

CR-55

SERVICE MANUAL

FIRST EDITION

Canon

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MY8-13A6-000

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Use of this manual
should be strictly
supervised to avoid
disclosure of confidential
information.

This Service Manual describes necessary basic information for field service and maintenance for maintaining the product quality and functions of this machine.

Contents

Chapter 1: General description

Features, specifications, name of parts, operation method

Chapter 2: Functions and operation

Description of operation of machine system and electrical system by function

Chapter 3: Disassembly and reassembly

Disassembly method, reassembly method

Chapter 4: Installation and maintenance

Installation method, maintenance method

Chapter 5: Troubleshooting

Service modes and troubleshooting

Appendix: General circuit diagrams, etc.

Information in this manual is subject to change. Notification of such changes will be given in Service Information Bulletins.

Thoroughly read the information contained in this Service Manual and the Service Information Bulletins to gain a correct and deeper understanding of the machine. This is one way of fostering response for ensuring prolonged quality and function, and for investigating the cause of trouble during troubleshooting.

Quality Assurance Center
Canon Electronics Inc.

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CHAPTER 1

GENERAL DESCRIPTION

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I. FEATURES

1. Compact Design (Small, Light)

Dimensions (Tray closed): 223 (W) x 140 (D) x 188 (H) mm

Weight: 2 Kg

2. High-Speed Scanning

Black & White, Grayscale: Simplex 55 ppm, Duplex 55 ipm (200 dpi, Personal checks)

Color: Simplex 23.8 ppm, Duplex 23.8 ipm (200 dpi, Personal checks)

3. Magnetic Ink Characters (MICR) Reading

Reading E13B/CMC7 fonts with magnetic head

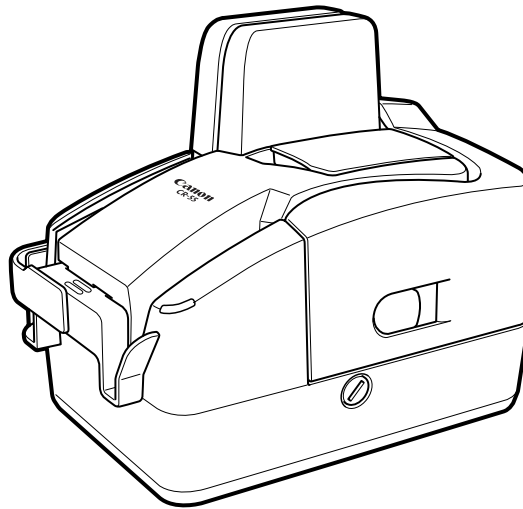


Figure 1-101

“Windows” is a registered trademark of Microsoft Corporation in the U.S. and other countries. Other company names and products names mentioned in this manual are registered trademarks or trademarks of respective companies.

II. SPECIFICATIONS

1. Appearance/Installation

No.	Item	Specifications
1	Type	Desktop type sheet-through scanner
2	Product models	1) 120 V model: 120 VAC, 60 Hz 2) 220-240 V model: 220-240 VAC, 50/60 Hz
3	Rating power	1) Main body All mode: 16 VDC, 0.8 A *Packaged AC adapter must be used *Energy Star conformity 2) Packaged AC adapter Input: 100-240 VAC, 50/60 Hz, 0.65-0.34 A (65-82 VA) Output: 16 VDC, 1.8 A
4	Operating environment	1) 10 to 32.5°C (50 to 90.5°F) 2) 20 to 80%RH *No condensation allowed.
5	Noise	65 dB or less (Sound power level)
6	Dimensions	Tray closed: 223 (W) × 140 (D) × 188 (H) mm
7	Weight	Approx. 2 kg
8	Output interface	USB2.0 (Hi-speed)
9	Expected product life (In-house information)	One of the following two items, whichever comes first. 1) 5 years 2) Sheets fed: 10,000,000 sheets (Personal checks) *There are parts needed to replace.
10	Estimated duty cycle	3,000 sheets/day
11	Installation	By users
12	Bundle software	Scanning Utility for CR-55 (incl. driver), Ranger driver
13	Option	Ink cartridge Hewlett-Packard Company, Product number: C6602B/G/R

Table 1-201

2. Documents Feed

No.	Item	Specifications		
1	Document size	1) Width: 54 to 106 mm 2) Length: 80 to 228 mm		
2	Document weight (converted thickness)	60~128 g/m ² (0.08~0.20 mm) *When using double feed detection, the document thickness is restricted to 0.10~0.14 mm.		
3	Document type	Check or Bill paper		
4	Document requirements	1) Carbon-backed paper: Cannot be fed. 2) Pressure-sensitive paper: Can be fed with limitation of direction. 3) Curled paper: Can be fed only if curl is 5 mm or less. 4) Creased paper: Can be fed, but crease must be straightened before being fed. 5) Remaining of perforated line: Cannot be fed.		
5	Document storage	1) Pickup: 5 mm or less including curls, or 50 sheets at max. 2) Eject: same as Pickup		
6	Feeding speed	Reading Resolution	Binary Grayscale	Color
		100 x 100 dpi	423 mm/sec	188 mm/sec
		200 x 100 dpi		188 mm/sec
		200 x 200 dpi	423 mm/sec	
		300 x 300 dpi	188 mm/sec	
7	Other functions	1) Separation: Comb-shaped roller method (Non by-path-mode) 2) Ejection pocket: one pocket 3) Double feed detection: Infrared method		

Table 1-202

3. Document Reading *using bundle software Scanning Utility for CR-55

No.	Item	Specifications															
1	Type of sensor	Contact Image Sensor (CIS)															
2	Picture element	Density of element: 600 dpi, Effective elements: 2808 (119 mm)															
3	Light source	3-color (RGB) LEDs R: 620 nm, G: 530 nm, B: 467 nm															
4	Reading side	Simplex (Front)/Duplex (Both)															
5	Reading size	1) Typical: Personal check (152 x 70 mm), Bill (216 x 93 mm), and others 2) Auto size detection 3) Maximum size (228 x 117.5 mm)															
6	Output mode	1) Binary (Black & White/Error diffusion/Advanced text enhancement/Adaptive threshold) 2) Grayscale (4 bit/8 bit) 3) Color (24 bit)															
7	Output resolution	1) Binary/Grayscale (100 x 100 dpi, 200 x 200 dpi, 300 x 300 dpi) 2) Color (100 x 100 dpi, 200 x 200 dpi) *Color 200 x 200 dpi is converted from 200 x 100 dpi at computer.															
8	Reading speed	Using Personal check *cpm=checks/minute															
		<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 33%;">Reading Resolution</th> <th style="width: 33%;">Binary Grayscale</th> <th style="width: 33%;">Color</th> </tr> </thead> <tbody> <tr> <td>100 x 100 dpi</td> <td>55 cpm</td> <td>23.8 cpm</td> </tr> <tr> <td>200 x 100 dpi</td> <td style="text-align: center;">/</td> <td>23.8 cpm</td> </tr> <tr> <td>200 x 200 dpi</td> <td>55 cpm</td> <td style="text-align: center;">/</td> </tr> <tr> <td>300 x 300 dpi</td> <td>23.8 cpm</td> <td style="text-align: center;">/</td> </tr> </tbody> </table>	Reading Resolution	Binary Grayscale	Color	100 x 100 dpi	55 cpm	23.8 cpm	200 x 100 dpi	/	23.8 cpm	200 x 200 dpi	55 cpm	/	300 x 300 dpi	23.8 cpm	/
		Reading Resolution	Binary Grayscale	Color													
		100 x 100 dpi	55 cpm	23.8 cpm													
		200 x 100 dpi	/	23.8 cpm													
		200 x 200 dpi	55 cpm	/													
300 x 300 dpi	23.8 cpm	/															
*Settings of reading are default. The numbers above may differ depending on the computer, the function settings and other conditions.																	
9	Reading font of MICR	E13B/CMC7															
10	Reading font of OCR	E13B/OCR-A/OCR-B/Check writer/Universal character															

Table 1-203

4. Image Processing/Other Functions *using bundle software Scanning Utility for CR-55

No.	Item	Specifications
1	Brightness adjustment	255 steps, front/back side individual setting
2	Contrast adjustment	7 steps, front/back side individual setting
3	Edge emphasis	5 steps, front/back side individual setting
4	Gamma correction	Grayscale/R/G/B individual color, each side setting
5	Other image processing	Skew correction (Deskew), Black frame removal
6	Calculating shading correction value	Using shading sheet (service tool)
7	Counter	Total fed counts (indicated in display with computer)
8	Operation/Indication panel	Power switch, Paper thickness adjustment, Power indicator

Table 1-204

The specifications above are subject to change for improvement of the product.

III. EXPLANATION OF MICR

1. Outline

MICR, which stands for Magnetic Ink Character Recognition, is a system for printing with magnetic ink or magnetic toner on special fonts called MICR fonts on checks, etc., reading the data thus printed, sorting, and so on.

This machine is equipped with a MICR reading function in addition to its image reading function.

2. MICR Font

There are two MICR fonts, E13B and CMC7. E13B is used principally in North America and East Asia, and CMC7 is used principally in Europe and South America. These fonts and printing specifications are regulated by the ISO and other standards.

1) E13B

E13B consists of 10 numbers and 4 symbols. The characters have a height of 3 mm. Table 1-301 shows the various characters that make up this font.

2) CMC7

CMC7 consists of 10 numbers and 5 symbols. The characters have a height of 3 mm. Table 1-302 shows the various characters that make up this font.

Read Characters	Name
0	Zero
1	One
2	Two
3	Three
4	Four
5	Five
6	Six
7	Seven
8	Eight
9	Nine
⋮	Transit
⋮'	Amount
⋮"	On-Us
⋮⋮	Dash

Table 1-301

Read Characters	Name
0	Zero
1	One
2	Two
3	Three
4	Four
5	Five
6	Six
7	Seven
8	Eight
9	Nine
⋮'	S-1 (Internal)
⋮	S-2 (Amount)
⋮	S-3 (Terminator)
⋮	S-4 (Not Used)
⋮	S-5 (Routing)

Table 1-302

3) Printing

Figure 1-301 shows the character string printing positions.

The dimension values are for reference only. Actual dimensions are defined by each standard. The character strings indicate the amount, routing number, account number, etc.

The 16mm width area from the bottom is called the “clear band”. This area can contain only correct MICR character strings. Print characters in the prescribed areas within the clear band.

The character spacing, slant, and alignment tolerances are prescribed by each standard.

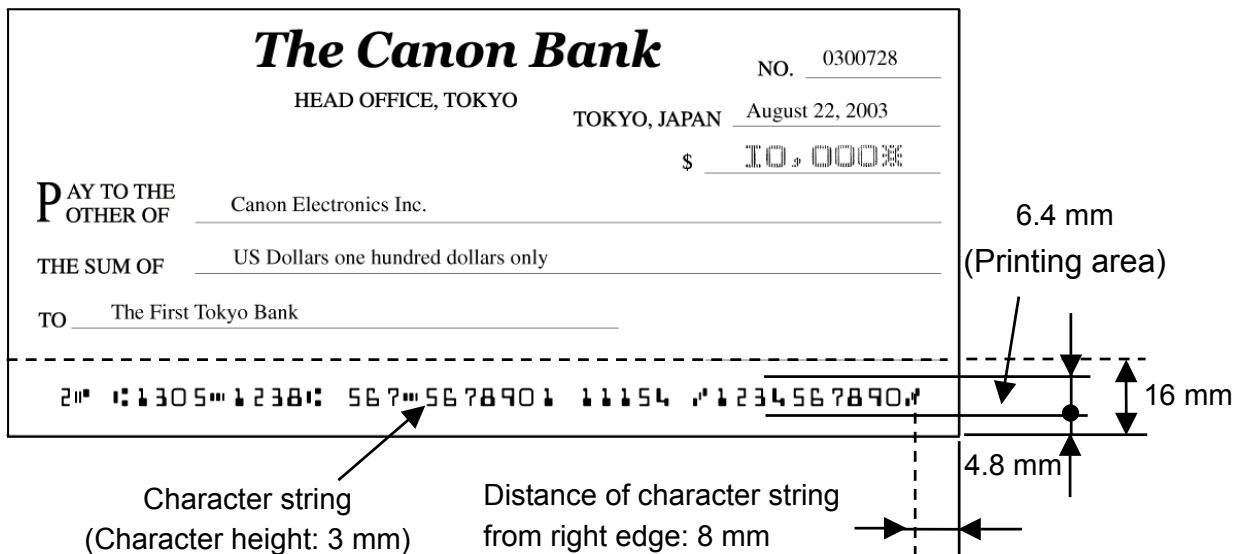


Figure 1-301

IV. PRECAUTIONS

This section describes items that require particular care, for example, regarding human safety. These precautions must be observed. Explain to the user items that relate to user safety, and instruct the user to take appropriate actions.

1. Power OFF in Emergency

When such abnormalities as abnormal noise, smoke, heat and odor occur, unplug the power cord immediately.

As it may cause injury, be careful not to get clothing (ties, long hair, etc.) caught in the machine. If this happens, unplug the power cord immediately. Also, do not insert your fingers in the feed section while feeding documents.

2. Prohibition of Modify

Do not change nor modify this machine. If this has been carried out, its use may be forcibly discontinued on site.

If this machine's specifications shall be changed, or the machine shall be disassembled and reassembled, follow the instructions described in this manual or in service Information.

3. Electromagnetic Wave Interference Countermeasures

This machine complies with the electromagnetic wave interference standards (VCCI, FCC, etc.). However, the user might have to carry out countermeasures if the machine causes electromagnetic wave interference.

4. User Manual

Read the user manual thoroughly before using this machine.

5. Ink Cartridge

Follow the manufacturer and distributor cautions printed on the ink cartridge package, etc.

6. Disposal

Following local regulations when disposing of the product and parts.

V. NAME OF PARTS

1. Front View

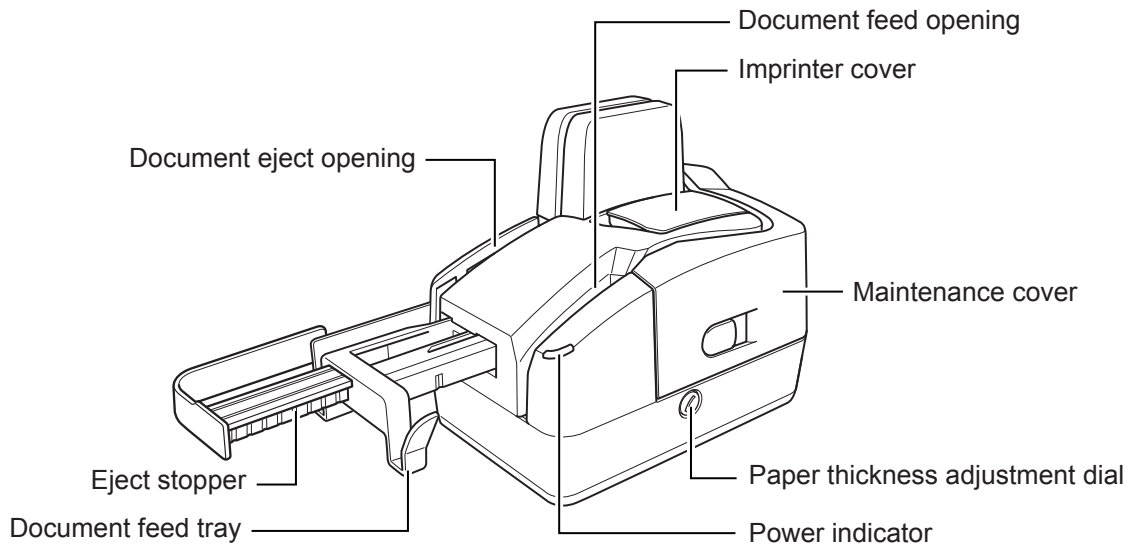


Figure 1-501

2. Inside of Imprinter Cover

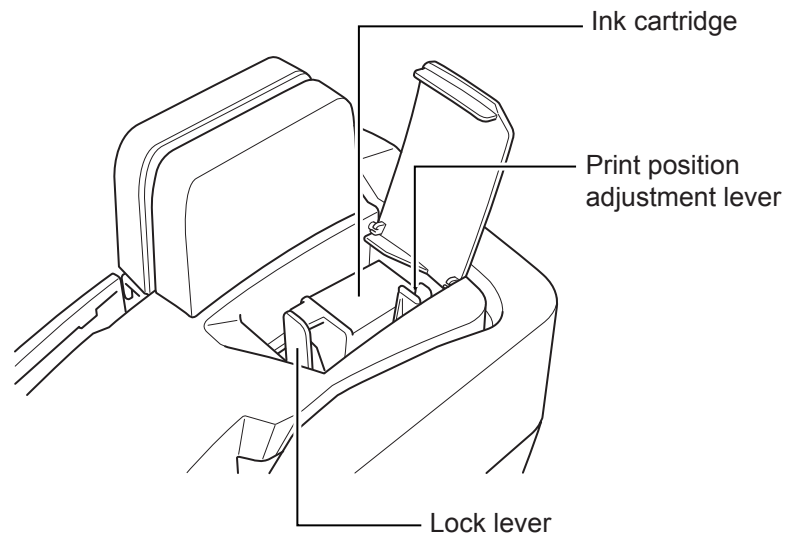


Figure 1-502

3. Inside of Maintenance Cover

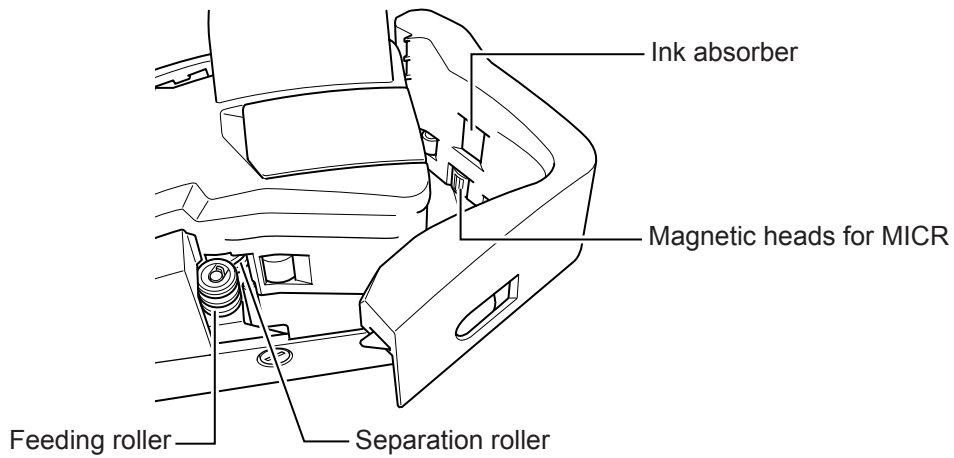


Figure 1-503

4. Rear View

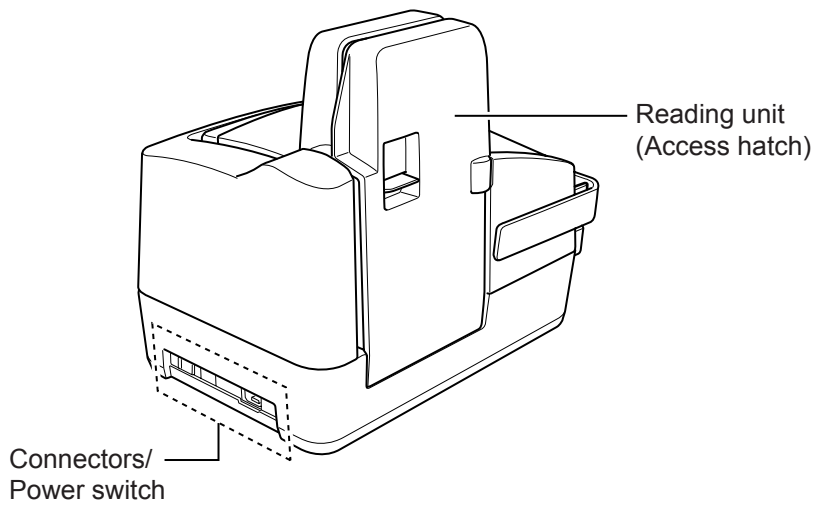


Figure 1-504

5. Connectors/Power Switch

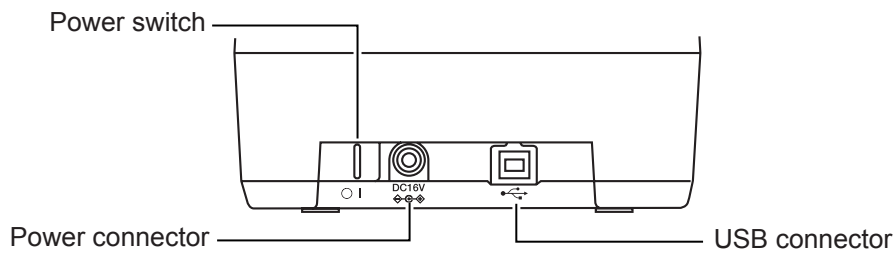


Figure 1-505

VI. USER OPERATION

Refer to the user manuals for this machine and software to be used for details.

1. Installation

This machine is installed by the user. Unpacking and installation are performed by the user. If they are performed by a service technician, refer to the user manual. "CHAPTER 4 INSTALLATION & MAINTENANCE," in this manual provides an overview.

2. Operation Screen

The basic operation screens when using Scanning Utility for CR-55 are shown below for reference.

The Scanning Utility for CR-55 uses a proprietary driver.

1) Start Window

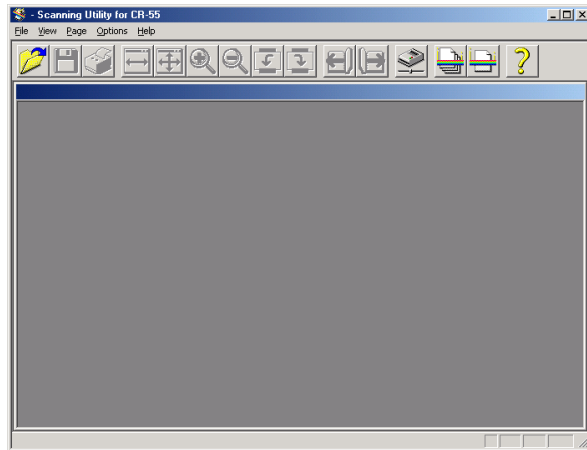


Figure 1-601

2) Basic Settings

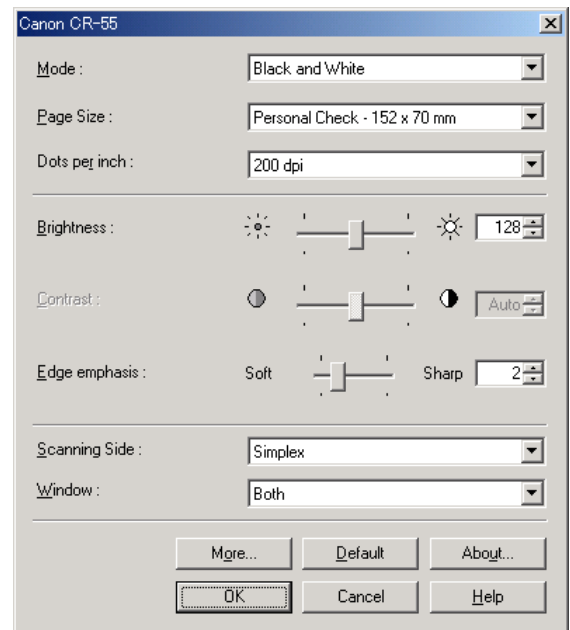


Figure 1-602

3) Detailed Settings

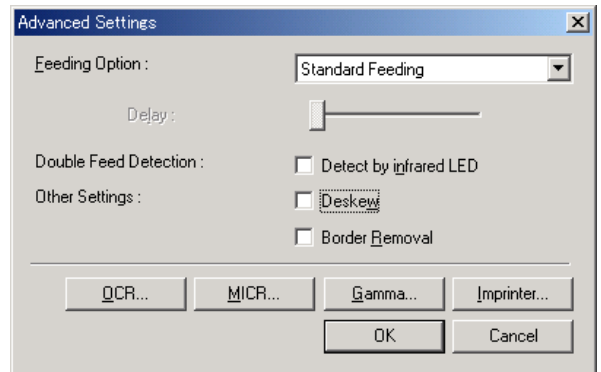


Figure 1-603

3. Jam Handling

1) Open the maintenance cover while pulling the open lever.

3) Remove the jammed document carefully.

4) Close the door calmly.

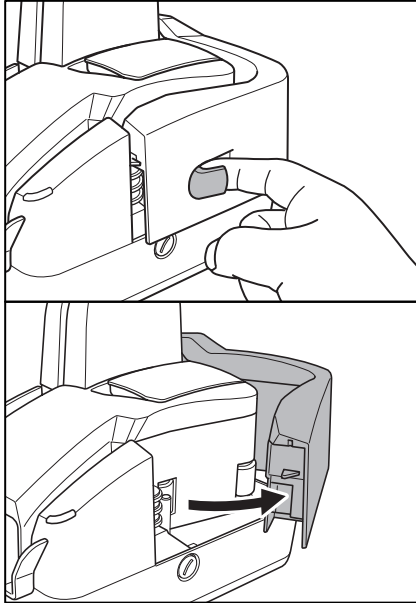


Figure 1-604

2) Open the reading unit while pushing down the open lever.

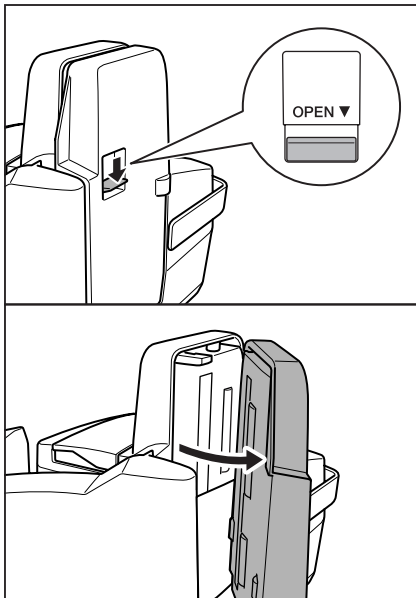


Figure 1-605

4. Separation Roller Clearance Adjustment

- 1) Adjust the position of the document feed tray and the eject stopper, according to the document size.
- 2) Set the two documents.

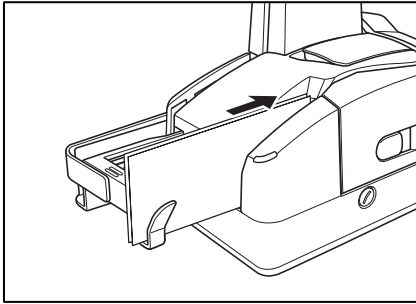


Figure 1-606

- 3) Perform "Scan Page." If only one document is fed, it is not necessary to perform this adjustment.

- 4) If two documents are fed together or if no documents are fed, adjust the clearance between the separation roller and the feeding roller.
 - If two documents are fed together, turn the paper thickness adjustment to the right 45 to 90° to reduce the clearance between the separation roller and the feeding roller.
 - If no documents are fed, turn the paper thickness adjustment to the left to increase the clearance between the separation roller and the feeding roller.

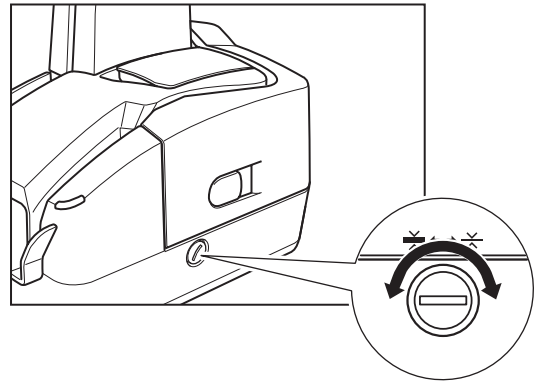


Figure 1-607

- 5) Perform steps 2 to 4 until the documents are fed correctly.

VII. USER MAINTENANCE

Refer to the user manual for this machine for details.

1. List of Maintenance Items

[△:Cleaning, ●:Replace, ☆:Lubricate, □:Adjust, ◎:Check]

Unit name	Location/ Parts	Intervals (sheets)		Remarks
		As necessary	Other	
Feed section	Feeding roller	△		Wipe with cloth slightly moistened with water, then wipe dry.
	Separation roller	△		
	Other rollers	△		
Reading section	Reading glass	△		Wipe with dry cloth. You can also use the audio head cleaner.
	Magnetic head	△		
Imprinter	Ink cartridge	△/●		Wipe off ink stacked on nozzle using cotton-swab etc.
	Around area of ink absorption pad	△		Wipe ink adhesion part with cloth slightly moistened with water, then wipe dry.

Table 1-701

Note:When cleaning the drive rollers, we recommend turning the roller indicated by the * while wiping it. The other drive rollers rotate together with it. We recommend using a cotton swab to clean rollers that are hard to reach.

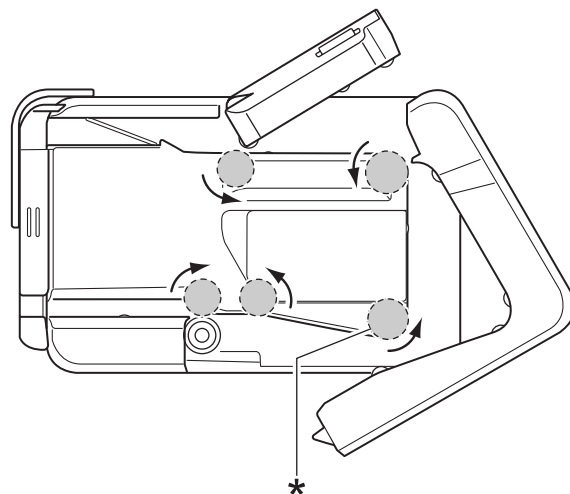


Figure 1-701

2. Ink Cartridge Replacement

- 1) Open the maintenance cover and imprinter cover.
- 2) Press the print position adjustment levers on both sides and lower the carriage to the lowest position.
- 4) Install the new ink cartridge. For more details, refer to "CHAPTER 4 INSTALLATION & MAINTENANCE".

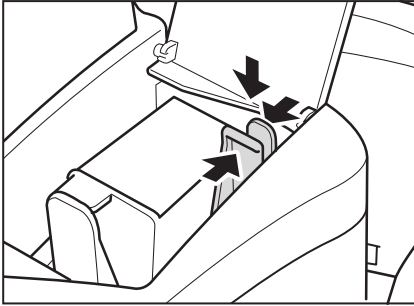


Figure 1-702

- 3) Remove the ink cartridge while holding down the lock lever.

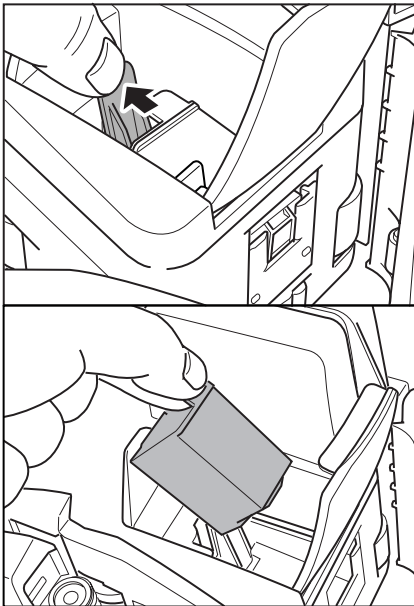


Figure 1-703

CHAPTER 2

FUNCTIONS & OPERATION

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I. OUTLINE

1. Basic Configuration

Figure 2-101 shows the configuration of this machine.

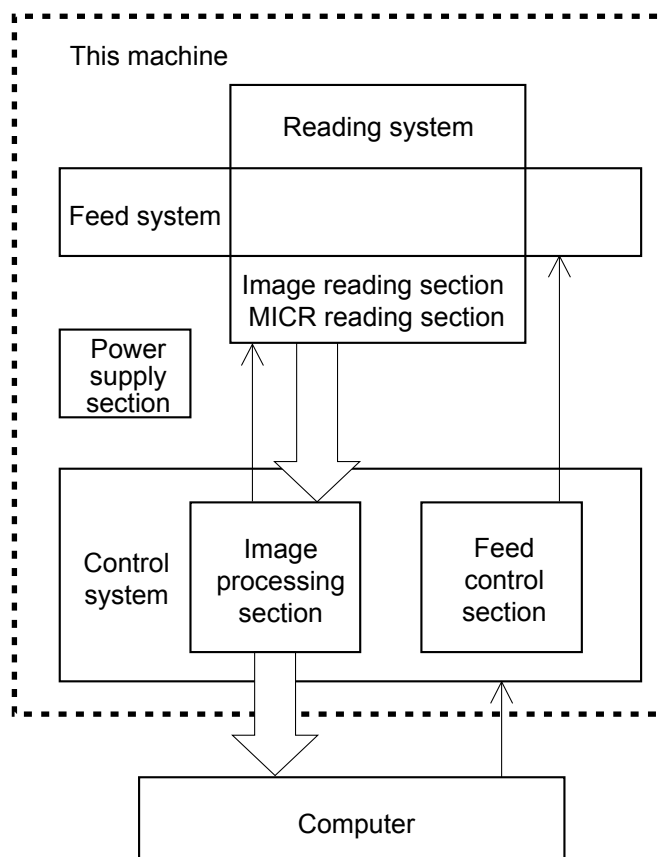


Figure 2-101

1) **Feed System**

This system performs from document pickup to document ejection.

2) **Read System**

This system is comprised of an image reading section that reads image data from image sensors, and a MICR reading section that reads MICR characters from a magnetic head.

3) **Control System**

The control system is comprised of an image processing section and a feed

control section.

The image processing section controls the reading system, processes the read image data, and outputs it to the computer. However, image data processing is also performed by the computer.

The feed control section controls the feed system.

4) **Power Supply Section**

This section converts the AC power into the DC power by a supplied AC adapter and supplies it to the control PCB in the main body.

2. Motor Drive

This machine has two motors, a main motor for feeding documents (M1) and a pickup motor (M2).

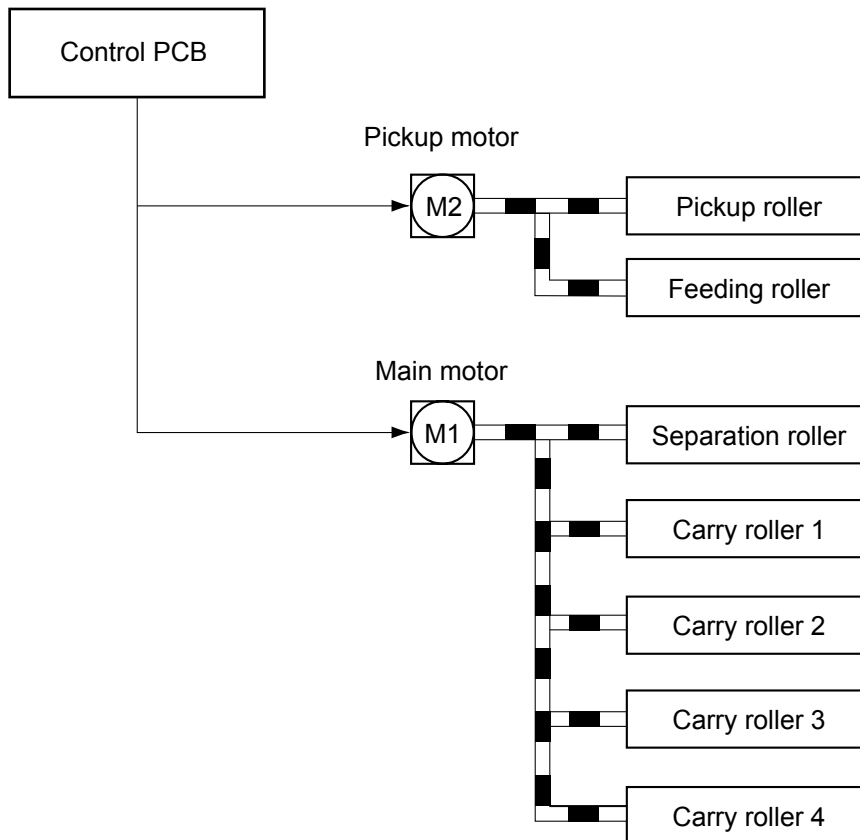


Figure 2-102

3. Electrical Circuits

Figure 2-103 shows an overview of the electrical circuits block diagram of this machine.

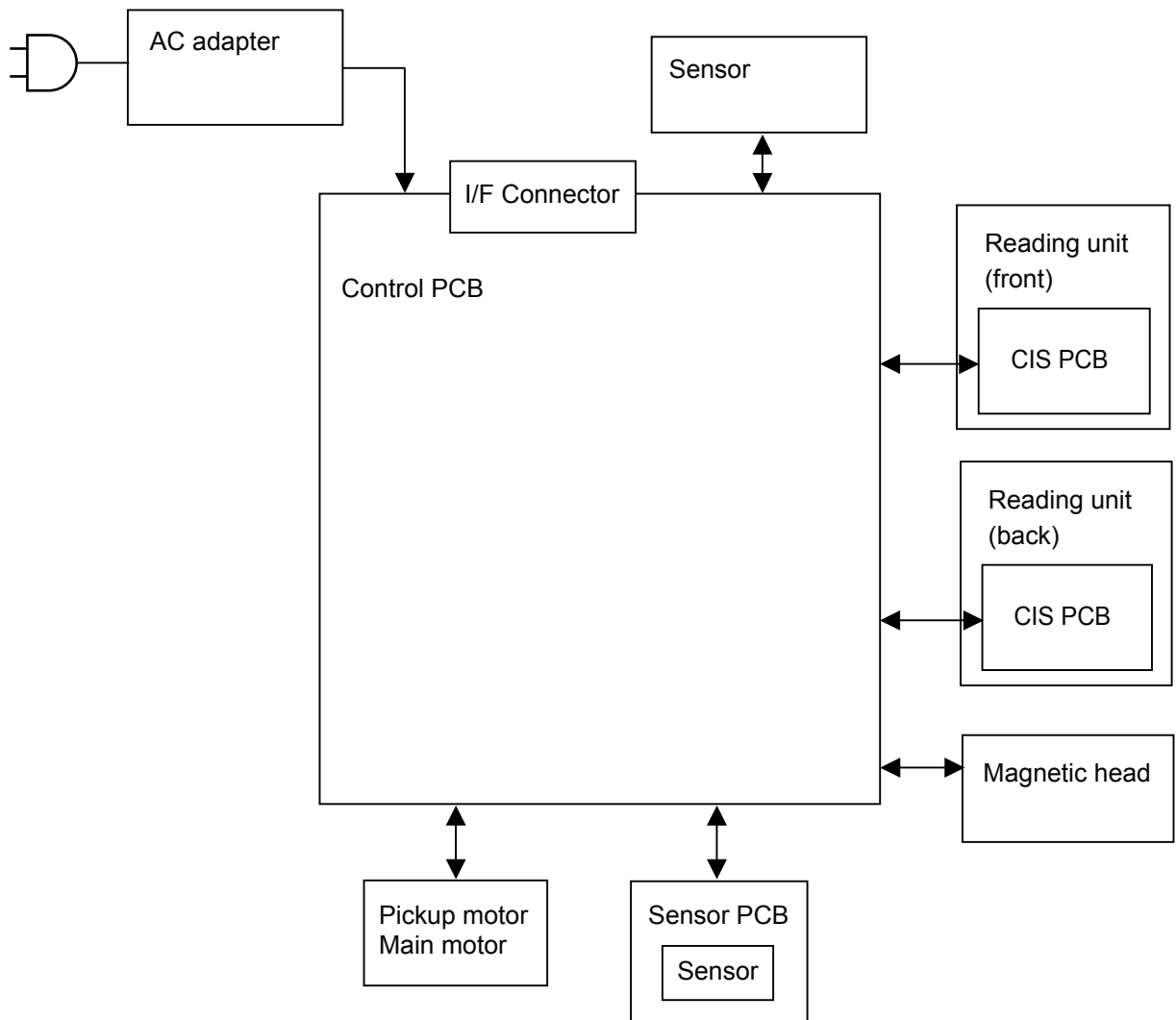
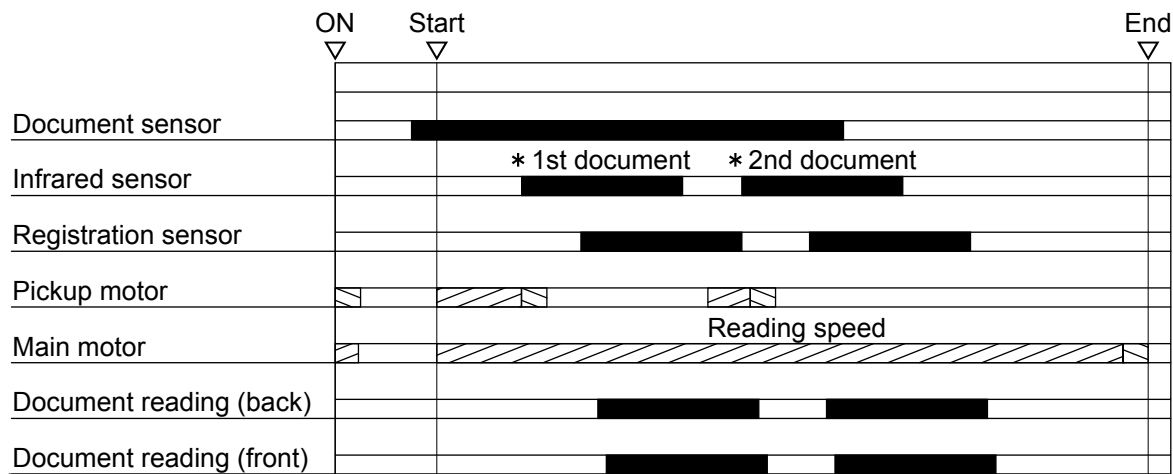


Figure 2-103

4. Timing Chart

Figure 2-104 describes the timing chart when two document sheets are scanned.



* Motor rotative direction---Normal rotation: ▨, Reverse rotation: ▩

Figure 2-104

II. READING SYSTEM

1. Image Reading

Figure 2-201 shows a sectional view of the reading section.

The CIS unit (front) reads the front side of the documents and the CIS unit (back) reads the back side of the documents. This configuration enables the unit to read both sides of the document using a single scan. The image data read are sent to the image processing unit on the control PCB.

The CIS unit consists of the CIS PCB, lens array, LEDs (R/G/B), light guide, and case. Additionally, the reading glass and platen roller are mounted on the holder.

A row of photoreceptors is mounted on the CIS PCB at a pitch of 600 dpi. Since the maximum resolution of this machine is 300 dpi, the output from the CIS PCB is 300 dpi.

Two sets of three basic color LEDs, red, green, and blue (R/G/B), are mounted in the CIS unit. In the binary or grayscale modes, picture element data are read with composite light generated by lighting the R/G/B LEDs at the same time. In the color mode, the LED is successively lit, and reads picture element data with each color. As documents are being fed at regular speed while picture element data are read, the reading positions of R/G/B are shifted slightly.

The LED light illuminates the document through the right and left light guides. The reflected light from the document enters photoreceptors through the lens array, and converted into analog signals corresponding to the density of each picture element.

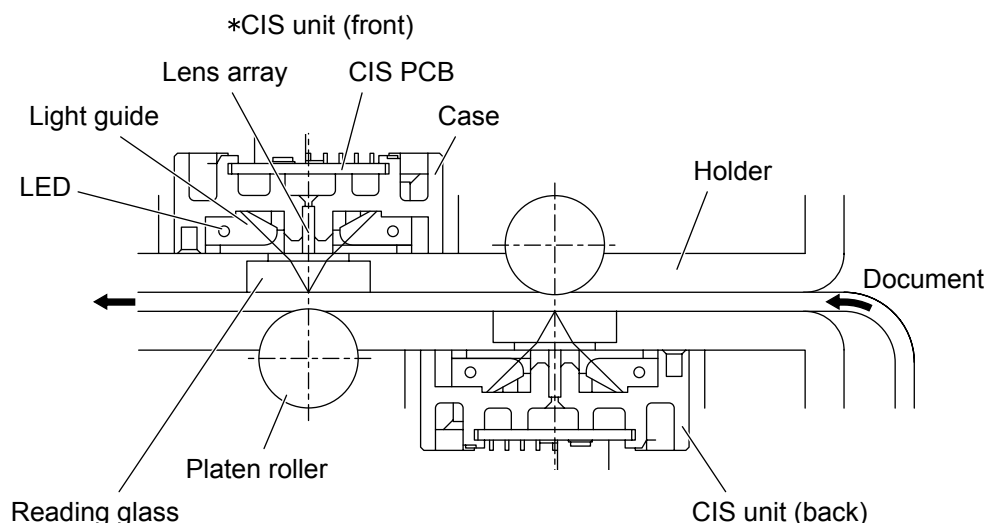


Figure 2-201

2. MICR Reading

Figure 2-202 shows a sectional view of the MICR reading section.

Magnets are located in front of the magnetic head, and there is a document presser roller opposite the magnetic head.

The magnet magnetizes the MICR characters, causing the formation of an N pole at the right of each character. When the magnetized MICR characters pass by the mag-

netic head, a voltage waveform is produced at the magnetic head. This analog waveform is output to the control PCB, identifies characters from the characteristics, and outputs the corresponding character code.

Figure 2-203 shows a typical voltage waveform of the magnetic head.

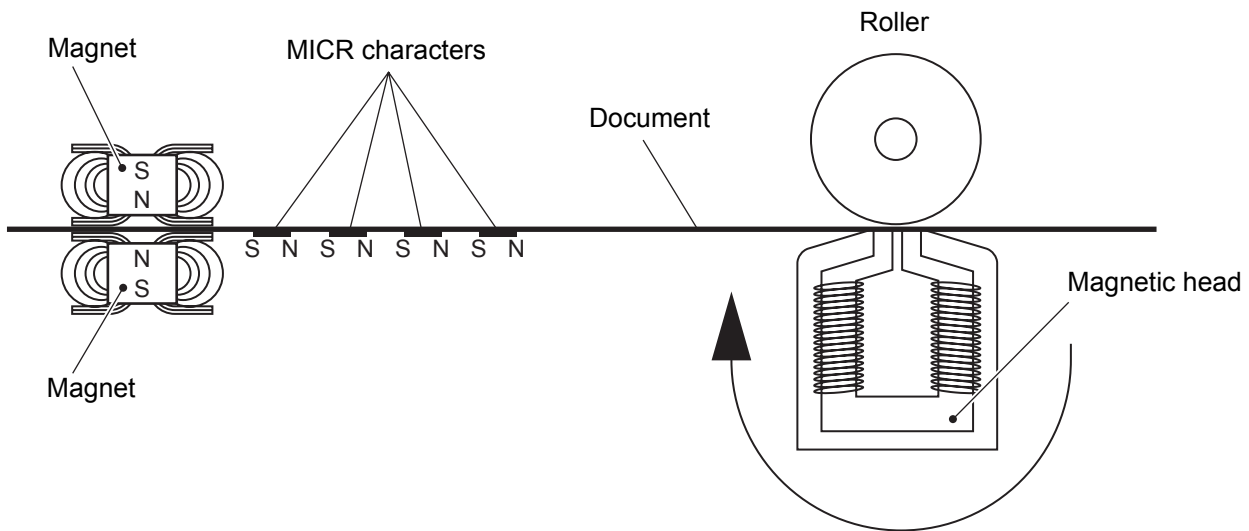


Figure 2-202

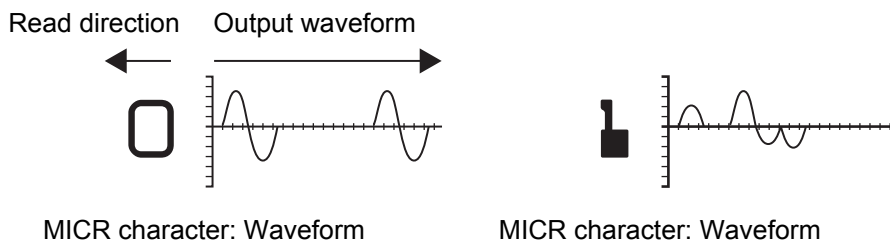


Figure 2-203

III. FEED SYSTEM

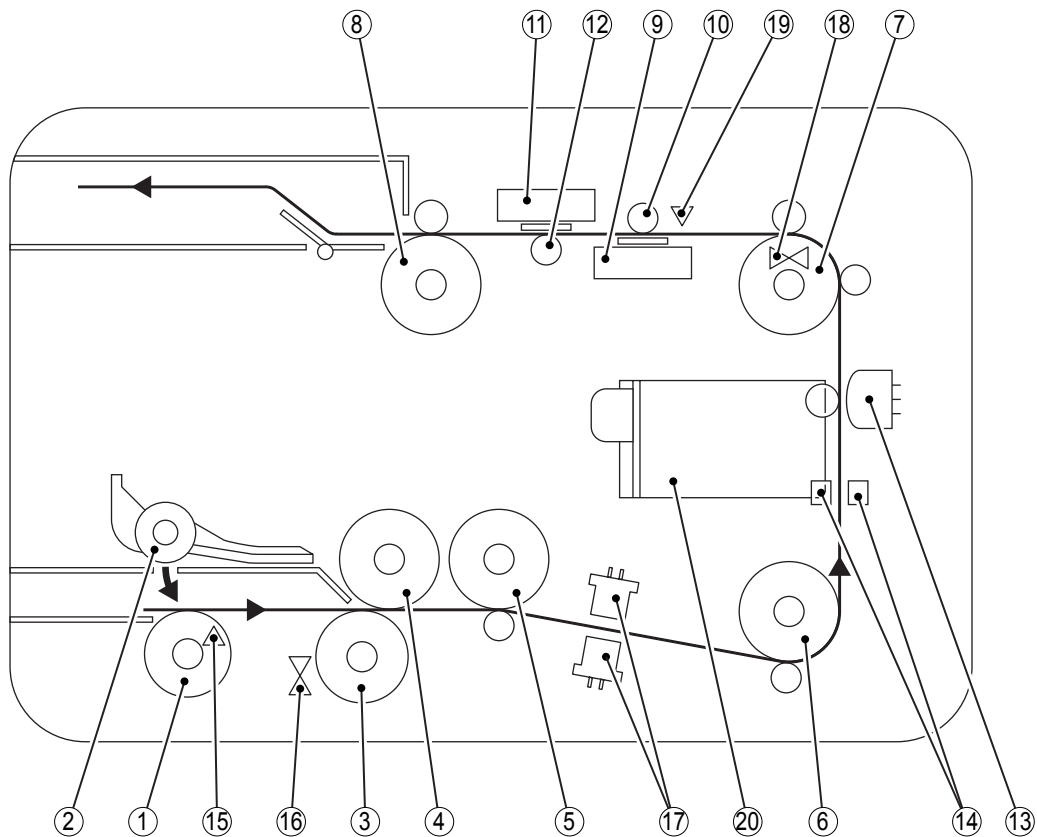
1. Outline

Figure 2-301 shows the sectional view of the feed system.

This machine being designed for feeding documents such as checks, documents are fed upright so that their bottom edge, which serves as the reference for MICR reading, is in contact with the feed plane.

Documents picked up by the pickup, feeding, and separation rollers are fed by the carry rollers and then ejected at the ejection section.

The image reading section, MICR reading section, and various sensors are located along this feed path. The imprinter for printing text on the back side of documents is also located here.



- | | |
|--------------------------|-----------------------------|
| ① : Pickup roller | ⑪ : CIS unit (front) |
| ② : Feeding presser | ⑫ : Platen roller (front) |
| ③ : Feeding roller | ⑬ : Magnetic head |
| ④ : Separation roller | ⑭ : Magnet |
| ⑤ : Carry roller1 | ⑮ : Document sensor |
| ⑥ : Carry roller2 | ⑯ : Maintenance door sensor |
| ⑦ : Carry roller3 | ⑰ : Infrared sensor |
| ⑧ : Carry roller4 | ⑱ : Reading door sensor |
| ⑨ : CIS unit (back) | ⑲ : Registration sensor |
| ⑩ : Platen roller (back) | ⑳ : Imprinter cartridge |

Figure 2-301

2. Infrared Sensor

The machine uses an infrared sensor to detect double feeds. Figure 2-302 shows a sectional view of the infrared sensor section.

Although slightly inferior to the ultrasonic sensors employed in other products, an infrared sensor is used in this machine due to its small size and because it can detect double feeds of checks placed in translucent envelopes. Ultrasonic sensors misdetect double feeds when translucent envelopes are used, but with infrared sensors the signal from the translucent portions has little effect.

An infrared LED is used as the photoemitter, and a phototransistor as the photoreceptor. The amount of light that permeates the document varies according to the document thickness. The absolute thickness and variation in thickness of the document are calculated based on the amount of light that is detected, and if either of these values exceeds a threshold value a double feed is

judged to have occurred. The threshold value for the absolute thickness is 0.16 mm, and the threshold value for the variation in thickness is 0.05 mm. The reference value for calculating the variation in thickness is cleared at paper intervals (when no document is present) and then re-established at the next document.

Note, however, that double feed sometimes cannot be detected correctly as the amount of transmitted light also changes according to the color of the document. Also, as a double feed is judged when the specified value exceeds the feed length continuously by 30 mm or more, a short overlapping section is not judged to be a double feed.

Detection of the document leading edge by the infrared sensor is called pre-registration detection and is used as a timing signal for the motor drive and start/stop of MICR reading, etc.

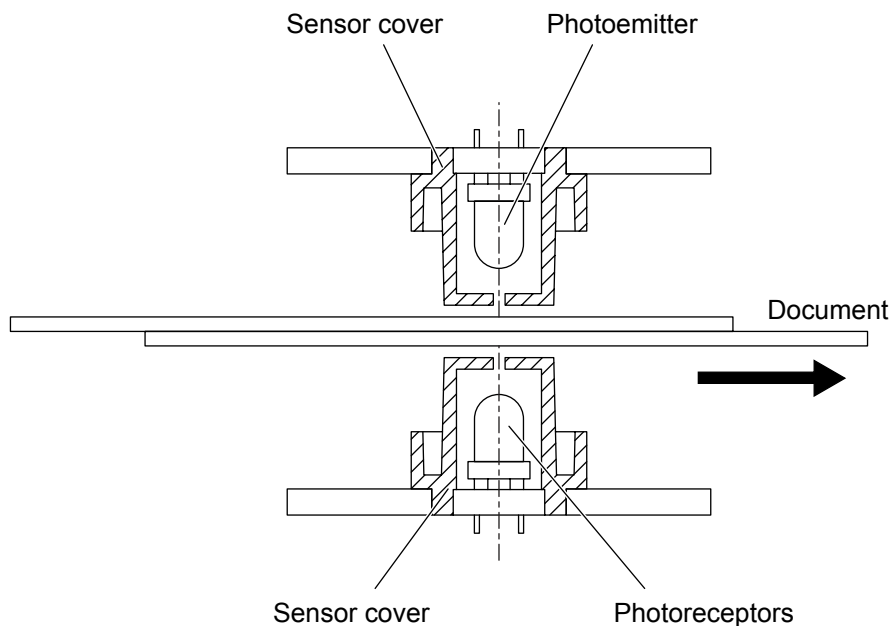


Figure 2-302

IV. CONTROL SYSTEM

1. Control PCB

Control of this machine is performed by the control PCB.

Figure 2-401 shows the block diagram of the control PCB.

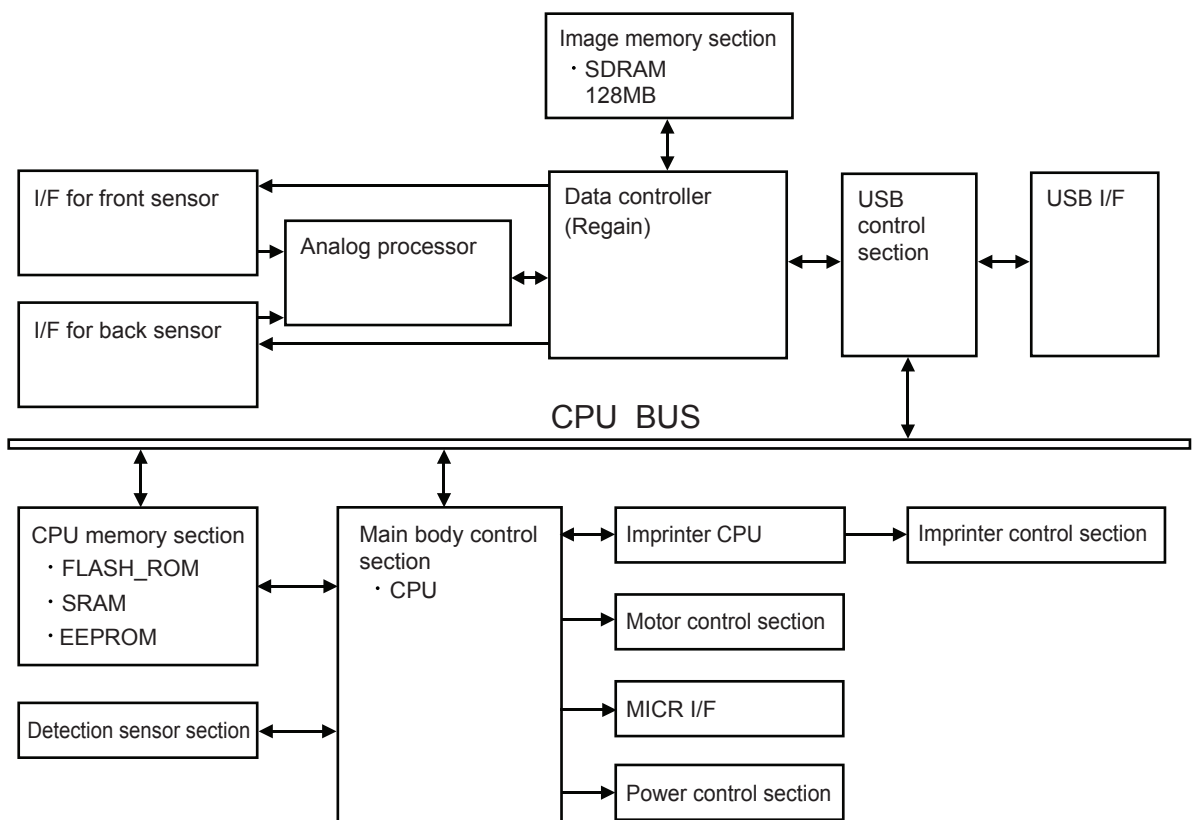


Figure 2-401

2. Image Processing Control

Figure 2-402 shows the block diagram of the image processing in the main body.

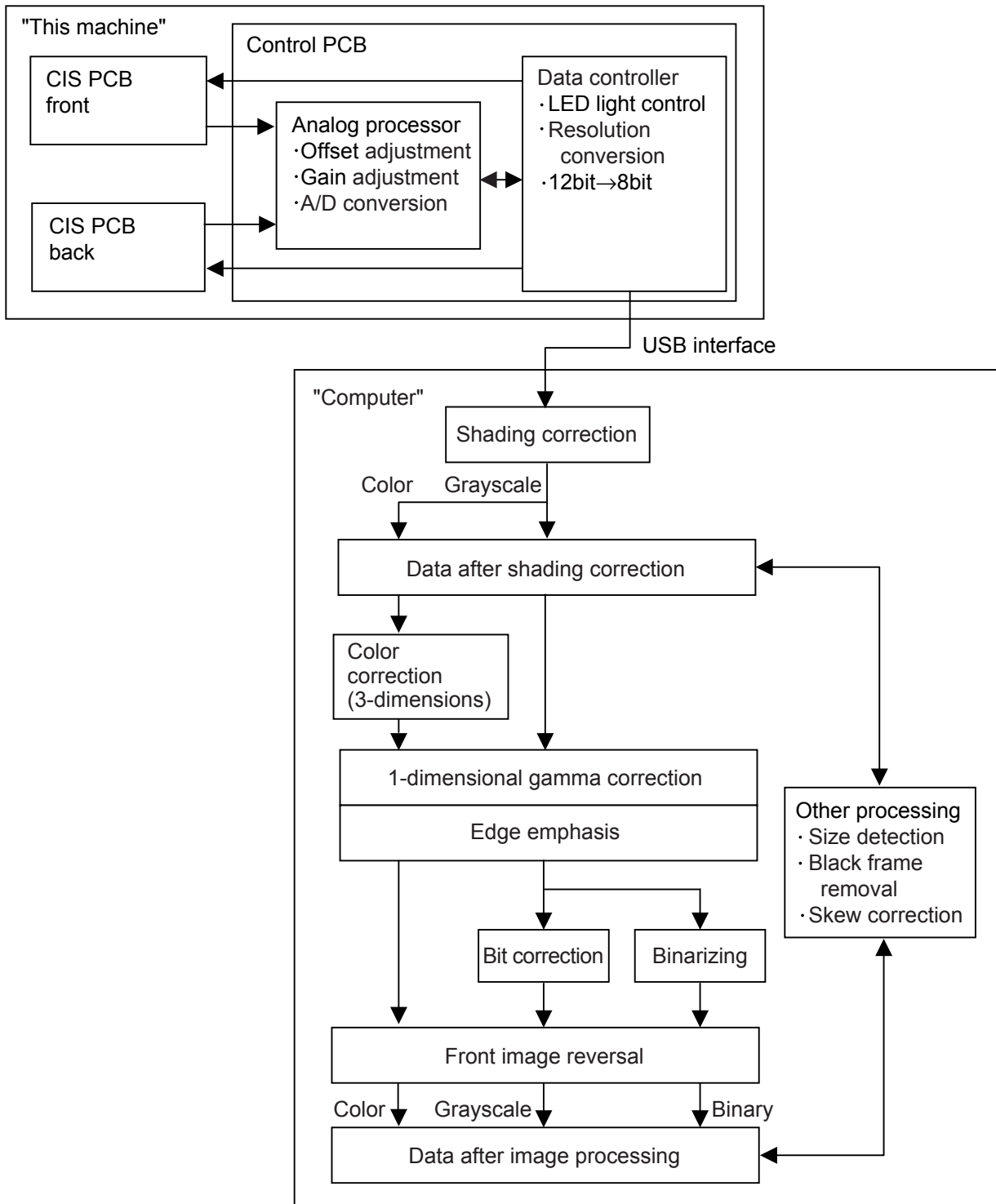


Figure 2-402

Analog signals proportionate to the density of each picture element are output to the analog processor on the control PCB from the CIS PCB.

The analog processor carries out offset adjustment, gain adjustment, and A/D conversion. Analog signals are converted into 12 bit digital signals in the analog processor. Then the image data is transferred to the data controller and the resolution is converted from 12 bits to 8 bits.

After that, the image data is output to the computer through an USB interface.

All the image processing carried out in this machine are described above. Other image processing are carried out inside the computer.

The computer performs the image processing according to the user settings after the shading correction.

V. IMAGE PROCESSING

Note: The principle of the image processing is described simply in this section so that you can easily understand it. In actual cases, the procedure may be somewhat complicated.

1. Image Processing in Main Body

1) Offset Adjustment

Offset adjustment is carried out on analog signals for the whole image sensor. Black correction is adjusted so that the minimum output value of the overall black level matches the specified value.

2) Gain Adjustment

Gain adjustment is carried out on analog signals for the whole image sensor. White correction is adjusted so that the maximum output value of the overall white level matches the specified value.

Note: Offset and gain adjustment are used to perform A/D conversion properly.

3) A/D Conversion

This processing converts analog signals into digital signals. The analog processor unique to this machine converts analog signals into 12 bit digital signals. However, 12 bit data is converted to 8 bit data during the resolution conversion described later.

Note: Shading correction for digital signals is carried out in a computer, however, correction values are stored in the FLASH Memory of the control PCB. The correction values are output to the computer.

4) Image Resolution Conversion

The machine outputs the following resolutions to a computer.

- Binary or grayscale mode
 - 100 x 100 dpi
 - 200 x 200 dpi
 - 300 x 300 dpi
- Color mode
 - 100 x 100 dpi
 - 200 x 100 dpi

a) Main-Scanning Direction

Although the optical resolution of the CIS unit that the machine uses is 600 dpi, the output can be switched 600 dpi or 300 dpi to match the required resolution. Because the maximum resolution of the machine is 300 dpi, the output resolution of the CIS unit is 300 dpi. An averaging method is used to

change the resolution of this 300 dpi data.

The image resolution conversion by averaging is sometimes called "smoothing."

Averaging method conversion enables the data to be smoothly transformed much better than that by thinning-out method, resulting in reducing the occurrence of Moire patterns. Averaging is especially useful for low-resolution photographs.

The data are averaged according to the resolution applied when the basic data of each picture element are converted.

Figure 2-501 shows the aspects of 300 dpi image data and the image data averaged to 100 dpi data.

- 300 dpi

1st line	A	B	C	D	E	F	G	H	I
2nd line	A	B	C	D	E	F	G	H	I
3rd line	A	B	C	D	E	F	G	H	I
4th line	A	B	C	D	E	F	G	H	I
5th line	A	B	C	D	E	F	G	H	I
6th line	A	B	C	D	E	F	G	H	I



- 100 dpi

1st line	$(A+B+C)/3$	$(D+E+F)/3$	$(G+H+I)/3$
2nd line	$(A+B+C)/3$	$(D+E+F)/3$	$(G+H+I)/3$
3rd line	$(A+B+C)/3$	$(D+E+F)/3$	$(G+H+I)/3$

Figure 2-501

b) Sub-Scanning Direction

The document is scanned in the sub-scanning direction basically by changing the feeding speed.

In the case of 200 dpi, feeding speed is 1.5 times as fast as 300 dpi. In the case of 100 dpi, three times the speed used for 300 dpi.

If the timing for reading the data from

the image sensor is the same, the resolution in the sub-scanning direction can be converted by changing the feeding speed. (Figure 2-502)

However, the feeding speed is limited depending on the specifications of carry motor. If the feeding speed cannot be increased, the read timing interval is widened. (Figure 2-503)

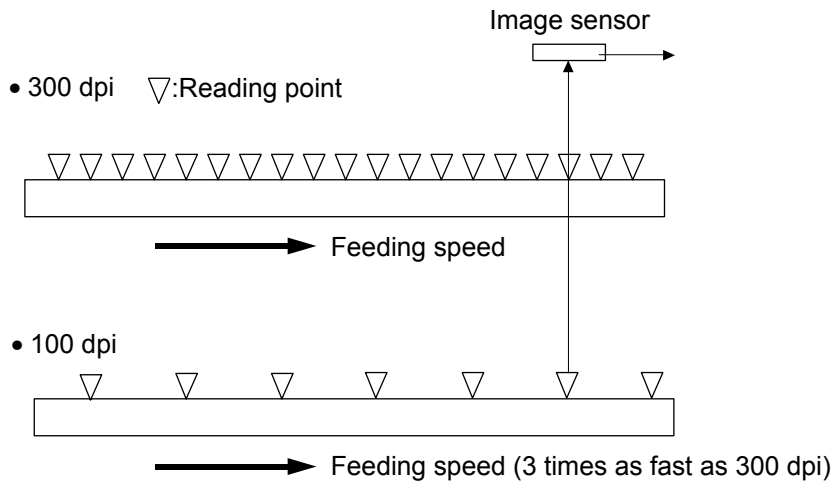


Figure 2-502

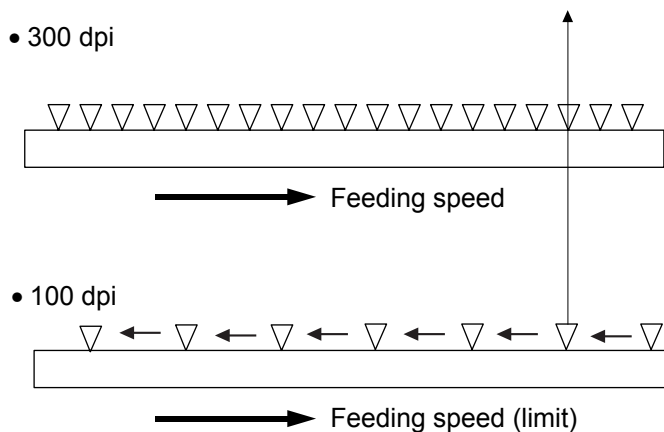


Figure 2-503

2. Image Processing in the Computer

1) Shading Correction

Even if the image brightness is consistent, the values output from the image sensor are not necessarily consistent because the sensitivities of each element of the image sensor and the performance of each reading system would vary. In the shading correction, the variations of each element are compensated. This processing is done for the digital signals after A/D conversion.

The correction values of each element are calculated in advance and stored in a memory.

There are two types of correction values: black and white compensation values. For black compensation value, readout indicated when an LED does not illuminate, in other words, when a black image is read (intense black) is set as a target value. For white compensation value, readout of standard shading sheet is set as a target value (pure white).

The data of each element which have been converted into digital signals are compensated in accordance with the corresponding values.

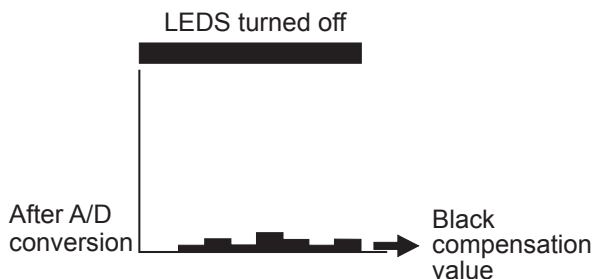


Figure 2-504

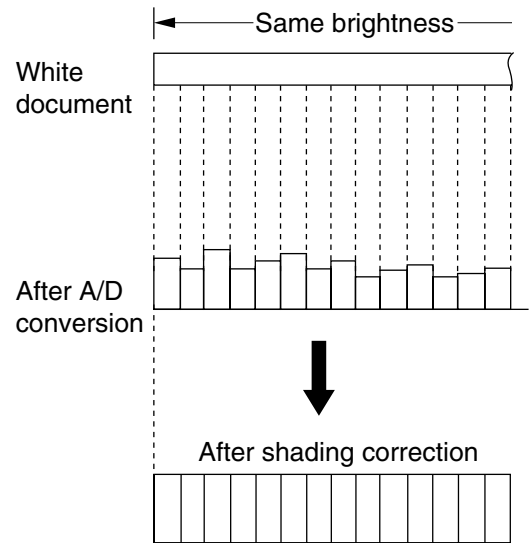


Figure 2-505

These correction values are stored in memory on the machine's internal control PCB. A dedicated shading sheet is used in the field to calculate and overwrite shading correction values. For details, see the pages on service mode.

2) Color Correction

To improve the reproducibility of color images, the 3-dimensional gamma correction is performed on the color data after the shading correction.

A 3-dimensional conversion table that suits the characteristics of this machine is provided to convert RGB values.

3) Gamma Correction (1-dimension)

To improve the reproducibility of documents or modify the acquired image as required by the user, it is possible to convert the document image data using conversion tables.

This machine provides various conversion tables adjusted for image mode and setting value.

However, there are several adjustment items not available for image mode and other conditions. For details, refer to the driver software "Help" function.

The conversion tables below are for fundamental items and may be different from actual items.

a) Brightness Adjustment

This adjusts the overall brightness of the scanned image. The image brightness increases as the setting value becomes larger, and decreases as the value becomes smaller. For brightness adjustment in black and white mode, refer to the "Binarizing" section.

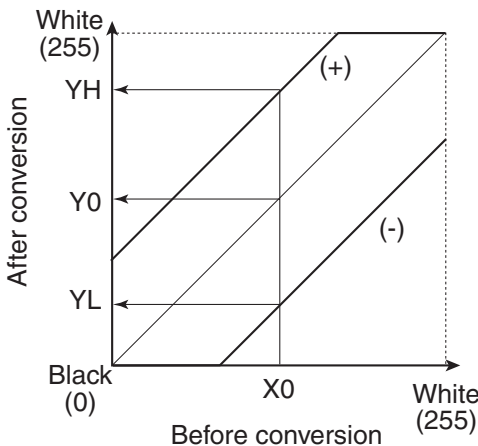


Figure 2-506

b) Contrast Adjustment

This adjusts the contrast of the

scanned image. The image contrast increases as the setting value becomes larger, and decreases as the value becomes smaller.

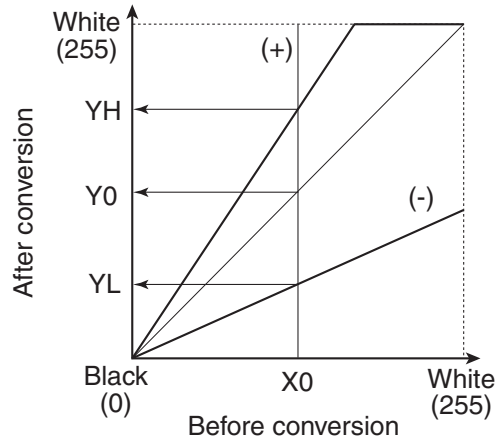


Figure 2-507

c) Custom Adjustment

This is used when data conversion other than brightness and contrast adjustments is required.

It is possible for the user to use a custom conversion table for converting the gamma curve to the document image data. In this case, the brightness and contrast adjustments become invalid, and the unique gamma curve is given priority.

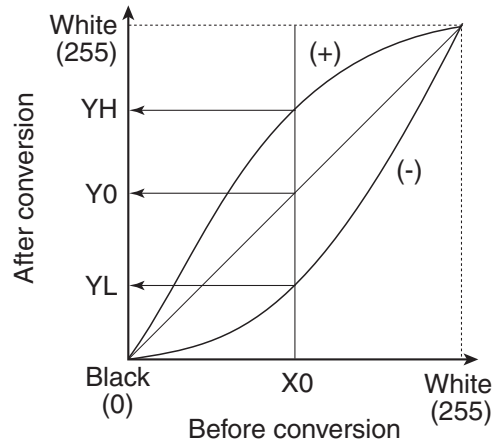


Figure 2-508

4) Edge Emphasis

Edge emphasis is a kind of processing which emphasizes the brightness change in order to make the image appear sharp. (Figure 2-509)

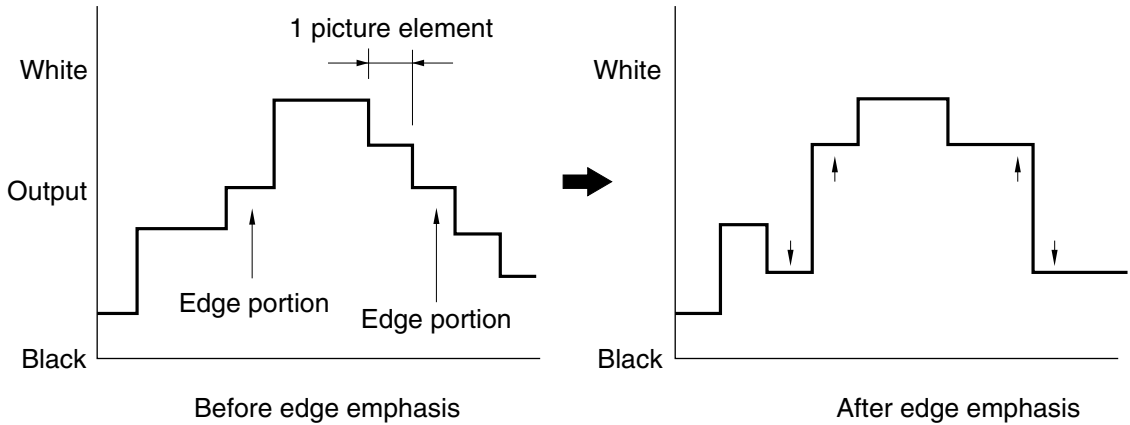


Figure 2-509

The processing is performed by comparing the data in the conversion table provided for performing edge emphasis, with the target picture element data (a). (Figure 2-510)

The stages in edge emphasis can be changed by changing the conversion table and reproduction ratio (B) of the conversion table.

For example, if the target picture element data is increased fourfold and the other four points multiplied by -1, the overall brightness will remain unchanged.

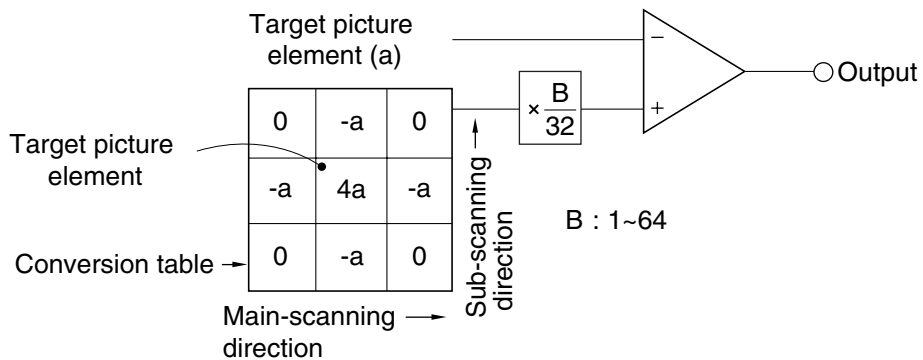


Figure 2-510

5) Binarizing

a) Simple Binarizing

Binary image data can only express picture elements as either “black” or “white.”

In order to separate the picture elements into black and white, signals corresponding to the image brightness must be cut off at a certain level, so that anything above that level is judged as “white” and anything below as “black.” This is called simple binarizing. This is useful for text documents. Simple binarizing for this machine is called “Black and White” mode.

The level at which picture elements are to be divided into white or black is called the “slice level.” The image brightness is adjusted by changing this slice level.

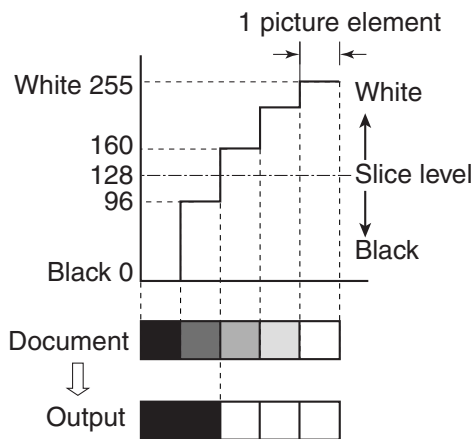


Figure 2-511

b) Error Diffusion

Error diffusion processing is used to binarize documents containing gray levels, such as pictures and photos.

A sample case is shown below, where the output is set to four bits and the slice level is set to "8."

The value of 1 picture element of input image data is compared with the slice level. When it is smaller than the slice level, it is output as "0" and when it is

bigger than the slice level, it is output as "15." The difference between the values of the input and output picture elements is then added to the next picture element to be processed.

First, when processing the first low of Line 1, since the data "12" is larger than the slice level "8," the output data becomes "15," and the resultant error becomes -3 (=12-15). (Figure 2-512)

First row of line 1

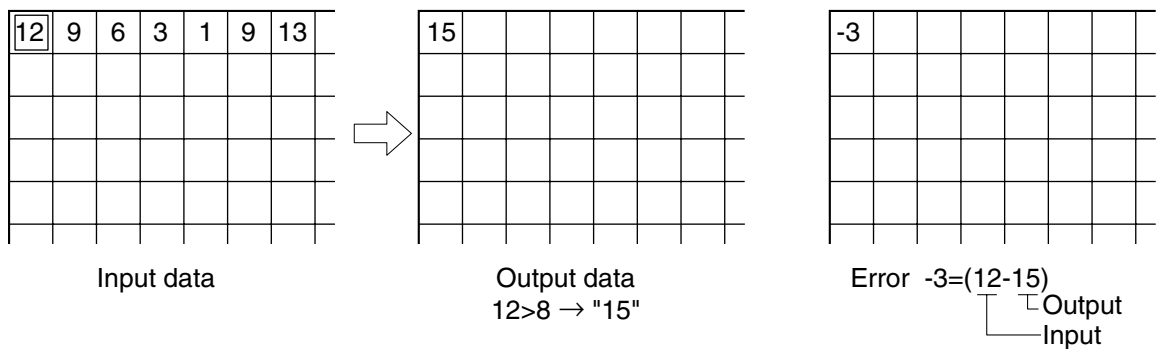


Figure 2-512

Next, when processing the second row of Line 1, since the error is diffused to the right, the data of the picture element of the second row of Line 1 becomes "6" (=9-3).

As this value is smaller than the slice

level, the output data is "0" and the error becomes "+6" [(9-3)-0]. (Figure 2-513)

The third row of Line 1 and later are processed similarly.

Second row of line 1

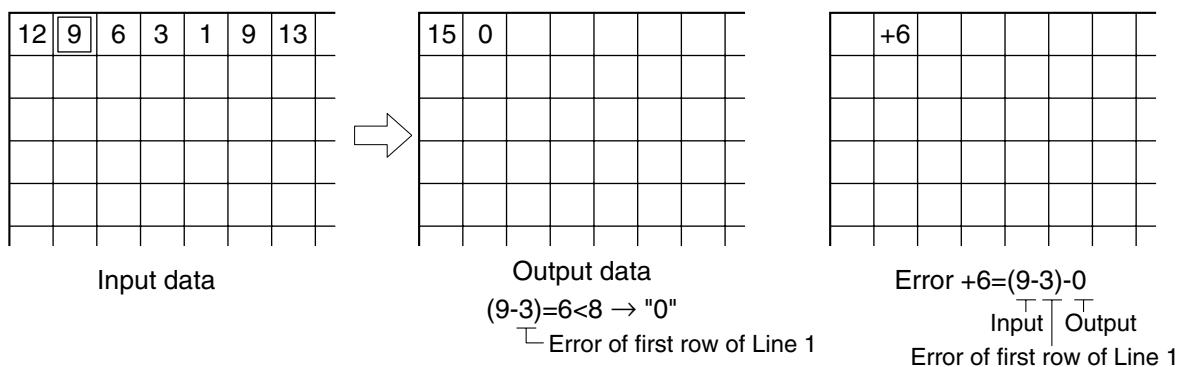


Figure 2-513

Line 2 is processed using the first row of Line 2 as a reference. If the rest is processed similarly, the data becomes as shown in Figure 2-514.

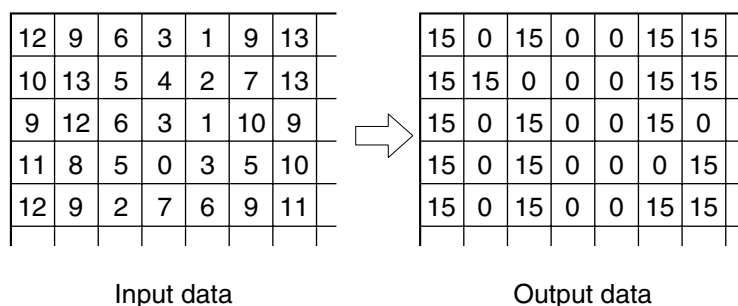


Figure 2-514

Figure 2-515 shows a comparison of binarizing with error diffusion processing, and binarizing without error diffusion processing (simple binarizing).

The brightness adjustment for error diffusion is done by using the data conversion table. The slice level is always set at median.

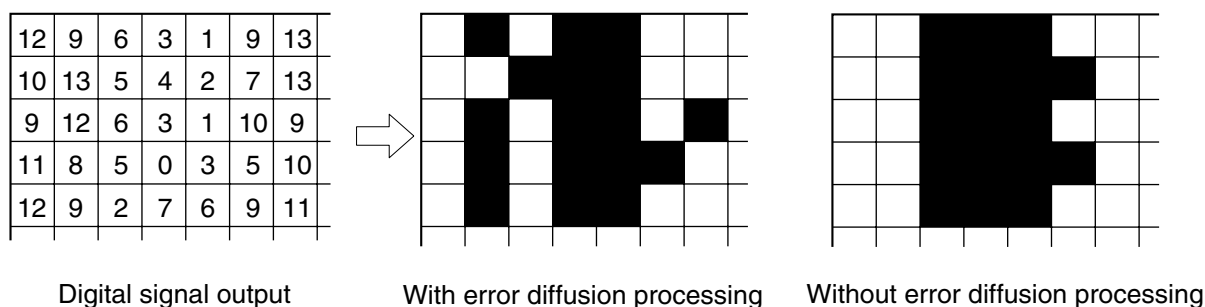


Figure 2-515

c) Advanced Text Enhancement

In this mode, a histogram of brightness level for each block within the scanned data is calculated, and an optimum slice level is determined to binarize the picture elements.

Binarizing in this way removes the background, for example, from behind text printed on a background.

For example, as shown in the image in Figure 2-516, a histogram for each block is calculated, and the optimum slice level is determined to binarize the picture elements.

d) Adaptive Threshold

This binarize processing is effective when the different brightness documents are fed at the same time.

A histogram for the brightness levels of each document is calculated, and the optimum slice level for each document is determined to binarize the picture elements.

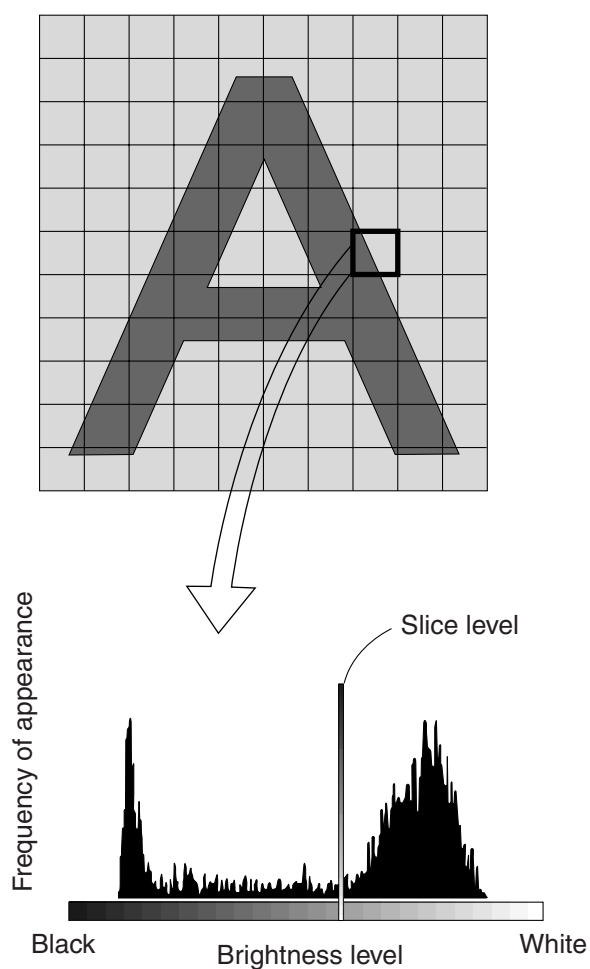


Figure 2-516

6) Front Image Reversal

Figure 2-517 shows the scanning directions for the front side and the back side. The scanning direction in relation to the orientation of the image on the front side and the back side differs. If the image data of the front side is saved as is, the displayed image appears in shown in Figure 2-518. This processing is performed only for the image data on the front side, so that it assumes the proper image orientation.

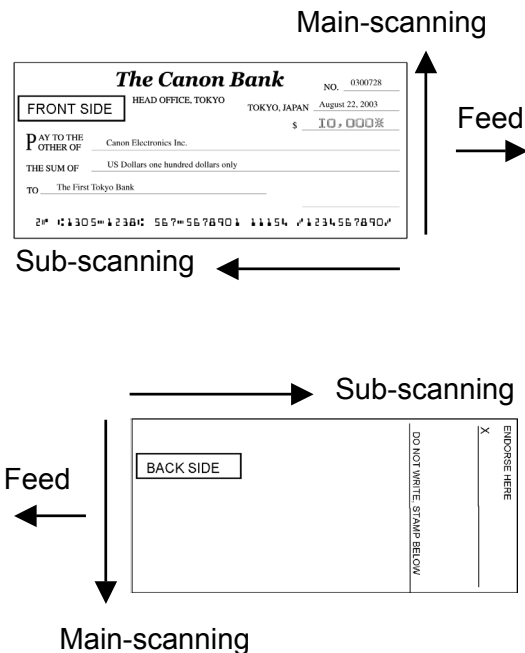


Figure 2-517

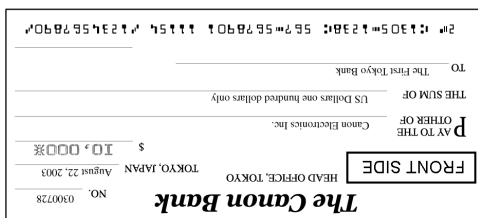


Figure 2-518

7) Size Detection

When automatic size detection is selected, the image is read using the maximum size. The picture elements other than the black ones are detected starting from the edge of the image, and the black picture element data outside the scanned image is discarded.

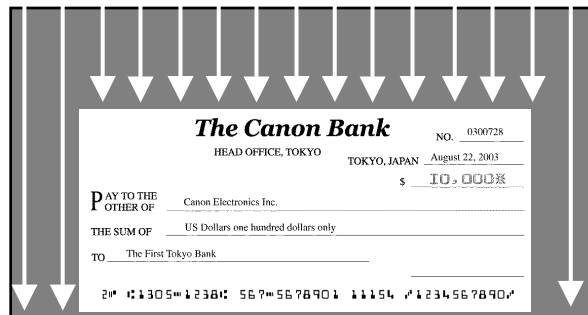


Figure 2-519

Note: In case that part of circumference of document is dark or brightness level is not appropriately set, this function may not successfully work. This may also happen when the skew correction or black frame removal described later is performed.

8) Skew Correction (Deskew)

If the skew correction is selected, the size of document read is broadened by 10 mm compared with the user-specified size. The skew is detected based on the data read to compensate the skew. The image data is then restored to the user-specified image size.

9) Black Frame Removal

When the black frame removal is selected, the image data is read with the specified read size. The frame of document is detected based on this image data and the outside of the

frame is converted into the white data.

10) 200 dpi Conversion

200 x 200 dpi data in the color mode is created by converting the 200 x 100 dpi data generated by the machine. Resolution is doubled by iterating over the same data in the sub-scanning direction. See figure 2-520.

· 200 x 100 dpi

Line	Picture element data				
1	A1	B1	C1	D1	E1
2	A2	B2	C2	D2	E2
3	A3	B3	C3	D3	E3



· After 200 x 200 dpi conversion

Line	Picture element data				
1	A1	B1	C1	D1	E1
2	A1	B1	C1	D1	E1
3	A2	B2	C2	D2	E2
4	A2	B2	C2	D2	E2
5	A3	B3	C3	D3	E3
6	A3	B3	C3	D3	E3

Figure 2-520

11) 4 bit Conversion

When in the grayscale mode 16 level (4 bit) gray scale is selected, the image data is converted from 256 level (8 bit) image data.

VI. POWER SUPPLY

1. Power Supply

The AC adapter is used for the power supply of this machine. The values of AC input and output power are 100-240V 50/60Hz and +16VDC, respectively.

Use the AC adapter which is enclosed with this machine.

The output power is input to the control PCB. And then, +3.3V and +5V are generated there. Dedicated +3.3V is generated for the CIS unit.

+3.3V, +5V and +16V are supplied for each IC including the CPU, for CIS LED and ICs including the analog processor, and for driving the motors, respectively.

The AC adapter has the overload protection function to automatically block the power output in the event of a failure such as short circuit on the load side of the AC adapter.

This machine will shift into the power saving mode if such states as no document feeding and no USB interface communication continue. In the power saving mode, the electrical circuits enter the sleep state. The CPU, however, does not shift into the sleep state. The machine returns to the standby mode from the power saving mode when any communication is carried out on the computer side.

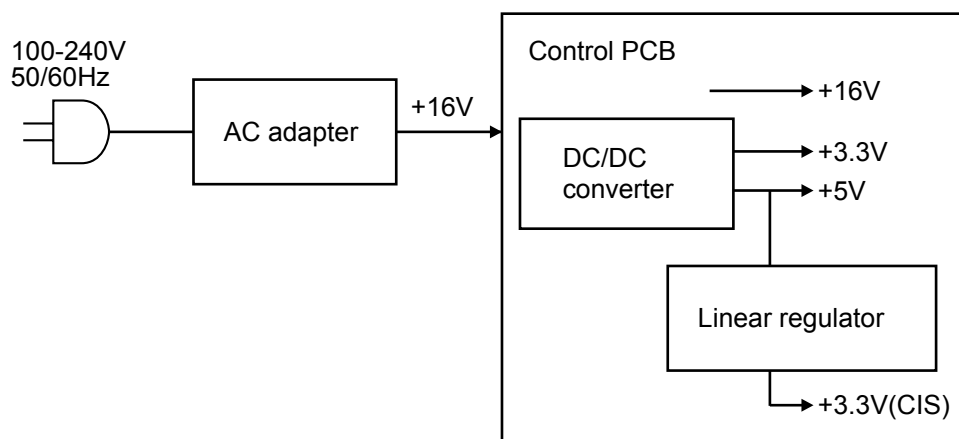


Figure 2-601

VII. ELECTRICAL PARTS LAYOUT

1. Main Body

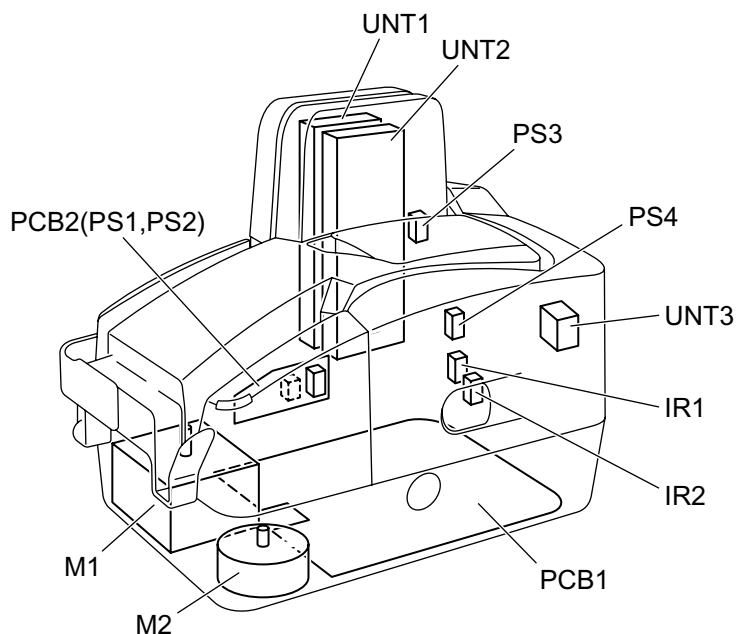


Figure 2-701

Category	Name	Symbol
Sensor	Document sensor	PS1
	Maintenance door sensor	PS2
	Registration sensor	PS3
	Reading unit door sensor	PS4
	Infrared sensor (Light emission)	IR1
	Infrared sensor (Photosensitive)	IR2
Motor	Main motor	M1
	Pickup motor	M2
Unit	CIS unit (front)	UNT1
	CIS unit (back)	UNT2
	Magnetic head unit	UNT3
PCB	Control PCB	PCB1
	Sensor PCB	PCB2

Table 2-701

VIII. PCB PARTS LAYOUT

1. Control PCB

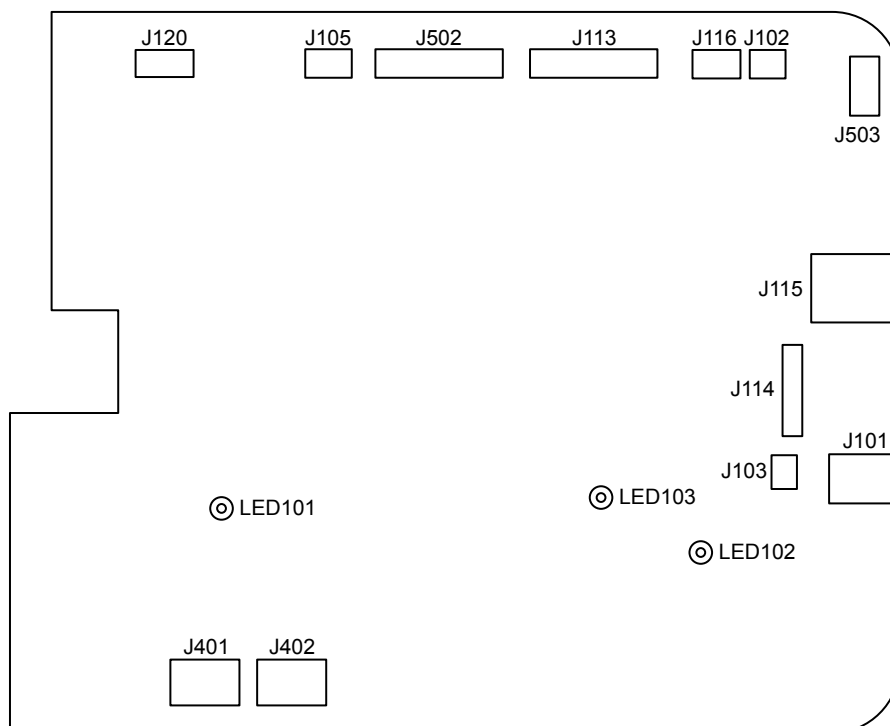


Figure 2-801

Connector	Description
J101	-- AC adapter
J102	2P Infrared sensor (Photosensitive)
J103	2P Infrared sensor (Light emission)
J105	3P Registration sensor
J114	13P Ink cartridge(option)
J113	15P CIS PCB (back)
J115	-- USB I/F
J116	3P Reading unit door sensor
J120	4P Main motor
J401	6P Registration sensor PCB
J402	4P Pickup motor
J502	15P CIS PCB (front)
J503	4P Magnetic head

Table 2-801

LED	Description
LED101	Blinking: CPU normal operation
LED102	Lighting: Normal power supply
LED103	Blinking: CPU for imprinter normal operation

Table 2-802

CHAPTER 3

DISASSEMBLY & REASSEMBLY

I. EXTERNAL COVERS	3-1	III. READ RELATED	3-11
II. FEED RELATED	3-5	IV. ELECTRICAL	3-13

I. EXTERNAL COVERS

1. Main Cover

- 1) Open the imprinter cover ①, and then remove screw ②. Unlock the two fitting parts ③, and then remove the main cover ④. At this time, the eject presser ⑤ and spring ⑥ become detached.

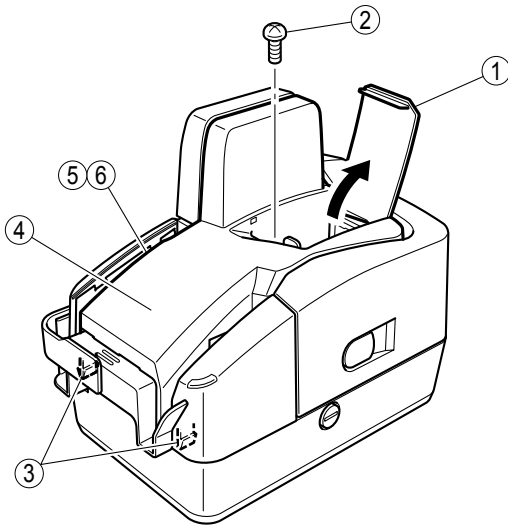


Figure 3-101

- 2) Pull off the imprinter cover ① from the two fitting parts ② to separate it from the main cover ③.

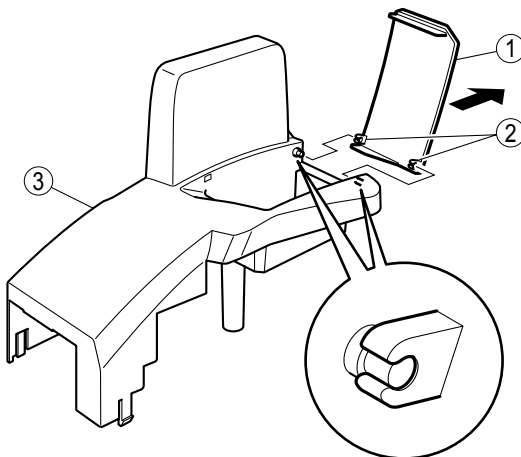


Figure 3-102

2. Document Feed Tray/Eject Stopper

- 1) Remove the main cover.
- 2) Slide off the document feed tray ① together with eject stopper ② to remove them.

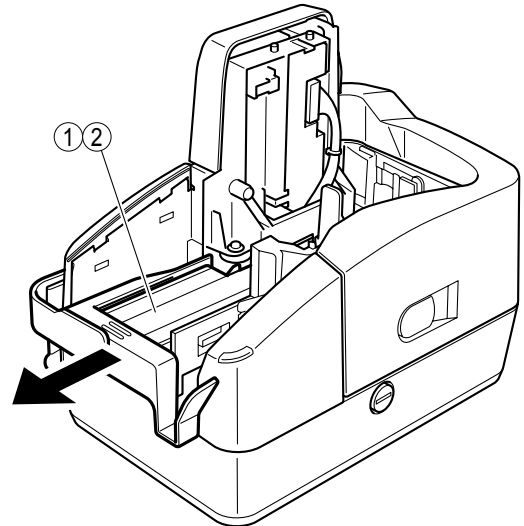


Figure 3-103

- 3) Unlock the fitting part ①, and then separate the document feed tray ② and eject stopper ③.

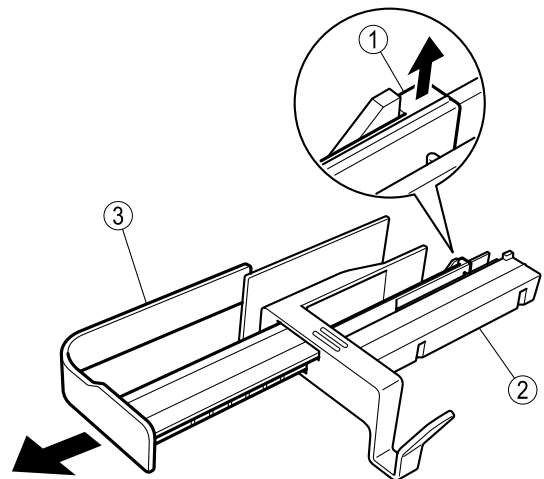


Figure 3-104

3. Pickup Cover

- 1) Remove the main cover.
 - 2) Open the maintenance cover.
- Note:** Leaving it shut might damage parts.
- 3) Unlock the two fitting parts ①, and then remove the pickup cover ②.

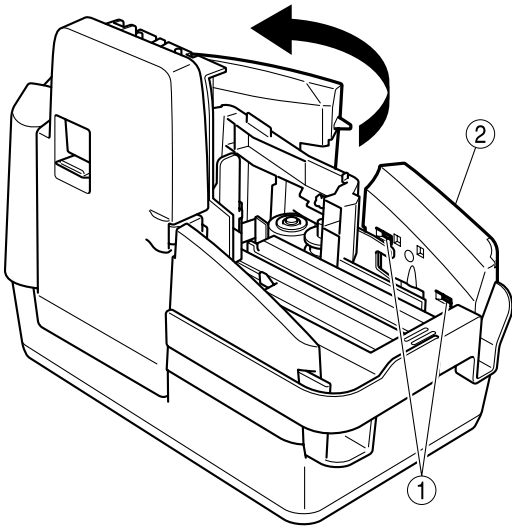


Figure 3-105

- 4) Press the back of the LED light guide ① and remove it from the pickup cover.

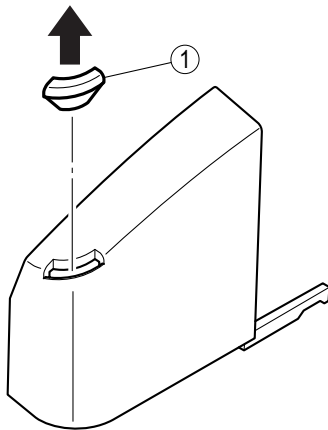


Figure 3-106

4. Eject Guide Cover

- 1) Remove the main cover.
- 2) Unlock the two fitting parts ①, and then remove the eject guide cover ②.

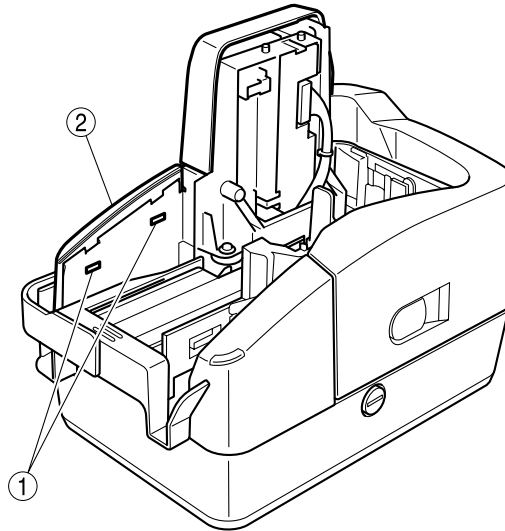


Figure 3-107

*** Notes on assembly**

Insert the two eject guide cover's fitting parts into the bottom cover.

5. Bottom Cover

- 1) Place the machine sideways.
- 2) Remove the three screws ①, and then remove the bottom cover ③ while avoiding the paper thickness adjustment ②.

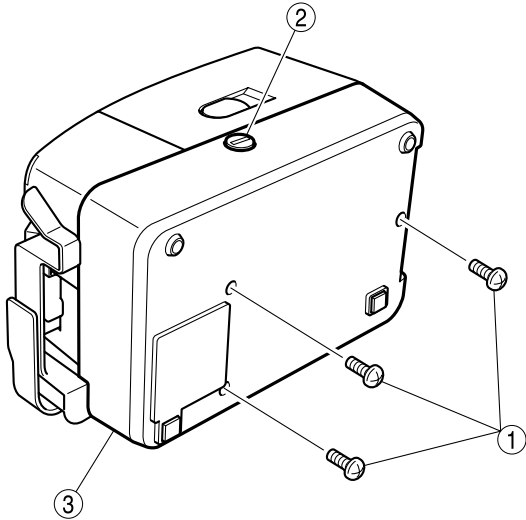


Figure 3-108

6. Reading Cover

- 1) Open the reading unit.
- 2) Unlock the three fitting parts ①, and then remove the reading cover ② while opening it slightly.

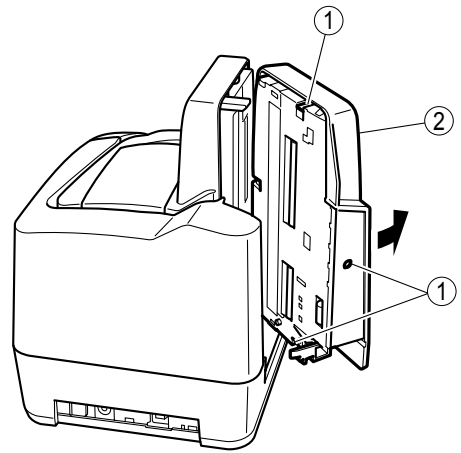


Figure 3-109

* Notes on assembly

Insert the two eject guide cover's fitting parts into the bottom cover.

7. Movable Guide Cover

- 1) Open the reading unit and the maintenance cover (movable guide unit).
- 2) Remove the screw ① (M2.5 Tapping) on the back side. Then, unlock the two fitting parts ②, and then remove the movable guide cover ③.

Note: If the fitting part on the reading unit side is difficult to unlock, remove the reading unit (front).

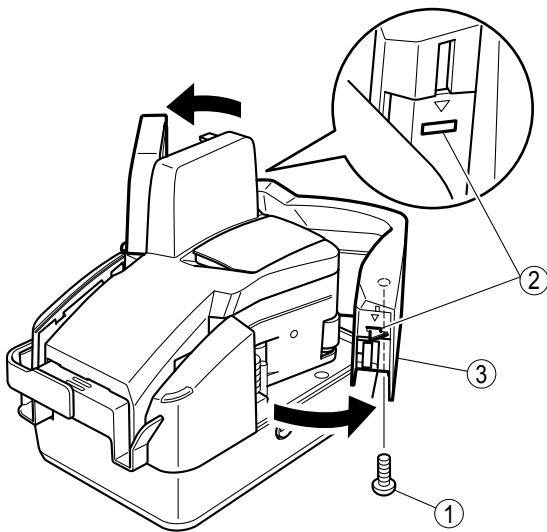


Figure 3-110

8. Ink Absorption Pad

- 1) Remove the movable guide cover.
- 2) Remove the ink absorption pad ①.

Note: Be careful not to stain your fingers or surrounding parts with ink.

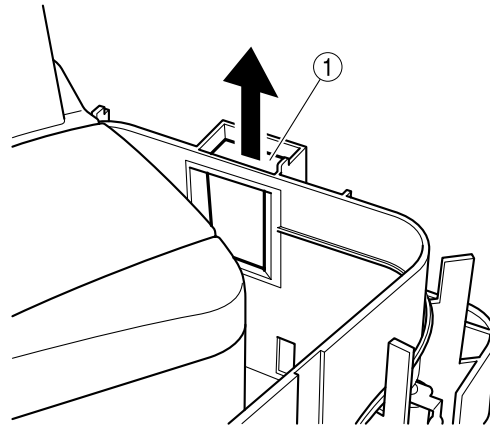


Figure 3-111

II. FEED RELATED

1. Pickup Roller/Feeding Roller

- 1) Remove the main cover.
- 2) Open the maintenance cover.
- 3) Remove the pickup cover.
- 4) Unlock the two fitting parts ①, and then remove the PCB ②. Then, remove the two screws ③ and remove the pickup guide ④.

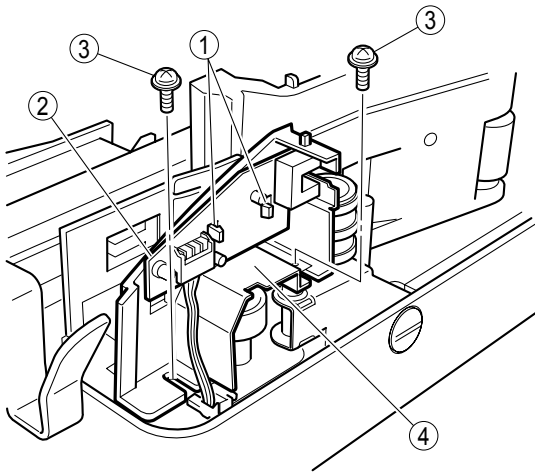


Figure 3-201

- 5) Unlock the fitting part ①, then remove the pickup roller ②. Unlock the fitting part ③, and then remove the feeding roller ④.

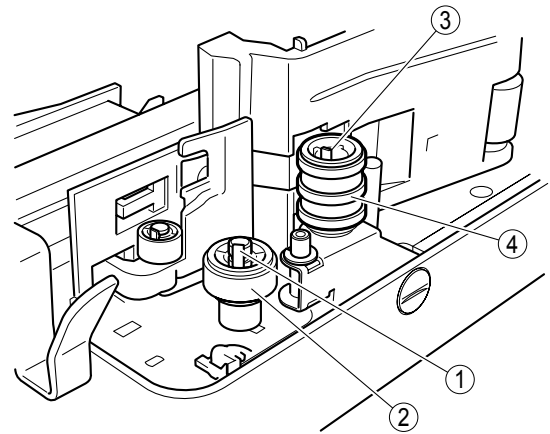


Figure 3-202

* Notes on assembly

Attach the pickup guide aligning it with the positioner on the bottom. Make sure it does not rise up.

2. IP Feed Guide/Internal Feed Guide

- 1) Remove the main cover.
- 2) Remove the document feed tray/eject stopper.
- 3) Open the maintenance cover.
- 4) Remove the plastic stopper ①, the bearing ②, and the four screws ③, then push back the IP feed guide ④, the IP carriage ⑤, and the internal feed guide ⑥ so that the target parts can be removed.

Note: The IP carriage and internal feed guide have cables attached so do not pull them too hard.

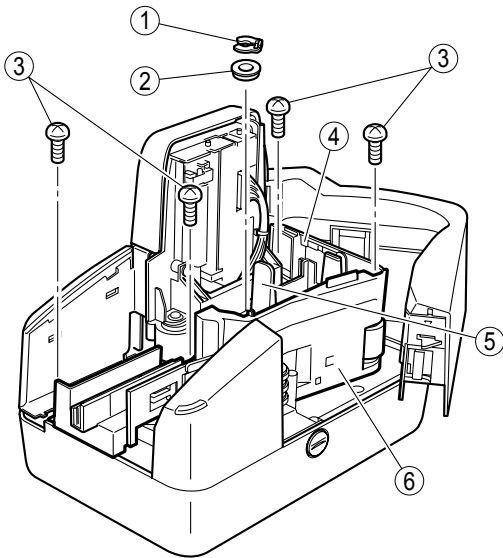


Figure 3-203

- 5) When removing the IP carriage and internal feed guide, remove the control PCB and remove the connected cables.

* Notes on assembly

Attach the IP feed guide and internal feed guide aligning them with the positioner on the bottom. Make sure they do not rise up.

3. Separation Roller

- 1) Push back the IP feed guide/internal feed guide so that the separation roller can be removed.
- 2) Unlock the fitting part ① and remove the separation roller ②.

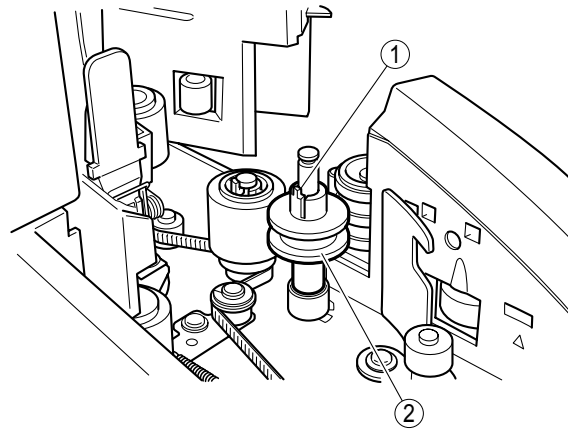


Figure 3-204

4. Carry Roller 1

- 1) Push back the IP feed guide/internal feed guide so that the carry roller can be removed.
- 2) Loosen the screw ①, and then release the belt tensioner ②. Then, unlock the fitting part ③ and remove the carry roller 1 ④.

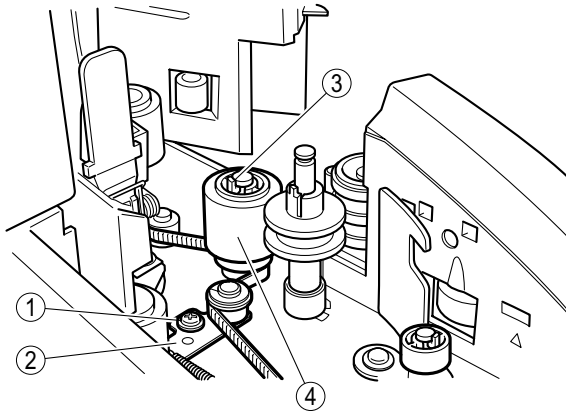


Figure 3-205

* Notes on assembly

When installing carry roller 1, after correctly mounting the belts and including other carry rollers, align the tensioner with the mounting plate's positioner, then fix the tensioner.

5. Feed Pressure Roller/Feed Pressure Plate

- 1) Push back the IP feed guide/internal feed guide so that the feed pressure roller/feed pressure plate can be removed.
- 2) After removing the spring ①, unlock the fitting part ②, and then remove the feed pressure roller ③ and the feed pressure plate ④.

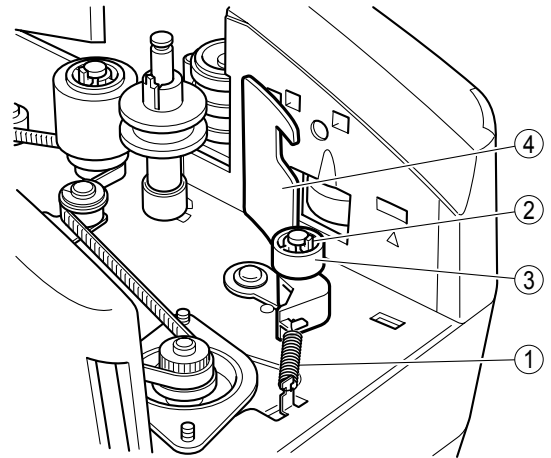


Figure 3-206

6. Movable Guide Unit

- 1) Remove the bottom cover.
- 2) Remove the movable guide cover.
- 3) Remove the two connectors ①. Then, unlock the fitting part ② and remove the movable guide unit ③.

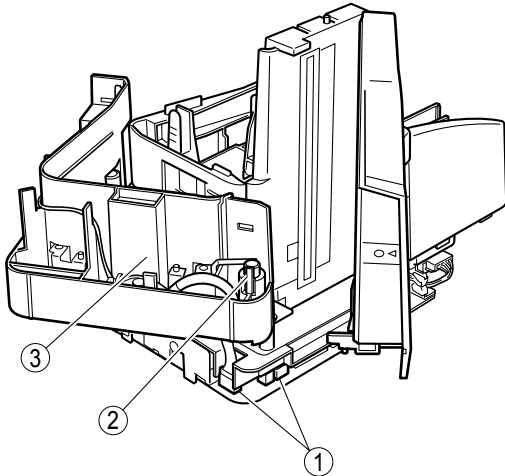


Figure 3-207

7. Protection Plate

- 1) Remove the bottom cover.
- 2) Remove the control PCB. For more details, refer to the section "IV. ELECTRICAL".
- 3) Remove the IP carriage. Then, remove the five screws ① and the screw ② (for the reading unit front), then remove the protection plate ③.

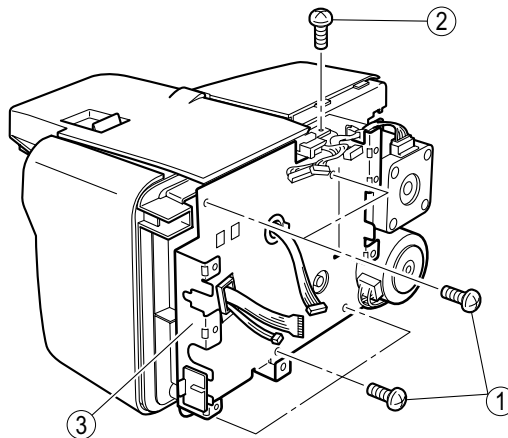


Figure 3-208

* Notes on assembly

Pass the IP cable, infrared sensor cable, and CIS unit (front) cable through the hole in the protection plate.

8. Torque Limiter for the Feed Pressure

- 1) Remove the main cover.
- 2) Remove the bottom cover.
- 3) Remove the control PCB.
- 4) Remove the protection plate.
- 5) Remove the screw ② on the top side while retaining the feed pressure shaft ①, and then remove the shaft.

Note: At this time, the pin and torque limiter unit also detach. The spring attached to the upper side of the feed pressure plate might also detach.

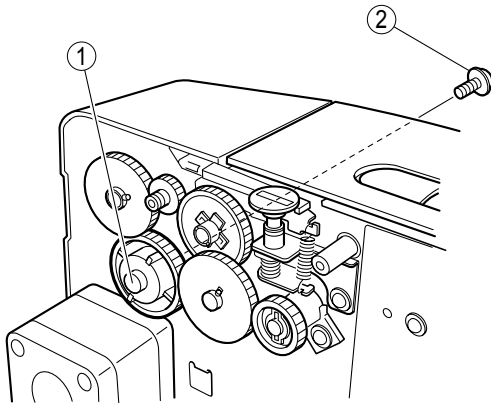


Figure 3-209

- 6) Unlock the two fitting parts ①, and then remove the gear ② and torque limiter ③.

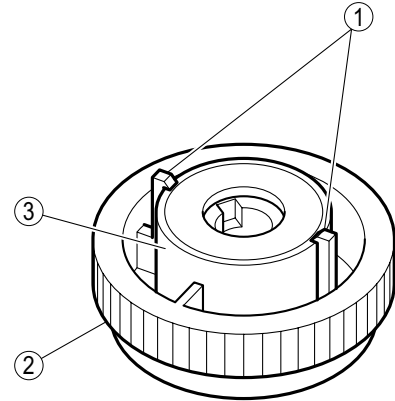


Figure 3-210

* Notes on assembly

Mesh the D-shaped part of the mounting plate with the top side of the feed pressure shaft, and then fix with the screw. Confirm that the spring is installed on the feed pressure plate.

9. Dial Adjustment Unit

- 1) Remove the bottom cover.
- 2) Remove the control PCB.
- 3) Remove the protection plate.
- 4) Pull out the dial ①. Remove the spring ② and the screw ③, and then remove the dial adjustment unit ④.

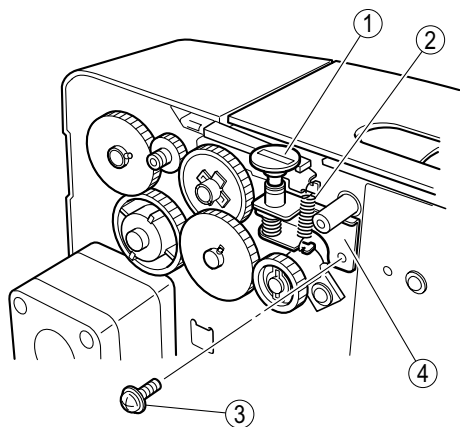


Figure 3-211

* Notes on assembly

Insert the protruding part of the separation unit plate into the groove on the dial adjustment shaft.

After assembly, perform paper thickness adjustment.

III. READ RELATED

1. Reading Unit (Front)

- 1) Remove the bottom cover.
- 2) Remove the reading cover.
- 3) Remove the screw ① and two connectors ②. Then lower the cable guide ③, unlock the fitting part ④, and then remove the reading unit ⑤.

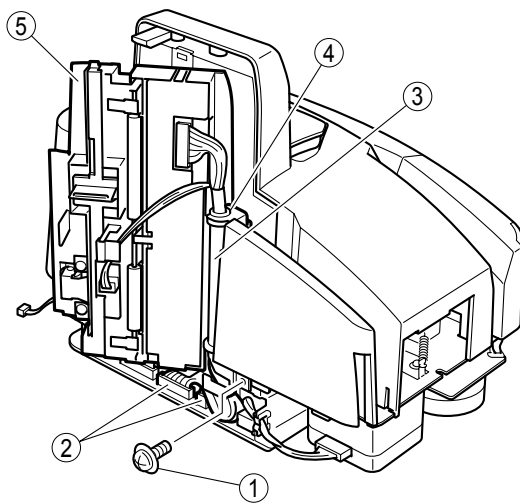


Figure 3-301

* Notes on assembly

There are protruding parts of the shielding plate at the bottom of the reading unit.

Be sure to touch the protruding parts to the top part of the base plate.

The CIS unit (front) cable connects to J502 on the control PCB.

Confirm that the reading unit rotates smoothly.

2. Reading Unit (Back)

- 1) Remove the bottom cover.
- 2) Remove the main cover.
- 3) Remove the document feed tray and eject stopper.
- 4) Remove the connector ① which is connected to the CIS unit (back).

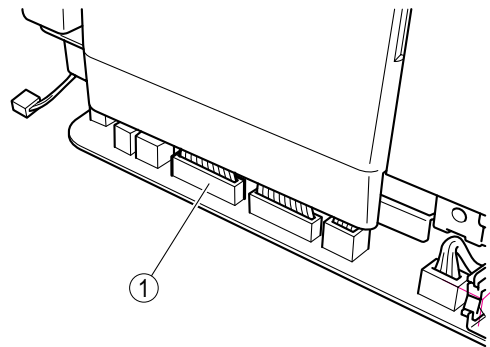


Figure 3-302

- 5) Open the maintenance cover and the reading unit. Then, remove the two screws ① and remove the IP feed guide ②.

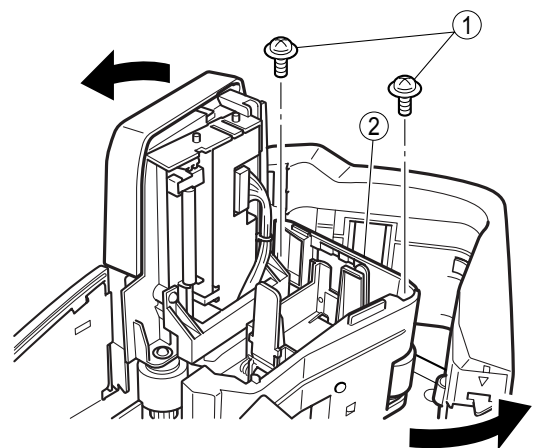


Figure 3-303

- 6) Move the IP carriage to the top. Then, remove the two screws ①. Pull out the reading unit ② upwards while avoiding the IP carriage.

Note: A cable guide protrudes from the bottom of the reading unit, so pull out the cable guide upwards, and remove it from the base plate.

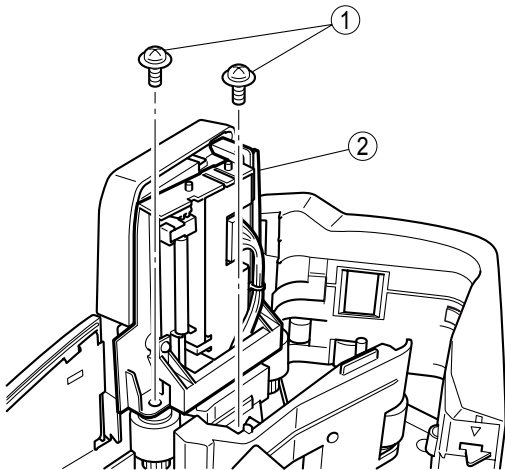


Figure 3-304

*** Notes on assembly**

Before inserting the reading unit (back), pass the CIS unit (back) cable through the hole in the base plate and down onto the control PCB. The cable connects to J113.

3. Magnetic Head

- 1) Remove the bottom cover.
- 2) Remove the movable guide cover.
- 3) Remove the movable guide unit.
- 4) Peel off the shielding plate ①.

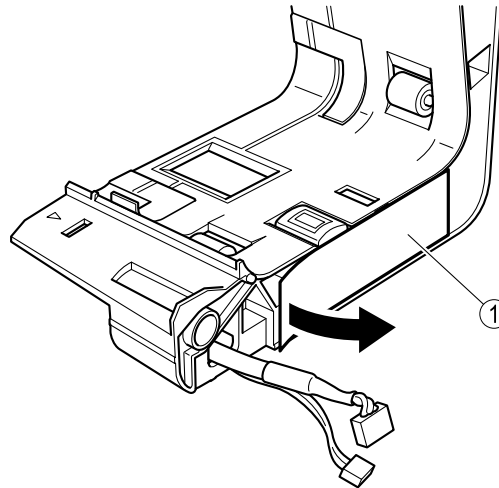


Figure 3-305

- 5) Remove the single screw (self tapping) ①, and then remove the magnetic head (cable attached) ②.

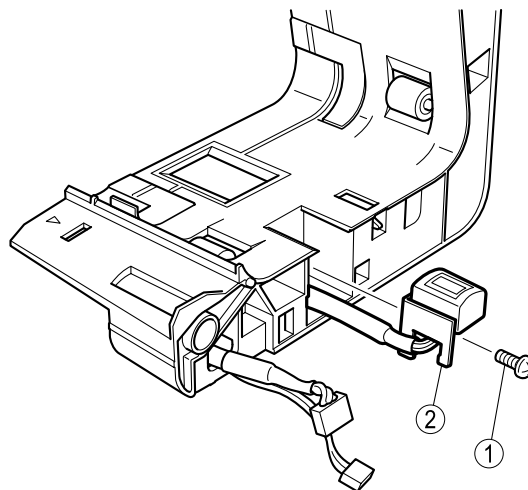


Figure 3-306

*** Notes on assembly**

Stick down the shielding plate in its original position so that it does not rise up. If it does rise up, use a new shielding plate.

IV. ELECTRICAL

1. Control PCB

- 1) Remove the bottom cover.
- 2) Remove the four screws ①, the screw ② (with washer) and the connected cable, and then remove the EMC sheet ③, the PET sheet ④, and the control PCB ⑤.

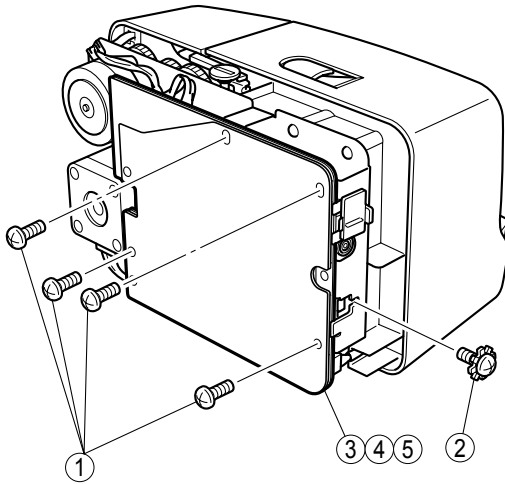


Figure 3-401

* Notes on assembly

Connect the PCB's two internal connectors ① before fixing the screw.

Attach the PET sheet on the control PCB, and attach the EMC sheet onto the PET sheet.

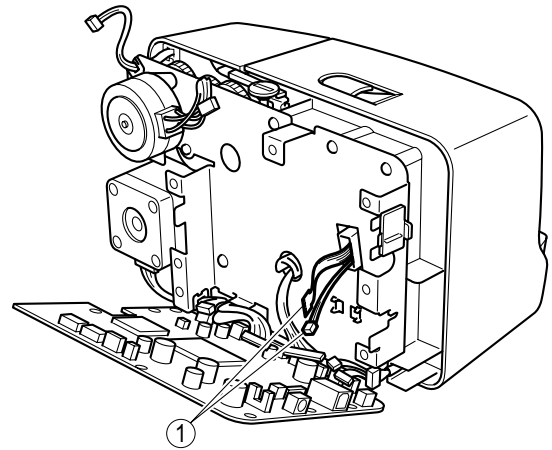


Figure 3-402

2. Main Motor

- 1) Remove the bottom cover.
- 2) Remove the connector ①.

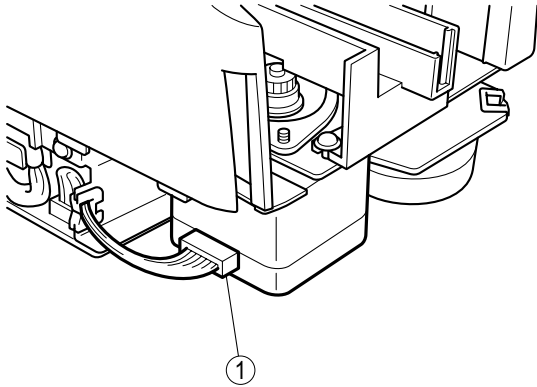


Figure 3-403

- 3) Push back the internal feed guide so that the main motor can be removed. For more details, refer to the section "II. FEED RELATED".
- 4) Loosen the screw ①, and then release the belt tensioner ②. Then, remove the two screws ③ and remove the main motor ④.

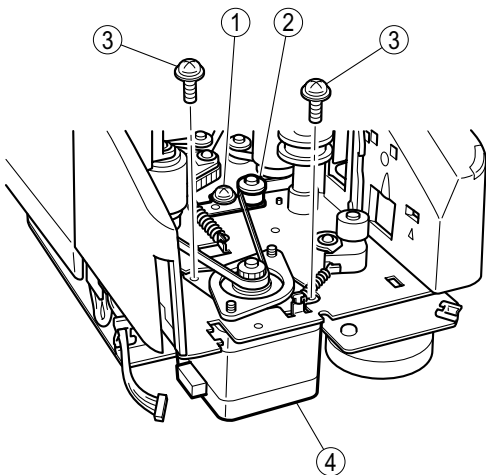


Figure 3-404

3. Pickup Motor

- 1) Remove the bottom cover.
- 2) Remove the connector ①, the two screws ②, and the pickup motor ③.

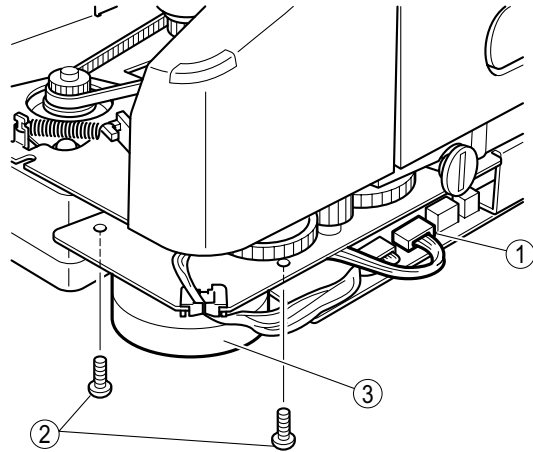


Figure 3-405

* Notes on assembly

Align the tensioner with the positioner on the mounting plate, then fix the tensioner.

CHAPTER 4

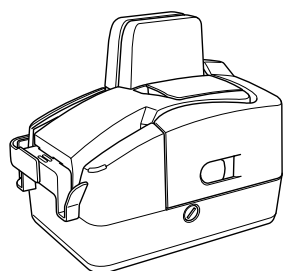
INSTALLATION & MAINTENANCE

I. INSTALLATION	4-1		II. MAINTENANCE	4-5
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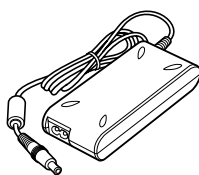
I. INSTALLATION

1. Unpacking

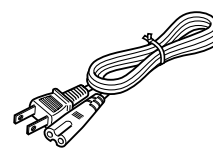
Open the outer packaging box and take out the main body and other items packed with it. Check that there are no missing items.



CR-55 scanner



AC adapter



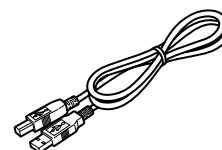
Power cord



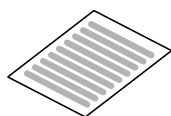
Startup manual



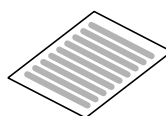
CR-55 setup disc
(CD-ROM)



USB interface cable



Warranty card
(U.S.A. and Canada only)



Registration card
(U.S.A. and Canada only)

Figure 4-101

- The CR-55 setup disc is inserted in the startup manual.
- Ink cartridge is not enclosed with this machine.
- Retain the outer packaging box and packing materials because they are required to store and transport this machine.

2. Protection Material Removal

- 1) Remove the protection tape from the main body.

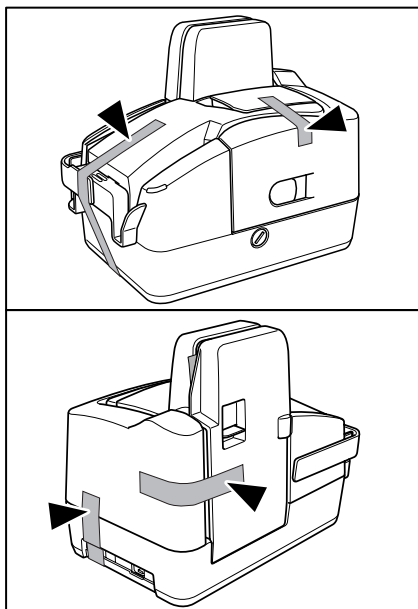


Figure 4-102

- 2) Open the reading unit while pushing down the open lever. Remove the protection tape from the reading unit.

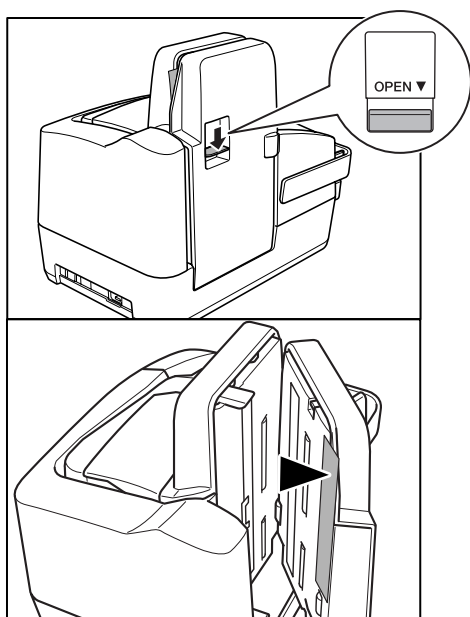


Figure 4-103

3. Connection to the Computer

- 1) Install software (Scanning Utility for CR-55) for the computer.
- 2) Connect the supplied AC adapter and power cord to this machine.
- 3) Connect the computer to this machine.
- 4) Switch this machine ON.

Note: Before connecting the computer and this machine, install Scanning Utility for CR-55 for the computer.

4. Operation Check

- 1) Install the ink cartridge as required. For more details, refer to the next section.
- 2) Adjust the position of the document feed tray and the eject stopper, according to the document size.
- 3) Set documents.
- 4) Run the application software according to the operation procedure.
- 5) Check operation results.

5. Ink Cartridge

Note: Do not touch the contacts or ink jet nozzle.

- 1) Open the maintenance cover while pulling the open lever.

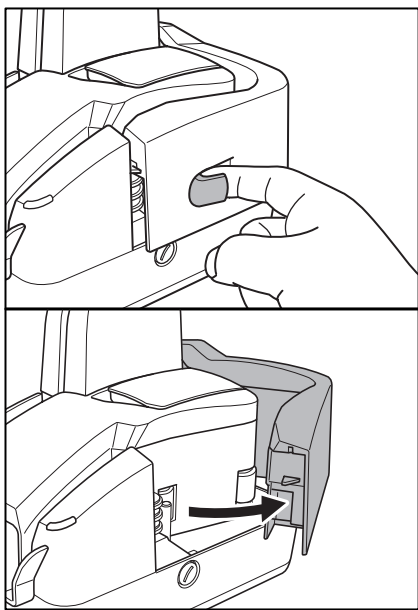


Figure 4-104

- 2) Open the imprinter cover.

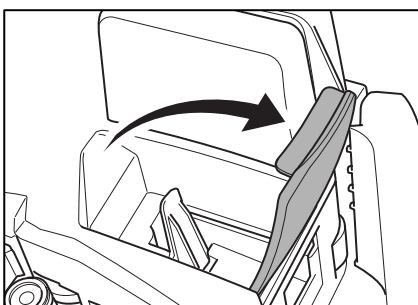


Figure 4-105

- 3) Take ink cartridge out of the bag.

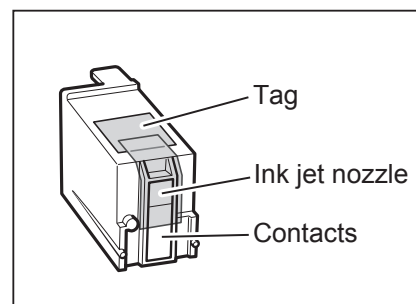


Figure 4-106

- 4) Grasp the tag and then peel off the tape covering the ink jet nozzle.

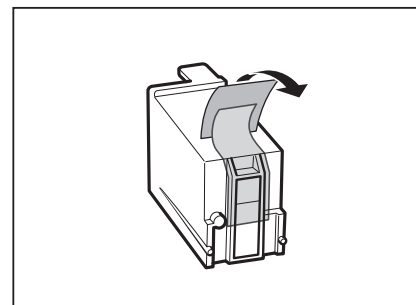


Figure 4-107

- 5) Set the ink cartridge as shown in figure.

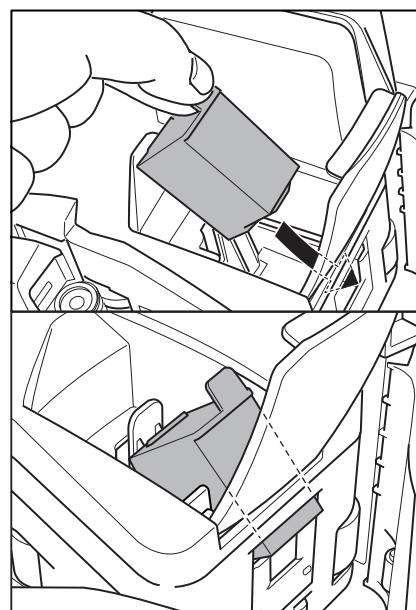


Figure 4-108

- 6) Push in the ink cartridge until it clicks into place.

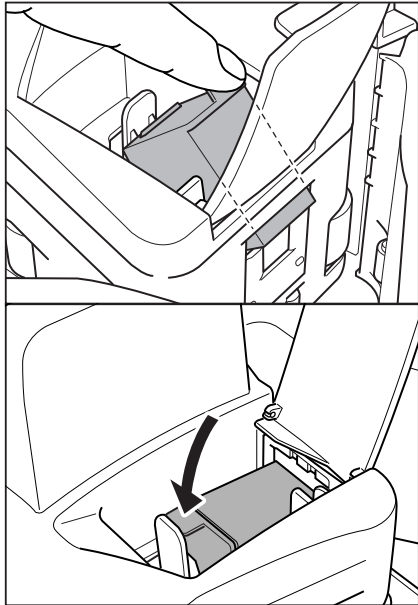


Figure 4-109

Note: If the two ink cartridge pins are not fit into the holes on the carriage, turn back the lock lever in the direction of the arrow and reset the cartridge in the correct position.

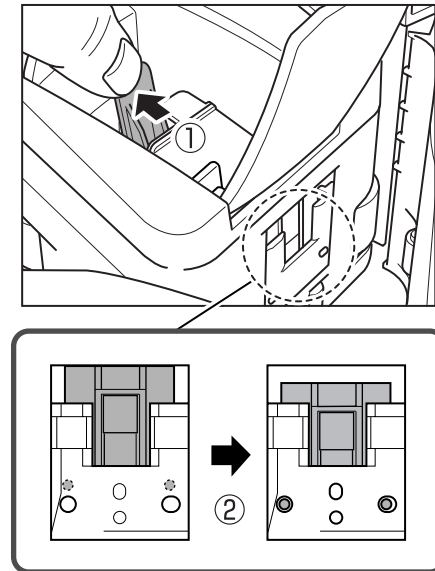


Figure 4-111

- 7) Make sure that the lock lever locks the ink cartridge into the correct position. Set the two ink cartridge pins fit into the holes on the carriage.

- 8) Close the imprinter cover and maintenance cover.

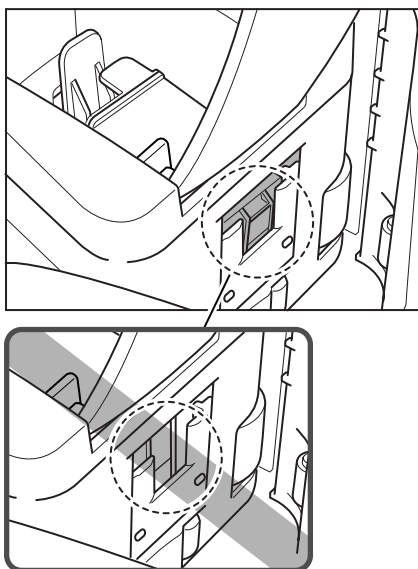


Figure 4-110

II. MAINTENANCE

1. Periodically Replaced Parts

This machine has no periodically replaced parts, but it has consumable parts.

Reference: Differences between periodically replaced parts and consumable parts

1. Periodically replaced parts shall be replaced when becoming at appointed time, and which are usually replaced by service technicians and assigned as service parts. However, if the storage period is limited, parts are assigned as commercially available products.
2. Consumable parts shall be replaced when becoming no good by users or service technicians, and which are assigned as service parts and/or commercially available products.

2. Consumable Parts

1) Replaced by Service Technician

No.	Part name	Part number	Expected life	Remarks
1	Pickup roller	MF1-4390-000	500,000 sheets	It should be replaced when a roller is worn and the pickup failures or document jams are occurred after roller cleaning.
2	Feeding roller	MF1-4391-000	500,000 sheets	
3	Separation roller	MA2-7482-000	3,000,000 sheets	
4	Ink absorption pad	MA2-7476-000	1,500,000 sheets	Replace when the pad becomes filled with ink, and is leaking outside or soiling the document.

Table 4-201

Note: These parts above are assigned as service parts.

2) Replaced by User

No.	Part name	Merchandise code	Expected life	Remarks
1	Ink cartridge Hewlett-Packard Company Product number: C6602B/G/R	Blue: 3693A002BA Red: 3693A003BA Green: 3693A004BA	1,850,000 characters (77,000 sheets)	It should be replaced when it runs out of ink. The expected life comes from; small font (42 dots/character), 24 alphanumeric/sheet, 50 sheets/batch, and include preliminary discharge.

Table 4-202

Note: Purchase Hewlett-Packard Company product number C6602B/G/R for this machine's ink cartridge. You can also purchase this ink cartridge from us.

3. List of Maintenance Items

When the rollers are replaced, the reading glass and other rollers should be cleaned also.

If service technicians visit users, check the rollers and reading glass and direct "User's Maintenance" if they are very dirty.

[△ : Cleaning, ● : Replace, ☆ : Lubricate, □ : Adjust, ◎ : Check]

Unit name	Location/Parts	Maintenance intervals (expectancy)			Remarks
		500,000	1,000,000	3,000,000	
Feed section	Pickup roller	△/●			Wipe with cloth slightly moistened with water, then wipe dry.
	Feeding roller	△/●			
	Separation roller	△		●	
	Other rollers	△			
	Sensor window	△			Clean with air blower.
Reading section	Reading glass	△			Wipe with cloth slightly moistened with water, then wipe dry.
	Magnetic head	△			Wipe with dry cloth. You can also use the audio head cleaner.
	CIS unit		□		Perform optical adjustment.
Imprinter	Ink cartridge	△			Wipe off ink stacked on nozzle using cotton-swab etc.
	Around area of ink absorption pad	△			Wipe ink adhesion part with cloth slightly moistened with water, then wipe dry.

Table 4-203

CHAPTER 5

TROUBLESHOOTING

I. ERROR DISPLAY	5-1	IV. OPERATION TROUBLESHOOTING	5-15
II. SERVICE MODE.....	5-2	V. MICR TROUBLESHOOTING.....	5-18
III. IMAGE TROUBLESHOOTING	5-13	VI. AFTER REPLACING PARTS.....	5-19

I. ERROR DISPLAY

1. Power Indicator

This machine does not have an error display area, but some errors are indicated by the power indicator on the main body.

If this machine operates normally, the power indicator lights. The power indicator blinks if it can not scan the document in case that the cover opens or the document jam occurs, etc.

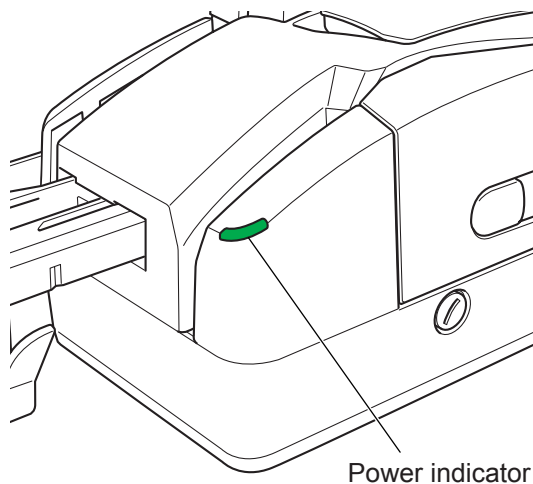


Figure 5-101

2. Error Messages

Error messages are displayed on the display connected to the computer. The contents of the error message differ depending on the software that is used.

Most error messages are related to improper user operation and document jams. The user shall perform the remedy according to the error message.

The followings show the main error messages displayed when the "Scanning Utility for CR-55" is used.

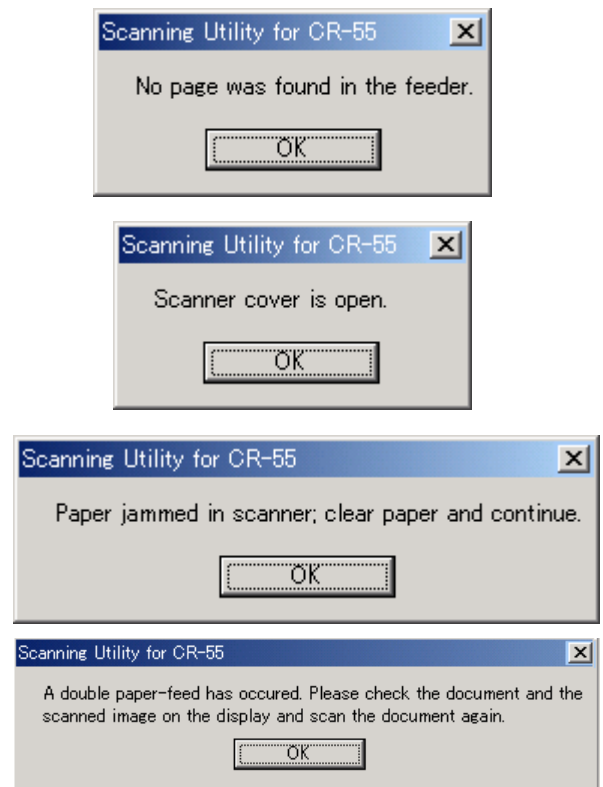


Figure 5-102

II. SERVICE MODE

1. Outline

The service mode of this machine can be executed by installing on the computer for servicing the service mode software located in the setup disc provided with this machine.

The system conditions for the computer to be used are the same as those described in the user manual. If the CPU performance or memory capacity is lower, the processing time might be longer, but the service mode can still be used.

Figure 5-201 shows the service screen.

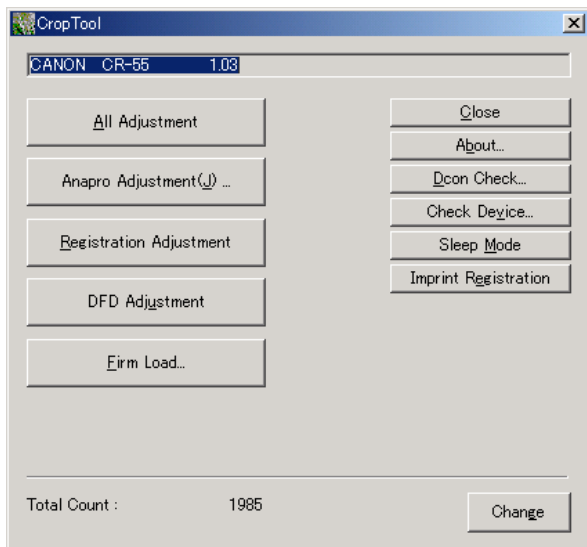


Figure 5-201

The service screen displays the buttons for selecting the various modes. Each service mode is performed from this screen.

Table 5-201 shows the list of the service modes.

No.	Button name/Functions
1	All Adjustment Perform all adjustments related to image reading.
2	Anapro Adjustment Perform the optical adjustment of the CIS unit.
3	Registration Adjustment Perform the registration adjustment.
4	DFD Adjustment Perform the double feed detection sensor adjustment.
5	Firm Load Change the firmware.
6	About Display this service mode version.
7	Dcon Check Check the operation of the hardware such as operation buttons, sensors, motors, etc.
8	Check Device Display the version of the internal devices of this machine.
9	Sleep Mode Set the sleep mode.
10	Imprint Registration Corrects the print position.
11	Change Display and change the total count (cumulative number of sheets fed) and the number of document jam.

Table 5-201

2. Installation Procedure

The service mode software installation procedure is described below. Do not install it on the user's computer.

- 1) Power ON the computer for servicing and start up the OS (Windows).
- 2) Set the setup disc supplied with this machine.
- 3) Install "Scanning Utility for CR-55".
- 4) Copy the "\Driver\Tools" folder in the setup disc to one of the drives of the computer for servicing.

Note:For how to install the software provided with this machine, refer to the user manual.

To confirm the specifications, such as the maximum number of documents that can be scanned at one time, make sure that the computer system conditions described in the user manual are met.

Note:After this machine is connected to the computer for the first time, a screen requesting installation of "Device Driver" is displayed. In this case, follow the procedure in the user manual. If the driver of this machine is not installed, select [Cancel] in the screen, and then install "Scanning Utility for CR-55."

3. Starting Up and Exiting Service Mode

The procedure for starting up the service mode is described below.

- 1) Connect the computer for servicing with this machine using a USB interface cable.
- 2) Open the installed "Tools" folder and start up the "CropTool.exe" file. (See Figure 5-202.)
- 3) The password screen is displayed, so after inputting the six characters "market," select [OK]. (See Figure 5-203.)
- 4) The service screen is displayed.

To exit the service mode, select [Close] in the service screen.

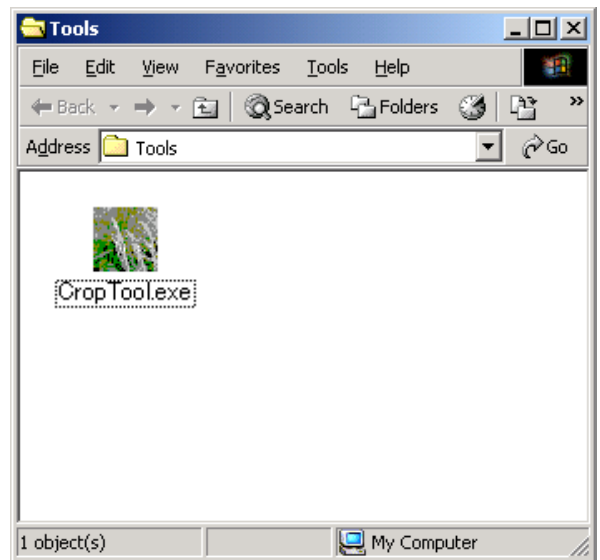


Figure 5-202



Figure 5-203

Note: To execute the service mode with the user's computer, start up the file on the setup disc supplied with this machine. Do not copy this program to the user's computer. Do not let the user know the folder name and password to be used.

4. All Adjustment

This mode is used to adjust all image reading adjustments at the same time. Since the adjustment value is saved on the control PCB, be sure to execute this mode after the control PCB have been replaced.

This mode consists of three individual adjustment items: "Anapro Adjustment", "Registration Adjustment" and "DFD Adjustment."

- Operating Procedure

- 1) Close the both cover after cleaning the rollers in the feed path, around the sensor and reading glass.
- 2) Insert the shading sheet (service tool: TKM-0341) from the top into the image reading section. Do not leave a tilt or floating. Refer to figure 5-204 and 5-205.

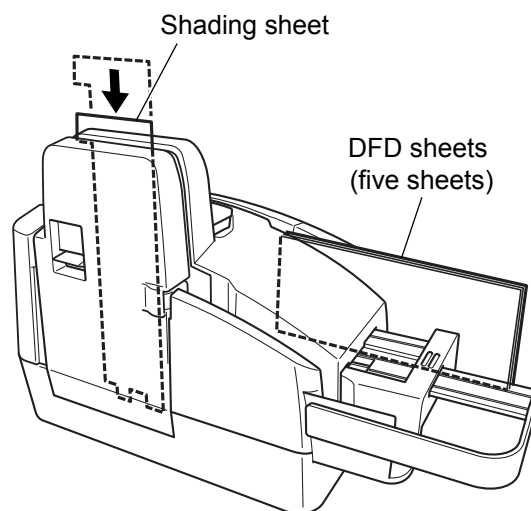


Figure 5-204

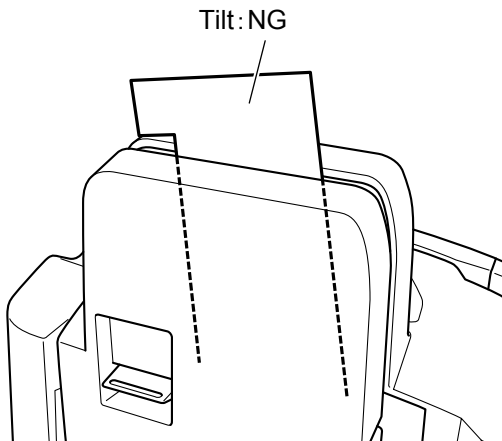


Figure 5-205

- 3) Set five DFD sheets (service tool: TKM-0342) in the pickup opening.
One of the five sheets is used for the registration adjustment, and the other four sheets are used for the DFD adjustment. Generally, two or three sheets are required for DFD adjustment, but in this case, an extra sheet added, so four sheets are used in total.
- 4) Select [All Adjustment] on the service screen.

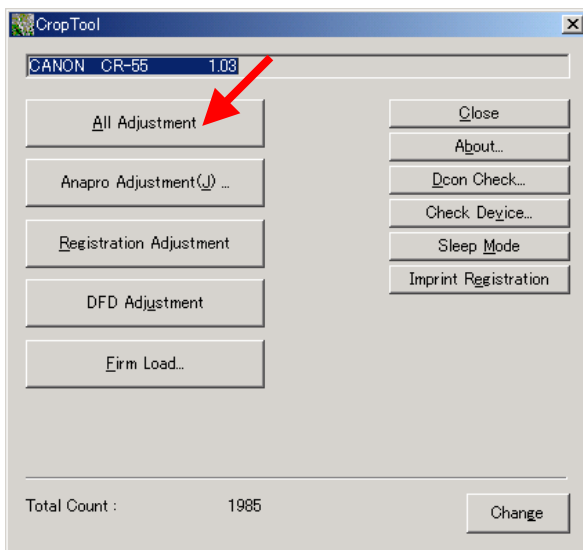


Figure 5-206

- 5) The adjustment starts automatically. The progress screen appears on the display. An example of display is shown below.

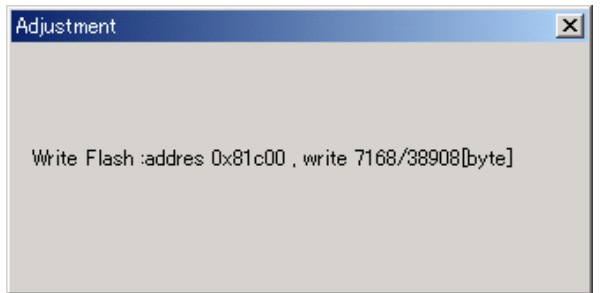
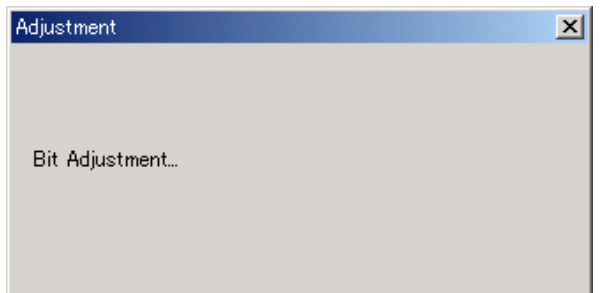
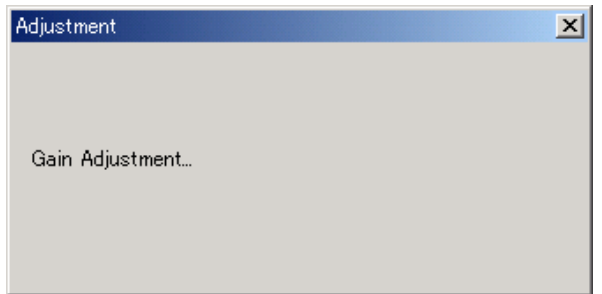
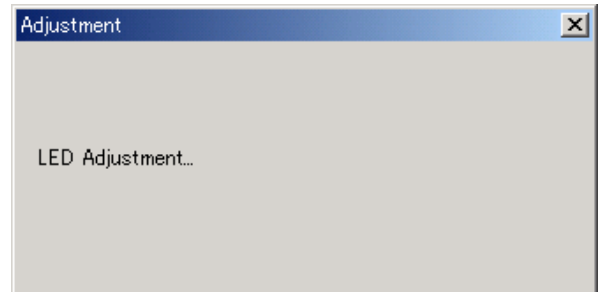


Figure 5-207

- 6) Remove the shading sheet when “Please Remove the Shading Sheet” is displayed in the sheet removal screen shown in figure 5-208.

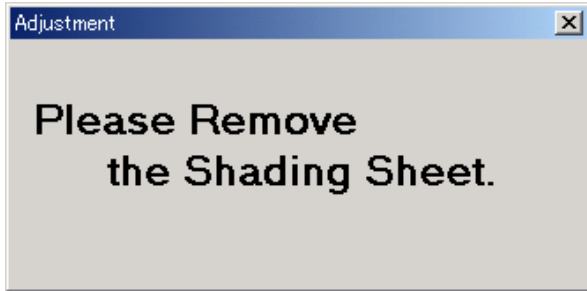


Figure 5-208

- 7) The DFD sheet feeds automatically and the remaining adjustments are performed.

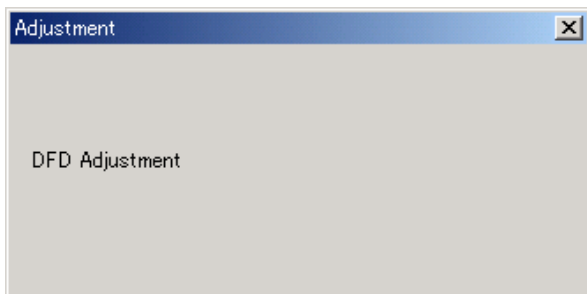
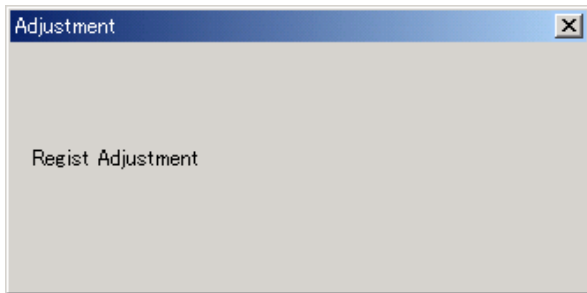


Figure 5-209

- 8) When the adjustment is finished, the progress screen disappears and the OK screen (Figure 5-210) appears. Select [OK] in the screen.
It takes approx. 3 minutes to finish. If you are using USB 1.1, it takes longer.



Figure 5-210

- [DFD sheet] Error
If the DFD adjustment could not finish within the number of DFD sheets, the no page screen (Figure 5-211) is displayed instead of the OK screen at the step 8. In this case, confirm the number of DFD sheets, perform adjustment again.



Figure 5-211

- Other Errors
If an adjustment value failure occurs while executing this mode, an error screen is displayed, and adjustment is interrupted. If an error screen is displayed, select [OK] in the screen to stop adjustment. Then after checking the operating procedure, perform adjustment again. If adjustment is interrupted, the adjustment value remains the value prior to adjustment.

Sample error screens are shown below.

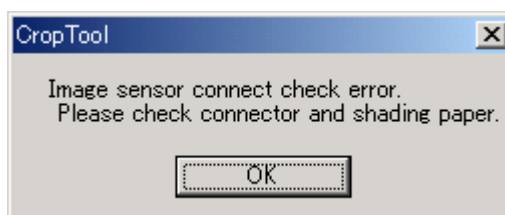


Figure 5-212

5. Individual Adjustments

This section describes the individual adjustment items. If all the three adjustments are performed, use "All Adjustment".

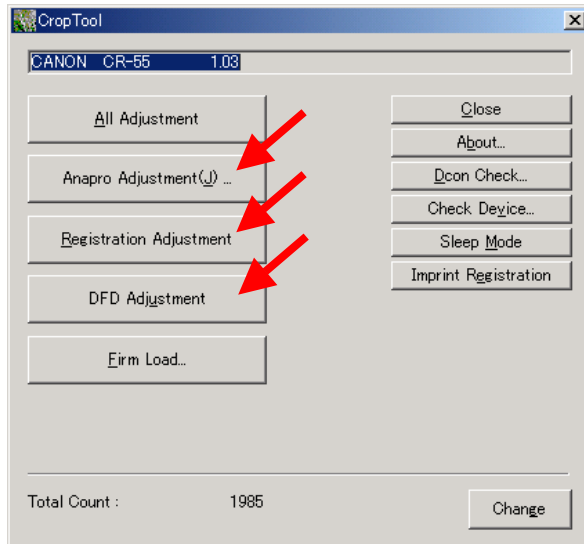


Figure 5-213

a. Anapro Adjustment

The reading unit is adjusted in this mode. Execute this mode when the reading unit is replaced, or if the read images are faulty.

- Operating Procedure

- 1) Clean the reading glass.
- 2) Insert the shading sheet (service tool: TKM-0341) from the top into the image reading section. Do not leave a tilt or floating.
- 3) Select [Anapro Adjustment] on the service screen.
- 4) The adjustment starts automatically. The progress screen appears on the display.
- 5) When the adjustment is finished, the sheet removal screen is displayed, so remove the shading sheet.

b. Registration Adjustment

The reading position is adjusted in this mode. Execute this mode if the leading edge and trailing edge of a read image are faulty.

- Operating Procedure

- 1) Clean the area around the registration sensor in front of the reading unit.
- 2) Set a normal sheet of copy paper that has been cut to about the size of a check. The size is approximately 150 x 70 mm, an approximation is acceptable. Alternatively, it is acceptable to use the DFD sheet (service tool: TKM-0342).
- 3) Select [Registration Adjustment] on the service screen.

- 4) The adjustment starts automatically. The progress screen appears on the display.
- 5) When the adjustment is finished, the progress screen disappears and the service screen appears.

c. DFD Adjustment

This mode is used to adjust double feed detection. Execute this mode when the infrared sensor is replaced, or if there is a problem with the double feed detection.

- Operating Procedure

- 1) Clean around the infrared sensor.
- 2) Set four DFD sheets (service tool: TKM-0342). Be sure to use this DFD sheet, since the sheet material and thickness are important factors for the correct adjustment.
- 3) Select [DFD Adjustment] on the service screen.
- 4) The adjustment starts automatically. The progress screen appears on the display.
- 5) When the adjustment is finished, the progress screen disappears and the OK screen (Figure 5-210) appears. Be sure to select [OK] in the screen.

Note: If the no page screen (Figure 5-211) is displayed instead of the OK screen, confirm the number of DFD sheets, perform adjustment again.

6. Dcon Check

This mode is used when checking the operation of the hardware controlled with the control PCB.

- Operation Screen

When [Dcon Check] is selected on the service screen, the operation screen is displayed.

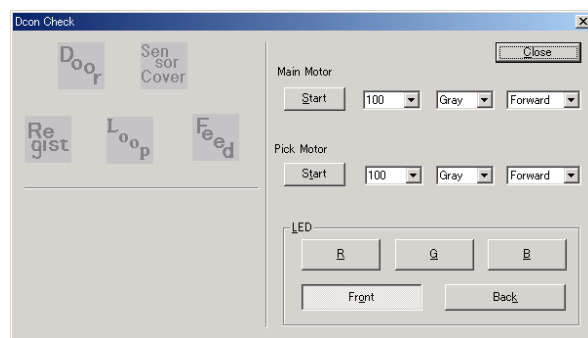


Figure 5-214

a. Sensors

When sensors enter the detection state, the corresponding mark lights. The case where the document sensor enters the detection state is shown below.

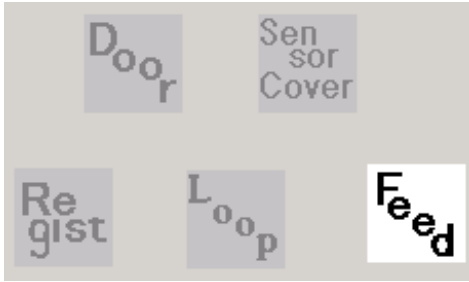


Figure 5-215

The contents of marks are shown below.

Mark	Sensor name	Lighting state
Door	Maintenance door sensor	The maintenance cover is open.
Sensor Cover	Reading unit door sensor	The door is open.
Re gist	Registration sensor	The registration sensor detects a document.
Loop	Infrared sensor	The infrared sensor is detecting the document.
Feed	Document sensor	The document sensor at the pickup opening is detecting the document.

Table 5-202

b. Motor

This section describes the operation check of the main motor (Main Motor) and the pickup motor (Pick Motor).

When the reading mode, resolution and rotative direction corresponding to each motor are selected, and the [Start] button is selected, the motor runs at the speed that meets the conditions. When the button is selected again, the motor stops.

The operation screen is shown below.

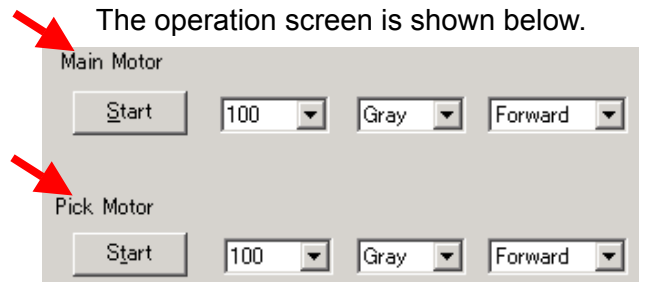


Figure 5-216

c. LED

The confirmation of the lighting of the lamp of the CIS unit LED is shown.

When the color (R, G, B) and reading side (front, back) is selected, the corresponding LED lights.

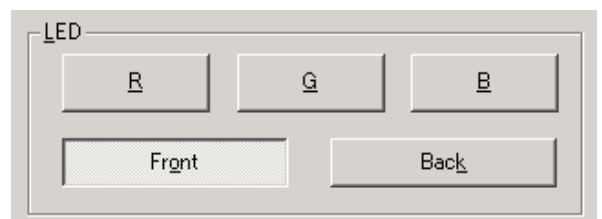


Figure 5-217

7. Check Device

This mode is used to check the versions of the internal devices of this machine.

When [Check Device] is selected on the service screen, the version screen is displayed.

[MAIN] indicates the version number of the firmware of the control PCB.

Select [Discharge] to check the output of the ink jet nozzle. Place a piece of paper against the ink jet nozzle when the ink sprays out of it.

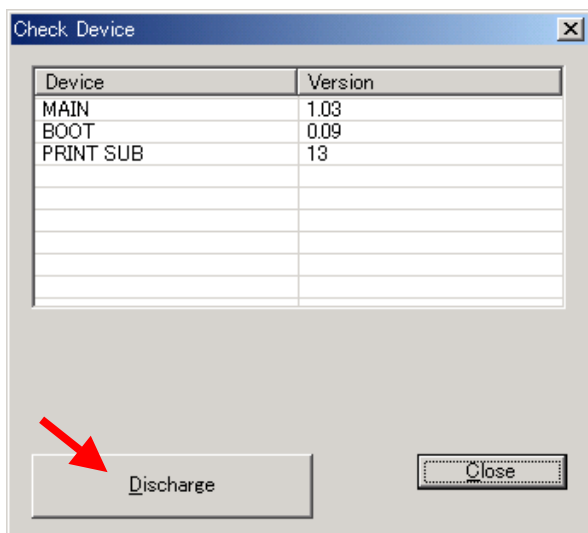


Figure 5-218

8. Sleep Mode

This mode is used to set so that the sleep mode is not effective. However, the sleep mode OFF is not the standard specification, so it is used for special users only. Do not use it for general users.

When [Sleep] is selected on the service screen, the setting screen is displayed. To set the sleep mode OFF, change the setting to [Sleep Mode Off] and press the [OK] button.

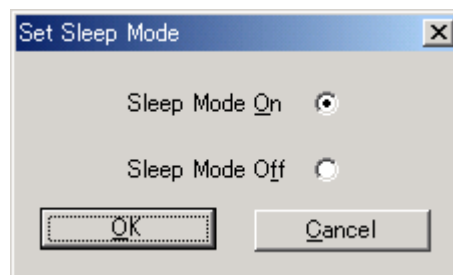


Figure 5-219

9. Change

This mode is used to display/change total count (cumulative number of feed sheet) and display/change the number of document jams.

When [Change] is selected on the service screen, the counter screen is displayed.

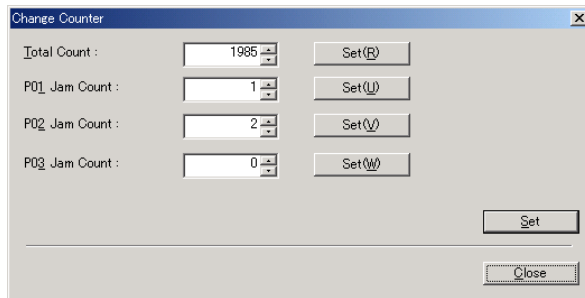


Figure 5-220

The contents of display are as follows:

- Total Count
Indicates total count of the main unit.
- P01_Jam Count
Indicates the number of early reach jams.
- P02_Jam Count
Indicates the number of residual jams.
- P03_Jam Count
Indicates the number of fast feed jams.

When the [Set] button on the right or the [Set] on the lower right of the screen is selected after the value is changed, the changed value is determined.

To close the screen, press the [Close] button.

These values might be changed if the control PCB is replaced. Therefore, inputting the values again is required after the replacement. If the values before the replacement are not clear, it is better to input the recommended values.

10. Imprint Registration

This mode is used to correct the printing position of the imprinter.

Selecting [Imprint Registration] in the service screen displays the correction screen.

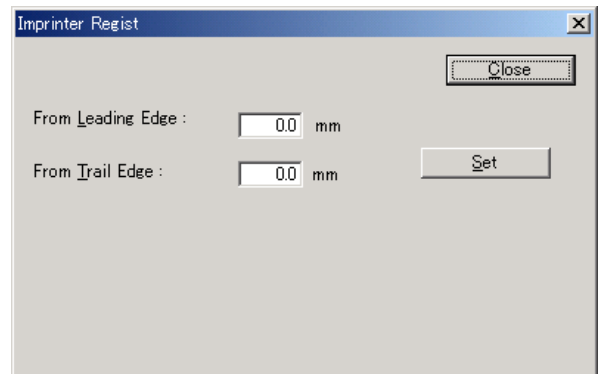


Figure 5-221

If an error between the printing position of the imprinter specified in the user's operation screen and the actual printed position occurs, it can be corrected with the following procedure. However, a slight deviation (1 to 2 mm) in the printing position occurs each time that a document is fed.

- Operation Procedure
- 1) Before you enter the service mode, determine the correction values from an actual printed sample.

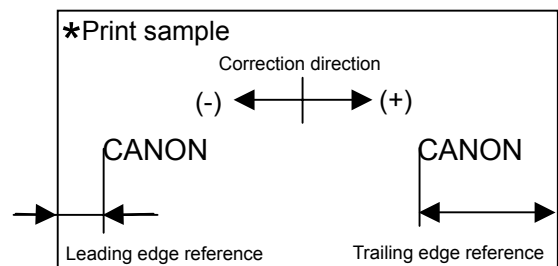


Figure 5-222

- 2) Select [Imprint Registration] in the service screen to display the correction screen.

- 3) Input the correction value of the leading edge reference you determined in the [From Leading Edge] and the correction value of the trailing edge reference in the [From Trail Edge].

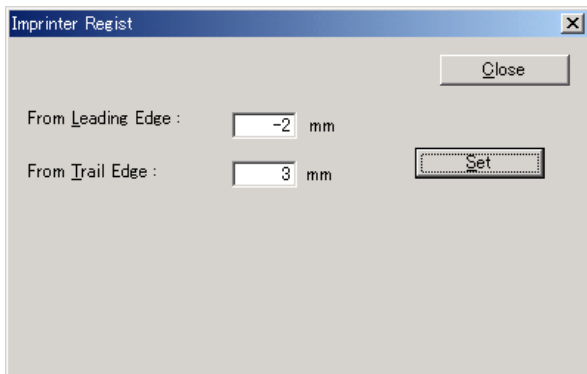


Figure 5-223

- 4) Select [Set] to write the correction values.

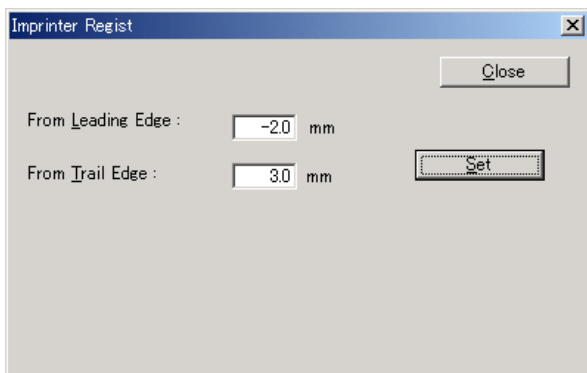


Figure 5-224

- 5) Exit the service mode, and make an actual print in the user's operation screen.
- 6) Check that the printing position has been corrected.

11. About

This mode is used to check the version of the software for this service mode.

When [About] is selected on the service screen, the version screen is displayed.

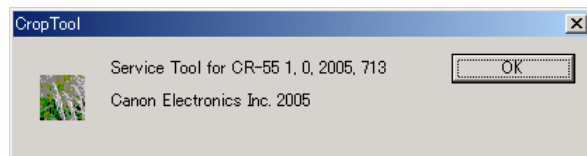


Figure 5-225

12. Firm Load

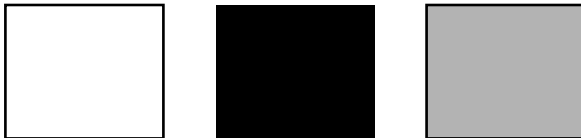
This mode is used to change the firmware of this machine. For details, refer to the service information issued during firmware changes. Be careful not to execute this mode by mistake.

- Operation procedure outline
 - 1) Select [Firm Load] on the service screen.
 - 2) The screen for selecting the file in which the firmware is saved is displayed.
 - 3) Select and open the file.
 - 4) The firmware is loaded to this machine.

III. IMAGE TROUBLESHOOTING

There are times when, depending on the type of image and settings, document reproducibility becomes poor. In such case, the image may be improved by changing the settings.

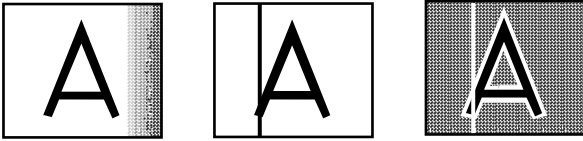
1	No image is output (completely white, completely black, completely gray)
----------	---



Cause/Faulty location	Step	Check item	Result	Action
"Brightness" setting	1	Is the "Brightness" setting appropriate?	NO	Change the setting. Also change "Contrast" if necessary.
Connection of reading unit	2	Are the reading related cables connected properly?	NO	Connect them properly.
Reading unit adjustment	3	Is the problem solved when the "All adjustment" in the service mode is performed?	YES	End.
Reading unit	4	Is the problem solved when the reading unit is replaced?	YES	End.
Control PCB	5	Is the problem solved when the control PCB is replaced?	YES	End.

Table 5-301

2 Uneven density, streaks (main-scanning direction)



Cause/Faulty location	Step	Check item	Result	Action
Roller	1	Are they dirty or deformed?	NO	Clean or replace them.
Gear, belt	2	Does it turn smoothly?	NO	Adjust assembling or replace parts.
Main motor	3	Is the problem solved when the motor is replaced?	YES	End.
Reading unit	4	Is the problem solved when the reading unit is replaced?	YES	End.
Control PCB	5	Is the problem solved when the control PCB is replaced?	YES	End.

Table 5-302

3 Uneven density, streaks (sub-scanning direction)



Generally, the white streaks caused by incorrect shading, and the black streaks caused by dirty reading glass.

Cause/Faulty location	Step	Check item	Result	Action
Reading glass	1	Is the reading glass clean?	NO	Clean it. If necessary, clean the roller too.
Reading unit adjustment	2	Is the problem solved when the "All adjustment" in the service mode is performed?	YES	End.
Reading unit	3	Is the problem solved when the reading unit is replaced?	YES	End.
Control PCB	4	Is the problem solved when the control PCB is replaced?	YES	End.

Table 5-303

IV. OPERATION TROUBLESHOOTING

When an operation problem occurs, first check for an “Error Messages” on the display connected to the computer. In addition, check the operation of the various sensors, motors using the “Service Modes.”

1	No power
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Note: The machine power indicator does not light.

Cause/Faulty location	Step	Check item	Result	Action
Connection of power cord	1	Are the power cord and AC adapter connected?	NO	Connect it properly.
AC power supply voltage	2	Is the specified voltage supplied at the outlet?	NO	Explain to the user that the trouble is not with the machine.
Power switch	3	Is the power switch turned ON?	NO	Turn the power switch ON.
PCB unit	4	Remove the bottom cover, then connect the power cord and turn the power switch ON. Does the LED of the control PCB light or blink properly?	YES	The power is supplied properly.
	5	Is the problem solved when the control PCB is replaced?	YES	End.

Table 5-401

2 Computer does not recognize the machine

Cause/Faulty location	Step	Check item	Result	Action
Power supply	1	Is the power supplied to the machine?	NO	Perform the actions in section 1: "No power."
Connection of USB interface cable	2	Is the USB interface cable properly connected?	NO	Connect it properly.
Computer, I/F card	3	Are the computer and I/F card set properly?	NO	Use them properly.

Table 5-402**3 Motors do not operate**

Cause/Faulty location	Step	Check item	Result	Action
Power supply	1	Is the power supplied to the machine?	NO	Perform the actions in section 1: "No power."
Connectors	2	Are the connectors for the motor connected properly?	NO	Connect them properly.
Transmission system load	3	Is the transmission system driven by the motor normal? Are such parts as gears and belts normal?	NO	Remove the abnormal load. Replace needed parts.
Sensor	4	Is the operation normal when checking the sensor detection display in the service mode?	NO	Replace the sensor.
Motor	5	Is the operation normal when checking the operation in the service mode?	NO	Replace the motor.
Control PCB	6	Is the problem solved when the control PCB is replaced?	YES	End.

Table 5-403

4 Faulty document feeding (jam/double feed/wrinkles)

Cause/Faulty location	Step	Check item	Result	Action
Document	1	Is the document within the specifications (thickness, dimensions, fold, curl, etc.)?	NO	Ask the user to use documents within the specifications.
Roller	2	Is the clearance between the separation roller correct?	NO	Adjust the clearance.
	3	Are they dirty or deformed?	NO	Clean or replace them.
Parts in feed path	4	Are all parts that the documents contact properly installed (not loose or tilted)?	NO	Install them properly.
	5	Is the surface in contact with the document smooth (not scratched, no burrs)?	NO	Replace faulty parts.
Drive transmission system	6	Is any abnormal noise emitted when feeding documents? Are any gears broken or is the belt tension failed?	YES	Replace faulty parts. Adjust the belt tension.

Table 5-404

V. MICR TROUBLESHOOTING

Cannot read MICR or low read percentage.

Cause/Fault location	Step	Check item	Result	Action
MICR characters	1	Are MICR characters correctly printed?	NO	Explain to the user that the trouble is not with the machine.
MICR settings	2	Are MICR read settings correct?	NO	Correct them.
Document setting	3	Are documents properly set?	NO	Set them properly.
Dirty magnetic head	4	Is magnetic head clean?	NO	Clean it.
Magnetic head connection	5	Is cable properly connected?	NO	Connect it properly.
Magnetic head	6	Is problem solved when magnetic head is replaced?	YES	End.
Control PCB	7	Is problem solved when control PCB is replaced?	YES	End.

Table 5-501

VI. AFTER REPLACING PARTS

Some of the parts used in this machine require adjustments and settings after being replaced or disassembled/reassembled.

Check document feed and images after the replacement or disassembly/reassembly of the parts.

1. Control PCB

Perform “All Adjustment” and “Change” in the service mode. Perform “Sleep Mode” if necessary.

2. Reading Unit

Perform “Anapro Adjustment” and “Registration Adjustment” in the service mode. “All Adjustment” can be performed too.

3. Infrared Sensor

Perform “DFD Adjustment” in the service mode.

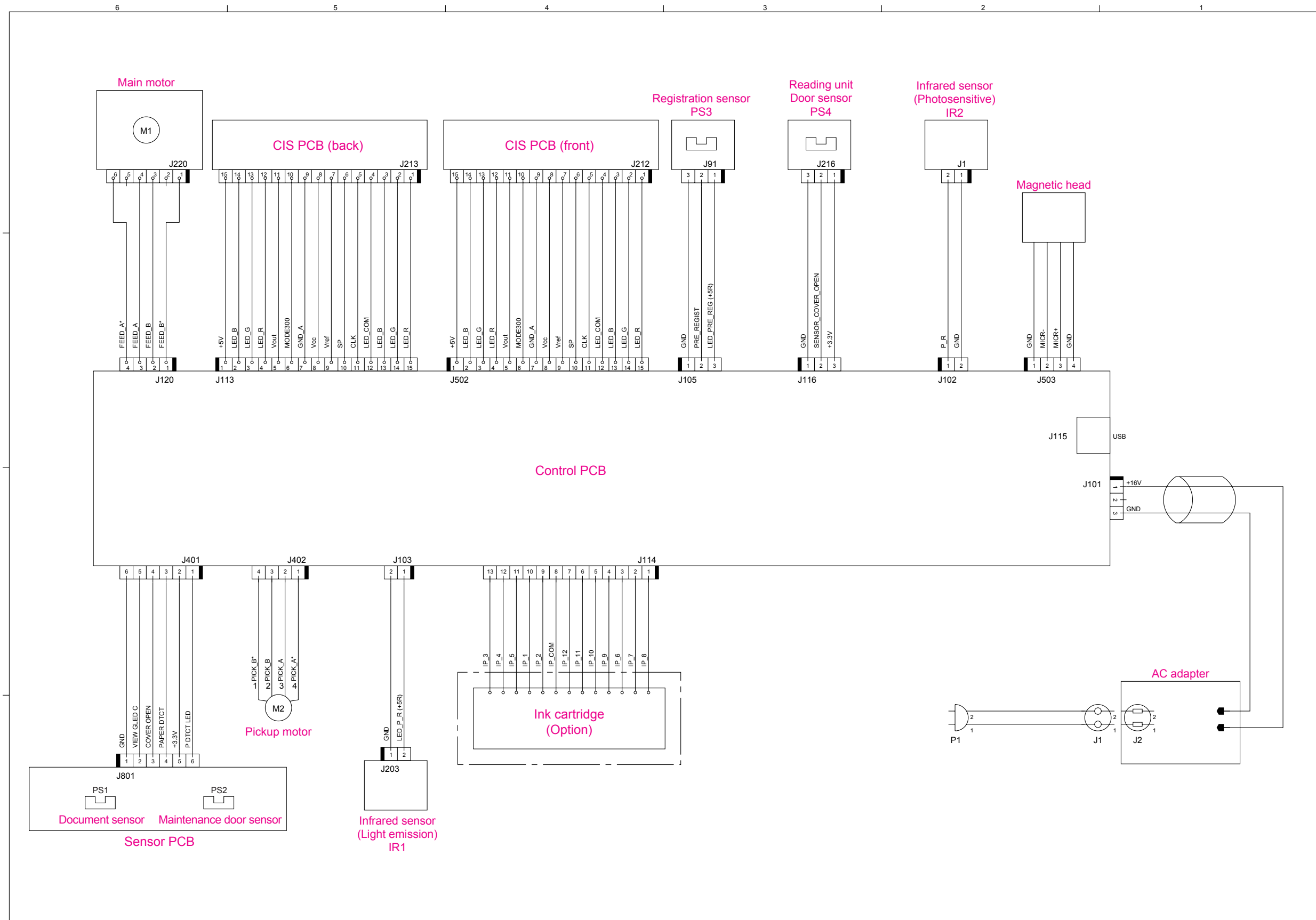
4 Registration Sensor

Perform “Registration Adjustment” in the service mode.

APPENDIX

I. GENERAL DIAGRAM	A-1	II. LIST OF SPECIAL TOOLS.....	A-3
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I. GENERAL DIAGRAM



II. LIST OF SPECIAL TOOLS

The special tools that are required when servicing this machine are listed below.

No.	Tool Name	Tool No.	Dimensions	Rank	Purpose/Remarks
1	Shading sheet	TKM-0341	Appropriate figure	B	<ul style="list-style-type: none"> • 10 sheets/set • For CIS unit adjustment
2	DFD sheet	TKM-0342	148.5 x 70 mm	B	<ul style="list-style-type: none"> • 10 sheets/set • For infrared sensor adjustment

Table A-201

Remark: Rank Designation

A = Every service technician must carry one of these tools.

B = One such tool can be shared by group of 5 service technicians.

C = Each workshop should have one of these tools.

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