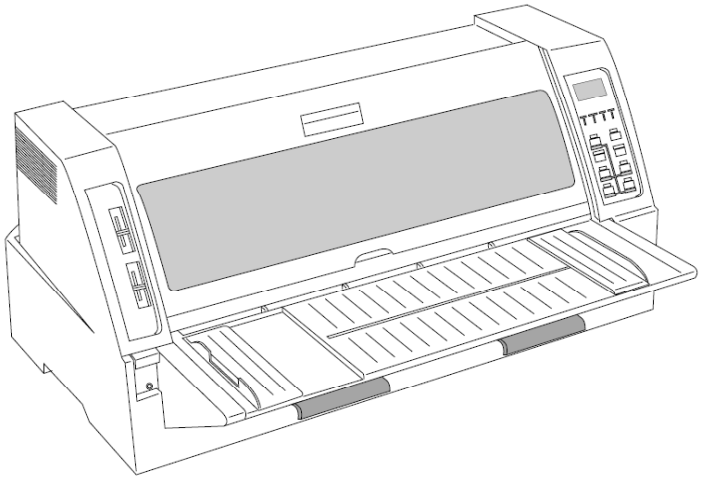
AMT Datasouth

Accel-7350
Dot Matrix Printer

Service Manual



Document #130034

This Manual is to help qualified service engineers repair or adjust your AMT ACCEL-7350 Printer.

Please read the manual carefully before repairing and adjusting your AMT ACCEL-7350 Printer.

The warranty will not cover any trouble with or damage to the printer resulting from repair or modification by unqualified persons.

> WARNING: Be sure to turn off the printer and disconnect the power cord from the AC outlet before removing the top enclosure. Failure to disconnect the power could result in an electric shock

1. No part of this manual may be reproduced in any form.
2. This manual is subject to change without notice.
3. This manual was prepared with the greatest care. If you should find any unclear points, mistakes, or omissions, please contact us.
4. We will not bear any responsibility for unsatisfactory results from the use this printer despite item 3 above.

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1. GENERAL PRINTER SPECIFICATION

1.1. Description

- 24 pin Serial Dot Matrix Printer
- Flat bed, Wide Carriage
- Beige Color

1.2. Dimensions:

- At Operation - (W) 25” [635 mm] x (D) 18.3” [465 mm] x (H) 11.6” [294mm]
- At Storage (without paper tractor and paper support) –
  (W) 25” [635 mm] x (D) 13.2” [335 mm] x (H) 11.6” [294mm]

1.3. Weight:

- Approx. 52 lbs (23.5 kg) with Tractor Unit

2. PRINTING PARAMETERS

2.1. Printing Method

- Serial impact dot matrix method

2.2. Print Head

- 24 pins
- Pin Diameter: .010” (0.25 mm)
- Head life: 300 million stroke/pin

2.3. Print Direction

- Bi-directional logic seeking

2.4. Print Speed (pitch, dot structures)

o High Speed Draft	400 cps	(10 cpi, 24 x 9)
o Draft	300 cps	(10 cpi, 24 x 12)
o LQ	150 cps	(10 cpi, 24 x 36)

2.5. Number Of Copy & Print Speed

o Normal Mode	Original + 5	
	Draft	10 cpi, 300 cps
	LQ	10 cpi, 150 cps
o High Impact	Original + 7	
	Draft	10 cpi, 200 cps (1 pass printing)
	LQ	10 cpi, 100 cps (1 pass printing)

2.6. Print Width

- 136 columns (10 cpi)

2.7. Line Feed Speed

- 6 inch/seconds (with continuous line feed)

2.8. Throughput

- ISO/IEC 10561, Letter-Performance
- High Speed draft 340 pph
- DRAFT 290 pph
- LQ 200 pph

2.9. Ribbon

- Type - Cassette with endless fabric ribbon
- Ribbon Life -15 million characters in draft mode
- Color - Real Black

2.10. Paper Handling

- Fanfold Paper, Front Push
  Insertion: Front
  Ejection: Rear
  Paper Width: 8 ~15” (203.2 mm–381 mm)
- Fanfold paper, Rear Push
  Insertion: Rear
  Ejection: Front
  Paper Width: 8 ~15” (203.2 mm–381 mm)
- Cut Sheet, Manual
  Insertion: Rear
  Ejection: Front
  Paper Width: 7.2~16.5” (182 mm–420 mm)
  Paper Length: 7.2~16.5” (182 mm–420 mm)
  Capacity of Hopper: 100 sheets
- Change of Paper Path:
  Lever/electrical control, and software command
- Adjustment of paper thickness:
  Lever/electrical control, software command, and Auto adjustment
- Skew detection:
  Yes (Only for Manual Insertion)
- Paper Jam Detection:
  Yes (Only for Front/Rear Tractor feeding)

3. MEDIA PARAMETERS

3.1. Media Type

- Fanfold (Single-Part)
  Paper Width: 8 ~15” (203.2 mm–381 mm)
  Paper Thickness: .003~.005” (0.08 mm–0.12 mm)
  Paper Weight: 16~24 lbs
  Paper Type: Plain Paper
  Unprintable Area: Top: .012” (3 mm)
  Bottom: .012” (3 mm)
  Before Perforation: .012” (3 mm)
  After Perforation: .012” (3 mm)

- Fanfold (Multi-parts)

  Paper Width: 8 ~15” (203.2 mm–381 mm)
  Paper Thickness: .005~.02” (0.12 mm–0.52 mm)
  Number of Copies: Original + 7 max
  Unprintable Area: Top: .012” (3 mm)
  Bottom: .012” (3 mm)
  Before Perforation: .012” (3 mm)
  After Perforation: .012” (3 mm)

- Fanfold (Label)

  Paper Width: 8 ~15” (203.2 mm–381 mm)
  Paper Thickness: .003~.007” (0.08 mm–0.18 mm)
  Paper Weight: 16~36 lbs
  Step between label and base sheet: Less than 0.12 mm
  Unprintable Area: Top: .012” (3 mm)
  Bottom: .012” (3 mm)
  Before Perforation: .012” (3 mm)
  After Perforation: .012” (3 mm)

- Cut Sheet (Single-part) with Manual Insertion

  Paper Width: 7.2~16.9” (182 mm–430 mm)
  Paper Length: 7.2~16.9” (182 mm–430 mm)
  Paper Thickness: .003~.005” (0.08 mm–0.12 mm)
  Paper Weight: 16~24 lbs
  Paper Type: Plain Paper, Fine PPC
  Unprintable Area: Top: .012” (3 mm)
  Bottom: .012” (3 mm)
  Right: .012” (3 mm)
  Left: .012” (3 mm)

- Cut Sheet (Multi-part) with Manual Insertion

  Paper Width: 7.2~16.9” (182 mm–430 mm)
  Paper Length: 7.2~16.9” (182 mm–430 mm)
  Paper Thickness: .005~.02” (0.12 mm–0.52 mm)
  Number of Copies: Original + 7 max
  Paper Weight: 16 lbs x (1+ 7P)
  Unprintable Area: Top: .012” (3 mm)
  Bottom: .012” (3 mm)
  Right: .012” (3 mm)
  Left: .012” (3 mm)

- Card with Manual Insertion

  Paper Width: 7.2~16.9” (182 mm–430 mm)
  Paper Length: 7.2~16.9” (182 mm–430 mm)
  Paper Thickness: .003~.079” (0.08 mm–2.0 mm)
  Paper Weight: 16~47 lbs
  Paper Type: Plain Paper
  Unprintable Area: Top: .012” (3 mm)
  Bottom: .012” (3 mm)
  Right: .012” (3 mm)
  Left: .012” (3 mm)

- Cut Sheet (Single-part) with ASF

  Paper Width: 7.2~16.9” (182 mm–430 mm)
  Paper Length: 7.2~16.9” (182 mm–430 mm)
  Paper Thickness: .003~.004” (0.08 mm–.11 mm)
  Paper Weight: 16~20 lbs
  Paper Type: Plain Paper, Fine PPC
  Unprintable Area: Top: .012” (3 mm)
  Bottom: .012” (3 mm)
  Right: .012” (3 mm)
  Left: .012” (3 mm)

4. PRINT EMULATION & CHARACTER

4.1. Emulations

Epson Mode	Epson LQ-2550	ADP
IBM Mode	IBM 2391	OEM1
OKI	OKI DATA 8480	OEM2

4.2. Font Typeface

ANK	High-Speed Draft, Draft, Roman, Sans Serif, Courier, Prestige, Script, Gothic, OCR-A, OCR-B, Orator and Orator-S

4.3. Character Set

EPSON mode ANK	EPSON character set, code page 437, 850, 860, 863, 865, 857, 858, ISO-8859-1
IBM mode ANK	code page 437, 850, 860, 863, 865, 857, 858, ISO-8859-1

4.4. Character Pitch

ANK	10, 12, 15, 17.1, 20 and 24 cpi Proportional

4.5. Download Character

EPSON mode ANK	128 characters
IBM mode ANK	32 k bytes

4.6. Barcode Symbology

Industrial 2 of 5	Interleaved 2 of 5
Matrix 2 of 5	Codabar
Code 11	Code 39
Code 93	Code 128
EAN-8	EAN-13
UPC-A	UPC-E
Postnet	Element (created in elements)

4.7. Graphics Resolutions

360 x 180 dpi (HXV), Horizontal adjacent dots cannot be printed

4.8. Printer Drivers

Windows 95/98/Me, NT 4.0, 2000/XP, Vista

5. CONTROL SWITCHES & INDICATORS

5.1. Power

Power switch	located left front side
LCD	122 (W) x 32 (H) dots bitmap display
LED	4 (ONLINE, SPEED, ERROR, HIGH IMPACT)
Key	8 (ONLINE, TEAR OFF, SPEED & RESET, EJECT/LOAD, HIGH IMPACT & MENU, LF & MICRO LF, ENTER & ALT, RLF & MICRO RLF)

5.2. Paper Path Lever Adjustment

Control Panel	located left front side

5.3. Paper Thickness Lever Adjustment

Control Panel	located left front side

6. INTERFACE

6.1. Parallel

Centronics Parallel
(Reverse: IEEE-1284 nibble mode)
(Forward: IEEE-1284 compatibility mode)

6.2. Serial

EIA-232 Standard

6.3. Buffer

64 K bytes

7. DETECTION & PROTECTION FUNCTION

7.1. Type

Paper Detection
Paper Jam Detection
Paper Skew Error Detection
Head Overheat Protection
Cover Open Detection

8. ACOUSTIC NOISE

8.1. Specification

Less than 58 dB(A) (LQ printing, fanfold, ISO 7779)

9. RELIABILITY & SAFETY

9.1. Print Head Life

300 million stroke / pin

9.2. Total Print Volume

12 million lines

9.3. Safety Standards

Equivalent to the following Standards
U.S.A. version UL60950, CSA 22.2 No.60950
Europe version: CE marking EN60950

9.4. EMI

Equivalent to the following Standards
U.S.A. version FCC class B
Europe version:CE marking
EN55022 class B
EN61000-3-2
EN61000-3-3

9.5. Immunity

Equivalent to the following Standards
EN55024 (CE marking)

9.6. MTBF

10000 hours

9.7. MTTR

30 minutes

10. POWER

10.1. Power Supply

AC 220V -10%, AC 240V +10%, Frequency 50 Hz/60Hz
AC 100V -10%, AC 120V +10%, Frequency 50 Hz/60Hz

10.2. Power Consumption

LQ Self Printing: 140W
Draft Self Printing: 170W
Stand-by: 40W
Energy Star mode: 15W

11. OTHER

11.1. Temperature

At Operation	41~104^{o} Fahrenheit (5~40^{o} Celsius)
At Storage	-22~149^{o} Fahrenheit (-30~65^{o} Celsius)

11.2. Humidity

At Operation	20% RH–80% RH (No condensing)
At Storage	10% RH–90% RH (No condensing)

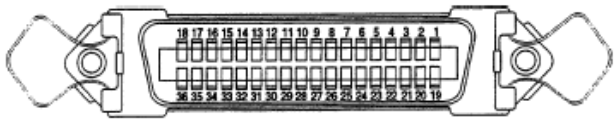
11.3. Dimensions

At Operation	(W) 25”(635 mm) x (D)18.3”(465 mm) x (H) 11.6” (294mm)
At Storage	(W) 25”(635 mm) x (D)13.2”(335 mm) x (H) 11.6” (294mm)

11.4. Weight

At Operation	Approx. 52 lbs (23.5 kg) with Tractor Unit

Parallel Interface Specifications



Cable Side Connector	DDK 36-pin 57-30360-D8 or equivalent
Printer Side Connector	ELCO 36-pin 00834-6360020858 or equivalent
Cable type	Twisted paired cable with ground line and maximum of 10 feet.

PIN	SIGNAL	IN/OUT	PIN	SIGNAL	IN / OUT
1	STROBE*	IN	19	GND	
2	DATA 1	IN	20	GND	
3	DATA 2	IN	21	GND	
4	DATA 3	IN	22	GND	
5	DATA 4	IN	23	GND	
6	DATA 5	IN	24	GND	
7	DATA 6	IN	25	GND	
8	DATA 7	IN	26	GND	
9	DATA 8	IN	27	GND	
10	ACK*	OUT	28	GND	
11	BUSY	OUT	29	GND	
12	PE	OUT	30	HIGH	OUT
13	SELECT	OUT	31	INITIAL*	IN
14	AUTOFEED *	IN	32	ERROR*	OUT
15	HIGH	OUT	33	HIGH	OUT
16	LOW	OUT	34	NC	
17	CHASSIS GND		35	HIGH	OUT
18	HIGH	OUT	36	SELECT IN *	IN

Notes:
(1) * is a negative logic.
(2) HIGH is pulled up to +5V by 2.2k ohms.
(3) NC stands for no connection.
(4) CHASSIS GND and GND are connected in the printer.
(5) LOW is pulled down to GND by 2.2k ohms.

Printer Input Signals

DATA1-DATA8 8bit data signals with DATA 1 being the Least Significant Bit (LSB), and DATA 8 being the Most Significant (MSB).

STROBE* A strobe signal for reading 8-bit data. When this signal goes "low", data is read. The data is latched on the falling edge of STROBE*.
The next STROBE* pulse shall not occur until the trailing edge of the BUSY signal from the previous data.

INITIAL* A signal for initializing the printer (similar to turning power on). The signal goes "low" to reset the printer, then when the signal returns "high" the printer will initialize.

AUTO FEED* This signal is ignored.

SELECT IN* This signal is ignored.

Printer Output Signals

BUSY A signal indicating that printer is busy. When this signal goes "high", the printer does not accept data from the host. The printer causes the BUSY signal to go "high" in the following cases.
(1) When the initializing operation is being executed;
(2) When data is input with the STROBE* signal;
(3) When the self test print is executed;
(4) When the printer is in the offline state;
(5) When the printer cover is opened;
(6) When a paper out condition or other error takes place.

ACK* A signal, which is output in synchronization with the transition of BUSY from "high" to "low". ACK* indicates the printer is ready to accept the next data byte. In the cases (4), (5), and (6) above, the ACK* signal is not output.

PE When paper is not loaded, this signal goes "high". When paper is loaded, this signal goes "low".

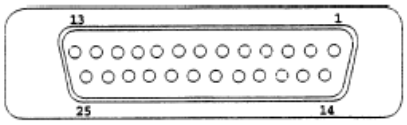
ERROR* This signal goes "low" in the following cases;
(1) when the paper out or the paper error takes place;
(2) when one of the function errors takes place;
(3) when the printer cover is opened; or
(4) when the printer is in the offline state
However, this signal stays "high" in the IBM mode when the offline state is entered from the control panel.

SELECT This signal is always HIGH.

Printer Output Signal Levels

All the signals used in the printer are in the TTL levels.
"HIGH" level: +2.4 to 5.0 [V], "LOW" level: 0 to 0.4[V]
Measured at input terminals of the printer.

Serial Interface Specifications



Cable Side Connector 25-pin (male type)
Printer Side Connector 25-pin (D-sub connector (female type)

PIN	SIGNAL	IN/OUT	PIN	SIGNAL	IN / OUT
1	CHASSIS GND		14	NC	
2	TXD	OUT	15	NC	
3	RXD	IN	16	NC	
4	RTS	OUT	17	NC	
5	CTS	IN	18	NC	
6	NC		19	NC	
7	SIGNAL GND		20	DTR	OUT
8	NC		21	NC	
9	NC		22	NC	
10	NC		23	NC	
11	NC		24	NC	
12	NC		25	NC	
13	NC				

Notes:(1) NC stands for no connection.
(2) CHASSIS GND and GND are connected in the printer.

Printer Input Signals

RXD Receive Data
A serial data line that consists of a start bit, data bits, (party bit), and stop bit. The configuration of the data length (7 or 8 bits), parity and stop bit are set in the setup mode from the control panel. RXD signal level is determined as "0" when "high" and as "1" when "low".

CTS Clear To Send
This signal is ignored.

Printer Output Signals

TXD Transmit Data
A Serial output data line that sends XON, XOFF, ACK, and ID sequence. This signal is sent regardless of whether CTS and DSR is "high" or "low". The format of the data is the same as the received data.
TXD signal level is determined as "0" when "high" and as "1" when "low".

RTS Request To Send
Always held in the ON ("space" or "high") state.

DTR Data Terminal Ready
This signal represents the busy state of the printer. When signal is "low", it indicates that the printer is busy and therefore data cannot be sent to the printer.
When this signal is "high", it indicates that the printer is ready and thereby data can be sent to the printer. In the case of the XON/XOFF protocol, this signal is always "high".

Signal Signals

'HIGH" (ON, SPACE = Logic "0"):	+3 through +15V
"LOW" (OFF, MARK = Logic "1") :	-3 through -15V

Handshake Protocol

DTR (READY/BUSY) Protocol

A protocol that indicates the printer state with the signal line DTR (terminal No.20). When the printer is in the ready state, the signal line is high (+12V). When the printer is in the busy state or in the offline state, the signal line is low (-12V). When the printer is in the busy state and in the offline state, the host must not send data to the printer. However, the printer will accept data from the host when busy is indicated until the buffer is filled.

Power ON state After the power is turned on and the initialization of the printer is completed, DTR is set "high".

XON/XOFF Protocol

A protocol whereby the printer sends to the host XON (11h) and XOFF (13h) codes to indicate the printer the printer's state.

The XOFF (13h) code is sent to the host to indicate not ready. In either the busy or offline state, CTS is held "low".

When the power is turned on, the XON code is sent to the host.

In the following cases, the XOFF code is sent to the host.

(1) When the printer state changes from ready to busy.
(2) When the printer state changes from ready to offline.
(3) When printer receives 64 bytes to data after condition (1) or (2) occurs. (However, when the remaining capacity of the buffer is smaller than 64 bytes, the XOFF is not sent to the host).
(4) When the buffer is full regardless of the online state or the offline state.

In the following cases, the XON code is sent to the host.

(1) When the printer state changes from busy to ready.
(2) When the printer state changes from offline to online.
(3) After the power is turned on, when the printer enters the online state.

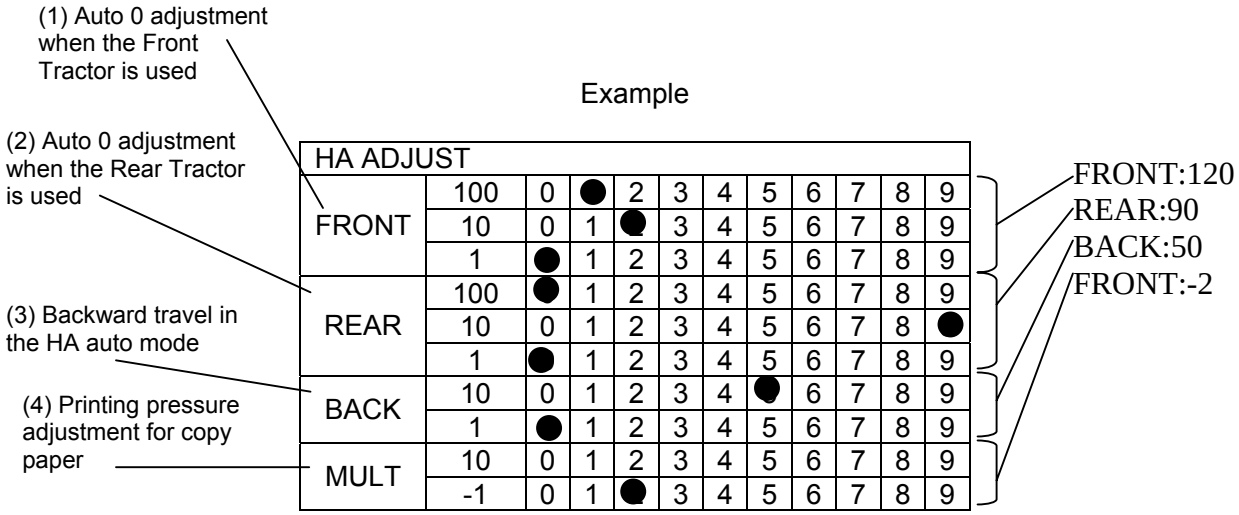
Baud Rate

In the setup mode, one of the following baud rates can be selected: 300, 600, 1200, 2400, 4800, 9600, and 19200.

Serial Data Structure: data frame consists of, start bit (1) + data bits (7 or 8) + parity bit (0 or 1) + stop bit (1 or 2).

Print Head (HA) Adjust Label

The numbers shown in the table on the HEAD ADJUST label represent the settings made prior to shipment. These settings will be erased from the EEPROM by initialization routine 3. After initialization routine 3 is performed, restore the settings shown on the label (settings made prior to shipment). The following example shows how to read the table.



Note: If a minus sign is shown in the first-digit line of “MULT,” the setting is a negative number.

(1) FRONT (Front Tractor HA ADJUST)
This setting is used for head position adjustment when the Front Tractor is used (Auto 0).

(2) REAR (Rear Tractor HA ADJUST)
This setting is used for head position adjustment when the Rear Tractor is used (Auto 0).

(3) BACK (BACK PULSE: Basic backward travel in the HA auto mode)
This is the BACK PULSE setting. It sets the distance by which the head travels backward in the auto gap mode. It is set to 50 prior to shipment.

Procedure:

While holding down [ONLINE], turn on the power to the printer.
Press [ALT] then [MENU] to enter menu
Select HA Adjust using [←] and [→].
Press [↓] or [↑] until the desired number is displayed, then press [ENTER].
Press [HIGH IMPACT] to save the setting.

(4) MULT (HA MULTIPART ADJUST)

The HA MULTIPART ADJUST sets the print density for copy paper. The HA MULTIPART ADJUST setting adjustment is enabled only in the HA auto mode. The HA MULTIPART ADJUST setting is adjustable between -5 and +10. As the setting decreases, the print darkness increases.

Procedure:

While holding down [ONLINE], turn on the power to the printer.
Press [ALT] then [MENU] to enter menu
Select HA MULTIPART ADJUST using [←] and [→].
Press [↓] or [↑] until the desired number is displayed, then press [ENTER].

Press [HIGH IMPACT] to save the settings.

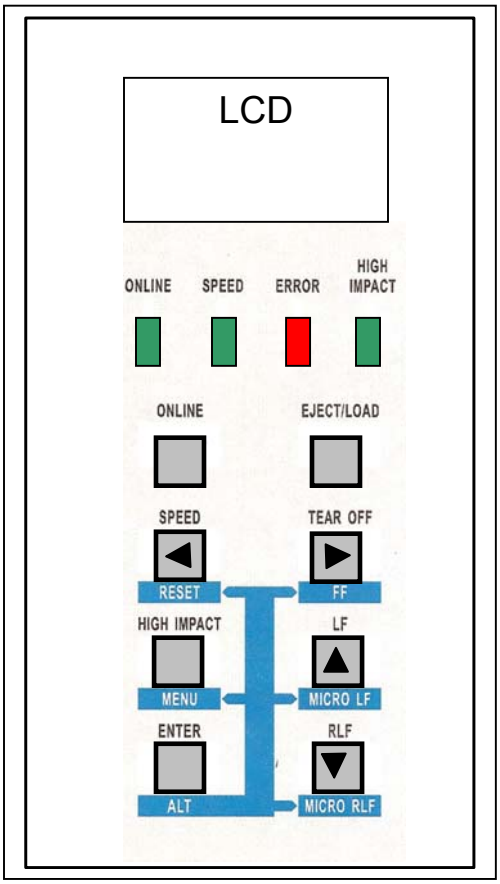
Printer Features

(Refer to USER'S MANUAL for details)

Setup options

The setup options configure the printer to work with the current operating environment.

- To enter the setup mode, depress the ALT and MENU keys simultaneously.



Hexadecimal Dump Function

The hexadecimal dump function produces an exact printout of the codes received by the printer.

- To enter the hexadecimal dump mode, depress the SPEED key while turning on the printer's power. Continue pressing key until the display reads “Hex Dump”.
  Draft mode Hexadecimal Dump: **Power ON** + **SPEED** key
  LQ mode Hexadecimal Dump: **Power ON** + **SPEED** key + **ONLINE** key
- When the host sends output to the printer, all codes and data are printed in hexadecimal format. The example below shows a BASIC program list and the resulting printout.

Program list:
```
10 LPRINT "STANDARD"; CHR$(10);
20 LPRINT CHR$(27);"E";
30 LPRINT "EMPHASIZED"; CHR$(10);
40 LPRINT CHR$(27);"F";
```

Printed sample: (Standard printout)
STANDARD
EMPHASIZED

Hexadecimal Dump mode:
```
00000 53 54 41 4E 44 41 52 44  0A 1B 45 45 4D 50 48 41  STANDARD.ESCEEMPHA
00010 53 49 5A 45 44 0A 1B 46                           SIZED.ESCF
```

- By comparing the characters printed in the right column with the hex codes, you can verify exactly what codes are being sent to the printer. If the code sent is a printable character (20h-7Eh), that character is printed in the right column. If the code sent is a non-printable character, such as a control code, a dot is printed.
- To exit from the hexadecimal dump mode, turn off the power switch or press the **ALT** then **RESET** keys.

Self-Test Function

The self-test prints a continuous pattern of characters, either in draft or LQ. The font is determined by the setup setting.

- Select paper path and load paper.
- To initiate the draft self test, depress the LF key while either turning on the power. Continue pressing the LF key until the print test begins.
- To initiate the LQ self test, depress both the **LF** and **ONLINE** keys while either turning on the power.
- To terminate or stop the self test function, either turn off the power or press the ONLINE key.

Safety Auto Stop Functions

- Cover Open Sensor
  When the front cover is open:
  The printer stops printing (C motor is disabled, but front operation keys -**LF**, **RLF**, **MICRO LF**, **MICRO RLF** - are operable).
  "FRONT COVER OPEN" is displayed on LCD.
  The ONLINE lamp blinks.

- Overheat Sensor (in the print head)
  When high temperature is detected in the print head, the printer automatically takes the following actions:
  Temperature > 115°C (Voltage at the test point TP 11 > 3.98 V)
  Stop printing, and then moves the carrier in full printing width.
  Temperature > 110°C (Voltage at the test point TP 11 > 3.85 V)
  Reverse logic seek.

Head Gap Adjustment

This printer has a mechanism to automatically adjust the head gap after measuring the paper thickness. As there is variance from printer to printer, the head gap of each printer is adjusted to the optimum setting at the factory prior to shipment.

Operating Procedure

(1) Select the rear tractor paper path and feed a 15-inch wide sheet of paper.

(2) While simultaneously holding down the [LF] and [RLF] keys, turn on the printer. The printer will enter the head gap adjustment mode.

(3) The LCD will have the display shown below. Select Front or Rear using the [←] key (SPEED) or the [→] key (TEAR OFF).
The front head gap adjustment setting is used for front tractor feed and manual feed.
The rear head gap adjustment setting is used for rear tractor feed and cut-sheet feed (CSF).

(4) Press the [↑] key (LF) to display the numeric gap setting. Press the [↓] key (RLF) to select the current setting. NOTE: the current setting is indicated with an asterisk (*****).

HA GAP **ADJ FRONT**	**HA GAP** **ADJ REAR**

(5) Press the [↓] key (RLF), and the printer will print out the gap adjustment pattern.
The figures to the left of the gap adjustment pattern represent the [gap settings].
The figures on the right represent the [number of pulses from home (top)].
After the printing is complete, the LCD displays the current gap adjustment setting, as shown below.

160*****

(6) Based on the gap adjustment pattern printout, select the gap adjustment settings that will provide the optimum print density. Designate the selected gap adjustment setting on the LCD using the [↓] and [↑] keys. Press the [ENTER] key and the printer will adjust the head gap using the selected settings and print out the confirmation pattern.

(7) After you have adjusted the front and rear head gaps, press the [HIGH IMPACT] key.
The front and rear [gap adjustment settings] and the [number of pulses from home] will be stored in the EEPROM, and the printer will initialize itself automatically.

Print Position Adjustment

This printer has two print position adjustment modes, “print start position adjustment mode (Mode A)” and “bidirectional print position adjustment mode (Mode B),” in order to minimize the effects of variance between individual printers and age-related deterioration. These modes enable fine adjustment of the print position in accordance with its carrier speed.

The print start position adjustment mode (hereinafter referred to as Mode A) is used to align the print start positions of the print modes with different print speeds. This mode sets the print start position constant for any print speed.
The bi-directional print position adjustment mode (hereinafter referred to as Mode B) aligns the characters in lines printed at the same speed in different directions. This mode sets the optimum value for each speed.

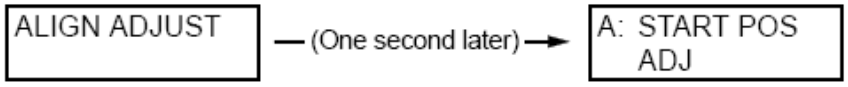
A change in Mode A affects Mode B. If the Mode A setting has been edited, the Mode B setting will also require adjustment. The printer, therefore, automatically moves to Mode B after it enters and exits Mode A. When the Mode A setting has not been edited, you can adjust the print position in Mode B only.

Operating Procedure

(1) Select the rear tractor paper path and feed a 15-inch wide sheet of paper.

(2) While simultaneously holding down the [ENTER] and [RLF] keys, turn on the power. The printer will enter the print position adjustment mode.

(3) This screen will change to the Mode A menu in one second.

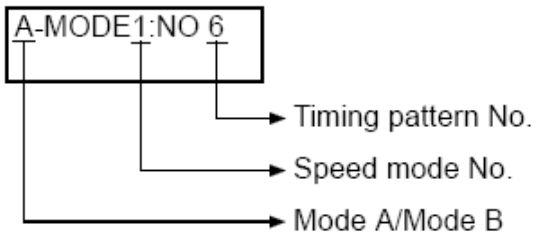


(4) Select Mode A or B using the [←] and [→] keys. The following steps are common in Modes A and B.

(5) Press the [ENTER] key to start printing the timing pattern of Mode A (or B). The currently selected timing number is marked with the “*****” character.

The timing pattern printout shows six speed modes from Mode 1 to Mode 6 in Mode A and seven Speed modes from Mode 0 to Mode 6 in Mode B, and 13 timing numbers will be printed for each Speed mode.

The LCD display is as shown below.



(6) While referring to the pattern printout, select the speed mode to adjust using the [←] and [→] keys to best align the top and bottom “H” pattern.

(7) Select a timing pattern number in the speed mode number above using the [↑] and [↓] keys.

(8) After you have selected a speed mode number and a timing pattern number, press the [ENTER] key. When this key is pressed, the printer simultaneously stores the selected timing temporarily and starts printing according to that timing.

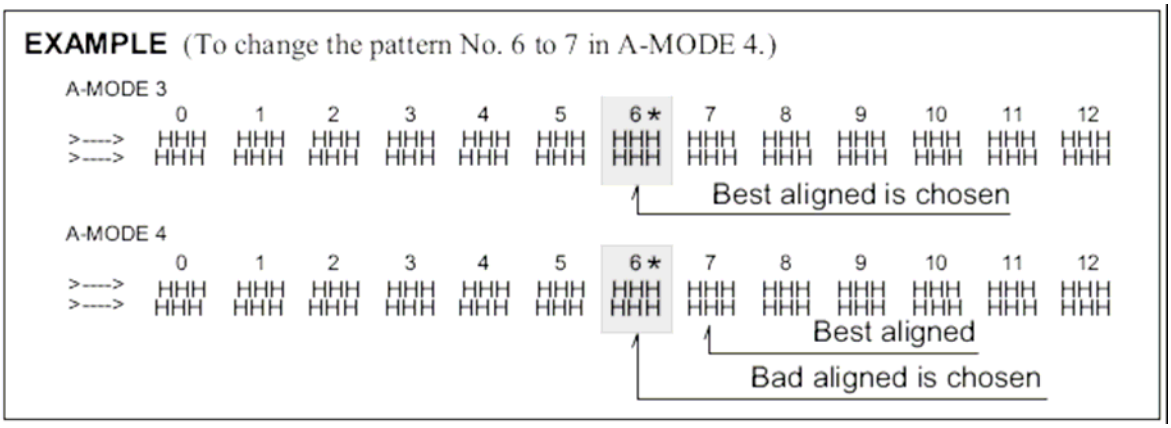
(9) Edit the speed mode settings by repeating steps (6) to (8) above.

(10) Press the [HIGH IMPACT] key to exit the print position adjustment mode. Be sure to use this key to exit the mode. When this key is pressed, the temporarily stored timing is written to the EEPROM.

(11) When the print position adjustment mode is completed using the [HIGH IMPACT] key, the printer will take one of the following actions depending on the modes.

a. When Mode A is completed, Mode B menu will appear on the LCD. When the [ENTER] key is pressed after the Mode B menu appears on the LCD, the printer will start printing the Mode B pattern. Follow the steps from (6) above.

b. When Mode B is completed, the printer will automatically initialize.



Paper Feed Position Adjustment

This printer detects the edge of the loaded paper with the edge sensor (reflection type) on the ribbon guide of the print head and feeds the paper to the TOF position. If the feed position of a printer is judged to be out of position by more than the specified distance, due to variance between individual printers, it is adjusted before shipment.

Operating Procedure

(1) While simultaneously holding down the [TEAR OFF] and [EJECT/LOAD] keys, turn on the power.
The printer will enter the paper feed position adjustment mode.

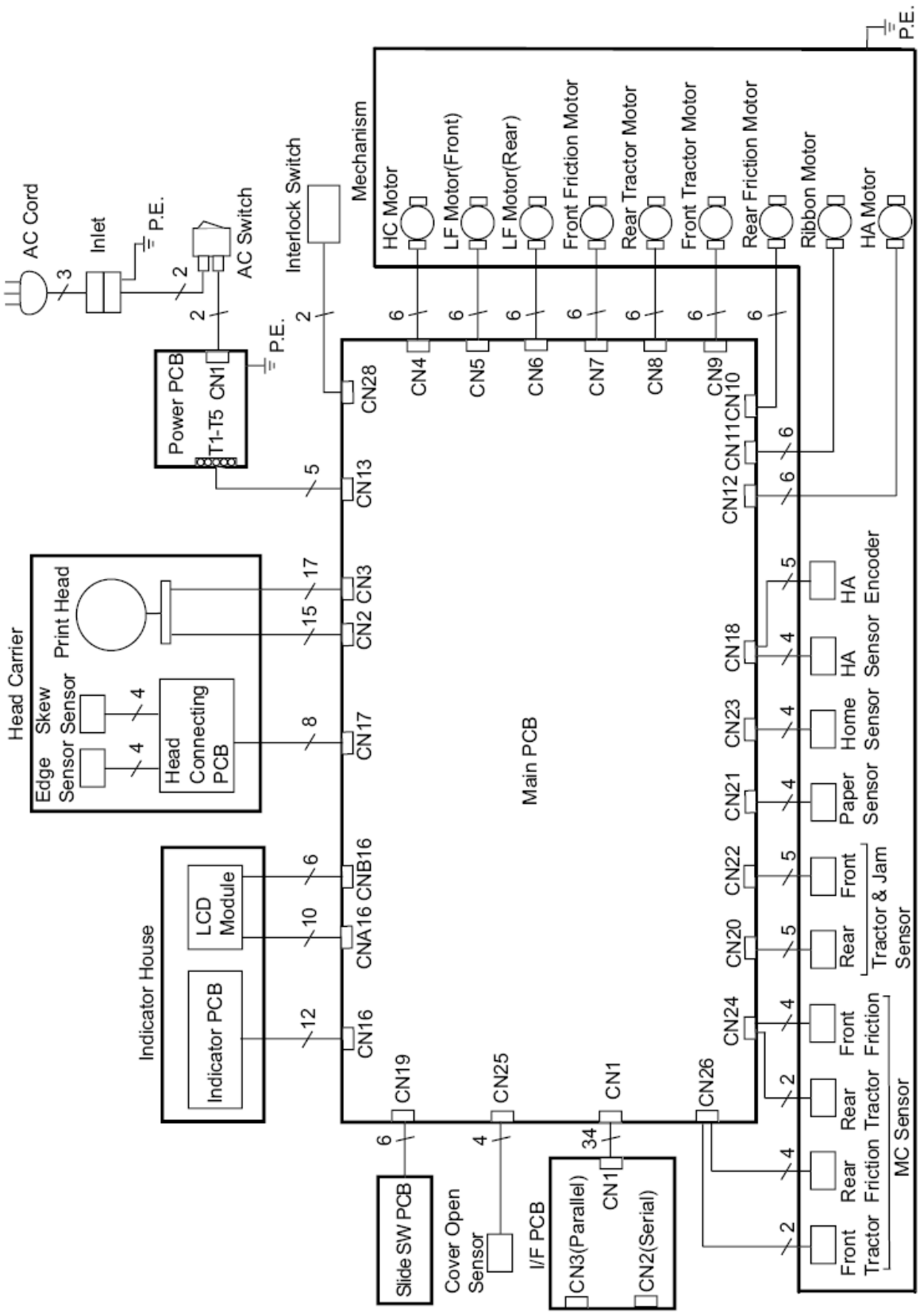
(2) The LCD will have the display shown below. Select Front or Rear using the [←] key (SPEED) or the [→] key (TEAR OFF).
The front adjustment setting is used for front tractor feed and manual feed.
The rear adjustment setting is used for rear tractor feed and cut-sheet feed (ASF).

(3) Press the [↑] key (LF), and the printer will enter the adjustment setting selection mode.
The current setting will appear on the LCD as shown below.

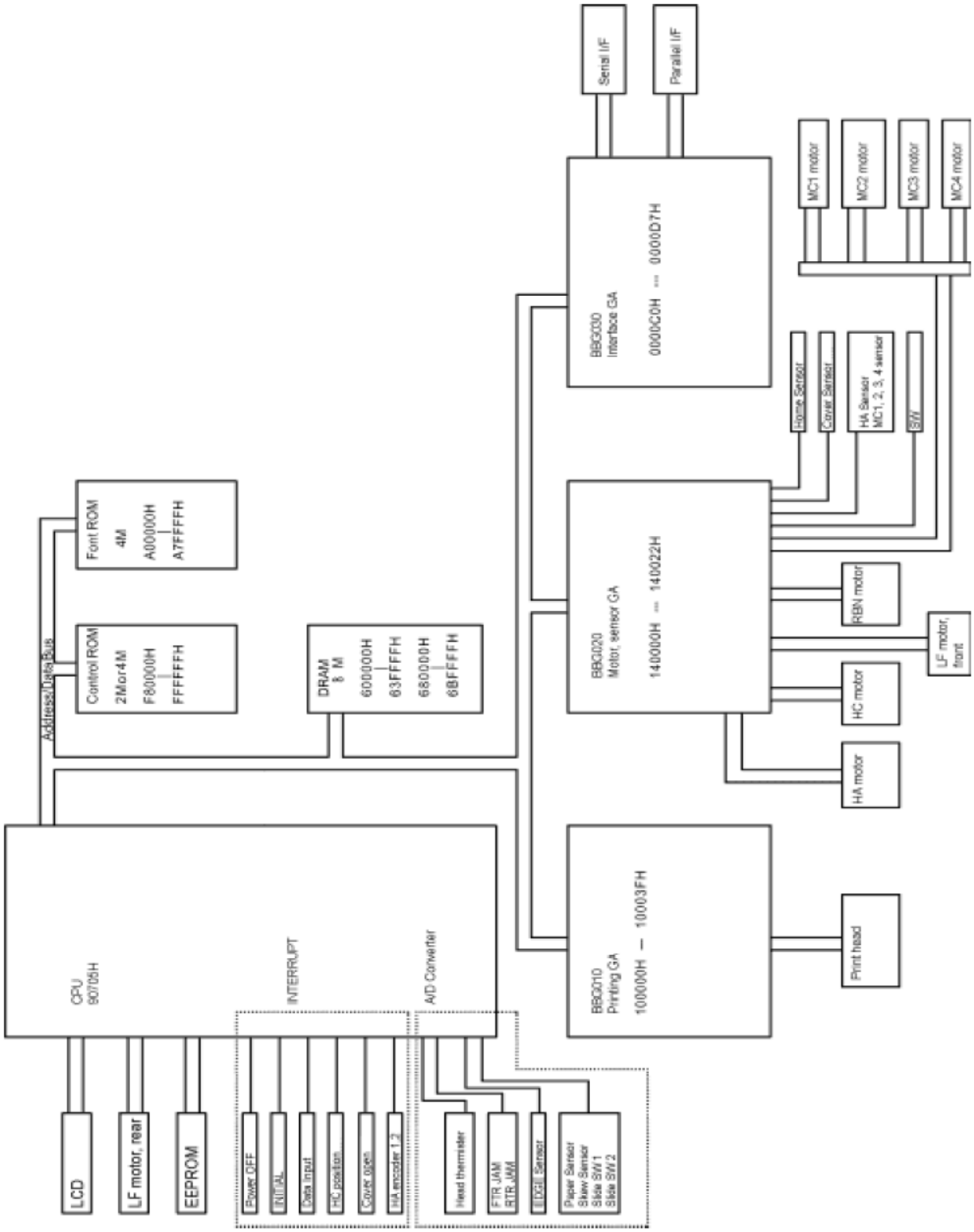
(4) Edit the adjustment setting using the [↑] and [↓] keys and then press the [ENTER] key.

(5) After the adjustment has been completed, press the [HIGH IMPACT] key.
The front and rear paper feed position settings will be stored in the EEPROM, and the printer will automatically initialize.

Wiring Diagram



Control Diagram



Troubleshooting

Control ROM and PCB Replacement

When an EEPROM error or sensor problem arises, if there is no mechanical problem and if the control ROM on the PCB is not the latest version, then replace the control ROM with the latest version.

After you have replaced the control ROM, perform EEPROM initialization routines 1 and 2. After the initialization routines, conduct a self-test to check print quality. If the problem is not solved by the replacement of the control ROM, replace the control PCB and perform EEPROM initialization routine 3.

Initialization of EEPROM

(1) Initialization Routine 1
Initializes the entire panel data settings stored in the EEPROM. To start the routine, simultaneously hold down the [HIGH IMPACT] and [LF] keys and turn on the power.

(2) Initialization Routine 2
Learns the following sensor information and stores it in the EEPROM:
- Thresholds of the right/left edge sensors
- Threshold of the manual feed paper sensor
- Reference pulse for skew detection

When performing this routine, be sure to remove paper from the printing station and place 15 inch paper on the rear tractor (do not feed it in). To start the routine, simultaneously hold down the [SPEED] and [TEAR OFF] keys and turn on the power.

(3) Initialization Routine 3
Initializes all of the data in the EEPROM. Routine 3 = Routine 1 + Routine 2 + Clearing of print position adjustment data, head gap adjustment data, and paper feed position adjustment data. When performing this routine, be sure to remove paper from the printing station and place 15 inch paper on the rear tractor (but do not feed it in). To start the routine, simultaneously hold down the [ONLINE] and [EJECT/LOAD] keys and turn on the power. After you have performed initialization routine 3, be sure to adjust the print position, the head gap, and the paper feed position.

Troubleshooting Guide

Appearance Checks

Localize defective parts such as broken switches and levers, damaged FFC cable, loose connections, burned components or blown fuses.

Functional checks

Define the defective functional block without disassembling the printer:

- Power-on initialization check (Checking printer power)
- Display indicator check (lamps operate abnormally)
- Checking on the error messages
- Performing self test check
- Sending printable characters from the host system to check the output (Head Adjustment Lever)
- Checking function after Program ROM replacement
- Line feed control function check (Reverse line feeding stops after exceeding 22 inches)

Voltage check on the test points specified on Main PCB:
(Remove the top cover and lift the mechanism. Then inspect from the rear side.)

- +5V(Vcc) No.32 pin of U8 (OPTION FONT) of the Main PCB.
- +40V The left side lead wire of the resistor R209 of the Main PCB.
  Note: When the interlock SW is OFF, the output of this point is open.
  When the interlock SW is ON, the output of this point is 40V.

Components checks

- You can perform component level repairs using voltage/ampere meters, Oscilloscope.
- You may be required to understand the electric component characteristics and the operation principles, before you make any repairs. For the power supply PCB, many details are provided for your troubleshooting aids.

Error messages & Remedies

HEAD PROTECTION	• Print head is overheated. The printer automatically resumes to its normal print operation when the print head cools down.
FRONT COVER OPEN	• Front Cover is opened. Check if the cover is closed properly. Check the cover open sensor connector (CN25) on Main PCB. Replace the Main PCB.
RAM ERROR	• The error lamp blinks and buzzer sounds immediately after turning the power on or after the printer is reset.
PARK ERROR	• Fanfold paper is not fed back to the packing position properly. Cut the paper to remove it.
PAPER OUT FRONT TR **(PAPER OUT REAR TR)**	• Fanfold paper is not set on the front (rear) tractor. Reload paper.
SET PAPER	• A cut sheet is not loaded into the printer. Reload paper.
PAPER OUT ASF (CSF)	• A cut sheet is not loaded into the ASF unit. Install cut sheets into the ASF.
PAPER JAM FRONT TR **(PAPER JAM REAR TR)**	• A paper jam occurs at the front (rear) tractor. Adjust tractor tension if necessary. Remove the jammed paper and reload a paper.
SET PAPER AGAIN	• Fanfold paper is not fed properly. Remove paper and reload.
REMOVE PAPER	• A cut sheet is not ejected properly. Remove the paper. Check for paper path debris.
SKEW ERROR	• A cut sheet is loaded on the skew. If necessary adjust roller tension. Reload paper.
JAM SENSOR ERROR	• The jam sensor is defective. Remove paper dust from the jam sensor.

HAI SENSOR ERROR	• The Head Adjust (hereinafter HA) Sensor detects an error when the head is moved to the home position for HA. Check to determine whether anything is obstructing the operation of the HA Motor. Check the connection of the HA Sensor harness. If it is connected properly, replace the HA Sensor or the Main PCB.
HA SENSOR ERROR	• The printer fails to detect the paper thickness during head adjustment. Check the connection of the HA Encoder harness. If it is connected properly, replace the HA Encoder PCB or the Main PCB.
HOME SENSOR ERROR	• The printer fails to detect the print-head position. (Carriage Error) Check to determine whether anything is obstructing the operation of the HC Motor. Check the connection of the Home Sensor harness. If it is connected properly, replace the Home Sensor or the Main PCB.
FUNCTION MCMTR1 ERROR	• The MC Sensor (Front Friction) detects an error when the printer is initialized or when the front friction is adjusted. Check to determine whether anything is obstructing the operation of the Front Friction Motor. Check the connection of the MC Sensor (Front Friction) harness. If it is connected properly, replace the MC Sensor (Front Friction) or the Main PCB.
FUNCTION MCMTR2 ERROR	• The MC Sensor (Rear Tractor) detects an error when the printer is initialized or when the paper feed path is changed. Check to determine whether anything is obstructing the operation of the Rear Tractor Motor. Check the connection of the MC Sensor (Rear Tractor) harness. If it is connected properly, replace the MC Sensor (Rear Tractor) or the Main PCB.

FUNCTION MCMTR3 ERROR	• The MC Sensor (Front Tractor) detects an error when the printer is initialized or when the paper feed path is changed. Check to determine whether anything is obstructing the operation of the Front Tractor Motor. Check the connection of the MC Sensor (Front Tractor) harness. If it is connected properly, replace the MC Sensor (Front Tractor) or the Main PCB.
FUNCTION MCMTR4 ERROR	• The MC Sensor (Rear Friction) detects an error when the printer is initialized or when the rear friction is adjusted. Check to determine whether anything is obstructing the operation of the Rear Friction Motor. Check the connection of the MC Sensor (Rear Friction) harness. If it is connected properly, replace the MC Sensor (Rear Friction) or the Main PCB.
RIGHT EDGE SENSOR ERROR	• The difference between the maximum and minimum Skew Sensor values falls below the specified level during the sensor instruction operation. Check to determine whether paper is loaded into the printer during the sensor instruction operation. (This error also occurs if paper is not loaded properly due to a paper jam.) Check to ensure that the Skew Sensor is mounted properly, the Skew Sensor harness is connected properly, and the FFC harness between the Main PCB and the Head Connecting PCB is connected properly. If they are mounted or connected properly, replace the Skew Sensor or the Main PCB.
LEFT EDGE SENSOR ERROR	• The difference between the maximum and minimum Edge Sensor values falls below the specified level during the sensor instruction operation. Check to determine whether paper is loaded into the printer during the sensor instruction operation. (This error also occurs if paper is not loaded properly due to a paper jam.) Check to ensure that the Edge Sensor is mounted properly, the Edge Sensor harness is connected properly, and the FFC harness between the Main PCB and the Head Connecting PCB is connected properly. If they are mounted or connected properly, replace the Edge Sensor or the Main PCB.

PAPER EDGE SENSOR ERROR	• The difference between the maximum and minimum Paper Sensor values falls below the specified level during the sensor instruction operation. Check to determine whether paper is loaded into the printer during the sensor instruction operation. (This error also occurs if paper is not loaded properly due to a paper jam.) Check the connection of the Paper Sensor harness. If it is connected properly, replace the Paper Sensor or the Main PCB.
SKEW PULSE ERROR	• The printer fails to acquire the criteria for skew detection during the sensor instruction operation. Check to determine whether paper is loaded into the printer during the sensor instruction operation. (This error also occurs if paper is not loaded properly due to a paper jam.) Check the connection of the Edge Sensor harness and the connection of the Skew Sensor harness. If they are connected properly, replace the Edge Sensor, the Skew Sensor, or the Main PCB.

Trouble Symptoms

The lamp does not light and no display on LCD

Possible cause:	Power cable is defective or loose. Power lines from the power switch are disconnected. Loose connection between the main PCB and indicator PCB. Loose connection on the Main PCB and power PCB. Fuse (F1) is blown. Power PCB circuitry is defective. Main PCB circuitry is defective.
Remedy:	Replace defective parts and refer to the "Electric Repairs" section.

Incorrect LCD indication

Possible cause:	Loose connector on the indicator PCB. Main PCB circuitry is defective.
Remedy:	Reinstall the connector properly or replace the Main PCB.

Home position detection error

Possible cause:	Head carrier malfunctions. Defective sensor or interlock switch.
Remedy:	• Check if the head carrier smoothly moves across its carrier bar. If not, replace the print head, head carrier, or carriage bar. • Check the interlock switch and the connection of the connectors, CN28 on the Main PCB.

RAM error

Possible cause:	Internal RAM error in CPU or external RAM error.
Remedy:	Replace the control PCB.

Improper carrier movement

Possible cause:	Carrier runs along a bent carrier bar.C motor is defective. Timing belt is too loose. Print head position is too close to the platen. Main PCB is defective.
Remedy:	Readjust the head position, repair/replace defective components, check motor for mechanical problems, or check pulses from Main PCB.

Abnormal printing

Dot is missing in horizontal direction.

Possible cause:	A pin in the printhead is defective. Main PCB is defective.
Remedy:	Replace the print head if a print pin is bent or broken and if 14 Ω of resistance between GND and each pin is not measured on the print head terminal. Replace the defective components on the Main PCB, such as the driving transistor or fuse for missing pin.

Vertical dot spacing is improper.

Possible cause:	Print head is defective. Paper holding pressure by tractor R/L is insufficient.
Remedy:	Replace the print head or the tractor spring.

Dot alignment in horizontal direction is improper.

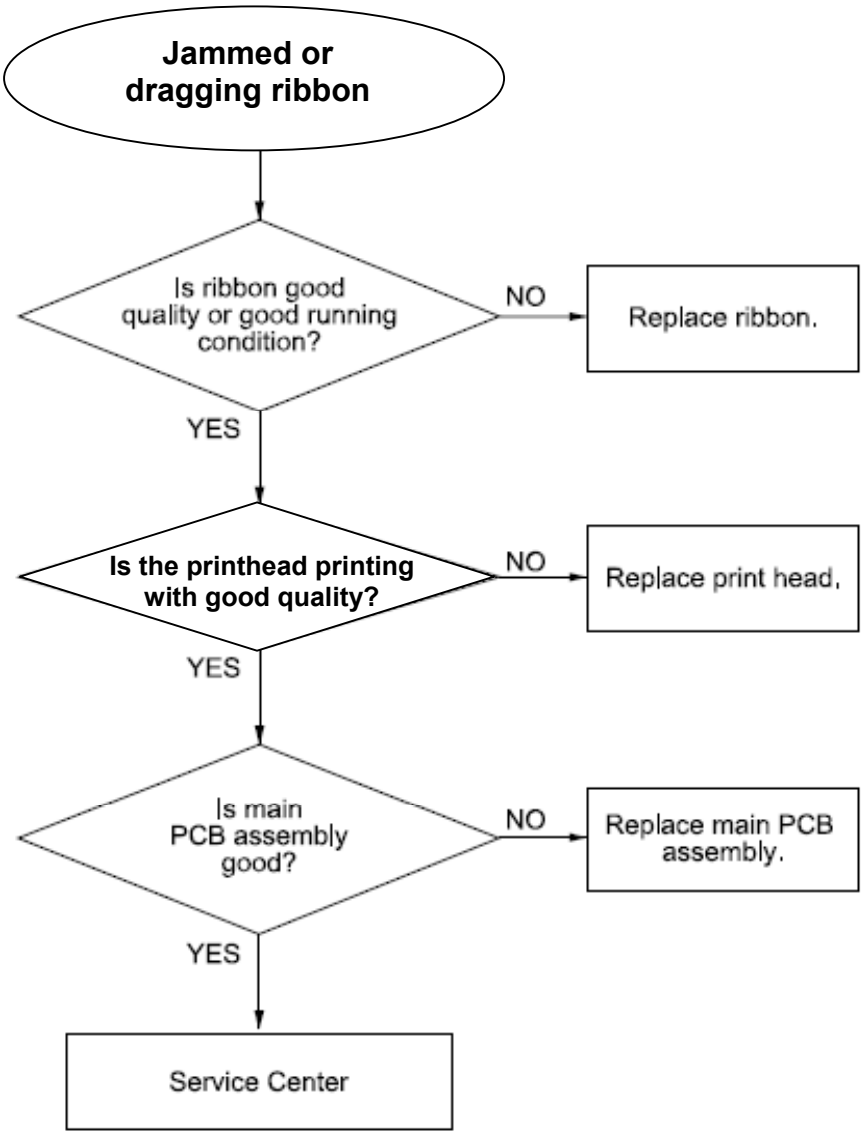
Possible cause:	C motor is defective.
Remedy:	Replace the C motor.

Repair Flow Charts

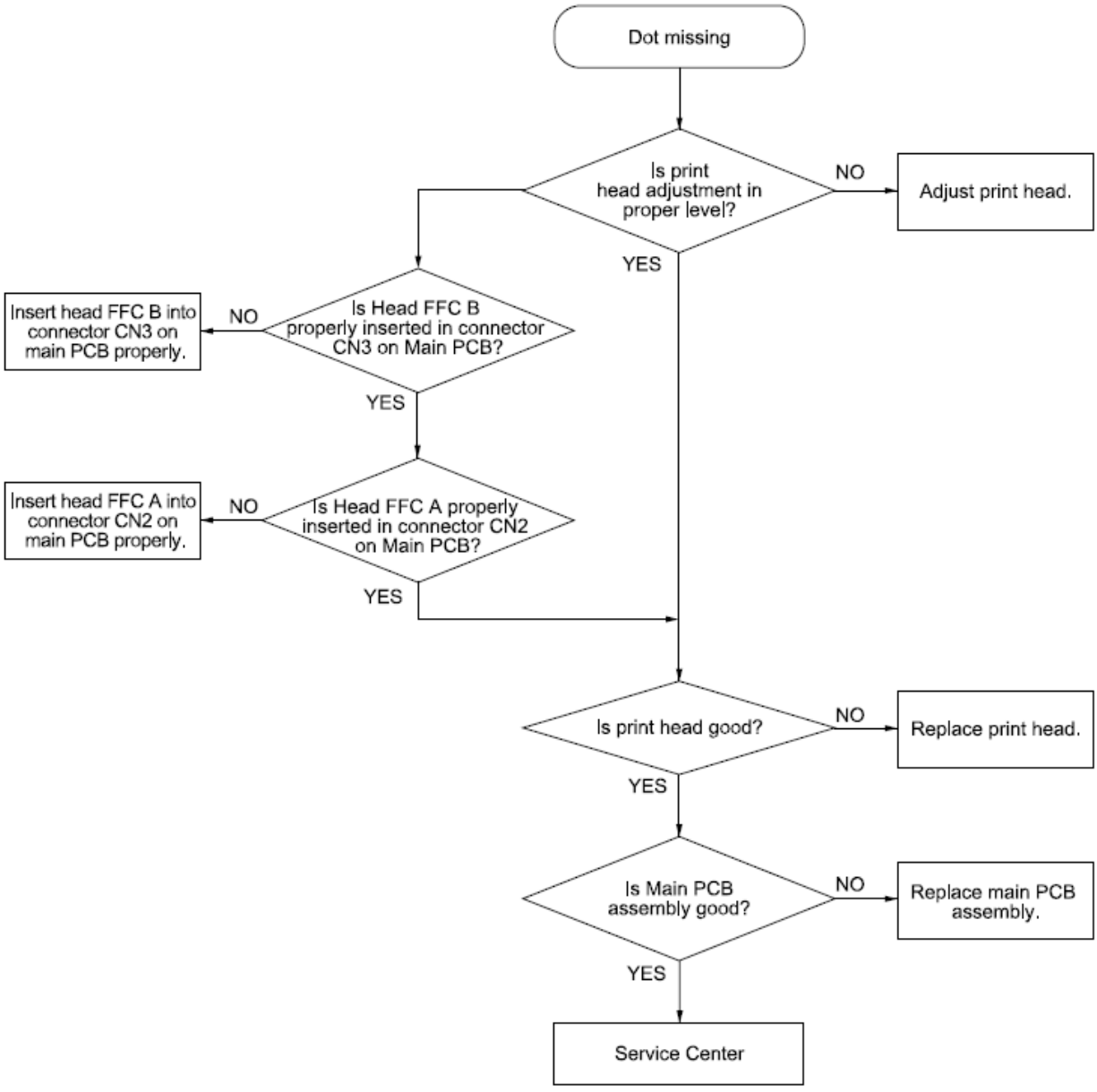
The following are only for troubleshooting to a functional block level.

Problems

Jammed Ribbon

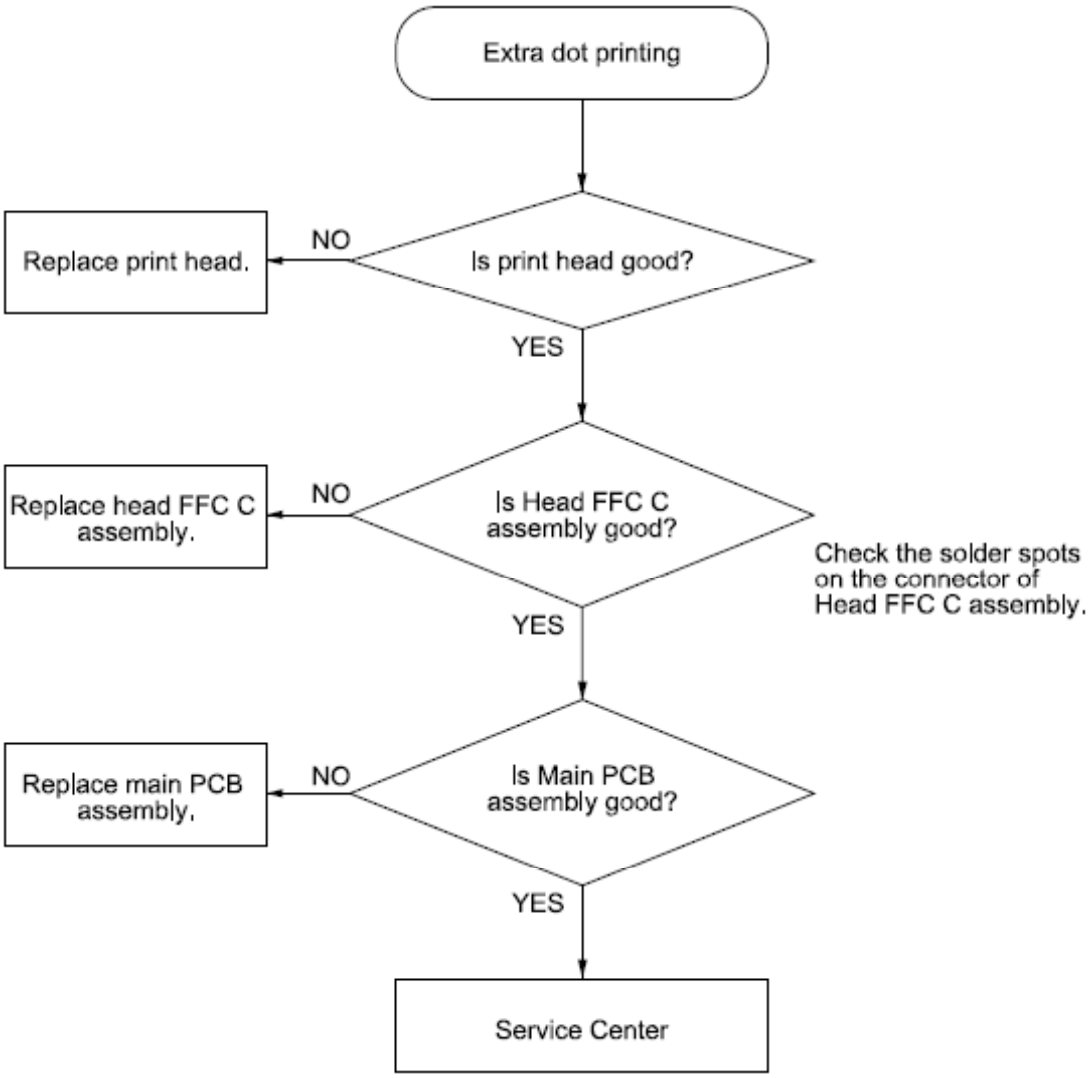


Dots Missing

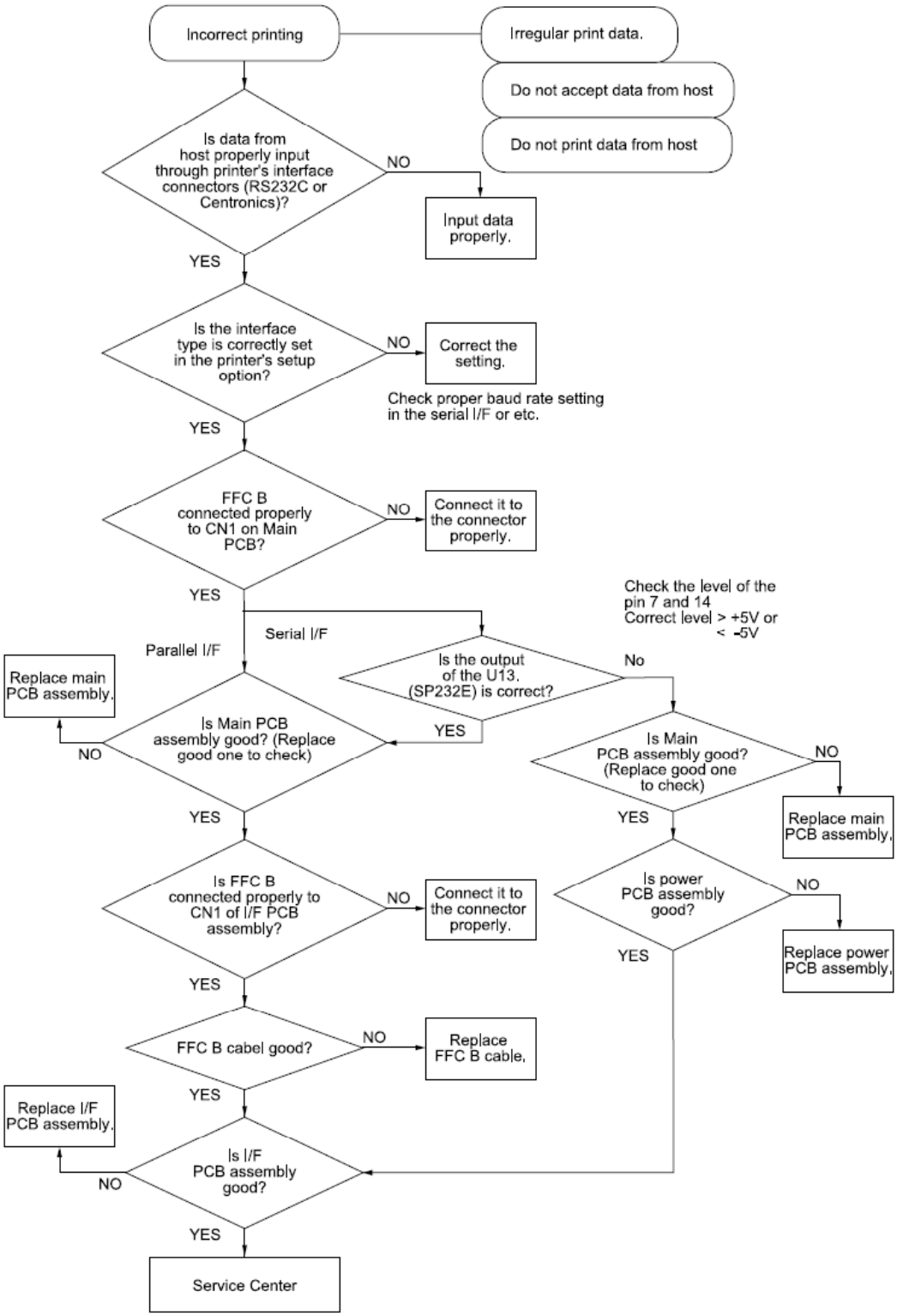


Caution: Do not touch the print head immediately after printing because it may be too hot.

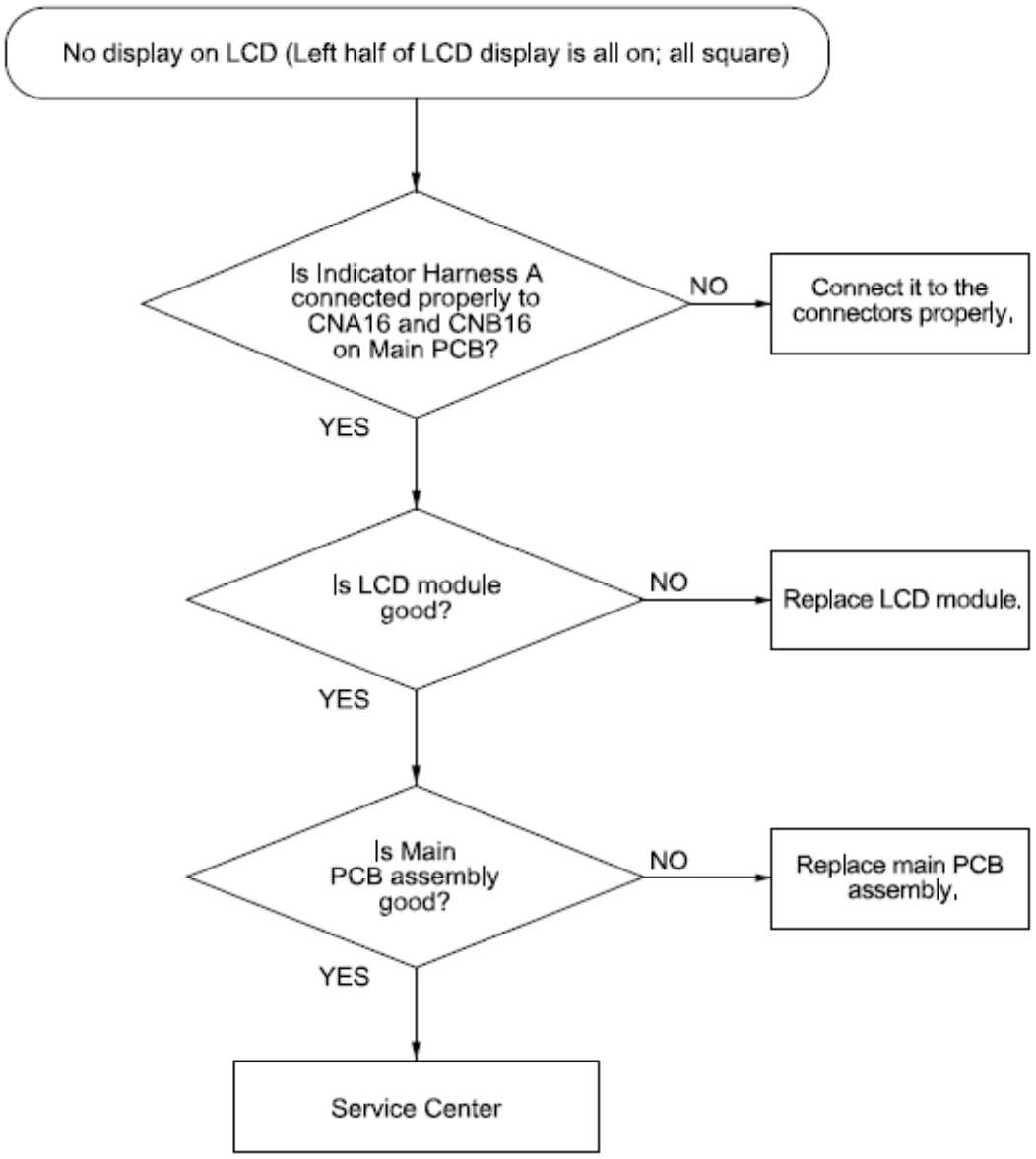
Extra Dot Printing (Improper character)



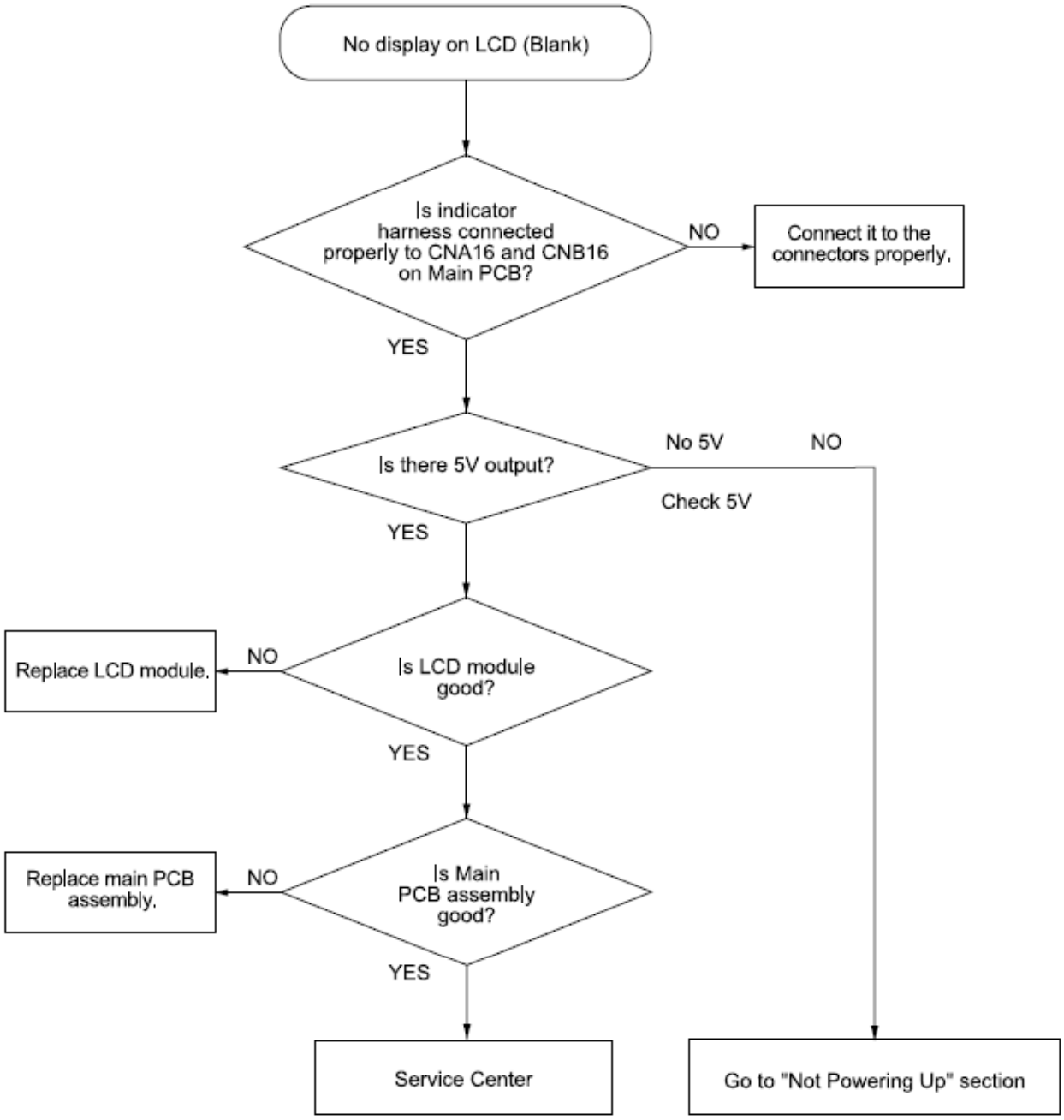
Incorrect Printing (Irregular print data)



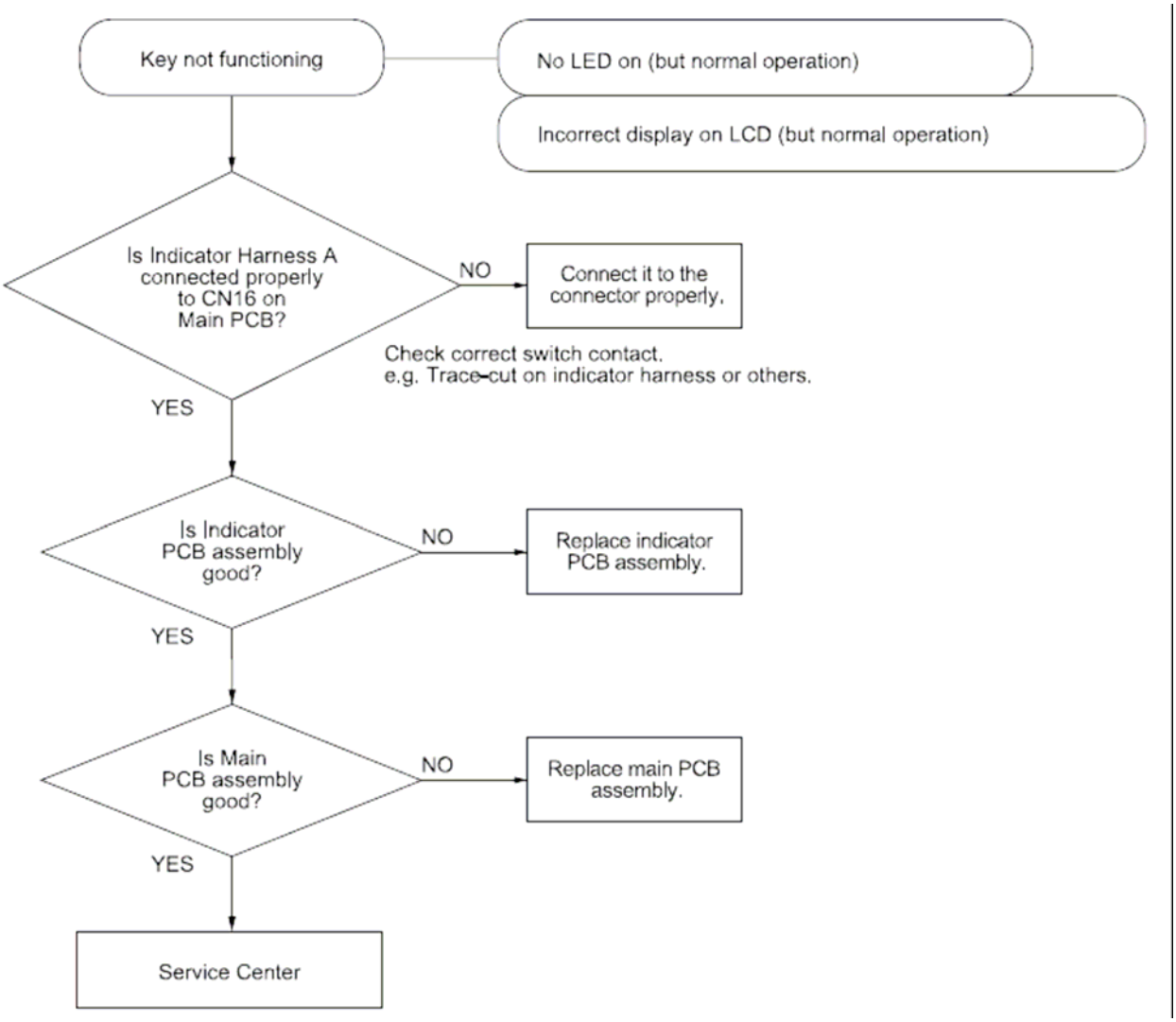
No LCD Display (Half of the LCD lights up)



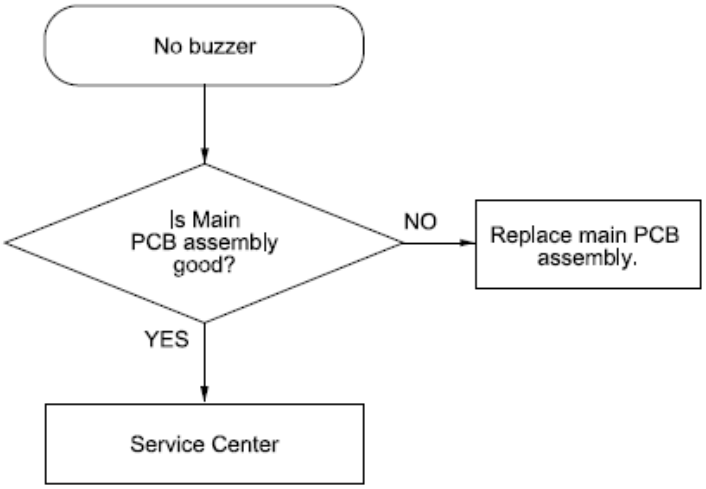
No LCD Display (Completely blank)



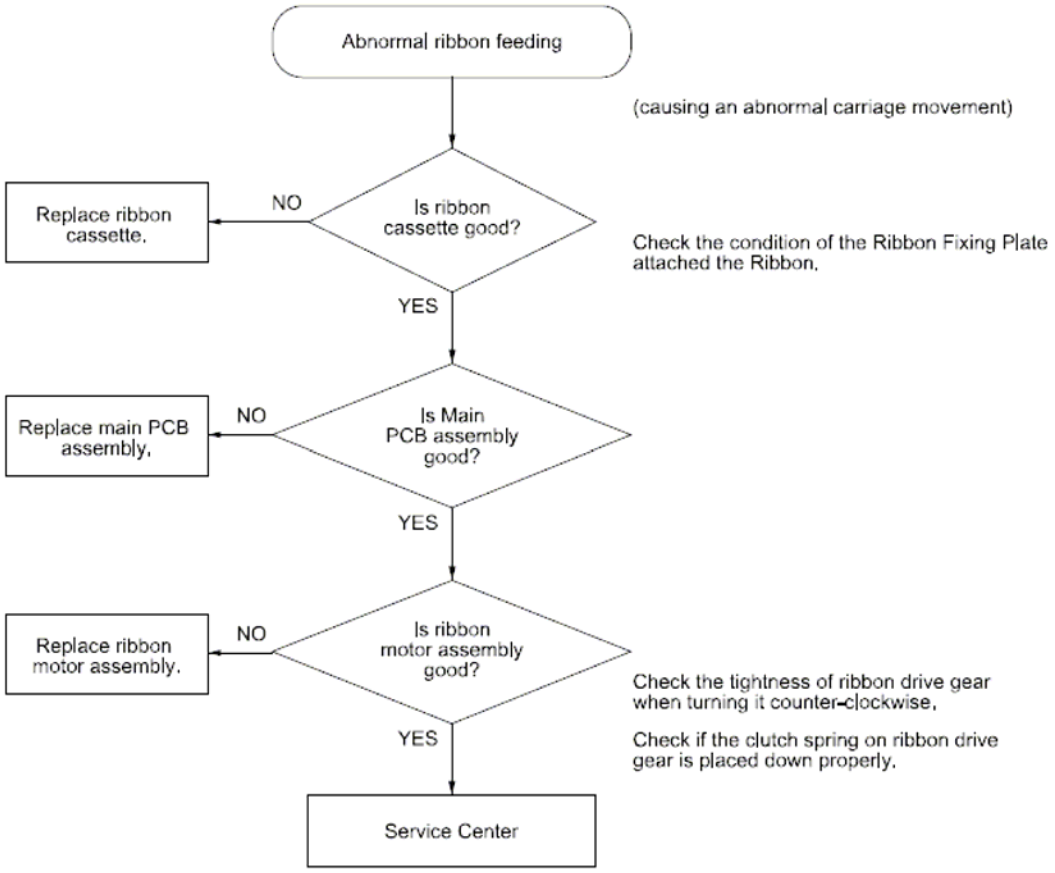
Control Keys Not Functioning



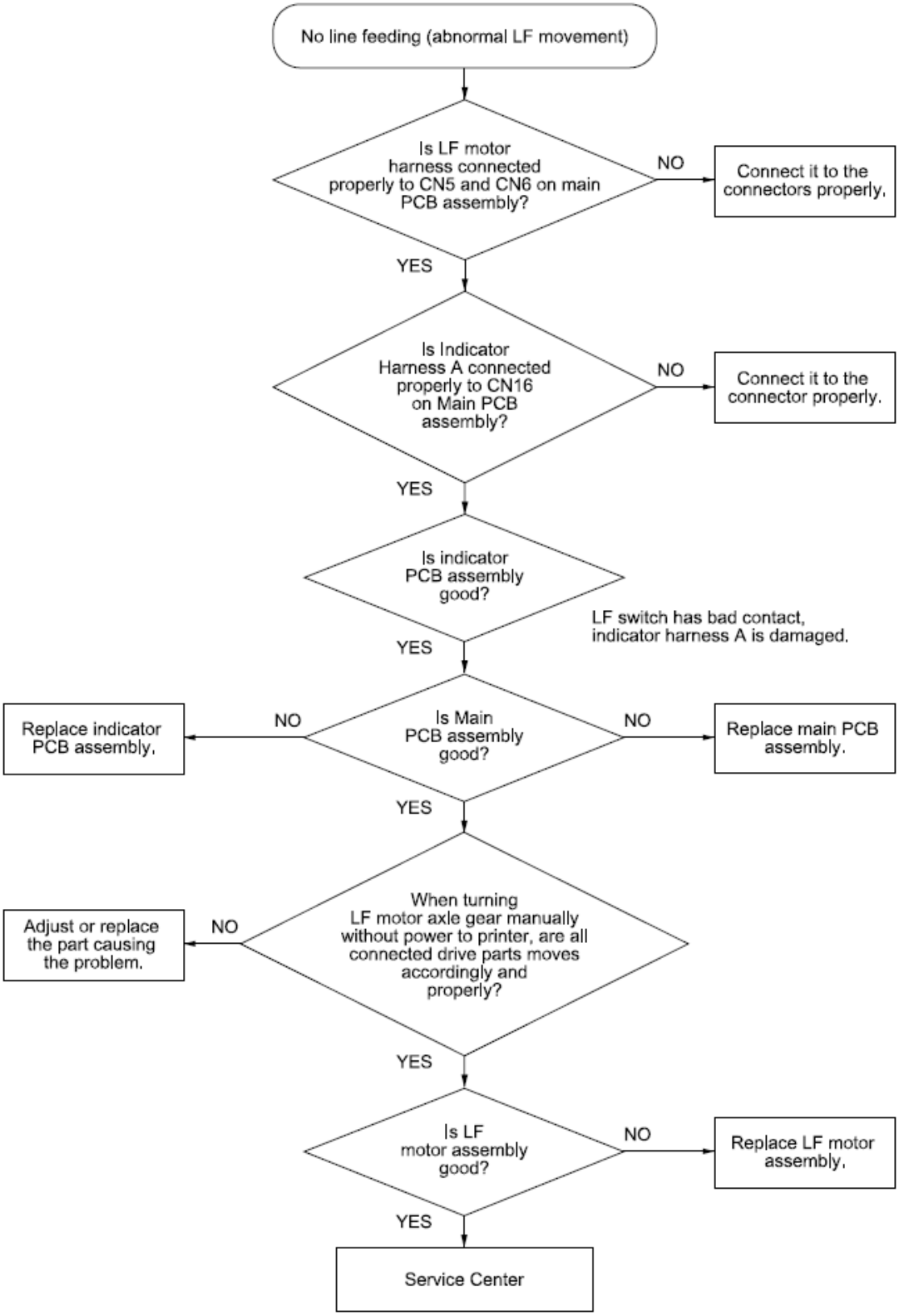
No Buzzer



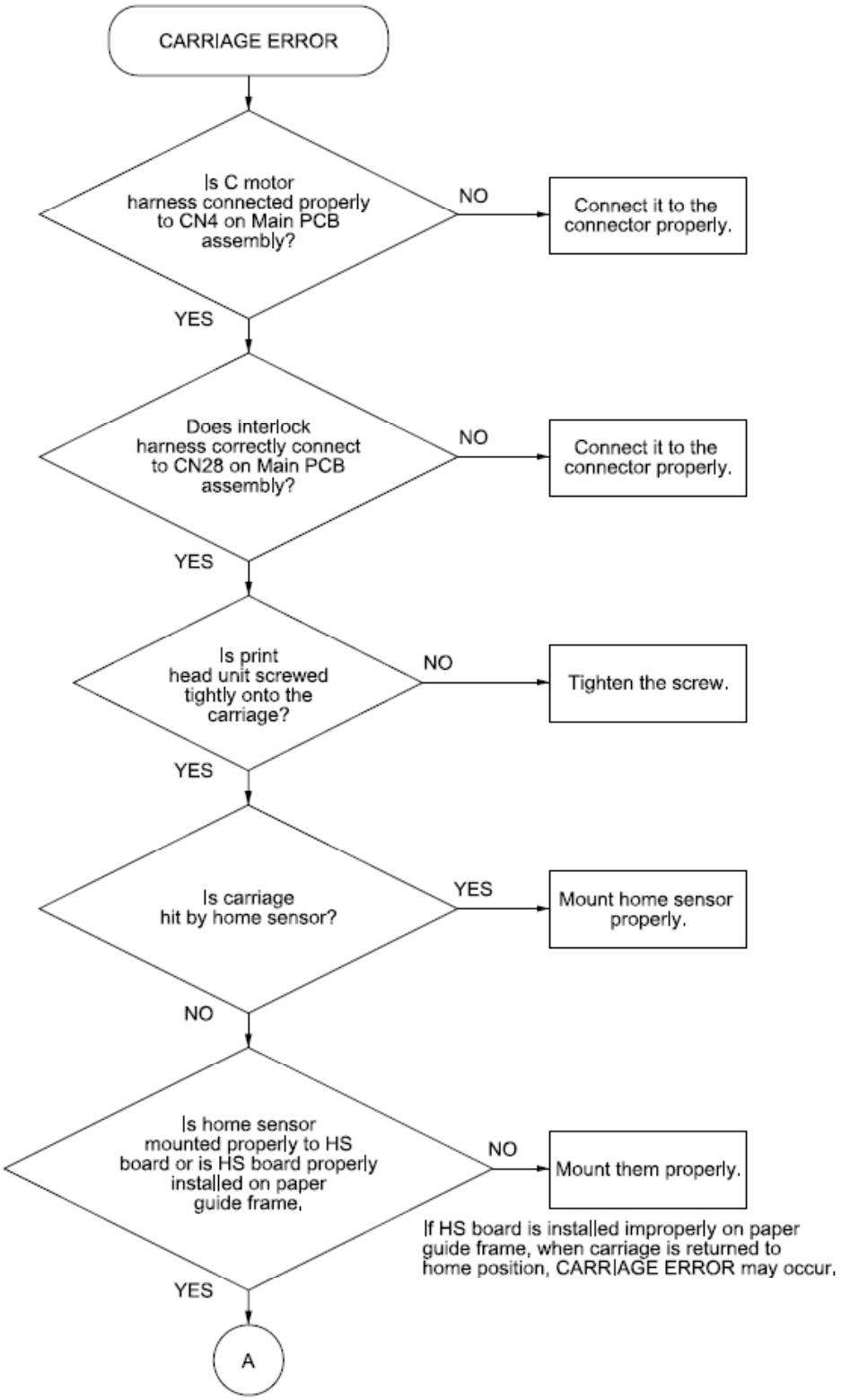
Abnormal Ribbon Feeding (Causing abnormal carriage movement)

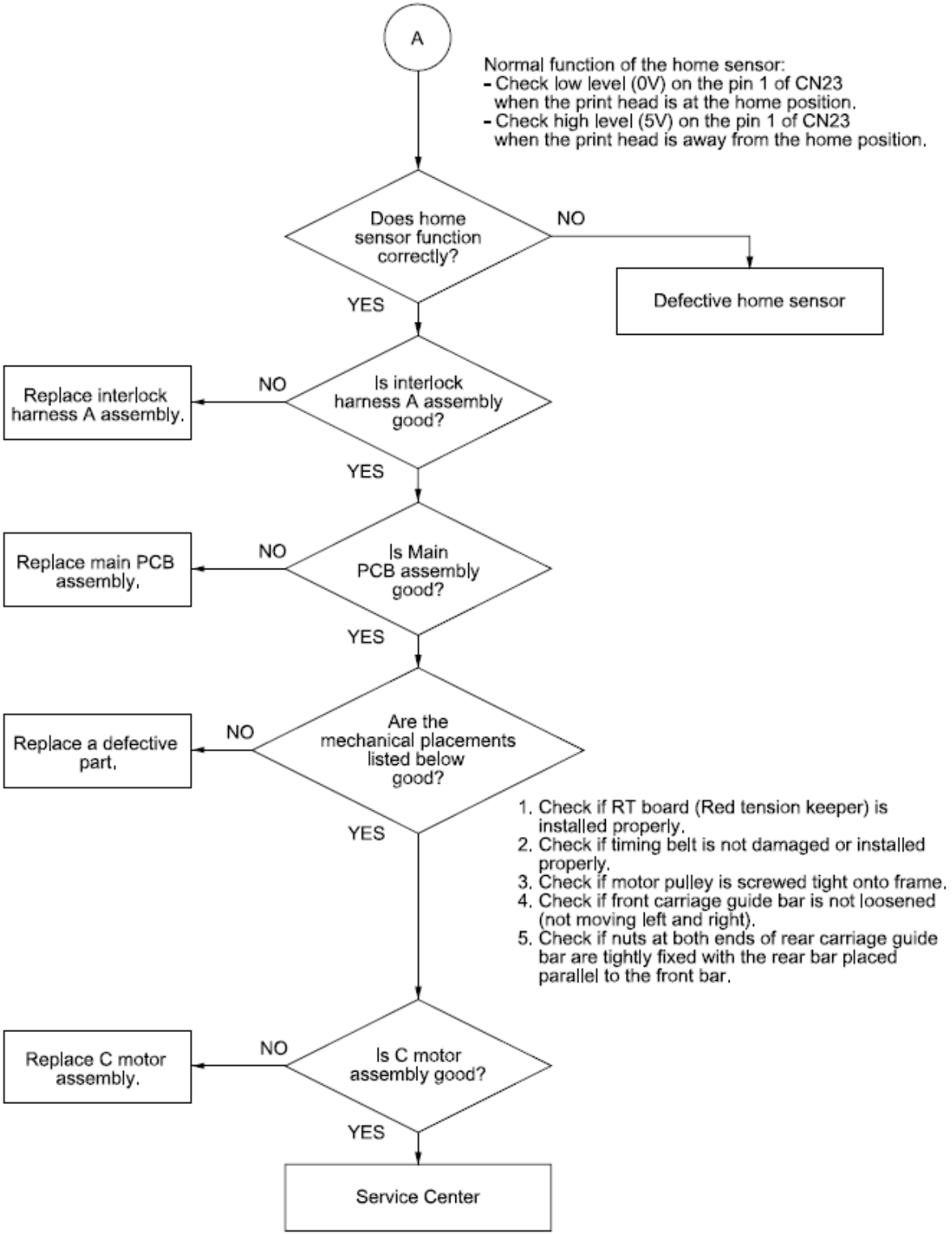


No Line Feed or Inconsistent Line Feeding

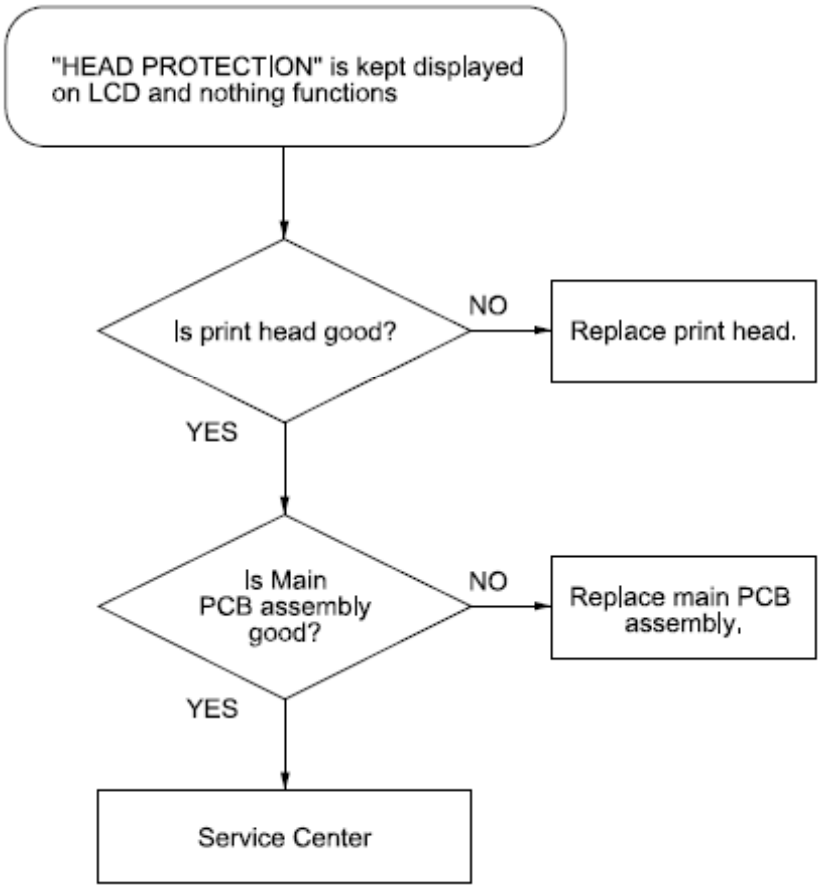


Carriage Error



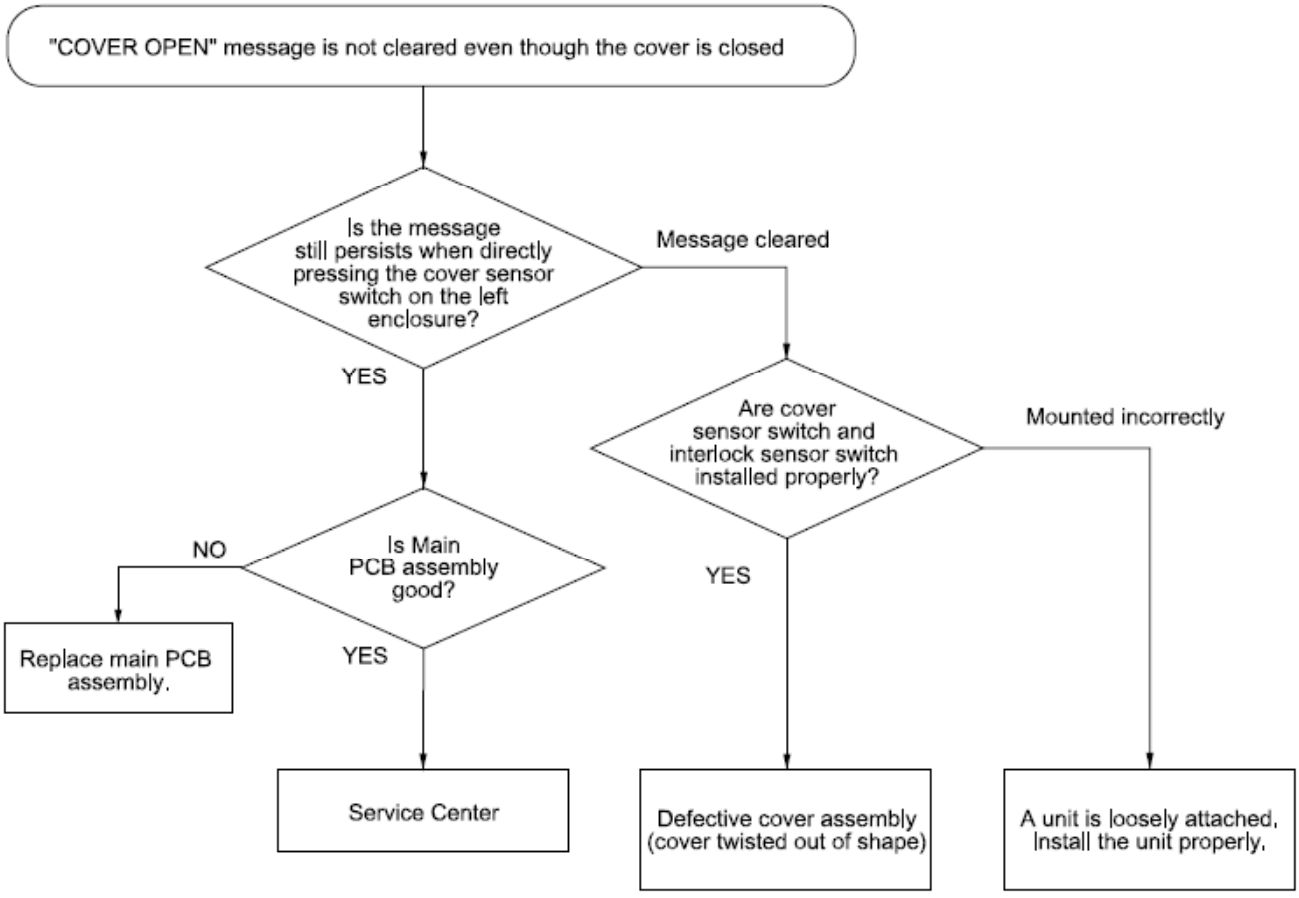

A
Normal function of the home sensor:
- Check low level (0V) on the pin 1 of CN23 when the print head is at the home position.
- Check high level (5V) on the pin 1 of CN23 when the print head is away from the home position.
Does home sensor function correctly?
NO
Defective home sensor
YES
Is interlock harness A assembly good?
NO
Replace interlock harness A assembly.
YES
Is Main PCB assembly good?
NO
Replace main PCB assembly.
YES
Are the mechanical placements listed below good?
NO
Replace a defective part.
YES
1. Check if RT board (Red tension keeper) is installed properly.
2. Check if timing belt is not damaged or installed properly.
3. Check if motor pulley is screwed tight onto frame.
4. Check if front carriage guide bar is not loosened (not moving left and right).
5. Check if nuts at both ends of rear carriage guide bar are tightly fixed with the rear bar placed parallel to the front bar.
Is C motor assembly good?
NO
Replace C motor assembly.
YES
Service Center

"HEAD PROTECTION" displayed but nothing happens

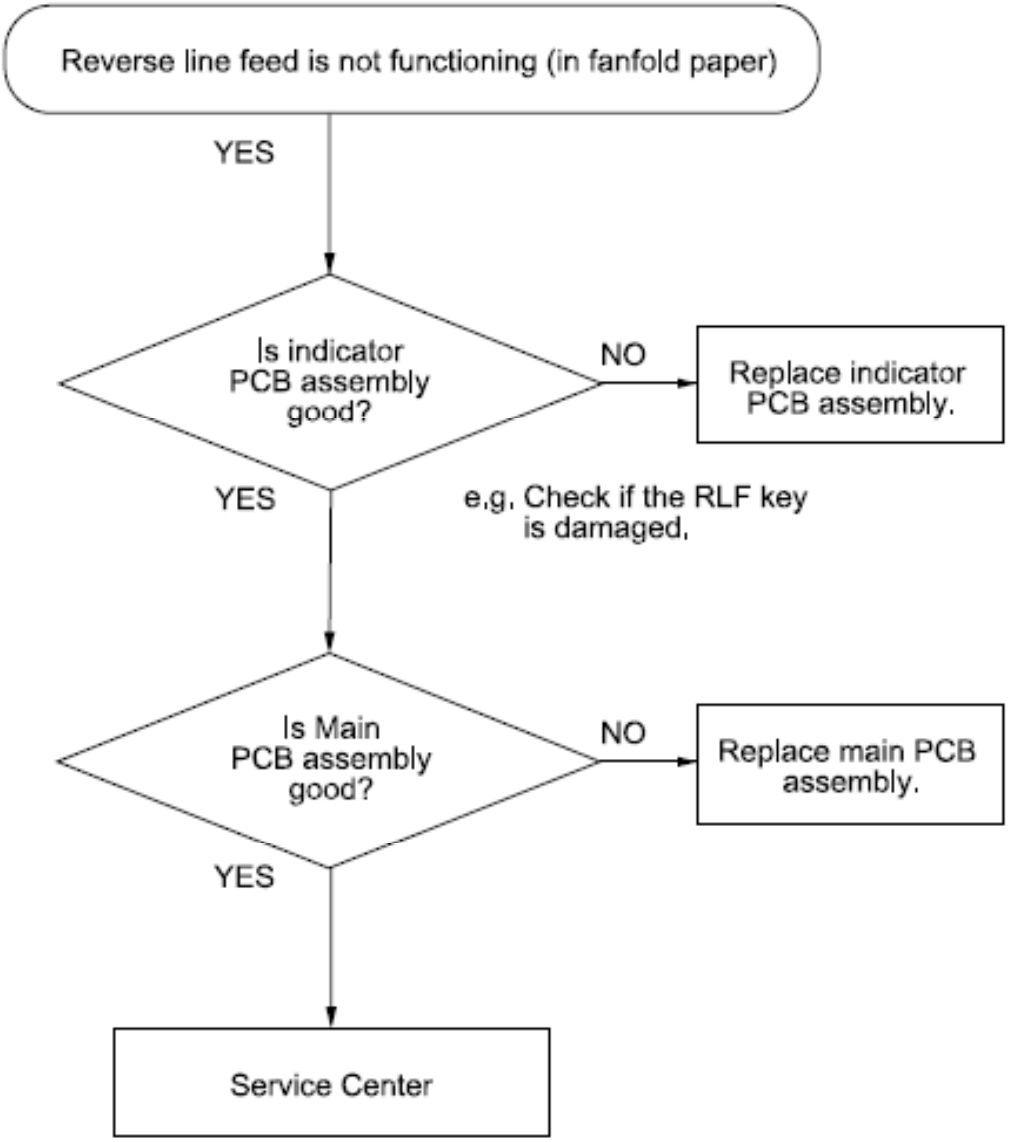


Caution: Do not touch the print head immediately after printing because it may be too hot.

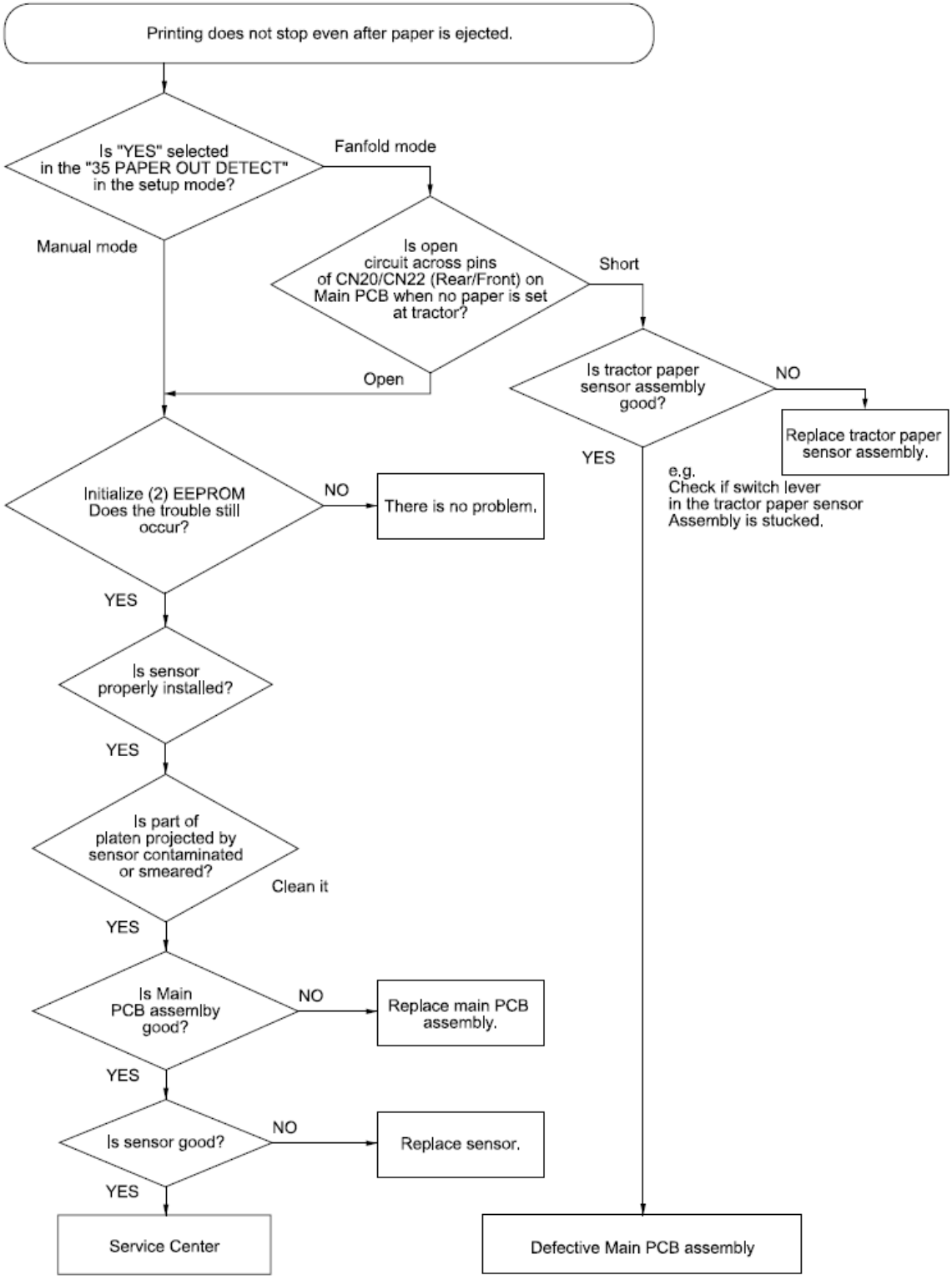
Cover Open Error Will Not Cancel With Cover Closed



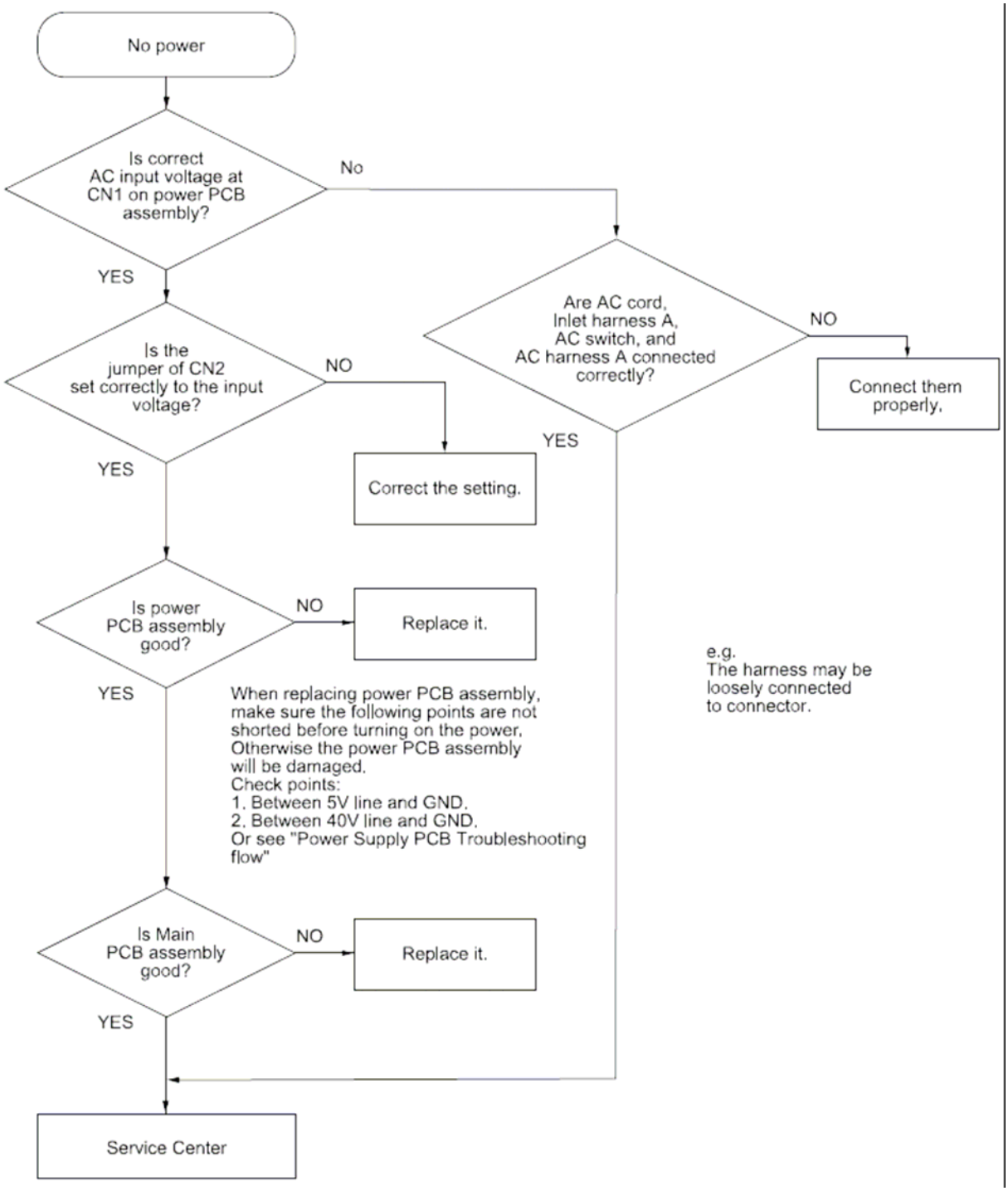
No Fanfold Paper Reverse Line Feed



Printing Does Not Stop After Paper Is Ejected



Not Powering Up



Mechanical Replacement

Enclosures

(1) Top Enclosure and Printer Cover Replacement

REMOVAL

Step 1. Remove 3 pan head screws (S-16) on the front and 4 truss head screws (S-22) on the back to remove the top enclosure.

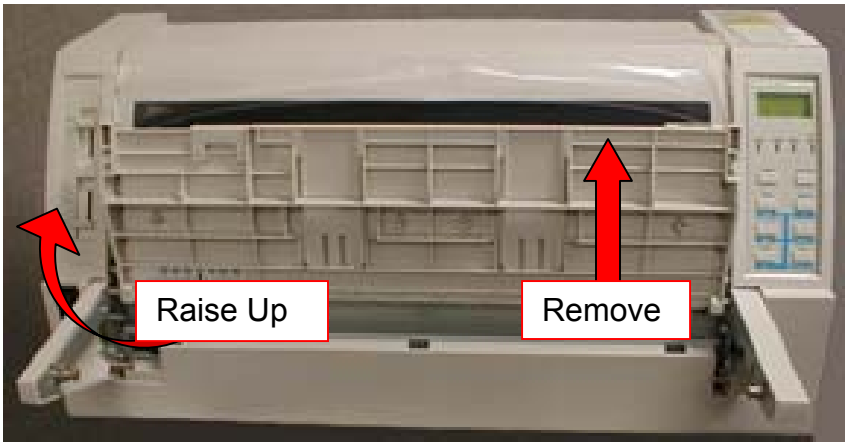
(2) Paper Rack Assembly Replacement

REMOVAL

Holding the external edge of the paper rack with your hands, raise the front edge up to a vertical position, and then lift up the paper rack gently.

INSTALLATION

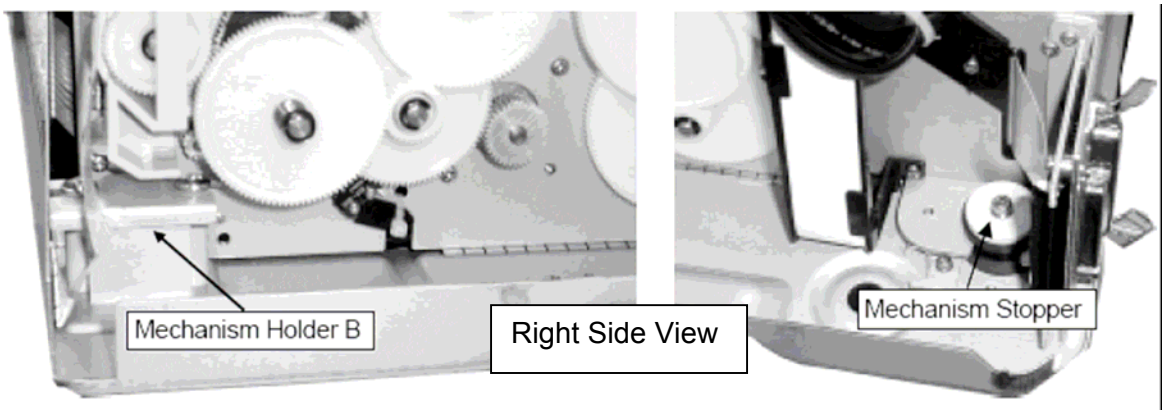
Follow the reverse of the above procedure as the way shown in the User's Manual.



(3) Mechanical Block Replacement

REMOVAL

Step 1.The paper rack and cover L/R must be removed.
Step 2. The top enclosure must be removed.
Step 3. Remove 1-pan head screws (M4 x 32.6) on the right front mechanism holder B, rotate the metal plate to the right. Remove 1-pan head screw (M4 x 32.6), 1-pan head screw (S-18) on the left mechanism holder B. Remove the mechanism holders and the switch holder.
Step 4. Remove 2 pan head screws (S-17) from the mechanism stoppers (left and right rear corners of the mechanism).
Step 5. Lift up the back of the mechanism, and disconnect all the harnesses from the printed circuit board assembly. Remove the mechanism from the bottom enclosure.



INSTALLATION
Follow the reverse of the above procedure.

(4) Bottom enclosure Replacement

REMOVAL

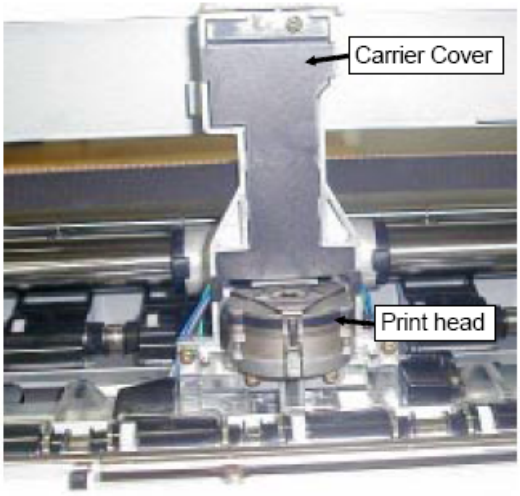
Step 1. The top enclosure and the mechanism must already be removed.
Step 2. Remove 2 flat head screws (S-21) on the power jack. Remove GND screws (S-14) (Note: do not separate the screw from its GND wire.)
Step 3. Disconnect all the harnesses from the printed circuit board assembly.

INSTALLATION
Follow the reverse of the above procedure.

Print Head and FFC Cable Replacement

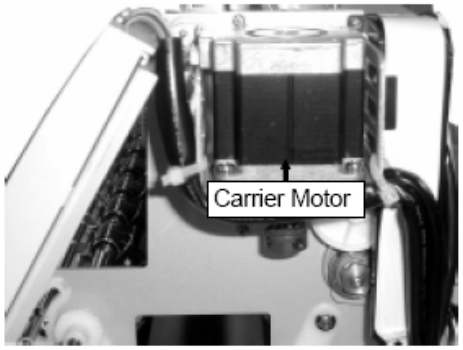
REMOVAL (Print Head)

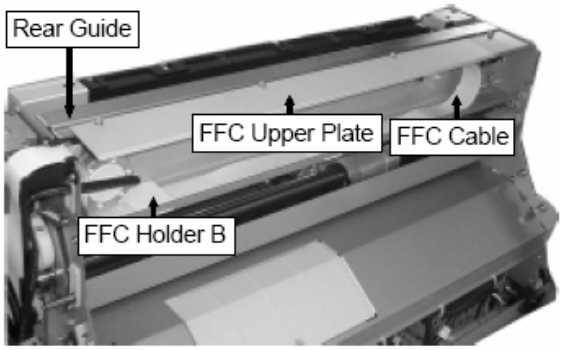
Step 1. Open the printer front cover and remove the ribbon cassette.
Step 2. Remove 2 pan head screws (S-6) that are securing the print head onto the carrier. Remove 1 screw from the carrier cover and pull the printhead toward the front of the printer. Disconnect the printhead cables.



REMOVAL (FFC Cables)

Step 1. Print Head must be already removed.
Step 2. Remove the carrier motor, 4 pan head screws (S-16).
Step 3. Remove the rear guide FFC upper plate, 3 pan head screws (S-6).
Step 4. Remove 2 pan head screws (S-17) from the mechanism stoppers (left and right corners of the mechanism).
Step 5. Lift up the back of the mechanism and disconnect the FFC cables from the connectors on the control PCB unit.
Step 6. Lift up the FFC guide plate and remove cables from the retainers with tweezers or a screwdriver.
Step 7. Disconnect the FFC cables from the connectors on the print head PCB unit in the carrier; then remove the FFC cables from the carrier.





Caution: Make sure that three FFC cover clip retainers hold the cable but not damage it.

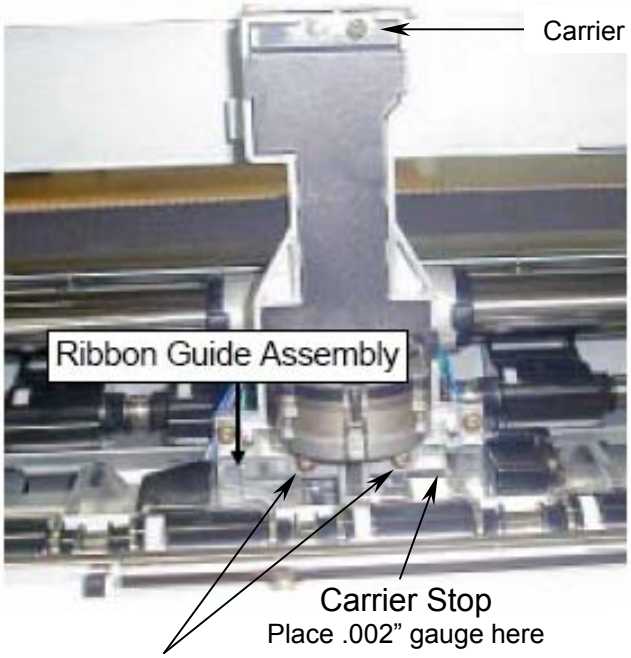
INSTALLATION
Follow the reverse of the above procedure.

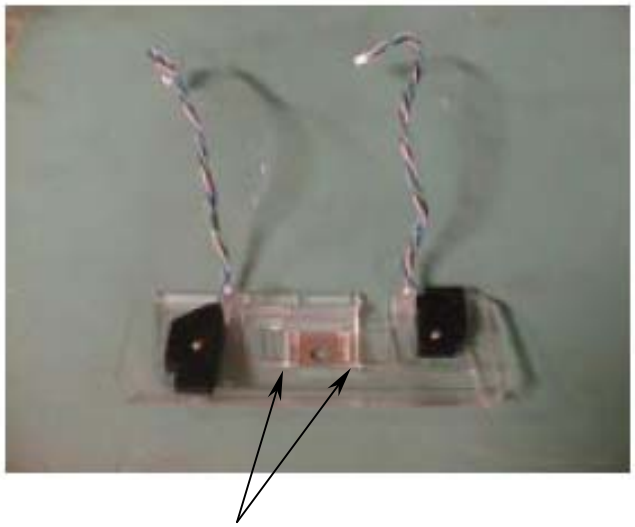
Ribbon Guide Assembly Replacement

TOOLS: Philips Screwdriver, six inch long .002” (qty-1), and .004” (qty-2) Feeler Gauges

REMOVAL

Step 1. Remove the printer top cover, 7-pan head screws.
Step 2. Remove ribbon cassette.
Step 3. Remove the carrier cover, 1-pan head screw.
Step 4. Disassemble the print head by removing 2-pan head screws (S-6) from the head carrier and pull the printhead toward the front of the printer. Place the print head on top of the unit, out of the way.
Step 5. Remove 2-pan head screws (S-6) that secure the ribbon guide assembly onto the carrier.
Step 6. Remove the plastic ribbon guide assembly from the carrier.





INSTALLATION

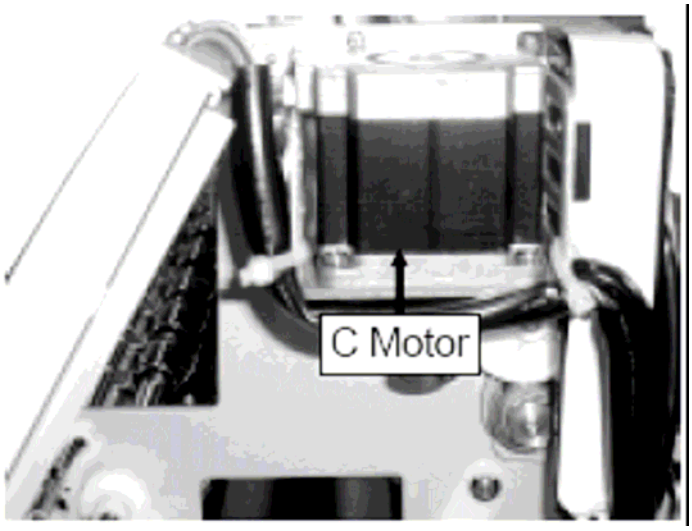
Step 7. Replace the clear plastic ribbon shield assembly. Insert, but do not tighten screws.
Step 8. Use the large white gear left side of the printer chassis to move the carrier up or down. Position the Carrier Stop .002” (use feeler gauge) above the platen.
Step 9. Place .004” feeler gauges (qty-2) beneath the clear plastic ribbon shield. Place the gauges alongside the metal ribbon guide. Refer to above picture for reference.
Step 10. Press down and tighten screws (qty-2) securing shield in place. NOTE: Tightening the screws can sometimes cause the ribbon plastic guide to move out of alignment. Alternate tightening the screws a small amount until the guide is secured in place.
Step 11. Verify the plastic ribbon guide and platen gap by using a .004” feeler gauge beneath the clear plastic ribbon shield. Should the gap be incorrect, repeat steps #7 through #11.
Step 12. Reassemble the print head and carrier cover.
Step 13. Reassemble top cover.

Carriage (C) Motor Assembly Replacement

TOOL: Screwdriver

REMOVAL

Step 1. The top enclosure must be removed.
Step 2. Remove 2 pan head screws (S-17) from the mechanism stoppers left and right corners of the printer chassis.
Step 3. Lift up the back of the mechanism and disconnect the C motor harness from the connector on the control PCB unit. Cut and remove tie wrap from tie plate.
Step 4. Remove 4 pan head screws (S-16) from the C motor.
Step 5. Remove the screw from the return pulley bracket, pull and remove the timing belt from the return pulley.
Step 6. Remove the C motor.



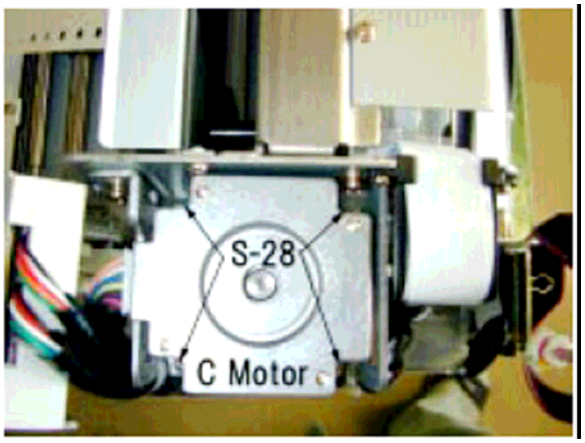
INSTALLATION
Follow the reverse of the above procedure.

Note: Place the harness back in it's original position. Secure the wire harness with a tie wrap.

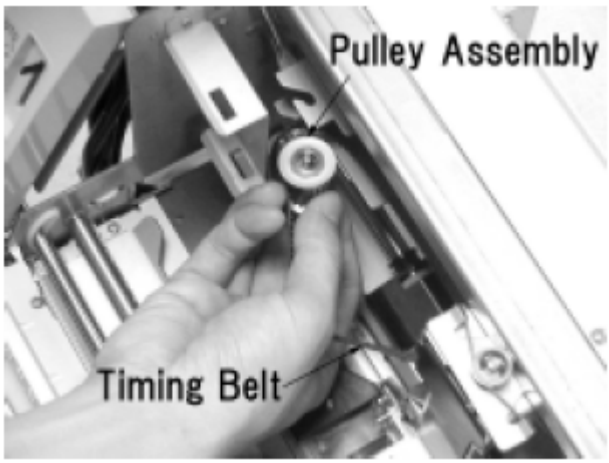
Carriage Timing belt replacement

REMOVAL

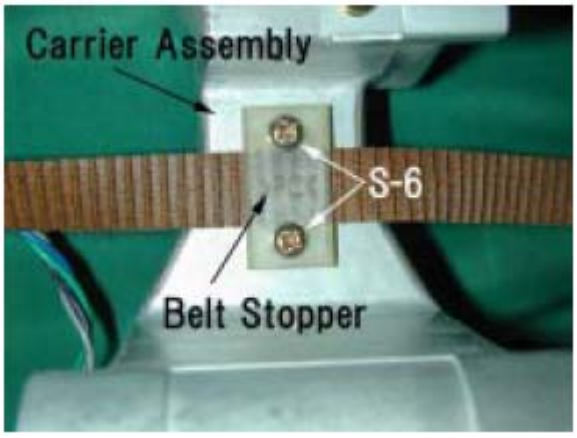
Step 1: Remove 4 captive screws securing the C motor to the motor plate, and then remove the timing belt from the motor pulley.



Step 2: Remove the timing belt from the idler pulley assembly by simply dislocating the idler pulley assembly from its holder.



Step 3: Remove 2 screws to separate the timing belt from the carrier assembly.



INSTALLATION

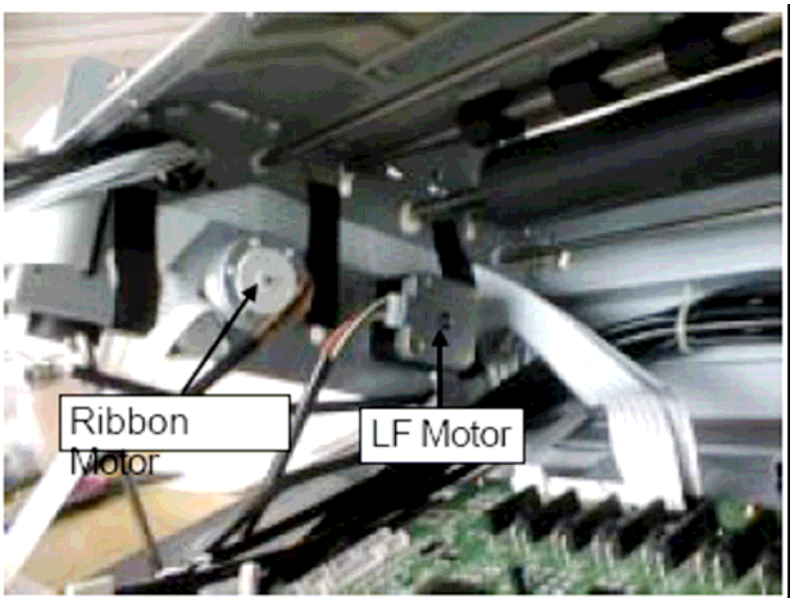
Follow the reverse of the procedure.

NOTE: When installing the timing belt on the carrier assembly, fix the teeth of the timing belt on the teeth of the belt stopper.

Line Feed (LF) Motor Assembly Replacement

REMOVAL

Step 1. Remove the top enclosure.
Step 2. Remove 2 pan head screws (S-17) from the mechanism stoppers left and right corners of the mechanism. Rotate the mechanism up.
Step 3. Disconnect the LF motor harness from its connector in the control PCB unit.



Step 4. Remove LF motor timing belt.
Step 5. Remove 2 pan head screws (S-16) from the LF motor to remove the assembly.

INSTALLATION

Follow the reverse of the above procedure.
Note: Secure the wire harness with a tie wrap. Place the harness back in its original position.

Platen Replacement

REMOVAL

Caution: avoid getting grease on the platen.

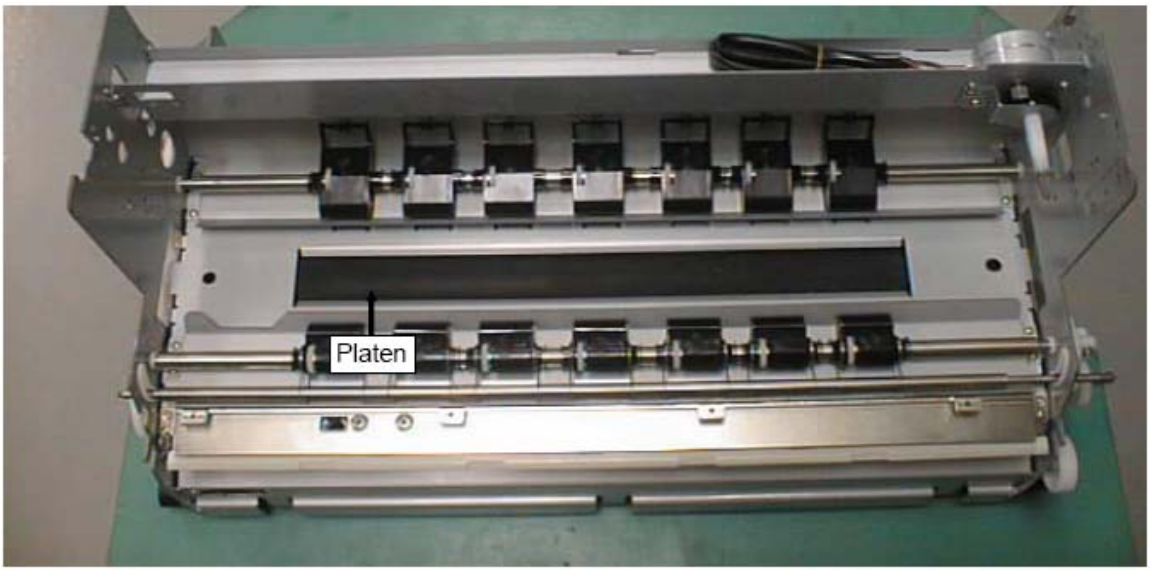
Step 1. Remove top enclosure.

Step 2. Remove 2 pan head screws (S-17) from the mechanism stoppers left and right corners of the printer chassis. Rotate the mechanism up.

Step 3. Detach the plastic gear on the left side of the platen shaft by removing1 pan head screw (S-16).

Step 4. Remove the E-rings (E-6) on either end of the platen shaft.

Step 5. Slide the platen to the left and then right out of the mechanism.



INSTALLATION

Follow the reverse of the above procedure.

Note: When installing the platen shaft on the mechanical block, be sure to locate the plastic bearing with the shaft opening on top.

Friction Mechanism Replacement

This mechanism consists of pinch roller driver assembly and pinch roller driver assembly B.

Pinch roller driver Assembly

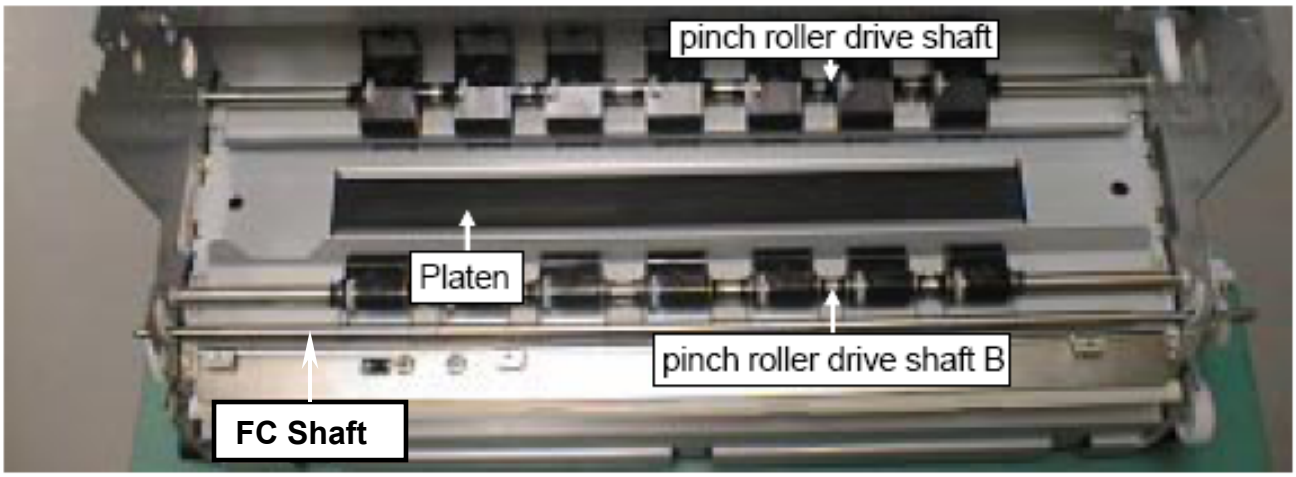
REMOVAL

Step 1. Remove top enclosure.

Step 2. Unhook the friction springs (qty-7) from the FC shaft B.

Step 3. Detach the paper feed intermediate gear on the left side of the pinch roller drive shaft by removing 1 pan head screw (S-6); then remove the E-ring (E4) on either end of the pinch roller drive shaft.

Step 4. Slide the carrier to extreme left along the F guide shaft.
Step 5. Slide the pinch roller drive shaft to the left and then right out of the mechanism.



Note: When installing the pinch roller shaft assembly, the "D" shape side of the shaft is placed to the left.

Pinch roller driver Assembly B (Front)

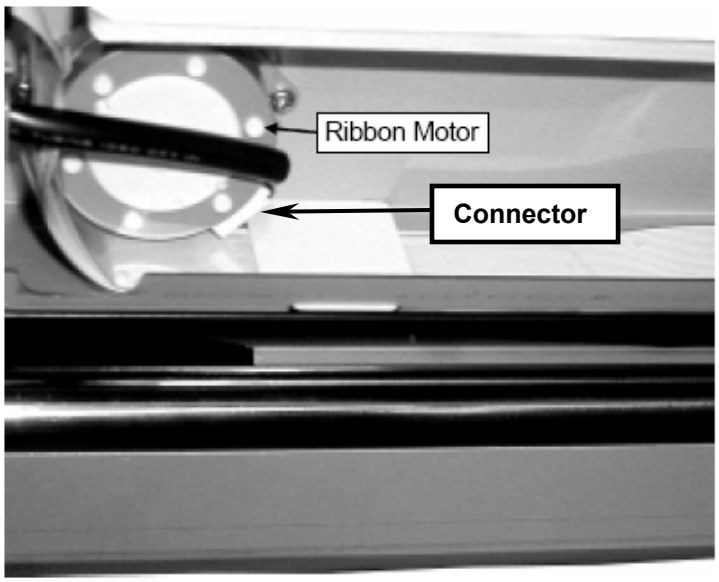
REMOVAL
Step 1. Remove top enclosure.
Step 2. Unhook the friction spring from the FC shaft.
Step 3.Detach the paper feed shaft intermediate gear on the right side of the pinch roller drive shaft B by removing 1 pan head screw (S-6); then remove the E-ring (E4) on either end of the pinch roller drive shaft.
Step 4. Slide the pinch roller drive shaft to right the and then left out of the mechanical block.

INSTALLATION
Follow the reverse of the above procedure.
Note: When installing the pinch roller shaft assembly, note the "D" shape side of the shaft is placed to the right.

Ribbon Motor Assembly Replacement

REMOVAL

Step 1. Remove the top enclosure.
Step 2. Remove 2 pan head screws (S-17) from the mechanism stoppers left and right corners of the mechanism. Rotate the mechanism up.
Step 3. Remove 2 pan head tapping screws (S-11) from the ribbon motor assembly.
Note: Replace motor with cable connector located on right lower side.



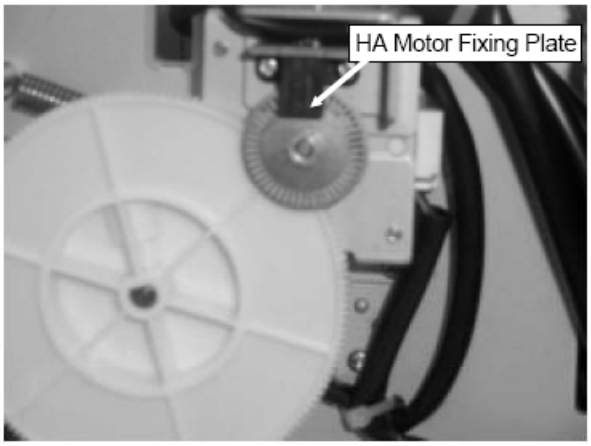
INSTALLATION

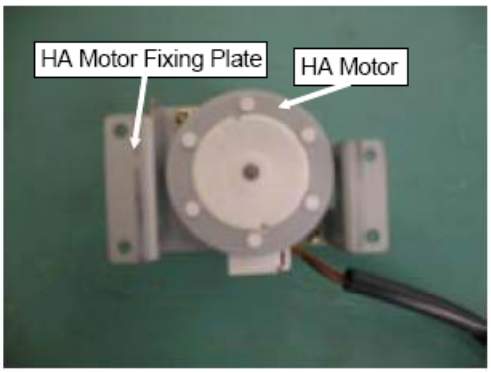
Follow the reverse of the above procedure.

HA Motor Replacement

REMOVAL

Step 1. Remove the top enclosure.
Step 2. Remove control panel support bracket 2 pan head screws.
Step 3. Remove HA sensor-fixing plate, 1 pan head screw (S-4).
Step 4. Remove 4 pan head tapping screws (S-11) to disassemble the HA motor Fixing Plate.
Step 5. Remove the HA motor Assembly, 2 pan head tapping screws (S-11).



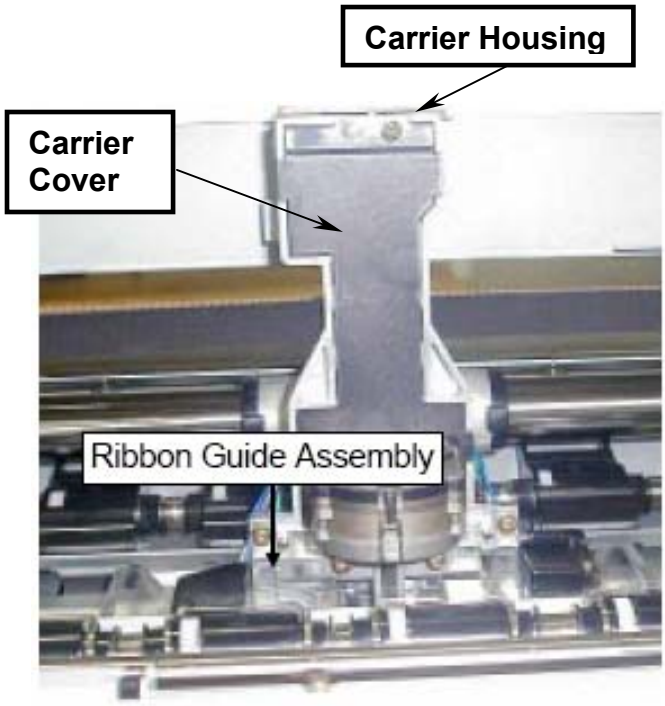


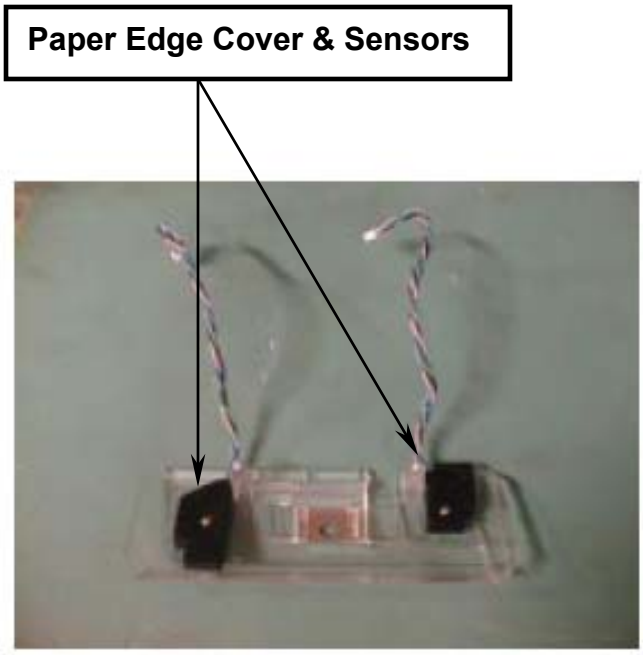
INSTALLATION
Follow the reverse of the above procedure.

Paper edge sensor replacement

REMOVAL

Step1: Turn off the printer power switch, and then open the printer cover, move the print head to the left of the printer.
Step2: Remove ribbon cassette.
Step4: Remove the carrier cover.
Step5: Remove the paper edge sensor cover.
Step6: Remove the paper edge sensor(s).
Step7: Disconnect the paper edge sensor connector from the carrier housing.
Step8: Install new sensor(s) into the ribbon guide assembly, and tighten the screw.
Step9: Install the paper edge sensor cover(s), route the sensor cable into the cover opening and tighten the screw.
Step10: Connect the sensor cable(s) plug into the socket on the carrier housing.
Step11: Replace the carrier cover.

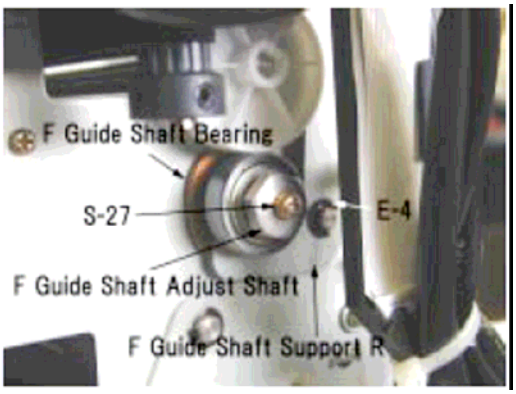




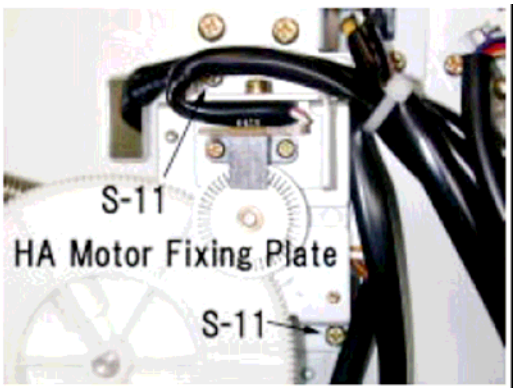
Carrier replacement

REMOVAL

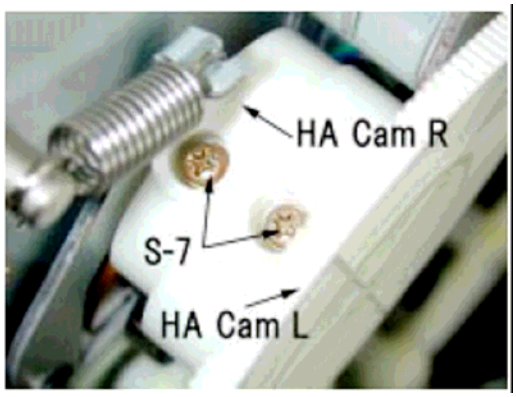
Step1: Remove the F guide shaft support “E” rings (left and right), remove both support brackets, and the springs.
Step2: Remove the F guide shaft screw, Adjust shaft and two bearings.



Step3: Remove the two HA motor screws from the fixing plate.

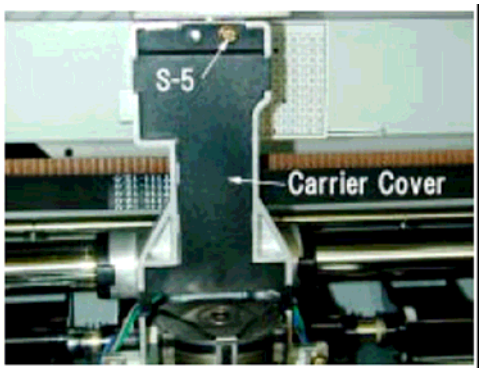


Step4: Remove the screws on the HA cam L/R (left and right side of the mechanism). Remove the three cams.

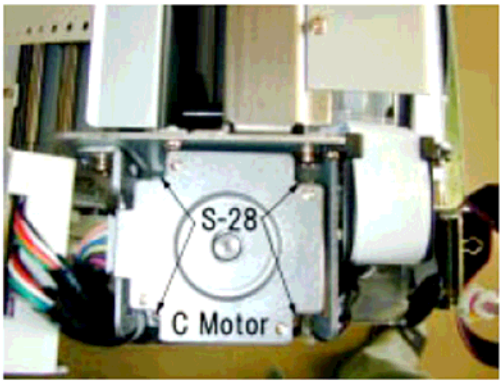


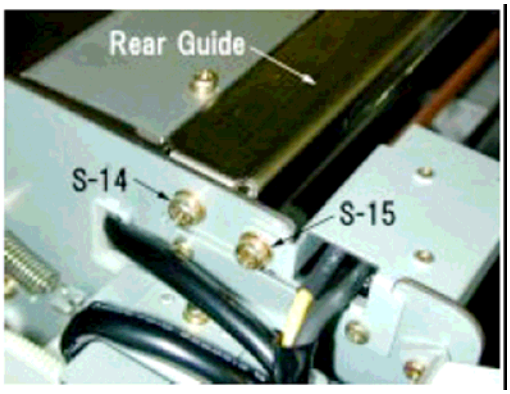
Step5: Remove the “E” rings from inside of the F guide shaft, remove the bearings.

Step6: Remove carrier cover screws, and cover.

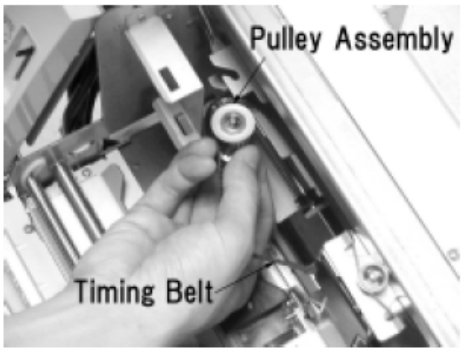


Step7: Remove the two print head screws and detach the print head FFC- A, B and C cables.
Step8: Remove the 4 captive screws that are holding the C motor to the fixing plate, then remove the timing belt from the C motor pulley. Remove the screws that are holding the rear guide to the base plate L and the base plate R. Remove the rear guide.





Step9: Remove the timing belt from the idler pulley assembly by dislocating the idler pulley assembly from its holder.



Step10: Remove the carrier assembly to the left of the printer.
Step11: Remove F guide shaft from the base plate R.

INSTALLATION
Follow the reverse of the above procedure

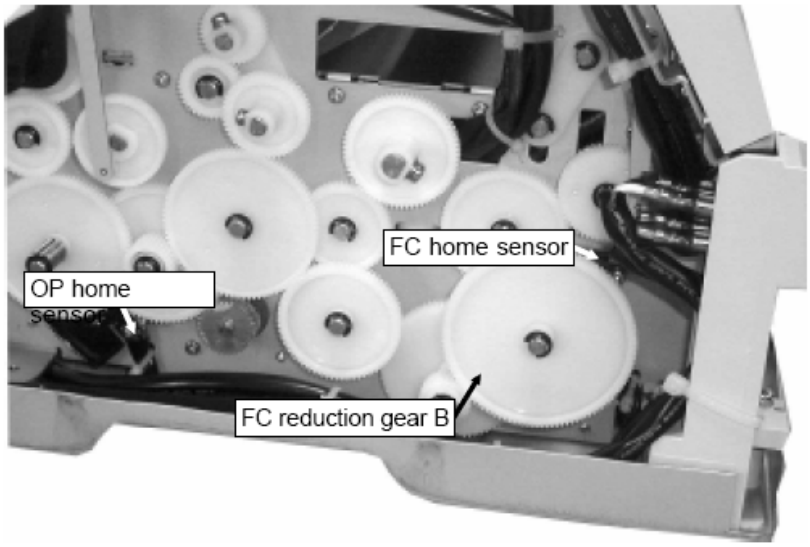
Replacement of Sensors

(1) FC Home Sensor Assembly Replacement

FC Home Sensor Assembly consists of one FC home, and one OP home sensor located on base plate L assembly.

REMOVAL

Step 1. Remove the top enclosure.
Step 2. Remove 2 pan head screws (S-17) from the mechanism stoppers left and right corners of the mechanism. Rotate the mechanism up.
Step 3. Disconnect the harnesses of FC home sensor and OP home sensor on the control PCB.
Step 4. Remove the OP home sensor 2 pan head screws (S-1), cut the tie wrap.
Step 5. Remove the E-ring (E-4) to disassemble the FC reduction gear B.
Step 6. Remove the FC home sensor 2 pan head screws (S-4) from the FC home sensor.



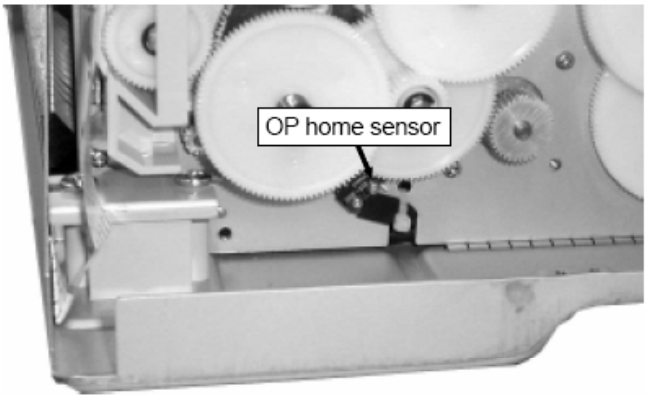
INSTALLATION
Follow the reverse of the above procedure.

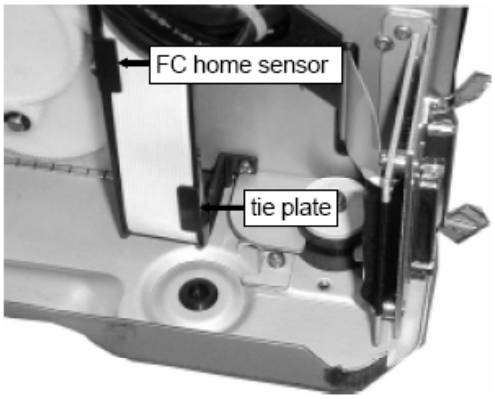
(2) FC Home Sensor B Assembly Replacement

FC Home Sensor B Assembly consists of one FC home, and one OP home sensor located on base plate R assembly.

REMOVAL

Step 1. Remove the top enclosure.
Step 2. Remove 2 pan head screws (S-17) from the mechanism stoppers left and right corners of the mechanism. Rotate the mechanism up.
Step 3. Disconnect the harnesses of FC home sensor and OP home sensor on the control PCB.
Step 4. Remove the OP home sensor, 2 pan head screws (S-1) and cutting the tie wrap.
Step 5. Remove tie plate, 4 screws.
Step 6. Remove the FC home sensor 2 pan head screws (S-4) from the FC home sensor.





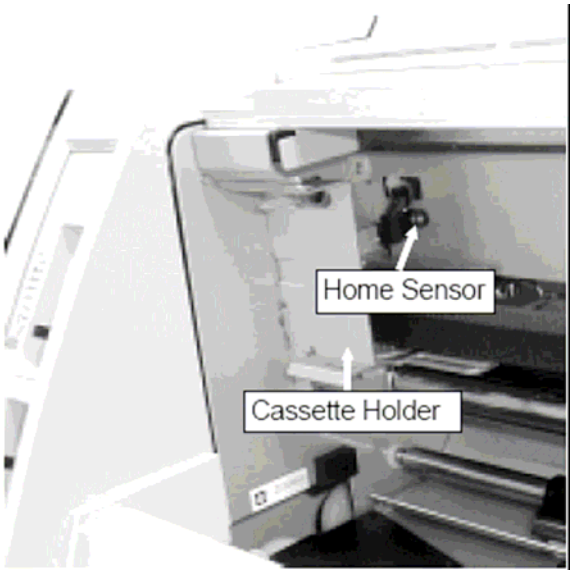
INSTALLATION
Follow the reverse of the above procedure.

(3) Home Sensor Assembly Replacement

Home Sensor Assembly is located on the left side of the FFC bottom plate assembly.

REMOVAL

Step 1. Remove the top enclosure.
Step 2. Remove 2 pan head screws (S-17) from the mechanism stoppers left and right corners of the mechanism. Rotate the mechanism up.
Step 3. Disconnect the home sensor harnesses on the control PCB.
Step 4. Remove the cassette holder L, 2 pan head screws (S-6).
Step 5. Detach the home sensor assembly by removing 2 pan head tapping screws (S-12).



(4) Paper Sensor Assembly Replacement

The Paper Sensor Assembly is located beneath the plastic molded metric scale (front printer view).

REMOVAL

Step 1. Remove the top enclosure.
Step 2. Remove 2 pan head screws (S-17) from the mechanism stoppers left and right corners of the mechanism. Rotate the mechanism up.
Step 3. Disconnect the harness of the paper sensor assembly on the control PCB.
Step 4. Remove the metric scale, 4 pan head tapping screws (S-12).
Step 5. Detach the Paper sensor assembly by removing 1 screw (S-13).

INSTALLATION
Follow the reverse of the above procedure.

(5) Paper Edge Sensor Replacement

The Paper Edge Sensor is located on the ribbon guide assembly.

REMOVAL

Step 1. Remove the carrier cover, 1 pan head screw (S-6).
Step 2. Disconnect the harnesses of the paper edge sensor from the head connecting PWB.
Step 3. Open the paper edge sensor cover by removing 1 pan head tapping screw (S-19).

INSTALLATION
Follow the reverse of the above procedure.

(6) Sensor Harness A Replacement

The Sensor Harness A Assembly is located beneath the plastic molded metric scale (front printer view). The sensor is functional when the cover is opened.

REMOVAL

Step 1. Remove the top enclosure.
Step 2. Remove 2 pan head screws (S-17) from the mechanism stoppers left and right corners of the mechanism. Rotate the mechanism up.
Step 3. Remove the paper cutter cover, 4 pan head tapping screws (S-12).
Step 4. Disconnect the connector for the sensor harness A assembly on the control PCB.
Step 5. Detach the sensor harness A assembly by removing the retaining screw (S-13).

INSTALLATION
Follow the reverse of the above procedure.

(7) HA Sensor Assembly Replacement

REMOVAL

Step 1. Remove the top enclosure.
Step 2. Remove 2 pan head screws (S-17) from the mechanism stoppers left and right corners of the mechanism. Rotate the mechanism up.
Step 3. Disconnect the HA sensor assembly harness on the control PCB.
Step 4. Detach the HA sensor assembly by removing 2 pan head tapping screws (S-3).

INSTALLATION
Follow the reverse of the above procedure.

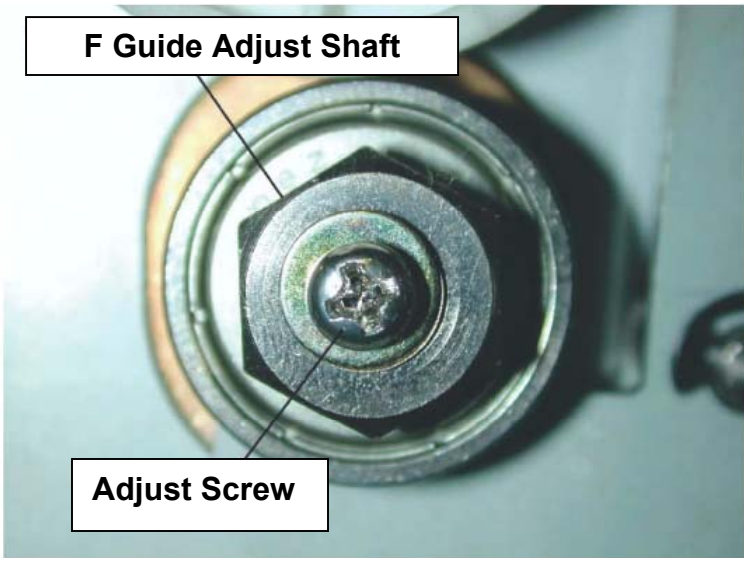
Parallelism Adjustment

F Guide Shaft Parallelism Adjustment

Parallelism is required when print darkness differs between the right and left sides of the paper. The following adjustment is intended for minor adjustment only. Contact the manufacturer for major adjustments.

PROCEDURE:

Step 1: Remove the Top Enclosure.
Step 2: Loosen the F Guide Shaft Adjust screw on the right end of the F Guide Shaft. Rotate the Shaft nut no more than 1/8" clockwise.
Step 3: Print Self-Test to verify contrast. When printing without the top enclosure on, make sure the Interlock Switch and the Cover Open/Close Switch are closed.
Note: Keep your hands away from the head during printing.
Step 4: Upon completion of the adjustment, tighten the screw.
Step 5: Run Self-Test to check whether the print darkness is uniform. If satisfied, replace the top enclosure.



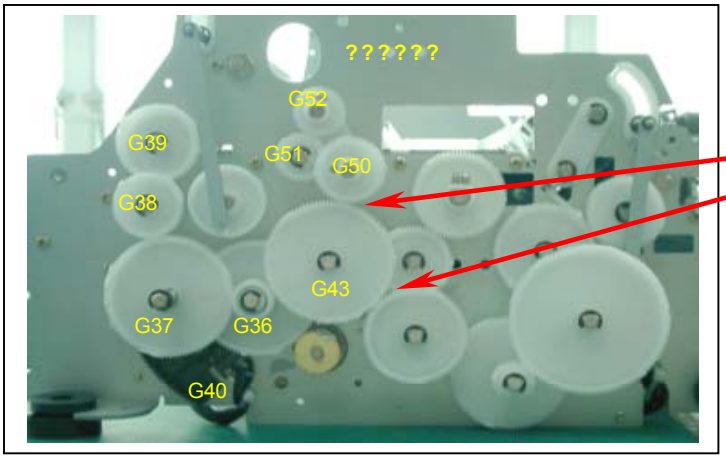
Lubrication

The manufacture specified lubricants should be used. Their usage and applicable areas are specified in the Exploded View.

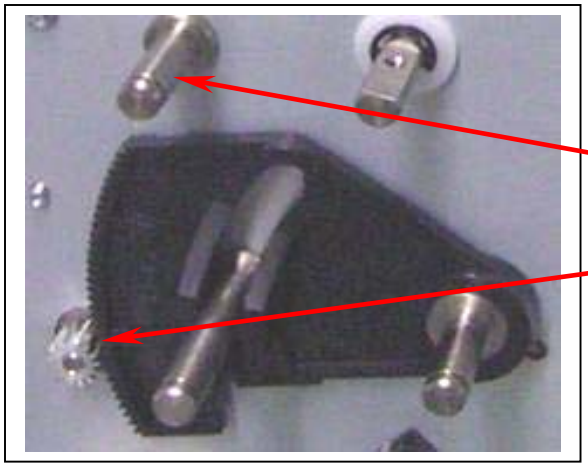
Part Numbers	Description
EM60L	Apply between plastic parts, such as gears and pinch roller holder.
SFP-6	Apply between the metal and plastic parts such as a gear and lever axle (metal stud).
HV#22	This lubricant (oil) is durable in temperature and is used for the carriage assembly. Main shaft and carriage felt washers.

**Refer to the next page for lubrication examples.*

Lubrication Examples



EM60L, between mating gears.



SFP-6, between the metal and plastic parts.

HV-22, applied to carriage felt washers and main shaft.

Electronic Repairs

Introduction

This section will limit the explanation to the operational principles of the circuitry.

The Cable Connection table below shows the interface of the electronic assembly with the mechanical assembly. You may be able to check the possibility of the connection faults or the mechanical defects at this point.

Main PCB

Main PCB

Name of PCB: FP6000K-01VB

PCBA parts

CPU MB90705H(25 MHz), QFP, 120pin
EEPROM(2k bits), SOP, 8pin
Gate array BBG010(12.5MHz), QFP, 120pin
Gate array BBG020(12.5MHz), QFP, 100pin
Gate array BBG030(12.5MHz), QFP, 100pin
Reset circuit
MC motor drive circuit (4 circuit)
Head Adjust motor drive circuit
Ribbon motor drive circuit
C motor drive circuit
LF motor drive circuit (2 circuit)
Pin drive circuit
Detector

CPU MB90705H

QFP,120 pin, Acts with 12.5 MHz(input oscillation frequency is 25 MHz), Data bus width is 8 bit and uses addresses A0-A22.

Main Function

Controlling indicator
Controlling and observing sensors
Data transmitting and receiving of serial interface
Analyzing data
DRAM control
Controlling LF motor rotation

Port Explanation

(1) X0,X1(Input): Terminal for oscillator (25 MHz)
(2) XRESET(Input): Reset signal input.
(3) A0-A22(Output): Address bus.
(4) D0-D7(I/O): Data bus.
(5) XRD, XWR(Output): Read signal, write signal.
(6) A19/A18, A17/A16(Output): Address for DRAM.
(7) XRAS, XCAS(Output): Signal for DRAM control.
(8) SYSCLK (Output):12.5 MHz (Original oscillation frequency of 25 MHz is divided into 2).
(9) HRQ(Input), XHAK(Output): DMA request, hold acknowledge. Refer to DMA item for details.
(10) Interrupt input(All input)
  INT0: HA encoder input
  INT1: Home sensor input
  INT2: HA encoder input
  INT3: Sensor interrupt input (For detection by tractor sensor, home sensor and cover open)
  DRE0: Power cutoff input
  DRE1: Centronics interface initial interrupt input
  DRE2: Centronics interface data receiving interrupt input
  DRE3: C motor position interrupt input
(11) XCS03(Output): Chip select output to gate array BBG030
(12) SCK0(Input): Basic clock input for serial transmitting and receiving signal
(13) SIN0(Input): SOUT0(Output): Data input and output of serial data interface.
(14) PB0-PB3: connect with EEPROM. Refer to EEPROM item for details.
(15) Analog input
  AN0: Detection of head temperature
  AN1: Detection of Jam sensor (front/rear)
  AN2: Detection of paper edge
  AN3: Detection of paper sensor, skew sensor and slide volume
(16) P11-P17: LCD data bus.
(17) P50, P53, P61, P65: LCD control.
(18) TOUT0(Output): Clock output for LF motor drive
(19) TOUT1(Output): Clock for C motor drive

- **MB90705H pin assignment**

Pin No.	Signal	I/O	Pin No.	Signal	I/O	Pin No.	Signal	I/O	Pin No.	Signal	I/O	Pin No.	Signal	I/O
1	A09	O	25	CAS	O	49	AN3	I	73	PC0	O	97	D02	C
2	A10	O	26	P61	O	50	INT0	I	74	PC1	O	98	D03	C
3	A11	O	27	RAS	O	51	INT1	I	75	CS3	O	99	D04	C
4	A12	O	28	A17/A16	O	52	INT2	I	76	PC3	O	100	D05	C
5	A13	O	29	A18/A19	O	53	INT3	I	77	PC4	O	101	D06	C
6	A14	O	30	P65	O	54	Vcc	P	78	PC5	O	102	D07	C
7	A15	O	31	P70	O	55	DREQ0	I	79	PC6	O	103	P10	O
8	Vcc	P	32	P71	O	56	DERQ1	I	80	SIN0	I	104	P11	O
9	A16	O	33	Vss	P	57	DREQ2	I	81	SOUT0	O	105	P12	O
10	A17	O	34	P72	O	58	DREQ3	I	82	SCLK0	I	106	P13	O
11	A18	O	35	P73	O	59	PA4	-	83	PD3	O	107	P14	C
12	A19	O	36	P74	I	60	PA5	-	84	PD4	-	108	P15	C
13	A20	O	37	TOUTO	O	61	PA6	O	85	PD5	O	109	P16	C
14	A21	O	38	TOUT1	O	62	PA7	I	86	MD3	-	110	P17	C
15	A22	O	39	P82	O	63	Vss	O	87	MD2	-	111	A00	O
16	P47	O	40	P83	O	64	PB0	O	88	MD1	-	112	A01	O
17	P50	O	41	P84	O	65	PB1	O	89	MD0	-	113	A02	O
18	RDX	O	42	AVcc	P	66	PB2	O	90	RSTX	I	114	A03	O
19	WRX	O	43	AVR+	P	67	PB3	I	91	Vss	P	115	A04	O
20	P53	O	44	AVR-	P	68	PB4	O	92	X0	I	116	A05	O
21	HRQ	I	45	AVss	P	69	PB5	O	93	X1	I	117	A06	O
22	HAK	O	46	AN0	I	70	PB6	O	94	Vcc	P	118	A07	O
23	P56	-	47	AN1	I	71	PB7	O	95	D00	C	119	Vss	P
24	CLK	O	48	AN2	I	72	CS0	-	96	D01	C	120	A08	O

EEPROM CAT93C56J
EEPROM of serial I/O of SOP, 8 pin, 2k bits.

Main Function
Maintains printer setup data (information including number of print lines, margins, starting position for printing and lateral alignment). Data is read when power is turned on, and data is written at setup and when power is turned off.

Terminals Explanation:

D0 (Output): Data output. Connect with PB3 of CPU.

D1 (Input): Data input. Connect with PB1 of CPU.

CS (Input): Chip select. Active when "High". Connect with PB2 of CPU.

CLK (Input): Clock for write/access data. Connect with PB0 of CPU.

Gate array BBG010

QFP, 120 pin. Acts at 12.5 MHz. Access is possible with addresses 100000h-10003Fh.

Main function

Pin Drive Waveform Creation

Chip select output(Control, font ROM and BBG020)

DMA controller(For printing data transmission)

- **BBG010 pin assignment**

Pin No.	Signal	I/O	Pin No.	Signal	I/O	Pin No.	Signal	I/O	Pin No.	Signal	I/O	Pin No.	Signal	I/O
1	VDD	P	25	GND	P	49	AM15	O	73	XRAS	O	97	PINA21	O
2	PINB4	O	26	PINA2	O	50	AH18	I	74	XCAS	O	98	PINA22	O
3	PINB12	O	27	PINA10	O	51	AH19	I	75	GND	P	99	PINA23	O
4	PINB3	O	28	PINA1	O	52	AH20	I	76	GND	P	100	PINA24	O
5	PINB11	O	29	PINA9	O	53	AH21	I	77	GND	P	101	PINB17	O
6	PINB2	O	30	VDD	P	54	AH22	I	78	SYSCLK	I	102	PINB18	O
7	PINB10	O	31	VDD	I	55	XGA2	O	79	GND	P	103	PINB19	O
8	PINB1	O	32	AL0	I	56	D0	C	80	DRAM9	O	104	GND	P
9	PINB9	O	33	AL1	I	57	D1	C	81	XWR	I	105	GND	P
10	PINA8	O	34	AL2	I	58	D2	C	82	XRD	I	106	GND	P
11	PINA16	O	35	AL3	I	59	D3	C	83	SYNC	I	107	PINAB20	O
12	PINA7	O	36	AL4	I	60	VDD	P	84	INTREQ	I	108	PINB21	O
13	PINA15	O	37	AL5	I	61	VDD	P	85	XRESET	I	109	PINB22	O
14	GND	P	38	XGA3	O	62	GND	P	86	XRCONT	O	110	PINB23	O
15	GND	P	39	AM8	O	63	D4	C	87	XREXT	O	111	PINB24	O
16	GND	P	40	AM9	O	64	D5	C	88	XROPT	O	112	PINB8	O
17	PINA6	O	41	AM10	O	65	D6	C	89	XRFONT	O	113	PINB16	O
18	PINA14	O	42	AM11	O	66	D7	C	90	VDD	P	114	PINB7	O
19	PINA5	O	43	AM12	O	67	MODE1	I	91	VDD	P	115	PINB15	O
20	PINA13	O	44	AM13	O	68	MODE2	I	92	GND	P	116	PINB6	O
21	PINA4	O	45	GND	P	69	XHAK	I	93	PINA17	O	117	PINB14	O
22	PINA12	O	46	GND	P	70	HREQ	O	94	PINA18	O	118	PINB5	O
23	PINA3	O	47	GND	P	71	XOE	O	95	PINA19	O	119	PINB13	O
24	PINA11	O	48	AM14	O	72	DRAM8	O	96	PINA20	O	120	VDD	P

Port Explanation

(1) AL0-AL5(Input): Address input.
(2) AM8-AM15(3 state): Output address to DRAM for DMA.
(3) DRA8, DRA9(3 state) Output address to DRAM for DMA.
(4) AH18-AH22(Input) Address input.
(5) D0-D7(I/O): Data bus.
(6) XRD, XWR(Input): Read signal, write signal.
(7) XRAS, XCAS(3 state): Control access to DRAM of DMA.
(8) XRCONT(Output): Chip select for control ROM.
(9) XROPT(Output): Chip select for Option font ROM.
(10) XRFONT(Output): Chip select for font ROM.
(11) XGA2(Output): Chip select for BBG020.
(12) HREQ(Output): XHAK(Input): For DMA request and DMA start.
(13) INTHC(Input): To inhibit pin action at C motor position interrupt.
(14) SYNC(Input): For start timing of printing.
(15) SYSCLK(Input): 12.5 MHz clock.
(16) XRESET(Input): Reset signal.
(17) PINA1-24(Output, open drain): Pin waveform output.

Gate array BBG020
QFP, 100pin. Acts at 12.5 MHz. Access is possible with addresses 140000h-14003Fh.

Main Function

Controlling C motor rotation
Controlling LF motor rotation
Controlling ribbon motor rotation
Controlling head adjust motor rotation
Controlling MC motor rotation
Sensor interrupt output
C motor position interrupt output
Paper sensor input
Home sensor input
Cover open A input
Sensor input control
Buzzer control

- **BBG020 pin assignment**

Pin No.	Signal	I/O	Pin No.	Signal	I/O	Pin No.	Signal	I/O	Pin No.	Signal	I/O	Pin No.	Signal	I/O
1	HCDR5	O	21	XLFXB	O	41	THRSHLD3	O	61	DS4	I	81	XIN	I
2	VDD	P	22	LFDR2	O	42	THRSHLD4	O	62	SSIN	I	82	MODE20	I
3	VDD	P	23	HAA	O	43	GND	P	63	SSLTCH	O	83	MODE21	I
4	XHCA	O	24	RBDR0	O	44	D0	C	64	SSCLK	O	84	IREQ0	I
5	HCDR0	O	25	HAXA	O	45	D1	C	65	GND	P	85	IREQ1	I
6	XHCXA	O	26	RBDR1	O	46	D2	C	66	GND	P	86	XCSIN	I
7	HCDR2	O	27	HAB	O	47	D3	C	67	GND	P	87	XRD	I
8	XHCB	O	28	HADR0	O	48	D4	C	68	SYNC0	I	88	XWR	I
9	HCDR1	O	29	HAXB	O	49	D5	C	69	SYNC1	I	89	TEST1	I
10	XHCXB	O	30	MCDR0	O	50	D6	C	70	DS5	I	90	XRESET	I
11	HCDR3	O	31	AUX12	I	51	D7	C	71	DS6	I	91	AUXI1	I
12	XLFA	O	32	GND	P	52	VDD	P	72	DS7	I	92	RBA	O
13	HCDR4	O	33	A0	I	53	VDD	P	73	DS8	I	93	RBXA	O
14	GND	P	34	A1	I	54	AUXO0	O	74	LMP0	P	94	RBB	O
15	GND	P	35	A2	I	55	AUXO1	O	75	LMP1	P	95	RBXB	O
16	GND	P	36	A3	I	56	AUXO2	O	76	TEST0	I	96	MCA	O
17	XLFXA	O	37	A4	I	57	AUXO3	O	77	BUZZ	O	97	MCB	O
18	LFDR0	O	38	A5	I	58	DS1	I	78	AUX10	I	98	GND	P
19	XLFB	O	39	THRSHLD1	O	59	DS2	I	79	PWCNT	O	99	MCXA	O
20	LFDR1	O	40	THRSHLD2	O	60	DS3	I	80	XEXCUR	I	100	MCXB	O

Port Explanation

(1) A0-A5 (Input): Address bus.
(2) D0-D7 (I/O): Data bus.
(3) XCSIN (Input): Chip select.
(4) XRD, XWR (Input): Read signal, write signal.
(5) IREQ1 (Output): This signal turns to "High" at sensor interrupt. Refer to CPU INT3 item.
(6) DS1, 4, 5(Input): Sensor input.
(7) AUXO1-3 (Output): For setting LF motor current.
(8) SYNC0 (Input): Clock for C motor rotation, detects the edge of this signal and turns C motor.
(9) SYNC1 (Input): Clock for LF motor rotation. Detects the edge of this signal and turns LF motor.
(10) BUZZ (Output): Signal for piezoelectric buzzer drive.
(11) HCA, HCB, HCXA, HCXB (Output, open-drain): Signal for C motor drive.
(12) HCDR0-4(Output): For setting C motor current.
(13) LFA, LFB, LFXA, LFXB (Output, open-drain): Signal for LF motor drive.
(14) LFDR0-LFDR2 (Output): For setting LF motor current.
(15) RBA, RBB, RBXA, RBXB (Output, open-drain): Signal for Ribbon motor drive.
(16) RBDR0-RBDR1 (Output): For setting ribbon motor current.
(17) HAA, HAB, HAXA, HAXB (Output, open-drain): Signal for HA motor drive.
(18) HADRO (Output): For setting HA motor current.
(19) MCA, MCB, MCXA, MCXB (Output, open-drain): Signal for MC motor drive.
(20) XRESET (Input): Reset signal.
(21) XIN(Input): 12.5 MHz clock.

Gate array BBG030
QFP, 100pin. Acts at 12.5 MHz. Access is possible with addresses 0000C0h-0000FFh.

Main Function

Controls centronics I/F
Controls serial I/F

Port Explanation

(1) A0-A5(Input): Address bus.
(2) D0-D7(I/O): Data bus.
(3) XCSIN(Input): Chip select.
(4) XRD, XWR(Input): Read signal, write signal.
(5) INTREQ(Output): "High" for centronics I/F initial input.
(6) DTXREQ(Output): "High" for centronics I/F data input.
(7) SYNC0(Input): 12.5 MHz clock.
(8) SYNC2(Output): Clock for serial I/F baud setting.
(9) CDATA0-7(Input): Centronics I/F data input.
(10) XACK, BUSY, POUT, XERR, SLCTOUT(Output): Centronics I/F signal.
(11) XSTB, XATFD, XINIT, XSLCTIN(Input): Centronics I/F signal.
(12) DTR(Output): Serial I/F signal.
(13) CTS(Input): Serial I/F signal.
(14) SWCLK, SWLTCH(Output): For detection of Panel key.
(15) SWIN(Input): For detection of Panel key.
(16) ENCODE2-3(Input): For detection of HA encoder.

- **BBG030 pin assignment**

Pin No.	Signal	I/O	Pin No.	Signal	I/O	Pin No.	Signal	I/O	Pin No.	Signal	I/O	Pin No.	Signal	I/O
1	MODE31	I	21	CDATA0	B	41	B-READY	O	61	SSCLK	O	81	RDY	O
2	VDD	P	22	CDATA1	B	42	B-RST	O	62	SSLT	O	82	XWR	I
3	VDD	P	23	CDATA2	B	43	B-INH	O	63	SSIN	I	83	XRD	I
4	RTS	O	24	CDATA3	B	44	B-STA2	I	64	SSOUT	O	84	D7	B
5	DTR	O	25	CDATA4	B	45	B-STA1	I	65	RSV3	O	85	D6	B
6	SRTS	O	26	CDATA5	B	46	B-STA0	I	66	GND	P	86	D5	B
7	SRCNT3	O	27	VDD	P	47	B-STA3	I	67	GND	P	87	D4	B
8	CTS	I	28	VDD	P	48	GND	P	68	SYNC2	O	88	GND	P
9	DSR	I	29	CDATA6	B	49	B-WR	O	69	SYNC1	O	89	D3	B
10	CD	I	30	CDATA7	B	50	B-RD	O	70	INTRQ	O	90	D2	B
11	SRSTA3	I	31	GND	P	51	B-CS	O	71	DTXRQ	O	91	D1	B
12	IFCNT0	B	32	XSTB	I	52	VDD	P	72	THRS3	O	92	D0	B
13	IFCNT1	B	33	XACK	O	53	VDD	P	73	THRS2	O	93	XCS	I
14	IFCNT2	B	34	BUSY	O	54	TYBA2	B	74	THRS0	O	94	A5	I
15	IFCNT3	B	35	POUT	O	55	TYBA3	B	75	THRS1	O	95	A4	I
16	GND	P	36	XATFD	B	56	TYBA0	B	76	GND	P	96	A3	I
17	IFTYP0	I	37	XINIT	B	57	TYBA1	B	77	VDD	P	97	A2	I
18	IFTYP1	I	38	XERR	O	58	GND	P	78	VDD	P	98	A1	I
19	IFTYP2	I	39	XSLCTIN	B	59	TXSTB	I	79	XRST	I	99	A0	I
20	IFTUP3	I	40	SLCTO	O	60	XTXPW	O	80	SYNC0	I	100	MODE30	I

Regarding DMA

BBG010 transfers printing data to BBG010 directly by DMA from DRAM without going through the CPU in order to transmit data developed in DRAM to BBG010 from DRAM at high speed (DMA: Direct Memory Access). The following is an explanation of this process.

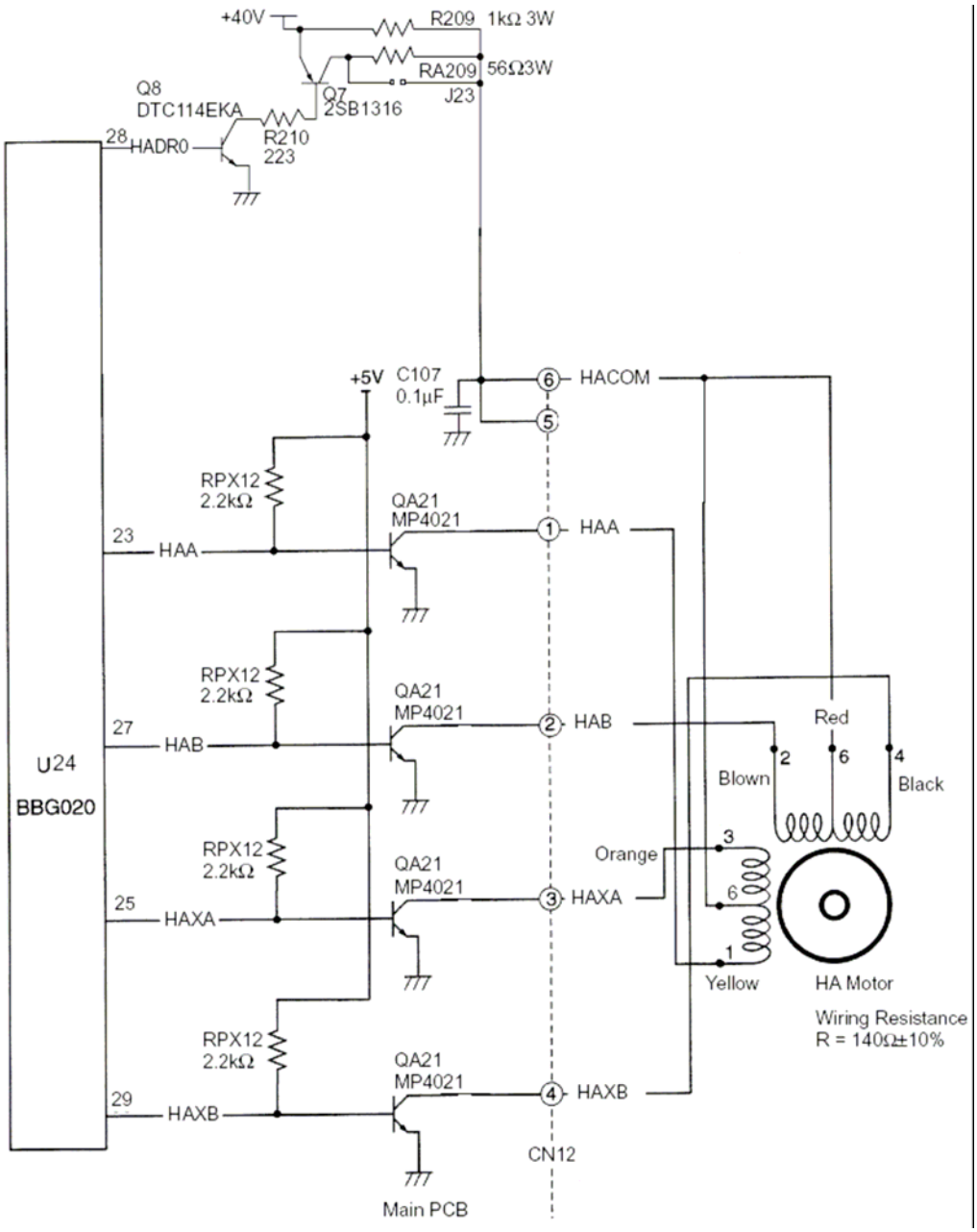
1. The CPU gives the first address of pin cycle, pin drive time, printing direction and pin buffer and moves the C motor for the head to reach printing position. When the LFCK signal is turned 0 → 1 → 0 or 1 → 0 → 1 (one of these will be selected according to printing direction), printing starts.
2. Dot timing of the leading pin starts at the first edge of LFCK and dot timing of the next successive pin starts at next edge. This dot timing refers to the time that it takes the carriage head to move 1/720 inch.
3. DMA is operated according to the dot timing of each successive pin.
   3.1 HRQ of BBG010 becomes "High".
   3.2 When the CPU acknowledges hold (bus is released), XHAK becomes "High".
   3.3 BBG010 transfers printing data to the printing buffer in BBG010 from 6 bytes of DRAM.
   3.4 After transferring data, BBG010 turns HRQ to "Low".
   3.5 The CPU operates and XHAK becomes "High".
4. DMA repeats dot timing cycle until printing is completed.

HA Motor Driver Circuitry

The HA motor is a 4-phase stepper motor, driven by double-phase, and controlled by BBG020.

During standby, transistor Q7 is turned OFF and the HA motor is supplied with standby current from the 40 V power line through R209. This standby current is necessary to stop the HA motor smoothly.

When the HADR0 signal (U24/28) goes HIGH, current is supplied to the HA motor through Q7. Thereafter, each phase is turned ON or OFF, in turn, to revolve the HA motor.

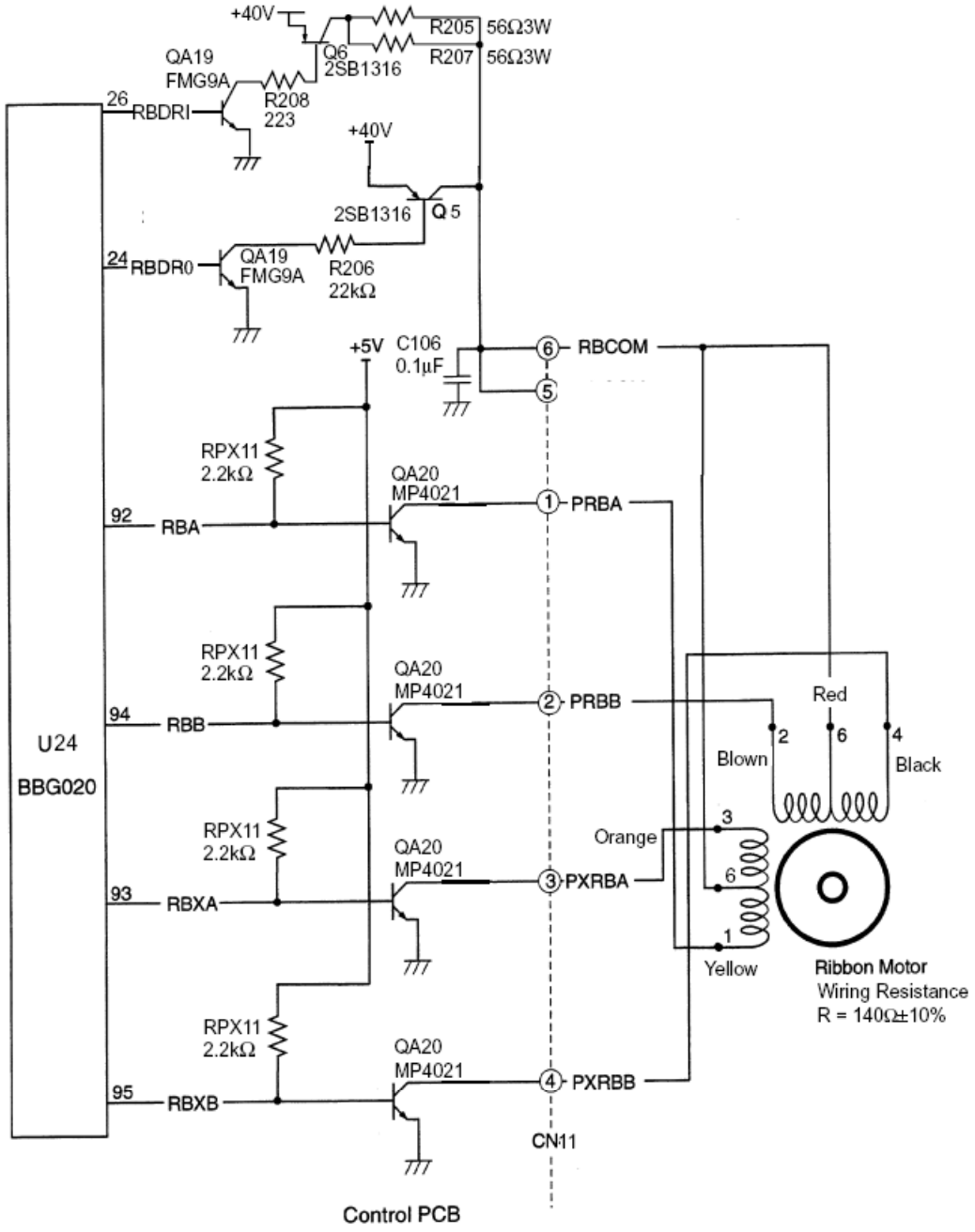


Ribbon Motor Driver Circuitry

The ribbon motor is a 4-phase stepper motor, driven by double-phase, and controlled by BBG020.

During standby, transistor Q5 is turned OFF and Q6 is turned ON so that the ribbon motor is supplied with standby current from the 40 V power line through R205 and R207. This standby current is necessary to stop the ribbon motor smoothly.

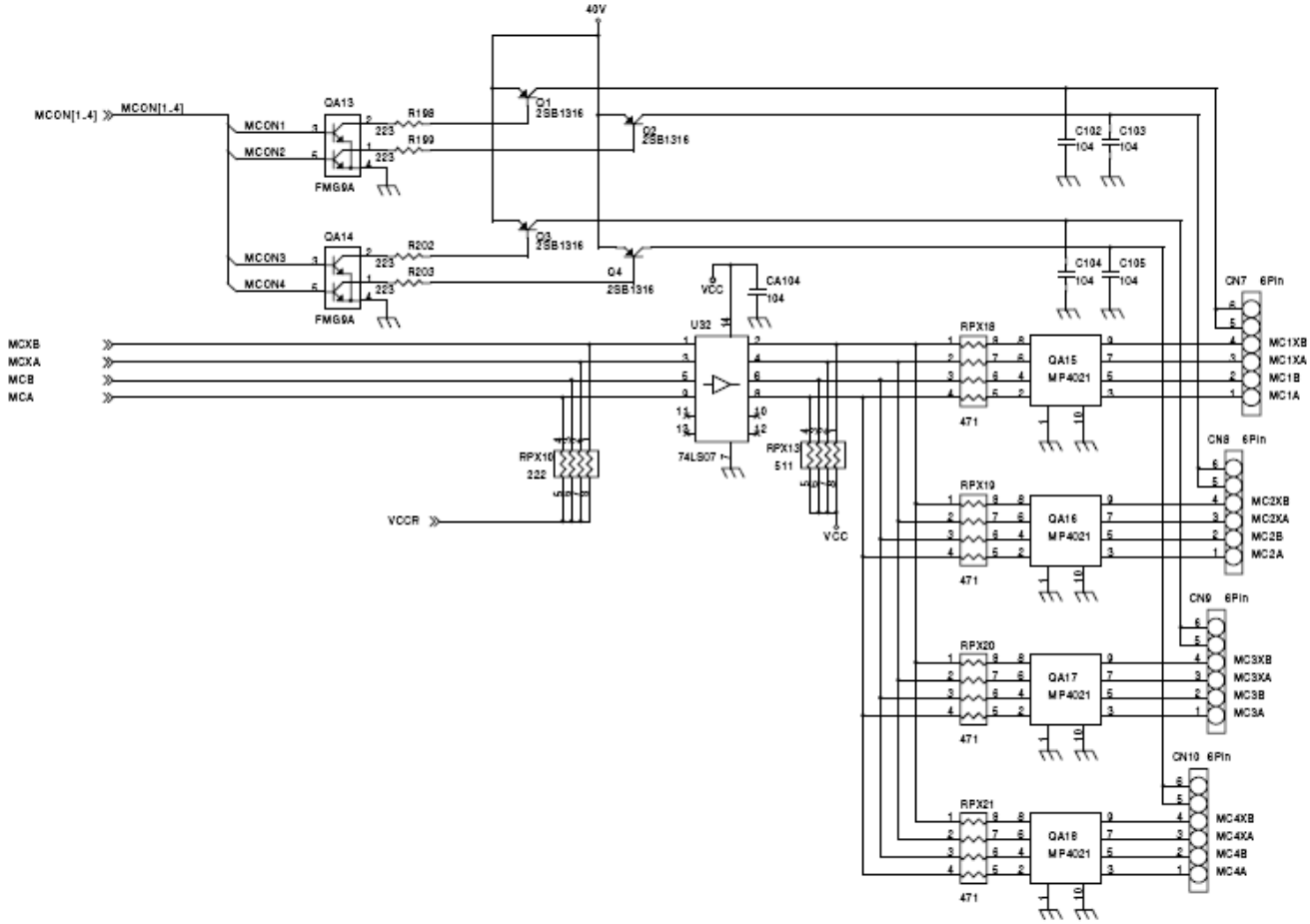
When the RBDR0 signal(U24/24) goes HIGH, current is supplied to the ribbon motor through Q5. Thereafter, each phase is turned ON or OFF, in turn, to revolve the ribbon motor.



MC Motor Driver Circuitry

The MC motors are 4-phase stepper motors, driven by double-phase, and controlled by BBG020.

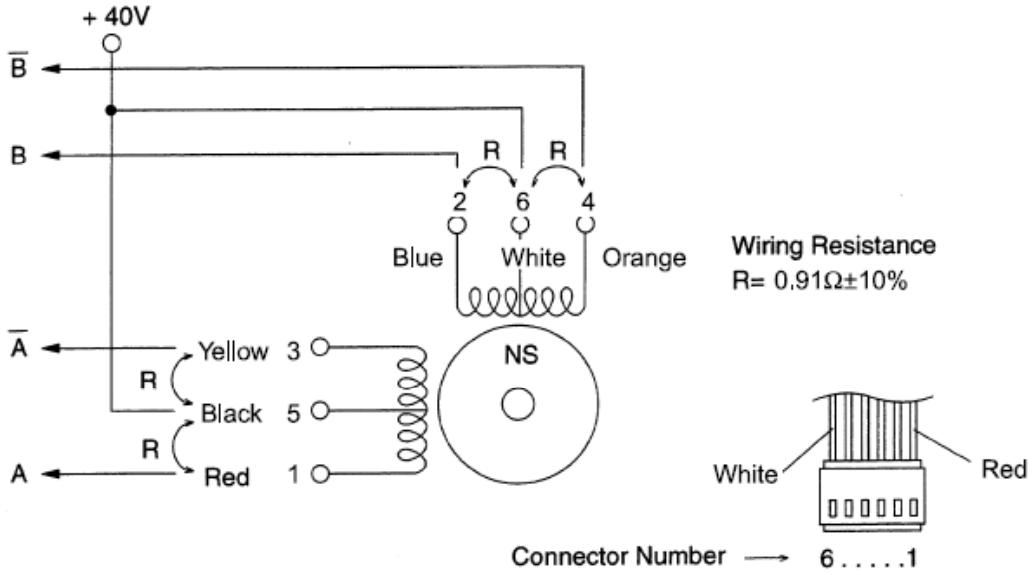
There are four MC motors: MC1 to MC4. To select a motor to operate, set the motor's corresponding signal of MCON1 through MCON4 to HIGH. Only one motor may be operated at a single time; it is impossible to simultaneously run two or more motors.



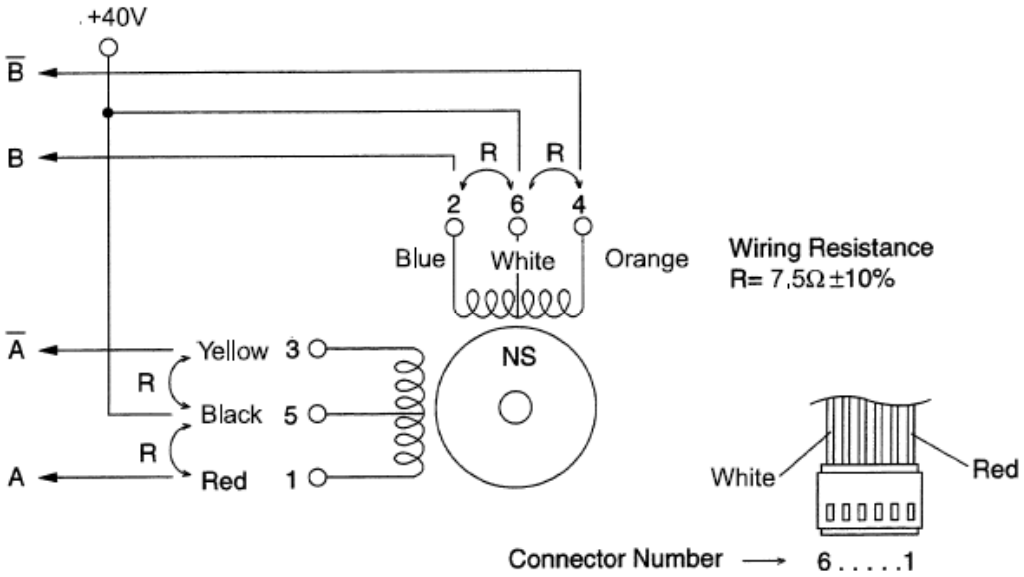
LF/HC Motor Driver Circuitry

The line feed (LF) motor and head carriage (C) motor are both a 4-phase stepper motor, driven by 1/2 phase (C motor) or 2-phase (LF Motor), and controlled by U24 (BBG020) and U1(CPU). The signals (LF motor: LFA, LFB, XLFA, XLFB, LFBA, LFBB, LFBXA, LFBXB and C motor. HCA, HCB, XHCA, XHCB) are phase drive signals, which controls the direction and the step width of the motor. LFDR0-2, LFBDR0-2, HCDR0-4, and HCST are current control signals, which controls the speed of motor.

C Motor Wiring



LF Motor Wiring



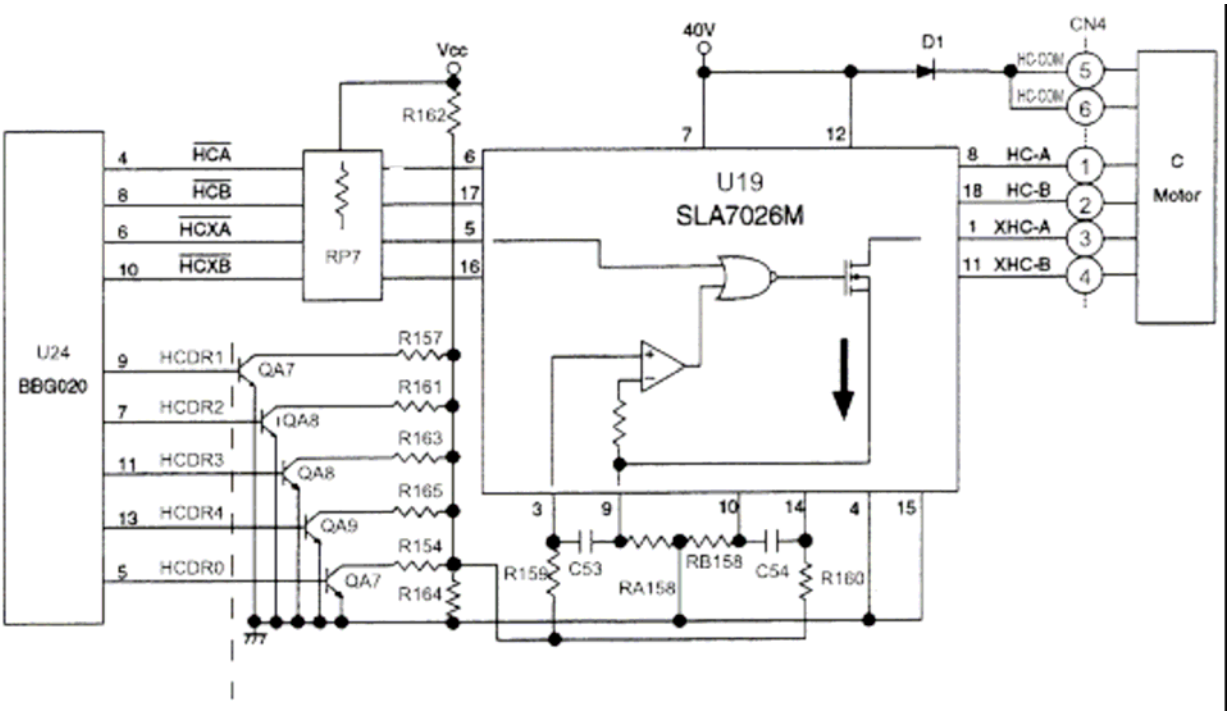
C motor drive circuit

C motor uses a 4-phase stepper, and it is set in single phase by BBG020 at standby 1/2-phase at rotation of the motor.

The current value reaching the motor is decided by turning on HCDR0–HCDR4.

Drive Method

Data control signals from the gate array consist of a speed control and phase signals. The speed control signal is set at a certain voltage level by transistors Q8, Q9, Q10, Q12 and Q11 and resistors R58, R59, R60, R76 and R61, and is supplied to P2. This voltage level determines how P2 controls the current, which flows to the motor.



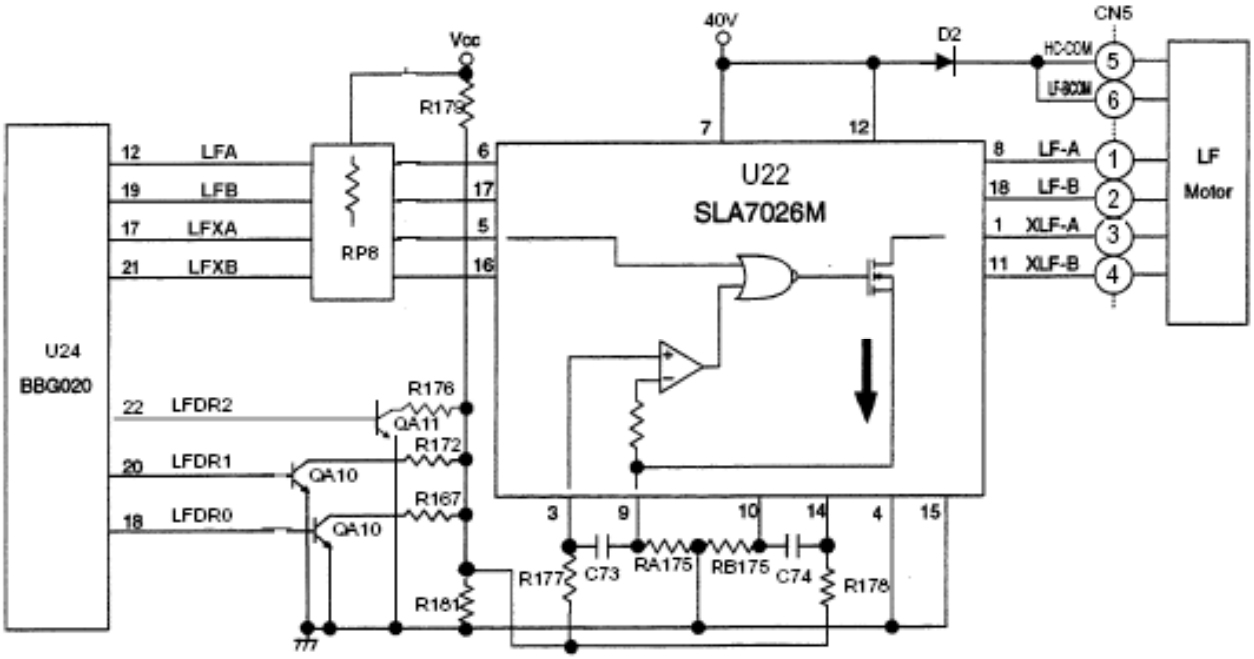
LF motor (front) drive circuit

LF motor uses a 4-phase stepping motor, and it is set in single phase by BBG020 at standby and double phase at rotation of the motor.

Current value, which flows to the motor, is decided by turning on LFDR0-LFDR2.

Drive method

Data control signals from gate array consist of speed control and phase signals. The speed control signal is set at a certain voltage level by transistors QA10, QA11 and resistor R167, R172 and R179, and is supplied to U22. This voltage level determines how U22 controls the current, which flows to the motor.



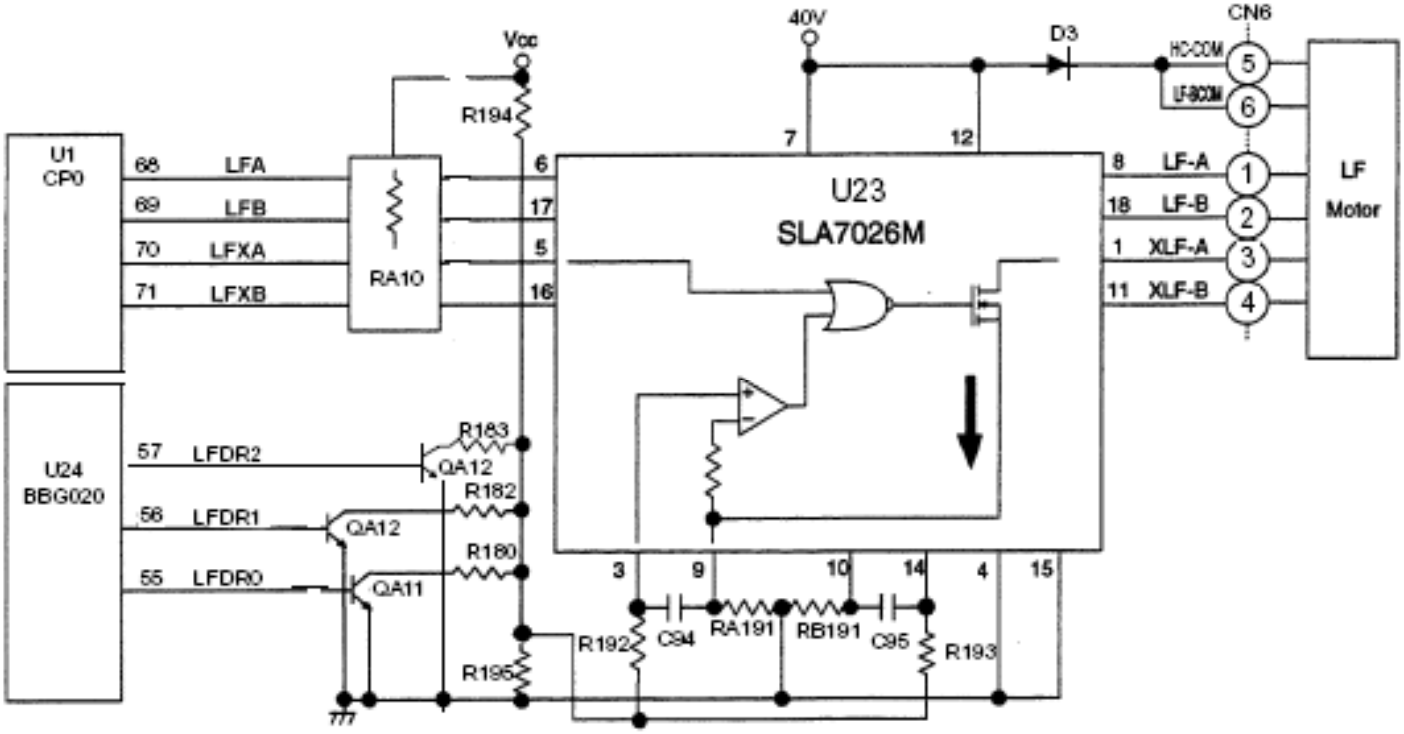
LF motor (rear) drive circuit (LFB)

LF motor uses a 4-phase stepping motor, and it is set in single-phase excitation by MB90705H at standby and double phase excitation at rotation of the motor.

Current value, which flows to the motor, is decided by turning on LFBDR0-LFBDR2.

Drive method

Data control signals from gate array consist of speed control and phase signals. The speed control signal is set at a certain voltage level by transistors QA11, QA12 and resistor R180, R182 and R183, and is supplied to U23. This voltage level determines how U23 controls the current, which flows to the motor.



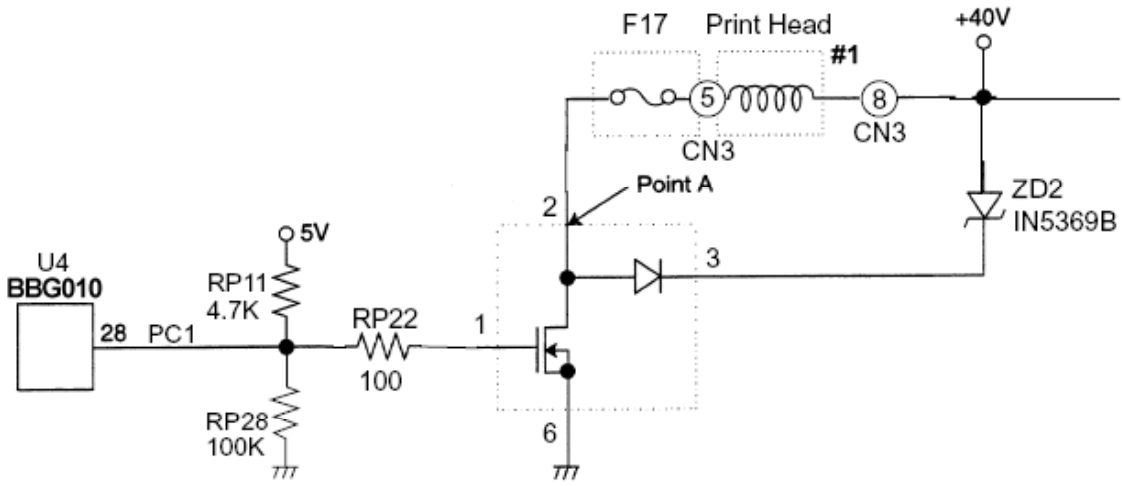
Print Pin Driver Circuitry

The control signal from Gate Array turns on or off the transistors SMA5106 (QA1-QA6). When the transistor is turned ON, the current starts flowing out of the print pin coil and producing the pin striking force due to a electromagnetic phenomenon.

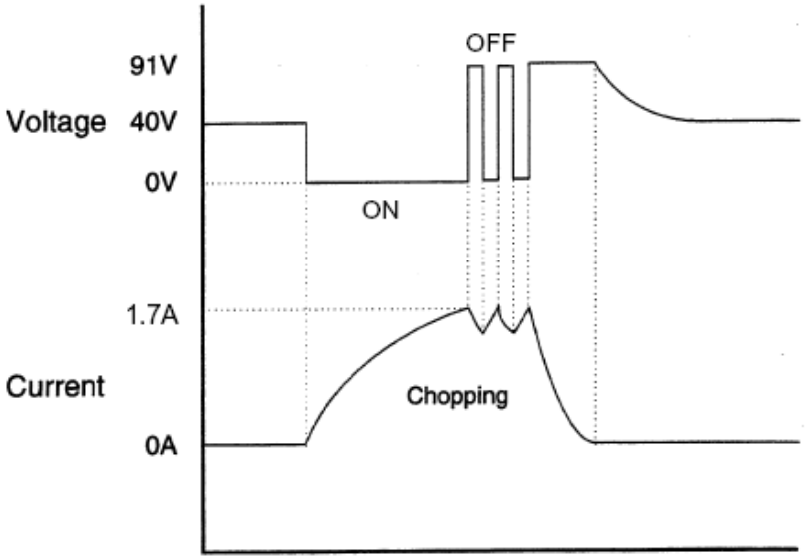
When the transistor is turned OFF, the current persists to flow due to the existing electromagnetic field and creates negative high voltage at point A.

The print pin is activated for a period of 120μ to 128μ seconds, and then continues several repetition of OFF for 3.2μ seconds and ON for 19.2μ seconds. The activated period depends on the print density (multipart mode).

In the case of Pin #1

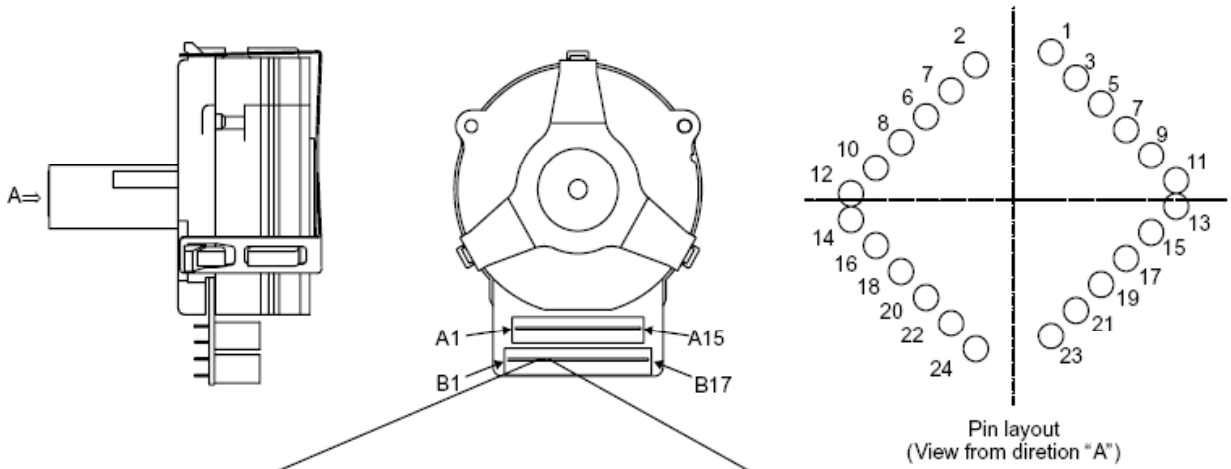


Voltage and Current at the point A



Printhead Pin Configuration

The print head has 32 pin terminals. Approximately 14.7 ohms of resistance should be measured between COMMON terminal and each pin terminal.



Connector No.	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15
PIN No.	15	7	5	9	23	21	C	C	24	22	6	2	20	4	16

Connector No.	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15	B16	B17
PIN No.	T2	C	11	T19	T1	17	13	C	18	C	10	14	1	12	8	C	3

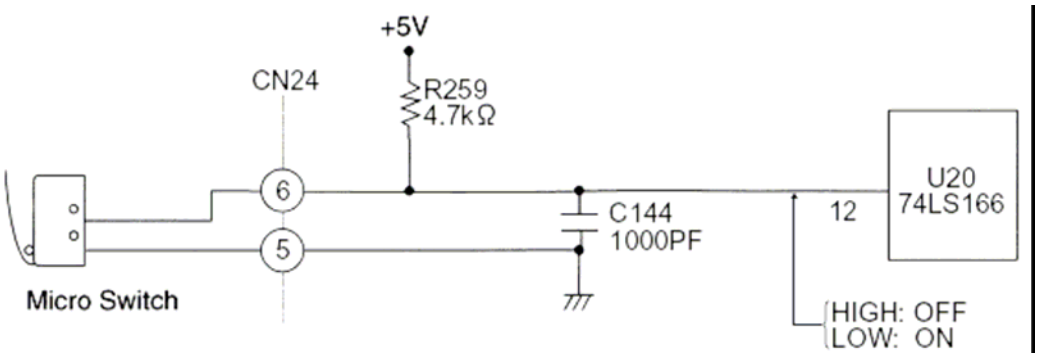
C: Common
T1, T2:Thermistor

When high temperature is detected in the print head, the printer automatically takes the following actions:

Temperature > 115°C (Voltage at the test point TP 11 > 3.98V)
Stop printing, and then moves the carrier in full printing width.
Temperature > 110°C (Voltage at the test point TP 11 > 3.85V) Reverse logic seek

Detecting Circuitry

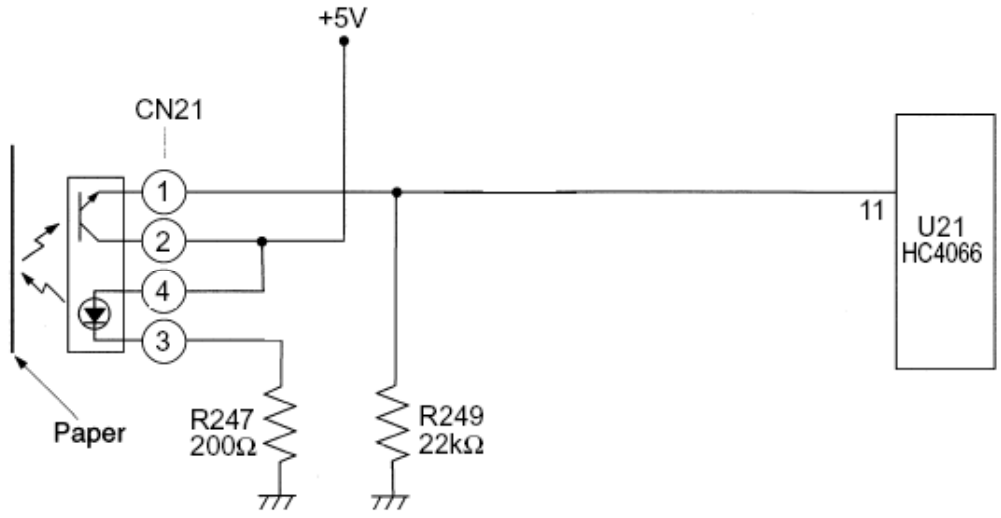
MC sensor (Rear tractor)
When the rear tractor is selected, the micro switch turns ON, causing No. 12 of U20 to set to LOW.



Note: MC Sensor (Front tractor), Tractor Paper Sensor (Rear/Front) belong to this circuit type. Refer to the circuit diagram for those details.

Paper Empty Detector

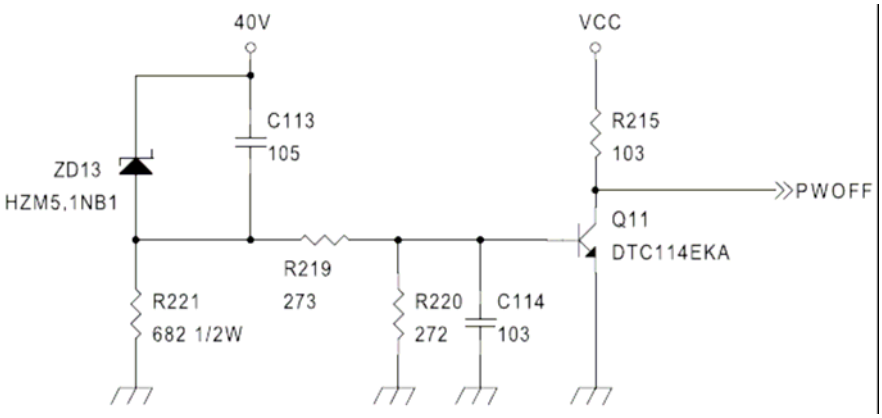
A photo-reflector type sensor is used to detect a paper empty condition.



Note: Circuit type: Edge Sensor ,Skew Sensor and Jam Sensor (Rear/Front)

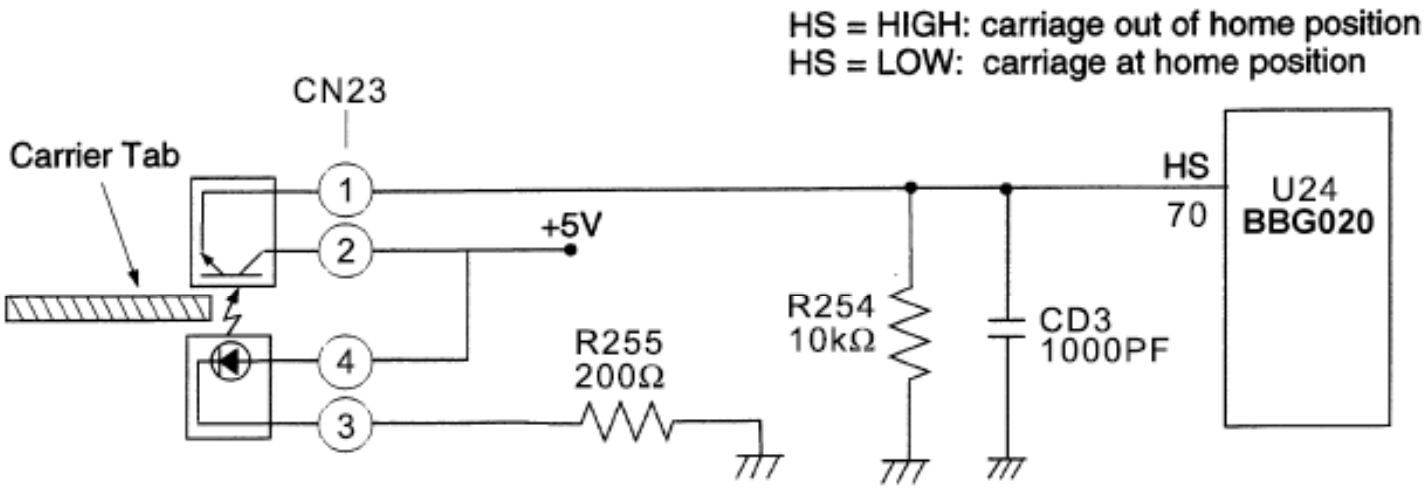
Power cutoff detection

When the power of the CPU is cutoff or 40 V system power voltage falls below 30 V due to trouble, PWOFF signal turns to "1" and the CPU is interrupted. When the CPU accepts this interrupt, it finishes all printing and mechanical action and writes necessary data (present paper position) to EEPROM. During approx. 500 msec. after detection of PWOFF signal, power voltage of 5 V system is assured.



Home Sensor

A photo-interrupter type sensor is used to detect a carrier position. If the voltage level at HS (U24/ 70) is LOW, the printer detects the carrier at home position. If the carrier is out of the home position, the voltage level is HIGH.



Note: Circuit type: Head Adjust Sensor, Cover Open Sensor and Mc Sensor (front/rear friction)

Power Supply PCB

Outline

This is a self-oscillating, RCC type switching power supply circuit. The output voltage is controlled by the switching frequency. The rated input is 120V, 60Hz for U.S.A. and 100V for JAPAN setting (adding to the Jumper at CN2) and 230V, 50Hz for European setting (Removing the Jumper at CN2). The output voltages are +40V, and +5V. To stabilize the output voltages, the switching frequency of the HIC (P1) in the primary circuitry is controlled by the signal feed back from the +40V output voltage detection circuitry through the photo-coupler (PC2).

Operations

See the voltage waveform and circuit diagrams.

(1) Power switch is turned on.
(2) The DC voltage Vin is converted through the rectifying circuitry (DB1, L2, C7, C8) and is supplied to the HIC (P1) through initial one-time flow resistor (R5). The P1 starts oscillating when the 4 pin of P1 reaches 16V.
(3) Initiated by the oscillation of P1, the Power MOSFET (in P1) is turned ON, then the current starts flowing through C7 (+) → TR1 (5→2) → P1 (4→2) → R2 → C8 (-).
(4) The drain current at P1 increases in proportion to the ON time interval of P1 due to the transformer (TR1) inductance.
(5) When P1 is ON and the current flows in the primary coil (5-2) of the transformer (TR1), the voltage is generated on the control coil (6-7) of the TR1. The voltage is rectified through D2 and C11 and is supplied to the Vcc of the P1 at approximately 20V to sustain the oscillation in P1. At that time, the voltages for 40V is also generated in the secondary coil (12,13-15,16) of the TR1.
(6) The voltage in the secondary coil (12,13) is rectified through the diode D7 and smoothed by C16 and C17.
(7) When the voltage exceeds +40V in the output and reaches over the rated value of the Zener diode (ZD5) at the voltage level divided down by the ratio of R19 and R20, the transistorQ1) is turned on. Simultaneously, the photo-couplerPC2) is turned on. Consequently it increases the voltage on OCP/FB1 pin) of P1 and the switching frequency of P1, and it decreases the output voltages. When the output voltages decrease below 40V the PC2 is turned off. It in turn, increases the output voltages.
(8) By the repetition of the process at step 7 above, +40V output voltage is stabilized. Because the current flow in the PC2 responds linearly and inversely proportional to the load, the switching frequency of the P1 is controlled to stabilize at the +40V output.
(9) +5V output voltage is also leveled to a constant value by the chopper operation in the regulator IC (P2) and smoothing circuit. +40V output voltage flows into P2 and generates a square waveform with a different duty ratio by the switching on and off operation (chopper operation). These square waves are flattened and smoothed out to be in 5V voltage level in the rectifying circuitry

Troubleshooting flow

Power Supply PCB Troubleshooting flow.

When the power switch is turned on.

Is AC power cord properly attached?
• Turn the power switch off then reinstall the power cord again.

Fuse blown?
• Check the jumper of CN2 (for 100V/120V model).
• Check fuses (F1, F2) on the power PCB.

Check the output voltage on the secondary circuit on the Power Supply PCB.
• Test points for those output voltage are located near the Capacitor C16.

Test Point	Location
Ground	Heat sink panel of D7
+40V	Lead of FB2
+5V	Lead of FB3

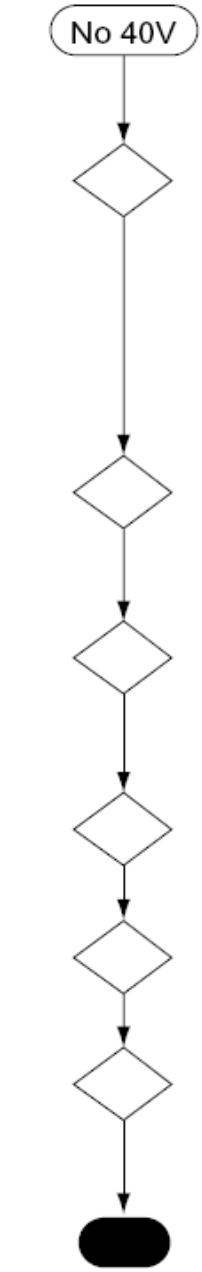
Caution:
Do not cross the test point with the ground line on the PCB. A short may damage the component.

Check the appearance of the components for any abnormality.

Note:
Basically when troubleshooting the target device, the device must be isolated from other device. User the proper loads for the device to obtain the correct measures.

Load in condition of printer	Current Consumption	
	40V	5V
Standby	0.5A	600mA
"K" character printing	3A	600mA

Current Consumption



(First, check 40V-generating circuit, because +5V is regulated from the 40V output.)

If using a “X100” attenuator built-in probe, check the waveform at 200KHz frequency between the drain of P1 and primary GND (heat sink panel of P1). Else check all following possibilities.

P1 OK?

- Check the resistance between the drain and source of P1. Make sure it is not shorted.

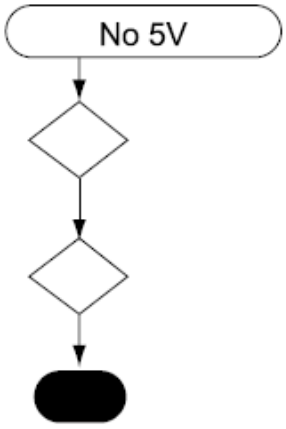
P1 OK?
Check the waveform at pin 3 of P1.

R4, R5 OK? If not, replace.

SCR1, SCR2 OK? If not, replace.

PC2, Q1, ZD2, ZD5, ZD4, R19, R20 OK? If not, replace.

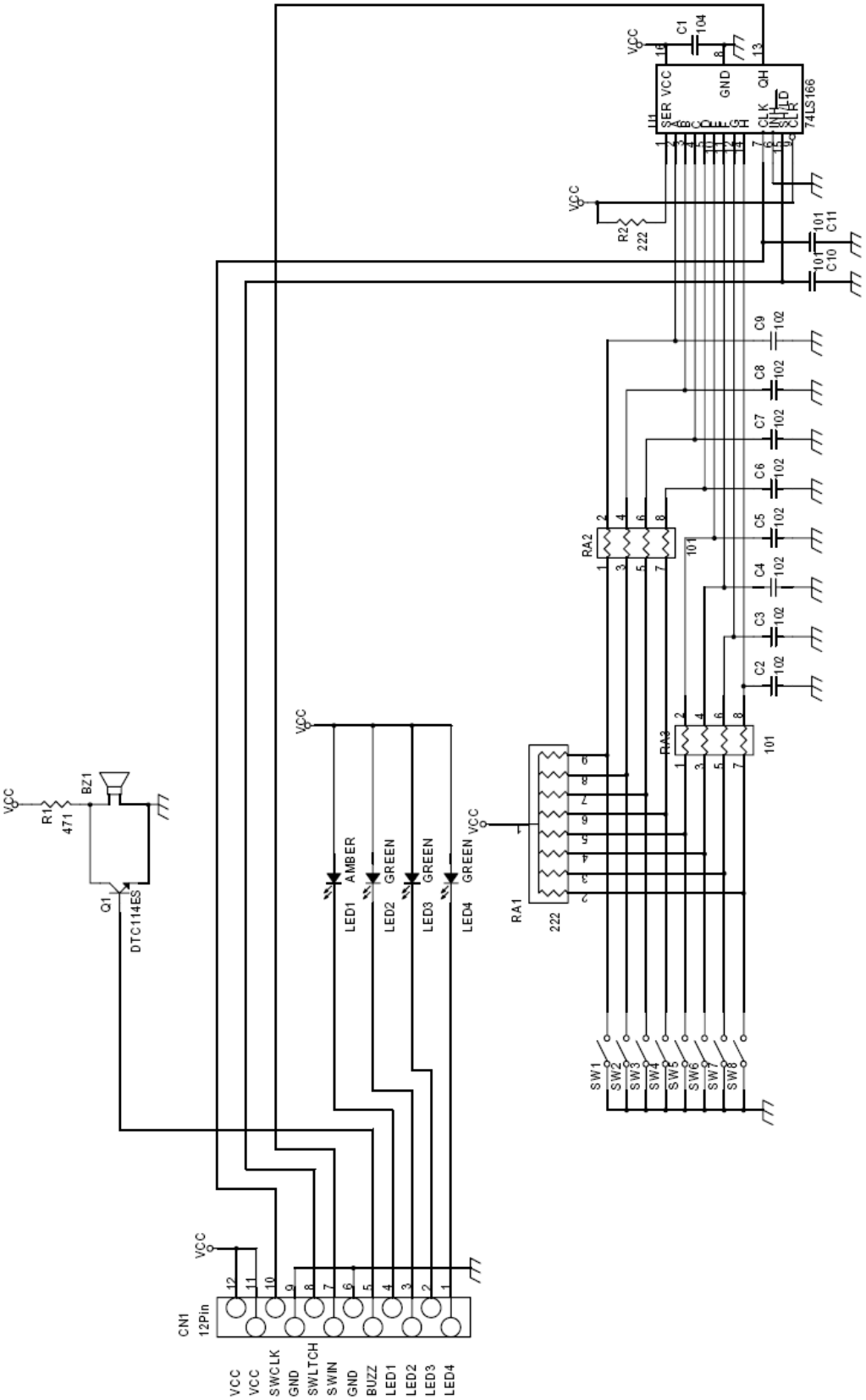
If still no 40V, consult your dealer.



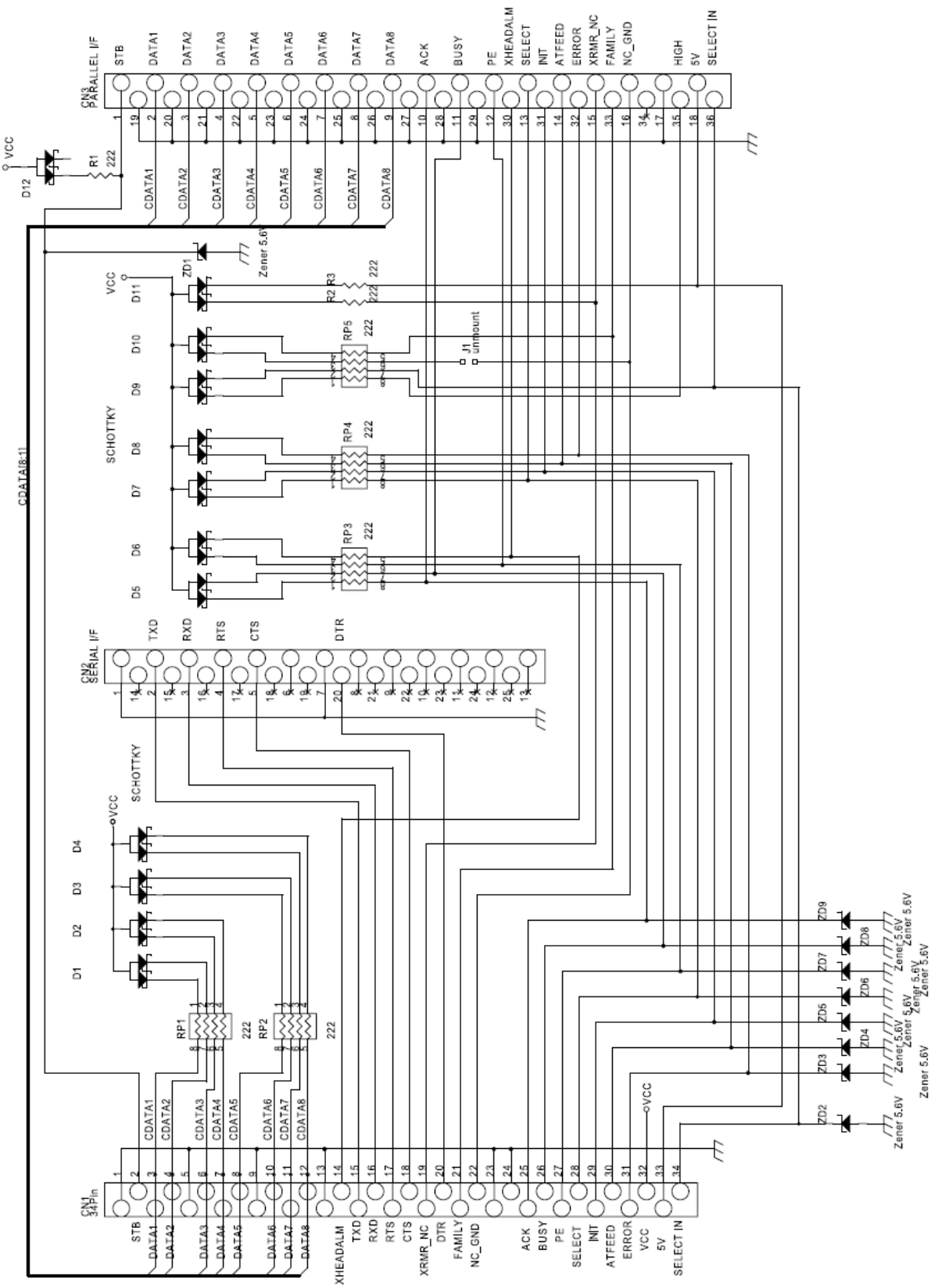
F2 fuse, P2, ZD3 OK? If not, replace

If no +5V, check FB3.
If still no +5V, consult your dealer.

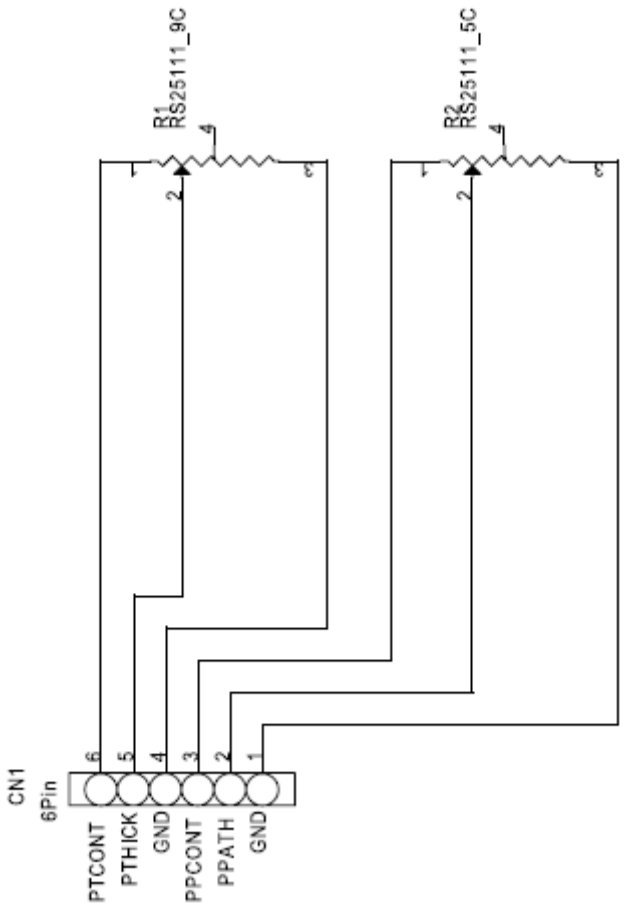
Indicator Circuit



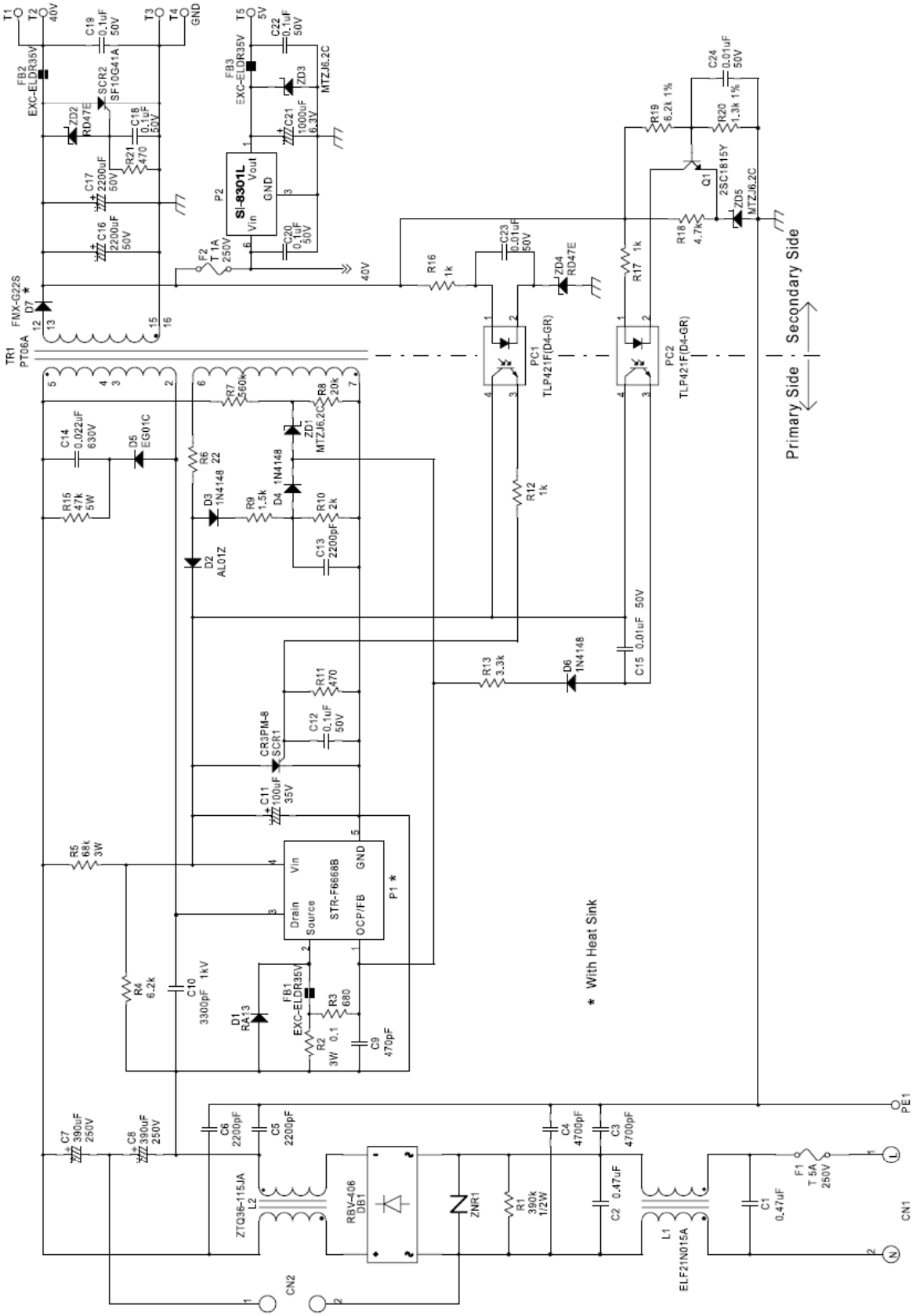
I/F Circuit


CN3
PARALLEL I/F
STB
DATA1
DATA2
DATA3
DATA4
DATA5
DATA6
DATA7
DATA8
ACK
BUSY
PE
XHEADALM
SELECT
INIT
ATFEED
ERROR
XRMR_NC
FAMILY
NC_GND
HIGH
5V
SELECT IN
VCC
D12
R1
222
CDATA1
CDATA2
CDATA3
CDATA4
CDATA5
CDATA6
CDATA7
CDATA8
ZD1
Zener 5.6V
D11
D10
D9
D8
D7
D6
D5
SCHOTTKY
R2 R3
RP5
RP4
RP3
J1
unmount
CDATA[8:1]
CN4
SERIAL I/F
TXD
RXD
RTS
CTS
DTR
D4
D3
D2
D1
RP1
RP2
CN1
34Pin
XRMR_NC
FAMILY
NC_GND
ZD9
ZD8
ZD7
ZD6
ZD5
ZD4
ZD3
ZD2

Slide SW Circuit

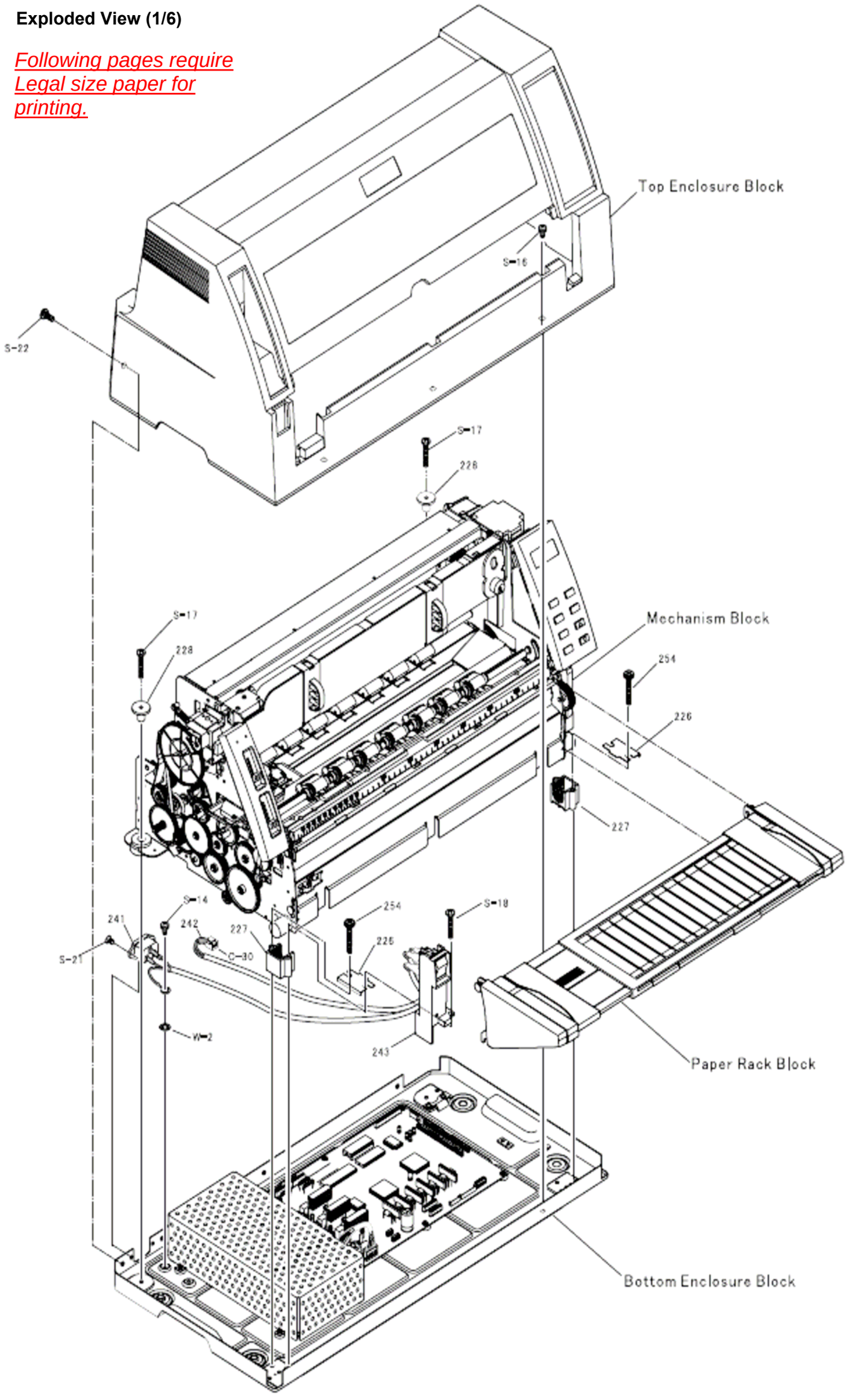


Power Circuit

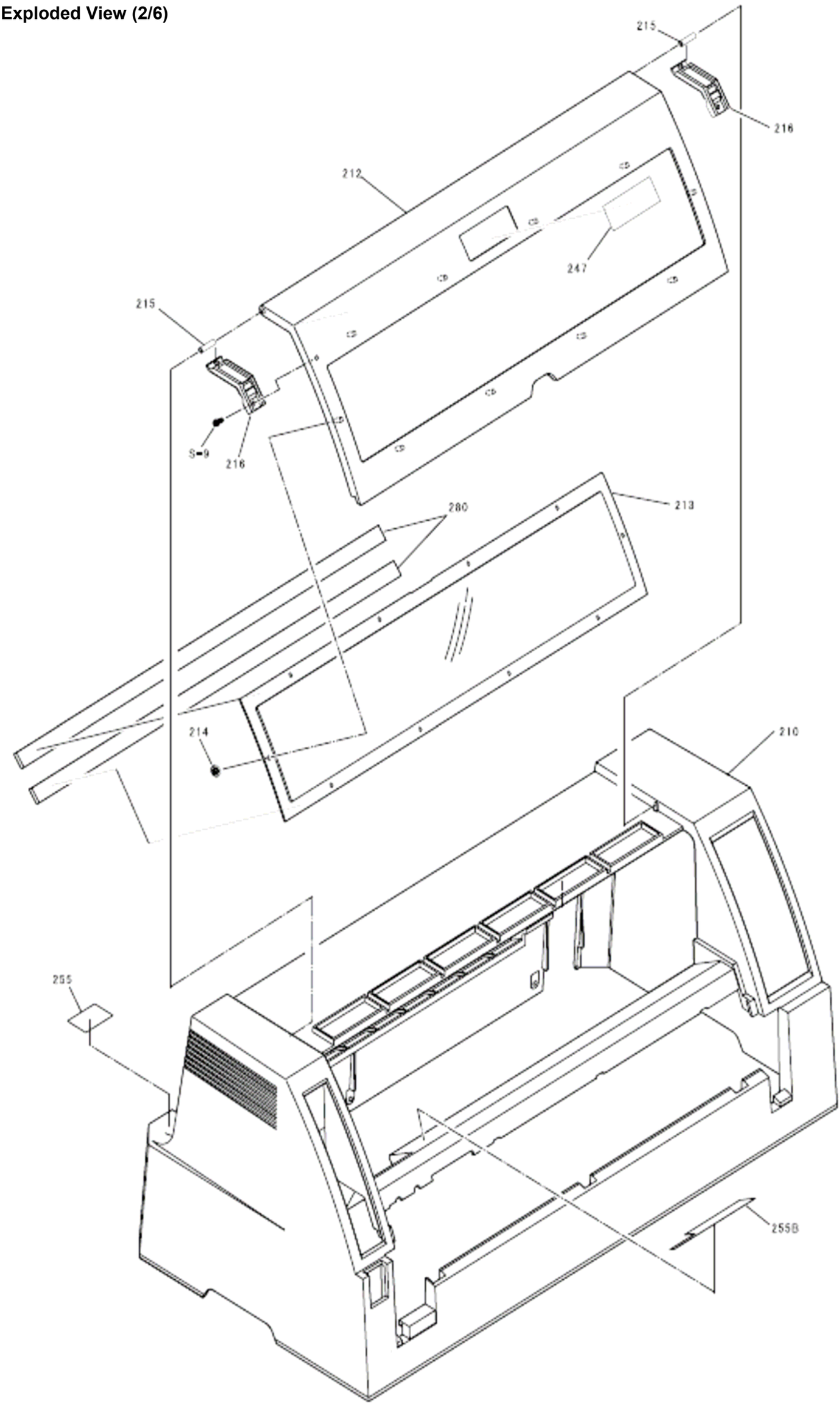


Exploded View (1/6)

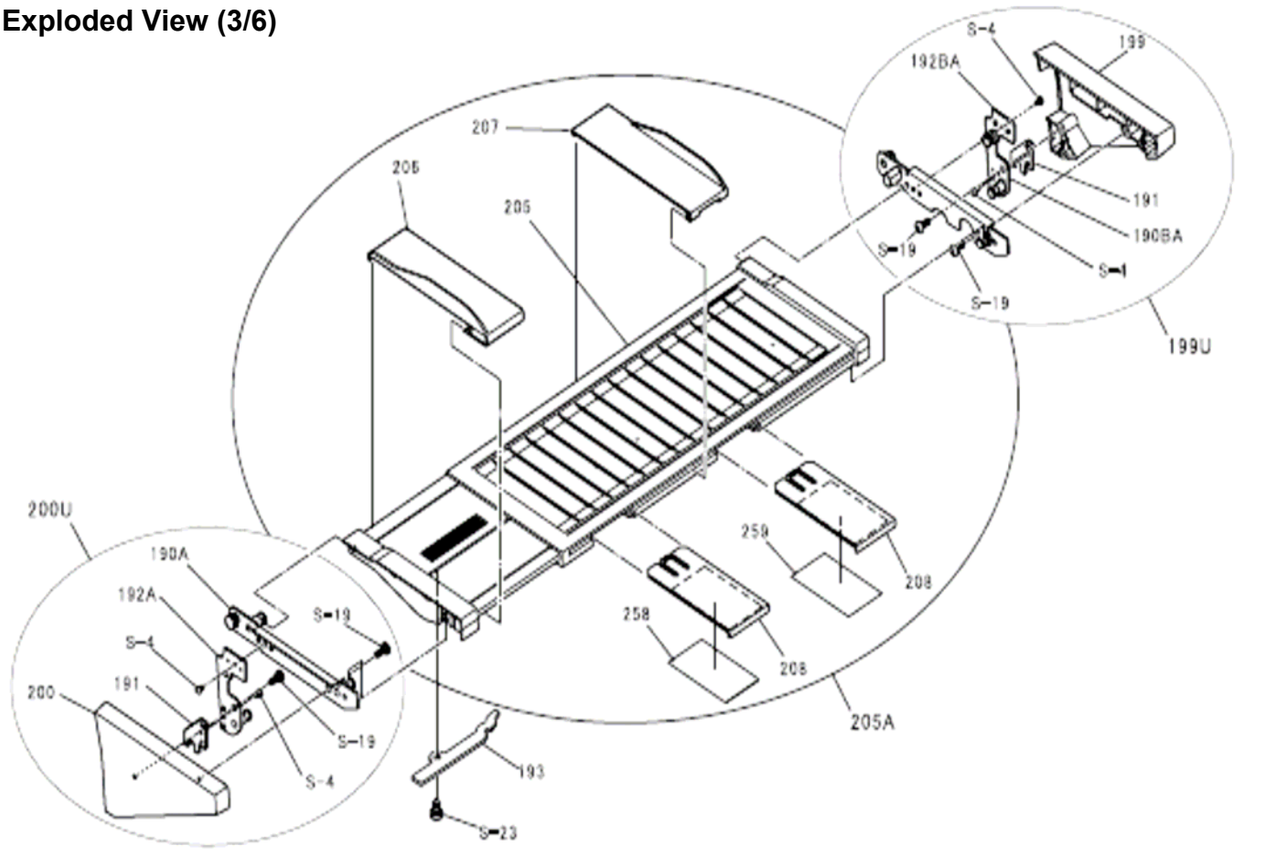
Following pages require Legal size paper for printing.

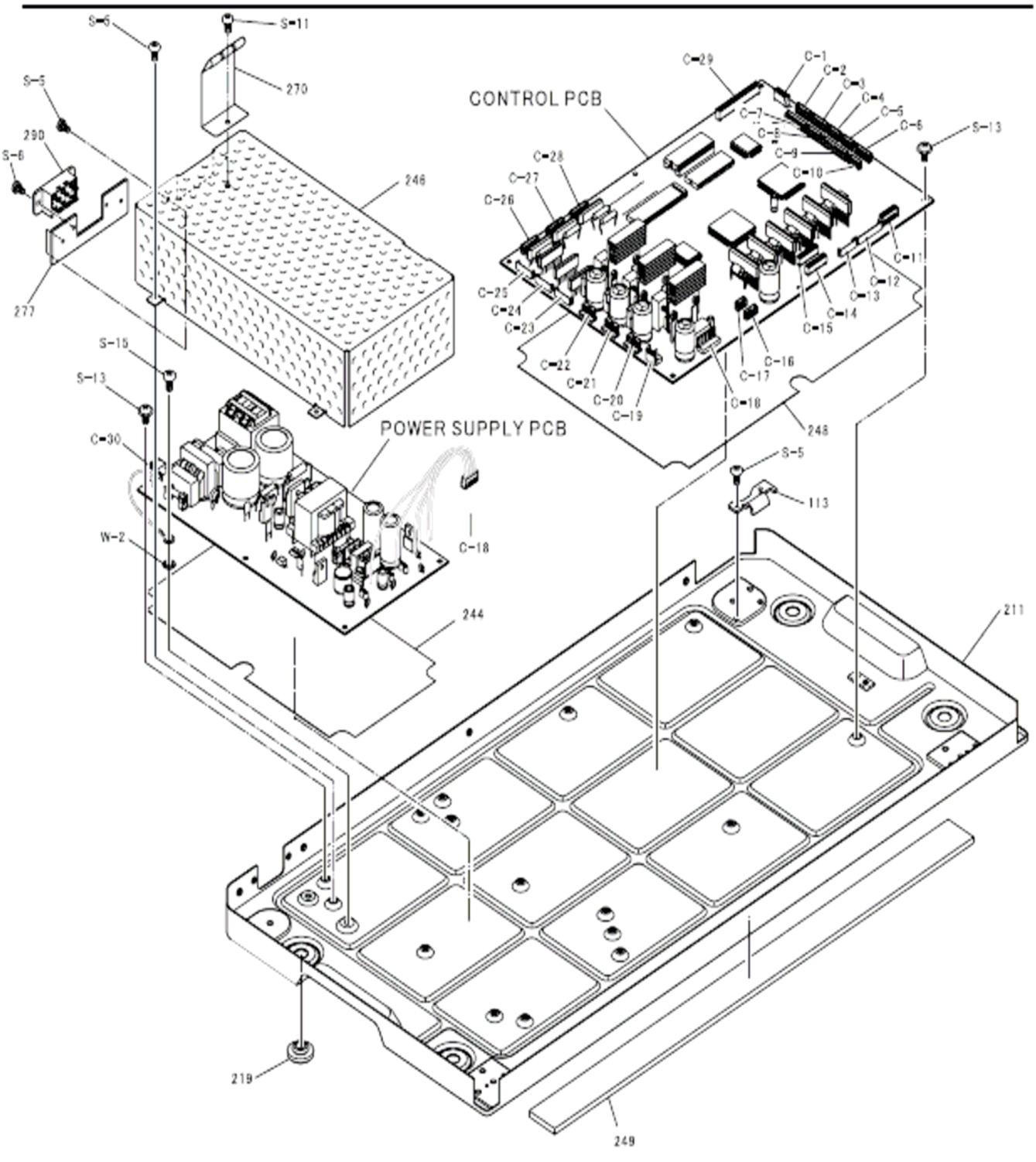


Exploded View (2/6)

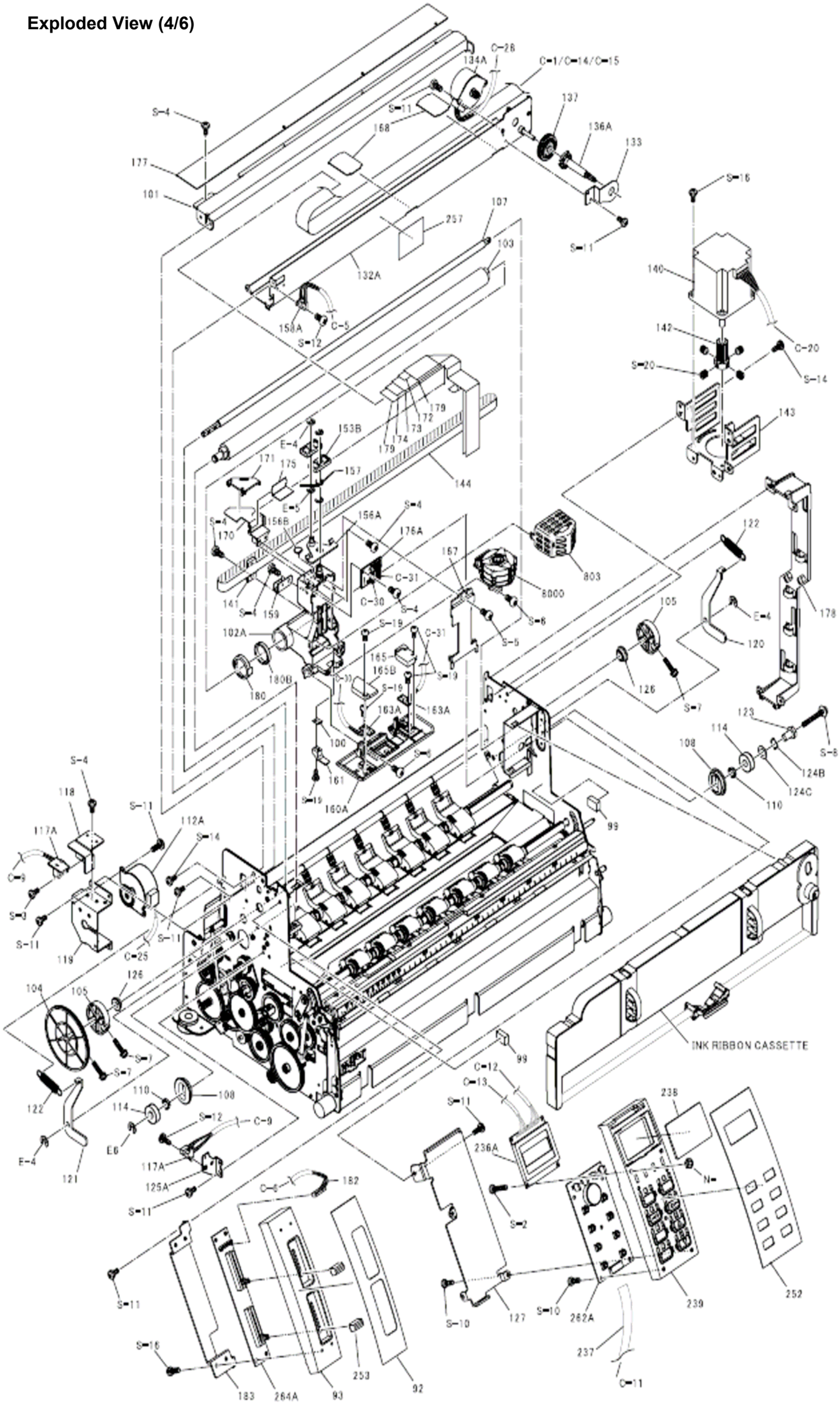


Exploded View (3/6)

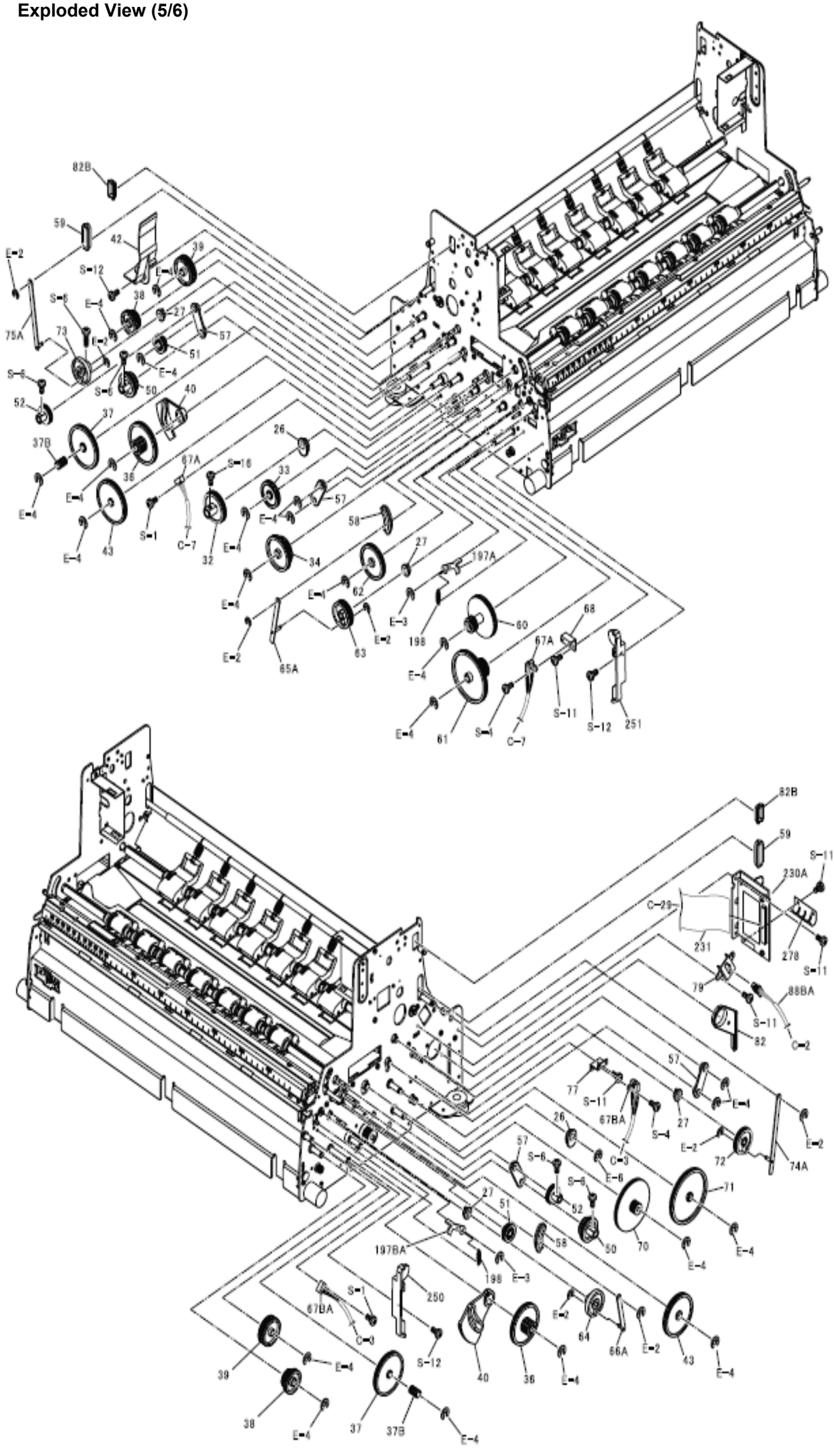




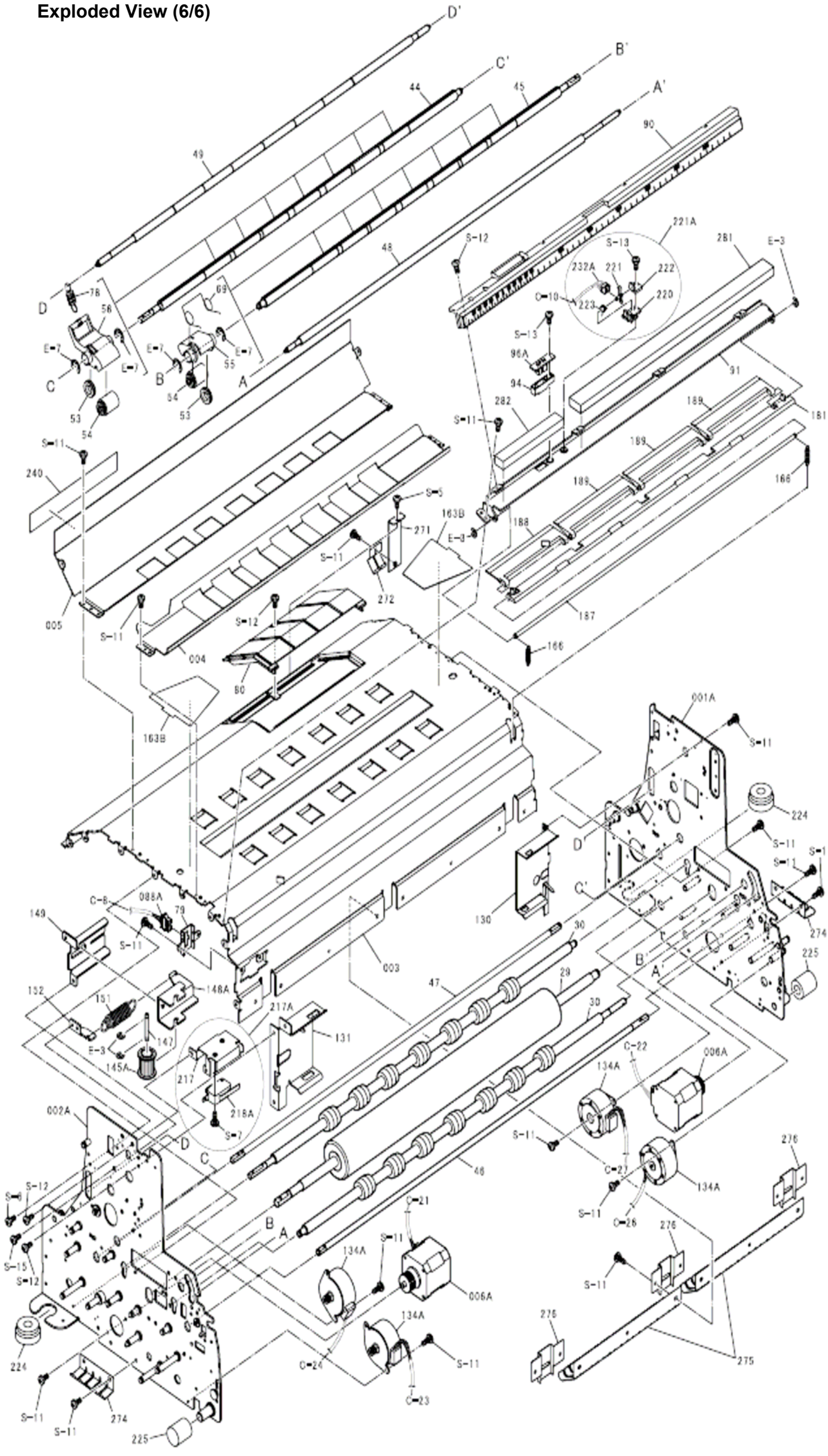
Exploded View (4/6)



Exploded View (5/6)



Exploded View (6/6)



Assemblies

Reference Number	Part Number	SAP	Parts Name	QTY
N104-4000		1~177	Mechanism	1
N104-205U	130407	1~178	Paper Rack	1
N104-6040A		1~179	Tractor Unit	1
95150-239A	130414	1~162	Indicator House Assembly	1
N104-263A	130403	1~172	I/F PCB Assembly	1
95150-093A	130413	1~164	Slide SW Cover Assembly	1
95150		1~168	External Electric	1
95150-5001A	130404	1~121	Main PCB Assembly	1
N104-5014A	130418	1~112	Power Supply PCB Assembly	1
95150			Enclosure	1
95150			Packing	1

Mechanism Material
PART NO.: N104-4000 SAP: 100000000177

Reference Number	Part Number	SAP	Parts Name	QTY/ Assy	QTY
N104-001A	130456	4615	Base Plate R Assembly		1
N104-002A	130457	4724	Base Plate L Assembly		1
N104-003		4787	Paper Guide		1
N104-004		4800	Paper Guide B		1
N104-005		4802	Paper Guide C		1
N104-006A	130402	4671	LF Motor Assembly NMB		2
N104-026		4806	Platen Bearing		2
N104-027		4832	Bearing 6		4
N104-029	130464	4804	Platen		1
N104-030		4808	Paper Feed Shaft		2
N104-032		4847	Platen Gear		1
N104-033		4850	Platen Intermediate Gear		1
N104-034		4851	Platen Reduction Gear		1
N104-036		4842	Reduction Gear B		2
N104-037		4856	Intermediate Gear C		2
N104-037B		4844	Compression Spring		2
N104-038		4858	OP Reduction Gear		2
N104-039		4857	OP Gear		2
N104-040		4841	OP Switching Cam		2
N104-042		4859	Gear Cover		1
N104-043		4846	Intermediate Gear		2
N104-044		4814	Pinch Roller Drive Shaft		1
N104-045		4825	Pinch Roller Drive Shaft B		1
N104-046		4831	Cam Shaft		1
N104-047		4833	Cam Shaft B		1
N104-048		4820	FC Shaft		1
N104-049		4838	FC Shaft B		1
N104-050		4855	Paper Feed Shaft Gear		2
N104-051		4854	Paper Feed Shaft Intermediate Gear B		2
N104-052		4853	Paper Feed Shaft Intermediate Gear		2
N104-053		4816	Pinch Roller Transmitting Gear		14
N104-054		4809	Pinch Roller		14
N104-055		4811	Pinch Roller Holder		7
N104-056		4823	Pinch Roller Holder B		7
N104-057		4818	Pinch Roller Bearing		4
N104-058		4687	FC Shaft Guide		2
N104-059		4690	FC Shaft Guide B		2
N104-060		4861	FC Reduction Gear		1
N104-061		4862	FC Reduction Gear B		1
N104-062		4863	FC Intermediate Gear		1
N104-063		4864	FC Cam L		1
N104-064		4883	FC Cam R		1
N104-065A		4865	FC Arm L Assy		1
N104-066A		4884	FC Arm R Assy		1

N104-067A		1~180	FC Home Sensor Assy		1
N104-067BA		1~181	FC Home Sensor B Assy		1
N104-068		4860	FC Home Sensor Fixing Plate		1
N104-069		4812	Friction Spring 2		7
N104-070		4887	FC Reduction Gear C		1
N104-071		4888	FC Intermediate Gear B		1
N104-072		4890	FC Cam BR		1
N104-073		4868	FC Cam BL		1
N104-074A		4891	FC Arm BR Assy		1
N104-075A		4869	FC Arm BL Assy		1
N104-077		4882	FC Home Sensor B Fixing Plate		1
N104-078		4830	Friction Spring B		1
N104-079		4685	Plug Fixing Plate		2
N104-080		4894	ROM Cover		1
N104-082		4785	Edge Guard		1
N104-082B		4718	Edge Guard B		2
N104-088A		4793	Sensor Harness Assembly		1
N104-088BA		4640	Sensor Harness B Assembly		1
N104-090		4613	Paper Cutter Cover		1
N104-091		4607	Paper Cutter		1
N104-094		4604	Paper Sensor Cover		1
N104-096A		1~182	Paper Sensor Assembly		1
N104-099		5533	Carrier Damper		2
N104-100		4681	Carrier Stopper Spacer		1
N104-101		4900	Rear Guide		1
N104-102A	130408	4914	Carrier Assembly		1
N104-103	130428	4895	F Guide Shaft		1
N104-104	130436	4906	HA Cam L		1
N104-105	130435	4907	HA Cam R		2
N104-107		4905	HA Cam Shaft		1
N104-108		4896	F Guide Shaft Bearing		2
N104-110		4897	Bearing L-1280ZZ (NMB)		2
N104-112A	130410	1~183	HA Motor Assembly		1
N104-114		4898	Bearing 608ZZ (NMB)		2
N104-117A	130411	1~184	HA Sensor Assembly		1
N104-116		4502	HA Sensor /GP1A13R(SHARP)	1	
N104-124		4696	HA Home Sensor /GP1S51V(SHARP)	1	
N104-118		4521	HA Sensor Fixing Plate		1
N104-119		4491	HA Motor Fixing Plate		1
N104-120		4902	F Guide Shaft Support R		1
N104-121		4901	F Guide Shaft Support L		1
N104-122		4903	F Guide Spring		2
N104-123		4899	F Guide Shaft Adjust Shaft		1
N104-124B		4735	Wave washer 8		1
N104-124C		7322	F Guide Spacer		1
N104-125A		4461	HA Home Sensor Fixing Plate Assembly		1
N104-126		4904	HA Cam Bearing		2
N104-127		4458	Indicator Stand		1
N104-130		4525	Cassette Holder R		1
N104-131		4528	Cassette Holder L		1
N104-132A		4931	FFC Bottom Plate Assembly		1
N104-133		4941	Ribbon Shaft Plate		1
N104-134A	130419	4677	Ribbon Motor Assembly NMB		5
N104-136A		1~185	Ribbon Drive Driving Shaft Assembly		1
N104-137	130454	4940	Ribbon Drive Gear		1
N104-140	130421	4445	C Motor		1
N104-141		4929	Belt Stopper		1
N104-142	130437	4449	C Motor Pulley		1
N104-143		4454	C Motor Fixing Plate		1
N104-144	130429	4928	Timing Belt		1
N104-145A		4944	Pulley Assembly		1
N104-147		4441	Pulley Shaft		1
N104-148A		4909	Pulley Shaft Fixing Plate Assembly		1
N104-149		4908	Pulley Receive Plate		1
N104-151	130440	4913	RT Spring		1
N104-152		4912	Spring Support Plate		1
N104-153B		6544	Rear Guide Slider		2
N104-156A		4919	Carrier Support Plate Assembly		1

N104-156B	130438	4867	Rear Guide Roller Spacer		1
N104-157		4923	Carrier Sprint		1
N104-158A	130409	1~186	Home Sensor Assembly		1
N104-159		4927	Home Sensor Cutoff Plate		1
N104-160A	130401	1~187	Ribbon Guide Assembly		1
N104-160		4653	Ribbon Guide	1	
N104-162	130463	4654	Ribbon Mask	1	
N104-161	130434	4679	Carrier Stopper		1
N104-163A	130406	1~188	Paper Edge Sensor Assembly		2
N104-163		4396	Paper Edge Sensor / GP2S40(SHARP)	2	
N104-163B	130453	4789	Paper Guide Seal		2
N104-165		4674	Paper Edge Sensor Cover		1
N104-165B		4678	Paper Edge Sensor Cover B		1
N104-166		4629	Flap Spring		2
N104-167	130465	4584	Carrier Cover		1
N104-168		4573	FFC Holder B		2
N104-170		4930	FFC Guide Plate		1
N104-171	130459	4569	FFC Cover		1
N104-172	130425	4544	Head FFC-C/TW-VFM-8-0.035,0.8(FUJIKURA)		1
N104-173	130426	4550	Head FFC-B/TW-VFM-17-0.035,0.8(FUJIKURA)		1
N104-174	130427	4555	Head FFC-A/TW-VFM-15-0.035,0.8(FUJIKURA)		1
N104-175	130458	4559	FFC Holder		1
N104-176A		1~189	Head Connecting PWB Assembly		1
N104-177		4576	FFC Upper Plate		1
N104-178		4580	Tie Plate		1
N104-179	130433	4566	FFC Safety Sheet		1
N104-180B	130424	4926	Felt Cover		2
N104-180	130423	4925	Ring Felt		2
N104-181		4624	Flap C		1
N104-187		4626	Flap Shaft		1
N104-188		4619	Flap B		1
N104-189		4617	Flap		3
N104-197A		4754	RU Lock Plate L Assembly		1
N104-197BA		4658	RU Lock Plate R Assembly		1
N104-198		4668	RU Lock Spring		2
N104-217A		1~190	I Base Plate Assembly		1
N104-217		4691	I Base Plate	1	
N104-218A		4694	Interlock Harness A Assembly	1	
N104-221A		1~191	Change Lever Assembly		1
N104-220		4714	C Base Plate	1	
N104-221		4717	Change Lever	1	
N104-222		4719	C Cover	1	
N104-223		4721	Spring A	1	
N104-232A	130412	1~192	Sensor Harness A Assembly	1	
N104-224		4650	Rubber A		2
N104-225		4648	Rubber B		2
N104-250		4633	Side Plate R		1
N104-251		4637	Side Plate L		1
N104-257		6542	HA Adjust Label		1
N104-270		5378	Ground spring		1
N104-271		5379	Ground plate		1
N104-272		4456	Ground spring B		1
N104-274		5841	Ground spring C		2
N104-275		6292	Ground spring D		2
N104-276		6293	Shield cover		3
N104-281		6983	Sound-absorbing Sheet C		1
N104-282		6984	Sound-absorbing Sheet D		1
N104-8000	130400	4620	Print Head		1
N104-803		6541	Head Cover		1
84500-5409		6403	Binder		8
		6404	Binder		11

Paper Rack
PART NO.: N104-205U SAP: 100000000178

Reference Number	Part Number	SAP	Parts Name	QTY/ Assy	QTY
N104-193		5376	RU Removable Lever		1
N104-199U	130415	1~193	Rack Cover R Unit		1
N104-190BA		4537	RU Holding Plate R Assembly	1	
N104-191		4558	RU Support Plate	1	
N104-192BA		4549	Tractor Support Plate R Assembly	1	
N104-199		4535	Rack Cover R	1	
N104-200U	130416	1~194	Rack Cover L Unit		1
N104-190A		4564	RU Holding Plate L Assembly	1	
N104-191		4558	RU Support Plate	1	
N104-192A		4579	Tractor Support Plate L Assembly	1	
N104-200		4563	Rack Cover L	1	
N104-205A		1~195	Paper Rack Assembly		1
N104-205		4597	Paper Rack	1	
N104-206		4601	Sheet Guide	1	
N104-207		4605	Sheet Guide B	1	
N104-208		4608	Paper Support	2	
N104-258		6534	Remove Label	1	
N104-259		6535	Remove Label B	1	

Tractor Assembly
PART NO.: N104-6040A SAP: 100000000179

Reference Number	Part Number	SAP	Parts Name	QTY/ Assy	QTY
N104-255		6538	TR Caution Label		1
N104-256	130455	6537	TR Position Label		2
N104-301		4424	Tractor Cover L		1
N104-302		4425	Tractor Cover R		1
N104-303		4364	Tractor plate		2
N104-304		4367	Tractor shaft		1
N104-305		4373	Tractor Guide Shaft		2
N104-306		4426	Tractor Guide B		2
N104-307		4421	Tractor Bearing		2
N104-308		4422	Tractor Gear		1
N104-309A		1~198	Tractor R Assembly		1
N104-310		4385	Tractor Sub Frame L	1	
N104-311		4402	Tractor sensor Frame		1
N104-312		4388	Tractor Lid L□R	2	
N104-312A		1~199	Tractor L Assembly		1
N104-314		4394	Tractor sensor PCB	1	
N104-314A		1~200	Tractor sensor PCB Assembly		1
N104-315		4406	Tractor sensor Cover		1
N104-322		6506	Tractor PCB Cover		1
N104-324		4398	Tractor Paper Sensor	1	
N104K-M02		4379	Tractor Main Frame L	1	
N104K-M08		4386	Tractor Knob L	1	
N104K-M10		4408	Tractor Main Frame R	1	
N104K-M11		4413	Tractor Sub Frame R	1	
N104K-M12		4414	Tractor Knob R	1	
		4382	Tractor Pulley	2	
		4383	Tractor Driving Belt	2	
		4390	Tractor Pin	4	
		4391	Tractor Spring	2	
		6404	Binder		1

Indicator House Assembly
PART NO.:95150-239A SAP: 100000000162

Reference Number	Part Number	SAP	Parts Name	Specification/Model	Location	QTY
N104P-252		4726	Indicator Plate			1
N104P-239		4731	Indicator House			1
N104P-238		4744	LCD Cover			1
N104P-4722		4722	Screw	P.H.T. Screw(BT)3*12		4
N104P-127		4747	Indicator Stand			1
N104P-4749		4749	Screw	P.H.T. Screw M2*10		2
N104P-1953		1953	Hexagon Nut M2			2
N104P-236A		1~173	LCD Ass'y			1
N104P-4757		4757	LCD Module	KONXX-3001-G	LCD	1
N104P-262A		1~174	Indicator PCB Ass'y			1
N104P-4776		4776	74LS166A(IC)	74LS166A	U1	1
84090-7233		4778	Transistor	DTC114ES TP	Q1	1
N104P-4779		4779	LED	573AD(AWBER)	LED1	1
N104P-4781		4781	LED	573GD(GREEN)	LED2,3,4	3
N104P-3049		3049	Carbon Res.	470ohm,1/6W,+/-5%	R1	1
N104P-4786		4786	Carbon Res.	2.2kohm,1/6W,+/-5%	R2	1
N104P-2831		2831	Res. Array	100ohm,1/8W,+/-5%	RA2,RA3	2
N104P-4790		4790	Res. Array	2.2kohm,1/8W,+/-5%	RA1	1
N104P-4792		4792	Ceramic Cap.	100pF,50V,+/-10%	C10,C11	2
N104P-4794		4794	Ceramic Cap.	1000pF,50V,+/-10%	C2~C9	8
N104P-4796		4796	Ceramic Cap.	0.1uF,16V,+/-10%	C1	1
84092-4611		4797	Switch	SOA-212HS	SW1~SW8	8
N104P-4798		4798	Connector	XX6216 012 110 808	CN1	1
N104P-4799		4799	Buzzer	KBS-20DB-4P-0	BZ1	1

I/F PCB Assembly
PART NO.:95150-263A SAP: 100000000172

Reference Number	Part Number	SAP	Parts Name	Specification/Model	Location	QTY
N104P-4803		4803	Connector	XX 6216 034 120 808 34Pin	CN1	1
84092-20001		4056	Connector	SDBB-25S(05) Serial I/F	CN2	1
N104P-4059		4059	Lack Screw	MDS-P6-40 (inch screw)	(CN2)	2
N104P-4060		4060	Spring Washer	M2.6	(CN2)	2
84092-0089		4055	Connector	008346360020858 Parallel I/F	CN3	1
N104-230A		1~175	Input Panel Ass'y			1
N104P-4807		4807	Input Panel			1
N104P-4810		4810	Holding Pillar B			2
N104P-4532		4532	Screw	P.H. Screw M3*6, SW		4
N104P-4758		4758	Zener diodes	RLZ 5.6B	ZD1-ZD9	9
N104P-7000		7000	Shottky diode	BAT54A	D1-D12	12
N104P-4622		4622	Chip Res. Array	2.2kohm(+/-5% 1/16W)	RP1-RP5	5
N104P-487		487	Chip Res.	2.2kohm(+/-5% 1/16W)	R1-R3	3
N104P-278		6669	Ground Spring E			1
N104P-4971		4971	P.H.T. Screw(ST)3*5			2

Slide SW Cover Assembly
PART NO.:95150-093A SAP: 100000000164

Reference Number	Part Number	SAP	Parts Name	Specification /Model	Location	QTY
N104P-183		4815	Slide SW Fixing Plate			1
N104P-93		4817	Slide SW Cover			1
N104P-253		4819	Knob			2
N104P-92		4821	Click Seal			1
N104P-4722		4722	P.H.T. Screw(BT)3*12			4
N104-264A		1~176	Volume PCB Ass'y			1
N104P-4826		4826	Slide Switch	RS25111-9C 10Kohm	R1	1
N104P-4829		4829	Slide Switch	RS25111-5C 10Kohm	R2	1
N104P-4016		4016	Connector	B 6B-EH	CN1	1
N104-182		4834	Connector Harness Ass'y			1

External Electrical
PART NO.:95150 SAP: 100000000168

Reference Number	Part Number	SAP	Parts Name	Specification/Model	Location	QTY
N104P-1329		1329	AC Cord	Approved		1
N104-237		4843	Indicator Harness A	12 Pins UL2896□80C□30V		1
N104-231		4845	I/F Cable A	34 Pins UL2896□80C□30V		1
N104P-4848	130432	4848	Power Switch	R-22 250V 16A		1
N104-242		4849	AC Harness A	Length:19.6"±.4", Color: Black/White	AC Switch →Power PCB	1
N104-241		4852	Inlet Harness A	Length:15.7"±.4"	Inlet→ AC Switch	1

Main PCB Assembly
PART NO.:95150-5001A SAP: 100000000121

Reference Number	Part Number	SAP	Parts Name	Specification/Model	Location	QTY
84091-0154		3968	CPU	MB90705H(CMOS,16bit)	U1	1
84090-5530		3969	Custom Lsi A	BBG010(KL9H035006CFP)	U4	4
84090-5531		3970	Custom Lsi B	BBG020	U24	1
84090-5532		3971	Custom Lsi C	BBG030	U25	1
N104P-4482		4482	DRAM	MSM514800E-60/70	U9	1
	130006	4484	Programmed ROM A	STANDARD Firmware	U6	1
	130036	4484	Programmed ROM A	F & I Firmware	U6	1
	130025	3966	EPROM	W27E040-12	(U6)	1
84092-9913		3964	Seal	DAT-45-619-10	(U6)	1
N104P-4493		4493	Programmed ROM B	ARYA011	U7	1
N104P-3966		3966	EPROM	MX27C4000DC-90	(U7)	1
84092-9913		3964	Seal	DAT-45-619-10	(U7)	1
84091-5012		764	IC Socket	DILB32P-8J 32Pin	U6,U7,U8	3
N104P-4512		4512	EEPROM	CAT93C56J	U27	1
N104P-5491		5491	Reset IC	M51957BFP	U3	1
N104P-4520		4520	TTL IC	SN74LS14DR	U14	1
N104P-4522		4522	TTL IC	SN74LS07DR	U15,U16,U32	3
N104P-4524		4524	TTL IC	SN74LS166ANSR	U20	1
N104P-4527		4527	IC	SN74HC4066DR	U21	1
N104P-4529		4529	IC	SP232ECN	U13	1

84091-0654		258	HIC	SLA7026M	U19,U22,U23	3
N104P-4534		4534	Ceramic Oscillator	25.00M Pitch: .2”	X1	1
84090-7408		3917	Transistor Array	SMA5106(4A 100V)	QA1-QA6	6
84090-7407		4543	Transistor Array	MP4021(100V 2A)	QA15-QA18,QA20, QA21	6
84090-7431		4546	Transistor	FMG8A-T148(100mA 50V) Dual NPN	QA7-QA12	6
84090-7432		4548	Transistor	FMG9A-T148(50mA 50V) Dual NPN	QA13,QA14,QA19, QA22,QA23	5
N104P-4551		4551	Transistor	FMG11A-T148(100mA 50V) Dual NPN	QA24,QA25	2
84090-7909		3982	Transistor	2SB1316-TL(2A 100V)	Q1-Q7	7
N104P-3979		3979	Transistor	DTC114WKA-T146(100mA 50V)	Q8,Q11,Q16	3
84090-7948		3981	Transistor	DTA143XKA-T146(100mA 50V)	Q15,Q17	2
N104P-4553		4553	Shottky Diode	FSQ10A06B(10A 60V)	D1,D2,D3	3
84091-***1301***		***4553***	***Shottky Diode***	***RKF10KQ60B(10A 60V)***	***D1,D2,D3***	***3***
N104P-5492		5492	Zenner Diode	1N5369B(51V 5W)	ZD1-ZD12	12
N104P-***4557***		***4557***	***Zenner Diode***	***3Z51(51V 3W)***	***ZD1-ZD12***	***12***
84091-2604		4560	Chip Zenner Diode	HZM5.1NB1(200mW)	ZD13	1
N104P-4562		4562	Chip Res.	10ohm(+/-5% 1/8W)	RA2	1
N104P-4565		4565	Chip Res.	360ohm(+/-5% 1/8W)	RA1	1
N104P-4621		4621	Chip Res.	150ohm(+/-5% 1/10W)	RA3,RA4	2
N104P-4568		4568	Chip Res.	33ohm(+/-5% 1/10W)	R16,R19,R20,R21	4
N104P-3404		3404	Chip Res.	100ohm(+/-5% 1/10W)	R56,R75	2
N104P-4570		4570	Chip Res.	220ohm(+/-5% 1/10W)	R222,R223,R225, R226	4
N104P-4572		4572	Chip Res.	1kohm(+/-5% 1/10W)	R240,R241	2
N104P-487		487	Chip Res.	2.2kohm(+/-5% 1/10W)	R67,R73,R76,R77, R289-R294,R17, R18,R296,R23, R275, R284-R287,R266, RA293,R281	22
N104P-3393		3393	Chip Res.	2.4kohm(+/-5% 1/10W)	R159,R160,R177, R178,R192,R193,R22	7
N104P-4575		4575	Chip Res.	2.7kohm(+/-5% 1/10W)	R220	1
N104P-4578		4578	Chip Res.	4.7kohm(+/-5% 1/10W)	R259,R263,R267, R268,R276-R278, R283,R15,R217, RA12,R24	12
N104P-4581		4581	Chip Res.	10kohm(+/-5% 1/10W)	R215	1
N104P-4583		4583	Chip Res.	22kohm(+/-5% 1/10W)	R198,R199,R202, R203,R206,R208, R210	7
N104P-4589		4589	Chip Res.	27kohm(+/-5% 1/10W)	R219	1
N104P-4586		4586	Chip Res.	33kohm(+/-5% 1/10W)	R140	1

N104P-3397		3397	Chip Res.	47kohm(+/-5% 1/10W)	R155,R156,R173, R174,R189,R190	6
N104P-4587		4587	Chip Res.	0ohm(+/-5% 1/10W)	R39,R40,R48,R49, R55,R248,RA253, RA60,RB51,RB53, RB54,R41,R58, R70,J15-J22	22
N104P-4590		4590	Chip Res.	22ohm(+/-5% 1/10W)	R154,R167,R180	3
N104P-4596		4596	Chip Res.	30ohm(+/-5% 1/10W)	R195,R181	2
N104P-4490		4490	Chip Res.	68ohm(+/-5% 1/10W)	R163	1
N104P-4599		4599	Chip Res.	82ohm(+/-5% 1/10W)	R164	1
N104P-4592		4592	Chip Res.	91ohm(+/-5% 1/10W)	R157	1
N104P-4595		4595	Chip Res.	100ohm(+/-5% 1/10W)	R182,R172	2
N104P-2708		2708	Chip Res.	300ohm(+/-5% 1/10W)	R161	1
N104P-4600		4600	Chip Res.	470ohm(+/-5% 1/10W)	R183,R176	2
N104P-4602		4602	Chip Res.	510ohm(+/-5% 1/10W)	R162,R179,R194, RB22	4
N104P-4603		4603	Chip Res.	1.2kohm(+/-5% 1/10W)	RA22	1
N104P-4606		4606	Chip Res.	220ohm(+/-5% 1/10W)	R165	1
N104P-4610		4610	Chip Res.	10kohm(+/-5% 1/10W)	R236,R244,R252, R254,R257,R261, R262	7
N104P-4611		4611	Chip Res.	22kohm(+/-5% 1/10W)	R235,R239,R243, R249	4
N104P-4612		4612	Chip Res.	150ohm(+/-5% 1/8W)	R233,R242,R246, R250,R253	5
N104P-4614		4614	Chip Res.	200kohm(+/-5% 1/8W)	R234,R237,R238, R247,R255,R256, R258,R260	8
N104P-4616		4616	Chip Res.	15kohm(+/-5% 1/4W)	R149,R166,R184, R214,R221,R221A	6
N104P-826		826	Res. Array	10kohm(+/-5% 1/16W)	RP1-RP4, RPX5-RPX8	8
N104P-1820		1820	Res. Array	100kohm(+/-5% 1/16W)	RP13,RP15,RP16, RP18,RP20,RP28	6
N104P-4622		4622	Res. Array	2.2kohm(+/-5% 1/16W)	RP7-RP9, RPX10-RPX12	6
N104P-4627		4627	Res. Array	470ohm(+/-5% 1/16W)	RPX18-RPX21	4
N104P-4630		4630	Res. Array	510ohm(+/-5% 1/16W)	RPX13	1
N104P-		661	Res. Array	100ohm(+/-5% 1/16W)	RP22- RP27,RP29, RP30	8
N104P-4632		4632	Res. Array	4.7kohm(+/-5% 1/16W)	RPX2,RP11,RP12, RP14,RP17,RP19, RP21	7
N104P-4635		4635	Metal Oxide Res.	15ohm(2W +/-5%)	R150- R153,R168- R171,R185- R188	12
N104P-4638		4638	Metal Oxide Res.	56ohm(3W +/-5%)	R205,R207,RA209	3

N104P-4641		4641	Metal Oxide Res.	1kohm(3W +/-5%)	R209	1
N104P-5537		5537	Cement Res.	50mohm(3W +/-5%)	R212	1
N104P-4642		4642	Cement Res.	0.33ohm(3W +/-5%) 2Pin	RA158,RB158,RA175, RB175,RA191,RB191	6
N104P-4647		4647	Chip Ceramic Cap	5pF,50V,+/-5%,CH	C13,C14	2
N104P-4006		4006	Chip Ceramic Cap	100pF,50V	C117-133,C147,C139, C140,CB3	21
N104P-4651		4651	Chip Ceramic Cap	470pF,50V	C59,C60,C79,C80, C100,C101	6
N104P-4008		4008	Chip Ceramic Cap	1000pF,50V	C2-C5,C11,CA3,CA4, CC3,CD3,CE3, C36, C42,C136,C137, C138, C141-C146,R59	22
N104P-4655		4655	Chip Ceramic Cap	2200pF,50V	C74,C94,C95,C53, C54,C73	6
N104P-4657		4657	Chip Ceramic Cap	0.01uF,50V	C49-C52,C63-C67, C69-C72,C83-C88, C90-C93,C114	24
N104P-4009		4009	Chip Ceramic Cap	0.022uF,50V	C6	1
N104P-4660		4660	Chip Ceramic Cap	0.1uF,50V	C1,C7,C9,C12, C15-C25,C29-C34,CA104, C45,C102-C108,C134, C135,CA43,CA39,CA40, C10,C148	37
N104P-4664		4664	Chip Ceramic Cap	1uF,50V	C44,C47,C48,C62, C68,C82,C89,C113	8
N104P-4666		4666	Chip Ceramic Cap	4700p,50V	C55-C58,C75-C78, C96-C99	12
N104P-533		533	Al.Elec. Cap	100uF, 16V 85deg	C8,C109	2
N104P-4669		4669	Al.Elec. Cap	1000uF, 50V 85deg	C43,C46,C61,C81,C111	5
N104P-4672		4672	Al.Elec. Cap	10uF, 16V 85deg	C37-C41	5
84093-0438		4027	Femite Beads	HB-H2012B601T	B1-B4,B6-B14,B16-B33	31
84093-0439		4026	Femite Beads	HB-H2012A	B5	1
N104P-4676		4676	Connector	00 6216 134 820 808	CN1	1
N104P-4683		4683	Connector	00 6216 017 000 808	CN3	1
N104P-4688		4688	Connector	00 6216 015 000 808	CN2	1
N104P-4692		4692	Connector	00 6216 012 000 808	CN16	1
N104P-4695		4695	Connector	00 6216 008 000 808	CN17	1
84092-2101		4697	Connector	5045-06A	CN4,CN5,CN6	3
84092-2704		4016	Connector	B6B-EH	CN7-CN12,CN19,CN16, CN24,CN26	10
N104P-4700		4700	Connector	B10B-EH	CN18,CN16	2
N104P-4703		4703	Connector	B5B-EH	CN20,CN22	2

N104P-4706		4706	Connector	B5P-VH	CN13	1
84092-2702		4708	Connector	B4B-EH	CN21,CN23,CN25	3
84092-1410		892	Connector	B2P3-VH	CN28	1
N104P-4711		4711	Fuse	ICP-S1.0(1.0A 50V)	F1-F24	24
N104P-4713		4713	Heat Sink	1.7" * 1.4" * .4"	U19,U22,U23	3
N104P-450		450		Pan Head Screw M3*8	(U19,U22,U23)	6
N104P-4716		4716	IC Socket	42 Pin	U12	1
N104P-5493		5493	TTL IC	SN74LS125AD	U17,U18	2
84093-3201		4029	Contact	XJ8A-0211	J12	1
N104P-4720		4720	Connector	XJ8C-0211	J6,J12,J26	3

Power Supply PCB Assembly
PART NO.:N104-5014A SAP: 100000000112

Reference Number	Part Number	SAP	Parts Name	Specification	Model	Location	QTY
N104P-4362		4362	Fuse	5A,250V,Timelag, UL/CSA/SEMKO/METI	219 005	F1	1
N104P-4365		4365	Fuse	1A,250V,Timelag, UL/CSA/SEMKO/METI	219 001	F2	1
N104P-4366		4366	Fuse Holder	10A	HF-004/N	(F1,F2)	4
N104P-4368		4368	Pulse Transformer		PT06A	TR1	1
N104P-4369		4369	Coil	22mH,1.8A	ELF24V018A	L1	1
N104P-4370		4370	Coil	8.3mH,1.95A	ETQR36T004A	L2	1
84091-1709		3835	Suger Absorber	470V,UL Approved	ERZV14D471	ZENR1	1
84093-0425		3828	Ferrite Beads	EXC-ELDR35V		FB1,2,3	3
N104P-4371		4371	HIC	800V,Pout=230W	STR-F6668B	P1	1
N104P-4372		4372	HIC	5.0V,1.0A,with coil	SI-8301L	P2	1
84090-7530		4837	Photo Coupler(IC)	CTR:100-300%,UL/VDE	TLP421F(D4-GR)	PC1,2	2
N104P-3831		3831	Transistor	150mA,50V,HFE rank=Y	2SC1815Y	Q1	1
N104P-4374		4374	Diode Bridge	4A,600V	RBV-406	DB1	1
84091-1398		4376	F.R. Diode	10A,200V,trr=25ns	FMX-G22S	D7	1
84091-1388		3837	F.R. Diode	0.5A,1000V,trr=50ns	EG01C	D5	1
N104P-4378		4378	F.R. Diode	1A,200V,trr=35ns	AL01Z	D2	1
84091-1138		1466	Diode	100V,150MA	IN4148	D3,4,6	3
N104P-4380		4380	Shottky Diode	2A,30V,VF=0.36V	RA13	D1	1
84090-7700		4381	Thyristor	3.0A,400V	CR3PM-8	SCR1	1
84090-7708		3834	Thyristor	10A,400V	SF10G41A	SCR2	1
84091-2470		3845	Zenner Diode	6.2V,500mW	MTZJ6.2C	ZD1,3,5	3
N104P-4384		4384	Zenner Diode	47V,500mW	RD47E	ZD2,4	2
N104P-4387		4387	AL.Elec.Cap	390uF,250V 85deg, 22x30	EETUQ2E391H	C7,8	2
N104P-4389		4389	AL.Elec.Cap	2200uF,50V Low impedance 105deg,18x35.5	EEUFC1H222	C16,17	2
N104P-4393		4393	AL.Elec.Cap	100uF,35V 85deg, 6.3x11.2	ECA1VM101B	C11	1
N104P-4395		4395	AL.Elec.Cap	1000uF,6.3V 85deg, 80x11.5	ECA0JM102B	C21	1
N104P-4033		4033	Ceramic. Cap	4700pF,250V, UL/CSA/VDE,X1,Y2	DE1307-486E472M-KH	C3,4	2
N104P-348		348	Ceramic. Cap	2200pF,250V, UL/CSA/VDE,X1,Y2	DE1007-486E222M-KH	C5,6	2
N104-4397	130430	4397	Ceramic. Cap	3300pF,1kV, Low loss type	DE1105-979R332K1K	C10	1

N104P-4401		4401	Ceramic. Cap	0.1uF,50V	Pitch: 0.2 inch	C12,C18, C19,C20, C22	5
N104P-4403		4403	Ceramic. Cap	0.01uF,50V	Pitch: 0.1 inch	C15,C23	2
84090-2060		3848	Metal Film Cap.	0.47uF,257V, UL/CSA/VDE,X2	RE474-C3.5	C1,2	2
N104P-4409		4409	Metal Film Cap.	0.022uF,630V,+/-10%	Pitch: 0.4 inch	C14	1
N104P-4412		4412	Film Cap.	0.01uF,50V,+/-5%	ECQB1H103JFAS	C24	1
N104P-4415		4415	Film Cap.	2200pF,50V,+/-5%	ECQB1H222JFAS	C13	1
N104P-4417		4417	Film Cap.	470pF,50V,+/-5%	ECQB1H471JFAS	C9	1
N104P-4419		4419	Cement Res.	0.1ohm,3W,+/-5%, Non-inductive	Pitch: 1.0 inch	R2	1
N104P-5536		5536	Cement Res.	47kohm,5W,+/-5%	Pitch: 1.2 inch	R15	1
N104P-4423		4423	Metal Oxide Res.	68kohm,3W,+/-5%	Pitch: 1.0 inch	R5	1
N104P-4427		4427	Metal Film Res.	1.3kohm,1/4W,+/-1%	ERO25CHF1301	R20	1
N104P-4429		4429	Metal Film Res.	6.2kohm,1/4W,+/-1%	ERO25CHF6201	R19	1
N104P-4431		4431	Carbon Res.	390kohm,1/2W,+/-5%	ERDS1TJ394T	R1	1
N104P-4433		4433	Carbon Res.	22ohm,1/4W,+/-5%	ERDS2TJ220T	R6	1
N104P-4436		4436	Carbon Res.	470ohm,1/4W,+/-5%	ERDS2TJ471T	R11,21	2
N104P-4437		4437	Carbon Res.	680ohm,1/4W,+/-5%	ERDS2TJ681T	R3	1
N104P-4439		4439	Carbon Res.	1kohm,1/4W,+/-5%	ERDS2TJ102T	R12,16, 17	3
N104P-4440		4440	Carbon Res.	1.5kohm,1/4W,+/-5%	ERDS2TJ152T	R9	1
N104P-4442		4442	Carbon Res.	2kohm,1/4W,+/-5%	ERDS2TJ202T	R10	1
N104P-4443		4443	Carbon Res.	3.3kohm,1/4W,+/-5%	ERDS2TJ332T	R13	1
N104P-4444		4444	Carbon Res.	4.7kohm,1/4W,+/-5%	ERDS2TJ472T	R18	1
N104P-4446		4446	Carbon Res.	6.2kohm,1/4W,+/-5%	ERDS2TJ622T	R4	1
N104P-4448		4448	Carbon Res.	20kohm,1/4W,+/-5%	ERDS2TJ203T	R8	1
N104P-4451		4451	Carbon Res.	560kohm,1/4W,+/-5%	ERDS2TJ564T	R7	1
N104P-4452		4452	Heat Sink	AL	PUSH36,L=40	(P1,D7)	2
N104-451	130439	451	P.H.Screw M3*10,S	M3*10,SPW		(P1,D7)	2
N104P-892		892	Connector	2Pins	B2P3-VH	CN1,2	2
N104P-4460		4460	Power Harness Assy	5Pins		T1,2,3,4,5	1
N104P-4463		4463	Power GND Harness	1 Pin		PE1	1

Enclosure Material

Reference Number	Part Number	SAP	Parts Name	QTY/ Assy	QTY
N104-210		4447	Top Enclosure		1
N104-211A		1~196	Bottom Enclosure Ass'y		1
N104-113		4477	Mech Stopper Support Plate		1
N104-211		4469	Bottom Enclosure	1	
N104-219		4471	Rubber	4	
N104-227		4475	Mechanism Holder B	2	
N104-249		4472	Sound-absorbing Sheet	1	
N104-212A	130405	1~197	Printer Cover Ass'y		1
N104-212		4453	Printer Cover	1	
N104-213		4455	Cover B	1	
N104-214		4457	Crimp A	10	
N104-247		4459	Name Plate	1	
N104-280		6982	Sound-absorbing Sheet B	2	
N104-215		4462	Holding Pillar A		2
N104-216		4464	Cover Stop Board		2
N104-226		4486	Mechanism Holder		2
N104-228		4488	Mechanism Stopper		2
N104-240		4497	Rating Plate		1
N104-243	130420	4480	Switch Holder		1
N104-244		4492	Insulating sheet B		1
N104-246		4483	Separating Plate		1
N104-248		4495	Insulating sheet C		1
N104-252		4628	Indicator plate		1
N104-277		6294	SW Holder Plate		1
N104-601		4631	Ribbon exchange label		1
84009-1120		6402	Mount Base		1
84500-5409		6403	Binder		1
		6404	Binder		1
94740-2611		4507	ES Label		1

Packing Material

Reference Number	Part Number	SAP	Parts Name	QTY/ Assy	QTY
N104-1310A		4623	Ribbon Cartridge		1
N104-6178		4503	Hand Book		1
N104-801B		4435	Caution seal		1
PK-001	130447	4508	Pad Set P1		1
PK-002	130448	4510	Pad Set R		1
PK-003	130449	4513	Pad Set L		1
PK-004	130450	4515	Pad Set U		4
PK-005	130451	4517	Pad Set P2		1
PK-006		4519	Packing Box		1
PK-007		4523	Plastic Bag (for machine)		1
PK-008		4526	Plastic Bag (Tractor & paper Rack)		2
PK-009		4530	Plastic Bag (Hand Book, CD, Rack U)		1
PK-010	130452	4967	Small Pad Set		2
95150-6160		3805	Driver CD		1

Screws

Reference Number	Part Number	Exploded View No.	SAP	Parts Name	Location	QTY
N104P-450		S-24	450	Pan Head Screw M3x8,SPW	Mechanism Holder B	2
N104P-451		S-6	451	Pan Head Screw M3x10,SPW	Paper Feed Shaft Gear (2)	20
					Paper Feed Shaft Intermediate Gear (2)	
					FC Cam R (1)	
					FC Cam BL (1)	
					Indicator PCB (2)	
					Indicator Stand (2)	
					Slide SW Fixing Plate (4)	
					Ribbon Guide Assembly (2)	
					Carrier Stopper (1)	
					Belt Stopper (2)	
					Spring Support Plate (1)	
N104-991		S-21	991	Flat Head Screw M3x8	Power Jack (2)	2
N104P-2784		N-2	2784	Nut M3	Tractor Guide Shaft (4)	4
N104P-3728		S-27	3728	Pan Head Screw M3x25,SW	F Guide Shaft Adjust Shaft (1)	1
N104P-3907		S-22	3907	Truss Head Screw M4*8 Cr	Back of the Top Enclosure(4)	4
N104P-3909		S-29	3909	Pan head Tapping screw(BT)4x10	Rack Support Plate(5)	5
N104P-3910		S-9	3910	Pan Head Tapping Screw (BT)3x8	Cover Stop Board (2)	4
					Tractor Main Frame (2)	
N104P-3912		S-1	3912	Pan Head Screw M2x8,SW	FC Home Sensor (2)	4
					FC Home Sensor B (2)	
N104P-4430		W-4	4430	Plane Washer M3	TR GUIDE SHAFT(4)	4
N104P-4432		W-5	4432	Spring Washer M3	TR GUIDE SHAFT(4)	4
N104-254		254	4450	Mech Lock Screw M4x32.6	Mechanism Holder B(2) Mechanism Holder B(2)	3
N104-214		214	4457	Crimp A	Cover B (10)	10
N104P-4500		W-2	4500	Toothed Lock Washer M4 (IT)	Gnd Wire (2)	2
N104P-4509		S-14	4509	Pan Head Screw M4x6,SW	Fixing Carrier Guide(2)	8
					C Motor Fixing Plate (4)	
					Gnd Wire(2)	
N104P-4514		S-15	4514	Pan Head Screw M4x8,SPW	I Base Plate (1)	3
					Pulley Receive Plate (2)	
N104P-4728		E-2	4728	Ring JE-2	FC Cam L(1)	10
					FC Cam R(1)	
					FC Cam BR(1)	
					FC Cam BL(1)	
					FC Arm L(1)	
					FC Arm R(1)	
					FC Arm BL(1)	
					FC Arm BR(1)	
					RU Lock Plate L Assembly (1)	
					RU Lock Plate R Assembly (1)	
N104P-4729		E-3	4729	Ring JE-3	Pulley Shaft (2)	4
					Flap Shaft (2)	

N104P-4730	130460	E-4	4730	Ring JE-4	Pinch Roller Bearing(8) FC Shaft Guide (4) Cam Shaft (2) OP Gear (2) OP Reduction Gear (2) Reduction Gear B (2) Intermediate Gear C (2) FC Reduction Gear C (1) FC Intermediate Gear (1) Plate Intermediate Gear (1) Plate Reduction Gear (1) Intermediate Gear (2) FC Reduction Gear B (1) FC Intermediate Gear (1) FC Reduction Gear (1) FC Cam BR (1) FC Cam L (1) Cam Shaft B (2) F Guide Shaft Support R (1) F Guide Shaft Support L (1) Bearing R-1350ZZR (2) Carrier Spring (1) Tractor Guide Shaft (1)	43
N104P-4733	130462	E-6	4733	Ring JE-6	Platen Bearing (2) F Guide Shaft (1)	3
N104P-4735	130461	E-5	4737	Ring JE-5	Carrier Support Plate Assembly (1)	1
N104P-4739		E-7	4739	Ring JE-7	Pinch Roller Holder (14) Pinch Roller Holder B (14)	28
N104P-4741		S-17	4741	Pan Head Screw M4x25,SPW	Mechanism Holder (2)	2
N104P-4742		S-13	4742	Cap Screw M3x6	Power PCB (6) Change Base Plate (1) Control PCB(6)	13
N104P-4743		S-18	4743	Pan Head screw M4x35,SPW	Mechanism holder(1)	1
N104P-4749		S-2	4749	Pan Head Screw M2x10	Indicator House Assembly (2)	2
N104P-4772		S-23	4772	Pan Head Screw M3x6,SPW	Tractor Gear (1)	1
N104P-4773		W-3	4773	Poly slider Washer	Tractor Shaft (2)	2
N104P-4774		S-19	4774	Pan Head Tapping Screw (BT)2x4	Paper Edge Sensor Assembly (4)	4
N104P-4943		S-4	4943	Pan Head Screw M3x5,SPW	FC Home Sensor (2) FC Home Sensor B (2) Carrier Assembly (2) Head Connecting PWB Assembly (3) Print Head (2) Carrier Cover (1) Home Sensor Cutoff Plate (1) FFC Upper Plate (4) Ribbon Guide Assembly (2)	19
N104P-4970		S-3	4970	Pan Head Tapping Screw (ST)2.6x5	HA Sensor (2)	2

N104P-4971		S-11	4971	Pan Head Tapping Screw (ST)3x5	Plug Fixing Plate locating at Base Plate R(2)	80
					Ribbon Motor locating at Base Plate R/L(8)	
					FC Home Sensor Fixing Plate(1)	
					FC Home Sensor B Fixing Plate (1)	
					Plug Fixing Plate locating at Paper Guide (2)	
					Paper Guide B (4)	
					Paper Guide C (4)	
					Paper Cutter (2)	
					Ribbon Motor on FFC Bottom Plate (2)	
					Ribbon Shaft Plate (2)	
					I/F PCB Assembly (2)	
					HA Motor Assembly (2)	
					HA Motor Fixing Plate (3)	
					Cassette Holder R (2)	
					FFC Bottom Plate Assembly (4)	
					Base Plate R (9)	
					Base Plate L (9)	
					Indicator Stand (2)	
					Slide SW Fixing Plate (2)	
					Ground Spring(17)	
N104P-4972		S-12	4972	Pan Head Tapping Screw (ST)3x6	Edge Guard (1)	18
					Home Sensor (2)	
					Cassette Holder L (1)	
					Tie Plate (4)	
					HA Sensor (1)	
					Paper Cutter Cover (4)	
					Gear Cover (2)	
					Side Plate R (1)	
					Side Plate L (1)	
					ROM Cover (1)	
N104P-4975		S-26	4975	Pan Head Screw M3x12,SPW	Paper Sensor (1)	3
					Interlock Harness A Assembly (2)	
N104P-4976		S-5	4976	Pan Head Screw M3x6,SW	LF Motor (4)	8
					Separating Plate (4)	
N104P-4979		S-16	4979	Pan Head Screw M4x10,SPW	Platen Gear (1)	3
					Front of Top Enclosure (3)	
N104P-4981		S-20	4981	Hexagon Hole Screw M4x5	C Motor Pulley (4)	4
N104P-5534		S-7	5534	Pan Head Screw M3x15,SPW	HA Cam L (1)	2
					HA Cam R (1)	
N104P-6295		S-28	6295	Pan Head Screw M4x8,SW	Carrier Motor (4)	4
N104P-6385		S-31	6385	Hexagon Hole ScrewM3x4	Carrier Shaft	1
N104P-6536		S-30	6536	Pan Head Tapping Screw (BT)2x6	Tractor PCB Cover(1)	1
N104P-6703		S-25	6703	Pan head screw M3x11,PW	Paper Sensor (1)	1