CD-4070NW

SERVICE MANUAL

FIRST EDITION

Canon

MAY 2004 MY8-13A3-000

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

PREFACE

This Service Manual describes necessary basic information for field service and maintenance for maintaining the product quality and functions of the CD-4070NW.

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.

CONTENTS

CHAPTER 1 GENERAL DESCRIPTION

CHAPTER 2 FUNCTIONS & OPERATION

CHAPTER 3 DISASSEMBLY & REASSEMBLY

CHAPTER 4 INSTALLATION & MAINTENANCE

CHAPTER 5 TROUBLESHOOTING

APPENDIX

CHAPTER 1

GENERAL DESCRIPTION

I. FEATURES

1. Color Scanning
Scanning function based on the DR-3080C engine

2. Faster Recording
Faster recording with New CD-R Drive (52 times writing speed)

3. Easier Operation
8.4-inch operation panel

4. Quicker Operational Speed
Higher speed CPU (600 MHz)

5. PDF and Web Functions
Text-embedded PDF generation function
PDF full text search function
Web browse function
Web search function

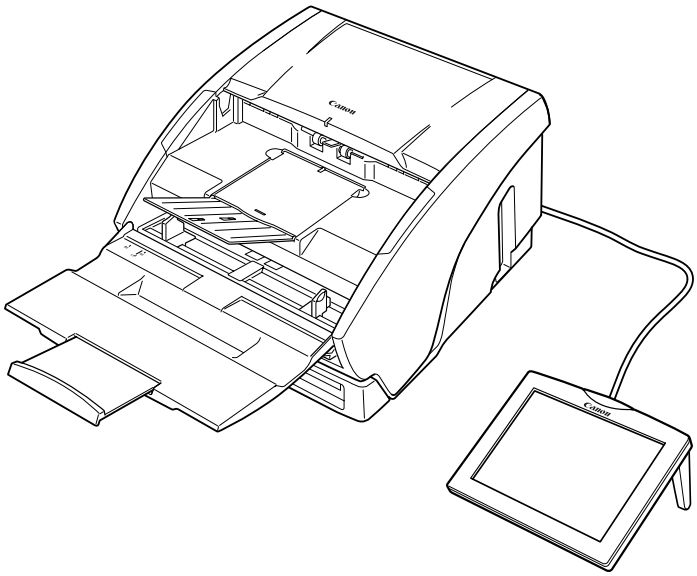


Figure 1-101

II. SPECIFICATIONS

1. Appearance/Installation

No.	Item	Specifications
1	Type	Desktop type CD-R recorder with document feed scanner
2	Product models	1) 100 V model (JPN): 100 VAC, 50/60 Hz 2) 120 V model: 120 VAC, 60 Hz 3) 220-240 V model: 220-240 VAC, 50/60 Hz
3	Rating power consumption/current	1) 100 V model: 80 W 2) 120 V model: 0.7 A 3) 220-240 V model: 0.4 A
4	Performance-guaranteed environment	15 to 27.5°C (59 to 81.5°F) 25 to 75%RH **Note:** No condensation allowed.
5	Noise	1) Sound power level In standby mode: 5.5 Bels (55 dB) or less In operating mode: 7.2 Bels (72 dB) or less 2) Sound pressure level: Bystanders In operating mode: 65 dB or less
6	Dimensions	1) Main body Tray closed: 350 (W) × 400 (D) × 260 (H) mm 2) Operation panel Foot closed: 210 (W) × 170 (D) × 45 (H) mm
7	Weight	Approx. 15 kg (included operation panel)
8	Output interface	1) Keyboard: PS/2 2) Mouse: PS/2 3) Network: 10 Base-T/100 Base-TX 4) Monitor: VGA 5) USB: for UPS (Uninterrupted Power Supply)
9	Expected product life	One of the following two items, whichever comes first. 1) 5 years 2) Sheets fed: 3,000,000 sheets (A4 size) There are parts needed to replace.
10	Installation	By service technician
11	Option	1) Endorser: ED500 2) Barcode module (software) 3) Exchange Roller Kit (500K, 1000K)

Table 1-201

2. System Configuration

No.	Item	Specifications
1	Scanner	DR-3080C based *Scanner I/F: USB 2.0
2	CPU on motherboard	EDEN ESP6000 (600 MHz)
3	OS	Windows®XP Embedded
4	HD drive	3.5 inch ATA 40 GB
5	Writing device	CD-R drive Maximum recording speed: 52×
6	Display device	8.4 inch TFT color LCD

Table 1-202

3. Documents Feed

No.	Item	Specifications
1	Document size	1) Width: 55 to 257 mm (70 to 257 mm at Auto-detect) 2) Length: 70 to 364 mm
2	Document weight (converted thickness)	1) Separation feed: 52 to 128 g/m^2 (0.06 to 0.15 mm) 2) Non-separation feed: 52 to 157 g/m^2 (0.053 to 0.20 mm)
3	Document requirements	1) Pressure-sensitive paper: Can be fed with limitation of direction. 2) Carbon-backed paper: Cannot be fed. 3) Perforated paper for binder: Can be fed only round holes. 4) Curled paper: Can be fed only if curl is 5mm or less. 5) Creased paper: Can be fed, but crease must be straightened before being fed.
4	Document storage	1) Pickup 10 mm or less in height including curls. (Approx. 100 sheets with 80 g/m^2 document) 2) Delivery 10 mm or less. (Approx. 100 sheets with 80 g/m^2 document)
5	Pickup mode	Standard / Manual / Auto
6	Delivery face direction	Face down
7	Feeding mechanical function	1) Automatic document separation 2) Document thickness adjustment
8	Feeding speed	1) Binary, Grayscale 300 dpi Hi-speed: 241.9 mm/s (only for the binary mode) 200 dpi: 181.4 mm/s 240 dpi: 151.2 mm/s 300 dpi: 121.0 mm/s 2) Color 100 dpi: 121.0 mm/s 200 dpi: 60.5 mm/s

Table 1-203

4. Document Reading

<table>
<tr><th>No.</th><th>Item</th><th colspan="4">Specifications</th></tr>
<tr><td>1</td><td>Type of sensor</td><td colspan="4">Contact Image Sensor (CIS)</td></tr>
<tr><td>2</td><td>Picture element</td><td colspan="4">Density of element: 300 dpi, Effective elements: 3024 (256 mm)</td></tr>
<tr><td>3</td><td>Light source</td><td colspan="4">1) Front side
3-color (RGB) 1 line LED array
R: 640 nm, G: 525 nm, B: 470 nm
2) Back side
Yellow green 1 line LED array
YG: 570 nm</td></tr>
<tr><td>4</td><td>Dropout color</td><td colspan="4">Available (R/G/B) only front side
* Red emphasize mode is available.</td></tr>
<tr><td>5</td><td>Scanning side</td><td colspan="4">Single (Front) / Double (Both) / Blank skip</td></tr>
<tr><td>6</td><td>Scanning size (typical)</td><td colspan="4">1) Typical: B4/A4/B5/A5/LTR/LGL
2) Auto size detect</td></tr>
<tr><td>7</td><td>Output mode</td><td colspan="4">1) Binary (Black&White / Error diffusion / Advanced text enhancement)
2) Grayscale (8 bit)
3) Color (24 bit)</td></tr>
<tr><td>8</td><td>Output resolution</td><td colspan="4">1) Binary, Grayscale
300 × 300 (Hi-speed), 200 × 200 dpi, 240 × 240 dpi, 300 × 300 dpi
* 300 dpi Hi-speed is available only for the binary mode.
2) Color
100 × 100dpi, 200 × 200dpi
* When Mixed (= Color and Double) is selected, a resolution of back side (grayscale) is the same as color’s one.</td></tr>
<tr><td rowspan="11">9</td><td rowspan="11">Reading speed</td><td colspan="4">A4 size documents</td></tr>
<tr><td>Mode</td><td>Resolution</td><td>Single</td><td>Double</td></tr>
<tr><td rowspan="4">Black&White</td><td>300 dpi Hi-speed</td><td>42 ppm</td><td>85 ipm</td></tr>
<tr><td>200 dpi</td><td>32 ppm</td><td>64 ipm</td></tr>
<tr><td>240 dpi</td><td>26 ppm</td><td>54 ipm</td></tr>
<tr><td>300 dpi</td><td>21 ppm</td><td>43 ipm</td></tr>
<tr><td rowspan="3">Grayscale</td><td>200 dpi</td><td>30 ppm</td><td>48 ipm</td></tr>
<tr><td>240 dpi</td><td>25 ppm</td><td>35 ipm</td></tr>
<tr><td>300 dpi</td><td>20 ppm</td><td>23 ipm</td></tr>
<tr><td rowspan="2">Color</td><td>100 dpi</td><td>20 ppm</td><td>34 ipm</td></tr>
<tr><td>200 dpi</td><td>10 ppm</td><td>15 ipm</td></tr>
<tr><td colspan="4">* The detailed conditions are omitted. The numbers above may differ depending on the function settings and other conditions.</td></tr>
</table>

Table 1-204a

No.	Item	Specifications
10	Image adjustment	1) Brightness 2) Contrast * Grayscale or color mode is available. 3) Skew correction (Deskew) 4) Border removal

Table 1-204b

5. Display

No.	Item	Specifications
1	Display device	8.4 inch TFT Color LCD
2	Display method	VGA (640 × 480 dot)
3	Display area	170 × 128 mm
4	Input device	Touch panel * It is placed on the front side of LCD.
5	Image display functions	1) Enlarge & Reduction 2) Rotation 3) Scroll 4) Move page 5) Move file

Table 1-205

6. Writing

No.	Item	Specifications
1	Writing device	CD-R drive Maximum writing speed: 52×
2	Available media	CD-R disc 650/700 MB * CD-RW disc is not available.
3	Write method	Track at-once
4	Write timing	Write data before a disc will be ejected.
5	Rewriting selection	Available “Yes” or “No” at a disc ejection.
6	File format	1) Binary TIFF (one/job, multiple/job) PDF (one/job, multiple/job) 2) Grayscale, Color JPEG (one/job) PDF (one/job, multiple/job).
7	Backup	Duplicate a CD-R disc.

Table 1-206

7. Other Functions

No.	Item	Specifications
1	Apart OCR function	Searchable characters: Numeral, English letter, Symbol, space, Chinese letter Aria setting: Use a preview screen.
2	MICR function	Method: Optical method Searchable characters: E13B Aria setting: Use a preview screen.
3	Full text OCR function	Available for a text-embedded PDF only.
4	Mail function	Available Sending a scanned image to the appointed address.
5	Network function	Available Writing an image in shared folder with a network, and browsing an image in shared folder also.
6	Web function	Available Browsing and searching an image in HD drive of this machine from a computer on network.
7	Compatibility	A disc of CD-4060/4050 is available a reading function include search, display, and duplicating, but never additional writing by this machine.
8	Backup battery	None Use UPS (Uninterrupted Power Supply) customer owned in necessary.

Table 1-207

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

III. 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.

The power switch on the touch panel of this machine is for turning the DC power ON and for starting up the software. And the reset switch is for shutting down the system if a system error, for example, the machine does not work.

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.

If the power cord is unplugged or the reset switch is turned ON, data in the CD-R disc and/or HDD may be damaged.

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. Laser Beam Safety

A laser beam is emitted inside the CD-R drive of this machine. This laser beam will not be directed at user's eyes during normal operation. However, direct contact of the laser beam and the user's eyes may cause injury. So, never disassemble the CD-R drive.

4. Electromagnetic Wave Interference Countermeasures

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

5. User Manual

Read the user manual thoroughly before using this machine.

6. Disposal

Following local regulations when disposing of the product and parts.

7. Lithium Battery

The following lithium battery is mounted on the motherboard of this machine for memory backup.

- Manufacturer: Hitachi Maxell Ltd.
- Model: CR2450
- Voltage: 3 VDC

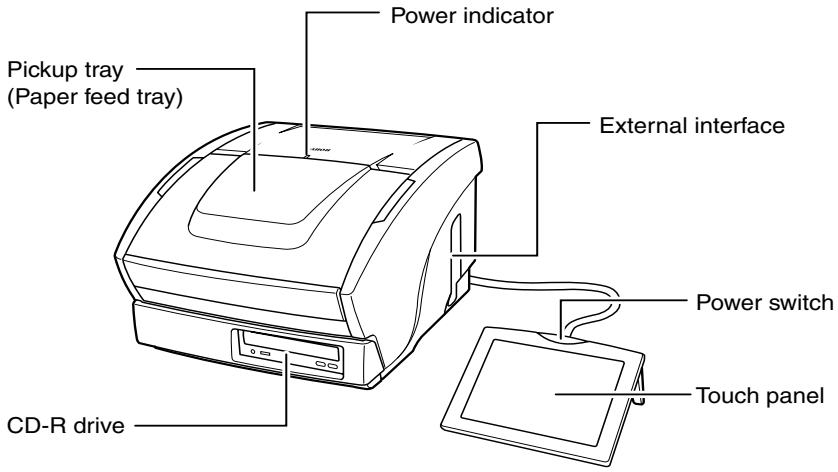
When the lithium battery is replaced, make sure it is replaced with the same battery. When disposing of used battery or motherboard on which the lithium battery is mounted, follow the manufacturer's instructions or local regulations.

⚠ CAUTION:

Replace the lithium battery with Hitachi Maxell CR2450 only. Use of another battery may present a risk of fire or explosion. The battery may present a fire or chemical burn hazard if mistreated. Do not recharge, disassemble or dispose of in fire.
Keep the battery out of reach of children and discard use battery promptly.

IV. NAME OF PARTS

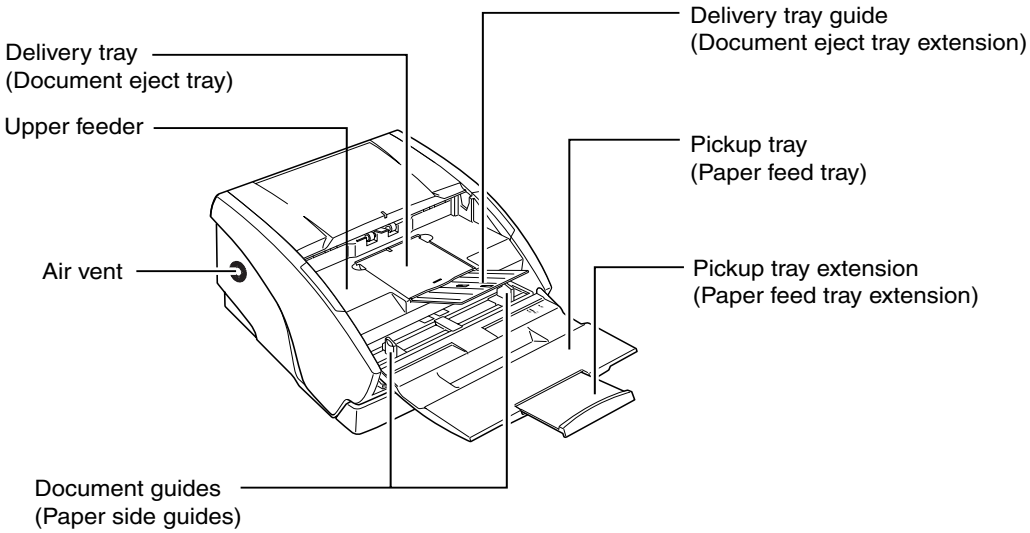
1. Front View



Note: Names in parentheses are used in user manual.

Figure 1-401

2. Front View with Pickup Tray Open



Note: Names in parentheses are used in user manual.

Figure 1-402

Note: Never block the air vents. Doing so might cause heat build-up inside the unit or failure.

3. External Interface

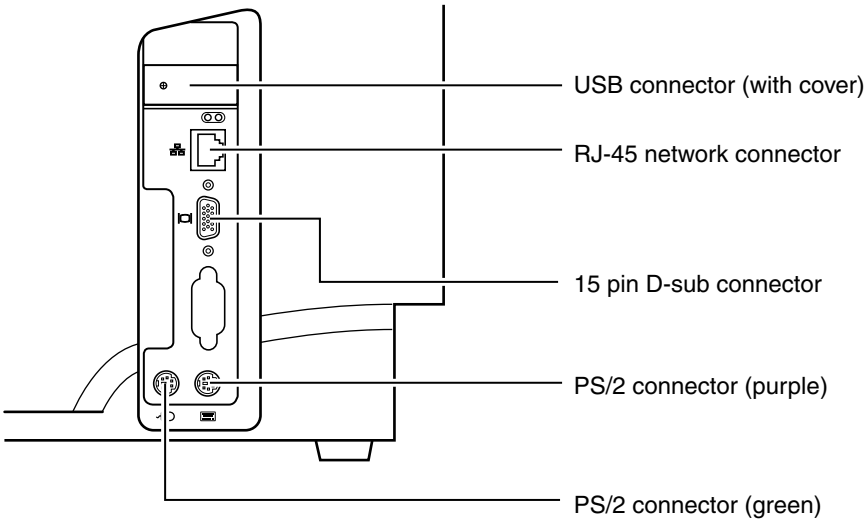


Figure 1-403

4. Back View

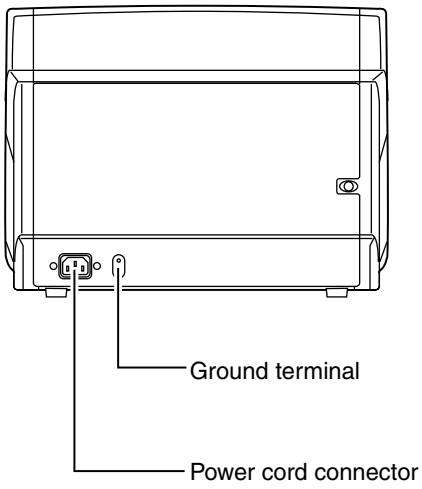


Figure 1-404

5. Touch Panel

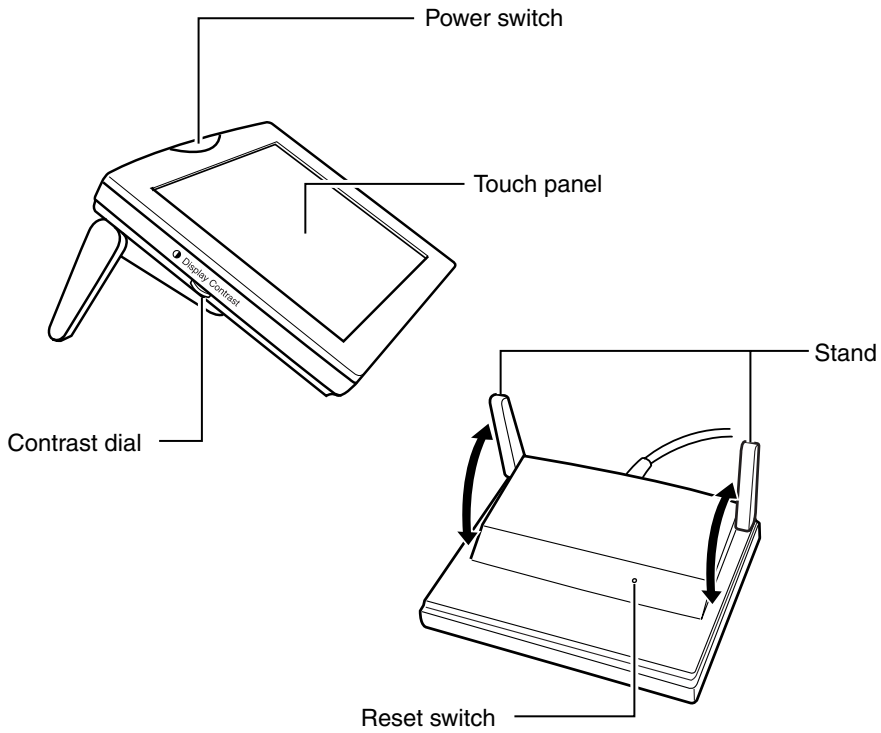


Figure 1-405

6. CD-R Drive

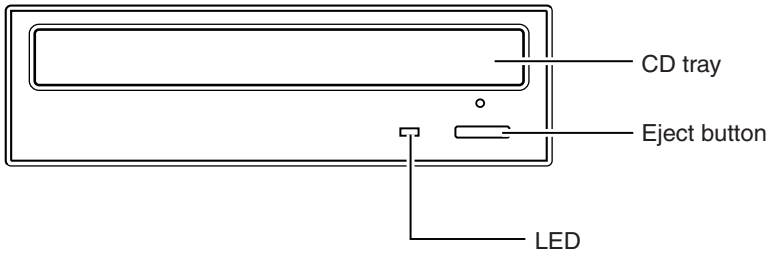


Figure 1-406

Note: A disc cannot be ejected by using the eject button during the normal operation (available during the service mode operation).

V. DESCRIPTION OF OPERATION

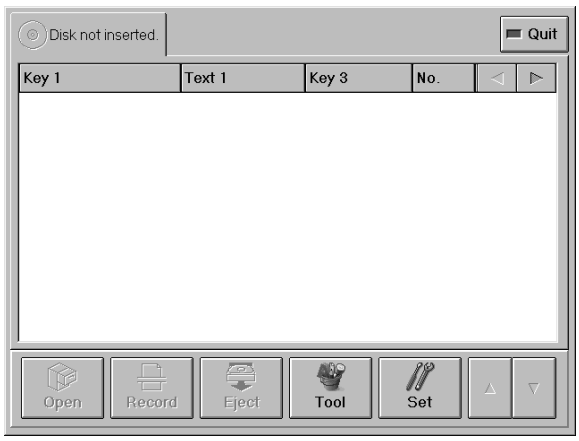
For details, refer to the user manual.

1. Basic Operation

1) Press the power switch.
2) The software automatically starts up and the [Startup screen] is displayed, followed by the [Main screen]. (It takes about 1 minute and 30 seconds for the [Main screen] to be displayed.)
3) Carry out all necessary operations in accordance with the instructions on the touch panel display and description in the user manual.
4) Quit operations in the [Main screen].
5) The software automatically shuts down, and the power is turned OFF.

Note 1: Carry out operations on the touch panel with your fingertips. Using a hard, sharptipped object will damage the touch panel. If you find it hard to touch the touch panel with your fingertips, you may use a commercially available touch panel pen.

Note 2: If the CD-R disc is inserted, pull out the CD-R disc before the machine is turned OFF. Before the CD-R disc is removed, the data is written on the CD-R disc.



[Main screen]

Figure 1-501

If the CD-R disc is subjected to vibration or shock during writing, the data on the CD-R disc may be destroyed. If there is any dust and scratch on the writing side (label side) of the CD-R disc, data might be destroyed. Once data is destroyed it cannot be recovered. Make absolutely sure that the user is aware of this.

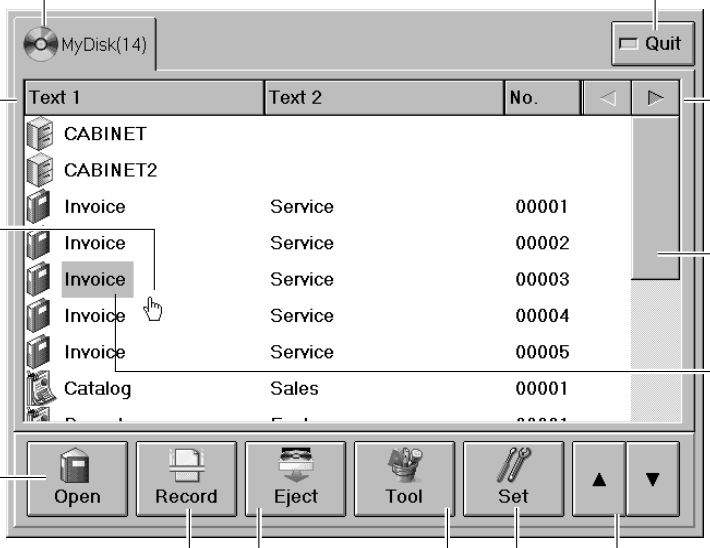
2. Main Screen

The following describes the operation buttons in the [Main screen] after a CD-R disc is inserted.

Field button
This displays the field name set up by "Field Setup". Cabinets, folders and document icons and the preset keyword are listed underneath this button.

Tab
This displays the name of the currently inserted disc, and the name of the currently open cabinet, folder and document. If there are two or more tabs, Press the desired tab to redisplay that screen.

Quit button
Press this button to quit the software.



◄ ► buttons
These buttons move the field button and fields to the left and right.

Pointer
This is displayed where you press on the touch panel. (Not displayed in the default settings.)

Scroll bar
This bar scrolls the field up and down.

Highlighted display
The location pressed by the finger is selected and highlighted.

Open button
Press this button to open cabinets and folders, and displays images in documents.

[Main Screen]

▲ ▼ buttons
Press these buttons to select the cabinet, folder and document.

Record button
Touch this button to record images.

Eject button
Press this button to eject the disc.

Set button
This button is used to change the basic setup and set up the field.

Tool button
Press this button to create cabinets and folders, change cabinet or folder names, delete cabinets and folders, change document names, and copy discs, and access a network, send e-mail.

Figure 1-502

3. Operation Screen

The following describes the main operation screen.

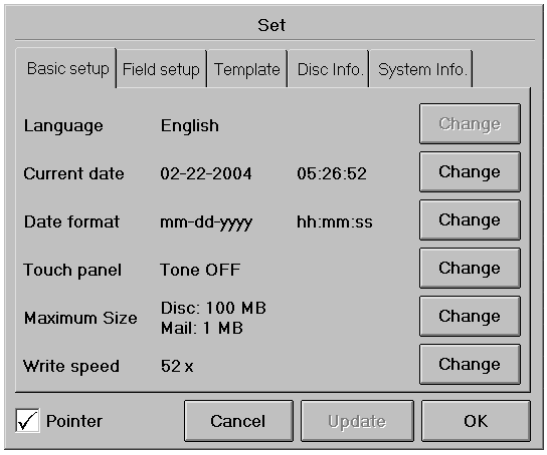


Figure 1-503

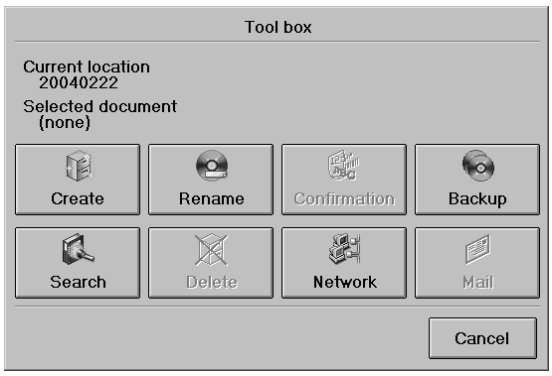


Figure 1-504

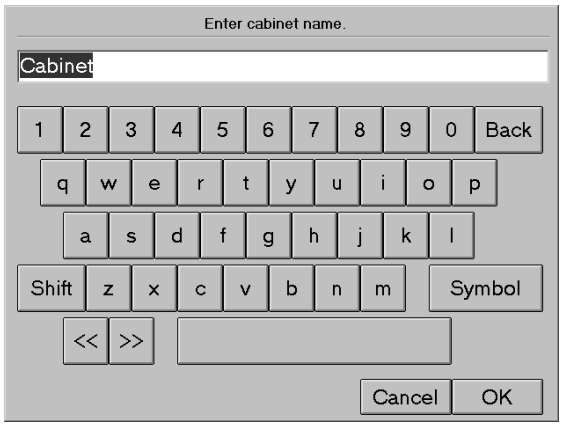


Figure 1-505

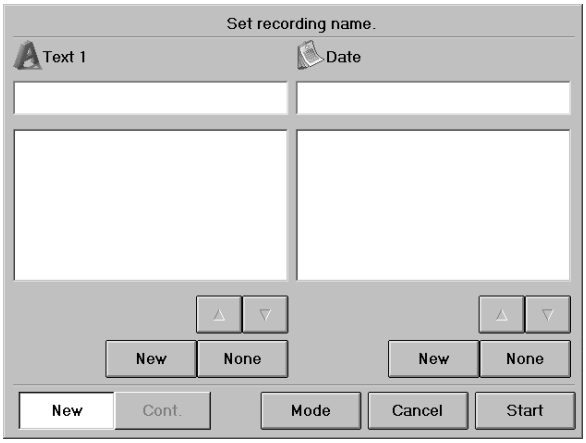


Figure 1-506

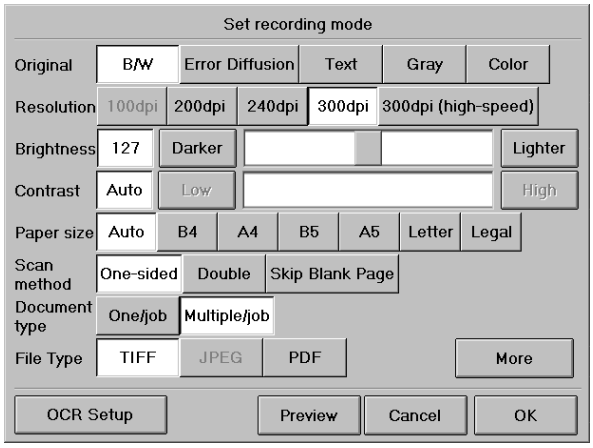


Figure 1-507

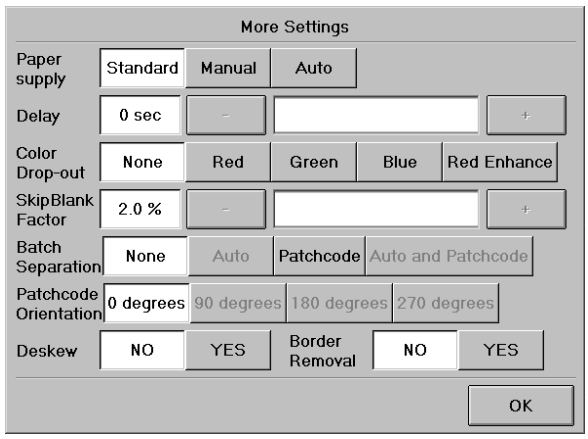


Figure 1-508

4. Jam Clearing

1) If there are any documents on the delivery tray, remove them.
2) Close the delivery tray guide.

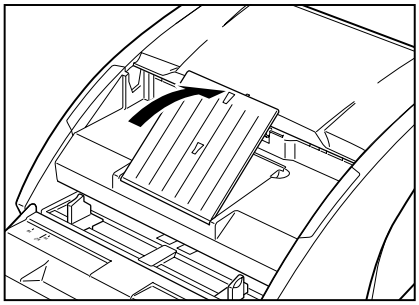


Figure 1-509

3) Lift the upper feeder slowly.

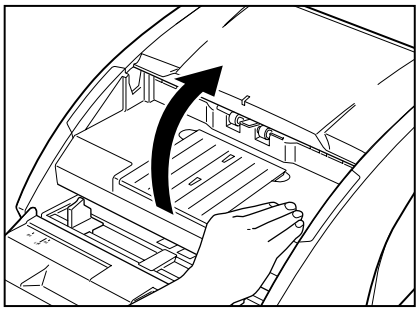
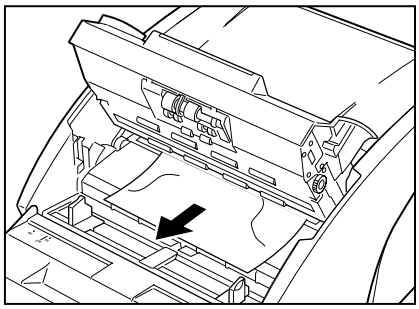


Figure 1-510

4) Remove the jammed paper.



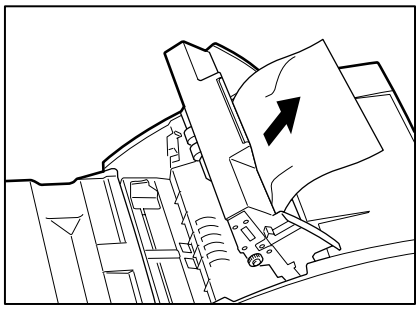


Figure 1-511

5) Push down the upper feeder slowly to its original position. Verify that it clicks and has returned to its original location.

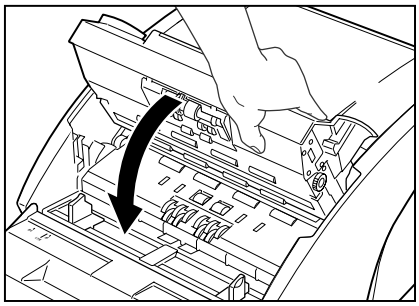


Figure 1-512

Note: When this procedure is finished, check whether the last page was recorded.

CHAPTER 2

FUNCTIONS & OPERATION

I. OUTLINE

1. Basic Configuration

The basic configuration of this machine is as follows.

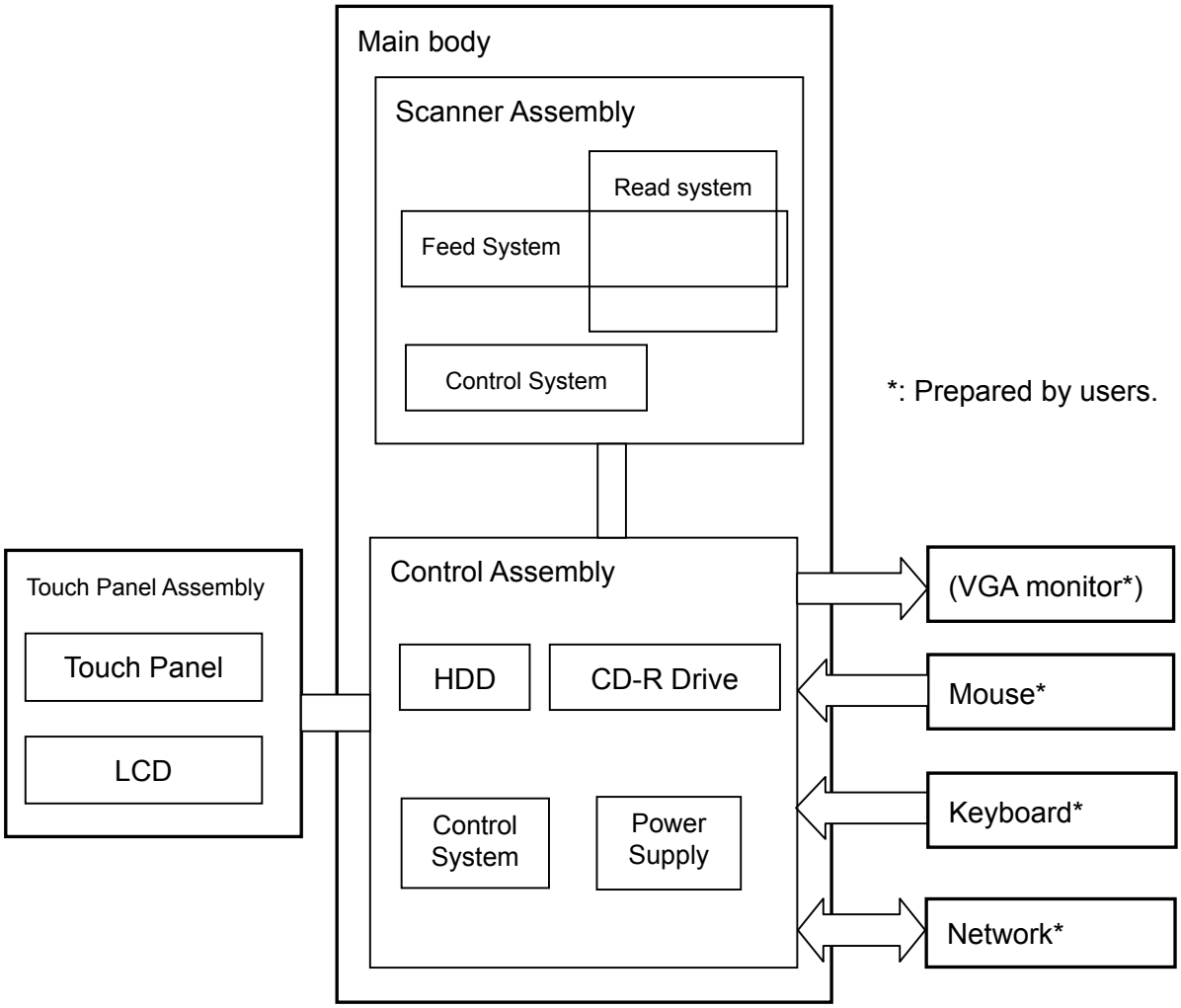


Figure 2-101

1) Scanner assembly
The scanner assembly consists of a feed system for feeding documents from the pick-up through to the delivery, a read system for reading the image data, and a control system for controlling these systems. This scanner assembly is almost the same as the DR-3080C.

2) Control assembly
The control assembly consists of a HDD in which software is installed, CD-R drive for writing image data, and a control system for controlling these components.
This control system also controls scanner assembly and touch panel assembly.

3) Touch panel assembly
The touch panel assembly consists of a color LCD for display and a touch panel for operation. It is connected to the control assembly by a cable.

4) Power supplies
AC power is input to the power supply for the control assembly, in which the power is converted to 24 DVC and is supplied to each assembly.

5) External equipment
The control assembly has external I/F connectors to which a user's keyboard, a mouse, and a network are connected. A VGA monitor can also be connected. It has a UPS connector as well.

Note: Use a keyboard with a PS/2 connector for Windows XP. For use of other external equipment, refer to the user manual.

2. Motor Drive

The scanner assembly of this machine has a main motor (M1) and a document board motor (M2). “M1” is used to feed the document, and “M2” is used to raise and lower the document board.

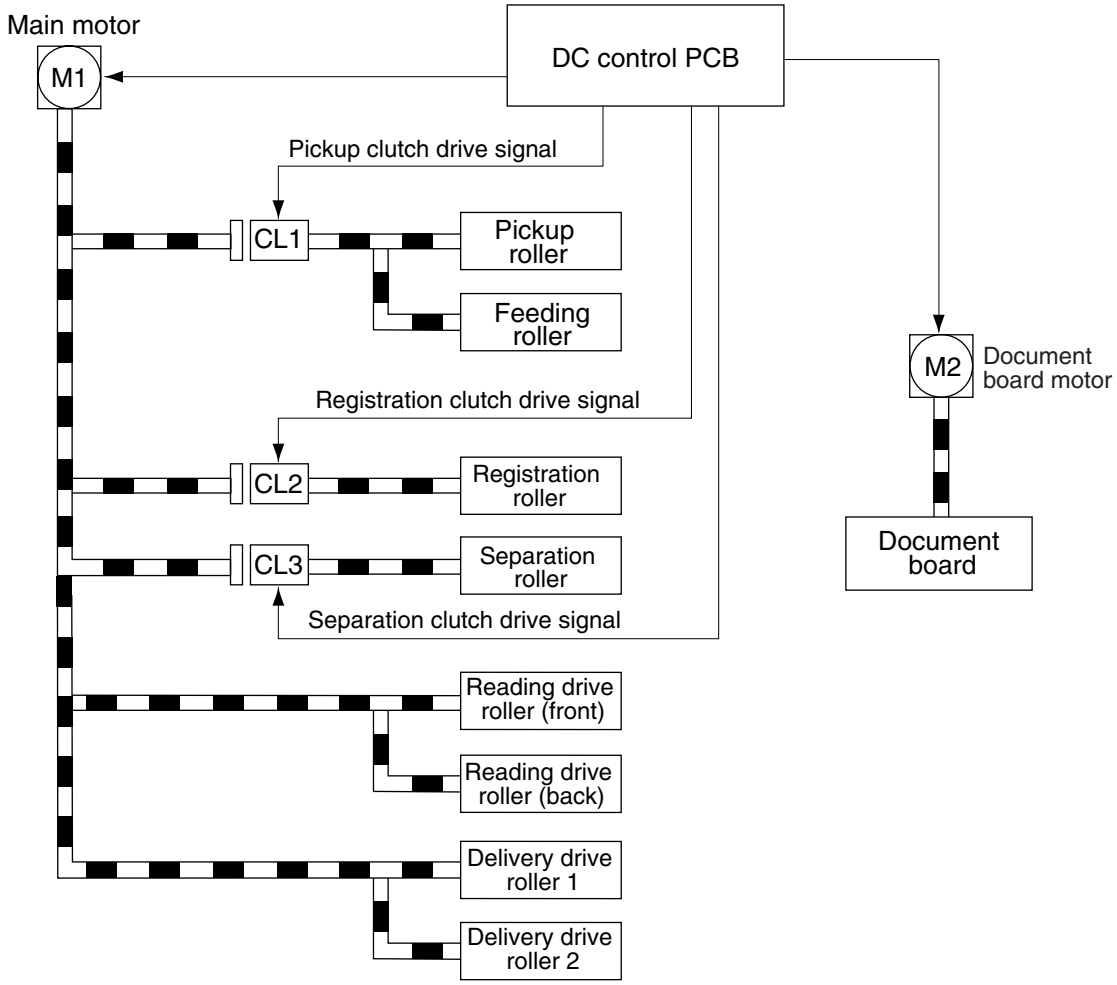


Figure 2-102

3. ELECTRICAL CIRCUITS

Figure 2-103 shows a block diagram of the entire electrical circuits and figure 2-104 shows a block diagram of the scanner assembly.

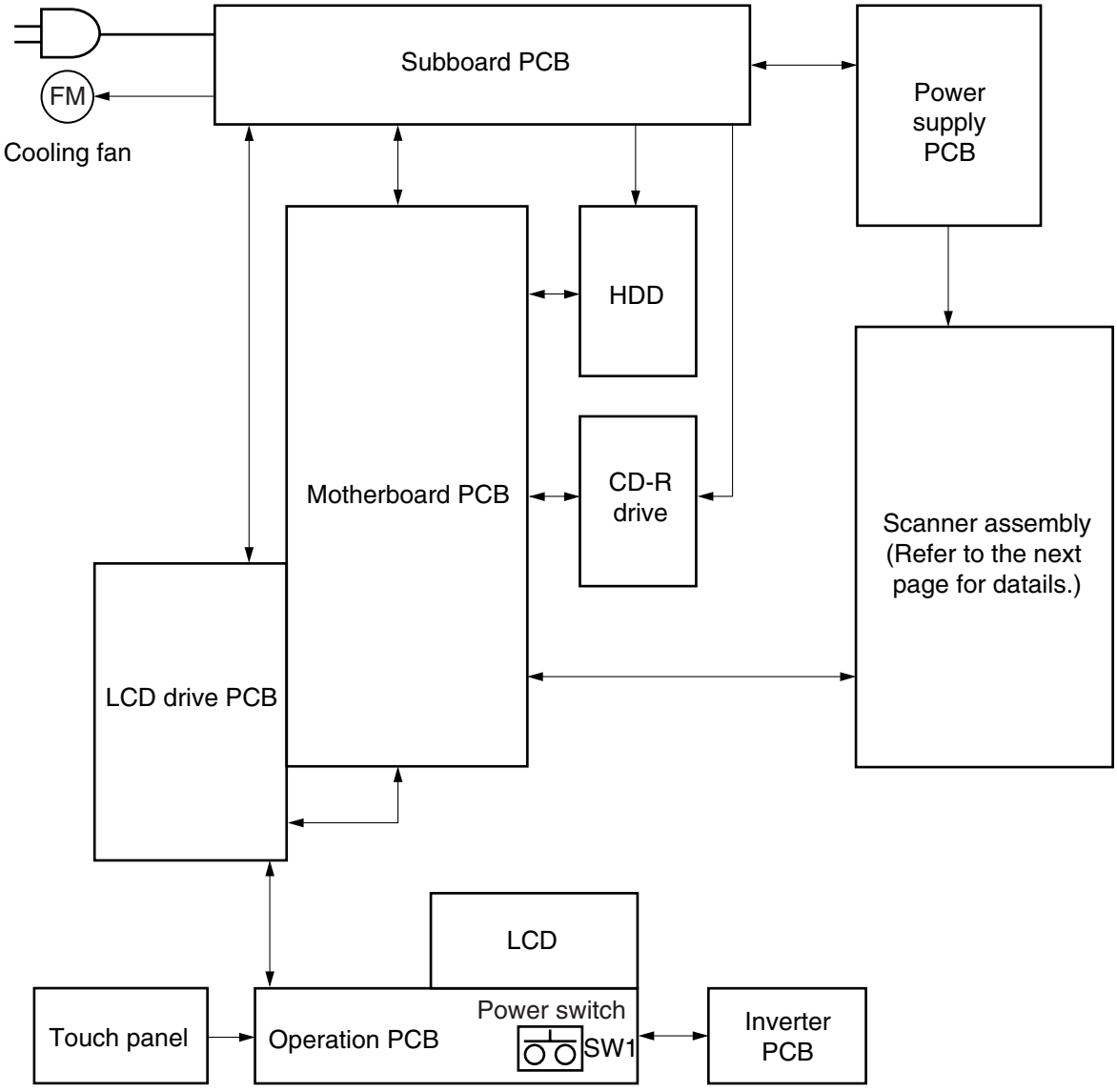


Figure 2-103

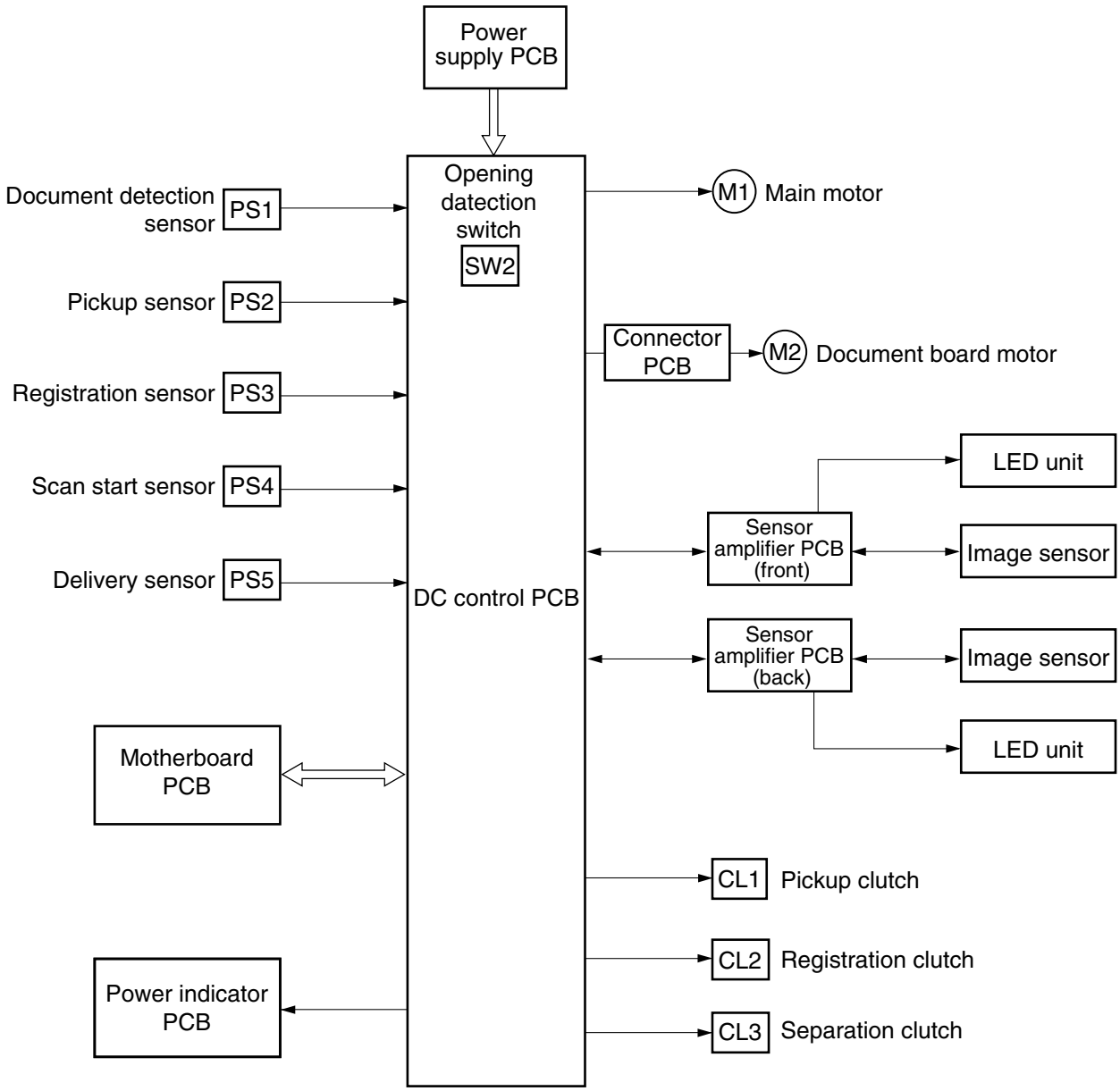


Figure 2-104

II. READ SYSTEM

1. Outline

Figure 2-201 shows the configuration of the image read system.

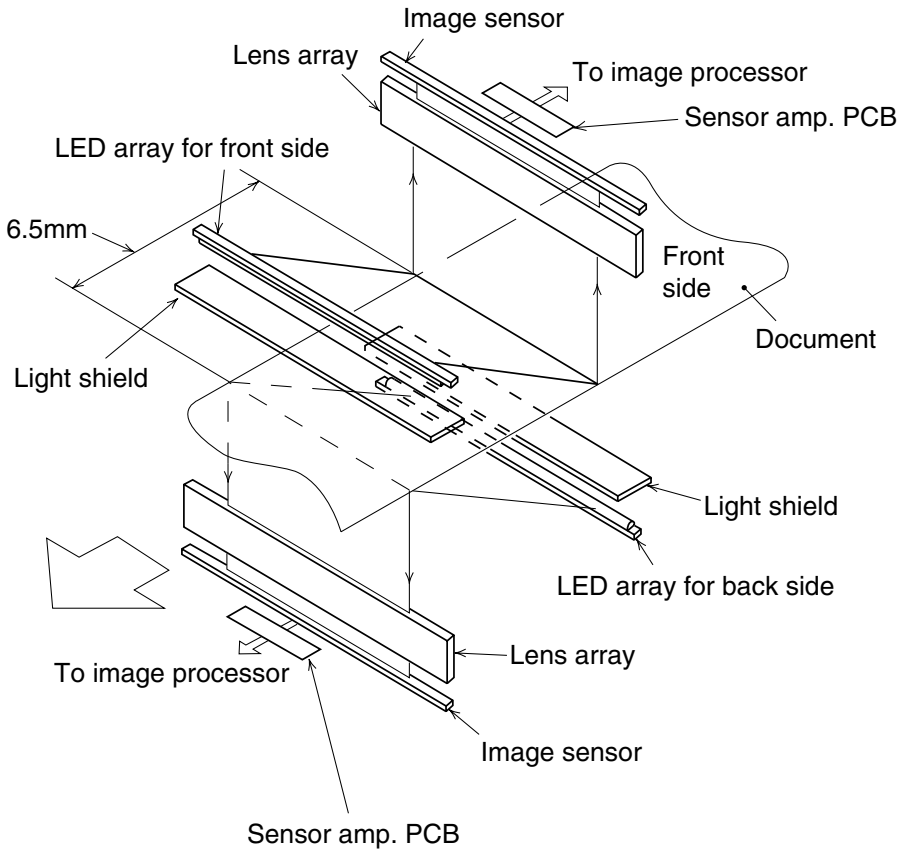


Figure 2-201

The front and back of the document are illuminated at the read system by upper and lower LED arrays while being fed at a speed dependant on the output mode and resolution.

The light reflected from the document converges, via the lens arrays, on the image sensor to form an image of equal size.

The front and back sides of the document are read at points that are offset by 6.5 mm to prevent the image on the back side of the document from being read through to the front side.

Light reflected from the document is photo-electrically converted by the image sensors, and the resulting signals undergo various processing by the image processor.

While the image is being read, light in the vertical direction from the LED array is shielded by a light shield. By this means, the background of the document is made "black."

2. Image Sensor

In this machine, a CMOS CIS (Contact Image Sensor) is used as a photosensitive element device.

On a single PCB assembly, there are 3,042 photosensitive elements lined up every 84.7 μm in a row and 13 chips which respectively contain a circuit to provide the scanning function. In this manual, this entire PCB assembly is called the image sensor.

Figure 202 is the equivalent circuit of one photosensitive element (single pixel).

The function of one photosensitive element is explained as follows.

First, by turning on the TRES terminal signal, the potential of the buffer 1 (BUF1) gate is made the same as the bias potential, and by turning off the TRES terminal signal, the voltage converted from light by the photo-diode (PD) is accumulated in buffer 1.

Next, by turning on the TM terminal signal, the accumulated voltage is stored in the capacitor memory (CM), read out by buffer 2 (BUF2), and voltage EOUT corresponding to the density is obtained.

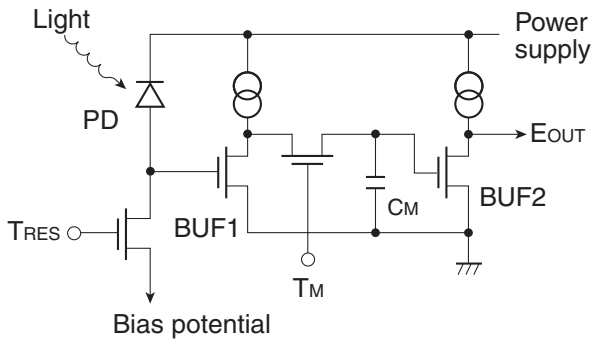


Figure 2-202

3. LED Array

The front LED array consists of a 3-color (RGB) LED making it capable of scanning color documents. The three color LEDs are arranged as shown in Figure 2-203

The back LED array is yellow-green LEDs.

In the color mode, its composition is read by illuminating the RGB LEDs in succession and detecting the respective reflected RGB light with the image sensor. The reading position slides very little, because the document is fed at a constant speed.

In the binary and gray scale modes, composition is read with the light generated by illuminating the RGB LEDs simultaneously.

Figure 2-203

4. Lens Array

The lens has a fiber type configuration as shown in Figure 2-204. The characteristic of this lens is that only a short focal distance is required.

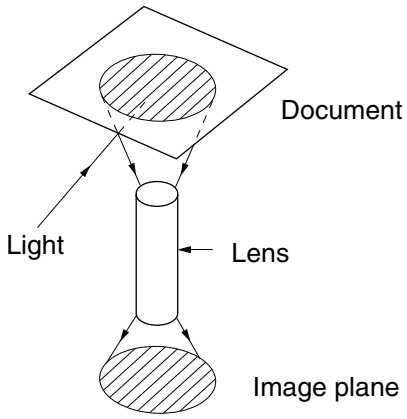


Figure 2-204

Light rays entering the lens are repeatedly reflected inside the lens as shown in Figure 2-205. The interval between these light ray reflections is proportionate to the wave length of the incident light.

For instance, when the lens is shorter than the ratio of the light wave length as in (A) of Figure 2-205, the emerging light rays are focused. When it is longer as in (B), the emerging light rays are diffused. When the lens matches the ratio of the wave lengths as in (C), the emerging light rays are parallel rays and the image of the document is focused at its original size on the image plane.

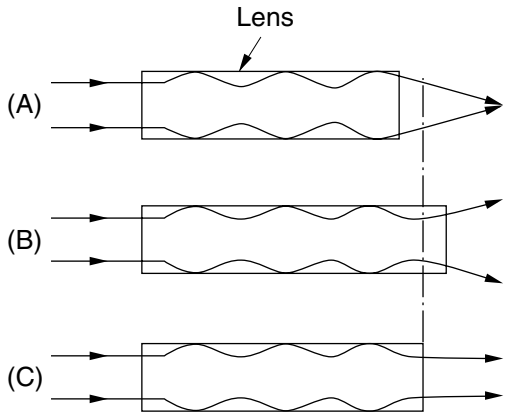


Figure 2-205

The short focus lenses that do not produce RGB color aberrations are used only on the front side for color documents. Also, in order to increase the amount of light entering the lenses, the short focus lenses are arranged in two rows. (See Figure 2-206.)

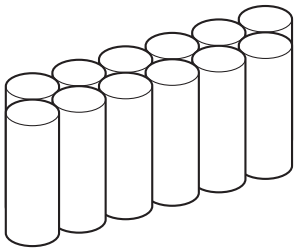


Figure 2-206

5. Sensor Amplifier PCB

The sensor amplifier PCB is installed for the output from the image sensor to reduce impedance and suppress influence of noise.

When the image sensor reads an image, a voltage proportionate to the density of the image and a standard voltage are output from the image sensor. The sensor amplifier circuit amplifies and outputs the difference between the voltage proportionate to the image density and the standard voltage. (See Figure 2-207.)

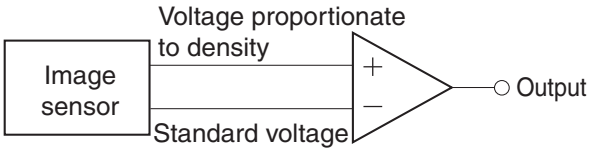


Figure 2-207

6. Image Data

1) Binary image data

Image data that expresses an image in two values, black and white, is called binary image data.

As binary image data has just two tones, black and white, per pixel, it cannot output gray and other half tones. (See Figure 2-208.)

There are three types of processes, simple binarizing, error diffusion and text enhanced mode. Simple binarizing divides tones into two at the specified level, error diffusion compensates the reproducibility of the tones, and advanced text enhancement mode automatically adjusts the density.

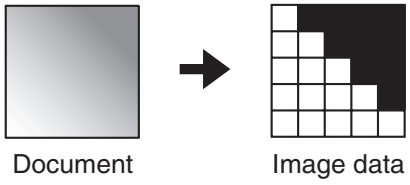


Figure 2-208

Note: "Advanced text enhancement" is abbreviated as "text" in some cases in this machine.

2) Gray scale image data
This machine can output 8-bit gray scale image data.
Image data which can express not only black and white but gray and other half tones is called gray scale image data.
The greater the number of tones becomes, the more the number of bits per pixel. (See Figure 2-209.)

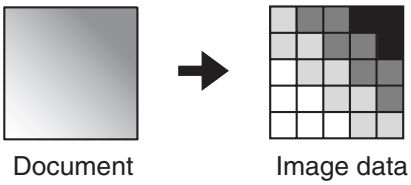


Figure 2-209

3) Color image data
The CD-4070NW can output image data as a total of 24 bits, with eight bits used for each of the three basic colors red, green and blue.
It expresses color by the mixed ratios of the three basic colors of light, red (R), green (G), and blue (B). (See Figure 2-210.)
Each pixel contains RGB data and, as in gray scale image data, each data has its own tone.

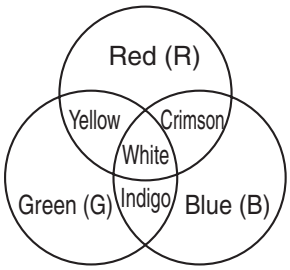


Figure 2-210

Note: This machine is equipped with a temperature adjustment function to prevent LEDs brightness changes in color images caused by heat. When the temperature is low the color reproduction becomes brighter and when the temperature is high the color becomes darker. To compensate for this, this machine has the thermostat elements on the DC control PCB and a function to change the brightness of the LED according to the temperature.

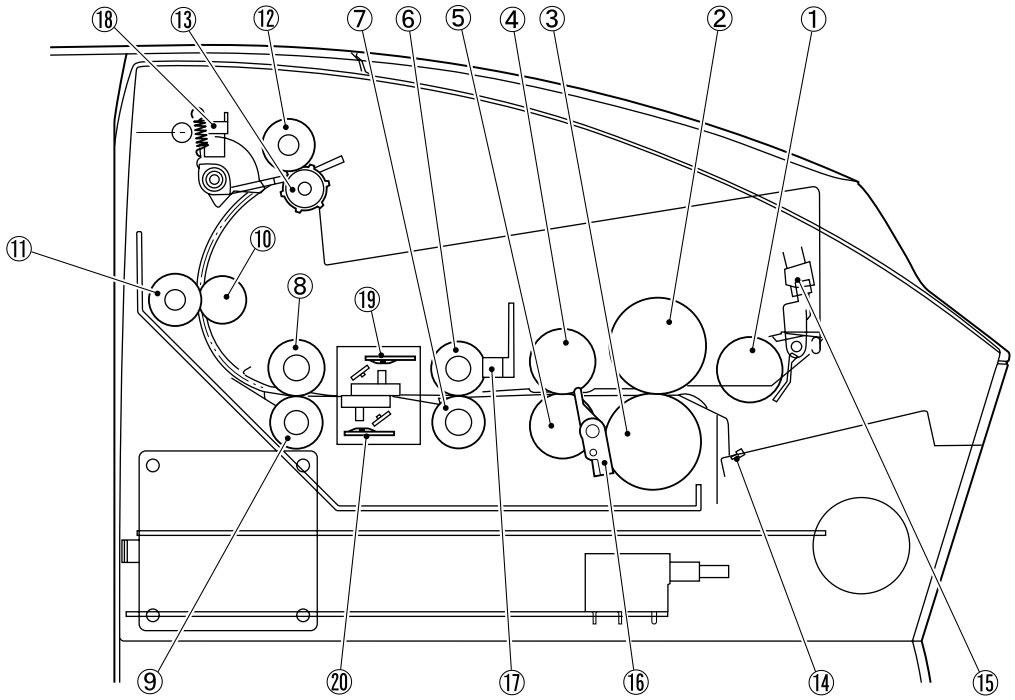
III. DOCUMENT FEED SYSTEM

1. Outline

The document pickup assembly of this machine consists of the following assemblies.

1) Document board drive assembly
   During automatic pickup, this assembly automatically pushes up the document board, and when pickup is finished, returns it to its original position.
2) Manual pickup switchover assembly
   This assembly is designed to switch over from automatic pickup to manual pickup.
   This assembly also stops the drive of the separation roller to cancel the separation function.
3) Automatic adjust/separation assembly
   This assembly automatically changes the space between the feeding roller and separation roller in accordance with the thickness of the document, and separates/feeds the document one page at a time without jamming or double feeding.

A cross section of the document feed system is shown in Figure 2-301.



① Pickup roller
② Feeding roller
③ Separation roller
④ Registration drive roller
⑤ Registration follower roller
⑥ Reading follower roller (front)
⑦ Reading drive roller (front)
⑧ Reading follower roller (back)
⑨ Reading drive roller (back)
⑩ Delivery follower roller 1
⑪ Delivery drive roller 1
⑫ Delivery drive roller 2
⑬ Delivery follower roller 2
⑭ Document detection sensor
⑮ Pickup sensor
⑯ Registration sensor
⑰ Scan start sensor
⑱ Delivery sensor
⑲ Upper reading unit
⑳ Lower reading unit

Figure 2-301

Figure 2-302 shows a timing chart for a double side, two A4 sheets scanned at 300 × 300 dpi without a pause.

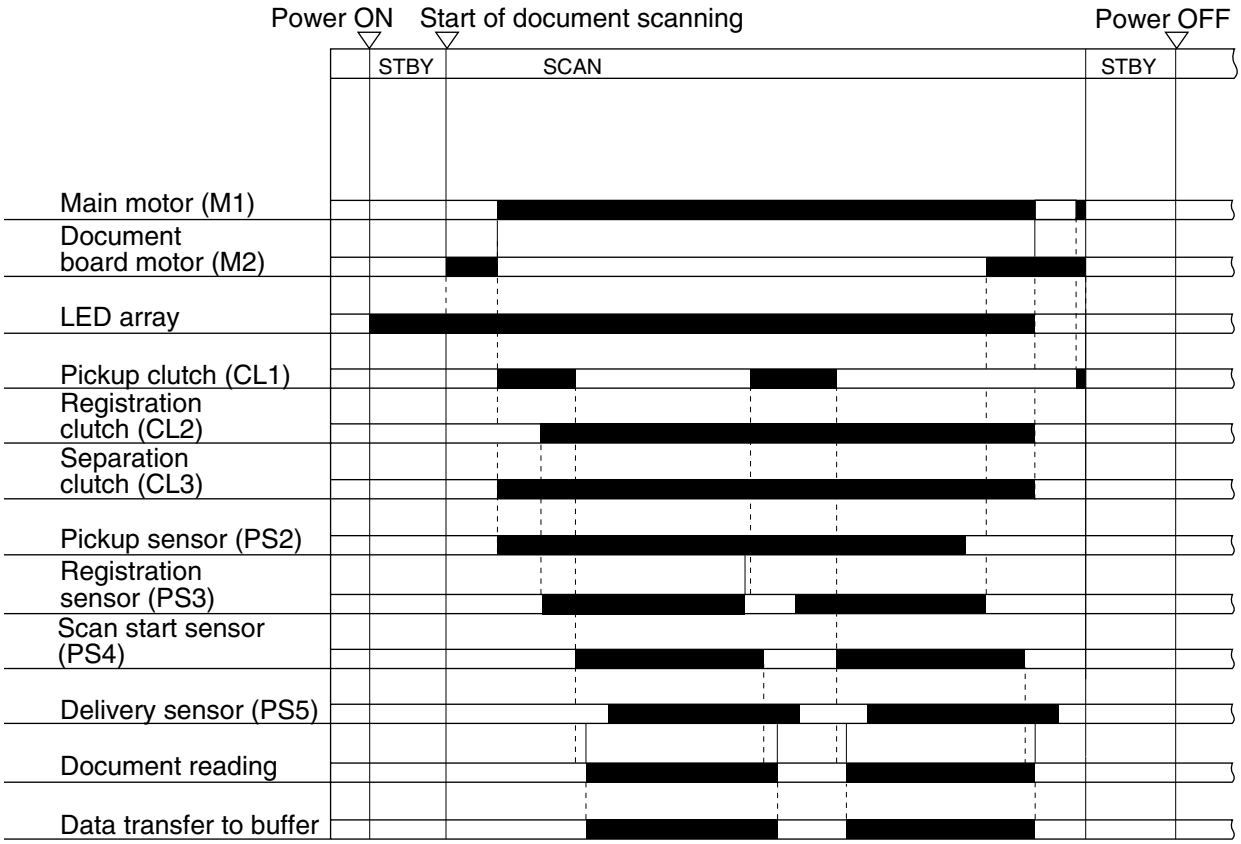


Figure 2-302

Duration		Purpose
SCAN	Time during which the document is being fed or image data is being read	• To pick up the document • To illuminate the document by the LED arrays and project its reflected light onto the CIS
STBY	Time during which commands can be accepted	To prepare for acceptance of document scanning

Table 2-301

2. Automatic Adjust/Separation Assembly

Figure 2-303 shows an outline of the document pickup assembly.

The pickup assembly consists of a pickup roller, feeding roller, registration roller, planetary gear device, torque limitter, and other components.

Figure 2-304 shows an outline of the planetary gear device.

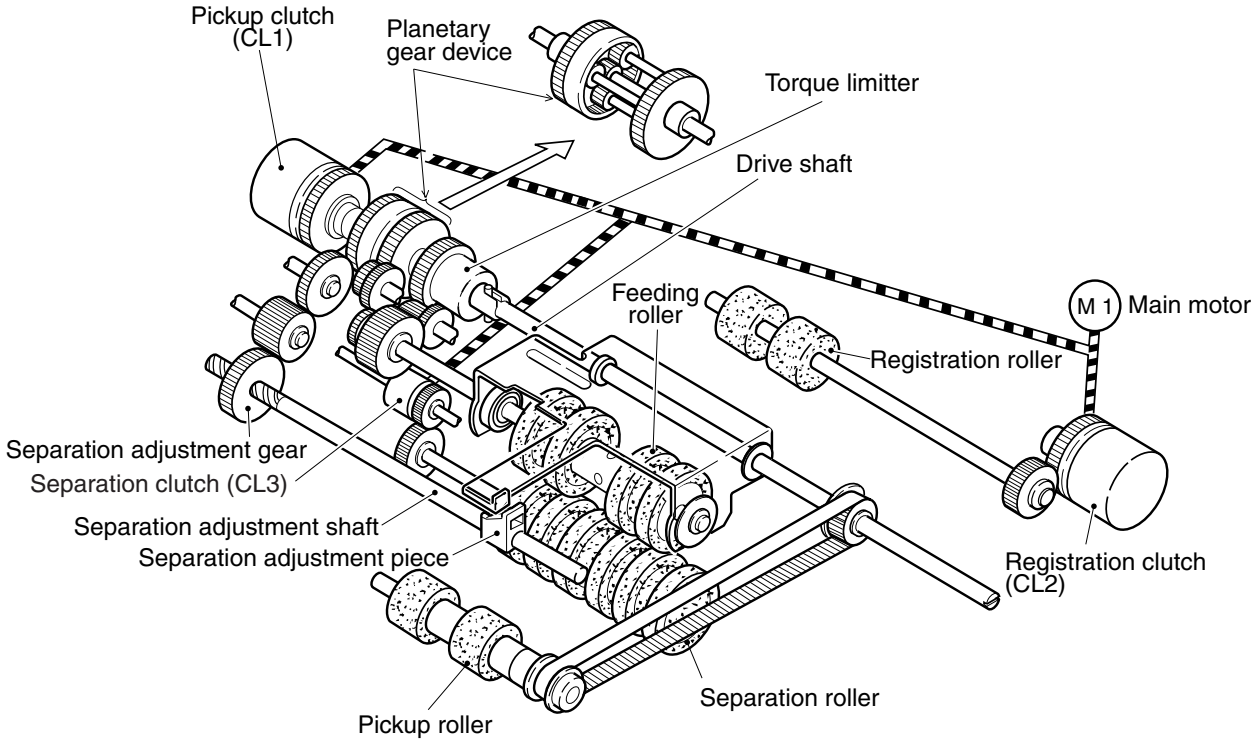


Figure 2-303

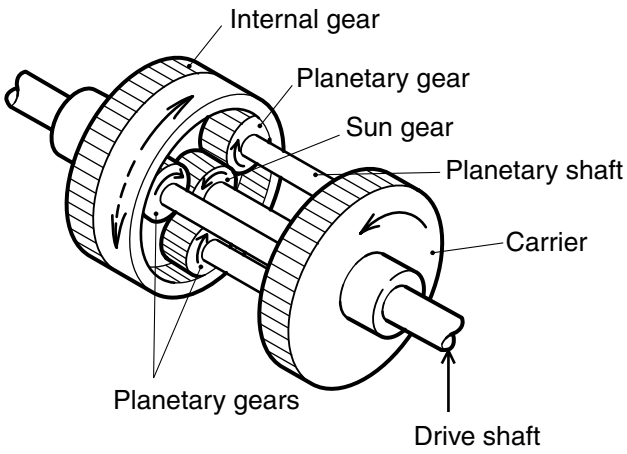


Figure 2-304

- Document pickup

  Figures 2-305 and 2-306 illustrate an outline of document feeding.

1) When pickup is started, first the pickup clutch (CL1) turns ON. ①
2) When pickup is started, a load does not act on the feeding roller as the document is not fed to the feeding roller section. For this reason, the drive power from the main motor is transmitted to the feeding roller to turn the roller. ②→③→④
3) The drive power transmitted to the feeding roller is then transferred to the carrier to turn the planetary gears of the planetary gear device. ④→⑤→⑥→⑦
4) On the other hand, rotation of the sun gear of the planetary gear device is transmitted to the planetary gears to turn the internal gear. ⓐ→ⓑ
5) However, as a load is not acting on the feeding roller, the inner gear rotates in the counterclockwise direction as the rotation speed from the feeding roller to the carrier transmitted to the inner gear of the planetary gear device is faster than that from the planetary gears. ⑦
6) Rotation of the planetary gear device is transmitted to the separation adjustment gear to move the separation adjustment shaft to the right. ⑧→⑨→⑩→⑪
7) Movement of the separation adjustment piece to the right causes the feeding roller to fall to the lowermost limit. ⑫
8) When the feeding roller falls to the lowermost limit, the space between the feeding roller and the separation roller is at its minimum.

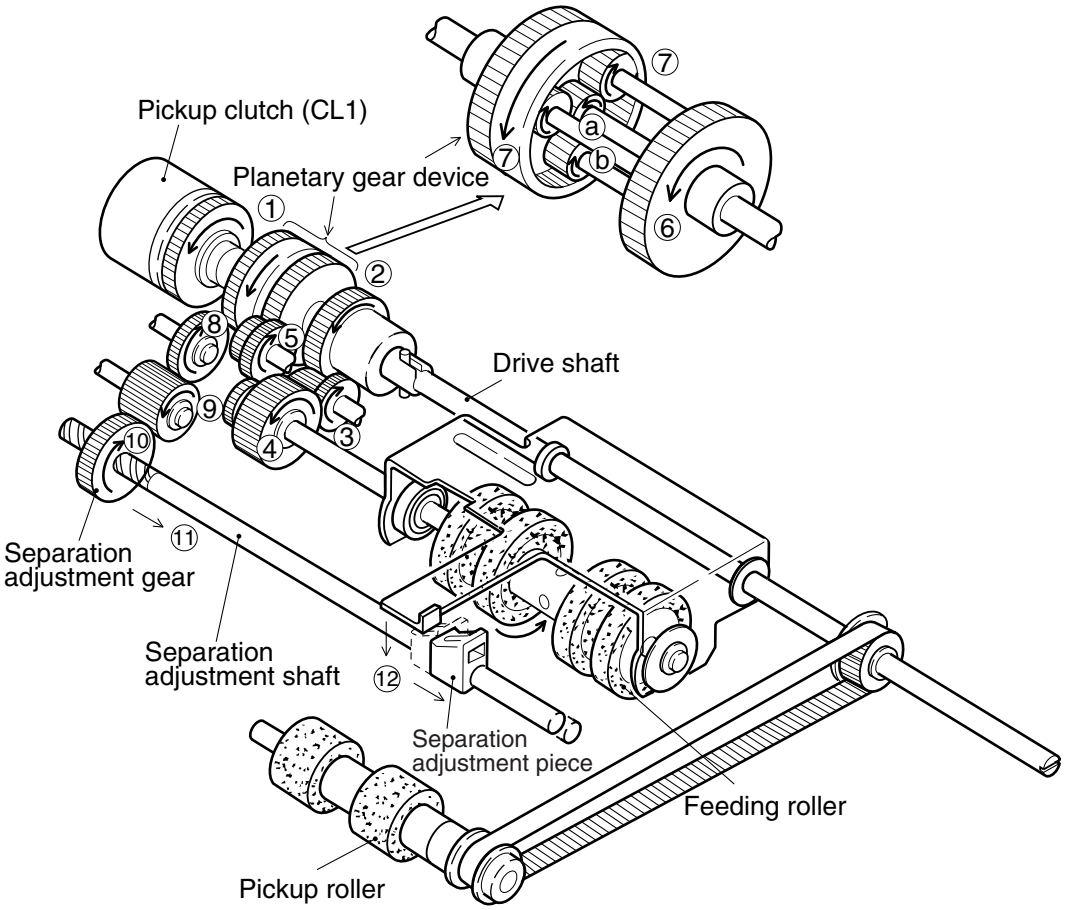


Figure 2-305

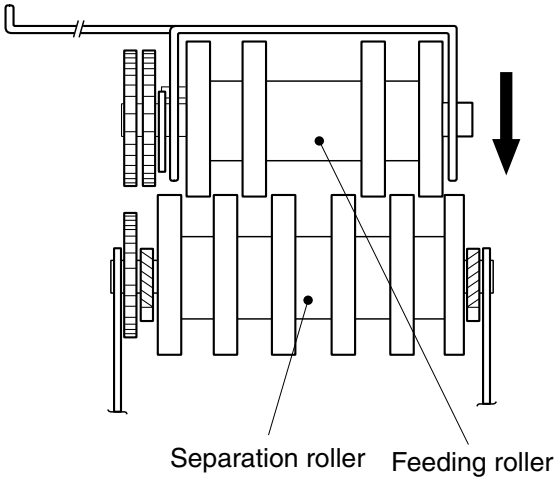
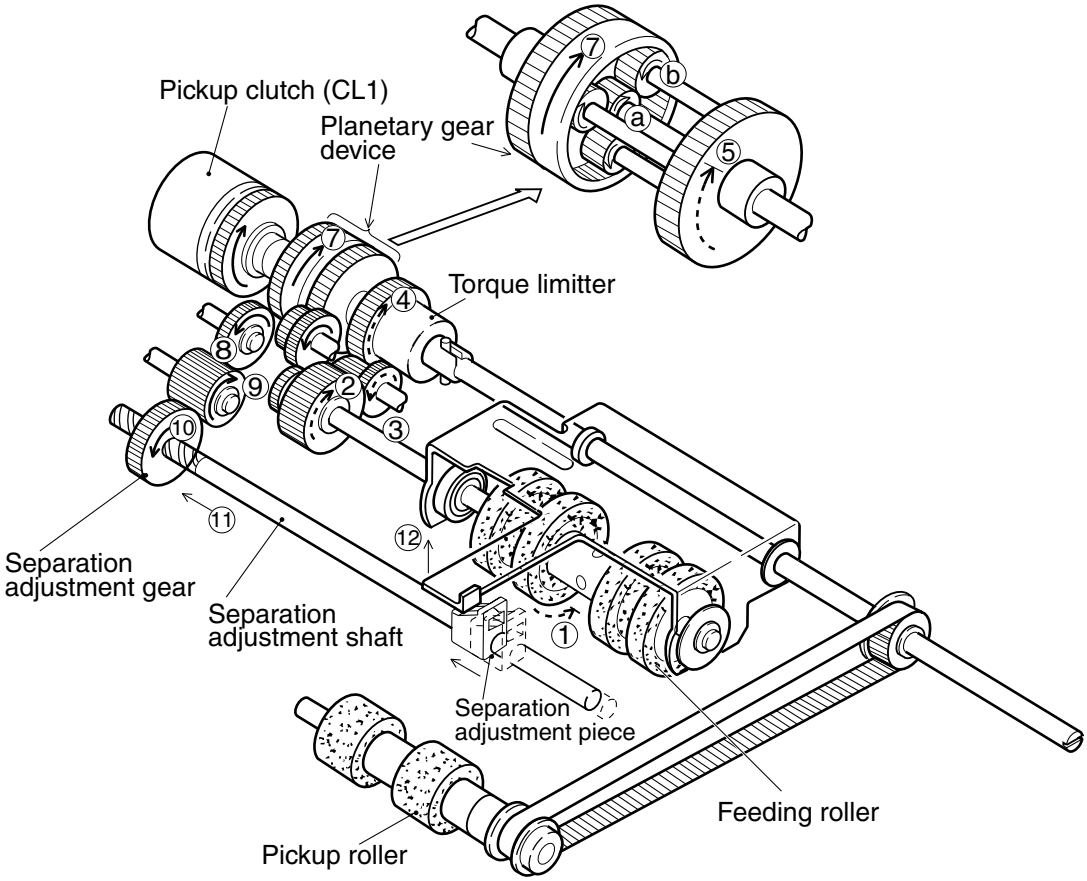


Figure 2-306

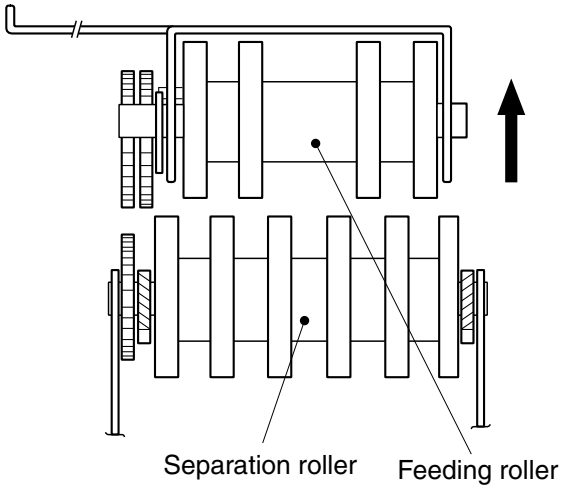
- Document feed

  Figures 2-307 and 2-308 illustrate an outline of document pickup.

1) When the document is fed to the feeding roller section by rotation of the pickup roller, it is not fed any further as the space between the feeding roller and the separation roller is at its minimum.
2) Although the feeding roller is rotating, there is a load on the feeding roller because of the thrust of the document. ①
3) The feeding roller stops when its load becomes greater than the value set by the torque limitter. ②→③→④
4) The rotation drive to the carrier of the planetary gear device stops because rotation of the feeding roller stops. ⑤
5) For this reason, the drive power to the planetary gears themselves also stops.
6) On the other hand, the planetary gears rotate since the sun gear is always rotating. ⓐ
7) As the drive transmitted to the internal gear of the planetary gear device is transmitted to only the planetary gears from the sun gear, the internal gear begins to rotate in the clockwise direction. ⓐ →ⓑ
8) Reverse rotation is transmitted to the separation adjustment gear, and the separation adjustment shaft moves to the left.
   ⑧→⑨→⑩→⑪
9) Due to this action, the separation adjustment piece now moves to the left, and the feeding roller starts to rise. ⑫
10) The space between the feeding roller and separation roller begins to widen, and the document is fed when the space becomes equal to the thickness of the document.
11) When the thickness of the second and subsequent pages of the document is the same as the first page, the rotation of the internal gear of the planetary gear device is stopped as the load on the feeding roller is uniform.
12) For this reason, the separation adjustment shaft does not rotate, the separation adjustment piece also stops, and the document is fed at all times.



Figures 2-307



Figures 2-308

- Pickup action due to change in document thickness

1) When the document becomes thinner:
   ① The load on the feeding roller becomes smaller, and rotation of the feeding roller becomes faster.
   ② The rotation of the carrier of the planetary gear device becomes faster, and the internal gear rotates in the counterclockwise direction.
   ③ The separation adjustment gear rotates in reverse, the separation adjustment shaft moves to the right, the separation adjustment piece moves to the right, and the feeding roller begins to fall.
2) When the document becomes thicker:
   Action is reverse to that when the document becomes thinner.

3. Detection of Faulty Document Feed

This machine has the following sensors installed in it to detect whether or not a document has been fed properly.

No.	Name of Sensor	Name of Signal
PS2	Pickup sensor	$\overline{PC4}$
PS3	Registration sensor	$\overline{PC5}$
PS4	Scan start sensor	$\overline{PC6}$
PS5	Delivery sensor	$\overline{PC7}$

Table 2-302

1) Pickup assembly delay jam
   When the document, after passing the pickup sensor (PS2), does not reach the registration sensor (PS3) within the specified time
2) Feed section delay jam
   When the document, after passing the registration sensor (PS3), does not reach the scan start sensor (PS4) within the specified time
3) Feed section residual jam 1
   When the document, after passing the scan start sensor (PS4), does not pass the registration sensor (PS3) within the specified time
4) Feed section residual jam 2
   When the document, after passing the scan start sensor (PS4), does not pass the scan start sensor (PS4) within the specified time
5) Delivery assembly delay jam
   When the document, after passing the scan start sensor (PS4), does not reach the delivery sensor (PS5) within the specified time

6) Delivery assembly residual jam
When the document, after passing the scan start sensor (PS4), does not pass the delivery sensor (PS5) within the specified time

IV. CONTROL SYSTEM

1. DC Control PCB

Control of the scanner assembly is performed by the DC control PCB.

Figure 2-401 shows the block diagram of the DC control PCB, and Table 2-401 lists the main IC functions.

Refer to the next section for the image processing.

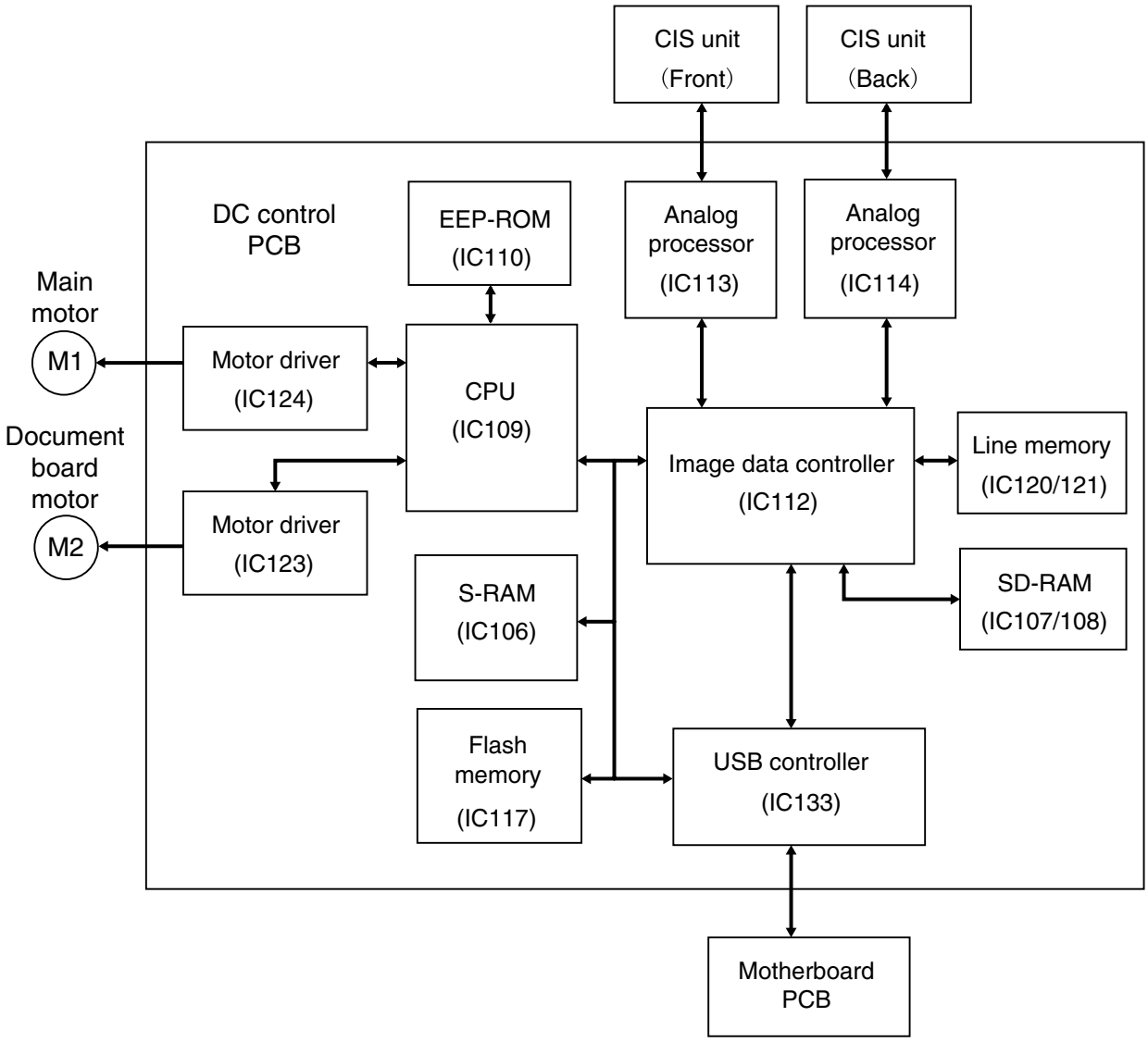


Figure 2-401

IC No.	Name	Function
IC106	S-RAM	CPU work memory (32 Kbytes)
IC107	SD-RAM	Image data memory (16 Mbytes)
IC108	SD-RAM	Image data memory (16 Mbytes)
IC109	CPU	General scanner control
IC110	EEP-ROM	Log record parameter memory (2 Kbytes)
IC112	Image data controller	Image data read control, image processing
IC113	Analog processor	Image data amplification, A/D conversion (front)
IC114	Analog processor	Image data amplification, A/D conversion (rear)
IC117	Flash memory	Firm and various parameter memory (512 Kbytes)
IC120	Line memory	Image processing memory (binary/grayscale edge emphasis)
IC121	Line memory	Image processing memory (binary/grayscale edge emphasis)
IC123	Motor driver	Document board motor control
IC124	Motor driver	Main motor control
IC133	USB controller	USB interface control

Table 2-401

2. Control Assembly

Figure 2-402 shows the block diagram of the control system of the control assembly.

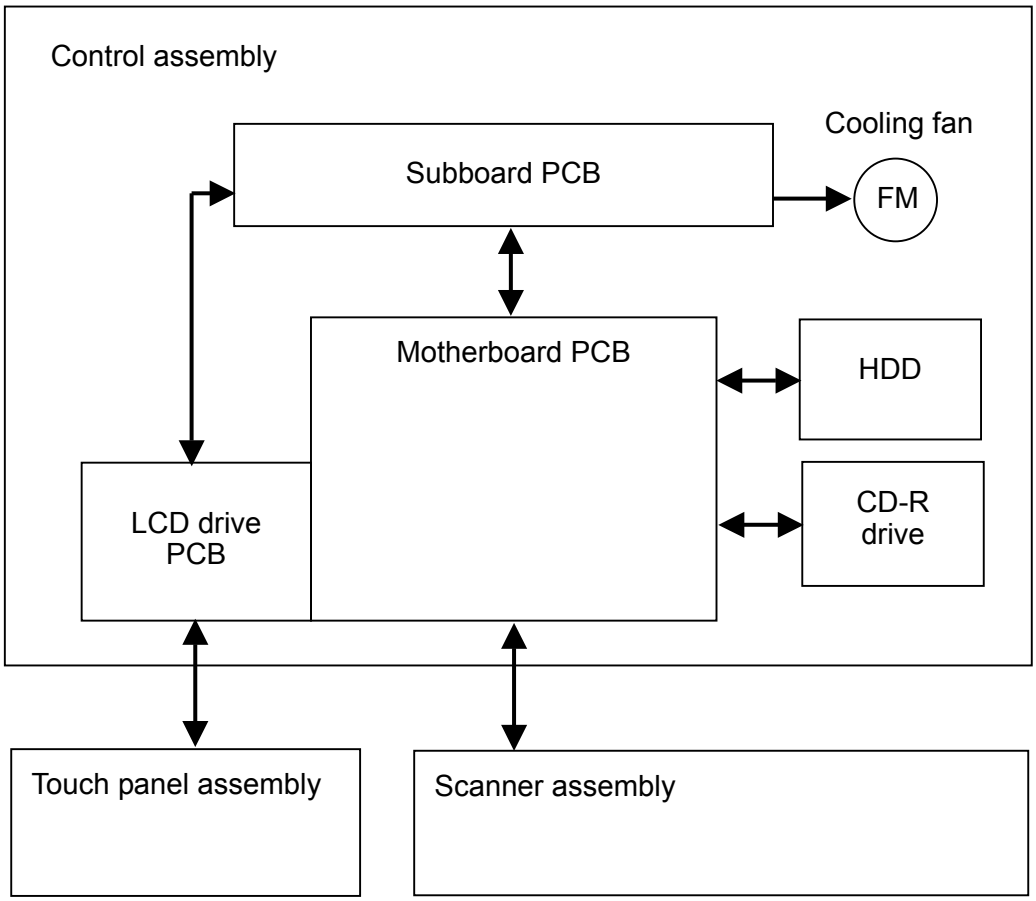


Figure 2-402

Table 2-402 shows the PCB functions.

PCB	Function
Motherboard	• General control of the machine (See the following section for the internal block diagram and so on.)
Subboard	• Power-on sequence control • Cooling fan rotation monitor
LCD drive	• LCD signal conversion and relay • Relay of signals with each PCB

Table 2-402

3. Motherboard PCB

The control assembly is controlled by the motherboard PCB.

The motherboard PCB is a board computer for computers, which is designed and manufactured by an external manufacturer. Software, such as the operating system, is stored on the HDD where image data is recorded.

Figure 2-403 shows the block diagram of the motherboard PCB and Table 2-403 lists its main functions.

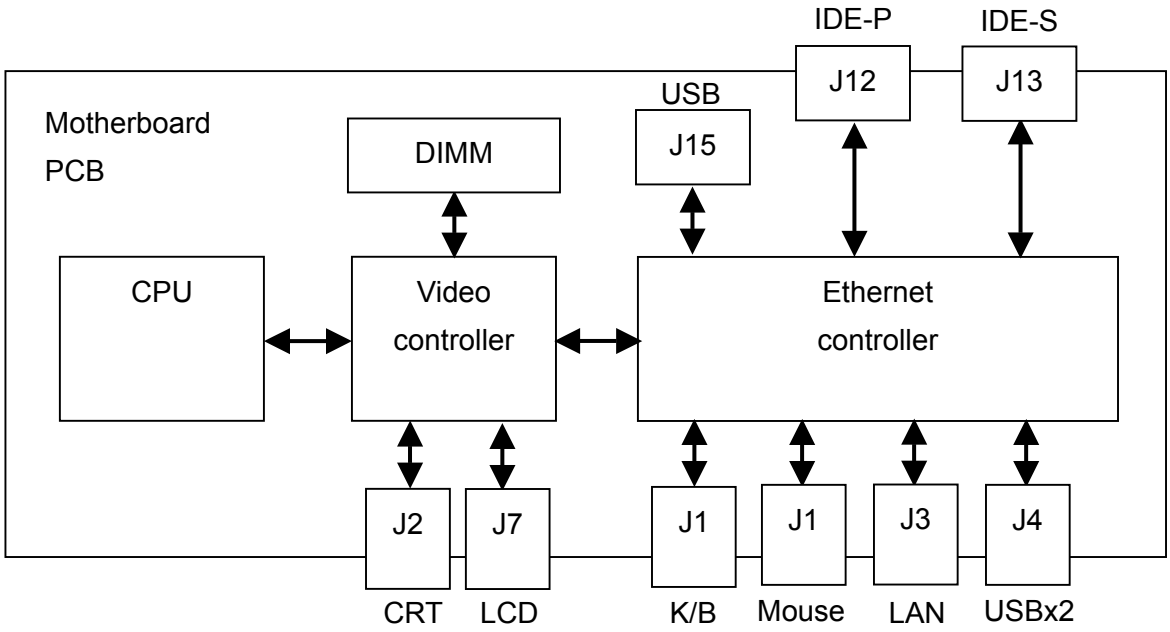


Figure 2-403

Name	Function
CPU	EDEN ESP6000 600 MHz is used.
Video controller	Analog RGB, digital RGB Dual view, dual monitor
Ethernet controller	IEEE802.3/802.3U 100BASE-TX/10BASE-T
DIMM	256 Mbyte DIMM
Interface connector	J1: Keyboard, J1: Mouse, J2: CRT, J3: LAN, J4: USBx2, J7: LCD, J12: IDE-PRIMARY, J13: IDE-SECONDARY, J15: USB (SCANNER)

Table 2-403

V. IMAGE PROCESSING

1. Image Data Flow

Figure 2-204 shows the basic flow of image data of the machine.

The image data read by the image sensor on the scanner assembly is processed by the DC control PCB, and the resulting data is passed through the USB controller and sent to the motherboard PCB of the control assembly. The image processed by the motherboard PCB is recorded on the HDD. The image data is displayed on the LCD of the touch panel assembly through the LCD drive PCB.

The image data recorded on the HDD is written onto the CD-R disc before it is ejected.

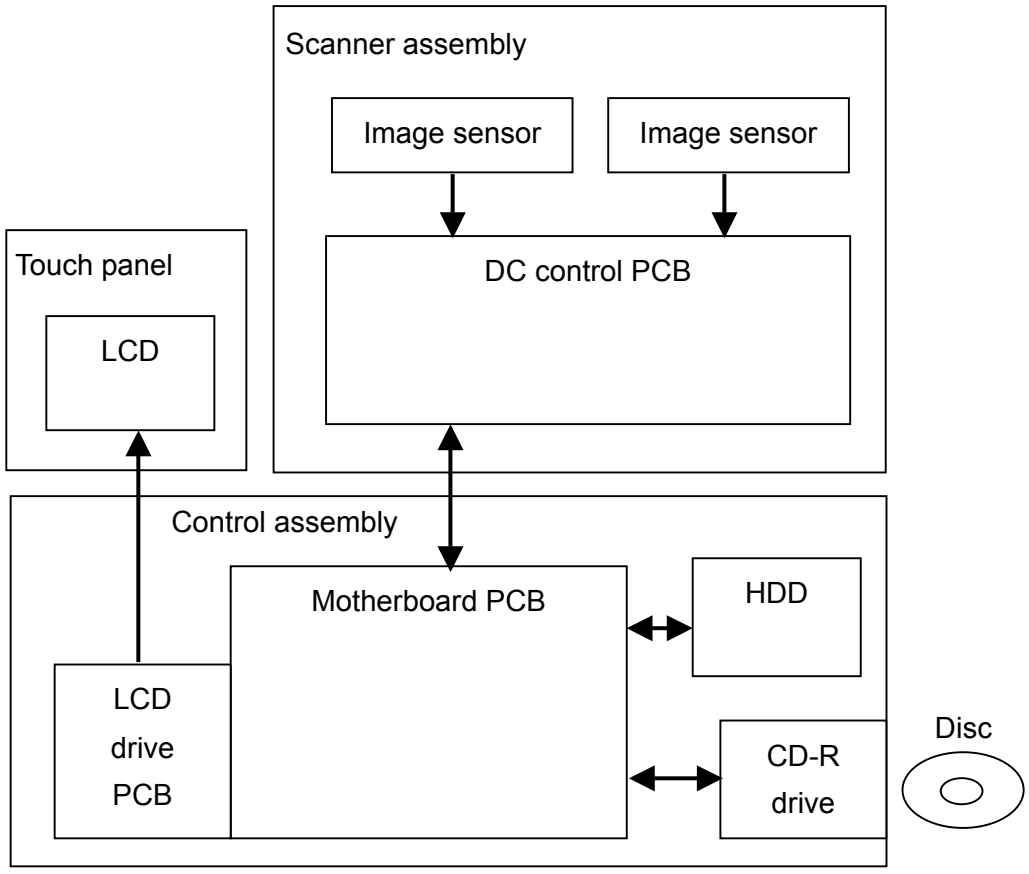


Figure 2-501

2. Scanner Assembly

1) Outline

Figure 2-405 shows a block diagram of image processing of the scanner assembly.

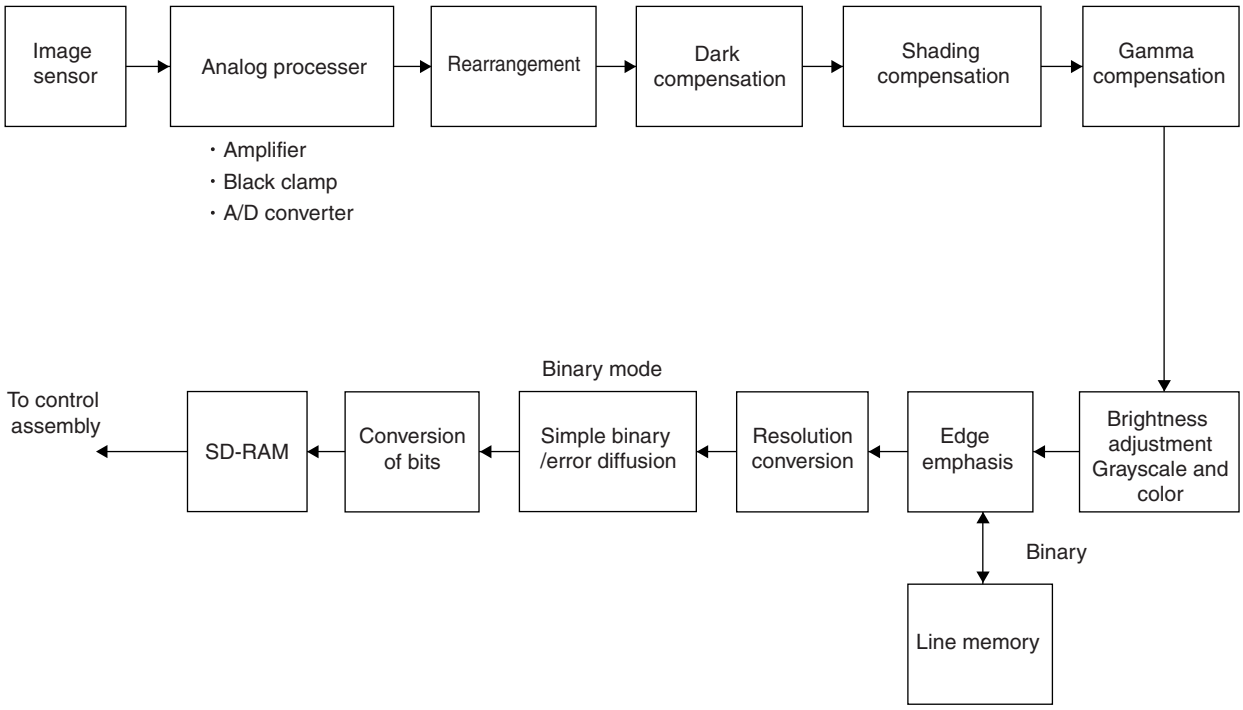


Figure 2-502

Analog signals proportional to the density of each 10 bit set of pixels, read by the image sensor, are sent one after another to the analog processor on the DC control PCB. The signals are amplified, black-clamped and converted from analog to digital by the analog processor. The image data is sent to the image data controller and is rearranged. The data undergoes various processing in order, dark compensation, shading compensation, and gamma compensation.

If the signals are in the gray scale and color mode, they undergo brightness adjustment. If the signals are in the binary mode, they undergo brightness adjustment during binarization.

The signals are then sent to the edge emphasis section. If the signals are in the binary and gray scale mode, they first go through the line memory before processing in the edge emphasis section. Color mode signals go through the edge emphasis section without being processed. Color mode signals are transferred to the control assembly for edge emphasis processing. After processing in the edge emphasis section, the signals undergo resolution conversion.

In the binary mode, the data after resolution conversion is binarized at the simple binary processor or error diffusion processor.
However, if text is selected, the data is processed by the control assembly.
After that, 10-bit image data is converted to 8-bit image data by the image data conversion assembly and sent to SDRAM.
Image data that has undergone the above processing is stored to SDRAM, and then sent to the USB controller.

On this machine, the controller performs the following processes:

① Advanced text enhancement (when text mode is selected)
② Double output in the sub-scanning direction
[When 300 × 300 (high speed) is selected]
③ Skew correction
④ Blank skip
⑤ Automatic size detection
⑥ Border removal
⑦ Image compression (including JPEG)
⑧ Edge emphasis (when color mode is selected)

2) Black clamp
The light from the LEDs cannot reach some parts of the photosensitive elements of the image sensor. The signals of those parts are called black level signals.
The difference between the voltage proportionate to the image density and the standard voltage is output from the image sensor.
As the true signal is the difference between the voltage proportionate to the image density and the black level signal, if the black level signal differs from the standard voltage, the true signal will not be amplified. (See Figure 2-503.)
Making the black level signal the same as the standard voltage is called black clamp.
This process makes it possible to amplify the true signal.

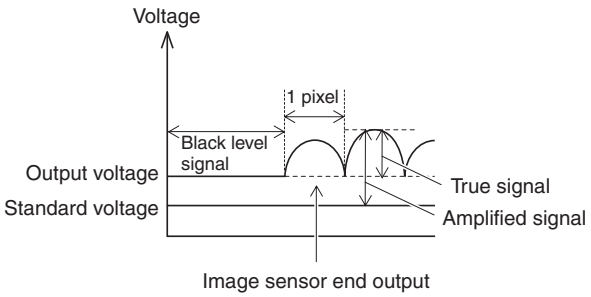


Figure 2-503

3) A/D conversion

The signals sent from the image sensor are analog signals. These signals are converted to digital signals in order to process them into an image.

Figure 2-504 shows the outputs of digital signals after A/D conversion when they are 4-bit signals.

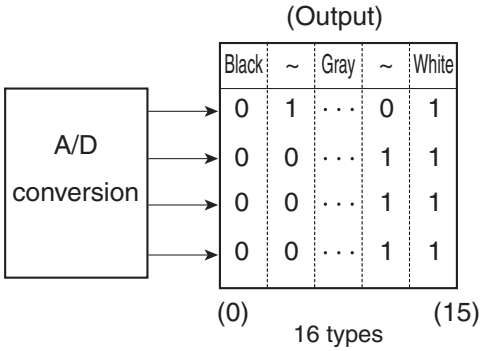


Figure 2-504

If the output is 4 bits, it is possible to output 16 types of values. Consequently, the input analog signal as the image of the document changes progressively through white, gray, and black, is converted to a digital signal of one of the above 16 levels corresponding to the particular values.

This machine outputs 8 bits, and internally processes 10 bits, so 1,024 tonal values can be obtained.

As the number of output bits increases, the resulting digital signal represents the changes in image density of the document more faithfully with good tonal reproduction.

4) Rearrangement

The image sensor used in this machine is divided into two blocks. To speed up reading image data, data in both blocks are output at the same time. Both front and back data are output at the same time. (See Figure 2-505.)

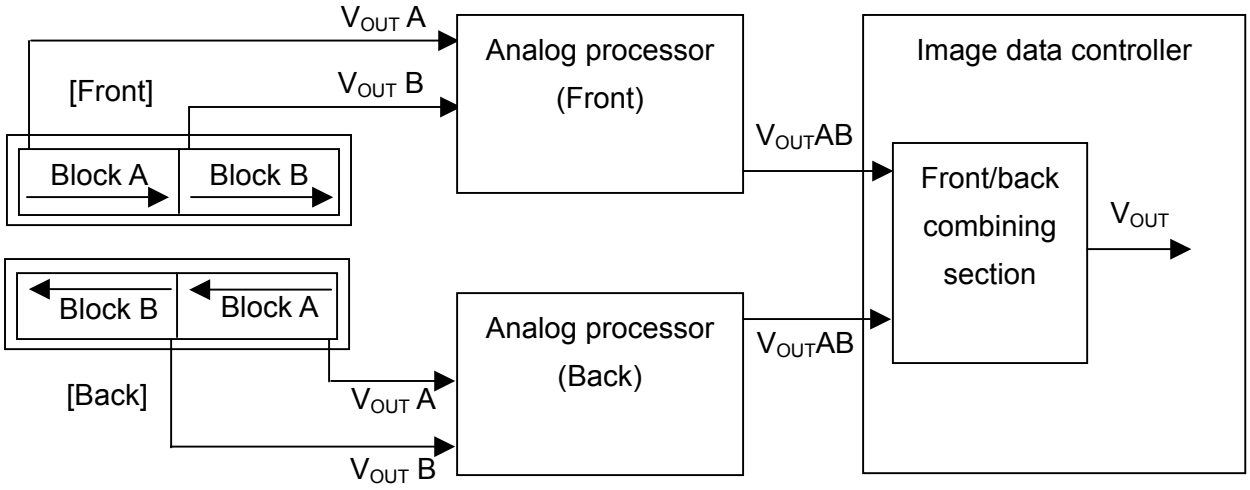
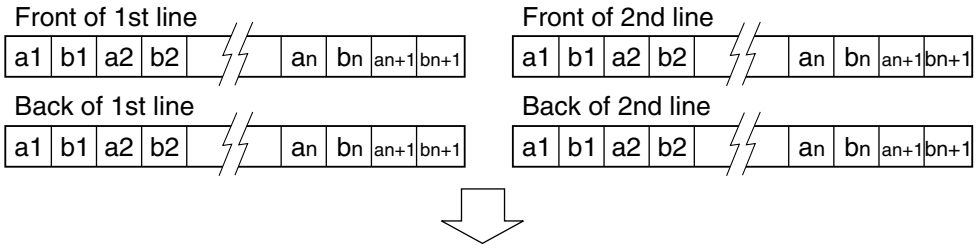


Figure 2-505

To convert pixels to the actual list, the pixels of the image data output from the analog processor are rearranged and the front and back are combined by the front/back combining section in the image data controller. (See Figure 2-506.)

- Front/back combining section input



- Front/back combining section output

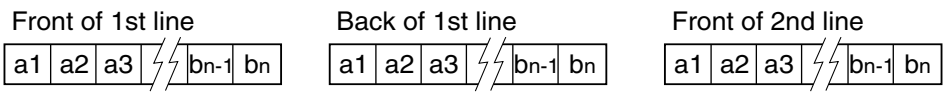


Figure 2-506

5) Dark compensation

The output of each photosensitive element in the image sensor varies when light does not reach the elements. So, the output when reading a black document is not definite, because it becomes the added output with different values depending on each element. To compensate this output is called dark compensation.

Compensation is carried out by storing the output from the image sensor in memory as compensation values on the condition that LEDs are turned off, and then subtracting the compensation values from the output when an image is scanned. (See Figures 2-507 and 2-508.)

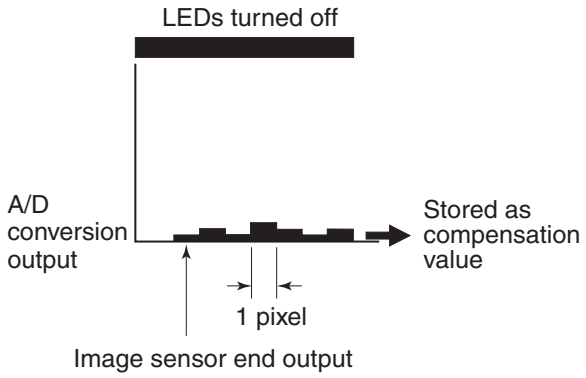


Figure 2-507

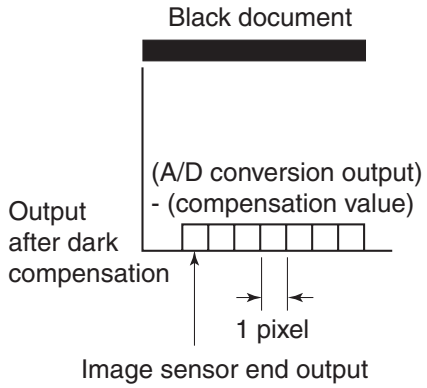


Figure 2-508

Black clamp together with dark compensation is sometimes called black compensation.

6) Shading compensation (white compensation)

The output from the image sensor corresponding to each pixel cannot be a uniform value, even if all the reflected light is detected by the image sensor from a document whose overall density is uniform in the scanning direction. The reasons are as follows:

- The light intensity of each LED is different.
- The light intensity irradiated on the image sensor differs depending on each lens.
- The sensitivity of each photosensitive element in the image sensor is different.

Compensating unevenness in the output from the image sensor because of these factors, is called shading compensation. In other words, when the light reflected from a document with uniform density is detected by the image sensor, as each output from the image sensor is different, compensation is carried out by multiplying each image sensor output (corresponding to each pixel) with a fixed compensation factor so that all the outputs are equal. (See Figures 2-509 and 510.)

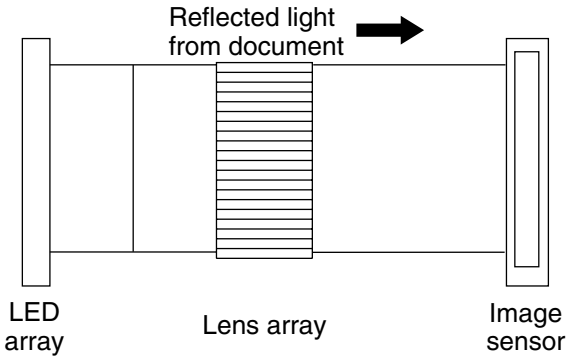


Figure 2-509

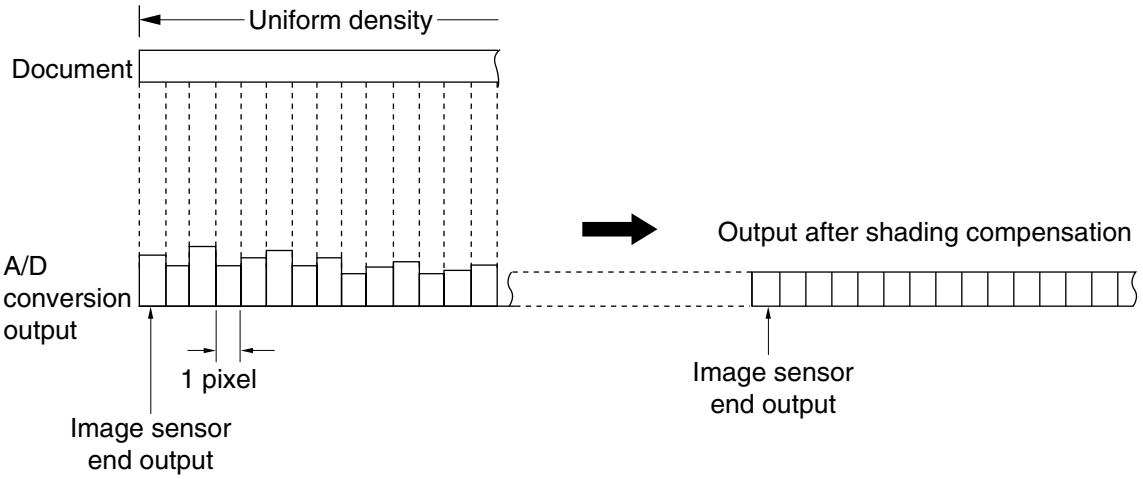


Figure 2-510

Figure 2-511 shows the output of an element (A) of the image sensor when the document density changes from black to white, and the output of the standard value of the image sensor, if the A/D conversion output is assumed to be four bits.

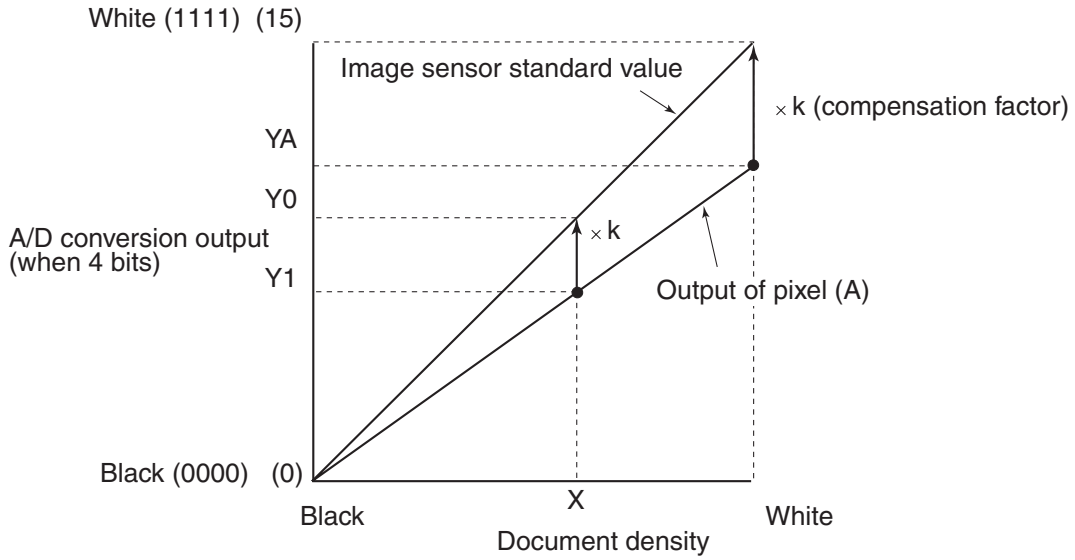


Figure 2-511

At first, a standard white sheet is scanned, and the respective output data of the image sensor is stored in memory.
Then, the compensation factor is calculated by comparison with the standard value of the image sensor so as to make each output data level from the image sensor uniform. The compensation factor is then saved to memory.
When actually scanning a document and its image density is X, the output Y0 after shading compensation is obtained by multiplying the pre-compensation output Y1 with the compensation factor k.

7) Gamma compensation
This is one processing method for improving the reproducibility for documents. Gamma compensation converts each pixel of the image data one at a time according to a preset gamma curve before the image is output.
In the gray scale and color modes on this machine, contrast adjustment is performed according to a 7-setting gamma curve.
Also, in the error diffusion mode, brightness adjustment is also performed according to a 7-setting gamma curve.
Gamma compensation performs compensation on digitized signals.

The following shows typical gamma curves.

a) Gamma curve for weak compensation
This gamma curve is used when contrast adjustment is set to a low setting on this machine in the gray scale and color modes.

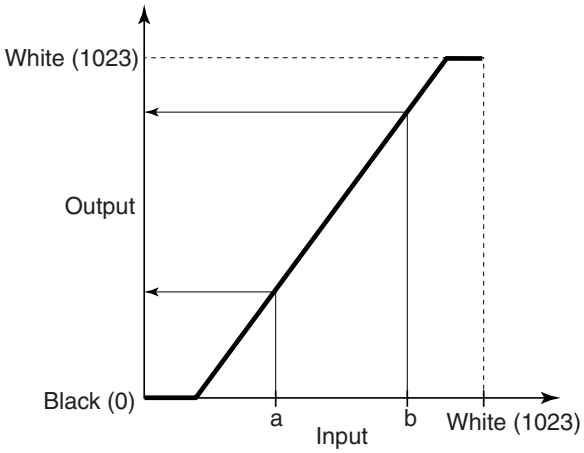


Figure 2-512

b) Gamma curve for strong compensation
This gamma curve is used when contrast adjustment is set to a high setting on this machine in the gray scale and color modes.

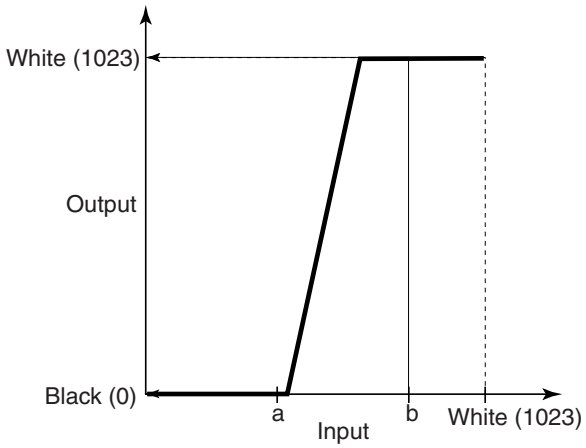


Figure 2-513

c) Gamma curve for weak compensation
This gamma curve is used when brightness adjustment is set to a low setting in the error diffusion mode on this machine.

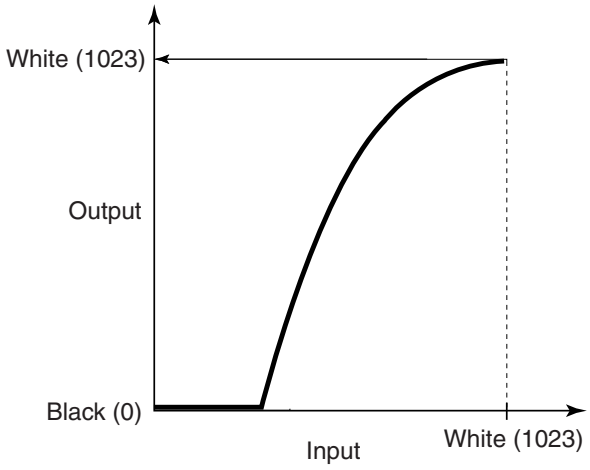


Figure 2-514

d) Gamma curve for strong compensation
This gamma curve is used when brightness adjustment is set to a high setting in the error diffusion mode on this machine.

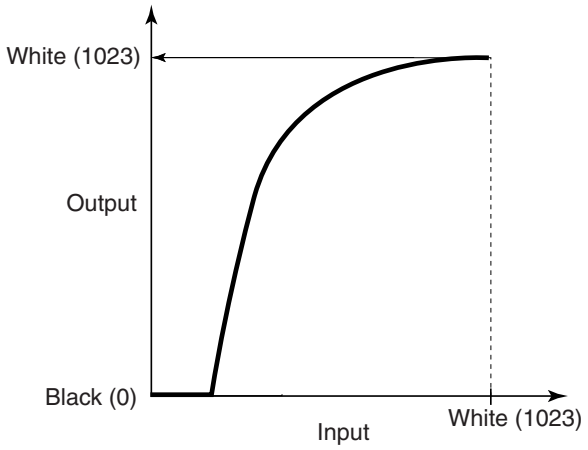


Figure 2-515

8) Brightness adjustment
Brightness adjustment is the process of adjusting the overall brightness of the image.
On this machine, the brightness of the overall image can be lightened or darkened more than the value obtained by the image sensor by adding or subtracting the value within the range -512 to +511 preset to inputs 0 to 1023 (10 bits).
On this machine, the following adder/subtractor is used to adjust the brightness when the gray scale or color mode is selected. The driver setting is 1 to 255 and a value -512 to +511 is determined according to the setting. (See Figure 2-516.)

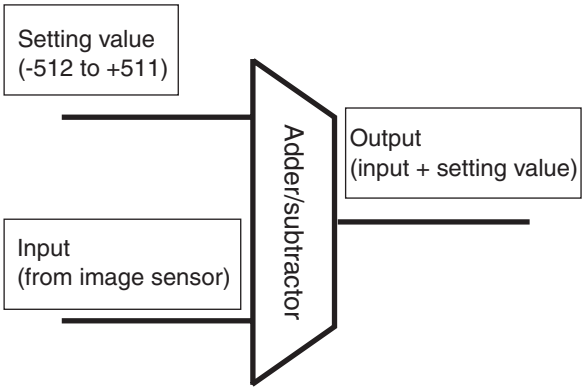


Figure 2-516

Figures 2-517 and 2-518 show brightness I/O 0 to 1023 and input A that is sent from the image sensor.

a) When the brightness adjustment setting on this machine is set to the +a setting

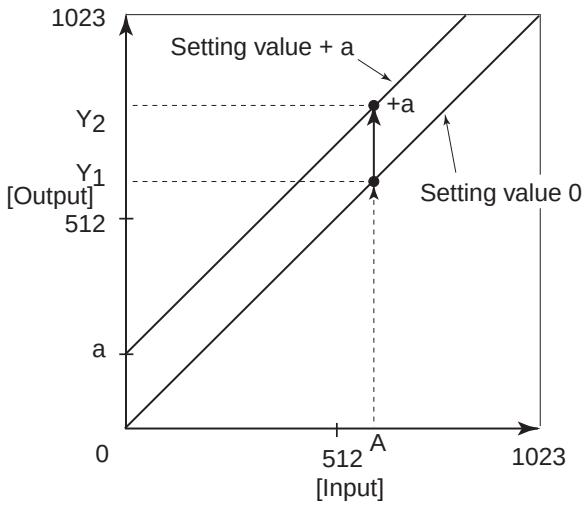


Figure 2-517

When the setting value is 0, input A is output as Y_1. However, if the setting value is set as the +a value, output becomes Y_1+a and the value Y_2 is output.

b) When the brightness adjustment setting on this machine is set to the -a setting

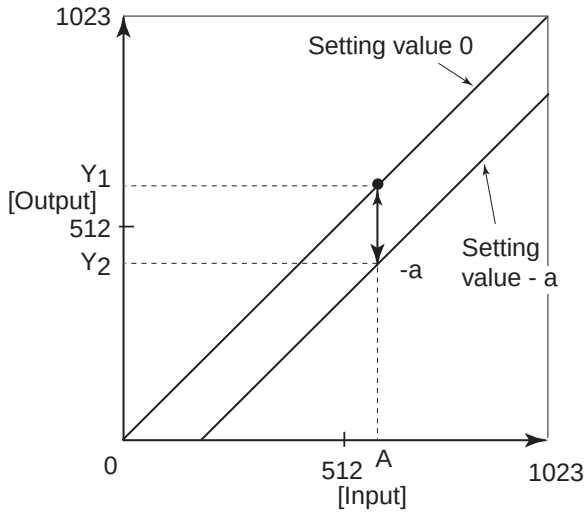


Figure 2-518

When the setting value is 0, input A is output as Y_1. However, if the setting value is set as the -a value, output becomes Y_1+(-a) and the value Y_2 is output.

9) Edge emphasis

Edge emphasis is a kind of processing which emphasizes light and dark in order to make the image appear sharper. (See Figure 2-519.)

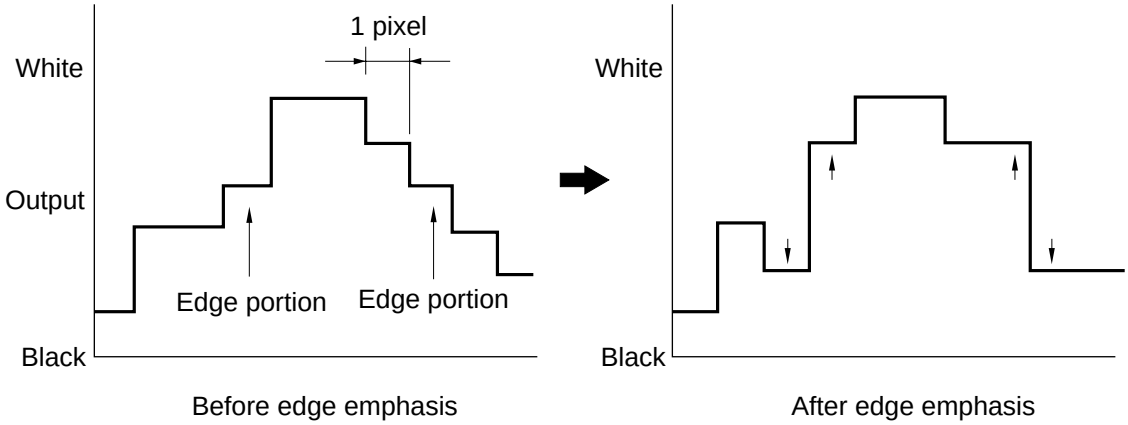


Figure 2-519

Density processing is performed by comparing the data in the conversion table provided for performing edge emphasis, with the target pixel. (See Figure 2-520.)

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

If the density of the target pixel is increased fourfold and the density of the other four points multiplied by -1, the overall density will remain unchanged.

Arithmetic processing in the main-scanning direction is performed simultaneous with scanning, while arithmetic processing of the sub-scanning direction in binary and gray scale mode uses the line memory. In color mode, the memory in the control assembly is used to convert front line data.

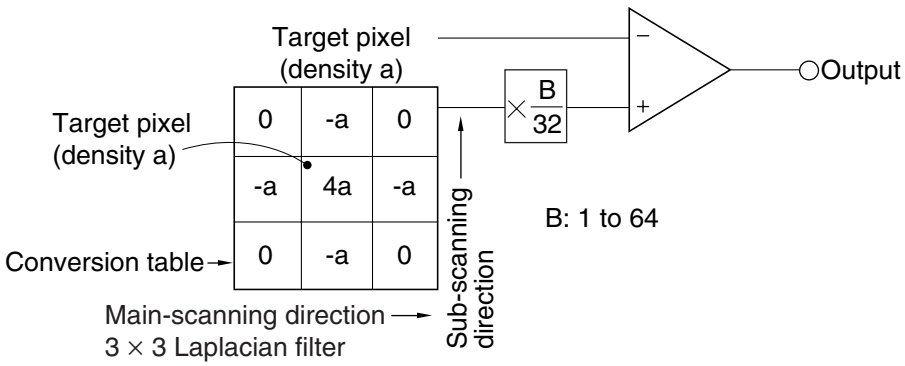


Figure 2-520

10) Line memory

Line memory is used for comparing the image density of the former and the next when processing the image by edge emphasis.

When this machine is equipped with two line memory units in binary and gray scale modes, it can compare three lines of data at a time. (See Figure 2-521.)

The following shows the flow of image data of each line. The data of the three lines are called Line 1, Line 2, and Line 3 in the order in which they are read from the image sensor.

a) Line 1 is read into edge emphasis. At the same time, it is written into line memory (A).

b) Line 2 is read into edge emphasis. Line 1 is read from line memory (A) and at the same time, Line 2 is written into line memory (A). Line 1 is written into line memory (B).

c) Line 3 is read into edge emphasis. Line 2 is read from line memory (A) and at the same time, Line 3 is written into line memory (A). Line 1 is read from line memory (B) and at the same time, Line 2 is written into line memory (B).

The data of subsequent lines are successively read and written in the same manner.

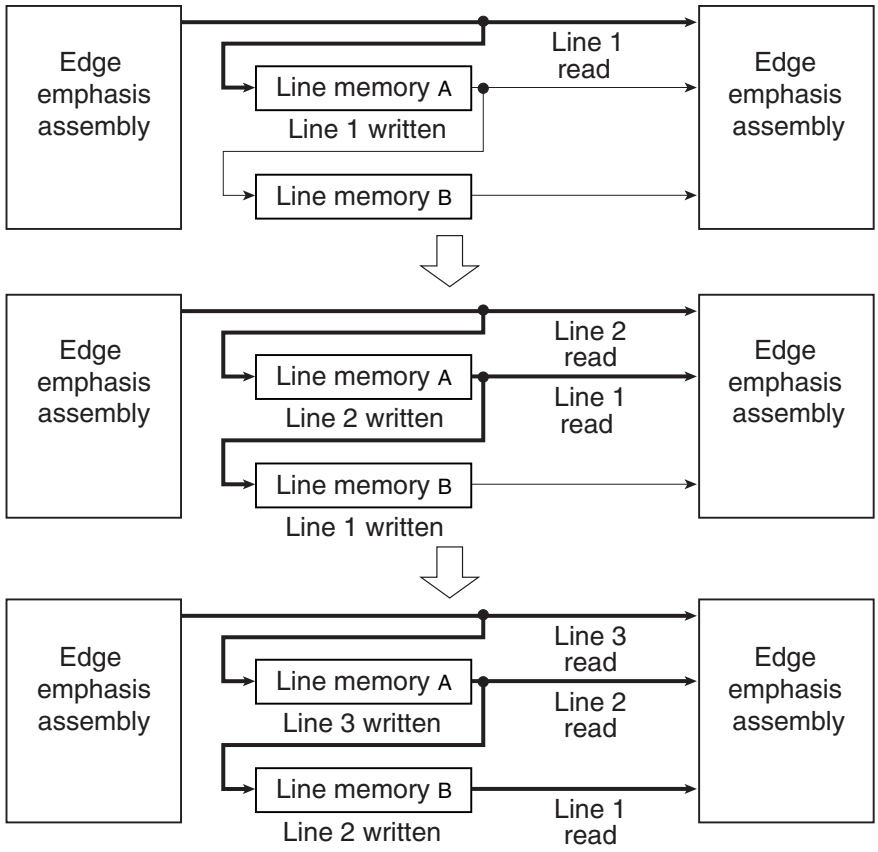


Figure 2-521

11) Resolution conversion

The binary resolution of this machine can be selected from the following.

- 300 × 300 dpi
- 240 × 240 dpi
- 200 × 200 dpi
- 300 × 150 dpi (300 dpi high-speed)

The resolution in the color mode can be selected from the following.

- 200 × 200 dpi
- 100 × 100 dpi

The optical resolution of image sensor (main-scanning direction) is 300 dpi.

a) Main-scanning direction

Conversion of main-scanning resolution is done by thinning out the standard clock for the image processing according to the resolution. (See Figure 2-522.)

When converting the resolution to 200 dpi, one out of three on the standard clock is thinned out and used as the operating clock. In the case of 240 dpi, one out of five pulses from the standard clock are used as the operating clock.

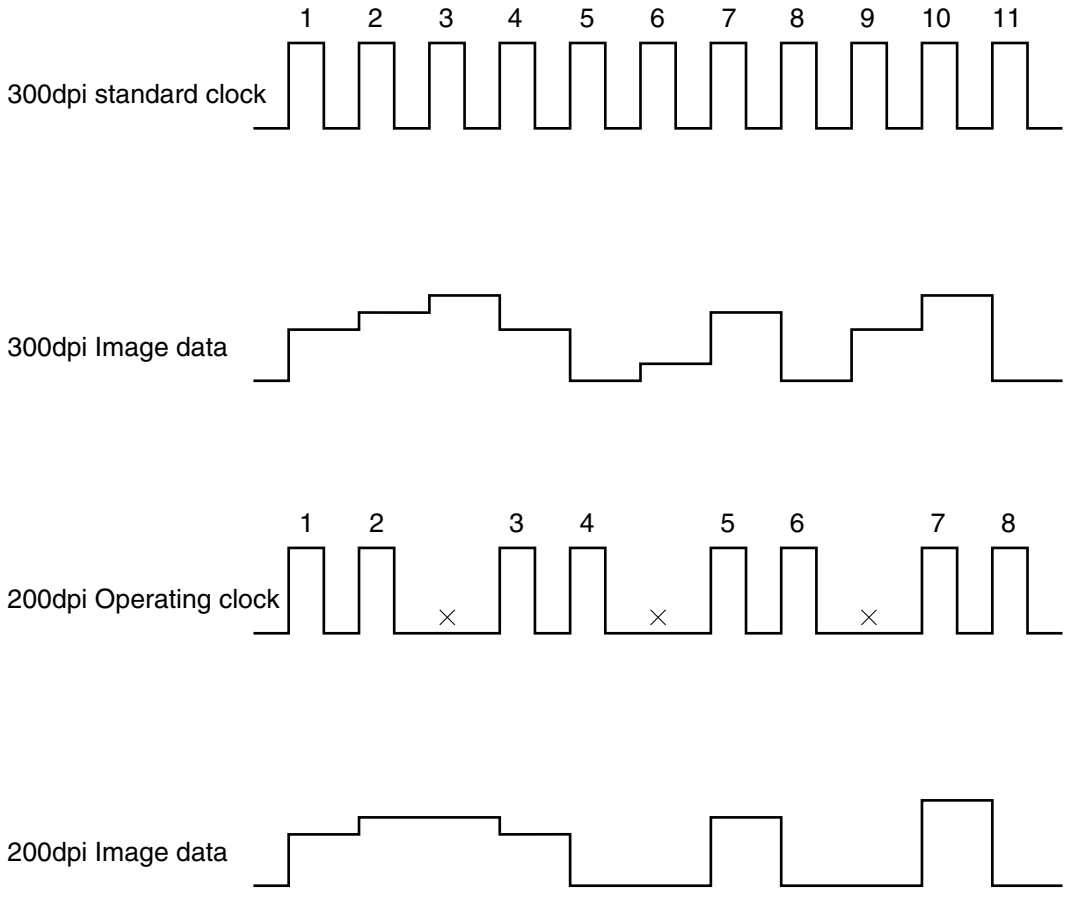


Figure 2-522

b) Sub-scanning direction

As for the sub-scanning direction, the feed speed of the document is changed when scanning.

In the case of 200 dpi, the feed speed changes to 1.5 times that of 300 dpi, and if 150 dpi, it changes to 2 times that of 300 dpi, and if 100 dpi, it changes to 3 times that of 300 dpi. Since the timing for loading data from the image sensor is not changed, the feed speed is modified to convert the resolution in the sub-scanning direction. (Refer to Figure 2-523.)

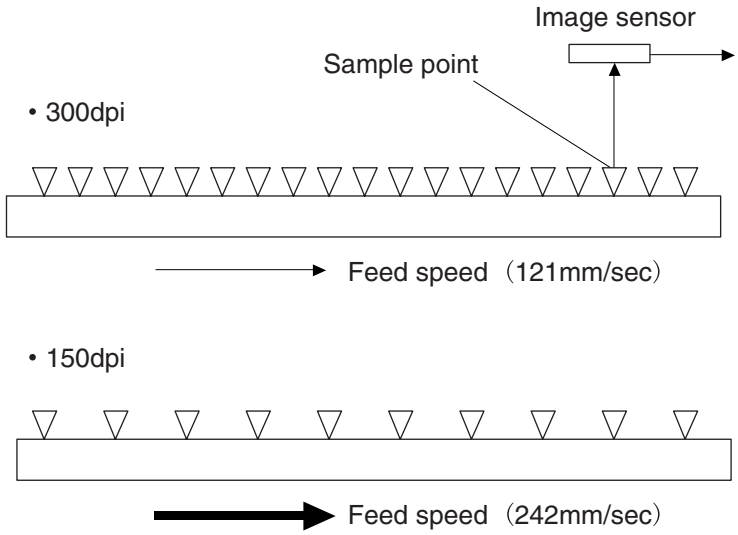


Figure 2-523

As for the high-speed mode (300 × 150 dpi), the data in the sub-scanning direction is output twice in the control assembly and output at 300 × 300 dpi. (Refer to Figure 2-524.)

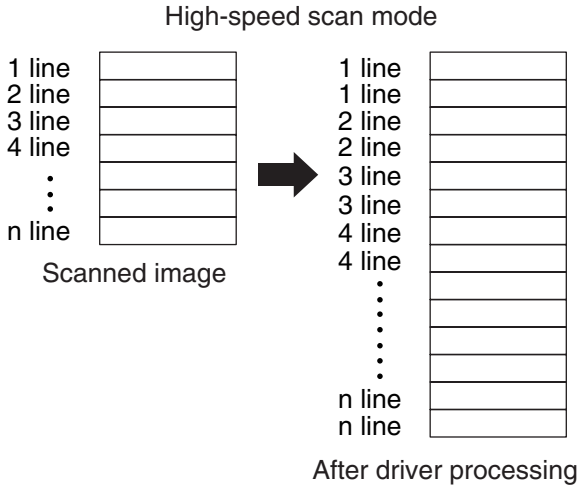


Figure 2-524

12) Simple binarizing

Binary image data can only express pixels as either "black" or "white."

In order to separate the pixels into black and white, signals corresponding to the image density of the document 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 pixels are to be divided into white or black is called the "slice level".

Changing the slice level can adjust the image brightness.

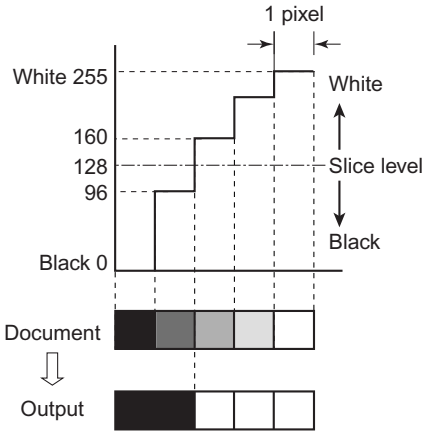


Figure 2-525

13) 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 4 bits and the slice level is set to 8.

The value of 1 pixel 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 then the slice level, it is output as "15".The difference between the values of the input and output pixels is then added to the next pixel 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). (See Figure 2-526.)

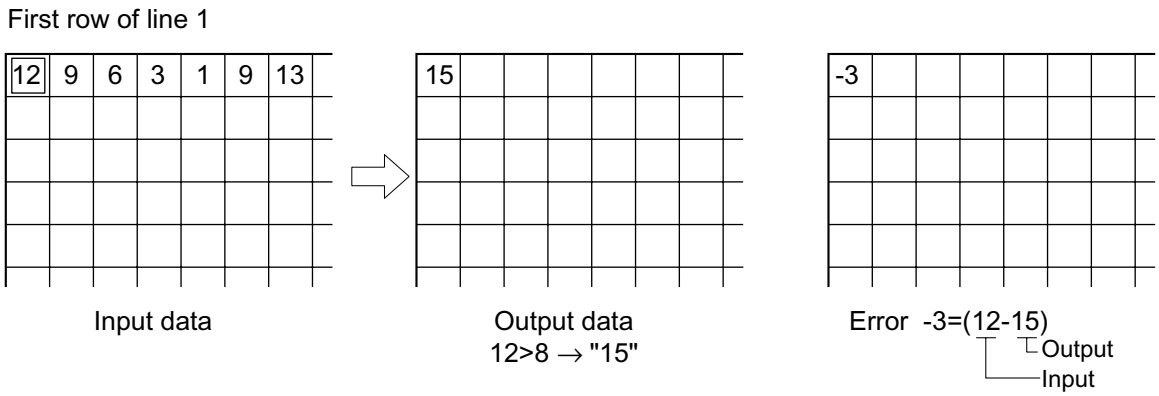


Figure 2-526

Next, when processing the second row of Line 1, since the error is diffused to the right, the data of the pixel 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]. (See Figure 2-527.)

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

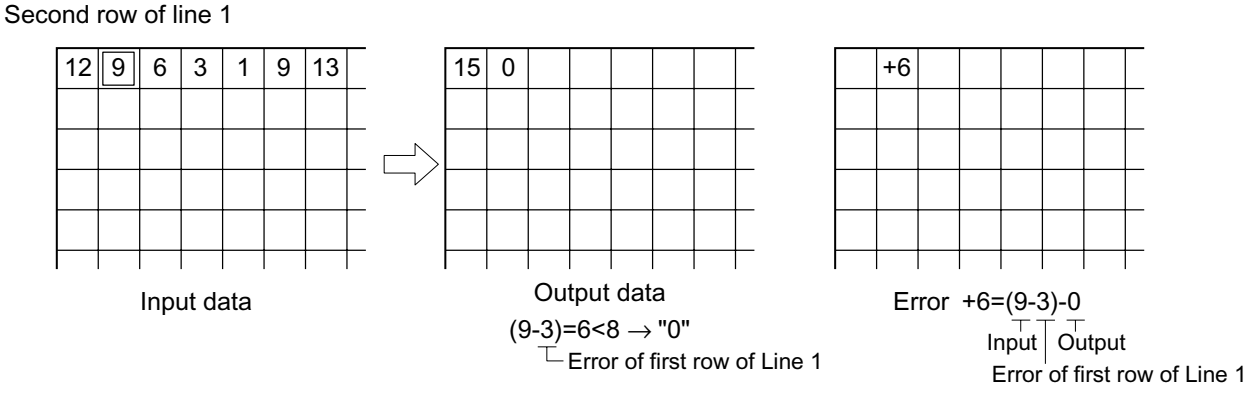


Figure 2-527

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 2-528.

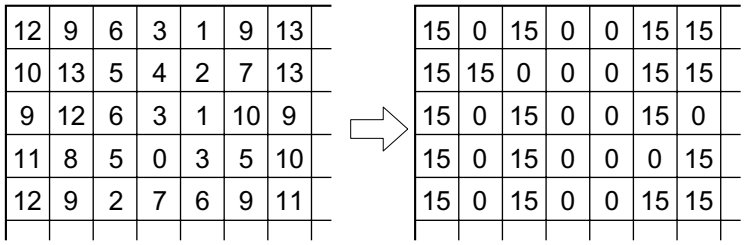


Figure 2-528

Figure 2-529 shows a comparison of binarizing with error diffusion processing, and binarizing without error diffusion processing (simple binarizing).

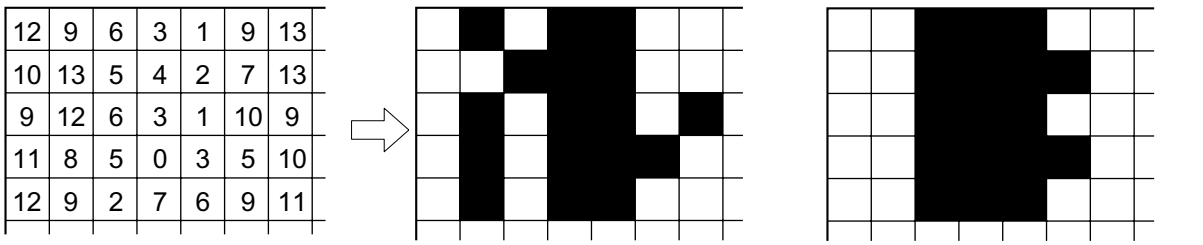


Figure 2-529

14) Dropout color

This machine can be set so that it does not scan red, green or blue (the same colors as RGB of the LEDs). This is called “dropout color.”

When red is specified as the dropout color, only the red LED lights when the document is scanned. When the red in the document is the same color as the LED light, the reflected light has the same quantity of light as that as the white part and is detected as white. (See Figure 2-530.)

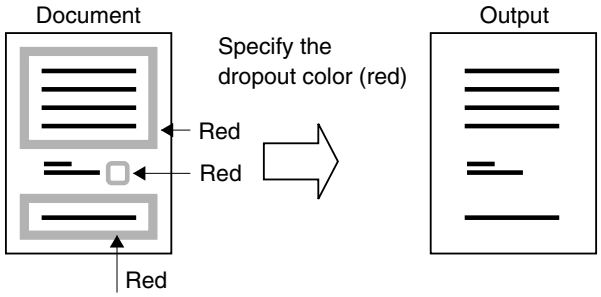


Figure 2-530

To emphasize red, the G and B LEDs light when the document is scanned. In this case, the output from the green and blue parts weakens and as a result, the red part is emphasized.

3. Control Assembly

1) Advanced text enhancement

It is simply called "text" for this machine.

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 pixels.

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 2-531, a histogram for each block is calculated, and the optimum slice level is determined to binarize the pixels.

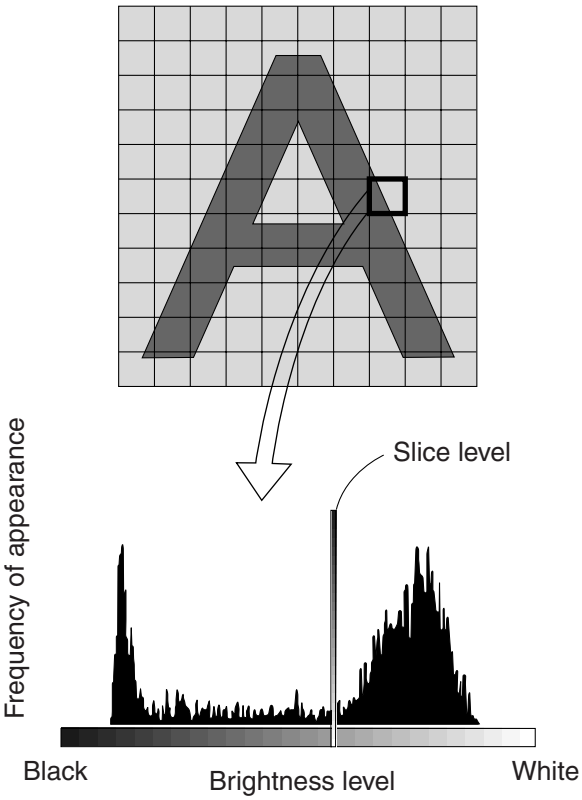


Figure 2-531

2) 300 dpi (high speed)
In 300 dpi high-speed mode, 300 × 150 dpi data images are output from the scanner assembly to the control assembly. To convert image data in read at 300 × 150 dpi to 300 × 300 dpi image data in the subscanning direction, each line is output twice to the control assembly, to make it 300 × 300 dpi image data.

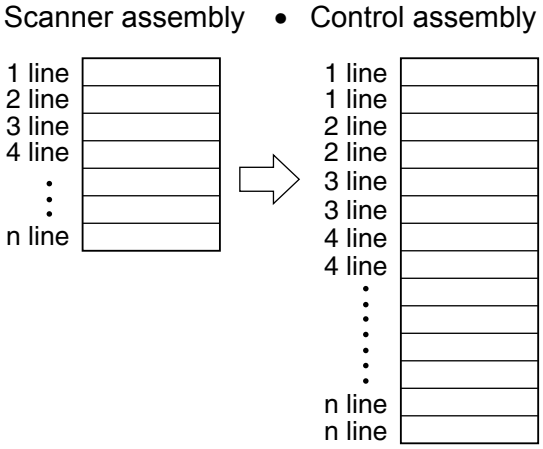


Figure 2-532

3) Skew correction (Deskew)
When image skew correction (deskew) is enabled, the driver specifies a size slightly larger than the user-specified document size. The control assembly detects the angle of skew from the image data that is read with the size and corrects the skew angle. The image data is then restored to the user-specified image size.
However, skew correction may not work properly if the document has dark areas on its left and right edges or if the brightness setting is incorrect.
This is also true for automatic size detection and border removal.

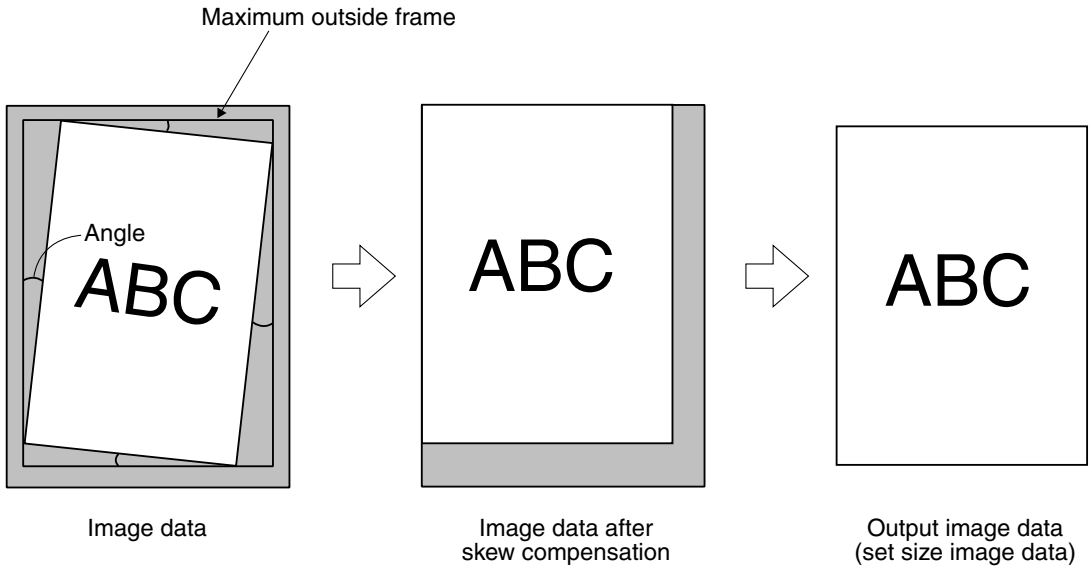


Figure 2-533

4) Blank skip

"Blank skip" is processing for not automatically recording blank documents that are fed on the HDD.

Judgment as to whether or not to record a document is determined by comparing the actual number of black pixels of the document with a preset percentage (0% to 20%) of number of black pixels as follows. First, image data read at the leading 10% and trailing 10% of the document in the main-scanning direction and 10% on both sides of the sub-scanning direction are excluded. The number of black pixels in the remaining 80% in both main- and sub-scanning directions is then judged referenced to the preset percentage of black pixels of the image data that is read. If the number of black pixels is at the preset percentage of number of black pixels or higher, the page is read. Alternately, if number of black pixels is less than the preset percentage, the page is not read.

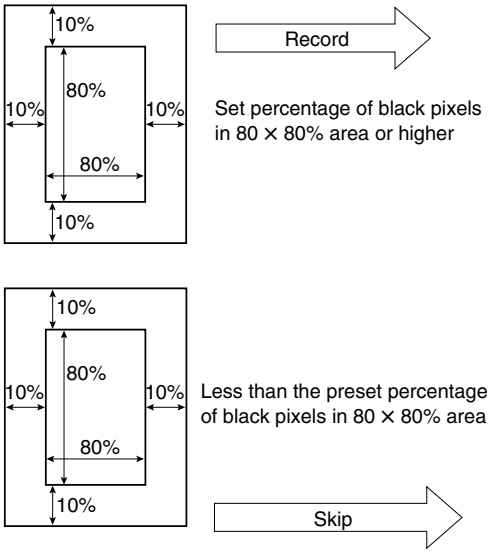


Figure 2-534

5) Automatic size detection

When you select automatic size detection, this machine detects the document length by the registration sensor, reads the document width by the maximum size.

The control assembly, then, searches for pixels other than black pixels from the left and right edges one line at a time in the image data sent from this machine, and discards black pixel data on the outside.

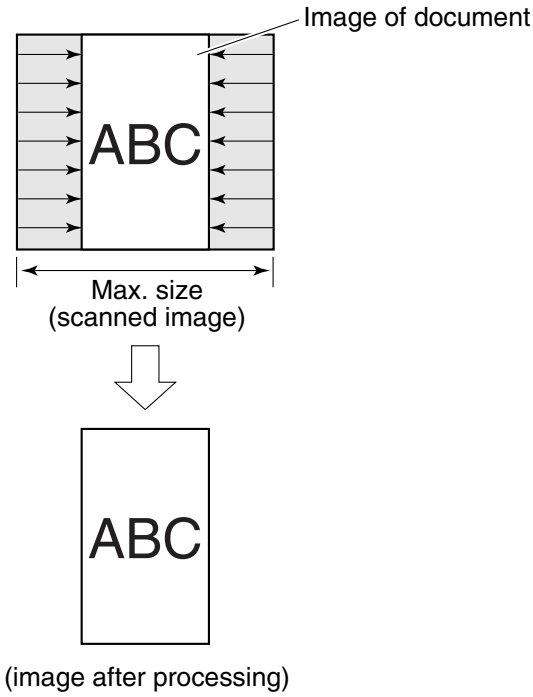


Figure 2-535

If a document skews when you select automatic size, but do not select skew correction, parts of leading and trailing edges of the image will be missing.

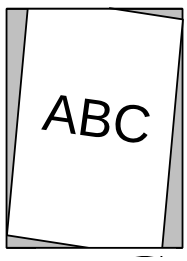


Figure 2-536

6) Border removal

When you select border removal, image data is read with the specified read size. The control assembly detects the maximum outside frame of the image and changes black data outside the image to white data. If the document skews, black data remains around the image, so the areas 10 mm inside the maximum outside frame, excluding actual image data areas, are changed to white data. If the skew is large, part of black data may remain.

- No skew

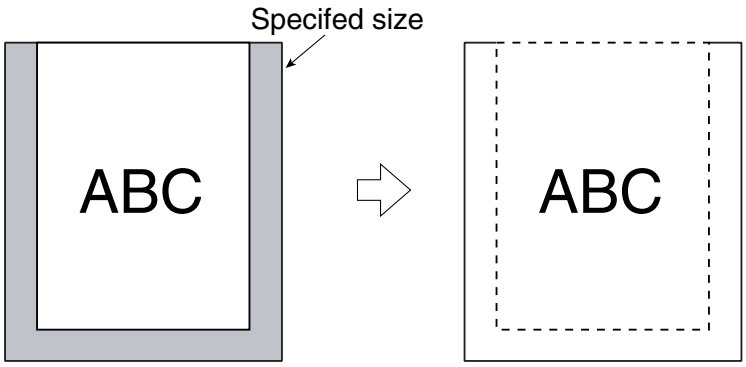


Figure 2-537

- Skew (Small)
- Skew (Large)

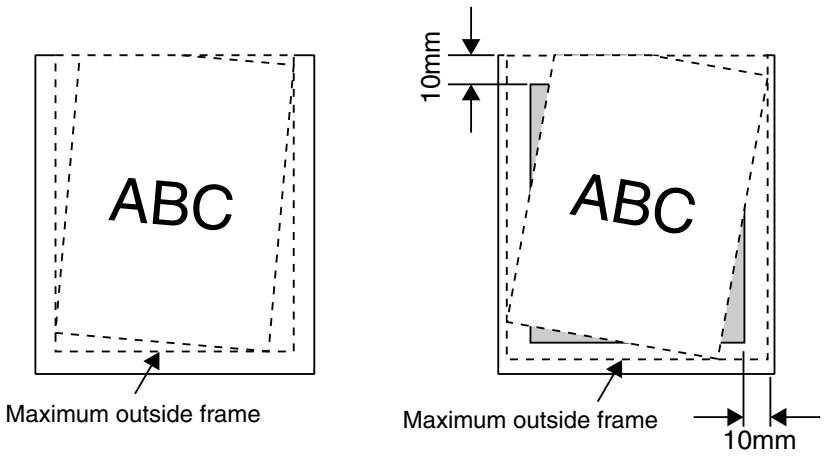


Figure 2-538

7) Edge emphasis (when color mode is selected)

When the color mode is selected, this machine uses the memory of the motherboard PCB of the control assembly instead of the line memory of the DC control PCB of the scanner assembly to process color data because the capacity of the line memory is insufficient. (See Figure 2-539.) The basic processing method is the same as the one of binary and gray scale mode.

In color mode, RGB data is transferred from the scanner to the motherboard PCB line by line. Since each RGB color has to be compared to the previous line during edge emphasis, color mode requires three times as much memory as binary and gray scale mode.

Data for each color is read out from the line memory in A, B, C, D, E and F order.

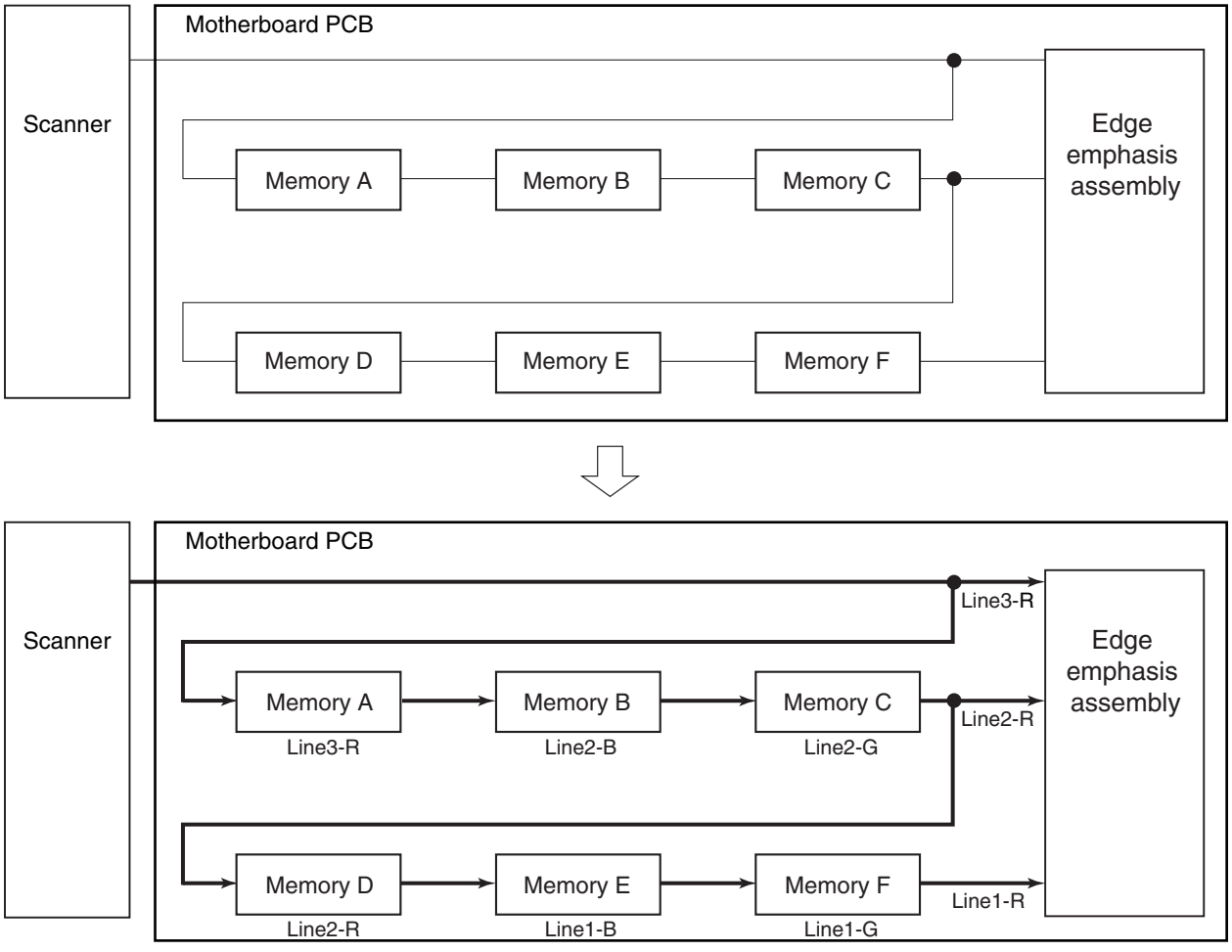


Figure 2-539

VI. IMAGE WRITING

1. Outline

Image data recorded on the HDD is written onto the CD-R disc inserted into the CD-R drive. The writing timing and writing method are different from those of the conventional CD-4046/4050.

This machine writes image data onto the CD-R disc by the "track at-once" method when it is ejected.

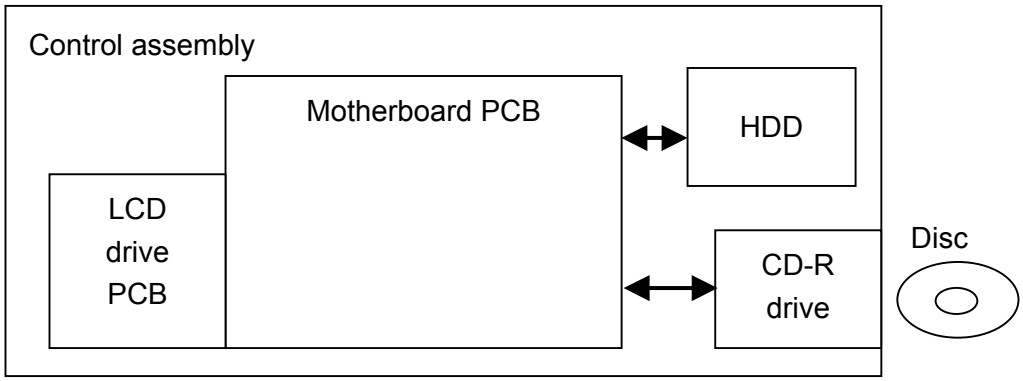


Figure 2-601

2. Writing Method

The CD-4046/4050 uses "Packet writing method", but this machine uses "Track at-once" method. When the CD-4046 was developed, the HDD capacity was smaller than the recent one and the writing speed for CD-R discs was low. Data had to be written onto a CD-R disc immediately after a document was scanned. Therefore, the "Packet writing" method that considered convenience of additional writing important was adopted. Adaptec "Direct CD" was used as writing software.

Presently, the HDD recording capacity has increased greatly and the writing speed for CD-R discs has improved. Therefore, image data can be recorded on the HDD until image reading operation ends and can be written onto a CD-R disc when it is ejected. This machine uses the "Track at-once" method.

This eliminates writing time during scanning so that writing errors do not occur due to vibration or shock during scanning.

An APLIX writing engine is used as a writing software.

1) Disk at-once

By this system, data can be written only once.

This system is also called “single session”.

Most CD-ROMs use this system.

Figure 2-602

2) Track at-once

By this system, data can be written additionally up to 99 times. This system is also called “multi session”.

It is important to note that a management area of about 14 Mbytes is needed every time additional data is written.

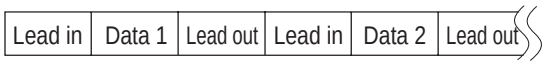


Figure 2-603

3) Packet writing

By this system, the writing area can be divided into even smaller data areas, and the number of additional writes can be increased.

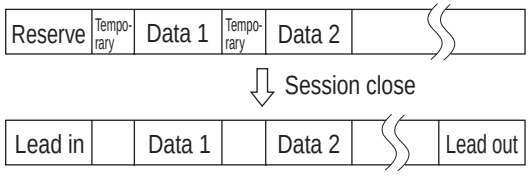


Figure 2-604

3. CD-R Drive

A Shinano Kenshi PLEXTOR PX-W5224TA is used for this machine.

The following table shows its main specifications.

The specifications of this product may be changed in part, or the product may be replaced with an equivalent item.

No.	Item	Description
1	Interface	ATA/ATAPI-5
2	Writing & reading speed (CD-R disc)	Writing: 4/8/16/20/20-52×
		Reading: 4/8/20-52×
3	Data transmission rate	33.3 Mbytes (Ultra DMA33)
4	Data buffer	2 Mbytes
5	Laser type	Semiconductor laser GaAlAs (output at writing: 35 mW)
6	Usable disc	Use CD-R discs having the disc mark that indicates compliance with the Recordable Compact Disc System Part II (Orange Book Part II).
7	Max. writing capacity	700 Mbytes/disc
8	Input voltage	+5 VDC, +12 VDC
9	External dimensions	146 (W) × 190 (D) × 41.3 (H) mm (Excluding front panel)

Table 2-601

Note 1: Handle the CD-R drive with care. CD-R drives use a laser for writing and reading data. Never disassemble CD-R drives in the field.

Note 2: This CD-R supports CD-RW, but cannot be used for this machine CD-4070NW.

4. CD-R Disc

CD-R (Compact Disc Recordable) is a CD that is recordable.

“Pits” are indentations formed on the recording surface of the CD. A laser beam is directed at this recording surface, and “0” and “1” digital signals are recognized by the difference between the light reflected from the pits and lands (flat areas that are not pits) to read data. CD-Rs are read in the same way as CDs.

(See Figures 2-605 and 2-606.)

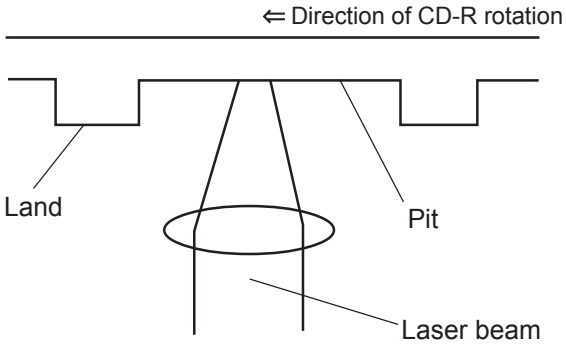


Figure 2-605

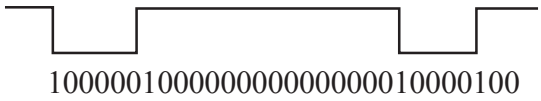


Figure 2-606

Figure 2-607 shows the structure of a CD-R. CD-Rs have a writing layer and a reflective layer. CD-Rs also have channels called "grooves". When the laser beam for writing data is directed at the reflective layer along these grooves, the heat generated by the laser beam causes the writing layer to dissolve and change shape to form pits.

Handling of the CD-Rs during writing requires extra care because vibration or impact to the writing assembly may cause damage to the data. Damaged data is irrecoverable.

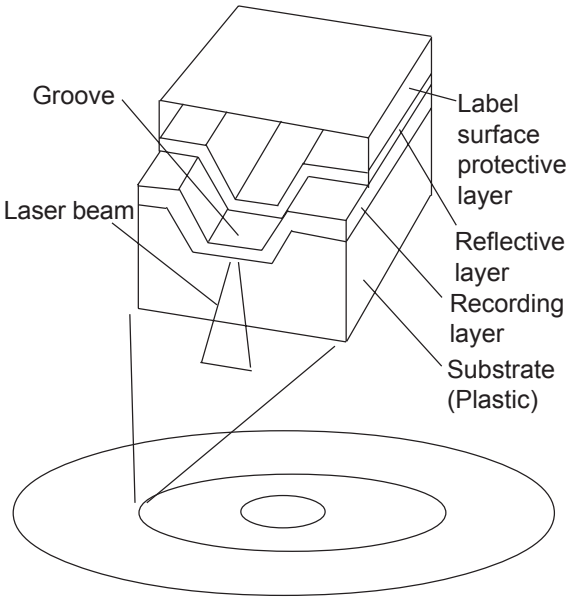


Figure 2-607

VII. POWER SUPPLY

1. Power Supply

The power switch on this machine does not turn AC power ON or OFF directly. When the power cord is connected, AC power is supplied to the subboard PCB. The subboard PCB generates +3.3 VDC for power switch confirmation and provides it to the power switch circuit on the operation PCB.

When the power switch is turned ON, AC power is supplied from the subboard PCB to the power PCB. The power PCB generates +24 VDC and supplies it to the subboard PCB and the DC control PCB on the scanner assembly.

The subboard PCB supplies +12/+5/+3.3 VDC that is generated from +24 VDC to each of the units on the control assembly and the touch panel assembly. The DC control PCB supplies +24 VDC and +12/+5/+3.3 VDC that is generated from +24 VDC to each of the units on the scanner assembly.

The inverter PCB generates a high voltage (approx. 1 KVAC or higher) for the LCD backlight.

When the operating system terminates, the subboard PCB stops supplying AC power to the power PCB.

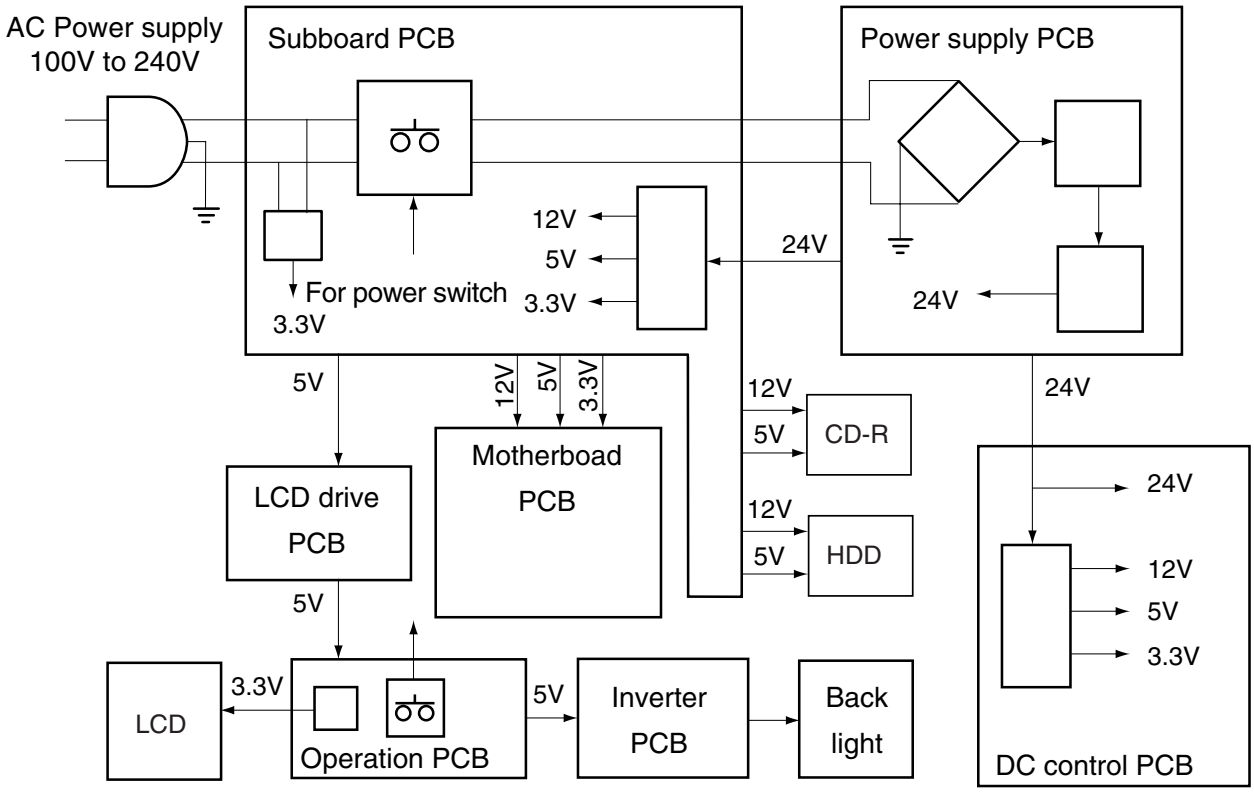


Figure 2-701

2. Power Supply PCB

The power supply PCB of this machine is capable of handling power input of 100 to 240 VAC.

Figure 2-702 shows a block diagram of the power supply PCB.

AC power is supplied to the power supply PCB by turning ON the power switch.

The 100 to 240 VAC power is converted by a rectifying bridge to unsmoothed 100 to 240 VUN and sent to the booster assembly. At the booster assembly, the power is temporarily raised to 380 VDC and then converted to 24 DC.

A fuse is used in the power supply PCB to protect against over-current situations.

24 VDC is output from the power supply PCB to the subboard PCB and the DC control PCB.

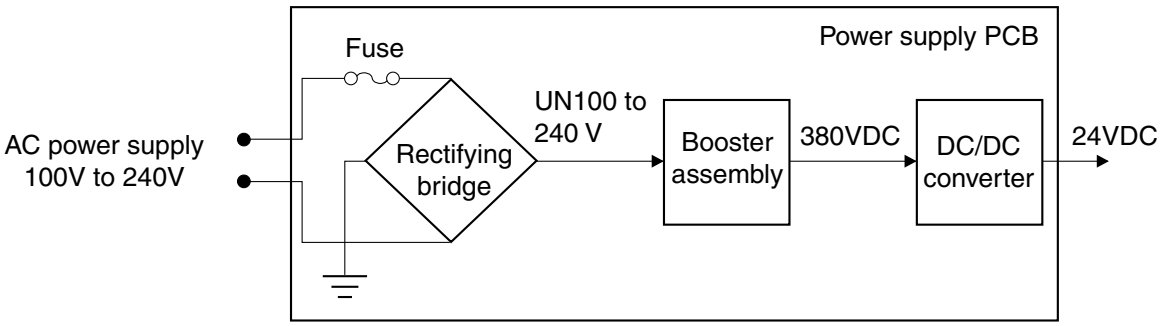


Figure 2-702

3. Power Saving Mode

If no key or pickup operation takes place for 20 minutes or more, when the power is ON, the LCD backlight will go OFF.

The machine shifts back to the ready mode when you tap on the touch panel or press any keyboard key.

VIII. ELECTRICAL PARTS LAYOUT

1. SENSOR

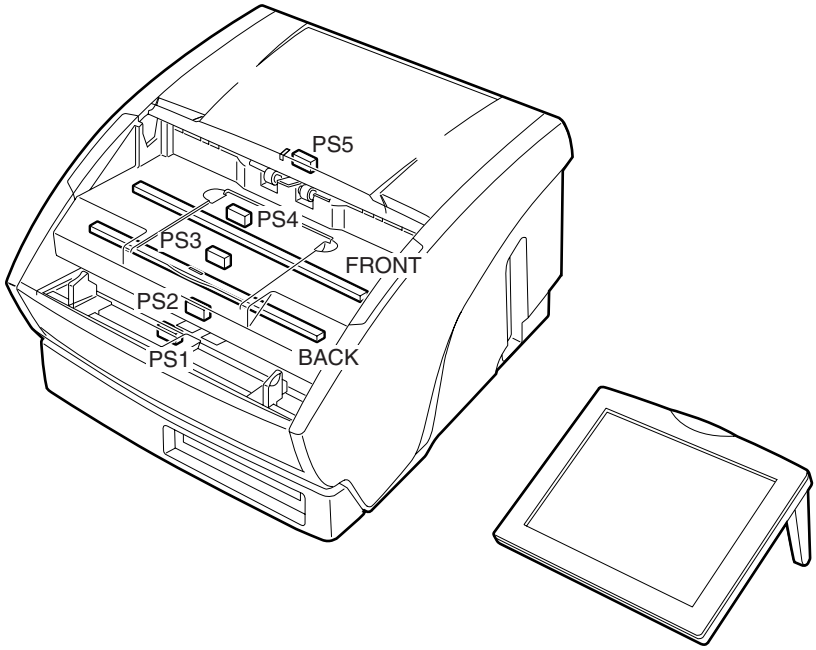


Figure 2-801

Category	Name	Symbol
Photo interrupter	Document detection sensor	PS1
	Pickup sensor	PS2
	Registration sensor	PS3
	Scan start sensor	PS4
	Delivery sensor	PS5
Image sensor	CIS for front of document	FRONT
	CIS for back of document	BACK

Table 2-801

2. SWITCH, LED

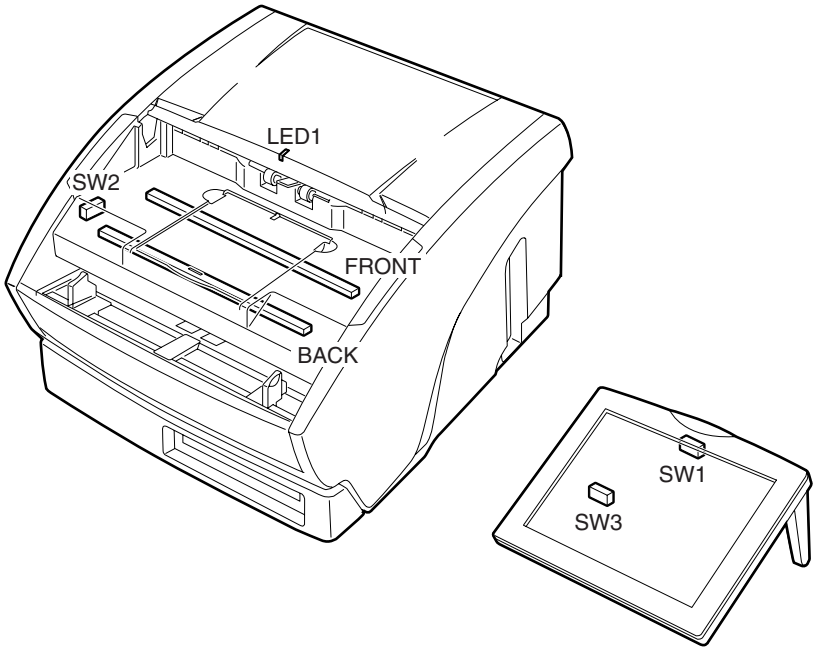


Figure 2-802

Category	Name	Symbol
Switch	Power switch	SW1
	Opening detection switch	SW2
	Reset switch	SW3
LED	Power indicator	LED1
	LED for front of document	FRONT
	LED for back of document	BACK

Table 2-802

3. MOTOR, CLUTCH

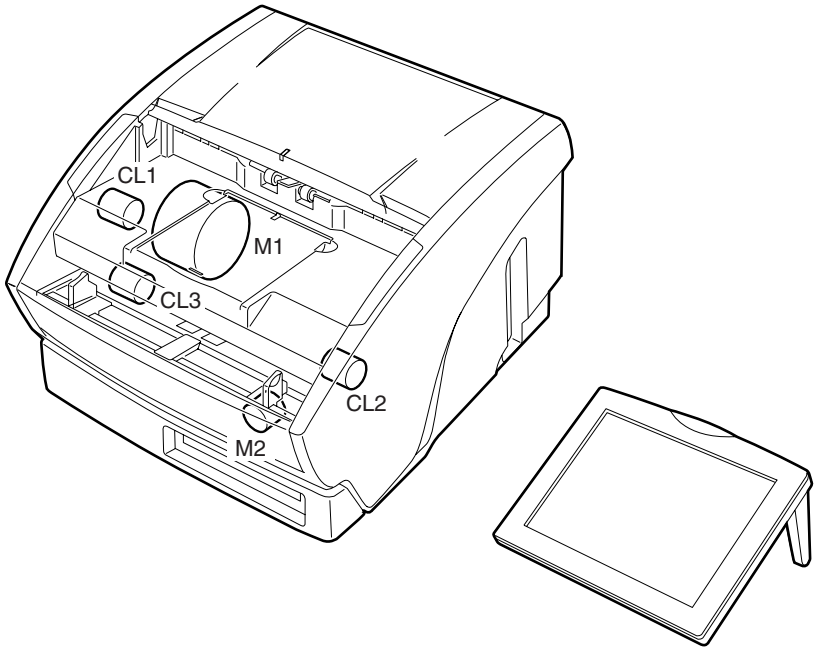


Figure 2-803

Category	Name	Symbol
Motor	Main motor	M1
	Document board motor	M2
Clutch	Pickup clutch	CL1
	Registration clutch	CL2
	Separation clutch	CL3

Table 2-803

4. PCB, UNIT

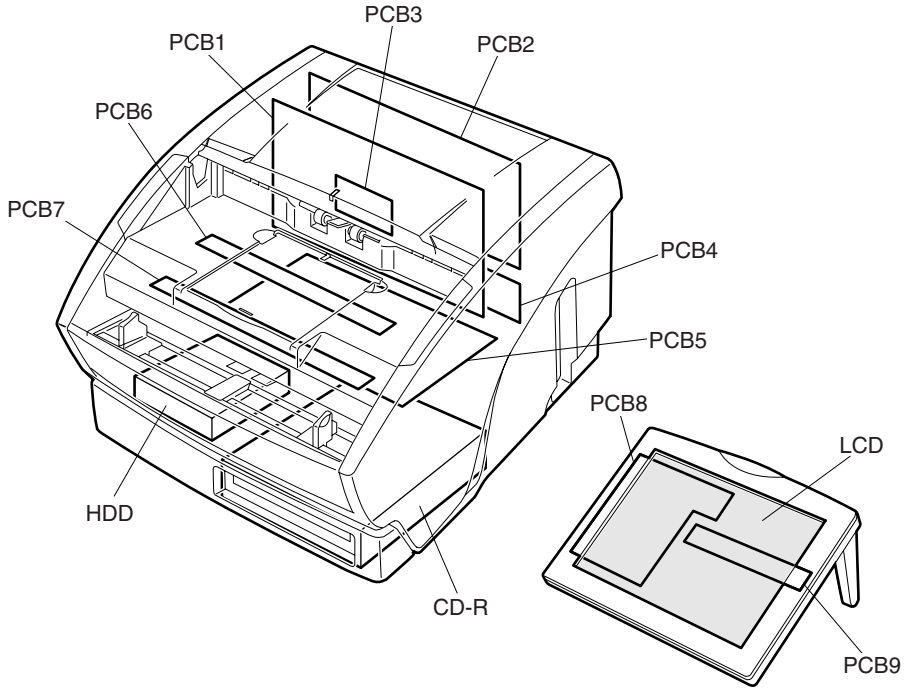


Figure 2-804

Category	Name	Symbol
PCB	Motherboard PCB	PCB1
	Subboard PCB	PCB2
	LCD drive PCB	PCB3
	Power supply PCB	PCB4
	DC control PCB	PCB5
	Sensor amplifier PCB (front)	PCB6
	Sensor amplifier PCB (back)	PCB7
	Operation PCB	PCB8
	Inverter PCB	PCB9
Unit	HDD	HDD
	CD-R drive	CD-R
	LCD	LCD

Table 2-804

IX. LISTS OF CONNECTORS/SW/LED OF EACH PCB

Items that are not listed in the lists and items that are specified as usage prohibited must not be procured in the field.

1. Motherboard PCB

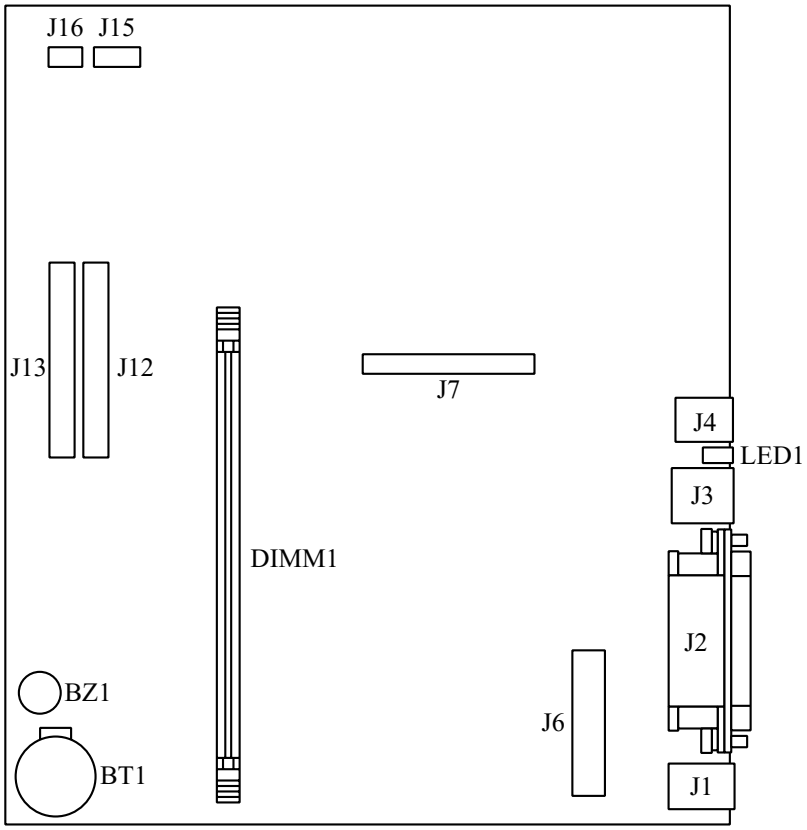


Figure 2-901

Connector		Description
DIMM1	168P	Image memory
J1	PS/2	Keyboard
J1	PS/2	Mouse
J2	15P	CRT
J3	RJ45	LAN
J4	5P×2	USB×2
J6	20P	DC power supply
J7	44P	LCD
J12	40P	IDE (PRI)
J13	40P	IDE (SEC)
J15	9P	USB (Scanner)
J16	4P	OS startup signal

Table 2-901

2. DC Control PCB

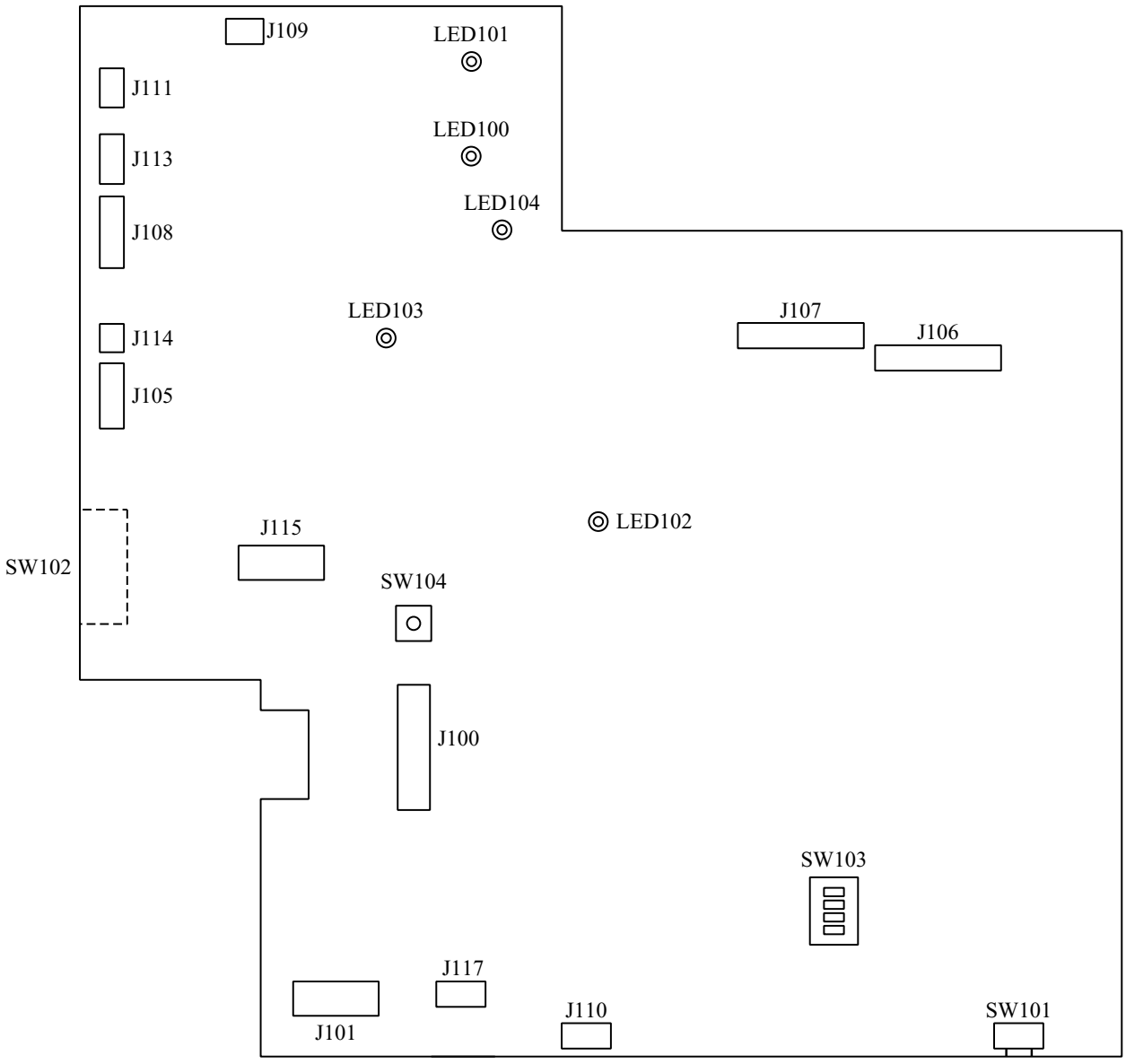


Figure 2-902

Connector		Description
J101	4P	DC24 VDC
J105	7P	RS3/CL2/CL3
J106	14P	Reading unit (front)
J107	5P	Reading unit (back)
J108	8P	CL1/PS2/PS4
J109	2P	Document board motor (M2)
J111	3P	Document detection sensor (PS1)
J115	14P	Main motor (M1)
J117	5P	Motherboard PCB

Table 2-902

Note: J100, 110, 114 are not used in the field.

LED	Description
LED100	+5 V normal → Light
LED101	+3.3 V normal → Light
LED102	CPU normal operation → Flash
LED103	Main motor abnormality → Light
LED104	+24V normal → Light

Table 2-903

Switch	Description
SW101	For design (Do not use this switch in the field.)
SW102	Feeder opening detection
SW103	For design (Do not use this switch in the field.) Factory setting: All OFF
SW104	For design (Do not use this switch in the field.)

Table 2-904

3. Subboard PCB

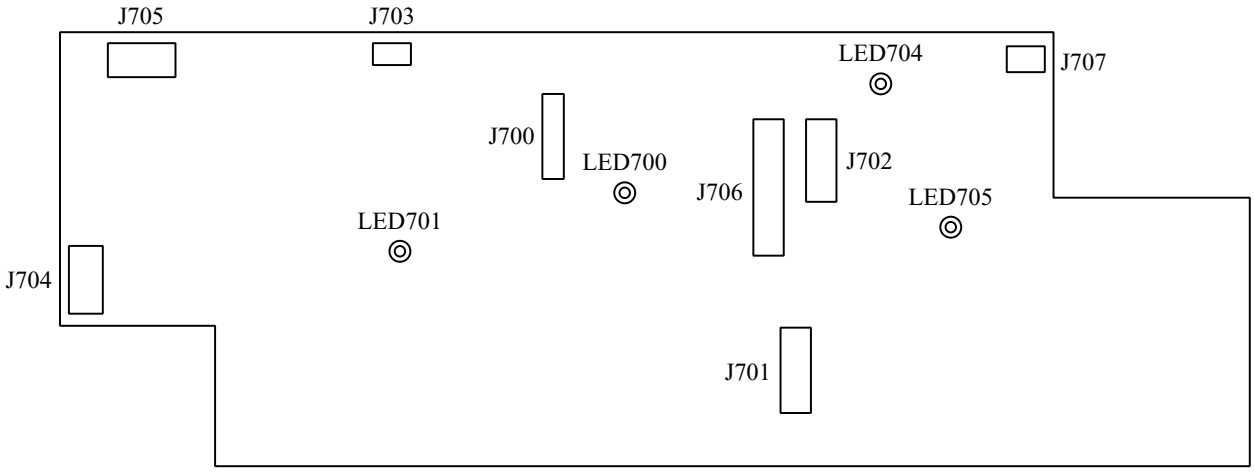


Figure 2-903

Connector		Description
J700	8P	Power supply start/LCD drive signal
J701	4P	24 DVC power supply input
J702	8P	5/12 DVC power supply output (to drive)
J703	4P	OS startup signal
J704	3P	AC power supply input
J705	3P	AC power supply output
J706	20P	3.3/5/12 DVC output
J707	3P	Cooling fan

Table 2-905

LED	Description
LED700	+5V Normal → ON
LED701	CPU Normal operation → Flash
LED704	+12V Normal → ON
LED705	+3.3V Normal → ON

Table 2-906

4. Power Supply PCB

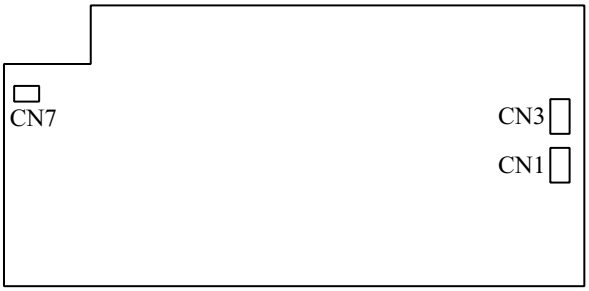


Figure 2-904

Connector		Description
CN1	4P	24 DVC power supply output
CN3	4P	24 DVC power supply output
CN6	3P	Power supply standby signal

Table 2-907

5. LCD Drive PCB

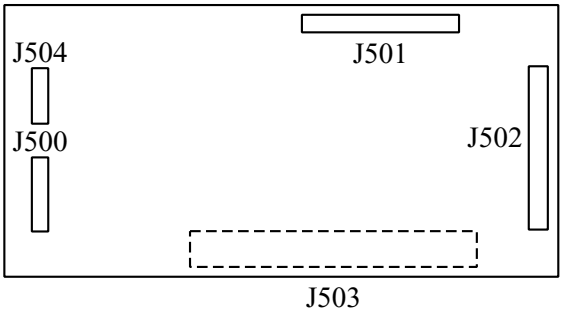


Figure 2-905

Connector		Description
J500	8P	Power supply start/LCD drive signal
J501	14P	Touch panel/LCD signal
J502	15P	Touch panel/LCD signal
J503	44P	Motherboard PCB
J504	5P	USB signal

Table 2-908

6. Operation PCB

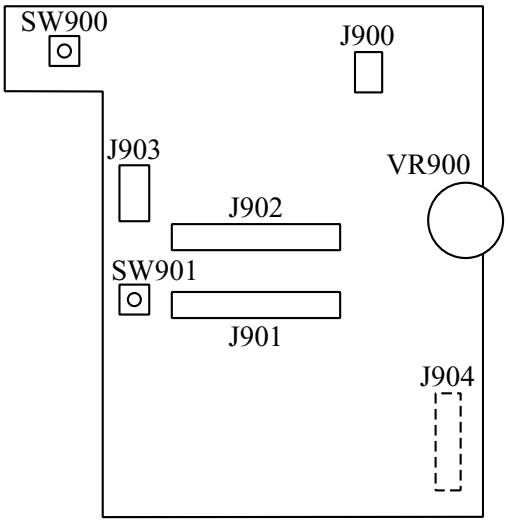


Figure 2-906

Connector		Description
J900	4P	Touch panel
J901	14P	Touch panel /LCD signal
J902	15P	Touch panel /LCD signal
J903	6P	Inverter PCB
J904	31P	LCD

Table 2-909

7. Inverter PCB

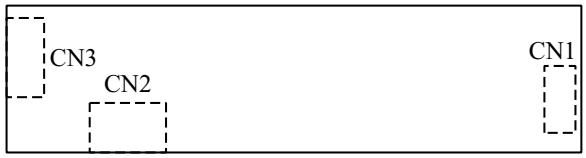


Figure 2-907

Connector		Description
CN1	6P	Inverter drive signal
CN2	3P	Backlight
CN3	3P	Backlight

Table 2-910

CHAPTER 3

DISASSEMBLY & REASSEMBLY

I. EXTERNAL COVERS

1. Rear Cover

1) Remove the 8 screws ①, and remove the rear cover ②.

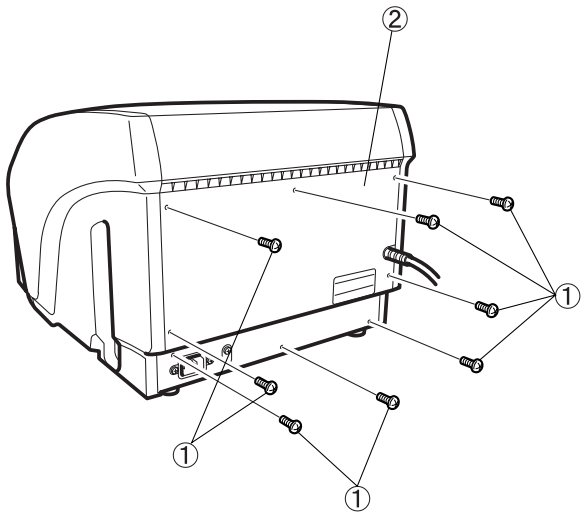


Figure 3-101

Note: The rear cover may not be easily removed because it is pushed against another cover.

2. CD Front Cover

1) Push open the 2 fitting parts ① (marked with △) to release them, and remove the CD-R front cover ②.

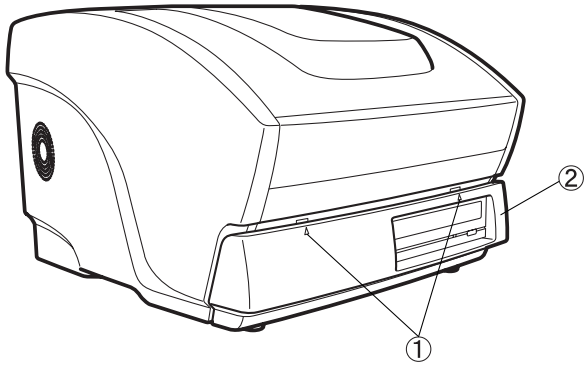


Figure 3-102

Note: For reassembly, insert the 2 lower hooks into the corresponding holes and fit the upper fitting parts.

3. Left Cover

1) Remove the rear cover.
2) Remove the CD front cover.
3) Remove the screw ①, release the fitting part ②, and remove the left cover ③.

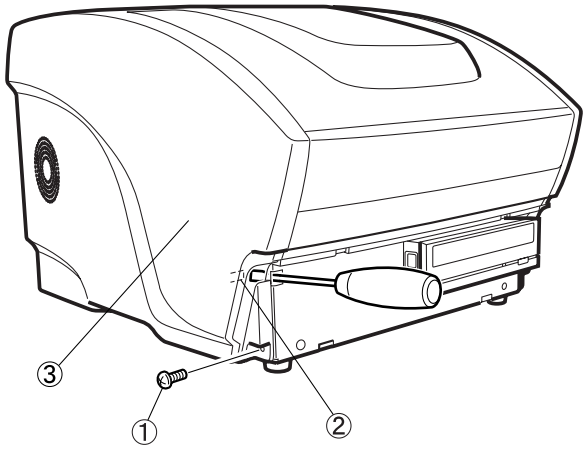


Figure 3-103

Note: For reassembly, fully open the upper feeder, align the pickup tray, opening front cover and document board fitting parts.

4. Right Cover

1) Remove the rear cover.
2) Remove the CD front cover.
3) Remove the screw ①, release the fitting part ②, and remove the right cover ③.

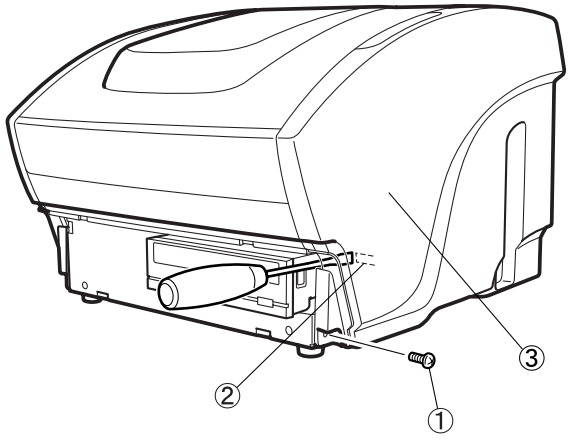


Figure 3-104

Note: For reassembly, fully open the upper feeder, align the pickup tray, opening front cover and document board fitting parts.

5. Pickup Tray

1) Remove the rear cover.
2) Remove the CD front cover.
3) Remove the left or right cover.
4) Remove the fitting parts ① and remove the pickup tray ②.

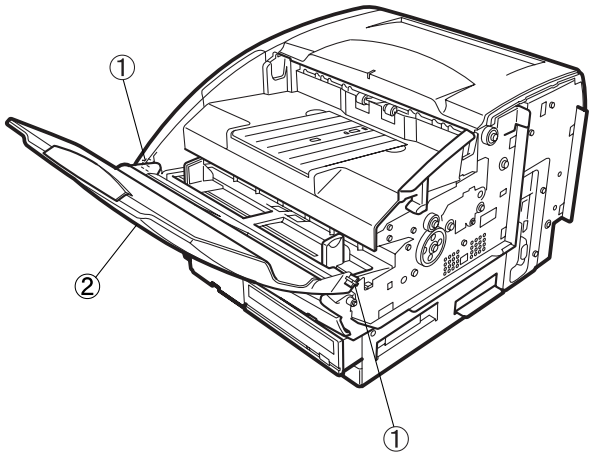


Figure 3-105

6. Opening Front Cover

1) Remove the rear cover.
2) Remove the CD front cover.
3) Remove the left and right covers.
4) Remove the 2 springs ① and remove the opening front cover ②.

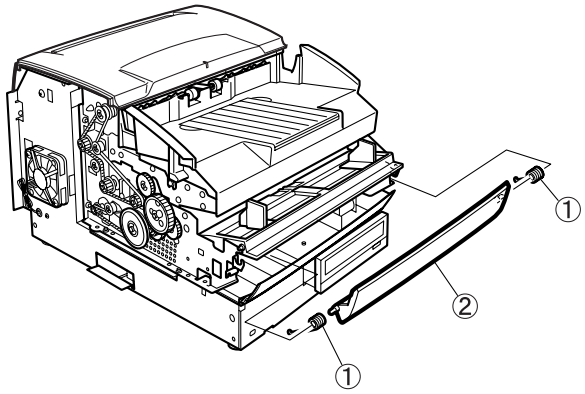


Figure 3-106

Note: During reassembly, pay attention to the shape and direction of the right and left springs and install them so that the opening front cover is opened and closed correctly.

7. Top Cover

1) Remove the rear cover.
2) Remove the CD front cover.
3) Remove the left and right covers.
4) Remove the right and left screws ① (one each) and remove the top cover ②.
   Note that cables are connected to the rear of the cover.

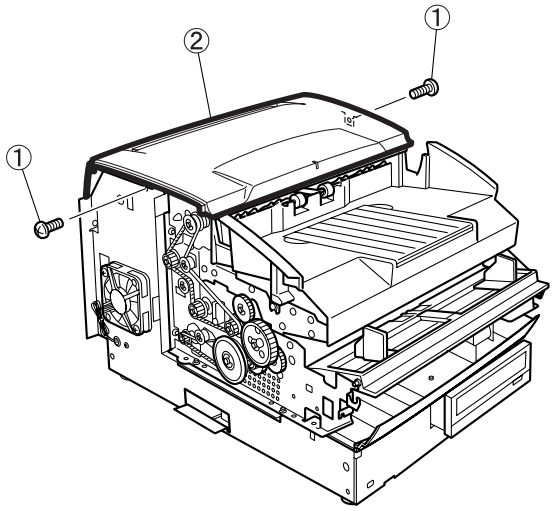


Figure 3-107

5) Remove the fitting part ① on the rear and remove the power LED assembly.

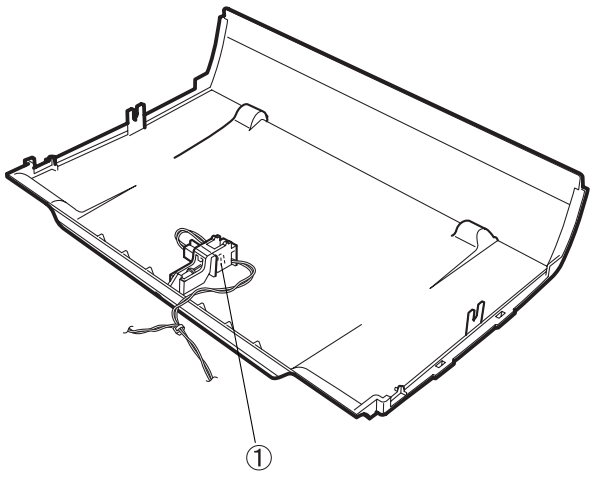


Figure 3-108

8. Delivery Cover

1) Remove the top cover.
   (Refer to II. MAIN UNIT.)
2) Remove the 2 screws ① and remove the delivery cover assembly ②.

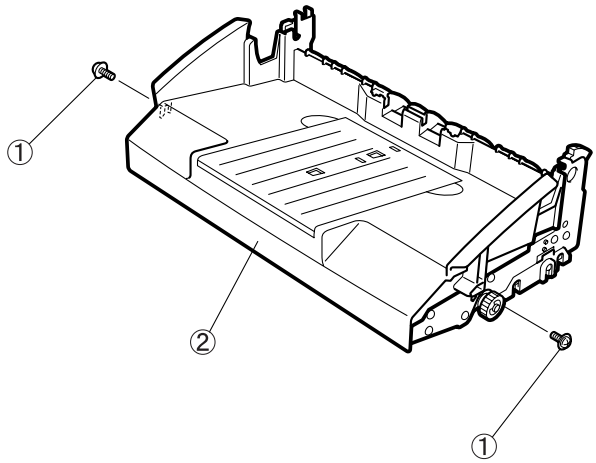


Figure 3-109

3) Remove the delivery follower rollers 1 and 2.
   (Refer to IV. FEED SYSTEM.)

II. MAIN UNIT

1. Scanner

1) Remove the rear cover.
2) Remove the CD front cover.
3) Remove the left and right covers.
4) Remove the top cover.
5) Remove the right and left screws ① (three each) and slightly lift the scanner ② and move it to the front.

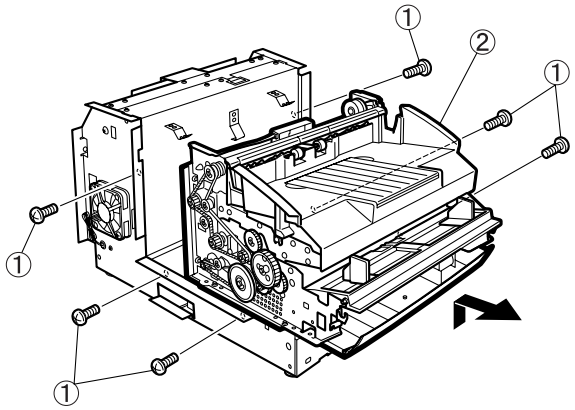


Figure 3-201

6) Remove the 2 connectors ① and remove the scanner ②.
   The DC supply connector has a lock.

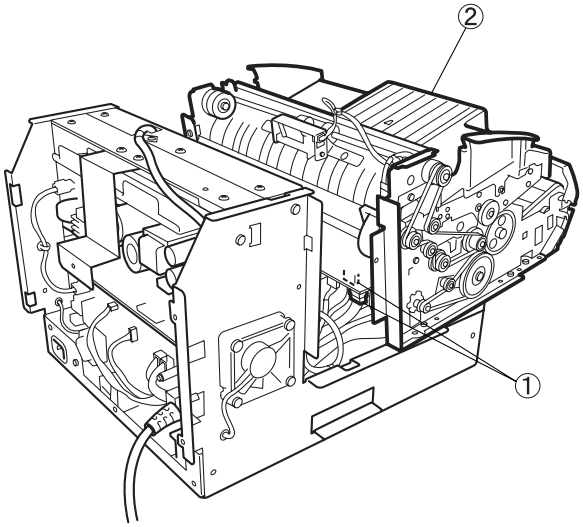


Figure 3-202

Note: During reassembly, set the connectors in front, then slide them to the rear. Since there are leaf springs on the back of the scanner, lift the front of the unit and slide it to prevent deformation of the leaf spring.

2. PCB Unit

1) Remove the rear cover.
2) Remove the CD front cover.
3) Remove the left and right covers.
4) Remove the top cover.
5) Remove the scanner.
6) Remove the 9 screws ① (top 4, right 2 and left 3), disconnect the cable and remove the shield plate ②. One of the upper screws holding the cable is 6 mm long and has a lock washer.

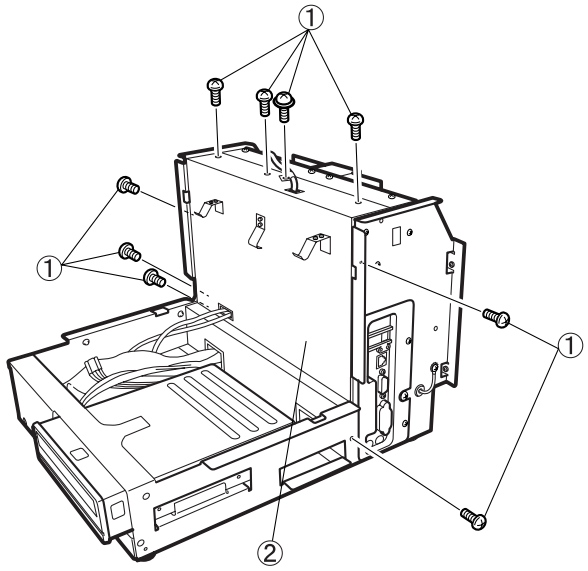


Figure 3-203

7) Remove the 4 screws ① (6 mm long), remove the interface cover ② and shield plate.
The shield plate is attached to the back of the interface cover.

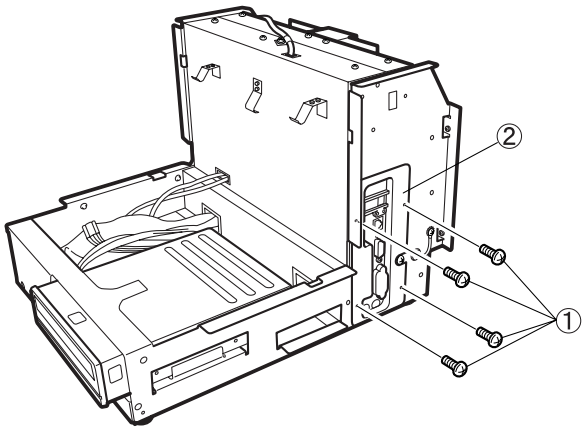


Figure 3-204

8) Remove the cable holder ①, 5 connectors ②, and each cable cramp, then remove the 8 screws ③ and PCB unit ④.

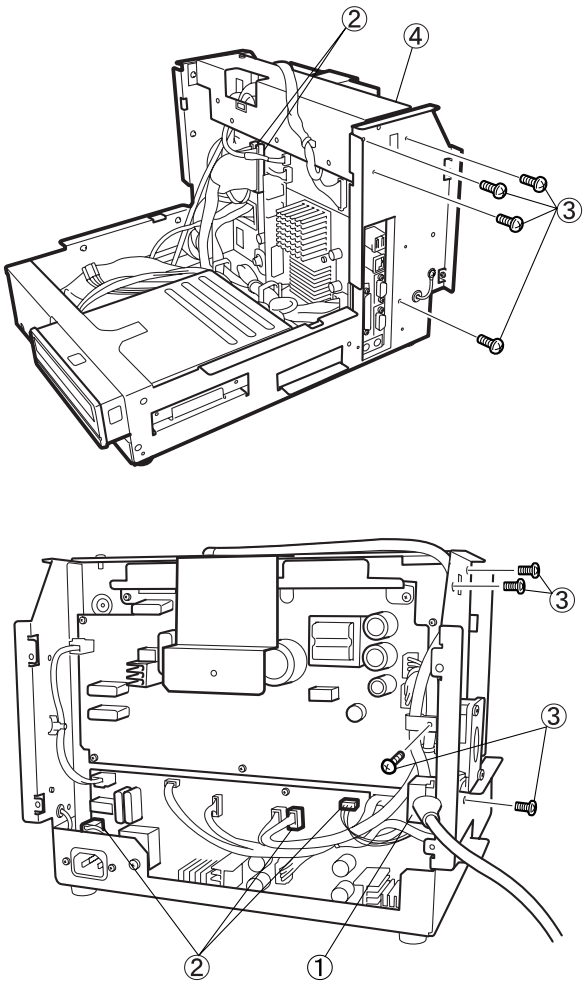


Figure 3-205

Note: For reassembly, be careful not to get the cable damaged and caught. Avoid damage to your fingers with edges of mounting plates.

3. Upper Feeder

1) Remove the scanner unit
2) Remove the 7 screws ① (including 4 TP screws) on the back, and then remove the front lower cover assembly ②.
   Disconnect the cable. Take necessary precautions since the 2 leaf springs, the document board and the opening front cover fall.

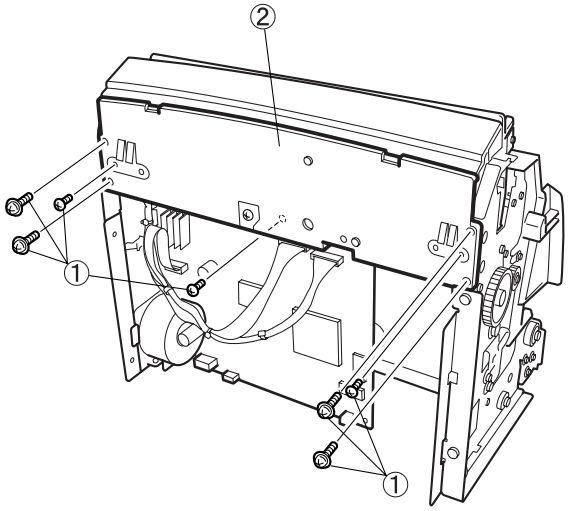


Figure 3-206

3) Remove the 3 connectors ① from the DC control PCB ②.

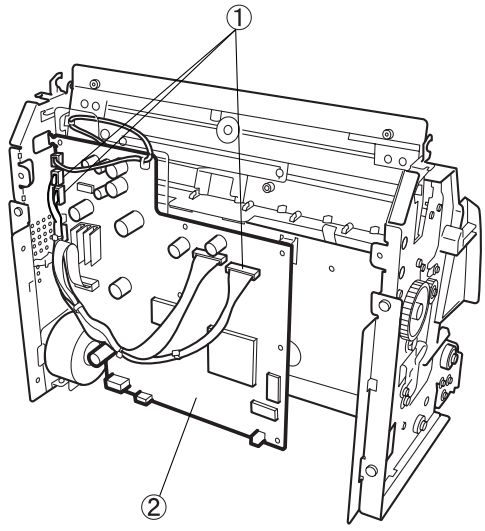


Figure 3-207

4) Remove the 2 E-rings ② at both ends of the delivery drive roller 2 ①, remove the flange ③ and belt 1 ④, then remove gear ⑤, pin ⑥ and 2 washers ⑦.

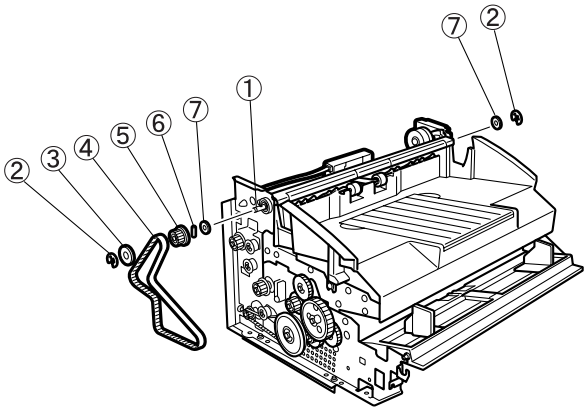


Figure 3-208

5) Remove the E-ring ① and the damper gear ②.

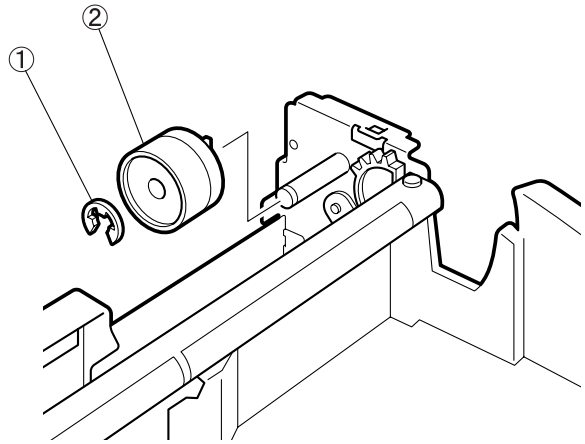


Figure 3-209

Note: If the damper gear is removed and the upper feeder is opened and the hand is released, the upper feeder falls, so be careful.

6) Remove the 2 screws ① and remove the static eliminator stay ②.

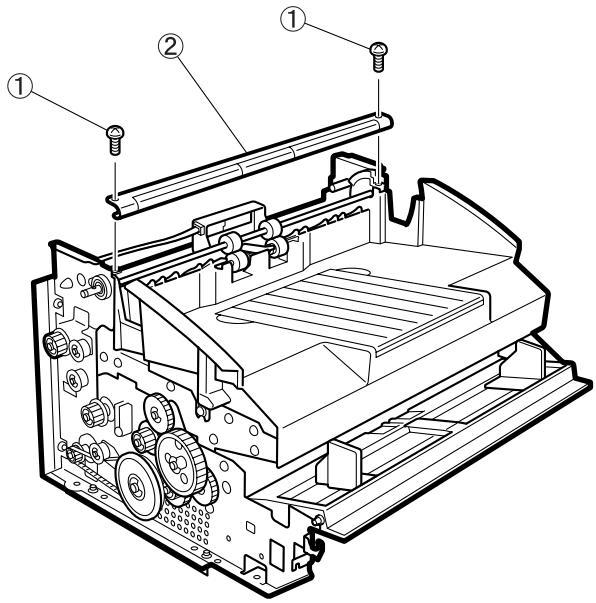


Figure 3-210

7) Remove the bearings ② at both ends of the delivery drive roller 2 ① and remove the delivery drive roller.

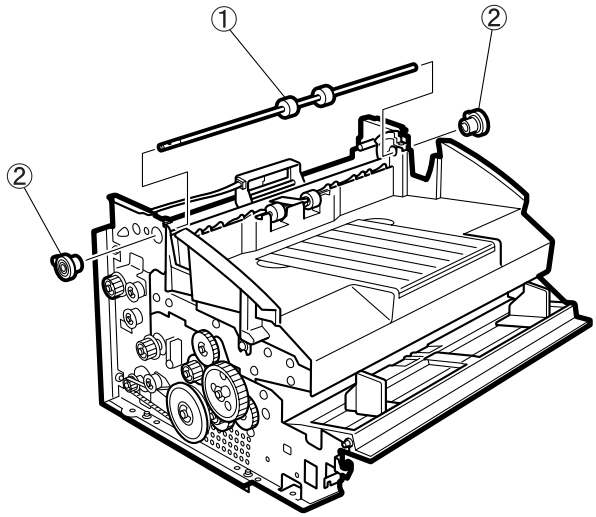


Figure 3-211

8) Remove the bushings ①, delivery sensor connector ② and remove the upper feeder ③.

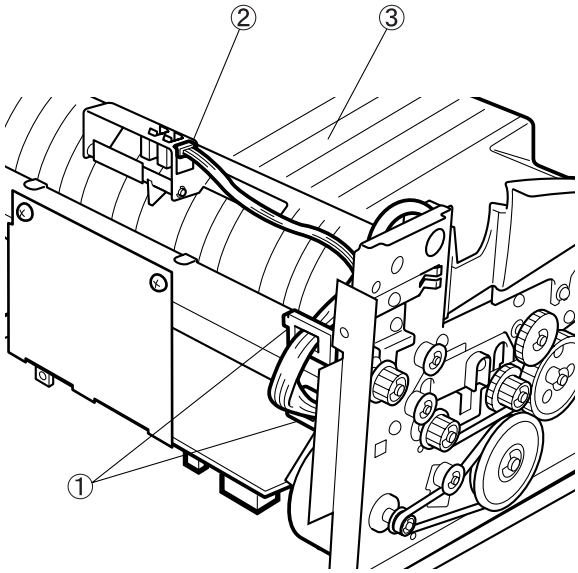


Figure 3-212

III. DRIVE SYSTEM

1. Main Motor

1) Remove the scanner.
2) Remove the DC control PCB.
   (Refer to VI. ELECTRICAL SYSTEM.)
3) Remove the 4 screws ①, and then pull out the main motor ②.

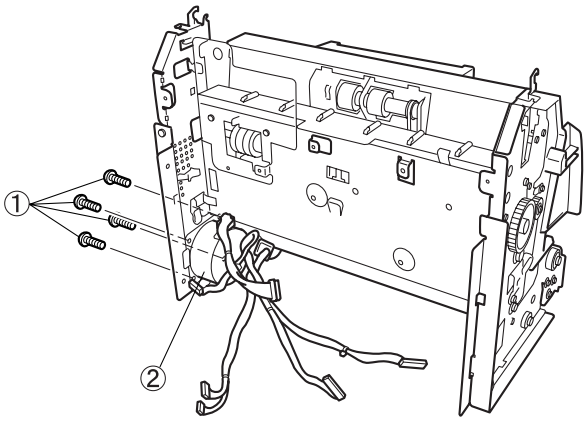


Figure 3-301

Note: Adjust the timing belt tension during reassembly if necessary.

2. Document Board Motor

1) Remove the scanner.
2) Remove the 7 screws ① (including 4 TP screws) on the back, and then remove the front lower cover assembly ②. Disconnect the cable. Take necessary precautions since the 2 leaf springs, the document board and the opening front cover fall.

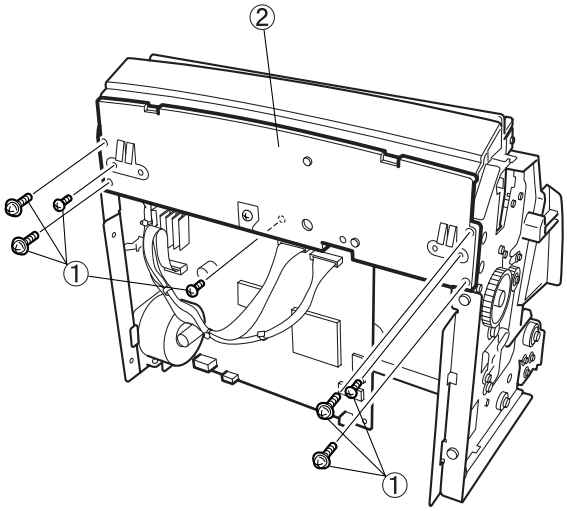


Figure 3-302

3) Remove the 3 screws ① (8 mm long), and then remove the document board motor unit ②. Take necessary precautions since the leaf spring ③ is removed.

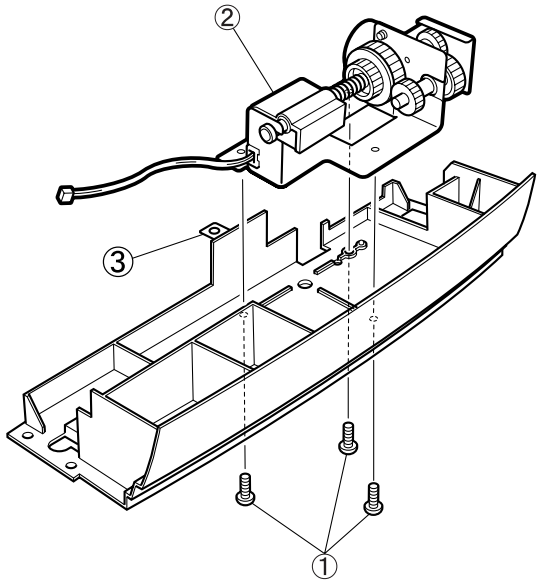


Figure 3-303

4) Remove the 2 screws ① and connector ②, and then remove the document board motor ③ (with gear assembly).

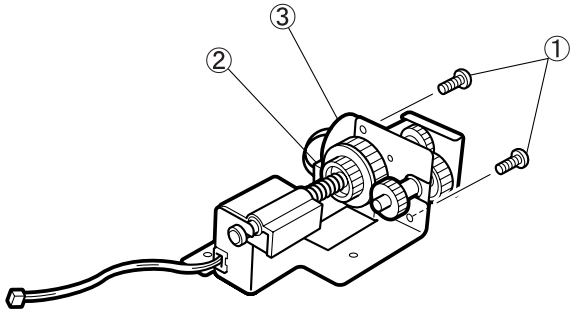


Figure 3-304

3. Upper Pickup Guide Plate

1) Remove the 4 screws ①, and then remove the upper pickup guide plate ②.

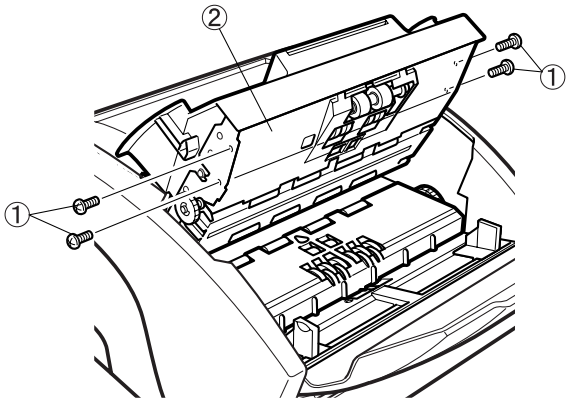


Figure 3-305

4. Pickup Unit

1) Remove the upper pickup guide plate.
2) Remove the 7 screws (2 are TP screws) ①, and pull out the pickup unit ②.

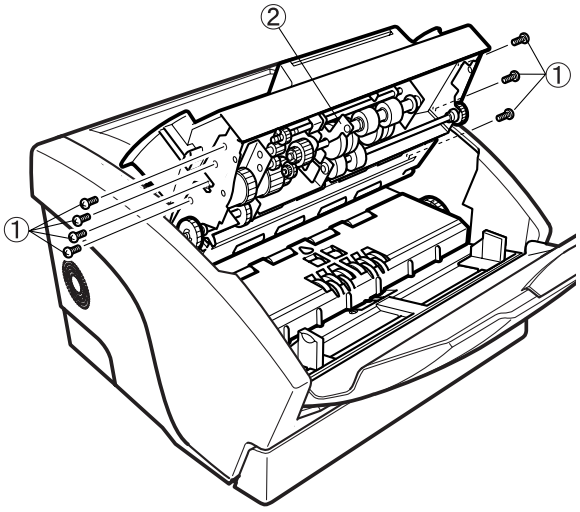


Figure 3-306

3) Disconnect the 3 connectors ①, and then remove the pickup unit ②.

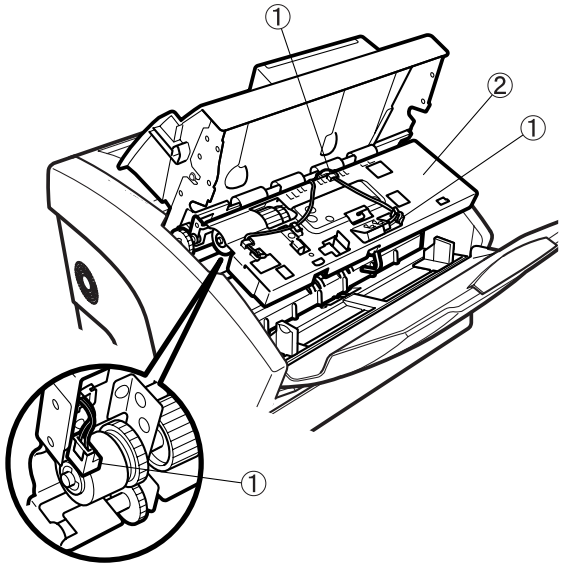


Figure 3-307

5. Lower Pickup Guide Plate

1) Remove the rear cover.
2) Remove the CD front cover.
3) Remove the left and right covers.
4) Remove the 4 screws ①, and then remove the lower pickup guide plate ②.

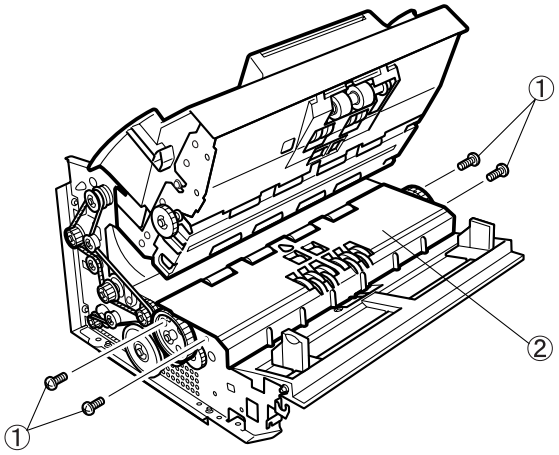


Figure 3-308

6. Registration Clutch

1) Remove the lower pickup guide plate.
2) Remove the E-ring ①, gear ② and pin ③.

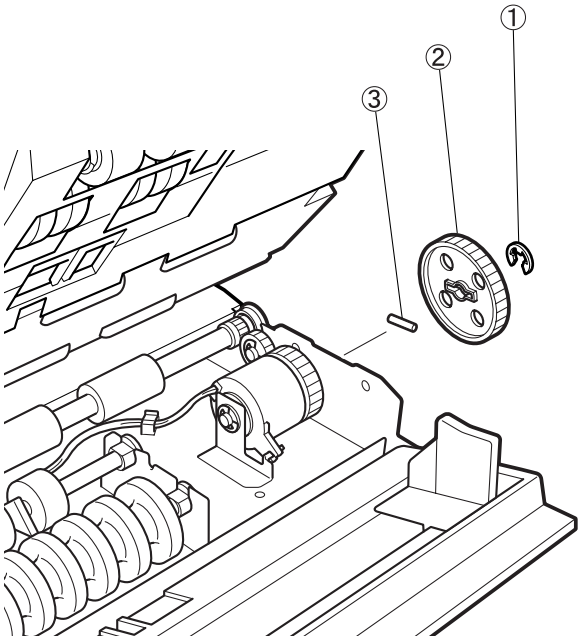


Figure 3-309

3) Remove the 2 E-rings ①, and the 2 bearings ②.

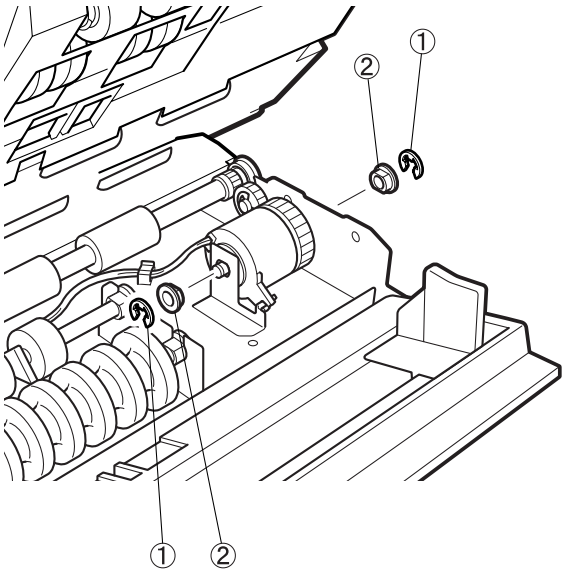


Figure 3-310

4) Remove the shaft ①, disconnect connector ②, and then remove the registration clutch ③.

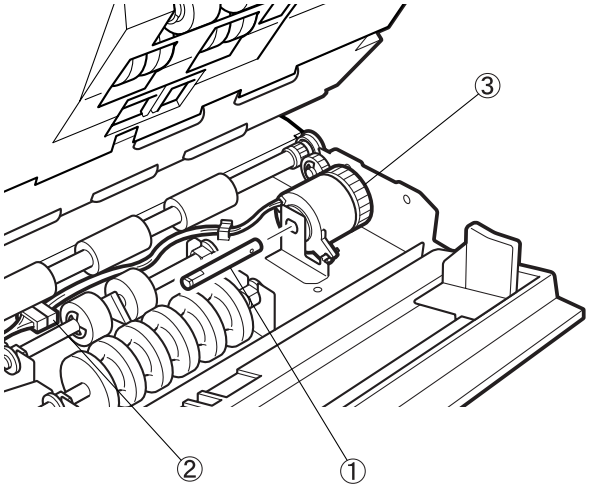


Figure 3-311

7. Pickup Clutch

1) Remove the pickup unit.
2) Remove the E-ring ①, gear ②, pin ③ and G-ring ④, and then remove the pickup clutch ⑤.

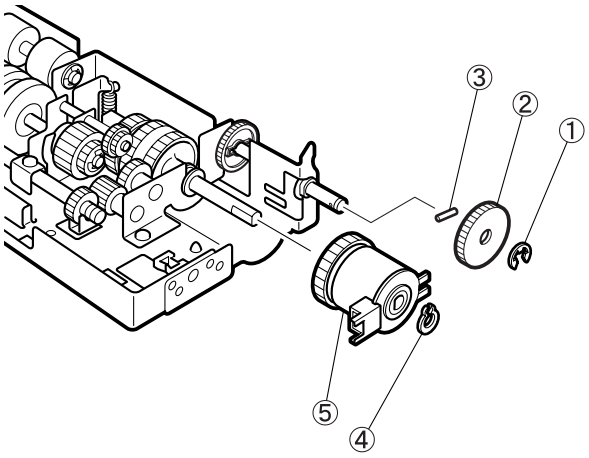


Figure 3-312

Note: During reassembly, align the D-cut on the shaft and clutch with the rotation stopper.

8. Separation Clutch

1) Remove the lower pickup guide plate.
2) Remove the E-ring ①, and remove the gear ②.

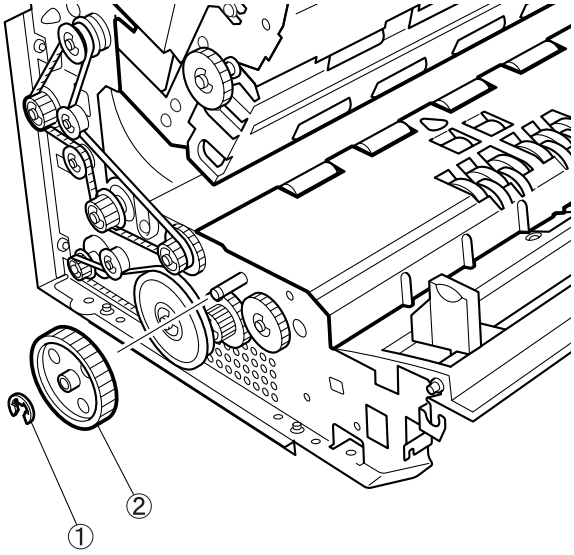


Figure 3-313

3) Remove the E-ring ①, slide the separation clutch to the gear ② side, remove pin ③, and then remove the separation clutch ④.

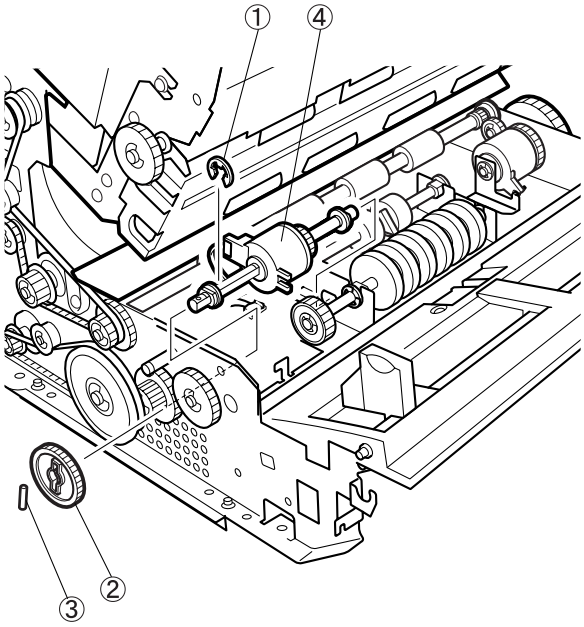


Figure 3-314

4) Remove the 2 bearings ①, disconnect the connector ②, remove the E-ring ③, and then remove the separation clutch ④.

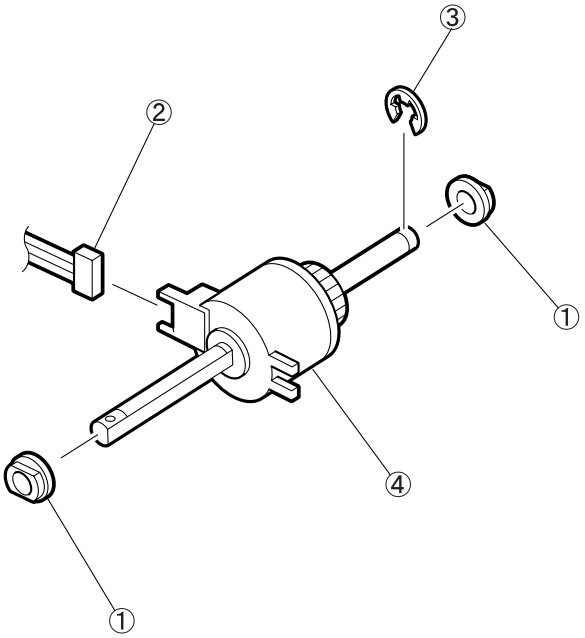


Figure 3-315

IV. FEED SYSTEM

1. Pickup Roller

1) Remove the upper pickup guide plate. (Refer to III. DRIVE SYSTEM.)
2) Remove the 2 screws ①. When removing the belt ②, also remove the pickup roller assembly ③.

Note: To remove the pickup roller assembly, slightly push, but avoid bending, the plates on the left and right outwards.

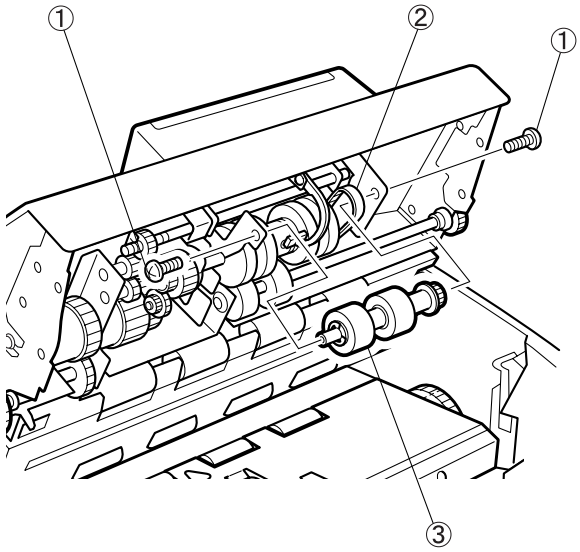


Figure 3-401

3) Remove the gear ①, and separate the pickup roller assembly ②.

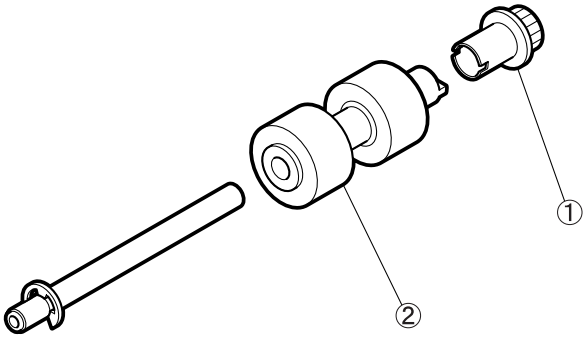


Figure 3-402

2. Feeding Roller

1) Remove the upper pickup guide plate. (Refer to III. DRIVE SYSTEM.)
2) Remove the E-ring ①, and slide the washer ②, the wave washer ③ and the bearing ④ to the feeding roller ⑤ side.

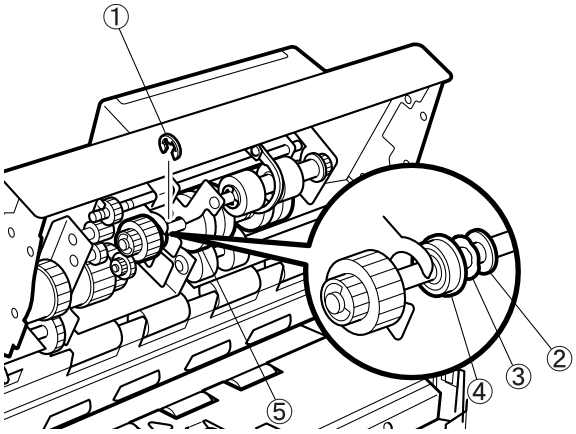


Figure 3-403

3) Loosen the 2 hexagon socket head screws ① to remove the feeding roller shaft ② and the feeding roller ③ at the same time.

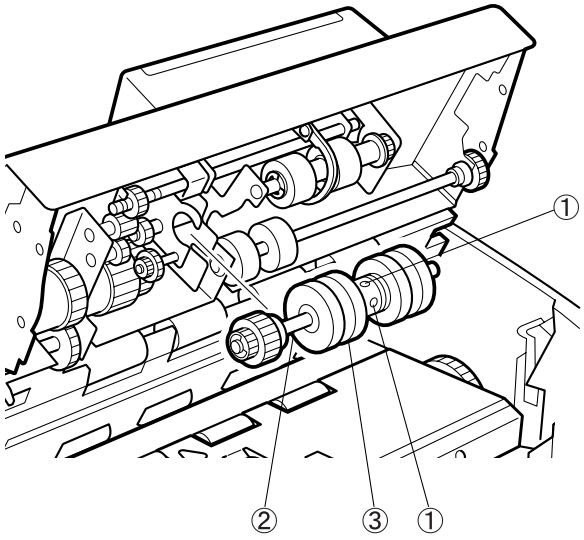


Figure 3-404

4) Remove the E-ring ① and bearing ②, and then remove the feeding roller ③.

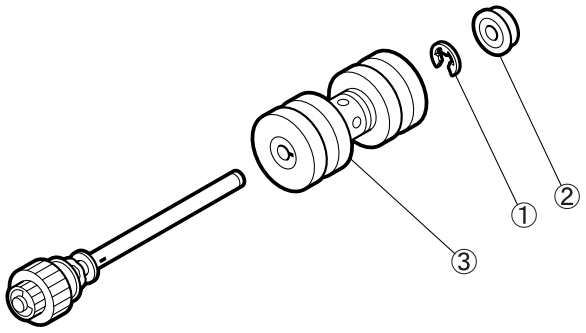


Figure 3-405

Note: When attaching the feeding roller, make the following adjustment.

1) Loosen the hexagon socket head screws ①, and adjust the gap between the feeding roller and separation roller so that the gap on the left ② and right ③ is the same.

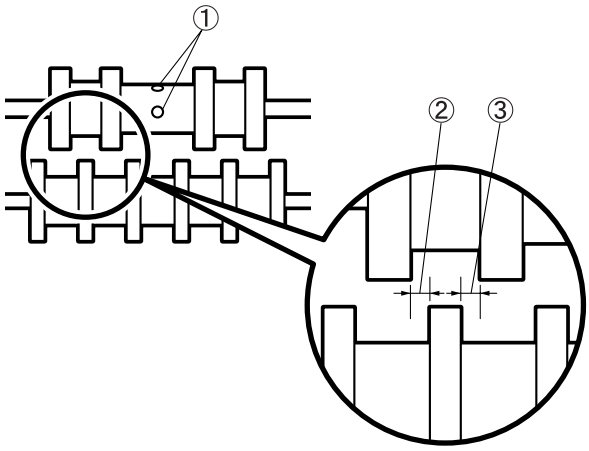


Figure 3-406

2) After replacing parts, when the separation failure occurs, adjust the height-direction gap between the separation roller and the feeding roller. Refer to "CHAPTER 5, IV. AFTER REPLACING PARTS."

3. Registration Drive Roller

1) Remove the upper pickup guide plate. (Refer to III. DRIVE SYSTEM.)
2) Remove the E-ring ①, washer ②, bearing ③ and spring ④, and then remove the registration drive roller shaft ⑤.

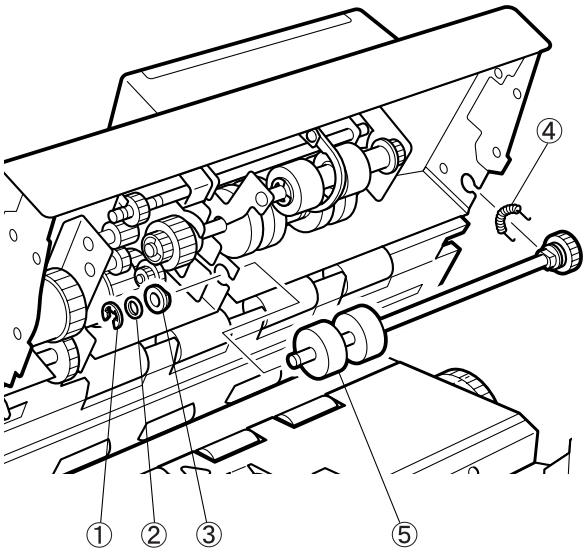


Figure 3-407

3) Remove the 2 E-rings ①, draw out the gear ②, pin ③ and bearing ④, and remove the registration drive roller ⑤.

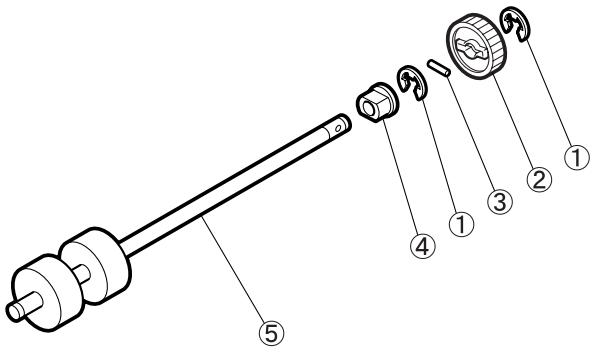


Figure 3-408

4. Separation Drive Roller

1) Remove the lower pickup guide plate. (Refer to III. DRIVE SYSTEM.)
2) Remove the E-ring ①, slide the bearing ② to the gear ③ side, and remove the separation roller ④.

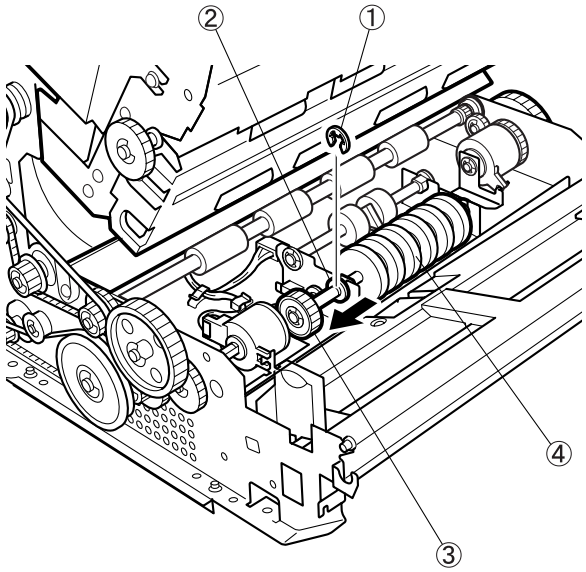


Figure 3-409

3) Remove the 2 E-rings ①, draw out the gear ②, pin ③ and 2 bearings ④, and separate from the separation drive roller ⑤.

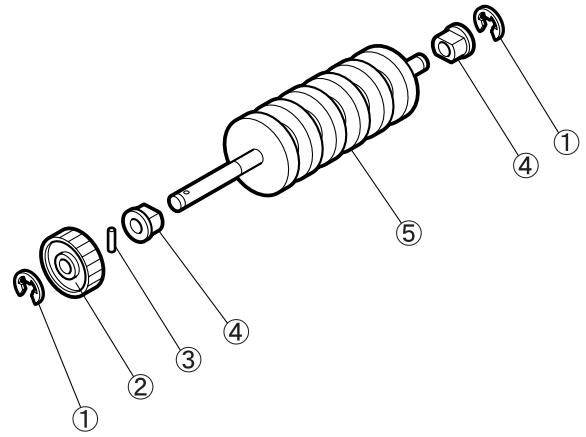


Figure 3-410

Note: After replacing parts, when the separation failure occurs, adjust the gap between the separation roller and the feeding roller. Refer to “CHAPTER 5, IV. AFTER REPLACING PARTS.”

5. Registration Follower Roller

1) Remove the lower pickup guide plate. (Refer to III. DRIVE SYSTEM.)
2) Remove the 2 E-rings ①, 2 bearings ②, 2 springs ③ and remove the registration follower roller ④.

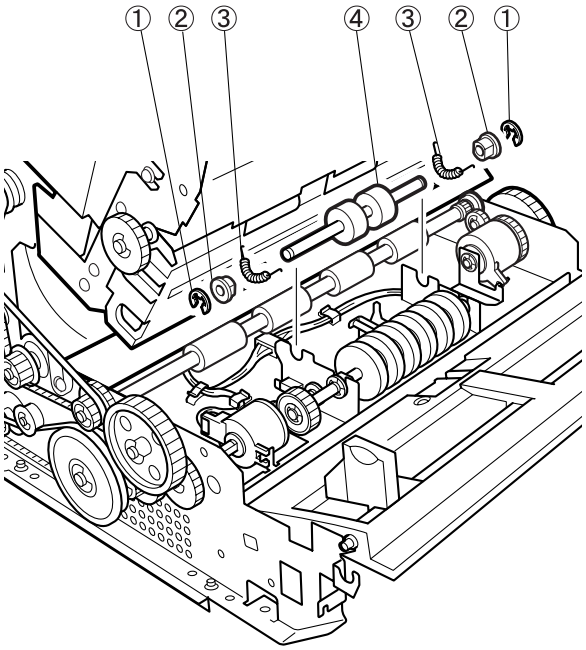


Figure 3-411

6. Reading Drive Rollers

1) Remove the lower pickup guide plate. (Refer to III. DRIVE SYSTEM.)
2) Remove the lower reading unit. (Refer to V. READ SYSTEM.)
3) Remove the E-ring ①, washer ② and bearing ③.

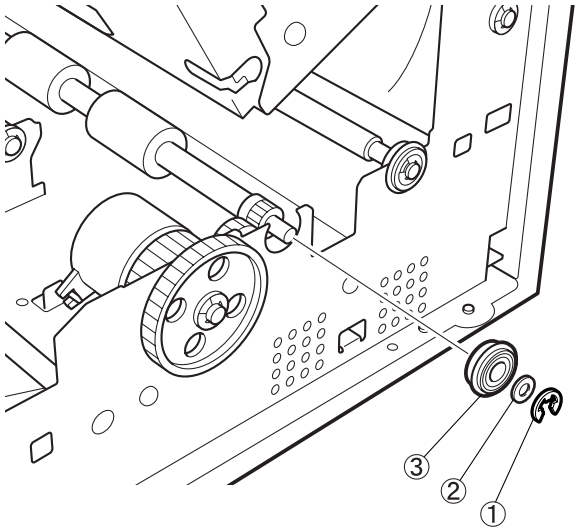


Figure 3-412

4) Remove the belt 1 ①, and slide the reading drive roller shaft ② to the gear ③ side.

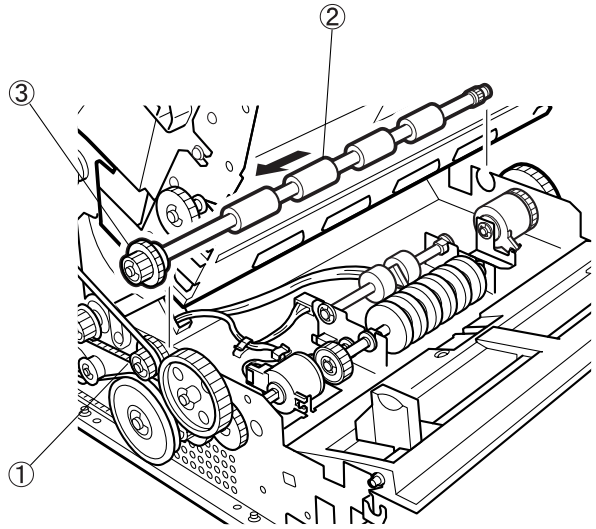


Figure 3-413

5) Remove the E-ring ①, and then gear ② and bearing ③.
Remove the gear ④ and pin ⑤, and separate from reading drive roller ⑥.

Note: The reading drive roller (back) is not provided with gear ④ and pin ⑤.

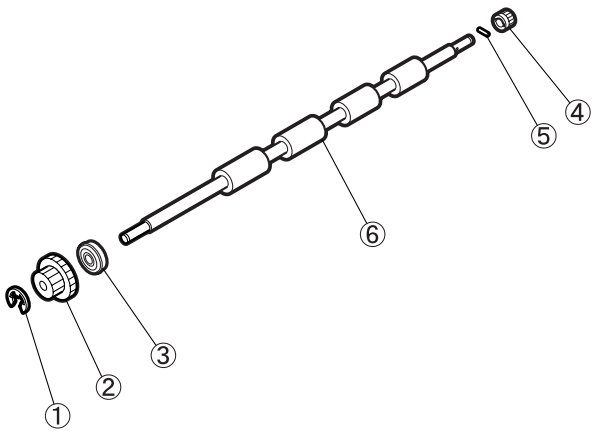


Figure 3-414

7. Reading Follower Rollers

1) Fully open the upper feeder and remove the upper reading unit.
(Refer to V. READ SYSTEM.)
2) Slide the reading follower roller shaft ① in the direction of the arrow and remove 2 springs ② and 4 rollers ③.

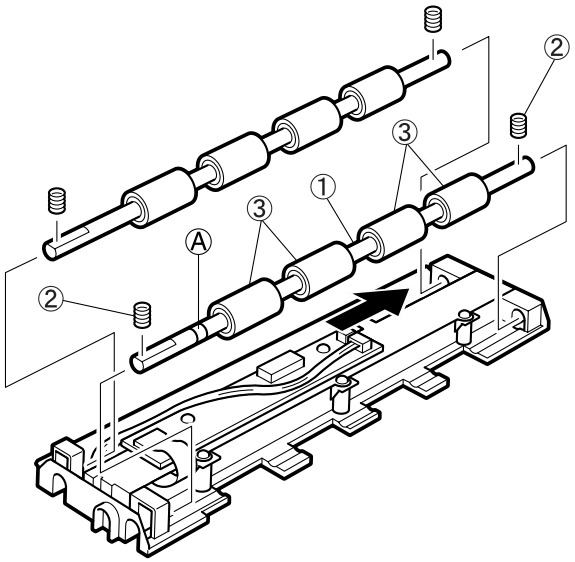


Figure 3-415

Note: When reassembling, first set the spring, and then insert the reading follower roller shaft while pressing down the spring.
Do not mistake the front/rear and left/right sides of the reading follower roller shaft. The front shaft of the reading follower roller shaft has a space Ⓐ for a gear.

8. Delivery Drive Roller 1

1) Remove the upper feeder. (Refer to II. MAIN UNIT.)
2) Remove the 4 screws ① and 2 leaf springs ②, and then remove the U-turn guide ③.

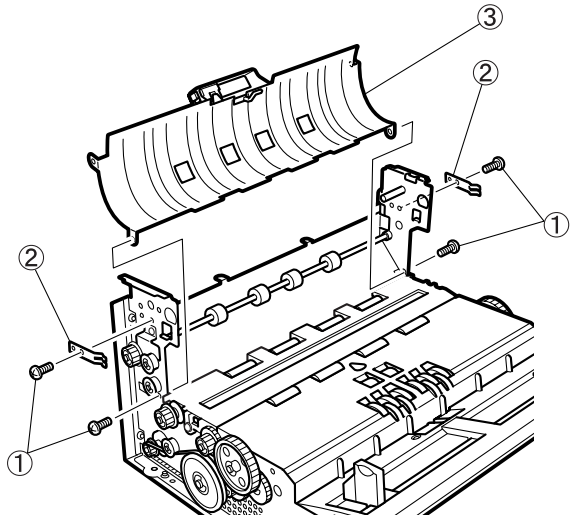


Figure 3-416

3) Remove the 3 E-rings ① , gear ②, pin ③ and 2 bearings ④, and then remove the delivery drive roller 1 ⑤.

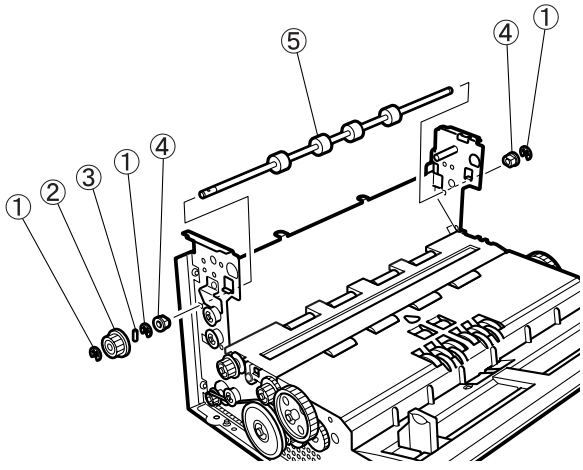


Figure 3-417

9. Delivery Drive Roller 2

1) Remove the rear cover.
2) Remove the CD front cover assembly.
3) Remove the left and right covers.
4) Remove the top cover.
5) Remove the 2 E-rings ①, flange ②, and then remove the belt 1 ③, gear ④, pin ⑤ and 2 washers ⑥.

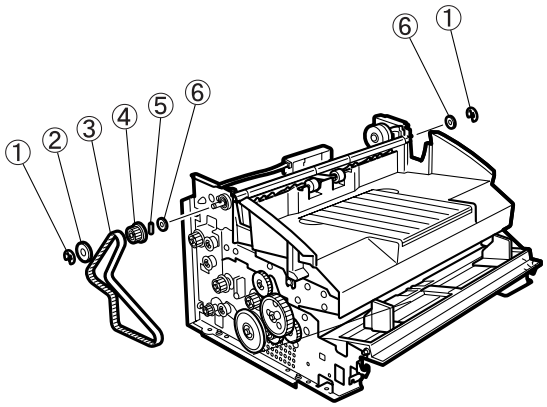


Figure 3-418

6) Remove the 2 screws ① and the static eliminator stay ②.

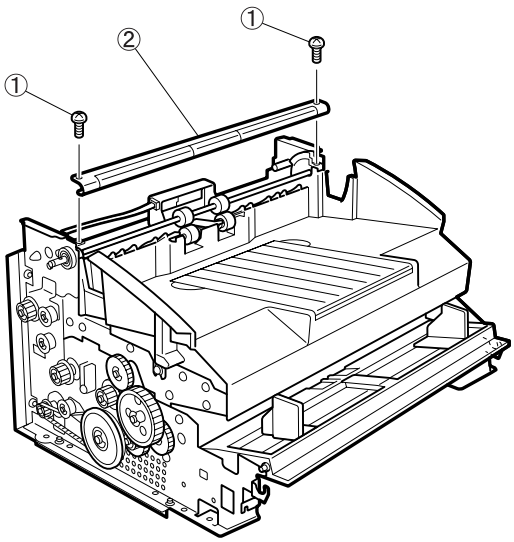


Figure 3-419

7) Remove the 2 bearings ①, and the delivery drive roller 2 ②.

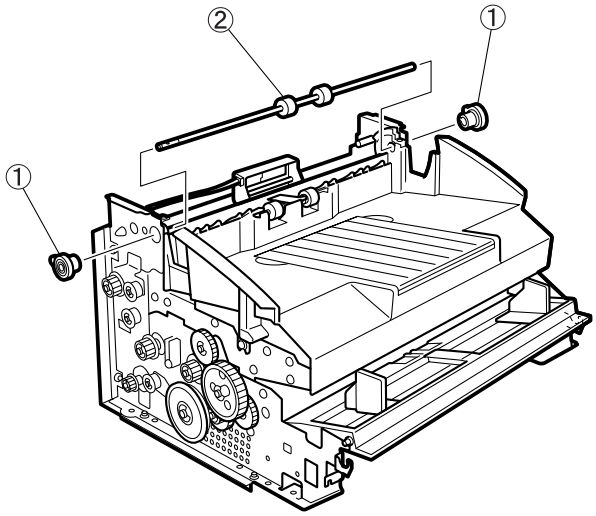


Figure 3-420

10. Delivery Follower Roller 1

1) Remove the delivery cover.
(Refer to II. MAIN UNIT.)
2) Remove the delivery follower roller stay ② while pushing up the delivery cover rear clip ①.

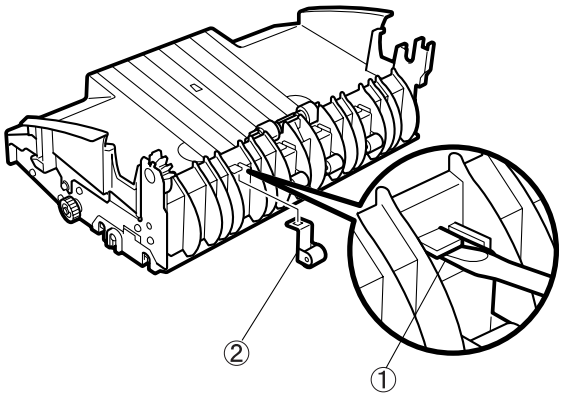


Figure 3-421

3) Extend the delivery follower roller stay ① to remove delivery follower roller ②.

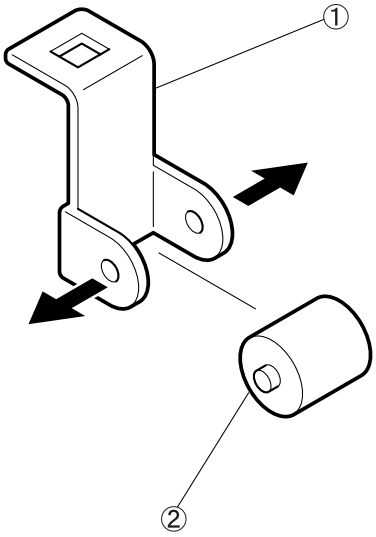


Figure 3-422

11. Delivery Follower Roller 2

1) Remove delivery drive roller 2.
2) Remove delivery follower roller 2 ① in the direction of the arrow.

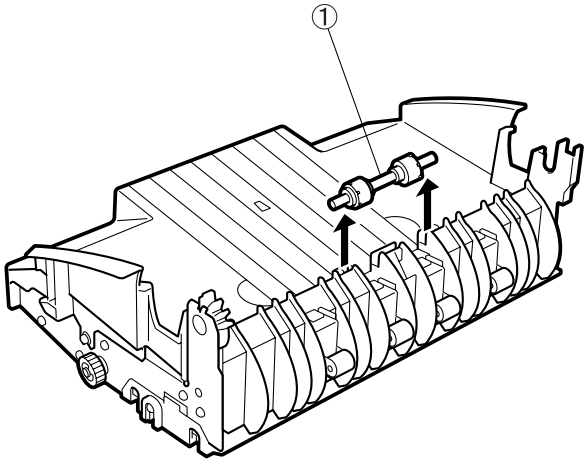


Figure 3-423

12. Belt 1

1) Remove the rear cover.
2) Remove the CD front cover.
3) Remove the left cover.
4) Remove the pickup tray.
5) Loosen the screw ① and remove belt 1 ②.

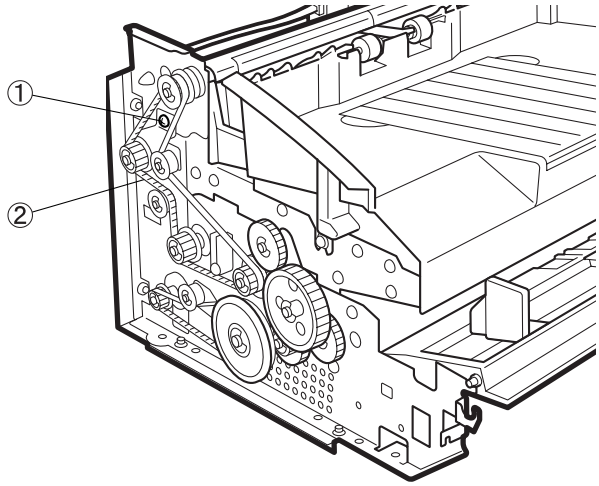


Figure 3-424

Note: When reassembling, adjust the tension of the belt.
Fasten the screw ② while pressing in tension plate ① by a force of 2.5 N (250 gf) in the direction of the arrow.

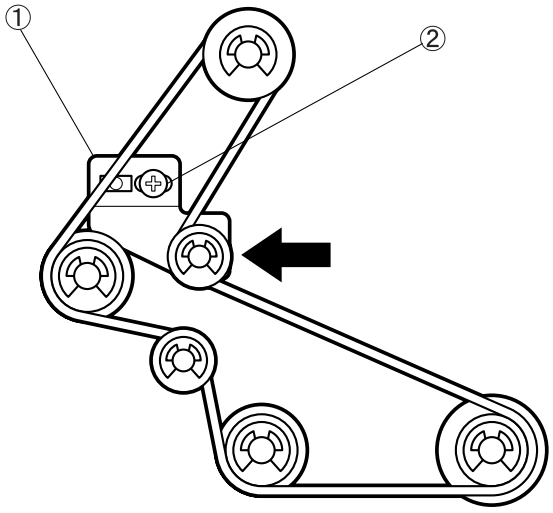


Figure 3-425

13. Belt 2

1) Remove the rear cover.
2) Remove the CD front cover.
3) Remove the left cover.
4) Remove the pickup tray.
5) Loosen the screw ① and remove belt 2 ②.

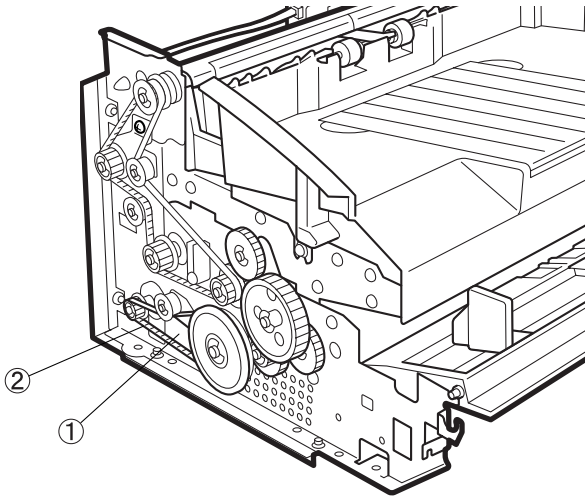


Figure 3-426

Note: When reassembling, adjust the tension of the belt.
Fasten the screw ② while pressing in tension plate ① by a force of 2.5 N (250 gf) in the direction of the arrow.

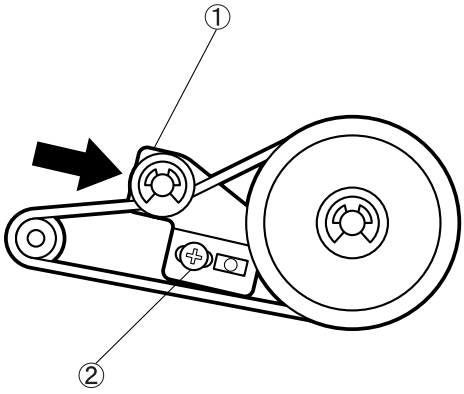


Figure 3-427

V. READ SYSTEM

1. Upper Reading Unit

1) Fully open the upper feeder pressing the upper reading unit ① and remove the 2 screws ② (stepped), and pull out the upper reading unit to the front.

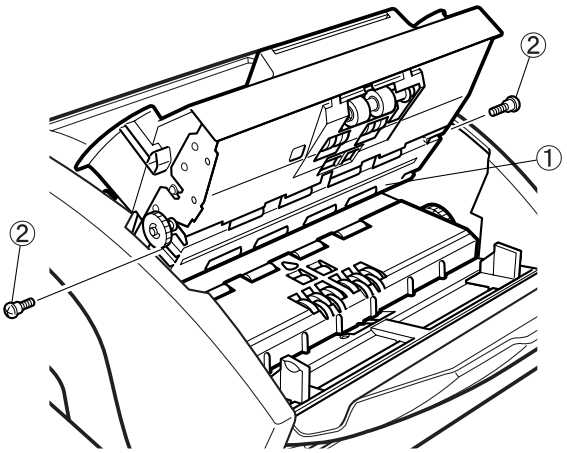


Figure 3-501

2) Disconnect the connector ①, and take out the upper reading unit ②.

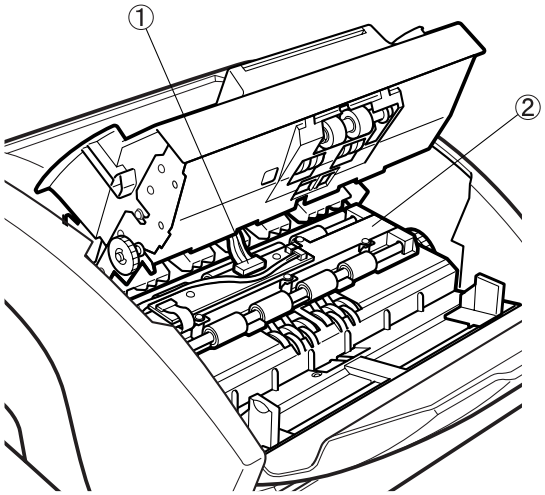


Figure 3-502

2. Lower Reading Unit

1) Remove the lower pickup guide plate. (Refer to III. DRIVE SYSTEM.)
2) Remove the 2 screws ①, lift the lower reading unit ② straight up and remove it.

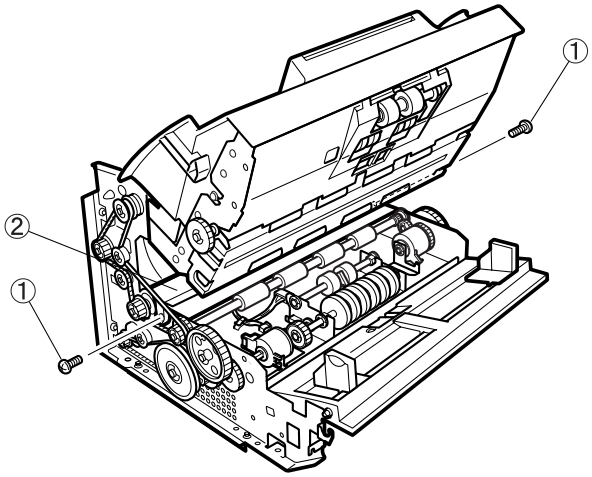


Figure 3-503

3) Disconnect the connector ①, and take out the lower reading unit ②.

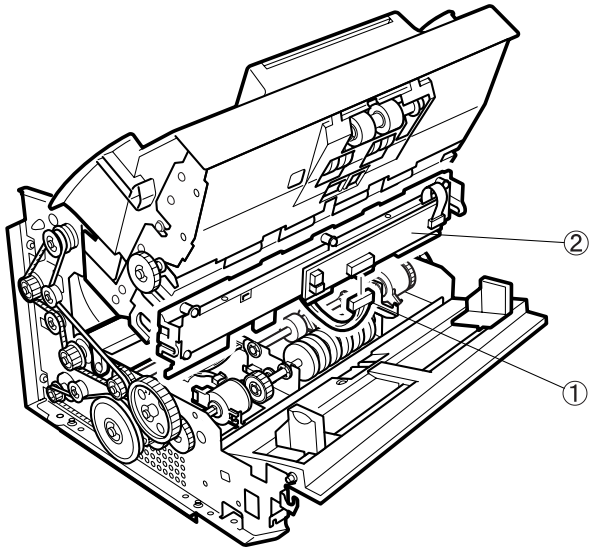


Figure 3-504

Note: When reassembling, firmly fit the cable into the cable holder.

VI. ELECTRICAL SYSTEM

1. DC control PCB

1) Remove the scanner.
2) Remove the 7 screws ① (including 4 TP screws) on the back, and then remove the front lower cover assembly ②. Disconnect the cable. Take necessary precautions since the 2 leaf springs, the document board and the opening front cover fall.

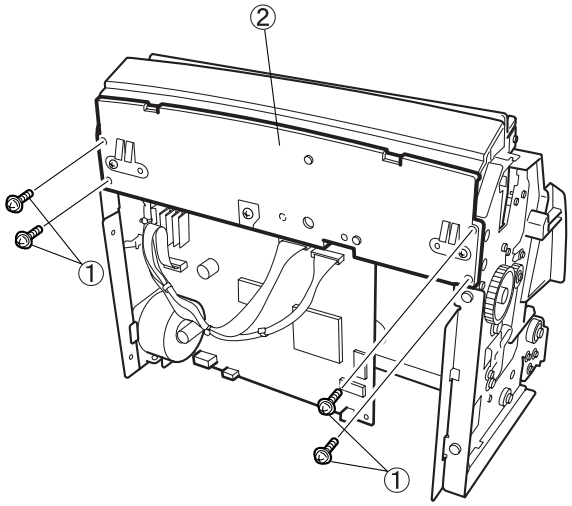


Figure 3-601

3) Disconnect all connectors connected to the DC control PCB ①, remove the 6 screws A ②, the 3 screws B ③ (M2.5), and remove the DC control PCB.

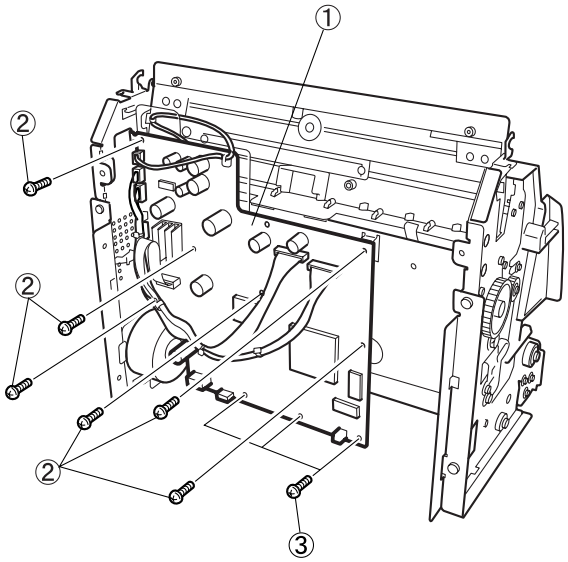


Figure 3-602

2. Power Supply PCB

1) Remove the rear cover.
2) Remove the CD front cover.
3) Remove the left and right covers.
4) Remove the top cover.
5) Remove the 2 screws A ①, and remove the mounting plate ②. Then, disconnect the 3 connectors (with lock) ③, remove the 6 screws B ④, and remove the power supply PCB ⑤.

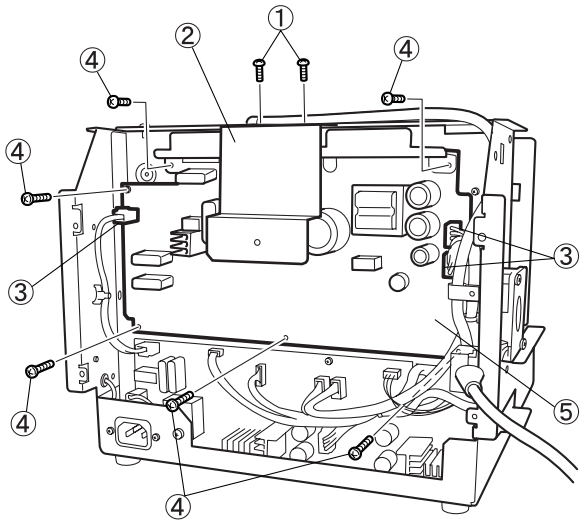


Figure 3-603

3. Motherboard PCB

1) Remove the PCB unit.
   (Refer to II. MAIN UNIT.)
2) Remove all the connectors connected to the motherboard PCB ①, remove the 8 screws ② and remove the motherboard PCB.

Note: The 2 screws holding the LCD drive PCB are of TP type.

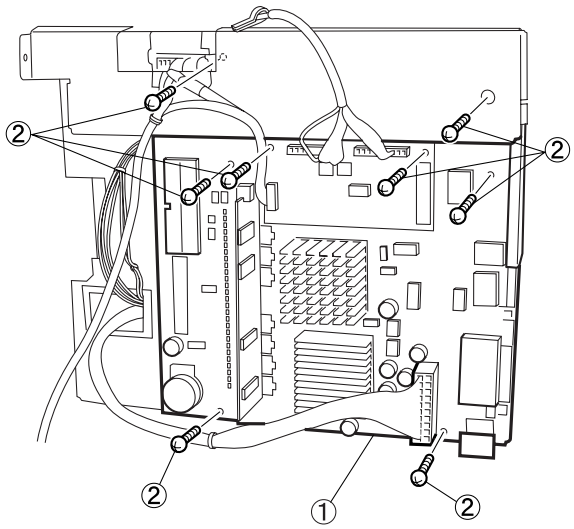


Figure 3-604

3) Remove the LCD drive PCB ① and memory ②.

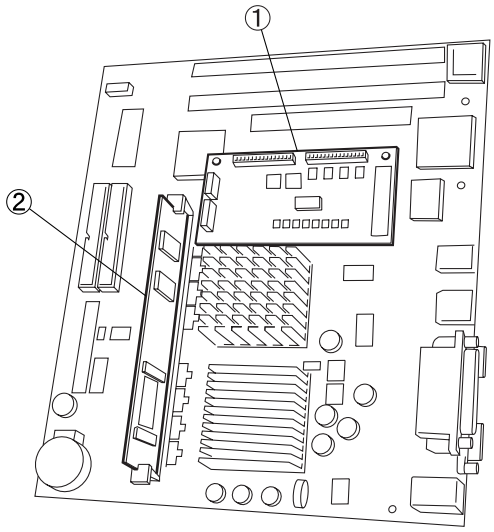


Figure 3-605

Note: During reassembly, be sure to press-fit it.

4. Subboard PCB

1) Remove the PCB unit.
(Refer to II. MAIN UNIT.)
2) Remove all the connectors connected to the subboard PCB ①, remove the 3 screws ②, remove the 2 PCB stoppers ③ and remove the subboard PCB.

Note: The AC power and DC power supply connectors have locks.

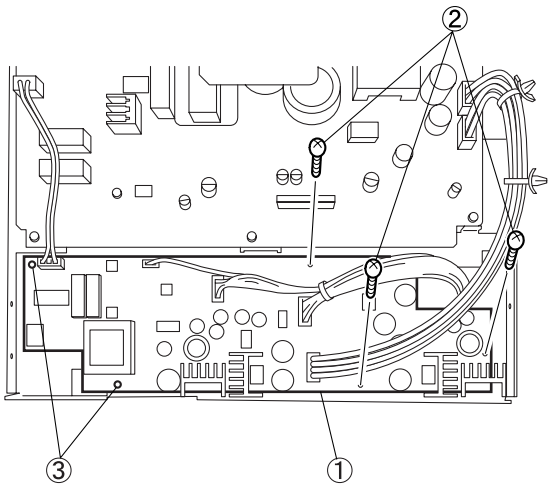


Figure 3-606

5. CD-R drive

1) Remove the CD front cover.
2) Place the main unit with the right side on the surface.
3) Remove the 4 screws ① in the opening and pull the CD-R drive ② forward.
   Use a magnetized screwdriver to prevent screws from falling inside the machine.

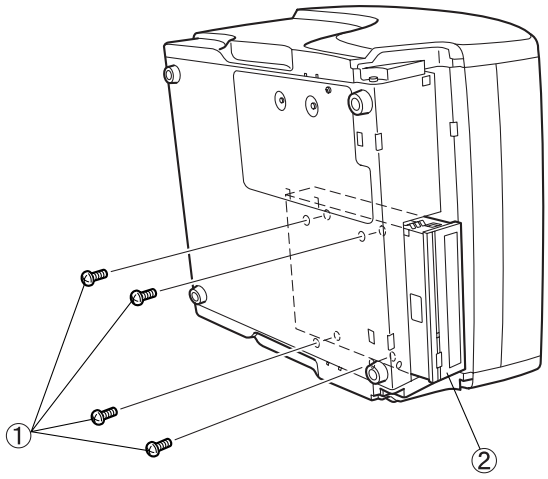


Figure 3-607

4) Disconnect the 2 connectors ①.
   Remove the 2 leaf springs ② on the both sides of the CD-R drive.

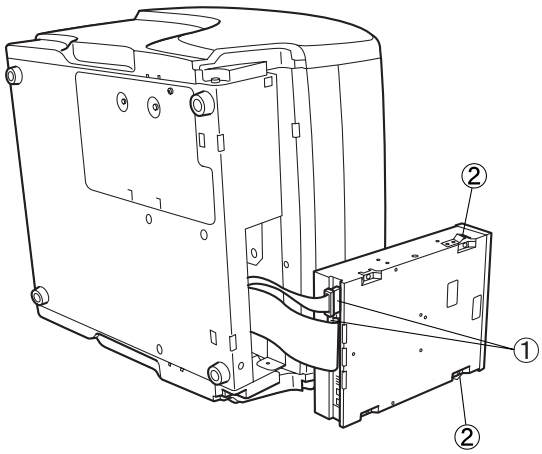


Figure 3-608

Note: The positions of installing screws are not easily recognized during reassembly. Identify them carefully.

6. HDD

1) Place the main unit with the right side on the surface.
2) Remove the 2 screws ①, open the HDD mounting plate ② slowly, remove the lower tab, and remove the plate.
   Be careful not to damage the cables connected to the HDD.

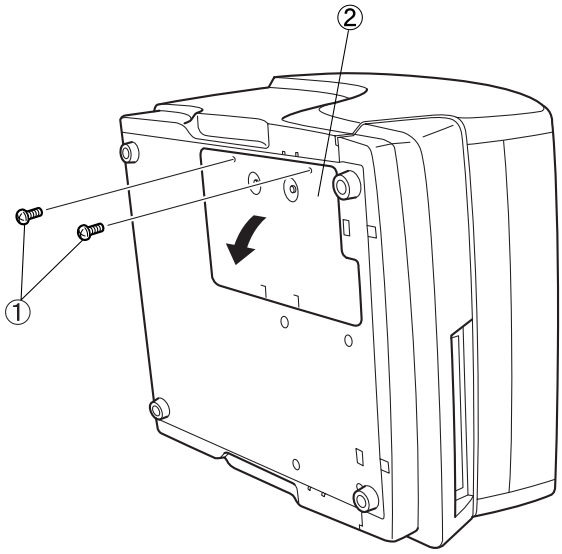


Figure 3-609

3) Remove the 4 screws ①, disconnect the 2 connectors ②, and remove the HDD ③.
   The screws are special ones for the HDD.

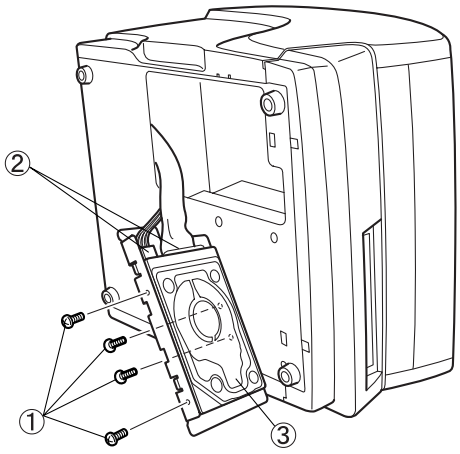


Figure 3-610

VII. TOUCH PANEL

Note: Remove the power cord before starting disassembly or reassembly of this touch panel and others. Be sure to remove the power cord before starting disassembly or reassembly of the touch panel because the power switch on the touch panel is easily turned ON during work. If the power switch is turned ON with the power cord is connected, the high voltage is applied to the cable connected to the inverter PCB, causing hazard.

1. Front Panel

1) Remove the 2 screws ①, lift the upper part of the front panel ②, slide it down, remove the 3 lower fitting parts ③ and remove the front panel.

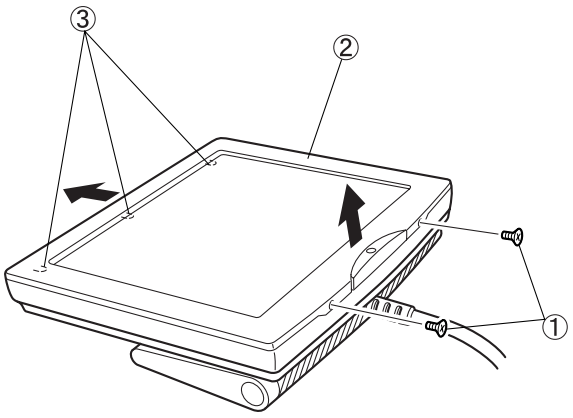


Figure 3-701

2. Touch Panel

1) Remove the front panel.
2) Remove the screw ① and remove the cable cover ②.

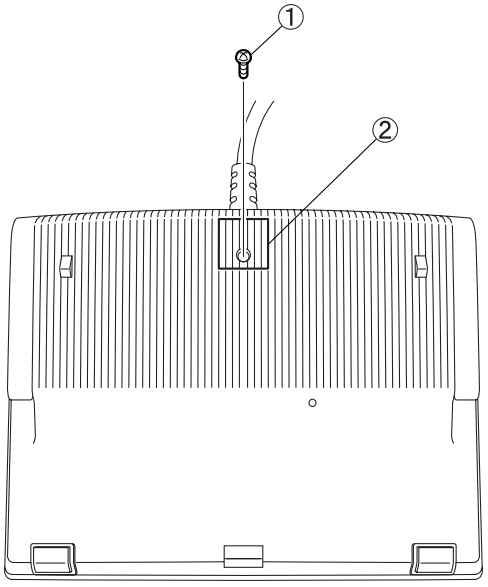


Figure 3-702

3) Remove the 4 positioning pads ① and open the touch panel ②.
The flat cable for the touch panel is connected to the back of the LCD.

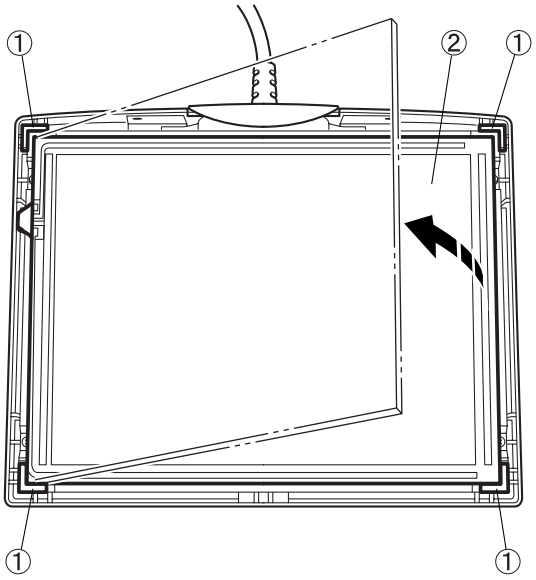


Figure 3-703

4) Remove the 4 screws ① and return the touch panel ② to the top of the LCD ③. Hold the touch panel surface, turn it over and remove the unit from the lower cover.

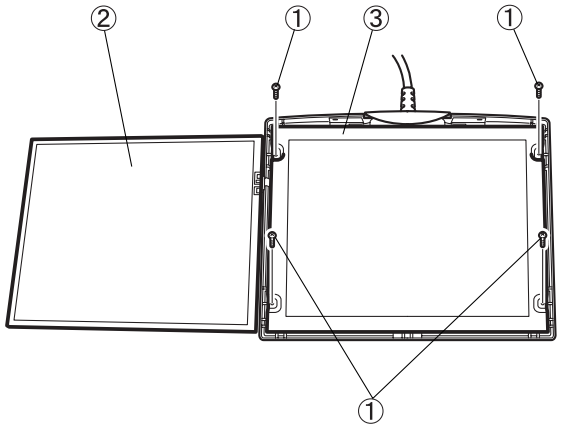


Figure 3-704

5) Remove the flat cable ① from the connector and remove the touch panel.

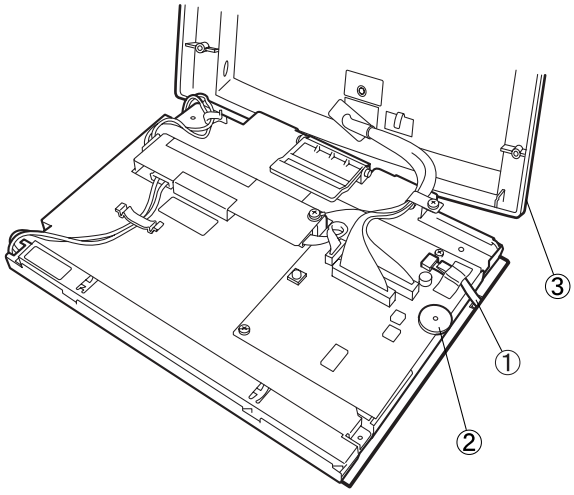


Figure 3-705

Note: For reassembly, be careful not to get the inner cable caught. Insert the LCD contrast adjustment dial ② into the slit of the lower cover ③.

3. LCD

1) Remove the touch panel.
2) Disconnect the 2 connectors ① and remove the LCD ②.

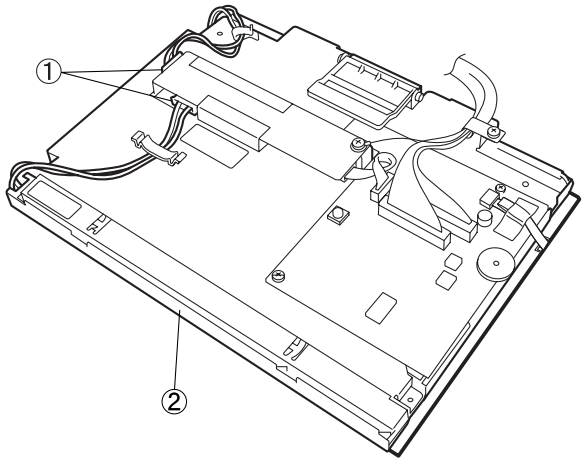


Figure 3-706

Note: During reassembly, align the LCD and operation panel PCB connectors ①.

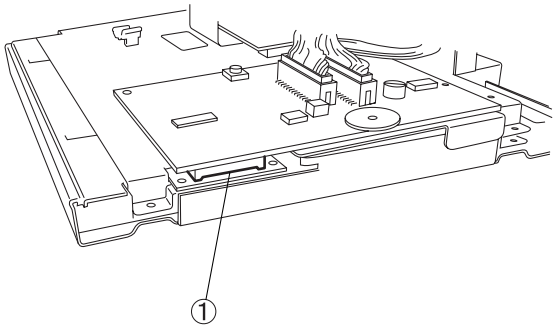


Figure 3-707

4. Operation PCB

1) Remove the touch panel.
2) Remove the LCD.
3) Turn the lever ① and remove the mounting plate ②.

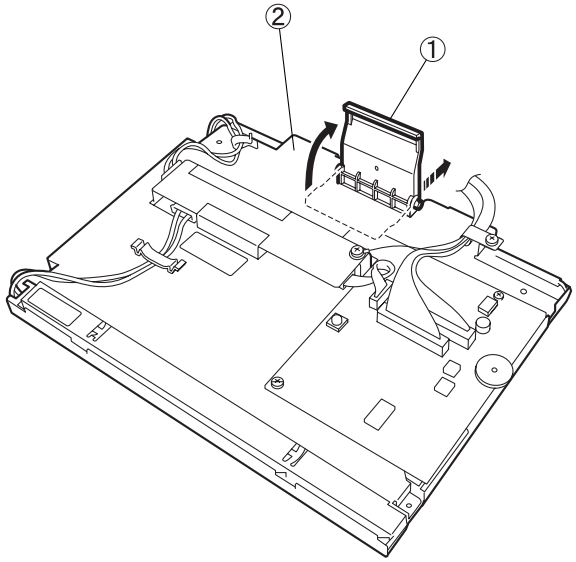


Figure 3-708

4) Disconnect the 3 connectors ①, remove the 4 screws ② and remove the operation PCB ③.

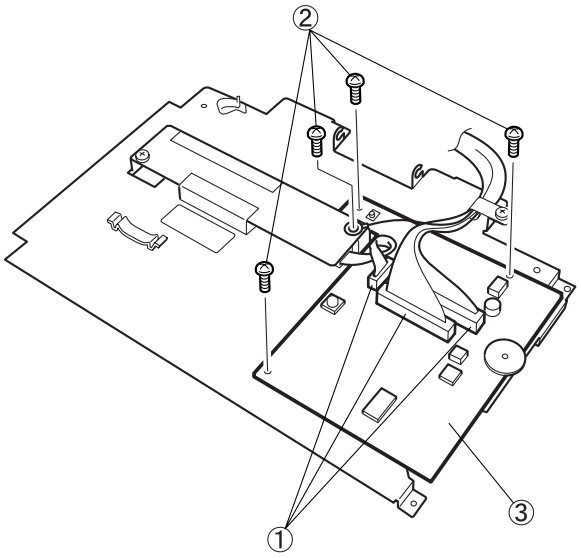


Figure 3-709

CHAPTER 4

INSTALLATION & MAINTENANCE

I. SELECTION OF LOCATION

The installation location of CD-4070NW should meet the following requirements.

The service technician must personally inspect the user's premises before installing CD-4070NW.

■ The power supply should be connected to an outlet capable of supplying the voltage shown on the rating plate plus or minus 5%. A grounding plug must be used.

Ground Items
1) Power outlet ground terminal
2) Grounding wire that has been grounded for office equipment

■ Do not install CD-4070NW on a weak table, a tilted or unstable surface.
CD-4070NW weighs approx. 15 kg.

■ The usable temperature is between 10 to 32.5°C, and usable humidity between 20 to 80% RH. However, the temperature should be between 15 to 27.5°C, and humidity between 25 to 75% RH to guarantee performance.
In particular, do not install the machine near water faucets, humidifiers, hot water heaters, and refrigerators.

■ If a network is used, the network environment must be properly established.

■ CD-4070NW should not be exposed to open flame, dust, ammonia or other corrosive gases, direct sunlight, intensive vibration or near machinery that generates electromagnetic waves.
* Prevent cigarette smoke from coming into direct contact with CD-4070NW.
* At the places where installation of CD-4070NW in the direct sunlight is unavoidable, a heavy curtain should be installed on the windows to protect CD-4070NW.

■ Maintain sufficient space around CD-4070NW during operation and maintenance, and to allow ventilation.
* The rear panel has a power cord and the left panel has air vents, therefore do not press it against a wall.
* There must be a sufficient space on both sides of CD-4070NW so that it can be held with hands when it is moved.

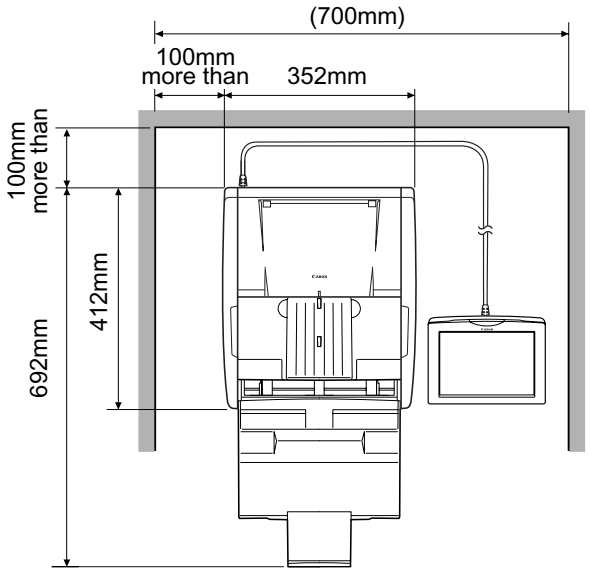
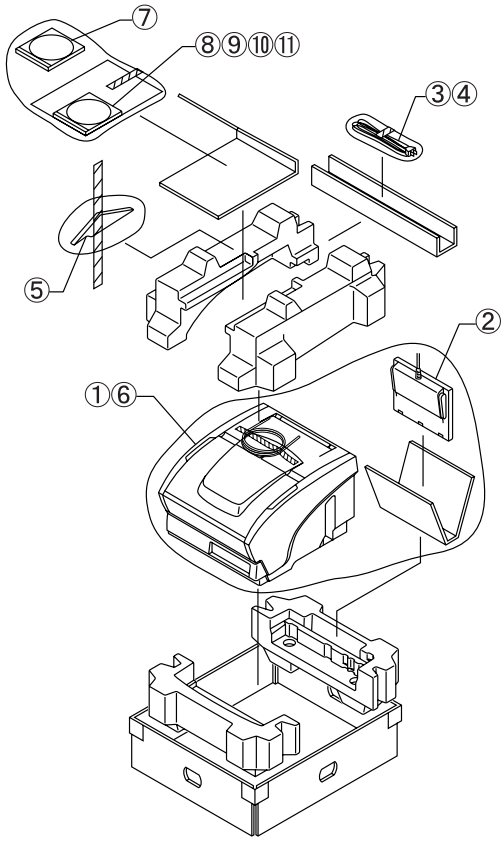
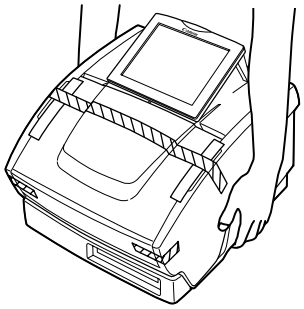


Figure 4-101

II. UNPACKING AND INSTALLATION

Water droplets sometimes form on the surface of metal parts when the machine is brought into a warm place from a cold place. This phenomenon is called "condensation." Using the machine when condensation has occurred might cause machine trouble.

At least one hour should be allowed for the machine to warm up to room temperature before the shipping container is opened after it has been moved to a warm place from a cold place.

No.	Procedure	Check Items/Remarks
1	Remove the package and take out the product and its accessories. Check if anything is missing. The container weighs approx. 20 kg. Its external dimensions are approx. 508 (W) × 592 (D) × 442 (H) mm. ①Main body ②Touch panel ③Power cord ④Grounding wire (100 V model only) ⑤Document eject guide ⑥Auxiliary paper support plate ⑦CD-R disc (blank) ⑧User manual Hardware and Software versions (100 V model has only Hardware version.) ⑨Disc for user manual (100 V and 120 V models only) ⑩Quick reference guide ⑪Warranty card (100 V and 120 V models only) **Note:** The main unit and the touch panel are connected with a relay cable.	
2	Move the main body to where it is to be installed. The product weighs approx. 15 kg. Be careful not to drop the touch panel when moving the machine.	

No.	Procedure	Remarks
3	Peel off all the protective tapes securing the various parts. Check all the covers for possible damage incurred during transportation.	
4	Open the upper feeder and remove the protective sheet from the reading glass.	
5	Connect a keyboard, mouse, and network cable if necessary.	
6	Mount a delivery tray extension if necessary.	
7	Connect the power cord. In the case of the 100 V model, connect the grounding wire also.	
8	Press the power switch to startup the system.	
9	Check if the machine operates normally. For details on how to operate it, refer to the user manual. For models other than Japanese 100 V models, the "locale setting" must be changed. For details, see the "Locale" section in service mode. **Note:** See the next section for the network settings and the UPS connections.	

III. NETWORK SETTINGS

When the network is set up, the user administrator should be present to provide necessary information.

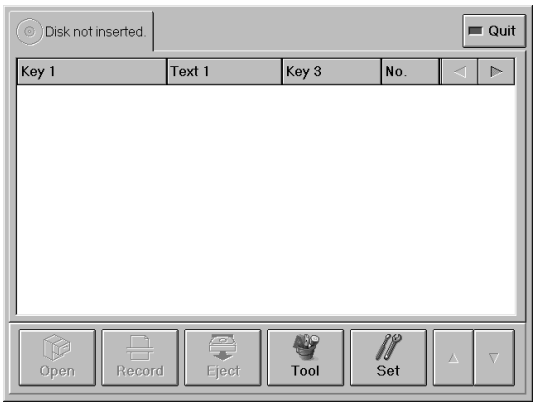
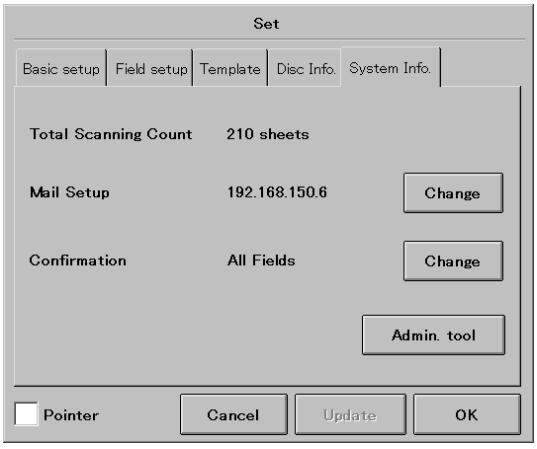
Note1: If a computer named "CD4070NWE" is connected to the network system, it is the same as the computer name of this machine. Therefore, change the computer name of this machine to a different name that can be used for the network system.

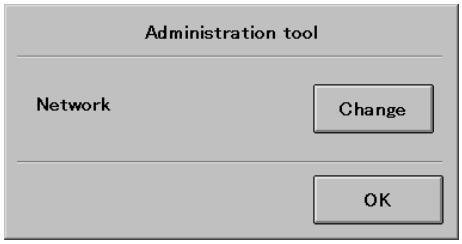
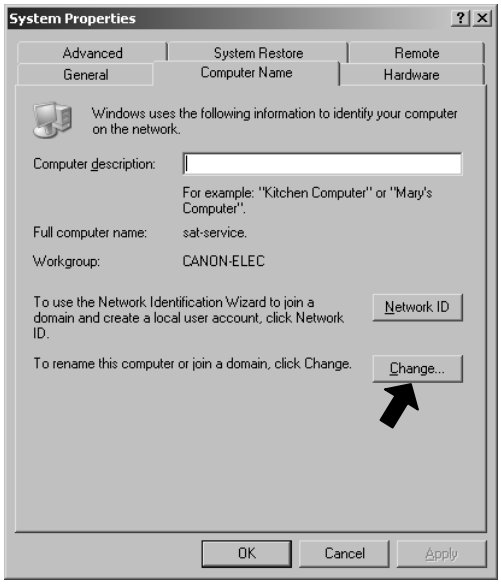
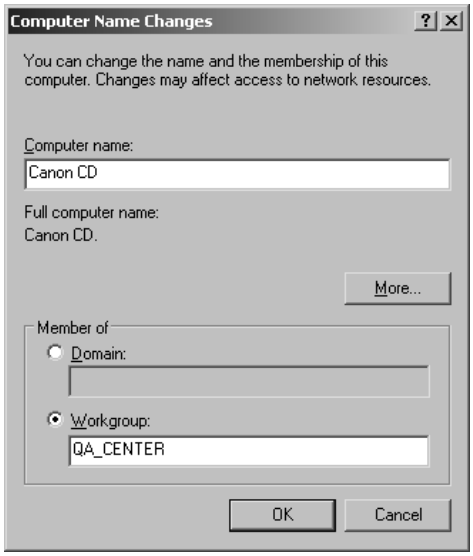
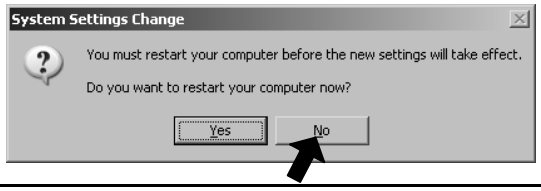
However, there is a limitation on the maximum number of characters of computer name.

If the member setting is necessary, set it according to the procedure in section 1. If it is not necessary, do not set it.

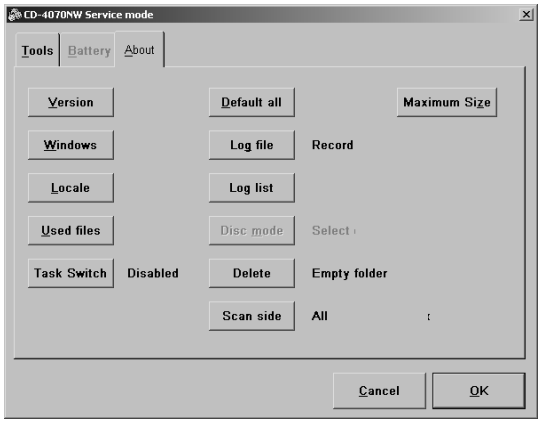
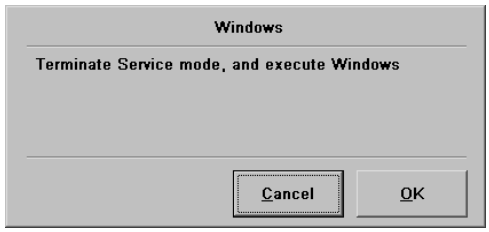
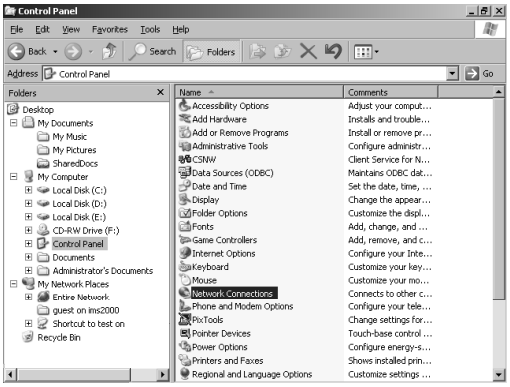
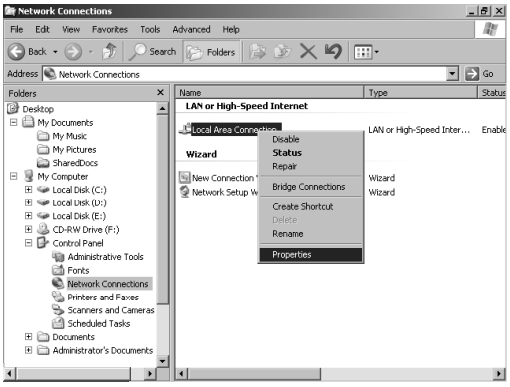
Note2: If the "DHCP server" of the user network system is running and the IP address can be obtained automatically, setup is not necessary. If the IP address needs to be set, set it according to the procedure in section 2.

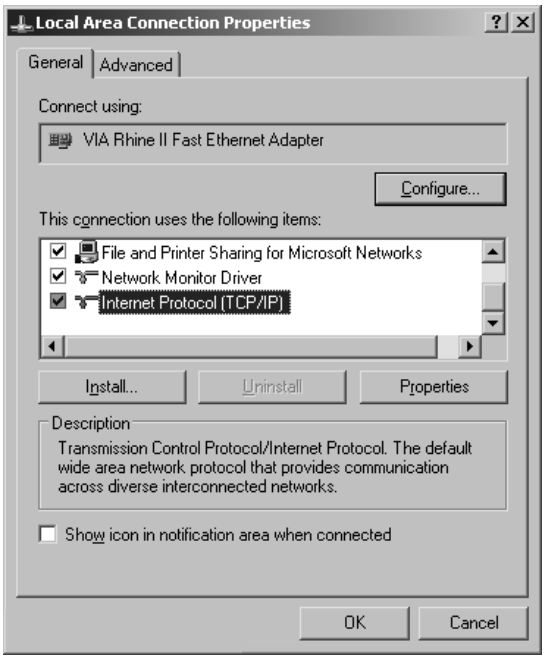
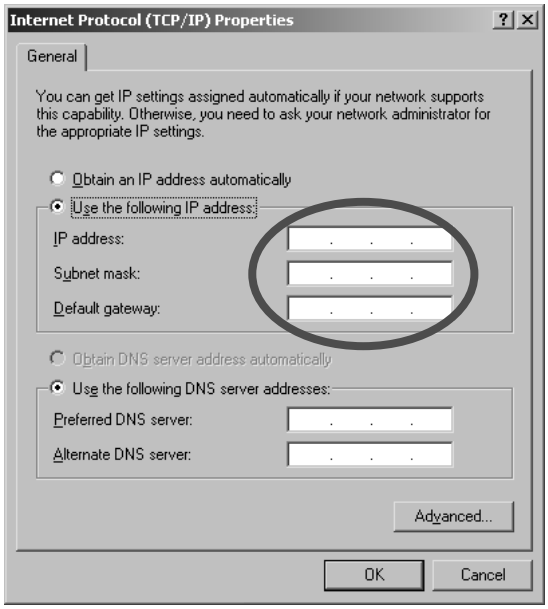
1. Computer Name/Member

No.	Procedure	Remarks
1	Connect the network cable and keyboard and turn the power ON. When the [Main screen] is displayed, press the Set button.	
2	When the [Setting screen] is displayed, press the System Info. tab. When the [System Information screen] is displayed, press the Admin. tool button.	

No.	Procedure	Remarks
3	When the [Administration tool screen] is displayed, press the Change button.	
4	When the [System Properties screen] is displayed, press the Change… button.	
5	Enter "Computer name" and "Workgroup" with the keyboard as required, then press the OK button. **Note:** Set the "Workgroup" instead of "Domain" for the member.	
6	If a dialog that requests for restarting the system is displayed, press the No button and terminate the machine.	

2. IP Address Setting

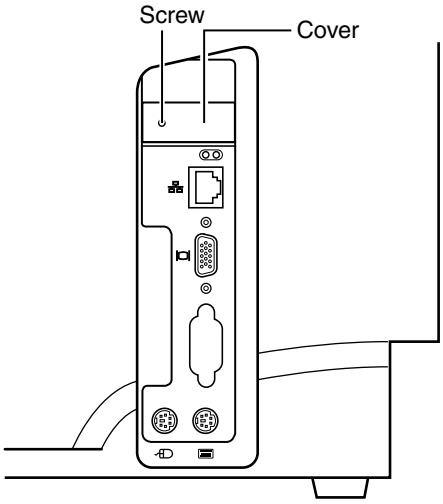
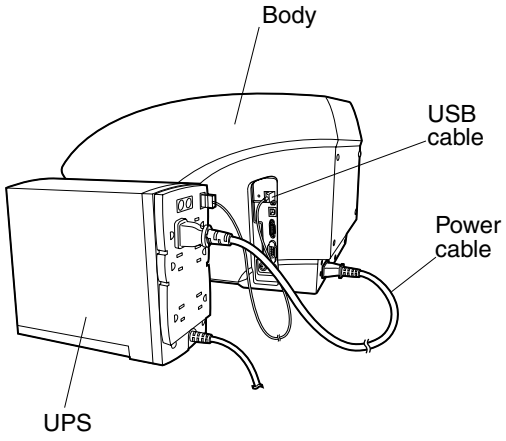
No.	Procedure	Remarks
1	Connect a keyboard and a mouse to this machine and start the machine.	
2	Enter service mode. (For details, see the service mode section.)	
3	Select About>Windows.	
4	Press the OK button on the [Windows confirmation screen].	
5	A Windows screen is displayed. Select Desktop>My Computer>Control Panel> Network Connections.	
6	Right-click "Local Area Connection" with the mouse and select "Properties".	

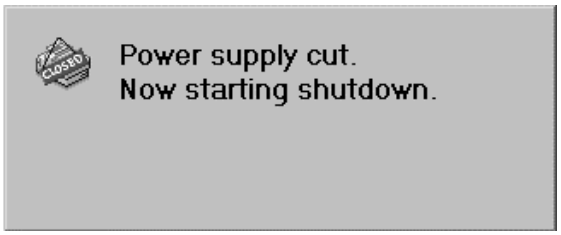
No.	Procedure	Remarks
7	The [Local Area Connection Properties screen] is displayed. Select "Internet Protocol (TCP/IP)" and press the Properties button.	
8	The [Internet Protocol (TCP/IP) Properties screen] is displayed. Select "Use the following IP address" and enter necessary data. Ask the user administrator about data to be input.	
9	After entering data, press the OK button to terminate the screen. **Note:** When a dialog that requests for system restart is displayed, press the No button.	
10	Press the Ctrl + Alt + Delete keys on the keyboard to display the [Windows security screen].	

No.	Procedure	Remarks
11	When the Task Manager button is selected, the [Application screen] in the [Task Manager screen] is displayed. **Note:** If you are not certain about steps 11 to 13, press the rest switch.	
12	Select the New Task button, enter "nm01" with the keyboard, then press the Enter key.	
13	The normal [Main screen] is displayed. Close the [Task Manager screen] and perform normal termination processing.	
14	Windows terminates and the machine is turned OFF.	

IV. UPS CONNECTION

If you use a UPS that manages power supply by connecting a USB cable to the computer, the service technician must release the USB connector of this machine. In this case, the service technician must refer to the UPS user manual and verify that the UPS works correctly.
This section describes basic procedure for connecting a UPS that uses USB.

No.	Procedure	Remarks
1	Remove the one screw and remove the cover for the USB connector of this machine.	
2	Connect the UPS and this machine with the power cable and USB cable. No UPS settings are necessary on this machine.	
3	Supply AC power from the UPS to this machine and turn it ON.	

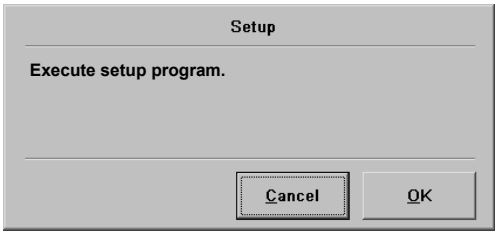
No.	Procedure	Remarks
4	Stop AC power supply to the UPS to cause power failure and verify that the UPS functions properly. • Power failure processing when USB is connected 1) The [Power Supply Cut screen] is displayed after the work being performed is completed. 2) Then, shutdown processing is carried out and power is turned OFF. • Power failure processing when USB is not connected 1) Power is supplied automatically from the battery after power failure. 2) Perform Quit processing manually and quickly.	Some UPSs may sound buzzer or light an LED.  **[Power Supply Cut screen]**

V. BARCODE MODULE INSTALLATION

The procedure for installing the optional barcode module is shown below.

A service technician must install the module.

Barcodes in documents can be recognized as character information by installing this module. For its usage, refer to the user manual.

No.	Procedure	Remarks
1	Enter service mode. (For details, see the service mode section.)	
2	Insert the barcode module disc into the CD-R drive of this machine.	
3	When the LED on the front panel of the CD-R drive turns green, select Tools>Setup. When the [Setup screen] appears, press the OK button.	
4	When "Canon Barcode Module Setup" starts and the Confirmation screen is displayed, press the Next button.	
5	When the Complete screen is displayed, press the Finish button.	
6	Terminates the service mode. The disc is automatically ejected. Take it out.	
7	Select barcodes and check whether they are correctly recognized. (For its usage, refer to the user manual.)	

VI. PERIODICALLY REPLACED PARTS

1. List of Periodically Replaced Parts

No.	Part name	Part number	Q'ty	Expected life	Remarks
1	Pickup roller	MA2-4321	1	250,000 sheets	Exchange Roller Kit 500K (Refer to next section.)
2	Separation roller	MA2-6041	1	250,000 sheets	
3	Feeding roller	MA2-4342	1	500,000 sheets	
4	Registration drive roller	MA2-4335	1	1,000,000 sheets	Exchange Roller Kit 1000K (Refer to next section.)
5	Reading drive roller	MA2-6068	2	1,000,000 sheets	
6	Delivery follower roller 2	MA2-4349	2	1,000,000 sheets	
7	Document board motor	MH7-1137	1	1,000,000 sheets	Calculated by 60 sheets/batch
8	Registration clutch	MH7-5041	1	1,000,000 sheets	Calculated by 60 sheets/batch
9	Pickup clutch	MH7-5040	1	1,000,000 sheets	
10	Reading unit (upper)	MG1-8218	1	1,500,000 sheets	500hr lit
11	Reading unit (lower)	MG1-8221	1	1,500,000 sheets	500hr lit

Table 4-601

Note: Have a service technician perform replacements of all parts.

2. Exchange Roller Kit

In addition to service parts, periodically replaced parts are assigned as commercially available products: "Exchange Roller Kit 500K: 6915A001AA", which includes the previously described rollers No. 1 to No. 3 and "Exchange Roller Kit 1000K: 6915A002AA", which includes the previously described rollers No. 4 to No. 6. Refer to product configuration for details.

Reference: Differences between periodically replaced parts, consumable parts, and consumables.

1. Periodically replaced parts are the parts which shall be replaced periodically and are usually assigned as service parts. They are replaced by service technicians.
2. Consumable parts are the parts which shall be replaced when becoming no good and are assigned as service parts. They are usually replaced by service technicians.
3. Consumables are the parts which shall be replaced when becoming no good and are assigned as commercially available products. They are usually replaced by users.

VII. CONSUMABLE PARTS AND CONSUMABLES

There are no consumable parts or consumables for this machine. However, ink rollers are consumables for the optional endorser (ED500).

VIII. PERIODIC SERVICING LIST

Note: Use only specified solvents/oils.

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

Unit name	Location/Parts	Intervals (sheets)				Remarks
		0.25 million	0.5 million	1 million	1.5 million	
Feed assembly	Pickup roller	●				Wipe with cloth slightly moistened with water, then wipe dry.
	Separation roller	●				
	Feeding roller	△	●			
	Registration drive roller	△		●		
	Reading drive roller	△		●		
	Delivery follower roller 2	△		●		
	Registration follower roller	△				
	Reading follower roller	△				
	Delivery follower roller 1	△				
Drive assembly	Document board motor			●		
	Registration clutch			●		
	Pickup clutch			●		
Reading assembly	Reading glass	△				Wipe with cloth slightly moistened with water, then wipe dry.
	Reading unit		□		●	Need a adjustment after replaced

Table 4-801

Note: If rollers and the reading glass are very dirty, the customer should be advised to clean them. Refer to the user manual for details.

CHAPTER 5

TROUBLESHOOTING

I. ERROR DISPLAYS AND REMEDY

1. Error Messages

Messages are displayed on the touch panel if an error occurs on this machine.

There are many messages associated with user operation mistakes and document jams. The user should take appropriate remedy according to messages. Refer to the user manual for details. Problems that cannot be solved by the user must be solved by the service technician.

Figure 5-101 shows an example of a message.

The situation in which errors occurred can be recorded and displayed. For details, refer to "SERVICE MODE".

Note: Any mention of "disc" in this chapter and messages refers to the "CD-R disc".

Figure 5-101

2. Basic Remedy

The following describes the "basic remedy" when an error is displayed.

1) Check the display, and press the OK button. The error display disappears.
2) Make sure that operation was not wrong or that an unauthorized disc was not used.
3) If operation was wrong, carry out the correct operation. Or, remedy the trouble following the on-screen instructions.
4) If operation was not wrong or the cause of the trouble is unknown, repeat the operation.
5) If the same error occurs, press the OK button.
6) Shut down the system in the normal way, and press the power switch again to restart the system.
   If the system cannot be shut down in the normal way, press the reset switch to shut down the system.
7) If the system starts up normally by carrying out the same operation, continue to operate the machine in the normal way.
8) If the same error is still displayed by carrying out the same operation, shut down the system in the normal way.
   ---From here on, the service technician should carry out the procedure.

3. Disc Fault

Discs become faulty in the following instances, sometimes preventing data to be written to or read from the disc.

1) When a disc whose data is damaged is used.
2) When a disc is subjected to vibration or shock during data writing.
3) When a disc that was created another unit such as a computer is used.
4) When a scratched or dirty disc is used.

Note: Discs whose data is damaged due to scratches on the disc cannot be repaired.

4. Disc Cleaning

If the surface of the disc is dirty, data sometimes cannot be written or read from the disc. Wipe lightly with a soft, dry cloth or a commercially available CD cleaner outwards from the center of the disc. Follow other cautions that come with the disc.

II. SERVICE MODE

A. Outline

1. Items List

Table 5-201 shows a list of items available in the service mode.

Note: Even if the language is set to a language other than English, most of the lettering on screen is displayed in English.

Tab Name	Item Name	Description
Tools	Scanner	Start up the scanner assembly service software. This is used for adjusting the scanner assembly and so on.
	Touch panel	Start up the software for calibrating the positions on the touch panel. This is used for calibrating the touch panel.
	Setup	Update software version. Version update disc must be inserted into the CD-R drive. Details are notified at the time of version update.
	Erase	Delete backup data on the hard disc. Do not use it in the field.
Battery		Not used in this machine.
About	Version	Displays version information.
	Windows	Start up [Explorer] on Windows. This is used only in special cases such as when setting a fixed IP address.
	Locale	Start up [Regional Settings Properties] on Windows. This is not be used in Japanese-language version.
	Used files	Displays a list of files used by CD-4070NW.
	Task Switch	Set Windows task key to Enabled/Disabled. This is disable in the field.
	Default all	Return all settings excluding [Locate] settings to their defaults.
	Log file	Select whether or not to record the log to hard disk. Normally, set to [Record] in the field.
	Log list	Display the log file list.
	Disc mode	Not used in the field.
	Delete	Set cabinet and folder deletion method selection.
	Scan side	Set reading method selection. (Single/double/blank skip/all)
	Maximum size	Change the select value of the maximum size for disc writing and mail transmission.

Table 5-201

2. Start Procedure

1) Turn the power ON to display the [Main screen]. If another screen is already displayed, return to the [Main screen].
2) If a disc is inserted, press the Eject button to eject the disc.

Note: Be sure to take out the disc before entering service mode.

3) Press the Quit button to display the [Quit screen].
4) Press the left side of the [Quit screen] twice, followed by the right side once and then the left side once.

Note: The left and right sides of the screen must be pressed a total of four times within about two seconds. If these sides are not pressed properly and the service mode is not entered, you must repeat the same actions from the step 3.

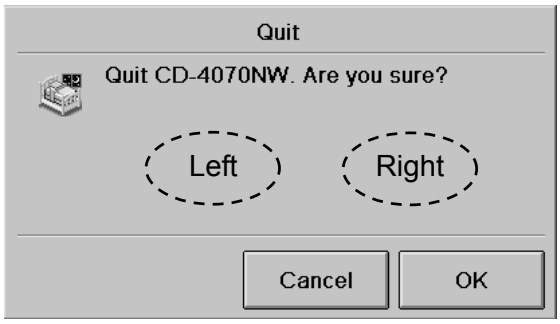
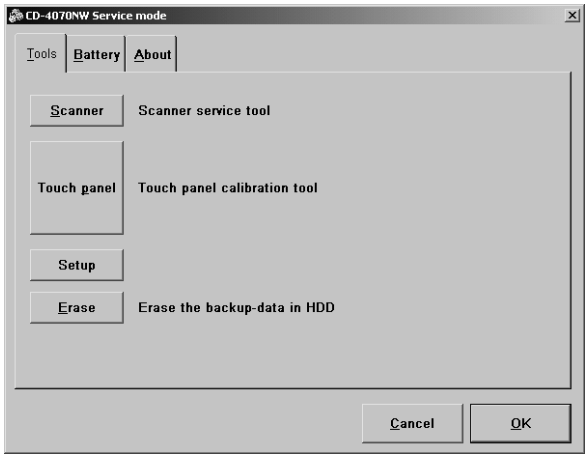


Figure 5-201

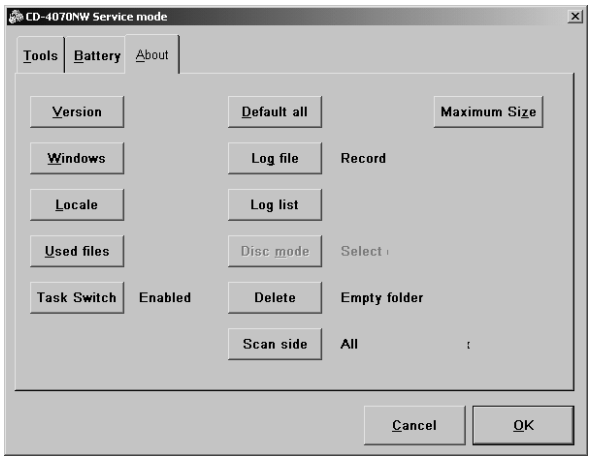
5) The [Service mode screen] is displayed.

6) Press the tabs arranged at the top left to display the screen containing items for carrying out that operation. Three tabs are provided:
"Tools", "Battery" and "About". The screen for when "Tools" is selected is first displayed.

Note: The [Battery screen] is not displayed in this machine.



[Tools screen]



[About screen]

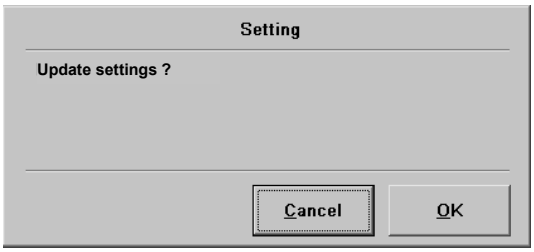
Figure 5-202

3. Termination Procedure

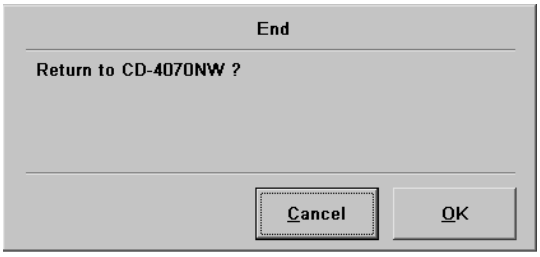
1) Finish each of the items.
2) Press the OK button at the bottom of the [Service mode screen].
3) When the settings have been changed, the [Setting confirmation screen] is displayed.
   Press the OK button. If you press the Cancel button, the [Service mode screen] is re-displayed.

Note: When the OK button is pressed on this screen, changes become effective.

4) The [END confirmation screen] is displayed.
   Press the OK button. If you press the Cancel button, the [Service mode screen] is re-displayed.
5) The [Main screen] is automatically redisplayed.
6) Press the Quit button and turn the power OFF. When the setup has been changed, make sure that it has been changed correctly before returning to the user.



[Setting confirmation screen]



[END confirmation screen]

Figure 5-203

B. Tools

This section describes the modes that are shown on the [Tools screen]. For Scanner, see another section.

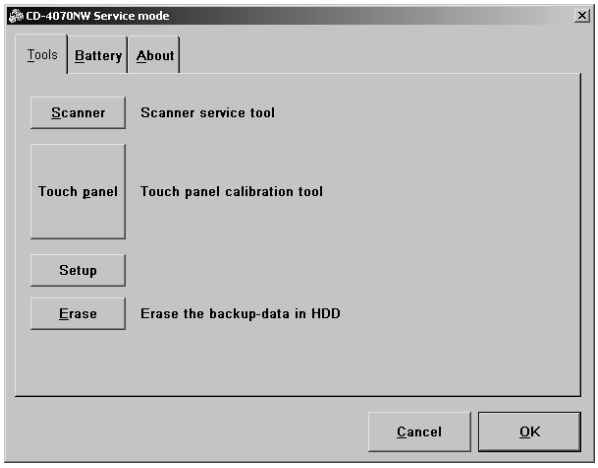


Figure 5-204

1. Touch Panel

Perform touch panel calibration.

1) When the Touch panel button is pressed, the [Calibration screen] is displayed.

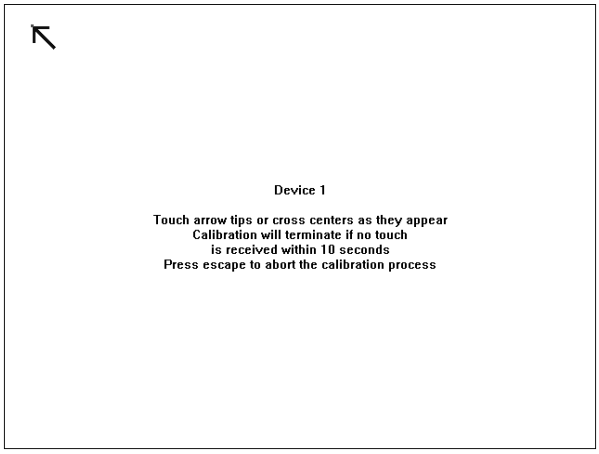


Figure 5-205

2) Press the tip of the arrow accurately according to the instruction shown on the screen.

Note: If a wrong location is pressed, a wrong calibration is carried out.

3) The [Termination screen] is displayed. Press the OK button.

Note: If calibration fails and the OK button cannot be pressed, the calibration becomes invalid. The [service mode screen] returns automatically in approx. 10 seconds. Calibration can be performed with the keyboard. See the next section for details.

- Calibration with the keyboard

Calibration can be carried out with the keyboard.

If the Ctrl + Shift + Alt + C keys are pressed with the keyboard when the [Main screen] is displayed, the [Calibration screen] is displayed. Perform calibration.

If the keyboard is connected after power is turned ON, the keyboard may not be recognized. In this case, reset the power.

2. Setup

Update file version and add files. For details, refer to the service information that is issued at the time of update.
An outline of procedure is given below.

1) Insert the CD-R disc on which specified files are written.
2) Wait until the LED on the front panel of the CD-R drive turns green.
3) When the Setup button is pressed, the [Setup screen] is displayed. Press the OK button.

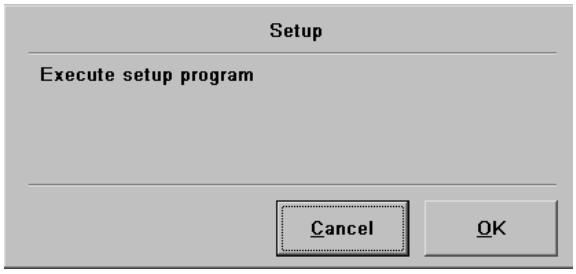


Figure 5-206

Note: If the setup files are not recognized, the [Error screen] is displayed when the Setup button is pressed.

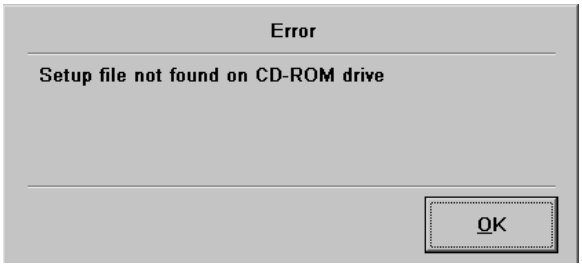


Figure 5-207

4) Updating will start automatically.
5) Press the Version or Used Files button on the [About screen] after completion to verify that updating has finished.
6) When the service mode is terminated, the disc is ejected. Take it out.

3. Erase

Delete backup data recorded on the HDD. However, it must not be performed in the field.

If the Erase button is pressed by mistake, the [Password Input screen] is displayed. Press the Cancel button.

Figure 5-208

C. Scanner

Scanner service mode on the [Tool screen].

When the Scanner button is pressed, the [DR3KSvcTool screen] is displayed.

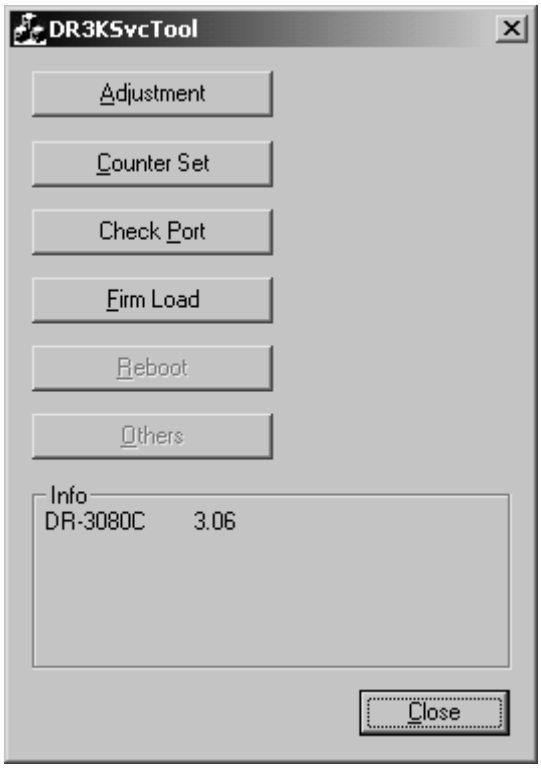


Figure 5-209

1. Adjustment

Carry out image sensor adjustment.

When the Adjustment button is pressed, the [Adjustment screen] is displayed.

The Light Adjustment, Shading and Color Balance buttons of the Each Adjust are not used in the field.

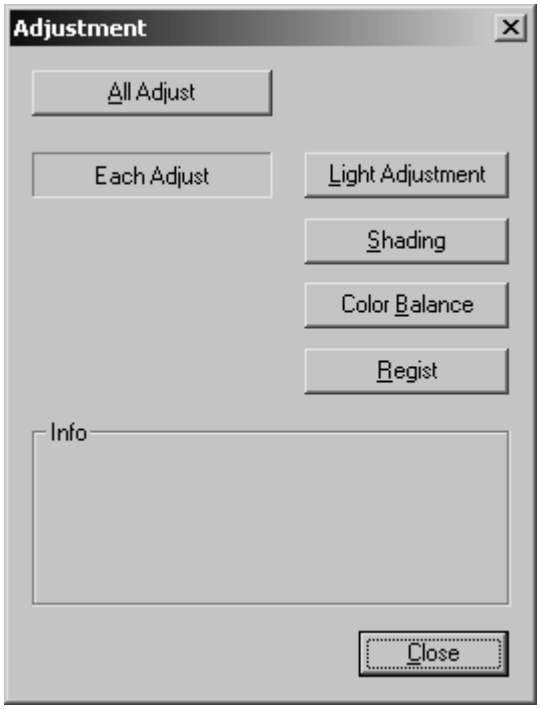


Figure 5-210

a. All Adjustment

All adjustments can be performed at the same time.

1) Clean the reading glass and each roller.
2) Fully open the document guide and set two sheets of normal white copy paper cut to the same size (262 × 305 mm) as the standard white sheet and then place a standard white sheet (TKM-0316) on the document board. Be sure to place the standard white sheet on the top of the other papers. Be careful so that they do not skew.
3) When the All Adjust button is pressed, the standard white sheet is picked up automatically and light intensity adjustment begins. "Light Adjust." is displayed at the bottom of the [Adjustment screen].
4) Black compensation and white compensation are carried out, and the standard white sheet is ejected.
5) The first white copy paper is picked up and color balance adjustment is carried out.
6) Then, the second white copy paper is picked up and registration adjustment is carried out.
7) When all adjustments are completed, "Regist Adjust Complete." is displayed at the bottom of the [Adjustment screen]. It takes approx. 5 minutes until they are completed.

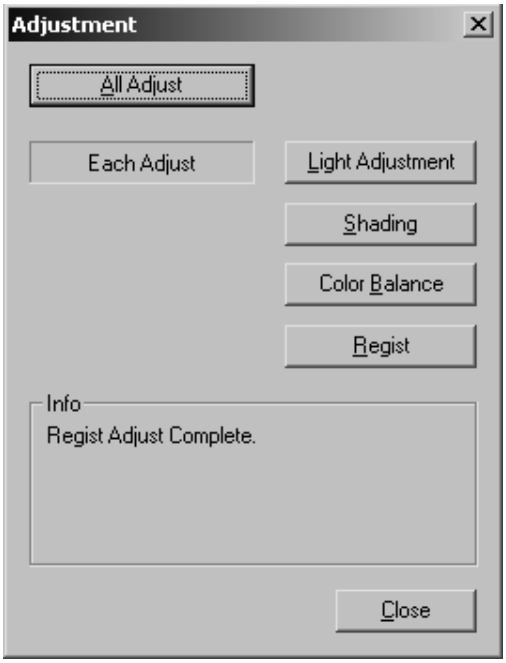


Figure 5-211

Note: If adjustment fails, "xxxxx Failed." is displayed at the bottom of the [Adjustment screen]. Possible causes are dirty or folded adjustment sheets, skew, and dirty reading glass. Check them and perform adjustments again.

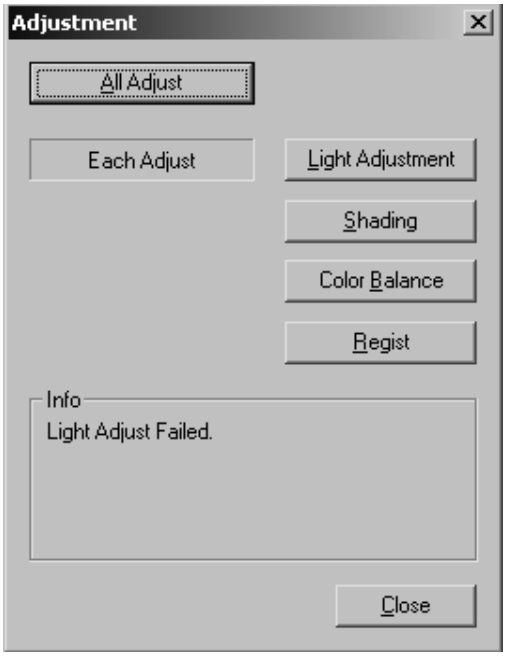


Figure 5-212

b. Regist

Perform registration adjustment only. Do this adjustment if the image adjustment only position at the leading or trailing edge of a scanned image is wrong after a scan start sensor is replaced and so on.

1) Fully open the document guide and set a sheet of normal white copy paper of A4 or LTR size on the document board. Be careful so that they do not skew.
   The paper cut to the same size as the standard white sheet can be used.
2) When the Regist button is pressed, the white copy paper is picked up automatically and registration adjustment begins.
3) When the adjustment is completed, "Regist Adjust Complete." is displayed at the bottom of the [Adjustment screen]. It takes approx. 10 seconds until it is completed.

2. Counter Set

a. Outline

Display and set the accumulated number of sheets fed, image sensor LED (front/back) lighting time and accumulated document jam count.

When the Counter Set button is pressed, the [Counter Set screen] is displayed.

Long document mode can be set, but the default "No" should be used on this machine. Change it to "Yes" only when long document mode is requested.

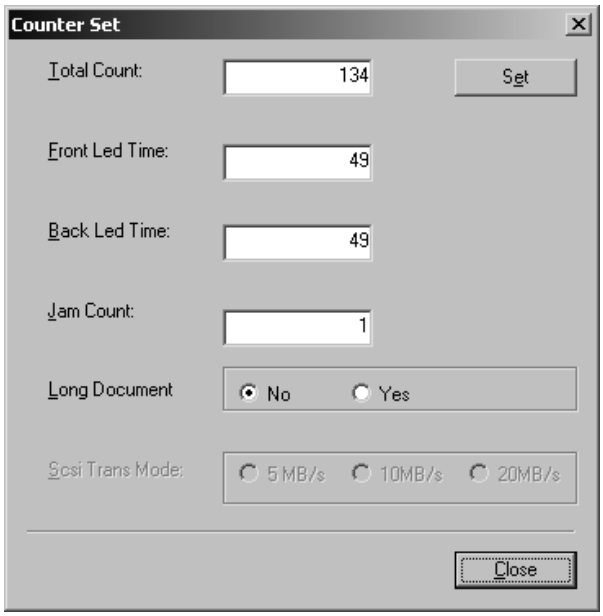


Figure 5-213

The guideline for periodical maintenance can be confirmed by displaying these items.

This data is stored on the DC control PCB. If the DC control PCB is replaced, data values change, and they must be returned to the values before change. If the values before change are not certain, estimated values may be used.

- Total Count
  Accumulated number of sheets fed
- Front Led Time
  Front image sensor LED lighting time (unit: second)
- Back Led Time
  Back image sensor LED lighting time (unit: second)
- Jam Count
  Accumulated number of document jams
- Long Document
  Long document mode setting

b. Data change procedure
   1) Enter a new value into the box on the right of the corresponding item with the keyboard.
   2) Press the Set button.
   3) The new value becomes effective after power is reset.

3. Check Port

Checks operations of sensors, motors, clutches, etc.

When the Check Port button is pressed, the [Check Port screen] is displayed.

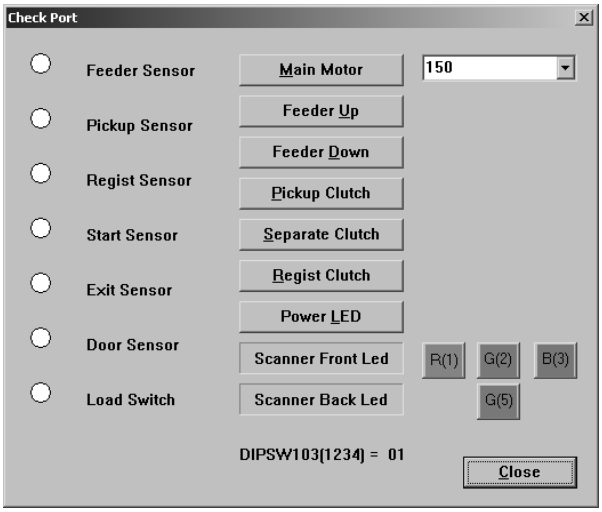


Figure 5-214

a. Sensor
   When OFF changes to ON, the white circle "○" on the left of the corresponding name changes to the red circle "●".
   - Feeder Sensor: Document detection sensor
   - Pickup Sensor: Pickup sensor
   - Regist Sensor: Registration sensor
   - Start Sensor: Scan start sensor
   - Exit Sensor: Delivery sensor
   - Door Sensor: Door switch
   - Load Switch: Load switch (Note)

Note: The load switch is a switch on the DC control PCB and is not used for this machine.

b. Main motor
Drive the main motor.
1) Select resolution from the pull-down box on the right.

Note:"300" indicates binary, grayscale 300 dpi, and color 100 dpi. "600" indicates color 200 dpi.

2) When the Main Motor button is pressed, the main motor is driven at the speed corresponding to the resolution.
3) When the Main Motor button is pressed again, the main motor stops.

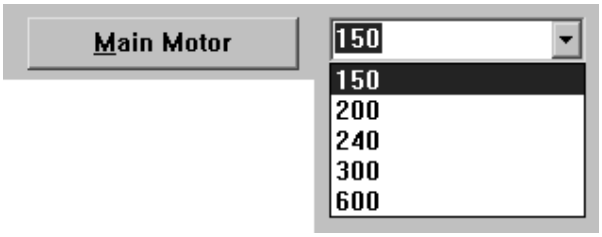


Figure 5-215

c. Document board motor
Raise or lower the document board.
1) When the Feeder Up button is pressed, the document board motor is driven to lift the document board. It stops automatically in several seconds.
2) When the Feeder Down button is pressed, the document board motor is driven to lower the document board. It stops automatically in several seconds.

d. Clutch
Drive clutches.
When the button is pressed, the corresponding clutch is driven, and when it is pressed again, the clutch returns.
- Pick Clutch: Pickup clutch
- Separate Clutch: Separation clutch
- Resist Clutch: Registration clutch

e. Power indicator
Turn the power indicator ON and OFF.
When the Power LED button is pressed, the power indicator comes on and when the Power LED button is pressed again, the power indicator goes off.

f. Scanner LED
Turn the scanner LED ON and OFF.
When the buttons on the right of the “Scanner Front Led” and “Scanner Back Led” are pressed, the corresponding LED comes on. When the button is pressed again, the LED goes off.

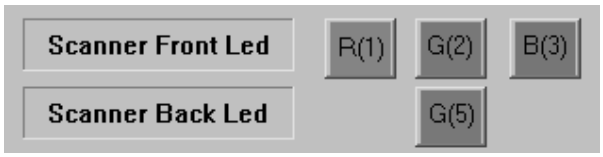


Figure 5-216

D. About

This section describes the modes that are shown on the [About screen].

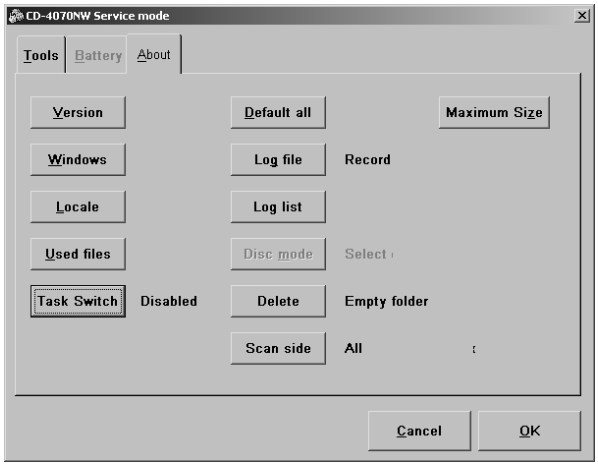


Figure 5-217

1. Version

Display various versions.

When the Version button is pressed, the [Version Information screen] is displayed.

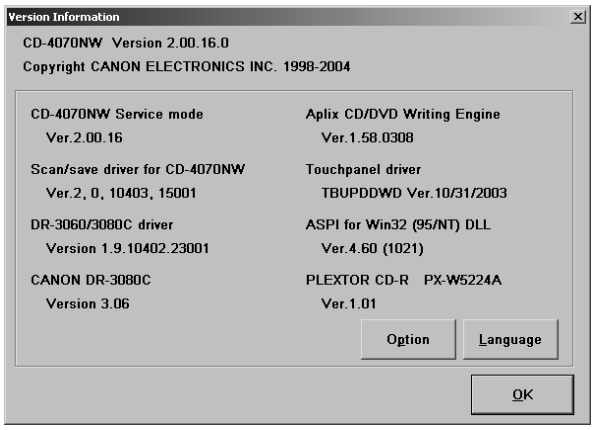


Figure 5-218

The basic version of this machine is displayed at the top of the [Version Information screen], and versions of service mode, etc. are displayed below it.

When the Option and Language buttons are pressed, related versions are displayed.

2. Windows

Change to Windows.

However, if this button is only used in special cases such as when setting a network-related fixed IP address in the field. Refer to each item for details. If the Windows button is pressed by mistake, press the Cancel button on the [Confirmation screen] that is displayed next and return to the original screen.

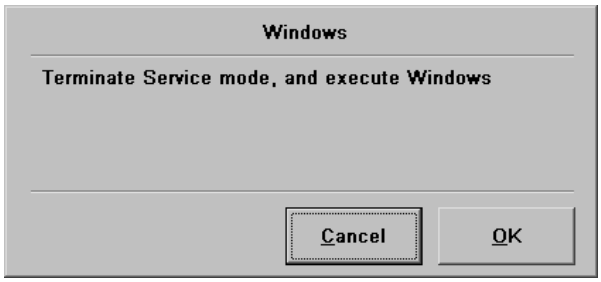


Figure 5-219

3. Locale

Set a locale.

It is not necessary to change the setting for Japanese models (100 V) because it has been correctly set.

1) When the Locale button is pressed, the [Time Zone setting screen] is displayed. Set appropriate values for the region where this machine is used. Then, press the OK button.

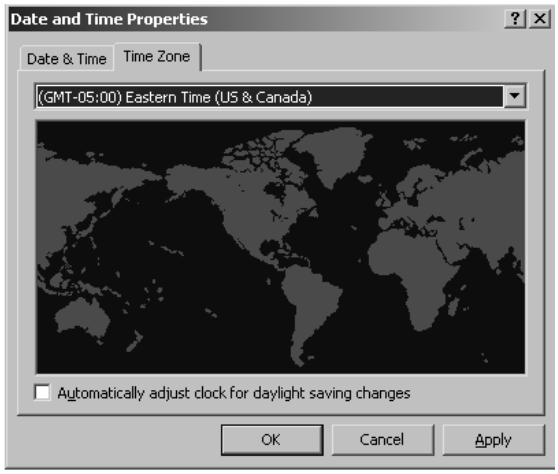


Figure 5-220

2) Then, the [Regional Options setting screen] is displayed. Set appropriate values for the region where this machine is used. Then, press the OK button.

Note: This setting is effective only for models that support multiple languages, and not effective for models that support only English.

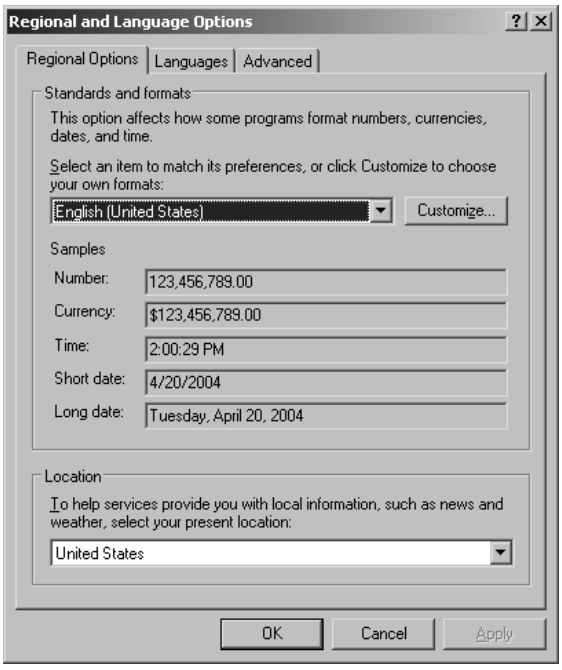


Figure 5-221

3) The original screen returns. The settings become effective when leaving the service mode.

4. Used Files

Display a list of files used for this machine. However, Windows-related files are excluded.

It is used to check whether files are installed correctly, but normally, not used in the field.

1) When the Used files button is pressed, the [List of Files screen] is displayed. Information on selected files is displayed at the bottom.

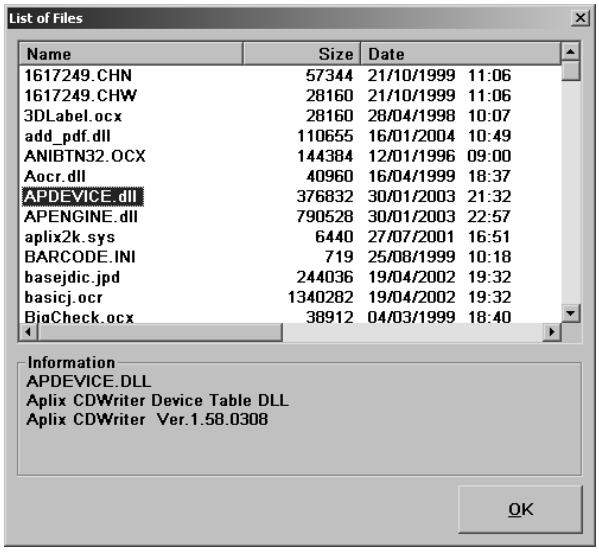


Figure 5-222

2) When the OK button is pressed, the previous screen returns.

5. Task Switch

Set the Windows task switch key to "Enabled" or "Disabled". However, it is not used in the field. Be sure to set it to "Disabled" in the field so that the user may not enter Windows by mistake. The default is "Disabled".

6. Default All

Return all settings, except "Locale", and “Task Switch” to defaults. Do not press the Default all button by mistake.

The defaults in each mode are shown below for reference.

Task Switch: Disabled
Log files: Record
Delete: Empty folder
Scan side: All

7. Log File

Enable or disable log records. Always set it to "Record" in the field to maintain operation records.

The default is "Record".

8. Log List

Display a list of log files and their details. Log files can be written onto a CD-R disc to analyze defects.

- Display

1) When the Log list button is pressed, the [Log file screen] is displayed.

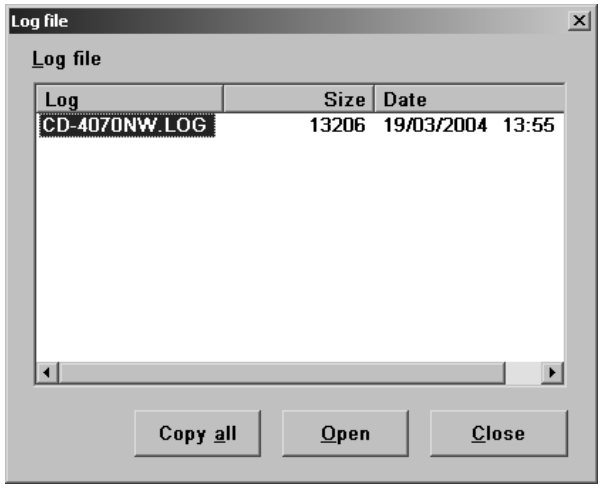


Figure 5-223

2) When a file is selected and the Open button is pressed, its contents are displayed on the [Notepad screen].
An operation log, an error log and time are displayed.

Note: For a description of logs, see another section.

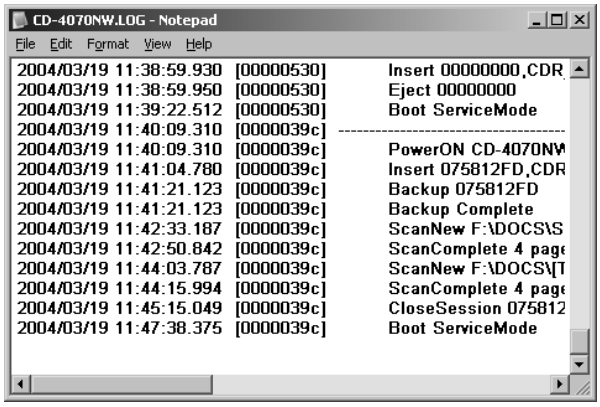


Figure 5-224

- Writing

1) When the Copy all button on the [Log file screen] is pressed, the [Error screen] is displayed to prompt for disc insertion.

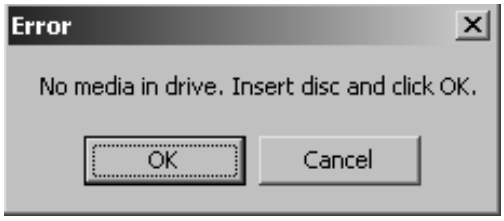


Figure 5-225

2) Insert a service CD-R disc onto which log files can be written into the CD-R drive. When the LED on the front panel of the CD-R drive turns green, press the OK button.

Note: Unformatted blank discs or discs that have been used for this machine can be used.

3) Log files are written and the session is closed automatically.

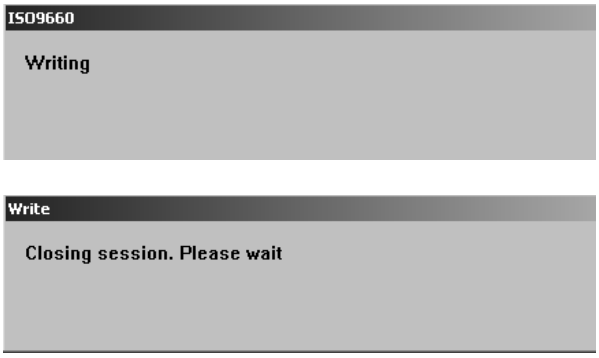


Figure 5-226

4) When the processing finishes, the disc is ejected and the [Log file screen] returns.

Note: For a description of log files written onto the disc, see another section.

9. Delete

Set a condition if the user presses the Delete button on the [Tool box screen].

Each time the Delete button is pressed, the condition is changed.

It must be set to "Empty folder" in the field. The default is "Empty folder".

- Disable
  Since the Delete button is not displayed, it cannot be used.
- Empty folder
  Deletion can be performed only if the cabinet or folder is empty.
- Both file and folder
  Deletion can be performed even if the cabinet or folder contains images.

Note: For "Empty folder" and "Both file and folder", data written on CD-R discs cannot be deleted. Data recorded on the HDD before closing a session can be deleted.

10. Scan Side

Set user selection of "Scan method" on the [Set recording mode screen].

Each time the Scan side button is pressed, the condition is changed.

"All" is basically used in the field.

It should be changed only if the user requests to do so. "All" is assumed in the user manual. The default is "All".

- All
  All can be set.
- Simplex only
  "One-sided" only can be set.
- Duplex only
  "Double" only can be set.
- BlankSkip only
  "Skip Blank Page" only can be set.

11. Maximum Size

The default value of "Maximum Size" on the [Setting screen] can be changed.

The value at the time of shipment is basically used in the field. It should be changed only if the user requests to do so.

1) When the Maximum Size button is pressed, the [Maximum Size screen] is displayed.

Note: The unit of values is byte.
104857600=100MB, 52428800=50MB
20971520=20MB, 10485760=10MB
2097152=2MB, 1048576=1MB
102400=100KB, 51200=50KB

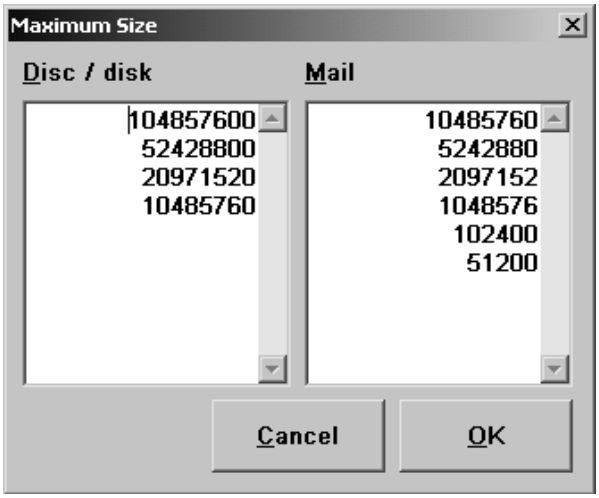


Figure 5-227

2) Select a recording size and change its value with the keyboard.
"2097152=2MB" of "Mail" is changed to "3145728=3MB" on the screen shown below.

Note: Values can be entered in bytes on this screen, but they are displayed in megabytes or kilobytes and fractions are omitted on the user selection screen.

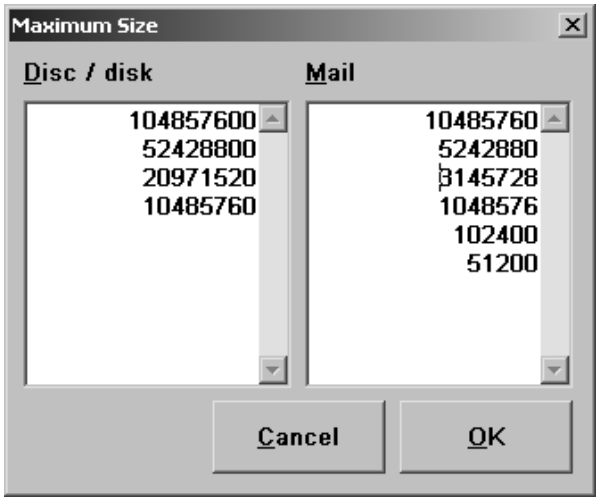


Figure 5-228

3) When the OK button is pressed, the original screen returns.
4) Terminate the service mode and verify that the user selection screen has been correctly changed.

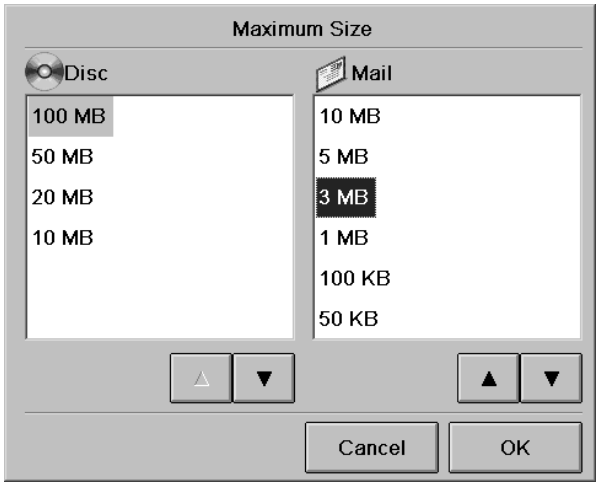


Figure 5-229

E. Log Record

1. Log Description

This section describes the contents of logs.

Figure 5-230 gives an example of the [Log file screen]. "Log contents" are displayed on the right side of the screen. They show this machine operated. "Error No." is displayed in some logs associated with errors. "Date", "Time" and "Execution No." for the log are displayed on the left side of the screen.

Table 5-202 gives a basic log description and Table 5-203 describes error logs.

Date	Time	Execution No.	Error No.	Log contents
2004/5/19	16:51.3	[00000194]		ScanNew F:\DOCS|Document 2_00001.PDF
2004/5/19	18:57:2	[00000194]	Error 20,	Close the original feeder, after opening it to remove the paper
2004/5/19	19:12.3	[00000194]		ScanComplete 1 pages/1 files

Figure 5-230

- Basic operation (Power ON → Disc insertion → Scan → Disc ejection → Power OFF)

----------	(When the power is turned ON, a dashed line is displayed.)
PowerON CD-4070NW Version 2.00.16.0	Power ON (Software version number is displayed.)
Backup 075812FD	Back up an inserted disc. (Disc No. is displayed.)
Backup Complete	Backup is completed.
Insert 075812FD,CDR_MEDIA_CLOSED,Backup	Disc processing is completed. (Progress is displayed.)
ScanNew F:\DOCS\Document 1__00001.PDF	Perform new scan. (Save file name is displayed.)
ScanComplete 4 pages/1 files	Scanning is completed. (Number of pages is displayed.)
ScanCont F:\DOCS\Document1__00001.PDF	Perform continuous scanning. (Save file name is displayed.)
ScanComplete 8 pages/1 files	Scanning is completed. (Number of pages is displayed.)
CloseSession 075812FD	Close the session and eject the disc. (Disc No. is displayed.)
PowerOFF	End

Table 5-202a

- Name setting, search

Label service	Change disc name. (Disc name is displayed.)
MkDir F:\DOCS\Cabinet8	Create a cabinet. (Cabinet name is displayed.)
Search document	Search with a keyword. (Keyword name is displayed.)
Search 2004-05-22	Search with a creation date. (Creation date is displayed.)

Table 5-202b

- Network, e-mail

Connect \\CANON2004\test\	Enter the network function. (Shared holder name is displayed.)
ScanNew \\CANON2004\test\network 1_00001.TIF	Perform new scan. (Save file name is displayed.)
ScanComplete 1 pages/1 files	Scanning is completed. (Number of pages is displayed.)
Mail	Enter the electronic mail function.
ScanNew D:\MAILTEMP\mail 1_00001.TIF	Perform new scan. (Save file name is displayed.)
ScanComplete 2 pages/1 files	Scanning is completed. (Number of pages is displayed.)
SendMail D:\MAILTEMP\mail 1_00001.TIF to service	Start transmission. (File name and destination are displayed.)
Disconnect	Suspend the electronic mail function and change to the disc writing function.

Table 5-202c

- Service mode

Boot ServiceMode	Start service mode.

Table 5-202d

2. Disc log

This section explains logs written onto a CD-R disc.

Logs have been written into the "Log" folder on the CD-R disc. (See Figure 5-231.)

Since previously-written logs have also been stored, the latest log folder must be selected. "Time when it was written" is used as a folder name. (See Figure 5-232.)

If defect analysis is requested, this log folder must be submitted.

Example: 20040405113554

- Time: 11:35:54
- Date: April 5
- Year: 2004

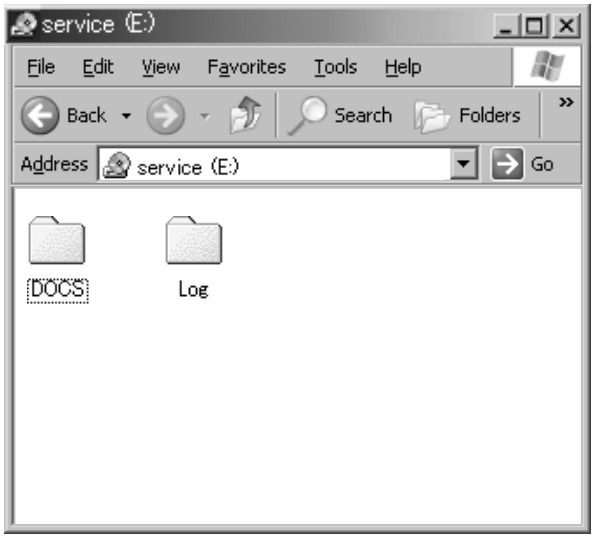


Figure 5-231

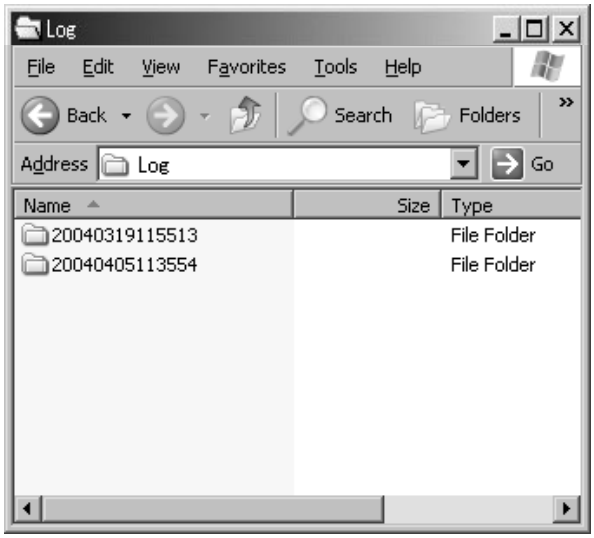


Figure 5-232

There are files other than the log file (CD-4070NW.LOG) in the log folder as shown in Figure 5-233, but they are not used in the field.

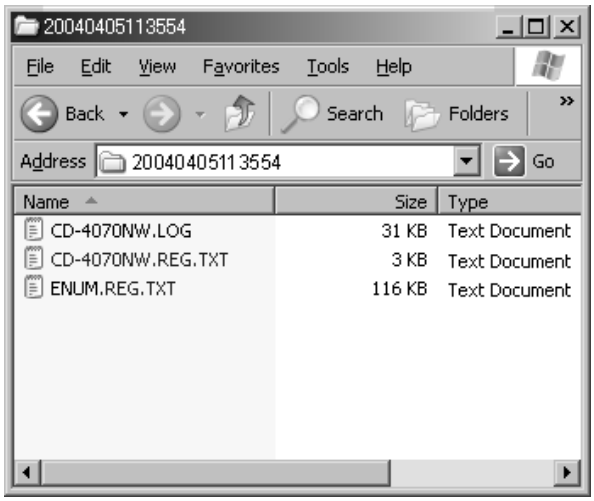


Figure 5-233

The log file (CD-4070NW.LOG) is the same as the log that can be displayed by the "Log list" in service mode. (See Figure 5-234.)

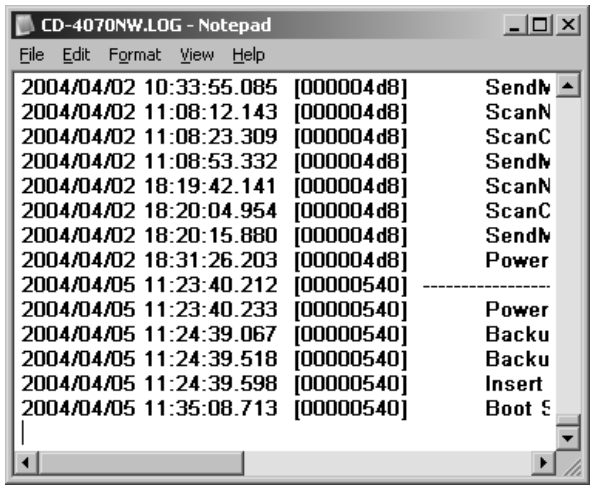


Figure 5-234

3. List of Error Messages

A list of error messages is shown below. Some of the error messages that appear on the touch panel are recorded in the log with error numbers.

No.	Log Message	Main Causes, etc.
0	Unexpected error occurred. **Note:** This message may not be displayed.	Normally, this error does not occur. This error may be remedied by cleaning the disc or re-installing software, but how to remedy such an error in the field is basically unknown.
1	Invalid compression type	An attempt was made to open a file of PDF format in a shared folder on the network, which was created by other than this machine.
4	File of same name already exists.	An attempt was made to change the name of a cabinet, but the same name exists.
6	Cannot find file.	An attempt was made to open or delete a cabinet. However, this was not possible because the cabinet does not exist on the disc. Or a probable cause is “Disc fault”.
10	CD-R drive not found. System will shut down.	CD-R drive could not be identified. Check the CD-R drive connection and check the disc for any fault.
11	Could not make directory.	An attempt was made to create a new cabinet in a shared folder on the network where creation of folders is forbidden.
14	Some files cannot be deleted.	An attempt was made to delete a cabinet. However, this was not possible as the name, for example, was incorrect or the disc is faulty.
15	Wrong password	A password that is different from the preset password was input.
16	Cannot read specified file.	A probable cause is “Disc fault”. Or an attempt was made to open an open file in the shared folder on the network.
19	No paper on the paper-feed tray	There was no document on the pick-up tray when recording was started in the standard pickup mode. Start recording after placing a document on the pickup tray.
20	Close the document feeder, after opening it to remove the paper.	A document jam occurred. Remove the document.

Table 5-203a

No.	Log Message	Main Causes, etc.
21	Close the document feeder.	The scanner upper feeder was open when the machine was started up or recording was started. Close the scanner upper feeder.
22	Scanner not connected, or power not ON. Quit operation.	The scanner is not recognized. Check scanner failure and connections.
23	File access failed.	Something is wrong with the shared folder on the network. Or the disc is faulty, but normally, this error does not occur.
28	Too many characters in field. Reduce by xx characters.	The characters (64 including extenders) in a preset field exceed the specified number by xx characters.
30	Little disc space left. Prepare a new disc.	The remaining amount of disc space has fallen below 60 MB. (Actually, HDD assigned disk capacity is checked.) Data can be recorded until the remaining amount of disc space has fallen to 40 MB.
33	Possible disc error. Replace with new disc.	A disc that cannot be used on this machine was inserted. If the disc is dirty, carry out “Disc cleaning”.
38	Could not copy	Copying was canceled by the user midway. Writing to disc was not possible due to "Disc fault".
45	The network name cannot be found.	The specified network name does not exist on the network. The computer is OFF or has been renamed.
48	Network Error	Error related to the network. Information from Windows is recorded.
55	Not enough free disc space. Copy to new disc again.	An attempt was made to copy backup data of larger than 650 MB for 700MB disc onto a 650 MB disc.
63	Cannot record more due to insufficient disc space. Close the session.	The remaining amount of disc space has fallen below 40 MB. No more data cannot be recorded.
71	Recording possible only if multiple/job document is selected in Search Results Screen.	No documents were selected on the search result screen or an attempt was made to select and record one/job document. However, multiple/job document cannot be recorded if it has already been written to the disc.
76	Disc I/O Error	Something on the HDD or CD-R drive side prevented accessing to it from being executed.

Table 5-203b

No.	Log Message	Main Causes, etc.
78	Failed to eject disc. Press button of CD-R drive.	An attempt was made to eject the disc, but this was not possible. If the disc is faulty, this error may occur. Normally, when the disc is inserted, an error is detected and the disc is automatically ejected.
79	Network access is denied	Access to the network was rejected. Check the network and contact administrator.
99	Retried to copy file.	An error occurred and an retry was made when copying from disc to HDD. This message is not shown to the user and only recorded in the log.
100	Network extend error	Error related to the network extension function. Information from Windows is recorded.
102	Verify error	There were differences from HDD data when verifying disc data. Normally, this error does not occur, but a probable cause is “Disc fault”.
103	Could not delete backup data.	Backup data (HDD) could not be deleted due to incorrect backup file name. This error does not occur when data is recorded normally.
105	Cannot write field setting.	An attempt was made to write the field setup file onto the disc. However, this was not possible. A probable cause is “Disc fault”.
109	Could not close session.	An attempt was made to close the session. However, this was not possible due to disc fault.
112	Power OFF detected on scanner. Quit operation.	The scanner assembly power was momentarily cut and supplied again. Since the scanner state is instable, termination processing is automatically performed. Check the scanner assembly connections.
122	%1; of same name already exists.	An attempt was made to create a cabinet with the same name.
124	Power supply cut.	If a UPS with USB I/F is used, UPS power failure information was detected. If this error is detected, work is interrupted and the system is shut down.
129	Up to xx receiver's names can be registered. Unable to register more names.	An attempt was made to create destinations in mail mode, but failed because the maximum value (500) was reached.
131	Could not disconnect network connection with xx.	Network connection was not able to be terminated correctly because destination did no longer exist.

Table 5-203c

No.	Log Message	Main Causes, etc.
137	That name has already been registered. You cannot create the name.	An attempt was made to create the same name as a destination that already exists.
140	Hierarchy is too deep. You cannot create more documents and folders.	Since the path length exceeds the length (260 characters in total) allowed for this machine, documents or folders cannot be created.
149	Hierarchy is too deep. You cannot retrieve under this folder.	Since the path length exceeds the length (260 characters in total) allowed for this machine, documents or folders cannot be searched. This error may occur during network connection.
150	You cannot access shared folder. ("xx cannot be accessed. Do you wish to quit access to this network?" is displayed on the screen.)	Shared folder could not be accessed due to trouble in network environment.
152	Rejected your access to xx.	Shared folder setting did not allow access from this machine or allowed it previously, but currently cancelled it.
154	Unable to record documents of more than xx continuously.	An attempt was made to continuously record documents with maximum recording size.
155	xx of documents being recorded, system quit recording more.	Document size reached maximum recording size during recording.
158	You failed to send the mail.	Mail could not be sent because network cable was not connected or mail server was not found.
165	Following message returned from the Server.	An attempt was made to send mail, but the mail server returned an error because the destination address was incorrect.
184	Fail the backup. Not available to record on this disc.	An attempt was made to back up data, but failed due to disc fault, etc.
748	The remote network is not reachable by the transport.	An attempt was made to connect the shared folder that was previously connected without connecting network cable. A probable cause is network-related fault.

Table 5-203d

III. SOFTWARE REINSTALLAION

1. Overview

If this machine becomes inoperative due to damage to software, including WindowsXP, the software must be reinstalled. Unlike the previous model CD-4046/4050, the dedicated HDD and cable are not necessary. In addition to this machine, the dedicated recovery CD, a commercially available keyboard and an external monitor are used for reinstallation.

This method is also used to install software on an unformatted HDD.

Dedicated recovery CDs are assigned as service tools. A set of recovery CDs are provided.

- For Japan: TKM-0338 (Three CDs/set)
- For other countries: TKM-0339 (Two CDs/set)

A reinstallation procedure is outlined below:

1) Change BIOS settings.
2) Run the first recovery CD.
3) Run the second recovery CD.
4) Run the third recovery CD. (Japan only)
5) Restore the BIOS settings.
6) Start the machine normally.
7) End

Note: If any operation is performed mistakenly, installation may stop. Perform the following procedure correctly. If installation fails, try it again from the beginning. If the HDD is faulty, an error occurs even when installation is performed. Replace the HDD, then perform installation. The software is not installed on the HDD assigned as service parts.

2. Reinstallation procedure

1) Connect a keyboard and an external monitor to the machine. A mouse can be connected.
2) Turn the monitor ON, then turn the machine ON. Observe the monitor.
3) When "Press DEL to enter SETUP" is displayed on the monitor, press the Delete key on the keyboard to enter the BIOS setting screen.

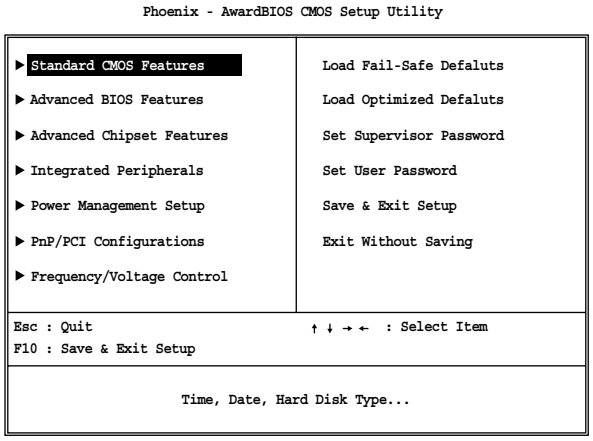


Figure 5-301

Note: If "Press DEL to enter SETUP" is not displayed, hold down the Delete key until the BIOS setting screen is displayed after the power is turned On.

4) Insert the first recovery CD-1 (Recovery Media No.1) into the CD drive.

5) Select "Advanced BIOS Feature" on the BIOS setting screen with arrow keys on the keyboard and press the Enter key.

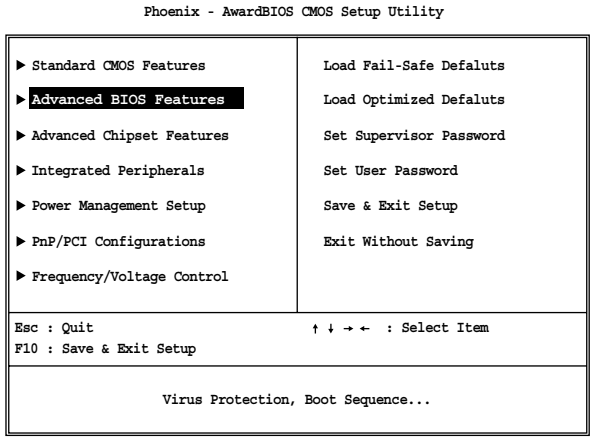


Figure 5-302

6) Select "First Boot Device" on the "Advanced BIOS Features" screen with arrow keys on the keyboard and press the Enter key.

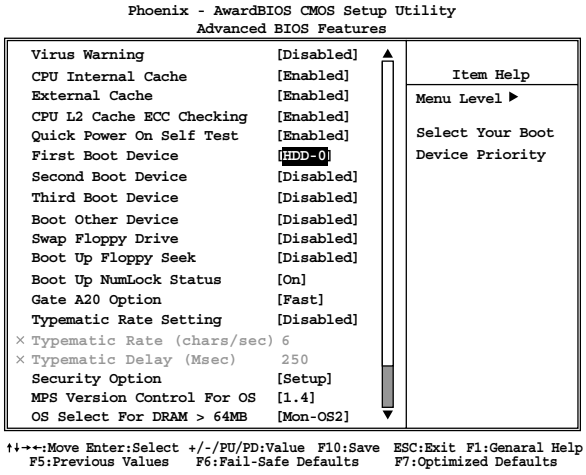


Figure 5-303

7) Select "CDROM" on the "First Boot Device" screen with arrow keys on the keyboard and press the Enter key.

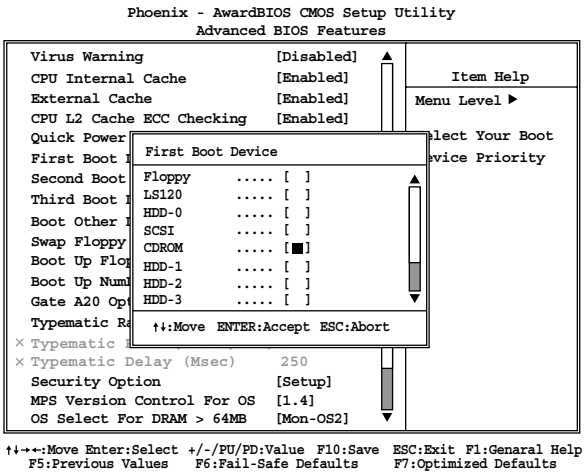


Figure 5-304

8) The "Advanced BIOS Features" screen returns. Verify that "CDROM" is displayed on "First Boot Device", then press the Esc key on the keyboard to return to the BIOS setting screen.
9) Select "Save & Exit Setup" on the BIOS setting screen with arrow keys on the keyboard and press the Enter key.

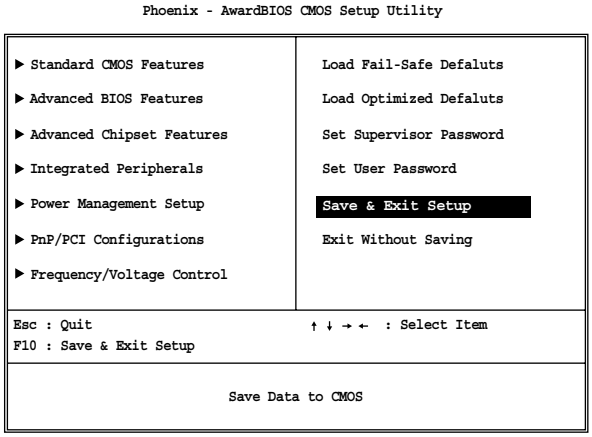


Figure 5-305

10) "SAVE to CMOS and EXIT (Y/N)? Y" is displayed. Verify that it is "Y", then press the Enter key. Changes become effective and the machine starts automatically from recovery CD.

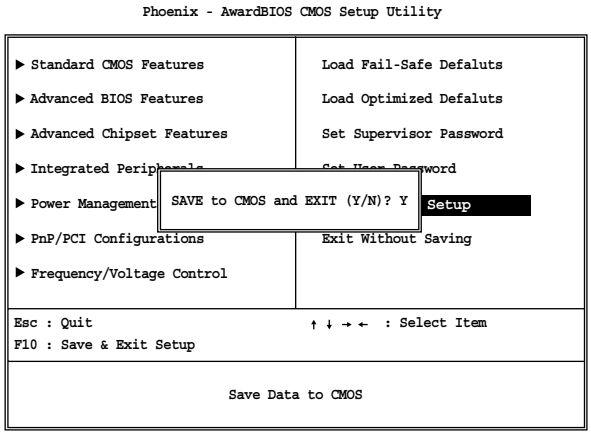


Figure 5-306

11) If the "Found New Hardware Wizard" screen is displayed in approx. 2 minutes, press the Esc key on the keyboard to clear the screen.
If the "System Setting Change" screen is displayed afterward, leave it as it is or select "No" with arrow keys on the keyboard and then press the Enter key.

[Found New Hardware Wizard]

Figure 5-307

12) If there is a correct partition on the HDD, the "Recovery Select" dialog is displayed. Select "Reserve Backup" with arrow keys on the keyboard and then press the Enter key.

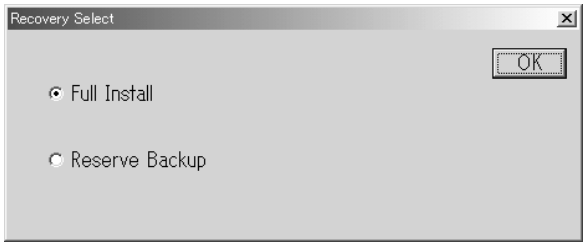


Figure 5-308

- Full Install

Clear the current HDD partition and create a new partition. All data will be cleared. After this process, partition creation processing (step 13) is carried out.

If this setting is selected, it takes approx. 30 minutes to process recovery CD-1.

- Reserve Backup

Save the current HDD backup data as they are and replace only the system. Backup data is not lost and processing time is short. Recovery CD-1 termination processing (step 14) is carried out after this process.

If this setting is selected, it takes approx. 10 minutes to process recovery CD-1.

If the problem is not solved by this setting, select "Full Install".

13) Partition creation processing, HDD formatting processing and file copying processing are automatically performed. The system is restarted automatically in the middle of the processing.
14) When recovery CD-1 processing ends, the "ReCover" dialog is displayed.

Figure 5-309

15) When the Enter key is pressed on the keyboard, the machine is reset. If "Press DEL to enter SETUP" is displayed on the monitor after restart, press the eject button on the CD-R drive. Take out the recovery CD-1 and insert the second recovery CD-2 (Recovery Media No.2).

Note: Press the eject button while BIOS is being started. If it is pressed too late, the eject button becomes invalid and the recovery CD-1 cannot be taken out. In this case, recovery CD-1 starts again.

Note: If recovery CD-2 is inserted too late and the disc is not recognized in time, "NTLDR is missing" or “Press Ctrl+Alt+Del to restart” is displayed. In this case, with recovery CD-2 inserted in the drive, press the Ctrl + Alt + Del keys to restart.

If "DISC BOOT FAILURE, INSERT SYSTEM DISC AND PRESS ENTER" is displayed, press the Enter key with recovery CD-2 inserted in the drive.

16) Recovery CD-2 processing is automatically executed. If the "Found New Hardware Wizard" screen is displayed in the same way as Recovery CD-1, press the Esc key on the keyboard to clear the screen. If the "System Setting Change" screen is changed, leave it as it is or select "No" and then press the Enter key.
Recovery CD-2 processing time is approx. 5 minutes.
For Japan, go to step 17, and for other countries, go to step 18.
17) Replace recovery CD-2 with the third recovery CD-3 in the same way as in steps 14 and 15. Recovery CD-3 processing time is approx. 5 minutes.
18) When the processing ends, the "Re-Cover" dialog is displayed in the same way as in step 14.
When the Enter key is pressed on the keyboard, the machine is reset. If "Press DEL to enter SETUP" is displayed, press the Delete key on the keyboard to enter the BIOS setting screen.
19) Press the eject button on the CD-R drive and take out the recovery CD.
20) Select "Advanced BIOS Feature" on the BIOS setting screen with arrow keys on the keyboard and press the Enter key.

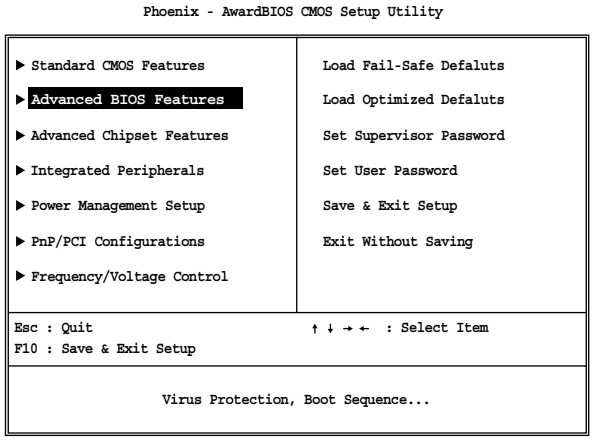


Figure 5-310

Note: The following procedure returns the BIOS settings to their original values.

21) Select "First Boot Device" on the "Advanced BIOS Features" screen with arrow keys on the keyboard and press the Enter key.
22) Select "HDD-0" on the "First Boot Device" screen with arrow keys on the keyboard and press the Enter key.
23) The "Advanced BIOS Features" screen returns. Verify that "HDD-0" is displayed on "First Boot Device", then press the ESC key on the keyboard to return to the BIOS setting screen.
24) Select "Save & Exit Setup" on the BIOS setting screen with arrow keys on the keyboard and press the Enter key.

25) "SAVE to CMOS and EXIT (Y/N)? Y" is displayed. Verify that it is "Y", then press the Enter key. Changes become effective and the machine starts automatically from the HDD.
26) The application on the machine starts automatically. When it starts for the first time, the Windows device setting file is updated automatically, but the system is instable. Some devices may not be found or restarting may be requested, and some dialogs are displayed on the touch panel. Perform operations according to the instructions on the dialog. Then press the "Quit" button on the touch panel and turn the power OFF.

Note: If the power cannot be turned OFF, press the reset switch on the back of the touch panel.

27) Turn the machine ON and start normally.
28) Enter service mode and perform touch panel calibration. Then, check version information. Perform "locale setting", "network setting" and so on as required. Refer to the "CHAPTER 4 INSTALLATION & MAINTENANCE" for details.
29) Verify that the machine operates properly.

IV. AFTER REPLACING PARTS

Check operations and images after replacing parts.

Some of the components of this machine must be adjusted or their settings must be changed after replacement. The following measures should be taken:

1. HDD

Reinstall software. For details, see the appropriate section.

2. DC control PCB

Execute "Adjustment" and "Counter Set" in "Tools>Scanner" in service mode.

3. Reading unit

Execute "Adjustment" in "Tools>Scanner" in service mode.

4. Touch panel, LCD

If related parts, such as touch panel and LCD, are replaced at the touch panel location, execute "Tools>Touch panel" in service mode.

Note: If the position of a component is changed after disassembly, as well as after replacing parts, this measure may be required.

5. Registration

If the components related to the registration, such as scan start sensor and registration rollers, are replaced, execute "Regist" in "Tools>Scanner" in service mode.

Note: If the position of a component is changed after disassembly, as well as after replacing parts, this measure may be required.

6. Separation Roller, Feeding Roller

If a separation failure occurs after replacing parts, carry out an adjustment of the space between the separation roller and the feeding roller.

1) Open the upper feeder, and remove the upper pickup guide plate.
2) Loosen screw ①, and slide stopper ② in the direction of the arrow ③.

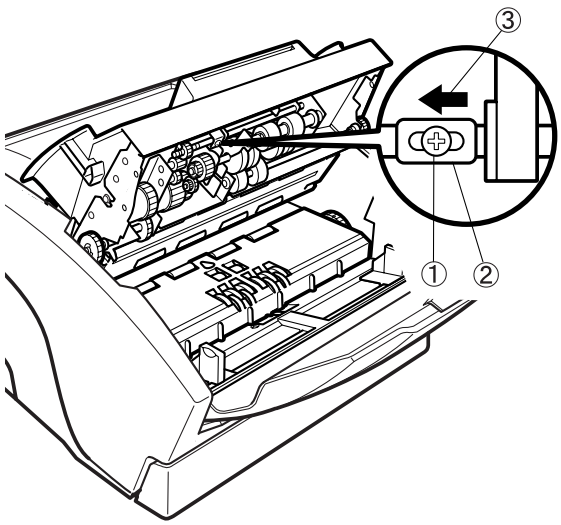


Figure 5-401

3) Attach the upper pickup guide plate.
4) Turn this machine ON.

5) Place at least three normal copy papers (A4/LTR) in the document board and feed them through the machine.
6) Open the upper feeder, and stop feeding while the third paper is being fed.
7) Remove the upper pickup guide plate.
8) Press stopper ① against shaft support plate ②, and tighten screw ③.

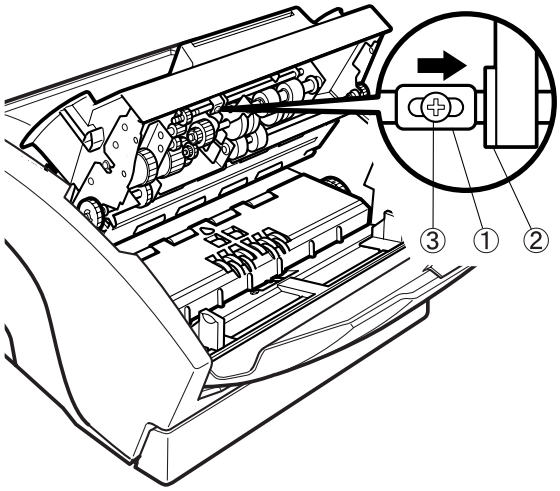
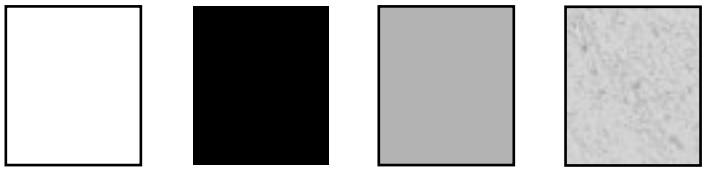


Figure 5-402

9) Attach the upper pickup guide.

V. IMAGE TROUBLESHOOTING

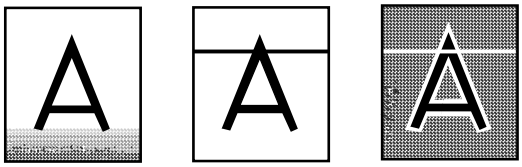
1	Image is not output (completely white, completely black, all gray, mottled)



Cause/Faulty Location	Step	Check Item	Result	Action
“Brightness” setting	1	Is "Brightness" setting appropriate?	NO	Change the setting. Also change "Contrast" setting if necessary.
Reading glass	2	Is reading glass clean?	NO	Clean. Also clean rollers if necessary.
Reading unit connection	3	Are cables of reading unit correctly connected?	NO	Connect firmly.
Image sensor adjustment	4	Is trouble solved when "Adjustment" in service mode is performed?	YES	End
Reading unit	5	Is trouble solved when reading unit is replaced?	YES	End
DC control PCB	6	Is trouble solved when DC control PCB is replaced?	YES	End

Table 5-501

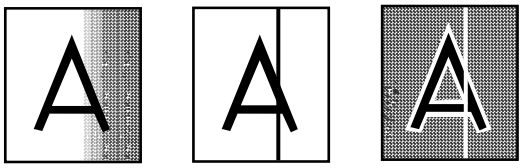
2	Uneven density, streak (main-scanning direction)



Cause/Faulty Location	Step	Check Item	Result	Action
Rollers	1	Dirty or deformed?	NO	Clean or replace rollers.
Gear, belt	2	Turning smoothly?	NO	Adjust assembly, replace parts.
Main motor (M1)	3	Is trouble solved when main motor is replaced?	YES	End
Reading unit	4	Is trouble solved when reading unit is replaced?	YES	End
DC control PCB	5	Is trouble solved when DC control PCB is replaced?	YES	End

Table 5-502

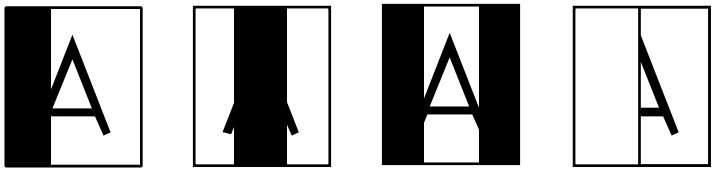
3	Uneven density, streak (sub-scanning direction)



Cause/Faulty Location	Step	Check Item	Result	Action
Reading glass	1	Is reading glass clean?	NO	Clean. Also clean rollers if necessary.
Image sensor adjustment	2	Is trouble solved when "Adjustment" in service mode is performed?	YES	End
Reading unit	3	Is trouble solved when reading unit is replaced?	YES	End
DC control PCB	4	Is trouble solved when DC control PCB is replaced?	YES	End

Table 5-503

4	Part of image is not output



Cause/Faulty Location	Step	Check Item	Result	Action
Image sensor adjustment	1	Is trouble solved when "Adjustment" in service mode is performed?	YES	End
Reading unit	2	Is trouble solved when reading unit is replaced?	YES	End
DC control PCB	3	Is trouble solved when DC control PCB is replaced?	YES	End

Table 5-504

VI. OPERATION TROUBLESHOOTING

1	Nothing is displayed on touch panel

Nothing is displayed on the touch panel when the power button is pressed.

Note: Though it takes approx. 30 seconds until a message is displayed after the power button is pressed, it is not a failure.

Cause/Location	Step	Check Item	Result	Action
Power indicator	1	Is the power indicator lit?	YES	Press the forced button. If trouble persists when the power button is pressed again, go to step 5.
Power cord	2	Is power cord correctly connected?	NO	Connect it correctly.
Cable connection (AC power)	3	Are AC inlet and subboard PCB correctly connected?	NO	Connect them correctly.
Cable connection (DC power)	4	Are subboard PCB, each PCB, LCD drive PCB and operation PCB correctly connected?	NO	Connect them correctly.
Cable connection (HDD)	5	Is HDD correctly connected?	NO	Connect it correctly.
LCD connection	6	Are operation PCB and LCD correctly connected?	NO	Connect them correctly.
Power supply PCB	7	Is trouble solved when power supply PCB is replaced?	YES	End
Subboard PCB	8	Is LEDxxx on subboard PCB lit?	NO	Replace subboard PCB.
LCD	9	Is trouble solved when LCD is replaced?	YES	End
Software reinstallation	10	Is trouble solved when software is reinstalled?	YES	End
			NO	Replace other PCBs and LCD.

Table 5-601

2	The scanner is not recognized.

"Scanner not connected, or power not ON" is displayed on the touch panel.

Cause/Location	Step	Check Item	Result	Action
Cable connection (DC power)	1	Is DC power cable for power supply PCB and DC control PCB correctly connected?	NO	Connect it correctly.
Cable connection (USB)	2	Is USB cable for mother PCB and DC control PCB correctly connected?	NO	Connect it correctly.

Table 5-602

3	Motor/clutch does not operate.

Operation can be checked in service mode.

Cause/Location	Step	Check Item	Result	Action
Load on transmission system	1	Is each transmission system correct?	NO	Remove abnormal loads.
Cable connection (DC power)	2	Is LED104 (24V) on DC control PCB lit?	NO	Check power supply PCB connections.
Cable connection (parts)	3	Are parts correctly connected?	NO	Connect them correctly.
Motor/clutch	4	Is trouble solved when motor/clutch is replaced?	YES	End
DC control PCB	5	Is trouble solved when DC control PCB is replaced?	YES	End

Table 5-603

4	Sensor does not operate.

Operation can be checked in service mode.

Cause/Location	Step	Check Item	Result	Action
Detection lever	1	Does detection lever correctly operate? (If there is a detection lever)	NO	Assemble correctly.
Cable connection (DC power)	2	Is LED104 (24V) on DC control PCB lit?	NO	Check power supply PCB connections.
Cable connection (Sensor)	3	Is sensor correctly connected?	NO	Connect it correctly.
Sensor	4	Is trouble solved when sensor is replaced?	YES	End
DC control PCB	5	Is trouble solved when DC control PCB is replaced?	YES	End

Table 5-604

5	LED array does not light

LED array can be checked in service mode.

Cause/Location	Step	Check Item	Result	Action
Cable connection	1	Is reading unit correctly connected?	NO	Connect it correctly.
LED array	2	Is trouble solved when reading unit is replaced?	YES	End
DC control PCB	3	Is trouble solved when DC control PCB is replaced?	YES	End

Table 5-605

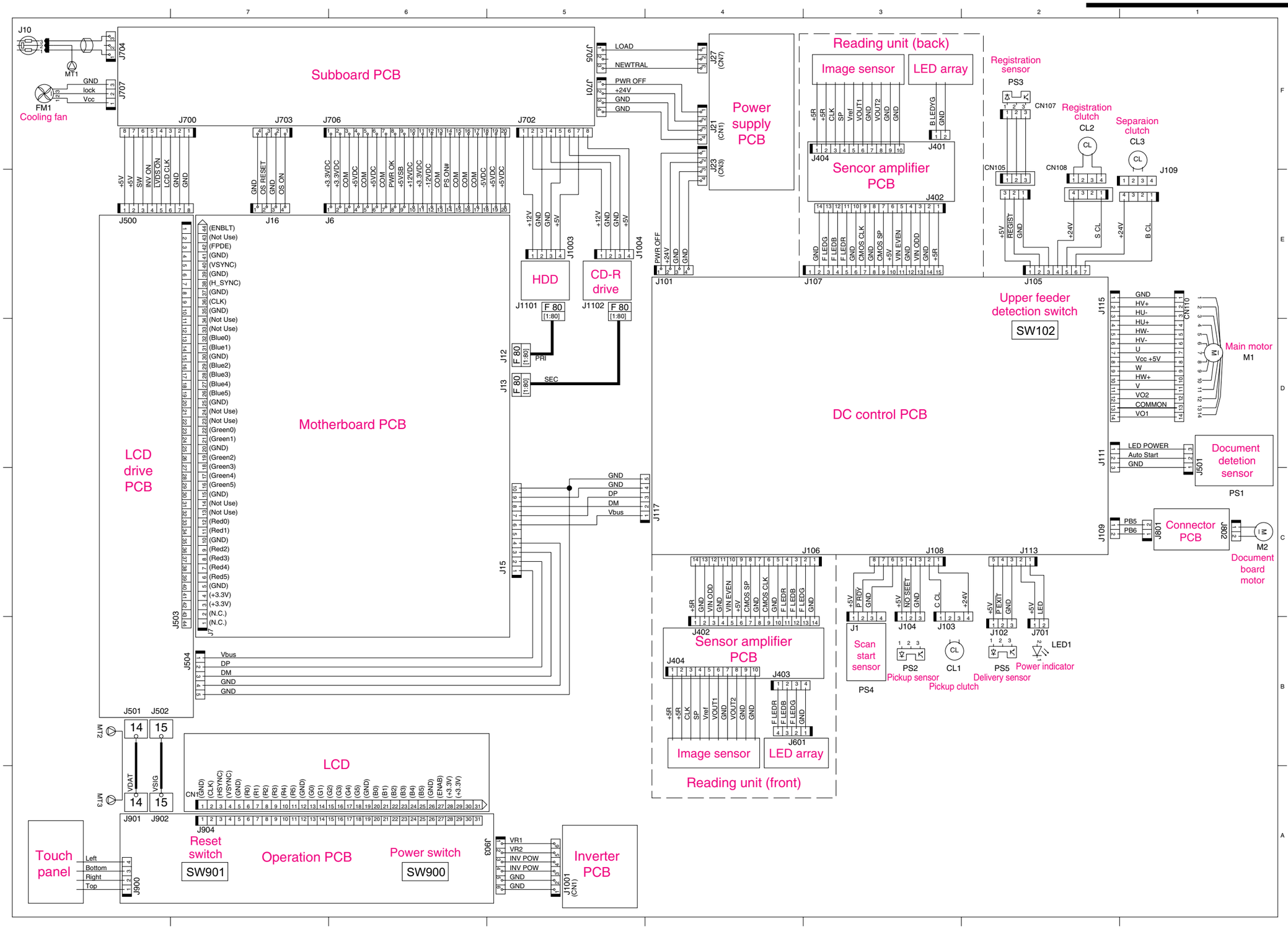
6	Feeding trouble (Jams, double-feed, wrinkles)

Cause/Location	Step	Check Item	Result	Action
Document	1	Does the document match the document specifications (e.g. type, size. folding, curling)?	NO	Ask the user to use a document that matches the document specifications.
Rollers	2	Are the rollers dirty? (Stain, wear)	NO	Clean or replace the rollers.
Drive power transmission	3	Turning smoothly? Are the power transmission gears broken or the belts loose?	YES	Adjust assembly or replace parts.

Table 5-606

APPENDIX

I. GENERAL DIAGRAM



 CANON CD-4070NW FIRST EDITION MAY 2004

II. TABLE OF SPECIAL TOOLS

The special tools for servicing this machine are shown below.

No.	Tool name	Tool number	Shape	Rank	Purpose/Remarks
1	Standard white sheets	TKM-0316	262x305mm	B	• 10 sheets/set • For adjustment of image sensor
2	Recovery CD (JPN)	TKM-0338	Three CDs	B	• Reinstall software (for Japan)
3	Recovery CD (MULTI)	TKM-0339	Two CDs	B	• Reinstall software (for other countries)

Note: Recovery CDs above (TKM-0338/0339) are new special tools.

Characters in the Rank column indicate the following meanings:
A: Each service technician should carry one.
B: Each group of five technicians should carry one.
C: Each dealer and service center should keep one.

Prepared by

Quality Assurance Center
Canon Electronics Inc.

3-17-7 Shibaura, Minato-ku
Tokyo 108-0023, Japan

FIRST EDITION (MAY 2004) [63999]

Canon

0504TG