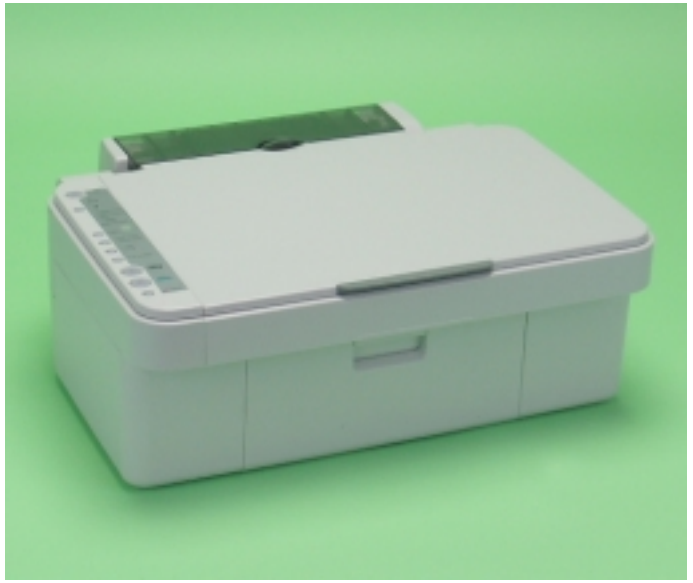
SERVICE MANUAL



Color Inkjet Printer

EPSON STYLUS CX3500/CX3650/CX3600/ CX4500/CX4600

EPSON

PRECAUTIONS

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

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

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

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

DANGER

1. ALWAYS DISCONNECT THE PRODUCT FROM THE POWER SOURCE AND PERIPHERAL DEVICES PERFORMING ANY MAINTENANCE OR REPAIR PROCEDURES.
2. NO WORK SHOULD BE PERFORMED ON THE UNIT BY PERSONS UNFAMILIAR WITH BASIC SAFETY MEASURES AS DICTATED FOR ALL ELECTRONICS TECHNICIANS IN THEIR LINE OF WORK.
3. WHEN PERFORMING TESTING AS DICTATED WITHIN THIS MANUAL, DO NOT CONNECT THE UNIT TO A POWER SOURCE UNTIL INSTRUCTED TO DO SO. WHEN THE POWER SUPPLY CABLE MUST BE CONNECTED, USE EXTREME CAUTION IN WORKING ON POWER SUPPLY AND OTHER ELECTRONIC COMPONENTS.
4. WHEN DISASSEMBLING OR ASSEMBLING A PRODUCT, MAKE SURE TO WEAR GLOVES TO AVOID INJURIER FROM METAL PARTS WITH SHARP EDGES.

WARNING

1. REPAIRS ON EPSON PRODUCT SHOULD BE PERFORMED ONLY BY AN EPSON CERTIFIED REPAIR TECHNICIAN.
2. MAKE CERTAIN THAT THE SOURCE VOLTAGES IS THE SAME AS THE RATED VOLTAGE, LISTED ON THE SERIAL NUMBER/ RATING PLATE. IF THE EPSON PRODUCT HAS A PRIMARY AC RATING DIFFERENT FROM AVAILABLE POWER SOURCE, DO NOT CONNECT IT TO THE POWER SOURCE.
3. ALWAYS VERIFY THAT THE EPSON PRODUCT HAS BEEN DISCONNECTED FROM THE POWER SOURCE BEFORE REMOVING OR REPLACING PRINTED CIRCUIT BOARDS AND/OR INDIVIDUAL CHIPS.
4. IN ORDER TO PROTECT SENSITIVE MICROPROCESSORS AND CIRCUITRY, USE STATIC DISCHARGE EQUIPMENT, SUCH AS ANTI-STATIC WRIST STRAPS, WHEN ACCESSING INTERNAL COMPONENTS.
5. REPLACE MALFUNCTIONING COMPONENTS ONLY WITH THOSE COMPONENTS BY THE MANUFACTURE; INTRODUCTION OF SECOND-SOURCE ICs OR OTHER NONAPPROVED COMPONENTS MAY DAMAGE THE PRODUCT AND VOID ANY APPLICABLE EPSON WARRANTY.

About This Manual

This manual describes basic functions, theory of electrical and mechanical operations, maintenance and repair procedures of the printer. The instructions and procedures included herein are intended for the experienced repair technicians, and attention should be given to the precautions on the preceding page.

Manual Configuration

This manual consists of six chapters and Appendix.

CHAPTER 1.PRODUCT DESCRIPTIONS

Provides a general overview and specifications of the product.

CHAPTER 2.OPERATING PRINCIPLES

Describes the theory of electrical and mechanical operations of the product.

CHAPTER 3.TROUBLESHOOTING

Describes the step-by-step procedures for the troubleshooting.

CHAPTER 4.DISASSEMBLY / ASSEMBLY

Describes the step-by-step procedures for disassembling and assembling the product.

CHAPTER 5.ADJUSTMENT

Provides Epson-approved methods for adjustment.

CHAPTER 6.MAINTENANCE

Provides preventive maintenance procedures and the lists of Epson-approved lubricants and adhesives required for servicing the product.

CHAPTER 7.APPENDIX

Provides the following additional information for reference:

- Connector pin assignments
- Electric circuit boards components layout
- Electrical circuit boards schematics
- Exploded diagram & Parts List

Symbols Used in this Manual

Various symbols are used throughout this manual either to provide additional information on a specific topic or to warn of possible danger present during a procedure or an action. Be aware of all symbols when they are used, and always read NOTE, CAUTION, or WARNING messages.

Indicates an operating or maintenance procedure, practice or condition that, if not strictly observed, could result in injury or loss of life.

Indicates an operating or maintenance procedure, practice, or condition that, if not strictly observed, could result in damage to, or destruction of, equipment.

May indicate an operating or maintenance procedure, practice or condition that is necessary to accomplish a task efficiently. It may also provide additional information that is related to a specific subject, or comment on the results achieved through a previous action.

I.ndicates an operating or maintenance procedure, practice or condition that, if not strictly observed, could result in injury or loss of life.

Indicates that a particular task must be carried out according to a certain standard after disassembly and before re-assembly, otherwise the quality of the components in question may be adversely affected.

Revision Status

Revision	Issued Date	Description
A	2004/8/18	First Release

NOTE: *Any illustrations or photos of the printer without a card slot are based on the Stylus CX3500/3600/CX3650.*

CONTENTS

CHAPTER

1

PRODUCT DESCRIPTION

1.1 Overview

The major features of EPSON color inkjet dot matrix printer EPSON Stylus CX3500/ CX3600/CX3650/CX4500/CX4600 are:

1.1.1 Features

- Printer functions
  As a printer, this unit achieves high-quality output at high speed on plain paper, and uses new pigment inks for improved light fastness, water fastness, gas fastness, rubbing fastness. It includes the following features.
  - Maximum print resolution: 2880 (H) x 1440 (V) dpi
  - Separate ink cartridge for each color
  - ASF (Auto Sheet Feeder) holds up to 100 cut sheets (64g/m^2)
  - Border-free printing with EPSON specialty media is provided
  - Reduced noise level
  - Fast and thick draft mode with the combination of real black and composite black
- Scanner functions
  Use of a CIS sensor means no warm-up period is required, which makes scanning more convenient and allows for a more compact scanner.
  Additional features include the following.
  - Maximum optical resolution 600 x 1200 dpi
  - Scan gradations 48 bits (input), 24 bits (output)
- Stand-alone copy functions
  It benefits from using a more recently developed type of ink which enables photo-quality copies to be made not only on special media but even on plain paper. Only the basic copy functions are provided for easy operation.
  - Paper size can be selected from 2 or 3 options.

Table 1-1. Paper size

Paper size	Model
Letter/4"x6"	Stylus CX4600
A4/10x15	Stylus CX3500/CX3600/CX3650/CX4500

  - Paper type can be selected from 2 options, plain paper or photo paper, which also defines copy quality.
  - Enlarge / Reduce factor can be selected from 2 options, actual size (100%) or “Fit to page”.
  - Copy margin is automatically selected from 3 options, related to paper type and paper size. 3mm, “Small Margins Copy”, “Border Free Copy”
  - Fast and thick draft mode with the combination of real black and composite black
  - Copy functions can be directly alternated from memory card print functions, by operation panel. (Only for Stylus CX4500/CX4600)
- Card reader functions (only for Stylus CX4500/CX4600)
  This unit includes memory card slots that support CompactFlash, SmartMedia, Memory Stick, Memory Stick PRO, Micro Drive, SD Memory Card, and xD-Picture Card standards.
- Memory card print functions (only for Stylus CX4500/CX4600)
  This unit can print images from the memory card in memory card slots in stand-alone mode.
  The memory card print features are as follows.
  - Supports “Index sheet printing” whereby images can be selected simply by marking an index sheet. Selecting images is easy-just check the desired images and then scan the index sheet.
  - Memory card print functions can be directly alternated from copy functions, by operation panel.

- Scan functions
  This unit provides scan mode so that data can be scanned and transferred to a connected computer or to e-mail via application software like the EPSON SMART PANEL.

- Simultaneous use of functions
  Printer functions and scanner functions are independent and can therefore be operated simultaneously from a connected computer.

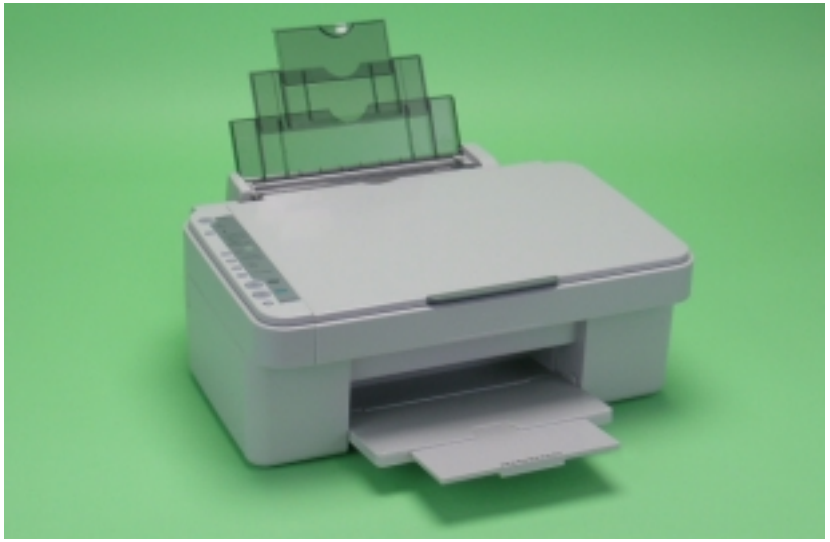


Figure 1-1. Product's external view

- Easy operation panel
  The unit has a simple operation panel equipped with 10 buttons including power button, LEDs including 7 segment LED and provides basic functions only for easy operation.
  * Card slot model only. (9 buttons for the model without card slot)

- Exterior design
  Use of a CIS scanner engine has enabled a more compact design.
  Also, this unit has operation panel on the left side, which becomes more distinctive but still easier to use.

1.2 Specifications

1.2.1 Printer specifications

This section covers specifications of the printer.

1.2.1.1 Physical Specification

- Weight
  - Stylus CX3500/CX3600/CX3650 : 6.52kg (without the ink cartridges)
  - Stylus CX4500/CX4600 : 6.6kg (without the ink cartridges)
- Dimension (Including rubber feet)
  - Printing : 430mm (W) x 500mm (D) x 280mm (H)
  - Storage : 430mm (W) x 344mm (D) x 170mm (H)

1.2.1.2 Printing Specification

- Print Method
  - On demand ink jet
- Nozzle Configuration
  - Monochrome 90 nozzles
  - Color 90 nozzles x 3 (Cyan, Magenta, Yellow)

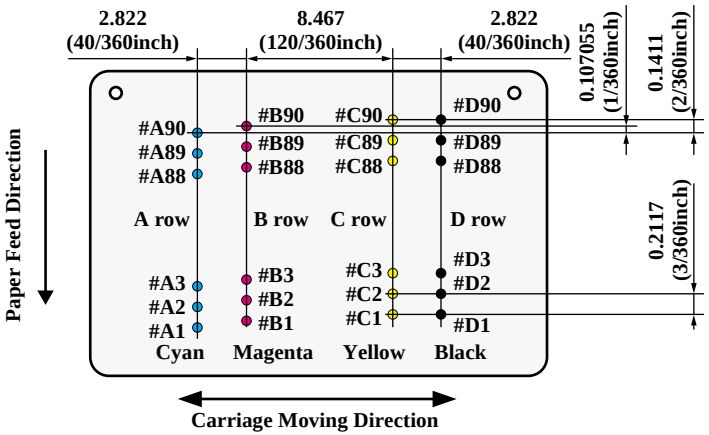


Figure 1-2. Nozzle configuration

- Print Direction
  - Bi-directional minimum distance printing (with logic seeking)
- Print Speed & Printable Columns

Table 1-2. Character mode

Character pitch	Printable columns	CR speed
10 CPI (Pica)	80	285 CPS*

Note "*": CPS: Characters/Second
This speed is when using normal dot printing mode.

Table 1-3. Graphics mode (standard)

Horizontal resolution	Printable area	Max. dot count	CR speed
360dpi*	209.8mm (8.26")	2976	285cps
360dpi	209.8mm (8.26")	2976	285cps
720dpi	209.8mm (8.26")	5952	285cps
1440dpi	209.8mm (8.26")	11904	285cps
2880dpi	209.8mm (8.26")	23808	285cps

Note "*": Draft Printing

Table 1-4. Graphics mode (border-free printing)

Horizontal resolution	Printable area	Max. dot count	CR speed
360dpi*	215.05mm (8.46")	3048	285cps
720dpi	215.05mm (8.46")	6096	285cps
1440dpi	215.05mm (8.46")	12192	285cps
2880dpi	215.05mm (8.46")	24384	285cps

Note "*": Except Draft Printing

- Control Code
  - ESC/P Raster command
  - EPSON Remote command

- Internal fonts
  - Character code : Alphanumeric with expanded graphics (PC437)
    ASCII, 20H to 7FH only
  - Fonts : EPSON original fonts
    Alphanumeric font: Courier
- Input buffer size
  - 32 Kbytes

1.2.1.3 Paper Feed Specifications

- Paper feed method
  Friction feed, using one ASF (Auto Sheet Feeder)
- Paper path
  Top feed, front out
- Paper feed rates
  - 203.2mm/sec (8.0inch/sec)
    : high quality mode, 25.4-mm feed
  - 294.64mm/sec (11.6inch/sec)
    : high speed mode, continuous feed
- CR interval
  Programmable in 0.0176mm (1/1440inch) steps

1.2.1.4 Paper Support

- Cut sheets

Table 1-5. Cut sheets

Paper size	Dimensions		Thickness	Weight	Paper type
	Width	Length			
A4	210mm	297mm	0.08-0.11mm	64-90g/m^2 (17-24(lb))	Plain paper Recycled paper
A5	148mm	210mm			
A6	105mm	148mm			
B5	182mm	257mm			
Letter	215.9mm (8.5")	279.4mm (11")			
Legal	215.9mm (8.5")	355.6mm (14")			
Executive	184.2mm (7.25")	266.7mm (10.5")			
Half Letter	139.7mm (5.5")	215.9mm (8.5")			
5"x8"	127mm (5")	203.2mm (8")			
8"x10"	203.2mm (8")	254mm (10")			
User defined	89-215.9mm	89-1117.6mm			

CAUTION

- **Poor quality paper may reduce print quality and cause paper jams or other problems. If you encounter problems, switch to a higher grade of paper.**
- **It is necessary that there is no wrinkle, nap, tear, fold, so on in the form.**
- **The curve of form must be 5mm or below.**
- **Use paper under normal conditions**
  - **Temperature 15 to 25°C (59 to 77°F)**
  - **Humidity 40 to 60% RH**

☐ Postcards

Table 1-6. Postcards

Paper size	Dimensions		Paper type
	Width	Length	
Postcard	100mm	148mm	Government-standard postcard
Return postcard set	200mm	148mm	

CAUTION

- **Use paper under normal conditions**
  - **Temperature 15 to 25°C (59 to 77°F)**
  - **Humidity 40 to 60% RH**
- **It is necessary that there is no wrinkle, nap, tear, fold, so on in the form.**
- **The curve of form must be 5mm or below.**
- **As for the going and returning postcard, don't use the one with a fold in the center.**

☐ Envelopes

Table 1-7. Envelopes

Paper size	Dimensions		Thickness	Weight	Paper type
	Width	Length			
No.10 *1	241.3mm (9.5")	104.8mm (4.125")	N/A	75-90g/m^2 (20-24(lb))	Bond paper Air mail PPC
DL *1	220mm	110mm			
C6 *1	162mm	114mm			
220x132 *1	220mm	132mm			
Tall No.3 *2	120mm	235mm			Craft paper New Kent paper
Tall No.4 *2	90mm	205mm			
Western No.1 *1	120mm	176mm		75-100g/m^2 (20-27(lb))	
Western No.2 *1	114mm	162mm			
Western No.3 *1	98mm	148mm			
Western No.4 *1	105mm	235mm			

Note *1: Check that the flap is on the long edge and can be folded.

*2: Check that the flap is on the short edge and can not be folded.

CAUTION

- **Use paper under normal conditions**
  - **Temperature 15 to 25°C (59 to 77°F)**
  - **Humidity 40 to 60% RH**
- **Poor quality paper may reduce print quality and cause paper jams or other problems. If you encounter problems, switch to a higher grade of paper.**
- **It is necessary that there is no wrinkle, nap, tear, fold, so on in the form.**
- **Don't use the adhesive envelopes.**
- **Don't use sleeve insert envelopes and cellophane window envelopes.**

☐ Exclusive papers

Quality: EPSON Exclusive paper

Transparency printing is only available at normal temperature.

■ Stylus CX4600

Table 1-8. Exclusive papers

Item	Size	Width (mm)	Length (mm)	Thickness (mm)	Weight (g/m^2)
Glossy Photo Paper *	Letter	215.9	279.4	0.23	188
	4"x6"	101.6	152.4		
Matte Paper Heavy Weight *	Letter	215.9	279.4	0.23	167
	8"x10"	203.2	254		
DURABrite Ink Glossy Photo Paper	Letter	215.9	279.4	0.21	206
	4"x6"	101.6	152.4		
Double Sided Matte Paper *	Letter	215.9	279.4	0.25	178

Note "*": Not supported with stand-alone functions of copy and memory card print.

CAUTION

- **Use paper under normal conditions.**
  - **Temperature 15 to 25°C (59 to 77°F)**
  - **Humidity 40 to 60% RH**
- **Poor quality paper may reduce print quality and cause paper jams or other problems. If you encounter problems, switch to a higher grade of paper.**
- **It is necessary that there is no wrinkle, nap, tear, fold, so on in the form.**
- **The curve of form must be 5mm or below.**

■ Stylus CX3500/CX3600/CX3650/CX4500

Table 1-9. Exclusive papers

Item	Size	Width (mm)	Length (mm)	Thickness (mm)	Weight (g/m^2)
Photo Paper *	A4	210	297	0.23	188
Photo Quality Ink Jet Paper *	A4	210	297	0.13	102
	A6	105	148		
	5"x8"	127	203.2		
	8"x10"	203.2	254		
Matte Paper Heavy Weight *	A4	210	297	0.23	167
	8"x10"	203.2	254		
DURABrite Photo Paper	A4	210	297	0.21	206
	10cmx15cm	101.6	152.4		
Premium Semigloss Photo Paper *	A4	210	297	0.27	250
Archival Matte Paper *	A4	210	297	0.25	189
Double Sided Matte Paper *	A4	210	297	0.25	178

Note "*": Not supported with stand-alone functions of copy and memory card print.

CAUTION

- **Use paper under normal conditions.**
  - **Temperature 15 to 25°C (59 to 77°F)**
  - **Humidity 40 to 60% RH**
- **Poor quality paper may reduce print quality and cause paper jams or other problems. If you encounter problems, switch to a higher grade of paper.**
- **It is necessary that there is no wrinkle, nap, tear, fold, so on in the form.**
- **The curve of form must be 5mm or below.**

1.2.1.5 Printing Area

☐ Cut sheet (standard printing)

■ Printable area
The print quality is guaranteed for the print area above the 3 mm bottom margin. For paper width (PW) and paper length (PL), refer to "1.2.1.4 Paper Support" *(p.12)*.
Refer to the following table. As for each margin area, refer to Figure 1-3 *(p.15)*.

Table 1-10. Applicable paper/Printing area

Paper type		Left margin	Right margin	Top margin	Bottom margin
Cut sheets	A4	3 mm (0.12")	3 mm (0.12")	3 mm (0.12")	3 mm (0.12")
	A5				
	A6				
	B5				
	Letter				
	Legal				
	Executive				
	Half Letter				
	5"x8"				
	8"x10"				
	User defined				
Post cards	Postcard	3 mm (0.12")	3 mm (0.12")	3 mm (0.12")	3 mm (0.12")
	Return postcard set				
Exclusive papers Stylus CX3500/CX3600/ CX3650/CX4500	Photo Paper	3 mm (0.12")	3 mm (0.12")	3 mm (0.12")	3 mm (0.12")
	Photo Quality Ink Jet Paper				
	Matte Paper Heavy Weight				
	DURABrite Photo Paper				
	Premium Semigloss Photo Paper				
	Archival Matte Paper				
	Double Sided Matte Paper				

Table 1-10. Applicable paper/Printing area

Paper type		Left margin	Right margin	Top margin	Bottom margin
Exclusive papers Stylus CX4600	Glossy Photo Paper	3 mm (0.12")	3 mm (0.12")	3 mm (0.12")	3 mm (0.12")
	Matte Paper Heavy Weight				
	DURABrite Ink Glossy Photo Paper				
	Double Sided Matte Paper				

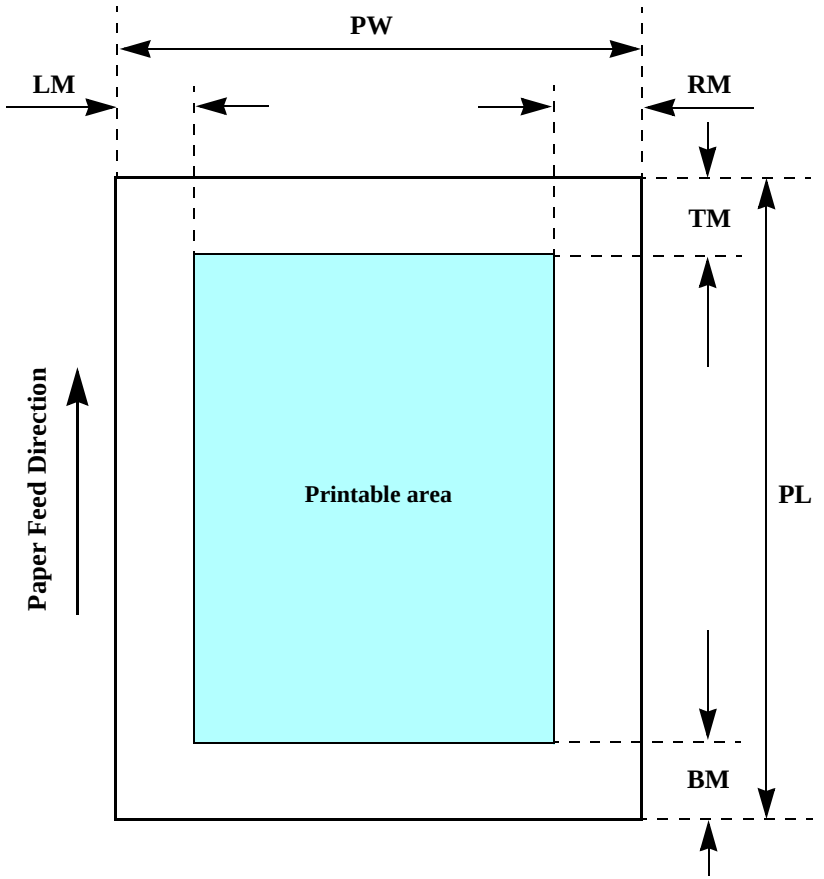


Figure 1-3. Printable area Cut sheet (standard printing)

☐ Cut sheet (border-free printing)

■ Printable area
For paper width (PW) and paper length (PL), refer to "1.2.1.4 Paper Support" *(p.12)*.
Refer to the following table. As for each overhang area, refer to Figure 1-4 *(p.16)*.

Table 1-11. Applicable paper/Printing area

Paper type			Left Overhang	Right Overhang	Top Overhang	Bottom Overhang
Exclusive paper	Stylus CX3500/CX3600/ CX3650/CX4500	Photo Paper	2.5 mm (0.09")	2.5 mm (0.09")	3 mm (0.12")	5 mm (0.2")
		Matte Paper Heavy Weight				
		DURABrite Photo Paper				
		Premium Semigloss Photo Paper				
	Stylus CX4600	Glossy Photo Paper	2.5 mm (0.09")	2.5 mm (0.09")	3 mm (0.12")	5 mm (0.2")
		Matte Paper Heavy Weight				
		DURABrite Ink Glossy Photo Paper				

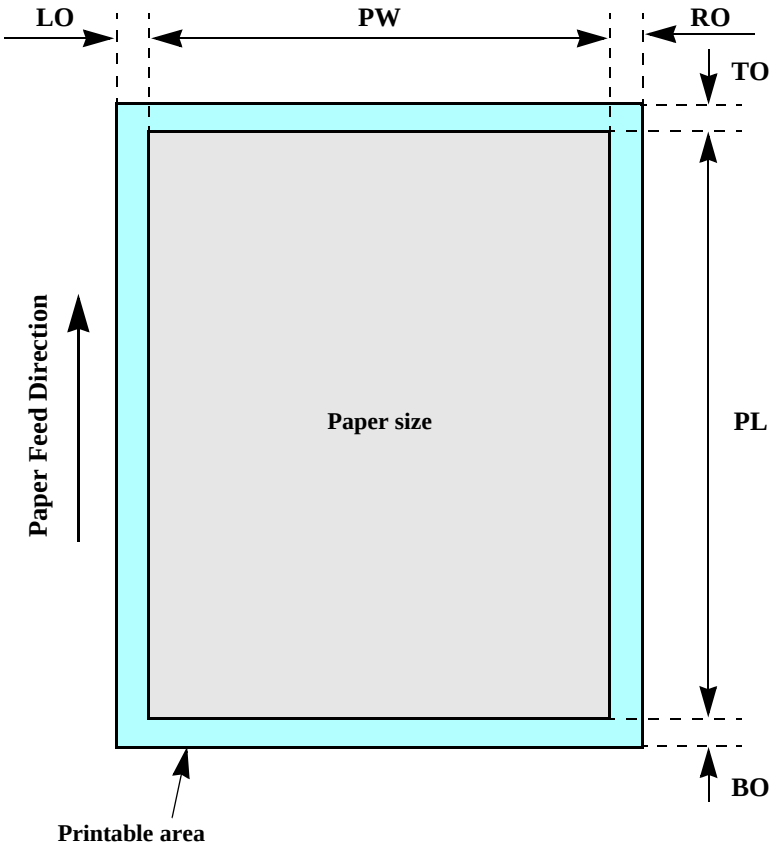


Figure 1-4. Printable area for Cut sheet (border-free printing)

- Envelopes
  - Printable area
    For paper width (PW) and paper length (PL), refer to "1.2.1.4 Paper Support" *(p.12)*.
    Refer to the following table. As for each margin area, refer to Figure 1-5 *(p.17)*.

Table 1-12. Applicable paper/Printing area

Paper type	Left Margin	Right Margin	Top Margin	Bottom Margin
No.10	3mm (0.12")	3mm (0.12")	3mm (0.12")	20mm (0.79")
DL	3mm (0.12")	3mm (0.12")	3mm (0.12")	20mm (0.79")
C6	3mm (0.12")	3mm (0.12")	3mm (0.12")	20mm (0.79")

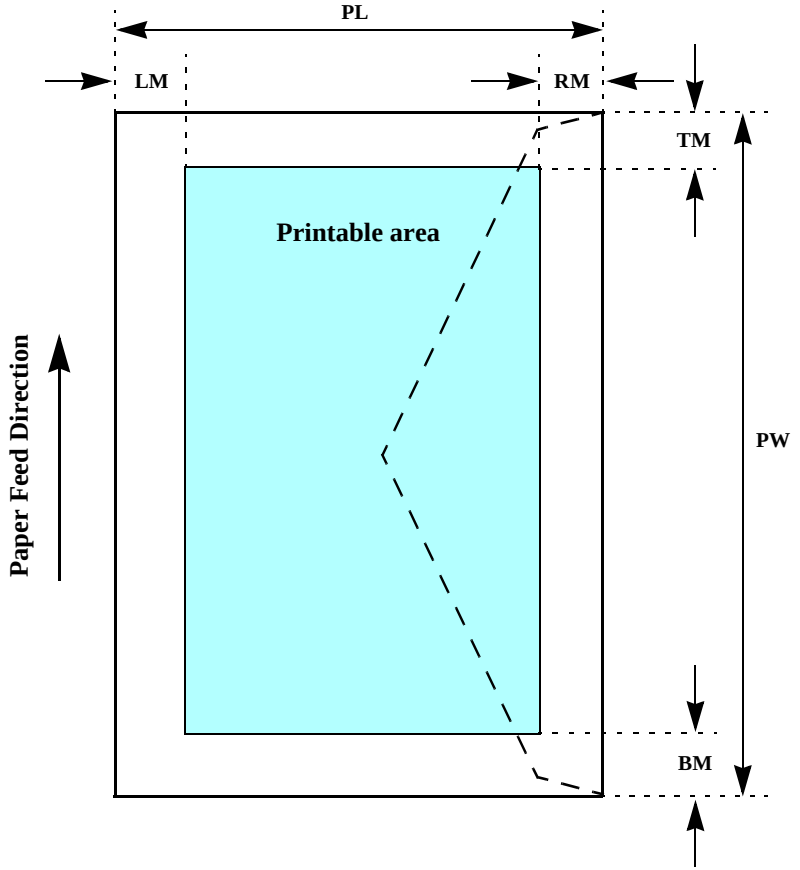


Figure 1-5. Printable area for envelopes

1.2.1.6 Ink Cartridge Specification

☐ Type/color : EPSON-brand special ink cartridges

Table 1-13. Ink Cartridge

Color	Size	Stylus CX3500/CX3600/ CX3650/CX4600	Stylus CX3500/CX4500
Black	S size	T0441	T0461
Cyan	S size	T0442	—
	SS size	T0452 *	T0472
Magenta	S size	T0443	—
	SS size	T0453 *	T0473
Yellow	S size	T0444	—
	SS size	T0454 *	T0474

Note "*": Except Stylus CX4600.

☐ Print Capacity

■ Black Ink Cartridge : 400 pages/A4
(ISO/IEC10561 Letter Pattern at 360x720 dpi)
380 pages/A4
(360x720 dpi, 5% duty)

■ Color Ink Cartridge

• S size : 450 pages/A4 (360x720 dpi, 5% duty for each color)
• SS size : 260 pages/A4 (360x720 dpi, 5% duty for each color)

☐ Shelf life : After packing is opened, it is assumed 6 months, and assumes 2 years including this.

☐ Storage Temperature

Table 1-14. Storage Temperature

Situation	Storage Temperature	Limit
When transported in individual boxes	-30 °C to 50 °C	10 days max. at 50 °C
When stored in individual boxes	-30 °C to 40 °C	1 month max. at 40 °C
When installed in main unit	-20 °C to 40 °C	

☐ Dimension : 12.7mm (W) x 73.46mm (D) x 55.25mm (H)

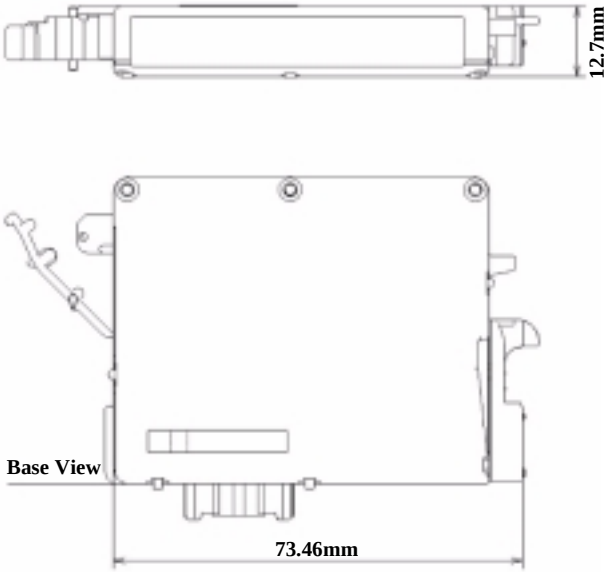


Figure 1-6. Ink cartridge

CAUTION

- **The ink cartridge cannot be refilled.**
- **The ink cartridge that passes the expiration date should not be used.**
- **The ink in the ink cartridge freezes when leaving it in the environment of -16 °C or under. It takes 3 hours that the frozen ink becomes usable when moving it from the environment of -20 °C to the environment of 25 °C.**

1.2.2 Scanner specifications

This section covers specifications of the scanner.

1.2.2.1 Basic Specifications

- ☐ Product type : Flatbed color image scanner
- ☐ Scanning method : Scanning of fixed document with mobile scan head
- ☐ Sensor : CIS
- ☐ Maximum scan area : 8.5" x 11.7" (216 mm x 297 mm)
- ☐ Document sizes : A4 or US letter
- ☐ Max. effective pixels : 5,100 x 7,020 pixels (600 dpi)
- ☐ Resolution
  - ■ Main scan : 600 dpi
  - ■ Sub scan : 1200 dpi with Micro Step
- ☐ Scanning resolution : 50 to 4800 dpi (selectable in 1-dpi steps), 7200 dpi, 9600 dpi
- ☐ Gradations (pixel depth) : Each color pixel has 16-bit input and either 1-bit or 8-bit output.
- ☐ Scanning speed : 600 dpi
  - ■ Color : Approx. 15 msec/line
  - ■ Monochrome : Approx. 5 msec/line
- ☐ Light source : RGB Three Color LED

1.2.2.2 Detailed Specifications

- ☐ Control commands : ESC/I D7
- ☐ Gamma correction : Two user-defined levels

1.2.2.3 Image scanning area

Table 1-15. Image scanning area

RW (readable width)	OLM (out-of-range left margin)	RL (readable length)	OTM (out-of-range top margin)
216 mm (8.5")	1.5 mm ± 1 mm	297 mm (11.7")	1.5 mm ± 1 mm

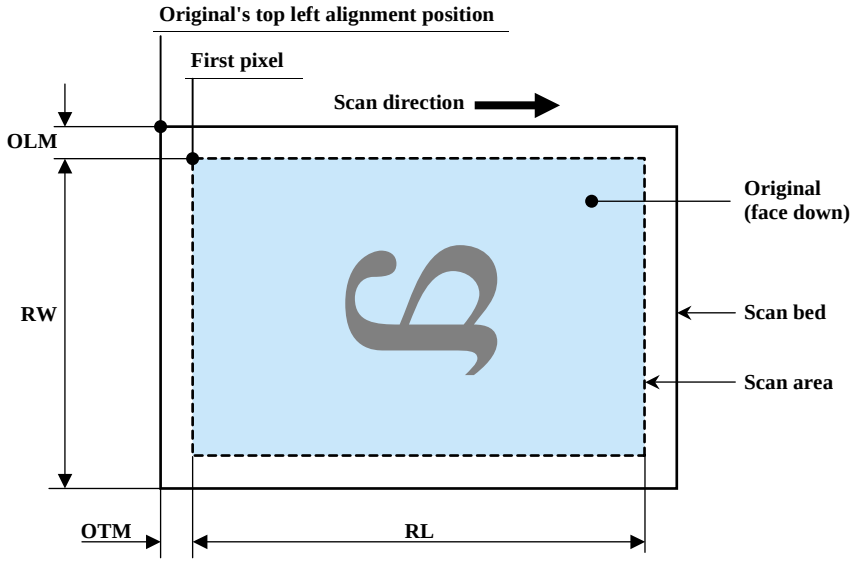


Figure 1-7. Image scanning area

1.2.3 Common

1.2.3.1 Electric Specification

☐ Primary power input

Table 1-16. Primary power input

	100-120V model	220-240V model
Rated power supply voltage (ACV)	100 ~ 120	220 ~ 240
Input voltage range (ACV)	90 ~ 132	198 ~ 240
Rated current (A)	0.4A (max. 0.6A w/ card slot model) (max. 0.7A w/o card slot model)	0.2A (max. 0.3A)
Rated frequency (Hz)	50 ~ 60	
Input frequency range (Hz)	49.5 ~ 60.5	
Power consumption (W)	Approx. 11W (w/ card slot model) Approx. 12W (w/o card slot model) (Standalone copying, ISO10561 Letter Patter, Plain Paper - Text)	
	Approx. 2.5W (Lowe-power Mode/Sleep Mode)	
	Approx. 0.2W (Power Off Mode)	Approx. 0.4W (Power Off Mode)

Note 1: This product complies with the “Energy Star” standards.

2: If the printer is not operated at all for at least five minutes, the standby function reduces the current to the motor to conserve power.

3: If the scanner is not operated at all for at least five minutes, the standby function reduces the current to the motor to conserve power.

☐ Insulation resistance
10MΩ minimum (tested between AC line and chassis, test voltage: DC500V)

☐ Dielectric strength

- ■ AC1000 Vrms for one minute or AC1200 Vrms for one second (100-120V version)
- ■ AC1500 Vrms for one minute (220-240V version)

1.2.3.2 Environmental Performance

Table 1-17. Environmental Performance

Condition	Temperature	Humidity *2	Impact	Vibration
Operating	10 ~ 35°C *3	20 ~ 80% *3	1G, 1 x 10^{-3} seconds	0.15G
Not operating *1	-20 ~ 40°C	5 ~ 85%	2G, 2 x 10^{-3} seconds	0.50G

Note *1: After unpacking (storage)

*2: No condensation

*3: Under the following conditions

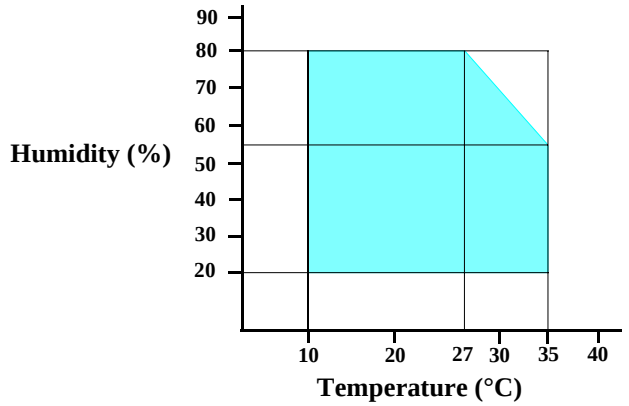


Figure 1-8. Temperature/Humidity range

1.2.3.3 Durability

☐ Total print life : 10,000 pages (black only, A4), or 5 years (whichever comes first)

☐ Print Head Life : 3 billion shots (per nozzle) or 5 years (whichever comes first)

☐ Scanner head : MCBF (30,000 cycles)

1.2.3.4 Safety Standards: EMC

Table 1-18. Safety Standards: EMC

	100-120V version	220-240V version
Safety standards	UL60950	EN 60950
	CSA22.2 No.60950	
EMI	FCC part15 subpart B class B	EN 55022(CISPR Pub.22) class B
	CSA C108.8 class B	AS/NZS 3548 class B

1.2.3.5 Acoustic Noise

- Noise level
  45dB (max.) (according to ISO7779 when for copying)

1.2.3.6 CE Marking

- 220-240 V version
  - Low Voltage Directive 73/23/EEC : EN60950
  - EMC Directive 89/336/EEC : EN55022 Class B
    EN61000-3-2
    EN61000-3-3
    EN55024

1.3 Interface

The EPSON Stylus CX3500/CX3600/CX3650/CX4500/CX4600 provides the following interface.

1.3.1 USB Interface

- Standards
  - "Universal Serial Bus Specifications Revision 2.0"
  - "Universal Serial Bus Device Class Definition for Printing Devices Version 1.1" (printer unit)
  - "Universal Serial Bus Mass Storage Class Bulk-Only Transport Revision 1.0" (storage unit)
- Transfer rate : 12 Mbps (Full Speed Device)
- Data format : NRZI
- Compatible connector : USB Series B
- Recommended cable length : 2 [m] or less
- Device ID

Table 1-19. Device ID

Model Name	Device ID	Model Name	Device ID
Stylus CX3500	[00H][54H] MFG:EPSON; CMD:ESCPL2,BDC,D4; MDL:Stylus[SP]CXxxxx; CLS:PRINTER; DES:EPSON[SP]Stylus[SP]CX3500;	Stylus CX4500	[00H][54H] MFG:EPSON; CMD:ESCPL2,BDC,D4; MDL:Stylus[SP]CXxxxx; CLS:PRINTER; DES:EPSON[SP]Stylus[SP]CX4500;
Stylus CX3600	[00H][54H] MFG:EPSON; CMD:ESCPL2,BDC,D4; MDL:Stylus[SP]CXxxxx; CLS:PRINTER; DES:EPSON[SP]Stylus[SP]CX3600;	Stylus CX4600	[00H][54H] MFG:EPSON; CMD:ESCPL2,BDC,D4; MDL:Stylus[SP]CXxxxx; CLS:PRINTER; DES:EPSON[SP]Stylus[SP]CX4600;
Stylus CX3650	[00H][54H] MFG:EPSON; CMD:ESCPL2,BDC,D4; MDL:Stylus[SP]CXxxxx; CLS:PRINTER; DES:EPSON[SP]Stylus[SP]CX3600;		

- Connector signal layout

Table 1-20. Connector pin assignment and signals

Pin No.	Signal name	I/O	Function description
1	VCC	-	Cable power. Max. power consumption is 2mA.
2	-Data	Bi-D	Data
3	+Data	Bi-D	Data, pull up to +3.3V via 1.5K ohm resistor.
4	Ground	-	Cable ground

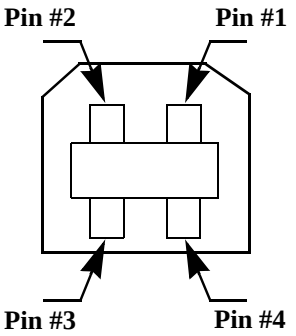


Figure 1-9. USB pin Assignment

- Product ID
  - 0x080D (Stylus CX4500/CX4600)
  - 0x080E (Stylus CX3500/CX3600/CX3650)
- Endpoint attribute

Table 1-21. Endpoint attribute

I/F No.	Endpoint Address	Endpoint Type	Linked Interface
0x00	0x01	Bulk In	Scanner
	0x02	Bulk Out	
0x01	0x03	Bulk In	Printer
	0x04	Bulk Out	
0x02	0x05	Bulk In	Card
	0x06	Bulk Out	

1.3.2 Standard Card Slots (only for Stylus CX4500/CX4600)

1.3.2.1 Memory card

Table 1-22. Memory card

Memory card standards		Slots	Supported memory cards
Compact Flash	CF+ and CompactFlash Specification Revision 1.4 compliant	CF Type II slot	• Compact Flash (memory card only) • Microdrive
SmartMedia	SmartMedia Standard 2000 compliant	SmartMedia slot	Smart Media (maximum capacity: 128 MB)
Memory Stick	MemoryStick Standard version 1.3 compliant	Memory Stick/ Memory Stick PRO slot	• Memory Stick (maximum capacity: 128 MB, including versions with memory select function) • MagicGate Memory Stick (maximum capacity: 128 MB, copy protection function is not supported) • Memory Stick Duo (requires Memory Stick Duo adapter)
Memory Stick PRO	MemoryStick Standard Memory Stick PRO Format Specifications version 1.0 compliant		• Memory Stick Duo (requires Memory Stick Duo adapter) • Memory Stick PRO Duo • (requires Memory Stick Duo adapter)
SD	SD Memory Card Specifications / PART1. Physical Layer Specification Version 1.0 compliant	SD/MMC slot	• SD (Secure Digital) memory card • miniSD card (requires SD adapter)
MultiMedia Card	MultiMediaCard Standard compliant		MultiMediaCard
xD-Picture Card	xD-Picture Card™ Card Specification Version 1.00 compliant	xD-Picture Card slot	xD-Picture Card

CAUTION

Note the following caution points when handling the memory card.

- **Since the SD card and Memory Stick share the same slot, only one can be inserted at a time.**
- **Since the SmartMedia and xD-Picture Card share the same slot, only one can be inserted at a time.**
- **When a memory card is being accessed, be sure to keep the memory card slot's cover closed and do not touch the memory card.**

1.3.2.2 Supported power supply voltage

☐ 3.3V/5V (both)

☐ 3.3V (only)

NOTE 1: 3.3V power is supplied to media that support both 3.3V and 5V.

2: Maximum current to memory card is 500mA.

3: 5V type memory cards are not supported.

1.3.2.3 Multi-slot operations

☐ Overview

■ There is only one type of card that can be used to simultaneously access both a connected computer and the direct printing function.

■ The slots have assigned priority to determine which slot will be accessed first when cards are inserted in several slots at once.

■ To select a card that has been inserted in a non-active slot, the card in the active slot must first be removed.

- Direct printing:
  Only the image files in the active slot are valid and have assigned frame numbers. The number of images will not change if a card is also inserted in a non-selected slot.
- Connection to computer (Windows):
  Only one drive is displayed at a time as a “removable disk” and only the card that is in the active slot can be accessed via the removable disk. A card that has been inserted into a non-selected slot cannot be accessed.
- Connection to computer (Macintosh):
  Only the card in the active slot can be mounted on the desktop. A card that has been inserted into a non-selected slot cannot be mounted on the desktop.

☐ Details

■ Access priority
The access priority among slots is assigned as:
1: CF (Micro Drive)
2: Smart Media
3: Memory Stick (Memory Stick PRO)
4: SD (MMC)
5: xD-Picture Card

■ Slot selection when power is turned on
If cards are inserted in several slots when the power is turned on, the active slot is determined by the priority ranks listed above.
Example: If Smart Media and Memory Stick are both inserted at power-on, the Smart Media slot becomes the active slot.

■ Slot selection after power is turned on
When a card is removed from the active slot, the slot with the next-highest priority becomes the active slot (if a card has been inserted into it). There is no need to re-insert any card before accessing it. If no slots contain any cards, the highest-priority slot (CF Micro Drive) again becomes the active slot.
Cards can be removed from non-selected slots in any order.
Example: If a memory stick and CF card are inserted while Smart Media is selected, CF becomes selected (active) once Smart Media is removed.

1.4 Stand-alone Copy

1.4.1 Basic Specifications

1.4.1.1 Supported paper sizes, types and qualities

Table 1-23. Supported paper sizes, types and qualities

Paper type		Quality *1	Paper size *2	
Paper name	Panel Indication		Paper size	Panel Indication
Plain Paper Recycled Paper	Plain Paper	Plain Paper	A4 (Letter)	A4 (Letter)
DURABright Photo Paper (DURABright Ink Glossy Photo Paper)	Photo Paper	Photo Paper	A4 (Letter), 10cm x 15cm (4" x 6")	A4 (Letter), 10cm x 15cm (4" x 6")

Note : The quality of draft copy is not affected by “Paper type” selection.

Note *1: Connected with Paper type.

*2: Paper sizes in parentheses apply only to Stylus CX4600.

1.4.1.2 Zoom function

The zoom function provides enlarged or reduced copies of originals. The either of the following can be selected from the operation panel.

- Actual (The state which “Fit to page” is not selected. It is the power-on default.)
  The zoom factor is set to 100%.
- Fit to page
  This function detects the image size of the original and automatically sets the zoom factor of the copy according to the copy paper's printable area.

1.4.1.3 Number of copies setting

This function sets the number of copies. The setting range is 1 to 9 and 100.

1.4.1.4 Maximum copy size

- 216 x 297mm

1.4.1.5 Copy layout

The following copy layout is provided according to “Paper type”, “Paper size” and zoom selections.

- Standard copy
  Provided for ordinary use with 3mm copy margin from every side.
- BorderFree copy
  Border-free printing of copies occurs when the print area is set as larger than the copy paper's size. In such cases, the outer edges of the original image may be omitted in the printed copy.
- Small Margins copy
  This function sets a 1.5mm margin on all four sides when printing in order to make maximum use of the original image and copy paper.

NOTE: Only “Standard Copy” can be used in draft copy mode.

Table 1-24. Copy layout

Zoom	Paper type	Paper size *3	B&W / Color	Layout
Actual *1	Plain Paper	A4 (Letter)	B&W, Color	Standard
		10cm x 15cm (4" x 6")	B&W, Color	Standard
	Photo Paper	A4 (Letter), 10cm x 15cm (4" x 6")	B&W, Color	Small margin
Fit to page *2	Plain Paper	A4 (Letter)	B&W, Color	Standard
		10cm x 15cm (4" x 6")	B&W, Color	Standard
	Photo Paper	A4 (Letter), 10cm x 15cm (4" x 6")	B&W, Color	Border free

Note *1: Actual is the state that “Fit to page” is not selected.

*2: “Fit to page” automatically sets the enlarge/reduce scale so that the entire image fits into the printable area or the border free area when border free layout is selected. When the original image is smaller than general card size (approx. 54mm x 86mm), the print margins will be different from the one that is defined by each layout. The image placement uses the upper left corner as the origin and any margins that occur during the fitting process occur along the bottom and/or right edge.

*3: Paper sizes in parentheses apply only to Stylus CX4600.

1.4.1.6 Multiple copies from an original

Second and subsequent copies can be printed from an original without scanning. When printing two or more copies, under the following settings the scan data can be stored in the unit's memory so that the second and subsequent copies can be printed without scanning.

- ☐ "Draft" mode (monochrome/color)
- ☐ "Text" mode (monochrome)

1.4.2 Copy Speed

1.4.2.1 Black Copy Speed

- ☐ Plain Paper – Draft 12.6 cpm (Copy per minute), Plain Paper – 3.1 cpm
- ☐ Black e-Memo text A4 size pattern, zoom 100%

  The above speed is for the second and subsequent copies (the time between ejection of the first page to ejection of the second page).

1.4.2.2 Color Copy Speed

- ☐ Plain Paper – Draft 11.6 cpm (Copy per minute)
- ☐ Color e-Memo text A4 size pattern, zoom 100%

  The above speed is for the second and subsequent copies (the time between ejection of the first page to ejection of the second page)

1.4.3 Configuration for copying

Table 1-25. Configuration for copying

Copy Mode setting			Scan and Print configuration					
Paper type	B&W / Color	Enlarge / Reduce*1 (%)	Scan resolution*1 (M x S dpi)	Print resolution (H x V dpi)	Dot size	MW	High Speed	LUT
Plain Paper	B&W	100 (Default)	600 x 300	360 x 360	VSD1	Off	On	C1
	Color	100 (Default)	300 x 600	360 x 720	VSD1	On	On	C1
Photo Paper (A4/Letter)	B&W	100 (Default)	600 x 600	720 x 1440*4	VSD3	On	On	C2
	Color	100 (Default)	600 x 600	720 x 1440*4	VSD3	On	On	C2
Photo Paper (smaller than A4/Letter)	B&W	100 (Default)	600 x 600	720 x 1440	VSD3	On	On	C3
	Color	100 (Default)	600 x 600	720 x 1440	VSD3	On	On	C3
Draft (Plain paper only)	B&W	100 (Default)	300 x 100	360 x 120	VSD1	Off	On	C4
	Color	100 (Default)	300 x 100	360 x 120	VSD1	Off	On	C4

Note *1: "Default" is the state in which "Fit to page" is not selected. When "Fit to page" is selected, scan resolution will be optimized according to enlarge/reduce scale.

*2: With "Photo Paper", composite black will be used in both B&W and color mode.

*3: With "Draft", both real black and composite black will be used for black printing. "PEC" technology will be used.

*4: "PEC" technology will be used for A4 or Letter size printing.

1.4.4 Relation between original and copy

1.4.4.1 Standard copy

The following table shows the relative positioning of the original and copy.

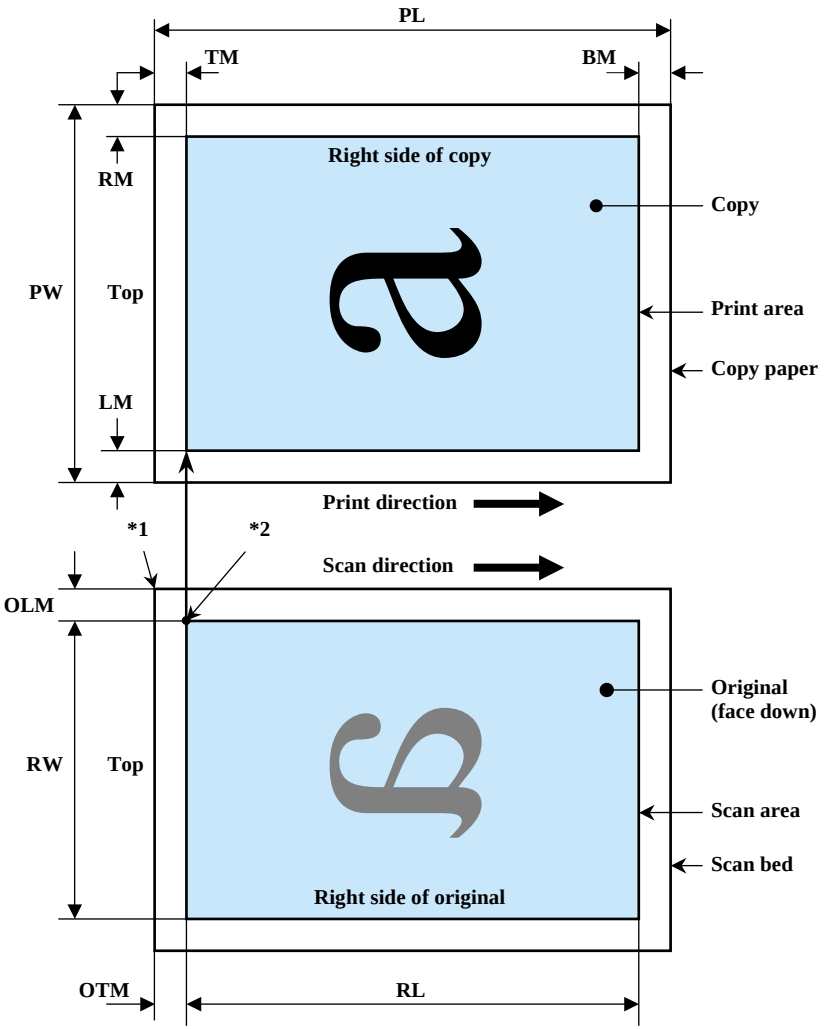
Table 1-26. Original (scanner)

RW (readable width)	OLM (out-of-range left margin)	RL (readable length)	OTM (out-of-range top margin)
216 mm (8.5")	1.5 mm ± 1 mm	297 mm (11.7")	1.5 mm ± 1 mm

Table 1-27. Copy (printer)

RM	LM	TM	BM
3 mm (0.12")	3 mm (0.12")	3 mm (0.12")	3 mm (0.12")

Note : Refer to "1.2.1.4 Paper Support" *(p.12)* for paper width (PW) and paper length (PL).



Note *1: This indicates the top left corner of the original. Normally, this corner is aligned with the scan bed's top right corner as the reference point.

*2: This indicates the scan start position at the top left of the original, which corresponds to the print start position at the top left of the copy. The bottom right corner position of the copy is within the print area but varies according to the enlarge/reduce setting.

Figure 1-10. Standard copy

1.4.4.2 BorderFree Copy

The following table shows the relative positioning of the original and copy.

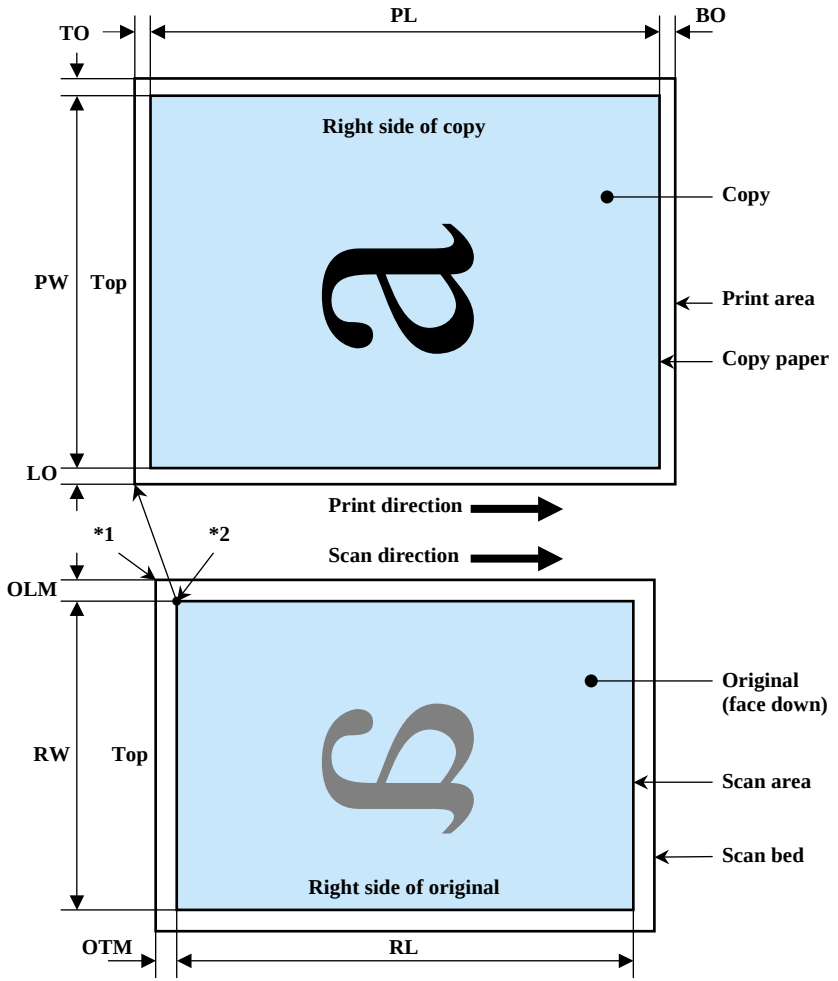
Table 1-28. Original (scanner)

RW (readable width)	OLM (out-of-range left margin)	RL (readable length)	OTM (out-of-range top margin)
216 mm (8.5")	1.5 mm ± 1 mm	297 mm (11.7")	1.5 mm ± 1 mm

Table 1-29. Copy (printer)

RO	LO	TO	BO
2.5 mm (0.09")	2.5 mm (0.09")	3 mm (0.12")	5 mm (0.2")

Note : Refer to "1.2.1.4 Paper Support" *(p.12)* for paper width (PW) and paper length (PL).



Note *1: This indicates the top left corner of the original. Normally, this corner is aligned with the scan bed's top right corner as the reference point.

*2: This indicates the scan start position at the top left of the original, which corresponds to the print start position at the top left of the copy. The bottom right corner of the print area varies according to the scale setting in the print area.

Figure 1-11. BorderFree Copy

1.4.4.3 Small Margins copy

The following table shows the relative positioning of the original and copy.

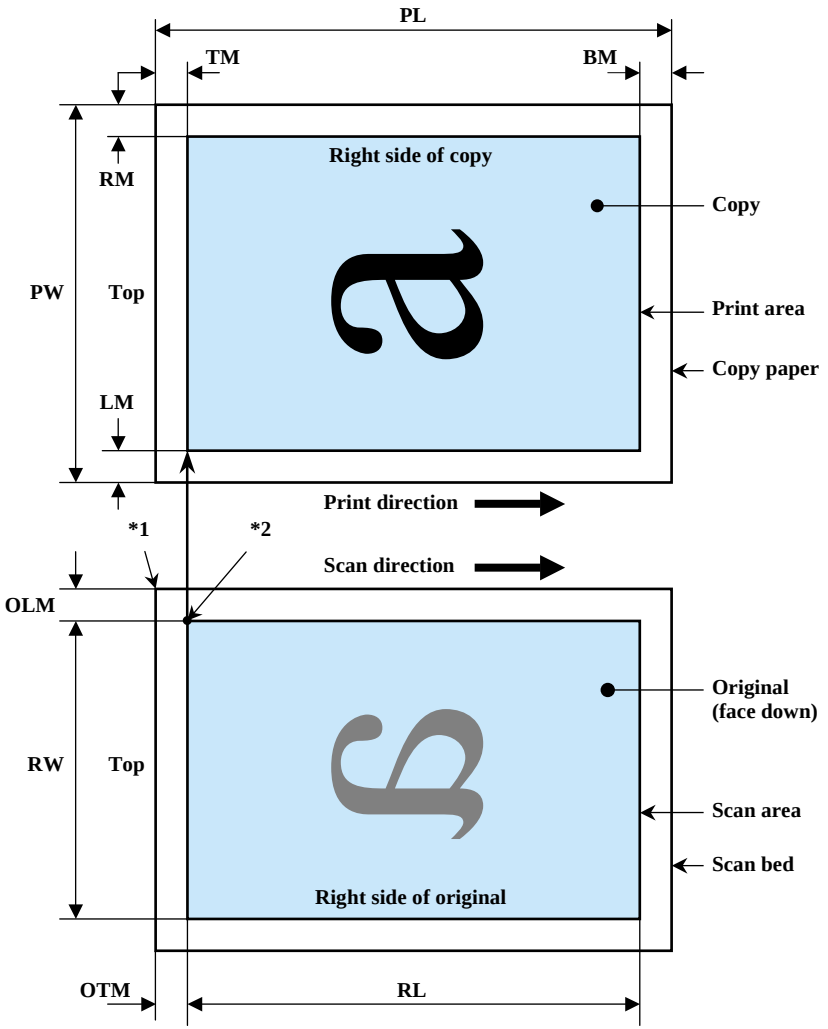
Table 1-30. Original (scanner)

RW (readable width)	OLM (out-of-range left margin)	RL (readable length)	OTM (out-of-range top margin)
216 mm (8.5")	1.5 mm ± 1 mm	297 mm (11.7")	1.5 mm ± 1 mm

Table 1-31. Copy (printer)

RM	LM	TM	BM
1.5 mm (0.06")	1.5 mm (0.06")	1.5 mm (0.06")	1.5 mm (0.06")

Note : Refer to "1.2.1.4 Paper Support" *(p.12)* for paper width (PW) and paper length (PL).



Note *1: This indicates the top left corner of the original. Normally, this corner is aligned with the scan bed's top right corner as the reference point.

*2: This indicates the scan start position at the top left of the original, which corresponds to the print start position at the top left of the copy. The bottom right corner position of the copy is within the print area but varies according to the enlarge/reduce setting.

Figure 1-12. Small Margins copy

1.5 Memory Card Print (only for Stylus CX4500/CX4600)

1.5.1 Basic Specifications

1.5.1.1 File system

DCF Version 1.0 is the only file system that can be used with this unit's stand-alone printing functions. Operation is not guaranteed when any other file system is used. The file system used by the card reader function depends on the host's specifications. For a detailed description of the DCF specifications, see the “Design Rule for Camera File System Standard, DCF Version 1.0, JEIDA-49-2-1998”.

1.5.1.2 Media format

- Media must be formatted according to the DCF Version 1.0 standard.
- DOS FAT formats (FAT12, FAT16) and single partition (basic partition)

1.5.1.3 File formats

The file formats supported by this unit are described below.

- JPEG files (*.JPG)
  These are photo data files that comply with the Exif Version 2.1 or Version 2.2 standard.
- Camera specification files (*.MRK)
  These are definition files used when in camera specification mode. An “AUTOPRINT.MRK” file whose full path name is no longer than 32 characters is valid.

Note, however, any file that is saved in the following directories or their sub-directories cannot be included as files to be printed.

- Directories containing system properties or hidden properties
- Directories that contain any double-byte characters in the directory name
- “RECYCLED” : Windows directory for deleted files
- “PREVIEW” : Directories containing CASIO's DSC thumbnail images
- “SCENE” : Directories containing data for CASIO's DSC Best Shot function
- “MSSONY” : Directories containing SONY's DSC e-mail image data, voice memos, video files, or non-compressed images

1.5.1.4 Valid image size

The maximum image size handled by this unit is:

- Horizontal : $120 \leq X \leq 4600$ (pixels)
- Vertical : $120 \leq Y \leq 4600$ (pixels)

1.5.1.5 Maximum number of photo data files

This unit can handle up to 999 photo data files. If the amount of photo data to be recorded exceeds the capacity of one memory card, this unit uses file sorting rules to sort the photo data into valid photo data in frames numbered from 1 to 999. Although it is possible to print photo data files with frame numbers over 999 that have been specified for printing by camera specification files, the maximum number of frames that can be specified is 999 frames.
If you insert a memory card that contains over 999 photo data files, only files up to 999 will be printed by the “Print All” or “Print index sheet” functions.

1.5.1.6 Thumbnail image data

This unit handles thumbnail image data in the DCF Version 1.0 format (Exif format, 160 x 120 pixels).
During this unit's Index sheet and memory card printing modes, the layout is 80 thumbnails per sheet (when using plain paper or special paper in high-speed print mode).

1.5.1.7 File sorting

This unit stores all photo data files in the memory, using the photo data files' full-path file names (for example, “\DCIM\100EPSON\EPSN0000.JPG”), and assigned photo frame numbers. Since photo frame numbers are assigned based on this unit's own proprietary file sorting rules, the assigned frame numbers do not necessarily match those indicated by digital cameras.

1.5.1.8 File sorting rules

This unit sorts photo data files based on the following prioritization rule.

- File name is sorted in ASCII order as full path name.

NOTE: Sorting results are not guaranteed if two files have matching full-path file names. (Matching full-path file names are not allowed under the DOS specification.)

1.5.1.9 Rules for acquisition of date/time data

The following priorities are used to fetch date and time information from photo data files.

1. Date/time data that complies with the standard format (Exif) for digital cameras
2. Date/time data that complies with the DOS standard file system (file time stamps)
3. Fixed values (01/01/1970, 00:00:00)

Note that the date/time data assigned to individual photo data files does not necessarily match the date/time when the photo was actually taken. The photo date/time may be modified due to the digital camera's calendar settings (presence/absence of functions, incorrect date/time settings, etc.), processing of the photo data after the photo was taken, or subsequent saving of data. In such cases, this unit performs the relevant processing based on the most recently modified date/time data.

1.5.1.10 Number of sheets which can be printed in total

Printing sum total number of sheets presupposes that it is possible to 999 sheets. Moreover, the printing sum total number of sheets per sheet is possible to 99 sheets.

1.5.2 Functions

1.5.2.1 List of functions

The memory card print menu and its settings are listed in the following table. The values shown in this table indicate the total number of options and the number of pages or copies that can be printed consecutively.

Table 1-32. List of functions

Memory card printing	Mode selection	Layout	Paper type	Paper size	Page/copies
Print index sheet	Print Index Sheet	None	Plain Paper	1	1
Print from index sheet	Print From Index Sheet	• Standard • Border free	• Plain Paper • Photo Paper	2	1 to 3 (according to marking)
Print all images	Print All / DPOF	• Standard • Border free	• Plain Paper • Photo Paper	2	1
DPOF *	Print All / DPOF	• Standard • Border free	• Plain Paper • Photo Paper	2	1 to 99

Note "*": It is available only DPOF file exists in the memory card.

Note : "Print index sheet" will be selected as default function of Memory Card Print. But when DPOF file exists in the memory card, "Print All / DPOF" will be selected as default and DPOF print can be done easily.

1.5.2.2 Memory card printing mode

- ☐ Print index sheet printing
  This function prints thumbnail images (stored in the memory card) onto an Index Sheet (form) that is marked for selecting images.
  The combinations of paper types and paper sizes are fixed as follows.
- ☐ Print from index sheet printing
  This function prints selected images onto the sheet output by index sheet printing.
- ☐ Print all images
  This function prints all of the image files stored in the memory card. As shown below, the number of printed pages depends on the number of copies to be printed. The settings are described below.
- ☐ DPOF printing
  In this mode, the photo frame numbers previously specified via the camera are printed in the number of pages specified via the camera. Only the paper type and layout are specified on the printer side. If the layout assigned multiple photos per output sheet, photos that have different frame sizes are automatically assigned in the specified number of pages in numerical order (of the specified photo frame numbers). If index print mode was set via the camera, this unit will print in DPOF index layout. (When in DPOF print mode, the mode cannot be switched by writing the print file specification from the host after inserting the memory card.)

Table 1-33. Memory card printing mode

Setting	Memory card printing mode	Description	Option, setting range, etc.
Layout (no menu)	• Print from index sheet printing • Print all images • DPOF printing	Sets print layout	Fixed in combination with paper type and paper size (refer to "1.5.4 Layout and Paper Type, Paper Size" *(p.36)*)
Paper type	Print index sheet printing	Fixed	Plain Paper
	• Print from index sheet printing • Print all images • DPOF printing	Sets paper type	Plain Paper or Photo Paper
Paper size	Print index sheet printing	Fixed	A4 or Letter *1
	• Print from index sheet printing • Print all images • DPOF printing	Sets paper size	A4 or 10cm x 15cm *2 Letter or 4" x 6" *3
Pages/ copies	Print index sheet printing	Fixed	Fixed as 1 page (can vary according to the number of image files)
	Print from index sheet printing	Sets number of printout	1 to 3 (set by the marking to the index sheet)
	Print all images	Sets number of printout	1
	DPOF printing	Sets number of printout	The number of copies specified via the camera is used. The setting range is 1 to 99 copies (default is 1 copy).
Quality	Print index sheet printing	Fixed	Prints it by the quality of 360 x 720dpi of Plain Paper. Only the Color print is supported.
	• Print from index sheet printing • Print all images • DPOF printing	Sets print quality	Fixed according to paper type (refer to "1.5.9 Relation between Paper Type and Quality" *(p.40)*)

Note *1: A4 size will be used for Stylus CX3500/CX3600/CX3650/CX4500.
Letter size will be used for Stylus CX4600.

*2: A4 or 10cm x 15cm size will be used for Stylus CX3500/CX3600/CX3650/CX4500.

*3: Letter or 4" x 6" size will be used for Stylus CX4600.

1.5.3 Index Sheet

- 30 thumbnail images are assigned per index sheet.
- There are 3 marking areas for each thumbnail and you can set the number of copies up to 3.
- “Paper type” and “Paper size” can be set from the operation panel.
- The layout is fixed according to the paper type and it is not indicated on the sheet. (Refer to “1.5.4 Layout and Paper Type, Paper Size” *(p.36)*)
- Images are arranged in the Index sheet in ascending order (of image file number). (Refer to “1.5.1.7 File sorting” *(p.30)* and “1.5.1.8 File sorting rules” *(p.31)*)
- Index sheet will be printed from the last page, in descending order. (The sheet containing first thumbnail comes top of printouts.)
- The mode transition may occur from “Print index sheet” to “Print from index sheet” when the “Print index sheet” completes successfully.

Figure 1-13. Sample of index sheet

1.5.3.1 Rules for scanning index sheets

☐ Index sheet scan range

■ Set index sheet in scanner

- Place the side to be scanned face down relative to the scan bed, as described below.
  Align the corner of the sheet to the upper left origin point and make sure the sheet is straight. Angled setting of the sheet is allowed as long as the sheet remains within the scan bed's scan range (the maximum angle on the scan bed is about 2.8°).
- The cover must be closed on the original to enable scanning. (This is to prevent any shifting of the position marks while scanning).
- Do not use paper that allows images to “bleed through” to the rear side. (This is to prevent empty bubbles from being filled in by “bleed-through”.)

■ Set scan area and original

Table 1-34. Set scan area and original

RW (readable width)	OLM (out-of-range left margin)	RL (readable length)	OTM (out-of-range top margin)
216 mm (8.5")	1.5 mm ± 1 mm	297 mm (11.7")	1.5 mm ± 1 mm

Place the Index Sheet face down with its top edge aligned to the left edge of the scan bed, and with the corner of the paper set to the original's top left position.

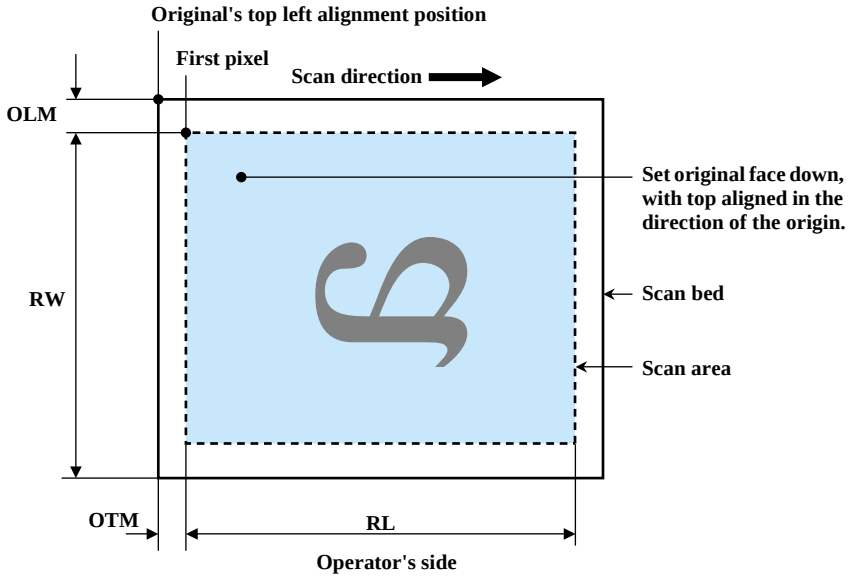


Figure 1-14. Set scan area and original

☐ Basic specifications for scanning of index sheets

■ Scanning rules for index sheet
Check if following symbols are found or not.

Table 1-35. Symbols check

No.	Symbols	Usage
①	Left top triangle (1)	Left reference position
②	Right top “O” of EPSON (1)	Right reference position
③	Right top block codes (36)	Sheet information (memory card ID, page)
④	Optional mark of “ALL” (1)	Determines whether or not to print all images in the sheet
⑤	Image marks (3x30)	Determines whether or not to print each image up to 3 copies. Left most is 1, center is 2 and right most is 3.

- When two or three marks of one image are filled, larger number will be used for the number of copies. (ex. 1 and 3 are filled, number of copies is 3.)
- When the optional “ALL” mark is filled, all images in the sheet will be printed one by one regardless of each image mark is filled or not.
- Index sheet error will be caused when any of image mark or “ALL” mark is not filled.
- Index sheet error will be caused when “Left top triangle”, “Right top EPSON” and “Block codes” are not found correctly due to something like smear.
- Place the index sheet so that the “Left top triangle” can meet the left top corner of the scanner.

<OK/NG mark samples>

- More than half part of the mark should be filled.
- Outside of each mark should not be filled excessively.

■ Errors during scanning or printing of index sheets

- Stops scanning and returns to the menu screen if the card is removed while an index sheet is being scanned or printed.
- Index sheet error (No index sheet) is displayed if the sheet cannot be scanned because it is dirty, set backwards, etc.
- Index sheet error (Incorrect marking) is displayed if the image bubbles cannot be read because they are not filled in correctly.
- Index sheet error (Incorrect card) is displayed if, after printing an index sheet, you try to print from a non-matching memory card, such as a different (replacement) card or a re-edited version of the same card.

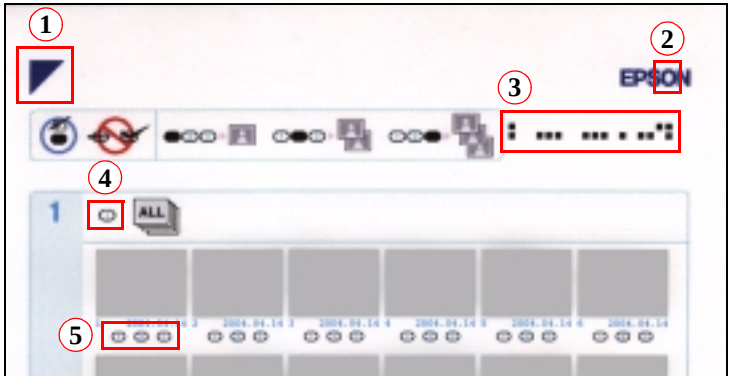


Figure 1-15. Symbols check

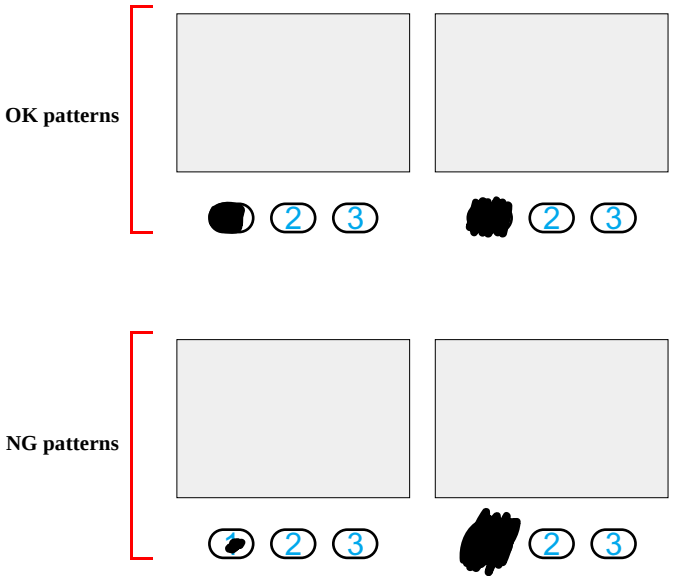


Figure 1-16. OK/NG mark samples

1.5.4 Layout and Paper Type, Paper Size

The layout/paper type and size combinations that can be selected are listed below.

Table 1-36. Layout and Paper Type, Paper Size

Layout	Paper type	Paper size	Description
Border free	Photo Paper	• A4, 10cm x15cm *1 • Letter, 4" x 6" *2	Prints with no margins along top, bottom and both sides
1-up with borders	Plain Paper	• A4, 10cm x15cm *1 • Letter, 4" x 6" *2	Prints with 3 mm margins along top, bottom and both sides
20-up	—	10cm x15cm *1 4" x 6" *2	Prints 20 frames per page, laid out in 5 columns and 4 rows (For DPOF index print only)
80-up	—	A4 *1 Letter *2	Prints 80 frames per page, laid out in 10 columns and 8 rows (For DPOF index print only)

Note 1: A4 or 10cm x 15cm size will be used for Stylus CX3500/CX3600/CX3650/CX4500.

2: Letter or 4" x 6" size will be used for Stylus CX4600.

1.5.5 Options

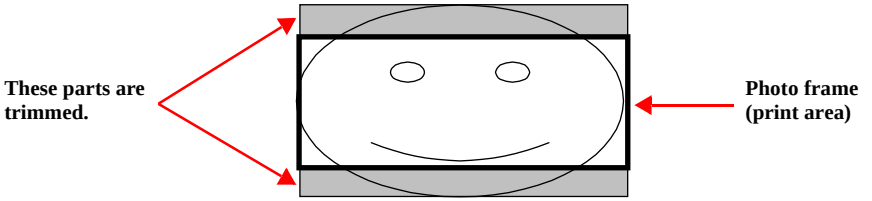
The functions below will be available by marking to options on the index sheet.

☐ Prints all photos one by one shown on the index sheet.

1.5.6 Trimming Function

A trimming function is provided as a means of coordinating photo data with the types of photo frames handled by this unit. This function is always activated so that printing photo data is in shapes that fit these photo frames.
This function is described briefly below.
The printed photo frame and the photo to be printed are matched in length along one side and the photo is resized along the perpendicular side to fit the frame on that side. Any part of the photo that does not fit within the photo frame is trimmed away (not printed).

☐ The image below shows an example in which the photo data is aligned vertically with the photo frame.



☐ The image below shows an example in which the photo data is aligned horizontally with the photo frame.

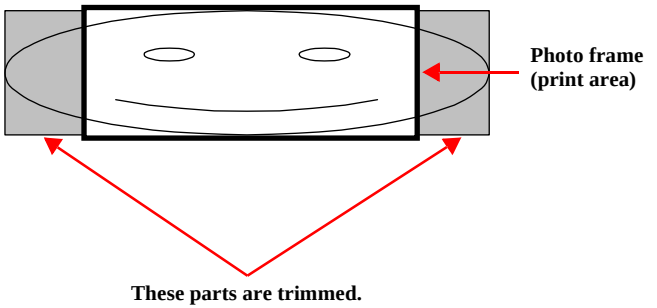


Figure 1-17. Trimming Function

1.5.7 Assignment Rules for Photo Frame Numbers and Rotation

The rules concerning photo frame numbers that are referred when assigning photos are described below. The numbers shown in each diagram and photo frame below indicate the photo frame numbers used for various types of layout.
The direction of the number shown in each photo frame matches the direction of the printed photo to which the horizontal photo data was allocated. When there are more pixels vertically than horizontally, the vertical photo data is allocated instead, and the number shown in the figure below is then rotated 90° before being printed. In Index printing mode, the numbers are printed as they are shown below, regardless of the shape of the photo data.
However, when the photo data has an equal number of pixels vertically and horizontally the photos are printed without rotation, regardless of the layout.
(Note: the vertical photo data refers to when the photo data file itself is set for a vertical (portrait) orientation. Photo data is defined as the vertical photo data if it is taken by a digital camera with a portrait position detecting function.)

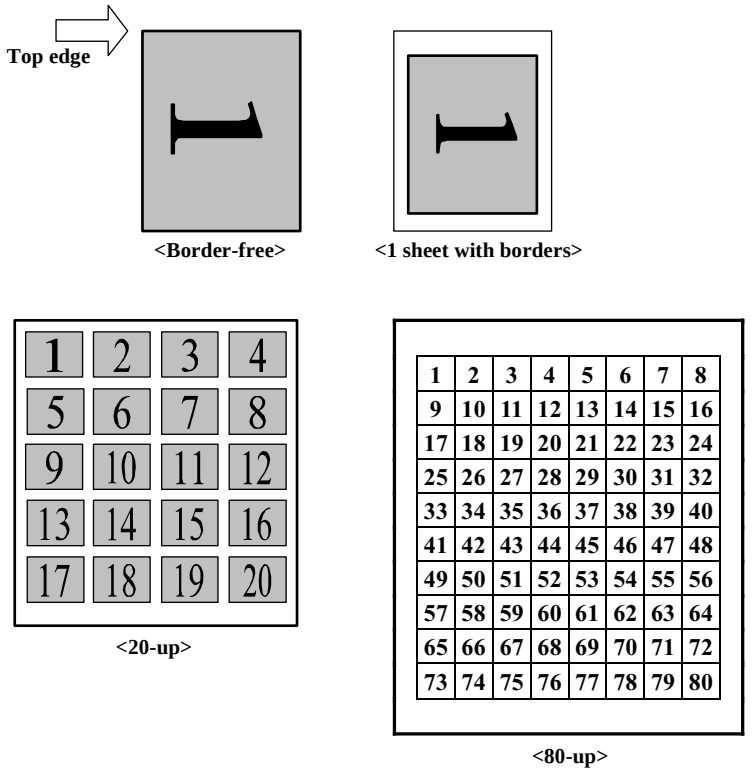


Figure 1-18. Assignment Rules for Photo Frame Numbers and Rotation

1.5.8 Layout Drawings

1.5.8.1 Border free

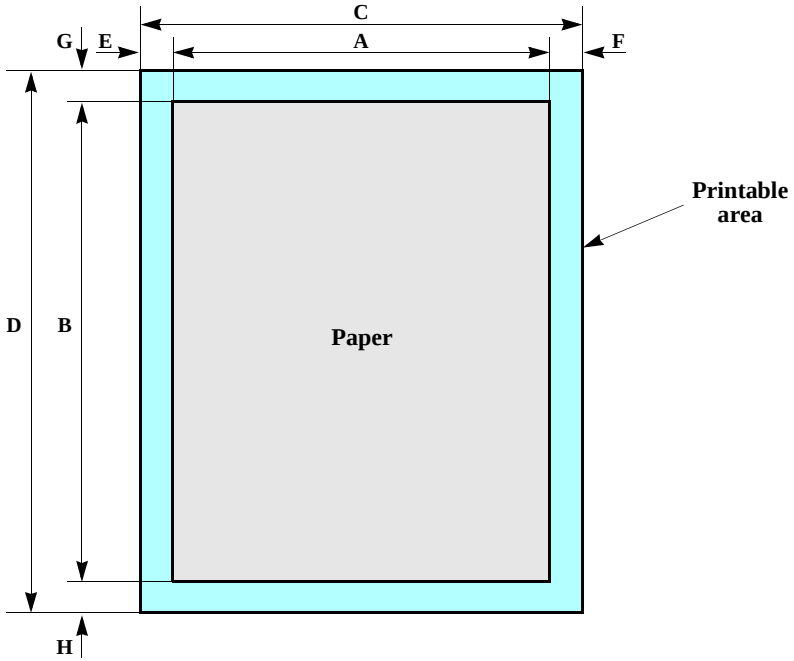


Figure 1-19. Border free

Table 1-37. Border free (unit: mm (inch))

Paper type	A	B	C	D	E	F	G	H
A4 *1	210.00	297.00	215.08	305.04	2.54	2.54	2.96	5.08
10cm x 15cm *1	101.60	152.40	106.68	160.53	2.54	2.54	2.96	5.08
Letter *2	215.90 (8.50)	279.40 (11.00)	220.98 (8.70)	287.53 (11.32)	2.54 (0.10)	2.54 (0.10)	2.96 (0.12)	5.08 (0.20)
4" x 6" *2	101.60 (4.00)	152.40 (6.00)	106.68 (4.20)	160.53 (6.32)	2.54 (0.10)	2.54 (0.10)	2.96 (0.12)	5.08 (0.20)

Note 1: A4 or 10cm x 15cm size will be used for Stylus CX3500/CX3600/CX3650/CX4500.

2: Letter or 4" x 6" size will be used for Stylus CX4600.

1.5.8.2 1-up with borders

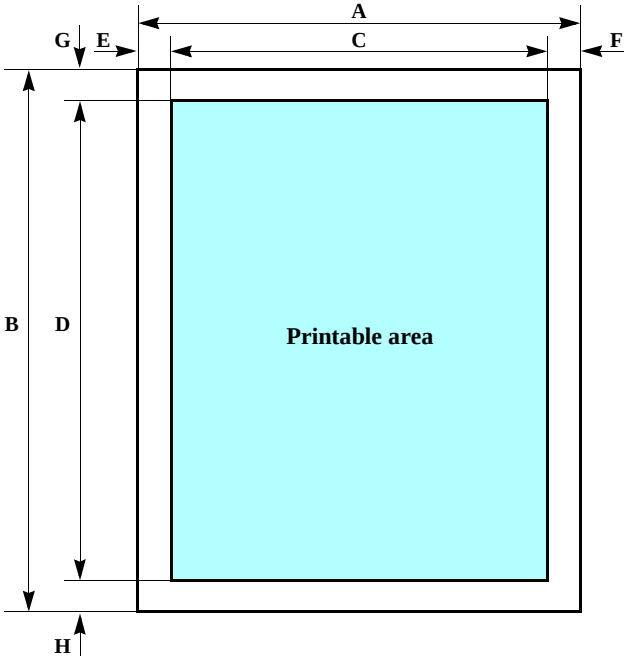


Figure 1-20. 1-up with borders

Table 1-38. 1-up with borders (unit: mm (inch))

Paper type	A	B	C	D	E	F	G	H
A4 *1	210.00	297.00	204.00	291.00	3.00	3.00	3.00	3.00
10cm x 15cm *1	101.60	152.40	95.60	146.40	3.00	3.00	3.00	3.00
Letter *2	215.90 (8.50)	279.40 (11.00)	209.90 (8.26)	273.40 (10.76)	3.00 (0.12)	3.00 (0.12)	3.00 (0.12)	3.00 (0.12)
4" x 6" *2	101.60 (4.00)	152.40 (6.00)	95.60 (3.76)	146.40 (5.76)	3.00 (0.12)	3.00 (0.12)	3.00 (0.12)	3.00 (0.12)

Note 1: A4 or 10cm x 15cm size will be used for Stylus CX3500/CX3600/CX3650/CX4500.

2: Letter or 4" x 6" size will be used for Stylus CX4600.

1.5.8.3 20-up

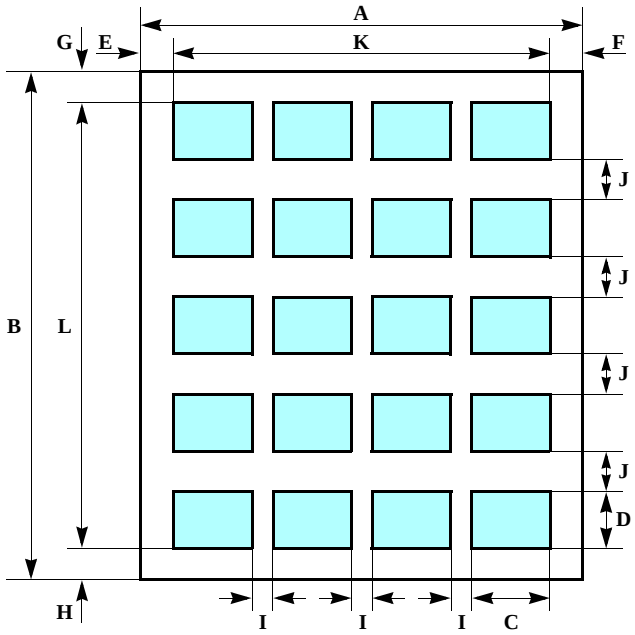


Figure 1-21. 20-up

Table 1-39. 20-up (unit: mm (inch))

Paper type	A	B	C	D	E	F	G	H	I	J	K	L
10cm x 15cm *1	101.60	152.40	20.00	20.00	6.10	6.30	19.80	20.30	3.00	3.00	89.30	112.30
4" x 6" *2	101.60 (4.00)	152.40 (6.00)	20.00 (0.79)	20.00 (0.79)	6.10 (0.24)	6.30 (0.25)	19.80 (0.78)	20.30 (0.80)	3.00 (0.12)	3.00 (0.12)	89.30 (3.52)	112.30 (4.42)

Note 1: A4 or 10cm x 15cm size will be used for Stylus CX3500/CX3600/CX3650/CX4500.

2: Letter or 4" x 6" size will be used for Stylus CX4600.

1.5.8.4 80-up

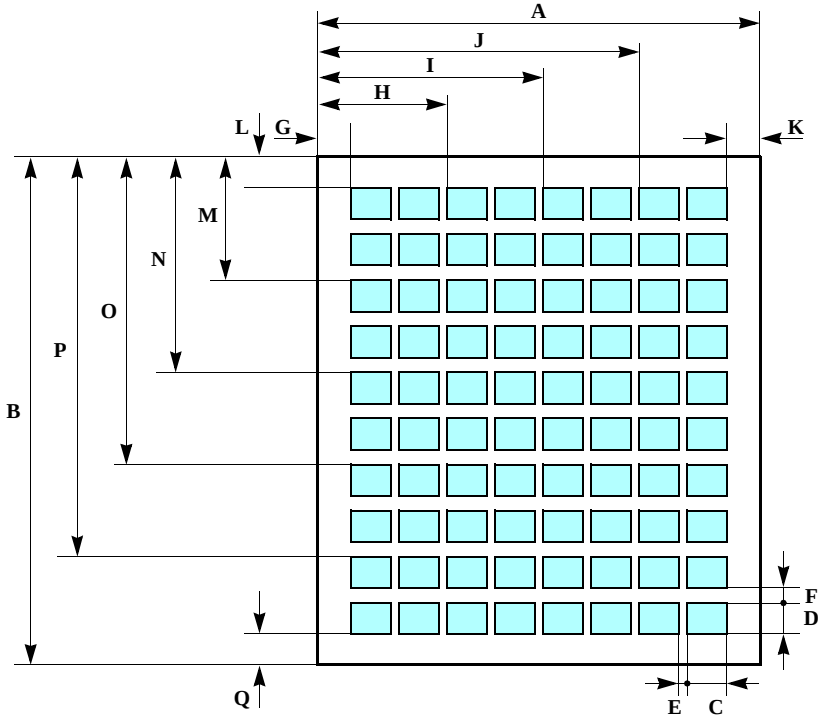


Figure 1-22. 80-up

Table 1-40. 80-up (unit: mm (inch))

Paper type	A	B	C	D	E	F	G	H	I
A4 *1	210.00	297.00	20.00	20.00	2.00	5.00	18.00	62.00	106.00
Letter *2	215.90 (8.50)	279.40 (11.00)	20.07 (0.79)	20.07 (0.79)	6.10 (0.24)	6.10 (0.24)	6.35 (0.25)	58.67 (2.31)	111.00 (4.37)
Paper type	**J**	**K**	**L**	**M**	**N**	**O**	**P**	**Q**	
A4 *1	150.00	18.00	26.00	76.00	126.00	176.00	226.00	26.00	
Letter *2	163.32 (6.43)	6.35 (0.25)	11.94 (0.47)	64.26 (2.53)	116.59 (4.59)	168.91 (6.65)	221.23 (8.71)	119.4 (0.47)	

Note *1: A4 or 10cm x 15cm size will be used for Stylus CX3500/CX3600/CX3650/CX4500.

*2: Letter or 4" x 6" size will be used for Stylus CX4600.

1.5.9 Relation between Paper Type and Quality

In this mode, printing is always in color (CMYK), not black ink only.

Table 1-41. Relation between Paper Type and Quality

Paper type	Print resolution (H x V dpi)	Dot size	MW	High speed	LUT
Plain Paper	720 x 720	VSD3	On	Off	D1
Photo Paper (A4/Letter)	720 x 1440	VSD3	On	On	D2 *1
Photo Paper (smaller than A4/Letter)	720 x 1440	VSD3	On	On	D3
Index sheet (Plain Paper)	360 x 720	VSD1	On	Off	D1

Note *1: "PEC" technology will be used for A4 or Letter size printing.

1.6 Control Panel

1.6.1 Buttons

The control panel contains following 9 or 10 buttons, which are used to set and execute various operations.
All of them are non-lock type buttons.

Table 1-42. Buttons

Button	Function
Power Button	Execute turning on/off this unit.
Ink Button	Execute exchanging ink cartridges or head cleaning.
Memory Card Button *1	Make transition from “Copy mode” to “Memory Card mode” and selects one of card print mode.
Copy Button	Make transition from “Memory Card mode” to “Copy mode” and sets number of copies.
Paper Type Button	Select paper type.
Paper Size Button	Select paper size.
Fit to Page Button	Alternate zoom of “Fit to page” and default (actual; 100%).
B&W Start Button *2	Start monochrome copy.
Color Start Button	Start card print or color copy.
Stop Button	Stop job of copying or printing or sometimes work as shift button.

Note *1: Only for Stylus CX4500/CX4600

*2: B&W means “Black and White”.

Refer to “1.6.3.1 Stand-alone Copy / Memory Card Print” *(p.43)* for details about each button.

1.6.2 Indicators

The control panel contains following 7-segment LED and 8 or 11 LEDs, which are used to indicate various status.

Table 1-43. Indicators

LED		Function
Power LED [Green] *5		Light at stand-by. Blink while some operation is proceeding.
Error LED [Red]		Light or blink while some error or warning is occurring.
Ink LED [Red]		Light when some ink is out. Blink when some ink is near empty or in the ink cartridge exchanging procedure.
Memory Card LED 1-3 *1		Light one of them while some memory card print function showing below is ready or proceeding.
	1st [Green]	Print Index Sheet
	2nd [Green]	Print From Index Sheet
	3rd [Green] *3	Print All / DPOF
7-seg. LED *4		Indicate number of copies, or some error codes in error status.
	Decimal Point LED	Blinks slowly in low power panel status.
Paper Type LED 1,2		Light one of them showing which paper type below is selected.
	1st [Green]	Plain Paper
	2nd [Green]	Photo Paper
Paper Size LED 1,2		Light one of them showing which paper size below is selected.
	1st [Green]	A4 or Letter *2
	2nd [Green]	10x15 or 4"x6" *2
Fit to Page LED [Green]		Light when “Fit to Page” function is effective in copy mode.
Card Access LED [Green] *6		Light when available memory card is in a slot. Blink when accessing to the card.

Note *1: Only for Stylus CX4500/CX4600
When Standalone Copy mode is selected, those LEDs are turned off.

*2: Depending on its market. Letter and 4"x6" are for North and South America, and A4 and 10x15 are for other areas.

*3: When DPOF printing is proceeding, this LED is blinking.

*4: When Memory Card Print mode is selected, those LEDs are turned off.

*5: All LEDs except for Power LED will be turned off while printing or scanning by PC.

*6: This LED is located near the card slot, not on the control panel.

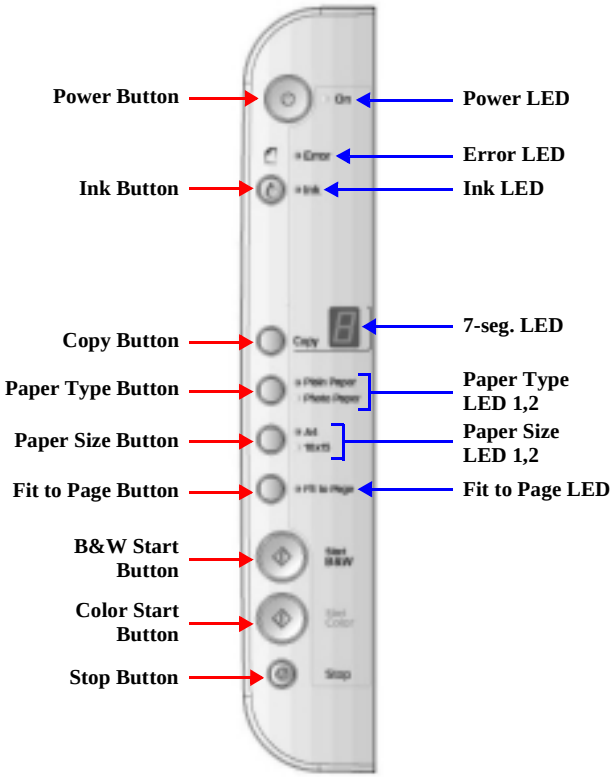
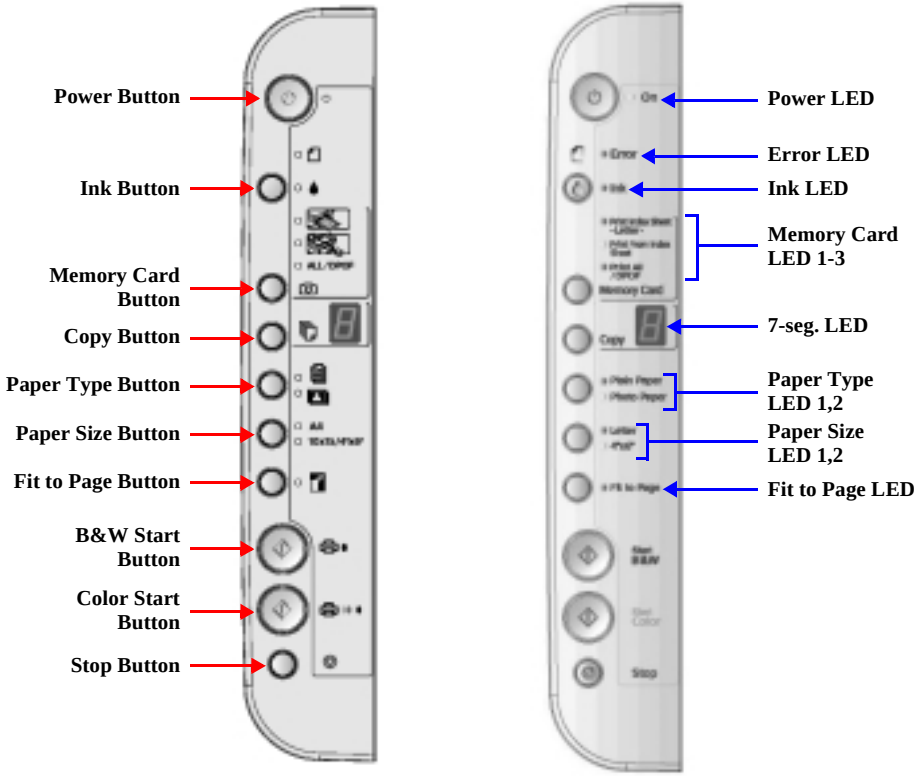


Figure 1-23. Control panel (Stylus CX3500/CX3600/CX3650)



<Stylus CX4500> <Stylus CX4600>

Figure 1-24. Control panel (Stylus CX4500/CX4600)

1.6.3 Operations

1.6.3.1 Stand-alone Copy / Memory Card Print

The functions of this unit caused by each button in stand-alone copy mode or memory card print mode are described in the following table.

Table 1-44. Operations

Button	Function	
	Stand-alone Copy	Memory Card Print (only for stylus CX4500/CX4600)
Power Button	• Turn on or off this unit.	
Ink Button	• Start or advance ink cartridge (I/C) exchanging procedure. ☐ Case ■ [All inks are enough.] Move carriage (CR) to I/C exchange position. ■ [Ink low, Ink out, Without I/C error] Move CR to each color's ink check position if that color's I/C is ink low or ink out or without I/C. CR moves in the order of Cyan, Magenta, Yellow, Black. ■ [CR is in some color's ink check position.] Move CR to next color's ink check position or I/C exchange position. ■ [CR is in I/C exchange position.] Move CR to standby position.	
Ink Button (Holding over 3 sec.)	• Start cleaning head procedure. • Invalid while printing, scanning, cleaning head, stopping printing or copying, exchanging I/C, or in error status except for paper out error, memory card error, index sheet error, PG error.	
Memory Card Button (only for Stylus CX4500/CX4600)	• Make transition from “Stand-alone copy” mode to “Memory card print” mode and select and light “Print Index Sheet”, or “Print All / DPOF” if DPOF file exists in the card. • Turn off both 7-seg. LED and “Fit to Page” LED. • Select “Plain Paper” and “Letter (or A4)”	• Change to next “Memory card print” function. ☐ Case ■ [Print Index Sheet] Change to “Print From Index Sheet”, and change paper type and paper size to the one last set in “Print From Index Sheet” or “Print All / DPOF”. ■ [Print From Index Sheet] Change to “Print All / DPOF”. ■ [Print All / DPOF] Change to “Print Index Sheet”, and change paper type and paper size to “Plain Paper” and “Letter (or A4)”.
	• Invalid while printing, scanning, cleaning head, stopping printing or copying, exchanging I/C, or in error status except for memory card error, index sheet error, PG error.	
Copy Button	• Set number of copies incrementally and indicate it on 7-seg. LED. ☐ Case ■ [1 to 8] Add 1 and the number becomes 2 to 9. ■ [9] Indicate “-”, which means 100 copies. ■ [-] Reset to “1”.	• Make transition from “Memory card print” mode to “Stand-alone copy” mode and set number of copies to “1”. • Invalid while printing, scanning, cleaning head, stopping printing or copying, exchanging I/C, or in error status except for memory card error, index sheet error, PG error.
Paper Type Button	• Alternate paper type of “Plain Paper” and “Photo Paper”.	• Alternate paper type of “Plain Paper” and “Photo Paper” which will be used in “Print From Index Sheet” or “Print All / DPOF”. • Invalid in “Print Index Sheet”, and then it is fixed to “Plain Paper”.
	• Invalid while printing, scanning, cleaning head, stopping printing or copying, exchanging I/C, or in error status.	

Table 1-44. Operations

Button	Function	
	Stand-alone Copy	Memory Card Print (only for stylus CX4500/CX4600)
Paper Size Button	• Alternate paper size of “Letter (or A4)” and “4"x6" (or 10x15)”.	• Alternate paper size of “Letter (or A4)” and “4"x6" (or 10x15)” which will be used in “Print From Index Sheet” or “Print All / DPOF”. • Invalid in “Print Index Sheet”, and then it is fixed to “Letter (or A4)”.
	• Invalid while printing, scanning, cleaning head, stopping printing or copying, exchanging I/C, or in error status.	
Fit to Page Button	• Alternate “Fit to Page” status and turn on or off the “Fit to Page” LED. • Invalid while printing, scanning, cleaning head, stopping printing or copying, exchanging I/C, or in error status.	• Invalid. “Fit to Page” LED is always turned off in this mode.
B&W Start Button	• Start monochrome copy. • Invalid while printing, scanning, cleaning head, stopping printing or copying, exchanging I/C, or in ink out error. • Move to PG error status when platen gap is large. But when this button is pressed again in that status, that print will start.	• Invalid but for clearing some error status. • Clear PG error and start print that was suspended by PG error. • Clear index sheet error and start “Print from index sheet”.
	• Load paper in paper out error or double feed error and eject paper in paper jam error.	
Color Start Button	• Start color copy.	• Start memory card print. • Make transition from “Print Index Sheet” to “Print From Index Sheet” when “Print Index Sheet” finishes successfully, without any error or “STOP” operation. • Invalid with no card in slots. • Move to memory card error status when incompatible memory card is inserted or no images found in the card.
	• Invalid while printing, scanning, cleaning head, stopping printing or copying, exchanging I/C, or in ink out error. • Load paper in paper out error or double feed error and eject paper in paper jam error. • Move to PG error status when platen gap is large. But when this button is pressed again in that status, that print will start.	
Stop Button	• Stop job of copying or printing and reset the number of copies to the beginning.	• Stop job of copying or printing.
	• Eject paper when paper exists or may exist in the paper path. • Invalid while PC scanning, cleaning head and exchanging I/C. • Clear some of error status.	
B&W Start Button with Stop Button	• Start draft monochrome copy when “Plain Paper” and “Letter (or A4)” are selected. • Invalid while printing, scanning, cleaning head, stopping printing or copying, exchanging I/C, or in ink out error, or without “Letter” or “A4” is selected. • Move to PG error status when platen gap is large.	—
Color Start Button with Stop Button	• Start draft color copy when “Plain Paper” and “Letter (or A4)” are selected. • Invalid while printing, scanning, cleaning head, stopping printing or copying, exchanging I/C, or in ink out error, or without “Letter” or “A4” is selected. • Move to PG error status when platen gap is large.	—

1.6.3.2 Memory Card Insertion/Ejection (only for Stylus CX4500/CX4600)

The functions of this unit caused by memory card insertion or ejection are described in the following table.

Table 1-45. Memory Card Insertion/Ejection

Action	Function
Card Insertion	• Recognize the card and light Card Access LED if it is right. • The LED blinks while memory access occurs to the memory card. • Also the Power LED blinks during the card recognition. • Return from the low power panel mode.
Card Ejection	• Turn off Card Access LED. • Stop print job while memory card print is in process and eject paper. • Clear memory card error if memory card is wrong.

1.6.3.3 Low Power Panel Mode

Without any panel operation for 15 minutes while the printer and scanner unit are in standby status, this unit moves into the low power panel mode in which power consumption for the panel decreases.
This unit recovers from that mode by pushing any button but Power Button or printing/scanning by PC.
This unit is turned off by pushing Power Button in that mode.

Table 1-46. Low Power Panel Mode

Action	Function
Transition to low power mode	• Turn off all LEDs except for Power LED and Card Access LED. • Blink Decimal Point LED slowly. • No move in error status except for memory card error, index sheet error and PG error. • Ejecting of memory card or accessing it by PC has no effect on low power mode.
Recovery from low power mode	• Recall the panel status as that before moving to low power panel mode. • Inserting or ejecting of memory card or accessing it by PC has no effect on low power mode.

1.6.3.4 Adjust lever function

Without any panel operation for 15 minutes while the printer and scanner unit are in standby status, this unit moves into the low power panel mode in which power consumption for the panel decreases.
This unit recovers from that mode by pushing any switch or printing/scanning by PC.

Table 1-47. Adjust lever function

Adjust lever status	Function
PG open (Displayed “H”)	• “H” will be displayed with 7-seg.LED for about 3 seconds just after the adjust lever is changed to “H: Envelope” position.
PG close (Displayed “L”)	• “L” will be displayed with 7-seg.LED for about 3 seconds just after the adjust lever is changed to “L: Cut sheet” position. • Clear the PG error and print job suspended by PG error when the adjust lever is changed to “L: Cut sheet position” in the PG error status.

1.6.3.5 Nozzle check pattern print

Nozzle check pattern can be printed only with this unit. Left ink quantity of each color is also printed by the unit of 10%.
To activate this function, turn on this unit while depressing Ink Button. After printing the pattern, this unit moves to ordinary standby status.
The example of nozzle check pattern is below.

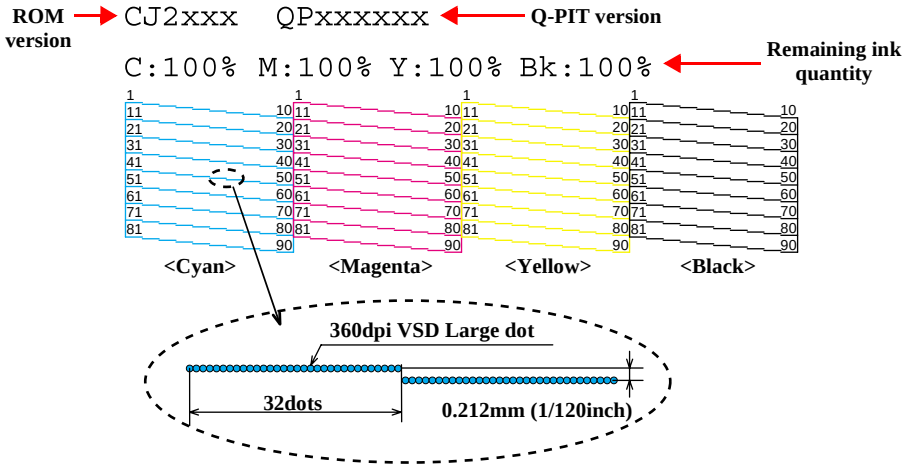


Figure 1-25. Nozzle check pattern

1.6.3.6 Head alignment adjustment

Alignment adjustments can be made to maintain high print quality during bi-directional printing. This function can be used for basic adjustments. For more precise adjustments, we recommend using the head alignment utility that is installed in the connected computer.
To activate this function, turn on this unit while depressing Copy mode Switch. The pattern will be printed which shows the head alignment at that time, and adjustment can be done regarding to that pattern. Following is the sample.

☐ Procedure

■ Preparation

1. Set A4 or Letter sized paper to the sheet feeder.
2. Set PG position is close (L).

■ Print Pattern

1. Turn on this unit while depressing Copy Switch.
2. Alignment adjustment pattern is printed.

■ Adjust 1st parameter

1. 1st parameter is ready to adjust while “Plain Paper” LED is ON.
2. Select the most appropriate value regarding the printed pattern #1 by pressing Copy Switch.
   The initial value is “5” indicated on 7-seg. LED and by pressing Copy Switch, the value will change from “1” upto “9” incrementally and cyclically.
3. Press B&W Start Switch to terminate 1st parameter adjustment. Just press that switch as well when the initial value is the most appropriate.

■ Adjust 2nd parameter

1. 2nd parameter is ready to adjust while “Photo Paper” LED is ON.
2. Select the most appropriate value regarding the printed pattern #2 by pressing Copy Switch.
   The initial value is “5” indicated on 7-seg. LED and by pressing Copy Switch, the value will change from “1” upto “9” incrementally and cyclically.
3. Press B&W Start Switch to terminate 2nd parameter adjustment. Just press that switch as well when the initial value is the most appropriate.

■ Adjust 3rd parameter

1. 3rd parameter is ready to adjust while “Letter (or A4)” LED is ON.
2. Select the most appropriate value regarding the printed pattern #3 by pressing Copy Switch as 1st, 2nd parameters.
3. Press B&W Start Switch to terminate that adjustment as 1st, 2nd parameters.

■ Adjust 4th parameter

1. 4th parameter is ready to adjust while “4"x6" (or 10x15)” LED is ON.
2. Select the most appropriate value regarding the printed pattern #4 by pressing Copy Switch as 1st, 2nd parameters.
3. Press B&W Start Switch to terminate that adjustment as 1st, 2nd parameters.

■ Termination

1. 1st, 2nd, 3rd and 4th parameter adjustment is terminated successfully, the adjusted value will be memorized and this unit will be turned off automatically. The adjusted value will be effective from next turning on.
2. To indicate the adjusted values are memorized, all the LEDs except for Card Access LED will be flashing once.

CHECK POINT

■ **The adjustment procedure will be terminated unsuccessfully in the following cases and no adjustment will be done.**
   1. **Some error like Paper Out, Paper Jam, PG Open has occurred.**
   2. **The procedure is terminated by pressing Stop Switch.**
   3. **The unit is turned off.**

   When Paper Out has occurred, the procedure can restart from “Print Pattern” by pressing Color Start Switch. The error should be removed in advance.
■ **Ink maintenance operation like “exchanging I/C” or “cleaning head” can not be done in this mode.**
■ **This unit will be turned off automatically when the procedure is terminated by pressing Stop Switch and when PG open error has occurred and then the adjust lever has been set to close position.**

1.6.4 Printer Condition and Panel Status

Note : "–" : Don't care
Blink : 0.5sec. On + 0.5sec. Off repetition
Blink 2 : 0.2sec. On + 0.2sec. Off + 0.2sec. On + 0.4sec. Off repetition
Blink 3 : Blink on and off along with access to a memory card.
Fast blink : 0.2sec. On + 0.2sec. Off repetition
Slow blink : 2.0sec. On + 2.0sec. Off repetition

Note *1: When the setting is "On".

*2: After finishing copying, the counter returns to the preset number of copies.

Table 1-48. Printer Condition and Panel Status

Printer status	Indicators													Priority
	Power LED	Error LED	Ink LED	Memory Card LED			7-seg. LED	Paper Type LED		Paper Size LED		Fit to Page LED	Card Access LED	
				1	2	3		1	2	1	2			
Power on (Normal ready mode)	On	—	—	—	—	—	—	—	—	—	—	—	—	24
Card printing mode (Print All/DPOF)	—	—	—	—	—	On	Off	Selected type is On		Selected size is On		Off	—	23
Card printing mode (Index Sheet scanning & printing)	—	—	—	—	On	—	Off	Selected type is On		Selected size is On		Off	—	
Card printing mode (Print index sheet)	—	—	—	On	—	—	Off	On	—	On	—	Off	—	
Copying mode	—	—	—	Off	Off	Off	"1~9" or "–"	Selected type is On		Selected size is On		On *1	—	
Ink low	—	—	Blink	—	—	—	—	—	—	—	—	—	—	22
PG open (Displayed "H")	—	—	—	—	—	—	"H" blink 2 (3sec.)	—	—	—	—	—	—	21
PG close (Displayed "L")	—	—	—	—	—	—	"L" blink 2 (3sec.)	—	—	—	—	—	—	
PG error	—	Blink 2	—	—	—	—	"H" blink 2	—	—	—	—	—	—	
Index sheet error (Incorrect card)	—	Blink 2	Off	—	Blink 2	—	"4" blink 2	—	—	—	—	—	—	20
Index sheet error (Incorrect marking)	—	Blink 2	Off	—	Blink 2	—	"3" blink 2	—	—	—	—	—	—	19

Table 1-48. Printer Condition and Panel Status

Printer status	Indicators													Priority
	Power LED	Error LED	Ink LED	Memory Card LED			7-seg. LED	Paper Type LED		Paper Size LED		Fit to Page LED	Card Access LED	
				1	2	3		1	2	1	2			
Index sheet error (No index sheet)	—	Blink 2	Off	—	Blink 2	—	"2" blink 2	—	—	—	—	—	—	18
Memory card error (Incompatible memory card)	—	Blink 2	Off	Blink 2	Blink 2	Blink 2	"1" blink 2	—	—	Off	Off	Off	—	17
Power on (Data Processing)	Blink	—	—	—	—	—	—	—	—	—	—	—	—	16
Reading a memory card (recognizing image data) is in progress	Blink	—	—	—	—	—	—	—	—	—	—	—	—	15
Stopping printing and cancelling the print job	Blink	—	—	—	—	—	—	—	—	—	—	—	—	14
The scanner is operating by a computer	Blink	—	—	Off	Off	Off	Off	Off	Off	Off	Off	Off	—	13
Printing by a computer	Blink	—	—	Off	Off	Off	Off	Off	Off	Off	Off	Off	—	
Copying	Blink	—	—	Off	Off	Off	Number of copies remaining*2	Selected type is On		Selected size is On		On *1	—	12
Card printing (DPOF)	Blink	—	—	—	—	On	Off	Selected type is On		Selected size is On		Off	—	
Card printing (Print All)	Blink	—	—	—	—	On	Off	Selected type is On		Selected size is On		Off	—	
Card printing (Index Sheet scanning & printing)	Blink	—	—	—	On	—	Off	Selected type is On		Selected size is On		Off	—	
Card printing (Print index sheet)	Blink	—	—	On	—	—	Off	On	—	On	—	Off	—	
Double feed	—	On	Off	—	—	—	—	—	—	—	—	—	—	11
Paper out	—	On	Off	—	—	—	—	—	—	—	—	—	—	
Ink Sequence Processing	Blink	—	—	—	—	—	—	—	—	—	—	—	—	10
Ink Cartridge Change Mode	Blink 2	Off	Blink 2	—	—	—	—	—	—	—	—	—	—	9

Table 1-48. Printer Condition and Panel Status

Printer status	Indicators													Priority
	Power LED	Error LED	Ink LED	Memory Card LED			7-seg. LED	Paper Type LED		Paper Size LED		Fit to Page LED	Card Access LED	
				1	2	3		1	2	1	2			
Ink out or No Ink cartridge	—	Off	On	—	—	—	—	—	—	—	—	—	—	8
CSIC error	—	Off	On	—	—	—	—	—	—	—	—	—	—	
Incorrect I/C	—	Off	On	—	—	—	—	—	—	—	—	—	—	
Paper jam	—	Blink	Off	—	—	—	—	—	—	—	—	—	—	7
Reset request/Stop request/Job cancel request/Various setting memory request	On (1min.)	On (1min.)	On (1min.)	On (1min.)	On (1min.)	On (1min.)	On (1min.)	On (1min.)	On (1min.)	On (1min.)	On (1min.)	On (1min.)	—	6
Power on (Initializing operation)	Blink	—	—	—	—	—	—	—	—	—	—	—	—	5
Maintenance request	Blink	On	On	Blink	Blink	Blink	“E” blink	Blink	Blink	Blink	Blink	Blink	—	4
Fatal error (Mechanism)	Blink	Blink	Blink	Blink	Blink	Blink	“E” blink	Blink	Blink	Blink	Blink	Blink	—	3
Fatal error (System)	Fast blink	Fast blink	Fast blink	Fast blink	Fast blink	Fast blink	Fast “E” blink	Fast blink	Fast blink	Fast blink	Fast blink	Fast blink	—	2
Power off (Processing termination)	Fast blink	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	—	1
No Memory card	—	—	—	—	—	—	—	—	—	—	—	—	Off	—
Memory card Processing	—	—	—	—	—	—	—	—	—	—	—	—	On	—
Reading a memory card	—	—	—	—	—	—	—	—	—	—	—	—	Blink 3	—
Power on (Low Power Panel Mode)	On	Off	Off	Off	Off	Off	Blink slowly only for D.P.	Off	Off	Off	Off	Off	—	—

1.6.4.1 Error Status

- **Ink end error**
  When the printer runs out the most amount of the ink of any one color, it indicates ink low and keeps printing. When the printer runs out the whole ink of any color, it stops printing and indicates ink end error. User is then requested to install a new ink cartridge in this state.
- **Paper out error**
  When the printer fails to load a sheet, it goes into a paper out error.
- **Paper jam error**
  When the printer fails to eject a sheet, it goes into a paper jam error.
- **No ink cartridge**
  When the printer detects that ink cartridge comes off, or failed to read or write CSIC data, it goes into this error mode.
- **Maintenance request**
  When the total amount of ink wasted through cleanings and flushing reaches to the limit, printer indicates this error and stops. In such a case, the absorber in the printer enclosure needs to be replaced with new one by a service person.
- **Fatal error**
  Carriage control error.

1.6.5 Memory Functions

1.6.5.1 Parameters that are retained while mode transition

The following parameters are retained for each mode while the mode transition from "Copy" mode to "Memory Card Print" mode or vice versa.

- "Paper Type" and "Paper Size" are retained for each mode as default.
- Zoom is retained for "Copy" mode as default.

NOTE: Paper Type and Paper Size are commonly used in "Print From Index Sheet" and "Print All / DPOF".

1.6.5.2 Parameters that are retained when power is turned off

The following parameters are retained when the unit's power is off. They are listed along with the corresponding memory functions in the table below.

- Copy mode is selected when this unit is turned on apart from the mode when it was turned off before.
- Paper Type and Paper Size are retained for each mode as default.
- Zoom is retained for copy mode as default.

Table 1-49.

Mode	Parameter retained in memory	Factory setting
Copy	Paper Type	Plain Paper
	Paper Size	Letter or A4
	Zoom (The status of Fit to Page)	100% (OFF)
Memory Card Print (only for stylus CX4500/CX4600)	Paper Type	Photo Paper
	Paper Size	4"x6" or 10x15

1.6.6 Printer Initialization

There are four kinds of initialization method, and the following explains each initialization.

1. Power-on initialization
   This printer is initialized when turning the printer power on, or printer recognized the cold-reset command (remote RS command).
   When printer is initialized, the following actions are performed.
   (a) Initializes printer mechanism
   (b) Clears input data buffer
   (c) Clears print buffer
   (d) Sets default values

2. Operator initialization
   This printer is initialized when turning the printer power on again within 10 seconds from last power off, or printer recognized the -INIT signal (negative pulse) of parallel interface.
   When printer is initialized, the following actions are performed.
   (a) Cap the printer head
   (b) Eject a paper
   (c) Clears input data buffer
   (d) Clears print buffer
   (e) Sets default values

3. Software initialization
   The ESC@ command also initialize the printer.
   When printer is initialized, the following actions are performed.
   (a) Clears print buffer
   (b) Sets default values

4. Power-on initialization except I/F
   The printer recognized the IEEE 1284.4 “rs” command.
   When printer is initialized, the following action is performed.
   (a) Initializes printer mechanism
   (b) Clears input data buffer
   (c) Clears print buffer
   (d) Sets default values except I/F

CHAPTER

2

OPERATING PRINCIPLES

2.1 Overview

This section describes the operating principles of the Printer Mechanism, Scanner Mechanism and Electrical Circuit Boards.

- Main Board
  - C577 Main Board (Stylus CX3500/CX3600/CX3650)
  - C571 Main Board (Stylus CX4500/CX4600)
- Power Supply Board
  - C571 PSB/PSE Board
- Panel Board
  - C571 PNL Board

2.2 Printer Mechanism

2.2.1 Printer Mechanism

The Printer Mechanism for the Stylus CX3500/CX3600/CX3650 is newly designed. But, the basic component of the Printer Mechanism is almost the same as the previous printer (Stylus Photo R300/R310). And also, the Stylus CX4500/CX4600 is successor to the Stylus CX3500/CX3600/CX3650 and is the same as its Printer Mechanism.
This printer consists of the Print Head, Carriage Mechanism, Paper Loading Mechanism, Paper Feeding Mechanism, Ink System.
Like the previous printers, the Stylus CX3500/CX3600/CX3650/CX4500/CX4600 is equipped with two DC motors; one for the Paper Loading/Feeding Mechanism and the Pump Mechanism with the CR Lock Mechanism, and one for the CR Mechanism. The ASF Unit for the Paper Loading Mechanism uses rear entry front eject system. The Paper Feeding Mechanism uses the LD Roller and Retard Roller to feed paper to the Printer Mechanism in the same way as previous printers.

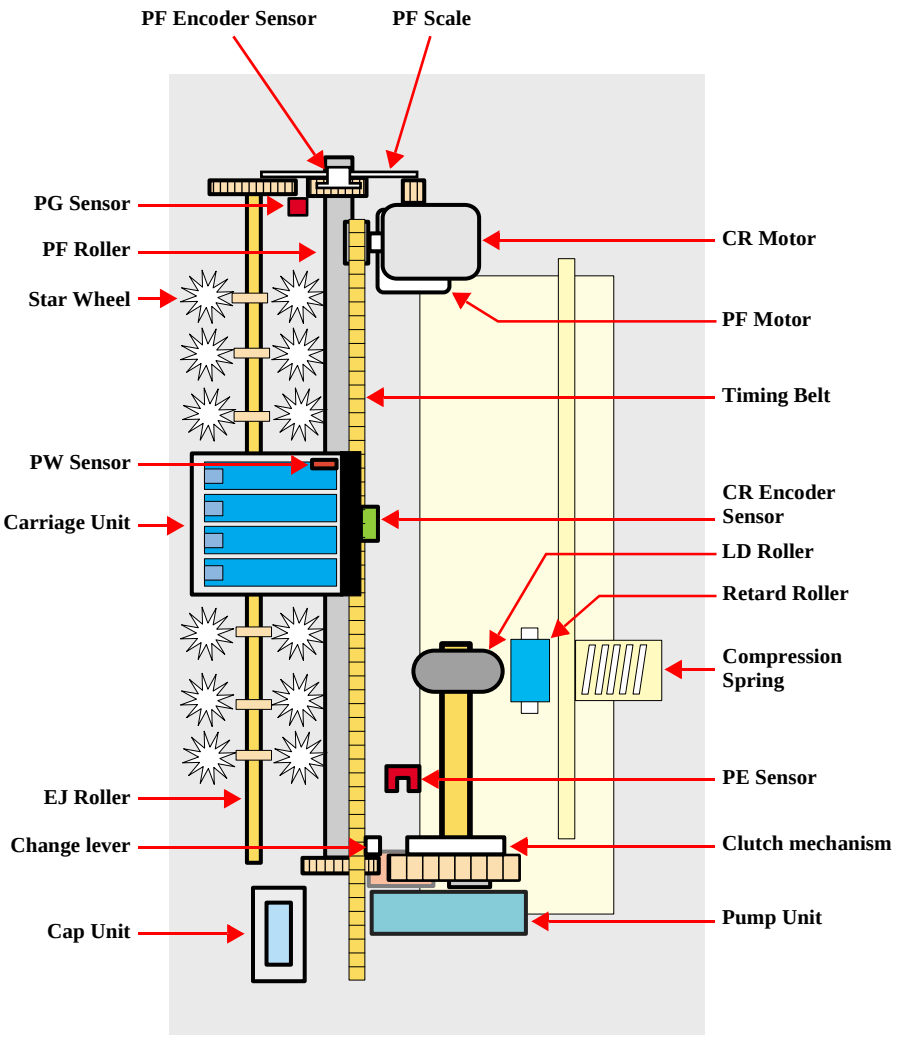


Figure 2-1. Printer Mechanism block diagram

2.2.2 Print Head

The Print Head is the same D4-CHIPS type as the previous SPC (Stylus CX4500/ 4600), and makes it possible to perform economy dot printing and variable dot printing.
The Print Head nozzle configuration is as follows.

- Nozzle layout
  - Black : 90 nozzles x 1 row
  - Color : 90 nozzles x 3 row/color (Cyan, Magenta, Yellow)

The nozzle layout when viewed from the back surface of the Print Head is shown below.

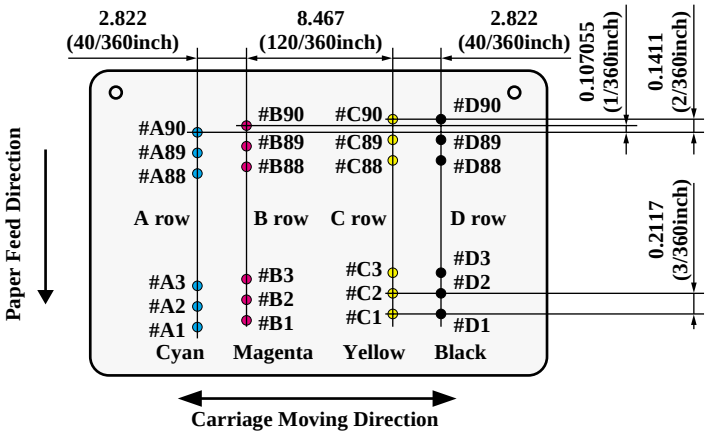


Figure 2-2. Nozzle layout

The Print Head has the Electric Poles (CSIC Connectors) to store the ink consumption amount data into the CSIC chip mounted on the Ink Cartridge. By storing the ink consumption amount data, this printer can detect the ink consumption status, such as Ink Low/Out condition.

The basic operating principles of the Print Head, which plays a major role in printing, are the same as the previous printer (Stylus Photo R300/R310); on-demand method which uses PZT (Piezo Electric Element). In order to uniform the ejected ink amount, the Print Head has its own Head ID (13-digits code for this Print Head **for Stylus CX3500/CX3600/CX3650/CX4500/CX4600**) which adjusts PZT voltage drive features.
So, you are required to store the Head ID pasted on the Print Head into the EEPROM by using the Adjustment Program when replacing the Print Head, the Main Board Unit, the Printer Mechanism with new one. (Note: there are no resistor arrays to determine the Head ID on the Main Board.) And then, based on the stored Head ID into the EEPROM, the Main Board generates appropriate PZT drive voltage.

Following explains the basic components for the Print Head.

- PZT
  PZT is an abbreviation of Piezo Electric Element. Based on the drive waveform generated on the Main Board, the PZT selected by the nozzle selector IC on the Print Head pushes the top of the ink cavity, which has ink stored, to eject the ink from each nozzle on the nozzle plate.
- Electric poles for CSIC
  This Electric Poles connects the CSIC chip mounted on the Ink Cartridge. By using this poles, current ink consumption amount data is red out from the CSIC chip. And, the latest ink consumption amount data is written into the CSIC chip.
- Nozzle Plate
  The plate with nozzle holes on the Print Head surface is called Nozzle Plate.
- Filter
  When the Ink Cartridge is installed, if any dirt or dust around the cartridge needle is absorbed into the Print Head, there is a great possibility of causing nozzle clog and disturbance of ink flow, and alignment failure and dot missing finally. To prevent this problem, a filter is set under the cartridge needle.

☐ Ink Cavity
The ink absorbed from the Ink Cartridge goes through the filter and then is stored temporarily in this tank called “ink cavity” until PZT is driven.

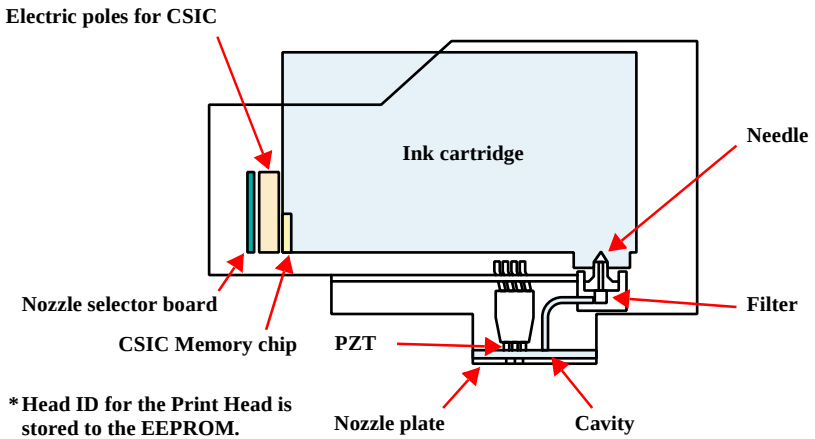


Figure 2-3. Printhead sectional drawing

2.2.2.1 Printing Process

This section explains the process which the Printheads of On-Demand inkjet printers eject ink from each nozzle.

1. **Normal state:**
When the printing signal is not output from the Main Board (C577 Main, C571 Main), or the PZT drive voltage is not applied, the PZT does not change the shape. Therefore, the PZT does not push the ink cavity. The ink pressure inside the ink cavity is kept normal. (refer to Figure 2-4 *(p.55)*: Normal state)

2. **Ejecting state:**
When the print signal is output from Main Board (C577 Main, C571 Main), the nozzle selector IC located on the Print Head latches the data once by 1-byte unit. Based on the drive waveform (common voltage) generated on the Main Board, the PZT selected by the nozzle selector IC pushes the top of the ink cavity. By this operation, the ink stored in the ink cavity is ejected from nozzles. (refer to Figure 2-4 *(p.55)*: Ejecting state)

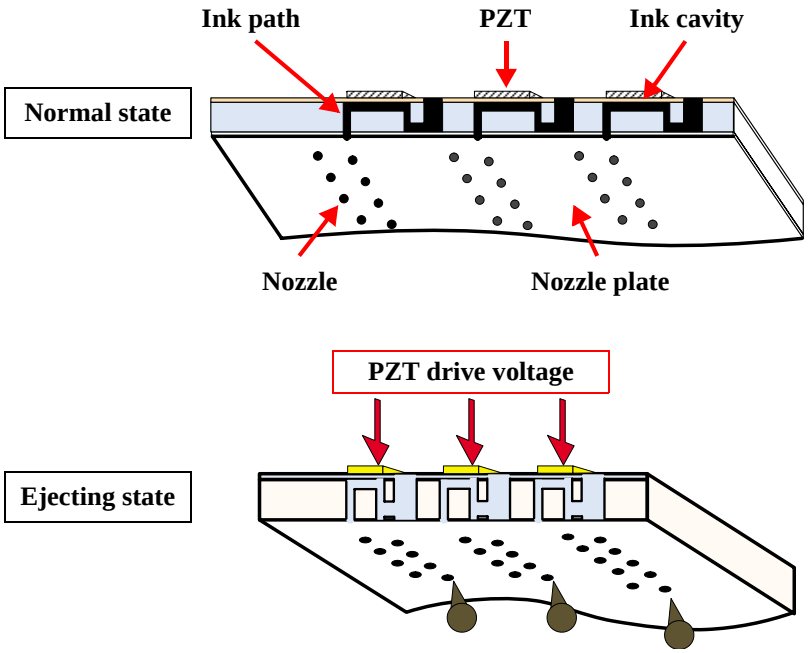


Figure 2-4. Print Head printing process

2.2.2.2 Printing Method

The dot printing systems of CX3500/CX3600/CX3650/CX4500/CX4600 are variable dot printing systems.

☐ Variable dot printing
This printing mode is developed to improve the print quality on exclusive paper. This mode is basically the same as variable dot printing mode used on other products; micro dot, middle dot and large dot compose this mode. The printing dot size varies according to the print data and this mode enables to output even sharper image on exclusive paper.

2.2.3 Carriage Mechanism

The Carriage Mechanism consists of Carriage Unit (including the Print Head, CR Encoder Board and PW Sensor), CR Motor, Timing Belt and CR Scale etc. Following figure shows you each component for the CR Mechanism.

2.2.3.1 Carriage Mechanism

The following DC motor controls the CR Mechanism on this printer.

Table 2-1. Carriage Motor specification

Items	Specifications
Type	DC motor with brushes
Drive Voltage	42V (DC) ± 5% (voltage applied to driver)
Armature resistance	28.4 Ω ± 10% (per phase at 25 degrees)
Inductance	20.1mH ± 25% (1KH 1Vrms)
Drive Method	PWM, constant-current chopping
Driver IC	A6627

Close loop control based on the CR Motor (DC Motor) and CR Encoder has advantages in stabilized print quality.

- Heat generation control
  Using low-cost DC motors, this product grasps the variations of the torque constants, coil resistances and power supply voltages of the individual DC motors adequately to carry out heat generation control according to individual differences.
- CR variation measurement sequence
  The variations of the torque constant, coil resistance and power supply voltage of the motor are measured in a CR variation measurement sequence when the CR mechanical load is in the initial status and saved into the EEPROM. According to the variations (individual differences) measured in this sequence, the voltage is corrected to make the drive current value constant (without an individual difference).
- CR measurement sequence
  To set the appropriate drive current value according to the variation of the CR mechanical load, the mechanical load is measured in a CR measurement sequence and saved into the EEPROM in a power-on or I/C change sequence. A fatal error will occur if too much load is applied to the CR drive system.

The above control and sequences correct the drive current value of the CR Motor according to not only the mechanical load but also the variations of the motor and like. In addition, the resultant CR drive current value is used to calculate a heating value, and when the specified heating value is reached, wait time is provided per CR path for printing.

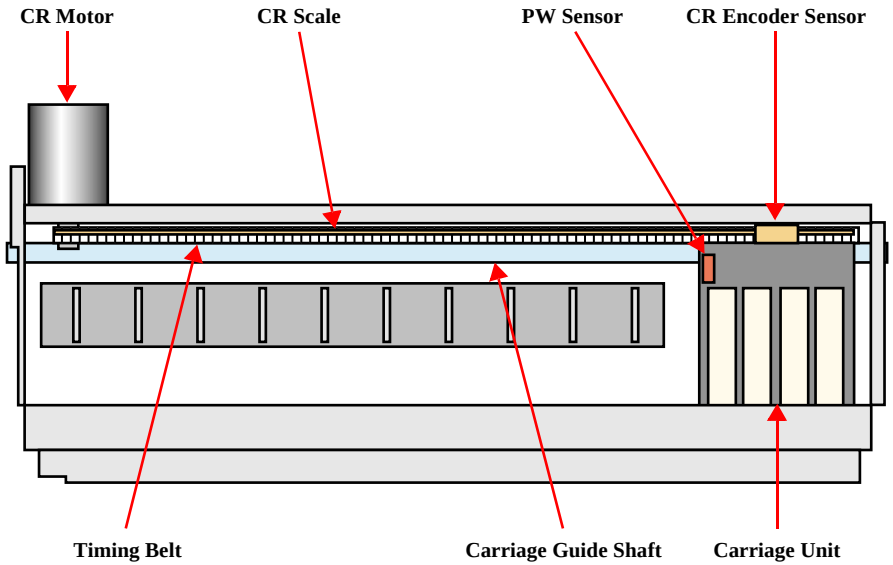


Figure 2-5. Carriage Mechanism

2.2.3.2 Carriage Home Position Detection

As in the conventional model, the Carriage Home Position is detected using the drive current of the CR Motor and the speed/position signal of the CR Encoder.
The basic home position detection sequence is as described below.

2.2.3.3 Sequence Used for PW Detection

The PW (paper width detection) Sensor installed on the Carriage Unit bottom is used to control the printer according to various sequences.

The following briefly describes the PW Sensor operating principle.

A dark voltage is measured by the PW Sensor in three places on the right end plane (area without the absorber) of the Front Paper Guide every time power is switched on, and the measurement values are saved into the EEPROM as threshold values.

- Threshold value > detection voltage: Paper present
- Threshold value < detection voltage: Paper absent

The following sequences are performed.

- Paper Left/Right Edge Detection Control
  Before start of printing (immediately after the end of paper locating), or during printing, whether paper is present or not is detected to prevent off-paper printing on the Paper Guide by borderless printing used in a wrong way.
- Paper Top Edge Detection Control
  Detects paper leading edge at start of printing. Also sets the amount of extension for the paper leading edge during borderless printing.
- Paper Bottom Edge Detection Control
  Sets the amount of extension for the paper trailing edge during printing.

2.2.4 Paper Loading/Feeding Mechanism

The following DC motor controls the Paper loading/feeding mechanism on this printer.

Table 2-2. PF Motor specifications

Item	Description
Motor type	DC motor with brushes
Drive voltage	42V (DC) ± 5% (voltage applied to driver)
Armature resistance	27.5 Ω ± 10% (per phase at 25 degrees)
Inductance	21.4mH ± 25% (1KH 1Vrms)
Driving method	PWM, constant-current chopping
Driver IC	A6627

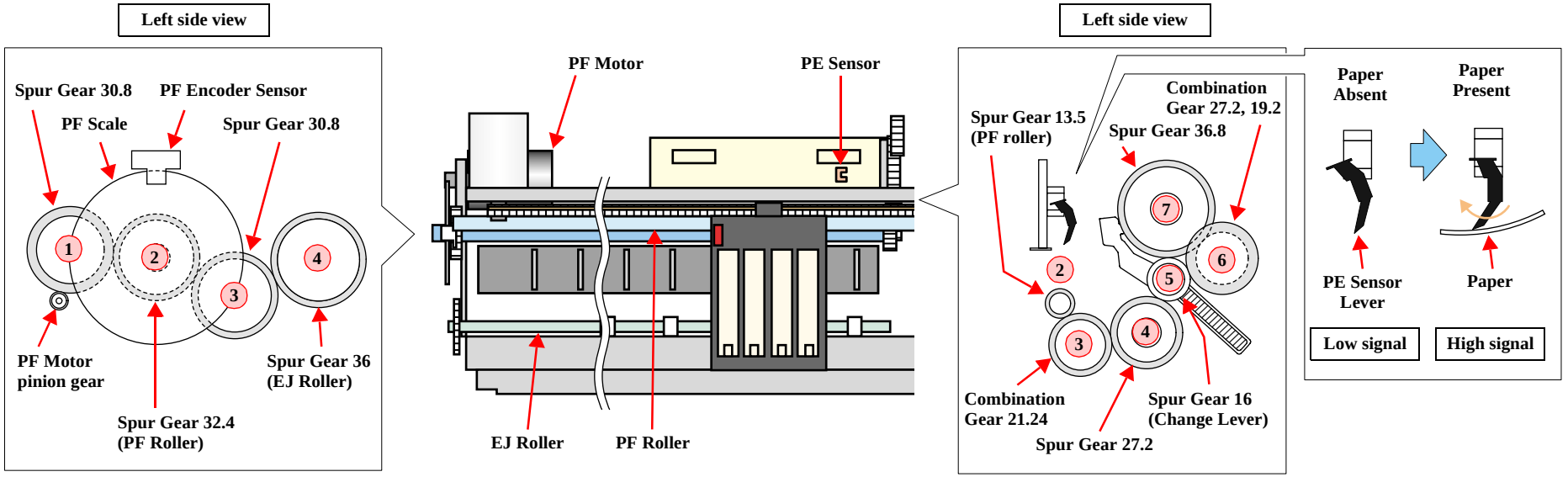
The drive of the PF motor is transmitted to the LD roller shaft and the PF roller through gears for the Paper loading/feeding mechanism. The Paper loading mechanism plays a role in loading a paper from the ASF unit to the PF roller. And also, the Paper feeding mechanism plays a role in feeding a paper loaded from the ASF unit. The functions of the Paper loading/feeding mechanism varies depending on the rotational direction of the PF motor as the table below.

Table 2-3. ASF unit function & PF Motor rotational direction

Directions *	Corresponding functions
Clockwise	• Pick up and feed a paper • Set the Change Lever on the Clutch mechanism
Counterclockwise	• Release the Change Lever from the Clutch mechanism

Note "*": The PF Motor pinion gear rotation direction = seen from the left side of the printer.

Following shows you the transmission path of the PF Motor drive to the LD Roller, the PF Roller and the EJ Roller. (The numbers in the following figure show you the order of transmission path.)



Note : The Clutch gear is molded on the backside of the Spur Gear 36.8 such as Combination gear.

Figure 2-6. Paper loading/feeding mechanism

For your reference, the top or the end of a paper is usually detected with the PE Sensor. In case that the PE Sensor cannot detect the top of a paper in the paper loading sequence, the printer indicates the “Paper Out error”. If the PE Sensor cannot detect the end of a paper in the paper feeding sequence, the printer indicates the “Paper Jam error”. As for the details, refer to Chapter 3 “Troubleshooting”.

2.2.4.1 Paper Loading Mechanism

The Paper loading mechanism consists of the Change Lever in the Pump Unit, the Holder Shaft Unit (including the Clutch mechanism) and the ASF Unit.
The Change Lever and the Clutch mechanism play a major role in the Paper loading mechanism as follows.

1. ASF home position detection function
   The ASF Unit on this printer does not have the ASF Home Position Sensor. Instead of the ASF Home Position Sensor, the Change Lever and the Clutch mechanism is used to detect the ASF home position.
   When the Change Lever is set on the Clutch mechanism with the counterclockwise rotation of the PF Motor pinion gear, the ASF home position is detected by this lever for the paper loading operation. In this time, the printer cannot load a paper from ASF Unit because the drive of the PF Motor is not transmitted to the LD Roller Shaft.
2. Paper loading function
   When the Change Lever is released from the Clutch mechanism with the clockwise rotation of the PF Motor pinion gear, the ASF home position detection function is changed over to the paper loading function. Therefore, the printer can load a paper from ASF Unit because the drive of the PF Motor is transmitted to LD Roller Shaft.

During paper loading, paper is transported from the ASF Unit into the printer by the rotation of the 2 cams of the LD Roller.

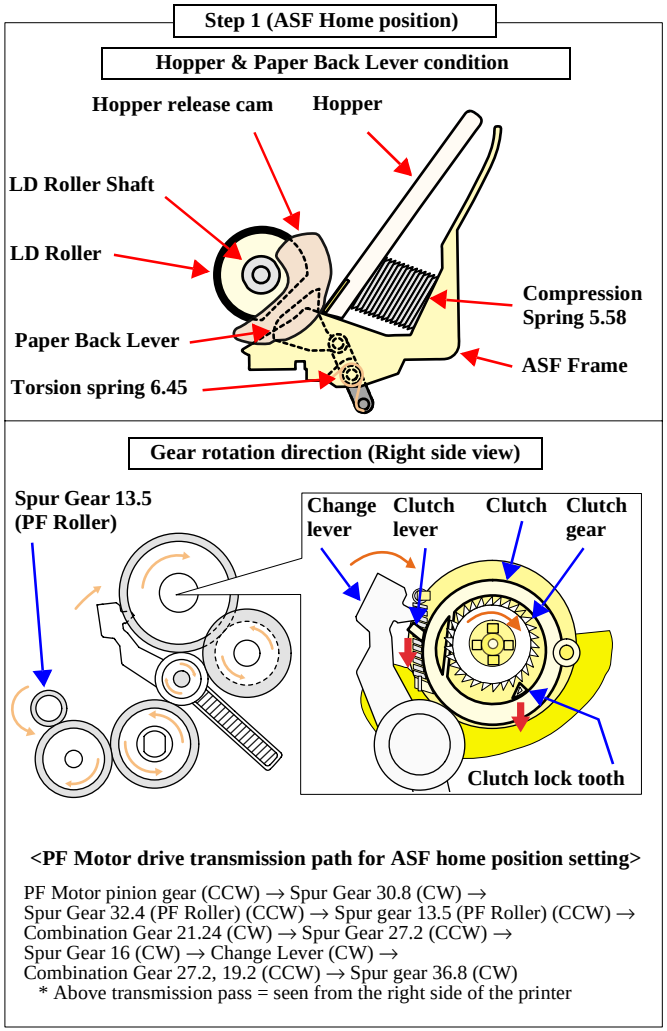
- Cam (Large) : Hopper release
- Cam (Small) : Paper Back Lever release

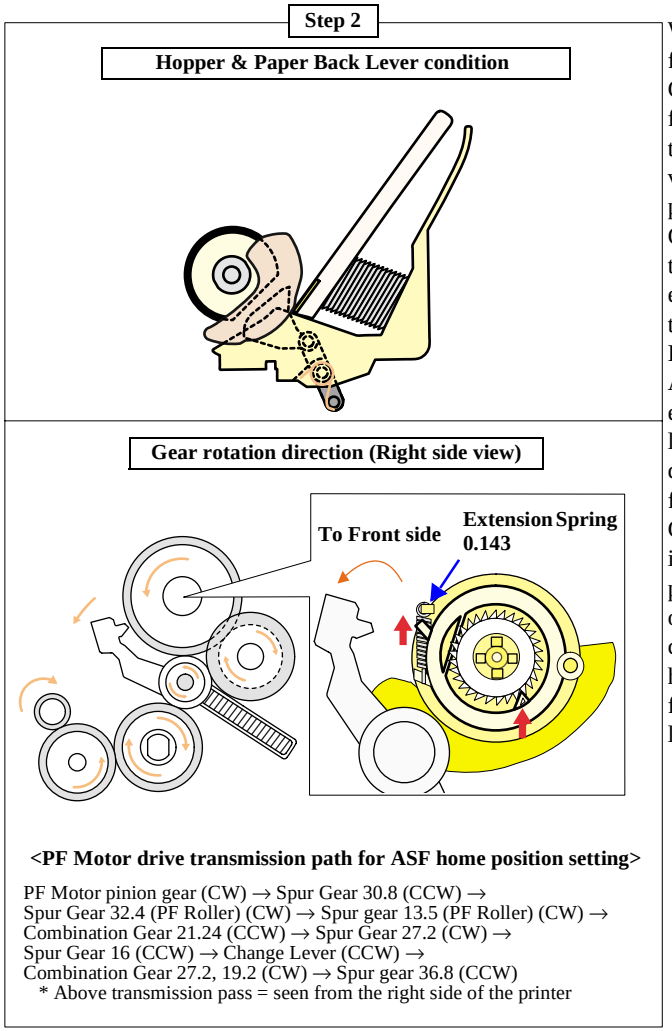
When 1 page paper is loaded, the cams mentioned above prepare the Hopper and Paper Back Lever for the next paper loading operation, and the remaining paper is returned to the standby position.

Figure 2-7 *(p.60)* and Figure 2-8 *(p.61)* show you the ASF paper loading sequence and the operation of each mechanism.

When the PF Motor pinion gear rotates CCW direction (right side view), the Change Lever pushes down the Clutch lever as right figure and the Clutch lock tooth is disengaged from the Clutch Gear. As the result, the LD Roller Shaft dose not rotate at all because the drive of the PF Motor is not transmitted. In this time, the Hopper is also pushed down by the two cams on the LD Roller Shaft, and the Paper Back Lever is set to avoid that papers are slipped down from the paper set position.

This position is the ASF home position.





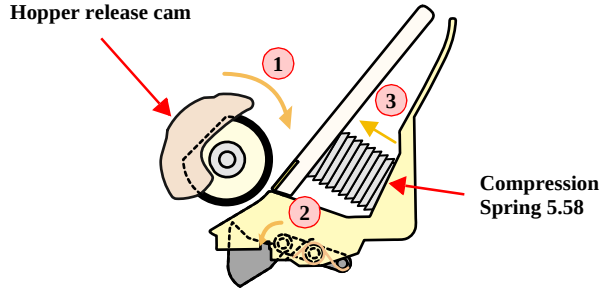
When a paper is loaded from the ASF Unit, the Change Lever moves to the front side of the printer with the CW rotation (right side view) of the PF Motor pinion gear and releases the Clutch lever. As the result, the Clutch turns back to the engagement position by the tension force of the Extension Spring 0.143. And, the Clutch gear is engaged with the Clutch lock tooth to transmit the drive of the PF Motor as left figure. In this time, the Change Lever is locked instantaneously by the protrusion on the backside of the Carriage Unit to change over from the ASF home position detection function to the paper loading function surely.

Figure 2-7. ASF paper loading sequence (Step 1, 2)

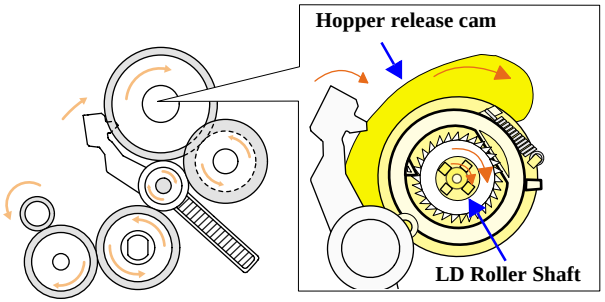
The PF Motor pinion gear rotates CCW direction (right side view), and the drive of the PF Motor is transmitted to the LD Roller Shaft through the Clutch lock tooth and the Clutch gear. After the LD Roller pushes down the Paper Back Lever into the ASF Frame, the Hopper is released by the tension force of the Compression Spring 5.58. And, a paper is picked up with the frictional force between the LD Roller and the Pad Hopper.

Step 3

Hopper & Paper Back Lever condition



Gear rotation direction (Right side view)

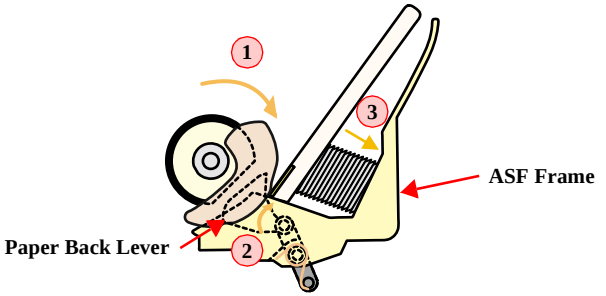


<PF Motor drive transmission path for ASF home position setting>

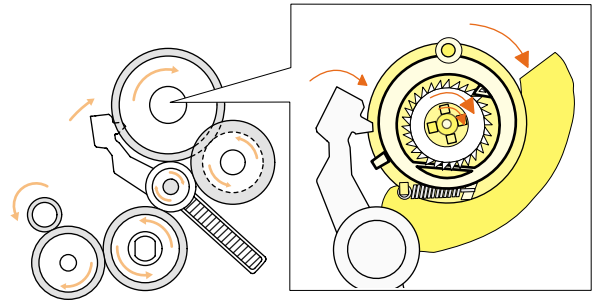
PF Motor pinion gear (CCW) → Spur Gear 30.8 (CW) →
Spur Gear 32.4 (PF Roller) (CCW) → Spur gear 13.5 (PF Roller) (CCW) →
Combination Gear 21.24 (CW) → Spur Gear 27.2 (CCW) →
Spur Gear 16 (CW) → Change Lever (CW) →
Combination Gear 27.2, 19.2 (CCW) → Spur gear 36.8 (CW)
* Above transmission pass = seen from the right side of the printer

Step 4

Hopper & Paper Back Lever condition



Gear rotation direction (Right side view)



<PF Motor drive transmission path for ASF home position setting>

PF Motor pinion gear (CCW) → Spur Gear 30.8 (CW) →
Spur Gear 32.4 (PF Roller) (CCW) → Spur gear 13.5 (PF Roller) (CCW) →
Combination Gear 21.24 (CW) → Spur Gear 27.2 (CCW) →
Spur Gear 16 (CW) → Change Lever (CW) →
Combination Gear 27.2, 19.2 (CCW) → Spur gear 36.8 (CW)
* Above transmission pass = seen from the right side of the printer

While the LD Roller rotates CCW direction (right side view) continuously, the top of a paper is loaded to the PF Roller. In this rotation, the Hopper returns to the open position and the Paper Back Lever is pushed up by the cam of the LD Roller. In this time, this lever returns papers to the stand-by position in ASF Unit for next paper loading operation.
Then, when the rolling LD Roller & the Clutch come at the above “Step1” position, the Clutch lever is locked with the Change Lever again. In this time, the drive of the PF Motor is interrupted and the drive is transmitted only to the PF Roller side for the paper feeding sequence.

Figure 2-8. ASF paper loading sequence (Step 3, 4)

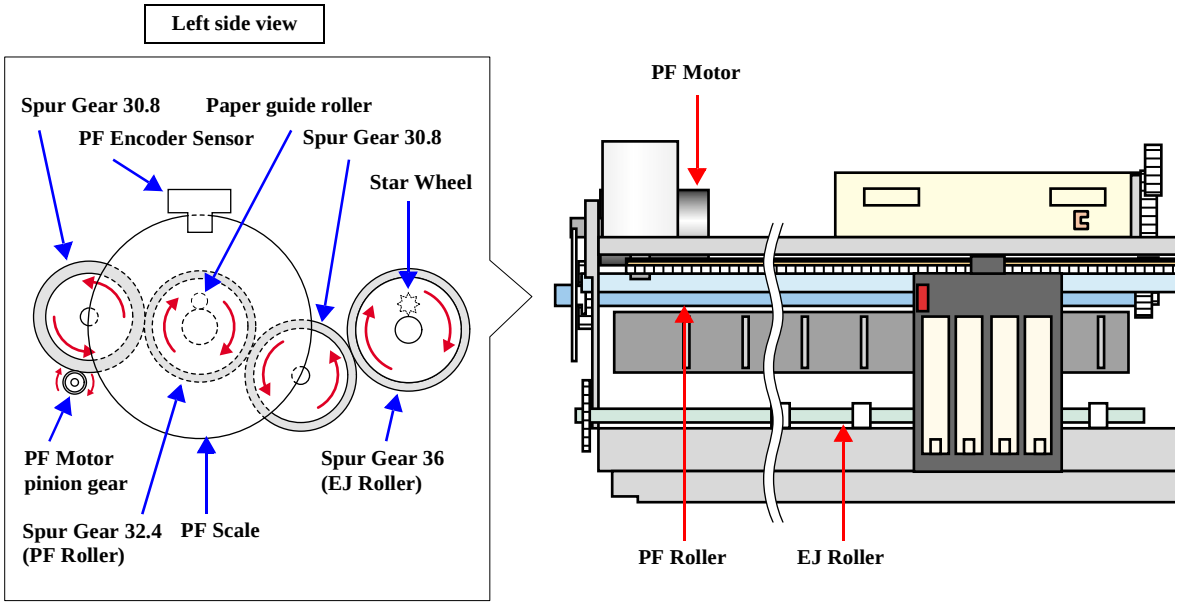
2.2.4.2 Paper Feeding Mechanism

The Paper feeding mechanism consists of PF Motor, PF Roller, EJ Roller, PE Sensor, PF Encoder and PF Scale etc. The Paper feeding mechanism feeds a paper loaded from ASF Unit by using pairs of rollers.

1. One pair is the PF Roller and the Paper Guide Roller which is assembled in the Paper Guide Upper Unit. The drive of the PF Motor is transmitted to the Paper Guide Roller through the PF Roller.
2. Another pair is the EJ Roller and the Star Wheel which is assembled on the EJ Frame Unit. The drive of the PF Motor is transmitted to the Star Wheel through the EJ Roller.

Following figure shows you the transmission path for the PF Roller & the Paper Guide Roller and the EJ Roller & the Star Wheel.

The top of a paper is loaded to the PF Roller from the ASF Unit in the paper loading sequence. And then, when the PF Motor pinion gear rotates CW direction (left side view), a paper is fed by the PF Roller & the Paper Guide Roller and the EJ Roller & the Star Wheel in the printing operation & the paper feed sequence.



Transmission path (left side view)

- PF Motor pinion gear (CW) → Spur Gear 30.8 (CCW) → Spur gear 32.4 (PF Roller) (CW)
- PF Motor pinion gear (CW) → Spur Gear 30.8 (CCW) → Spur gear 32.4 (PF Roller) (CW) → Spur Gear 30.8 (CCW) → Spur Gear 36 (EJ Roller) (CW)

Figure 2-9. Paper feeding mechanism

2.2.5 Ink System Mechanism

The Ink System Mechanism consists of Pump mechanism with Carriage lock mechanism and Capping mechanism with Wiper mechanism. Following table lists the function for each mechanism.

Table 2-4. Function for each mechanism

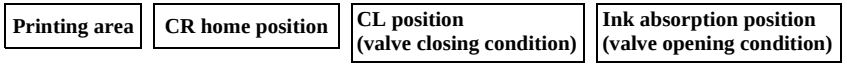
Mechanism	Function
Capping mechanism *	This is to cover the surface of the Print Head with the cap in order to prevent the nozzle from increasing viscosity.
Wiper mechanism	This is to remove the foreign material and unnecessary ink on the nozzle plate of the Print Head.
Pump mechanism	This is to eject the ink from the Ink Cartridge, the ink cavity and the cap to the Waste Ink Pad.
Carriage lock mechanism	This is to lock the Carriage Unit with the Change Lever while the Carriage Unit is at the home position.

Note : Like the previous printers (Stylus Photo R300/R310), this printer adopts the valveless cap system. The air valve system used for the previous printer (Stylus COLOR 740) have two functions by the CR position in the capping condition as follows.

1) Valve closing condition (CL position)
   By closing the air valve, the ink is forcibly absorbed from the Ink Cartridge or the ink cavity by the Pump Unit and is ejected to the Waste Ink Pad while the Carriage Unit is in the CL position.

2) Valve opening condition (Ink absorption position)
   By opening the Air valve, the negative pressure is decreased and only the ink inside the Cap is ejected while the Carriage Unit is in the further right side than the CL position. (the ink is not absorbed from the Ink Cartridge or the ink cavity.)

The following shows you the Carriage Unit position for each condition easily.



But, on the valveless cap system, the above 2) operation is done outside the capping position. The Carriage Unit moves outside the CR home position and the pump absorbs the ink inside the Cap.

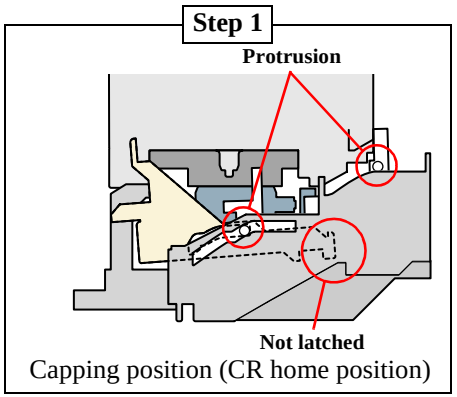
2.2.5.1 Capping Mechanism

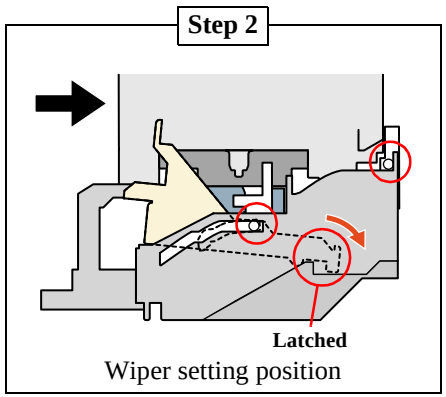
The Capping mechanism covers the Print Head with the Cap to prevent the nozzle from increasing viscosity when the printer is in stand-by state or when the printer is off.

☐ Wiper with the Cap unit

The wiping operation is controlled by the Carriage Unit movement. This operation is usually performed with every CL sequence which is to absorb the ink from the ink cartridge, the ink cavity by the Pump unit. Following figure shows you the mechanism for the wiping operation.

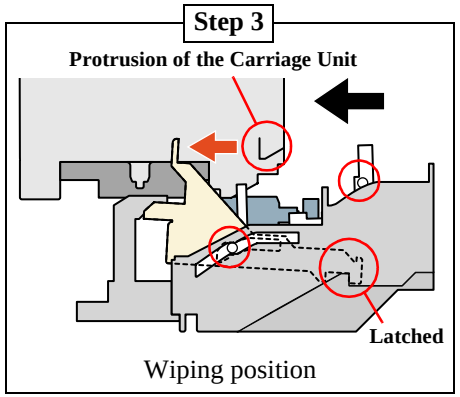
When the Carriage Unit is in the home position, the hook of the Slider Lock Lever is not latched to the dent of the Cap Frame.
In this time, the protrusion of the Cap Slider Lever does not reach the rightmost position of the Cap Frame.

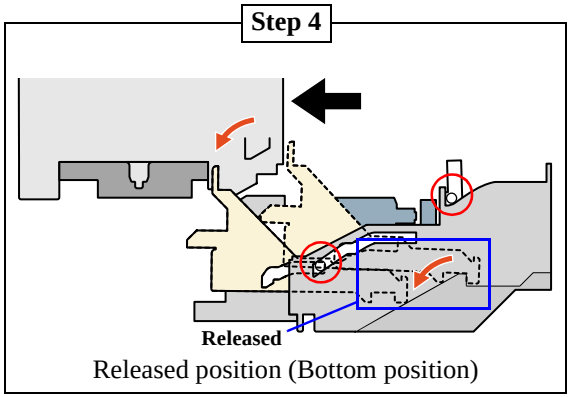




The Carriage Unit moves to the Wiper setting position on the rightmost position of the Cap Frame with keeping the Cap covered.
In this time, the hook of the Slider Lock Lever is latched to the dent of the Cap Frame.

When the Carriage Unit moves to the left side from the Wiper setting position, the Cap Unit is pulled back by the tension force of the Extension Spring 0.788.
In this time, the Cap Unit is automatically set to the wiping position because the hook on the Slider Lock Lever is latched to dent of the Cap Frame. And, the wiping operation is performed according to the Carriage Unit movement.





When the wiping operation is finished and the Carriage unit moves further to the left side, the hook of the Carriage unit hits to the Slider lock lever.
In this time, the Slider lock lever is released and the Cap slider returns to the bottom position completely.
(The broken line is the position of the Carriage unit & the Slider lock lever just before being released.)

Figure 2-10. Wiper mechanism

2.2.5.2 Pump Unit Mechanism

The PF Motor also controls the Pump Unit mechanism (including the Change Lever) as well as the Paper loading/feeding mechanism. The drive of the PF Motor is always transmitted to the Pump Unit. (And also, its drive is transmitted to the LD Roller through the Clutch mechanism & the Change Lever.)
On this printer, the Pump Unit mechanism including the Change Lever plays a major role expecting the ink eject operation. And, these operations control depending on the PF Motor rotational direction as the following table below.

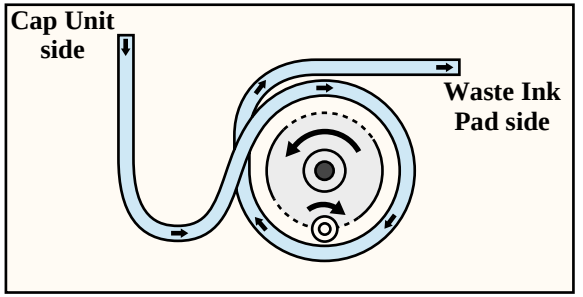
Table 2-5. PF Motor rotational direction & Ink system mechanism

Directions *	Functions
Clockwise	• Pump release
Counterclockwise	• Absorbs the ink • Release the Change Lever from the Clutch mechanism

Note "*": The PF Motor rotational direction = seen from the left side of the printer.

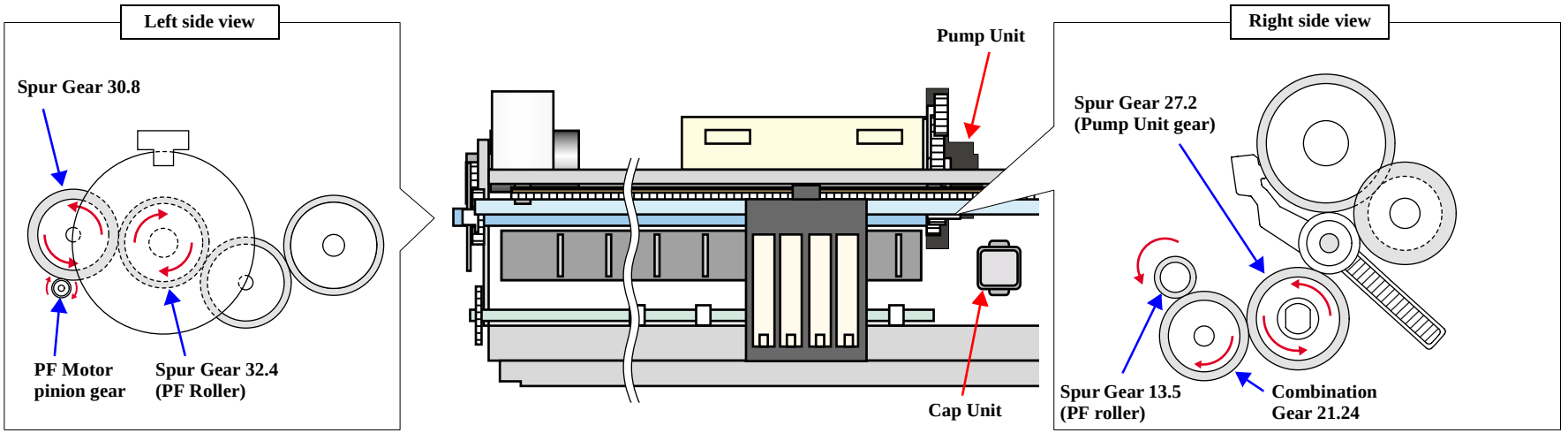
1. Ink eject operation (usual operation)
   The ink is absorbed from the Ink Cartridge, the ink cavity and is ejected to the Waste Ink Pad from the Cap when the Ink Tube is pressed by a roller in the Pump Unit.

Following figure shows you the overview of the Pump Unit mechanism operation.



Note : The PF Motor rotational direction = seen from the right side of the printer.

Figure 2-11. Pump mechanism



Transmission Path: PF Motor pinion gear (CW) → Spur Gear 30.8 (CCW) → Spur Gear 32.4 (PF Roller) (CW) → Spur gear 13.5 (PF Roller) (CW) → Combination Gear 21.24 (CCW) → Spur Gear 27.2 (Pump Unit gear) (CW)
(Above transmission pass = seen from the right side of the printer)

Figure 2-12. PF Motor drive transmission path to the Pump Unit

2. Carriage lock operation by the Change Lever
   Unlike the previous printer (Stylus COLOR 680), this printer does not have the Carriage Lock Lever with the Wiper.
   Instead of the Carriage Lock Lever, the Change Lever is set to the front side of the printer while the Carriage Unit is in the CR home position.
   (As for the detailed mechanism for setting the Change Lever, refer to Figure 2-7 *(p.60)* Step 2)

2.2.6 Ink Sequence

☐ Initial ink charge
After the printer is purchased and the power is turned on for the first time, the printer must perform the Initial Ink Charge to charge the ink inside the ink cavity. When the Initial Ink Charge is completed properly, the printer releases the flag inside the EEPROM. Initial Ink Charge will take about 100 seconds for Stylus CX3500/CX3600/CX3650/CX4500/CX4600. If the power is turned off during the Initial Ink Charge, the CL3 will be performed at next power on timing.

☐ Manual Cleaning
The Stylus CX3500/CX3600/CX3650/CX4500/CX4600 provides three types of manual cleaning to clean air bubbles, clogged ink with viscosity or foreign substances.
The manual CL can be performed by the Control Panel Operation, the Printer Driver Utility and the Adjustment Program.

■ CL1
- Ink absorption
  Black Ink: 0.161g, Color Ink: 0.482g
- Wiping operation
  Wipes the nozzle plate by the rubber part on the Cap Unit.
- Flashing operation
  Prevents color from mixing, and stabilizes ink surface inside the nozzle.

■ CL2
- Ink absorption
  Black Ink: 0.445g, Color Ink: 1.335g
- Wiping operation
  Wipes the nozzle plate by the rubber part on the Cap Unit.
- Flashing operation
  Prevents color from mixing, and stabilizes ink surface inside the nozzle.

■ CL3
- Ink absorption
  Black Ink: 1.015g, Color Ink: 3.045g
- Wiping operation
  Wipes the nozzle plate by the rubber part on the Cap Unit.
- Flashing operation
  Prevents color from mixing, and stabilizes ink surface inside the nozzle.

Independently of the printing path after the previous CL, perform manual CL from CL1 to CL3 in order if the cumulative printing timer counter is less than 9min. Only when the cumulative printing timer counter is more than 9min, execute only CL1.
Additionally, if the I/C is Ink Low or Out condition, any manual cleaning is prohibited and it is displayed on the LED indicators.

- Timer Cleaning
  Like the previous printers (Stylus Photo R300/R310), this printer dose not have Lithium battery which is used for the backup power source for Timer IC. So, this printer manages the printer off period or cleaning cycle by using the following method.
  The Printer Driver sends the timer command to the printer before printing. The timer command is generated based on the PC's timer and it consists of year, month, date, hour, minute and second. As soon as the printer receives the timer command from the Printer Driver, the printer stores its command in address 06<H> and 07<H> in the EEPROM. Then, it is compared with the latest CL time which is stored in address 04<H> and 05<H> in the EEPROM. And, In case that the timer cleaning period is over the specific period, the printer performs the timer cleaning automatically. In this time, the printer stores the timer command in address 04<H>, 05<H>, 06<H>, 07<H> in the EEPROM.
  Maximum 3.32g of the ink is consumed in the timer cleaning. (0.830g of black ink and 2.490g of color ink are consumed.)

- Flashing
  Two different flushing operations are executed for the following reasons.

  - Pre-printing flushing
    This is done before a start of printing to eliminate ink viscosity in the Print Head nozzles.

  - Periodic flushing
    This is done during printing to prevent ink viscosity in the Print Head nozzles from increasing.

2.3 Scanner Mechanism

The Scanner Mechanism of Stylus CX3500/CX3600/CX3650/CX4500/CX4600 is constructed of a Scanner Carriage Unit, Scanner Motor, Scanner HP Sensor, etc., in the same way as previous A4 size scanners.

2.3.1 Scanner Carriage Mechanism

2.3.1.1 Scanner Carriage Unit Overview

The Scanner Carriage Unit is constructed of a CIS Board (including linear CCD), Rod Lens Array, LED (light source), etc.

- CIS Board
  This takes the light information read from the document by the Rod Lens Array and converts it to digital information using the linear CCD.
- Rod Lens Array
  Many rod-shaped lenses are arranged in parallel, and the upright multiple images of each lens is overlapped to form a single continuous image. Compared to a regular lens, this has the special ability to reduce the distances between images. It can project at 1 to 1 size for imaging a linear CCD with a width identical to an A4 size document.
- LED
  The unit uses an LED for an exposure light source. Using an LED eliminates the need for an inverter board, and power consumption is reduced.

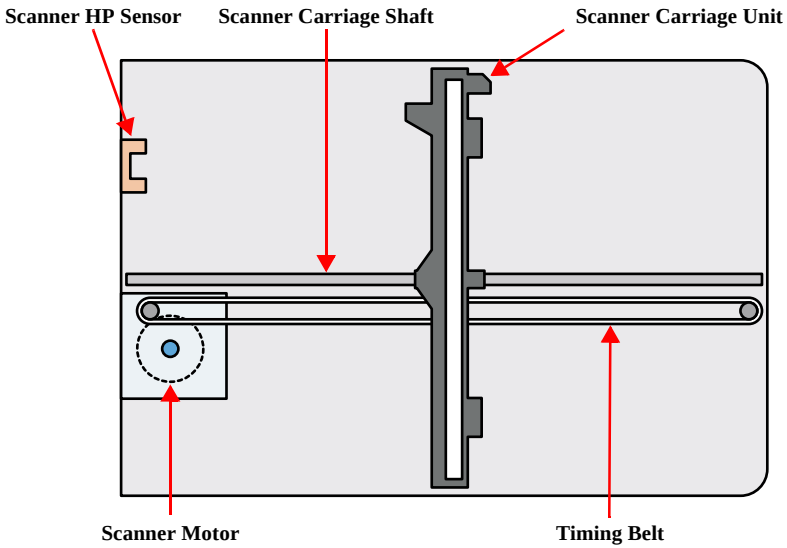


Figure 2-13. Scanner Mechanism

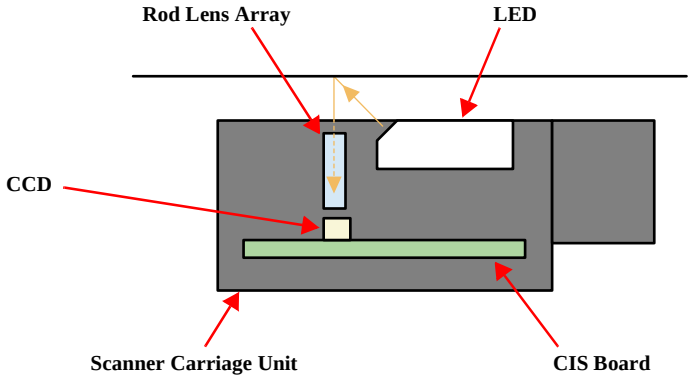


Figure 2-14. Scanning image

2.3.1.2 Scanner Carriage Unit Movement Overview

Scanning image is performed in the main scan direction (=1 line) by the CCD sensor and in the sub-scan direction (=several lines) combined with Scanner Carriage Unit movement. (refer to the figure below)
Line type, color CCD sensor can scan 1 line in main scan direction (parallel to the Scanner Carriage Unit) by one time. When scanning next lines after the second line in sub-scan direction, CR driving moves the Scanner Carriage Unit, which has CCD sensor inside, and scan the other lines. The scanned data is sent to the control board. The scanned data for “n” lines and “n-1” line are processed consecutively.

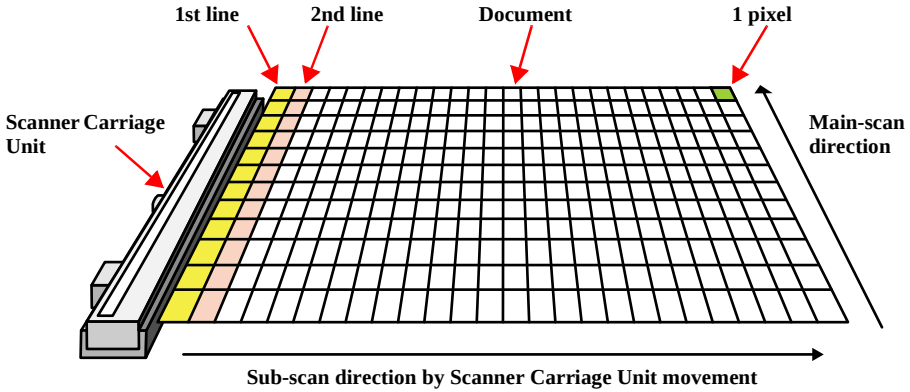


Figure 2-15. Scanner Carriage Unit movement

The table below shows the specifications for the stepping motor that controls the Scanner Carriage Mechanism.

Table 2-6. Scanner Motor specifications

Item	Description
Motor type	PM type stepping motor
Drive voltage	42V (DC)
Coil resistance	37Ω ± 7% (per phase at 25 degrees)
Inductance	TBDmH ± TBD% (1KH 1Vrms)
Driving method	PWM
Driver IC	A6627

Drive of the Scanner Motor is transferred to the Scanner Carriage Unit by the Scanner Timing Belt. The Scanner Carriage Unit slides in the secondary scanning direction. The Scanner Motor uses a stepping motor and drives using open loop control.

When the HP detection flag of the Scanner Carriage Unit disrupts the signal of the Scanner HP Sensor, the Scanner HP Sensor outputs a high signal, and the Scanner Carriage Unit is determined to be in the home position.

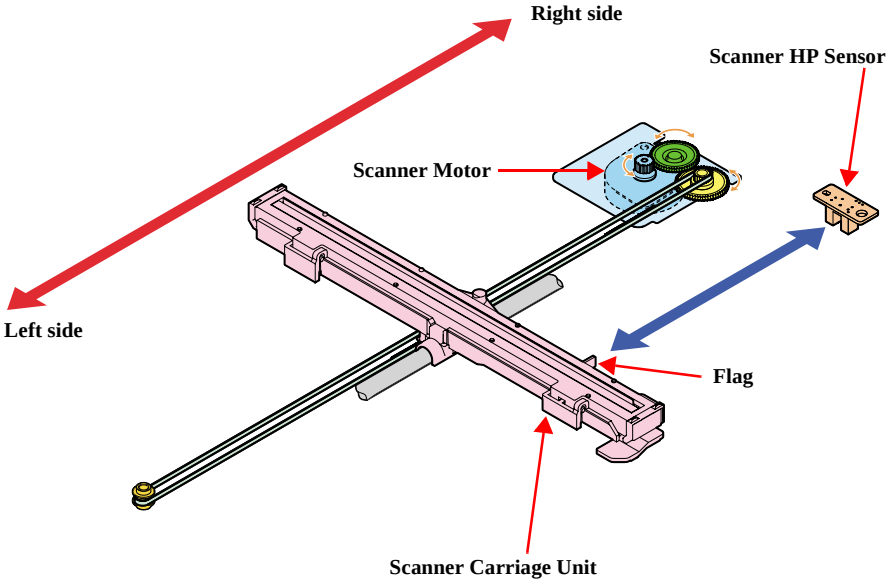


Figure 2-16. Scanner Carriage Unit Mechanism

2.4 Electrical Circuit Operating Principles

The electric circuit of the Stylus CX3500/CX3600/CX3650/CX4500/CX4600 consists of the following boards.

- ☐ Main Board (CPU-ASIC 2 in 1 + Soldering Flash ROM)
  - ■ Stylus CX3500/CX3600/CX3650 : C577 Main Board
  - ■ Stylus CX4500/CX4600 : C571 Main Board
- ☐ Power Supply Board : C571 PSB/PSE Board

NOTE: CPU and ASIC is integrated as one chip (IC8) on the Main Board.

This section provides operating principles of C577 Main Board, C571 Main Board and C517 PSB/PSE Board. Refer to Figure 2-17 *(p.70)* for the major connection of the each boards and their roles.

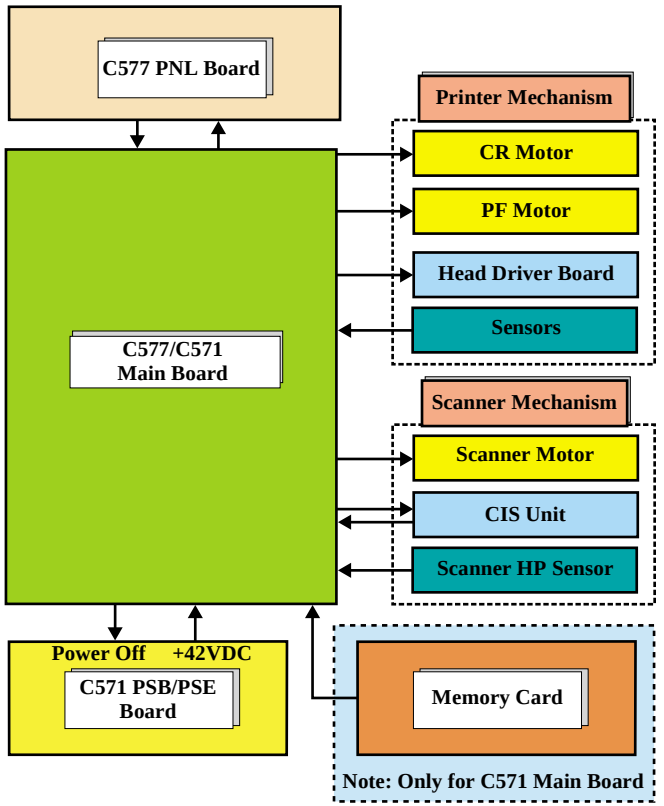


Figure 2-17. Electric circuit

2.4.1 PSB/PSE Board

In the PSB/PSE Board of Stylus Photo RX420/RX425/RX430, the simulated oscillating stimulation flyback converter circuit method is used, and it supplies +42VDC to the drive line. The application of the output voltage is described below.

Table 2-7. Application Of The DC Voltages

Voltage	Application
+42VDC	• Motors (CR Motor, PF Motor, Scanner Motor) • Print Head common voltage • Print Head nozzle selector 42V drive voltage

AC voltage input from AC inlet first goes through filter circuit that removes high frequency components and is then converted to DC voltage via the rectifier circuit and the smoothing circuit. DC voltage is then lead to the switching circuit and FET Q1 preforms the switching operation. By the switching operation of the primary circuit, +42VDC is generated and stabilized at the secondary circuit.

2.4.1.1 C571 PSB/PSE Board (TBD)

□

2.4.2 C571/577 Main Board

The logic circuit of the C571/577 Main Board is composed of the follows;

- Logic line (CPU-ASIC 2 in 1, SDRAM, P-ROM and so on)
- Motor control/drive circuit (CR Motor, PF Motor, Scanner Motor)
- Head control/drive circuit
- USB Interface control circuit
- Sensor circuit
- Combination circuit (RTC circuit, Reset circuit, EEPROM circuit)

The printer mechanism is controlled by the above circuits. Following explains the major characteristics of this Main Board.

☐ Lithium battery is not mounted
Unlike the previous printer (Stylus COLOR 680), the Lithium battery is not mounted on the Main Board.

☐ Adoption of 3.3V/1.5V drive logic circuit components
The 5V formed by the Combination Motor Driver (IC9) of C579 Main Board is stepped down to 3.3V by the Regulator (IC10), and it is then used as drive voltage for many elements. In addition, when SPC shifts to low power mode, the 3.3V that was stepped down by the Regulator (IC10) is stepped down to 1.5V by the Combination Motor Driver (IC9) and elements that had been driven by 3.3V are driven by 1.5V for suppression of power consumption.

Table 2-8. 3.3V/1.5V & 5V Drive Components

5VDC	3.3/1.5VDC
• Flash ROM (IC5)	• CPU-ASIC (IC8)
• SDRAM (IC6)	• Motor driver (IC9)
• RTC (IC7)	• Common driver (IC11)

2.4.2.1 Main Elements

Table 2-9 *(p.72)* shows the function of the each main elements on C571/577 Main Board.

Table 2-9. Main Elements

IC	Location	Function
Flash ROM	IC5	16Mbit • Firmware storage
SDRAM	IC6	Bus= 16 bit, 64Mbit DRAM
RTC	IC7	• EEPROM Default settings, backup for all parameters • Reset function • Timer function
CPU-ASIC	IC8	CPU mounted on the MAIN board is driven by clock frequency 48 MHz, 96MHz and controls the printer and scanner.
Motor Driver	IC9	• CR/PF/Scanner motor drive IC • Dropping 42V line to 5V • Dropping 3.3V line to 1.5V
Regulator	IC10	Dropping 5V line to 3.3V
Common Driver	IC11	Head drive control HIC • Generates head common voltage.

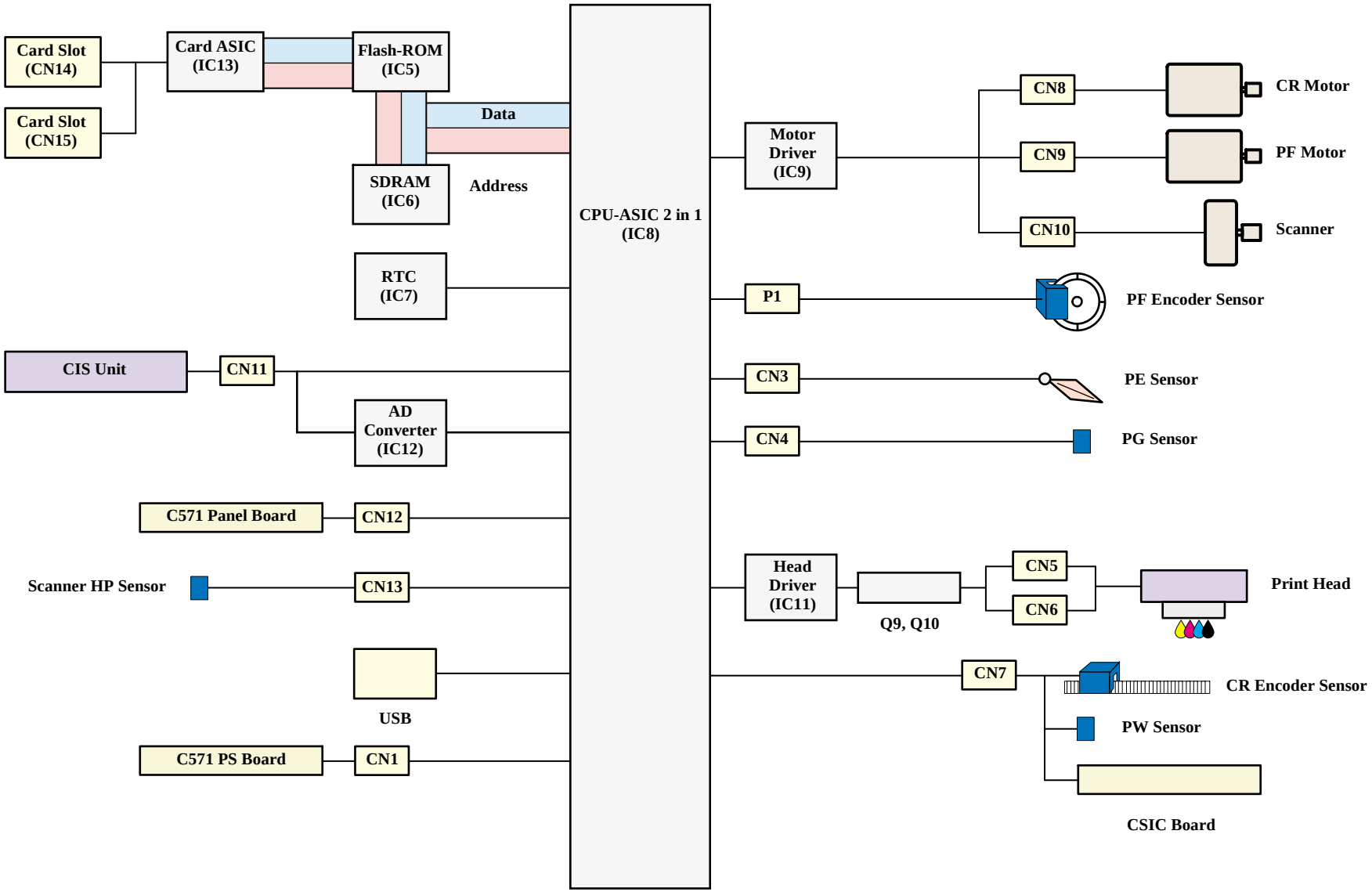


Figure 2-18. Block Diagram For The C579 Main Board

2.4.2.2 Print Head Driver Circuit

The Print Head driver circuit consists of the following two components:

- Head common driver circuit (Common driver IC11 & Wave amplifier transistor Q9, Q10)
- Nozzle selector IC on the Print Head driver

The common driver (IC11) generates a basic drive waveform according to the output signals from CPU (IC8). The basic drive waveform is amplified by the transistors Q9 and Q10 (the amplified one is called drive waveform.) and then transferred to the nozzle selector IC on the Print Head driver board. Print data is converted to serial data by the CPU and then sent to the nozzle selector IC on the Print Head driver board. Based on the serial data, the nozzle selector IC determines the nozzles to be actuated. The selected nozzles are driven by the drive waveforms amplified by the transistor Q9 and Q10. Refer to Figure 2-19 *(p.74)* for the Print Head driver circuit block diagram.

☐ Head common driver circuit
The basic drive waveform is generated in the common driver (IC11) based on the following 13 signal lines output from the CPU (IC8); DATA0-DATA9, LAT, RESET, and PSCNT.
By the DATA signal output from the CPU, the original data for the basic drive waveform is written in the memory in the common driver (IC11). The addresses for the written data are determined by DATA0-DATA9 signals. Then, the necessary data is selected from the address and appropriate basic drive waveform is generated. Generated basic drive waveform is transferred to nozzle selector IC on the Print Head driver board through the transistor Q9 and Q10 and applied to the nozzle PZT specified by nozzle selector IC.

☐ Nozzle selector circuit
Printing data is allocated to the four rows (the number of the head nozzle rows) and converted into serial data by the CPU (IC8). Then the converted data is transferred to the nozzle selector IC through the four signals lines (HS01 to HS04). Data transmission from the CPU to the nozzle selector synchronizes with the LAT signal and SCK clock signal. Based on the transmitted data, appropriate nozzle is selected and the PZTs of the selected nozzle are driven by the drive waveform output from the head common driver.

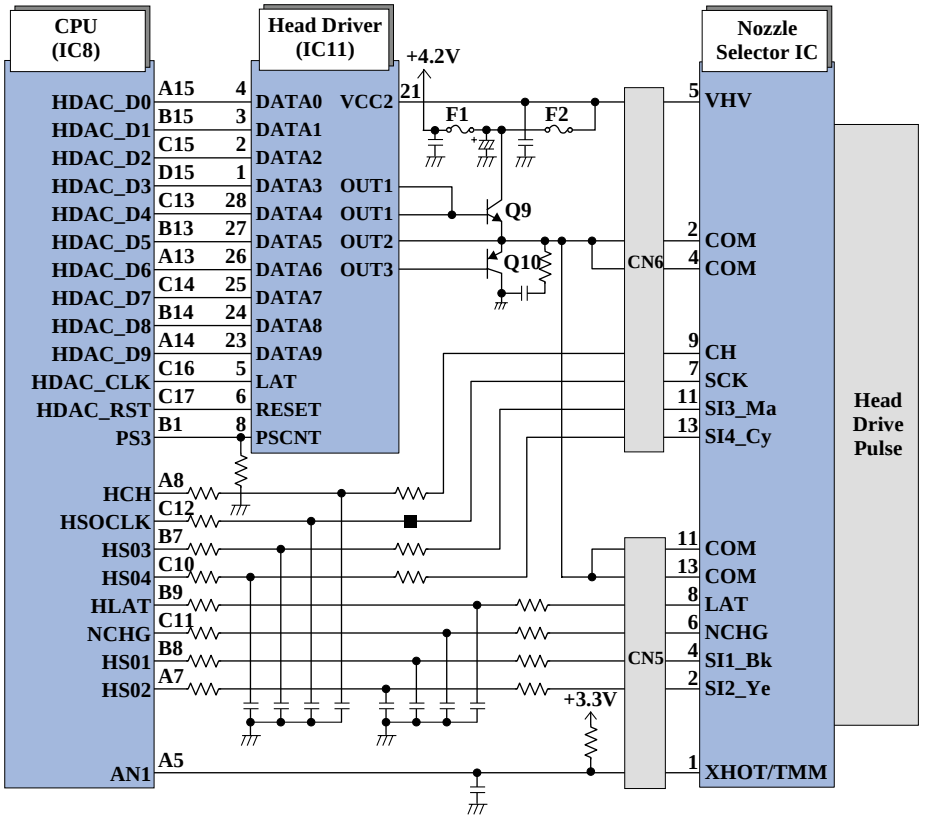


Figure 2-19. Print Head Driver Circuit

2.4.2.3 Motor Driver Circuit

CR/PF Motor drive circuit

The motor driver IC (IC9) on the Main board drives CR/PF Motor. This product uses DC motor and performs constant current PWM drive.
Based on the output pulse (signal) from CR Encoder or PF Encoder, the CPU (IC8) sets the appropriate drive current value for each operational action and outputs the value as a special control signal to the Motor Driver (IC9). Then, based on the signal output from the CPU, the Motor Driver outputs the motor drive current to the CR/PF Motor.
When no data has been received for 5 minutes, the CPU sets the Motor Driver current value to 0, turning off the Motor Driver, in order to conserve electricity.

Scanner Motor Driver Circuit

The motor driver IC (IC9) on the Main board drives Scanner Motor. This product uses PM type stepping motor and performs constant current bi-polar drive.
The Motor Driver IC (IC9) forms the motor drive waveform based on the signal output from the CPU (IC8), controlling the Scanner Motor.
When no data has been received for 5 minutes, the CPU sets the Motor Driver current value to 0, turning off the Motor Driver, in order to conserve electricity.

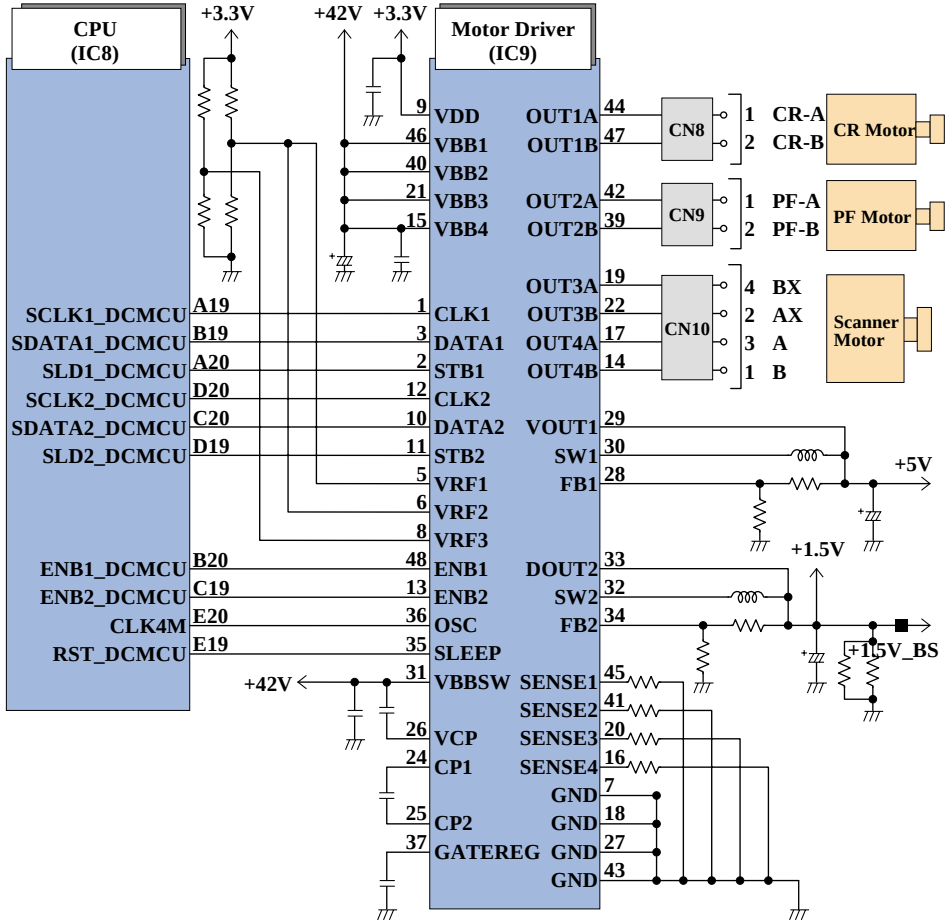


Figure 2-20. Motor Driver Circuit Block Diagram

2.4.2.4 Combination Circuit

This printer differs from previous models by using a combination IC that integrates the reset circuit, EEPROM and RTC.

Reset Circuit

RTC IC (IC7) on the Main Board monitors the three voltage: +3.3V for the logic line, +5V for the logic line and +42V for the drive line. Reset Circuit outputs the reset signal to CPU (IC8) in the following case.

- ☐ +3.3V line reset circuit
  The 3.3V line is monitored at the VDD port of IC7, and if an abnormal voltage is detected, a reset signal for the CPU is output from the FRST port of IC7.
- ☐ +5V line reset circuit
  The 5V line is monitored at the VDD2 port of IC7, and if an abnormal voltage is detected, a reset signal for the CPU is output from the RST port of IC7.
- ☐ +42V line reset circuit
  The 42V line is monitored at the VEX port of IC7, and if an abnormal voltage is detected, a reset signal for the CPU is output from the EXO port of IC7.

EEPROM Control Circuit

When the printer power is turned off, the following information is stored in EEPROM (IC7) which is nonvolatile memory. And, when the printer power is on, CPU (IC8) reads the information from EEPROM.

Information stored in EEPROM is listed below.

- Various ink counter (I/C consumption counter, Waste Ink Pad counter, etc.)
- Mechanical setting value (Head ID, Bi-D Adjustment, USB ID, etc.)

EEPROM is connected to CPU with 4 lines and each line has the following function.

- CE : Chip selection signal
- CLK : Data synchronism clock pulse
- DI : Data writing line (serial data) at power off.
- DO : Data reading line (serial data) at power on.

RTC Circuit

By adoption of the large-capacity capacitor (C9) for timer, the Power-off timer can be backed up for about one week after power-off.

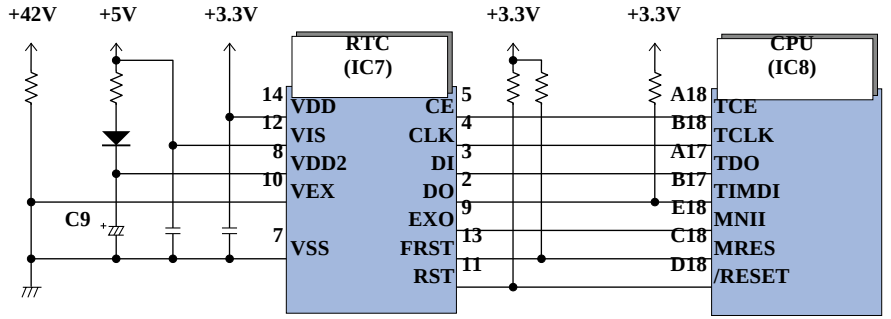


Figure 2-21. RTC Circuit Block Diagram

2.4.2.5 Sensor Circuit

CPU (IC8) on the Main Board monitors the status of the printer by several sensors. However, unlike the previous product, ASF Unit on this printer does not have ASF Sensor. Instead of ASF Sensor, Change Lever and the Clutch mechanism is used to detect ASF home position. (As for the ASF home position detection, refer to "2.2.4 Paper Loading/Feeding Mechanism" *(p.58)*.)

☐ **PE Sensor**
This sensor is mounted at the right side center of the Printer Mechanism, and it detects the presence/absence of paper when the paper passes through the Paper Guide Rear. The PE Sensor is constructed of a transmissive photosensor and the PE Sensor Lever.

- ■ Paper Absent : Because the PE Sensor Lever does not interfere between the photosensor terminals, a low signal is output to the CPU.
- ■ Paper Present : The PE Sensor Lever interferes between the photosensor terminals, and a high signal is output to the CPU.

☐ **PG Sensor**
This sensor is mounted at the left end lower section of the Printer Mechanism, and it detects the condition of PG (Platen Gap). The detection method used by the PG Sensor is mechanical contact points.

- ■ PG Normal : A low signal is output to the CPU.
- ■ PG Large : A high signal is output to the CPU.

☐ **PW Sensor**
The sensor is mounted to the bottom of the Carriage Unit. It detects the top and bottom, left and right edges of the paper being fed.

- ■ Paper absent : A low signal is output to the CPU.
- ■ Paper present : A high signal output to the CPU.

☐ **CR Encoder Sensor**
The sensor is composed of a transmissive photosensor mounted to the back of the carriage and a linear scale mounted in the CR scan direction. Minimum resolution of 1/180 inch is provided, and output to the CPU is a high signal for the black slits on the linear scale and a low signal for transparent slits. Control of the CR Motor is based on the output signal. The home position of the Carriage Unit is detected by this sensor.

☐ **PF Encoder Sensor**
The sensor is composed of a transmissive photosensors mounted to the loop scale of the PF Roller Unit left side and to the Main Board. Minimum resolution of 1/180 inch is provided, and output to the CPU is a high signal for the black slits on the loop scale and a low signal for the transparent slits on the loop scale. Control of the PF Motor is based on the output signal.

☐ **Thermistor (THM)**
The thermistor is directly mounted on the Print Head driver board. It monitors the temperature around the Print Head and determines the proper head drive voltage to uniform the weight of the ink fired from the Print Head. This information is fed back to the CPU analog port. When the temperature rises, the head drive circuit lowers the drive voltage: When the temperature lowers, the head drive circuit rises the drive voltage.

☐ **Scanner HP Sensor**
Mounted in the Scanner Unit, this sensor detects whether the CIS Unit is inside or outside the home position

- ■ Inside HP : A high signal output to the CPU.
- ■ Outside HP : A low signal is output to the CPU.

The block diagram for the sensor circuit is shown below.

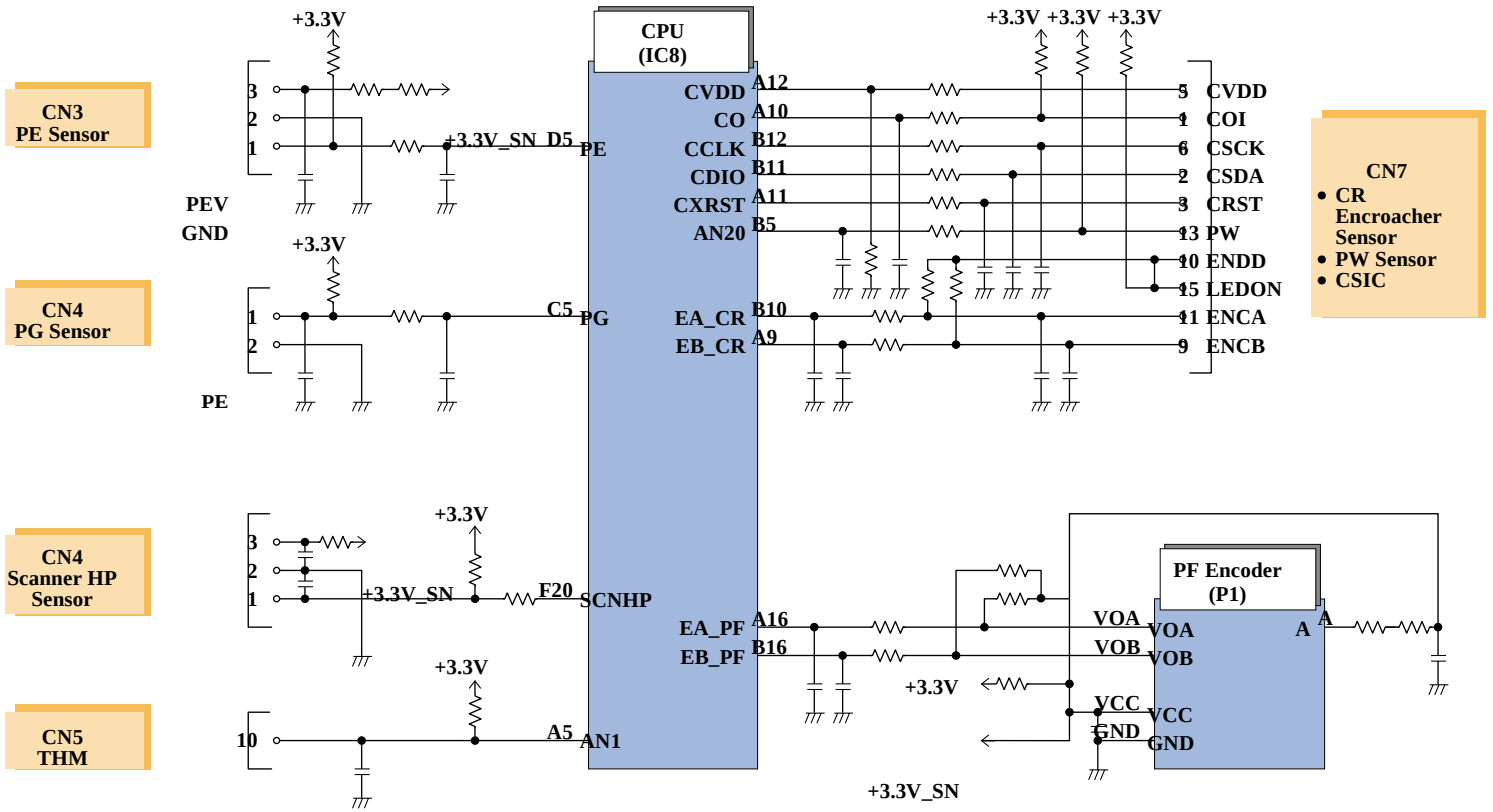


Figure 2-22. Sensor Circuit Diagram

CHAPTER

3

TROUBLESHOOTING

3.1 Overview

This chapter describes unit-level troubleshooting. Refer to the flowchart in this chapter to identify the defective unit and perform component level repair if necessary. This chapter also explains motor coil resistance, sensor specification and error indication.

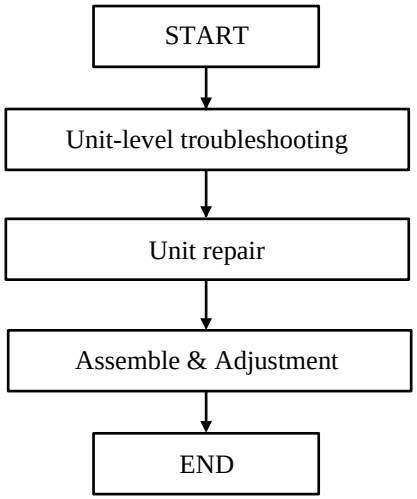


Figure 3-1. Troubleshooting flowchart

Table 3-1. Motor, coil resistance

Motor	Location	Check point	Resistance
Scanner motor	CN10	Pin 1 and 3 Pin 2 and 4	37Ω ± 7% (at 25°C / phase)

Note : Since CR Motor and PF Motor are DC motors, the resistance among the electric poles varies. Therefore, judge if it is normal or abnormal based on if there is operation of the motor or not; the resistance values cannot be used to judge the abnormality. However, it is difficult to judge accurately, if it is not clear, replace the motor.

Table 3-2. Sensor check point

Sensor name	Check point	Signal level	Switch mode
PE Sensor	CN3 / Pin 1 and 2	Less than 0.4V	Off: No paper
		More than 2.4V	On : Detect the paper
PG Sensor	CN4 / Pin 1 and 2	—	On : PG large Off: PG normal
Scanner HP Sensor	CN13 / Pin 1 and 2	—	On : Within Scanner Carriage home position Off: Out of Scanner Carriage home position

3.2 Error Indications and Fault Occurrence Causes

This section describes the LED indications, STM3 messages and fault occurrence causes at occurrence of the following errors during any sequence/operation (e.g. power-on sequence, paper feeding/loading sequence, ink sucking sequence).

NOTE: The explanations for STM3 of the Stylus CX3500/CX3600/CX3650 are the same as the Stylus CX4500/CX4600 completely except the followings.
1) SPC name (SPC: Scanner/Printer/Copier)
2) Figure of the SPC
3) T-code for each ink cartridge (refer to Table 1-13 *(p.18)**)*

Table 3-3. Error Indications and Fault Occurrence Causes

Printer Status			Communication error	Ink low	PG error	Index sheet error (Incorrect card)
Indi-cations	Power		—	—	—	—
	Error		—	—	Blink 2	Blink 2
	Ink		—	Blink	—	Off
	Memory Card (only for Stylus CX4500/CX4600)	1	—	—	—	—
		2	—	—	—	Blink 2
		3	—	—	—	—
	7-seg.		—	—	“H” blink 2	“4” blink 2
	Paper Type	1	—	—	—	—
		2	—	—	—	—
	Paper Size	1	—	—	—	—
		2	—	—	—	—
	Fit to Page		—	—	—	—
	Card Access		—	—	—	—
Status monitor 3 message					—	—
Fault Occurrence Cause			This error is detected when the SPC cannot communicate with the PC correctly.	This error is detected when the ink consumption amount reaches about 90%. Note : Even if this error is indicated on the STM3, you can continue the printing until I/C becomes Ink Out condition. However, the Head Cleaning operation cannot be done so that the remaining ink is low condition.	This error is generated by PG large condition and is detected at pressing of BW/Color Start Switch when about to use stand-alone printing. (The PG error is not generated when printing from a PC.)	This error is detected when the content of Index Sheet and content of Memory Card do not match. (Checksum does not match, etc.)

Note : “–” : Don’t care
Blink : 0.5sec. On + 0.5sec. Off repetition
Blink 2 : 0.2sec. On + 0.2sec. Off + 0.2sec. On + 0.4sec. Off repetition
Blink 3 : Blink on and off along with access to a memory card.
Fast blink : 0.2sec. On + 0.2sec. Off repetition
Slow blink : 2.0sec. On + 2.0sec. Off repetition

Note *1: When the setting is “On”.
*2: After finishing copying, the counter returns to the preset number of copies.

Table 3-3. Error Indications and Fault Occurrence Causes

Printer Status			Index sheet error (Incorrect marking)	Index sheet error (No index sheet)	Memory card error (Incompatible memory card)	Double feed
Indi-cations	Power		—	—	—	—
	Error		Blink 2	Blink 2	Blink 2	On
	Ink		Off	Off	Off	Off
	Memory Card (only for Stylus CX4500/CX4600)	1	—	—	Blink 2	—
		2	Blink 2	Blink 2	Blink 2	—
		3	—	—	Blink 2	—
	7-seg.		"3" blink 2	"2" blink 2	"1" blink 2	—
	Paper Type	1	—	—	—	—
		2	—	—	—	—
	Paper Size	1	—	—	—	—
		2	—	—	Off	—
	Fit to Page		—	—	Off	—
	Card Access		—	—	Off	—
Status monitor 3 message			—	—	—	
Fault Occurrence Cause			This error is detected when data does not conform to content of Index Sheet. (When mark is not set even though it must be selected.)	This error is detected when; • Index Sheet placement method is opposite. • There is no Index Sheet. • Index Sheet cannot be recognized.	This error is detected at pressing of Color Start Switch when a result for access to a memory card to be printed is outside the format of supported memory cards or when image data is not found. (This does not include situations when there is no memory card.)	This error is detected at resending of paper for double-sided printing when paper length is determined to be other than default value.

Note : "–" : Don't care
Blink : 0.5sec. On + 0.5sec. Off repetition
Blink 2 : 0.2sec. On + 0.2sec. Off + 0.2sec. On + 0.4sec. Off repetition
Blink 3 : Blink on and off along with access to a memory card.
Fast blink : 0.2sec. On + 0.2sec. Off repetition
Slow blink : 2.0sec. On + 2.0sec. Off repetition

Note *1: When the setting is "On".
*2: After finishing copying, the counter returns to the preset number of copies.

Table 3-3. Error Indications and Fault Occurrence Causes

Printer Status			Paper out	Ink out or No Ink cartridge	CSIC error	Incorrect I/C
Indi-cations	Power		—	—	—	—
	Error		On	Off	Off	Off
	Ink		Off	On	On	On
	Memory Card (only for Stylus CX4500/CX4600)	1	—	—	—	—
		2	—	—	—	—
		3	—	—	—	—
	7-seg.		—	—	—	—
	Paper Type	1	—	—	—	—
		2	—	—	—	—
	Paper Size	1	—	—	—	—
		2	—	—	—	—
	Fit to Page		—	—	—	—
	Card Access		—	—	—	—
Status monitor 3 message						
Fault Occurrence Cause			This error is detected when the top of a paper is not detected with the PE Sensor in the paper loading sequence.	This error is detected when; • The ink consumption amount reaches 100%. • The ink cartridge is defective. Note : The slight amount of the ink is remaining in the I/C even if the Ink Out error is detected. This is to prevent the Print Head nozzle from the printing operation without firing the ink.	This error is detected when data from CSIC cannot be read normally or when data cannot be written to CSIC.	This error is detected when; • An unsupported ink cartridge has been installed. • An ink cartridge with a different destination has been installed.

Note : "–" : Don't care
Blink : 0.5sec. On + 0.5sec. Off repetition
Blink 2 : 0.2sec. On + 0.2sec. Off + 0.2sec. On + 0.4sec. Off repetition
Blink 3 : Blink on and off along with access to a memory card.
Fast blink : 0.2sec. On + 0.2sec. Off repetition
Slow blink : 2.0sec. On + 2.0sec. Off repetition

Note *1: When the setting is "On".
*2: After finishing copying, the counter returns to the preset number of copies.

Table 3-3. Error Indications and Fault Occurrence Causes

Printer Status			Paper jam	Maintenance request	Fatal error (Mechanism)	Fatal error (System)
Indi-cations	Power		—	Blink	Blink	Fast blink
	Error		Blink	On	Blink	Fast blink
	Ink		Off	On	Blink	Fast blink
	Memory Card (only for Stylus CX4500/CX4600)	1	—	Blink	Blink	Fast blink
		2	—	Blink	Blink	Fast blink
		3	—	Blink	Blink	Fast blink
	7-seg.		—	“E” blink	“E” blink	Fast “E” blink
	Paper Type	1	—	Blink	Blink	Fast blink
		2	—	Blink	Blink	Fast blink
	Paper Size	1	—	Blink	Blink	Fast blink
		2	—	Blink	Blink	Fast blink
	Fit to Page		—	Blink	Blink	Fast blink
	Card Access		—	Blink	—	—
Status monitor 3 message						
Fault Occurrence Cause			This error is detected when the PE Sensor cannot properly detect the paper bottom edge during feeding of paper.	This error is detected when the Waste Ink Counter exceeds the preset counter value.	This error is detected when it is determined that the printer cannot operate properly. (CR error, PF error, etc.)	This error is detected when; • RAM is abnormal. • System is operating poorly.

Note : “–” : Don’t care
Blink : 0.5sec. On + 0.5sec. Off repetition
Blink 2 : 0.2sec. On + 0.2sec. Off + 0.2sec. On + 0.4sec. Off repetition
Blink 3 : Blink on and off along with access to a memory card.
Fast blink : 0.2sec. On + 0.2sec. Off repetition
Slow blink : 2.0sec. On + 2.0sec. Off repetition

Note *1: When the setting is “On”.
*2: After finishing copying, the counter returns to the preset number of copies.

3.3 Troubleshooting

You can identify the troubles by using the checklist in this section after confirming the LED indication on the SPC. If you connect the SPC to your PC and see an error message on the STM3, you can short the total repair time. And, when you find out the defective parts, replace them by referring the Chapter 4 “DISASSEMBLY AND ASSEMBLY”. The following tables describe the error check points.

Table 3-4. Check point for the communication error according to each phenomenon

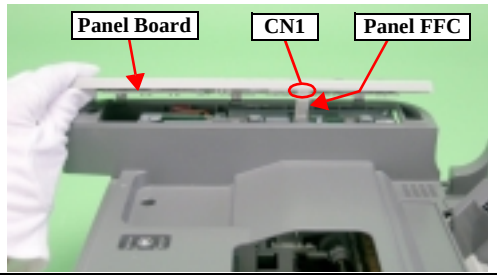
Occurrence timing CR position	Detailed phenomenon	Defective unit/part name	Check point	Remedy
• Power on • Anywhere	When turning on the power, the SPC does not operate at all.	Panel Unit	1. Check if the Panel FFC is connected to the CN1 on the Panel Board.  	1. Connect the Panel FFC to CN1 on the Panel Board.
			2. Check if the Panel FFC is not damaged.	2. Replace the Panel FFC with new one.
			3. Check if the Panel Board is not damaged.	3. Replace the Panel Board with new one.

Table 3-4. Check point for the communication error according to each phenomenon

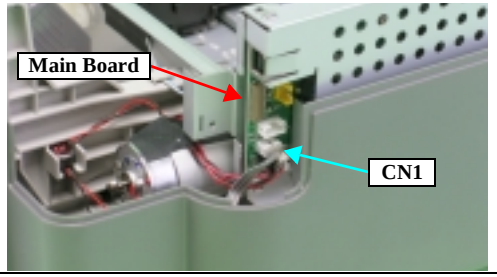
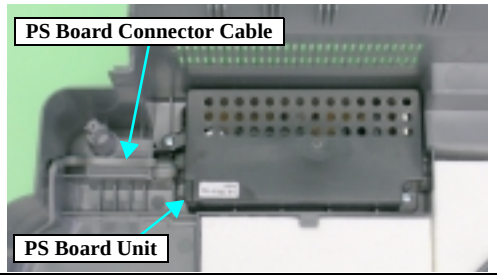
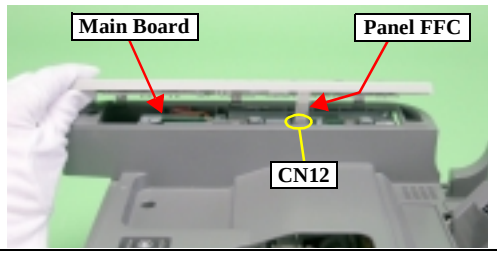
Occurrence timing CR position	Detailed phenomenon	Defective unit/part name	Check point	Remedy
• Power on • Anywhere	When turning on the power, the SPC does not operate at all.	PS Board Unit	1. Check if the PS Board Connector Cable is connected to the CN1 on the Main Board. 	1. Connect the PS Board Connector Cable to CN1 on the Main Board.
			2. Check if the PS Board Connector Cable/PS Board is not damaged. 	2. Replace the PS Board Unit with new one. * If the problem is not solved, replace the Main Board with new one.
• Operation • –	When turning on the power, the power on sequence is performed correctly. But, when any printer job is sent to the SPC, a communication error is indicated with STM3.	USB Cable	1. Check if the USB Cable is connected between the SPC and the PC.	1. Connect the USB Cable to the SPC and the PC.
		Main Board Unit	1. Check if an incorrect model name is not stored into the address of the EEPROM on the Main Board.	1. Use the Adjustment Program to write the correct value to the EEPROM address.
			2. Check if the Panel FFC is connected to the CN12 on the Main Board. 	2. Connect the Panel FFC to the CN12 on the Main Board.

Table 3-5. Check point for the error before the initial ink charge according to each phenomenon

Occurrence timing CR position	Detailed phenomenon	Defective unit/part name	Check point	Remedy
• Power on • Inside HP	The SPC does not perform the initial ink charge and an error is indicated with LEDs and STM3.	Ink Cartridge	1. Check if the Ink Cartridge can be used by installing it to other SPC.	1. Replace the Ink Cartridge with a brand-new one.
		Main Board	1. Check if an incorrect data is not stored into the address of the EEPROM on the Main Board.	1. Set the proper destination by using Adjustment Program.
• Power on • Anywhere	The SPC does not perform the ink replacement CL and an error is indicated with LEDs and STM3.	Ink Cartridge	1. Check if the Ink Cartridge can be used by installing it to other SPC.	1. Replace the Ink Cartridge with a brand-new one.
	The SPC does not perform the printing operation and an error is indicated with LEDs and STM3.	Ink Cartridge	1. Check if the ink is remaining in the Ink Cartridge.	1. Replace the Ink Cartridge with a brand-new one.
			2. Check if the Ink Cartridge can be used by installing it to other SPC.	2. Replace the Ink Cartridge with a brand-new one.

Table 3-6. Check point for the PG error according to each phenomenon

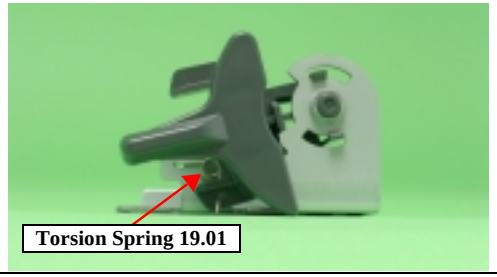
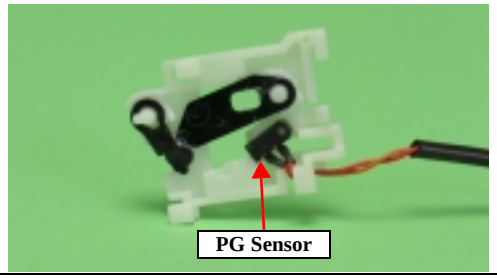
Occurrence timing CR position	Detailed phenomenon	Defective unit/part name	Check point	Remedy
• Operation • –	This error is generated when using stand-alone copy.	Torsion Spring 19.01	1. Check if the Torsion Spring 19.01 is properly installed.  	1. Properly install the Torsion Spring 19.01. * Only when the Torsion Spring 19.01 comes off while the PG lever is set to “H” position.
		PG Sensor	1. Check if the PG Sensor is not damaged.  	1. Replace the PG Sensor with a new one.
		Main Board	1. Check if the Main Board is not damaged.	1. Replace the Main Board with a new one.

Table 3-7. Check point for the Index Sheet error (incorrect card) according to each phenomenon

Occurrence timing CR position	Detailed phenomenon	Defective unit/part name	Check point	Remedy
• Operation • –	This error is generated when attempting to print from Index Sheet.	Index Sheet	1. Check if the Index Sheet was printed from an inserted Memory Card.	1. Switch to Index Sheet printed from an inserted Memory Card.
		Memory Card	1. Check if the Memory Card storing the Index Sheet data is inserted.	1. Insert Memory Card storing the Index Sheet data.
			2. Check if the Memory Card is not damaged.	2. Replace the Memory Card with a new one.

Table 3-8. Check point for the Index Sheet error (incorrect marking) according to each phenomenon

Occurrence timing CR position	Detailed phenomenon	Defective unit/part name	Check point	Remedy
• Operation • –	This error is generated when attempting to print from Index Sheet.	Index Sheet	1. Check if mark of Index Sheet has been properly covered over.	1. Properly cover over mark.

Table 3-9. Check point for the Index Sheet error (No index sheet) according to each phenomenon

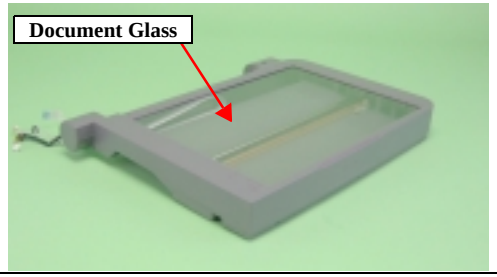
Occurrence timing CR position	Detailed phenomenon	Defective unit/part name	Check point	Remedy
• Operation • –	This error is generated when attempting to print from Index Sheet.	Index Sheet	1. Check if the Index Sheet is set in the wrong way.	1. Set the Index Sheet correctly.
			2. Check if the Index Sheet standard position is not clean.	2. Reprint the Index Sheet.
		Document Cover	1. Check if the Document Cover is not open.	1. Close the Document Cover.
		Scanner Housing Upper	1. Check if the Document Glass is not clean. 	1. Clean the Document Glass.

Table 3-10. Check point for the Memory Card error according to each phenomenon

Occurrence timing CR position	Detailed phenomenon	Defective unit/part name	Check point	Remedy
• Operation • –	The Memory Card is unrecognized and an error is displayed.	Memory Card	1. Check if the Memory Card is acceptable.	1. Replace the Memory Card with an acceptable one.
			2. Check if the Memory Card is not damaged.	2. Replace the Memory Card with a new one.
		Main Board Unit	1. Check if the Memory Card slot pins on the Main Board is not bended.	1. Change the Main Board Unit with a new one.

Table 3-11. Check point for the Double feed error according to each phenomenon

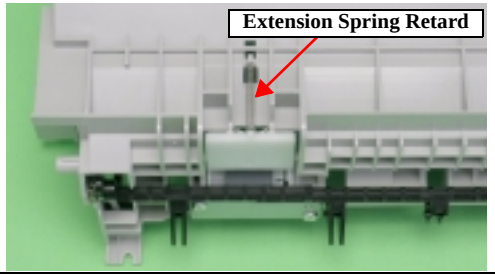
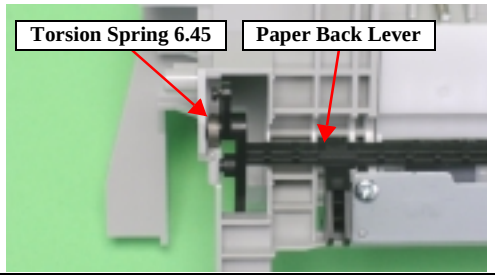
Occurrence timing CR position	Detailed phenomenon	Defective unit/part name	Check point	Remedy
• Operation • –	After both surfaces were printed, the paper was ejected but an error is displayed.	ASF Unit	1. Check if the Extension Spring Retard operates correctly in the paper loading sequence.  	1. Set the Extension Spring Retard between the Retard Roller Unit and the ASF Frame.
			2. Check if the Paper Back Lever operates correctly in the paper loading sequence.  	2. Set the Torsion Spring 6.45 between the ASF Frame and the Paper Back Lever.

Table 3-12. Check point for the paper out error according to each phenomenon

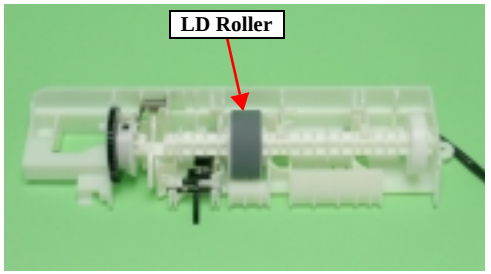
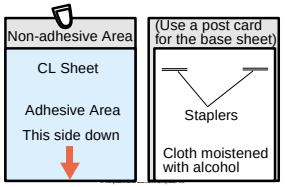
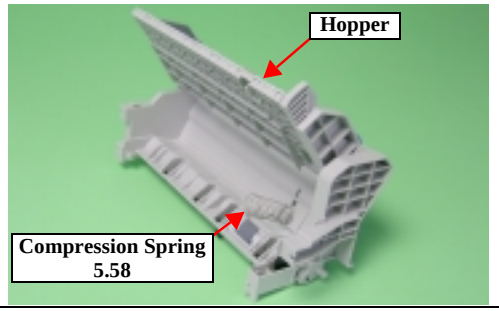
Occurrence timing CR position	Detailed phenomenon	Defective unit/part name	Check point	Remedy
• Operation • –	The LD Roller cannot pick up paper although the LD Roller attempt to rotate correctly.	Holder Shaft Unit	1. Check if any paper dust is not adhered to the surface of the LD Roller.  	1. Set a cleaning sheet in the ASF Unit up side down. Then holding the top edge, try to load the paper from the Printer driver. The micro pearl on the LD Roller surface is removed. To remove severe smear, staple a cloth moistened with alcohol to a post card and clean the roller in the same manner. 
• Operation • –	The Hopper does not operate during the paper loading sequence although the LD Roller rotates to load paper from the ASF Unit.	ASF Unit	1. Check if the Hopper operates correctly in the paper loading sequence.  	1. Reassemble the Compression Spring 5.58 between the ASF Frame and the Hopper.

Table 3-12. Check point for the paper out error according to each phenomenon

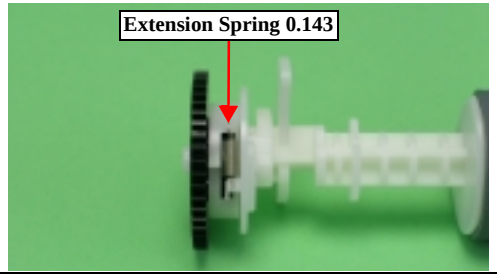
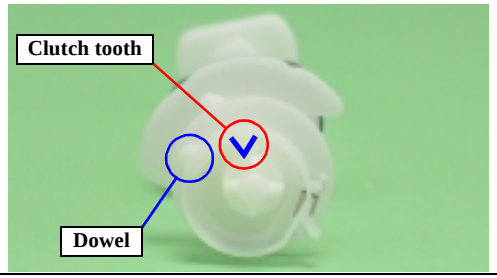
Occurrence timing CR position	Detailed phenomenon	Defective unit/part name	Check point	Remedy
• Operation • –	The drive of the PF Motor is not transmitted to the LD Roller Shaft.	Holder Shaft Unit	1. Check if the Extension Spring 0.143 does not come off in the Clutch mechanism.  	1. Reassemble the Extension Spring 0.143 in the Clutch mechanism.
			2. Check if the Clutch does not come off from the dowel of the LD Roller Shaft.  	2. Reassemble the round portion of the Clutch on the dowel of the LD Roller Shaft.
			3. Check if the Clutch tooth is not damaged.	3. Replace the Holder Shaft Unit with a new one.
			4. Check if the Clutch is not damaged.	4. Replace the Holder Shaft Unit with a new one.

Table 3-12. Check point for the paper out error according to each phenomenon

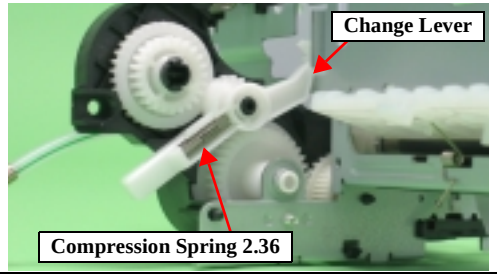
Occurrence timing CR position	Detailed phenomenon	Defective unit/part name	Check point	Remedy
• Operation • –	The drive of the PF Motor is not transmitted to the LD Roller Shaft.	Ink System Unit	1. Check if the Compression Spring 2.36 does not come off in the Change Lever.  	1. Replace the Ink System Unit with a new one.
• Operation • –	The LD Roller is not set to the ASF home position and paper is always loaded from the ASF Unit during the paper loading sequence.	Ink System Unit	1. Check if the tip of the Change Lever is not damaged.	1. Replace the Ink System Unit with a new one.

Table 3-13. Check point for the No ink cartridge/CSIC error/Incorrect ink cartridge according to each phenomenon

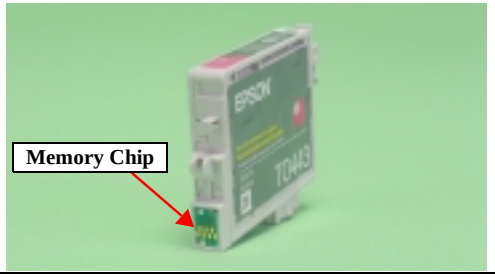
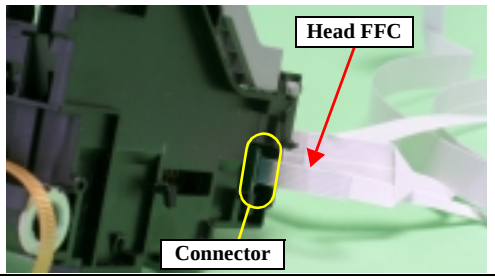
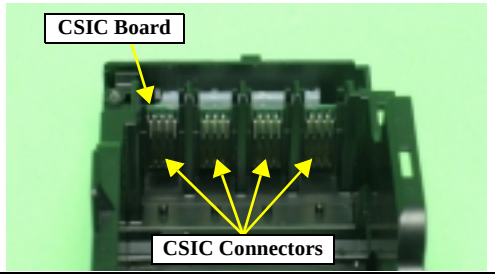
Occurrence timing CR position	Detailed phenomenon	Defective unit/part name	Check point	Remedy
• Power on • Inside HP	After the Carriage has detected the HP, an error is displayed.	Ink Cartridge	1. Check if Ink Cartridge is properly installed.	1. Install the Ink Cartridge properly.
			2. Check if the Memory Chip is not disconnected or not chipped. 	2. Replace the Ink Cartridge with a new one.
		CSIC Board	1. Check if the Head FFC is connected to connector on the CSIC Board. 	1. Connect the Head FFC to connector on the CSIC Board.
			2. Check if the CSIC Board is not damaged.	2. Replace the Carriage Unit with a new one.
		CSIC Connector	3. Check if the CSIC Connector is not damaged. 	1. Replace the Carriage Unit with a new one.

Table 3-14. Check point for the paper jam error according to each phenomenon

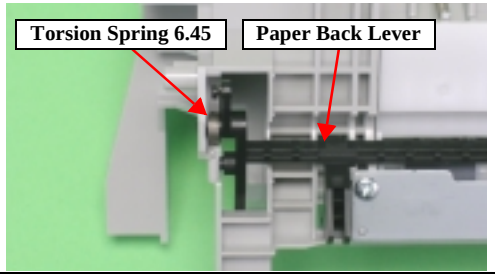
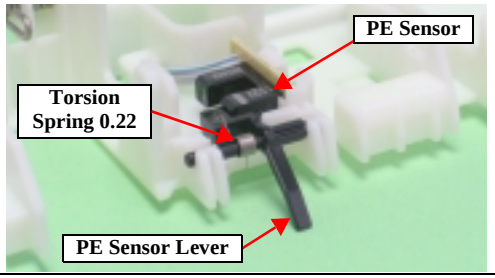
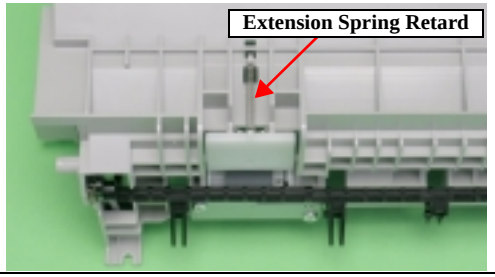
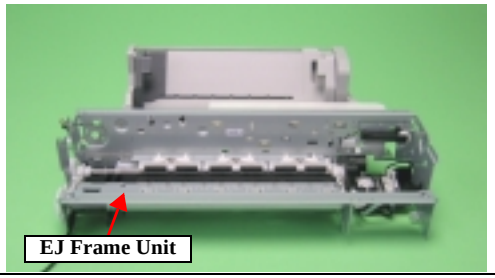
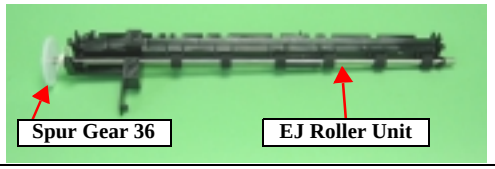
Occurrence timing CR position	Detailed phenomenon	Defective unit/part name	Check point	Remedy
• Operation • Outside HP	The paper feeding sequence is performed without loading paper in the paper loading sequence.	ASF Unit	1. Check if the ASF Unit is properly installed.	1. Install the ASF Unit properly.
			2. Check if the Paper Back Lever operates correctly in the paper loading sequence.  	2. Set the Torsion Spring 6.45 between the ASF Frame and the Paper Back Lever.
		Holder Shaft Unit	1. Check if the Torsion Spring 0.22 is properly installed.  	1. Set the Torsion Spring 0.22 between the Holder Shaft and the PE Sensor Lever.

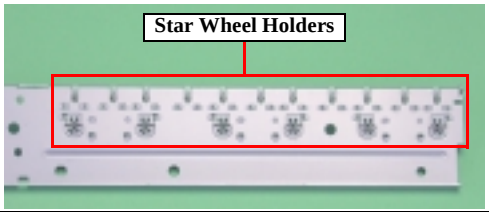
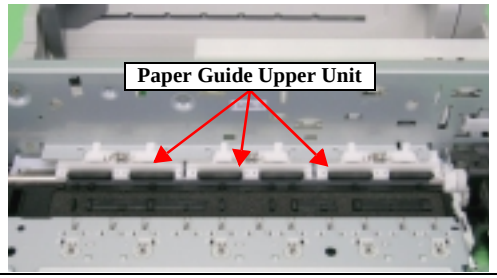
Table 3-14. Check point for the paper jam error according to each phenomenon

Occurrence timing CR position	Detailed phenomenon	Defective unit/part name	Check point	Remedy
• Operation • Outside HP	Paper is being resent during paper feeding operation.	ASF Unit	1. Check if the Extension Spring Retard operates correctly in the paper loading sequence. 	1. Set the Extension Spring Retard between the Retard Roller Unit and the ASF Frame.
	When turning on the power, the Carriage Unit move to the home position correctly. But, the paper feeding sequence is performed without loading paper in the paper loading sequence.	Holder Shaft Unit*	1. Check if the Torsion Spring 0.22 is properly installed.	1. Set the Torsion Spring 0.22 between the Holder Shaft and the PE Sensor Lever.
• Operation • –	The leading edge of paper does not go through between the EJ Roller Unit and the Star Wheel.	EJ Frame Unit**	1. Check if the EJ Frame Unit is correctly assembled. 	1. Reassemble the EJ Frame Unit correctly.
			2. Check if the EJ Roller Unit is correctly assembled. 	2. Reassemble the EJ Roller Unit correctly.

* The Carriage Unit can move to home position even if the Torsion Spring 0.22 comes off. However, the PE Sensor Lever keeps the high signal condition in the next operation. Therefore, the paper jam error is detected.

** In case that the paper jam error occurs in each operation, the jammed paper contacts the nozzle surface of the Print Head and the Print Head may be damaged.

Table 3-14. Check point for the paper jam error according to each phenomenon

Occurrence timing CR position	Detailed phenomenon	Defective unit/part name	Check point	Remedy
• Operation • –	The leading edge of paper does not go through between the EJ Roller Unit and the Star Wheel.	EJ Frame Unit**	3. Check if the Star Wheel Holders does not come off. 	3. Reassemble the Star Wheel Holders correctly.
			4. Check if the Spur Gear 36 is not damaged.	4. Replace the EJ Frame Unit with a new one.
	The leading edge of paper is not loaded to the PF Roller Unit.	Paper Guide Upper Unit **	1. Check if the Paper Guide Upper Unit is correctly assembled. 	1. Reassemble the Paper Guide Upper Unit to the Main Frame correctly.

* The Carriage Unit can move to home position even if the Torsion Spring 0.22 comes off. However, the PE Sensor Lever keeps the high signal condition in the next operation. Therefore, the paper jam error is detected.

** In case that the paper jam error occurs in each operation, the jammed paper contacts the nozzle surface of the Print Head and the Print Head may be damaged.

Table 3-15. Check point for the Fatal error according to each phenomenon

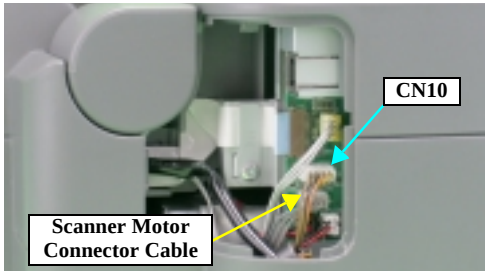
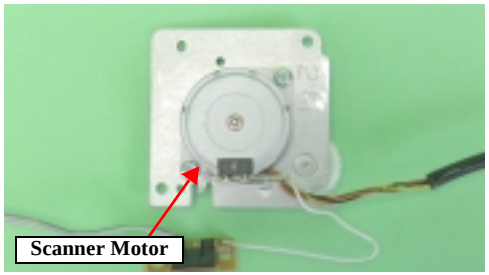
Occurrence timing CR position	Detailed phenomenon	Defective unit/part name	Check point	Remedy
• Power on • Anywhere	The Scanner Unit does not initialize when the power is turned on.	Scanner Motor	1. Check if the Scanner Motor Connector Cable is connected to CN10 on the Main Board.  	1. Connect the Scanner Motor Connector Cable to CN10 on the Main Board.
			2. Check if the coil resistance of the Scanner Motor is about 37Ω by using the tester *(refer to Table 3-1)*.  	2. Replace the Scanner Motor with a new one.
			3. Check if the Scanner Motor Connector Cable is not damaged.	3. Replace the Scanner Motor with a new one.

Table 3-15. Check point for the Fatal error according to each phenomenon

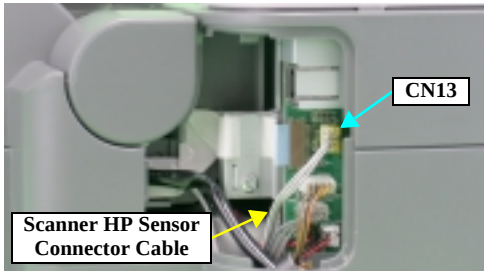
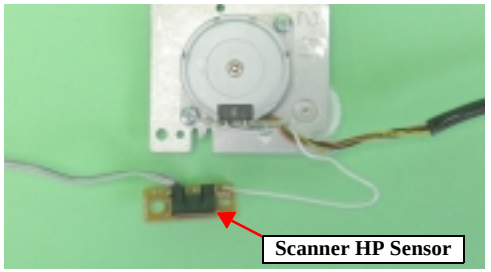
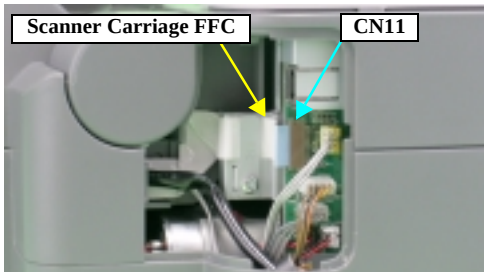
Occurrence timing CR position	Detailed phenomenon	Defective unit/part name	Check point	Remedy
• Power on • Anywhere	The Scanner Unit does not initialize when the power is turned on.	Scanner HP Sensor	1. Check if the Scanner HP Sensor Connector Cable is connected to CN13 on the Main Board.  	1. Connect the Scanner HP Sensor Connector Cable to CN13 on the Main Board.
			2. Check if the Scanner HP Sensor Connector Cable is not damaged.	2. Replace the Scanner HP Sensor with a new one.
			3. Check if the Scanner HP Sensor is not damaged.  	3. Replace the Scanner HP Sensor with a new one.
		Scanner Carriage FFC	1. Check if the Scanner Carriage FFC is connected to CN11 on the Main Board.  	1. Connect the Scanner Carriage FFC to CN11 on the Main Board.
			2. Check if the Scanner Carriage FFC is not damaged.	2. Replace the Scanner Carriage FFC with a new one.

Table 3-15. Check point for the Fatal error according to each phenomenon

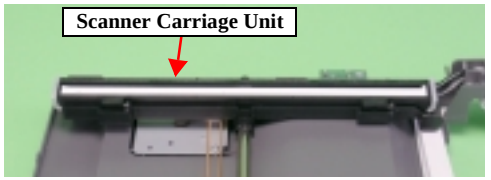
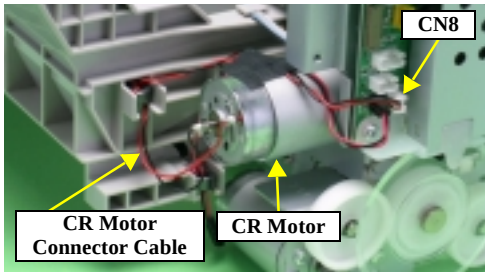
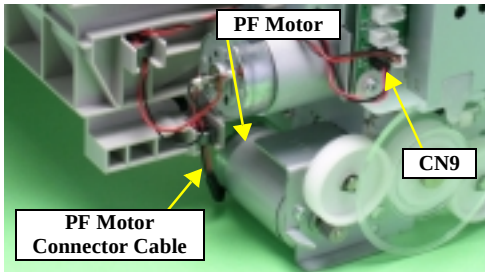
Occurrence timing CR position	Detailed phenomenon	Defective unit/part name	Check point	Remedy
• Power on • Anywhere	The Scanner Unit does not initialize when the power is turned on.	Scanner Carriage Unit	1. Check if the Scanner Carriage Unit is not damaged. 	1. Replace the Scanner Carriage Unit with a new one.
• Power on • Anywhere	When turning on the power, the CR Motor does not operate at all.	CR Motor	1. Check if the CR Motor Connector Cable is connected to CN8 on the Main Board. 	1. Connect the CR Motor Connector Cable to CN8 on the Main Board.
			2. Check if the CR Motor Connector Cable is not damaged.	2. Replace the CR Motor with a new one.
			3. Check if the CR Motor operates.	3. Replace the CR Motor with a new one.
	When turning on the power, the PF Motor does not operate at all.	PF Motor	1. Check if the PF Motor Connector Cable is connected to CN9 on the Main Board. 	1. Connect the PF Motor Connector Cable to CN9 on the Main Board.
			2. Check if the PF Motor Connector Cable is not damaged.	2. Replace the PF Motor with a new one.
			3. Check if the PF Motor operates.	3. Replace the PF Motor with a new one.

Table 3-15. Check point for the Fatal error according to each phenomenon

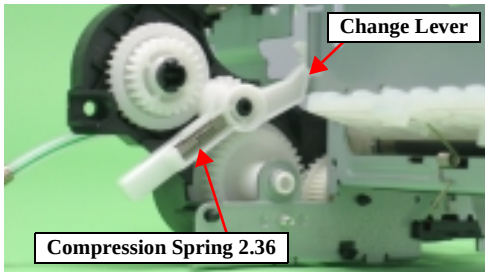
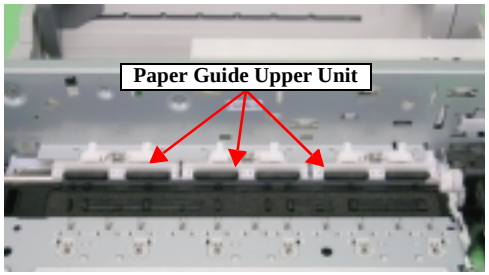
Occurrence timing CR position	Detailed phenomenon	Defective unit/part name	Check point	Remedy
• Power on • Anywhere	When turning on the power, the Carriage Unit collides to the Change Lever located to the front side of the printer.	PF Motor	1. Check if the PF Motor Connector Cable is connected to CN9 on the Main Board.	1. Connect the PF Motor Connector Cable to CN9 on the Main Board.
			2. Check if the PF Motor Connector Cable is not damaged.	2. Replace the PF Motor with a new one.
			3. Check if the PF Motor operates.	3. Replace the PF Motor with a new one.
		Ink System Unit	1. Check if the Compression Spring 2.36 does not come off in the Change Lever.  	1. Replace the Ink System Unit with a new one.
• Power on • Anywhere	The Carriage Unit collides with the Guide Upper Unit when power is turned on.	Paper Guide Upper Unit	1. Check if the Paper Guide Upper Unit is correctly assembled.  	1. Reassemble the Paper Guide Upper Unit to the Main Frame correctly.

Table 3-15. Check point for the Fatal error according to each phenomenon

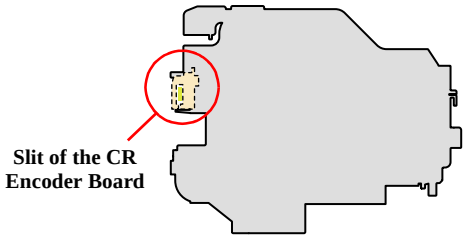
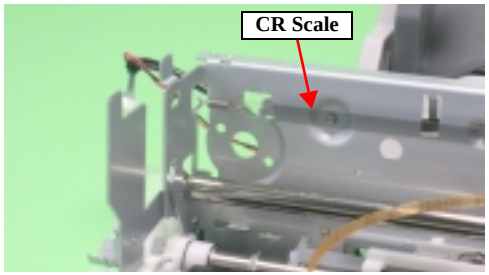
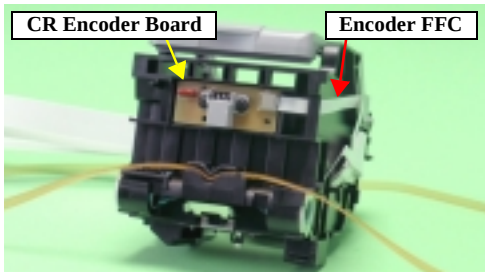
Occurrence timing CR position	Detailed phenomenon	Defective unit/part name	Check point	Remedy
• Power on • Anywhere	When turning on the power, the Carriage Unit collides to the right side of the Main Frame.	CR Scale	1. Check if the CR Scale does not come off or it properly passes through the slit of the CR Encoder Board.  	1. Reassemble the CR Scale correctly. * If the problem is not solved, replace the Main Board with a new one.
			2. Check if the CR Scale is not damaged or contaminated.  	2. Replace the CR Scale with a new one or clean it completely.
		CR Encoder Board	1. Check if the Encoder FFC is connected to the CR Encoder Board.  	1. Connect the Encoder FFC to the CR Encoder Board.
			2. Check if the Encoder FFC is not damaged.	2. Replace the Encoder FFC with a new one.
			3. Check if the CR Encoder Board is not damaged.	3. Replace the CR Encoder Board with a new one.

Table 3-15. Check point for the Fatal error according to each phenomenon

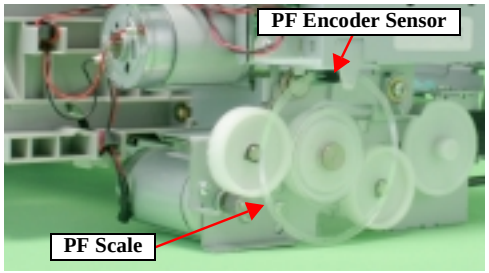
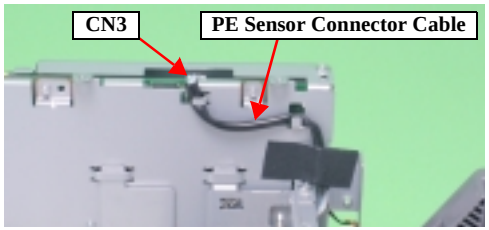
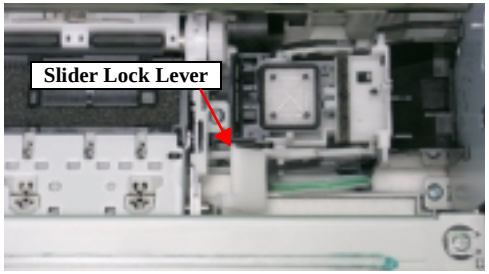
Occurrence timing CR position	Detailed phenomenon	Defective unit/part name	Check point	Remedy
• Power on • Anywhere	The eject rollers are rotating at high speed when power is turned on. (For about 1 cycle.)	PF Scale / Main Board Unit	1. Check if the PF Scale is not damaged or contaminated.  	1. Replace the PF Scale with a new one.
			2. Check if the PF Encoder Sensor is not damaged.	2. Replace the Main Board Unit with a new one.
• Operation • Anywhere	The Scanner Carriage Unit does not operate.	Scanner Carriage Shaft	1. Check if the grease is enough on the surface of the Scanner Carriage Shaft.	1. After wiping the grease on the Scanner Carriage Shaft with a dry, soft cloth, coat it with grease (G-26 Grease). (Refer to Chapter 6 “MAINTENANCE”.)
			2. Check if the Scanner Carriage Shaft is set correctly.	2. Reassemble the Scanner Carriage Shaft to the Scanner Carriage Unit.
• Operation • Anywhere	The paper feeding sequence is performed without loading a paper in the paper loading sequence.	Holder Shaft Unit	1. Check if the PE Sensor Connector Cable is connected to CN3 on the Main Board.  	1. Connect the PE Sensor Connector Cable to CN3 on the Main Board.
			2. Check if the PE Sensor Connector Cable is not damaged.	2. Replace the PE Sensor with a new one.
			3. Check if the PE Sensor is not damaged.	3. Replace the PE Sensor with a new one.

Table 3-15. Check point for the Fatal error according to each phenomenon

Occurrence timing CR position	Detailed phenomenon	Defective unit/part name	Check point	Remedy
• Operation • Anywhere	The Carriage Unit climbs over the Slider Lock Lever set to the wiping position and the Carriage Unit collides to its lever.	Front Frame	1. Check if the Slider Lock Lever is correctly released by the CR movement. 	1. Replace the Front Frame with a new one.
		Main Frame	1. Check if the Slider Lock Lever is correctly released by the CR movement.	1. Replace the Printer Mechanism with a new one.

3.3.1 Superficial Phenomenon-Based Troubleshooting

This section explains the fault locations of the error states (print quality and abnormal noise) other than the error states (LED and STM3) in the previous section.

Table 3-16. Check point for multiple sheets of paper are always loaded without LEDs and STM3

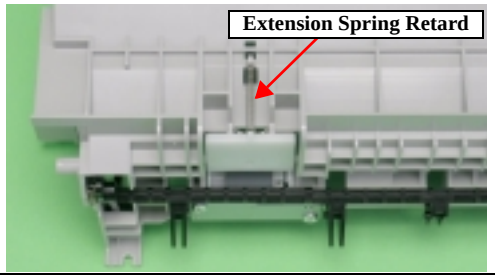
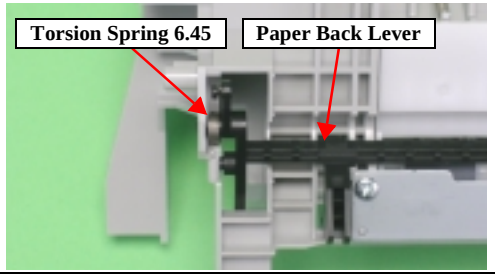
Occurrence timing CR position	Detailed phenomenon	Defective unit/part name	Check point	Remedy
• Operation • –	The LEDs and STM3 are not indicating error conditions. But, multiple sheets of paper are always loaded from the ASF Unit.	ASF Unit	1. Check if the Extension Spring Retard operates correctly in the paper loading sequence.  	1. Set the Extension Spring Retard between the Retard Roller Unit and the ASF Frame.
			2. Check if the Paper Back Lever operates correctly in the paper loading sequence.  	2. Set the Torsion Spring 6.45 between the ASF Frame and the Paper Back Lever.

Table 3-17. Check point for the abnormal noise

Occurrence timing CR position	Detailed phenomenon	Defective unit/part name	Check point	Remedy
• Anywhen • Anywhere	The abnormal noise occurs at the first power on timing and during each operation although the printing operation is performed.	Carriage Unit	1. Check if the grease on the Carriage Guide Shaft is sufficient.	1. Wipe off the remaining grease on the Carriage Guide Shaft and lubricate it on its shaft.
		Front Frame	1. Check if the grease on the Front Frame is sufficient.	1. Wipe off the remaining grease on the Front Frame and lubricate it on its frame.
		Ink System Unit	1. Check if the Change Lever moves smoothly.	1. Replace the Ink System Unit with a new one.
	The bottom of the Carriage Unit contacts the surface of the EJ Frame Unit.	EJ Frame Unit	1. Check if the EJ Frame Unit is not bent up.	1. Replace the EJ Frame Unit with a new one.
	The Carriage Unit collides to the Paper Guide Upper Unit during each operation.	Paper Guide Upper Unit	1. Check if the Paper Guide Upper Unit is attached securely. (check if it interferes with the Carriage Unit)	1. Reassemble the Paper Guide Upper to the Main Frame.

Table 3-18. Check point for poor scanned image quality

Scanned image Quality State	Detailed phenomenon	Defective unit/part name	Check point	Remedy
• Scanned image is not clear.	There are dusts on the Document Glass. (white dots appear on the scanned image)	Scanner Housing Upper	1. Check if there is not any dust on the Document Glass.	1. Remove the extraneous matter from the Document Glass. (Refer to the Chapter 6 “MAINTENANCE”.)
	There are dusts on the LED in the Rod Lens Array. (vertical stripes appear on the scanned image)	Scanner Carriage Unit	1. Check if there is not any dust on the LED.	1. Remove the extraneous matter from the Document Glass (blow away the dusts).
	The LED of Scanner Carriage Unit does not light up.	Scanner Carriage Unit	1. Check if the LED lights up.	1. Replace the Scanner Carriage Unit with new one.

Table 3-19. Check point for the poor printing quality

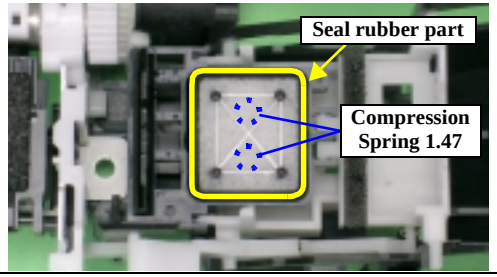
Print Quality State	Detailed phenomenon	Defective unit/part name	Check point	Remedy
• Dot missing and mixed colors	Ink is scarcely ejected to the Cap from the Print Head.	Ink System Unit (Cap Unit)	1. Check if there is not any foreign material/damage around the seal rubber part on the Cap Unit. 	1. Remove the foreign material around the seal rubber parts carefully.
			2. Check if the Compression Spring 1.47 is correctly mounted on the Cap Unit.	2. Replace the Ink System Unit with a new one.
	Ink is ejected to the Cap from the Print Head, but the SPC does not recover from the error after cleaning or ink change.	Print Head	1. Check if it returns to normal by performing CL operation or replacing the Ink Cartridge.	1. Perform CL operation and the Ink Cartridge replacement specified times. If it doesn't work, change the Print Head with a new one.
			2. Check if the Print Head is not damaged.	2. Replace the Print Head with a new one.
		Cleaner Blade	1. Check if the Cleaner Blade does not have paper dust or bending.	1. Replace Ink System Unit with a new one.
		Main Board	1. Check if the Main Board is not damaged.	1. Replace the Main Board with a new one.

Table 3-19. Check point for the poor printing quality

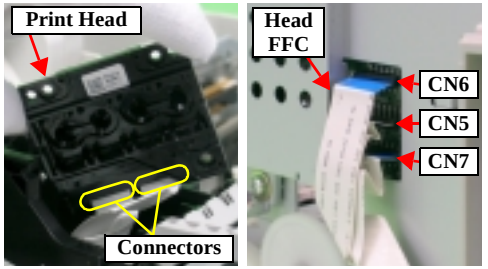
Print Quality State	Detailed phenomenon	Defective unit/part name	Check point	Remedy
• White streak / abnormal discharge	Ink is ejected to the Cap from the Print Head, but printing is not done at all after cleaning or ink change, or abnormal discharge occurs.	Head FFC	1. Check if the Head FFC is securely connected to the Print Head Connectors and the Main Board Connectors (CN5, CN6, CN7). 	1. Connect the Head FFC to the Print Head and the Main Board Connectors.
			2. Check if the Head FFC is not damaged.	2. Replace the Head FFC with a new one.
		Print Head	1. Check if it returns to normal by performing CL operation or replacing the Ink Cartridge.	1. Perform CL operation and the Ink Cartridge replacement specified times. If it doesn't work, change the Print Head with a new one.
		Main Board Unit	1. Check if the Main Board is not damaged.	1. Replace the Main Board Unit with a new one.

Table 3-19. Check point for the poor printing quality

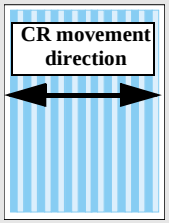
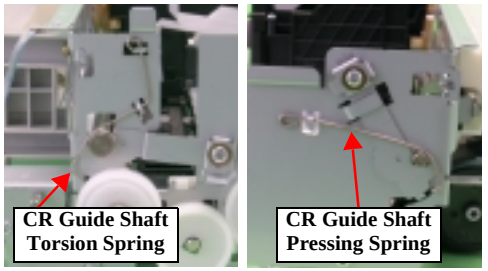
Print Quality State	Detailed phenomenon	Defective unit/part name	Check point	Remedy
• White streak/ color unevenness occurrence	Vertical banding appears against the CR movement direction. And, it looks like uneven printing.  [Note] If the problem is not solved, replace the CR Motor with a new one.	Adjustment	1. For printing in the Bi-D mode, check if Bi-D Adjustment has been performed properly.	1. Perform Bi-D Adjustment to eliminate displacements between the upper and lower rules. (Refer to Chapter 5 “ADJUSTMENT”.)
		Print Head	1. Check if each segment is printed correctly in the Nozzle Check Pattern.	1. Perform Head Cleaning and check the Nozzle Check Pattern. (Refer to Chapter 5 “ADJUSTMENT”.) If the problem is not solved, replace the Print Head with a new one.
		Carriage Unit / Carriage Guide Shaft	1. Check if there is not any foreign material on the surface of the Carriage Guide Shaft.	1. Remove foreign objects from surface of the Carriage Guide Shaft.
			2. Check if the Carriage Guide Shaft is properly secured to Main Frame by the CR Guide Shaft Torsion Spring and the CR Guide Shaft Pressing Spring.  	2. Reassemble the Carriage Guide Shaft correctly.
			3. Check if the grease is enough on the surface of the Carriage Guide Shaft.	3. After wiping the grease on the Carriage Guide Shaft and the Carriage with a dry, soft cloth, coat it with grease (KEN Grease). (Refer to Chapter 6 “MAINTENANCE”.)
			4. Check if any damage is not observed on the surface of the Carriage Guide Shaft.	4. Replace the Carriage Guide Shaft with a new one.
		Front Frame	1. Check if there is not any foreign material on the surface of the Front Frame.	1. Remove foreign matter from the Front Frame.
			2. Check if the Front Frame is lubricated with enough grease.	2. After wiping the grease on the Front Frame with a dry, soft cloth, coat it with grease (KEN Grease). (Refer to Chapter 6 “MAINTENANCE”.)
			3. Check if the Front Frame has not been deformed.	3. Replace the Front Frame with a new one.

Table 3-19. Check point for the poor printing quality

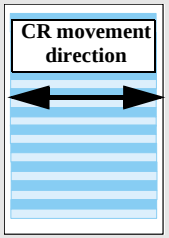
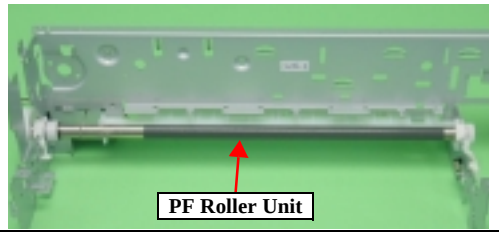
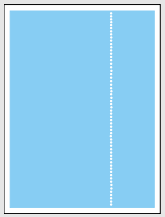
Print Quality State	Detailed phenomenon	Defective unit/part name	Check point	Remedy
• White streak/ color unevenness occurrence	Micro banding appears horizontally against the CR movement direction and it appears with the same width.  [Note] If the problem is not solved, replace the PF Motor with a new one.	Printer driver & exclusive paper	1. Check if the suitable paper is used according to the printer driver setting.	1. Use the suitable paper according to the printer driver setting.
		Print Head	1. Check if each segment is printed correctly in the Nozzle Check Pattern.	1. Perform the Head Cleaning and check the Nozzle Check Pattern. (Refer to Chapter 5 “ADJUSTMENT”.) If the problem is not solved, replace the Print Head with a new one.
		PF Roller Unit	1. Check if there is not any foreign material on the surface of the PF Roller Unit. 	1. Clean the surface of the PF Roller Unit carefully with the soft cloth.
			2. Check if the PF Roller Unit is not damaged.	2. Replace the PF Roller Unit with a new one.
	The Star wheel mark against the CR movement direction. 	EJ Frame Unit	1. Check if the Star Wheel Holder does not come off.	1. Reassemble the Star Wheel Holder correctly.
			2. Check if the surface of the EJ Frame Unit is flat.	2. Replace the EJ Frame Unit with a new one.
	Printing is blurred.	Printer driver & exclusive paper	1. Check if the suitable paper is used according to the printer driver setting.	1. Use the suitable paper according to the printer driver setting.
		Print Head	1. Check if the correct Head ID is stored into the EEPROM by using the Adjustment Program.	1. Input 13 digits code of the Head ID into the EEPROM by using the Adjustment Program.

Table 3-19. Check point for the poor printing quality

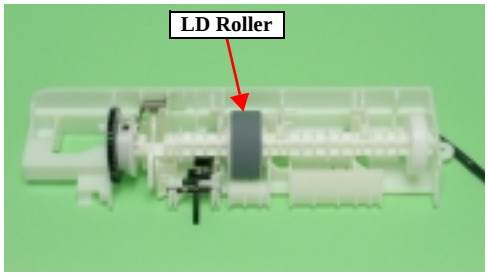
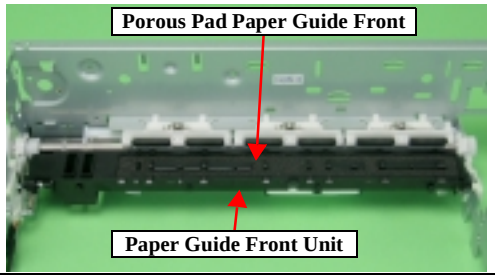
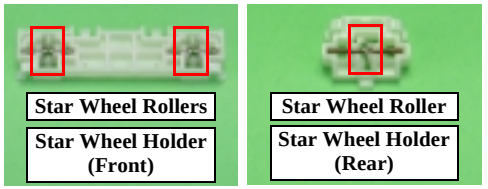
Print Quality State	Detailed phenomenon	Defective unit/part name	Check point	Remedy
• Print start position slip	The printing operation is correctly performed. But, the top margin is insufficient than usual one.	Holder Shaft Unit	1. Check if any paper dust is not adhered to the surface of the LD Roller. 	1. Set a cleaning sheet in the ASF up side down. Then holding the top edge, try to load the paper from the Printer driver. The micro pearl on the LD Roller surface is removed. To remove severe smear, staple a cloth moistened with alcohol to a post card and clean the roller in the same manner. As for the cleaning sheet, refer to page 91 “Remedy of the Paper out error” * If the problem is not solved, replace the Holder Shaft Unit with a new one.
• Ink stain of paper	Ink stain occurs at the back, top end or bottom end of the print paper.	Paper Guide Front Unit	1. Check if the Paper Guide Front Unit does not have the ink stain. 	1. Clean the Paper Guide Front Unit with a soft cloth.
			2. Check if heaps of ink are not formed on Porous Pad Paper Guide Front.	2. Replace the Paper Guide Front Unit with a new one.
		EJ Frame Unit	1. Check if the EJ Roller Unit does not have the ink stain.	1. Clean the EJ Roller Unit with a soft cloth.
		PF Roller Unit	1. Check if the PF Roller Unit does not have the ink stain.	1. Clean the PF Roller Unit with a soft cloth.

Table 3-19. Check point for the poor printing quality

Print Quality State	Detailed phenomenon	Defective unit/part name	Check point	Remedy
• Ink stain of paper	Ink sticks to other than the print area of the paper, resulting in contamination	Print Head	1. Check if the Print Head Cover does not have the ink drop.	1. Clean the Print Head Cover carefully with a soft cloth.
		Paper Guide Upper Unit	1. Check if the Paper Guide Upper Unit does not have the ink stain.	1. Clean the Paper Guide Upper Unit with a soft cloth.
		EJ Frame Unit	1. Check if the Star Wheel Rollers does not have the ink stain. 	1. Clean the Star Wheel Rollers with a soft cloth.

CHAPTER

4

DISASSEMBLY AND ASSEMBLY

4.1 Overview

This section describes procedures for disassembling the main components of the Stylus CX3500/CX3600/CX3650/CX4500/CX4600. Unless otherwise specified, disassembly units or components can be reassembled by reversing the disassembly procedure. Things, if not strictly observed, that could result in injury or loss of life are described under the heading “Warning”. Precautions for any disassembly or assembly procedures are described under the heading “CAUTION”. Chips for disassembling procedures are described under the heading “CHECK POINT”.
If the assembling procedure is different from the reversed procedure of the disassembling, the procedure is described under the heading “REASSEMBLY”.
Any adjustments required after reassembling the units are described under the heading “ADJUSTMENT REQUIRED”. When you have to remove any units or parts that are not described in this chapter, refer to the exploded diagrams in the appendix.

Read precautions described in the next section before starting.

4.1.1 Precautions

See the precautions given under the handling “WARNING” and “CAUTION” in the following column when disassembling or assembling EPSON Stylus CX3500/ CX3600/CX3650/CX4500/CX4600.

- **Disconnect the power cable before disassembling or assembling the printer.**
- **If you need to work on the printer with power applied, strictly follow the instructions in this manual.**
- **Wear protective goggles to protect your eyes from ink. If ink gets in your eye, flush the eye with fresh water and see a doctor immediately.**
- **Always wear gloves for disassembly and reassembly to avoid iujury from sharp metal edges.**
- **To protect sensitive microprocessors and circuitry, use static discharge equipment, such as anti-static wrist straps, when accessing internal components.**
- **Never touch the ink or wasted ink with bare hands. If ink comes into contact with your skin, wash it off with soap and water immediately. If irritation occurs, contact a physician.**

- **Avant de commencer, assure vous que l’imprimante soit eteinte et que le cordon d’alimentation soit debranche.**
- **Veillez a jeter les piles usagees selon le reglement local.**

Risque d’explosion si la pile est remplacée incorrectment. Ne remplacer que par une pile du même type ou d’un type équivalent recommandé par le fabricant. Eliminer les piles déchargées selon les lois et les règles de sécurité en vigueur.

- **When transporting the printer after installing the ink cartridge, be sure to pack the printer for transportation without removing the ink cartridge.**
- **Use only recommended tools for disassembling, assembling or adjusting the printer.**
- **Observe the specified torque when tightening screws.**
- **Apply lubricants and adhesives as specified. (Refer to Chapter 6 for details.)**
- **Make the specified adjustments when you disassemble the printer.**
  (Refer to Chapter 5 for details.)
- **Make sure the tip of the waste ink tube is located at correct position when reassembling the waste ink tube. Otherwise it will cause ink leakage.**

4.1.2 Tools

Use only specified tools to avoid damaging of the printer.

Table 4-1. Tools

Name	Supplier*	Parts No.
Phillips Screw Driver (No.1)	EPSON	1080530
Phillips Screw Driver (No.2)	EPSON	1080532
Standard Screwdriver	EPSON	1080527
PRECISION SCREW DRIVER #1 (-)	EPSON	1080525
Tweezer	EPSON	1080561
Needle nose pliers	EPSON	1080564
Acetate Tape	EPSON	1003963

Note "*": Available in the market

4.1.3 Work Completion Check

If any service is made to the printer, use the checklist shown below to confirm all works are completed properly and the printer is ready to be returned to the user.

Table 4-2. Check List

Classification	Part	Check item	Check column
Printer unit	Self test	Operation is normal?	☐OK / ☐NG
	On line test	Print is normally done?	☐OK / ☐NG
	Print Head (nozzle check pattern print)	Ink gets out normally from all the nozzles?	☐OK / ☐NG
	CR mechanism	CR smoothly operates?	☐OK / ☐NG
		CR makes abnormal sound during its operation?	☐OK / ☐NG
	Paper loading mechanism	Paper is smoothly loaded?	☐OK / ☐NG
		Paper jam does not happen?	☐OK / ☐NG
		Paper does not warp during paper loading?	☐OK / ☐NG
		Multiple papers are not fed?	☐OK / ☐NG
		Abnormal sound is not heard during paper loading?	☐OK / ☐NG
		There is no alien substance at paper route?	☐OK / ☐NG
Scanner unit	Mechanism	Glass surface is not dirty?	☐OK / ☐NG
		Alien substance is not mixed in the CR movement area?	☐OK / ☐NG
	CR mechanism	CR smoothly operates?	☐OK / ☐NG
		CR operates together with scanner unit?	☐OK / ☐NG
		CR makes abnormal sound during its operation?	☐OK / ☐NG
	LED	LED normally turns on and white reflection test is done near home position?	☐OK / ☐NG

Table 4-2. Check List

Classification	Part	Check item	Check column
On line test	On line test	Operation is normal?	☐OK / ☐NG
Copy	Copy	Local copy is normal?	☐OK / ☐NG
Adjustment	Designated adjustment items	Adjustment condition is suitable?	☐OK / ☐NG
Lubrication	Designated lubrication items	Lubrication is done at designated place?	☐OK / ☐NG
		Lubrication volume is suitable?	☐OK / ☐NG
Function	Firmware version	The newest version	☐OK / ☐NG
Dispatch packing	Ink cartridge	Ink cartridge is normally installed?	☐OK / ☐NG
	Waste Ink Pads	Remained life of waste ink pads are sufficient?	☐OK / ☐NG
	Protection during distribution	Printer CR is in the cap position?	☐OK / ☐NG
Others	Attached goods	All of attached goods from users are packed?	☐OK / ☐NG

4.2 Caution regarding assembling/disassembling of the Printer Mechanism, and how to ensure of quality on re-assembled product

On current low end models, we basically forbade to remove Housing Lower from Printer Mechanism in your repair. This is because there is a possibility of Main Frame deformation when a part (such as Ink System Unit) is removed from Printer Mechanism without Housing Lower.
For this reason, we recommend that a new Printer Mechanism be replaced along with the Housing Lower when a part cannot be replaced without removing the Printer Mechanism.
On these models, you have to remove Housing Lower from Printer Mechanism when replacing [Waste Ink Pads] with new one.
Therefore, we clarify caution regarding assembling/disassembling of the Printer Mechanism without Housing Lower, and how to ensure of quality on repaired production this section.

[Caution regarding assembling/disassembling of the Printer Mechanism]

1) Main Frame

(a) Control of assembled standard position.

[Reason]

- The assembled accuracy of each part composed of Printer Mechanism is based on Housing Lower.

[Service treatment]

- Confirm that there is no gap between Main Frame and Housing Lower.

[Reference]

- To ensure the assembled accuracy, you have to control the assembled standard position of main frame against X/Y/Z-axis direction.

[X-axis direction]

- Make sure that main frame is correctly placed on the groove of Housing Lower.
- Make sure that there is no gap between Main Frame and Housing Lower.

[Y-axis direction]

- Make sure that main frame is correctly placed on the groove of Housing Lower.
- Make sure that there is no gap between Main Frame and Housing Lower.

[Z-axis direction]

- Align dowel of Housing Lower with positioning hole of Main Frame and ensure there is no gap.

(b) How to assemble of ASF Unit/Main Board Unit/Paper Guide Upper Unit

[Reason]

- There is a possibility that main frame deformation is caused extra force in assembling. As the result, printing failure/operation failure occurs.

[Service treatment]

- Hold the opposite side by hand while you are installing the above parts.

2) CR Guide Frame

(a) Control of vertical level

[Reason]

- There is a possibility that printing failure occurs by CR Guide Frame deformation.

[Service treatment]

- Handle Front Frame in assembling/disassembling carefully.

3) Carriage Unit

(a) Handling of Carriage Unit

[Reason]

- If Carriage Unit is damaged in assembling/disassembling of your repair, there is a possibility that vital problem occur in user's further operation.

[Service treatment]

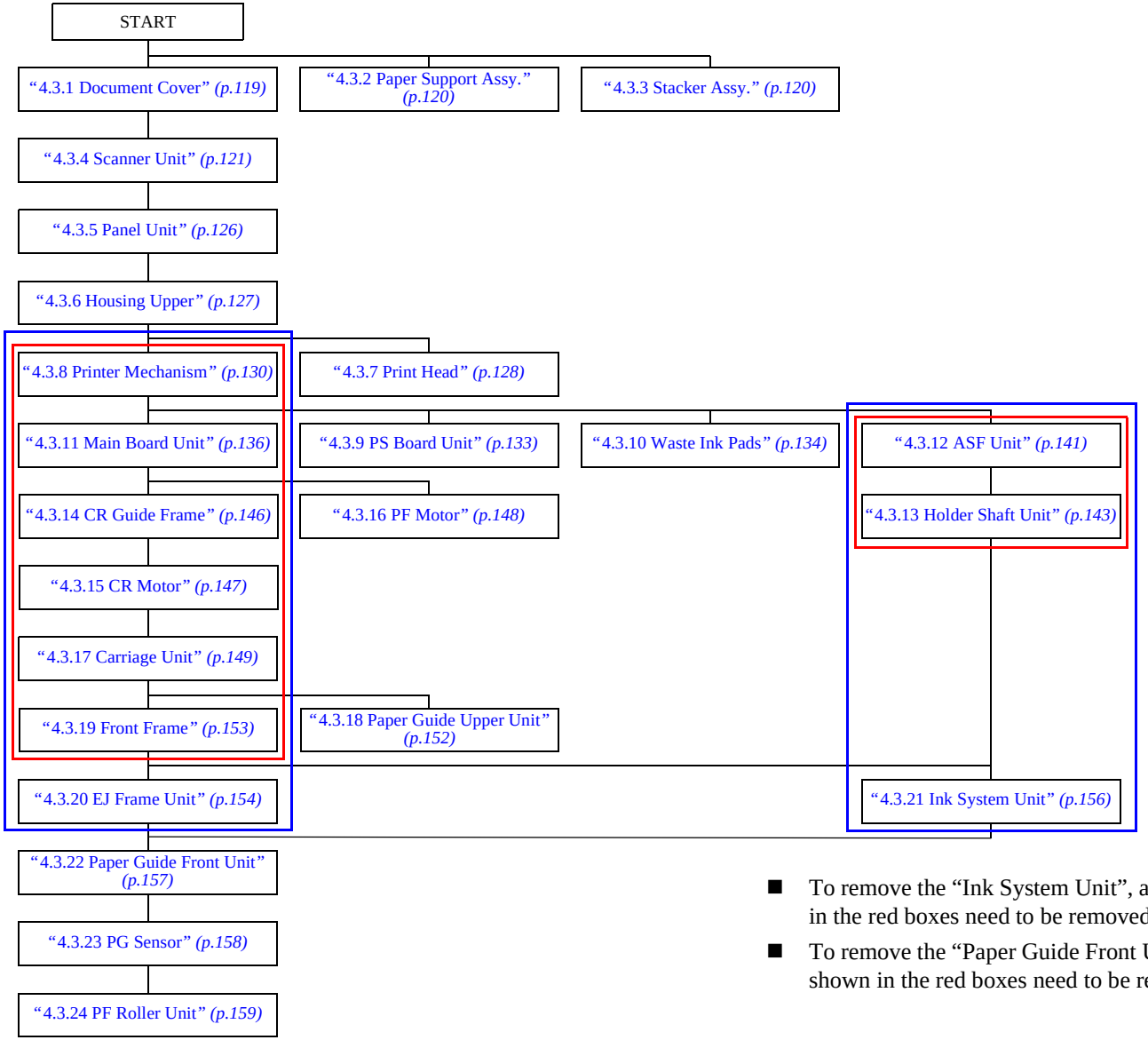
- Handle Carriage Unit in assembling/disassembling carefully.

[How to ensure of quality on re-assembled product]

We judge that the quality of re-assembled product is ensured if there is no problem about the print result by adjustment program.

4.3 Disassembly

The flowchart below shows step-by-step disassembly procedures. When disassembling each unit, refer to the page number shown in the figure.



- To remove the "Ink System Unit", all parts shown in the red boxes need to be removed.
- To remove the "Paper Guide Front Unit", all parts shown in the red boxes need to be removed.

Figure 4-1. Disassembling flowchart

4.3.1 Document Cover

☐ **External View**

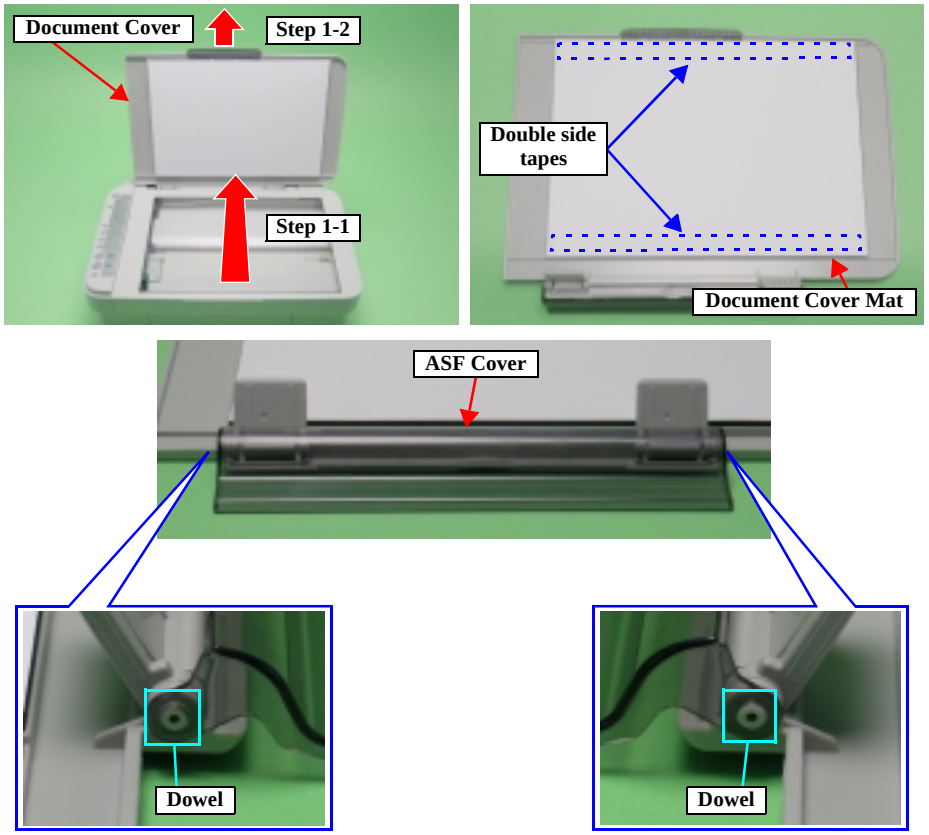


Figure 4-2. Document Cover Removal

☐ **Part/Unit that should be removed before removing Document Cover.**

None

☐ **Removal procedure**

1. Open Document Cover and remove it by pulling out upward.

■ **Document Cover Mat Removal**

1. Remove Document Cover Mat secured to Document Cover with the double-sided tapes (x2).

■ **ASF Cover Removal**

1. Release the dowels (x2, □) for securing ASF Cover, and then remove it from Document Cover.

4.3.2 Paper Support Assy.

☐ **External View**

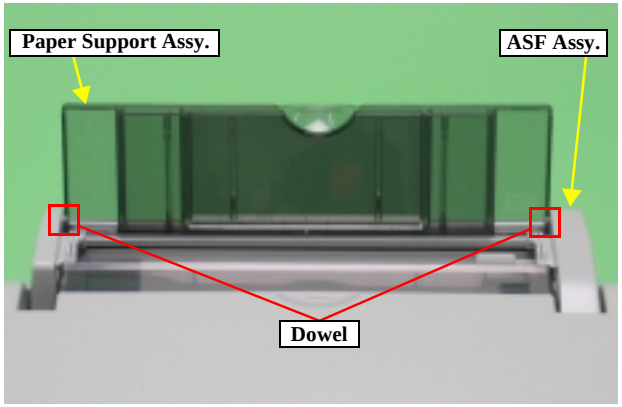


Figure 4-3. Paper Support Assy. Removal

☐ **Part/Unit that should be removed before removing Paper Support Assy.**

None

☐ **Removal procedure**

1. Release the dowels (x2, ☐) for securing Paper Support Assy, and then remove Paper Support Assy. from ASF Assy.

4.3.3 Stacker Assy.

☐ **External View**

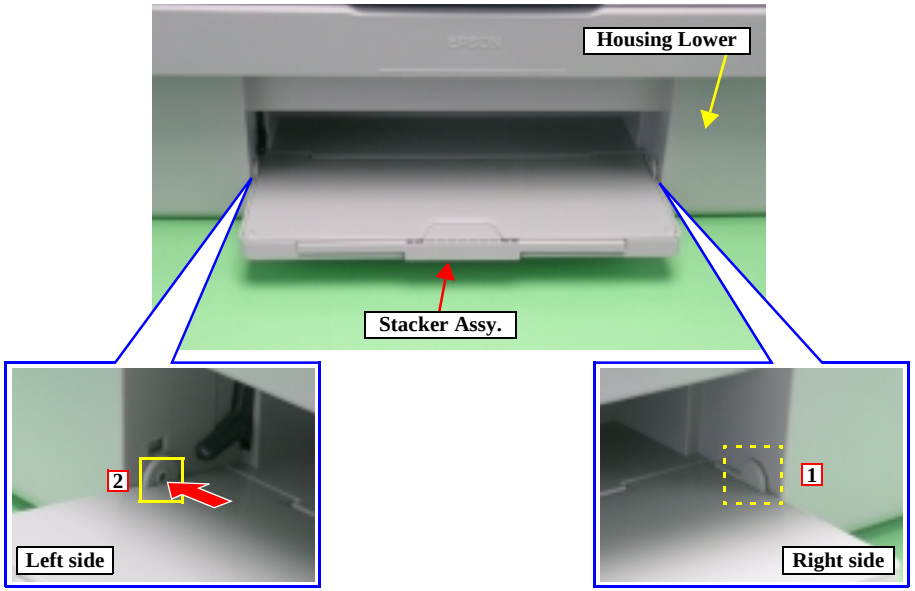


Figure 4-4. Stacker Assy. Removal

☐ **Part/Unit that should be removed before removing Stacker Assy.**

None

☐ **Removal procedure**

1. Open Stacker Assy.
2. Release the dowel (x1, ☐) for securing Stacker Assy. by using a precision screwdriver (-), and then remove Stacker Assy.

During reassembly, install Stacker Assy according to the steps shown in the figure.

4.3.4 Scanner Unit

☐ **External View (1)**

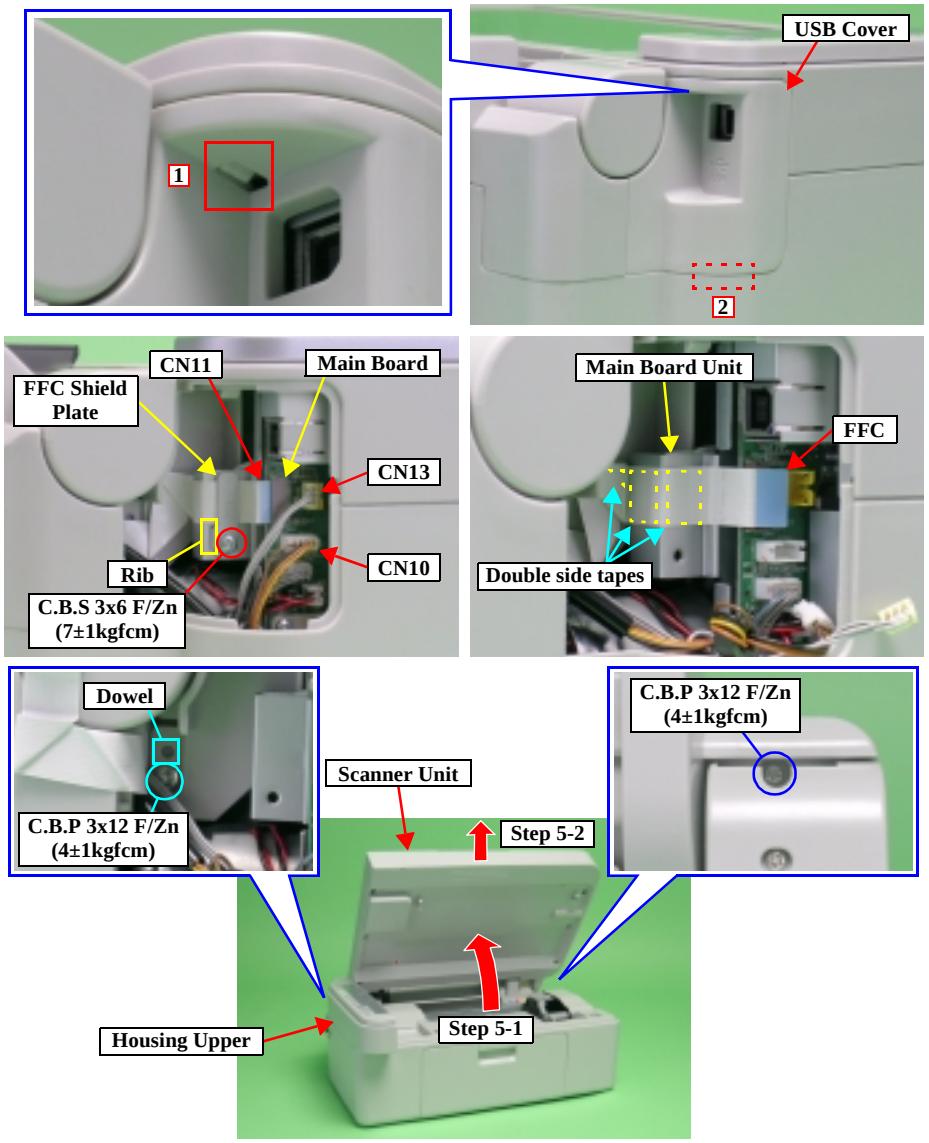


Figure 4-5. Scanner Unit Removal

☐ **Part/Unit that should be removed before removing Scanner Unit.**

Document Cover

☐ **Removal procedure**

1. Release the hooks (x2, 1 2) for securing USB Cover by using precision screwdriver (-), and then remove USB Cover.
2. Remove the screw (x1, ○) for securing FFC Shield Plate, and then remove FFC Shield Plate.
3. Disconnect the following Connector Cables and FFC from the connectors on the Main Board.
   - CN10: Scanner Motor Connector Cable
   - CN11: Scanner Carriage FFC
   - CN13: Scanner HP Sensor Connector Cable
4. Remove the screws (x2, ○○) for securing Scanner Unit.

CAUTION

- **Do not damage Scanner Carriage FFC when removing/installing the screw (○).**
- **The Scanner Carriage FFC is fastened with the double-sided tape, so be careful not to damage FFC when removing it.**

5. Open Scanner Unit, and then remove it by pulling out upward.

REASSEMBLY

- **Do not pinch the FFC or any Connector Cable between the Scanner Unit and Housing Upper.**
- **The Scanner HP Sensor Connector Cable places around the channel of Hinge L.**

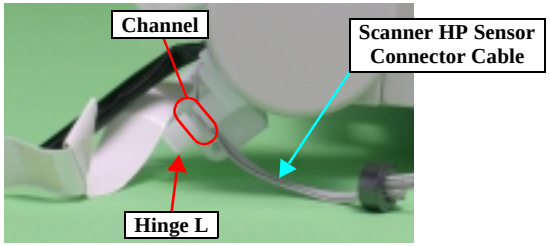


Figure 4-6. Wrapping of Connector Cable

- **Align the dowel (x1, □) Scanner Unit and positioning hole (x1) of Housing Upper.**
- **Insert the notch (x1) into the rib (x1, □) of FFC Shield Plate.**

☐ External View (2)

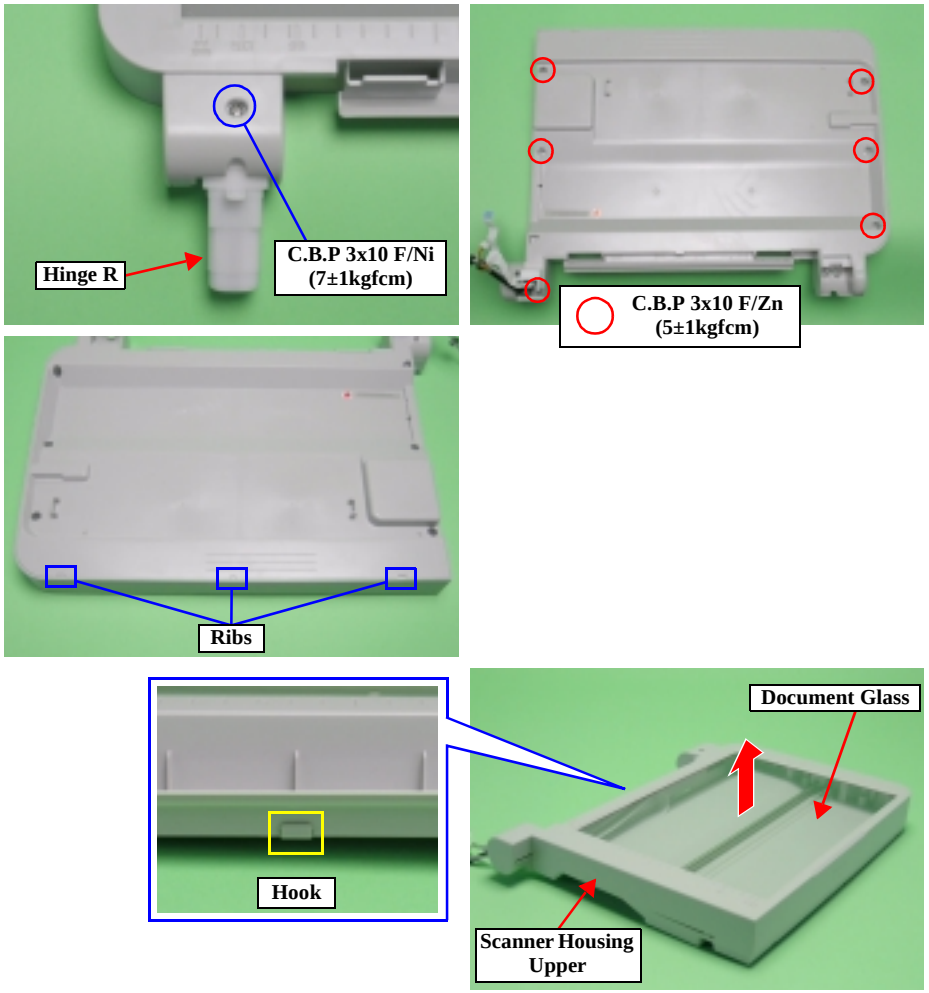


Figure 4-7. Scanner Housing Upper Removal

■ Scanner Housing Upper Removal

CAUTION

Perform the following steps in a location free of dirt and dust.
A clean room or clean bench is preferred.

1. Remove the screw (x1, ○) for securing Hinge R, and then remove Hinge R from Scanner Unit.

CAUTION

Do not damage the Document Glass of Scanner Housing Upper.

2. Remove the screws (x6, ○) for securing Scanner Housing Upper.
3. Release the ribs (x3, □) for securing Scanner Housing Upper by using a screwdriver (-), and then remove Scanner Housing Upper by lifting upward.

REASSEMBLY

Align the hook (x1, □) of Scanner Housing Lower with the notch (x1) of Scanner Housing Upper.

☐ **External View (3)**

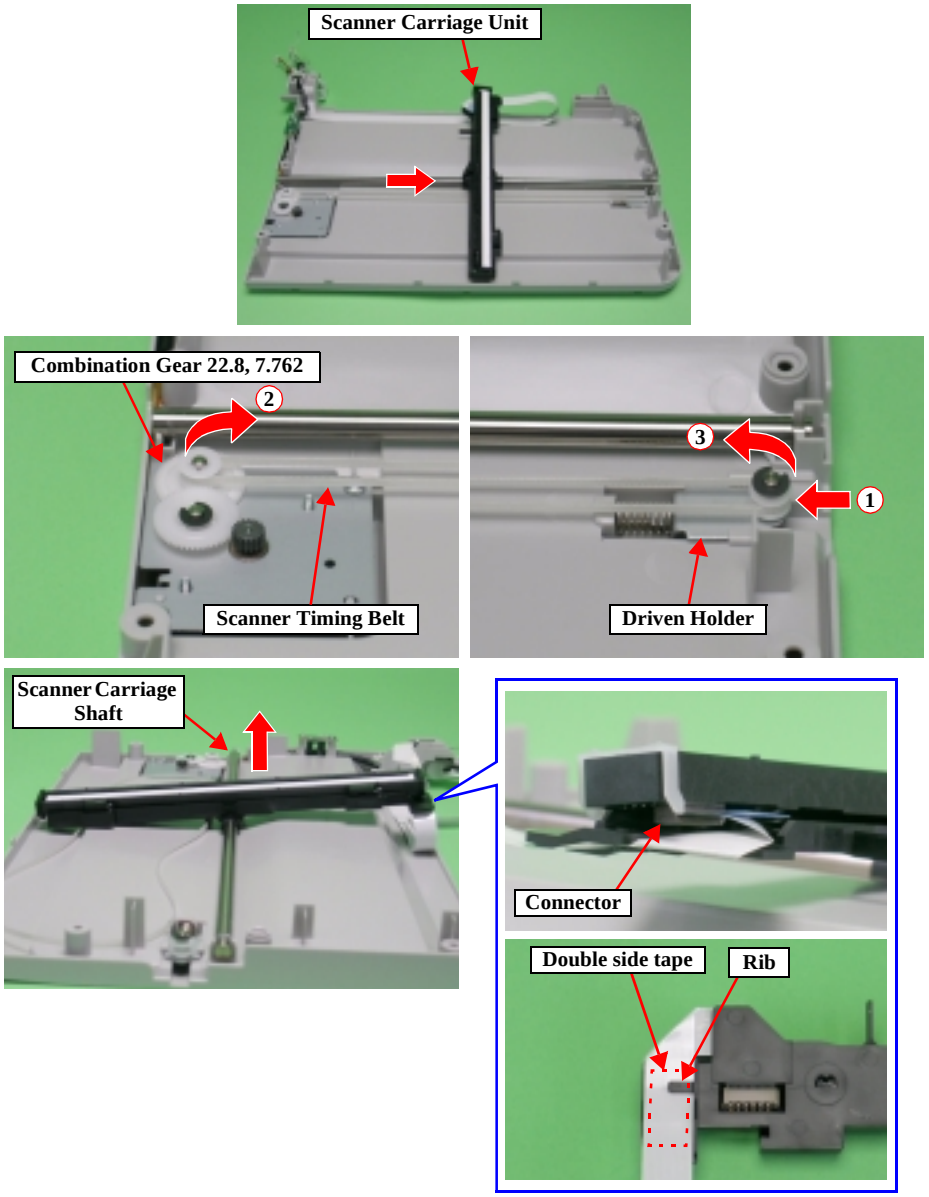


Figure 4-8. Scanner Carriage Unit Removal (1)

■ **Scanner Carriage Unit Removal**

CAUTION

Do not touch Rod Lens Array when removing Scanner Carriage Unit.

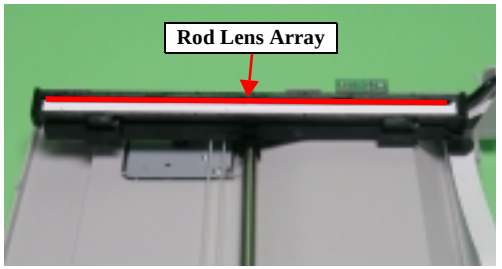


Figure 4-9. Handling of Scanner Carriage Unit

1. Move Scanner Carriage Unit to the center.
2. Release Scanner Timing Belt from Combination Gear 22.8, 7.762 and Driven Holder.
3. Disconnect Scanner Carriage FFC from Scanner Carriage Unit, and then remove Scanner Carriage Unit with Timing Belt.

CAUTION

The Scanner Carriage FFC is fastened with the double-sided tape, so be careful not to damage FFC.

☐ **External View (4)**

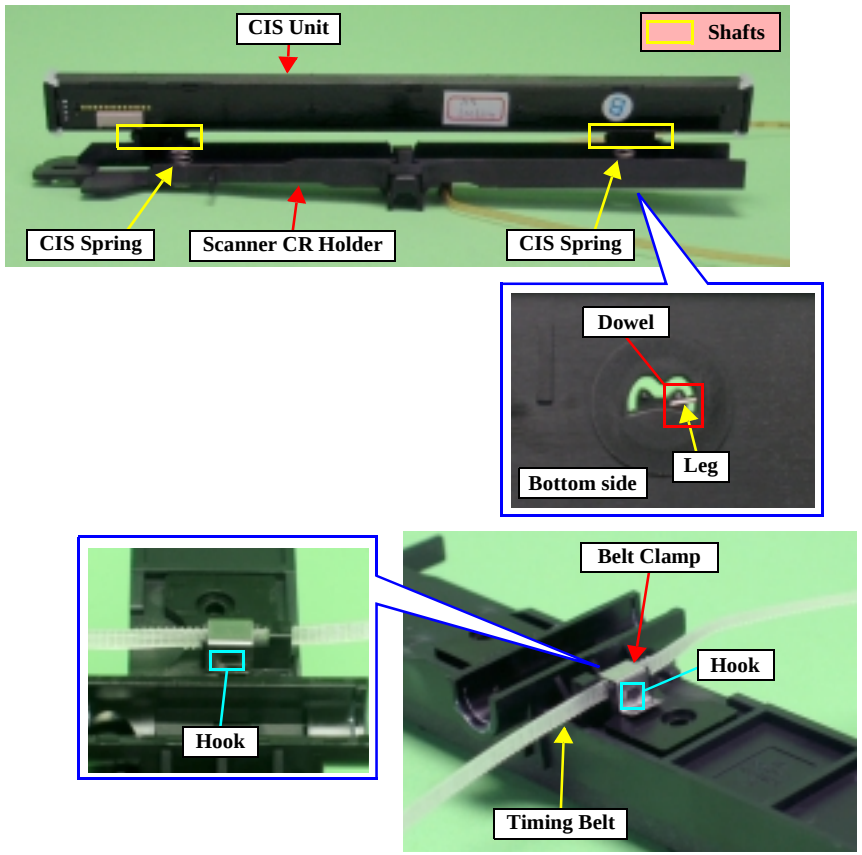


Figure 4-10. Scanner Carriage Unit Removal (2)

4. Remove CIS Unit from Scanner CR Holder with opening and shifting it to the right direction.
5. Remove CIS Spring (x2) from Scanner CR Holder.

REASSEMBLY

Install CIS Spring by fastening the leg of CIS Spring to the dowel (x1, ☐) of Scanner CR Holder.

6. Release the hooks (x2, ☐) for securing Belt Clamp by using a tweezers.
7. Remove Timing Belt from Scanner Carriage Unit.

REASSEMBLY

Install the location on Timing Belt having the teeth on both sides into Scanner Carriage Unit.

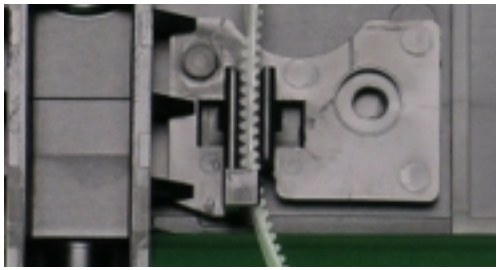


Figure 4-11. Installation of Timing Belt

ADJUSTMENT REQUIRED

After changing the Scanner Carriage Shaft for a new one, always apply grease G-26 to the specified portions.

■ **Refer to Chapter 6, Figure 6-4 *(p.177)***

☐ **External View (5)**

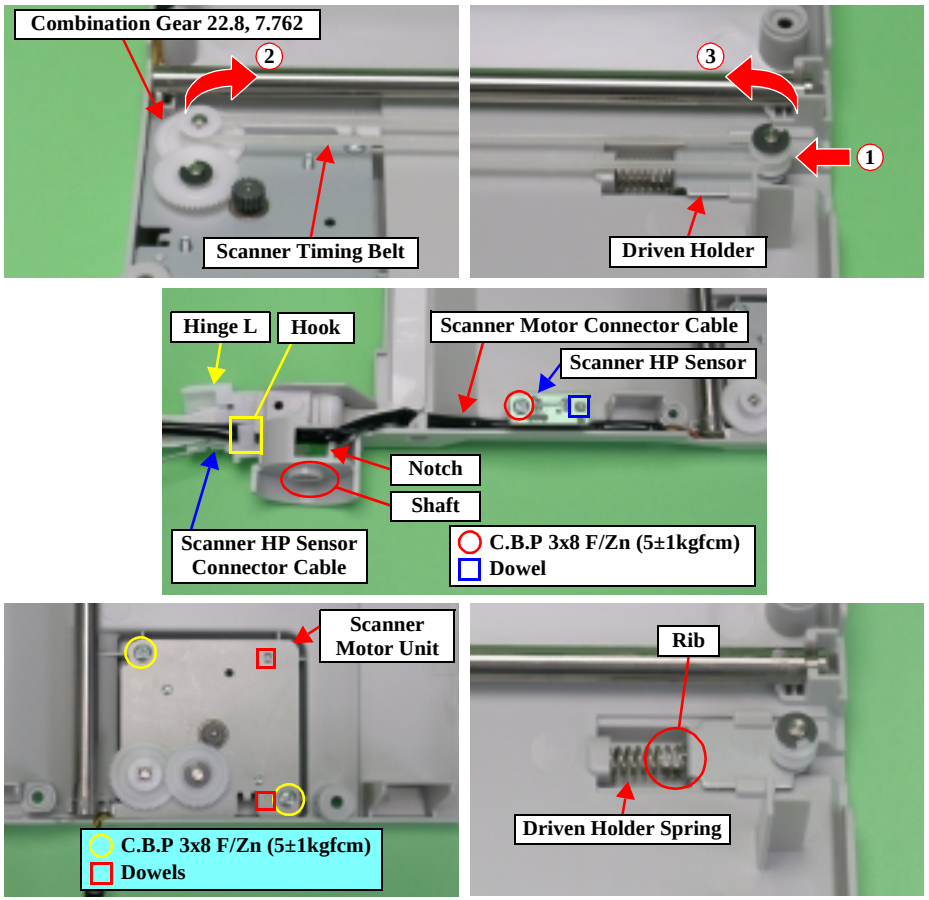


Figure 4-12. Scanner Motor Unit/Scanner HP Sensor/Driven Holder Removal

■ **Scanner Motor Unit/Scanner HP Sensor/Driven Holder Removal**

1. Move Scanner Carriage Unit to the center.
2. Release Scanner Timing Belt from Combination Gear 22.8, 7.762 and Driven Holder.
3. Release the shaft of Hinge L from the socket of Scanner Housing Lower.
4. Release Scanner Motor Connector Cable and Scanner HP Sensor Connector Cable from the hook of Hinge L, and then pull from the notch of Scanner Housing Lower.

REASSEMBLY **Place Scanner Motor Connector Cable and Scanner HP Sensor Connector Cable as shown by figure.**

5. Remove the screw (x1, ○) for securing Scanner HP Sensor, and then remove Scanner HP Sensor.

REASSEMBLY **Align the positioning hole (x1, □) of Scanner HP Sensor with the dowel (x1) of Scanner Housing Lower.**

6. Release Scanner Motor Connector Cable and Scanner HP Sensor Connector Cable from the hook of Scanner Housing Lower while holding Scanner Carriage Shaft.
7. Remove the screws (x2, ○) for securing Scanner Motor Unit, and then remove Scanner Motor Unit.

REASSEMBLY **Align the positioning holes (x2) of Scanner Motor Unit with the dowels (x2, □) of Scanner Housing Lower.**

8. Remove Driven Holder Spring from Scanner Housing Lower by using a tweezers.

REASSEMBLY **Insert Driven Holder Spring into the rib of Driven Holder.**

4.3.5 Panel Unit

☐ **External View**

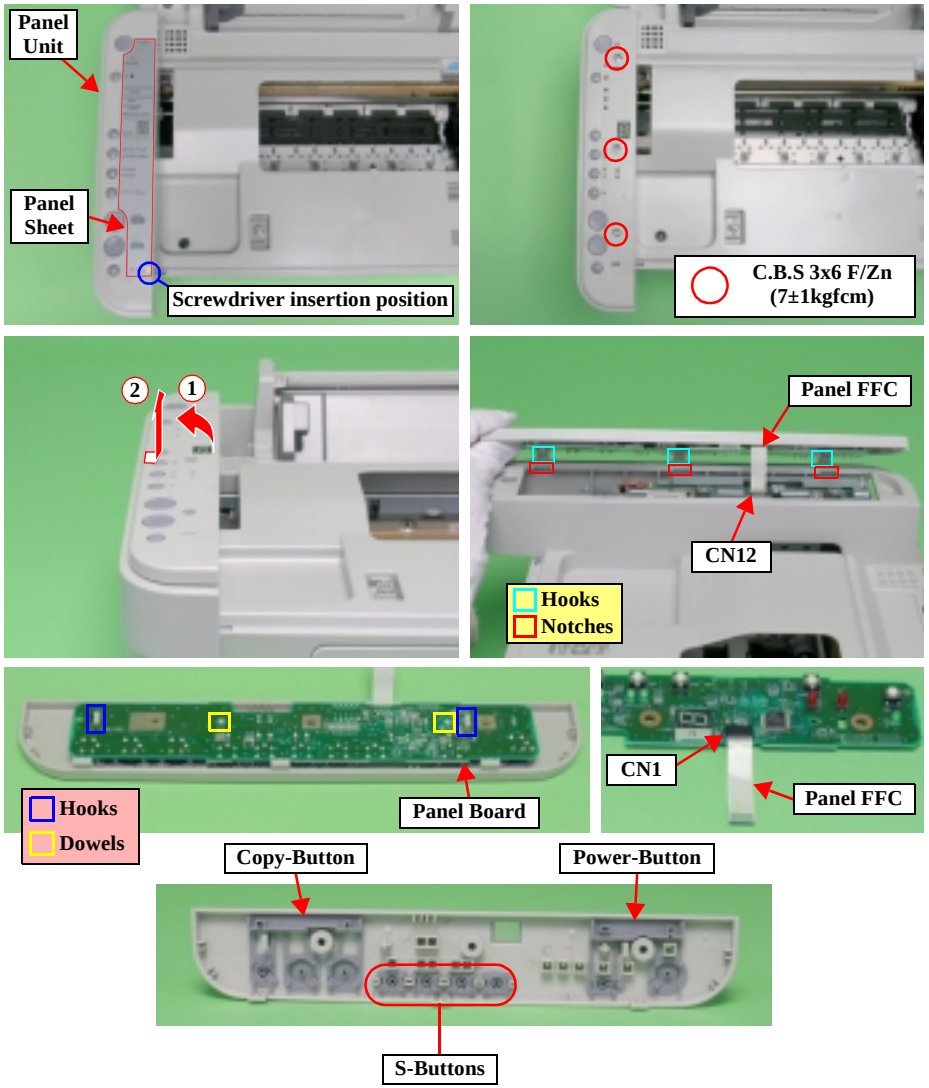


Figure 4-13. Panel Unit Removal

☐ **Part/Unit that should be removed before removing Panel Unit.**

Document Cover / Scanner Unit

☐ **Removal procedure**

1. Peel off Panel Sheet from Panel Unit by using a precision screwdriver (-).

CAUTION

When peeling off Panel Sheet, free it by inserting the screwdriver at the place shown by the figure.

REASSEMBLY

Paste new Panel Sheet to Panel Unit.

2. Remove the screws (x3, ○) for securing Panel Unit.
3. Release the hooks (x3, □) of Panel Unit in order shown by figure.

REASSEMBLY

Align the hooks (x3, □) of Panel Unit with the notches (x3, □) of Housing Upper.

4. Release Panel FFC from connector (CN12) of Main Board, and then remove Panel Unit.

CAUTION

When removing Panel Unit, Panel FFC will be hard to insert when disconnecting it from Panel Board side (CN1).

5. Release the hooks (x2, □) securing Panel Board, and then remove Panel Board.

REASSEMBLY

Align the positioning holes (x2) of Panel Board with the dowels (x2, □) of Panel Housing.

6. Remove FFC from connector (CN1) of Panel Board.
7. Remove S-Buttons (x4), Copy-Button and Power-Button from Panel Housing. (Stylus CX4500/CX4600 equipped with 5 S-Buttons.)

4.3.6 Housing Upper

☐ **External View**

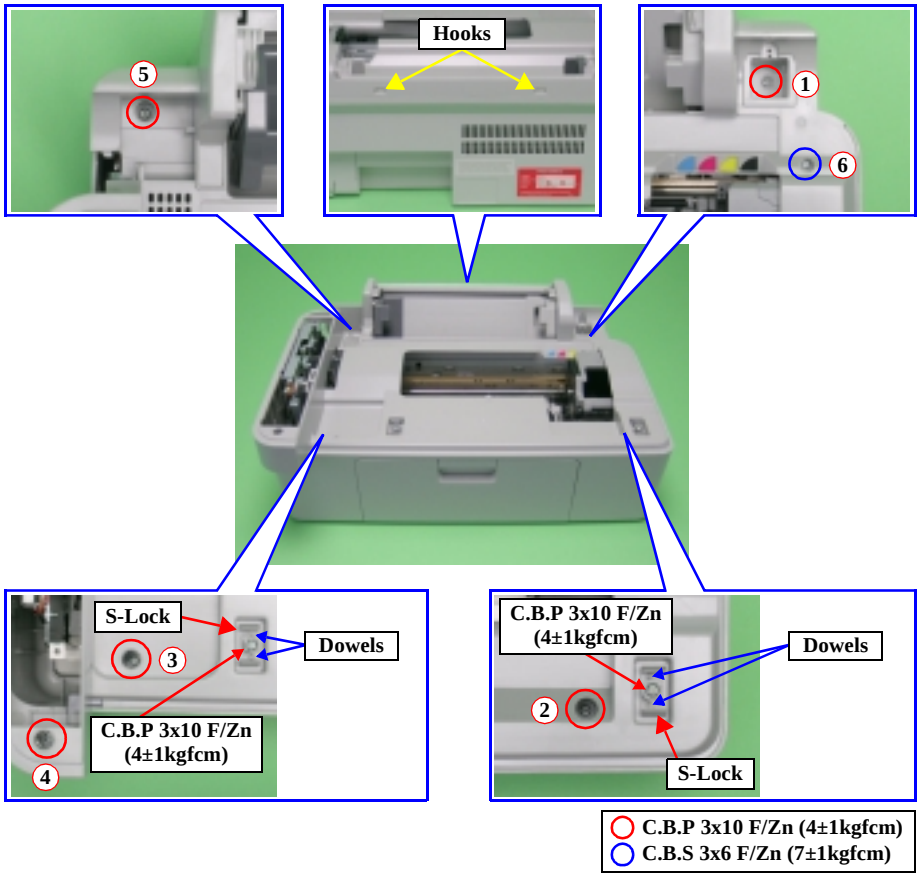


Figure 4-14. Housing Upper Removal

☐ **Part/Unit that should be removed before removing Housing Upper.**

Document Cover / Paper Support Assy. / Scanner Unit / Panel Unit

☐ **Removal procedure**

1. Remove the screws (x6, ○○) securing Housing Upper.

CHECK POINT

- **S-Locks (x2) are fastened with the screws (1 each).**
- **When removing S-Locks (x2), align the positioning hole of each S-Lock (x2) with Housing Upper dowels (x2).**

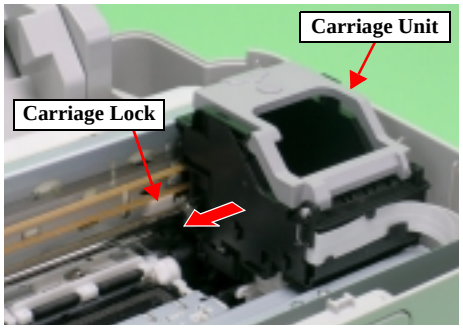
2. Release the hooks (x2) for securing Housing Upper by using a common screwdriver, and then remove by lifting upward.

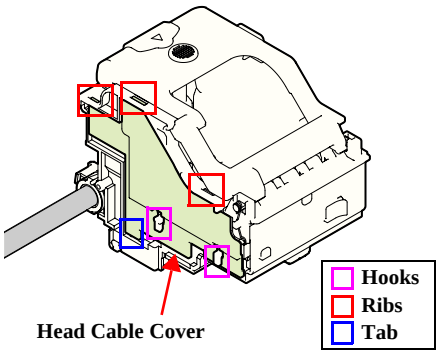
REASSEMBLY

Tighten the screws in order shown by figure.

4.3.7 Print Head

☐ **External View (1)**





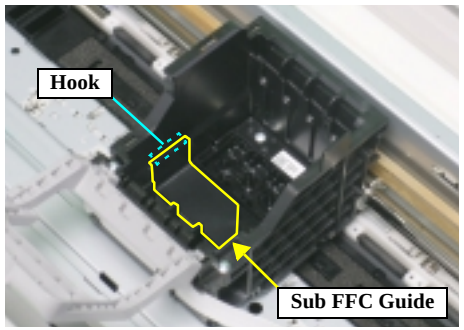


Figure 4-15. Print Head Removal (1)

☐ **Part/Unit that should be removed before removing Print Head.**

Document Cover / Paper Support Assy. / Scanner Unit / Panel Unit / Housing Upper

☐ **Removal procedure**

1. Release Carriage Lock by using a common screwdriver, and then slide Carriage Unit center of printer.
2. Remove all Ink Cartridges from Carriage Unit.
3. Remove Head Cable Cover downward while releasing the lower tab (x1, ☐) of Head Cable Cover by using a precision screwdriver (-).

CAUTION

Use caution because the hooks(☐) of Carriage Unit can break.

4. Release the hook (x1, ⛶) for securing Sub FFC Guide by using a precision screwdriver (-), and then remove Sub FFC Guide.

REASSEMBLY

Insert the rib of Sub FFC Guide into the notch of Carriage Unit.

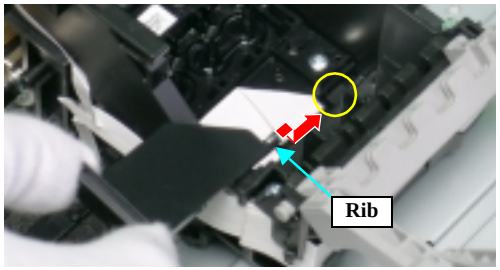


Figure 4-16. Installation of Sub FFC Guide

☐ External View (2)

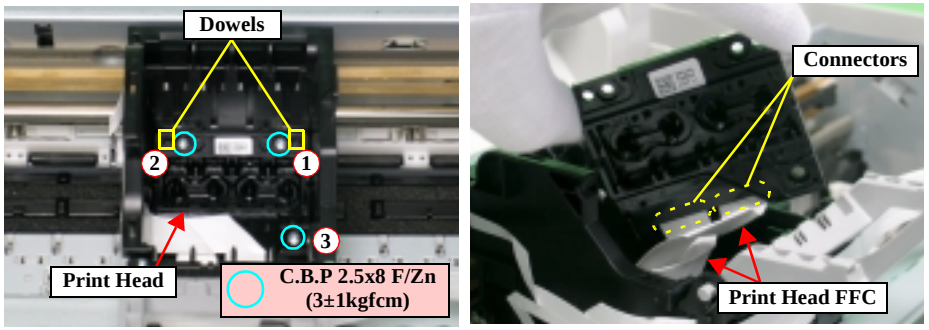


Figure 4-17. Print Head Removal (2)

5. Remove the screws (x3, ○) for securing Print Head, and then lift Print Head by using a long-nose plier.

CAUTION

Use caution not to touch or damage the nozzles or the ink supply needles of Print Head.

REASSEMBLY

- **Align the positioning holes (x2) of Print Head with the dowels (x2, ☐) of Carriage Unit.**
- **Tighten the screws in order shown by figure.**

6. Disconnect Head FFCs (x2) from connectors (x2) of Print Head, and then remove Print Head.

REASSEMBLY

Insert Head FFC firmly into the connector of Print Head.

ADJUSTMENT REQUIRED

When having removed or replaced Print Head, implement the adjustment in the following order. (Refer to Chapter 5 "ADJUSTMENT")

1. **PG Adjustment**
2. **Ink charge (for replacement only)**
3. **Input Head ID (for replacement only)**
4. **Head angular adjustment**
5. **Bi-D adjustment**
6. **PW adjustment**
7. **First dot adjustment**

4.3.8 Printer Mechanism

☐ **External View (1)**

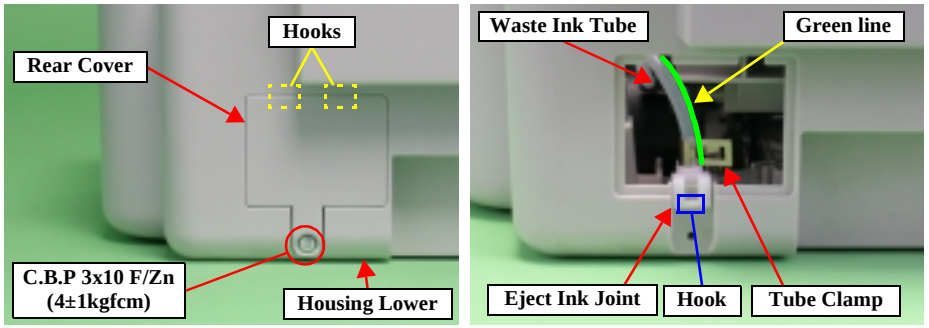


Figure 4-18. Printer Mechanism Removal (1)

☐ **Part/Unit that should be removed before removing Printer Mechanism.**

Document Cover / Paper Support Assy. / Scanner Unit / Panel Unit / Housing Upper

☐ **Removal procedure**

1. Remove the screws (x1, ○) for securing Rear Cover, and then remove Rear Cover.

REASSEMBLY

Align the notches (x2) of Housing Lower with the hooks (x2, ⬚) of Rear Cover.

2. Remove Eject Ink Joint from Housing Lower, grasp the handle of Tube Clamp and move it upwards, and then carefully remove Waste Ink Tube (of Ink System Unit side) by using both hands.

CAUTION

- **The Waste Ink Tube may break when it is removed. If it breaks, replace Ink System Unit.**
- **Ink may leak from Waste Ink Tube. Prepare cleaning rags beforehand, and be careful not spread ink onto surrounding area.**

REASSEMBLY

- **Set the green line of Waste Ink Tube with the position of Tube Clamp handle as shown by figure.**
- **Align the positioning hole (x1) of Housing Lower with the hook (x1, □) of Eject Ink Joint.**

3. Release Carriage Lock by using a common screwdriver, and then move Carriage Unit to center of printer.

☐ **External View (2)**

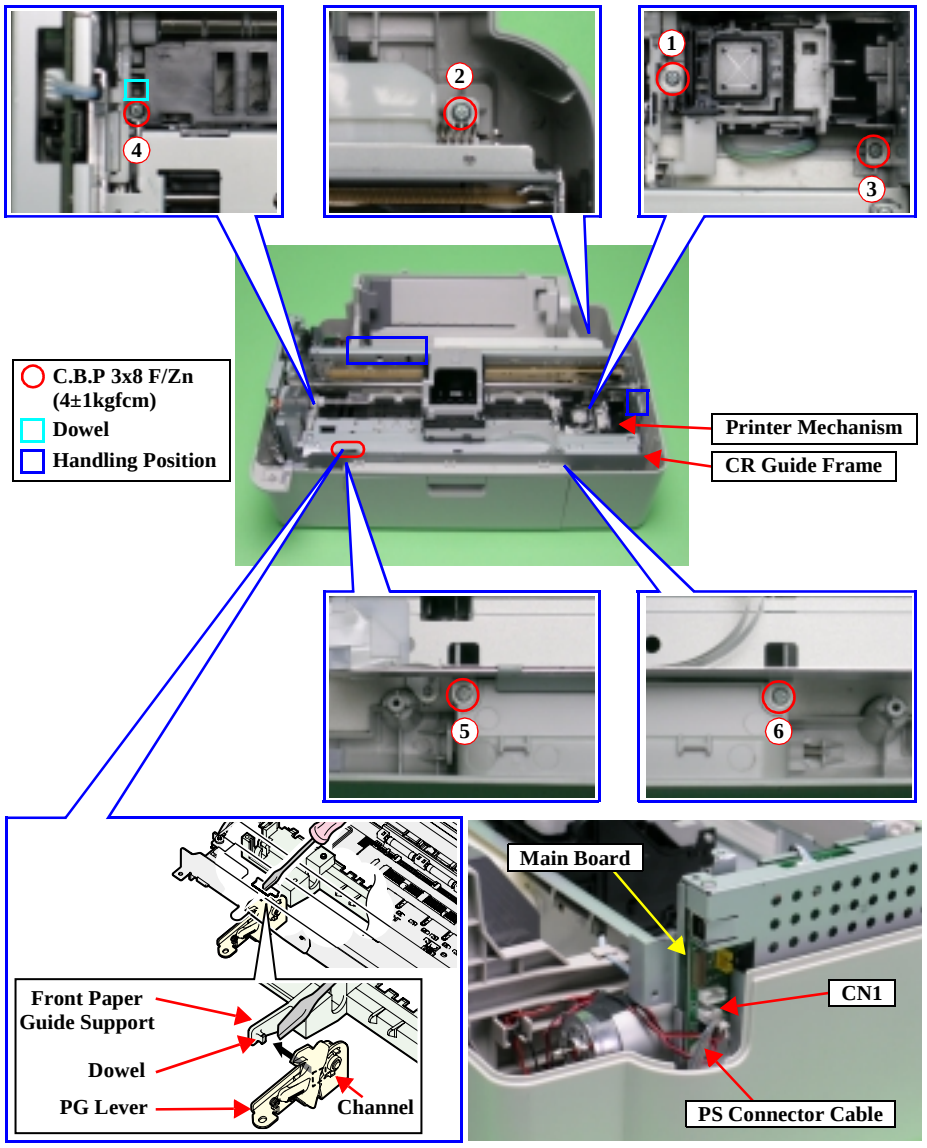


Figure 4-19. Printer Mechanism Removal (2)

4. Remove the screws (x6, ○) for securing Printer Mechanism.

REASSEMBLY

- **Tighten the screws in order shown by figure.**
- **Align the positioning hole (x1) of Printer Mechanism with the dowel (x1, □) of Housing Lower.**

5. Disconnect PS Connector Cable from the connector (CN1) of Main Board.
6. Hold up left side of Printer Mechanism while releasing dowel of Front Paper Guide Support from (Channel of) PG Lever by using a precision screwdriver (-), and then remove whole Printer Mechanism from Housing Lower.

CAUTION

Hold the designated position and lift Printer Mechanism upward when performing the following step in order to prevent warping of Main Frame.

WARNING

When installing Printer Mechanism into Housing Lower, insert Waste Ink Tube into Eject Ink Joint and firmly secure Waste Ink Tube with Tube Clamp. Ink may leak if not properly installed.

REASSEMBLY

When replacing Printer Mechanism with a new component, be sure to mark Bush 10 (Left) of PF Roller Unit with a red circle.
When replacing Main Board Unit with a refurbished unit, determine the PF Roller production value if the EEPROM cannot be backed up. (Printer Mechanism service parts are limited to IEI products.)

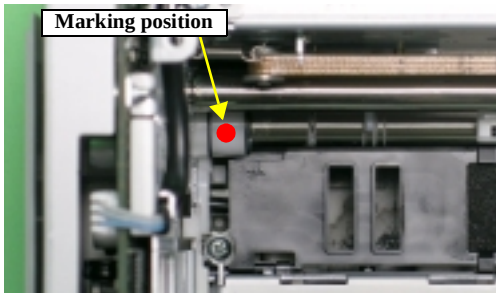
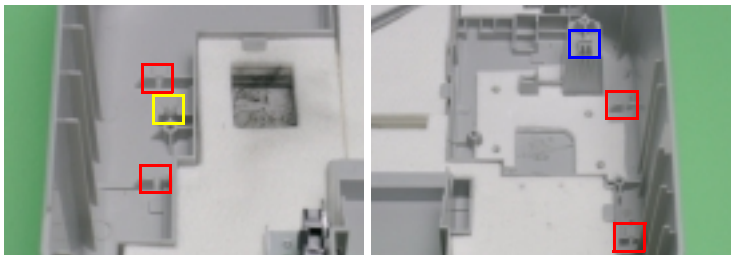


Figure 4-20. Marking position

REASSEMBLY

The assembled accuracy of each part composed of Printer mechanism is based on Housing Lower.
To ensure the assembled accuracy, you have to control the assembled standard position of main frame against X/Y/Z-axis direction as the following figure.

- **[X-axis direction]**
  Confirm that Printer Mechanism is properly placed in channel of Housing Lower and that there is no gap.
- **[Y-axis direction]**
  Confirm that Printer Mechanism is properly placed in channel of Housing Lower and that there is no gap.
- **[Z-axis direction]**
  Align positioning hole (x1) of Printer Mechanism with dowel (x1) of Housing Lower, and confirm that there is no gap.



Assembled standard position of Printer Mechanism

ADJUSTMENT REQUIRED

When having replaced Printer Mechanism, implement the following adjustment. (Refer to Chapter 5 "ADJUSTMENT")

1. **Initialize PF deterioration offset**
2. **Disenable PF deterioration offset**
3. **PF roller shaft manufacture code**
4. **CR motor heat protection control**

4.3.9 PS Board Unit

☐ **External View**

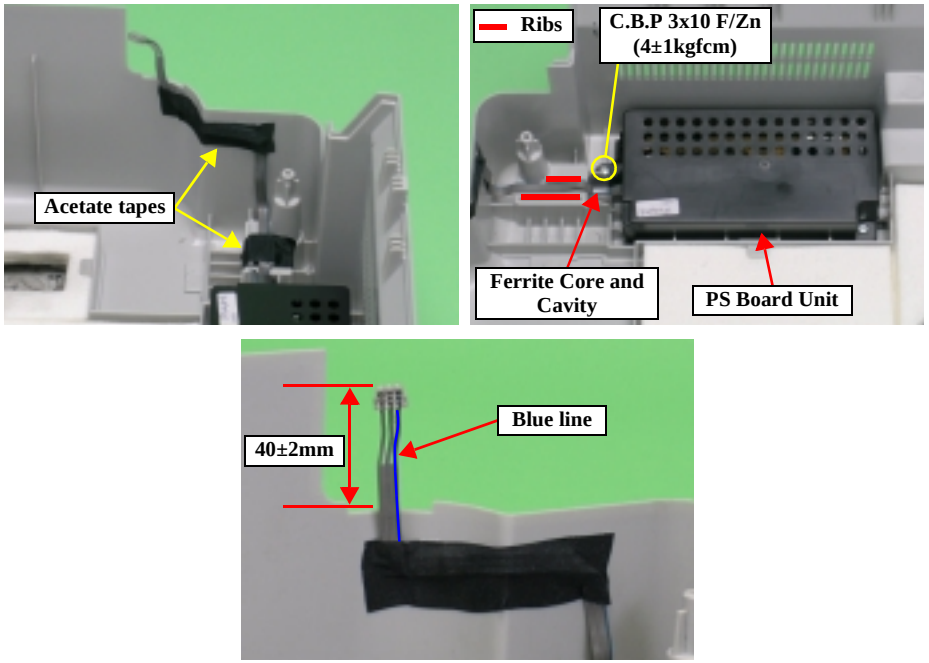


Figure 4-21. PS Board Unit Removal

☐ **Part/Unit that should be removed before removing PS Board Unit.**

Document Cover / Paper Support Assy. / Scanner Unit / Panel Unit / Housing Upper / Printer Mechanism

☐ **Removal procedure**

1. Peel off the acetate tapes (x2) for securing PS Connector Cable.

REASSEMBLY

- **Set Ferrite Core into cavity of Housing Lower.**
- **Place PS Connector Cable between the ribs of Housing Lower.**
- **Leave PS Connector Cable projecting 40±2mm from the edge of Housing Lower.**
- **Face the blue line of PS Connector Cable to the rear side of Housing Lower.**

2. Remove the screw (x1, ◯) for securing PS Board Unit, and then remove PS Board Unit.

ADJUSTMENT REQUIRED

When having replaced PS Board Unit, implement the following adjustment. (Refer to Chapter 5 "ADJUSTMENT")

- **CR motor heat protection control**

4.3.10 Waste Ink Pads

☐ **External View (1)**

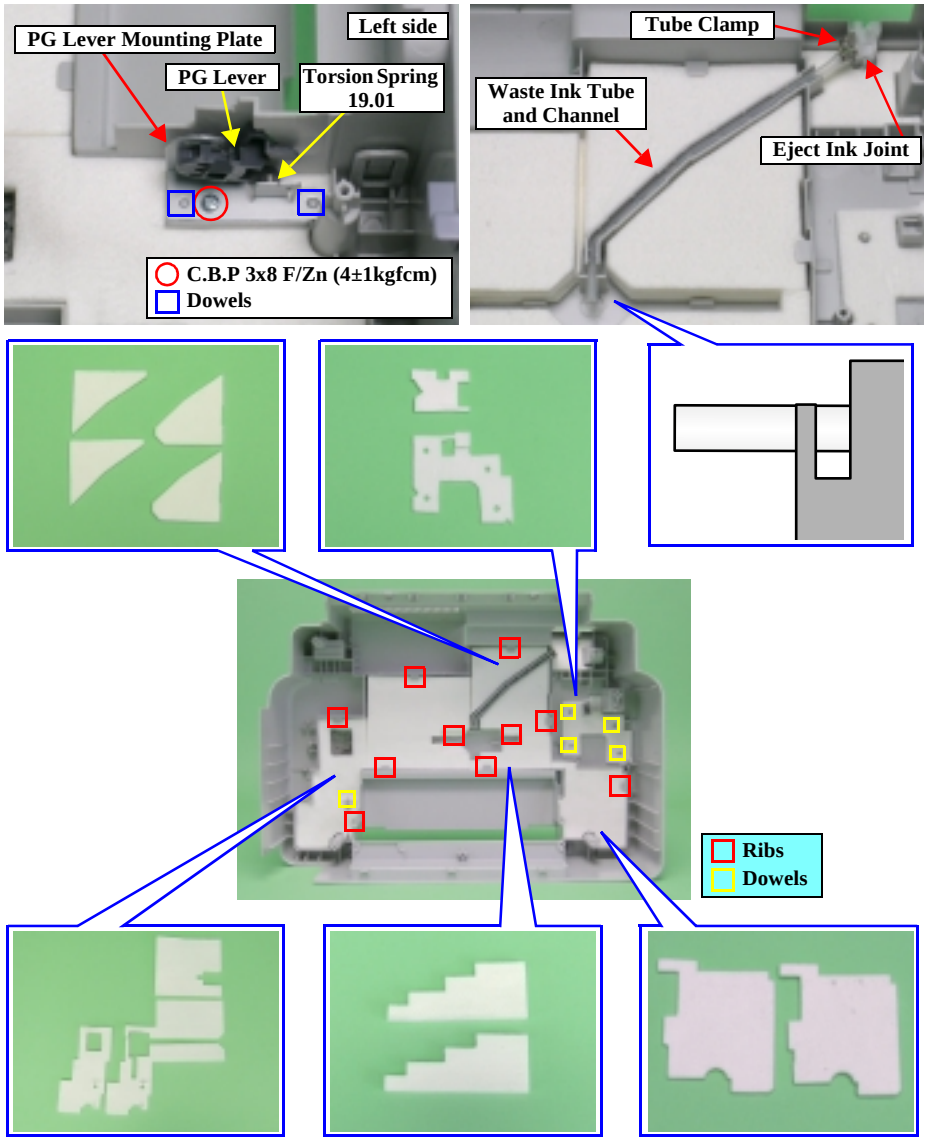


Figure 4-22. Waste Ink Pads Removal (1)

☐ **Part/Unit that should be removed before removing Waste Ink Pads.**

Document Cover / Paper Support Assy. / Stacker / Scanner Unit / Panel Unit / Housing Upper / Printer Mechanism

☐ **Removal procedure**

1. Remove the screw (x1, ○) for securing PG Lever Mounting Plate, and then remove together PG Lever, PG Lever Mounting Plate and Torsion Spring 19.01 from Housing Lower.

REASSEMBLY

Align the positioning holes (x2) of PG Lever Mounting Plate with the dowels (x2, □) of Housing Lower.

2. Remove Waste Ink Tube along with Tube Clamp, Eject Ink Joint from the channel of Housing Lower.

REASSEMBLY

Set the leading page of Waste Ink Tube straight ahead as shown by figure.

3. Remove 14 Waste Ink Pads from Housing Lower.

WARNING

When installing Waste Ink Tube into Housing Lower, insert into channel of Housing Lower and Eject Ink Joint, and firmly secure Waste Ink Tube with Tube Clamp. Ink may leak if not properly installed.

REASSEMBLY

Properly set Waste Ink Pads into the ribs (□) and the dowels (□)of Housing Lower.

☐ **External View (2)**

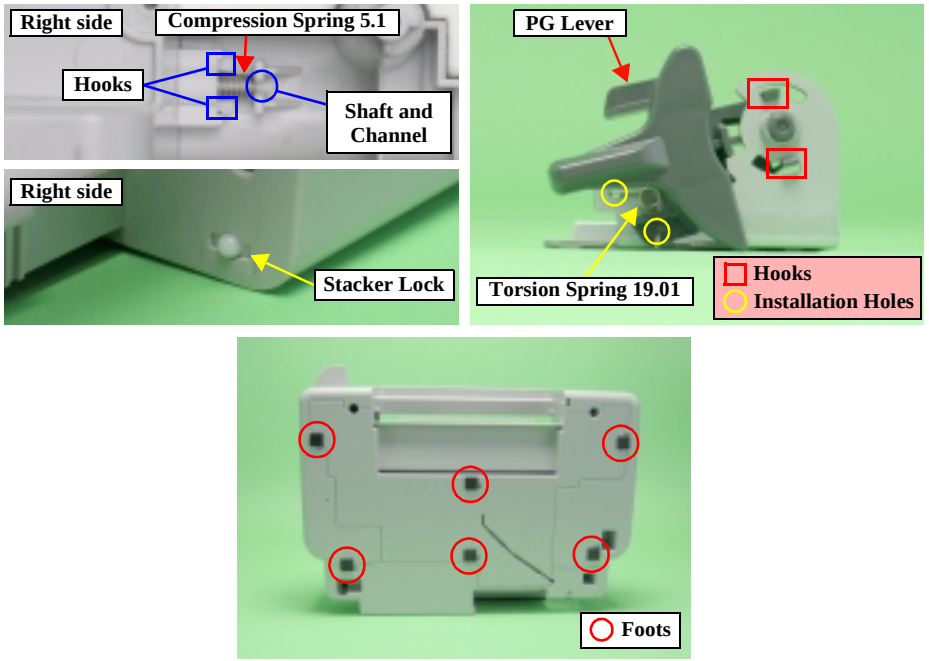


Figure 4-23. Stacker Lock/PG Lever/Foots Removal (2)

■ **Stacker Lock Removal**

1. Release the hooks (x2, □) for securing Stacker Lock, and then remove Stacker Lock and Compression Spring 5.1 from Housing Lower.

REASSEMBLY

- **Pass the shaft of Stacker Lock through the channel of Housing Lower.**
- **Confirm that Stacker opens and closes smoothly.**

■ **PG Lever Removal**

1. Release the hooks (x2, □) for securing PG Lever, and then remove PG Lever from PG Lever Mounting Plate.
2. Remove Torsion Spring 19.01 from the installation holes of PG Lever and PG Lever Mounting Plate, and then remove PG Lever and PG Lever Mounting Plate.

REASSEMBLY

Confirm that PG Lever operates smoothly.

■ **Foots Removal**

1. Remove Foots (x6) from bottom of Housing Lower, and separate from Housing Lower.

ADJUSTMENT REQUIRED

When having replaced Waste Ink Pads, implement the following adjustment. (Refer to Chapter 5 "ADJUSTMENT")

- **Waste ink pad counter**

4.3.11 Main Board Unit

4.3.11.1 Stylus CX3500/CX3600/CX3650

☐ **External View**

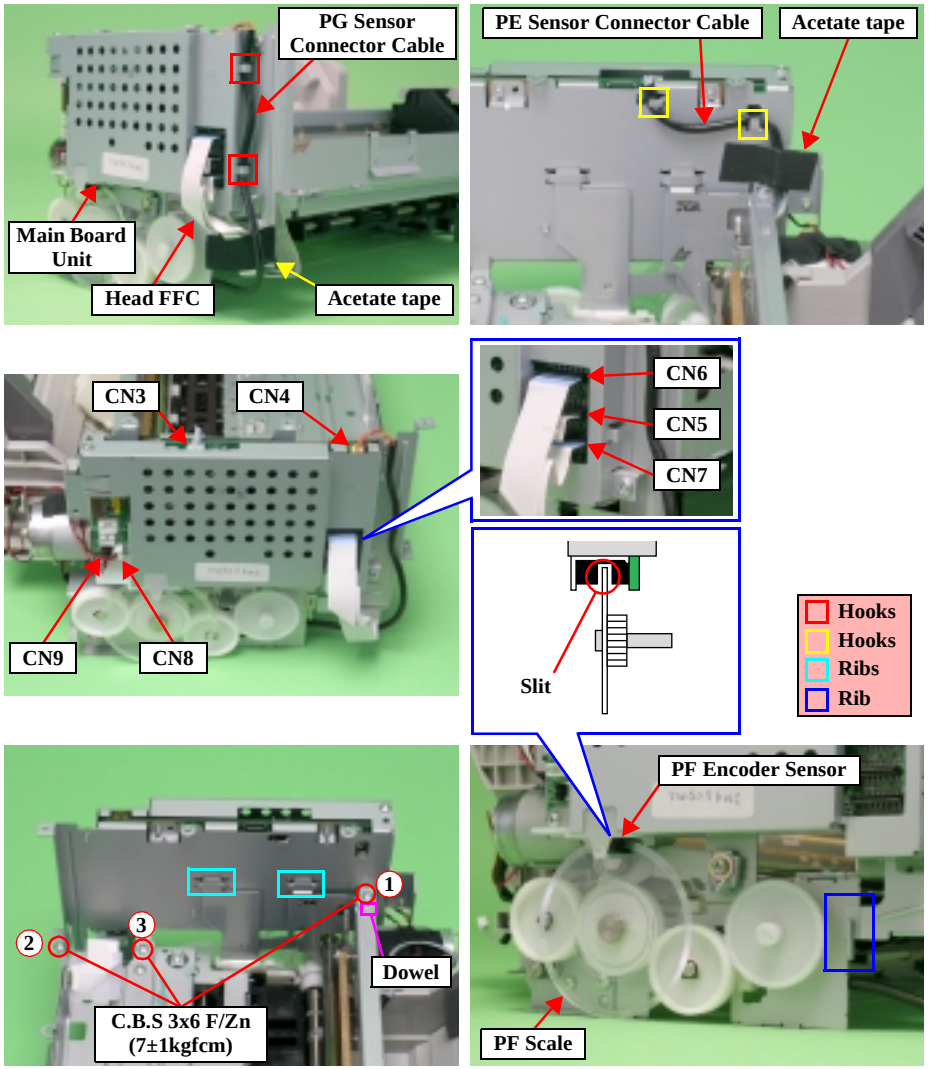


Figure 4-24. Main Board Unit Removal

☐ **Part/Unit that should be removed before removing Main Board Unit.**

Document Cover / Paper Support Assy. / Scanner Unit / Panel Unit / Housing Upper / Printer Mechanism

☐ **Removal procedure**

1. Peel off the acetate tape (x1) for securing Head FFCs (x3).
2. Release PG Sensor Connector Cable from the hooks (x2, ☐) of Main Board Unit.
3. Peel off the acetate tape (x1) for securing PE Sensor Cable Connector, and then release PE Sensor Connector Cable from the hooks (x2, ☐) of Main Board Unit.
4. Disconnect the following cable connectors and FFC from the connectors of Main Board.
   - CN3: PE Sensor Connector Cable
   - CN4: PG Sensor Connector Cable
   - CN5: Head FFC
   - CN6: Head FFC
   - CN7: Head FFC
   - CN8: PF Motor Connector Cable
   - CN9: CR Motor Connector Cable
5. Remove the screws (x3, ○) for securing Main Board Unit, and then remove Main Board Unit from Printer Mechanism.

REASSEMBLY

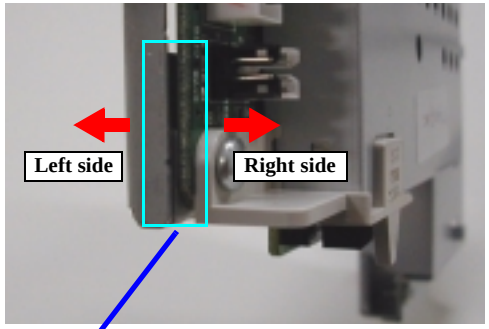
- **Insert PF Scale into the slit of PF Encoder Sensor.**
- **Insert the ribs (x2, ☐) of Main Frame into the hooks (x2) of Main Board Unit.**
- **Insert the rib (x1, ☐) of Main Board Unit into the hook (x1) of Main Frame.**
- **Align the positioning hole (x1) of Main Board Unit with the dowel (x1, ☐) of Main Frame.**
- **Tighten the screws in order shown by figure.**

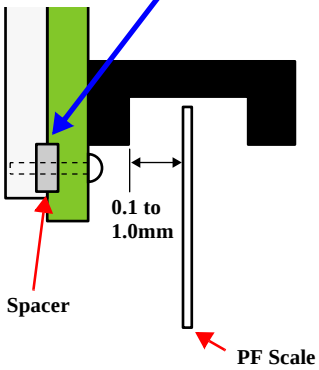
REASSEMBLY

■ PF Scale Sensor positioning adjustment

Use the following procedure to confirm that PF Scale is positioned in the center of the PF Sensor.

1. Test fit Main Board Unit, and confirm whether or not PF Scale is positioned in the center of PF Sensor.
2. If PF Scale is positioned in the center of PF Sensor, adjustment is complete. If scale is not positioned in center of sensor, adjust position of PF Scale using spacer (0.5mm thickness) as shown in diagram below.





Spacer is not applied to Main Board Unit for service part.

- Place spacer between Shield Board and Main Board.
- If PF Scale is off to the left, remove the spacer.
- If PF Scale is off to the right, add an additional spacer. (Total of 2 spacers)

Figure 4-25. PF Scale Sensor positioning adjustment

ADJUSTMENT REQUIRED

When having replaced Main Board Unit, implement the adjustment in the following order. (Refer to Chapter 5 “ADJUSTMENT”)

■ [When possible to read data from the old board]

1. EEPROM Data Copy
2. PF Scale Sensor positioning adjustment
3. PF roller shaft manufacture code

■ [When impossible to read from the old board]

1. PF Scale Sensor positioning adjustment (for replacement only)
2. Destination setting
3. Input Head ID
4. Top margin adjustment
5. Head angular adjustment
6. Bi-D adjustment
7. PW adjustment
8. First dot adjustment
9. CR motor heat protection control

4.3.11.2 Stylus CX4500/CX4600

☐ **External View (1)**

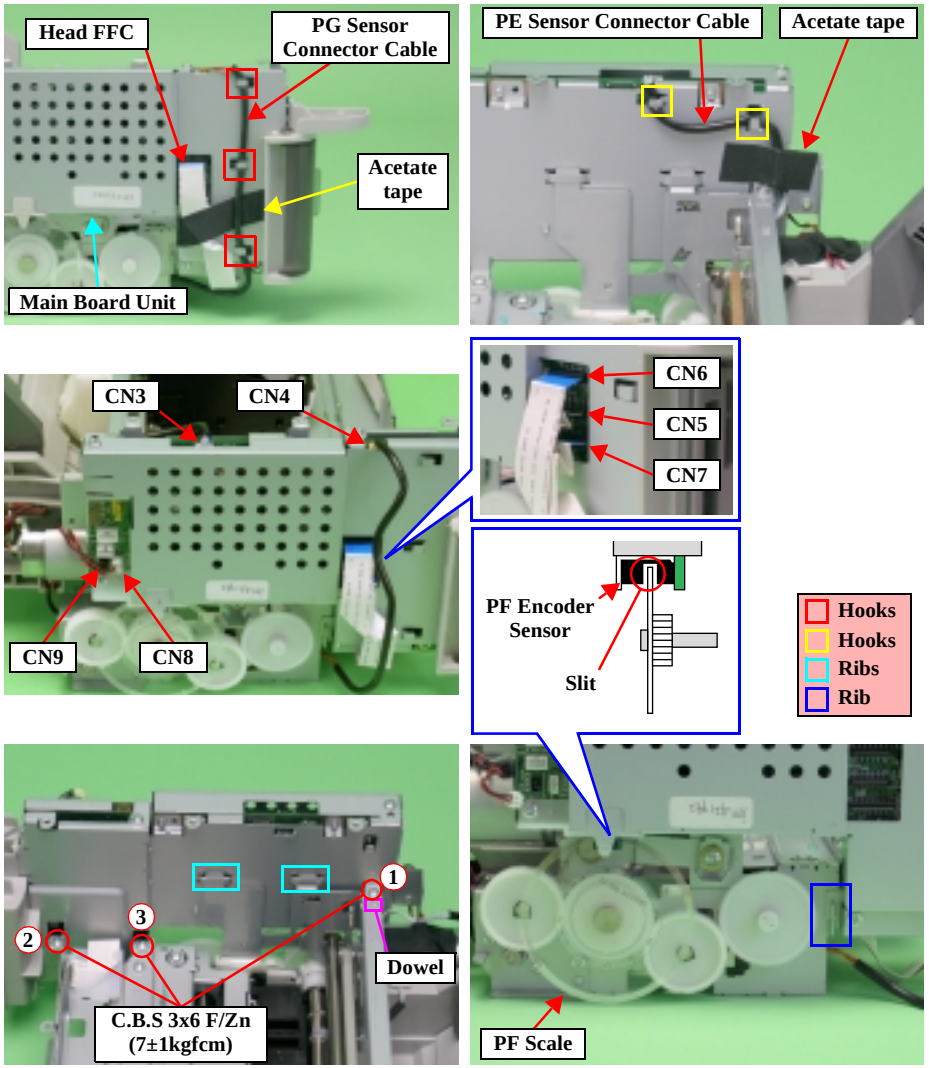


Figure 4-26. Main Board Unit Removal (1)

☐ **Part/Unit that should be removed before removing Main Board Unit.**

Document Cover / Paper Support Assy. / Scanner Unit / Panel Unit / Housing Upper / Printer Mechanism

☐ **Removal procedure**

1. Peel off the acetate tape (x1) for securing Head FFCs (x3)
2. Release PG Sensor Connector Cable from the hooks (x3, ☐) of Main Board Unit.
3. Peel off the acetate tape (x1) for securing PE Sensor Connector Cable, and then release PE Sensor Connector Cable from the hooks (x2, ☐) of Main Board Unit.
4. Disconnect the following cable connectors and FFC from the connectors of Main Board.
   - CN3: PE Sensor Connector Cable
   - CN4: PG Sensor Connector Cable
   - CN5: Head FFC
   - CN6: Head FFC
   - CN7: Head FFC
   - CN8: PF Motor Connector Cable
   - CN9: CR Motor Connector Cable
5. Remove the screws (x3, ○) for securing Main Board Unit, and then remove Main Board Unit from Printer Mechanism.

REASSEMBLY

- **Insert PF Scale into the slit of PF Encoder Sensor.**
- **Insert the ribs (x2, ☐) of Main Frame into the hooks (x2) of Main Board Unit.**
- **Insert the rib (x1, ☐) of Main Board Unit into the hook (x1) of Main Frame.**
- **Align the positioning hole (x1) of Main Board Unit with the dowel (x1, ☐) of Main Frame.**
- **Tighten the screws of Main Board Unit in order shown by figure.**

☐ **External View (2)**

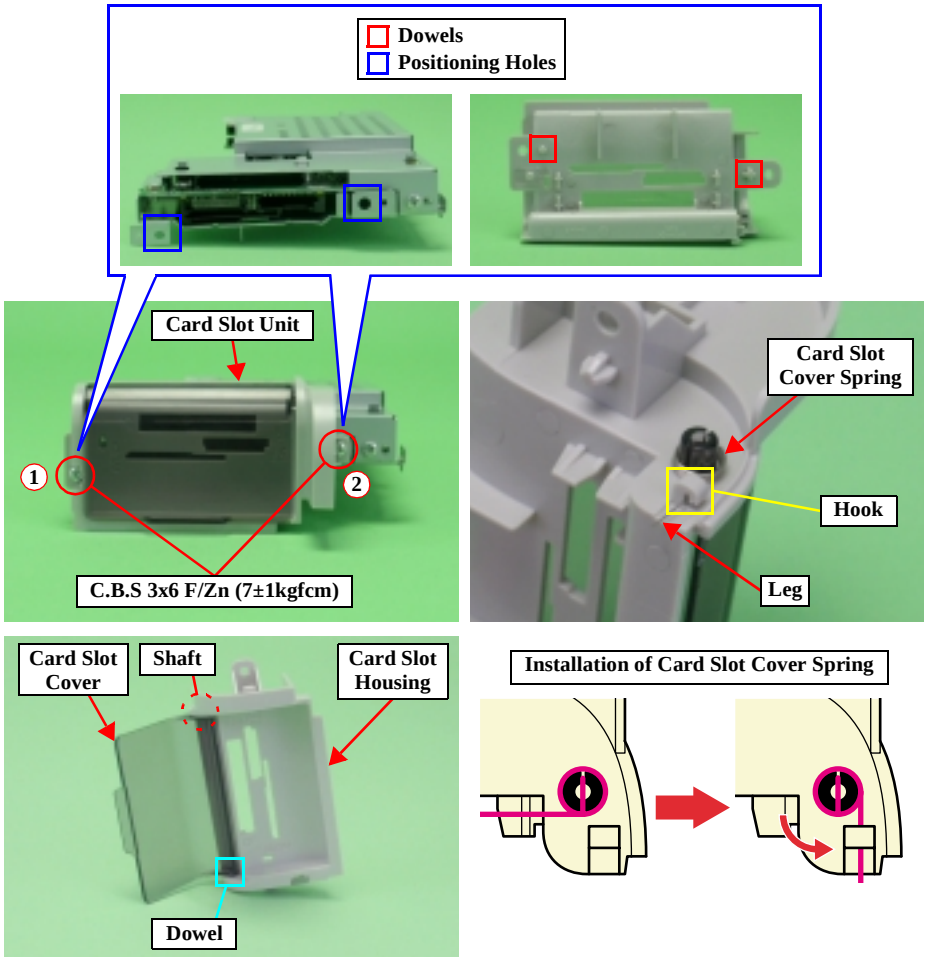


Figure 4-27. Main Board Unit Removal (2)

6. Remove the screws (x2, ○) for securing Card Slot Unit, and then remove Card Slot Unit from and Main Board Unit.

REASSEMBLY

- **Align the positioning holes (x2, □) of Main Board Unit with the dowels (x2, □) of Card Slot Housing.**
- **Tighten the screws of Card Slot Unit in order shown by figure.**

7. Release the foot of Card Slot Cover Spring from the hook (x1, □) of Card Slot Housing, and then remove Card Slot Cover Spring.

REASSEMBLY

Install Card Slot Cover Spring as shown by figure.

8. Release the dowel (x1, □) of Card Slot Cover from Card Slot Housing, and then remove Card Slot Cover.

REASSEMBLY

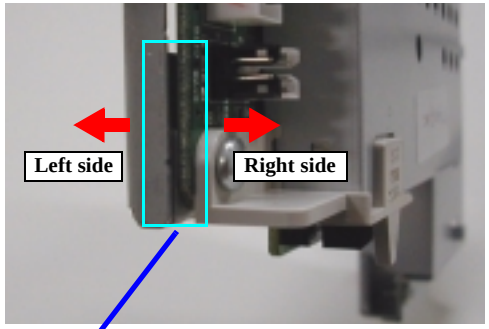
Set the shaft of Card Slot Cover into Card Slot Housing and then align the dowel.

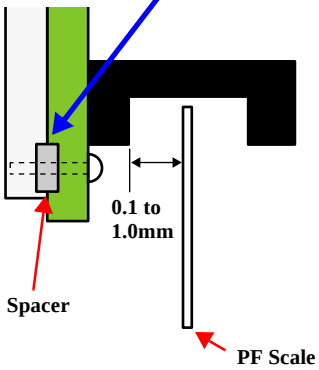
REASSEMBLY

■ PF Scale Sensor positioning adjustment

Use the following procedure to confirm that PF Scale is positioned in the center of the PF Sensor.

1. Test fit Main Board Unit, and confirm whether or not PF Scale is positioned in the center of PF Sensor.
2. If PF Scale is positioned in the center of PF Sensor, adjustment is complete. If scale is not positioned in center of sensor, adjust position of PF Scale using spacer (0.5mm thickness) as shown in diagram below.





Spacer is not applied to Main Board Unit for service part.

- Place spacer between Shield Board and Main Board.
- If PF Scale is off to the left, remove the spacer.
- If PF Scale is off to the right, add an additional spacer. (Total of 2 spacers)

Figure 4-28. PF Scale Sensor positioning adjustment

ADJUSTMENT REQUIRED

When having replaced Main Board Unit, implement the adjustment in the following order. (Refer to Chapter 5 “ADJUSTMENT”)

■ [When possible to read data from the old board]

1. EEPROM Data Copy
2. PF Scale Sensor positioning adjustment
3. PF roller shaft manufacture code

■ [When impossible to read from the old board]

1. PF Scale Sensor positioning adjustment (for replacement only)
2. Destination setting
3. Input Head ID
4. Top margin adjustment
5. Head angular adjustment
6. Bi-D adjustment
7. PW adjustment
8. First dot adjustment
9. CR motor heat protection control

4.3.12 ASF Unit

☐ **External View (1)**

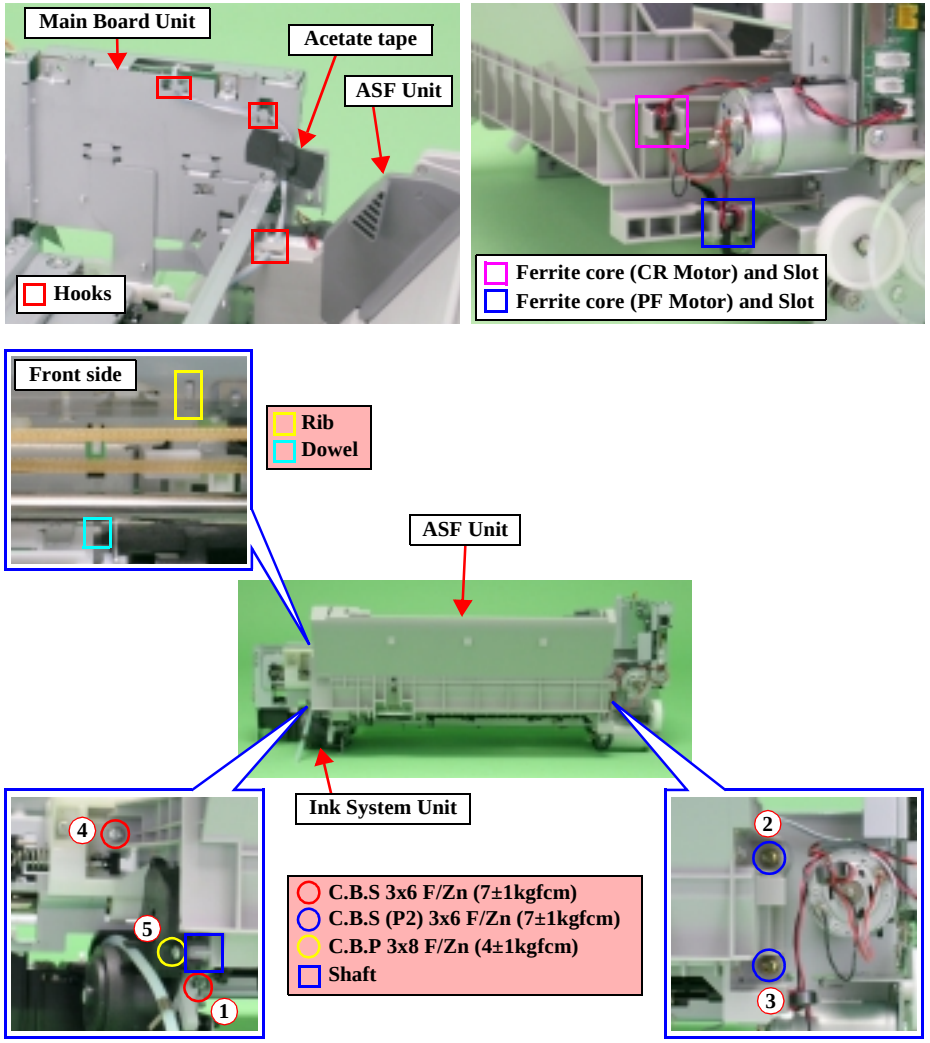


Figure 4-29. ASF Unit Removal (1)

☐ **Part/Unit that should be removed before removing ASF Unit.**

Document Cover / Paper Support Assy. / Scanner Unit / Panel Unit / Housing Upper / Printer Mechanism

☐ **Removal procedure**

1. Peel off the acetate tape (x1) for securing PE Sensor Connector Cable to the shield plate of Main Board, and then release PE Sensor Connector Cable from hooks (x3, ☐) of ASF Unit and Main Board Unit.
2. Remove Ferrite Core of CR/PF Motor Connector Cable from slot of ASF Unit.
3. Remove the screws (x5, ○○○) for securing ASF Unit, and then remove ASF Unit from Printer Mechanism.

REASSEMBLY

- **Align the positioning hole (x1) of Main Frame with the dowel (x1, ☐)/rib (x1, ☐) of ASF Unit.**
- **Insert the shaft of ASF Unit into the slot of Ink System Unit.**
- **Tighten the screws in order shown by figure.**

☐ **External View (2)**

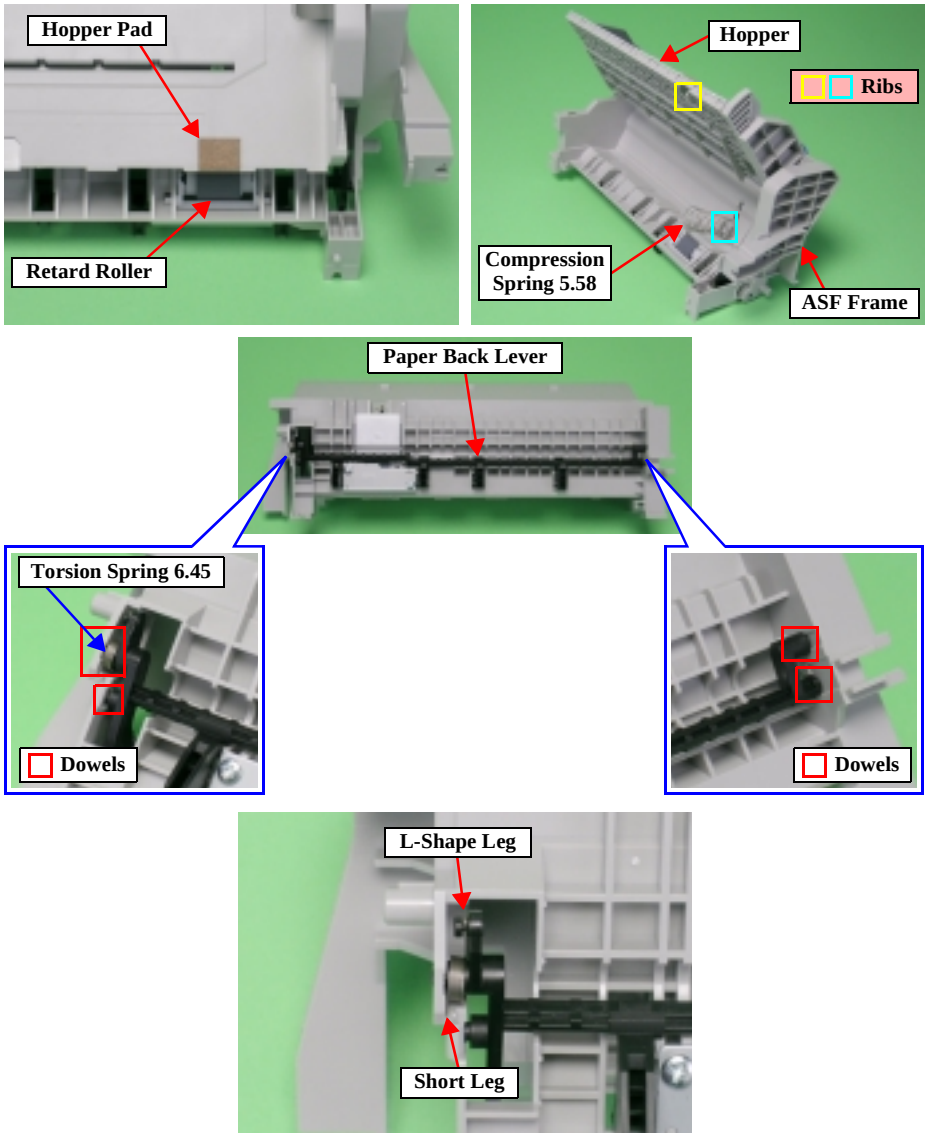


Figure 4-30. ASF Unit Removal (2)

4. Open Hopper, and then remove Compression Spring 5.58.

REASSEMBLY

Install Compression Spring 5.58 to into the ribs (x2, ☐) of ASF Frame and the rib (x1, ☐) of Hopper.

5. Bend Paper Back Lever, release the both ends of dowels (2 each, ☐) from ASF Unit, and then remove Paper Back Lever and Torsion Spring 6.45.

CAUTION

Do not touch Retard Roller and Hopper Pad.

REASSEMBLY

- **Fasten L-shape leg of Torsion Spring 6.45 to the shaft of Paper Back Lever, and then fasten short leg to the channel of ASF Unit.**
- **Confirm that Paper Back Lever operates smoothly.**

ADJUSTMENT REQUIRED

After changing the ASF Unit for a new one, always apply grease G-26 and grease G-46 to the specified portions.

- **Refer to Chapter 6, Figure 6-5 *(p.177)***

ADJUSTMENT REQUIRED

When having removed or replaced ASF Unit, implement the adjustment in the following order. (Refer to Chapter 5 "ADJUSTMENT")

1. **Top margin adjustment**
2. **First dot adjustment**

4.3.13 Holder Shaft Unit

☐ **External View (1)**

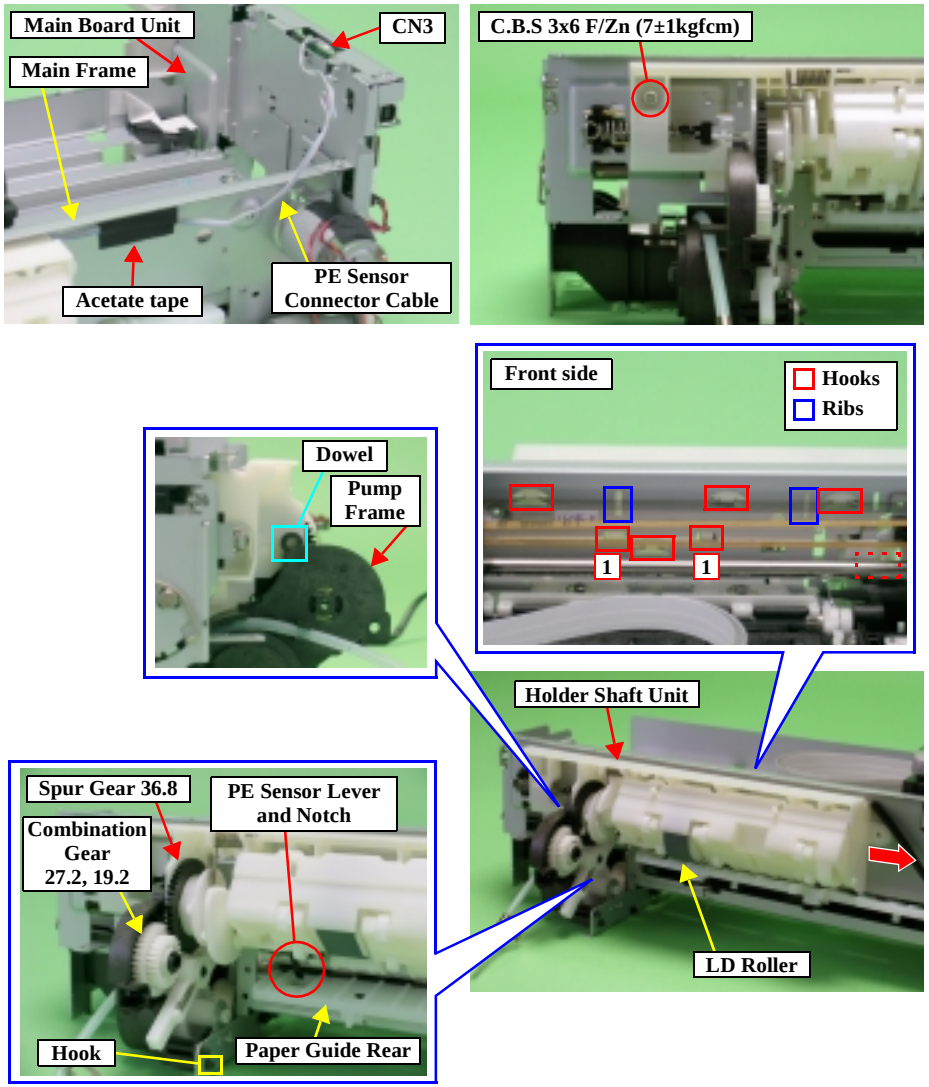


Figure 4-31. Holder Shaft Unit Removal (1)

☐ **Part/Unit that should be removed before removing Holder Shaft Unit.**

Document Cover / Paper Support Assy. / Scanner Unit / Panel Unit / Housing Upper / Printer Mechanism / ASF Unit

☐ **Removal procedure**

1. Slide Carriage Unit center of printer.
2. Peel off the acetate tape (x1) for securing PE Sensor Connector Cable from Main Frame.

REASSEMBLY

Use acetate tape to attach PF Sensor Connector Cable to printed line position on Main Frame.

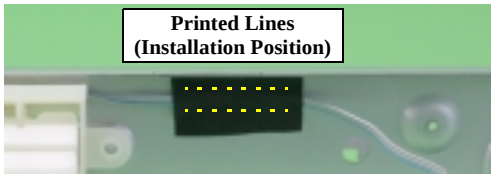


Figure 4-32. Installation of Timing Belt

3. Disconnect PE Sensor Connector Cable from connector (CN3) of Main Board.
4. Remove the screw (x1, ○) for securing Holder Shaft Unit.
5. Remove Holder Shaft Unit from Main Frame as belows.
   1. Push the hooks (x2, 1) of Holder Shaft Unit, and pull Holder Shaft Unit upward slightly from Main Frame.
   2. Move Pump Unit to home position side slightly while holing the whole of Holder Shaft Unit, and pull the bottom of the unit toward the backside of the printer.

CAUTION

- **Damage may occur by placing a load on lower side hook (x1, ☐) of Pump Frame if Pump Frame is spread too wide.**
- **Do not touch LD Roller.**
- **Do not allow damage to gear surface of Spur Gear 36.82 and Combination Gear 27.2, 19.2.**
- **Do not allow PE Sensor Lever to be damaged by interference with Paper Guide Rear.**

REASSEMBLY

- **Set PE Sensor Lever into notch of Paper Guide Rear.**
- **Engage gear surfaces of Spur Gear 36.8 and Combination Gear 27.2, 19.2.**
- **Align the positioning hole (x1) of Ink System with the dowel (x1, ☐) of Holder Shaft Unit.**
- **Secure Holder Shaft Unit with hooks (x6, ☐) and ribs (x2, ☐).**

☐ **External View (2)**

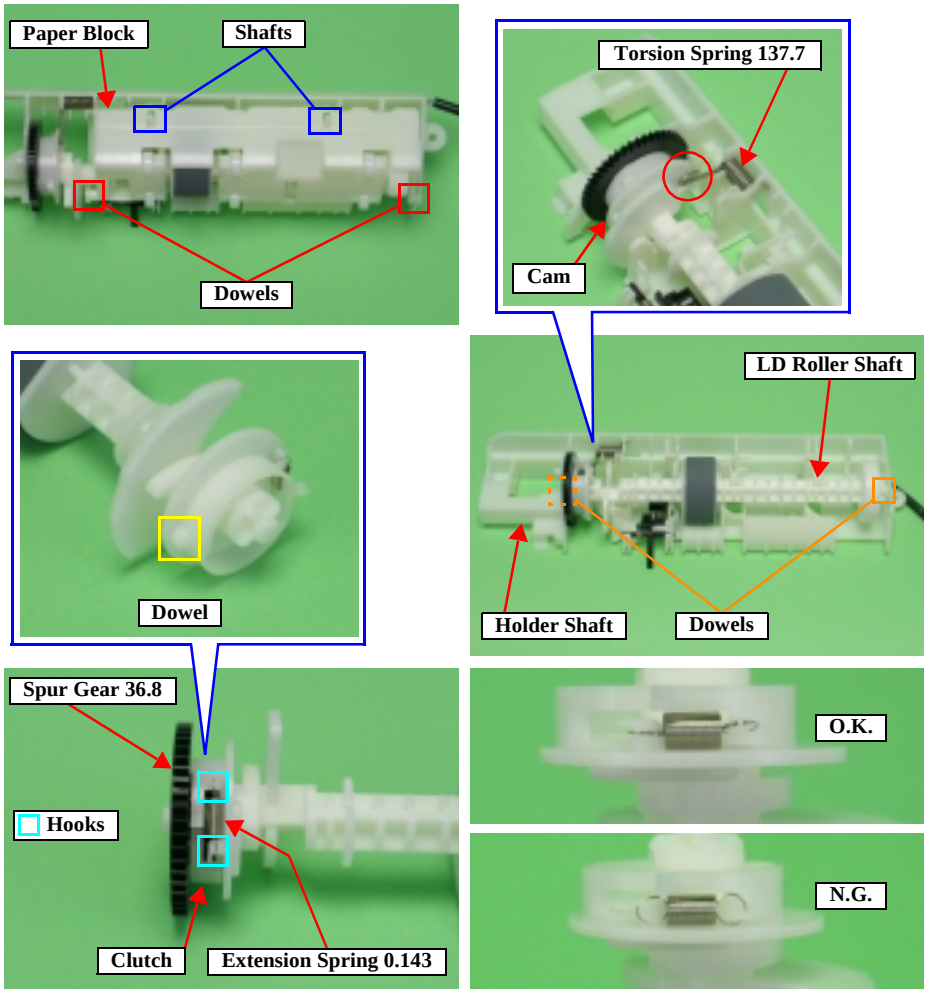


Figure 4-33. Holder Shaft Unit Removal (2)

6. Release dowels (x2, ☐) for securing Paper Block to Holder Shaft, and then remove Paper Block.

REASSEMBLY

Align notches (x2) of Paper Block with shafts (x2, ☐) of Holder Shaft.

7. Remove LD Roller Shaft along with Clutch mechanism from Holder Shaft.

REASSEMBLY

- **Use leg of Torsion Spring 137.7 to press cam of LD Roller Shaft.**
- **Align positioning hole (x2) of Holder Shaft with dowel (x2, ☐) of LD Roller Shaft.**

8. Remove Spur Gear 36.8 from LD Roller Shaft.

REASSEMBLY

Confirm that Clutch mechanism operates smoothly.

9. Remove Extension Spring 0.143, and remove Clutch from LD Roller Shaft.

REASSEMBLY

- **Align positioning hole (x1) of Clutch with dowel (x1, ☐) of LD Roller Shaft.**
- **Install Extension Spring 0.143 in the correct condition as shown by figure.**

☐ **External View (3)**

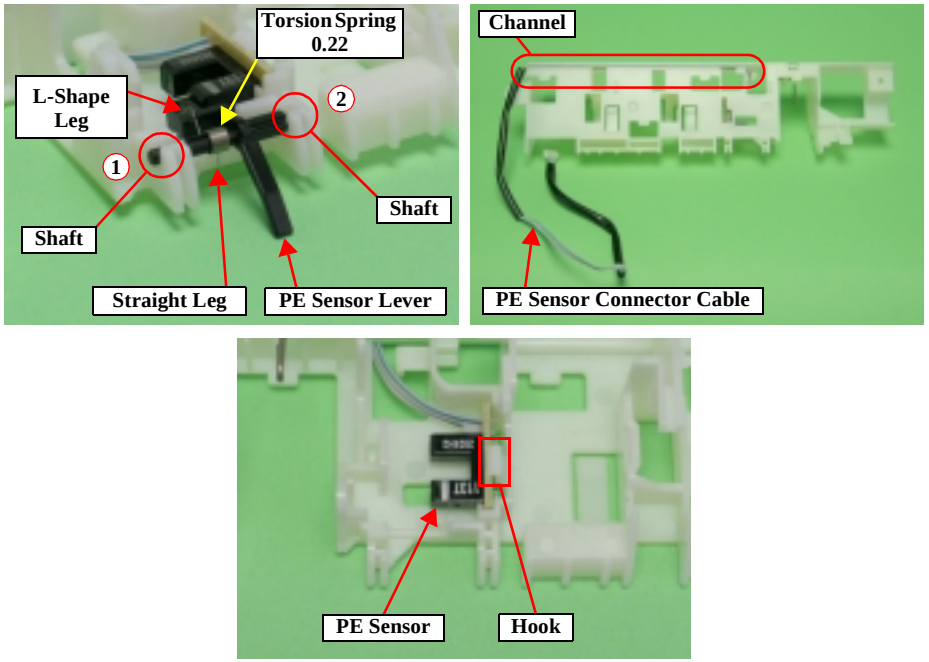


Figure 4-34. Holder Shaft Unit Removal (3)

10. Following order shown by figure, remove shaft of PE Sensor Lever from Holder Shaft, and then remove PE Sensor Lever and Torsion Spring 0.22.
11. Remove Torsion Spring 0.22 from PE Sensor Lever.

REASSEMBLY

- **Fasten L-shaped leg of Torsion Spring 0.22 to indentation of PE Sensor Lever, and fasten straight leg to Holder Shaft.**
- **Confirm that PE Sensor Lever operates smoothly.**

12. Release PE sensor Connector Cable from channel of Holder Shaft.

REASSEMBLY

Wrap PE Sensor Connector Cable so it will not protrude from channel of Holder Shaft.

13. Release hook (x1, ☐) for securing PE sensor, and then remove PE sensor from Holder Shaft.

ADJUSTMENT REQUIRED

When having removed or replaced Holder Shaft Unit, implement the adjustment in the following order. (Refer to Chapter 5 "ADJUSTMENT")

- **Top margin adjustment**

4.3.14 CR Guide Frame

☐ **External View**

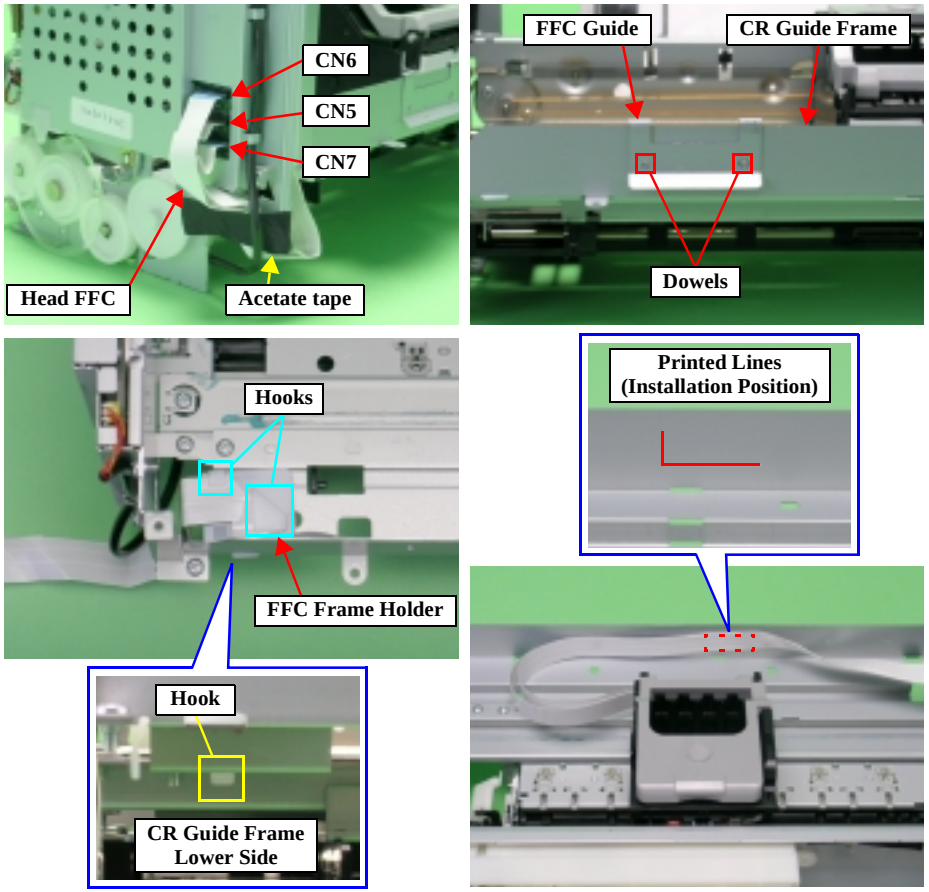


Figure 4-35. CR Guide Frame Removal (1)

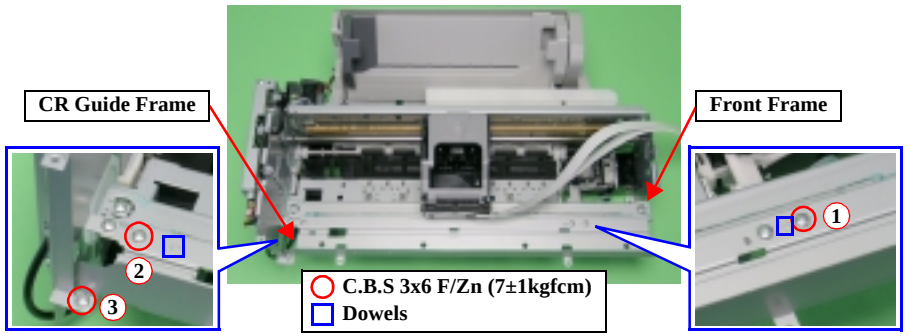


Figure 4-36. CR Guide Frame Removal (2)

☐ **Part/Unit that should be removed before removing CR Guide Frame.**

Document Cover / Paper Support Assy. / Scanner Unit / Panel Unit / Housing Upper / Printer Mechanism / Main Board Unit

☐ **Removal procedure**

1. Peel off the acetate tape (x1) for securing Head FFC (x3).
2. Disconnect Head FFCs from the connectors (CN5, CN6, CN7) of Main Board.
3. Release the dowels (x2, □) for securing FFC Guide, and then remove FFC Guide from CR Guide Frame.
4. Release the hook (x1, □) for securing FFC Frame Holder from lower side of CR Guide Frame, and then release FFC Frame Holder along with Head FFCs.
5. Release Head FFCs from hooks (x2, □) of FFC Frame Holder.
6. Peel off Head FFCs secured to CR Guide Frame by the double-sided tape (x1).

REASSEMBLY

Use the double-sided tape to attach Head FFCs to the printed line position on CR Guide Frame.

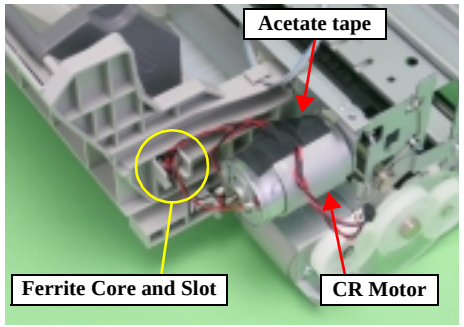
7. Remove screws (x3, ○) for securing CR Guide Frame, and then remove CR Guide Frame from Printer Mechanism.

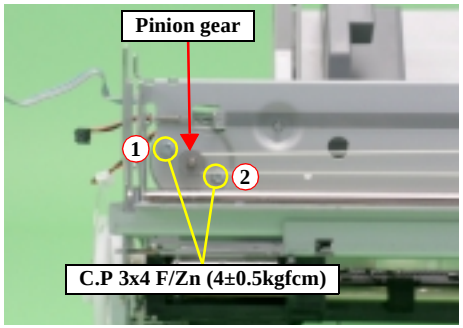
REASSEMBLY

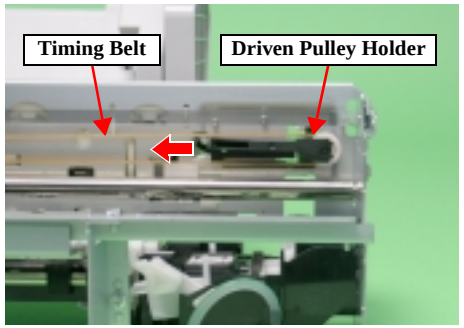
- **Align the positioning holes (x2) of CR Guide Frame with the dowels (x2, □) of Front Frame.**
- **Locations for using the screws (③) for combined tightening of Main Board Unit and CR Guide Frame are at the lower side screw hole tabs of CR Guide Frame.**
- **Tighten the screws in order shown by figure.**

4.3.15 CR Motor

☐ **External View**







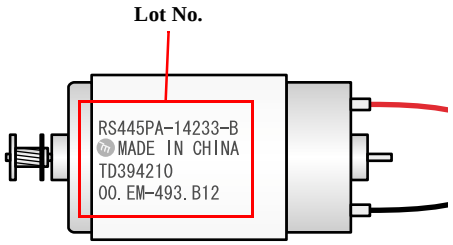


Figure 4-37. CR Motor Removal

☐ **Part/Unit that should be removed before removing CR Motor.**

Document Cover / Paper Support Assy. / Scanner Unit / Panel Unit / Housing Upper / Printer Mechanism / Main Board Unit / CR Guide Frame

☐ **Removal procedure**

1. Slide Carriage Unit center of printer.
2. Peel off the acetate tape (x1) from CR Motor, and then release CR Motor Connector Cable and PF Motor Connector Cable.
3. Remove Ferrite Core (x1) of CR Motor Connector Cable from the slot (x1) of ASF Unit.
4. Loosen tension of Timing Belt by pressing Driven Pulley Holder in the direction of arrow shown by figure, and then remove Timing Belt from the pinion gear of CR Motor.
5. Remove the screws (x2, ○) for securing CR Motor, and then remove CR Motor from Printer Mechanism.

CAUTION

Do not damage pinion gear of CR Motor.

REASSEMBLY

- **Assemble so that recorded Lot Number faces upward.**
- **Tighten the screws in order shown by figure.**
- **Make sure that there is no gap between CR Motor and Main Frame.**

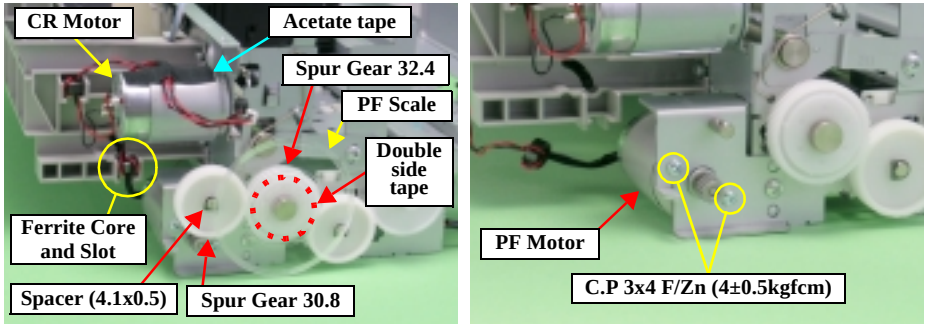
ADJUSTMENT REQUIRED

When having removed or replaced CR Motor, implement the adjustment in the following order. (Refer to Chapter 5 "ADJUSTMENT")

1. **Bi-D adjustment**
2. **PW adjustment**
3. **First dot adjustment**
4. **CR motor heat protection control (for replacement only)**

4.3.16 PF Motor

☐ **External View**



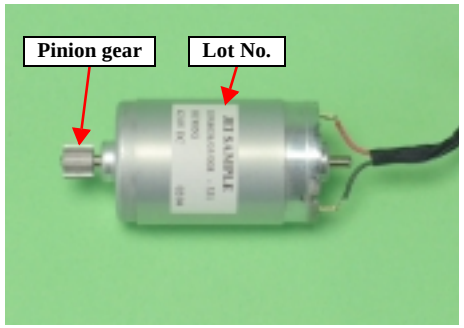


Figure 4-38. PF Motor Removal

☐ **Part/Unit that should be removed before removing PF Motor.**

Document Cover / Paper Support Assy. / Scanner Unit / Panel Unit / Housing Upper / Printer Mechanism / Main Board Unit

☐ **Removal procedure**

1. Peel off the acetate tape (x1) from CR Motor, and then release CR Motor Connector Cable and PF Motor Connector Cable.
2. Remove Ferrite Core (x1) of PF Motor Connector Cable from the slot (x1) of ASF Unit.
3. Peel off PF Scale secured to Spur Gear 32.4 with the double-sided tape (x1).
4. Remove Spacer (4.1x0.5) for securing Spur Gear 30.8, and then remove Spur Gear 30.8 from Main Frame.

CAUTION

Do not damage the following locations.
- **Pinion gear of PF Motor**
- **PF Scale**
- **Spur Gear 30.8**

5. Remove the screws (x2, ○) for securing PF Motor, and then remove PF Motor from Printer Mechanism.

REASSEMBLY

- **Assemble so that label with recorded Lot Number faces upward.**
- **Make sure that there is no gap between PF Motor and Main Frame.**

4.3.17 Carriage Unit

☐ **External View (1)**

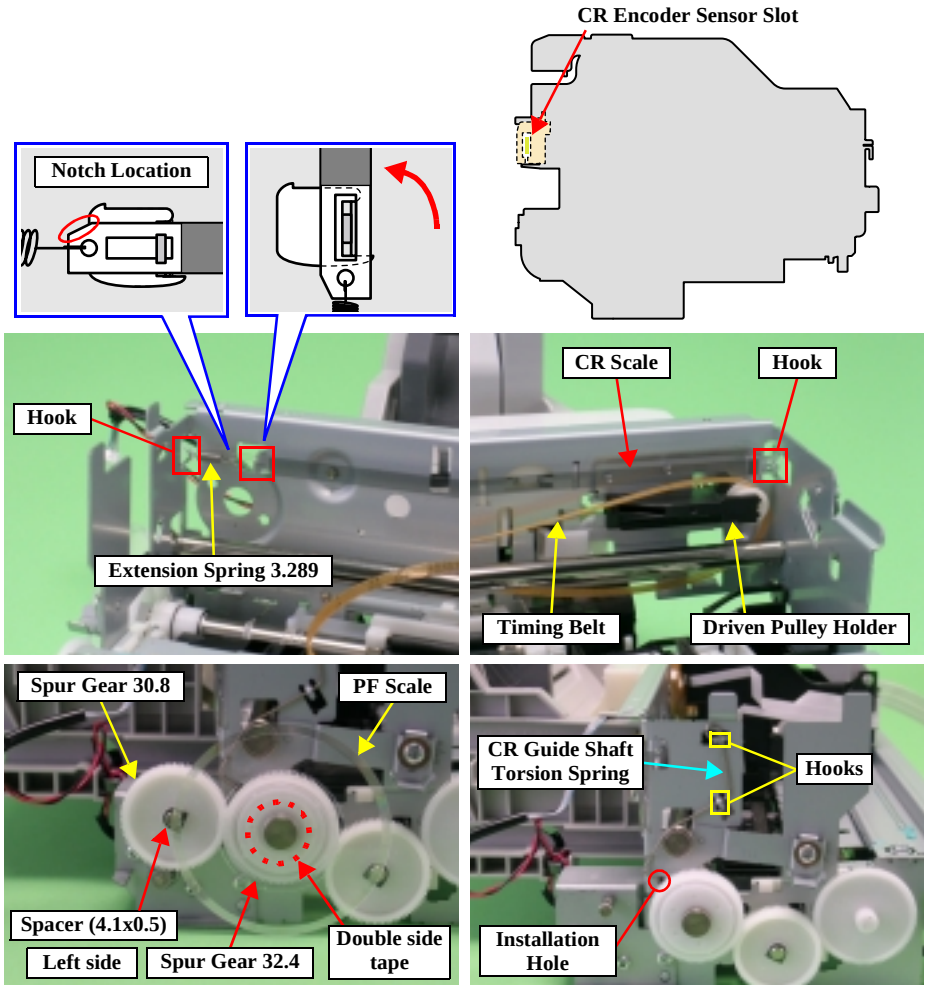


Figure 4-39. Carriage Unit Removal (1)

☐ **Part/Unit that should be removed before removing Carriage Unit.**

Document Cover / Paper Support Assy. / Scanner Unit / Panel Unit / Housing Upper / Printer Mechanism / Main Board Unit / CR Guide Frame / CR motor

☐ **Removal procedure**

1. Release Timing Belt from Driven Pulley Holder.
2. Remove CR Scale from Main Frame.

CAUTION

Be cautious of the following points.
- **Do not touch CR Scale with bare hands.**
- **Do not damage CR Scale.**
- **Handle leg of Extension Spring 3.289 in a way that does not extend it.**

REASSEMBLY

- **Extension Spring 3.289 should not be twisted.**
- **Install CR Scale so that it passes through the slit of CR Encoder Sensor.**
- **Install the left end of CR Scale so that the cut section faces upward.**

3. Peel off PF Scale secured to Spur Gear 32.4 with the double-sided tape (x1).

CAUTION

Be cautious of the following points.
- **Do not touch PF Scale with bare hands.**
- **Do not damage PF Scale.**

REASSEMBLY

PF Scale should not be unsteady.

4. Remove Spacer (4.1x0.5) for securing Spur Gear 30.8, and then remove Spur Gear 30.8 from Main Frame.
5. Release CR Guide Shaft Torsion Spring from the hooks (x2, ☐) of Main Frame, and then remove CR Guide Shaft Torsion Spring from Main Frame.

☐ **External View (2)**

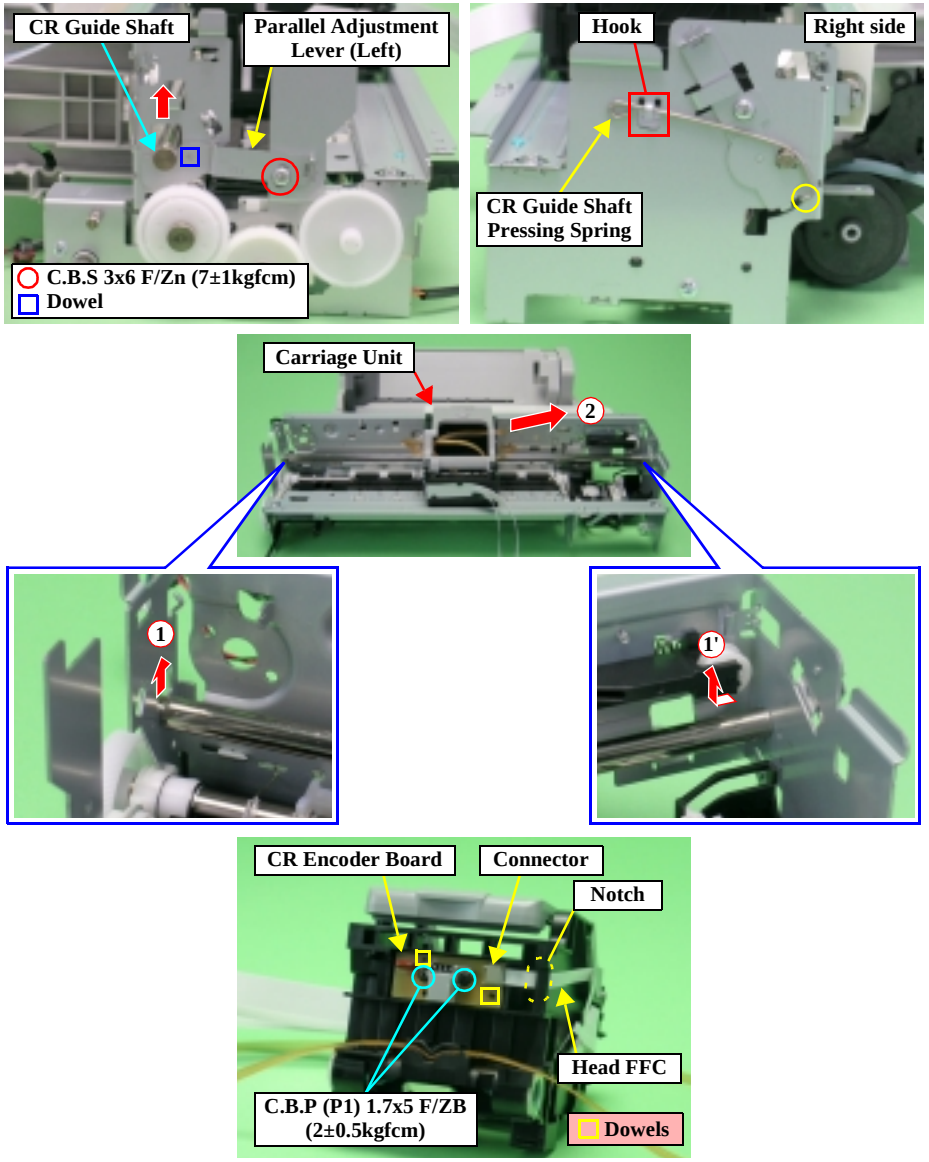


Figure 4-40. Carriage Unit Removal (2)

6. Remove the screw (x1, ○) for securing Parallel Adjustment Lever (Left), and then remove Parallel Adjustment Lever (Left) from Main Frame while lifting left end of Carriage Guide Shaft upward.

REASSEMBLY

Align the positioning hole (x1) of Parallel Adjustment Lever (Left) with the dowel (x1, □) of Main Frame.

7. Release CR Guide Shaft Pressing Spring from the hook (x1, □) of Main Frame, and then remove CR Guide Shaft Pressing Spring from Main Frame.
8. Remove Carriage Unit and Carriage Guide Shaft from Printer Mechanism as follows.
   1. Lift left end of Carriage Guide Shaft and shift in left direction until releasing right end of Carriage Guide Shaft from the notch of Main Frame.
   2. Remove Carriage Guide Shaft along with Carriage Unit from Main Frame.
9. Pull out Carriage Guide Shaft from Carriage Unit.

CAUTION

- **Do not damage Carriage Guide Shaft.**
- **Do not stain the Timing Belt with the grease (KEN Grease).**

REASSEMBLY

Confirm that Carriage Unit operates smoothly.

■ CR Encoder Board Removal

1. Disconnect Head FFC from the connector of CR Encoder Board, and then pull out Head FFC from the notch of Carriage.
2. Remove the screws (x2, ○) for securing CR Encoder Board, and then remove CR Encoder Board.

REASSEMBLY

- **Do not allow CR Encoder Board to float.**
- **Align the positioning holes (x2) of CR Encoder Board with the dowels (x2, □) of Carriage.**

☐ **External View (3)**

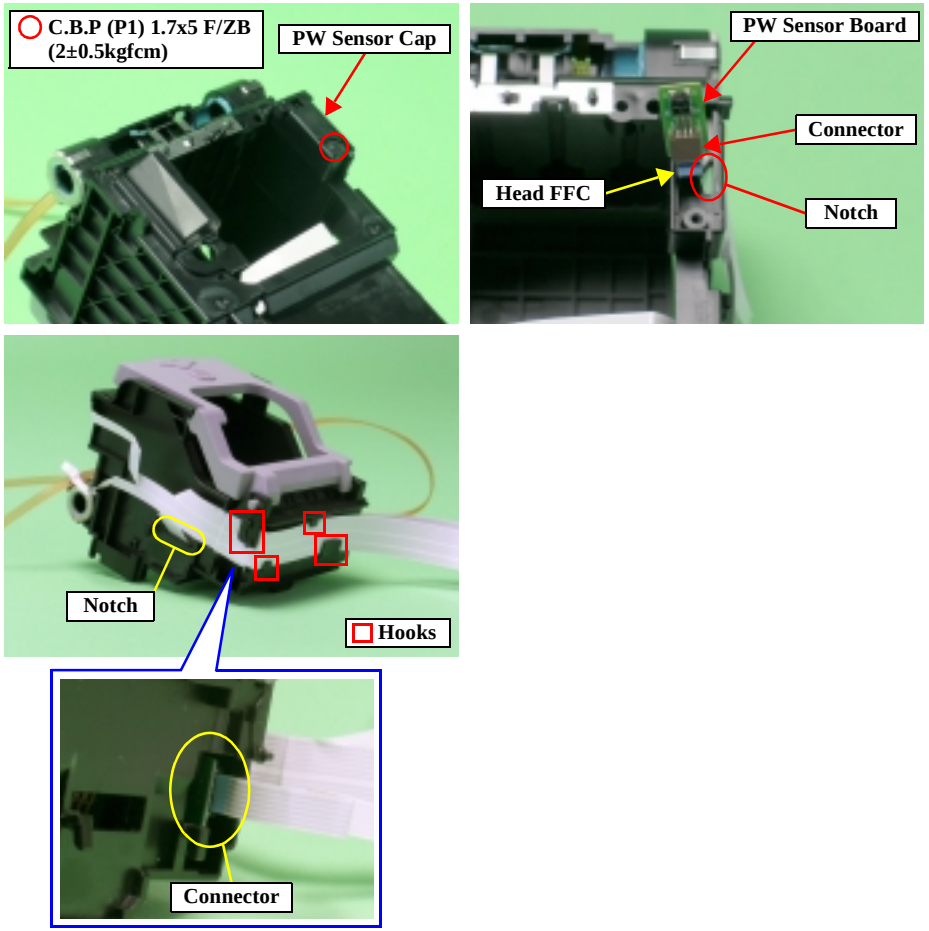


Figure 4-41. Carriage Unit Removal (3)

■ PW Sensor Board Removal

1. Remove the screw (x1, ○) for securing PW Sensor Cap, and then remove PW Sensor Cap.
2. Disconnect Head FFC from the connector of PW Sensor Board, and then pull out Head FFC from the notch of Carriage.

REASSEMBLY

Do not allow PW Sensor Cap to float.

■ Head FFC Removal

1. Remove Print Head from Carriage Unit.
2. Pull out Head FFC from the notch of Carriage.
3. Release Head FFC from the hooks (x4, □) for securing Head FFC.
4. Disconnect Head FFC from the connector of CSIC board.

ADJUSTMENT REQUIRED

After changing the Carriage Unit for a new one, always apply grease KEN to the specified portions.

■ **Refer to Chapter 6, Figure 6-7 *(p.178)***

ADJUSTMENT REQUIRED

When having replaced Carriage Unit, implement the adjustment in the following order. (Refer to Chapter 5 "ADJUSTMENT")

1. **PG Adjustment**
2. **Top margin adjustment**
3. **Head angular adjustment**
4. **Bi-D adjustment**
5. **PW adjustment**
6. **First dot adjustment**

4.3.18 Paper Guide Upper Unit

☐ **External View**

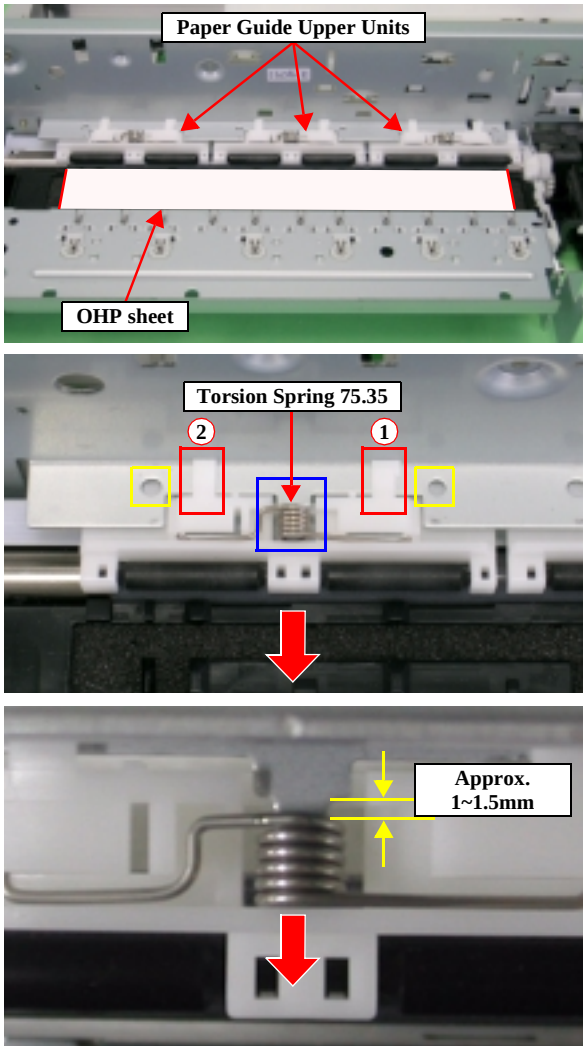


Figure 4-42. Paper Guide Upper Unit Removal

☐ **Part/Unit that should be removed before removing Paper Guide Upper Unit.**

Document Cover / Paper Support Assy. / Scanner Unit / Panel Unit / Housing Upper / Print Head/ Printer Mechanism / Main Board Unit / CR Guide Frame / CR motor / Carriage Unit

☐ **Removal procedure**

1. Set an OHP sheet.
2. Release the dowels (2 each, ☐) for securing Paper Guide Upper Unit (x3), and then remove Paper Guide Upper Unit (x3) along with Torsion Spring 75.35 (1 each) from Main Frame.

REASSEMBLY

Reassembly of Paper Guide Upper Unit

1. **Set Torsion Spring 75.35 onto Paper Guide Upper Unit.**
2. **Temporarily place hooks (x2, ☐) of Paper Guide Upper Unit onto Main Frame in order shown by figure.**
3. **Insert the coil section of Torsion Spring 75.35 into the rib.**
4. **Align the positioning holes (x2) of Main Frame with the dowels (x2, ☐) of Paper Guide Upper Unit, and then set Paper Guide Upper Unit along with Torsion Spring 75.35.**
5. **Pull the coil section of Torsion Spring 75.35 toward the front, hold the margin at approximately 1~1.5mm, and then eliminate gap with Paper Guide Upper Unit.**

ADJUSTMENT REQUIRED

When having removed or replaced Paper Guide Upper Unit, implement the adjustment in the following order. (Refer to Chapter 5 "ADJUSTMENT")

■ **Top margin adjustment**

4.3.19 Front Frame

☐ **External View**

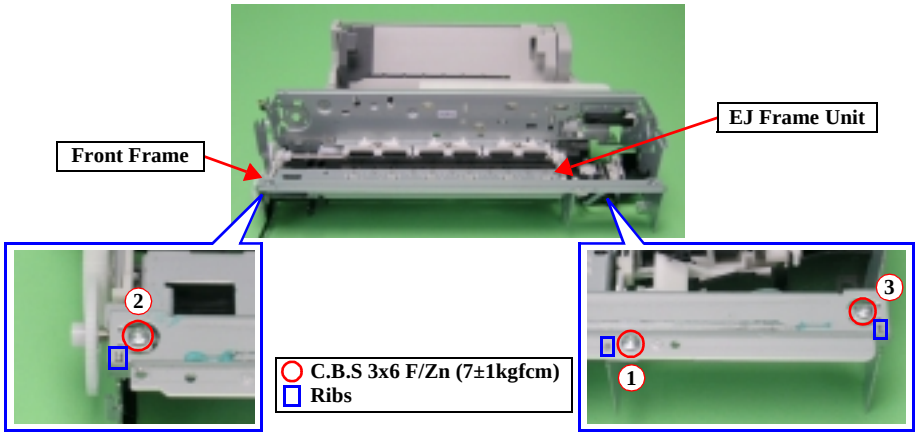


Figure 4-43. Front Frame Removal

☐ **Part/Unit that should be removed before removing Front Frame.**

Document Cover / Paper Support Assy. / Scanner Unit / Panel Unit / Housing Upper / Print Head/ Printer Mechanism / Main Board Unit / CR Guide Frame / CR motor / Carriage Unit

☐ **Removal procedure**

1. Remove the screws (x3, ○) for securing Front Frame, and then remove Front Frame from Printer Mechanism.

REASSEMBLY

- **Align the positioning holes of Front Frame with the ribs (x3, □) of Main Frame.**
- **Tighten the screws in order shown by figure.**

ADJUSTMENT REQUIRED

When changing the Front Frame for new one, always apply grease KEN to the specified portion.

- **Refer to Chapter 6, Figure 6-10 *(p.179)***

ADJUSTMENT REQUIRED

When having removed or replaced Front Frame, implement the adjustment in the following order. (Refer to Chapter 5 "ADJUSTMENT")

1. **Bi-D adjustment**
2. **First dot adjustment**

4.3.20 EJ Frame Unit

☐ **External View (1)**

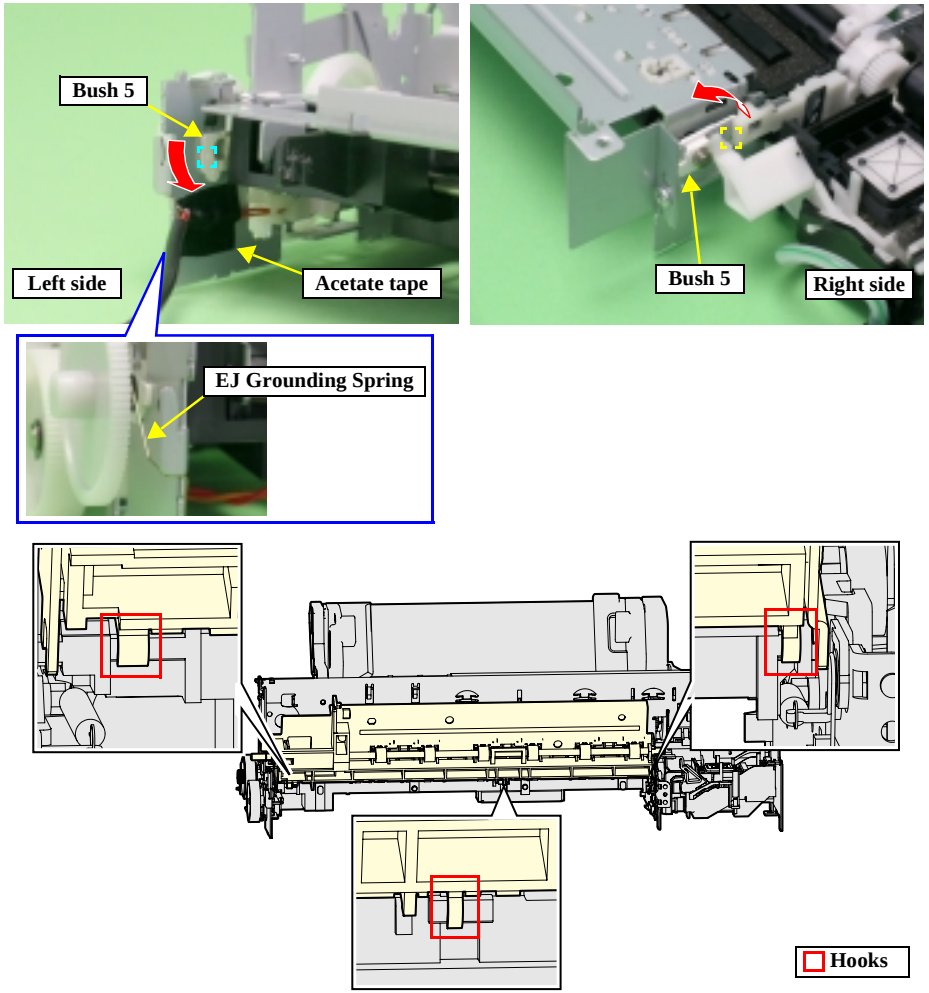


Figure 4-44. EJ Frame Unit Removal (1)

☐ **Part/Unit that should be removed before removing EJ Frame Unit.**

Document Cover / Paper Support Assy. / Scanner Unit / Panel Unit / Housing Upper / Print Head/ Printer Mechanism / Main Board Unit / CR Guide Frame / CR motor / Carriage Unit / Front Frame

☐ **Removal procedure**

CAUTION

■ **Do not hold FJ Frame Unit while handling Printer Mechanism in your repair.**
■ **Do not touch the rubber portion.**

1. Peel off the acetate tape (x1) for securing PG Sensor Connector Cable.
2. Remove EJ Grounding Spring from the left end of EJ Frame Unit.
3. Release dowel (x1, ⬚) of the left Bush 5 of EJ Frame Unit, and rotate downward 90°.
4. Release dowel (x1, ⬚) of Bush 5 at right end of EJ Frame Unit, and allow to rotate upward (or downward) 90°.
5. Release the hooks (x3, ☐) for securing EJ Frame Unit while lifting the front side of EJ Frame Unit upward.

REASSEMBLY

■ **Firmly insert left/right Bush 5 into the notches of Main Frame.**

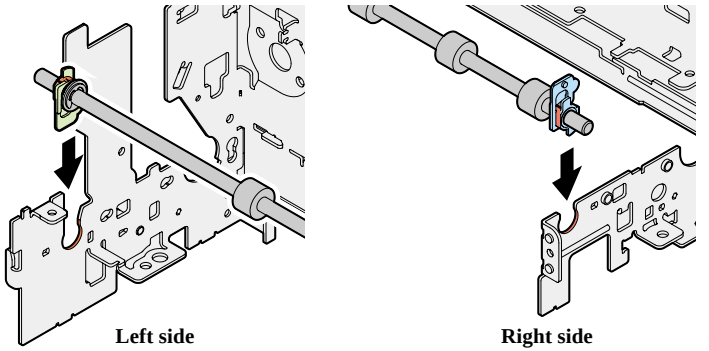


Figure 4-45. Installation of Bush 5

■ **Make sure that there is no gap between EJ Frame Unit and Main Frame.**

☐ **External View (2)**

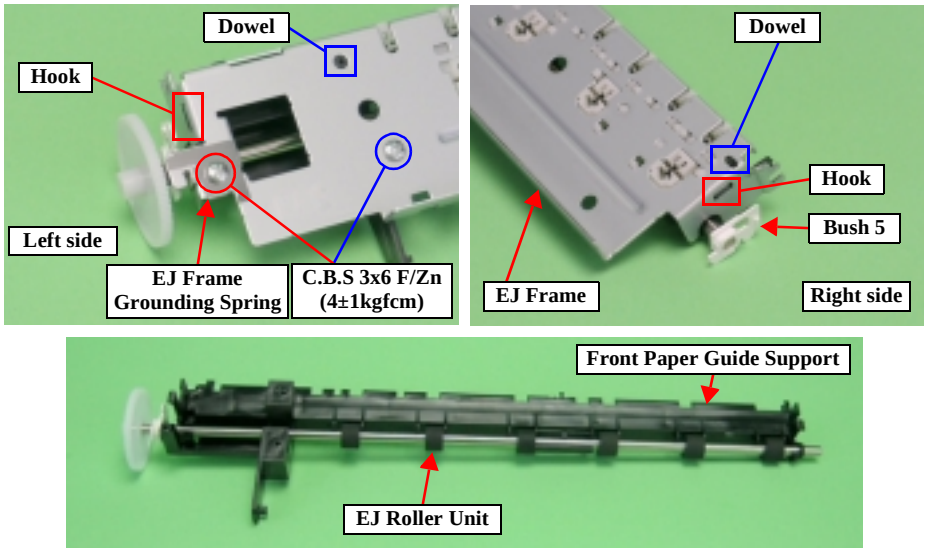


Figure 4-46. EJ Frame Unit Removal (2)

6. Remove the right Bush 5 from EJ Frame Unit.
7. Remove the screw (x1, ○) for securing EJ Frame Grounding Spring, and then remove EJ Frame Grounding Spring.
8. Remove the screws (x1, ○) for securing Front Paper Guide Support.
9. Remove Front Paper Guide Support along with EJ Roller Unit while releasing the hooks (x2, □) for securing Front Paper Guide Support.

REASSEMBLY

- **Align positioning holes (x2) of EJ Frame with dowels (x2, □) of Front Paper Guide Support.**
- **Confirm that EJ Roller Unit operates smoothly.**

ADJUSTMENT REQUIRED

When changing the Front Paper Guide Support for new one, always apply grease G-46 to the specified portions.

- **Refer to Chapter 6, Figure 6-8 *(p.178)***

4.3.21 Ink System Unit

☐ **External View**

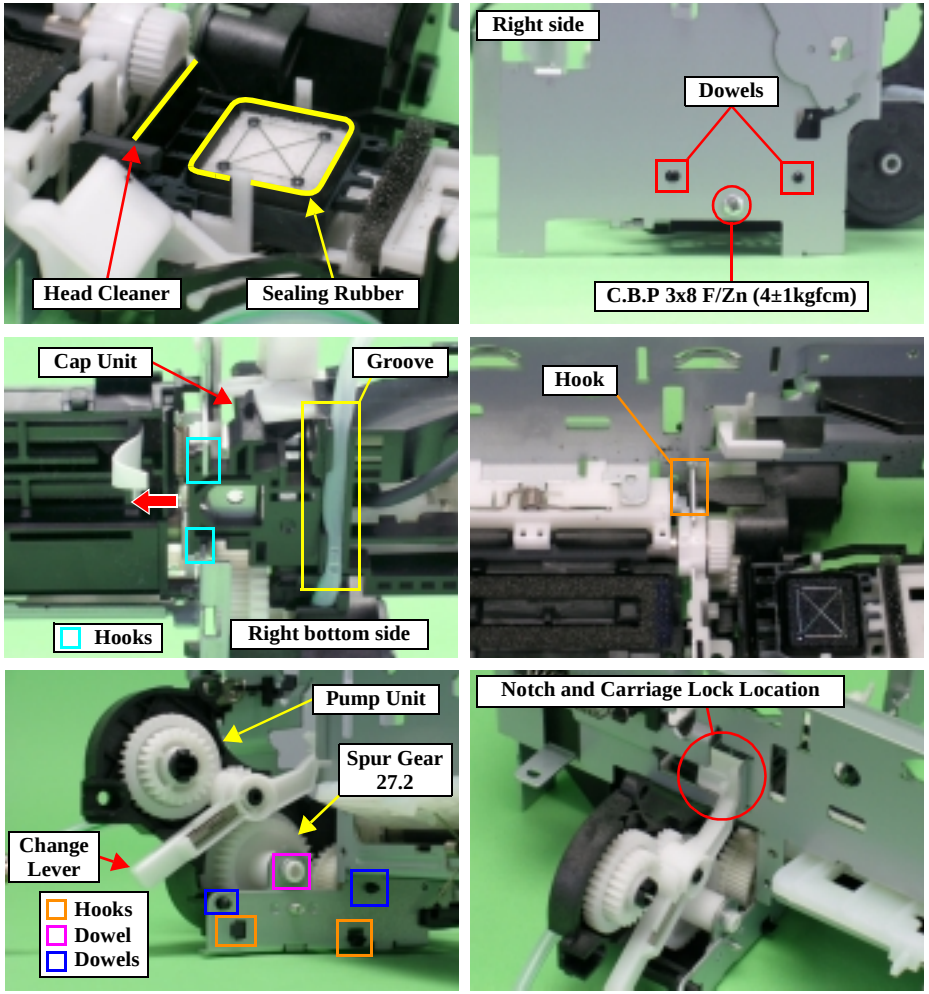


Figure 4-47. Ink System Unit Removal

☐ **Part/Unit that should be removed before removing Ink System Unit.**

Document Cover / Paper Support Assy. / Scanner Unit / Panel Unit / Housing Upper / Print Head/ Printer Mechanism / Main Board Unit / ASF Unit / Holder Shaft Unit / CR Guide Frame / CR motor / Carriage Unit / Front Frame

☐ **Removal procedure**

CAUTION

- **Do not cause damage by touching Sealing Rubber or Head Cleaner when performing the following steps.**
- **Mark the connection location before removing Ink Tube.**

1. Release Ink Tube located under Cap Frame.

REASSEMBLY

Set by inserting Ink Tube into groove.

2. Remove the screw (x1, ○) for securing Cap Unit.
3. Slide Cap Unit to Main Frame interior, and then release the hooks (x2, □) of Cap Unit from Main Frame.

REASSEMBLY

Align the positioning holes (x2) of Main Frame with the dowels (x2, □) of Cap Unit.

4. Release the hooks (x3, □) for securing Pump Unit to Main Frame carefully, and remove Pump Unit with supporting Change Lever and Combination Gear 27.2, 19.2 by your finger. (Supporting of Change Lever and gear is to prevent damage by dropping in disassembly.)
5. Remove the whole of Ink System Unit from Printer Mechanism, and remove the gears (x4) and the Pump Pulley.

REASSEMBLY

- **Align the positioning holes (x3) of Main Frame with the dowels (x2, □) of Pump Unit and the dowel (x1, □) of Spur Gear 27.2.**
- **Confirm that Cap Unit operates smoothly.**

4.3.22 Paper Guide Front Unit

☐ **External View**

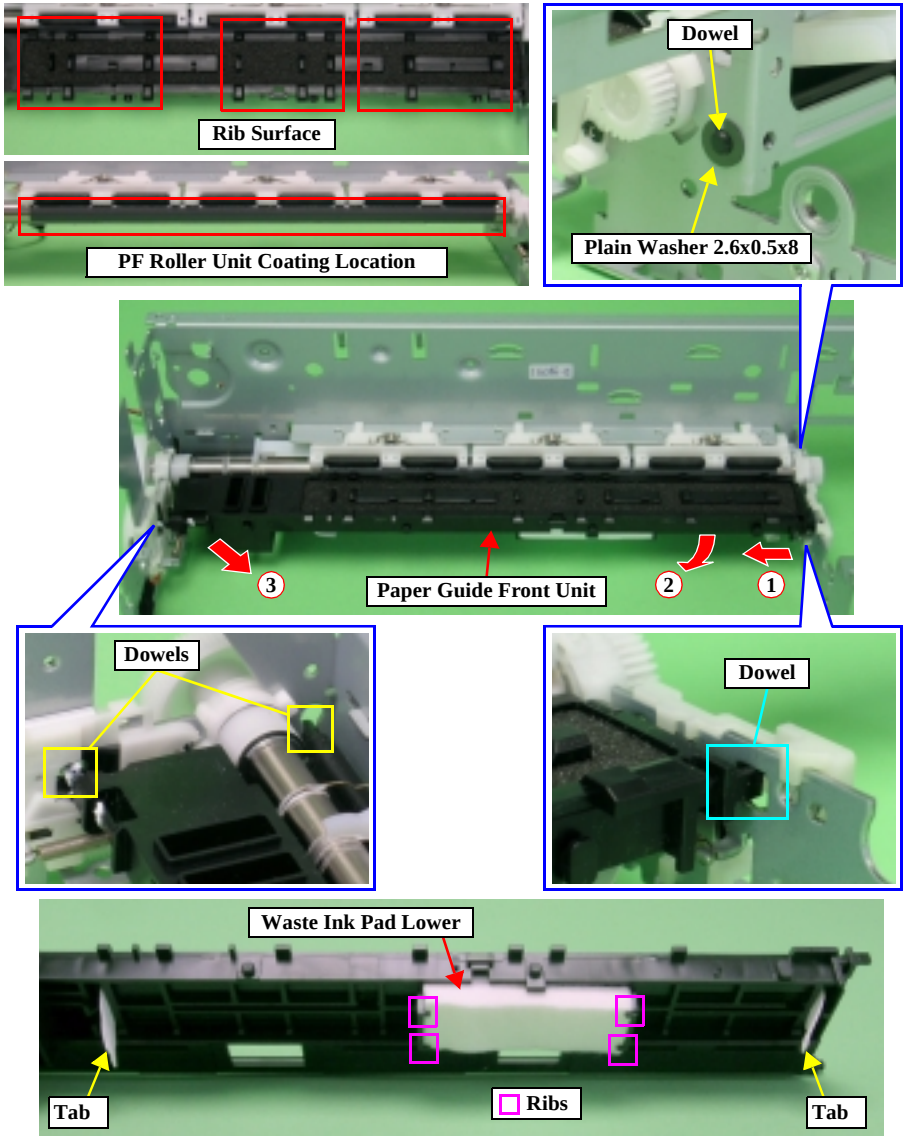


Figure 4-48. Paper Guide Front Unit Removal

☐ **Part/Unit that should be removed before removing Paper Guide Front Unit.**

Document Cover / Paper Support Assy. / Scanner Unit / Panel Unit / Housing Upper / Print Head/ Printer Mechanism / Main Board Unit / ASF Unit / Holder Shaft Unit / CR Guide Frame / CR motor / Carriage Unit / Front Frame / EJ Frame Unit / Ink System Unit

☐ **Removal procedure**

CAUTION

■ **Be cautious of the following points when performing the next steps.**
- **Do not damage the ribs of Paper Guide Front Unit surface.**
- **Do not cause damage by touching the coating location of PF Roller Unit.**

1. Remove Plain Washer (x1) for securing Paper Guide Front Unit by using the tweezers, remove Paper Guide Front Unit from Main Frame.
2. Shift Paper Guide Front Unit to the left until releasing the dowel (x1, ☐) from the installation hole of Main Frame.
3. Release the left dowels (x2, ☐) of Paper Guide Front Unit from the installation holes of Main Frame while lowering the right end of Paper Guide Front Unit.

REASSEMBLY

■ **Confirm that the tabs (x2) of Paper Guide Front Support Porous Pad face inward.**
■ **If ink has spread to the ribs on the upper surface of Paper Guide Front Unit, use a cotton swab to remove it.**

4. Remove Waste Ink Pad Lower from the ribs (x4, ☐) at the bottom surface of Paper Guide Front Unit.

ADJUSTMENT REQUIRED

After changing the Paper Guide Front Unit for a new one, always apply grease G-26 to the specified portions.
■ **Refer to Chapter 6, Figure 6-9 *(p.179)***

ADJUSTMENT REQUIRED

When having removed or replaced Paper Guide Front Unit, implement the adjustment in the following order. (Refer to Chapter 5 "ADJUSTMENT")
■ **Bi-D adjustment**

4.3.23 PG Sensor

☐ **External View**

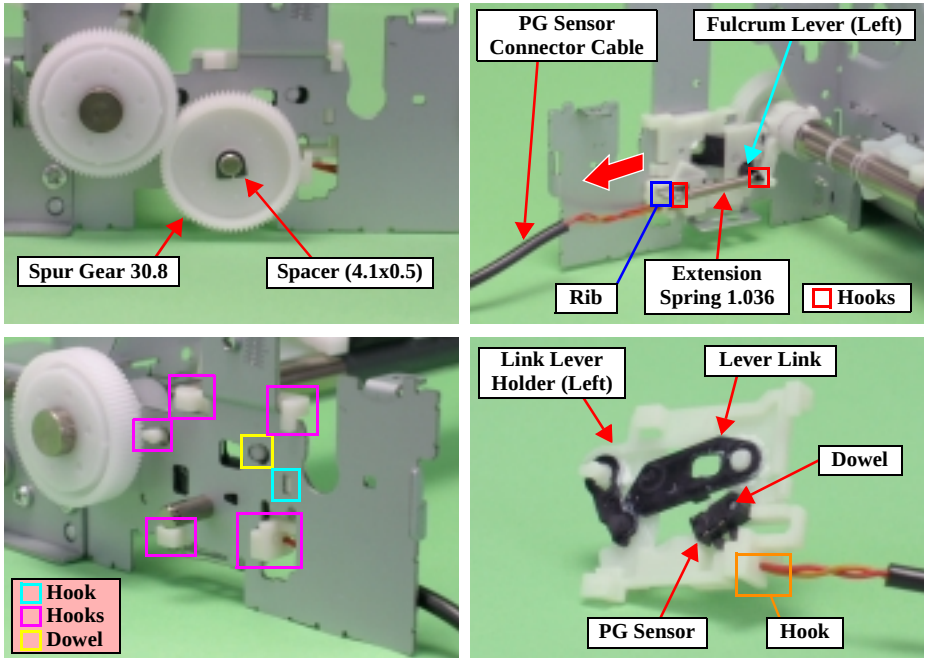


Figure 4-49. PG Sensor Removal

☐ **Part/Unit that should be removed before removing PG Sensor.**

Document Cover / Paper Support Assy. / Scanner Unit / Panel Unit / Housing Upper / Print Head/ Printer Mechanism / Main Board Unit / ASF Unit / Holder Shaft Unit / CR Guide Frame / CR motor / Carriage Unit / Front Frame / EJ Frame Unit / Ink System Unit / Paper Guide Front Unit

☐ **Removal procedure**

1. Remove Spacer (x1) for securing Spur Gear 30.8, and then remove Spur Gear 30.8 from Main Frame.
2. Remove Extension Spring 1.036 from the hooks (1 each, ☐) of Main Frame and Fulcrum Lever (Left).
3. Remove the hook (x1, ☐) for securing Link Lever Holder (Left) by using the tweezers, and then shift it in the direction shown by figure.
4. Release Link Lever Holder (Left) from the rib (x1, ☐) of Main Frame, and then remove Fulcrum Lever (Left), Lever Link along with Link Lever Holder (Left).

REASSEMBLY

Secure Link Lever Holder (Left) with the hooks (x6, ☐☐) and dowel (x1, ☐).

5. Release PG Sensor Connector Cable from the hook (x1, ☐) of Link Lever Holder (Left), and then remove PG Sensor.

REASSEMBLY

Install PG Sensor onto the dowel of Link Lever Holder (Left).

ADJUSTMENT REQUIRED

After changing the Link Lever and Link Lever Holder (Left) for a new one, always apply grease G-26 to the specified portions.

■ **Refer to Chapter 6, Figure 6-11 *(p.179)***

4.3.24 PF Roller Unit

☐ **External View (1)**

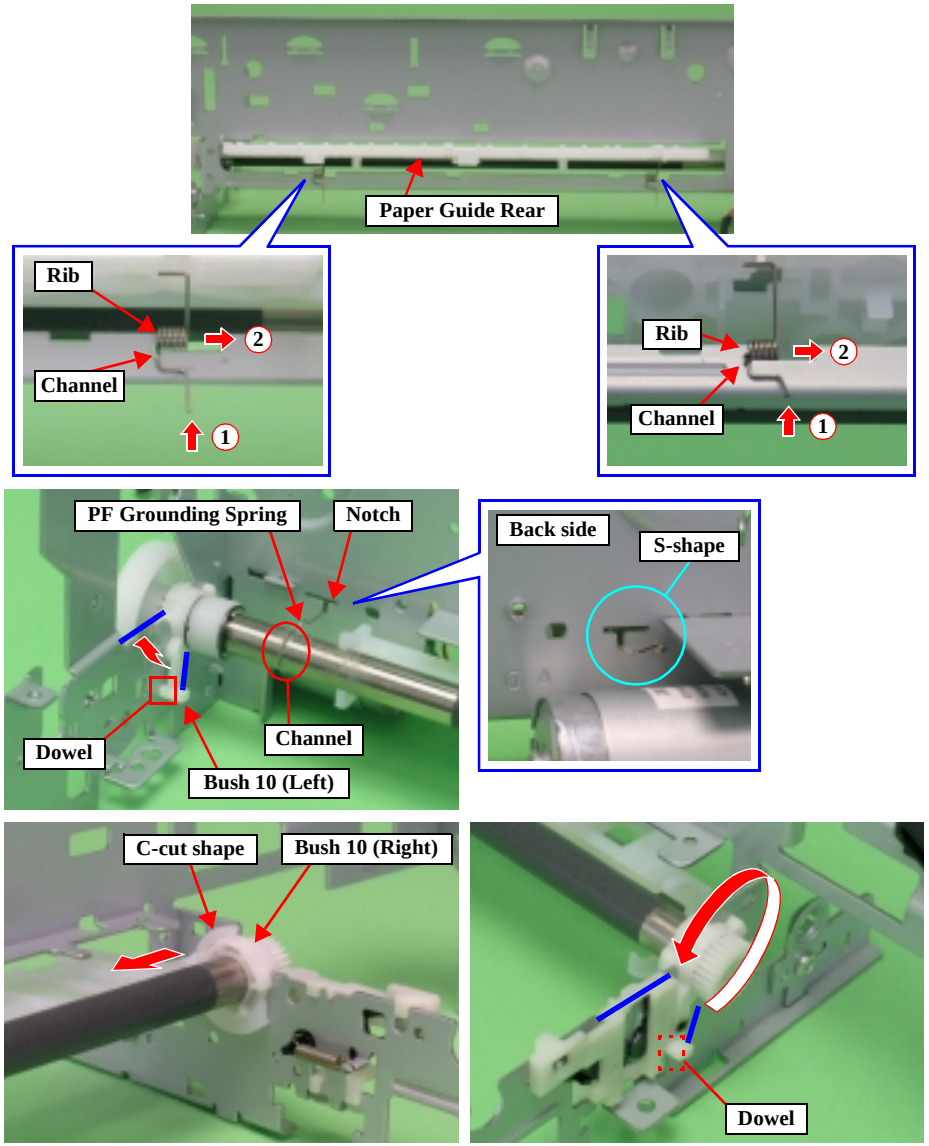


Figure 4-50. PF Roller Unit Removal (1)

☐ **Part/Unit that should be removed before removing PF Roller Unit.**

Document Cover / Paper Support Assy. / Scanner Unit / Panel Unit / Housing Upper / Print Head/ Printer Mechanism / Main Board Unit / ASF Unit / Holder Shaft Unit / CR Guide Frame / CR motor / Carriage Unit / Paper Guide Upper Unit / Front Frame / EJ Frame Unit / Ink System Unit / Paper Guide Front Unit / PG Sensor

☐ **Removal procedure**

CAUTION

Do not cause damage by touching the coating location of PF Roller Unit when performing the following steps.

1. Push upward the lower side leg of Torsion Spring 12.64 (1 each), and remove Torsion Spring 12.64 (x2) from the rib (1 each) of Main Frame.

REASSEMBLY

- **Insert the lower leg of Torsion Spring 12.64 into the channel of Main Frame.**
- **Push Paper Guide Rear from above, and confirm that it returns by tension of Torsion Spring 12.64.**

2. Release S-shape of PF Grounding Spring from the notch of Main Frame by using the tweezers, and then remove PF Grounding Spring from PF Roller Unit.

REASSEMBLY

Fasten PF Grounding Spring to the channel of PF Roller Unit.

3. Release the dowel (x1, □) of Bush 10 (Left) from Main Frame, and then rotate Bush 10 (Left) to the position shown by figure.
4. Release C-cut shape of Paper Guide Rear from Bush 10 (Right), and then shift Paper Guide Rear to the left.
5. Release the dowel (x1, ⬚) of Bush 10 (Right) from Main Frame, and then rotate Bush 10 (Left) to the position shown by figure.

☐ **External View (2)**

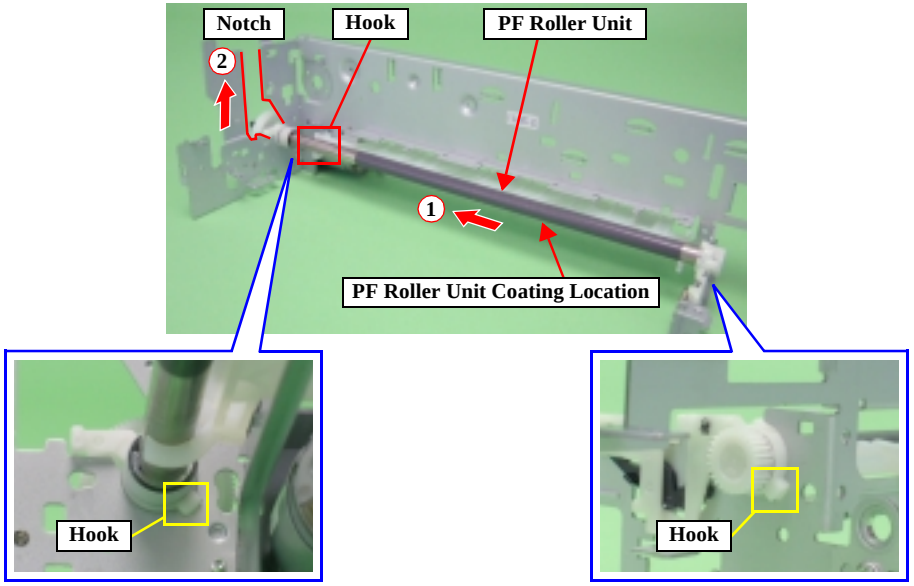


Figure 4-51. PF Roller Unit Removal (2)

6. Sift PF Roller Unit to left, and then release the hooks (1 each, ☐) of Bush 10 (Left/Right).
7. Release PF Roller Unit from the hook (x1, ☐) at the left side of Paper Guide Rear, and then remove PF Roller Unit along the notch at the left end of Main Frame.

CAUTION

Do not shift Bush 10 (Right) to coating location of PF Roller.

REASSEMBLY

When replacing PF Roller Unit with a new component, be sure to mark Bush 10 (Left) of PF Roller Unit with a red circle.
When replacing Main Board Unit with a refurbished unit, determine the PF Roller production value if the EEPROM cannot be backed up. (PF Roller Unit service parts are limited to IEI products.)

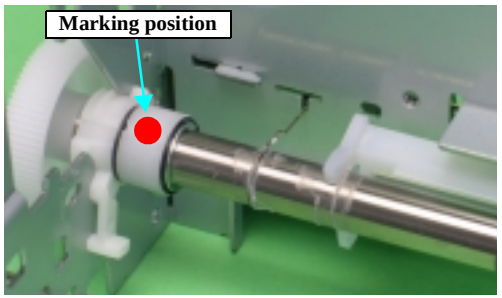


Figure 4-52. Marking position

ADJUSTMENT REQUIRED

After changing the PF Roller Unit for a new one, always apply grease G-26 to the specified portions.
■ **Refer to Chapter 6, Figure 6-13 *(p.180)* and Figure 6-14 *(p.180)***

ADJUSTMENT REQUIRED

When having replaced PF Roller Unit, implement the adjustment in the following order. (Refer to Chapter 5 "ADJUSTMENT")
1. **PF Scale Sensor positioning adjustment**
2. **PF roller shaft manufacture code**

CHAPTER

5

ADJUSTMENT

5.1 Overview

This section describes the procedure for adjustments required when the printer is disassembled and assembled for repair or service.

5.1.1 Required Adjustment

If you remove or replace the specific part in your service/repair, you have to perform the appropriate adjustment as listed Table 5-1 below.

In this printer, it is necessary to perform appropriate adjustment in order to maintain consistent printing function and quality, eliminate differences of each printer mechanism's characteristics. Therefore, in case that the combination between the printer mechanism and the Main Board changes or the Print Head is replaced during the repair service, you must input the correct adjustment value into the EEPROM on the Main Board by using the Adjustment program.

CHECK POINT

In case that any parts are removed and assembled on the repair product while running the Adjustment program, make sure to turn off the printer.

Note : Symbol explanation
The numbers in the circle shows the required adjustment order.
"NA": Not applicable

Table 5-1. Required Adjustment

Performance Priority	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Adjustment Item / Replaced part	EEPROM Data Copy	Waste ink pad counter	Destination setting	Initialize PF deterioration offset	Disenable PF deterioration offset	Ink charge	Input Head ID	Input PF roller manufacture code*3	Top margin adjustment	Head angular adjustment	Bi-D adjustment	PW adjustment	First dot position adjustment	CR motor heat protection control
Printer Mechanism replacement	NA	NA	NA	①	②	NA	NA	③	NA	NA	NA	NA	NA	④
ASF Unit removal	NA	NA	NA	NA	NA	NA	NA	NA	①	NA	NA	NA	②	NA
ASF Unit replacement	NA	NA	NA	NA	NA	NA	NA	NA	①	NA	NA	NA	②	NA
CR Motor removal	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	①	②	③	NA
CR Motor replacement	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	①	②	③	④
Paper Guide Upper Unit removal	NA	NA	NA	NA	NA	NA	NA	NA	①	NA	NA	NA	NA	NA
Paper Guide Upper Unit replacement	NA	NA	NA	NA	NA	NA	NA	NA	①	NA	NA	NA	NA	NA
Front Frame removal	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	①	NA	②	NA
Front Frame replacement	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	①	NA	②	NA
Print Head removal	NA	NA	NA	NA	NA	NA	NA	NA	NA	①	②	③	④	NA
Print Head replacement	NA	NA	NA	NA	NA	①	②	NA	NA	③	④	⑤	⑥	NA

Performance Priority	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Adjustment Item / Replaced part	EEPROM Data Copy	Waste ink pad counter	Destination setting	Initialize PF deterioration offset	Disenable PF deterioration offset	Ink charge	Input Head ID	Input PF roller manufacture code*3	Top margin adjustment	Head angular adjustment	Bi-D adjustment	PW adjustment	First dot position adjustment	CR motor heat protection control
Main Board Unit replacement*1	①	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Main Board Unit replacement*2	NA	NA	①	NA	NA	NA	②	NA	③	④	⑤	⑥	⑦	⑧
Holder Shaft Unit removal	NA	NA	NA	NA	NA	NA	NA	NA	①	NA	NA	NA	NA	NA
Holder Shaft Unit replacement	NA	NA	NA	NA	NA	NA	NA	NA	①	NA	NA	NA	NA	NA
PS Board Unit replacement	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	①
Paper Guide Front Unit removal	NA	NA	NA	NA	NA	NA	NA	NA	①	NA	NA	NA	NA	NA
Paper Guide Front Unit replacement	NA	NA	NA	NA	NA	NA	NA	NA	①	NA	NA	NA	NA	NA
Waste Ink Pads replacement	NA	①	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PW Sensor removal	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	①	NA	NA
PW Sensor replacement	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	①	NA	NA
Carriage Unit replacement	NA	NA	NA	NA	NA	NA	NA	NA	①	②	③	④	⑤	NA

Note *1: When data can be read from the old board.

*2: When data cannot be read from the old board.

*3: Only for Stylus CX3500/CX3600/CX3650

Note : Following adjustments are not required on this product.
- Platen Gap adjustment

CAUTION

- **When the Main board is replaced with new one, you may have to replace waste drain ink pad also in case the EEPROM parameter back up function is not available on the defective main board.**
- **After completing the adjustment, check the printing result with A4 check pattern by using the Adjustment program. If the result is not good, perform appropriate adjustment.**
- **If using new main board in the printer mechanism replacement, you need to perform EEPROM initial setting of main board. And then, please perform the adjustment by usual procedure.**

5.2 Adjustment by using adjustment program

The procedures of the adjustment items will be explained here. The intended item is as follows.

- ☐ EEPROM Data Copy
- ☐ Waste ink pad counter
- ☐ Destination setting
  - ■ Market destination setting
  - ■ USB ID
- ☐ Initialize PF deterioration offset
- ☐ Disenable PF deterioration offset
- ☐ Ink charge
- ☐ Input Head ID
- ☐ Input PF roller manufacture code
- ☐ Top margin adjustment
- ☐ Head angular adjustment
- ☐ Bi-D adjustment
- ☐ PW adjustment
- ☐ First dot position adjustment
- ☐ CR motor heat protection control
- ☐ Print check pattern
  - ■ Normal Paper Print (A4)
  - ■ Photo Quality Inkjet Paper Print (Letter)

5.2.1 EEPROM Data Copy

☐ **Adjustment procedure**

1. Select “EEPROM Data Copy” in the Adjustment Program.
2. Click the [backup] button to backup the old main board data.
3. When the backup operation is succeeded,
   1) Replace the Main Board Unit with a new one.
   2) Turn on the printer and click the [restore] button.
   3) When the restore operation is succeeded, click the [next] button to perform necessary adjustment.

   When the backup operation is failed,
   1) Click the [next] button to perform necessary adjustment.

5.2.2 Waste ink pad counter

☐ **Adjustment procedure**

1. Select “Waste ink pad counter” in the Adjustment Program.
2. Click the [Read] button, you can see the current or initialized counter value.
3. If you replace the waste ink pad, click the [Initialize] button to clear the current ink pad counter to “zero”. Once you click the [Initialize] button, you can see its completion message, so that click the [OK] button.

5.2.3 Destination setting

5.2.3.1 Market destination setting

☐ **Adjustment procedure**

1. Select “Destination setting” in the Adjustment Program.
2. Click the [Destination setting] button to set the market destination setting.

5.2.3.2 USB ID

☐ **Adjustment procedure**

1. Select “Destination setting” in the Adjustment Program.
2. Input the 10-digits serial number from the label applied to the back side of the Housing Lower.

5.2.4 Initialize PF deterioration offset

☐ **Adjustment procedure**

1. Select “Initialize PF deterioration offset” in the Adjustment Program.
2. Click the [Initialization] button to initialize the PF deterioration offset value.

5.2.5 Disenable PF deterioration offset

☐ **Adjustment procedure**

1. Select “Disenable PF deterioration offset” in the Adjustment Program.
2. Click the [Input] button to input the maximum value (3,000) of the PF deterioration offset value.

5.2.6 Ink charge

☐ **Adjustment procedure**

1. Select “Ink charge” in the Adjustment Program.
2. Click the [Ink charge] button to perform the initial ink charge

5.2.7 Input Head ID

☐ **Adjustment procedure**

1. Select “Input Head ID” in the Adjustment Program.
2. Input the 13-digits code of the Head ID label applied to the Print Head. Enter the Head ID from left to right on the top row and from top to bottom in due order.

5.2.8 Input PF roller manufacture code

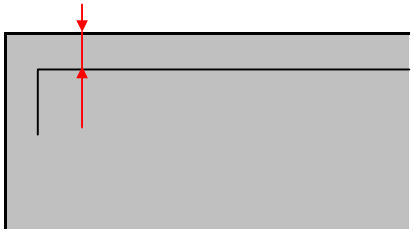
☐ **Adjustment procedure**

1. Select “Input PF roller manufacture code” in the Adjustment Program.
2. Input the PF roller shaft manufacture code on the edit box.
3. Click the [Input] button to register it to EEPROM.

5.2.9 Top margin adjustment

☐ **Adjustment procedure**

1. Set Normal Paper A4/Letter on the Paper Support.
2. Select “Top margin adjustment” in the Adjustment Program.
3. Click the [Print] button to print the Top margin adjustment pattern.
4. Confirmed the printed pattern and measure exact distance from Paper top edge to a line.
5. Input your decided parameter to the edit box and click the [Input] button.



[Judging Standard]
The distance from a paper top edge to a line is:
- 3.7 to 5.1mm Choose the “-” from a combobox.
- 2.3 to 3.7mm Choose the “0” from a combobox.
- 0.9 to 2.3mm Choose the “+” from a combobox.

Figure 5-1. Top Margin Adjustment Printing Pattern

5.2.10 Head angular adjustment

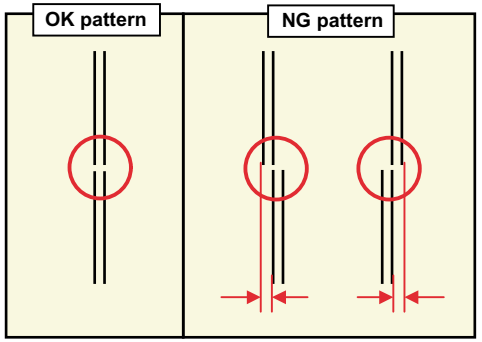
☐ **Adjustment procedure**

1. Set Normal Paper A4/Letter on the Paper Support.
2. Select “Head angular adjustment” in the Adjustment Program.
3. Click the [Print] button to print following two head angular check patterns.
   - Band pattern
   - Raster offset pattern
4. Check the printed patterns and select a pattern number that has the least amount of misalignment.
5. Click the [Input] button to write the adjustment value of checked items.
6. Print the check pattern again, and check the adjustment result.

☐ **[Treatment procedure for NG product]**

1. Replace the Print Head with new one again.
2. Print the check pattern, and check the adjustment result.
3. If the result is NG level, confirm the installation condition of removed parts during disassembly.
4. Perform Step 2 again.

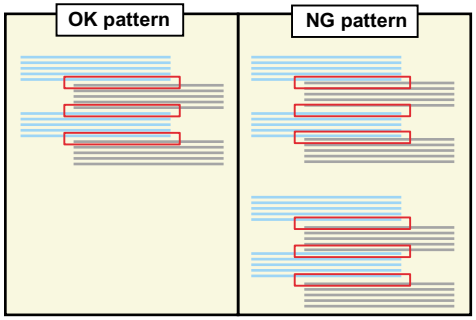
■ **Band pattern**



[Judging Standard]
The printed line should be straight line.

[Reference]
Shift length of Head Angular pattern is MAX ±50µm

■ **Raster offset pattern**



[Judging Standard]
Spaces between the cyan lines and gray lines should be uniformed.

[Reference: Standard value in manufactory]
±70µm

Figure 5-2. Head Angular Adjustment Printing Pattern

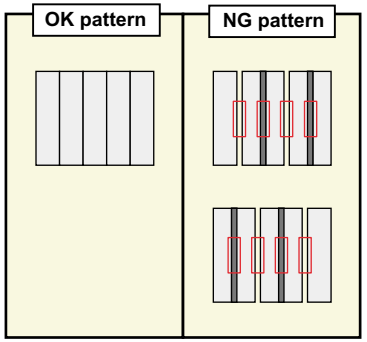
5.2.11 Bi-D adjustment

☐ **Adjustment procedure**

1. Set Normal Paper A4/Letter on the Paper Support.
2. Select “Bi-D adjustment” in the Adjustment Program.
3. Click the [Print] button to print the Bi-D adjustment pattern.
4. Check the printed patterns and select a pattern number that has the least amount of misalignment in each of the VSD dots.
5. Click the [Input] button to write the adjustment value of checked items.
6. Print the check pattern again, and check the adjustment result.

☐ **[Treatment procedure for NG product]**

1. Replace the Print Head with new one again.
2. Print the check pattern, and check the adjustment result.
3. If the result is NG level, confirm the installation condition of removed parts during disassembly.
4. Perform Step 2 again.



[Judging Standard]
The block patterns should align without gap and overlapping.

[Reference]
GAP Bi-D for each Dot

- VSD1 BLACK, COLOR: 60µm
- VSD3 BLACK, COLOR: 40µm

Figure 5-3. Bi-D Adjustment Printing Pattern

5.2.12 PW adjustment

☐ **Adjustment procedure**

1. Set Photo Paper A4/Letter on the Paper Support.
2. Select “PW adjustment” in the Adjustment Program.
3. Click the [Print] button to print the PW adjustment pattern.
4. Check the printed patterns and select a pattern number that has 5mm margins from the paper edges.
5. Click the [Input] button to write the adjustment value of checked items.

☐ **[Treatment procedure for NG product]**

1. Replace the PW Sensor with new one again.
2. Print the check pattern, and check the adjustment result.
3. If the result is NG level, confirm the installation condition of removed parts during disassembly.
4. Perform Step 2 again.

[Judging Standard]
Top / Bottom / Right / Left: 5mm

Figure 5-4. PW adjustment Printing Pattern

5.2.13 First dot position adjustment

☐ **Adjustment procedure**

1. Set Photo Paper A4/Letter on the Paper Support.
2. Select “First dot position adjustment” in the Adjustment Program.
3. Click the [Print] button to print the First dot position adjustment pattern.
4. Check the printed patterns and select a pattern number that has 5mm margin from the paper edge.
5. Click the [Input] button to write the adjustment value of checked item.

☐ **[Treatment procedure for NG product]**

1. Replace the repaired (replaced) part with new one.
2. Print the check pattern, and check the adjustment result.
3. If the result is NG level, confirm the installation condition of removed parts during disassembly.
4. Perform Step 2 again.

[Judging Standard]
Standard: 5mm away from left edge.

Figure 5-5. First dot position adjustment Printing Pattern

5.2.14 CR motor heat protection control

☐ **Adjustment procedure**

1. Select “CR motor heat protection control” in the Adjustment Program.
2. Check each box of the replaced parts/units checklist and then click the [Perform] button.
3. A dialogue box will be displayed, and click the [OK] button in the box.

5.2.15 Print check pattern

5.2.15.1 Normal Paper Print (A4)

☐ **Adjustment procedure**

1. Set Plain Paper A4 on the Paper Support.
2. Select “Print check pattern” in the Adjustment Program.
3. After selecting Plain Paper (A4 x 1), click the [Print] button to print Normal Paper Print Pattern.
4. Check the adjustment result in each pattern.

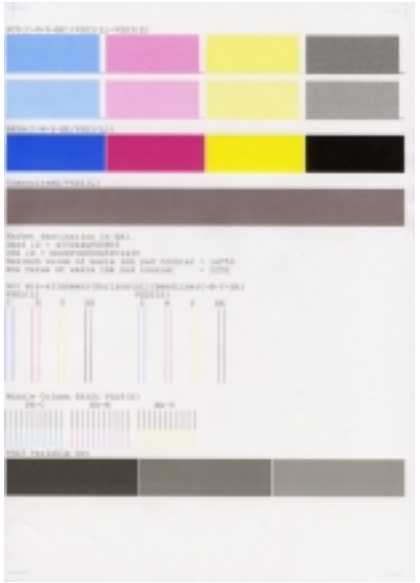


Figure 5-6. Normal Paper Print Pattern

5.2.15.2 Photo Quality Inkjet Paper Print (Letter)

1. Set Plain Paper Letter on the Paper Support.
2. Select “Print check pattern” in the Adjustment Program.
3. After selecting Photo Quality Inkjet Paper (Letter x 1), click the [Print] button to print Photo Quality Inkjet Paper Print Pattern.
4. Check the adjustment result in each pattern.

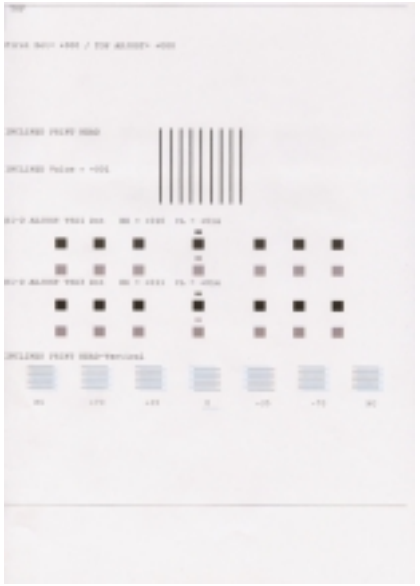


Figure 5-7. Photo Quality Inkjet Paper Print Pattern

5.3 Adjustment Except Adjustment Program

Following is adjustment except Adjustment Program.

5.3.1 PG adjustment

☐ **Parts to be Removed and Replaced**

- Removal and Replacement of Carriage Unit
- Removal and Replacement of Print Head

☐ **Adjustment procedure**

1. Make sure that the printer is turned off.
2. Set the ink cartridges into the Carriage Unit
3. Prepare the thickness gauge. (The thickness should be 1.45mm.)
4. Loosen the screw (C.B.S 3x6) for securing the Parallel Adjustment Lever (Left).

CAUTION

- **Do not remove a screw completely. (two or three revolution)**
- **You need not to loosen the screw securing the Parallel Adjustment Lever (Right).**

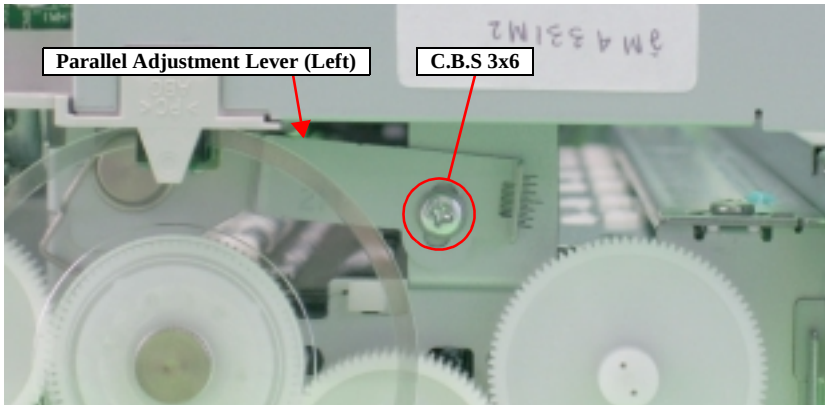


Figure 5-8. Parallel Adjustment Lever (Left) Location

5. Release the Carriage Lock if the Carriage Unit is locked.
6. Set the thickness gauge at the position shown by the figure. The thickness gauge should be placed between the front of the Paper Guide Front Unit and the center ribs.

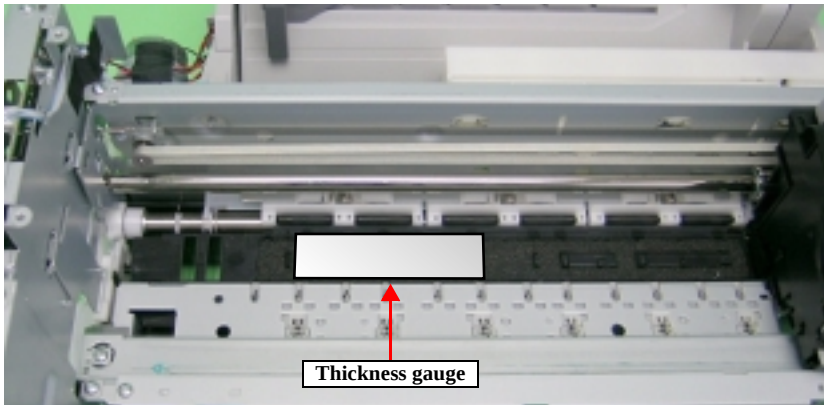


Figure 5-9. Placement position for thickness gauge

7. Confirm that PG Lever is lowered. If PG Lever is raised, lower it.
8. Move the Carriage Unit on the thickness gauge by using the Timing Belt, and check whether the thickness gauge moves or not.

CAUTION

- **If you push the Carriage Unit directly, it's possible to damage the Print Head surface by the friction with the thickness gauge.**
- **Following is the relationship between "Parallel Adjustment Lever (Left) operation" and "Platen gap reaction".**

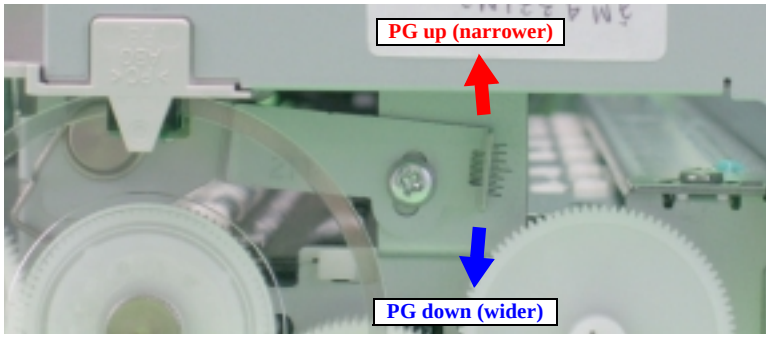


Figure 5-10. Relationship between Parallel Adjustment Lever (Left) Operation & Platen Gap

9. Accede to following steps until you've completed the left side PG adjustment.

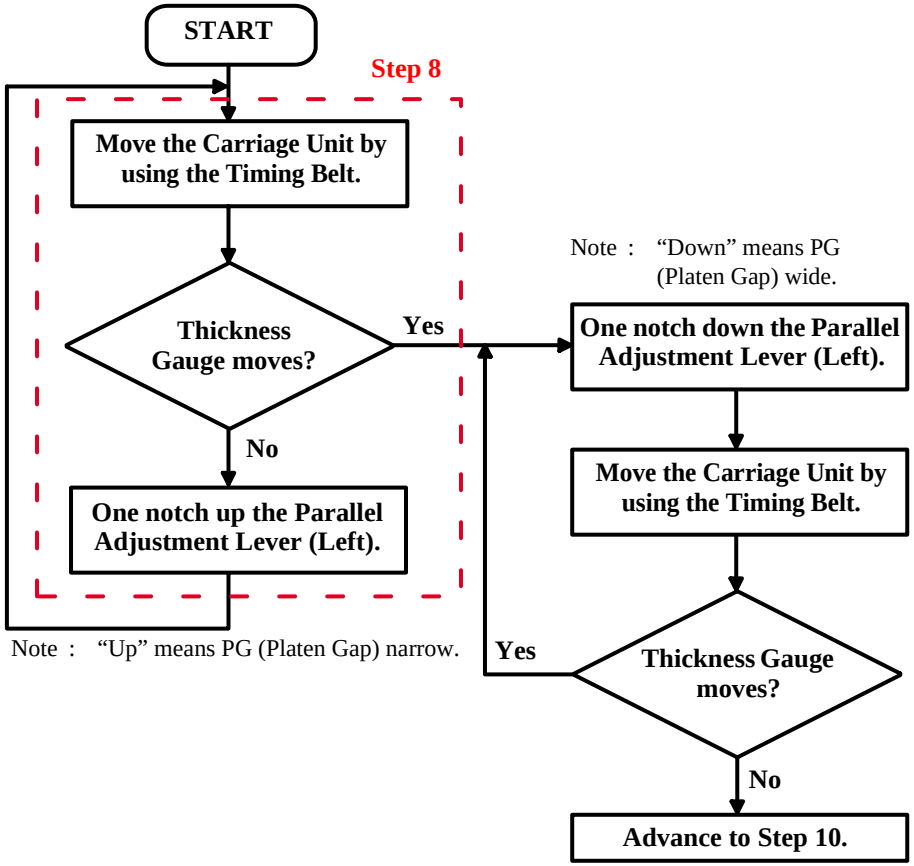


Figure 5-11. Left Side PG Adjustment

10. Tighten the screw for securing Parallel Adjustment Lever (Left) temporary.

11. Loosen the screw (C.B.S 3x6) for securing the Parallel Adjustment Lever (Right).

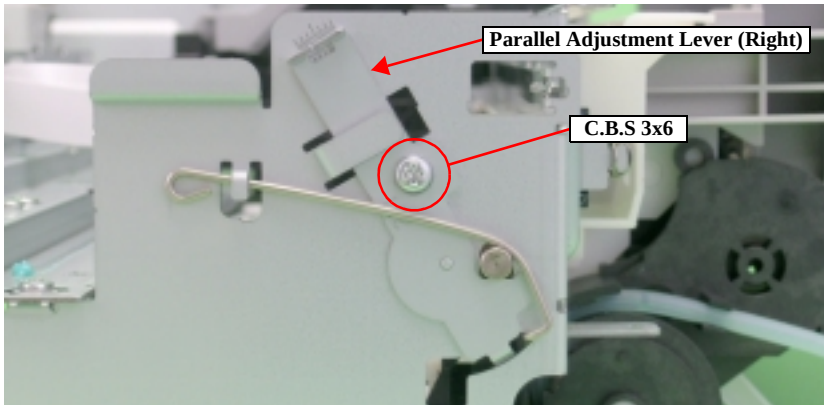


Figure 5-12. Parallel Adjustment Lever (Right) Location

CAUTION

- **Do not remove a screw completely. (two or three revolution)**
- **You need not to loosen the screw for securing the Parallel Adjustment Lever (Light).**

12. Set the thickness gauge at the position shown by the figure. The thickness gauge should be placed between the front of the Paper Guide Front Unit and the center ribs.

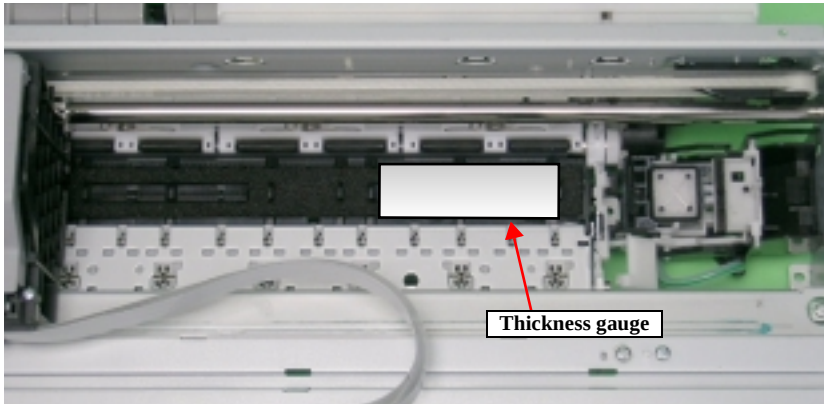


Figure 5-13. Placement position for thickness gauge

13. Move the Carriage Unit on the thickness gauge by using the Timing Belt, and check whether the thickness gauge moves or not.

CAUTION

- **If you push the Carriage Unit directly, it's possible to damage the Print Head surface by the friction with the thickness gauge.**
- **Following is the relationship between "Parallel Adjustment Lever (Right) operation" and "Platen gap reaction".**

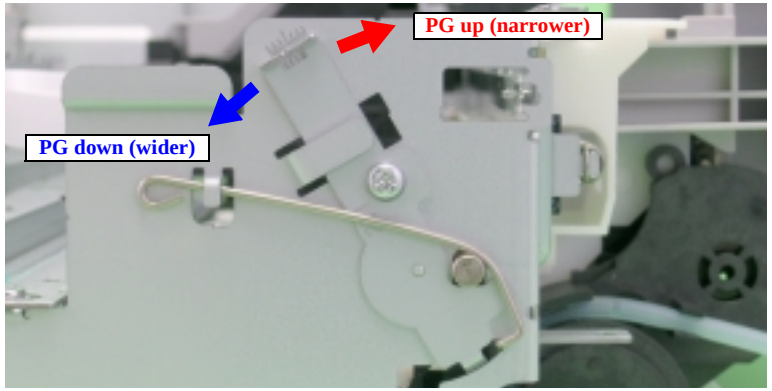


Figure 5-14. Relationship between Parallel Adjustment Lever (Right) Operation & Platen Gap

14. Accede to following steps until you've completed the right side PG adjustment.

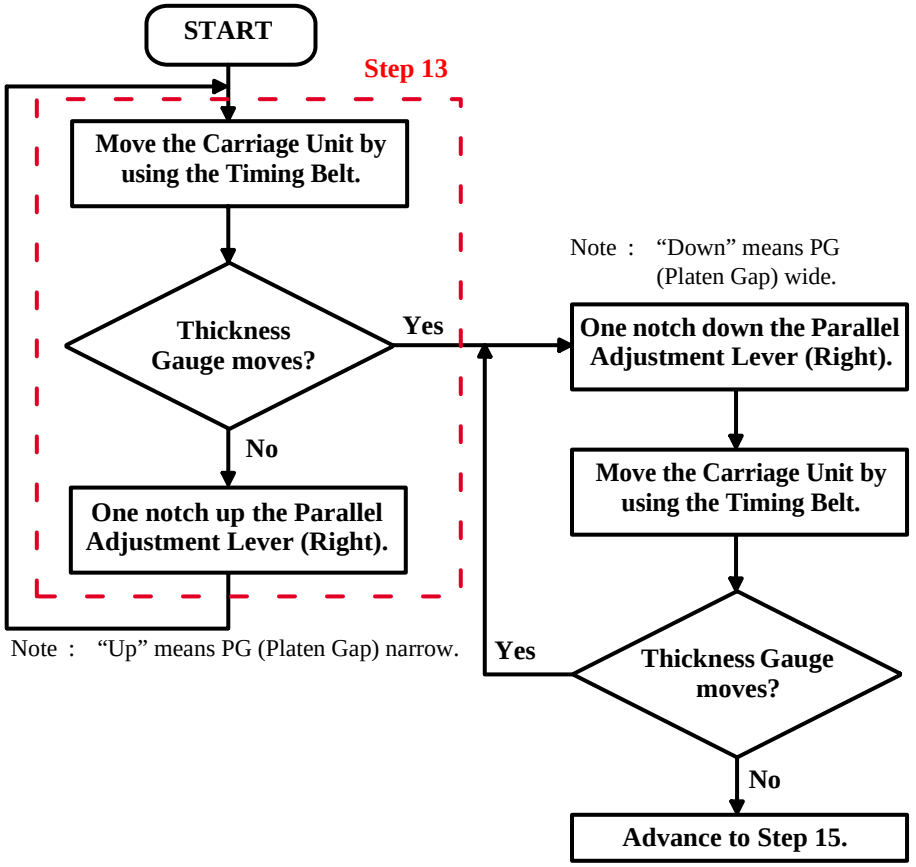


Figure 5-15. Right Side PG Adjustment

15. Tighten the screw securing for Parallel Adjustment Lever (Right) temporary.
16. Set the thickness gauge at position shown by Figure 5-9 again.

17. Accede to following steps to check left side PG again.

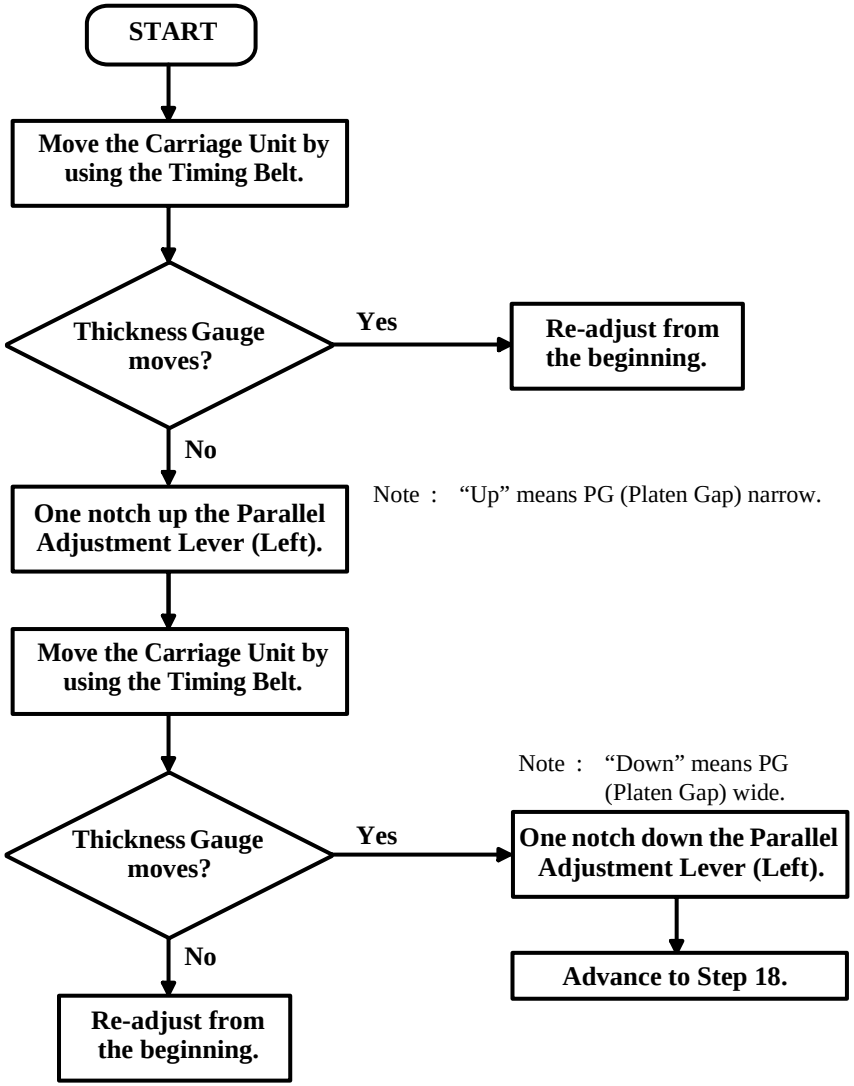


Figure 5-16. Right/Left Sides PG Checking

18. Tighten both screws completely.

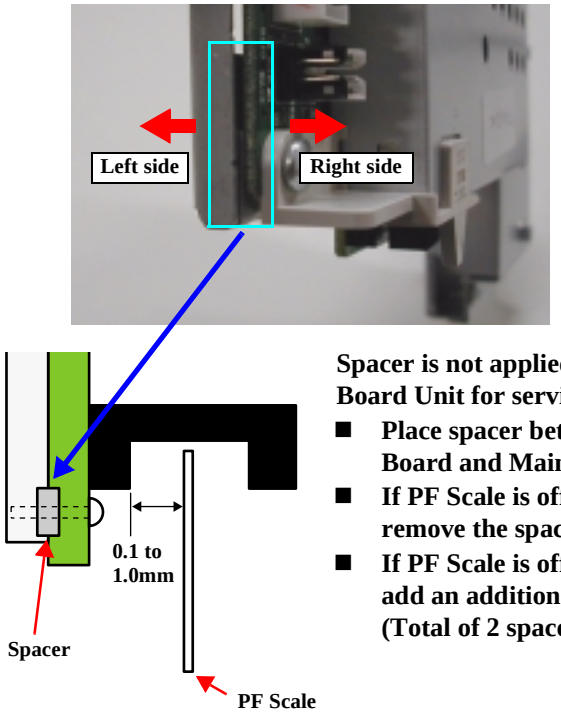
5.3.2 PF Scale Sensor positioning adjustment

☐ **Parts to be Removed and Replaced**

- ■ Replacement of Main Board Unit
- ■ Replacement of PF Roller Unit

☐ **Adjustment procedure**

1. Test fit Main Board Unit, and confirm whether or not PF Scale is positioned in the center of PF Sensor.
2. If PF Scale is positioned in the center of PF Sensor, adjustment is complete. If scale is not positioned in center of sensor, adjust position of PF Scale using spacer (0.5mm thickness) as shown in diagram below.



Spacer is not applied to Main Board Unit for service part.

- ■ **Place spacer between Shield Board and Main Board.**
- ■ **If PF Scale is off to the left, remove the spacer.**
- ■ **If PF Scale is off to the right, add an additional spacer. (Total of 2 spacers)**

Figure 5-17. PF Scale Sensor positioning adjustment

CHAPTER

6

MAINTENANCE

6.1 Overview

This section provides information to maintain the printer in its optimum condition.

6.1.1 Cleaning

This printer has no mechanical components which require regular cleaning except the Print Head. Therefore, when returning the printer to the user, check the following parts and perform appropriate cleaning if stain is noticeable.

CAUTION

- **Never use chemical solvents, such as thinner, benzine, and acetone to clean the exterior parts of the printer like the Housing. These chemicals may deform or deteriorate the components of the printer.**
- **Be careful not to damage any components when you clean inside the printer.**
- **Do not scratch the coated surface of the PF Roller Unit. Use soft brush to wipe off any dusts. Use a soft cloth moistened with alcohol to remove the ink stain.**
- **Do not use cleaning sheet included in the media for normal usage. It may damage the coated surface of PF Roller Unit. If the adhesive surface of the cleaning sheet is set to the LD Roller shaft side and used to clean the LD Roller surface, it is no problem.**

☐ Exterior parts
Use a clean soft cloth moistened with water, and wipe off any dirt. If the exterior parts are stained by the ink, use a cloth moistened with neutral detergent to wipe it off.

☐ Inside the printer
Use a vacuum cleaner to remove any paper dust.

☐ LD Roller
When paper loading function does not operate because friction of the LD Roller is lowered by any paper dust, set the adhesive side up of the cleaning sheet (included in the media) to remove any paper dust. Repeat loading the cleaning sheet several times.

☐ Document glass
Remove dust or any paper with a clean dry cloth. In case dirt is serious or alien substance is stick, wipe it off with a cloth moistened with neutral detergent. In case Stain is remained, wipe again with a dry clean cloth.

6.1.2 Service Maintenance

If any abnormal print (dot missing, white line, etc.) has occurred or the printer indicates the “Maintenance request error” (This error is displayed as “Maintenance call error” in the STM3), take the following actions to clear the error.

☐ Print Head cleaning
When dot missing or banding phenomenon has occurred, you need to perform the Print Head cleaning operation*1 by using the Print Head cleaning function. This function can be performed by the control panel operation, the printer driver utility and the Adjustment program.
In case that the cleaning sequence is performed by the control panel operation, confirm that the printer is in stand-by state (the Power LED is lighting), and hold down the Ink SW on the control panel for more than 3 seconds. Then, the printer starts the cleaning sequence (the Power LED blinks during this sequence).
In case that you select and perform the manual cleaning by the printer driver utility, the most appropriate cleaning mode is selected. The following is the process to perform the Print Head cleaning from the printer driver utility.
As for the operation of the Adjustment program, refer to Chapter 5 Adjustment.

*NOTE: *1: The Stylus CX3500/CX3600/CX3650/CX4500/CX4600 has 3 modes for manual cleaning, and even during printing, the appropriate cleaning mode is automatically selected and performed according to various conditions. Therefore the ink consumption amount for manual cleaning varies depending on each mode (Refer to Chapter 2).*

1. Select the “EPSON Status Monitor 3” in the printer driver utility, and make sure that the printer is in stand-by state by using the Status monitor 3. If the printer is in stand-by state, the following figure is indicated on the monitor.

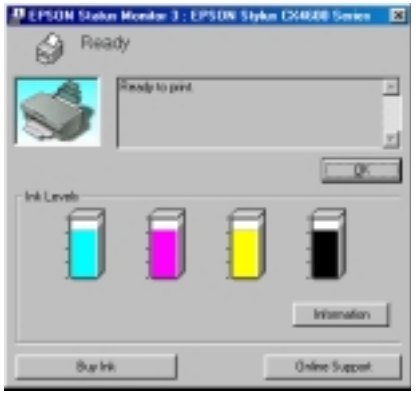


Figure 6-1. Status monitor 3 indication

2. Select the “Head Cleaning” in the printer driver utility, and perform the Print Head cleaning. After performing the Print Head cleaning operation, print a nozzle check pattern by selecting the “Nozzle Check“. If you repeat the Print Head cleaning operation without selecting the “Nozzle Check”, CL1, the weakest cleaning, will be repeated.

Figure 6-2. Head cleaning function in the printer driver utility

☐ Maintenance request error (Maintenance call error)
Ink is used for the Print Head cleaning operation as well as the printing operation. When the ink is used for the Print Head cleaning operation, the ink is drained to the Waste ink pads and the amount of the waste ink is stored as the waste ink counter into the EEPROM on the Main Board. Due to this, when the waste ink counter has reached the limit of the absorbing capability of the Waste ink pads, the Maintenance call error is indicated on Status monitor 3 as following figure. But waste ink max counter is changed by usage, therefore waste ink max counter is not necessarily right. *1

Note *1: Unlike current model, the present maximum value of the waste ink counter is changed by the printer condition. The range of maximum value is from 14700 to 36000. (__ means initial maximum value of non-used printer.)

Figure 6-3. Maintenance error indication in STM3

In this case, replace to new Waste ink pads and clear the waste ink counter stored into the EEPROM. The waste ink counter can be reset only from the Adjustment program because this printer dose not have the waste ink counter reset function by the control panel SW. As for the procedure, refer to Chapter 5 Adjustment.
In your repair activity, check the waste ink counter along with the firmware version, Main Board checker program version and nozzle check pattern on the nozzle check pattern printing. If the waste ink counter is closed to its limit, recommend that the Waste ink pads will be replaced with new one. This is because the “Maintenance request error” will may occur after returning the repaired product to the customer.

6.1.3 Lubrication

The characteristics of the grease have great affects on the mechanical function and durability, especially does the characteristics about temperature environment. The type and amount of the grease used to lubricate the printer parts are determined based on the results of the internal evaluations. Therefore, be sure to apply the specified type and amount of the grease to the specified part of the printer mechanism during servicing.

CAUTION

- **Never use oil or grease other than those specified in this manual. Use of different types of oil or grease may damage the component or give bad influence on the printer function.**
- **Never apply larger amount of grease than specified in this manual.**

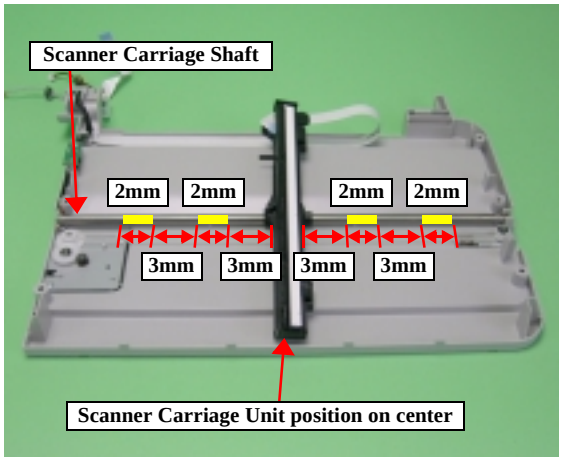
Table 6-1. Specified lubricants

Type	Name	EPSON code	Supplier
Grease	G-26	1080614	EPSON
Grease	G-46	1039172	EPSON
Grease	G-71	1304682	EPSON

CAUTION

When using G-46, it is recommended to use a flux dispenser (1049533) together.

☐ Refer to the following figures for the lubrication points.



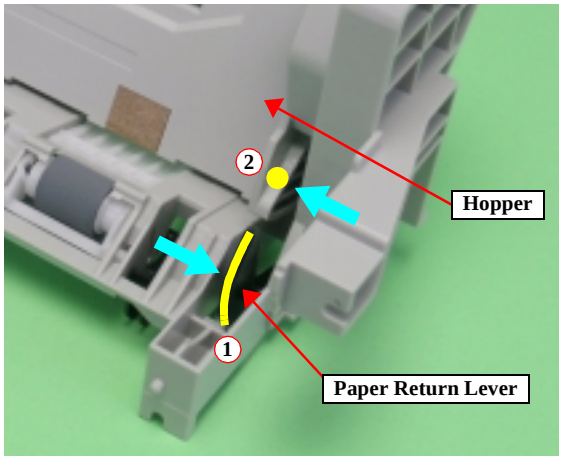
<Lubrication Point>
Scanner Carriage Shaft surface

<Lubrication Type>
G-26

<Lubrication Amount>
2mm x 4 points

<Remarks>
Use a brush to apply it

Figure 6-4. Lubrication



<Lubrication Point>
1. Paper Return Lever surface
2. Hopper surface

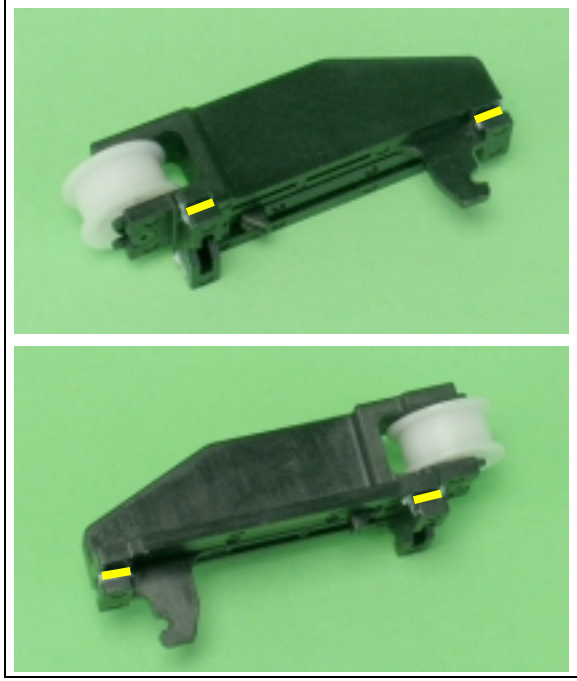
<Lubrication Type>
1. G-46
2. G-26

<Lubrication Amount>
1. Adequate dose
2. ϕ1 x 1mm

<Remarks>
1. Use a flux dispenser to apply it
2. Use a injector to apply it

• Grease application must not spread to other parts.

Figure 6-5. Lubrication



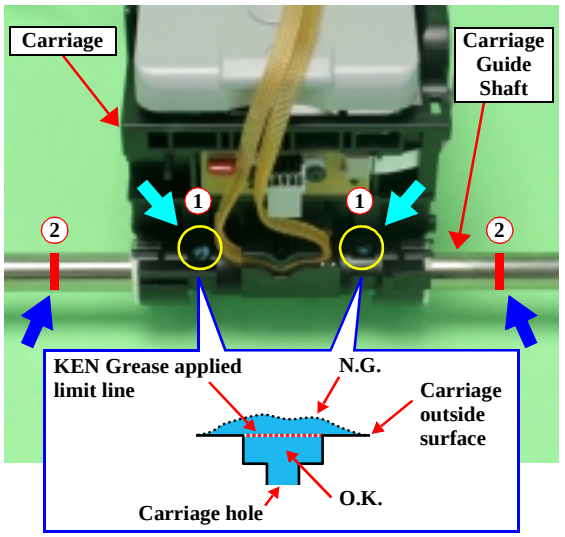
<Lubrication Point>
4 Ditches of Pully Driven Holder

<Lubrication Type>
G-26

<Lubrication Amount>
ϕ1 x 1mm x 4 points

<Remarks>
- Use a injector to apply it
- Wipe the unnecessary grease by bemcoat.
- Grease must not spread to Pully Driven area.

Figure 6-6. Lubrication



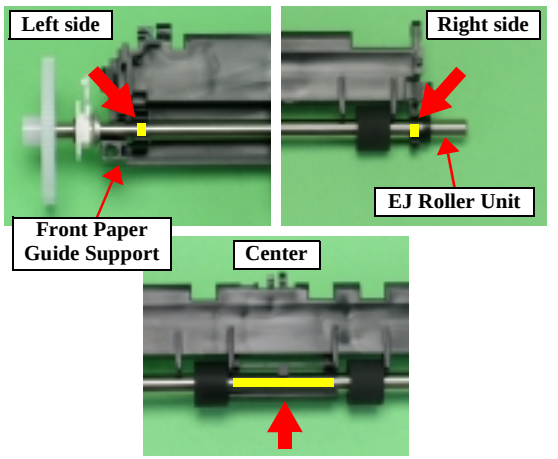
<Lubrication Point>
1. 2 position on holes of Carriage (touch to Carriage Guide Shaft)
2. Carriage Guide Shaft surface

<Lubrication Type>
1. G-71
2. G-71

<Lubrication Amount>
1. 150 ~ 210mg (total on 2 positions)
2. 120 ~ 160mg (total on 2 positions)

<Remarks>
1. Use a injector to apply it
2. Use a injector to apply it
- KEN Grease must not spread to Timing Belt.

Figure 6-7. Lubrication



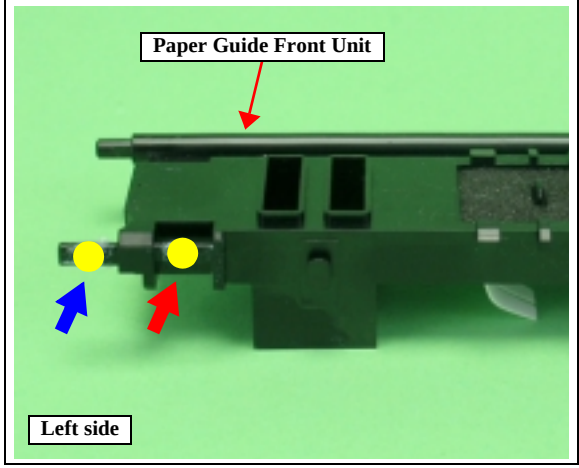
<Lubrication Point>
Contact point between EJ Roller Unit and 3 hooks of Front Paper Guide Support

<Lubrication Type>
G-46

<Lubrication Amount>
Adequate dose

<Remarks>
- Use a flux dispenser to apply it
- G-46 must not spread to rubber part of EJ Roller Unit.

Figure 6-8. Lubrication



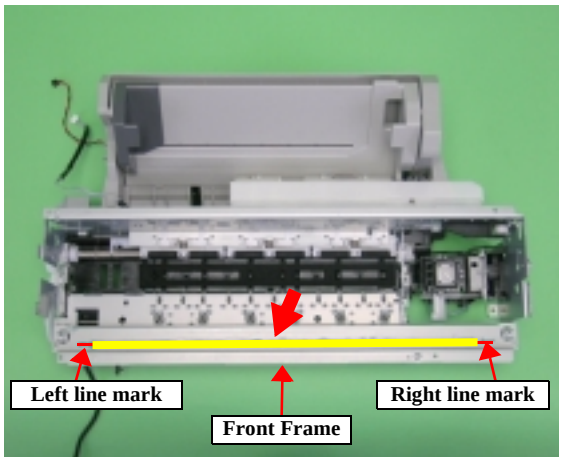
<Lubrication Point>
Points on the left side of Paper Guide Front Unit as shown in the figure

<Lubrication Type>
G-26

<Lubrication Amount>
ϕ1 x 1mm x 2 points

<Remarks>
Use a injector to apply it

Figure 6-9. Lubrication



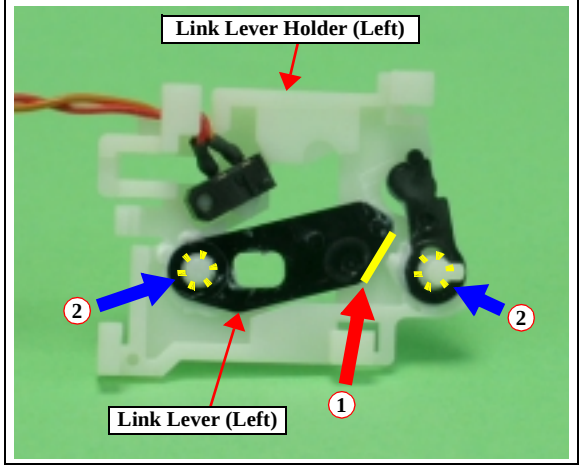
<Lubrication Point>
From the left edge of the Front Frame (left line mark) to the right edge of that (right line mark)

<Lubrication Type>
G-71

<Lubrication Amount>
200mg

<Remarks>
Use a injector to apply it

Figure 6-10. Lubrication



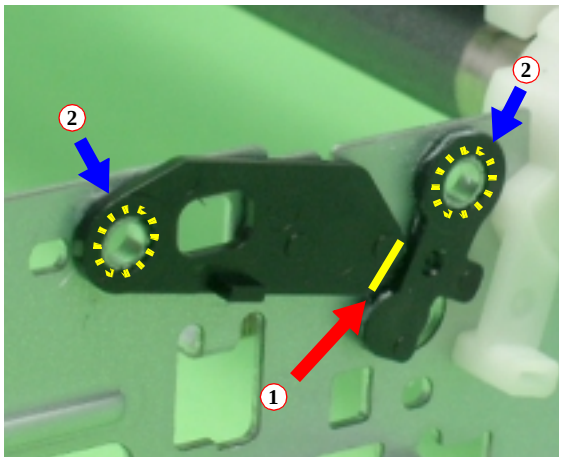
<Lubrication Point>
1. Edge line of Link Lever (Left)
2. Around 2 dowels of Link Lever Holder (Left)

<Lubrication Type>
1. G-26
2. G-26

<Lubrication Amount>
1. ϕ1 x 1mm
2. ϕ1 x 2 points

<Remarks>
Use a injector to apply it

Figure 6-11. Lubrication



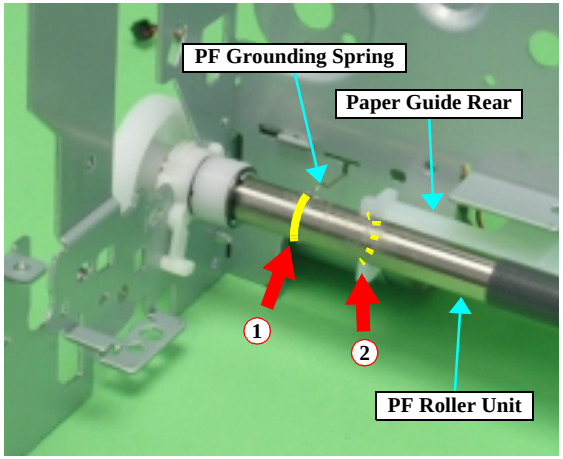
<Lubrication Point>
1. Edge line of Link Lever (Right)
2. Around 2 dowels of Main Frame (Right)

<Lubrication Type>
1. G-26
2. G-26

<Lubrication Amount>
1. ϕ1 x 1mm
2. ϕ1 x 2 points

<Remarks>
Use a injector to apply it

Figure 6-12. Lubrication



<Lubrication Point>

1. Contact point between PF Grounding Spring and PF Roller Unit
2. Contact point between Paper Guide Rear and PF Roller Unit

<Lubrication Type>

1. G-26
2. G-26

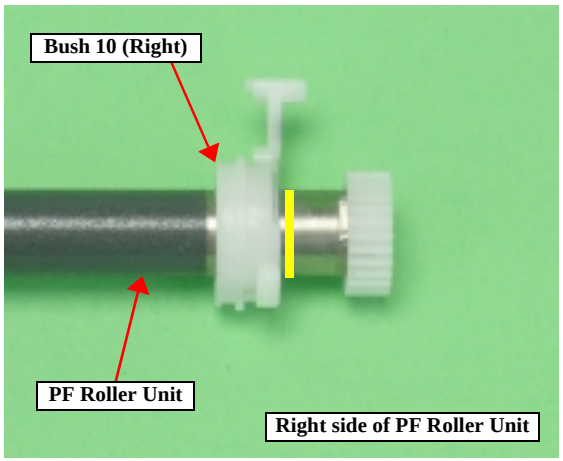
<Lubrication Amount>

1. ϕ1 x ϕ of PF Roller Unit
2. ϕ1 x ϕ of PF Roller Unit

<Remarks>

Use a injector to apply it

Figure 6-13. Lubrication



<Lubrication Point>

Contact point between Bush 10 (Right) and PF Roller Unit

<Lubrication Type>

G-26

<Lubrication Amount>

ϕ1 x ϕ of PF Roller Unit

<Remarks>

Use a injector to apply it

Figure 6-14. Lubrication

CHAPTER

7

APPENDIX

7.1 Connector Summary

7.1.1 Major Component Unit

The major component units of this printer are as follows.

- ☐ Main Board (C571 Main, C577Main)
- ☐ Power Supply Board (C571 PSB/PSE)
- ☐ Panel Board (C571 PNL)

The figure below shows how to connect these components.

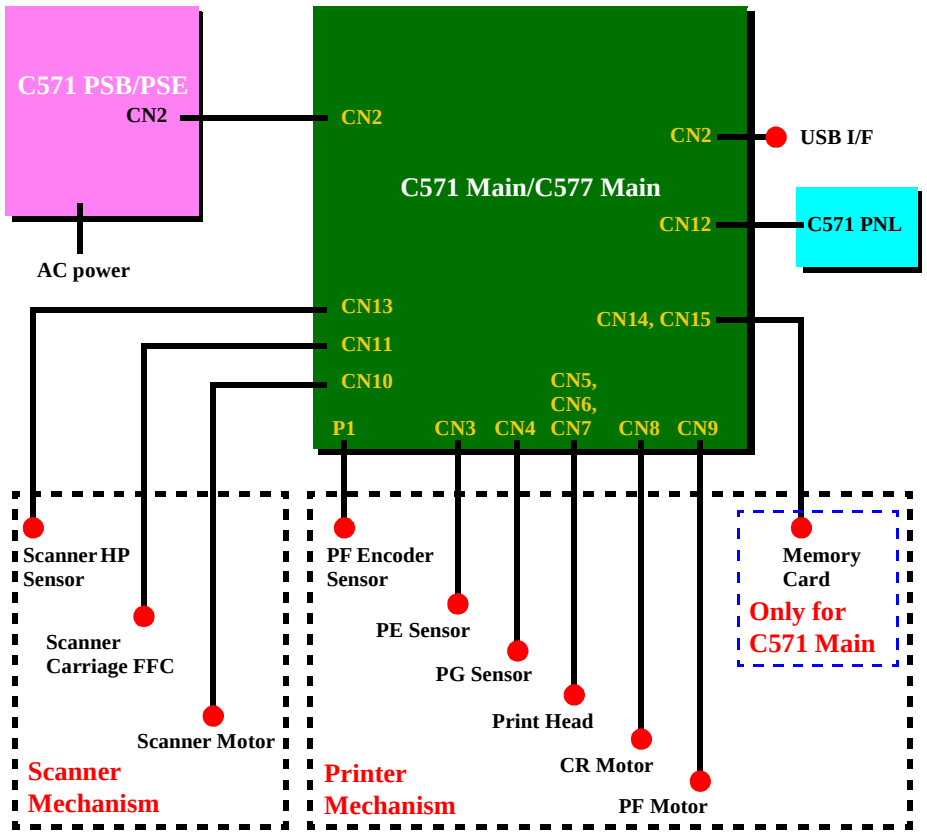


Figure 7-1. Connection of the major components

See the following tables for the connector summary for the C571 Main board, C577 Main board and each connector's pin alignment.

Table 7-1. Connector Summary for C571/C577 Main Board

Connector	Function	Table to refer to
CN1	For connection with the Power Supply Board	Table 7-2 *(p.182)*
CN2	For connection with the USB interface	"1.3.1 USB Interface" *(p.22)*
CN3	For connection with the PE Sensor	Table 7-3 *(p.183)*
CN4	For connection with the PG Sensor	Table 7-4 *(p.183)*
CN5 to CN7	For connection with the Print Head	Table 7-5 *(p.183)*, Table 7-6 *(p.183)*, Table 7-7 *(p.184)*
CN8	For connection with the CR Motor	Table 7-8 *(p.184)*
CN9	For connection with the PF Motor	Table 7-9 *(p.184)*
CN10	For connection with the Scanner Motor	Table 7-10 *(p.184)*
CN11	For connection with the Scanner Carriage FFC	Table 7-11 *(p.184)*
CN12	For connection with the Panel Board	Table 7-12 *(p.185)*
CN13	For connection with the Scanner HP Sensor	Table 7-13 *(p.185)*
CN14 to CN15	For connection with the Memory Card	Table 7-14 *(p.185)*, Table 7-15 *(p.186)*

Table 7-2. CN1 - Power Supply Board

Pin	Signal Name	I/O	Function
1	+42V	—	+42V
2	GND	—	Ground
3	PSC	I	Power supply control

Table 7-3. CN3 - PE Sensor

Pin	Signal Name	I/O	Function
1	PE	I	PE Sensor signal
2	GND	—	Ground
3	PEV	—	Power supply for PE Sensor

Table 7-4. CN4 - PG Sensor

Pin	Signal Name	I/O	Function
1	PG	I	PG Sensor signal
2	GND	—	Ground

Table 7-5. CN5 - Print Head

Pin	Signal Name	I/O	Function
1	XHOT/THM	I	Head temperature signal
2	SI2_Ye	O	Print data output for yellow nozzles
3	VDD2	—	+3.3V
4	SI1_Bk	O	Print data output for black nozzles
5	GND	—	Ground
6	NCHG	O	All nozzle fire selection pulse
7	GND	—	Ground
8	LAT	O	Head data latch pulse output
9	NC	—	Not connected
10	GND2	—	Ground
11	COM	O	Head drive pulse (trapezoid waveform)
12	GND2	—	Ground
13	COM	O	Head drive pulse (trapezoid waveform)

Table 7-6. CN6 - Print Head

Pin	Signal Name	I/O	Function
1	GND2	—	Ground
2	COM	O	Head drive pulse (trapezoid waveform)
3	GND2	—	Ground
4	COM	O	Head drive pulse (trapezoid waveform)
5	VHV	O	+42V power supply for nozzle selector
6	GND	—	Ground
7	SCK	—	Serial clock
8	GND	—	Ground
9	CH	O	Charge signal for the trapezoidal wave-form
10	VDD	—	+3.3V
11	SI3_Ma	O	Print data output for magenta nozzles
12	GND	—	Ground
13	SI4_Cy	O	Print data output for cyan nozzles

Table 7-7. CN7 - Print Head

Pin	Signal Name	I/O	Function
1	COI	I	Cartridge detect signal
2	CSDA	I/O	CSIC transmit and receive data
3	CRST	O	Reset signal for address counter of CSIC
4	GND2	—	Ground
5	CVDD	O	Power supply for CSIC
6	CSCK	I/O	Clock signal for CSIC read/write
7	NC	—	Not connected
8	GND	—	Ground
9	ENCB	I	Encoder feed back signal ch.B
10	EVDD	O	Power for CR Encoder
11	ENCA	I	Encoder feed back signal ch.A
12	NC	—	Not connected
13	PW	I	PW Sensor signal
14	GND	—	Ground
15	LEDON	—	Power supply for PW sensor

Table 7-8. CN8 - CR Motor

Pin	Signal Name	I/O	Function
1	CR-A	O	CR Motor drive signal (A)
2	CR-B	O	CR Motor drive signal (B)

Table 7-9. CN9 - PF Motor

Pin	Signal Name	I/O	Function
1	PF-A	O	PF Motor drive signal (A)
2	PF-B	O	PF Motor drive signal (B)

Table 7-10. CN10 - Scanner Motor

Pin	Signal Name	I/O	Function
1	B	O	Phase drive signal (-A)
2	AX	O	Phase drive signal (B)
3	A	O	Phase drive signal (A)
4	BX	O	Phase drive signal (-B)

Table 7-11. CN11 - Scanner Carriage

Pin	Signal Name	I/O	Function
1	OS	O	Output signal
2	VAD	—	Power supply for filtered 5V_SW (analog)
3	GND	—	Ground
4	M	O	Clock
5	RS	O	Reset
6	TR	O	Shift pulse
7	GND	—	Ground
8	VDD	—	Power supply for 5V_SW (digital)
9	LED R	O	LED cathode (Red)
10	LED G	O	LED cathode (Green)
11	LED B	O	LED cathode (Blue)
12	LED CA	—	Power supply for LED

Table 7-12. CN12 - Panel Board

Pin	Signal Name	I/O	Function
1	SDI	I	Switch data serial data input
2	SENB	O	LED lamp enable signal
3	SALT	O	Switch data load signal and LED data latch signal
4	CLK	O	Shift clock for serial data I/O
5	PSW	I/O	TBD
6	SDO	O	Serial data output for LED control
7	+3.3V	—	+3.3V
8	GND	—	Ground
01	GND	—	Ground
02	GND	—	Ground

Table 7-13. CN13 - Scanner HP Sensor

Pin	Signal Name	I/O	Function
1	SCN_HP	I	Scanner HP Sensor signal
2	GND	—	Ground
3	PEV	—	Power supply for Scanner HP Sensor

Table 7-14. CN14 - Memory Card

Pin	Signal Name	I/O	Function
1	GND	—	Ground
2	CD3		Data bus for CF slot (3)
3	CD4		Data bus for CF slot (4)
4	CD5		Data bus for CF slot (5)
5	CD6		Data bus for CF slot (6)
6	CD7		Data bus for CF slot (7)

Table 7-14. CN14 - Memory Card

Pin	Signal Name	I/O	Function
7	/CE1		Card enable signal
8	CA10		Address bus for CF slot (10)
9	/OE		Output enable signal
10	CA9		Address bus for CF slot (9)
11	CA8		Address bus for CF slot (8)
12	CA7		Address bus for CF slot (7)
13	VCC	—	Power supply for CompactFlash
14	CA6		Address bus for CF slot (6)
15	CA5		Address bus for CF slot (5)
16	CA4		Address bus for CF slot (4)
17	CA3		Address bus for CF slot (3)
18	CA2		Address bus for CF slot (2)
19	CA1		Address bus for CF slot (1)
20	CA0		Address bus for CF slot (0)
21	CD0		Data bus for CF slot (0)
22	CD1		Data bus for CF slot (1)
23	CD2		Data bus for CF slot (2)
24	WP/IOIS16B		Write protect - I/O port 16 bit
25	/CD2		Card detect signal
26	/CD1		Card detect signal
27	CD11		Data bus for CF slot (11)
28	CD12		Data bus for CF slot (12)
29	CD13		Data bus for CF slot (13)
30	CD14		Data bus for CF slot (14)
31	CD15		Data bus for CF slot (15)

Table 7-14. CN14 - Memory Card

Pin	Signal Name	I/O	Function
32	/CE2		Card enable signal
33	NC/VS1		Voltage sensing 1
34	/IORD		I/O read
35	/IOWR		I/O write
36	/WE		Write enable signal
37	RDY		Ready
38	VCC	—	Power supply for CompactFlash
39	/CSEL	—	Not connected
40	RPU/VS2		Voltage sensing 2
41	RESET		Reset
42	/WAIT		Bus cycle extension
43	INPACK		Input port response
44	/REG		Register select
45	BVD2/SPKA		Battery voltage detect/audio digital waveform
46	BVD1/STSCHG		Battery voltage detect/card status change
47	CD8		Data bus for CF slot (8)
48	CD9		Data bus for CF slot (9)
49	CD10		Data bus for CF slot (10)
50	GND	—	Ground

Table 7-15. CN15 - Memory Card

Pin	Signal Name	I/O	Function
1	GND	—	Ground
2	FCLE		Command latch enable signal
3	FALE		Address latch enable signal

Table 7-15. CN15 - Memory Card

Pin	Signal Name	I/O	Function
4	FWEB		Write enable signal
5	FWPB		Write protect signal
6	FD0		SSFDC data (Bit 0)
7	FD1		SSFDC data (Bit 1)
8	FD2		SSFDC data (Bit 2)
9	FD3		SSFDC data (Bit 3)
10	GND	—	Ground
11	CD1	—	Not connected
12	VCC	—	Power supply for SmartMedia
13	FD4		SSFDC data (Bit 4)
14	FD5		SSFDC data (Bit 5)
15	FD6		SSFDC data (Bit 6)
16	FD7		SSFDC data (Bit 7)
17	FLVD		Low Voltage Detect
18	GND	—	Ground
19	FRDY		Ready
20	FOEB		Output enable signal
21	FCEB		Chip enable signal
22	VCC	—	Power supply for SmartMedia
M1	GND	—	Ground
M2	BS		Serial protocol bus state signal
M3	VCC	—	Power supply for MemoryStick
M4	SDIO		Serial protocol data signal
M5	Reserve	—	Not connected
M6	INS		Serial protocol data signal

Table 7-15. CN15 - Memory Card

Pin	Signal Name	I/O	Function
M7	Reserve	—	Not connected
M8	SCLK		Stick inserted/removed detect terminal
M9	VCC	—	Power supply for MemoryStick
M10	GND	—	Ground
X1	GND	—	Ground
X2	XD_RDY		Ready
X3	XD_OEB		Output enable signal
X4	XD_CEB		Chip enable signal
X5	XD_CLE		Command latch enable signal
X6	XD_ALE		Address latch enable signal
X7	XD_WEB		Write enable signal
X8	XD_WPB		Write protect signal
X9	GND	—	Ground
X10	XD_D0		XD data (Bit 0)
X11	XD_D1		XD data (Bit 1(
X12	XD_D2		XD data (Bit 2)
X13	XD_D3		XD data (Bit 3)
X14	XD_D4		XD data (Bit 4)
X15	XD_D5		XD data (Bit 5)
X16	XD_D6		XD data (Bit 6)
X17	XD_D7		XD data (Bit 7)
X18	XD_VCC	—	Power supply for xD-Picture Card
S1	WP		TBD
S2	SW_GND	—	Ground
S3	DETECT		TBD

Table 7-15. CN15 - Memory Card

Pin	Signal Name	I/O	Function
S4	CD		Card detect signal
S5	GND	—	Ground
S6	WP1		Write protect seal condition
S7	GND	—	Ground
S8	XD_CD1		Card detect signal
D1	CD/DAT3		Card Detect /Data Line (Bit 3)
D2	CMD		Command/Response
D3	GND	—	Ground
D4	VDD	—	Power supply for SD Memory Card
D5	CLK		Clock
D6	GND	—	Ground
D7	DAT0		Data Line (Bit 0)
D8	DAT1		Data Line (Bit 1)
D9	DAT2		Data Line (Bit 2)

7.2 Component Layout

Figure 7-2. C571 Main board component layout (1)

Figure 7-3. C571 Main board component layout (2)

Figure 7-4. C577 Main board component layout (1)

Figure 7-5. C577 Main board component layout (2)

Figure 7-6. C571 PSB board component layout

Figure 7-7. C571 PSE board component layout

Figure 7-8. C571 Panel board component layout

7.3 Exploded Diagram

Following pages show exploded diagram.

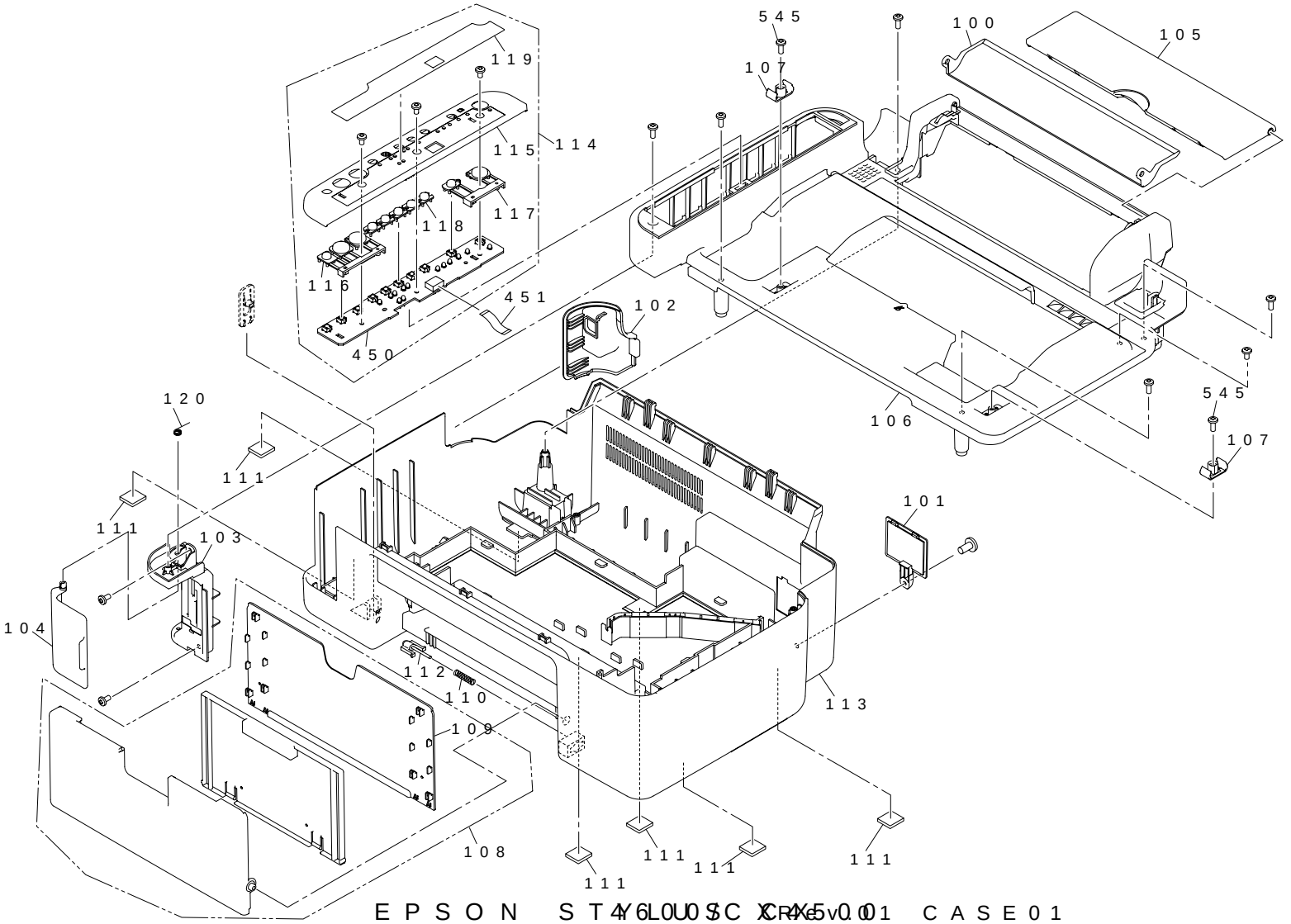


Figure 7-9. Stylus CX3500/CX3600/CX3650/CX4500/CX4600 Exploded Diagram 1

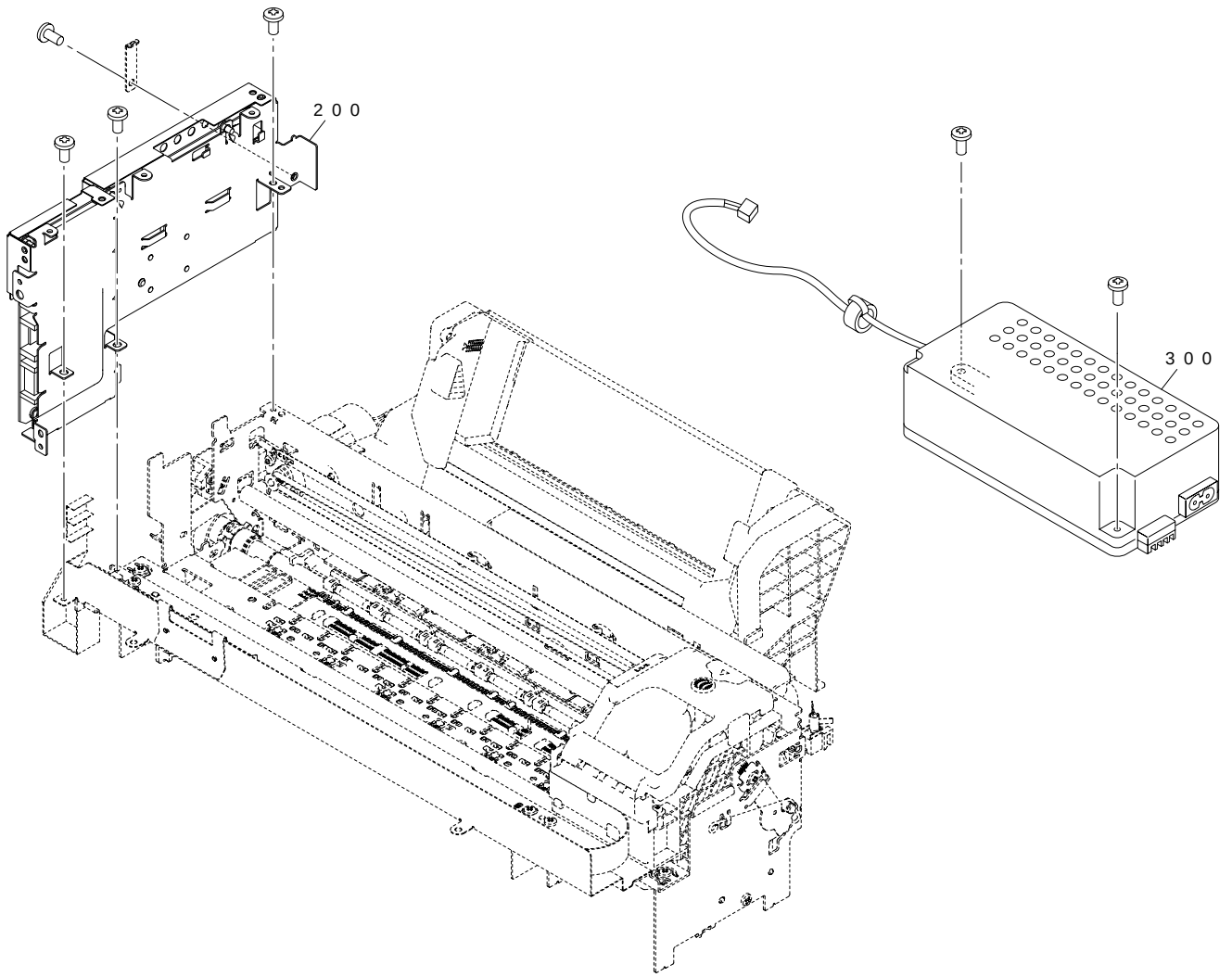


Figure 7-10. Stylus CX3500/CX3600/CX3650/CX4500/CX4600 Exploded Diagram 2

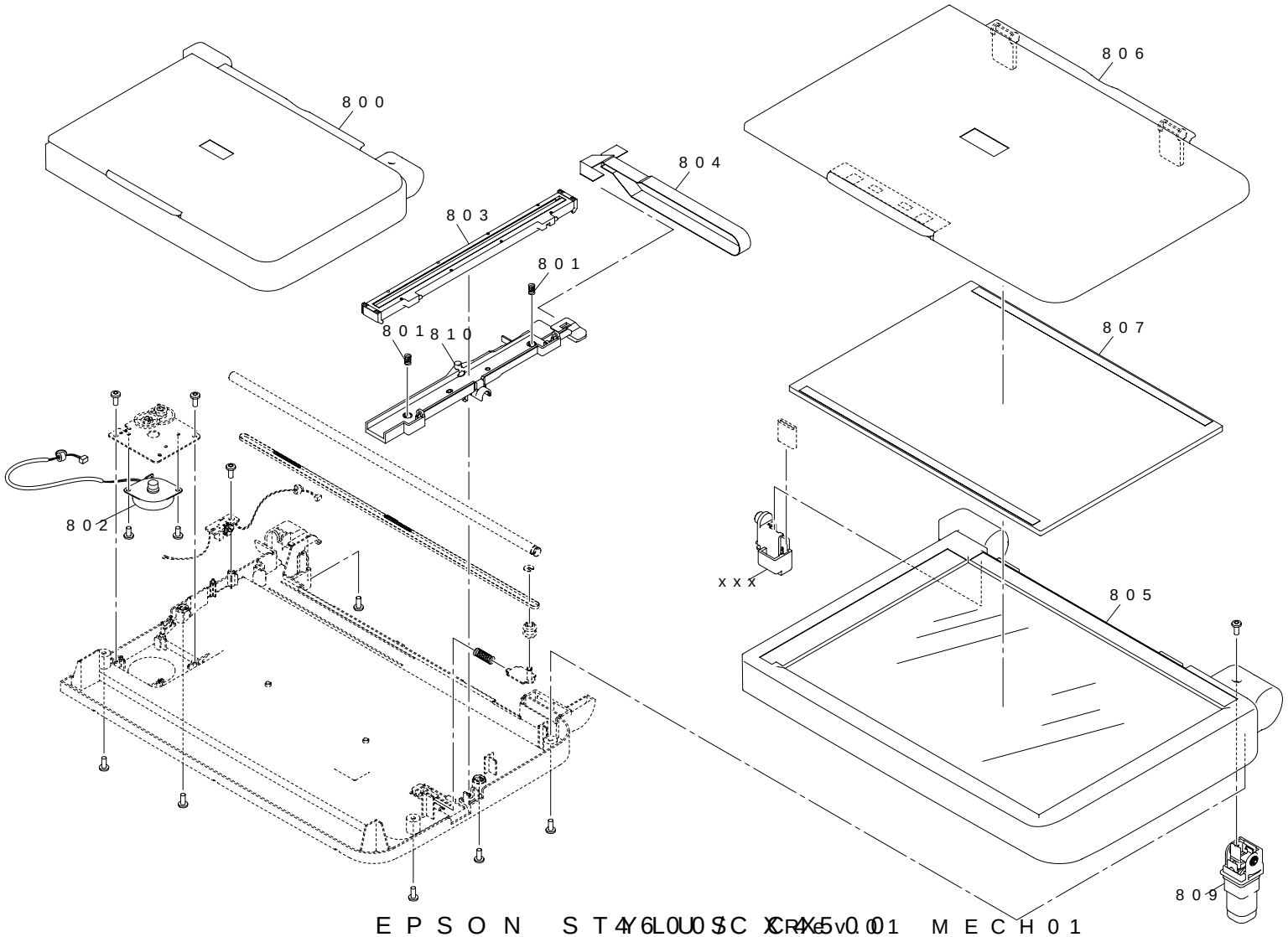


Figure 7-11. Stylus CX3500/CX3600/CX3650/CX4500/CX4600 Exploded Diagram 3

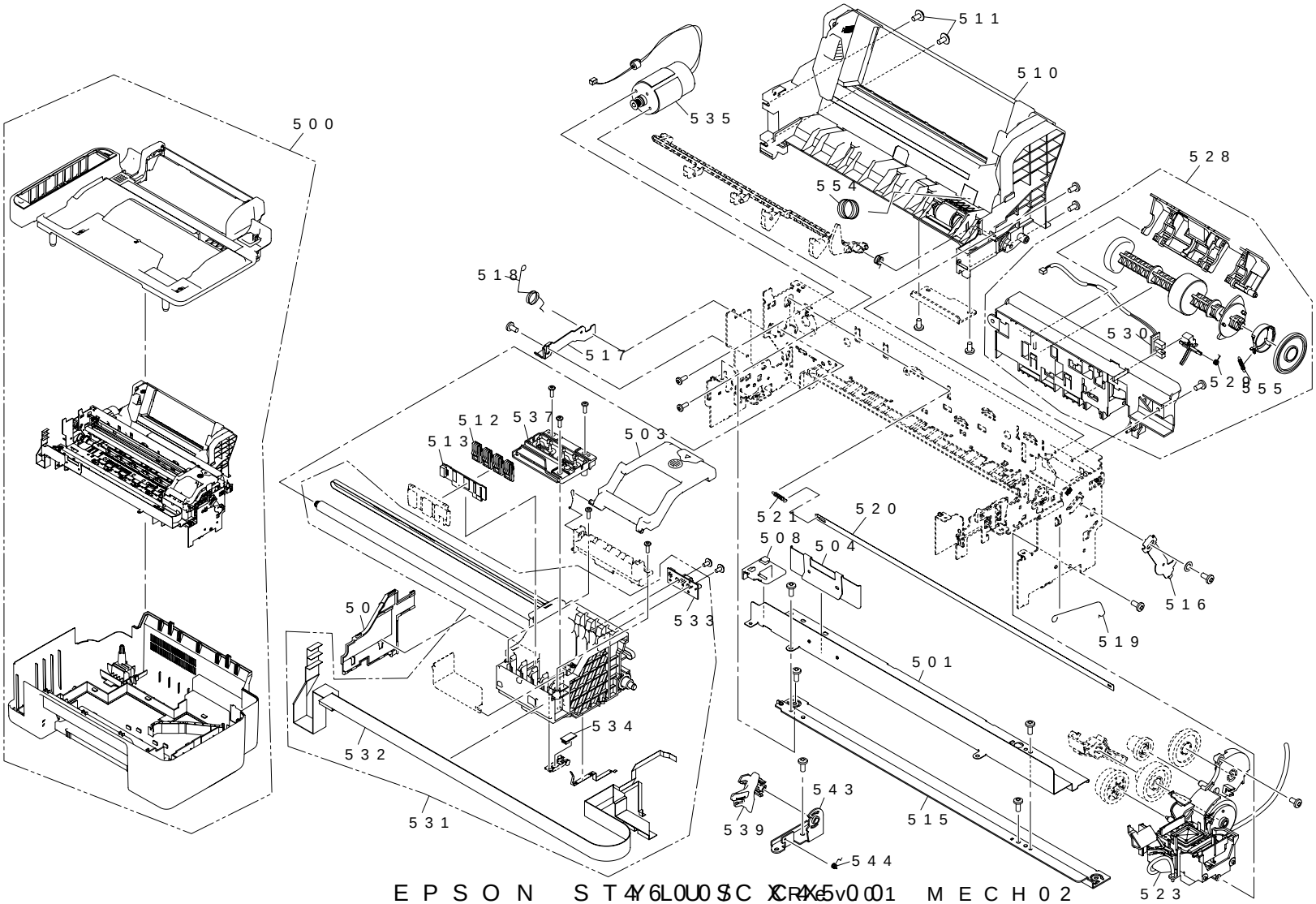


Figure 7-12. Stylus CX3500/CX3600/CX3650/CX4500/CX4600 Exploded Diagram 4

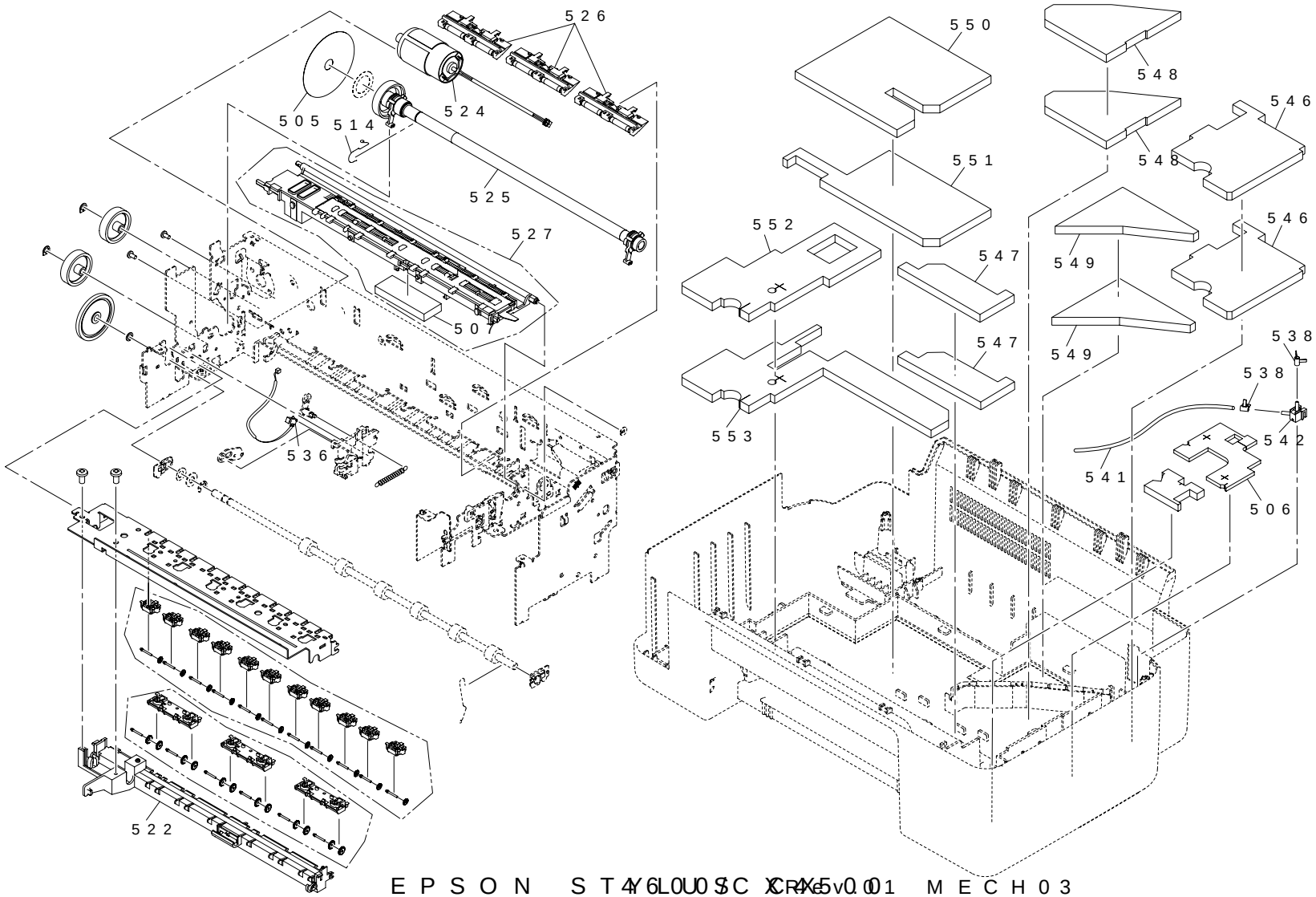


Figure 7-13. Stylus CX3500/CX3600/CX3650/CX4500/CX4600 Exploded Diagram 5

7.4 Parts List

Table 7-16. Stylus CX3500/CX3600/CX3650/CX4500/CX4600

Code	Parts Name
100	COVER,ASF
101	COVER,REAR;ECG
102	COVER,USB;ECG
103	HOUSING,CARD SLOT;ECG
104	COVER,CARD SLOT;EFS
105	PAPER SUPPORT ASSY.
106	HOUSING,UPPER ASSY.
107	LOCK,SCANNER;ECG
108	STACKER ASSY.
110	COMPRESSION SPRING,5.1
111	FOOT
112	LOCK,STACKER
113	HOUSING,LOWER;ECG
114	PANEL UNIT
116	BUTTON,COPY;EBM3
117	BUTTON,POWER;EBM3
118	BUTTON,S;EBM3
119	SHEET,PANEL;B
120	SPRING,COVER,CARD SLOT
450	BOARD ASSY.,PANEL
506	POROUS PAD,CAP,LOWER
540	POROUS PAD,JOINT,LOWER
546	POROUS PAD,INK EJECT,1

Table 7-16. Stylus CX3500/CX3600/CX3650/CX4500/CX4600

Code	Parts Name
547	POROUS PAD,INK EJECT,2
548	POROUS PAD,INK EJECT,3
549	POROUS PAD,INK EJECT,4
550	POROUS PAD,INK EJECT,5
551	POROUS PAD,INK EJECT,6
552	POROUS PAD,INK EJECT,7
553	POROUS PAD,INK EJECT,8
800	SCANNER UNIT
801	SPRING,CIS
802	MOTOR ASSY.,SC
803	CIS
804	FFC,CIS
806	COVER,DOCUMENT ASSY.
807	MAT,COVER,DOCUMENT
809	HINGE,ASSY.
810	CR,MAIN
811	HINGE,L
200	MAIN BOARD ASSY.;C
300	POWER SUPPLY UNIT;100V;B
451	HARNESS
500	PRINTER MECHANISM(ASP)MAK10-100
501	FRAME,FRONT
502	COVER,CABLE,HEAD
503	COVER,CARTRIDGE
504	FRAME,HOLDER,FFC

Table 7-16. Stylus CX3500/CX3600/CX3650/CX4500/CX4600

Code	Parts Name
505	SCALE,PF
507	POROUS PAD,TUBE,UPPER
508	GUIDE,FFC
510	ASF UNIT
511	C.B.P-TITE SCREW,3X6,F/ZN-3C
512	CONNECTER,CSIC
513	BOARD ASSY.,CSIC
514	GROUNDING SPRING,PF
515	FRAME,GUIDE,CR
516	LEVER,PARALLEL ADJUSTMENT,RIGHT
517	LEVER,PARALLEL ADJUSTMENT,LEFT
518	TORSION SPRING,SHAFT,CR,GUIDE
519	PRESSING SPRING,SHAFT,CR,GUIDE
520	SCALE,CR
521	EXTENSION SPRING,3.289
522	PAPER GUIDE,FRONT,SUPPORT
523	INK SYSTEM ASSY.
524	MOTOR ASSY.,PF
525	ROLLER,PF ASSY.
526	PAPER GUIDE,UPPER ASSY.
527	PAPER GUIDE,FRONT ASSY.
528	HOLDER,SHAFT ASSY.
529	TORSION SPRING,0.22
530	BOARD ASSY.,DETECTOR
531	CR ASSY.

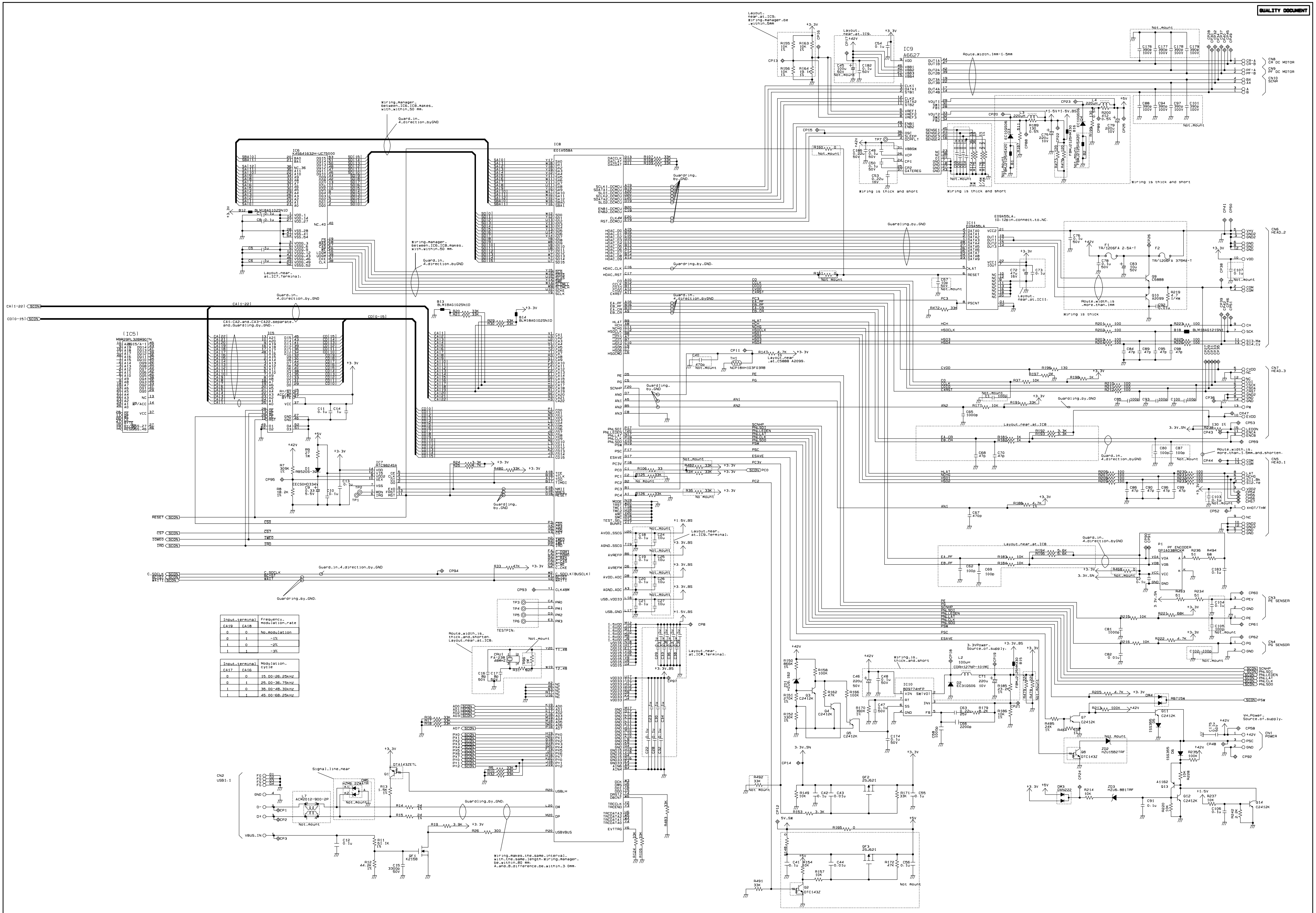
Table 7-16. Stylus CX3500/CX3600/CX3650/CX4500/CX4600

Code	Parts Name
532	CABLE,HEAD
533	BOARD ASSY.,ENCORDER
534	BOARD ASSY.,DETECTOR,PW
535	MOTOR ASSY.,CR
536	DETECTOR ASSY.,PG
537	PRINT HEAD
538	CLAMP,TUBE
539	LEVER,PG
541	TUBE,INK EJECT
542	JOINT,INK EJECT
543	MOUNTING PLATE,LEVER,PG
544	TORSION SPRING,19.01
545	C.B.P-TITE SCREW,3X10,F/ZN-3C
554	COMPRESSION SPRING,2.51
555	EXTENSION SPRING,0.143
556	TORSION SPRING,6.45

7.5 Electrical Circuits

The electric circuit diagrams below are shown at the following pages:

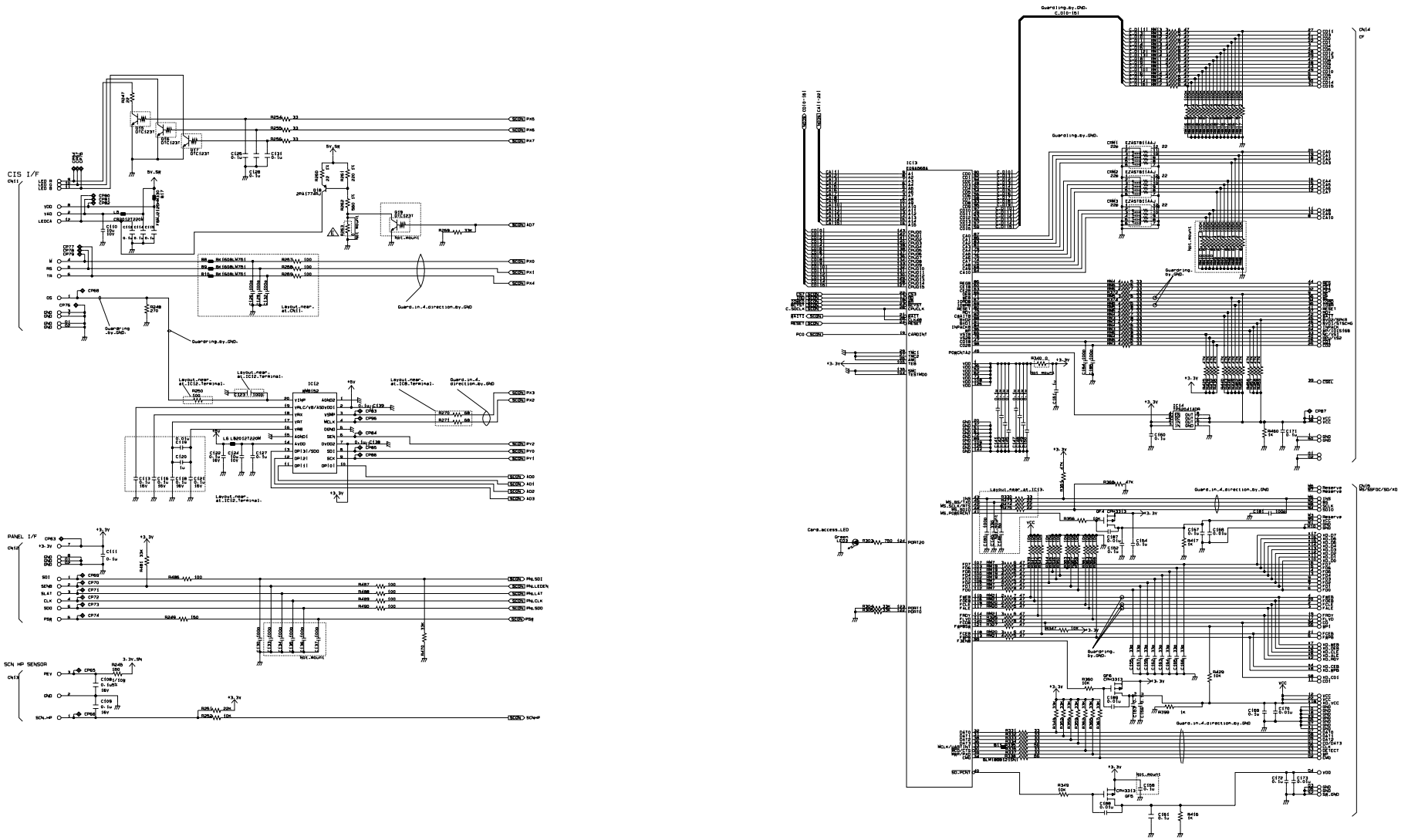
- C571 Main control circuit board
- C577 Main control circuit board
- C571 PSB/PSE power supply circuit board
- C571 Panel circuit board



Input_terminal		Frequency_ modulation_rate
CA19	CA18	
0	0	No_modulation
0	1	-1%
1	0	-2%
1	1	-3%

Input_terminal		Modulation_ cycle
CA17	CA16	
0	0	15.00-26.25kHz
0	1	25.00-36.75kHz
1	0	35.00-48.30kHz
1	1	45.00-68.25kHz

EPSON


CIS I/F
PANEL I/F
SCN HP SENSOR
IC12
IC13
IC14
Guarding.by.GND.
Guard.in.4.direction.by.GND
Card.access.LED
Not.mount

QUALITY DOCUMENT

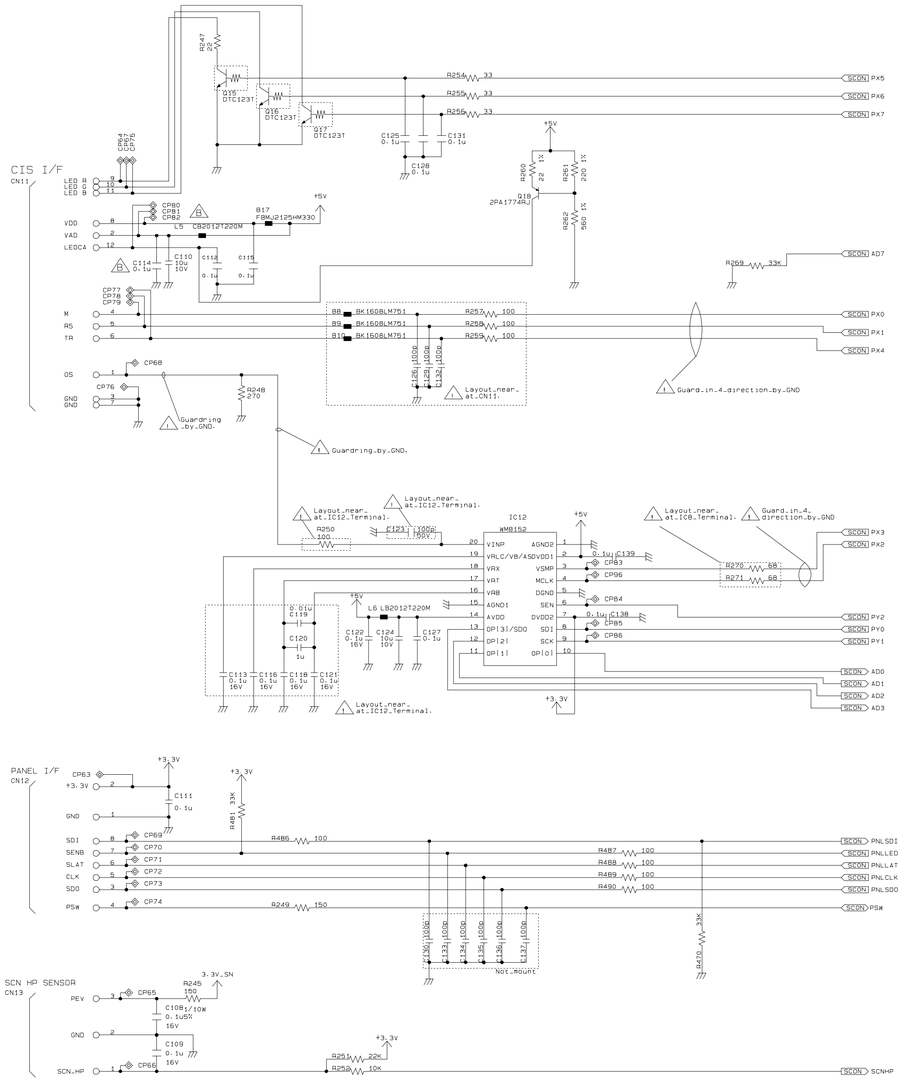
Input_terminal		Frequency_modulation_rate
C419	C416	
0	0	No_modulation
0	1	-1%
1	0	-2%
1	1	-3%

Input_terminal		Modulation_cycle
C417	C416	
0	0	15.00-26.25kHz
0	1	25.00-36.75kHz
1	0	35.00-48.30kHz
1	1	45.00-68.25kHz

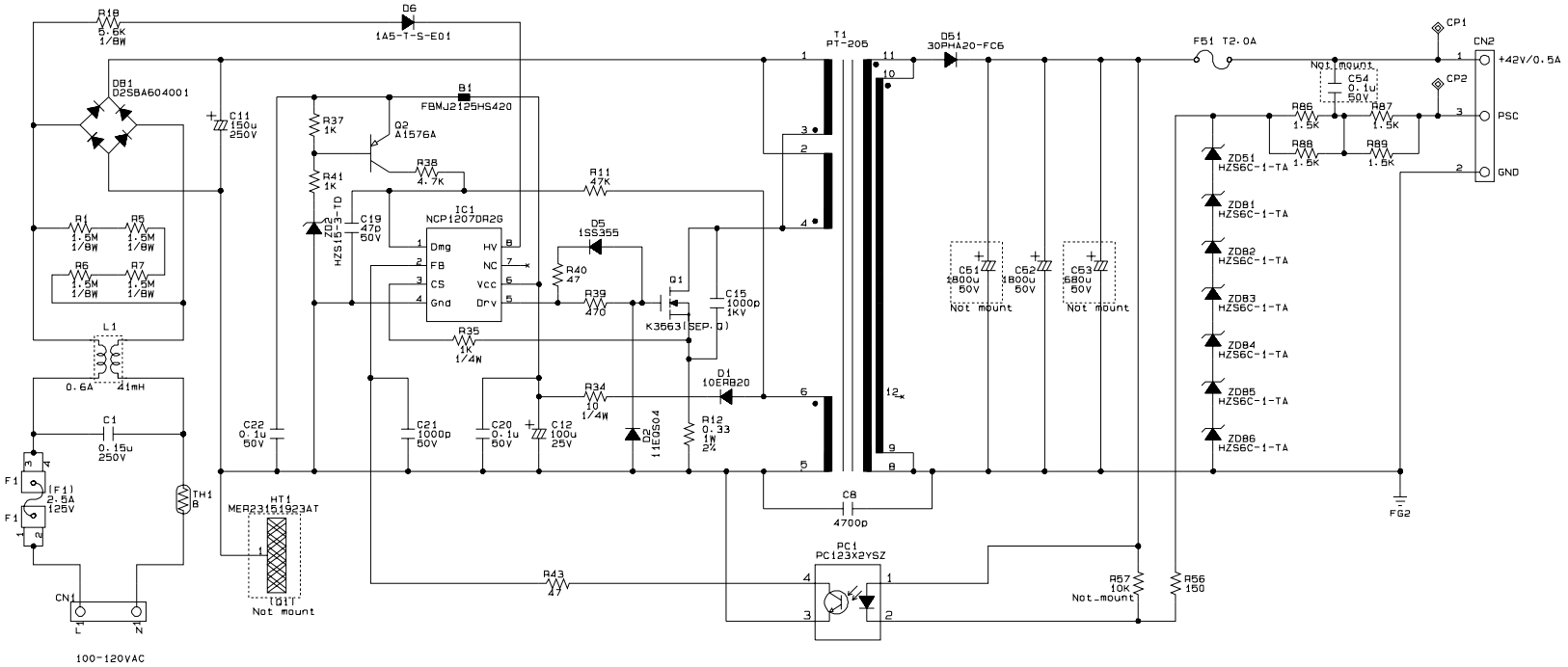
						NAME				DRAWING NO.
						BOARD ASSY.,MAIN (C577 MAIN-B)				2090125-01
							DRAWN	DESIGNED	CHECKED	APPROVED
E	04/05/26	H.Kagami	I.Shindo	M.Fujimori	Change of parts(IC6)(TEN167147)	DESIGN				
D	'04/05/21	H.Kagami	I.Shindo	M.Fujimori	No mount->Deletion(TEN166829)					
C	'04/04/12	H.Kagami	H.Nawate	T.Oi	Change of parts(TEN164032)					
B	'04/03/31	H.Kagami	Y.Sako	M.Fujimori	Change of parts(TEN163368)					
A	'04/03/22	H.Kagami	-	-	New release!TEN162764	TECH.	H.Kagami	-	Y.Sako	M.Fujimori
REV.	DATE	DESIGNED	CHECKED	APPROVED	REVISED		04.03.22	-	04.03.22	04.03.22

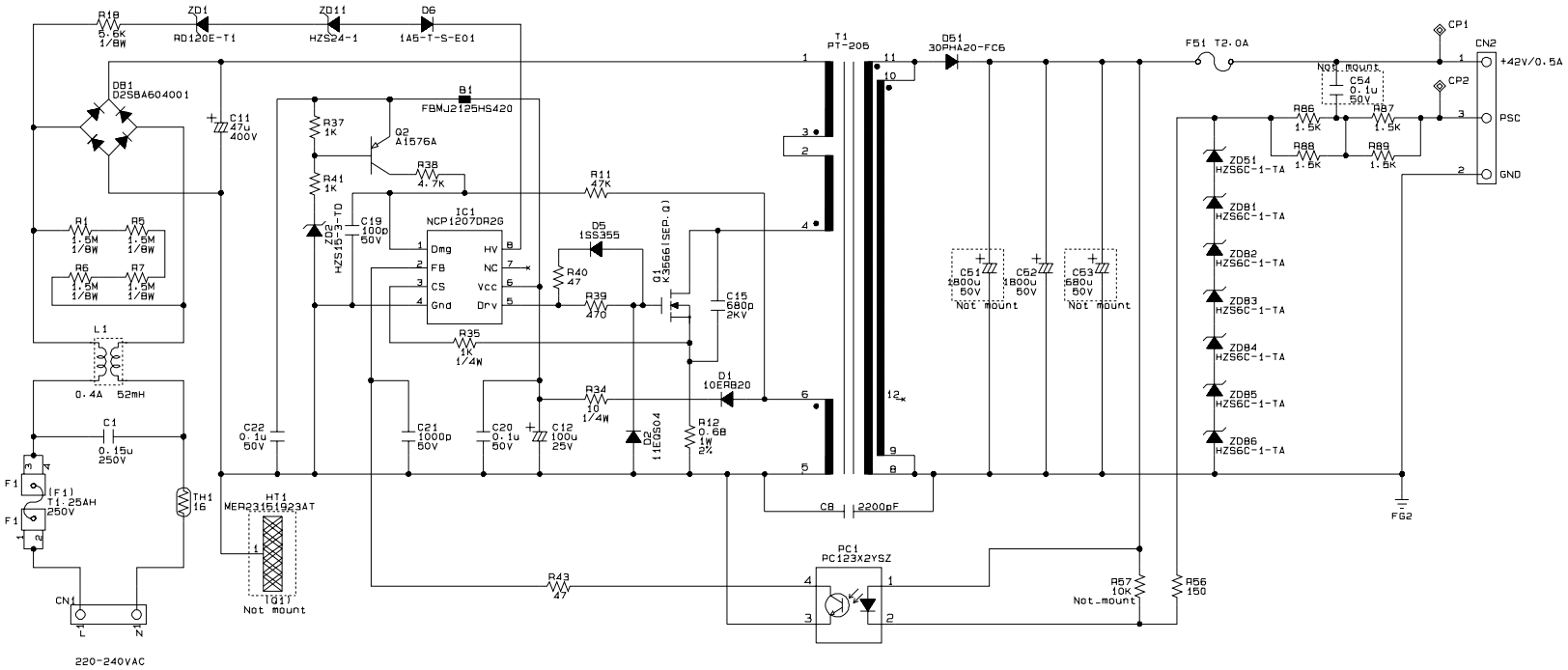
CODE: C577 | PAGE: 1/2

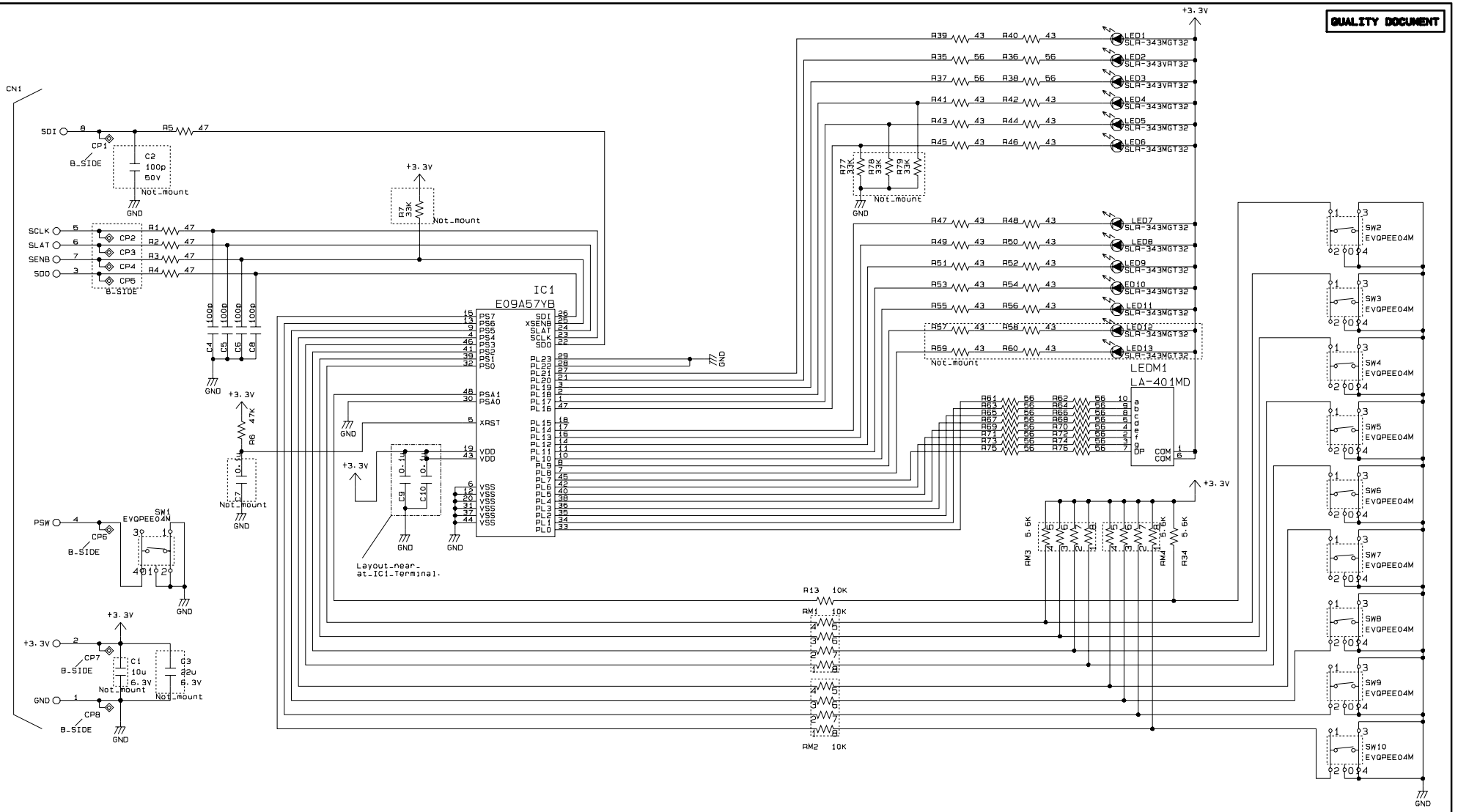
(A1) EPSON



						NAME				DRAWING NO.
						BOARD ASSY.. MAIN (C577 MAIN-B)				2090125-02
							DRAWN	DESIGNED	CHECKED	APPROVED	CODE
						DESIGN					C577
											PAGE
B	'04/05/21	H.Kagami	I.Shindo	M.Fujimori	Change of parts(TEN166829)	TECH.	H.Kagami	–	Y.Sako	M.Fujimori	2/2
A	'04/03/22	H.Kagami	–	–	New release(TEN162764)						
REV.	DATE	DESIGNED	CHECKED	APPROVED	REVISED		04.03.22	–	04.03.22	04.03.22	


R18 5.6K 1/8W
D6 1A5-T-S-E01
T1 PT-205
D51 30PHA20-FC6
F51 T2.0A
CP1
CN2
+42V/0.5A
PSC
GND
CP2
Not mount
C54 0.1u 50V
R86 1.5K
R87 1.5K
R88 1.5K
R89 1.5K
DB1 D2SBA604001
B1 FBMJ2125HS420
C11 150u 250V
R37 1K
Q2 A1576A
R38 4.7K
R41 1K
R11 47K
ZD2 HZS15-3-TD
C19 47p 50V
IC1 NCP1207DR2G
Dmg
FB
CS
Gnd
HV
NC
Vcc
Drv
D5 1SS355
R40 47
R39 470
Q1 K3563(SEP.Q)
C15 1000p 1kV
R35 1k 1/4W
D1 10ERB20
R34 10 1/4W
D2 11EQS04
R12 0.33 1W 2%
C51 1800u 50V
C52 1800u 50V
C53 680u 50V
Not mount
ZD51 HZS6C-1-TA
ZDB1 HZS6C-1-TA
ZDB2 HZS6C-1-TA
ZDB3 HZS6C-1-TA
ZDB4 HZS6C-1-TA
ZDB5 HZS6C-1-TA
ZDB6 HZS6C-1-TA
FG2
R1 1.5M 1/8W
R5 1.5M 1/8W
R6 1.5M 1/8W
R7 1.5M 1/8W
L1 0.6A 41mH
C1 0.15u 250V
F1 (F1) 2.5A 125V
TH1 B
CN1
L
N
100-120VAC
C22 0.1u 50V
C21 1000p 50V
C20 0.1u 50V
C12 100u 25V
HT1 MER23151923AT (D1T) Not mount
C8 4700p
PC1 PC123X2YSZ
R43 47
R57 10K Not mount
R56 150


R18 5.6K 1/8W
ZD1 RD120E-T1
ZD11 HZS24-1
D6 1A5-T-S-E01
DB1 D2SBA604001
B1 FBMJ2125HS420
C11 47u 400V
R37 1K
Q2 A1576A
R38 4.7K
R41 1K
ZD2 HZS15-1-TD
C19 100p 50V
IC1 NCP1207DR2G
Dmg FB CS Gnd HV NC Vcc Drv
R11 47K
D5 1SS355
R40 47
R39 470
Q1 K3566(SEP.G)
C15 680p 2KV
R35 1K 1/4W
D1 10ERB20
R34 10 1/4W
D2 11EQS04
R12 0.68 1W ±2%
T1 PT-205
D51 30PHA20-FC6
F51 T2.0A
CP1
CN2
+42V/0.5A
PSC
GND
CP2
Not mount
C54 0.1u 50V
R86 1.5K
R87 1.5K
R88 1.5K
R89 1.5K
ZD51 HZS6C-1-TA
ZD81 HZS6C-1-TA
ZD82 HZS6C-1-TA
ZD83 HZS6C-1-TA
ZD84 HZS6C-1-TA
ZD85 HZS6C-1-TA
ZD86 HZS6C-1-TA
C51 1800u 50V Not mount
C52 1800u 50V
C53 680u 50V Not mount
FG2
R1 1.5M 1/8W
R5 1.5M 1/8W
R6 1.5M 1/8W
R7 1.5M 1/8W
L1 0.4A 52mH
C1 0.15u 250V
F1 (F1) T1.25AH 250V
TH1 16
CN1 L N
220-240VAC
C22 0.1u 50V
C21 1000p 50V
C20 0.1u 50V
C12 100u 25V
HT1 MER231J51923AT
TQ1 Not mount
C8 2200pF
PC1 PC123X2YSZ
R43 47
R57 10K Not mount
R56 150


QUALITY DOCUMENT
CN1
SDI
SCLK
SLAT
SENB
SDO
IC1
E09A57YB
LEDM1
LA-401MD
SW1
EVQPEE04M
Layout near at IC1 Terminal.
Not mount
B SIDE
GND
+3.3V
EPSON