PG gauge and verify that there is a gap between the front edge of the carriage unit and the front frame.

Table 4-1. Gap and Adjustment Direction

Gap between Carriage and Front Frame	Left Bushing	Right Bushing
Yes	CW	CCW
No (Gap exists between printhead and PG gauge)	CCW	CW

4. Rotate the parallelism adjustment bushing on the left end of the carriage guide shaft until the printhead contacts the PG gauge. When you narrow the gap and the printhead contacts the PG gauge, the front edge of the carriage unit pops up and moves the bushing 1 step in the reverse direction.
5. Remove the PG gauge and place it in the adjustment position on the right side.
6. Repeat steps 2 to 4, and adjust the gap with the parallelism adjustment bushing on the right side of the carriage guide shaft.
7. Verify the gap for the left adjustment position again by rotating the bushing 1 step counter-clockwise (CCW) and seeing whether the front edge of the carriage unit pops up.

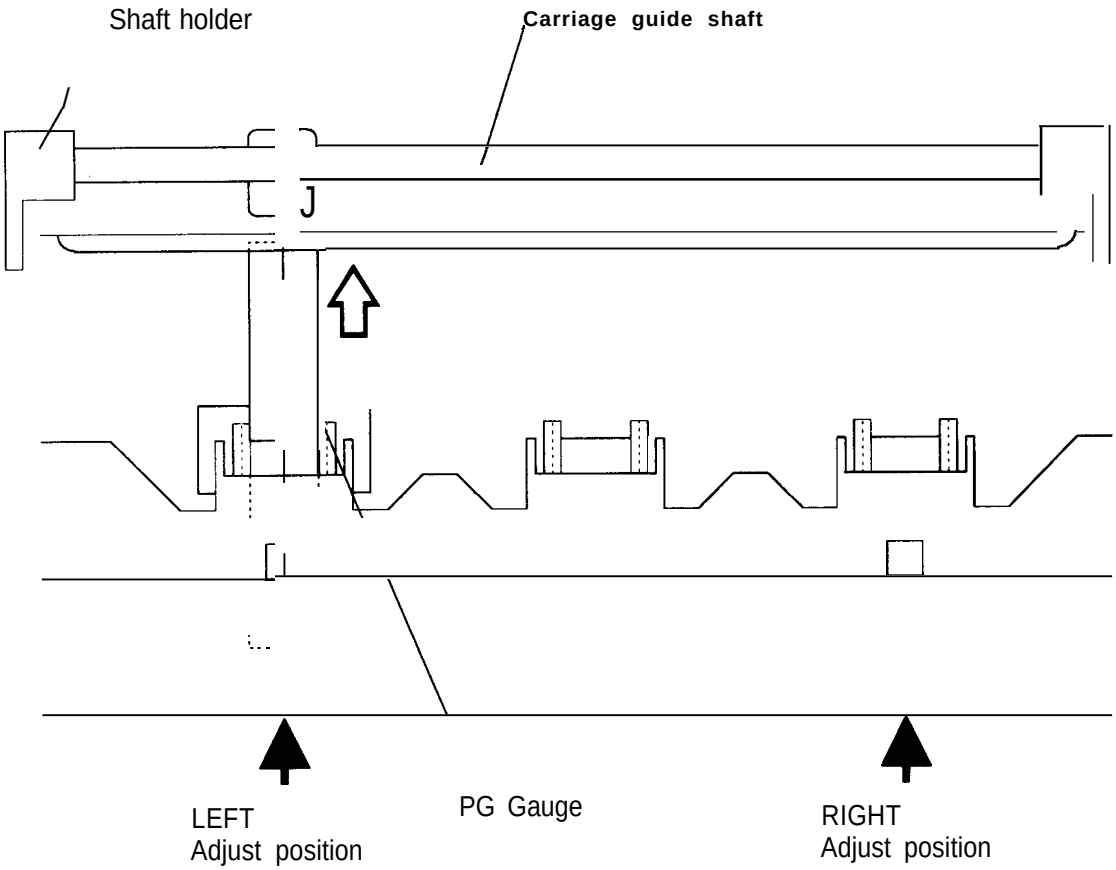

Figure 4-1. PG Adjustment -1

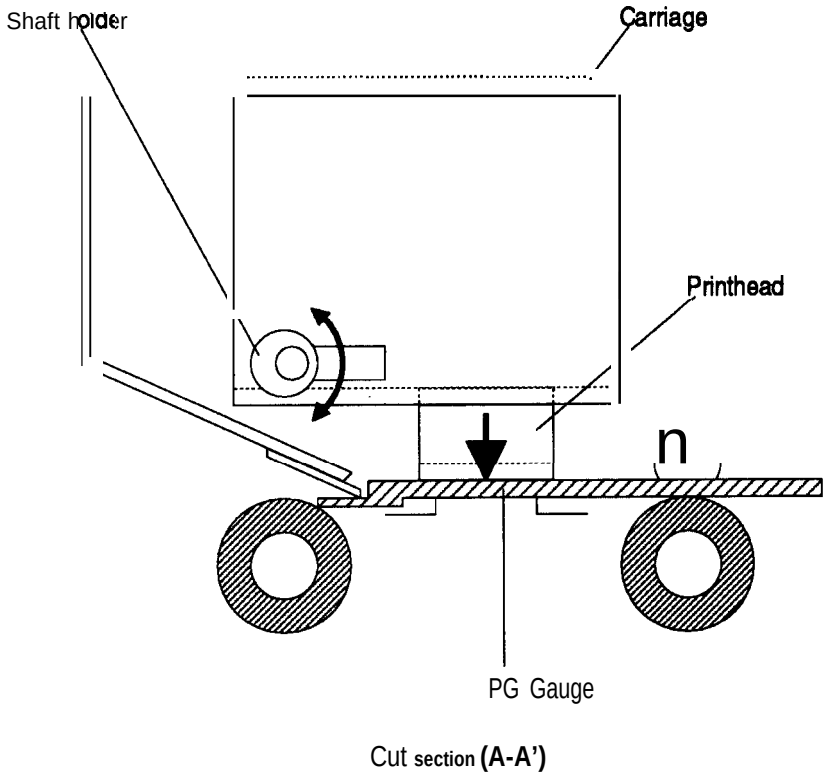

Figure 4-2. PG Adjustment -2

Chapter 5 Troubleshooting

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5.1 OVERVIEW

The Stylus 800+ has a sophisticated, built-in self-diagnostic function that reduces troubleshooting time by identifying failed-components.
The following tables show motor resistance ratings and sensor test points.

Table 5-1. Motor Resistance

Motor	Resistance	Remark
CR Motor	10.0Ω ± 7% / phase	At 25° C (77° F)
PF Motor	54.0Ω ± 3Ω / phase	At 25° C (77° F)

Table 5-2. Sensor Status

Sensor	Test Point	Signal Level	status
PE Sensor	CN4 / Pin 1	H (5V)	Paper present
		L (GND)	No paper (paper end)
HP Sensor	CN3 / Pin 10	H	At home position (HP)
		L	Away from HP

5.2 SELF-DIAGNOSTIC FUNCTION

This section describes the self-diagnostic function, in which the printer controller automatically checks the operating conditions of each component. If any abnormality is detected, the printer displays an error message on the control panel. Table 5-3 lists the messages that tell you if service is required.

Table 5-3. Error Codes

Error	Paper LED	Ink End LED	Pause LED	Buzzer
Paper out	ON	OFF	OFF	3 short times
Paper jam	BLINKS	OFF	OFF	3 short times
Ink low	OFF	BLINKS	-	No beeps
Ink end	OFF	ON	OFF	3 short times
No ink cartridge	OFF	ON	OFF	3 short times
Carriage Error	OFF	OFF	OFF	5 tong times
Waste ink tank overflow	OFF	ON	BLINKS	3 short times

5.3 TROUBLESHOOTING

This section describes how to troubleshoot abnormal operations and repair the circuit board unit.

5.3.1 Troubleshooting Abnormal Operations

This section describes how to detect malfunctions, how to determine their cause, and hOW to resolve them. Each entry in the table below refers you to a detailed troubleshooting table.

Table 5-4. Symptoms and Problems

Symptom	Printer Problem	Reference Table
The printer does not operate at ail.	The printer mechanism does not operate at power on.	5-5
The control panel LEDs do not operate at all.	The printer mechanism operates, but the LEDs do not light.	5-6
The control panel buttons do not operate at all.	There is no response to pressing the printer's buttons.	5-7
Carriage error displayed.	The printer displays a carriage error at power on.	58
Paper is not fed.	The paper is not fed from the auto sheet feeder (ASF).	5-9
	The paper is not fed from the manual feed sbt.	5-1o
Paper out displayed.	The paper is fed, but a paper out is displayed.	5-11
Paper jam displayed.	The printer displays a paper jam.	5-12
Ink low or ink end displayed.	A new ink cartridge is inserted, but ink low or ink end is displayed.	5-13
No ink cartridge displayed.	An ink cartridge is inserted, but no ink cartridge is displayed.	5-14
Waste ink tank overflow displayed.	The printer displays a waste ink tank overflow.	5-15
Self-test is abnormal.	The carriage moves, but the printhead does not print.	6-16
Self-test printout has poor quality.	Dots are missing.	5-17
	Line spacing is inconsistent.	5-18
	Other problems.	5-19
Abnormal printing in on-line mode.	Bidirectional printing position is abnormal.	520
	The printer does not print.	5-21
	Data from the host is incorrect.	522

Table 5-5. The Printer does Not Operate at All

Cause	Step	Checkpoint	Finding	Solution
Connector CN1 on the C106 PSB-B/PSE-B board maybe disconnected.	1	Is connector CN1 on the C106 PSB-B/PSE-B board disconnected?	Yes	Connect CN1 on C106 PSB-B/ PSE-B board.
Connector CN3 on the Cl 06 PSB-B/PSE-B board or connector CN7 on the Cl 34 MAIN board may be disconnected.	2	is connector CN3 on the Cl 06 PSB-B/PSE-B board or connector CN7 on the C134 MAIN board disconnected?	Yes	Connect CN3 on the C106 PSB-B/ PSE-B board or CN7 on the C134 MAIN board.
Fuse F1 on the C106 PSB-B/ PSE-B board is blown.	3	Is fuse F1 on the C106 PSB-B/PSE-B board blown?	Yes	Replace fuse F1.
The C106 PSB-B/PSE-B board may be defective.	4	With the power on, are there outputs of +5 VDC between pin 4 (+) and pin 6 (-) and +35 VDC between pin 1 (+) and pin 2 (-) from CN3 on the C106 PSB-B/PSE-B board?	No	Replace the C106 PSB-B/ PSE-B board.
The C134 MAIN board may be defective.	5	—	—	Replace the C134 MAIN board.

Table 5-6. The LEDs do Not Operate at All

Cause	Step	Checkpoint	Finding	Solution
Connector CN8 on the C134 MAIN board may be disconnected.	1	Is connector CN8 on the C134 MAIN board disconnected?	Yes	Connect CN8 on the C134 MAIN board.
The control panel may be defective.	2		—	Replace the control panel.
The C134 MAIN board may be defective.	3	—	—	Replace the C134 MAIN board.

Table 5-7. The Buttons do Not Operate at All

Cause	Step	Checkpoint	Finding	Solution
Connector CN8 on the C134 MAIN board maybe disconnected.	1	Is connector CN8 on the C134 MAIN board disconnected?	Yes	Connect CN8 on the C134 MAIN board.
The control panel may be defective.	2	—	—	Replace the control panei.
The C134 MAIN board may be defective.	3	—	—	Replace the C134 MAIN board.

Table 5-8. Carriage Error Displayed

cause	step	Checkpoint	Finding	solution
The carriage mechanism is defective.	,	Turn off the printer and try to move the carnage manually. Does the carriage move smoothly?	No	Check the carriage mechanism, and replace of reassemble the affected parts.
The HP sensor is defective.	2	Does the carriage move abruptly to the right or left frame before the error is displayed?	Yes	Replace the HP sensor.
The carnage motor is defective.	3	Disconnect CN6 on the C134 MAIN board and use a multimeter to check the coil resistance between: pin 1 and pin 5, pin 2 and pin 5, pin 3 and pin 5, and pin 4 and pin 5(4 points total) on the disconnected cable side. Pin 1- Pin 5 Pin 2- Pin 5 Pin 3- Pin 5 Pin 4- Pin 5 Are the resistances of all four points above approximately 10 ohms?	No	Replace the carriage motor.
		If any coil is shorted, check the carriage motor drive circuit using the following procedure: 1. Set the multimeter to resistance check mode. 2. Place the (-) terminal of the multimeter on pins 1, 2,3, & 4 of connector CN6 on the C134 MAIN board. 3. Place the(+) terminal on pin 6 of connector CN7 on the C134 MAIN board (GND). With the power off, does the multimeter detect "∞" ?	No	Replace the carriage motor and the C134 MAIN board.
The C134 MAIN board may be defective.	4	—	—	Replace the C134 MAIN board.

Table 5-9. Paper is Not Fed (ASF)

Cause	Step	Checkpoint	Finding	Solution
The paper-end sensor may be defective.	1	Does the sensor toggle? (Check with a multimeter.)	No	Replace the paper-end sensor.
The paper feed motor may be defective.	2	Disconnect CN5 on the CI 34 MAIN board and use a multimeter to check the coil resistance between: pin 1 and pin 3, pin 5 and pin 3, pin 2 and pin 4, and pin 6 and pin 4 (4 points total) on the disconnected cable side. Pin 1- Pin 3 Pin 5- Pin 3 Pin 2- Pin 4 Pin 6- Pin 4 Are the resistances of all four points above approximately 54 ohms?	No	Replace the paper feed motor.
		If any coil is shorted, check the paper feed motor drive circuit using the following procedure: 1. Set the multimeter to resistance check mode. 2. Place the (-) terminal of the multimeter on pins 1, 5,2, & 6 of connector CN5 on the C134 MAIN board. 3. Place the (+) terminal on pin 6 of connector CN7 on the C134 MAIN board (GND). With the power off, does the multimeter detect "I=" ?	No	Replace the paper feed motor and the C134 MAIN board.
The ASF mechanism maybe defective.	3	Does the ASF roller rotate?	No	Replace or reassemble the ASF mechanism.
The paper path may be defective.	4	—	—	Reassemble the paper path.

Table 5-10. Paper is Not Fed (Manual Feed)

cause	Step	Checkpoint	Finding	Solution
The paper-end sensor may be defective.	1	Does the sensor toggle? (Check with a multimeter.)	No	Replace the paper-end sensor
The paper feed motor may be defective.	2	Disconnect CN5 on the C134 MAIN board and use a multimeter to check the coil resistance between: pin 1 and pin 3, pin 5 and pin 3, pin 2 and pin 4, and pin 6 and pin 4 (4 points total) on the disconnected cable side. Pin 1- Pin 3 Pin 5- Pin 3 Pin 2- Pin 4 Pin 6- Pin 4 Are the resistances of all four points above approximately 54 ohms?	No	Replace the paper feed motor.
		If any coil is shorted, check the paper feed motor drive circuit using the following procedure: 1. Set the multimeter to resistance check mode. 2. Place the (-) terminal of the multimeter on pins 1, 5,2, & 6 of connector CN5 on the C134 MAIN board. 3. Pface the (+) terminal on pin 6 of connector CN7 on the C134 MAIN board (GND). With the power off, does the multimeter detect "∞" ?	No	Replace the paper feed motor and the C134 MAIN board.
The paper path maybe defective.	3	—	—	Reassemble the paper path.

Table 5-11. Paper Out Displayed

Cause	Step	Checkpoint	Finding	Solution
The paper-end sensor is defective.	1	—	—	Replace the paper-end sensor.

Table 5-12. Paper Jam Displayed

Cause	Step	Checkpoint	Finding	Solution
The paper path is defective.	1	Is the paper path OK?	No	Replace or reassemble the paper path mechanism.
The paper-end sensor is defective.	2	—	—	Replace the paper-end sensor.

Table 5-13. Ink Low or Ink End Displayed

Cause	Step	Checkpoint	Finding	Solution
The Cl 34 MAIN board may be defective.	1	—	—	Replace the C134 MAIN board.

Table 5-14. No Ink Cartridge Displayed

Cause	Step	Checkpoint	Finding	Solution
Connector CN3 on the C134 MAIN board may be disconnected.	1	Is connector CN3 on the C134 MAIN board disconnected?	Yes	Connect CN3 on the C134 MAIN board.
The printhead connector may be disconnected.	2	Is the printhead connector disconnected?	Yes	Connect the printhead.
The Cl 34 MAIN board may be defective.	3	—	—	Replace the C134 MAIN board.

Table 5-15. Waste Ink Tank Overflow Displayed

Cause	Step	Checkpoint	Finding	Solution
The waste ink tank may be full or the C134 MAIN board may be defective.	1	Is the printer OK after the EEPROM is cleared?	Yes	Replace the waste ink tank pad.
			No	Replace the C134 MAIN board and the waste ink tank pad.

Table 5-16. Self-teat is Abnormal

Cause	Step	Checkpoint	Finding	Solution
Connector CN2 on the C134 MAIN board may be disconnected.	1	Is connector CN2 on the C134 MAIN board disconnected?	Yes	connect CN2 on the C134 MAIN board.
The printhead connector may be disconnected.	2	Is the printhead connector disconnected?	Yes	Connect the printhead connector.
Ink cartridge maybe defective.	3	Is printing OK after ink cartridge replacement?	Yes	Replace the ink cartridge.
Printhead surface maybe dirty.	4	Is printing OK after cleaning the printhead?	Yes	Clean the printhead.
Printhead maybe defective.	5	—	—	Replace the printhead.

Table 5-17. Self-test Printout has Poor Quality (Dots)

Cause	Step	Checkpoint	Finding	solution
Printhead surface maybe dirty.	1	Is printing OK after cleaning the printhead?	Yes	Clean the printhead.
Ink cartridge may be defective.	2	Is printing OK after ink cartridge replacement?	Yes	Replace the ink cartridge.
Printhead maybe defective.	3	—	—	Replace the printhead.

Table 5-18. Self-test Printout has Poor Quality (Line Spacing)

Cause	Step	Checkpoint	Finding	Solution
The paper feed mechanism may be defective.	,	Check the paper feed mechanism gears and rollers. Are they OK?	No	Replace or reassemble the gears and rollers.
The paper feed motor may be defective.	2	Disconnect CN5 on the C134 MAIN board and use a muttimeter to check the coil resistance between: pin 1 and pin 3, pin 5 and pin 3, pin 2 and pin 4, and pin 6 and pin 4 (4 points total) on the disconnected cable side. Pin 1- Pin 3 Pin 5- Pin 3 Pin 2- Pin 4 Pin 6- Pin 4 Are the resistances of all four points above approximately 54 ohms?	No	Replace the paper feed motor.
		If any coil is shorted, check the paper feed motor drive circuit using the following procedure: 1. Set the multimeter to resistance check mode. 2. Place the (-) terminal of the multimeter on pins 1, 5,2, & 6 of connector CN5 on the C134 MAIN board. 3. Place the (+) terminal on pin 6 of connector CN7 on the C134 MAIN board (GND). With the power off, does the multimeter detect "00" ?	' °	Replace the paper feed motor and the C134 MAIN board.
The C134 MAIN board may be defective.	4	—	—	Replace the C134 MAIN board.

Table 5-19. Self-test Printout has Poor Quality (Other)

Cause	Step	Checkpoint	Finding	Solution
The pump unit may be defective.	1	Does the waste ink drop from the tube to the pad during the cleaning operation?	No	Replace the pump unit.
The printhead maybe defective.	2	—	—	Replace the printhead.

Table 5-20. Abnormal Printing in On-line Mode (Bi-directional)

Cause	step	Checkpoint	Finding	Solution
The bidirectional printing value may be incorrect.	1		—	Adjust the bidirectional printing position. (Refer to Chapter 4.)

Table 5-21. Abnormal Printing in On-line Mode (Printer)

cause	Step	Checkpoint	Finding	solution
Printer software settings may be incorrect.	,	Are they OK?	No	correct the software settings.
Printer default settings may be incorrect.	2	Are they OK?	No	Correct the printer default settings.
Interface cable may be defective.	3	Change the interface cable. Is printing OK?	No	Replace the interface cable.
The C134 MAIN board may be defective.	4	—	—	Replace the C134 MAIN board.

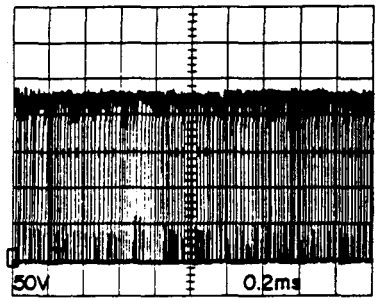
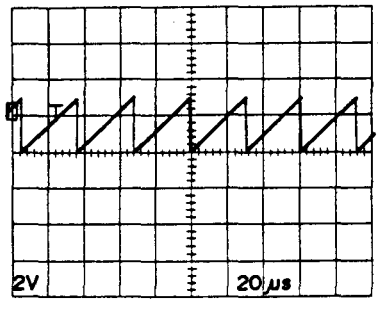
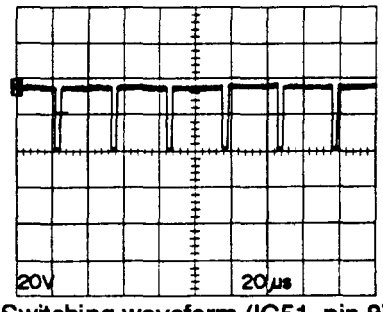
Table 5-22. Abnormal Printing in On-line Mode (Host)

Cause	Step	Checkpoint	Finding	solution
Host software settings may be incorrect.	,	Are they OK?	No	correct the software settings.
Printer default settings may be incorrect.	2	Are they OK?	No	correct the printer defauft settings.
Interface cable may be defective.	3	Change the interface cable. Is printing OK?	No	Replace the interlace cable.
The C134 MAIN board may be defective.	4	—	—	Replace the C134 MAIN board.

5.3.2 C106 PSB-B/PSE-B Board Unit Repair

This section describes problems related to the power supply board (C106 PSB-B/PSE-B). The table below presents various symptoms, likely causes, and checkpoints. The checkpoints refer to waveforms, resistances, and other values to check to evaluate the operation of each component.

Table 5-23. Repair of the C106 PSB-B/PSE-B Board

Symptom	Condition	Cause	Checkpoint	Solution
The printer does not operate at all.	+35V line is dead.	Transformer coils are open.	Check the transformer coils by using a multimeter.	Replace T1.
		Switching transistor Q1 is bad.	Check the waveform at the drain of Q1. 	Replace Q1.
	+35V line is abnormal.	ZD52, Q82, or PC1 is bad.		Replace ZD52, Q82, or PC1.
	+5V line is dead.	+35V line is dead.	Check the +35V line.	
		IC51 is dead.	Check the oscillation waveform and switching waveform of IC51.  Oscillation waveform (IC51, pin 5)  Switching waveform (IC51, pin 8)	Replace IC51.
		Q51 is dead.		Replace Q51.

5.3.3 C134 MAIN Board Unit Repair

This section describes problems related to the main controller board (C134 MAIN). The table below presents various symptoms, likely causes, and checkpoints. The checkpoints refer to waveforms, resistances, and other values to check to evaluate the operation of each component.

Table 5-24. Repair of the C134 MAIN Board

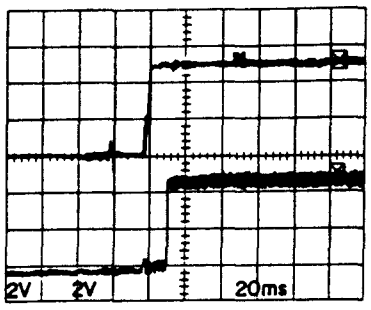
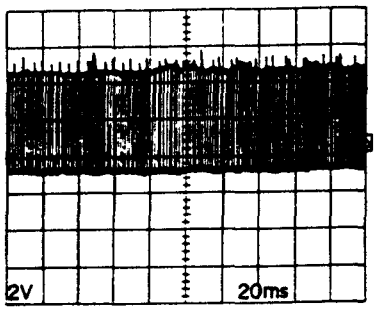
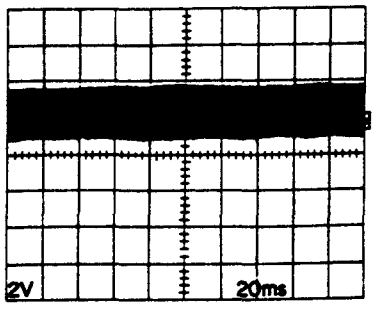
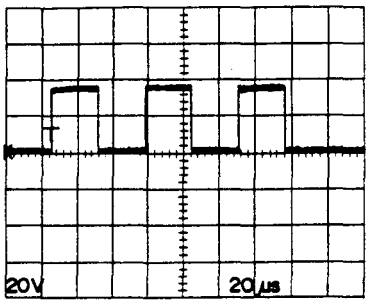
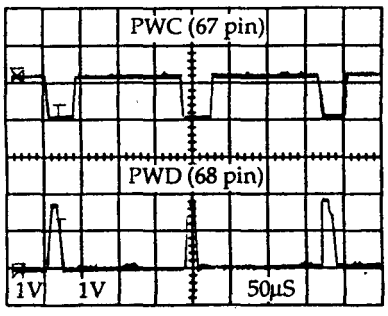
Symptom	Condition	Cause	Checkpoint	Solution
The printer does not operate at all.	The CPU does not operate.	The reset circuit does not operate.	Check the waveform of the +5V line and that of the RESET signal. 	Replace IC11.
		Selection of control ROM is abnormal.	Check pin 111 of IC3 for a change in the HIGH/LOW signal. 	Replace IC3.
		Either CG or RAM is defective.		Replace CG or RAM.
		CPU is defective.	Check the oscillator signal at either pin 26 or 27 of the CPU. 	If a signal is detected, replace the CPU. Otherwise, replace CR2.

Table 5-24. Repair of the C134 MAIN Board (Continued)

Symptom	Condition	Cause	Checkpoint	Solution
The carriage does not operate normally.	The carriage does not operate at all.	IC13 is defective.	Check the signal at pins 6, 5, 17, and 16 of IC13. 	Replace IC13.
		CPU is defective.		Replace the CPU.
Self-test printing is abnormal.	Self-test is not executed.	IC3 is defective.	Check the output signal at pin 67 and pin 68 of IC12. 	Replace IC3.
		Printhead unit is defective.		Replace printhead unit.
Paper is not fed normally.	The paper feed motor does not rotate.	QM1 is defective.	Check the signal at pins 1, 3, 6, and 8 of QM1.	Replace QM1.
		CPU is defective.		Replace the CPU.
	Feed pitch is abnormal (lack of torque).	QM1 is defective.	Check the output signal at pins 2, 4, 7, and 9 of QM1.	Replace QM1.
Abnormal printing in online mode.	Data is not received normally.	IC3 is defective.	Check the input/output signal of IC3.	Replace IC3.

Chapter 6 Maintenance

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6.1 PREVENTIVE MAINTENANCE

Although this printer is designed so that no specific maintenance is required on a regular basis, it is a good idea to clean the printer thoroughly whenever you get a chance. You can clean :

- Outer case

  If it is dirty, clean it with a soft, clean cloth, dampened with mild detergent if necessary.

- Auto sheet feeder

  If the inside of the auto sheet feeder is dirty (dusty), carefully brush away all dust and dirt using a soft brush. If the sheet feeder's pickup roller is dirty, clean its surface with a soft, clean cloth.

- Inside the printer

  If you notice any dust or dirt accumulated inside the printer when you open the outer case for repair, remove all dust and dirt using a vacuum cleaner.

WARNING

Never use thinner, trichloroethylene, or ketone-based solvents for cleaning. These chemicals can damage the components of the printer.

CAUTION

- *Do not use a hard or abrasive brush for cleaning.*
- *Be careful not to damage the components of the printer when usinga vacuum cleaner.*

6.2 SERVICE MAINTENANCE

Certain maintenance is required when the printer detects an error or when you see a decline m print quality.

6.2.1 Printhead Cleaning

If print quality deteriorates, clean the printhead using the built-in printhead cleaning function. The printer has an automatic printhead cleaning cycle to ensure proper nozzle operation for ink injection as well as keep the printhead in good condition. However, you should perform this printhead cleaning operation only if print quality declines. Unnecessary cleanings waste ink.

1. Turn the printer on and press the PAUSE button to pause the printer. Make sure that the PAUSE LED is on.
2. Hold down the ALT button and press the PAUSE button for two seconds.

When the printer accepts the button input from the control panel, the buzzer sounds and the cleaning cycle starts. It takes approximately 30 seconds to complete, and the PAUSE LED flashes during the cleaning cycle. When the cleaning is completed, the PAUSE LED stops flashing.

6.2.2 Waste Ink Drain Tank Replacement

The printer uses a counter to determine the total amount of wasted ink sent to the waste ink drain tank. This information is stored in the EEPROM on the main board as a value m protect counter A. When the value in counter A reaches a predetermined value, the printer detects it and signals an error ('Waste ink tank overflow." Refer *to* Chapter 1, Table 1-6, *Error Codes).* The waste ink absorbing materials should then be replaced and the protect counters should be reset, as described in the table below.

Table 6-1. Protect Counter Operations

Condition	Counter to Reset	Waste Ink Absorbing Material status
Protect counter A value is 216,000	A, B, C	Replace
Protect counter A value is ≤ 16,000 (*1)	B, C (*3)	Do not replace
Protect counter A value is unknown *(*2)*	A, B, C	Replace
overflow error (counter A value is ≥ *25,000)*	A, B, C	Replace

*Notes: (*1) The protect counter A value can be obtained by entering the default setting mode.*
*(*2) In this case, the main controller board (C134 MAIN) maybe defective.*
*(*3) Protect counters B and C can be reset by using a program supplied with the adjustt-ment software.*

To initialize counters A, B, and C, perform the following operations:

1. Open the upper case and remove the waste ink absorbing materials from the compartment of the lower case. Reassemble the printer.
2. Turn the printer on while holdrngdownthe ALT, ECONOMY/CONDENSED, LOAD/EJECT', and PAUSE buttons (the upper two buttons and lower two buttons on the control panel). This operation resets protect counters A, B, and C to their initial values(0).

6.3 LUBRICATION

The printer must be lubricated properly when it is disassembled for component replacement, or if the mechanical noise exceeds a certain level. Epson recommends only the lubricants listed in table below for this printer, both of which have been tested extensively and found to comply with the requirements of this printer mechanism. The figure on the next page shows the lubrication points.

Table 6-2. Recommended Lubricants

Type	Name	Quantity	Part No.	Availability
Oil	o-5	40 cc	1010513	E
Grease	G-26	40 g	B702600001	E

Note: E = Epson exclusive product (not commercial available)

Table 6-3. Lubrication Points

Ref. No. in Figure	Lubrication Point	Lubricant
(1)	Right Frame Assembly (gear shafts A, B, and C)	G-26 (1 -3 mg)
(2)	Flat Gear, 8	G-26 (1 -3 mg)
(3)	Reduction Shaft	G-26 (1 -3 mg)
(4)	Oil Pad (Carriage)	o-5(3 drops)
(5)	CR Guide Shaft	O-5 (paint on the shaft)
(6)	PF Roller	G-26 (1 -3 mg)

CAUTION

Do not apply too much lubricant, because it may place a stain on the mechanism or cause a mechanism malfunction.

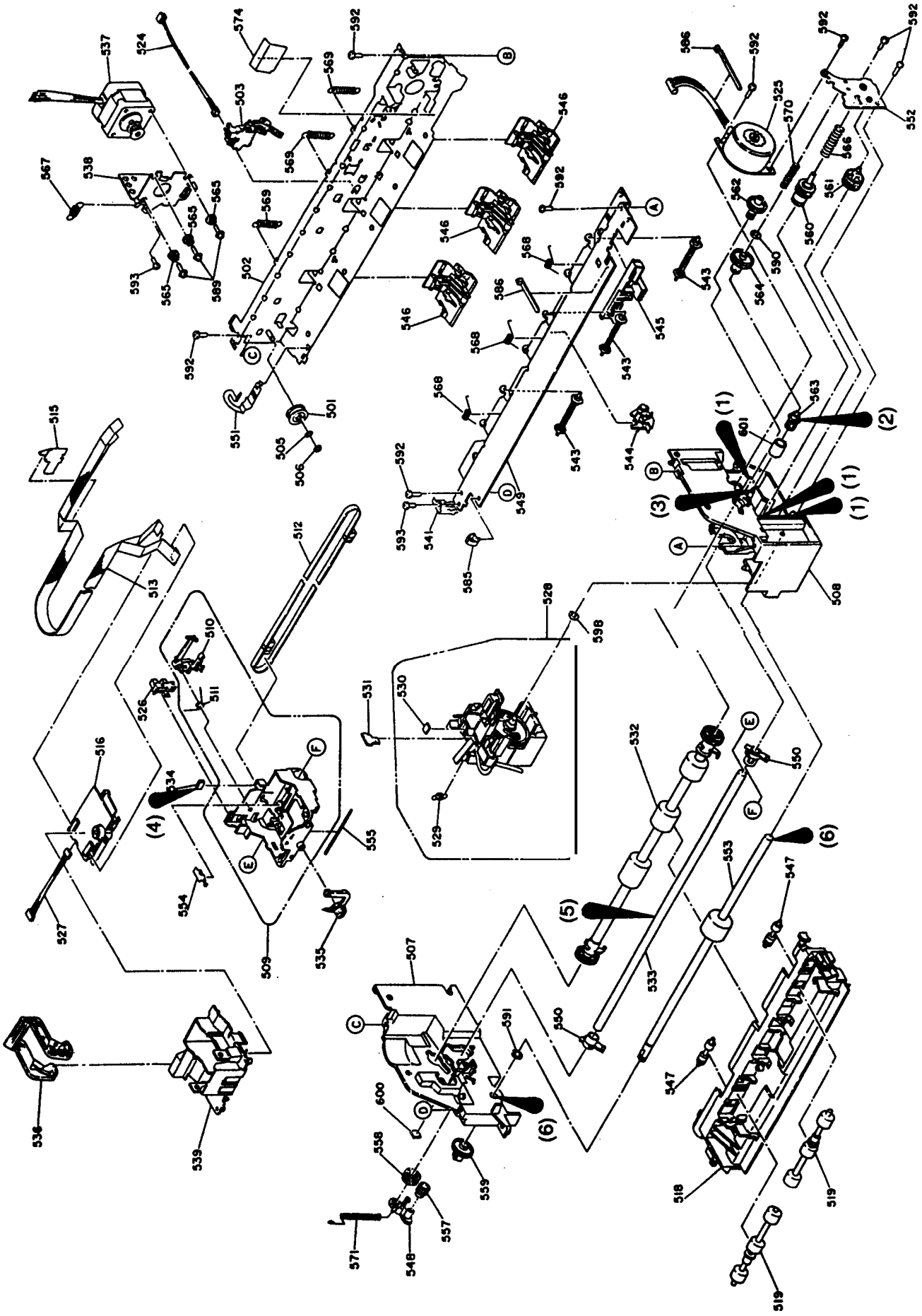

Figure 6-1. Lubrication Points

Appendix

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A.1 CONNECTOR SUMMARY

The figure below shows the interconnection between the major components of the Stylus 800+.

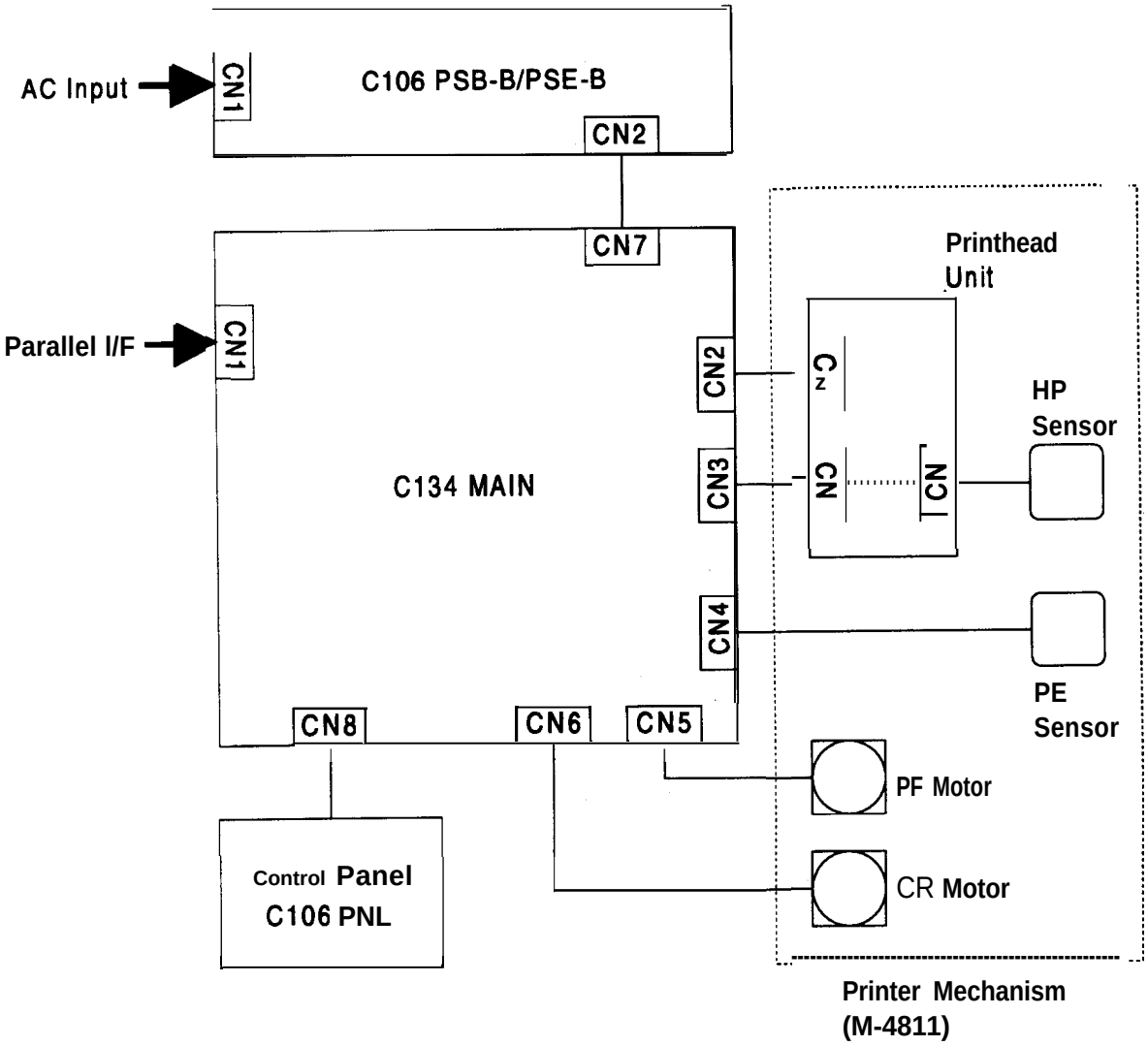


Figure A-1. Interconnection of Major Components

Table A-1. Connector Summary

Board	Location	Pin	Description
C134 MAIN	CN1	36 pins	Centronics parallel I/F
	CN2	12	HEAD-1 (to printhead unit)
	CN3	12	HEAD-2 (to printhead unit)
	CN4	2	PE sensor
	CN5	6	PF motor
	CN6	5	CR motor
	CN7	8	PS line (to C106 PSB-B/PSE-B)
	CN8	18	Panel control (to C106 PNL)
C106 PSB-B/PSE-B	CN1	2	AC input (UN)
	CN2	8	DC output (to C134 MAIN/printer mechanism)
C106 PNL	CN1	18	(to C134 MAIN)

Table A-2. Connector Pin Assignments - CN1

Pin	I/O	Name	Description
1	I	$\overline{STB}$	STROBE signal
2-9	I	D0-D7	Parallel data (DATA1 - DATA8)
10	O	$\overline{ACK}$	Acknowledge signal
11	O	BUSY	Busy signal
12	O	PE	Paper-end signal
13	O	SLCT	Printer select signal
14	I	$\overline{AFXT}$	Auto line-feed signal
15	-	Nc	No connation
16	-	GND	Ground
17	-	GND	Ground
18	-	Nc	No connection
19	-	GND	Ground
20-30	-	GND	Ground
31	I	$\overline{INIT}$	Printer initialize signal
32	O	$\overline{ERR}$	Error signal
33	-	-	Notused
34	-		Not used
35	-	-	Not used
36	I	$\overline{SLIN}$	Printer select signal

Table A-3. Connector Pin Assignments - CN2

Pin	I/O	Name	Description
1-6	-	VH	Printhead drive voltage (VH)
7-12	-	GP	Ground

Table A-4. Connector Pin Assignments - CN3

Pin	I/O	Name	Description
1	-	GND	Ground
2	0	HCLK	Synchronizing clock signal (to SI)
3	-	GND	Ground
4	0	LAT	Latch signal (to SI)
5	-	GND	Ground
6	0	SI	Head serial data signal
7		GND	Ground
8	0	I/E	Ink-end (IE) signal
9	0	HPV	Power supply to the photodiode of HP sensor
10	I	HP	HP sensor (output)
11		+5V	+5V Dc
12	I	TH	Thermistor signal

Table A-5. Connector Pin Assignments - CN4

Pin	I/O	Name	Description
1	I	PE	Paper-end (PE) signal
2		GND	Ground

Table A-6. Connector Pin Assignments - CN5

Pin	I/O	Name	Description
1	o	PFA	Phase A drive signal
2	0	PFB	Phase B drive signal
3	-	PFCOM	PF power supply line (+35/+5V DC)
4	-	PFCOM	PF power supply line (+35/+5V DC)
5	0	PF-A	Phase -A drive signal
6	0	PF-B	Phase -B drive signal

Table A-7. Connector Pin Assignments - CN6

Pin	I/O	Name	Description
1	0	CRA	Phase A drive signal
2	0	CR-A	Phase -A drive signal
3	0	CRB	Phase B drive signal
4	0	CR-B	Phase -B drive signal
5		CRCOM	CR power supply line (+35V DC)

Table A-8. Connector Pin Assignments - CN7

Pin	I/O	Name	Description
1		+35V	+35V Dc
2,3	-	GP	GND (for +35V)
4,5	-	+5V	+5V Dc
6,7	-	GND	GND (for +5V)
8		+35V	+35V Dc

Table A-9. Connector Pin Assignments- CN8

Pin	I/O	Nemo	Description
1	-	+5	+5V DC
2	O	LED8	LED8 drive signal (L = LED on)
3	I	SW1	SW1 input signal (L = Button pressed)
4	I	SW2	SW2 input signal
5	I	SW3	SW3 input signal
6	I	SW4	SW4 input signal
7	I	PAUSE	PAUSE input signal
8	O	LED0	LED0 drive signal
9	O	LED1	LED1 drive signal
10	O	LED2	LED2 drive signal
11	O	LED3	LED3 drive signal
12	O	LED4	LED4 drive signal
13	O	LED5	LED5 drive signal
14	O	LED6	LED6 drive signal
15	O	LED7	LED7 drive signal
16	I	SW5	SW5 input signal
17	-	GND	Ground
18	-	FG	Frame ground

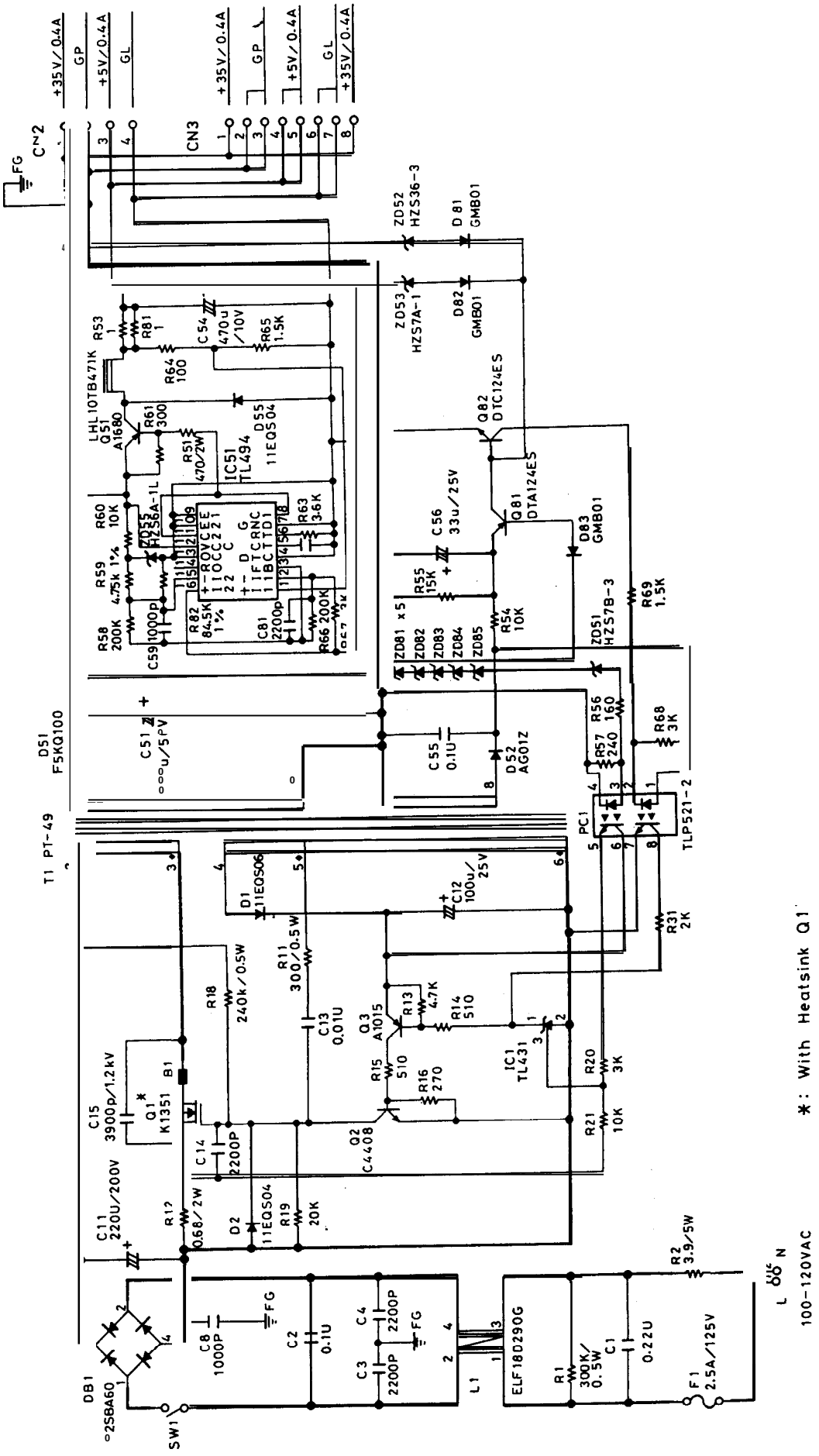


Figure A-3. CI06 PSB-B Board Circuit Diagram

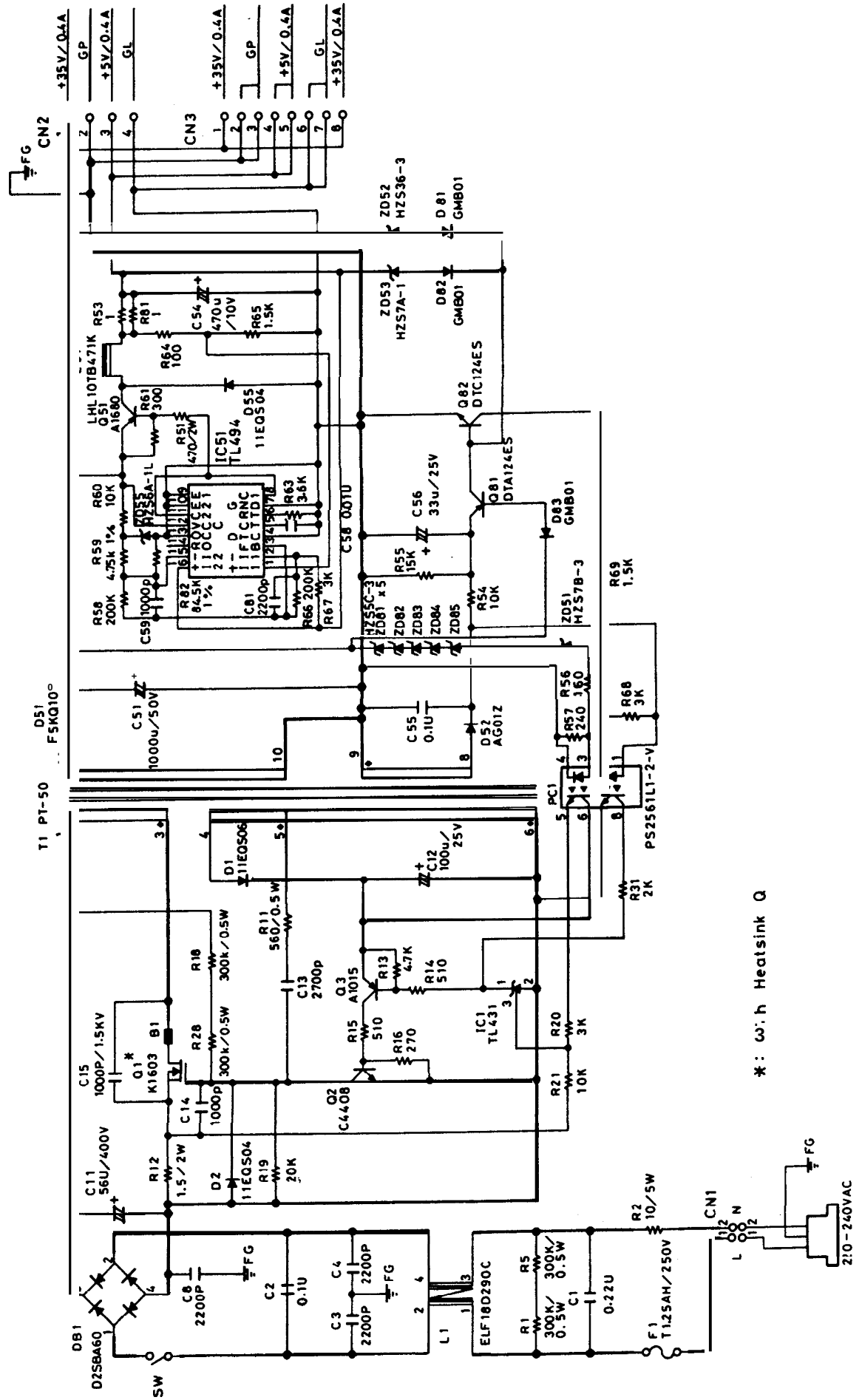
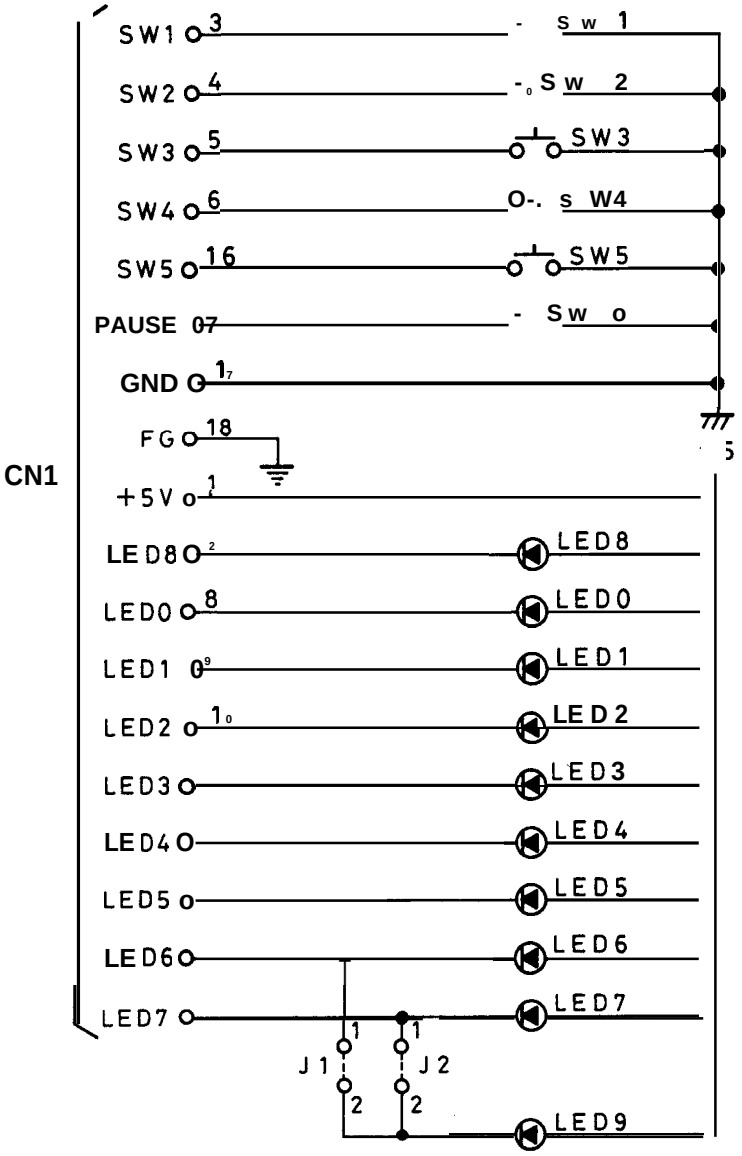


Figure A-4. C106 **PSE-B** Board Circuit Diagram



Parts Name	Stylus 8.00 Stylus 800+	MJ-500 MJ-SOOV2	stylus 1000	MJ-1000 MJ-1000V2
SW 0	0	0	0	0
Sw 1	0	0	0	0
Sw 2	0	0	0	0
Sw 3	0	0	0	0
SW 4	0	0	0	0
SW 5	x	○	0	0
LE DO	Led	Led	Led	Led
LED I	Led	Led	Led	Led
LE D2	Green	Green	Green	Green
LE D3	Green	Green	Green	Green
LE D4	Green	Green	Green	Green
LE D5	Green	Green	Green	Green
LE D6	Green	x	Green	x
LE D7	Orange	Green	X	Green
LE D8	Orange	Orange	Orange	Orange
LE D9	x	Green	Orange	Green
J 1	x	o	x	0
J 2	x	X	o	x

Figure A-5. CI06 PNL Board Circuit Diagram

A.3 CIRCUIT BOARD COMPONENT LAYOUT

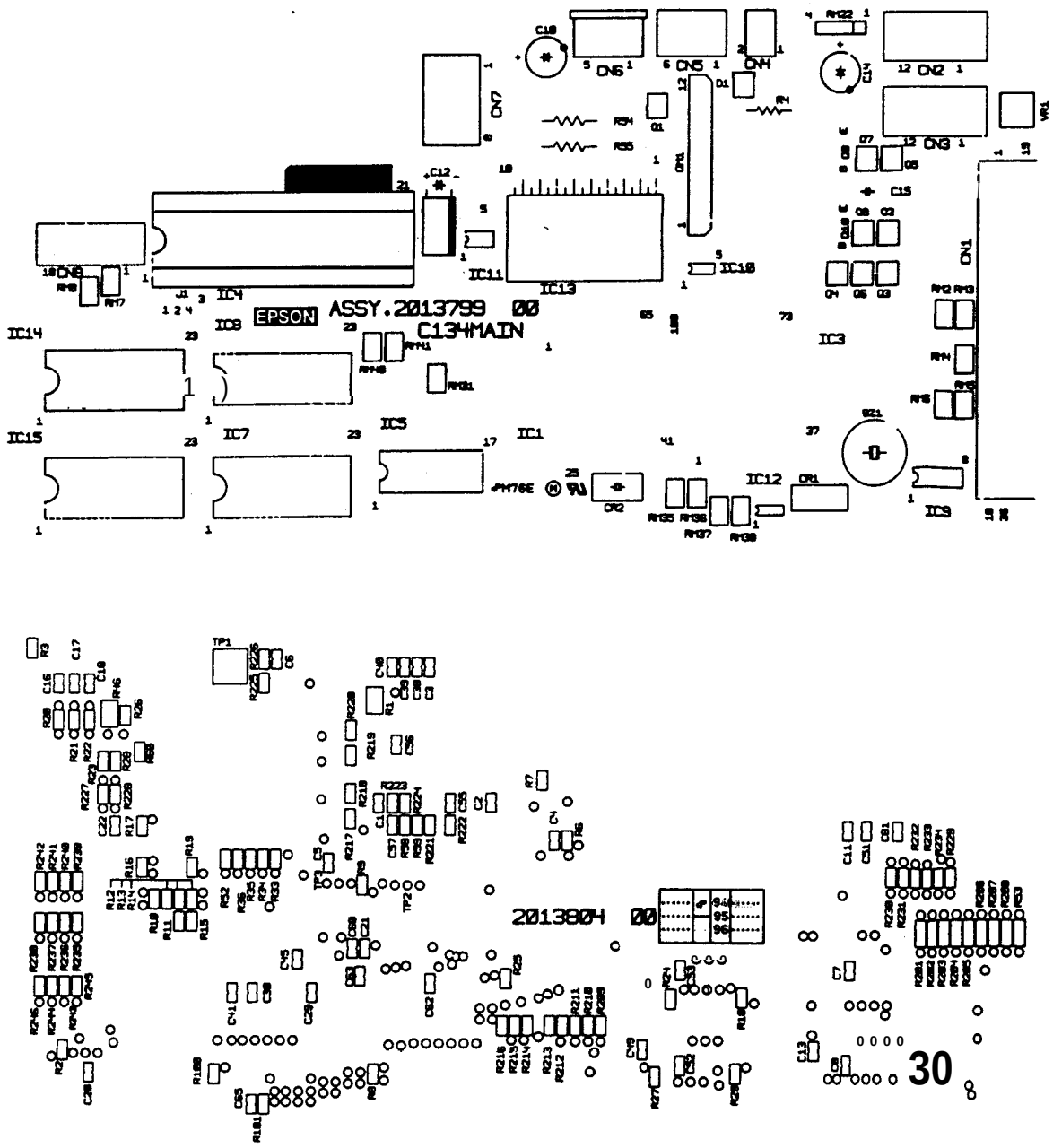


Figure A-6. C134 MAIN Board Component Layout

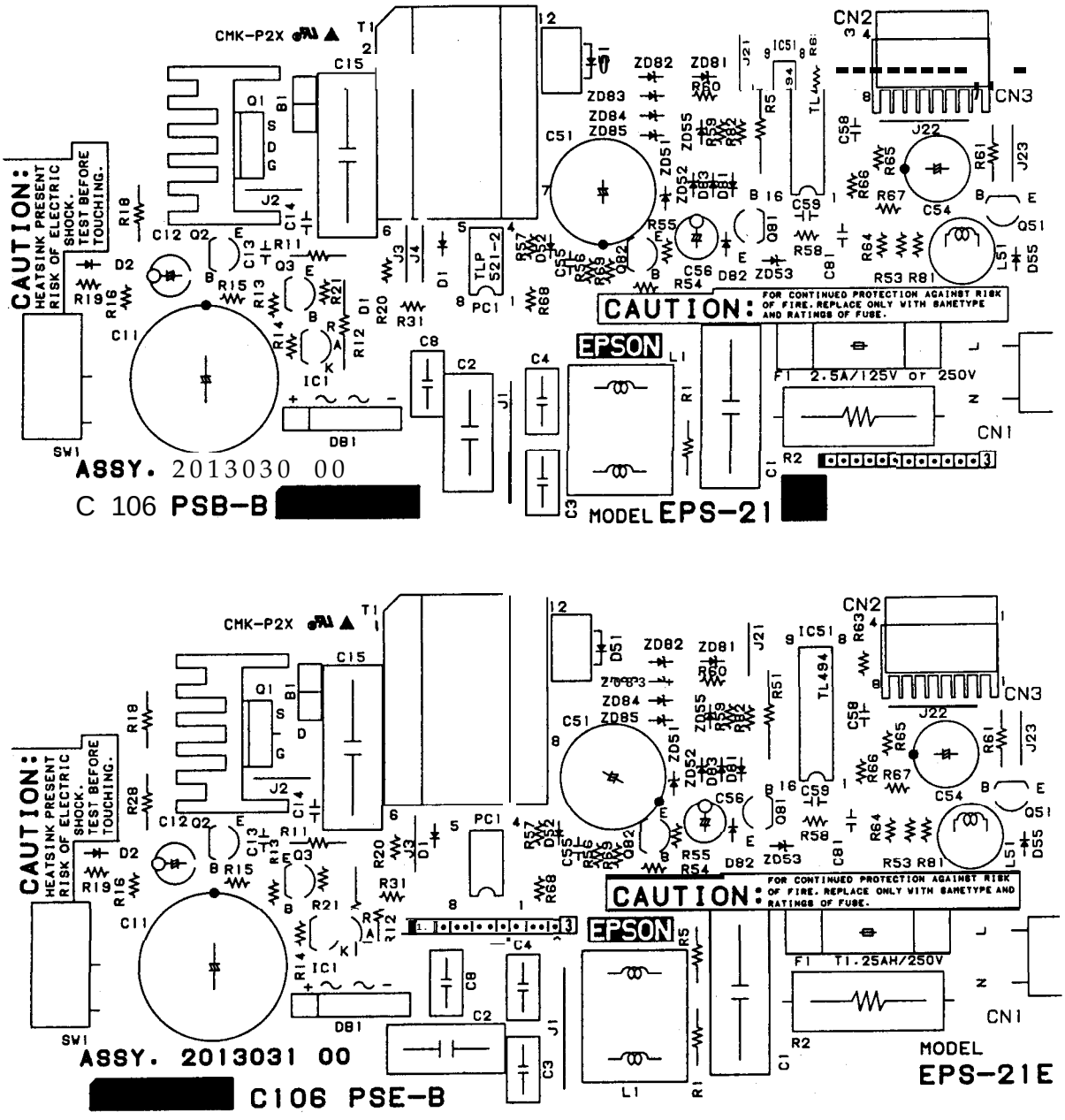


Figure A-7. CI06 PSB-B/PSE-B Board Component Layout

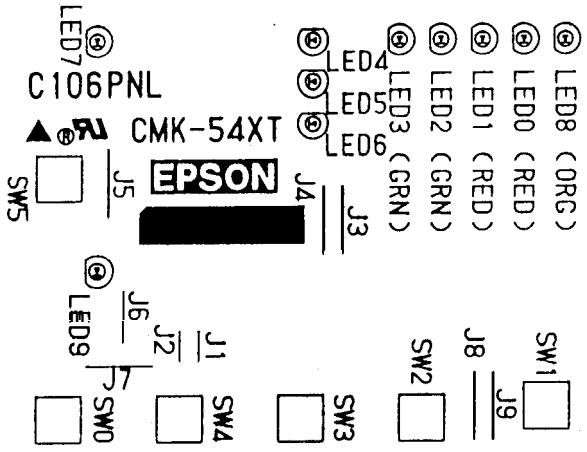


Figure A-8. C106 PNL Board Component Layout

A.4 EXPLODED DIAGRAM

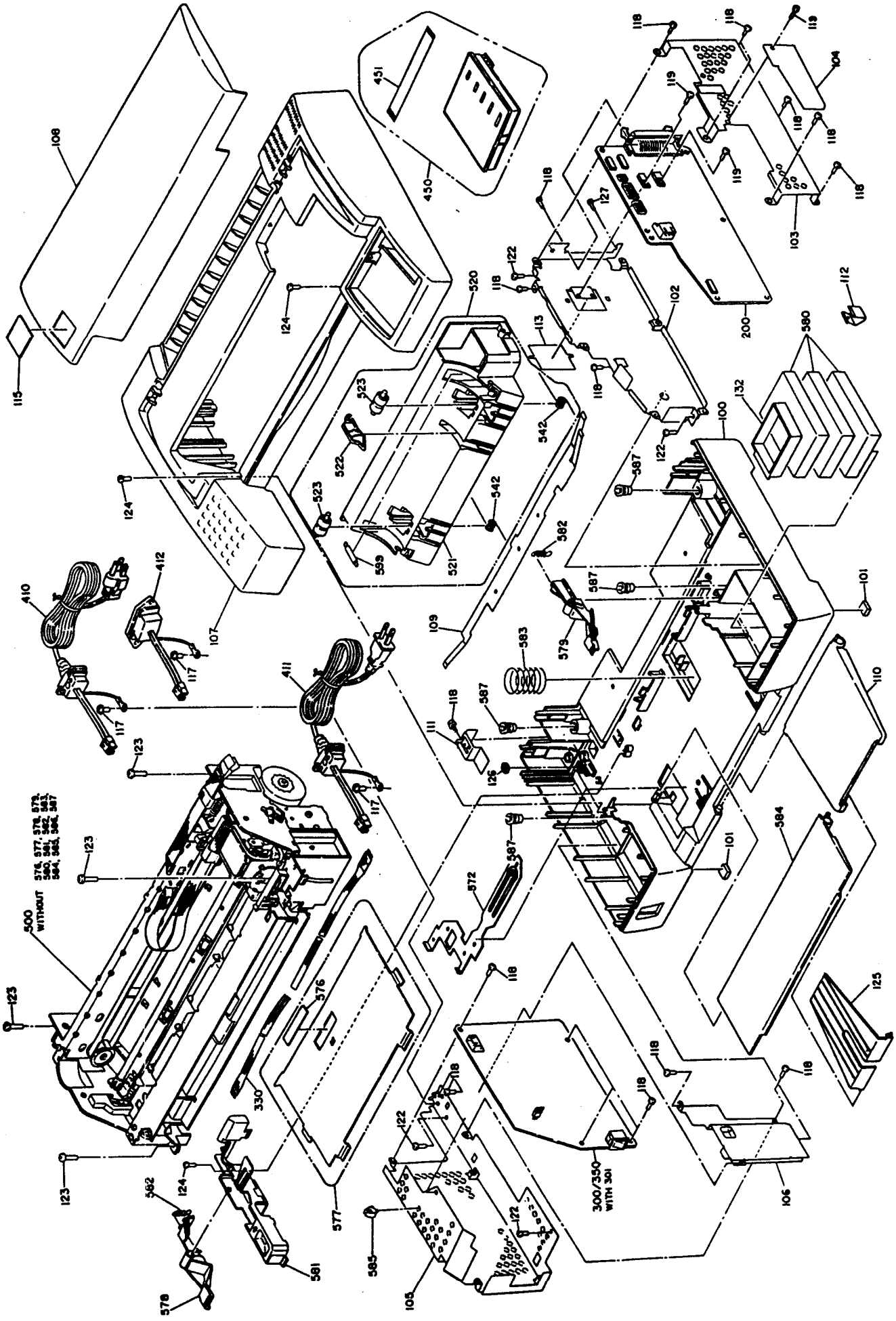


Figure A-9. Stylus 800+ Exploded Diagram (1)

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